UNISYS

CTOS™ Visinostics

Operations Guide

Release 5.5

Priced Item

April 1990
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UNISYS

CTOS®
Visinostics
Operations Guide

Release 5.6

August 1991

Printed in USA

Priced Item

4357 4508–120

The statement below is included in this document to comply with a Federal Communications Commission (FCC) regulation. The FCC is an agency of the United States government; thus, the statement below applies to computing equipment installed in the United States of America. Unisys is taking appropriate steps to be in compliance with FCC regulations and similar regulations of other countries.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications, However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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Product Information Announcement

○ New Release ○ Revision ● Update ○ New Mail Code

CTOS™ Visinostics Operations Guide, Update 2

This Product Information Announcement announces the release of Update 2 to the CTOS Visinostics Operations Guide. This update includes new information on diagnostic tests for the B25-MF1 dual floppy and B25-DDS digital data storage modules. Also included, is updated information on video controller diagnostic tests.

The subsection "What's New in Update 2" in "About This Manual" summarizes the content changes to the updated manual. Editorial changes are not identified. All changes will be incorporated into the next edition of the manual.

Insert the pages of this update according to the collation instructions below. Dates at the bottom of these pages will identify updated pages once they have been collated into the updated manual. These collation instructions assume that Update 1 has already been collated.

Remove	Insert
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xvii through xxxii	xvii through xxxii
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4–11 through 4–14	4–11 through 4–14
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continued

Announcement only:
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System: Visinostics
Release 5.6

Part Number: 4357 4508–120

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09–02635	Update 1
4357 4508–120	Update 2
09–02454	Original base manual
4358 2899–000	Base manual with binder and slipcase including Update 1 and Update 2

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Errata

The attached pages amend the following:

CTOS Visinostics Operations Guide
09–02454

Update 1
09–02635

Update 2
4357 4508–120

This errata documents the changes in Visinostics for release 5.7. Visinostics 5.7 supports additional tests for the B25-DN1/DN2 ISDN module.

Also supproted in release 5.7 is the B38–GXL CPU module. When testing the B38–GXL and B38–GXP, icons appear for the B38–EXP CPU module and the GC–004 graphics controller. In this case, the GC–004 icon represents the graphics controller circuitry in the processor module. Select these icons to test the module. Refer to the test descriptions for the B38–EXP and the GC–004 when testing the graphics controller circuitry in the B38–EXP and the B38–GXP.

The interprocessor data transfer test, documented on page 7-27, has been amended to allow the user to select 3.68 Mbps data transfers. A query appears in the preliminary dialog of the test if the feature is supported by the hardware.

Change pages are included in this errata for the "Module Reference Chart" in the "About This Guide" Section of the manual. The change pages add entries to the table for the following hardware: B25-DN1, B25-DN2, B25-MS9, B25-MSA, B25-XSA, B38-GXL. Unless otherwise noted in this errata, diagnostic tests for these modules operate in the same manner as previous diagnostic tests for their respective product families.

Distribution lists:

System: Visinostics
Release 5.7

Part Number: 4357 4508–122

The additional pages of this errata describe diagnostic tests for the B25-DN1/DN2 ISDN module.

These collation instructions assume that you have already collated update 1 and update 2.

Remove	**Insert**
	Place this errata page at the front of your manual
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About This Guide

This guide has several purposes:

- to provide instructions for running Visinostics and selection programs
- to describe diagnostic tests for each module in your system
- to direct you to related documentation

Audience

This manual is for field service technicians, system administrators, and workstation users running Visinostics diagnostic software.

Visinostics tests are sufficient for troubleshooting a system to the module level and for determining if a module is functioning correctly. Visinostics can be used as an aid in some cases to troubleshoot a module to the field replaceable unit, however troubleshooting to the field replaceable unit is beyond the scope of this manual.

Organization

This Guide is divided into the following sections:

- Later in this section is a "Module Reference Table" that shows the Visinostics run file, the selection program for your hardware, and directs you to the section of this guide where the diagnostic tests are described. In this table, modules are grouped by the Visinostics distribution diskette they are tested with.
- Section 1, "Overview," contains a summary of this manual and an introduction to Visinostics.
- Section 2, "Running Visinostics," contains instructions for bootstrapping and running Visinostics.
- Section 3, "Visinostics Selection Programs," contains information on using selection programs (SPs) to preconfigure Visinostics tests creating a custom diagnostic package.

- Section 4, "Real Mode Processor Modules and Input Devices," describes tests on Visinostics distribution diskette #1, CP/SP. Hardware covered in this section includes: real mode processor modules, keyboards, and mouse.
- Section 5, "Non-SCSI (X-Bus) Storage Modules," contains test descriptions for diagnostic tests on Visinostics distribution diskette #2, DCP/DSP. Hardware covered includes any non-SCSI data storage module.
- Section 6, "X-Bus Modules," contains test descriptions for diagnostic tests on Visinostics distribution diskette #3, XCP/XSP. Hardware covered includes graphics modules, communications modules, and monitors.
- Section 7, "Protected Mode Processor Modules," contains test descriptions for diagnostic tests on Visinostics distribution diskette #4 PCP/PSP. Hardware covered includes all protected mode processor modules. Floppy disk drives contained in protected mode processor modules however, are tested with Visinostics distribution diskette #5 SCP/SSP. Refer to Section 8 of this guide for test descriptions of the floppy disk drive in protected mode processor modules.
- Section 8, "SCSI Upgrade and Expansion Modules," contains test descriptions for diagnostic tests on Visinostics distribution diskette #5, SCP/SSP. All SCSI modules are covered. Section 8 describes tests for floppy drives in B39 and 386i processor modules. Diagnostic tests for the B25-MF1 Dual Floppy module are also described.
- Section 9, "Intelligent X-Bus Modules," contains test descriptions of diagnostic tests on Visinostics distribution diskette #6, CCP/CSP. Hardware covered includes any X-Bus module equipped with a processor.

What's New in Update 1

- Support for non-SCSI hard disks with ECC (error correction code) has been added to Visinostics version 5.5.1. Test descriptions are documented in this update.
- Support for B38-EXP and B38-GXP processor modules has been added to Visinostics version 5.5.1. Test descriptions and error codes for these modules are documented in this update.

What's New in Update 2

- Update 2 documents changes in Visinostics diagnostic software for release version 5.6. New test descriptions are documented in this update.
- Diagnostics tests for the B25-DDS digital tape storage module are added in Visinostics 5.6. These diagnostic test are documented in this update.
- Diagnostic tests for the B25-MF1 dual floppy module are added in Visinostics 5.6. These diagnostic tests are documented in this update.

Note: *Diagnostic tests for the B25-MF1 are distributed on Visinostics distribution diskette #5. In previous releases of Visinostics, distribution diskette #5 contained only diagnostic tests for SCSI modules. The B25-MF1 is not a SCSI module.*

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Related Product Information

CTOS Development and Programming Library

The following list contains manuals that you may need to refer to when using Visinostics.

CTOS System Software Installation and Configuration Guide

This guide provides step-by-step instructions for installing Standard Software and the appropriate CTOS or BTOS operating system(s).

CTOS Executive User's Guide

This procedural guide explains how to use the Executive command prompt and command forms. It also explains the file system and provides step-by-step procedures for performing common tasks, such as copying or deleting files, backing up to floppy disk, and initializing floppy disks.

CTOS Executive Reference

This reference manual is organized alphabetically by command name. It includes detailed information about the Standard Software commands and special features of the Executive.

CTOS System Administration Guide

This guide contains general information about hardware types and system software products. It provides detailed information about installing system services, user configuration files, formatting disks, backing up data, optimizing performance, configuring and customizing operating systems, and troubleshooting common problems.

CTOS Status Codes Reference Manual

This reference manual has been reorganized and enhanced. Codes are listed numerically. The second volume lists bootstrap errors.

CTOS Debugger User's Guide

This guide describes how to use the Debugger commands to debug programs on real and protected mode operating systems. The manual provides hands-on exercises in using the commands as well as debugging tips.

Hardware Documentation

Additional technical information about workstation hardware modules can be found in the manuals listed below. These manuals are only available to Unisys customer service representatives and to certain other specially licensed Unisys customers. The list is provided here as a convenience. Customer access to these manuals is given at the discretion of the local customer service group.

These manuals are module specific and are oriented to the Convergent Technologies line of workstation hardware.

Processor Manuals

These manuals describe the respective Processor Modules. Each of these two volume manuals covers one processor module and details the architecture and theory of operation of the printed circuit boards, external interfaces, and memory expansion, as well as X-Bus specifications.

Mouse Hardware Manual

This manual describes the architecture, theory of operation, and external interfaces for the NGEN mouse.

Dual Floppy Disk Manual and Floppy/Hard Disk Manual

These manuals describe the architecture and theory of operation for the respective NGEN disk modules. They discuss the applicable disk drives and controllers, and contain the applicable OEM disk drive manuals.

Hard Disk Upgrades and Expansions Manual

This manual describes the architecture and theory of operation of the Disk Upgrade and Disk Expansion Modules.

Ethernet Hardware Manual

This manual describes the architecture, theory of operation and external interfaces for the XE-001 Ethernet Module.

Color Monitor Manual

This manual describes the operation and connections of the 15-inch color monitor.

Monochrome Monitors Manual

This manual describes the operation and connections of the standard and high resolution monochrome monitors.

Graphics Controller Manual: Model GC-001

This manual describes the architecture, theory of operation, and external interfaces of the model GC-001 Graphics Controller, which accommodates either a Monochrome or Color Monitor.

GC-102 Technical Reference Manual

This manual describes the architecture and external interfaces of the model GC-102 video controller, which accommodates either a Monochrome or Color Monitor.

Graphics Controller Manual: Model GC-003

This manual gives instructions for installing the model GC-003 Graphics Controller. This manual also provides a functional description and theory of operation for the module, and describes software interfaces and external interfaces.

VGx / GC-x04 Technical Reference Manual

This manual describes the architecture and external interfaces for models VG1, VG2, VG3, VG4, GC-004 and GC-104 Graphics Controllers. These controllers accommodate monochrome, color, and IBM 8513 and 8514 (and compatible) monitors.

Series 286i Hardware Manual (Vols. 1 and 2)

This manual describes the operation and installation procedures for the Series 286i Processor; it also provides a theory of operation and information on external interfaces.

B39 / Series 386i Hardware Technical Reference

This manual describes major components, operation, and configuration for the B39 and Series 386i Processor; it also provides a functional description and information on software interfaces. The audience for this manual includes software developers, system integrators, and technicians.

SCSI Upgrades and Expansions Manual

This manual describes the architecture and theory of operation of SCSI expansions and upgrades. This manual is a companion manual to the Technical Reference manuals for SCSI modules.

HSB-002 Technical Reference Manual

This manual describes the architecture, theory of operation, and hardware specifications for the SCSI Tape Expansion Module.

B25-CDC / CD-001 SCSI Upgrade Module Hardware Technical Reference

This Technical Reference is a companion manual to *SCSI Upgrades and Expansions*. It gives a functional description, describes the architecture, and hardware specifications for the CD-ROM SCSI Upgrade module. Installation and configuration are also covered.

B25-CDX / CD-002 SCSI Expansion Module Hardware Technical Reference

This Technical Reference is a companion manual to *SCSI Upgrades and Expansions*. It describes the internal interfaces, hardware specifications, and gives a functional description of the CD-ROM SCSI Expansion module. Installation instructions and configuration are also covered.

PC Emulator Hardware Manual

This manual describes the PC Emulator hardware at a functional block and component level. The manual also describes the PC Emulator Module register set and gives installation instructions for the module.

B38-EXP Service and Hardware Technical Reference

This manual gives a functional description and field service procedures for the B38-EXP. Troubleshooting and boot error description are also covered.

B25-SCSI Storage Modules Service and Hardware Technical Reference B25-DDS Supplement

This manual gives a functional description of the B25-DDS SCSI tape storage module. Instructions for replacing FRUs are given. This manual is a companion manual to *SCSI Upgrades and Expansions.*

CTOS B25-MF1 Dual Floppy Module Service and Hardware Technical Reference

This manual gives a functional description of the B25-MF1 dual floppy module. Instructions for replacing FRUs are given.

Module Reference Chart

Module Model	Icon Name	Section	Visinostics Disk Number	Description
Real Mode Processors and Input Devices:				
CP-001	Processor	4	1 CP/SP	8 Mhz 80186 Processor
CM-002	CWS	4	1 CP/SP	512Kb Processor
CM-003	CWS	4	1 CP/SP	1 Mb Processor
B26-CPU	Processor	4	1 CP/SP	8 Mhz 80186 Processor
CM-001	Processor	4	1 CP/SP	8 Mhz 186 CWS Processor
KM-001	K1 Keyboard	4	1 CP/SP	Keyboard
B25-K1	K1 Keyboard	4	1 CP/SP	Keyboard
B25-K2	K2 Keyboard	4	1 CP/SP	Keyboard
B25-K2i	K2 Keyboard	4	1 CP/SP	Keyboard
B25-K3	K3/K5 Keyboard	4	1 CP/SP	Keyboard
B25-K4	K4 Keyboard	4	1 CP/SP	Financial Keyboard
B25-K5	K3/K5 Keyboard	4	1 CP/SP	Keyboard
SG-101-K	SG101	4	1 CP/SP	Keyboard
B25-MO3	Mse	4	1 CP/SP	3 Button Mouse
B25-MOU	Mse	4	1 CP/SP	2 Button Mouse
PD-001	Mse	4	1 CP/SP	3 Button Mouse

continued

Module Reference Chart (cont.)

Module Model	Icon Name	Section	Visinostics Disk Number	Description
Non SCSI (X-Bus) Storage Modules:				
B25-M0	Sngl Floppy	5	2 DCP/DSP	Single Floppy Drive
B25-M1	Dual Floppy	5	2 DCP/DSP	Dual Floppy Drive
FD-001	Dual Floppy	5	2 DCP/DSP	Dual Floppy Drive
FD-0A1	Dual Floppy	5	2 DCP/DSP	Dual Floppy Drive
B25-M3	Win/Floppy	5	2 DCP/DSP	Floppy / Hard 10Mb w/ECC
B25-M4	Win/Floppy	5	2 DCP/DSP	Floppy / Hard 20Mb w/ECC
B25-M5	Win/Floppy	5	2 DCP/DSP	Floppy / Hard 40Mb w/ECC
B25-MC5	Winchester	5	2 DCP/DSP	40 Mb w/ ECC
B25-MC6	Winchester	5	2 DCP/DSP	68 Mb w/ ECC
B25-CX6	Winchester	5	2 DCP/DSP	68 Mb Expansion w/ ECC
HD-0A3	Win/Floppy	5	2 DCP/DSP	Floppy / Hard 20Mb
HD-002	Win/Floppy	5	2 DCP/DSP	Floppy/Hard 10Mb
HD-003	Win/Floppy	5	2 DCP/DSP	Floppy/Hard 20Mb
HD-0A1	Win/Floppy	5	2 DCP/DSP	Floppy/Hard 20Mb
HD-011	Winchester	5	2 DCP/DSP	32Mb Hard Disk Upgrade
HD-020	Winchester	5	2 DCP/DSP	85Mb Hard Disk Upgrade
HD-006	Winchester	5	2 DCP/DSP	20Mb Hard Disk Upgrade
HX-002	Winchester	5	2 DCP/DSP	10Mb Hard Disk Expansion
HX-003	Winchester	5	2 DCP/DSP	20Mb Hard Disk Expansion
HX-011	Winchester	5	2 DCP/DSP	32Mb Hard Disk Expansion
B25-MX3	Winchester	5	2 DCP/DSP	10Mb Hard Disk Expansion
B25-MX4	Winchester	5	2 DCP/DSP	20Mb Hard Disk Expansion
B25-CX5	Winchester	5	2 DCP/DSP	40Mb Hard Disk Expansion w/ ECC

continued

Module Reference Chart (cont.)

Module Model	Icon Name	Section	Visinostics Disk Number	Description
Non SCSI (X-Bus) Storage Modules continued				
B25-MU5	Winchester	5	2 DCP/DSP	40Mb Hard Disk Upgrade w/0 ECC
B25-MX5	Winchester	5	2 DCP/DSP	40Mb Hard Disk Expansion w/0 ECC
HX-020	Winchester	5	2 DCP/DSP	85Mb Hard Disk Expansion
HB-001	Tape Backup	5	2 DCP/DSP	QIC Tape Drive
B25-TS	Tape Backup	5	2 DCP/DSP	QIC Tape Drive
Expansion Bus (X-Bus) Modules:				
GC-003	GC3Hi/Lo	6	3 XCP/XSP	Bit Mapped Graphics Controller Module
GC-103	GC3Hi/Lo	6	3 XCP/XSP	Bit Mapped Graphics Controller Board
GC-004	GC4	6	3 XCP/XSP	VGA Graphics Controller Module
GC-104	GC4	6	3 XCP/XSP	VGA Graphics Controller Board
VM-001	12/14"Mono	6	3 XCP/XSP	12" Monochrome Monitor
VM-003	15" Hi Res	6	3 XCP/XSP	High Resolution Monochrome Monitor
VC-002	15" Color	6	3 XCP/XSP	Color Monitor
B25-CD3	15" Color	6	3 XCP/XSP	Color Monitor
VM-002	12/14"Mono	6	3 XCP/XSP	14" Monochrome Monitor
B25-D1	12/14"Mono	6	3 XCP/XSP	12" Monochrome Monitor

continued

Module Reference Chart (cont.)

Module Model	Icon Name	Section	Visinostics Disk Number	Description
Expansion Bus (X-Bus) Modules continued				
B25-D2	12/14"Mono	6	3 XCP/XSP	14" Monochrome Monitor
B25-D5	12/14"Mono	6	3 XCP/XSP	9" Monochrome Monitor
B25-D6	12/14"Mono	6	3 XCP/XSP	9" Monochrome Monitor
B25-PD7	PD8 Mono	6	3 XCP/XSP	12" Positive Polarity Monitor
B25-PD8	PD8 Mono	6	3 XCP/XSP	14" Positive Polarity Monitor
VM-004	PD8 Mono	6	3 XCP/XSP	14" Positive Polarity Monitor
(8513)	VGA Color	6	3 XCP/XSP	Color VGA Monitor (IBM & compatible)
(8503)	VGA Mono	6	3 XCP/XSP	Monochrome VGA Monitor (IBM & compatible)
B25-CA1	CA1 Hi Color	6	3 XCP/XSP	Hi Res Color 8514 Compatible Monitor
B25-GS1	CS1 Hi Mono	6	3 XCP/XSP	Hi Res Monochrome 8514 Compatible Monitor
B25-GRE	Graph	6	3 XCP/XSP	Graphics Controller w/ 132 color capability
B25-GRA	Graph	6	3 XCP/XSP	Graphics Controller
GC-001	Graph	6	3 XCP/XSP	Graphics Controller
GC-102	EV	6	3 XCP/XSP	Enhanced Video Controller Board
XE-001	ENet	6	3 XCP/XSP	Ethernet Module
XC-002	PortX	6	3 XCP/XSP	4 Port Expander (RS-232)
B25-DCX	DCX	6	3 XCP/XSP	4 Port Expander (RS-232)
TM-001	Voice	6	3 XCP/XSP	Voice Processor w/Modem
VP-001	Voice	6	3 XCP/XSP	Voice Processor w/o Modem
B25-TEL	Voice	6	3 XCP/XSP	Voice Processor w/o Modem

continued

Module Reference Chart (cont.)

Module Model	Icon Name	Section	Visinostics Disk Number	Description
Protected Mode Processors:				
CP-002	P 286 CPU	7	4 PCP/PSP	8 Mhz 80286Processor
B28-LC1	B28LCW	7	4 PCP/PSP	1 Mb Diskless Workstation w/3 slot expansion
B28-EXP	P 286 CPU	7	4 PCP/PSP	2Mb 80286 Processor w/7 slot expansion
B38-EXP	B38-EXP	7	4 PCP/PSP	2Mb 80386 Processor w/7 slot expansion
B38-GXP	B38-EXP/GC-004	7	4 PCP/PSP	2Mb 80386 Processor w/7 slot expansion and VGA
B28-EX1	P 286 CPU	7	4 PCP/PSP	1Mb 8Mhz 80286 Processor w/ 7 slot expansion
CP-0E2	P 286 CPU	7	4 PCP/PSP	2Mb 80286 Processor w/7 slot expansion
B28-LCW	B28LCW	7	4 PCP/PSP	2Mb Diskless Workstation w/ 3 slot expansion
B28-CPU	P 286 CPU	7	4 PCP/PSP	8 Mhz 80286 Processor
B28-MCP	P 286 CPU	7	4 PCP/PSP	8 Mhz 80286 Processor w/ math coprocessor
B39-1/2/3/4/5	PMode 386i/B39	7	4 PCP/PSP	80386 Protected Mode Proc.
B39-D/E	PMode 386i/B39	7	4 PCP/PSP	80386 Protected Mode Proc.
PHD-111	PMode 386i/B39	7	4 PCP/PSP	80386 Protected Mode Proc. w/ floppy only
PHD-040	PMode 386i/B39	7	4 PCP/PSP	80386 Protected Mode Proc. w/ 40 Mb SCSI
PHD-140	PMode 386i/B39	7	4 PCP/PSP	80386 Protected Mode Proc.
PHD-320	PMode 386i/B39	7	4 PCP/PSP	80386 Protected Mode Proc.
CP-0A2	P 286 CPU	7	4 PCP/PSP	8 Mhz 80286 Processor w/ Enhanced Video

continued

Module Reference Chart (cont.)

Module Model	Icon Name	Section	Visinostics Disk Number	Description
Protected Mode Processors continued				
B28-EV	P 286 CPU	7	4 PCP/PSP	8 Mhz 80286 Processor w/ Enhanced Video
B28-MEV	P 286 CPU	7	4 PCP/PSP	8 Mhz 80286 Processor w/ Enhanced Video and math coprocessor
B38-CPU	P 386 CPU	7	4 PCP/PSP	16 Mhz 80386 Processor
B38-EV	P 286 CPU	7	4 PCP/PSP	16 Mhz 80386 Processor w. Enhanced Video
B38-MEV	P 286 CPU	7	4 PCP/PSP	16 Mhz 80386 Processor w. Enhanced Video and math coprocessor
CP-003	P 386 CPU	7	4 PCP/PSP	16 Mhz 80386 Processor
CP-0A3	P 386 CPU	7	4 PCP/PSP	16 Mhz 80386 Processor w. Enhanced Video
PHD-010	Series 286i	7	4 PCP/PSP	80286 Processor w/ 20Mb SCSI Hard Disk
PHD-011	Series 286i	7	4 PCP/PSP	80286 Processor Floppy Drive
PHD-020	Series 286i	7	4 PCP/PSP	80286 Processor w/ 80Mb SCSI Hard Disk
PHD-140	Series 286i	7	4 PCP/PSP	80286 Processor w/ 140Mb SCSI Hard Disk
PHD-020	Series 286i	7	4 PCP/PSP	80286 Processor w/ 80Mb SCSI Hard Disk
B25-ASB	NA	7	4 PCP/PSP	12 bit sync option
B39-12B	NA	7	4 PCP/PSP	12 bit sync option
B38-GXL	B38-EXP/GC-004	7	4 PCP/PSP	389 Processor w/ 7 slot expansion

continuec

Module Reference Chart (cont.)

Module Model	Icon Name	Section	Visinostics Disk Number	Description
SCSI Modules:				
B25-CDC	HSD CDROM	8	5 SCP/SSP	CD-ROM SCSI Controller
CD-001	HSD CDROM	8	5 SCP/SSP	CD-ROM SCSI Controller
B25-CDX	xCDROM	8	5 SCP/SSP	CD-ROM SCSI Expansion
CD-002	xCDROM	8	5 SCP/SSP	CD-ROM SCSI Expansion
B25-MS5	HSD Module	8	5 SCP/SSP	40 Mb Hard/Floppy SCSI Controller
B25-MS6	HSD Module	8	5 SCP/SSP	80 Mb Hard/Floppy SCSI Controller
B25-MS7	HSD Module	8	5 SCP/SSP	140 Mb Hard Drive / SCSI Controller
B25-XS6	xSCSI	8	5 SCP/SSP	80 Mb Hard Drive / SCSI Expansion
B25-XS7	xSCSI	8	5 SCP/SSP	140 Mb Hard Drive / SCSI Expansion
B25-MS8	HSD Module	8	5 SCP/SSP	320 Mb Hard Drive / SCSI Controller
B25-MS9	HSD Module	8	5 SCP/SSP	240 MB Hard Drive/SCSI Controller
B25-MSA	HSD Module	8	5 SCP/SSP	425 MB Hard Drive/SCSI Controller
B25-XS8	xSCSI	8	5 SCP/SSP	320 Mb Hard Drive / SCSI Expansion
B25-XSA	xSCSI	8	5 SCP/SSP	425 MB Hard Drive/SCSI Expansion
HSD-140	HSD Module	8	5 SCP/SSP	140 Mb SCSI Hard Upgrade
HSX-020	xSCSI	8	5 SCP/SSP	80 Mb SCSI Hard Expansion

continued

Module Reference Chart (cont.)

Module Model	Icon Name	Section	Visinostics Disk Number	Description
SCSI Modules continued				
HSX-140	xSCSI	8	5 SCP/SSP	140 Mb SCSI Hard Exp.
HSD-320	HSD Module	8	5 SCP/SSP	320 Mb SCSI Hard Upgrade
HSX-320	xSCSI	8	5 SCP/SSP	320 Mb SCSI Hard Exp.
HSB-002	xSCSI	8	5 SCP/SSP	SCSI QIC Tape Expansion
B25-TS2	xSCSI	8	5 SCP/SSP	SCSI QIC Tape Expansion
B25-DDS	B25-DDS	8	5 SCP/SSP	SCSI DDS Tape Expansion
B25-MF1	B25-MF1	8	5 SCP/SSP	3 1/2, 5 1/4 inch Dual Floppy
Intelligent X-Bus Modules:				
B25-TR2	TR2	9	6 CCP/CSP	Token Ring Module
TR-001	TR2	9	6 CCP/CSP	Token Ring Module
B25-EN3	EN3	9	6 CCP/CSP	Ethernet Module
XE-002	ENet	9	6 CCP/CSP	Ethernet Module
B25-ID2	IDS	9	6 CCP/CSP	Smart Comm Module
B25-IDS	IDS	9	6 CCP/CSP	Intelligent Data Slice
B25-1PC	PC-EM	9	6 CCP/CSP	PC Emulator
PC-001	PC-EM	9	6 CCP/CSP	PC Emulator
B25-DN1	ISDN	9	6 CCP/CSP	ISDN Card
B25-DN2	ISDN	9	6 CCP/CSP	ISDN Module

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Section 5 Non-SCSI (X-Bus) Storage Modules

Section 6 X-Bus Modules

Section 7 Protected Mode Processor Modules

Figures

Tables

Section 1
Overview

Visinostics is a self-contained package of diagnostic tests used to check the modular components of your workstation. It is designed to be used by systems administrators and technicians who need to run diagnostic tests on their equipment. The package provides complete tests for every module in your system and should be the first piece of software run when the workstation is assembled.

Note: *Visinostics is a diagnostic package for troubleshooting a system to the module level, and determining if a module is functioning properly. Some of the tests can be used to troubleshoot a module to its field replaceable components, but this work should only be performed by a field service technician familiar with your system.*

Visinostics Features

Visinostics contains a series of diagnostic tests for each module that can be included in a system. The number of tests per module varies with the complexity of the hardware.

Most of the tests are self-checking, and once started, run without the need for user intervention. Little more is required than to start up the system, load the diagnostic tests, and answer the preliminary questions. Screen messages automatically indicate which of the components have passed and which have failed.

Some module tests are not self-checking (for example, tests of the Graphics Controller Modules or Monitors). These are clearly pointed out in the test descriptions. These tests require visual verification while they are being run.

The sections following Section 3 contain detailed descriptions of the diagnostic tests for each module. A set of generic tabs is provided to separate the tests used most often in your system. Note that diagnostic tests for future modules will be issued in this format and can be inserted in the appropriate places among these sections.

Section 2
Running and Installing Visinostics

This section contains information and instructions for running and installing Visinostics diagnostic software. Visinostics can be bootstrapped from a floppy disk drive on your workstation, from a hard disk drive on your workstation, or from a remote hard disk on a master workstation. To run the diagnostic tests, you will need to do the following:

- bootstrap Visinostics
- verify that the icon menu accurately represents your system.
- select all modules and submodules that are to be tested.
- run the tests.

CAUTION

Some floppy disk and hard disk diagnostic tests destroy data. Hard disks should be backed up before bootstrapping Visinostics. After bootstrapping, blank or unneeded floppy disks should be inserted in the floppy disk drives. The diagnostic will display a warning that requires a prompt from the user before running a destructive test on a valid OS volume. Be careful when responding to diagnostic queries.

Recording Vendor Code and Bad Spot Data

On the bottom of every hard disk drive module chassis is a label with the vendor code letter and bad spot information for the drive. You may need this information for running hard disk diagnostic tests. Write this information down before bootstrapping so that you will not have to turn the disk modules over while the tests are running.

Refer to the release notice for your Visinostics Distribution Diskette for information on hard disk vendor codes.

The following information should be noted:

- vendor code letter (circled)
- number of cylinders
- number of tracks per cylinder (heads)
- number of sectors per track
- bad spots (if there are no bad spots on the disk, the label indicates No Media Defects)

For further information about vendor codes and bad spot data, see the diagnostic test descriptions for the Disk Modules.

Bootstrapping Visinostics

Loading Visinostics

Visinostics can be loaded on your workstation in any of the following ways:

- Bootstrapping from the floppy disk drive of a stand-alone workstation or a workstation attached to a cluster.
- Diagnostic tests can be copied onto a hard disk and run using the Bootstrap command.
- Bootstrapping from a master workstation via the telecluster cable.

Bootstrapping Visinostics From a Floppy Disk

Note: *Holding the spacebar down during system reset will bypass the self test in the processor boot ROM. Visinostics can also be bootstrapped by issuing the Bootstrap command in the Executive or similar command line interpreter. See "Using the Bootstrap Command" later in this section.*

To bootstrap Visinostics from a floppy disk

1. Insert the floppy disk in the left most floppy disk drive and power up the workstation.
2. Press and hold down the spacebar. *Optional see note above.*
3. Press the reset button on the Processor Module.
4. Wait until the following bootstrap menu appears:

   ```
   B,D,L,M,P,T:
   ```

5. Release the spacebar. *If applicable.*
6. Press **B** to select Bootstrap from the bootstrap menu.

Visinostics will automatically bootstrap from the floppy disk, and the icon menu will appear on the video display screen. If Visinostics does not bootstrap (that is, the icon menu does not appear), check the power and X-Bus connections to your modules, ensure that your workstation is correctly configured, ensure that you are using the correct distribution diskette or selection program to bootstrap your system (see "Module Reference Table" earlier in this manual) or call a field service technician familiar with your workstation.

Note: *If error code 20h (E:20) appears while bootstrapping Visinostics, this indicates an incompatibility between your Processor Module and the disk drives used in your system. If you receive an error code 20h, see the Status Codes Manual, or contact a field service technician for further information.*

Installing Visinostics on a Hard Disk

To bootstrap Visinostics from your workstation hard disk, install the Visinostics software in the **<Sys>** directory of your **[Sys]** volume.

This procedure installs the bootable run files as well as the selection program applications for each of the Visinostics distribution diskettes.

1. Sign on and set the path at the workstation. Set the path as follows:

   ```
   Path

      [Volume]                 Sys
      [Directory]              Sys
      [Default file prefix]
      [Password]               (if any)
   ```

   Press **Go**.

2. Insert the Visinostics distribution diskette 1 of 6 into the floppy drive [f0].

3. If the **Install** command is available on your workstation, type **Install** and press **Go**. (BTOS users, type **Software Install** and press **Go**.)

   If the Install (or Software Install) command is not available, type **Submit**, press **Return** and fill in the command form as follows.

   CTOS users.

   ```
   Submit

      File list                [f0]<sys>HdInstall.sub
      [Parameters]
      [Force expansion?]
      [Show expansion]
   ```

   BTOS users.

   ```
   Submit

      File list                [f0]<sys>Install.sub
      [Parameters]
      [Force expansion?]
      [Show expansion]
   ```

   Press **Go**.

   When prompted, insert the Visinostics distribution diskettes 2 thru 6 into floppy drive [f0] and press **Go** to continue.

Deleted in Update 1

Using the Bootstrap Command

To bootstrap Visinostics from a hard disk perform the following procedure after you have installed Visinostics on your workstation hard disk. See "Installing Visinostics on a Hard Disk" earlier in this section.

1. Issue the Bootstrap command from the Executive or similar command line interpreter. Type **Bootstrap**, press **Return** and fill out the command form as follows.

```
Bootstrap
  File name                    [Sys]<Sys>XXX.run
  [Sys volume or ws NNN]
```

   where *XXX* is the name of the run file for the Visinostics distribution disk you want to run.

   Use the table 2-1 to determine which run file to use.

   Press **Go**.

Table 2-1. Diagnostic Run Files

Run File	Disk Number	Module Tested
CP.run	1	Real mode Processors, Stand alone Workstations, Keyboards, Mouse (1 Meg maximum address space)
DCP.run	2	Any non-SCSI Storage Module.
XCP.run	3	X-Bus non Storage, Graphics, Communications, 4 Port Expander
PCP.run	4	Protected mode Processors, all Memory
SCP.run	5	all SCSI
CCP.run	6	Co-Processors (X-Bus non storage with processors)

Bootstrapping Visinostics From a Master Workstation

Visinostics can be bootstrapped from a master workstation equipped with a hard disk. To bootstrap Visinostics from a master workstation, copy the **sysimage.sys** file on any of the six diagnostic disks to the master workstation system hard disk. Use the "Module Reference Chart" at the beginning of this manual to decide which disk to use for testing your hardware. It is recommended that you back up the system hard disk on the master workstation before performing the following procedure.

If you are running Visinostics on a diskless workstation you need to bootstrap from a master workstation with a hard disk. Visinostics cannot be installed on a workstation without a hard disk.

To bootstrap Visinostics from a master workstation, follow these steps.

1. Copy the sysimage.sys file on the Visinostics disk that you want to run into the **WsNNN>sysimage.sys** file on the master workstation, where *NNN* is a number between 000 and 255, for example:

```
Copy

    From:        [f0]<sys>sysimage.sys

    To:          [!sys]<sys>WsNNN>sysimage.sys
```

Note: *For the value of NNN, 000 to 015, 100 and 200 to 255 are reserved and should not be used. Check with your system administrator to find out how the files on your master workstation are configured. The WsNNN files are described further in the CTOS System Administration Guide.*

2. Check that the workstation is connected to the master by a cluster cable.

3. Power up or reset the workstation while holding down the spacebar. When the following debugger menu (boot ROM menu) appears, release the spacebar and press **T**.

```
B,D,L,M,P,T:
```

(Continued on next page.)

4. The system prompts:

   `OS:`*NNN*

   Type the value you entered for *NNN* in step 1 and press **Return**.

   (Continued on next page.)

5. When the following debugger menu appears, type **B**.

   `B,D,L,M,P,T:`

   The system bootstraps from the master.

Note: ***To System Administrators,*** *You can install Visinostics on a volume other than [Sys] on the master and access the diagnostics by indirect bootstrapping from a file spec located in a WsNNN>SysImage.sys file. Refer to the CTOS System Administration Guide for more information.*

System Configuration Verification

Icon Menu

The icon menu (shown in Figure 2-1) is a pictorial representation of all the modules in a workstation configuration. It is used to select diagnostic tests and display status information about the tests. The icon menu is divided into three windows.

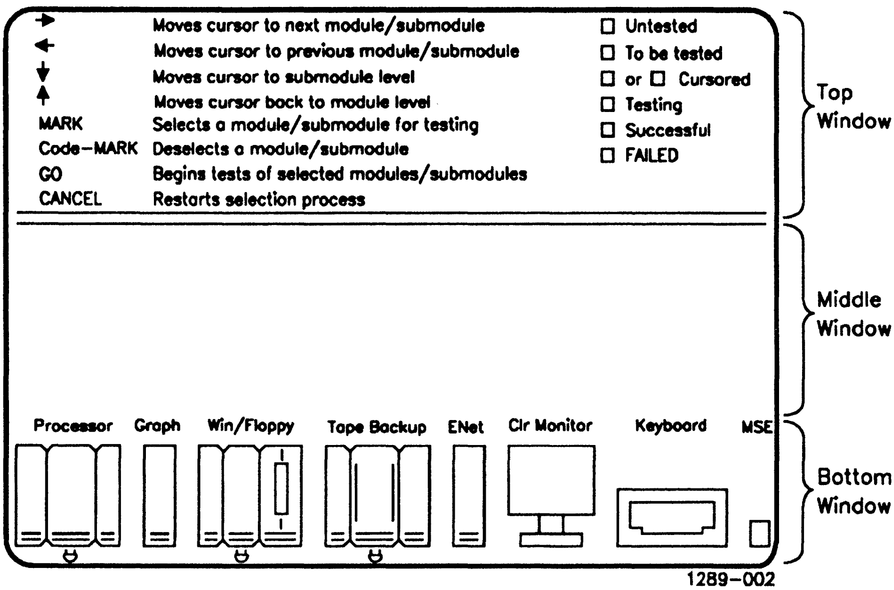

Figure 2-1. Icon Menu

The top window contains a list of the keystrokes used to move to, select, and deselect icons representing the modules and submodules. It also contains status information for each module being tested. The following information can be displayed:

- untested (the module has not been tested)
- to be tested (the module has been selected to be tested)
- cursored (cursor is on the module icon)
- testing (the module is currently being tested)
- successful (the module has passed all diagnostic tests)
- failed (the module failed one or more diagnostic tests)

The middle window displays the diagnostic queries. It scrolls upward as the tests proceed. In the monitors and graphics controller tests this scrolling can be stopped or started by pressing **Prev Page** and **Next Page**, respectively.

The bottom window displays the hardware configuration icons and the status of the currently selected tests. Soft and hard (intermittent and definite) errors are shown under each icon as they occur during the testing cycle.

Note: *Certain tests change the screen while they are being run. The screen returns to normal when the tests are complete.*

Determining if all Modules in a System Have Been Recognized

Once the icon menu appears on the screen, you must verify that all the modules in your system are included. Each icon resembles the actual module, and each has a name displayed above it. Thus, it is an easy matter to count the icons and match them to the modules in your system.

Configuration Display

The bottom window of the icon menu shows, from left to right, icons for the modules that are on the X-Bus, and then the monitor, keyboard, and Mouse (if included in your system). The display details the memory configuration of the Processor Module and distinguishes between different types of monitors (see Figure 2-2).

In all but very large configurations, the entire icon system fits into the bottom window of the screen. However, if three dots (...) appear at the right or left edge of the display, there are additional module icons that could not be shown. In this case, the entire display can be shifted by moving the cursor to the extreme right or left using the **Right** or **Left Arrow** keys.

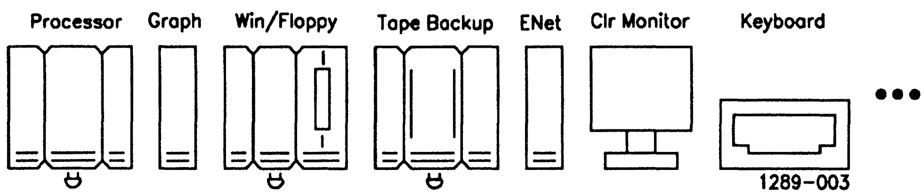

Figure 2-2. Sample Configuration Display

Power Check

If the display does not correspond to the actual arrangement of your modules, check the power configuration. In most cases, failure to properly supply power to a module or group of modules can cause the module(s) to go unnoticed by the system.

The required locations of the 36-Volt Power Supply bricks are shown by flashing plug symbols beneath the appropriate modules (see Figure 2-2). Make sure that each indicated module is connected to a 36-Volt Power Supply brick, and that the bricks are plugged into each other or into a wall outlet. If no plug symbol is seen beneath a module, no 36-Volt Power Supply brick is required.

Note: If you are using a "Super Brick" power supply, the power requirements indicated by the icon display do not accurately show the required power locations. Use the power code rating of the superbrick (power code: 15) to determine the power requirements for your system.

After making sure the power configuration is correct, press any key to continue. The power plug symbols will stop flashing.

For further information about power requirements for the workstation, see the Installation Manual for your system.

Configuration Rules Check

If a configuration rule is violated, a message describing the violation appears in the middle window of the screen. (See the Installation Guide or the Hardware Manual for each system information on configuration rules.) If no message appears, there is no violation.

Selecting Hardware Modules For Testing

Once you have verified the module and power configurations, press any key to proceed (as prompted). You will now select modules for testing.

The modules are tested in the order that you mark them, rather than in any predetermined order. To select a module for testing,

1. Move the cursor into the first module icon (always the Processor Module icon) by pressing the **Down Arrow** key.

   The icon changes to reverse video (if you are using a Monochrome Monitor) or orange (if you are using a Color Monitor). This indicates that the cursor is on it.

2. Press **Mark** to select the module for testing. This changes a Monochrome Monitor display from reverse video to bright, and a Color Monitor display from orange to yellow.

   Pressing **Code-Mark** deselects the module and changes the display back to reverse video or orange.

3. Use the **Left** and **Right Arrow** keys to move between the icons.

Selecting Submodules Within a Module For Testing

Certain modules contain submodules that can be selected for testing without testing the entire module or any of the other submodules (for example, the Memory Expansion Cartridges and RS-232-C channels in the Processor Module). If the entire module is marked, the submodules (if any) are displayed in the icon menu as the Preliminary Dialog appears.

To select a submodule for testing,

1. Move the cursor into the module icon and press the **Down Arrow** key to enter the submodule.

   When you press the **Down Arrow** key, the left most submodule is displayed in reverse video or orange. The name of the submodule replaces the name of the module above the icon. Figure 2-3 shows the cursor locations for the submodules of the Processor Module.

2. Press **Mark** to select the submodule for testing. Press **Code-Mark** to deselect the submodule.
3. Move between submodules using the **Left** and **Right Arrow** keys.
4. Press the **Up Arrow** key when the desired submodules have been selected. This returns you to the module level. You cannot move from one module to another until the **Up Arrow** key has been pressed.

This illustration gives an example of submodules as they appear in the Icon Menu.

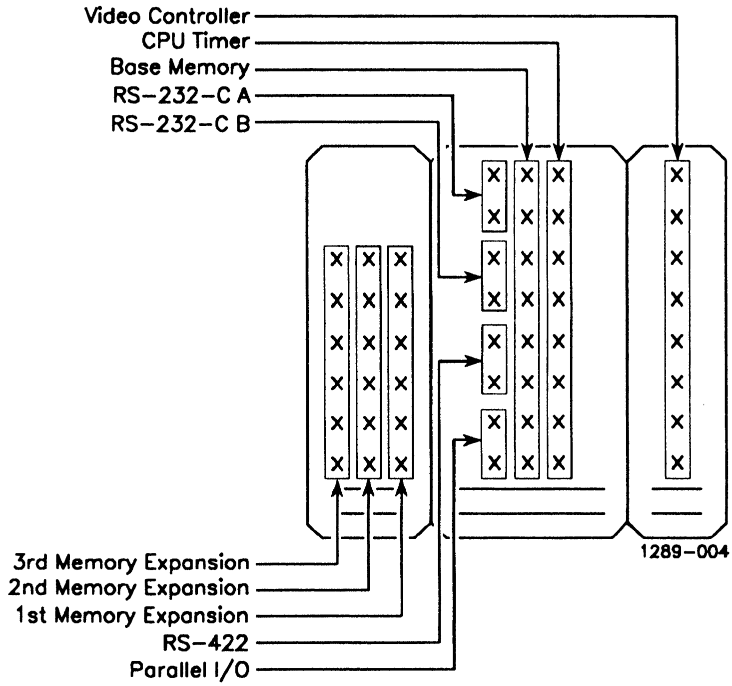

Figure 2-3. Processor Module Submodules

Initial Dialog

When all the desired modules and submodules have been selected and marked, press **Go** to begin the initial dialog phase.

Each test has a standard sequence of queries and prompts that must be answered before the test can be run. All queries for all selected tests must be answered before the first test is run. Most of the queries require a yes or no (**Y** or **N**) answer; however, some require a word or number, and some require a string of words or numbers.

Each query has a default setting designed to meet the needs of a first-time user. The default is displayed in square brackets immediately after the question, as in the following example:

```
Stop diagnostic on a memory error? [Y]
```

In this case the default is Y for yes. To select the default response, press **Return**. To enter a different response, type another answer (in this case, N for no), and then press **Return**.

The value you enter becomes the new default setting, and Visinostics retains it until it is changed. To restore the original default values for the entire program, reboot Visinostics according to the instructions given under "Bootstrapping Visinostics," earlier in this chapter.

Note: *Visinostics recalls previous responses to the queries or prompts, so that when a test is run again, the previous answers become the new default settings.*

To run the tests again without changing the new default settings, merely press **Return** in answer to each of the queries, without typing in a response.

Starting the Tests

Regardless of which modules or submodules have been selected, the last prompt that appears before testing will be the following:

```
Enter the number of times to run the diagnostic: [1]
```

This prompts you to choose the number of times you want to run the test. If you enter a number larger than 1, the entire test sequence is repeated the selected number of times.

Note: *The maximum value that you can enter for the number of times to run is 65535. This value corresponds to the hex value of FFFF. If a number larger than 65535 is entered, the diagnostic will insert that value minus 65536.*

When you press **Return** after responding to this final prompt, the tests begin.

User intervention is not required to run most diagnostic tests. Once the tests have been chosen and the initial queries and prompts have been answered, the tests run on their own.

However, if you answered Y to an earlier query,

```
Stop Visinostics on memory error?
```

The program will halt each time it encounters an error. This query will appear on the screen:

```
Continue?
```

You must answer Y to resume the tests.

Video Displays During and After The Tests

When a test is running with a Monochrome Monitor, the icon for the module or submodule tested is displayed in reverse video. With a Color Monitor the icon is displayed in blue.

A successful test with a Monochrome Monitor causes the icon to remain in reverse video, but at half-bright intensity. A failure causes the icon to blink and to change to a bright reverse video. With the Color Monitor, the icon changes to green for a successful test, and to bright, blinking red for a failure. These indicators remain until you press **Finish** to end the test.

Soft and hard errors are also indicated on the display screen while the tests are being run. The number of errors is shown beneath each module icon, and the errors will accumulate if the tests are run a number of times. Soft (or intermittent) errors are displayed in half-bright numerals to the left; hard (or definite) errors are displayed in full-bright numerals to the right. (For example, 5/0 indicates 5 soft errors and 0 hard errors.) Soft errors will not cause the test to fail.

During testing, the large legend at the top of the screen is replaced by a smaller legend, which displays the status information, the type of Processor Module being used, the keystrokes used to interrupt the test, and the number of test passes run.

Interrupting the Tests

You can interrupt the testing cycle by pressing and holding the **Finish** key. This ends the testing and returns you to the icon menu; you can then start the tests again.

The only tests that cannot be interrupted in this way are the tests which monopolize the data path to the keyboard, they are:

- keyboard tests
- base memory tests
- CPU timer tests,
- PC Emulator trapping tests

Pressing any key during these tests causes the test to register as a failure.

Section 3
Visinostics Selection Programs

Visinostics selection programs (SPs) are application programs by which you can preconfigure the diagnostic tests for a particular purpose. Using SPs, you can put together a custom diagnostic test package that can be bootstrapped in the same manner as the standard package.

SPs can be used to:

- Change the default responses to diagnostic queries so that the most frequently used responses are selected by simply pressing **Return**.
- Completely suppress some or all diagnostic queries, so that the defaults you specify are always used. The tests can then be run without user input.
- Replace the normal module selection process with a preselected program arranged by module type. In this way, you can test any number of preselected modules, without having to mark them for testing.

Note: *Visinostics Selection Programs can be preconfigured on any CTOS workstation for use on any of the different NGEN/B Series workstation modules.*

Types of Selection Programs

There are six selection programs available. This list gives the name of the selection program and tells what type of module tests are configured with the selection program. To find out which selection program to use with your module, refer to the "Module Reference Table" at the beginning of this manual.

- **SP** real mode processor modules, diskless workstations, keyboards, and mouse
- **DSP** X-Bus data storage modules (non SCSI)
- **XSP** graphics controllers and other X-Bus modules
- **PSP** protected mode processors, and their submodules
- **SSP** SCSI modules
- **CSP** coprocessor modules

Note: Use the SCSI Selection Program (SSP) to create custom diagnostics for the B25-MF1 dual floppy module or to create custom diagnostics for the floppy drives in B39 or 386i processor modules.

Selection programs all run in the same way. When you select a module for testing, all modules of that type are tested. (For example, if you select the Dual Floppy Module, all Dual Floppy Modules on the X-Bus are tested.)

Installing Selection Programs

Selection Programs are installed automatically when you install Visinostics Software on your hard disk. To install SPs, refer to the installation instructions earlier in this manual.

Running Selection Programs

To run an SP, type the command (or an abbreviation of the command) in the command field of the Executive or similar command-line interpreter command field, then press **Return**. The commands are as follows:

- **Real Mode Selection Program** (or **S P**)
- **Disk Selection Program** (or **D S P**)
- **X-Bus Selection Program** (or **X S P**)
- **Protected Mode Selection Program** (or **P S P**)
- **SCSI Selection Program** (or **S S P**)
- **Co-processor Selection Program** (or **C S P**)

Selection Program Input and Output Files

You must then specify the input file for the SP you will run. Type the name of the input file that contains the diagnostic for the module you want to test. The defaults for the input files are as follows:

- CP.run — Real Mode Selection program
- DCP.run — Disk Selection program
- XCP.run — X-Bus Selection program
- PCP.run — Protected Mode Selection program
- SCP.run — SCSI Selection Program
- CCP.run — Co-processor Selection Program

Note: *WsNNN files located on the master can be used as input files except in the case of the Protected Mode Selection Program which must always use the input file, PCP.run included in Visinostics distribution diskette #4 PCP/PSP.*

Next you must enter the output file name. This is the name of the new run file that you create with the Selection Program. An output file name must have the **.run** suffix to be used as a bootable file on a floppy disk. The defaults for the output files are as follows:

• new>CP.run	Real Mode Selection Program
• new>DCP.run	Disk Selection Program
• new>XCP.run	X-Bus Selection Program
• new>PCP.run	Protected Mode Selection Program
• new>SCP.run	SCSI Selection Program
• new>CCP.run	Co-processor Selection Program

Note: *Output file names are limited to 32 characters.*

Selection Program Options

Each selection program then displays the following queries:

```
Do you want the custom diagnostic to:
  Pause for power configuration check?
  Stop on a configuration violation?
  Allow user to do his own selections?
```

If you want to create custom diagnostics that will not pause for power configuration checks, answer **N** to the first and second queries.

The third query affects the manner in which hardware modules are chosen for testing. If the default, **Y**, is chosen, you can select the modules to be tested, as in the normal case. If you specify **N**, you are not given the opportunity to select modules; instead, only hardware modules of a type already selected are tested.

After running an SP, the output file can be bootstrapped in the same way as the non-customized diagnostics.

Changing Defaults in the Dialog

After you have marked the modules to be tested and pressed **Go**, the SP you are running proceeds with the initial dialog for each marked module.

Instead of executing tests, however, the SP merely records the responses to the queries in an output file. When all the queries have been answered, the SP writes the output file and then exits the program.

The responses given during a selection program session become the default values, as in the example that follows:

```
Enter the number of times to run the diagnostic: [1]
```

The normal default of 1 could have been changed to some higher number using an SP.

Suppressing Queries With Selection Programs

SPs provide the ability to eliminate user intervention for one or all of the diagnostic queries. This feature is invoked by pressing **Code-S** as the response to any of the queries instead of **Return**. 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 diagnostics runs 10 times without asking you for input.

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 query can be suppressed with **Code-S**, potentially dangerous custom diagnostics can be created. If used unknowingly, they could destroy important disk data. Be careful in distributing these custom diagnostics so that data accidents do not occur.

Suppressing Queries During the Diagnostics

Code-S can be used at any time, including during diagnostic tests. If it is used following a prompt or query, that prompt or query is removed from the dialog. However, rebootstrapping Visinostics restores the original default values, unaffected by **Code-S**.

After Running the Protected Mode Selection Program

Note: The following procedure only applies to custom diagnostics created with the Protected Mode Selection Program (PSP). The PMake command is installed when you install Visinostics software on your workstation. Other custom diagnostics created with Selection Programs can be copied directly to a location for use as a bootable file without running the PMake command.

After running the Protected Mode Selection program, you must run the PMake.run command to make the custom diagnostic a bootable file. Type **PMake**, press **Return**, and fill in the command form with the following parameters (the other parameters can assume default values):

```
PMake
   Run file                    new>PCP.run
   [Extra GTD slots (16)]      48
   [IDT slots (256)]
   [Load offset (0)]           2560
   [Include symbols?]
   [Symbol file (-.sym)]
   [List file (-.gdt)]
   [Image file (-.img]         new>PCP.img
   [Realnub file]              Realnub.sys
   [iSgFirst]
   [Compress?]
```

The image file, **new>PCP.img**, is the customized bootable diagnostic. This program enables you to bootstrap a Protected Mode run file.

Section 4
Real Mode Processor Modules and Input Devices

Real Mode Processor Module Diagnostic Tests

Introduction

The Real Mode Processor Module diagnostic tests are the same for all models. All Real Mode Processor Modules are tested using Visinostics distribution diskette #1 CP/SP. All Protected Mode Processor Modules are tested using Visinostics distribution diskette # 4 PCP/PSP.

Note: *Visinostics test diskette #1, CP/SP, will run on processor modules capable of running the Protected Mode Operating System. However, the tests do not fully exercise the hardware.*

If an error occurs, see the *Processor Manual* for your workstation, or contact a field service technician for a more thorough study of the problem.

Memory Expansion Cartridge Tests

Initial Dialogue

When you select the Memory Expansion Cartridge tests, the following query appears on the screen:

```
Stop diagnostic on memory error?
```

Type **Y** or **N**, then press **Return**. If you choose Y, the test stops when an error occurs. If you choose N, the test reports errors but continues testing.

Selecting Individual Tests

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

Type **Y** to run the Galpat test or **N** to run the standard memory test.

The Galpat (galloping pattern) memory test is an exhaustive test of the memory. This test can take several hours, depending on the amount of memory to be tested. A sequence of asterisks is displayed during the test to indicate that it is being run. Both parity and invalid data are reported.

To terminate the memory test at any point, press and momentarily hold **Finish**.

Tests of Individual Memory Cartridges

Memory expansion submodules are available in sizes of 512K or 1Meg. The diagnostic indicates which block of memory is being tested as the tests are run.

The Memory Expansion Cartridge tests have the following four distinct passes:

- write and read 0s
- write and read 1s
- write address patterns
- read address patterns

If an error occurs (and a Y response was given to the Stop Diagnostic On Memory Error? query), the relevant error information is displayed and the following query appears:

```
Continue?
```

Type **Y** and press **Return** to continue the test, or type **N** and **Return** to restart the diagnostics from the icon menu.

RS-232 Tests

The RS-232 tests exercise the RS-232 interface chip and its supporting logic on the I/O board.

Both RS-232 channels (A and B) can be tested independently of each other, and each can be tested in several modes of operation. All the combinations of parameters appropriate to each mode are automatically tested.

For the RS-232 tests to operate properly, each channel must be externally looped back to itself. Before running these tests, connect a loopback plug to each channel with the following pin arrangements:

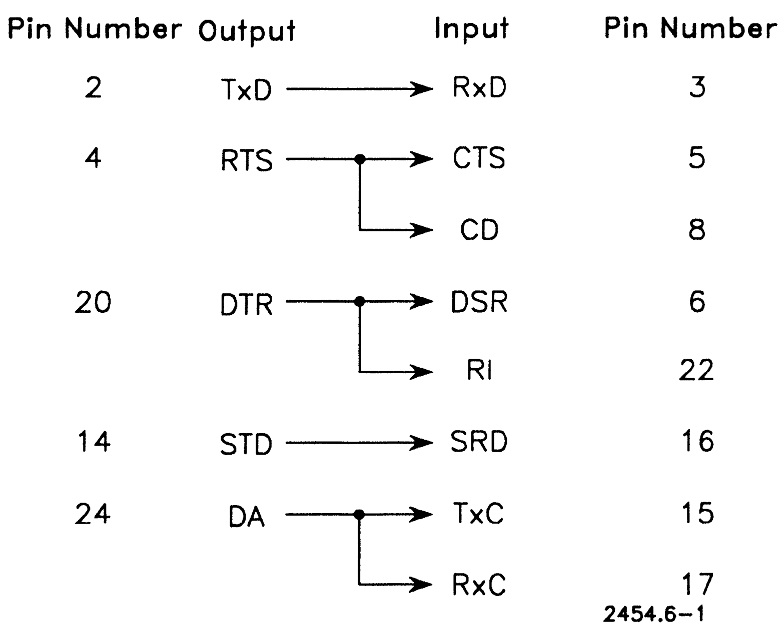

Figure 4-1. RS-232 Loopback

For further information on loopback connectors, and the RS-232 interface ports, see the discussion on external interfaces in the *Processor Manual* for your workstation or the *Multiline Port Expander Manual.*

Selecting Individual Tests

When you select the RS-232 tests a series of prompts and queries appear on the screen.

Static Status Test

The static status test is the first test run when the RS-232 submodule is selected. It runs automatically, so there is no query for the test. Its prompt appears on the screen only after the test begins.

The static status test consists of three subtests of increasing complexity.

The first subtest checks the interface between the CPU and the RS-232 interface chip by writing to and reading from the control register inside the interface chip. This subtest determines whether the CPU and the RS-232 interface chip can successfully communicate with each other.

The second subtest checks the interface between the RS-232 interface chip and the loopback plug. The following control lines are tested for proper loopback and function:

Control Line	Function
DTR	Data Terminal Ready
RTS	Request to Send
CTS	Clear to Send
CD	Carrier Detect
DSR	Data Set Ready
RI	Ring Indicator
STD	Secondary Transmit Data
SRD	Secondary Receive Data
DA	Transmit Signal Element Timing
TxC	Transmit Clock
RxC	Receive Clock

The third subtest checks the same control signals as the second subtest, but does this using interrupts between the CPU and the RS-232 interface chip. When the third subtest executes, nothing is seen on the screen unless an error occurs.

12 Bit Sync Option Board Installed?

Respond **Y** to this query if your processor module has the 12 bit sync option board. The diagnostic runs the synchronous subset of communications tests.

Note: If you respond **Y** to this query you must respond **N** to the asynchronous mode test and **N** to the DMA In and DMA out tests on the 386i and B39.

Asynchronous mode test?

Type **Y** or **N** to indicate whether or not you want to run the test.

The Asynchronous mode test transmits and receives data from the RS-232 interface chip by passing it through the RS-232 transmitters, the loopback, and the RS-232 receivers; and returning it to the RS-232 interface chip. The RS-232 interface chip is initialized to transmit and receive data in asynchronous format.

The transmit data are obtained from a transmit buffer, under interrupts, and the received data are placed into a receive buffer, also under interrupts. After all the data in the transmit buffer have been transmitted and received, the buffers are compared for errors. Any errors detected are displayed on the screen. If other errors are detected during the test, they are displayed when they are detected.

All combinations of baud rates (2400, 4800, 9600, and 19200 baud), data length (5, 6, 7, and 8 bits), parity (none, odd, and even parity), and stop bits (1, 1-1/2, and 2 bits) are tested.

Character sync CRC-16 test?

Type **Y** or **N** to indicate whether or not you want to run the test.

The character sync CRC-16 test is the same as the Asynchronous mode test described above, except that the RS-232 interface chip is initialized to transmit and receive data in bisynchronous format. The test uses the CRC-16 cyclical redundancy check (CRC) polynomial.

This test is run at several baud rates (2400, 4800, 9600, and 19200 baud). The data length is fixed at 8 bits and parity is fixed at none during the execution.

Bit sync data transfer test?

Type **Y** or **N** to indicate whether or not you want to run the test.

The bit sync data transfer test is the same as the Asynchronous mode test described above, except that the RS-232 interface chip is initialized to transmit and receive data in synchronous data link control (SDLC) bit synchronization format. It uses the SDLC CRC polynomial.

This test is run at several baud rates (300, 600, 1200, and 2400 baud). The data length is fixed at 8 bits and parity is fixed at none during the execution.

Bit sync abort/idle line test?

Type **Y** or **N** to indicate whether or not you want to run the test.

The bit sync abort/idle line test is the same as the Asynchronous mode test described above, except that the RS-232 interface chip is initialized to transmit and receive data in SDLC bit synchronization format. It uses the SDLC CRC polynomial.

This test is run at several baud rates (300, 600, 1200, and 2400 baud). The data length is fixed at 8 bits and parity is fixed at none during the execution. Normal data transmission and reception are tested, as in the bit sync data transfer test.

In addition, generation and recognition of an abort transmission sequence and restarting of the transmission are tested. When the bit sync abort/idle test is running, the following message appears if the test is successful:

```
<<<abort received>>>
```

Stop on communications error?

Type **Y** to stop the tests if an error occurs or **N** to continue. If you type N, any errors that occur are reported as they happen, without stopping the test.

RS-422 (Cluster Communications) Tests

The RS-422 tests exercise the cluster communications channel on the I/O board. The loopback for cluster communications in the RS-422 is internal to the interface, so no loopback connector is required for these tests.

CAUTION

Running the RS-422 tests while attached to an active cluster damages the cluster lines. Disconnect your workstation from the cluster before running these tests.

When the RS-422 tests are selected, the queries discussed below appear on the screen.

Cluster maintenance mode test?

Type **Y** or **N** to indicate whether or not you want to run the test.

The cluster maintenance mode test loops back a number of communications test frames and checks for timeout, CRC, overrun, data, channel hold, and other errors. When the test is complete, all errors are reported. If you choose to run the Cluster Maintenance Mode Test the Interprocessor Data Transfer Test and the Fast Cluster Communication queries are skipped.

Interprocessor Data Transfer Test

The following query is only presented if you answer **N** to the cluster maintenance mode test query. The next query is prefaced by a screen message stating a requirement:

```
The next test requires that two workstations be taken off
the cluster master and connected to each other via a cluster
cable.

Do you want to run:
- Interprocessor data transfer test?
```

Type **Y** or **N** to indicate whether or not you want to run the test.

The interprocessor data transfer test performs transfers between two workstations, using DMA for transmission and reception. For proper operation, both workstations must run this test simultaneously while connected by a standard cluster communications cable. However, they must not be connected to an operational cluster when you are running this test.

Other Queries

The next two queries concern the manner in which the tests are run.

Stop on a communications error?

Type **Y** to stop the test on an error or **N** to continue the test even if an error occurs.

Fast cluster communication?

This query is only presented when you choose to run the interprocessor test (the cluster maintenance mode test only runs at 307 kilobaud). Type **Y** to execute the tests at 1.8 megabaud or **N** to execute the tests at the standard cluster speed of 307 kilobaud.

Parallel I/O (Printer)Tests

The parallel I/O (printer) tests check the parallel printer port and its supporting logic. This test can be run with or without the use of interrupts. When you select the parallel I/O (printer) tests, the following four queries appear on the screen:

Barber pole test (without interrupts)?

Type **Y** or **N** to indicate whether or not you want to run the test.

The barber pole test (without interrupts) outputs one page (66 lines, 132 columns) of a test pattern consisting of all 96 printable ASCII characters. Each successive line is shifted one character to the left, resulting in a "barber pole" pattern.

Before the test pattern is transmitted, the status of the printer is checked. If the printer or the print buffer is busy or not selected, an error occurs and the test is suspended. However, if the printer status is positive, the diagnostics transmits the test pattern. It then polls the printer status after each character is transmitted. If the print buffer does not free itself to accept another character before the maximum wait time (see below), an error occurs and the test is suspended.

Barber pole test (with interrupts)?

Type **Y** or **N** to indicate whether or not you want to run the test.

This test is identical to the previous test, except that it does not poll the printer status after each character is transmitted. Instead, the test waits for an interrupt to be generated by the printer acknowledge line, signaling that the printer is ready to receive another character. If the interrupt is not generated before the maximum wait time (see below), or the printer status shows that the printer is still busy after the interrupt, an error occurs and the test is suspended.

Max printer wait time (ms)?

This query asks you to specify the maximum length of time (in milliseconds) the diagnostics will wait for a response from the printer before it ends the test.

Enter a number in milliseconds. The number you type in depends on several factors, such as the speed of the printer and the size of the character buffer. For more information about your individual printer, see the manual provided with your printer system.

Bypass any errors & continue with diagnostics?

If you select Y and the parallel I/O (printer) tests fail, the test stops and displays the printer error messages.

If you choose N and the test fails, the test displays the error messages, but continues to run indefinitely until it is stopped by pressing **Finish**.

Printer Error Messages

Once an error has occurred, the error message and the printer status are displayed.

The error message is a brief explanation of the type of error that occurred. An example is:

```
>>> Timeout waiting for printer interrupt <<<
```

The printer status message describes the status of the printer port at the time of the error.

Base Memory Test

The base memory test is almost identical to the Memory Expansion Cartridge tests described above, except that it tests the resident base memory in the Processor Module. There are no queries for the test. During this test, the diagnostics relocates itself to the first Memory Expansion Cartridge and then writes to and reads from the base memory using a slightly different pattern. This test uses the same passes used by the Memory Expansion Cartridge tests.

To run this test, your system must have at least one Memory Expansion Cartridge. If it does not the test fails and an error message is displayed.

Is the Hardware ID option installed?

If the Base Memory submodule is selected, and the processor is a CP-001, or B27, this query appears after the test has been started.

Note: *This query does not appear in the dialogue for the Selection Program. The query will appear when a custom diagnostic created with the SP is run, provided the above conditions are met. (This query won't appear on a B28-LCW or B28-EXP.)*

The diagnostic writes to the hardware ID register a maximum of five times, then the contents of the register is read.

CPU Timer Test

When selected, this test sets time intervals between 100 and 800 milliseconds, in 100 millisecond increments, to verify the operation of the CPU timer. There are no queries for this test.

You must have a keyboard connected to your workstation to run this test. If you press any key on the keyboard during this test, the test will fail.

Video Controller Tests

The video controller diagnostics checks the video RAM, the font RAM, and the video logic of the Processor Module. The diagnostics consists of five tests:

- video memory test
- video attribute test
- font display test
- mosquito net test
- cursored string test

Stop on video memory error?

This query appears before the tests are run.

If you answer Y, the test will stop while reporting video memory errors and prompt you to press any key to continue.

To stop any of the tests for closer inspection, press **Prev Page**. To restart the test, press **Next Page**.

The sequence of the five video controller tests is as follows.

Video Memory Test: Video RAM

The video memory video RAM test checks the video controller memory using the following patterns:

- all 0s
- all 1s
- alternating 0s and 1s (run twice)
- ramp pattern (run twice)

The video screen will display the contents of video memory. This test is self-checking.

Video Memory Test: Static RAM

The video memory static RAM test is performed on the internal video controller on 186, 286, and 386 processor modules, and on the GC-102 enhanced video controller.

This test confirms that static RAM in video memory is working properly. This test displays an image of an NGEN workstation; a processor module, a monitor, and a keyboard are displayed. Before the test runs, the following message is displayed on the screen:

```
                    Video Memory Test

This picture should scroll back to its original position
then cycle through different font mappings.
```

If this test fails, the test stops and an error message is displayed. The video memory test is performed once in each of the different combinations of video attribute modes.

Note: *The picture displayed does not necessarily represent the configuration of your workstation hardware.*

Video Attribute Test

The video attribute test displays all the video attributes on the screen (for example, half-bright, bold, struck-through, underlined). This test, along with the Font Display Test and the Mosquito Net Test (described below), cycles four times through the following sequence of screen attributes:

- full-bright with a dark background
- full-bright with a light background
- half-bright with a light background
- half-bright with a dark background

Font Display Test

The font display test shows the character font used by the diagnostics. This is not the standard workstation font, but instead, a special font designed to test all the font capabilities in the video memory.

Mosquito Net Test

The mosquito net test displays a screenful of one-pixel-thick lines used to test line clarity and pincushion distortion.

Cursored String Test

The cursored string test fills the screen with the following text:

```
The quick brown fox jumps over the lazy dog.
```

```
It moves the cursor to each T in the text, in turn.
```

When all the tests have been run, the memory errors are displayed (if you responded Y to the list all errors found query. If an N answer was given or no errors are found, the diagnostics returns to the icon menu.

Error Information Screen

If the diagnostic detects an error during testing, an error information screen is displayed. This screen is divided into the five sectors discussed below.

Error Information

This sector contains details of the detected error condition. The type of error and the actual and expected test results are displayed.

Probable Causes of the Error

This sector lists one to three conditions that may have caused the error. These conditions are not the only possible causes. However, the list does provide a starting point from which to locate the cause of the current error.

RS-232 Interface Chip (8274) Status Information

This sector displays the status of the RS-232 interface chip channel being tested when the error occurred. The actual and expected state of each bit in the RS-232 interface chip status registers are given. For a complete description of each bit in the two RS-232 interface chip status registers, see the *Processor Manual* for your workstation.

Extended Status Register Information

This sector displays the information contained in the Extended Communications status register at the time of the error. The register contains information for both communications channels, but the screen display shows only the information pertaining to the channel being tested. This sector, like the preceding sector, displays both the actual and the expected states of each bit at the time of the error.

Dialogue

Dialogue with the diagnostics program is displayed in this sector. The dialogue includes requests for continuing or aborting the tests.

Keyboard Diagnostic Tests

Introduction

The keyboard diagnostic tests are designed to run with the following model keyboards: B25-K1, B25-K2, B25-K2i, B25-K3, B25-K4, B25-K5, and KM-001.

If an error occurs, refer to the *Keyboard Manual* or contact a field service technician for a more thorough study of the problem.

Keyboard Tests

When the keyboard icon is selected, a series of queries and prompts appears on the screen.

Keyboard Echo Test?

Type **Y** or **N** to indicate whether or not you want to run the test.

This test is the last test executed in the keyboard diagnostics. The keyboard echo test checks the circuitry that signals the workstation when a keyboard key is pressed.

When the test is run, a representation of the keyboard appears on the screen. When keys on the keyboard are pressed, the corresponding key areas light up on the screen. The keyboard LEDs also light up when the appropriate keys are pressed. This test can be used to locate malfunctioning keys and inoperative keyboard LED indicators.

Press **Action-Finish** to exit the screen. Exiting the screen returns you to icon menu.

Perform Status Lights Test? (K3 & K5 keyboards only)

This test gives a graphic representation that corresponds with the status lights on the keyboard. Pressing the spacebar sequences the test.

Stop diagnostics on keyboard error?

Type **Y** to stop on an error or **N** to continue if an error occurs. If you choose **N**, hard and soft errors are displayed below the module icon as they occur.

Display all hex codes that come from the keyboard? (must reset to exit)

Type **Y** to display the keyboard hexadecimal codes or **N** to run the keyboard diagnostics in the conventional (nonhexadecimal) manner.

If you answer **Y** to this question, any key pressed on the keyboard is accompanied by its hexadecimal code on the screen.

> *Note:* *To exit the hex code display test, it is necessary to rebootstrap the diagnostics. To do this, reinsert the diagnostic disk in the floppy disk drive and press the reset button on the back of the Processor Module.*

I-Bus Hardware Reset Test

The I-Bus hardware reset test checks the software-controlled hardware reset of the keyboard. This reset causes the keyboard to turn on all its LED indicators. This test runs automatically when the keyboard is selected. There are no queries to answer.

ID Sequence Test

The ID sequence test checks whether the keyboard can identify itself to the Processor Module.

Keyboard Software Reset Test

The keyboard software reset test checks the keyboard's ability to execute a soft reset command.

The KBD software reset command is the first communication received by the keyboard from the Processor Module. This command informs the keyboard which of its ports is connected to that module. (The keyboard has two ports, at its right and left corners, either of which can be used to connect the keyboard to the video monitor base, and thus to the Processor Module.) Upon successful receipt of this command, the keyboard turns off its LED indicators.

ROM Checksum Test

The ROM checksum test performs a checksum of the ROM in the keyboard microcontroller. The result of this test should be the hexadecimal 0F0 hex. Any redesign of the keyboard firmware, to be successful, must ensure a ROM checksum of 0F0 hex.

Loopback Test

The loopback test checks the bidirectional serial communications channel between the Processor Module and the keyboard microcontroller. If you press any key during this test, the test will fail.

After the four subtests are executed, the diagnostic tests the second port on the keyboard to check for a pointing device or other attached accessory. The following status message appears on the screen:

```
Switching to I-Bus Position 02
```

No device should be attached to the I-Bus position 02. If anything is attached, the test fails and this message (along with an error message) is displayed on the screen:

```
Wrong ID code
```

Detach the device at I-Bus Position 02 and run the test again.

If a second device is not attached to I-Bus position 02, another status message appears:

```
No device attached
```

K4 Keyboard Tests

The K4 keyboard is an I-Bus keyboard designed for financial applications. The K4 keyboard must be plugged directly into the I-Bus port on the monitor to run the test.

K4 Keyboard Mapping

Use the following keyboard template chart to find the equivalent keystrokes for executing commands in the debugger menu.

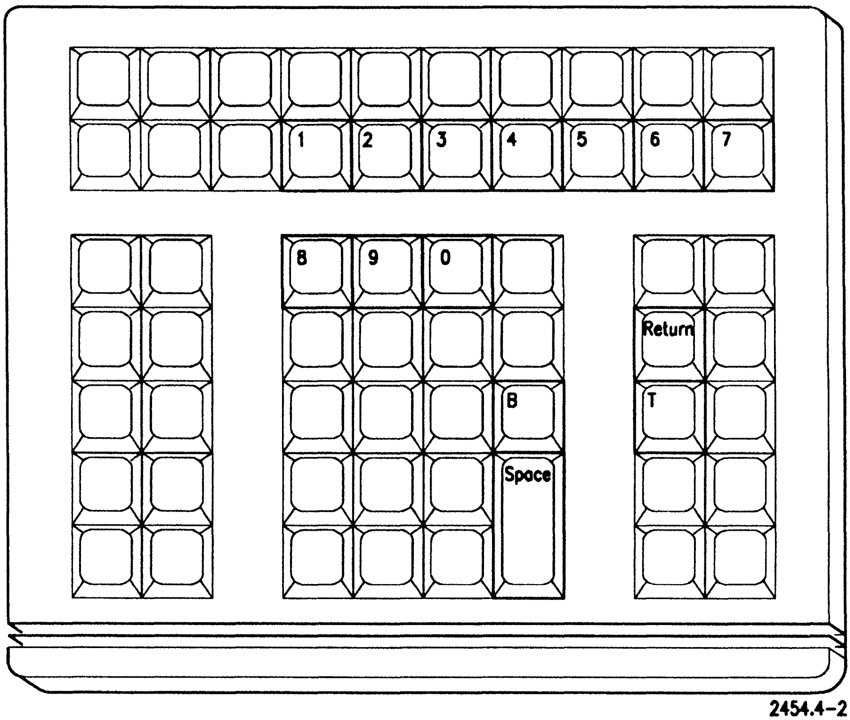

Figure 4-2. K-4 Keyboard Map, Boot ROM Menu.

Visinostics Test Menu

Use this keyboard template chart to find the equivalent keystrokes for executing commands when running Visinostics.

Note: *Some keystrokes require that you hold down the shift key. These are indicated when two characters appear on the key caps labeled here.*

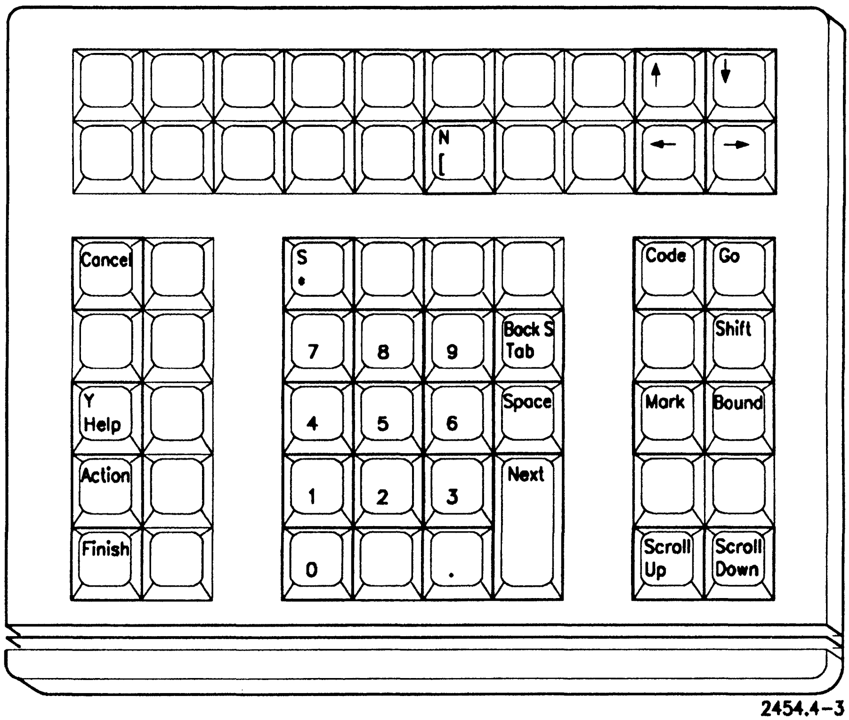

Figure 4-3. K4 Keyboard Map, Visinostics Test Menu

Mouse Diagnostic Tests

Introduction

Visinostics tests the following mouse models: B25-MO3, B25-MOU, PD-001.

3 Button Mouse Test

The test display screen shows a picture of the Mouse. To perform the test, press the Mouse buttons and verify that the corresponding buttons on the screen are lit. Then move the Mouse and observe that the cursor on the screen moves in the same direction. Press **Finish** to end the test.

Note: *If the Mouse icon is not displayed when the disk is booted, attach the Mouse to the other port on the keyboard and reboot the system. The mouse icon is not displayed on CWS workstations, and Visinostics cannot run the mouse test on a CWS workstation.*

2 Button Mouse Test

The 2 Button mouse can only be used with CP series, B28, and B38 processor modules. It is not compatible with CWS, series i, or B39 processor modules.

Resolution Test

The resolution test displays small boxes on the screen. Move the mouse to confirm that the cursor is following the mouse movement. To confirm that the mouse is fully operational the following functions can be performed:

- Press the left mouse button to highlight the box at the cursor position.
- Press the right mouse button to turn off the highlighting at the cursor position.
- Hold either of the buttons down and move the mouse to highlight or turn off several boxes.

Press **Finish** to exit the test. Press **Next Page** to perform the data echo test.

Data Echo Test

The data echo test displays the mouse data (in hex code) as the mouse is moved or buttons are pressed. Press **Finish** to exit the test. Press **Previous Page** to perform the resolution test.

Section 5
Non-SCSI (X-Bus) Storage Modules

Introduction

This section describes tests for non SCSI data storage modules. The following tests are run from Visinostics distribution diskette #2 DCP/DSP. Refer to the Module Reference table earlier in this manual for a list of the modules covered in this section.

Disk Drive Module Test Lookup Tables

The following tables show which tests are run depending on your response to the queries shown here in bold face type. The brackets, [ ], indicate the response to the query. The floppy drive tests listed here are applicable to single floppy, dual floppy, and floppy/hard disk modules.

Table 5-1. Floppy Drive Tests

Run quick Verification? [Y]	
Test	1 - Recalibrate
	4 - Format and verify floppy (Destructive)
Run full Verification? [Y]	
Test	1 - Recalibrate
	2 - Sequential seek
	3 - Random Seek
	4 - Format and verify floppy (Destructive)
	5 - Sequential Write/Read Single Sectors Test (Destructive)
	6 - Random Write/Read Single Sectors Test (Destructive)
	7 - Sequential Write/Read Multiple Sectors Test (Destructive)

continued

Note: *If you respond Y to the run full verification query, tests 1 thru 7 are run. Function tests 8 thru 17 can only be run by responding N to the Run full verification query and selecting the individual floppy drive test(s).*

Table 5-1. Floppy Drive Tests Continued

Run full Verification? [N]

Test 1 - Recalibrate

2 - Sequential seek

3 - Random Seek

4 - Format and verify (Destructive)

5 - Sequential Write/Read Single Sectors Test (Destructive)

6 - Random Write/Read Single Sectors Test (Destructive)

7 - Sequential Write/Read Multiple Sectors Test (Destructive)

8 - Read Track Format Function

9 - Display/Modify Sector Function

10 - Copy Drive to Drive Function (only on dual floppy)

11 - Read Disk Address Function

12 - Loop on Track Format Function (Destructive)

13 - Loop on Sector Read Function

14 - Loop on Sector Write Function (Destructive)

15 - Compare Drive to Drive Function (only on dual floppy)

16 - Read Sequential Tracks Function

17 - Loop on Full Track Read Function

Table 5-2. Hard Disk Tests

Run quick Verification? [Y]

Test 1 - Recalibrate
2 - Sequential seek
3 - Format Disk (Destructive)
4 - Random Seek Test With ID Scan

Note: *Some of the tests run under full verification are destructive to data. If a valid OS volume is selected, the diagnostic displays a warning and a query to confirm overwriting the volume before the full verification query is displayed.*

Run full Verification? [Y]

Test 1 - Recalibrate
2 - Sequential seek
3 - Format Disk (Destructive)
4 - Random Seek with ID Scan
5 - Write/Read All Tracks (Destructive)
6 - Sequential Write/Read Single Sectors Test (Destructive)
7 - Random Write/Read Single Sectors Test (Destructive)
8 - Sequential Write/Read Multiple Sectors Test (Destructive)

Table 5-2. Hard Disk Tests Continued

Run full Verification? [N]

Test 1 - Recalibrate
2 - Sequential seek
3 - Format Disk (Destructive)
4 - Random Seek with ID Scan
5 - Write/Read All Tracks (Destructive)
6 - Sequential Write/Read Single Sectors Test (Destructive)
7 - Random Write/Read Single Sectors Test (Destructive)
8 - Sequential Write/Read Multiple Sectors Test (Destructive)
9 - Display/Modify Sector Function
10 - Read Boot ROM Function
11 - Loop on Track Format Function (Destructive)
12 - Loop on Sector Read Function
13 - Loop on Sector Write Function (Destructive)
14 - Read Sequential Tracks Function
15 - Loop on Full Track Read Function
16 - Read/Write/Read Full Tacks with Filler Pattern (Destructive)
17 - Read Random Full Tracks Written with Filler Pattern
18 - Continuous Full Stroke Seek
19 - ECC Diagnostic (force errors, test 2010)
20 - Erase Defect Information From Disk

Floppy Disk Diagnostic Tests

The following subsection describes diagnostic tests that run on X-Bus workstation modules equipped with floppy disk drives.

Note: *To test the floppy drive in a Series i or B39 processor module, a SCSI hard disk module, or to test the B25-MF1 dual floppy module, use Visinostics disk #5 and refer to Section 8 "SCSI Upgrade and Expansion Modules" later in this manual.*

CAUTION

Floppy disk diagnostic tests can destroy data on disks in floppy disk drives. Before running any of these tests, remove the diagnostic disk and insert a blank or unneeded disk.

Initial Dialog

When you select the floppy disk diagnostics, the following queries appear on the screen:

Stop diagnostic on a disk error?

Type **Y** to stop the test on an error, or **N** to continue the test. Errors are registered and displayed even if you do not choose to stop.

Run quick verification? (some of the tests will destroy data)

Type **Y** to run a quick verification (recalibrate and format with verify tests only) or **N** to select from the full set of tests available or run full verification. These tests are described later in this section. If you answered N to the run quick verification query, the following query appears.

Run full verification? (some of the tests will destroy data)

Type **Y** to run a full verification or **N** to select individual tests. These tests are described under "Selecting Individual Tests," later in this section.

Note: *Some function tests are not run under full verification. Refer to the module test lookup table earlier in this section for a list of the tests run.*

If your response to the run quick verification query is Y, the queries that follow are displayed next. If your response is N, these queries appear after the individual test selection is complete.

Change detail parameters?

The detail parameters are characteristics of the floppy disk format. If you respond Y to this question you can alter the format.

If you choose Y, the following queries appear on the screen:

```
Number of retries?

Number of bytes per sector?

Number of sectors per track?

Number of tracks per cylinder?

Number of cylinders per disk?
```

The number of retries is the number of times the diagnostic tries to read data from a sector on the floppy disk. Several retries are generally chosen. Type in the number of retries you desire.

The next four parameters specify the number and size of the data areas on the floppy disk. Enter the appropriate numbers or use the default settings. The Bytes Per Sector response must be either 128, 256, 512, or 1024.

Debug?

Type **Y** or **N** to indicate whether or not you want to use the Debugger. If you choose Y and a disk error occurs, the diagnostic displays the following prompt:

```
Enter the debugger?
```

At this point you can type Y to enter the Debugger or N to continue with the diagnostics. If you enter the Debugger by mistake, press **Go**. This returns you to your previous location in the diagnostics.

If you respond **N** to the Debug query, the following query appears:

```
Show activity (dots)?
```

Type **Y** or **N** to indicate whether or not you want dots to appear on the screen when sectors or tracks are written to or read from the floppy disk drive. You are then asked,

```
Filler data?
```

Enter a four-digit hexadecimal number to change the data pattern written to the floppy disk drive. The default, 6DB6, is a worst-case pattern, maximizing the testing value of the diagnostics. It causes the greatest amount of response from the floppy disk drive during the write/read process.

Note: *If you selected the entire dual floppy module icon, the preliminary dialog is repeated for the second drive.*

Selecting Individual Tests

If you answered N to Run Quick Verification? and Run Full Verification?, you can now individually select the tests you wish to run. Selection occurs immediately after the Run Full Verification? query.

A series of prompts will appear, giving the names of the individual tests.

Recalibrate test

Type **Y** or **N** to indicate whether or not you want to run the test.

The recalibrate test checks the basic functioning of the read/write head positioning mechanism and track 00 sensor.

This test initializes the floppy disk interface and issues a recalibrate command to the floppy disk controller. It then issues a command to step the head inward to the center of the disk. It ends by issuing another recalibrate command and stepping the head back to track 00.

Any errors detected during recalibration are displayed.

Sequential seek test

Type **Y** or **N** to indicate whether or not you want to run the test.

The sequential seek test checks the functioning of the head positioning mechanism by stepping the head from track 00 to the innermost track on the disk, one track at a time.

Any errors detected during sequential seek are displayed.

Format with verify (destructive)

Type **Y** or **N** to indicate whether or not you want to run the test.

The format with verify test formats a floppy disk (or disks if both drives were selected). The disks are formatted one track at a time. Data are first written to the disk, then read back.

Random seek test

Type **Y** or **N** to indicate whether or not you want to run the test.

The random seek test checks the function of the head positioning mechanism by stepping the head from track TPD/2 to track TPD/2-1, to track TPD/2+1, to track TPD/2-2, to track TPD/2+2, and so on. (TPD represents the number of tracks per floppy disk.)

Any errors detected during the random seek test are displayed.

Sequential write/read single sectors (destructive)

Type **Y** or **N** to indicate whether or not you want to run the test.

The sequential write/read single sectors test writes data to each sector on a track, one sector at a time.

First, the odd-numbered logical sectors are written with filler data. Next, the even-numbered logical sectors are written, using the 1s complement of the filler data. After all the sectors on the track are written, the data in each sector are verified against the data written. The test is repeated on three tracks: track 00, track TPD/2, and track TPD-1.

Random write/read single sectors (destructive)

Type **Y** or **N** to indicate whether or not you want to run the test.

The random write/read single sectors test performs a write and a read of a random number of sectors on each tested track.

All tracks are tested from track TPD/2 to track TPD/2-1, to track TPD/2+1, to track TPD/2-2, to track TPD/2+2, and so on.

Sequential write/read multiple sectors (destructive)

Type **Y** or **N** to indicate whether or not you want to run the test.

The sequential write/read multiple sectors test writes data to each sector on a track, one half track at a time.

First, sectors 1 to SPT/2 are written using a ramp pattern (0123456789). (SPT represents the number of sectors per track on the disk.) Then sectors SPT/2+1 to SPT are written. The data in each sector are then verified against the data written.

read track format

Type **Y** or **N** to indicate whether or not you want to use the function.

The read track format function reads an entire track into the DMA buffer and displays it 256 bytes at a time.

The function prompts for a cylinder number and a head number. Press **Return** in response to the cylinder number prompt to exit the function. Invalid entries are reported with a beep. If this happens, backspace and enter the numbers again.

Once the first 256 bytes in the buffer are displayed, the function then queries

```
More?
```

Type **Y** to display the next 256 bytes in the buffer. Type **N** to read another track.

display/modify sector

Type **Y** or **N** to indicate whether or not you want to use the function.

If you use the display/modify sector function you can display and, optionally, modify any sector on the floppy disk under test.

The function issues prompts for a cylinder number, a sector number, and a head number. Invalid entries are reported with a beep. If this happens, backspace and enter the numbers again.

This test is interactive, and while it is running you are asked to respond to several more queries and prompts.

Enter a cylinder number in response to the following prompt:

```
cylinder:
```

If you want to discontinue, press **Return** at this point to terminate the display/modify sector function.

If you want to continue, enter the appropriate numbers when the following prompts appear:

```
head number:

sector number:
```

The sector specified is then read into the DMA buffer, and the first 256 bytes are displayed.

```
More?
```

Type **Y** to display the next 256 bytes in the buffer. Type **N** to modify the sector or inspect another sector.

```
Modify?
```

Type **Y** to modify the sector. Type **N** to inspect another sector.

```
Byte?
```

Enter the decimal number of the byte to be modified.

The function then displays the byte number and its hexadecimal value. Type a new hexadecimal value to change the byte, or press **Return** to leave the byte unchanged.

After the sector has been modified, the following query appears:

```
Write sector?
```

Type **Y** to rewrite the sector on the floppy disk with the modified data. Type **N** to leave the modified sector unchanged.

copy drive to drive

This test is a specific to the Dual Floppy Module and should be performed separate from the other diagnostic tests.

Type **Y** or **N** to indicate whether or not you want to use the function.

The copy drive to drive function copies the entire contents from one floppy disk to another. This function is only available on dual floppy disk modules.

Note: This test must be run separate from the compare drive to drive function mentioned later in this section. If you intend to run the compare drive to drive function, respond N to this query.

During the selection process the entire dual floppy disk icon must be marked. The diagnostics then assumes that the source and destination drives are F0 to F1, respectively.

The destination floppy disk must be formatted using the format with verify test (see above) before it can be used to copy from drive to drive. After each track is written to the destination disk, it is verified against the data on the source disk.

read disk address

Type **Y** or **N** to indicate whether or not you want to use the function.

The read disk address function reads the identification field of the next sector to pass under the read/write head.

This function prompts you for the cylinder number and the head number.

loop on track format (destructive)

Type **Y** or **N** to indicate whether or not you want to use the function.

The loop on track format function continuously formats one track on the disk.

This function prompts you for the cylinder number and the head number. It is designed to support troubleshooting using test equipment.

Press Cancel to stop the test, Go to resume the test, and Finish to terminate the test and return to the diagnostic manager.

loop on sector read

Type **Y** or **N** to indicate whether or not you want to use the function.

The loop on sector read function continuously reads one track on the disk.

This function prompts you for the cylinder number and the head number. It is designed to support troubleshooting using test equipment and runs until you press **Finish**.

loop on sector write (destructive)

Type **Y** or **N** to indicate whether or not you want to use the function.

The loop on sector write function continuously writes one track on the disk.

This function prompts you for the cylinder number and the head number. It is designed to support troubleshooting using test equipment and runs until you press **Finish**.

compare drive to drive

This test is specific to the Dual Floppy Module and should be run separate from the other diagnostic tests.

Type **Y** or **N** to indicate whether or not you want to use the function.

Note: *This test must be run separate from the copy drive to drive function mentioned earlier. If you intend to run the copy drive to drive function, respond **N** to this query.*

The compare drive to drive function compares the data on two floppy disks. It is the same as the verification process of the copy drive to drive function described above.

read sequential tracks

Type **Y** or **N** to indicate whether or not you want to use the function.

This function reads the entire floppy disk, one track at a time.

loop on full track read

Type **Y** or **N** to indicate whether or not you want to use the function.

The loop on full track read function continuously reads a full track of the disk.

This function prompts you for the cylinder number and head number. It is designed to support troubleshooting using test equipment and runs until you press **Finish**.

Error Message Format

When an error is detected during the floppy disk diagnostics, a brief description of the error condition is displayed on the screen. This is followed by information on the status of the floppy disk controller. The status information includes any or all of the following:

- The most recently executed floppy disk controller command. This command is displayed as a hexadecimal byte and a written message.
- The contents of the working status register of the floppy disk controller, as of the most recent command.
- The residual byte count from the last DMA transfer.
- The cumulative number of soft errors that have occurred during the execution of the current tests. These errors accumulate over all tests and all passes, for both drives.

  Soft errors are errors that occur intermittently. Often they are recoverable, if the tests are run again. The number of soft errors is displayed in half-bright below the module icon on the left side of the slash mark. (For example, 8/0 indicates 8 soft errors and 0 hard errors.)
- The cumulative number of hard errors that have occurred during the execution of the current tests.

  Hard errors indicate a failure of some portion of the hardware inside a module or submodule. They are generally not recoverable, even if the tests are run again. The number of hard errors is displayed in full-bright below the module icon to the right of the slash mark. (For example, 0/5 indicates 0 soft errors and 5 hard errors.)

The interpretation of the bytes displayed in the error message format above can be found in tables listing the controller flag, controller command, and status register summaries in the *Dual Floppy Disk Manual.*

Hard Disk Diagnostic Tests

CAUTION

The Floppy/Hard Disk Module tests can destroy the data on the disks being tested. The diagnostic prompts you to confirm overwriting a valid OS volume.

Remove the diagnostic disk from the floppy disk drive and back up the data on the hard disk before running any destructive tests.

Preliminary Dialog

The diagnostic runs a preliminary check of the hard disk to determine the type of hard disk being tested. If the drive is an ECC (error correction code) formatted drive, the diagnostic reports:

```
*****This drive has ECC type format*****
```

Drive Vendor Codes

When you select the hard disk diagnostics, the test begins by reading drive parameters from cylinder 0 of the disk. If this information is not found, the following prompt appears on the screen:

```
Enter Drive Vendor Code (circled letter on the bottom of the
module.)
```

The drive vendor code appears as a circled letter on the bottom of the chassis of all Floppy/Hard and Hard Disk Modules, next to the bad spot information. The drive vendor code determines the drive parameters used by the diagnostics to access the hard disk. It does not apply to floppy disk modules. (See Chapter 2, "Running Visinostics," for more information on drive vendor codes.)

If the vendor code on the bottom of your disk drive is A or B, you do not have to enter the letter. A and B are the default values, and therefore need not be entered.

If the vendor code is any letter other than A or B, type that letter after the prompt.

If no vendor code is specified on the bottom of the module, the number of cylinders and heads must be entered. These are entered after you answer Y to the prompt, Change Detail Parameters? (discussed later in this section).

For further information about vendor codes, see the current Release Notice accompanying the diagnostics.

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CAUTION

If your drive vendor code is not A or B and you do not enter the correct vendor code letter, the hard disk is formatted according to the default values. This can prevent the proper operation of the diagnostics and cause the drive to be formatted incorrectly which could result in lost storage capacity of the drive.

The hard disk diagnostics then determines whether the selected hard disk drive is a valid operating system volume. If so, this message is displayed:

```
WARNING!!!  THIS IS A VALID OS VOLUME.  Is overwrite OK?
```

If you answer Y, all diagnostic functions are enabled, including some functions that destroy the contents of the disk. If you answer N, only nondestructive diagnostic functions are enabled.

Stop diagnostic on disk error?

Type **Y** to stop the test on an error or **N** to continue the test, regardless of an error.

Run quick verification? (some of the tests will destroy data)

Type **Y** to run a quick verification (recalibrate, sequential seek, format disk, and random write / read single sectors tests) or **N** to go to the full verification query.

A quick verification recalibrates the read/write head (returns it to track 00), tests the read / write head mechanism, formats the hard disk, and randomly selects tracks to write to. It then reads back the data to make sure it was written correctly. For further information, see below under "Recalibrate Test," "Sequential Seek Test," "Format Disk Test," and "Random Write/Read Single Sectors Test."

Run full verification? (some of the tests will destroy data)

Type **Y** to run a full verification (all tests) or **N** to select individual tests. These tests are described under "Selecting Individual Tests", later in this section.

If your response to Run Full Verification? is **Y**, the following query is displayed next:

Change detail parameters?

The detail parameters are the characteristics of the hard disk format. If you respond **Y** to this query you can alter the format. If your response is **N** to both the run quick verification and run full verification queries, this query will appear after the individual test selection is complete.

If you choose Y, the following queries appear on the screen:

```
Record defect information on cylinder 0 of disk?
```

The hard disk drive saves drive parameters and bad spot information on cylinder 0 of the disk. Answer **N** if you do not want to save the information.

```
Number of retries?
```

The number of retries is the number of times the diagnostics tries to read data from a sector on the hard disk. Several retries are generally chosen. Type in the number of retries you desire.

```
Number of bytes per sector?

Number of sectors per track?

Number of tracks per cylinder?

Number of cylinders per disk?
```

These parameters specify the number and size of the data areas on the hard disk. Enter the appropriate numbers or use the default settings. The controller only supports bytes per sector sizes of 128, 256, 512, or 1024.

Note: *The number of bytes per sector must be 512 for BTOS / CTOS to be able to read the vendor code from track 0.*

```
Stepper rate?
```

This parameter determines the rate at which the read/write head on the hard disk drive steps from track to track. Type in a number for the stepper rate or use the default settings. See the *Floppy / Hard Disk Manual* for more details on the stepper rate.

```
Show activity (dots)?
```

Type **Y** to **N** to indicate whether or not you want dots to appear on the screen when sectors or tracks are written to or read from the hard disk drive.

```
Debug?
```

Type **Y** or **N** to indicate whether or not you want to use the Debugger. If you choose Y, and a disk error occurs, the diagnostic displays the following query:

```
Enter the debugger?
```

At this point you can type Y to enter the Debugger or N to continue with the diagnostics. If you enter the Debugger by mistake, press **Go**. This returns you to your previous location in the diagnostics.

```
Filler data?
```

Enter a four-digit hexadecimal number to change the data pattern written to the hard disk drive. The default, 6DB6, is a worst-case pattern, maximizing the testing value of the diagnostics. It causes the greatest response from the hard disk drive during the write/read process.

Record defect information on cylinder 0 of disk?

Respond **Y** to this query if you want the diagnostic to record defect information in the bad spot table on cylinder 0 of the disk for defects that it encounters while the test is running.

Note: *ECC and SCSI hard disk drives track defects automatically. There is no bad spot table that can be accessed by the user.*

Format with Error Correction? (ECC)

Respond **Y** if you want to format the hard disk in ECC format (error correction code). Hard disk modules with ECC drives include: B25-MC5, B25-MC6, B25-M3, B25-M4, B25-M5, B25-CX5, B25-CX6.

Selecting Individual Tests

If you answered **N** to the Run Quick Verification? query and **N** to the Run Full Verification? query, you now can individually select the tests you wish to run. Selection occurs immediately after the Run Full Verification? query.

A series of prompts will appear, giving the names of the individual tests.

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Recalibrate test

Type **Y** or **N** to indicate whether or not you want to use the test.

The recalibrate test checks the basic functioning of the read/write head positioning mechanism.

This test issues a recalibrate command to the disk controller, followed by a seek command, which moves the read/write head to the last cylinder on the disk under test.

Any errors detected during recalibration are displayed.

Sequential seek test

Type **Y** or **N** to indicate whether or not you want to use the test.

The sequential seek test checks the function of the head positioning mechanism by stepping the head from track 00 to the innermost track on the disk, one track at a time.

Any errors detected during sequential seek are displayed.

Format Disk Test (Destructive)

Type **Y** or **N** to indicate whether or not you want to format the disk.

The format disk test formats the hard disk. The disks are formatted one track at a time.

Random Seek Test with ID Scan

Type **Y** or **N** to indicate whether or not you want to run the test.

The random seek test with ID scan checks the functioning of the head positioning mechanism by stepping the head from cylinder CPD/2 to cylinder CPD/2-1, to cylinder CPD/2+1, to cylinder CPD/2-2, to cylinder CPD/2+2, and so on. (CPD represents the number of cylinders per hard disk.)

This test also reads the identification areas of the sectors.

Any errors detected during the random seek test are displayed.

Write/read all tracks (destructive)

Type Y or N to indicate whether or not you want to run the test.

The write/read all tracks test sequentially writes a ramp pattern (0123456789) to every track on the disk under test. The test then reads the data back to verify that it was correctly written.

Sequential write/read single sectors (destructive)

Type Y or N to indicate whether or not you want to run the test.

The sequential write/read single sectors test writes data to each sector on a track, one sector at a time.

First, the odd-numbered logical sectors are written using a ramp pattern (0123456789). Next, the even-numbered logical sectors are written, using the 1s complement of the ramp pattern. After all the sectors on the track are written, the data in each sector are verified against the data written. The test is repeated on three cylinders: cylinder 00, cylinder CPD/2, and cylinder CPD-1.

Random write/read single sectors (destructive)

Type Y or N to indicate whether or not you want to run the test.

The random write/read single sectors test performs a write/read of a random number of sectors on each tested track.

All tracks in each cylinder are tested. All cylinders are tested from cylinder CPD/2 to cylinder CPD/2-1, to cylinder CPD/2+1, to cylinder CPD/2-2, to cylinder CPD/2+2, and so on.

Sequential write/read multiple sectors (destructive)

Type Y or N to indicate whether or not you want to run the test.

The sequential write/read multiple sectors test writes data to each sector on a track, one-half track at a time.

First, sectors 1 to SPT/2 are written using a ramp pattern (0123456789). Then sectors SPT/2+1 to SPT are written. (SPT represents the number of sectors per track on the hard disk.) The data in each sector are then verified against the data written. All the cylinders of the hard disk are tested.

display/modify sector

Type **Y** or **N** to indicate whether or not you want to use the function.

The display/modify sector function allows you to display and, optionally, modify any sector on the hard disk under test.

The function issues prompts for a cylinder number, a sector number, and a head number. Invalid entries are reported with a beep. If this happens, backspace and enter the numbers again.

This test is interactive, and while it is running you are asked to respond to several more queries and prompts.

Enter a cylinder number in response to the prompt

```
cylinder:
```

If you want to discontinue, press **Return** at this point to terminate the display/modify sector function.

If you want to continue, enter the appropriate numbers when the following prompts appear:

```
head number:
```

```
sector number:
```

The sector specified is then read into the DMA buffer, and the first 256 bytes are displayed.

The next query is

```
More?
```

Type **Y** to display the next 256 bytes in the buffer. Type **N** to modify the sector or inspect another sector.

The next query is

```
Modify?
```

Type **Y** to modify the sector. Type **N** to inspect another sector.

The next query is

```
Byte?
```

Enter the decimal number of the byte to be modified.

The function then displays the byte number and its hexadecimal value. Type a new hexadecimal value to change the byte, or press **Return** to leave the byte unchanged.

After the sector has been modified, the following query appears:

```
Write sector?
```

Type **Y** to rewrite the sector on the disk with the modified data. Type **N** to leave the modified sector unchanged.

read boot ROM

Type **Y** or **N** to indicate whether or not you want to use the function.

The read boot ROM function reads and displays the contents of the Floppy/Hard Disk Module's bootstrap ROM. This function is only supported in modules equipped with a disk controller.

loop on track format (destructive)

Type **Y** or **N** to indicate whether or not you want to use the function.

The loop on track format function continuously formats one track on the disk.

This function prompts you for the cylinder number and the head number. It is designed to support troubleshooting using test equipment and runs until you press **Finish**.

loop on sector read

Type **Y** or **N** to indicate whether or not you want to use the function.

The loop on sector read function continuously reads one track on the disk.

This function prompts you for the cylinder number and the head number. It is designed to support troubleshooting using test equipment and runs until you press **Finish**.

loop on sector write (destructive)

Type **Y** or **N** to indicate whether or not you want to use the function.

The loop on sector write function continuously writes one track on the disk.

This function prompts you for the cylinder number and the head number. It is designed to support troubleshooting using test equipment and runs until you press **Finish**.

read sequential tracks

Type **Y** or **N** to indicate whether or not you want to use the function.

This function reads the entire hard disk, one track at a time.

loop on full track read

Type **Y** or **N** to indicate whether or not you want to use the function.

The loop on full track read function continuously reads a full track of the disk.

This function prompts you for the cylinder number and head number. It is designed to support troubleshooting using test equipment and runs until you press **Finish**.

Read/Write/Read full tracks with filler pattern (destructive)

Type **Y** or **N** to indicate whether or not you want to run the test.

In this test the entire disk is first written with the filler pattern. Next, cylinder 1 is read/verified, written, and then read/verified again. This sequence is repeated for cylinders 2, CPD-1, and so on until the middle operation comes to CPDS-2. At this point the test is complete.

If you earlier responded N to the Run Full Verification? query, the following query will now appear:

```
Change detail parameters?
```

The detail parameters are described under "Detail Parameters," earlier in this section.

Enter bad spot data

The hard disk diagnostics tests all sectors on the disk. Normally, the diagnostics stops testing when a defect is encountered. However, the diagnostics does not stop if the defect is a known bad spot.

The bad spot data appear on the bottom of your Hard Disk Module, next to the vendor code. Under the heading "Cylinder/Head/BFI," are listed the known defect information for the drive. BFI stands for bytes from index and is commonly referred to as an offset or an offset from index. This information should be recorded when you first receive the module (Refer to the *CTOS System Administration Guide* for more information on bad spot data.)

If your disk drive contains bad spots, enter the bad spot data after the following prompt:

```
No mapped defects have been previously entered
```

Enter the bad spot information in this format:

```
cylinder/head/BFI  (for example, 250/2/1234)
```

or

```
cylinder/head/#sector  (for example, 250/2/#2)
```

You can enter several defect parameters per line, separated by a space, or you can enter each one on a new line. Press **Return** twice when you have finished entering the bad spot data.

If no bad spots exist, the vendor code label reads "No Media Defects". In this case, press **Return** without entering any information after the prompt.

When the diagnostic detects a defect in a known bad spot, it displays the following message:

```
Mapped defect at cylinder: NNN  head: NNN  sector: NNN
```

Error Message Format

When an error is detected during the hard disk diagnostics, a brief description of the error condition is displayed on the screen. This is followed by information on the status of the hard disk controller. The status information includes any or all of the following:

- The most recently executed hard disk controller command. This command is displayed as a hexadecimal byte and a written message.
- The contents of the status and error registers of the hard disk controller, as of the most recent command.
- The residual byte count from the last DMA transfer.
- The cumulative number of soft errors that have occurred during the execution of the current tests. These errors accumulate over all tests and all passes, for both drives.

  Soft errors are errors that occur intermittently. Often they are recoverable, if the tests are run again. The number of soft errors is displayed in half-bright below the module icon, on the left side of the slash mark. (For example, 8/0 indicates 8 soft errors and 0 hard errors.)
- The cumulative number of hard errors that have occurred during the execution of the current tests.

  Hard errors indicate a failure of some portion of the hardware inside a module or submodule. They are generally not recoverable, even if the tests are run again. The number of hard errors is displayed in full-bright below the module icon to the right of the slash mark. (For example, 0/5 indicates 0 soft errors and 5 hard errors).

The interpretation of the bytes displayed in the error message format above can be found in tables listing the controller flag, controller command, and status register summaries in the *Floppy / Hard Disk Manual.*

Disk Upgrade and Disk Expansion Tests

The tests used for the hard disks in the Disk Upgrade and Disk Expansion Modules are the same as those described under the "Hard Disk Tests" above.

Note, however, that the vendor code of the Disk Expansion and Disk Upgrade Modules may differ from the vendor code of the modules to which they are attached.

For further information on the Disk Upgrade and Disk Expansion Modules, see the *Hard Disk Upgrades and Expansions Manual.*

B25-TS / HB-001 Quarter-Inch Cartridge Tape Backup Module Diagnostic Tests

Introduction

The following test descriptions cover both the HB-001 and the B25-TS tape backup modules. There are some tests that are exclusive to one of the two modules, these are pointed out in the test description.

CAUTION

The Quarter-Inch Cartridge Tape Module diagnostic tests destroy the data on the tape cartridge in the module.

Refer to Section 8 of this manual for tests relating to the SCSI tape backup module.

Initial Dialog

When you select the QIC tape diagnostics, a series of queries and prompts appears on the screen.

Stop diagnostics on a tape error?

Type Y to stop the diagnostic test in the event of a tape error.

Run quick verification? (some of the tests will destroy data)

Type **Y** to run a quick verification or **N** to have the full set of tests available.

If you type N the following query will appear:

Run full verification? (some of the tests will destroy data)

Type **Y** to run a full verification (all tests) or **N** to select specific tests to be run. (For more information, see "Selecting Individual Tests" later in this section.)

If your response is Y, the queries that follow are displayed next. If your response is N, these queries will appear after the individual test selection is complete.

Change detail parameters?

If you choose **Y**, the following queries appear on the screen:

```
Debug?
```

Answering Y to this query enables an extensive software trace of the diagnostic operation. This option is used primarily by systems programmers.

```
Show W/R Errors [Non-Streaming]?
```

This test is only available for the HB-001 tape backup module.

Answering **Y** to this query enables extensive and detailed error reporting during whole-tape tests. This option is used primarily by hardware engineers.

```
Show activity (dots)?
```

Type **Y** if you wish dots to appear on the screen for each tape block transferred. Type **N** to suppress the activity dots.

```
Data Mode (1 = Constant Data (29CF), 2 = Ramp Pattern)
```

Answer **1** or **2** depending on the type of pattern you want written to the tape.

```
Filler data?
```

Enter a four-digit hexadecimal number if you wish to change the data pattern written to the tape. The default value, 29CF, is a worst-case pattern, maximizing the testing value of the diagnostics.

Note: *If you specify the maximum on all 3 of the following parameters, the drive may reach the end of the tape, and an end of tape error will be displayed. This is useful to those diagnosing a malfunctioning module. The values that will avoid this error depend on the length of the tape used.*

```
Number of 512-byte blocks per transfer (32 max)
```

By responding, you can set the blocking factor for most of the tests. In most cases the tests run faster if the blocking factor is large.

```
Number of transfers per file (256 max)
```

Respond by entering the size of the file to be written.

```
Number of files (100 max)
```

Enter the number of files to be written on the tape.

```
Enter the number of times to run the diagnostic
```

The test sequence you have selected runs the number of times specified unless an error occurs or you press **Finish** to stop the testing.

Selecting Individual Tests

If you answered N to Run Quick Verification? and Run Full Verification?, you can now individually select the tests you wish to run.

A prompt will appear for each test. Type **Y** or **N** to indicate whether or not you wish to run the test.

Rewind to beginning of tape

This test verifies proper operation of the rewind logic in the tape controller.

Retension tape

This test performs a retension operation on the tape cartridge. Retensioning a tape cartridge is required before reading a tape that has been exposed to abnormal temperatures or stored for a long time.

Erase entire tape (destructive)

This test erases the entire tape cartridge and then attempts to read it to verify erasure.

Write/Read/Compare (short test)

This test writes blocks to the tape, rewinds the tape, reads the blocks, and verifies the data. This short test does not write the entire tape.

Write/Read/Compare (whole tape)

This test writes blocks to the tape, rewinds the tape, reads the blocks, and verifies the data. It writes the entire tape.

Read whole tape and compare

This test reads the entire tape and verifies the previously written data. The write/read/compare (whole tape) test must be run before this test.

Read and CheckSum ROM

Note: This test, and the rest of the tests that follow only apply to the HB-001 tape backup module.

This test verifies that the firmware in the ROM on the tape controller has the proper checksum.

Read and display data by 512-byte blocks

This test reads the entire tape and displays data in 512-byte blocks. The write/read/compare (whole tape) test must be run before this test.

Selecting Functions

If you answered N to Run Quick Verification? and to Run Full Verification?, you can select the following functions in addition to the individual tests.

These functions are only available for the HB-001 module.

Display total buffer underruns and read errors

After diagnostics are performed, this function displays the number of buffer underruns and read errors that occurred during the test.

Display Boot ROM

This function displays the boot ROM revision level and then dumps the contents of the boot ROM to the screen in hexadecimal code.

Section 6
X-Bus Modules

This section describes tests for X-Bus (non storage) modules. The tests are run from Visinostics distribution diskette #3 XCP / XSP. Refer to the Module Reference Table earlier in this manual for a list of the modules covered in this section.

XE-001 Ethernet Module Diagnostic Tests

Note: *The following tests are only applicable to Convergent Technologies model XE-001, they do not apply to the B25-EN3. The B25-EN3 is an intelligent X-Bus module equipped with a processor, test descriptions for it are in Section 9 "Intelligent X-Bus Modules". The XE-001 is not equipped with a processor and functions only as an ethernet controller.*

Introduction

The XE-001 Ethernet Module diagnostic tests are used to determine whether an Ethernet Module is functioning correctly. They are not sufficient to identify the cause of a malfunction in the module.

General-Purpose Register Test

A general-purpose register test is performed to verify that the internal control/status register can perform autoincrement, wraparound, and data write/read. This test is performed with each pass of the diagnostic, even if no other tests are specified.

Selecting Individual Tests

You can select the other tests you want to run by answering the queries that follow.

Initial Dialog

The diagnostic begins with the following.

Are both terminators connected to the ENET module?

Type **Y** if you want to test the thin net port. Answering **N** to this query skips this portion of the test.

If you are testing the thin net I/O, terminate the BNC connector on the back of the module with a T connector and two 50 ohm BNC terminators. This simulates a typical load on the LAN. The thick net port is not tested with a terminator of any kind.

Stop on error?

Answering Y to this query causes the diagnostics to stop if an error occurs.

Get station address only?

Answering **Y** causes the program to fetch the station address from the Ethernet PROM. The station address is displayed on the screen and all other tests are bypassed.

Loop back test?

Answering Y enables a local loopback test on the Ethernet board with packet sizes ranging from 60 to 1514 bytes.

DMA Test?

This test performs DMA writes and reads, checks register states, and verifies test data.

Repetitive DMA test (2, 15 or 2048 byte)

If you enter one of the values listed, this test performs DMA writes and reads, checks register states, and verifies test data on the transfer size specified. The test is run continuously until you press **Cancel**.

Alternate interrupts?

If you answer Y to this query, DMA transfers are tested using X-Bus interrupts 0, 1, and 4. If you answer N, DMA transfers are tested using X-Bus interrupt 4 only.

Receive mode test?

This test disables Receive mode and verifies that no characters are received. The receiver is then enabled and a check is made to verify that all frames are received. Finally, the Ethernet Module is set to Station/Broadcast mode and a check is made to verify that the broadcast message is received.

Illegal short frames test?

This test generates short packet conditions and verifies that the Ethernet controller is able to detect them.

Bad frames check sequence test?

This test suppresses end of file (EOF) on transmit during the loopback test and verifies that the receiver can detect a bad frame sequence error.

Data pattern

Enter a four-digit hexadecimal number to change the data pattern. The initial default value is 5A5A.

B25-DCX Module Diagnostic Tests

Introduction

There are four RS-232-C ports and one X.21 port on the B25-DCX module. A loop back plug is required to test the RS-232-C ports. The X.21 port is tested through RS-232 channel D. For this reason, a loopback plug is required on channel D to test the X.21 port.

The diagnostic tests exercise the RS-232-C interface chip and its supporting logic in the B25-DCX.

RS-232-C Test Requirements

The RS-232-C channels can be tested independently of each other. All the combinations of parameters appropriate to each mode are automatically tested.

For the diagnostic tests to operate properly, each channel must be externally looped back to itself. Before running these tests, connect a loopback plug to each RS-232-C channel with the following pin arrangements:

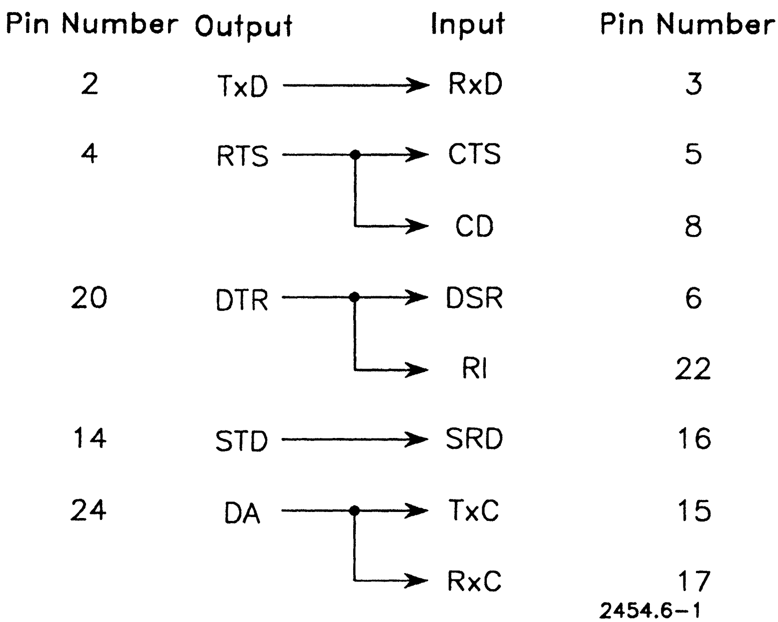


Figure 6-1. RS-232 Loopback Connector

Selecting Individual Tests

When you select the B25-DCX, a series of prompts and queries appears on the screen.

Run quick Asynchronous test?

Type **Y** or **N** to indicate whether or not you want to run the test.

The Asynchronous test transmits and receives data from the RS-232-C interface chip by passing it through the RS-232-C transmitters, the loop-back, and the RS-232-C receivers, and returning it to the RS-232-C interface chip. The RS-232-C interface chip is initialized to transmit and receive data in asynchronous format.

The transmit data are obtained from a transmit buffer, under interrupts, and the received data are placed into a receive buffer, also under interrupts. After all the data in the transmit buffer have been transmitted and received, the buffers are compared for errors. Any errors detected are displayed on the screen. If other errors are detected during the test, they are displayed when they are detected.

If you respond **Y** to this query, the test runs at the following parameters:

baud:	300 and 9600
character length:	5 bits
parity:	odd
stop bits:	2

If you respond **N** to this query, the test runs at the following parameters:

baud:	1200, 4800, and 9600
character length:	5, 6, 7, and 8 bits
parity:	none, odd, and even
stop bits:	1,1 1/2, and 2

Stop on a communications error?

Type **Y** to stop the test if an error occurs or **N** to continue. If you type **N**, any errors that occur are reported as they happen, without stopping the test.

When the diagnostic stops on an error, the error is reported and this query is displayed

```
Hit <GO> to continue...  <FINISH> to terminate.
```

Pressing **Go** continues the test. Pressing **Finish** ends the test.

Synchronous test

The synchronous test checks the operation of the RS-232-C driver circuitry in synchronous mode. All baud rates are tested.

SCC Access Test

The SCC (serial communication controller) access test is a preliminary register test performed on each port as the port is selected.

Static Signal Test

This test runs automatically, the message is displayed when the test is run. The test is run once on each RS-232-C submodule port selected for testing.

The static signal test checks the interface between the CPU and the RS-232-C interface chip by writing to and reading from the Control register inside the interface chip. This subtest determines whether the CPU and the RS-232-C interface chip can successfully communicate with each other.

X.21 Port Tests

The only test run on the X.21 port is the Synchronous test. This test checks the functioning on the driver circuitry for the X.21 port at baud rates of: 300, 600, 1200, 2400, 4800, and 9600.

XC-002 Multiline Port Expander Module Diagnostic Tests

Note: *The test descriptions that follow are for use with Convergent Technologies XC-002 Multiline Port Expander Module. Refer to "B25-DCX Diagnostic Tests" earlier in this section when testing the B25-DCX Module.*

Introduction

The Multiline Port Expander Module has four RS-232-C channels (A, B, C, and D) available for transmitting data to external devices. These channels are identical to the RS-232-C channels (A and B) found in the Processor Module, and the tests used to check them are also identical.

The diagnostic tests exercise the RS-232-C interface chip and its supporting logic in the Multiline Port Expander.

Test Requirements

The RS-232-C channels can be tested independently of each other, and each can be tested in several modes of operation. All the combinations of parameters appropriate to each mode are automatically tested.

For the diagnostic tests to operate properly, each channel must be externally looped back to itself. Before running these tests, connect a loopback plug to each channel with the following pin arrangements:

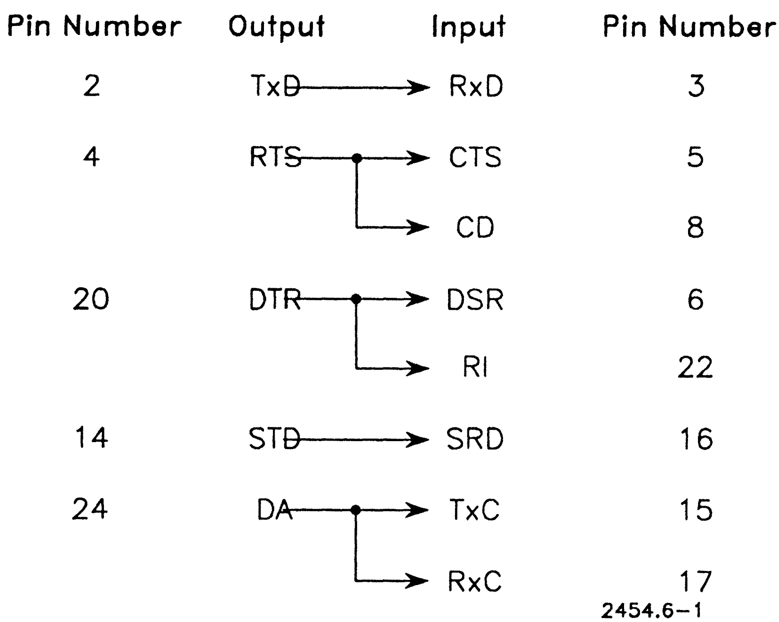


Figure 6-2. RS-232 Loopback Connector

For further information on loopback connectors and the RS-232-C interface channels, see the chapter on external interfaces in the *Multiline Port Expander Manual.*

Selecting Individual Tests

When you select the XC-002 Multiline Port Expander, a series of prompts and queries appears on the screen.

When the static status test is complete, the following query appears:

Asynchronous mode test?

Type **Y** or **N** to indicate whether or not you want to run the test.

The Asynchronous mode test transmits and receives data from the RS-232-C interface chip by passing it through the RS-232-C transmitters, the loopback, and the RS-232-C receivers, and returning it to the RS-232-C interface chip. The RS-232-C interface chip is initialized to transmit and receive data in asynchronous format.

The transmit data are obtained from a transmit buffer, under interrupts, and the received data are placed into a receive buffer, also under interrupts. After all the data in the transmit buffer have been transmitted and received, the buffers are compared for errors. Any errors detected are displayed on the screen. If other errors are detected during the test, they are displayed when they are detected.

All combinations of baud rates (2400, 4800, 9600, and 19200 baud), data length (5, 6, 7, and 8 bits), parity (none, odd, and even parity), and stop bits (1, 1-1/2, and 2 bits) are tested.

Character sync CRC-16 test?

Type **Y** or **N** to indicate whether or not you want to run the test.

The character sync CRC-16 test is the same as the Asynchronous mode test described above, except that the RS-232-C interface chip is initialized to transmit and receive data in bisynchronous format. It uses the CRC-16 cyclical redundancy check (CRC) polynomial.

This test is run at several baud rates (2400, 4800, 9600, and 19200 baud). The data length is fixed at 8 bits and parity is fixed at none during the execution.

Bit sync data transfer test?

Type **Y** or **N** to indicate whether or not you want to run the test.

The bit sync data transfer test is the same as the Asynchronous mode test described above, except that the RS-232-C interface chip is initialized to transmit and receive data in synchronous data link control (SDLC) bit synchronization format. It uses the SDLC CRC polynomial.

This test is run at several baud rates (300, 600, 1200, and 2400 baud). The data length is fixed at 8 bits and parity is fixed at none during the execution.

Bit sync abort/idle line test?

Type **Y** or **N** to indicate whether or not you want to run the test.

The bit sync abort/idle line test is the same as the Asynchronous mode test described above, except that the RS-232-C interface chip is initialized to transmit and receive data in SDLC bit synchronization format. It uses the SDLC CRC polynomial.

This test is run at several baud rates (300, 600, 1200, and 2400 baud). The data length is fixed at 8 bits and parity is fixed at none during the execution. Normal data transmission and reception are tested, as in the bit sync data transfer test.

In addition, the test includes generation and recognition of an abort transmission sequence and restarting of the transmission. When the bit sync abort/idle test is running, this message appears if the test is successful:

```
<<<abort received>>>
```

NRZI Data Test on Channels [A and B]?

The NRZI data test transmits and receives NRZI data on channels A and B. RS 232 loopback plugs must be installed on both ports A and B to run the test.

Stop on communications error?

Type **Y** to stop the test if an error occurs or **N** to continue. If you type N, any errors that occur are reported as they happen, without stopping the test. This is the final query.

Static Status Test

The static status test is the first test run when the RS-232-C submodule is selected. It runs automatically, and its prompt appears on the screen only after the test begins.

The static status test includes three subtests of increasing complexity.

The first subtest checks the interface between the CPU and the RS-232-C interface chip by writing to and reading from the Control register inside the interface chip. This subtest determines whether the CPU and the RS-232-C interface chip can successfully communicate with each other.

The second subtest checks the interface between the RS-232-C interface chip and the loopback plug. The following control lines are tested for proper loopback and function:

Control Line	Function
DTR	Data Terminal Ready
RTS	Request to Send
CTS	Clear to Send
CD	Carrier Detect
DSR	Data Set Ready
RI	Ring Indicator
STD	Secondary Transmit Data
SRD	Secondary Receive Data
DA	Transmit Signal Element Timing
TxC	Transmit Clock
RxC	Receive Clock

The third and final subtest checks the same control signals as the second subtest, but does so using interrupts between the CPU and the RS-232-C controller. Nothing is shown on the screen during the third subtest unless an error occurs.

Error Information Screen

If the diagnostics detects an error during testing, an error information screen is displayed. This screen is divided into the five sections discussed below.

Error Information

This section contains details of the detected error condition. The actual error and the actual and expected test results are displayed.

Probable Causes of the Error

This section lists one to three conditions that may have caused the error. These conditions are not the only possible causes. However, the list does provide a starting point from which to locate the cause of the current error.

RS-232-C Interface Chip (8274) Status Information

This section displays the status of the RS-232-C interface chip channel being tested when the error occurred. The actual and expected state of each bit in the RS-232-C interface chip status registers are given. For a complete description of each bit in the two RS-232-C interface chip status registers, see the Processor Manual for your workstation.

Extended Status Register Information

This section displays the information contained in the Extended Communications status register at the time of the error. The register contains information for both communications channels, but the screen display shows only the information pertaining to the channel being tested. This section, like the preceding section, displays both the actual and the expected states of each bit at the time of the error.

Dialog

Dialog with the diagnostics program is displayed in this section. The dialog includes requests for continuing or aborting the tests.

Voice Processor Module Diagnostic Tests

Introduction

The following Voice Processor Module tests are not sufficient for troubleshooting a malfunctioning Voice Processor Module. However, they are sufficient for determining whether the module is operating correctly.

If an error occurs, refer to the *Voice Processor Manual* or contact a field service technician for a more thorough study of the problem.

Initial Dialog

When you select the Voice Processor diagnostic tests, the following queries appear on the screen:

Stop on error?

Type **Y** to stop the test on an error or **N** to continue if errors occur. If you answer Y, the program stops when an error occurs and displays the following query:

```
Continue?
```

Type **Y** to continue. If you wish to end the tests at this point, press **Finish.**

If you respond N to Stop on Error? the tests continue without interruption, even if errors occur. Hard and soft errors are registered on the main icon menu as they take place.

Selecting Individual Tests

You can select the tests you want to run by answering the queries appropriate to each test.

External Loopback Test

The external loopback test checks the on-hook and off-hook relays in the line interface of external telephone lines 1 and 2. The dual tone multi-frequency (DTMF) generator and receiver are connected to the two external telephone lines and tested to verify that data are generated and received. Telephone lines 1 and 2 handle all the incoming and outgoing calls placed through the Voice Processor Module.

To run this test, both telephone lines must be connected by an external loopback cord. The loopback cord can be constructed using the special 15-foot Voice Processor cord provided with the Voice Processor Module and two parts, which are easily obtainable from any electrical supply store:

- one Modular Duplex Jack, USOC Code RJA2X (also known as an answering machine connector)
- one 5-1/4-inch RJ11 Modular Line Cord

Once you have the needed parts, assemble the loopback cord as follows (see Figure 1):

1. Remove the cover on the back of the Voice Processor. It comes off easily when pinched at the bottom and lifted up and out.
2. Insert the customized end of the 15-foot Voice Processor cord into the modular jack labeled Phone. Only one end fits.

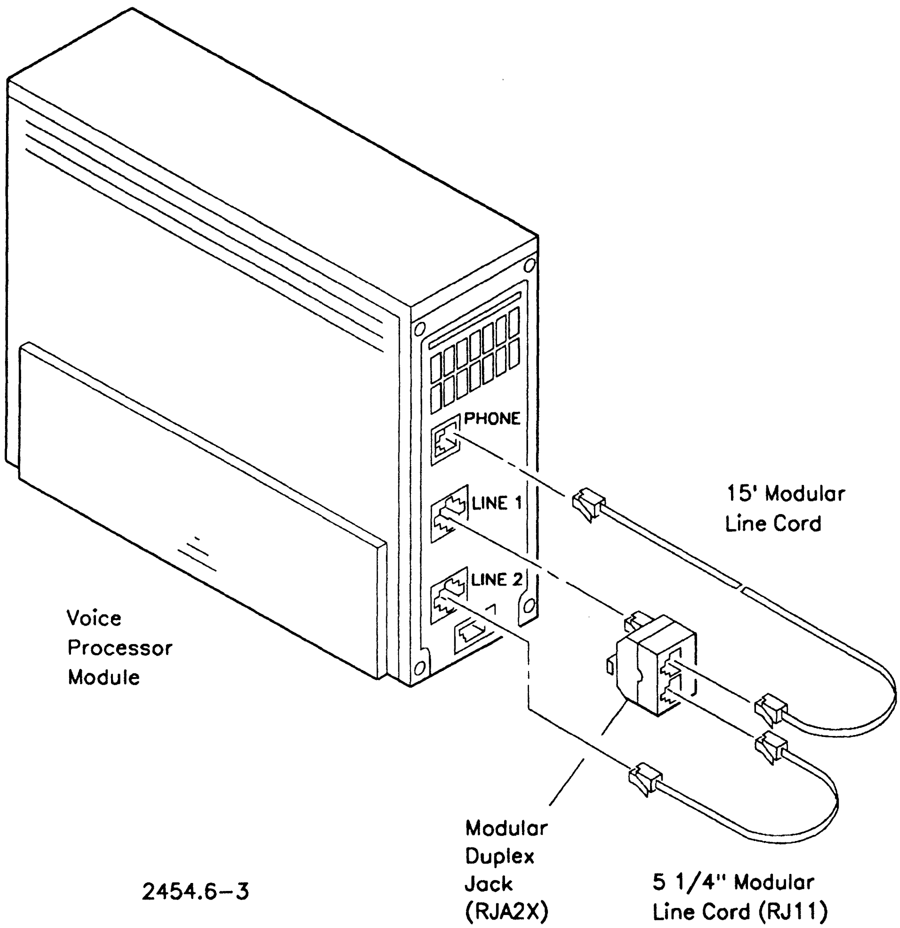


Figure 6-3. Assembling the Loopback Cord

3. Plug the other end of the Voice Processor cord into the RJA2X Modular Duplex Jack.
4. Plug the Modular Duplex Jack into the Voice Processor jack labeled Line 1. (Continued on next page)

5. Plug either end of the 5-1/4-inch Modular Line Cord into the remaining slot on the Modular Duplex Jack.
6. Plug the 5-1/4-inch Modular Line Cord into the Voice Processor jack labeled Line 2.

The external loopback test cannot be run without a loopback cord. A screen message describing the need for a loopback cord precedes the first query:

```
A loopback cord is required to run the external loopback
test of the telephone management diagnostics.  Do you want
to run this test?
```

Type **Y** or **N** to indicate whether or not you want to run the test.

Do you want to run the internal loopback test?

The internal loopback test checks various internal functions of the Voice Processor Module.

Type **Y** or **N** to indicate whether or not you want to run the test. If you choose Y, the following three subtests are run.

```
DTMF Generator/Receiver Test
```

The DTMF generator/receiver subtest connects the DTMF generator to the DTMF receiver through the analog crosspoint switch. The DTMF generator then generates a tone and checks whether it is received by the DTMF receiver.

Sixteen tones are generated in all, and if 16 are received, the test is passed. If any of the 16 are not received, the test is failed.

If you answered **N** to Stop on Error?, the tests continue even if a failure occurs.

```
Call Progress Tone Detector Test
```

The call progress tone detector (CPTD) subtest connects the DTMF generator to the call progress tone detector, through the analog crosspoint switch. The DTMF generator then simulates a dial tone and checks the CPTD's ability to detect this input of energy.

The DTMF generator also tests the CPTD's ability to register the absence of energy. It connects itself to the CPTD without generating a signal. It then polls the CPTD to make sure nothing was received.

If the CPTD performs as expected, the test is passed. If it does not, an error message is displayed, and the test is failed.

```
ADPCM Encoder/Decoder Test
```

The ADPCM encoder/decoder (CODEC) subtest checks the circuitry that handles analog-to-digital, and then digital-to-analog, signal conversions.

The DTMF generator tests the CODEC first for silence, and then for reception of DTMF tones. Signals are converted inside the CODEC, and transferred over the X-Bus using direct memory access of the workstation's memory.

Standalone Modem Test (if fitted)

The standalone modem test checks the state of the internal modem, without any outside connections.

Using the Analog Loopback mode of the modem, the diagnostics sends data to the microprocessor inside the Voice Processor Module, which relays the data to the modem. The modem then sends the data back to the diagnostics through the same channels. The transmitted and received data are compared to make sure there are no differences.

This data transfer takes place at two speeds, 300 and 1200 baud.

X-Bus DMA test?

Type **Y** or **N** to indicate whether or not you want to run the test.

In this test, the Voice Processor Module receives an X-Bus DMA command from the diagnostics and writes information found in a specific location to another specific location. The diagnostics then reads this information, compares it to what was written, and makes sure it is correct. In this way the diagnostics verifies the proper operation of the X-Bus DMA transfer.

Graphics Controller Module Diagnostic Tests

Graphics Controller Module Models: GC-001, B25-GRE, B25-GRA

Introduction

The diagnostic tests for Graphics Controller Modules require your close attention to the monitor screen while the tests are being run. Only three of the tests are self-checking: the others require your visual attention to determine whether an error has occurred. The following test descriptions apply to the GC-001, B25-GRE, and B25-GRA. For simplicity, only references to the B25-GRA are made in the text, these references apply to all three models.

Monitor Requirements

A Color or Monochrome Monitor can be used for the tests. Before running the tests with either monitor, make sure the monitor is plugged into the back of the module. If it is not, turn off the workstation power before connecting the cables.

Only some of the tests run with a Monochrome Monitor. The test displays that check color functions only (and in some cases their labels) do not appear on a Monochrome Monitor. For a list of the tests that run with a Monochrome Monitor, see the *Monochrome Monitors Manual*, or consult a field service technician familiar with your system.

Initial Dialog

When the Graphics Controller Module is chosen, the following queries are asked:

Stop on graphics memory error?

If you answer Y, the diagnostic test stops while reporting graphics memory errors and prompts you to press any key to continue. This question applies only to the three tests that are self-checking.

Delay (1-10)?

This query gives you the opportunity to speed up or slow down the pace of the tests. If you choose 1, the fastest setting, the tests run very rapidly. However, you can stop the test by pressing **Prev Page** and restart it by pressing **Next Page**. The speed you choose becomes the new default setting until it is changed.

Provide labels?

This query gives you the opportunity to suppress verbal descriptions of each test from the screen. Since most of the B25-GRA tests are not self-checking, labels are provided to help you verify what you see. Type N to suppress the labels. This becomes the new default setting until it is changed.

B25-GRA Graphics Controller Module Tests

Graphics Control Registers Test

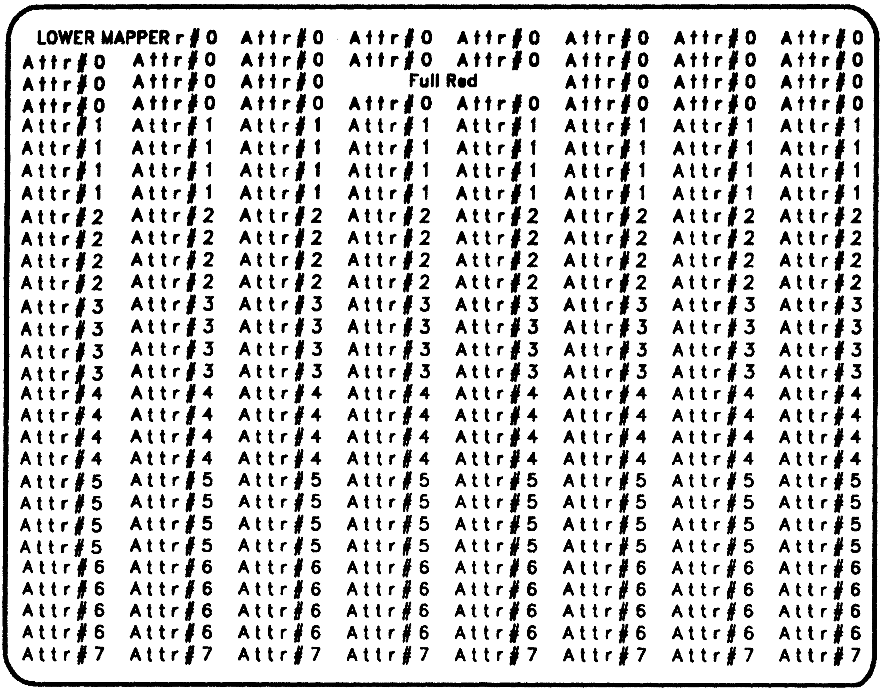
This test checks the basic communications hardware inside the B25-GRA (Graphics Control registers 1 and 2). It is self-checking; a screen message reports whether the test was passed or failed. The display is the same for a Color or a Monochrome Monitor.

Color Mapper Test

This test checks the lower and upper color mapper RAM inside the B25-GRA, and is displayed only on the Color Monitor. The color mapper tests do not appear on the screen when run with a Monochrome Monitor.

The test cycles through the color mapper display four lines at a time, starting with the lower mapper and then moving to the upper mapper. (Figure 1 shows the first set of lines in the full red portion of the sequence.)

Each four-line set is given a number between 0 and 6; the number 7 is given to a single line. Each set of numbered lines (including line 7) cycles through a sequence of color changes before the test moves on to the next group of lines. The test is finished when all sets of lines in both color mappers have finished the color changes.



2454.6–4

Figure 6-4. Color Mapper Test

The sequence of color changes, as they appear in the color mappers, is as follows:

- medium green
- low green
- full green
- medium blue
- low blue
- full blue
- medium red
- low red
- full red

The color mapper tests are not self-checking. You must determine if the test is passed or failed. Relative approximations of the colors are sufficient to indicate that the color mappers are working. However, any change in the blue background color or any alteration of the characters indicates a problem inside the module.

Memory Test

This test checks the bit map memory inside the B25-GRA. It includes several subtests, each of which is self-checking. For each subtest, a screen message indicates the errors, and whether the test is passed or failed. If the memory test fails, the B25-GRA tests halt and no more tests are run.

This is the last test in the B25-GRA sequence that is self-checking. The display is exactly the same for a Color or a Monochrome Monitor.

Three-Color Test

This test completely fills the screen, in sequence, with the three primary colors used by the B25-GRA Graphics Controller Module: green, blue, and red.

Each color in this test goes through a cycle similar to the one used in the color mapper tests. The display appears only on the Color Monitor. The sequence is as follows:

- medium green
- low green
- full green
- medium blue
- low blue
- full blue
- medium red
- low red

Unlike the color mapper sequence, full red is not tested.

The three-color test is not self-checking. You must determine if the test is passed or failed. Relative approximations of the colors are sufficient to indicate that the test is successful.

Line Drawing Test 1: Red Concentric Rectangles

The line drawing test checks the line drawing circuitry inside the B25-GRA. It draws a screenful of overlapping concentric rectangles made up of red and black lines. These rectangles are close together and appear to make up a single rectangle. It divides this rectangle into quarters, using four slanting lines that extend from the corners of the rectangle into the center. There they join the corners of a smaller rectangle. Inside this rectangle is the screen message, Red Concentric Rectangles. (See Figure 2.) If labels are suppressed the smaller rectangle appears completely black.

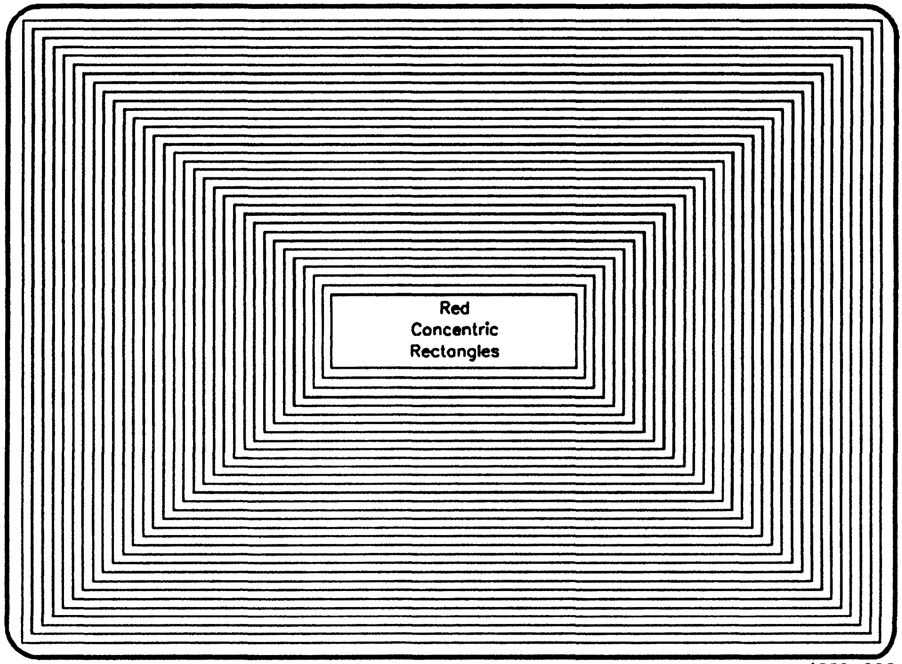


Figure 6-5. Line Drawing Test 1: Red Concentric Rectangles

This test appears in monochrome green and black on a Monochrome Monitor, and inside the small center rectangle is the message Concentric Rectangles, if labels are not suppressed.

This line drawing test is not self-checking. You must determine if the test is passed or failed. Relative approximations of the colors and straightness of the lines are sufficient to indicate that the line drawing circuitry in the module is functioning correctly.

Overlapping Lines Test

The overlapping lines test checks whether alphanumeric characters and graphics are properly aligned. It fills the screen with green letter H's, and then draws red lines horizontally and vertically through them, superimposed upon and intersecting the lines in the letters. (See Figure 3.) If labels are not suppressed, the message Lines Intersect Green H's appears in the center of the screen.

This test appears as green lines intersecting green H's on a Monochrome Monitor. In the center of the screen is the message Lines Intersect Green H's, if labels are not suppressed.

The overlapping lines test is not self-checking. You must determine if the test is passed or failed. Slight offsets of the lines, if consistent, do not indicate any malfunction of the module. However, a noticeable misalignment of letters and lines indicates a problem, which should be referred to a field service technician.

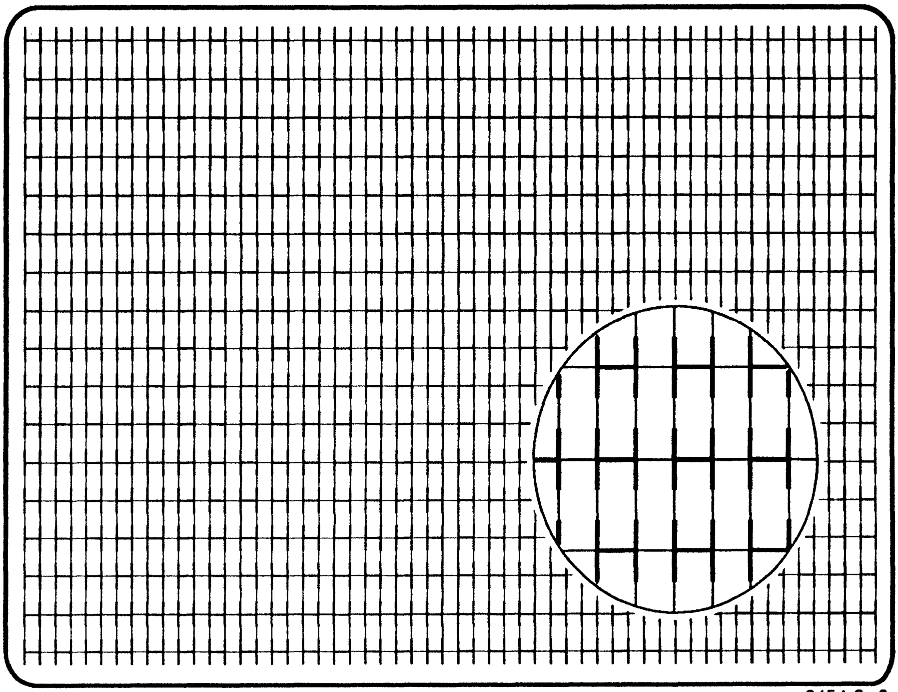


Figure 6-6. Overlapping Lines Test

Line Drawing Test 2: Rays

This test checks the line drawing circuitry by drawing rays of different colors inside a box on the screen. On a Monochrome Monitor, this test is not displayed. On a Color Monitor, the test divides the box into eight sections, each section with a differently colored ray.

Starting in the top left corner and moving clockwise, you should see the following colors:

- light blue
- dark red
- dark blue
- green
- light red
- yellow
- white
- purple

Each color is labeled if you answered Y to Provide Labels? (See Figure 4.) Otherwise, only the colors appear when the test is run.

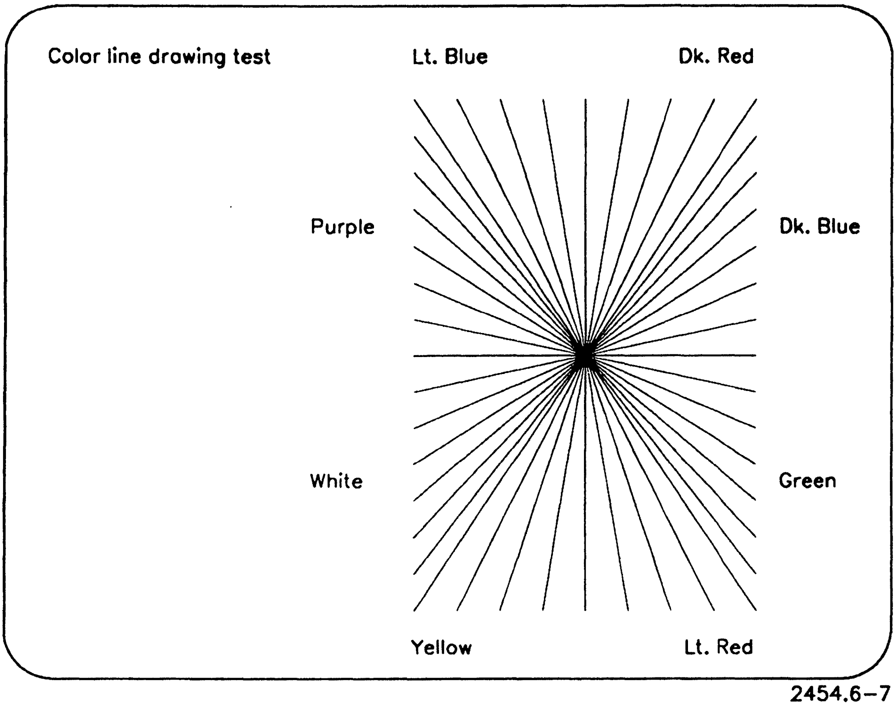


Figure 6-7. Line Drawing Test 2: Rays

This line drawing test is not self-checking. You must determine if the test is passed or failed. Relative approximations of the colors and a ray-like appearance of the lines are sufficient to indicate that the line drawing circuitry is functioning correctly.

Graphics Controller: Model GC-102

Introduction

The diagnostic tests for the GC-102 Graphics Controller require your close attention to the monitor screen while the tests are being run. Only two of these tests are self-checking: the others require your visual attention to determine whether an error has occurred.

The GC-102 is an Enhanced Video controller module. For processor modules equipped with Enhanced Video, refer to section 7 of this manual.

Initial Dialog

When the GC-102 Graphics Controller is chosen, the following queries are asked:

Stop on graphics memory error?

If your response is Y, the diagnostic test stops while reporting graphics memory errors and prompts you to press any key to continue. This question applies only to the two tests that are self-checking.

Delay (1-10)?

This query gives you the opportunity to speed up or slow down the pace of the tests. If you choose 1, the fastest setting, the tests run very rapidly. However, you can stop the test by pressing **Prev Page** and restart it by pressing **Next Page**. The speed you choose becomes the new default setting until it is changed

Graphics Register Test

This test checks all of the hardware registers inside the GC-102. It is self-checking; a screen message reports whether the test was passed or failed. The display is the same for a Color or a Monochrome Monitor. This test is self-checking.

Color Mapper Test

This test checks the sixteen color mapper registers (eight foreground, eight background) inside the GC-102, and is displayed only on the Color Monitor. The color mapper tests do not appear on the screen when run with a Monochrome Monitor.

The test subdivides the screen into eight windows, one for each color mapper. Each color mapper is initialized with a unique color (2/3 green, 1/3 green, 2/3 blue, 1/3 blue, 2/3 red, 1/3 red, white or black). The color mappers and their contents are clearly identified with descriptive text. The colors are rotated counterclockwise on the display until all colors have been displayed in each of the eight mappers. The eight foreground color mappers are tested first followed by the eight background color mappers. This test is not self-checking.

Reverse Video Test

This test checks the hardware register within the GC-102 which reverses the screen (the foreground mapper becomes the background and the background mapper becomes the foreground). A white text on black background display will be presented, when the reverse video bit is toggled the display will become black text on white background. This test is not self-checking, it must be visually verified.

132 Column Mode Test

This test checks the 132 column mode capability of the GC-102 by displaying a border character around the perimeter of the video display. If the 132 column mode is not functioning properly the screen will be distorted or the box will be broken. This test is not self-checking, it must be visually verified. The 132 column mode tests are not run when a Color Monitor is connected to the GC-102.

Graphics Memory Test

The graphics memory test checks the graphics memory using the following patterns:

- all 0s
- all 1s
- alternating 0s and 1s (run twice)
- ramp pattern (run twice)

The graphics screen will display unintelligible characters during this test because the display is based on the contents of graphics memory. This test is self-checking.

Video Memory Test: Static RAM

This test is performed on the internal video controller on 186, 286, and 386 processor modules, and on the GC-102 enhanced video controller.

This video memory test confirms that static RAM in video memory is working properly. This test displays an image of an NGEN workstation; a processor module, a monitor, and a keyboard are displayed. Before the test runs, the following message is displayed on the screen:

```
                    Video Memory Test

This picture should scroll back to its original position
then cycle through different font mappings.
```

If this test fails, the test stops and an error message is displayed. The video memory test is performed once in each of the different combinations of video attribute modes.

Note: *The picture displayed does not necessarily represent the configuration of your workstation hardware.*

Video Attribute Test

The video attribute test displays all the video attributes on the screen (for example, half-bright, bold, struck-through, underlined).

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Graphics Controller Models: GC-003, GC-103

Introduction

The following test descriptions are for the GC-003 and GC-103 bit mapped graphics controller modules. Tests for the two models are the same.

Initial Dialog

The GC-003 queries are briefly described below.

Display error table after testing?

If your response is Y, the screen will display a log of all of the errors that have occurred during testing.

Terminate the test on first error?

If you answer Y to this query, the diagnostics will stop on any error that may occur.

Rectangle scroll speed (0 - 9)?

Enter a number from 0 to 9 to determine the speed at which messages and patterns are scrolled off the screen. Nine is the minimum scrolling speed.

GC-003/103 Graphics Controller Tests

If you select the GC-003 Graphics Controller, both of the following diagnostic tests will run. They occur in the order listed below.

Graphics Memory Test

The graphics memory test checks the graphics memory using the following patterns:

- all 0s
- all 1s
- alternating 0s and 1s (run twice)
- ramp pattern (run twice)

The graphics screen will display unintelligible characters during this test because the display is based on the contents of graphics memory.

Cursor/Scroll Test

The cursor/scroll test is self-checking. It begins by drawing a converging rectangles pattern (see Figure 6). Then the video blanking function is tested; the screen will go blank and then reappear. Next, the cursor functions are verified in the following order:

- normal cursor
- cursor off
- normal cursor
- reverse video cursor
- exclusive-ORed cursor

Finally, horizontal and vertical scrolling are tested.

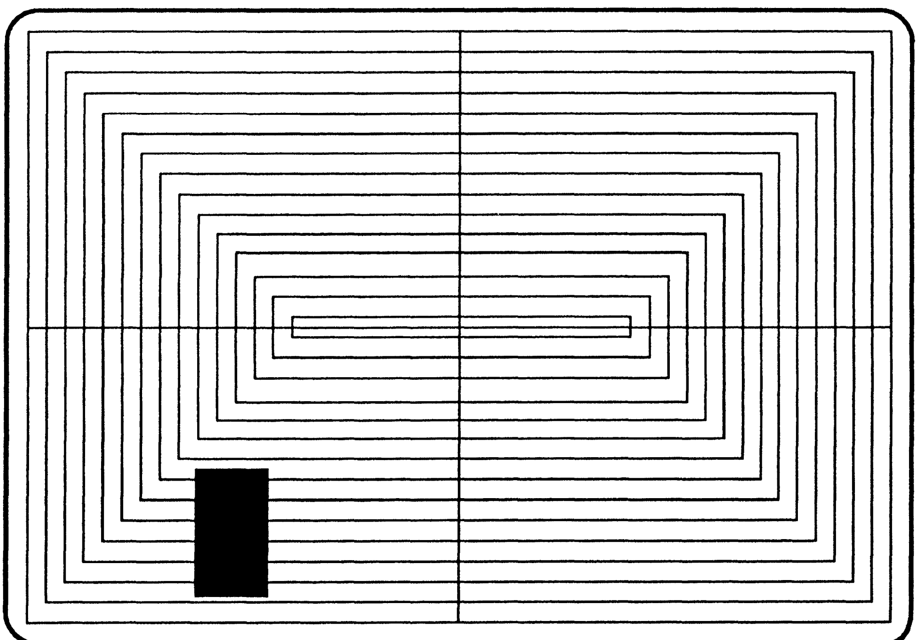

Figure 6-8. Cursor/Scroll Test

Graphics Controller: Models GC-004 and GC-104

This section describes the initial dialog and tests for the GC-004/104 Graphics Controller.

Initial Dialog

The GC-004/104 diagnostic tests begin with the following queries. Initial defaults are shown in square brackets ([ ]). If you change a default setting, however, that change becomes the default until you exit Visinostics (see also Chapter 2, "Running Visinostics").

Stop on graphics memory error? [Y]

If you use the initial default or enter **Y**, testing stops when graphics memory errors are encountered; you are then prompted to press any key to continue. This query applies only to tests that are self checking.

If you enter **N**, testing does not stop when graphics memory errors are encountered.

Manual step mode? (GoKey to proceed) [N]

If you enter **Y**, Visinostics pauses after each test until you press **Go** to resume testing. (If you select this mode, you can disable it at any time during testing by pressing **Code-Go**.)

If you use the initial default or enter **N**, the following prompt appears:

Delay (1-10)? [10]

By responding to this query, you can speed up or slow down the pace at which tests are executed. The default setting, 10, is the slowest; 1 is the fastest. If you enter 1, the tests run very rapidly.

Provide labels? [Y]

If you use the initial default or enter **Y**, test results are labeled with descriptions of what should appear, to help you verify test results.

If you enter **N**, labels are suppressed.

GC-004/104 Graphics Controller Tests

Different subsets of graphics controller tests are executed, depending on what monitor is attached to the GC-004/104. Table 1 lists the subset of tests for each monitor.

Most of the tests are not self-checking. You must visually verify test results from the appearance of the screen. If an error occurs during testing, see the GC-004/104 Technical Reference, or refer the problem to a field service engineer who is familiar with your workstation.

Register Test

This test checks the hardware registers inside the GC-004/104. It is self-checking and a message reports whether it has passed or failed.

Graphics Memory Test

This test checks the memory inside the GC-004/104. It is self-checking and a message at the bottom of the screen reports whether it has passed or failed.

If you execute this test in Manual Step mode (see "Initial Dialog," above), you will have to press **Go** several times during this test.

Table 6-1. GC-004/104 Controller Tests

Test	Monitor Attached					
	VM-001 or VM-002	VC-002	VM-003	VGA	8514 Color	8514 Mono
Register	X	X	X	X	X	X
Graphics Memory	X	X	X	X	X	X
Video Attribute	X	X	X	X	X	X
Mosquito Net	X	X	X	X	X	X
Cursor String	X	X	X	X	X	X
Color Mapper*		X		X	X	
Reverse Video	X	X	X	X	X	X
Three Color*		X		X	X	
Overlapping Lines	X	X	X	X	X	X
ASCII Character Set	X	X	X	X	X	X
Concentric Rectangles	X	X	X	X	X	X
Line Sweep	X	X	X	X	X	X
Color Bars*		X		X	X	
High Resolution			X		X	X
Digital-to-Analog Converter*				X	X	
Display from High Memory**	X	X	X	X	X	X

*color monitors only
**GC-004/104s with 512K bytes of memory

Note: *Tests for the CA1 and GS1 monitors are the same as tests for the 8514 Color and 8514 Mono respectively.*

The following tests are described elsewhere in this manual, as listed below:

- **Video Attribute, Mosquito Net, Cursor String**. See "Video Controller Tests," in the "Processors" chapter of this manual.
- **Color Mapper, Three Color, Overlapping Lines, Pattern and Vector Mode, Attribute Address**. See "GC-001 Graphics Controller Module Tests," earlier in this chapter.
- **Reverse Video**. See "GC-102 Graphics Controller Tests," earlier in this chapter.

The tests described below are unique to the GC-004/104 Graphics Controller.

Concentric Rectangles

The Concentric Rectangles test consists of three sets of rectangles drawn inside each other (similar to Figure 2, earlier in this chapter). The second set is then superimposed on the first, with elongated proportions. The third set is superimposed on the first two, with compressed proportions.

On color monitors, the first set of rectangles is green, the second red, and the third blue.

Line Sweep

The Line Sweep test consists of a straight line anchored at one corner of the screen, which sweeps the entire screen in a diagonal pattern. Due to the graphics motion, however, the line does not appear solid as it sweeps the screen; this is normal.

The test is performed four times, with the line anchored at each corner of the screen.

On color monitors, Line Sweep is executed seven times consecutively in green, red, blue, yellow, purple, cyan, and white.

Color Bars

On color monitors, vertical color bars appear on the screen, in the following order from left to right:

```
green  red  blue  yellow  purple  cyan  white
```

High Resolution

The High Resolution test is executed on VM-003 and IBM 8514 (and compatible) monitors. It consists of concentric rectangles (see above) appearing in the upper left quadrant of the screen.

Display From High Memory

The Display From High Memory test is only executed on Graphics Controllers with 512K bytes of memory. It presents three consecutive screens for your inspection.

Memory, as a whole, is depicted as a filled triangle on a blank background, as shown in Figure 7. In the first screen, the upper portion of the triangle is displayed to portray standard memory (see 7a).

In the second screen, the triangle scrolls upward and the first byte of high memory is displayed (see 7b).

In the third screen, the triangle again scrolls upward to show the limit of high memory, depicted by the point of the triangle, at the bottom of the screen (see 7c). The position of the first byte of high memory also scrolls upward.

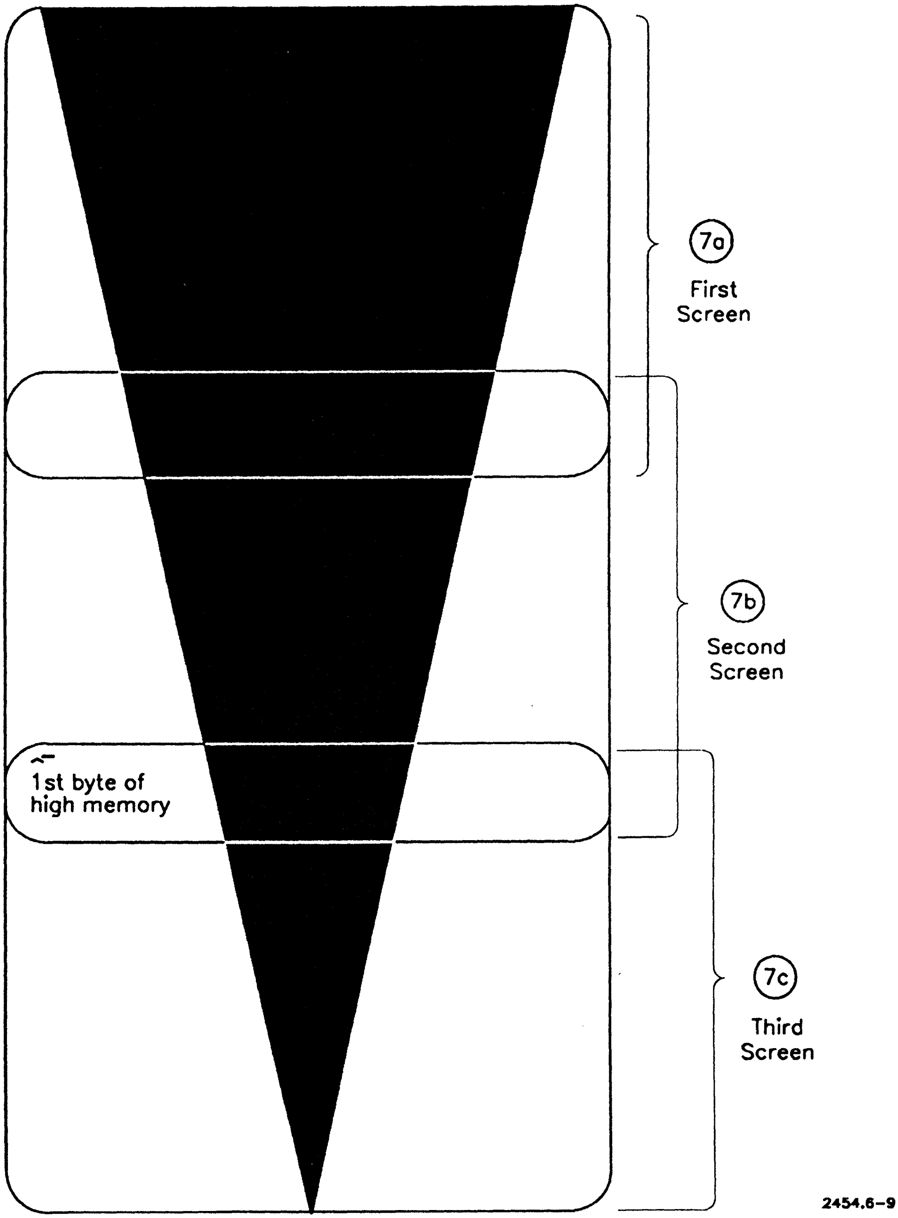

Figure 6-9. Display From High Memory Test

Digital-to-Analog Converter

The Digital-to-Analog Converter test is executed on IBM 8514 (and compatible) color monitors. It consists of three squares, colored red, green, and blue consecutively, displayed on the screen. During the test, the color intensity of each square fades from high (3Fh) to low (0). The current intensity is displayed as a hexadecimal number beneath the squares. This display decrements rapidly (much like a stopwatch) during testing.

In addition to color intensity, this test also checks the palette registers in the GC-004/104. Therefore, the test is repeated five times. Groups of registers are tested in five banks, displayed above the square as a value from 0 to 4.

Monitor Diagnostic Tests

Monochrome Monitors

The monochrome monitor diagnostic tests are executed on the following monitors:

- B25-D1
- B25-D2
- VM-001
- VM-002
- VM-003
- monochrome IBM 8514 (and compatibles)

Use the monochrome monitor tests to determine if your monitor is operating correctly. These tests require your close attention while they are executing; because the tests are not self-checking, you must determine, from the appearance of the screen, if they pass or fail.

If an error occurs, refer to the *Monochrome Monitors Manual* or contact a field service technician for a more thorough study of the problem.

Note: *Graphics controller tests can also be run on monochrome monitors. See "Graphics Controller Modules," earlier in this manual, for more information.*

Monochrome Monitor Tests

The following tests are executed on the VM-001, VM-002, monochrome IBM 8514 (and compatibles), and VM-003 connected to a GC-004/104 Graphics Controller.

For a VM-003 connected to a GC-003/103 Graphics Controller, see "Tests for VM-003 Connected to GC-003," later in this section.

When a test pauses, inspect the screen, then press **Go** or **Next** to move on to the next screen.

Pincushion Pattern Test

The pincushion pattern test (see Figure 1) is used to measure screen width, height, centering, and brightness of the monitor. Check to see that the lines are straight, complete, and in focus.

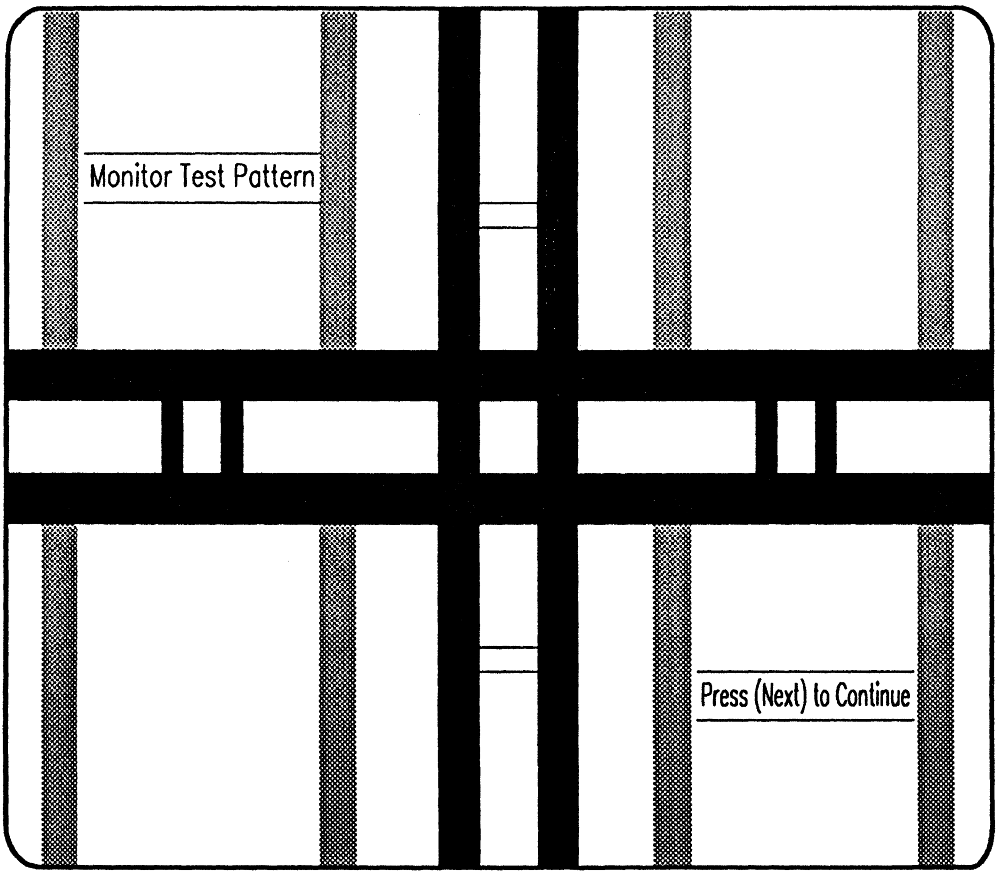

Figure 6-10. Pincushion Pattern Test

Half-Bright Pincushion Test

The half-bright pincushion test uses the same pattern and measures the half-bright attribute of the monitor.

Focus Test

The focus test displays a screen filled with lowercase m's. The m's should be in focus at every point on the screen.

Speaker Test

The speaker test checks the speaker in the monitor. A beep will sound for approximately 1 second whenever you press **Go**. Press **Next** to terminate this test.

High Voltage Regulator Test

The high voltage test displays a band across the lower half of the screen. While this band is displayed, slowly turn the brightness control knob from the dimmest to brightest position. Slight bowing of the vertical edges is to be expected, however, excessive bowing indicates a problem with the high voltage regulator.

Tests for VM-003 Connected to GC-003

The following tests are executed on the VM-003 monitor when it is connected to a GC-003/103 Graphics Controller. If the VM-003 is connected to a GC-004/104 Graphics Controller, only the monochrome monitor tests, described earlier in this section, are executed.

Initial Dialog

The tests are preceded by the following queries:

Automatically cycle through test screens?

If you enter **N**, diagnostics stop after each test, and you must press **Go** to proceed to the next test.

If you enter **Y**, tests execute automatically.

```
Delay? (1-10)
```

If you chose to cycle through tests automatically (see the previous query) you can speed up or slow down the pace at which tests are executed. The default setting, 10, is the slowest; 1 is the fastest. If you enter 1, the tests run very rapidly.

Screen Displays

Monitor tests consist of the following screen displays:

- full white screen in normal video
- full white screen with a black hole
- full black screen in normal video
- all-m pattern in reverse video with black background
- all-m pattern with white background
- bordered cross pattern, white on black
- horizontal band, white on black

Color Monitors

The color monitor diagnostic tests are executed on the following monitors:

- B25-CA1
- B25-CD3
- VC-001
- VC-002
- IBM VGA (and compatibles)
- IBM 8514 color (and compatibles)

The color monitor tests require no interaction, but do require your close attention to the screen while they are executing. Use them to determine if colors and shading are correct. Since these tests are not self-checking, you must determine, from the appearance of the screen, whether the tests pass or fail.

If an error occurs, refer to the manual for your color monitor, or contact a field service technician for a more thorough study of the problem.

Initial Dialog

The color monitor tests begin with the following queries:

```
Manual step mode? (goKey to proceed)
```

If you enter **Y**, Visinostics pauses after each test until you press **Go** to resume testing. (If you select this mode, you can disable it at any time during testing by pressing **Code-Go**.)

If you use the initial default or enter **N**, the following prompt appears:

```
Delay? (1-10)
```

By responding to this query, you can speed up or slow down the pace at which tests are executed. The default setting, 10, is the slowest; 1 is the fastest. If you enter 1, the tests run very rapidly.

```
Provide labels?
```

If you use the initial default or enter **Y**, test results are labeled with descriptions of what should appear, to help you verify test results.

If you enter **N**, test descriptions are suppressed.

Color Monitor Tests

The following tests are executed when a color monitor is selected.

Note: *Monitor tests on the VC-002 appear in monochrome if the monitor is not attached to a video controller that supports color, for example, if it is attached to a Processor Module without enhanced video (EV) capabilities. See "Processor Modules," later in this manual, for more detailed information.*

Pincushion Pattern Test

This test is identical to the pincushion pattern test described in "Monochrome Monitor Tests," earlier in this chapter.

Color Bar Test 1

This test presents a block of color divided in half, each side showing three variations of the same color. The left side shows three shades of red, and the right side shows three shades of green. Colors are arranged in vertical bars from left to right, as follows:

low red	medium red	full red	low green	medium green	full green

This color bar test is a visual test only. Relative approximations of the three shades of each color are sufficient to verify that the color monitor works.

Color Bar Test 2

This test also presents a block of color divided in half, showing three variations of the same color on each side. The left side shows three shades of blue, and the right side shows three shades of white.

Technically, the colors of the right half are considered white by the workstation, but visually they appear as three shades of gray. (This is normal and does not represent a failure of the color monitor or Visinostics.) Colors appear from left to right, as follows:

low blue	medium blue	full blue	low white	medium white	full white

This color bar test is a visual test only. Relative approximations of the three shades of each color are sufficient to verify that the color monitor works. Visinostics does not confirm the success or failure of this test.

Speaker Test

The speaker test checks the speaker in the color monitor. During this test, a beep should sound for approximately 1 second.

High Voltage Regulator Test

This test is identical to the high voltage regulator test described in "Monochrome Monitors," earlier in this chapter.

White Screen Test

This test displays a completely white screen.

Section 7
Protected Mode Processor Modules

Introduction

This section contains test descriptions for Processor Modules capable of running the protected mode Operating System. These tests are run from Visinostics distribution diskette #4 PCP / PSP. Processor modules that can be tested with PCP are:

- all B28 series processors (including EXP)
- all B38 series processors (including EXP)
- all B39 series processors
- all series 286 processors
- all series 386 processors
- all series 286i PHD processors
- all series 386i PHD processors

Note: *All processor modules are capable of running the Real Mode diagnostics, CP / SP. However, the Protected Mode diagnostic tests described here fully exercise the hardware.*

B28 / B38 / Series 286 / Series 386 Processor Module Diagnostic Tests

Floppy Drive Tests

Note: *To Test the floppy drive (if any) in your protected mode processor module, use Visinostics distribution diskette #5, SCP/SSP. Refer to Section 5 of this manual.*

Memory Expansion Cartridge Tests

Queries for the memory expansion cartridge tests appear if any memory expansion cartridges are installed in the processor. See "Tests of Individual Memory Cartridges" later in this section.

Initial Dialog

When you select the Memory Expansion Cartridge tests, the following query appears on the screen:

Stop diagnostic on memory error?

Type **Y** or **N**, then press **Return**. If you choose Y, the test stops when an error occurs. If you choose N, the test reports errors but continues further testing.

Selecting Individual Tests

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

Type **Y** to run the Galpat test or **N** to run the standard memory test.

The Galpat (galloping pattern) memory test is an exhaustive test of memory. This test can take several hours, depending on the amount of memory to be tested. A sequence of asterisks is displayed to indicate that the test running. Both parity and invalid data (data mismatch) are reported.

To terminate the memory test at any point, press and momentarily hold down the **Finish** key.

Tests of Individual Memory Cartridges

Memory expansion submodules are available in sizes of 512K or 1Meg. The diagnostic indicates which block of memory is being tested as the tests are run.

The Memory Expansion Cartridge tests have the following four distinct passes:

- write and read 0s
- write and read 1s
- write address patterns
- read address patterns

If an error occurs (and a Y response was given to the Stop Diagnostic On Memory Error? query), the relevant error information is displayed and the following query appears:

```
Continue?
```

Type **Y** and press **Return** to continue the test, or type **N** and press **Return** to restart the diagnostics from the icon menu.

RS-232-C Tests

The RS-232-C tests exercise the RS-232-C driver chip, the serial controller chip, and supporting logic on the I/O board.

Both RS-232-C channels (A and B) can be tested independently of each other, and each can be tested in several modes of operation. All the combinations of parameters appropriate to each mode are automatically tested.

For the RS-232-C tests to operate properly, each channel must be externally looped back to itself by using a loopback plug. Before running these tests, connect a loopback plug to each channel with the following pin arrangements:

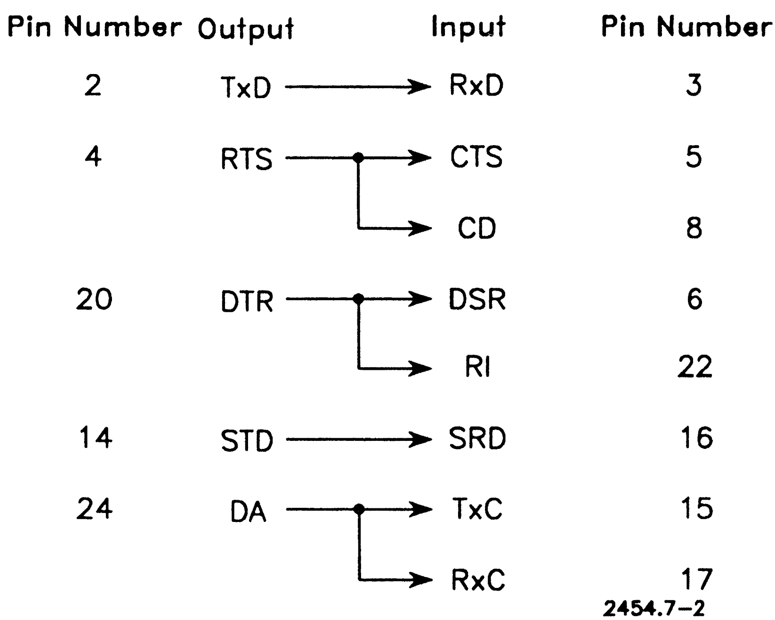

Figure 7-1. RS-232 Loopback Connector

For further information on loopback connectors, and the RS-232-C interface ports, see the discussion on external interfaces in the *Processor Manual* for your workstation or the *Multiline Port Expander Manual.*

Selecting Individual Tests

When you select the RS-232-C tests a series of prompts and queries appear on the screen.

Static Status Test

The static status test is the first test run when the RS-232-C subicon is selected. It runs automatically, so there is no query for the test. Its prompt appears on the screen only after the test begins.

The static status test consists of three subtests. The first subtest checks the interface between the CPU and the serial controller chip by writing to and reading from the control register inside the serial controller chip. This subtest determines whether the CPU and the serial controller chip can successfully communicate with each other.

The second subtest checks the interface between the RS-232-C interface chip and the loopback plug. The following control lines are tested for proper loopback and function:

Control Line	Function
DTR	Data Terminal Ready
RTS	Request to Send
CTS	Clear to Send
CD	Carrier Detect
DSR	Data Set Ready
RI	Ring Indicator
STD	Secondary Transmit Data
SRD	Secondary Receive Data
DA	Transmit Signal Element Timing
TxC	Transmit Clock
RxC	Receive Clock

The third subtest checks the same control signals as the second subtest, but does this using interrupts between the CPU and the RS-232-C interface chip. When the third subtest executes, nothing is seen on the screen unless an error occurs.

Note: *If you are testing a B38-EXP processor module, see "Additional Tests for B38 / CP-003 Processors" later in this section.*

12 Bit Sync Option Board Installed?

Respond **Y** to this query if your processor module has the 12 bit sync option board (B25-ASB, B39-12B). The diagnostic runs the synchronous subset of communications tests.

Note: If you respond ***Y*** *to this query, the asynchronous mode test and the DMA tests are skipped for channels A and B.*

Asynchronous mode test?

Type **Y** or **N** to indicate whether or not you want to run the test.

The Asynchronous mode test transmits and receives data from the RS-232-C interface chip by passing it through the RS-232-C transmitters, the loopback, and the RS-232-C receivers; and returning it to the RS-232-C interface chip. The RS-232-C interface chip is initialized to transmit and receive data in asynchronous format.

The transmit data are obtained from a transmit buffer, under interrupts, and the received data are placed into a receive buffer, also under interrupts. After all the data in the transmit buffer have been transmitted and received, the buffers are compared for errors. Any errors detected are displayed on the screen. If other errors are detected during the test, they are displayed when they are detected.

All combinations of baud rates (2400, 4800, 9600, and 19200 baud), data length (5, 6, 7, and 8 bits), parity (none, odd, and even parity), and stop bits (1, 1-1/2, and 2 bits) are tested.

Character sync CRC-16 test?

Type **Y** or **N** to indicate whether or not you want to run the test.

The character sync CRC-16 test is the same as the Asynchronous mode test described above, except that the RS-232-C interface chip is initialized to transmit and receive data in bisynchronous format. The test uses the CRC-16 cyclical redundancy check (CRC) polynomial.

This test is run at several baud rates (2400, 4800, 9600, and 19200 baud). The data length is fixed at 8 bits and parity is fixed at none during the execution.

Bit sync data transfer test?

Type **Y** or **N** to indicate whether or not you want to run the test.

The bit sync data transfer test is the same as the Asynchronous mode test described above, except that the RS-232-C interface chip is initialized to transmit and receive data in synchronous data link control (SDLC) bit synchronization format. It uses the SDLC CRC polynomial.

This test is run at several baud rates (300, 600, 1200, and 2400 baud). The data length is fixed at 8 bits and parity is fixed at none during the execution of the test.

Bit sync abort/idle line test?

Type **Y** or **N** to indicate whether or not you want to run the test.

The bit sync abort/idle line test is the same as the Asynchronous mode test described above, except that the RS-232-C interface chip is initialized to transmit and receive data in SDLC bit synchronization format. It uses the SDLC CRC polynomial.

This test is run at several baud rates (300, 600, 1200, and 2400 baud). The data length is fixed at 8 bits and parity is fixed at none during the execution. Normal data transmission and reception are tested, as in the bit sync data transfer test.

In addition, generation and recognition of an abort transmission sequence and restarting of the transmission are tested. When the bit sync abort/idle test is running, the following message appears if the test is successful:

```
<<<abort received>>>    Re-Transmission Initiated
```

Stop on communications error?

Type **Y** to stop the tests if an error occurs or **N** to continue. If you type N, any errors that occur are reported as they happen, without stopping the test.

Error Information Screen

If the diagnostic detects an error during testing, the error information screen is displayed. This screen is divided into the five sectors discussed below.

Error Information

This sector contains details of the detected error condition. The actual error and the actual and expected test results are displayed.

Probable Causes of the Error

This sector lists one to three conditions that may have caused the error. These conditions are not the only possible causes. However, the list does provide a starting point from which to locate the cause of the current error.

8274 Status

This sector displays the status of the serial controller chip (Intel 8274 or NEC 7201) being tested when the error occurred. The actual and expected state of each bit in the serial controller chip status registers are given. For a complete description of each bit in the two serial controller status registers, see the Processor Manual for your workstation.

Extended Status Register Information

This sector displays the information contained in the Extended Communications status register at the time of the error. The register contains information for both communications channels, but the screen display shows only the information pertaining to the channel being tested. This sector, like the preceding sector, displays both the actual and the expected states of each bit at the time of the error.

RS-422 (Cluster Communications) Tests

Initial Dialog

The RS-422 tests exercise the cluster communications channel on the I/O board. The loopback for cluster communications in the RS-422 is internal to the interface, so no loopback connector is required for these tests.

The cluster communications tests do not require an external loopback plug. The maintenance mode test performs an internal loopback test.

CAUTION

Running the RS-422 tests while attached to an active cluster damages the cluster lines. Disconnect your workstation from the cluster before running these tests.

When the RS-422 tests are selected, the queries discussed below appear on the screen.

Cluster maintenance mode test?

Type **Y** or **N** to indicate whether or not you want to run the test.

The cluster maintenance mode test loops back a number of communications test frames and checks for timeout, CRC, overrun, data, channel hold, and other errors, the test runs only at 307 kbps. When the test is complete, all errors are reported. If you choose to run the Cluster Maintenance Mode Test the Interprocessor Data Transfer Test and the Fast Cluster Communication queries are skipped.

Interprocessor Data Transfer Test

The following query is only presented if you answer N to the cluster maintenance mode test query. The query is prefaced by a screen message stating a requirement:

```
The next test requires that two workstations be taken off
the cluster master and connected to each other via a cluster
cable.
```

```
Do you want to run:
- Interprocessor data transfer test?
```

Type **Y** or **N** to indicate whether or not you want to run the test.

This page left blank.

The interprocessor data transfer test performs transfers between two workstations, using DMA for transmission and reception. For proper operation, both workstations must run this test simultaneously while connected by a standard cluster communications cable. However, they must not be connected to an operational cluster when you are running this test.

The next two queries concern the manner in which the tests are run.

```
Stop on a communications error?
```

Type **Y** to stop the test on an error or **N** to continue the test even if an error occurs.

```
Fast cluster communication?
```

This query is only presented when you choose to run the interprocessor test. Type **Y** to execute the tests at 1.8 megabaud or **N** to execute the tests at the standard cluster speed of 307 kilobaud.

Parallel I/O (Printer)Tests

The parallel I/O (printer) tests check the parallel printer port and its supporting logic. This test can be run with or without the use of interrupts.

When you select the parallel I/O (printer) tests, the following four queries appear on the screen:

Barber pole test (without interrupts)?

Type **Y** or **N** to indicate whether or not you want to run the test.

The barber pole test (without interrupts) outputs one page (66 lines, 132 columns) of a test pattern consisting of all 96 printable ASCII characters. Each successive line is shifted one character to the left, resulting in a "barber pole" pattern.

Before the test pattern is transmitted, the status of the printer is checked. If the printer or the print buffer is busy or not selected, an error occurs and the test is suspended. However, if the printer status is positive, the diagnostics transmits the test pattern. It then polls the printer status after each character is transmitted. If the print buffer does not free itself to accept another character before the maximum wait time (see below), an error occurs and the test is suspended.

Barber pole test (with Interrupts)?

Type **Y** or **N** to indicate whether or not you want to run the test.

This test is identical to the previous test, except that it does not poll the printer status after each character is transmitted. Instead, the test waits for an interrupt to be generated by the printer acknowledge line, signaling that the printer is ready to receive another character. If the interrupt is not generated before the maximum wait time (see below), or the printer status shows that the printer is still busy after the interrupt, an error occurs and the test is suspended.

The next two queries concern the manner in which the barber pole tests are run.

```
Max printer wait time (ms)?    [6000]
```

This query asks you to specify the maximum length of time (in milliseconds) the diagnostics will wait for a response from the printer before it ends the test.

Enter a number in milliseconds. The number you type in depends on several factors, such as the speed of the printer and the size of the character buffer. For more information about your individual printer, see the manual provided with your printer system.

```
Bypass any errors & continue with diagnostics?  [N]
```

If you select N and the test fails, the test stops and displays the printer error messages.

If you choose Y and an error occurs, the test displays the error messages, but continues to run indefinitely until it is stopped by pressing **Finish**.

Printer Error Messages

Once an error has occurred the error message itself and the printer status are displayed.

The error message is a brief explanation of the type of error that occurred. An example is:

```
>>> Timeout waiting for printer interrupt <<<
```

The printer status message describes the status of the printer port at the time of the error.

Base Memory Test

The base memory test is almost identical to the Memory Expansion Cartridge tests described above, except that it tests the resident base memory in the Processor Module. There are no queries for the test. During this test, the diagnostics relocates itself to the first Memory Expansion Cartridge and then writes to and reads from the base memory using a slightly different pattern. This test uses the same passes used by the Memory Expansion Cartridge tests.

Is the Hardware ID option Installed?

If the Base Memory Subicon is selected, and the processor is a CP-002, CP-003, B28, or B38, this query appears after the test has been started.

Note: This query does not appear in the dialog for the Protected Mode Selection Program. The query will appear when a custom diagnostic created with the PSP is run provided the above conditions are met. (This query won't appear on a B28-LCW or B28-EXP.)

The diagnostic writes to the hardware ID register a maximum of five times, then reads the contents of the register.

The diagnostic displays the following subtests in sequence as they run and indicates if the test has passed or failed. The decimal value of the hardware ID is displayed.

```
Activate Hardware ID:

Test Format Error:

Write and read each bit:

Test transmit error:

Software Reset:

Write Hardware ID:

Read Hardware ID:

Deactivate Hardware ID:

Software Reset:
```

CPU Timer Test

When selected, this test sets time intervals between 100 and 800 milliseconds, in 100-millisecond increments, to verify the operation of the CPU timer. There are no queries for this test.

You must have a keyboard connected to your workstation to run this test. If you press any key on the keyboard during this test, the test will fail.

80287/80387 NPX Test

The 80287 NPX test verifies proper operation of the 80287 NPX in the B-28, B38, CP-002, and CP-003 Processor Modules. There are no queries for this test.

Enhanced Video Controller Tests

If the processor module is connected to a graphics controller module, the following message is displayed when the video controller is selected for testing:

```
To properly test the CPU Video:

1.  Remove the graphics module from the system
    configuration.

2.  Plug a monochrome monitor into the CPU video connector.
```

The following video tests only apply to processors with enhanced video capability. For descriptions of graphics controller tests, refer to Section 6.

- video register test
- reverse video test
- 132 column mode test
- video attribute test
- video memory test
- color mapper test

These tests require visual confirmation while the tests are running. Refer to Section 6 for detailed descriptions of these tests.

The enhanced video controller diagnostic checks the video RAM, the font RAM, all Read/Write registers, and the video logic of the Processor Module.

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Stop on graphics memory error?

If your response is Y, the diagnostic test stops while reporting graphics memory errors and prompts you to press any key to continue. This question applies only to the two tests that are self-checking.

The next query is

Manual Step Mode?

Type **Y** if you want to step from one graphics/video controller test to the next manually. If you respond **N** to this query, the video tests are sequenced automatically.

Delay (1-10)?

This query gives you the opportunity to speed up or slow down the pace of the tests. If you choose 1, the fastest setting, the tests run very rapidly. However, you can stop the test by pressing **Prev Page** and restart it by pressing **Next Page**. The speed you choose becomes the new default setting until it is changed.

Video Register Test

This test checks all of the hardware registers on the enhanced video controller. It is self-checking; a screen message reports whether the test has passed or failed. The display is the same for a Color or a Monochrome Monitor.

Color Mapper Test

This test checks the sixteen color mapper registers (eight foreground, eight background) on the video controller board, and is displayed only on the Color Monitor. The color mapper tests do not appear on the screen when run with a Monochrome Monitor.

The test subdivides the screen into eight windows, one for each color mapper. Each color mapper is initialized with a unique color (2/3 green, 1/3 green, 2/3 blue, 1/3 blue, 2/3 red, 1/3 red, white or black). The color mappers and their contents are clearly identified with descriptive text. The colors are rotated counterclockwise on the display until all colors have been displayed in each of the eight mappers. The eight foreground color mappers are tested first followed by the eight background color mappers. This test is not self-checking.

Reverse Video Test

This test checks the hardware register on the video controller which reverses the screen (the foreground mapper becomes the background and the background mapper becomes the foreground). A green text on black background display will be presented, when the reverse video bit is toggled the display will become black text on green background. This test is not self-checking, it must be visually verified.

132 Column Mode Test

This test checks the 132 column mode capability of the video controller by displaying a border character around the perimeter of the video display. If the 132 column mode is not functioning properly the screen will be distorted or the box will be broken. This test is not self-checking, it must be visually verified. This test is not run when a Color Monitor is attached to the processor module.

Video Memory Test

The video memory test checks the enhanced video controller memory using the following patterns:

- all 0s
- all 1s
- alternating 0s and 1s (run twice)
- ramp pattern (run twice)

The video screen will display unintelligible characters during this test because the display is based on the contents of video memory. This test is self-checking.

Character Attribute Test

The character attribute test displays all the character attributes on the screen (for example, half-bright, bold, struck-through, underlined). This test, along with the Font Display Test and the Mosquito Net Test (described below), cycles four times through the following sequence of screen attributes:

- full-bright with a dark background
- full-bright with a light background
- half-bright with a light background
- half-bright with a dark background

Video Controller Tests

The following test descriptions apply to those processors without enhanced video capability. The video controller diagnostic checks the video RAM, the font RAM, and the video logic of the processor module. The diagnostic consists of the following tests:

- video memory test
- character attribute test
- font display test
- mosquito net test
- cursored string test

Before the tests begin, the following query appears:

```
Stop on video memory error?
```

If you answer Y, the test stops while reporting video memory errors and prompts you to press any key to continue.

To stop any of the tests while the diagnostic is running, press **Prev Page**. To restart the test, press **Next Page**.

The video controller tests are described in the following subsections. These tests are performed in each of the following video attribute modes:

- full-bright with a dark background
- full-bright with a light background
- half-bright with a light background
- half-bright with a dark background

Video Memory Test: Video RAM

This video memory test checks the video controller memory using the following patterns:

- all 0s
- all 1s
- alternating 0s and 1s (run twice)
- ramp pattern (run twice)

The video screen will display the contents of video memory. This test is self-checking.

Video Memory Test: Static RAM

This test is performed on the internal video controller on 186, 286, and 386 processor modules, and on the GC-102 enhanced video controller.

This video memory test confirms that static RAM in video memory is working properly. This test displays an image of an NGEN workstation; a processor module, a monitor, and a keyboard are displayed. Before the test runs, the following message is displayed on the screen:

```
                    Video Memory Test

This picture should scroll back to its original position
then cycle through different font mappings.
```

If this test fails, the test stops and an error message is displayed. The video memory test is performed once in each of the different combinations of video attribute modes.

Note: *The picture displayed does not necessarily represent the configuration of your workstation hardware.*

Character Attribute Test

The character attribute test displays text on the screen in different combinations of character attributes.

Font Display Test

The font display test shows the character font used by the diagnostics. This is not the standard workstation font, but instead, a special font designed to test all the font capabilities in the video memory.

Mosquito Net Test

The mosquito net test displays a screenful of one-pixel-thick lines used to test line clarity and pincushion distortion. For details and an illustration of this test refer to Section 6 of this manual.

Cursored String Test

The cursored string test fills the screen with the following text:

```
The quick brown fox jumps over the lazy dog.
```

The cursor moves to each T in the text, in turn.

When all the tests have been run, the memory errors are displayed (if you responded Y to the, list all errors found query. If an N response was given to this query, or if no errors are found, the diagnostics returns to the icon menu.

Additional Tests for B28 / CP-002 Processors

In addition to the tests described above, the following two tests are run to verify functioning of the 80286 microprocessor in the CP-002.

Soft Finger Test

The soft finger test causes the 80286 to enter Real mode, then return to Protected mode.

Loadall Test

This test executes an instruction that causes all of the 80286 internal registers to be loaded with preset values.

Deleted in update 1.

B28-LCW and B28-EXP Confidence Test Error Codes and Format

The confidence tests for the B28-LCW and B28-EXP can display the two-digit hexadecimal error codes in three different ways:

- In character format (hexadecimal values) on the workstation display monitor
- As binary (on/off) values on the LEDs located on the keyboard
- As binary values represented by a sequence of audible beeps (short/long) representing a binary value.

Represented in binary form, error codes are eight bits long, with the most significant bit (bit 7) first and the least significant bit (bit 0) last.

Error Code Format and Representations

The logical bit representation of the keyboard LEDs is as follows:

Table 7-1. B28-LCW/B28 EXP Error Code Bit Representations

LED Indicator	Binary Code
On	1
Off	0

The keyboard LED corresponding to each bit is:

Table 7-2. B28-LCW/B28-EXP Bit Position of Keyboard LED Indicators

Bit	LED Indicator
7	Over Type
6	Lock
5	F1
4	F2
3	F3
2	F8
1	F9
0	F10

The bit representation of the audio signal, or beep is:

Table 7-3. B28-LCW/B28-EXP Audio Signal Representation

Beep Duration	Binary Code
Short	1
Long	0

Table 7-4. B28-EXP/B28-LCW Error Code Summary

Hex	Binary Bits 7-0	Monitor	Kbd	Beep	Description
A2	1010 0010	X	X		Comm Init SRP down = never polled
A3	1010 0011	X	X		Comm Init serial I/O error
A9	1010 1001	X	X		Find ID search failure
AA	1010 1010	X	X		Find ID failure, too many collisions
AB	1010 1011	X	X		Comm read ID time out
AC	1010 1100	X	X		Comm dump bad address
AD	1010 1101	X	X		Comm disconnected in dump
AE	1010 1110	X	X		Comm dump no SNRM
AF	1010 1111	X	X		Comm dump no up REJ
B0	1011 0000	X	X		Comm dump no up
B1	1011 0001	X	X		Comm boot read UI error
B2	1011 0010	X	X		Comm boot read SNRM error
B3	1011 0011	X	X		Comm disconnected in boot
B4	1011 0100	X	X		Comm boot read checksum
B5	1011 0101	X	X		Comm read receive error
B6	1011 0110	X	X		Comm read time out
B7	1011 0111	X	X		Comm write bad DMA count
B8	1011 1000	X	X		Comm write SRP went down during boot
BA	1011 1010	X			Set up comm DMA error
E0	1110 0000			X	Bad ROM checksum
E1	1110 0001			X	Bad RAM work area
E4	1110 0100	X	X		Memory address error (See Note 1 below.)
E6	1110 0110	X			Keyboard initialization error

continued

Table 7-4. B28-EXP/B28-LCW Error Code Summary Continued

Hex	Binary Bits 7-0	Monitor	Kbd	Beep	Description
F0	1111 0000	X	X	X	RAM parity error (See Note 2 below.)
F1	1111 0001	X			Bad 8251
F2	1111 0010	X			Bad 8259
F3	1111 0011	X			Keyboard timeout, inoperative
F4	1111 0100			X	Video RAM
F5	1111 0101	X			Keyboard loopback failure
F6	1111 0110			X	Font RAM
F7	1111 0111	X			Bad 8254
F8	1111 1000	X			Bus timeout test failure
F9	1111 1001			X	Invalid monitor ID
FA	1111 1010			X	UCV chip failure
FB	1111 1011	X			RS-485 DIAG: Write timeout
FC	1111 1100	X			RS-485 DIAG: Transmit timeout
FD	1111 1101	X			RS-485 DIAG: Bad DMA write count
FE	1111 1110	X			RS-485 DIAG: Receiver error

***Note 1:** The format of the information displayed with this error is as follows (all values are hexadecimal):*

```
E:E4    Error Code

Sa:Ra WROTE: eeee  READ: aaaa
```

where:

```
Sa:Ra   Segment address and offset of failed word

eeee    Expected value (value written)

aaaa    Actual value (value read)
```

***Note 2:** If the error occurs during the firmware RAM memory test, the error code is reported only on the beeper. Otherwise, it is displayed on the monitor according to the format shown below. All values are hexadecimal.*

`E:FO`	Segment address and offset where NMI occurred
`ssss`	Memory parity controller status register value
`aaaa`	Memory parity controller address register value

B28-LCW Mother Board Test LEDs

The test LEDs in the B28-LCW are located inside the processor module behind a hinged side panel. There is one green LED and a row of five red LEDs. To view the LEDs, you must swing the panel open and look into the module. Table 7-1 shows the logical meaning of the on and off states of the green and red LEDs. Use this table when referring to Table 7-6, the B28-LCW test sequence.

Table 7-5. B28-LCW Mother Board LED Bit Representations

Color	LED	Binary Code
Green	On	1
Green	Off	0
Red	On	0
Red	Off	1

General Description of Test Sequence

The initial state of all five red LEDs is on. They change state in the sequence shown at the beginning of each test. If a test fails, the state of the LEDs will show the last test initiated before the failure. If no tests fail, the red LEDs will be all off and the green LED will be on to show that the confidence test ran successfully.

Table 7-6. B28-LCW Processor Board LED Test Sequence

Grn LED	Red LEDs	Description
0	00000	Power ON/System Reset – Start of Test
0	11111	Start of ROM checksum test
0	11110	Start of FW memory test
0	11101	Start of video and font buffer test
0	11100	Start of video test
0	11011	Start of 8254 timer/counter test
0	11010	Start of 8259 interrupt controller test
0	11001	Start of 8237 DMA controller test
0	11000	Start of memory/parity controller test
0	10111	Start of 8251 USART test
0	10110	Start of keyboard test
0	10101	Start of basic RAM memory test
0	10100	Reserved
0	10011	Reserved
0	10010	Reserved
0	10001	Reserved
1	11111	Passed

Additional Tests for B38 / CP-003 Processors

In addition to the tests described earlier for B38 and CP-003 processors, you can select the following test to verify correct functioning of the B38 series and CP-003 processor modules.

Test Cache?

This test checks the cache memory subsystem of the 80386 processor. It first reads memory RAM and places the contents into cache memory. It then reads the value from the cache memory. Press **Y** or **N** to indicate whether or not you want to run the test.

During a write, the value is written into both cache memory and RAM.

Additional Tests for B28-EXP, B38-GXP and B38-EXP Processors

With the exception of the graphics controller tests, diagnostic tests for the B38-GXP are the same as those for the B38-EXP. To test the graphics controller (B25-VG1) in the B38-GXP, refer to the test descriptions for the GC-104 in Section 6.

Note: *To test the B38-EXP with an AG1 or AG2 advanced graphics adapter, you must use Modular Diagnostics R5.0.0300. This configuration can have no more than 4 Mb of memory installed in the B38-EXP memory expansion slots.*

FSA Port: Do you want to run External Loopback Test?

The diagnostic displays this query when the B28-EXP, or the B38-EXP Processor module is selected for testing. These processors have an additional RS-232 port called the FSA, Financial Systems Architecture, port. Use a loopback plug if you want to run the external loopback test on this port. If you respond **N** to this query, the diagnostic tests the port by running an internal loopback test. The test runs at 4800 and 9600 baud within all combinations of the following parameters: even parity, odd parity, 1 stop bit, 1 1/2 stop bits, 2 stop bits.

B38-EXP Processor Board Test LEDs

The boot ROM in the B38-EXP contains a confidence test sequence that performs a preliminary check of the hardware on power up before the operating system is loaded. If a test fails at some point in this sequence an LED test pattern appears on LEDs D6 thru D1 on the processor board. Table 7-1 shows the LED pattern for each part of the boot ROM test sequence.

Table 7-7. B38-EXP Processor Board LED Test Sequence

Grn LED D6	Red LEDs D5 – D1	Description
0	11111	Power ON/System Reset – Start of Test
0	10101	Memory management register initialization
0	01111	Cache memory initialization
0	00000	Firmware ROM Checksum test
0	00001	Firmware CPU RAM test
0	10110	Firmware cache RAM test
0	00010	Video frame buffer test
0	00111	NMI generation test
If any graphics card or module is present tests at **A** below are performed.		
If AGP / GC-4 graphics card or module is present tests at **B** below are performed.		
0	10011	Video initialization routine (I/O board)
0	00011	Video registers / vertical sync test (I/O board)
0	00100	8254 timer test
0	00101	8259 PIC (interrupt controller) test
0	00110	8237 DMA test
0	01000	8251 USART test
0	01001	Keyboard test
0	01011	80387 math coprocessor test
0	10110	64K cache RAM test
0	01010	1 Mb base Memory (RAM) TEST
1	00000	Confidence test OK (OS is loaded) END TEST SEQUENCE

Legend

1 LED ON

0 LED OFF

continued

Table 7-7. B38-EXP Processor Board LED Test Sequence Continued

A Tests for configuration with graphics card or graphics module

Grn LED D6	Red LEDs D5 – D1	Description
0	01010	Graphics area CPU RAM test Load X-Bus ROM in CPU memory Return to test sequence above

B Tests for configuration with AGP / GC-4 graphics card / module

Grn LED D6	Red LEDs D5 – D1	Description
0	00010	Video frame buffer test pattern AGP/GC4 firmware starts Video initialization on I/O board AGP/GC4 chip initialization AGP/GC4 confidence test for testing AGP/GC4 chip hardware Return to test sequence above

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B39 / 286i / 386i Processor Module Diagnostic Tests

Introduction

The B39, Series 286i and 386i diagnostics package consists of a set of tests that check the modular components of the B39, Series 286i and 386i for system failure. Most of the tests are self checking, and once started, run without the need for user intervention. Little more is required than to start up the system, load the diagnostics, and answer the preliminary questions. The diagnostics automatically displays messages on the screen to signify which of the components have passed the tests and which have failed.

Unit tests that are not self-checking are clearly described in the discussion that follows. These tests require visual verification while they are running.

The diagnostic tests are not designed to be used as a troubleshooting package. If you find a problem, refer to the appropriate hardware manual or consult your System Administrator or a field service technician.

Note: *The floppy disk and SCSI disk tests are documented in the "Disk Modules" and "SCSI Upgrades and Expansions" sections of this manual.*

RS-232-C Tests

The RS-232-C tests run a diagnostic of the RS-232-C controller, interface devices, and the supporting logic.

Static Status Test

The static status test is the first test run when the RS-232-C submodule is selected. It runs automatically, and its prompt appears on the screen only after the test begins.

The static status test includes three subtests of increasing complexity.

The first subtest checks the interface between the CPU and the RS-232-C controller by writing to and reading from the RS-232-C controller. This subtest determines whether the CPU and the RS-232-C controller and interface devices can successfully communicate with each other.

The second subtest checks the interface between the RS-232-C controller and the loopback plug. The following control lines are tested for proper loopback and function:

Control Line	Function
DTR	Data Terminal Ready
RTS	Request to Send
CTS	Clear to Send
CD	Carrier Detect
DSR	Data Set Ready
RI	Ring Indicator
STD	Secondary Transmit Data
SRD	Secondary Receive Data
DA	Transmit Signal Element Timing
TxC	Transmit Clock
RxC	Receive Clock

The third and final subtest of the static status test checks the same control signals as the second subtest, but does so using interrupts between the CPU and the RS-232-C controller. Nothing is shown on the screen during the third subtest unless an error occurs.

12 Bit Sync Option Board Installed?

Respond **Y** to this query if your processor module has the 12 bit sync option board. The diagnostic runs the synchronous subset of communications tests.

Note: *If you respond **Y** to this query, the asynchronous mode test and the DMA tests are skipped for channels A and B.*

Asynchronous mode test?

When the static status test is complete, this query appears. Type **Y** or **N** to indicate whether or not you want to run the test.

Note: *If you answered **Y** to 12 bit sync option board installed?, this test is skipped for channel A.*

The Asynchronous mode test transmits and receives data from the RS-232-C controller by passing it through the RS-232-C transmitters and the RS-232-C receivers, and returning it to the RS-232-C controller. The RS-232-C controller is initialized to transmit and receive data in asynchronous format.

The Asynchronous mode test transmits data from the transmit buffer, and the received data are placed into a receive buffer. After all the data in the transmit buffer have been transmitted and received, the buffers are compared for errors. If there are any errors, they are displayed during the test.

All combinations of baud rates (2400, 4800, 9600, and 19200 baud), data length (5, 6, 7, and 8 bits), parity (none, odd, and even parity), and stop bits (1, 1-1/2, and 2 bits) are tested.

Character sync CRC-16 test?

Type **Y** or **N** to indicate whether or not you want to run the test.

The character sync CRC-16 test is the same as the Asynchronous mode test described above, except that the RS-232-C controller is initialized to transmit and receive data in bisynchronous format. It uses the CRC-16 cyclical redundancy check (CRC) polynomial.

This test is run at several baud rates: 2400, 4800, 9600, and 19200. The data length is fixed at 8 bits and parity is fixed at none during the execution.

Bit sync data transfer test?

Type **Y** or **N** to indicate whether or not you want to run the test.

The bit sync data transfer test is the same as the Asynchronous mode test described above, except that the RS-232-C controller is initialized to transmit and receive data in synchronous data link control (SDLC) bit synchronization format. It uses the SDLC CRC polynomial.

This test is run at several baud rates: 300, 600, 1200, and 2400. The data length is fixed at 8 bits and parity is fixed at none during the execution.

Bit sync abort/idle line test?

Type **Y** or **N** to indicate whether or not you want to run the test.

The bit sync abort/idle line test is the same as the Asynchronous mode test described above, except that the RS-232-C controller is initialized to transmit and receive data in SDLC bit synchronization format. It uses the SDLC CRC polynomial.

This test is run at several baud rates: 300, 600, 1200, and 2400. The data length is fixed at 8 bits and parity is fixed at none during the execution. Normal data transmission and reception are tested, as in the bit sync data transfer test.

Generation and recognition of an abort transmission sequence and restarting of the transmission are also tested. When the bit sync abort/idle test is running, the following message appears if the test is successful:

```
<<<abort received>>>
```

DMA Out, Programmed I/O In?

Type **Y** or **N** to indicate whether or not you want to run the test.

Note: *This test applies only to the B39 and Series 386i. If you answered Y to 12 bit sync option board installed?, this test is skipped for channel A.*

This test transmits and receives data from the RS-232-C controller. Data is passed through the RS-232-C transmitters using DMA, received through the RS-232-C receivers using programmed input/output, and returned back to the RS-232-C controller. The RS-232-C controller is initialized to transmit and receive data in asynchronous format.

During this test data is transmitted from the transmit buffer, and the received data is placed into a receive buffer. After all the data in the transmit buffer has been transmitted and received, the buffers are compared for errors. If there are any errors, they are displayed during the test.

Data is transmitted and received at 9600 baud, 7 data bits and 1 stop bit.

DMA Out, DMA In?

Type **Y** or **N** to indicate whether or not you want to run the test.

Note: This test applies only to the Series 386i. If you answered **Y** *to the 12 bit sync option board installed? query, this test is skipped for channel A.*

This test transmits and receives data from the RS-232-C controller. Data is passed through the RS-232-C transmitters using DMA, received through the RS-232-C receivers using DMA, and returned back to the RS-232-C controller. The RS-232-C controller is initialized to transmit and receive data in asynchronous format.

During this test data is transmitted from the transmit buffer, and the received data is placed into a receive buffer. After all the data in the transmit buffer has been transmitted and received, the buffers are compared for errors. If there are any errors, they are displayed during the test.

Data is transmitted and received at 9600 baud, 7 data bits and 1 stop bit.

Stop on communications error?

Type **Y** to stop the tests if an error occurs or **N** to continue. If you type N, any errors that occur are reported as they happen, without stopping the test.

Error Information Screen

If the diagnostics detects an error during testing, an error information screen is displayed. This screen is divided into the five sectors described below.

Error Information

This sector contains details of the detected error condition. The actual error and the actual and expected test results are displayed.

Probable Causes of the Error

This sector lists up to three conditions that may have caused the error. These conditions are not the only possible causes. However, the list does provide a starting point from which to locate the cause of the error.

RS-232-C Controller Status Information

This sector displays the status of the RS-232-C controller channel being tested when the error occurred. The actual and expected state of each bit in the RS-232-C controller status register are given. For a complete description of each bit in the RS-232-C controller status register, see the chapter entitled, "Software Interfaces," in the appropriate hardware manual.

Extended Status Register Information

This sector displays the information contained in the Extended Communications status register at the time of the error. Like the preceding sector, it displays both the actual and the expected states of each bit at the time of the error.

Dialog

Dialog with the diagnostics program is displayed in this sector. The dialog includes requests for continuing or aborting the tests.

RS-422 (Cluster Communications) Tests

Initial Dialog

The RS-422 tests exercise the cluster communications channel on the I/O board. The loopback for cluster communications in the RS-422 is internal to the interface, so no loopback connector is required for these tests.

The cluster communications tests do not require an external loopback plug. The maintenance mode test performs an internal loopback test.

CAUTION

Running the RS-422 tests while attached to an active cluster damages the cluster lines. Disconnect your workstation from the cluster before running these tests.

When the RS-422 tests are selected, the queries discussed below appear on the screen.

Cluster maintenance mode test?

Type **Y** or **N** to indicate whether or not you want to run the test.

The cluster maintenance mode test loops back a number of communications test frames and checks for timeout, CRC, overrun, data, channel hold, and other errors, the test runs only at 307 kbps. When the test is complete, all errors are reported. If you choose to run the Cluster Maintenance Mode Test, the Interprocessor Data Transfer Test and the Fast Cluster Communication queries are skipped.

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Interprocessor Data Transfer Test

The following query is only presented if you answer N to the cluster maintenance mode test query. The next query is prefaced by a screen message stating a requirement:

The next test requires that two workstations be taken off the cluster master and connected to each other via a cluster cable.

```
Do you want to run:
- Interprocessor data transfer test?
```

Type **Y** or **N** to indicate whether or not you want to run the test.

The interprocessor data transfer test performs transfers between two workstations, using DMA for transmission and reception. For proper operation both workstations must run this test simultaneously while connected by a standard cluster communications cable. However, they must not be connected to an operational cluster when this test is running.

The next two queries concern the manner in which the two tests are run.

```
Stop on a communications error?
```

Type **Y** to stop the test on an error or **N** to continue the test if an error occurs.

```
Fast cluster communication?
```

This query is only presented when you choose to run the interprocessor test (the cluster maintenance mode test only runs at 307 kilobaud). Type **Y** to execute the tests at 1.8 megabaud or **N** to execute the tests at the standard cluster speed of 307 kilobaud.

CPU Timer Test

The CPU timer test sets time intervals between 100 and 800 milliseconds, in 100-millisecond increments, to verify the operation of the CPU timer.

Your keyboard must be connected to your workstation to run this test. If you press any key on the keyboard during the test, the test will fail.

Graphics Tests

The graphics tests for the Series 286i are identical to those for the GC-003 Graphics Controller Module. This section does not apply to the Series 386i since the Series 386i does not have internal graphics capability.

Initial Dialog

The graphics queries are briefly discussed below.

Display error table after testing?

If you answer **Y**, the screen will display a log of all of the errors that have occurred during testing.

Terminate the test on first error?

If you answer Y to this query, the diagnostics will stop on any error that may occur.

Rectangle scroll speed (0 - 9)?

Enter a number from 1 to 9 to determine the speed at which messages and patterns are scrolled off the screen. Nine is the minimum scrolling speed.

Test Descriptions

Graphics tests occur in the order listed below.

Graphics Memory Test

The graphics memory test checks the graphics memory using the following patterns:

- all 0s
- all 1s
- alternating 0s and 1s (run twice)
- ramp pattern (run twice)

The graphics screen will display unintelligible characters during this test because the display is based on the contents of graphics memory.

Cursor/Scroll Test

The cursor/scroll test is self-checking. It begins by drawing a converging rectangles pattern (see Figure 1). Then the video blanking function is tested; the screen will go blank and then reappear. Next, the cursor functions are verified in the following order:

- normal cursor
- cursor of
- normal cursor
- exclusive-ORed cursor
- reverse video cursor
- exclusive-ORed cursor

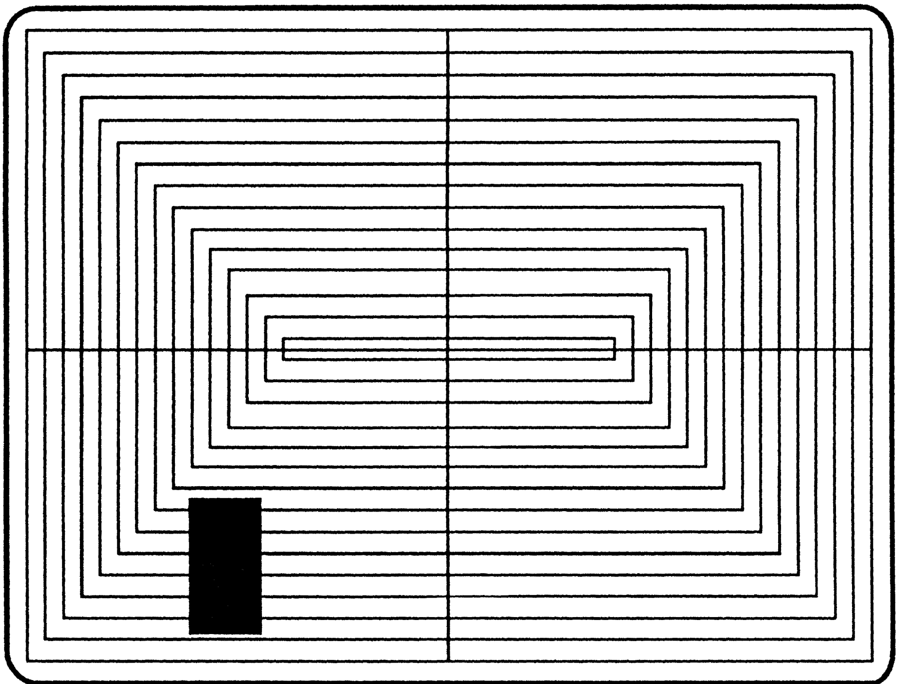

Figure 7-2. Cursor/Scroll Test

Finally, horizontal and vertical scrolling are tested.

Section 8
SCSI Upgrade and Expansion Modules

Introduction

The tests described in this section are on Visinostics distribution diskette #5, SCP/SSP. This diskette contains tests for all SCSI modules and tests for the floppy disk drive in SCSI modules that are equipped with a nonSCSI floppy disk drive.

Diagnostic tests for the B25-MF1 and floppy drives in B39 and Series i processor modules are also included on diskette #5.

SCSI Disk Drive Module Diagnostic Tests

Disk Drive Test Lookup Tables

These tables show which tests are run depending on your response to the queries in the preliminary dialog. These queries are shown in the tables in boldface. Brackets [ ] indicate the response to the query.

The floppy drive tests listed here are applicable to floppy/hard disk modules, the floppy drive in the B-39 and Series i processor modules, and the B25-MF1 dual floppy module.

Table 8-1. Floppy Drive Tests

Run quick Verification? [Y]
Test 1 - Recalibrate
Test 4 - Format and verify floppy (Destructive)

Run full Verification? [Y]
Test 1 - Recalibrate
Test 2 - Seek Sequential
Test 3 - Seek Random
Test 4 - Format and verify floppy (Destructive)
Test 5 - Sequential Write/Read Single Sectors Test (Destructive)
Test 6 - Random Write/Read Single Sectors Test (Destructive)
Test 7 - Sequential Write/Read Multiple Sectors Test (Destructive)

Note: *If you respond **Y** to the run full verification query, tests 1 thru 7 are run. Function tests 8 thru 14 can only be run by responding **N** to the run full verification query and selecting the individual floppy drive tests.*

Table 8-1. Floppy Drive Tests Continued

Run full Verification? [N]	
Test	1 - Recalibrate
Test	2 - Sequential seek
Test	3 - Seek Random
Test	4 - Format and verify floppy (Destructive)
Test	5 - Sequential Write/Read Single Sectors Test (Destructive)
Test	6 - Random Write/Read Single Sectors Test (Destructive)
Test	7 - Sequential Write/Read Multiple Sectors Test (Destructive)
Function	8 - Read track format [Not Supported]
Function	9 - Display/Modify Sector Function
Function	10 - Copy Drive to Drive [Not Supported]
Function	11 - Read Disk Address Function
Function	12 - Loop on Track Format Function (Destructive)
Function	13 - Loop on Sector Read Function
Function	14 - Loop on Sector Write Function (Destructive)
Function	16 - Read Sequential Tracks Function
Function	17 - Loop on Full Track Read Function

Note : *Function 8 and function 10 are not supported by the SCSI controller module. If you respond with a [Y] answer to these queries, the diagnostic displays, "Function not supported by this controller" when the tests are run.*

Table 8-2. Hard Disk Tests

Run quick Verification? [Y]
Recalibrate
Sequential seek
Format Disk (Destructive)
Random Seek Test With ID Scan

Note: *The full verification query will not appear when a valid OS volume is selected for testing unless you respond Y to the query in the preliminary dialog indicating the following: Warning!!!... valid OS volume, overwrite ok?*

Run full Verification? [Y]
Recalibrate
Seek Sequential
Format Disk (Destructive)
Random Seek with ID Scan
Write/Read All Tracks (Destructive)
Sequential Write/Read Single Sectors Test (Destructive)
Random Write/Read Single Sectors Test (Destructive)
Sequential Write/Read Multiple Sectors Test (Destructive)

Run full Verification? [N]
Recalibrate
Seek Sequential
Format Disk (Destructive)
Random Seek with ID Scan
Write/Read All Tracks (Destructive)
Sequential Write/Read Single Sectors Test (Destructive)
Random Write/Read Single Sectors Test (Destructive)
Sequential Write/Read Multiple Sectors Test (Destructive)
Display/Modify Sector Function
Read Boot ROM Function
Loop on Sector Read Function
Loop on Sector Write Function (Destructive)
Read Sequential Tracks
Loop on full track read
Read/Write/Read full tacks with filler pattern (Destructive)

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Disk Drive Diagnostic Preliminary Dialog

When the hard disk test begins, the diagnostic automatically performs a SCSI data buffer test. This test confirms that the SCSI bus is operational and that the SCSI controller is communicating with the drive.

Drive Vendor Codes

The diagnostic automatically queries the drive to calculate the vendor code. If the calculation fails, the diagnostic responds with the following prompt:

```
Drive Vendor Code (Circled letter on bottom of module)
```

Valid OS Volumes

The diagnostic then determines whether the selected hard disk drive is a valid operating system volume. If so, this message is displayed:

```
WARNING!!!  THIS IS A VALID OS VOLUME.  Is overwrite OK?
```

If you answer Y, all diagnostic functions are enabled, including some functions that destroy the contents of the disk. If you answer N, only nondestructive diagnostic functions are enabled.

B25-MF1 Diagnostic Queries

Diagnostic tests for the floppy drives in the B25-MF1 module require that you insert a floppy disk in the drive you are testing. On both the 3 1/2-inch and 5 1/4-inch floppy disks, note whether the floppy disk you are using is a double density or high density disk and insert the disk in the drive with the write protect notch toward the top of the module.

When you select the B25-MF1, the following query is displayed in addition to other queries in the preliminary dialog:

```
Run test at high density?
```

Type Y in response to this query if the disk you are using for the diagnostic test is a high density disk. If you are using a double density disk, type N in response to this query.

If you indicate the wrong density in your response to this query when testing the 3 1/2-inch drive, the diagnostic test stops, indicating the density of the disk in the drive.

If you indicate the wrong density when testing the 5 1/4-inch drive, the diagnostic proceeds and fails indicating an I/O error.

Verification Parameters

After the drive vendor code information is entered, the diagnostic displays the following prompts for both the hard disk diagnostic preliminary dialog and the floppy diagnostic preliminary dialog.

Stop diagnostic on disk error?

Type **Y** to stop the test on an error or **N** to continue the test, regardless of an error.

Run quick verification? (some of the tests will destroy data)

Type **Y** to run a quick verification (recalibrate, sequential seek, format disk, and random write/read single sectors tests) or **N** to have the full set of tests available. For further information on these tests, see the individual test descriptions later in this section.

If you answered **N** to the run quick verification query, the following query appears:

Run full verification? (some of the tests will destroy data)

Type **Y** to run the full verification set of tests or **N** to customize the diagnostics by selecting individual tests. These tests are described under "Selecting Individual Tests," later in this section.

If you answer **Y** to the run full verification query, and you are testing the hard disk drive, the first eight tests are run. Refer to the list of tests earlier in this section and the test descriptions later in this section.

Note: *Some function tests are not run under Full Verification. These tests are provided for technicians and field service engineers as an aid in troubleshooting a malfunctioning module.*

If your response to the run quick verification query or the run full verification query is Y, the following query is displayed:

Change detail parameters?

If your response to the run full verification query is N, this query appears after the individual test selection is complete.

The detail parameters are the characteristics of the hard disk format. If you respond Y to this query you can alter the format.

If you choose Y, the following queries and prompts appear on the screen:

```
Number of retries?
```

The number of retries is the number of times the diagnostics tries to read data from a sector on the hard disk. Several retries are generally chosen. Type in the number of retries you desire.

Note: *The values for the following queries should not be changed. They are provided for verification only.*

```
Number of bytes per sector?

Number of sectors per track?

Number of tracks per cylinder?

Number of cylinders per disk?
```

These parameters specify the number and size of the data areas on the hard disk.

```
DMA Transfer Mode:
```

Type **Y** to indicate that you want to enable DMA Transfer Mode. Type **N** to indicate that you want to select Direct I/O Transfer mode.

If DMA transfer mode is enabled, the following query appears:

```
Use Connect/Disconnect Mode?
```

Type **Y** or **N** to indicate whether or not you want to use connect/disconnect mode. In connect/disconnect mode, the SCSI drive can disconnect itself from the SCSI bus whenever it is running a time-consuming operation that does not require interaction with the processor (such as a seek to the end of the disk or a format disk).

```
Show activity (dots)?
```

Type **Y** or **N** to indicate whether or not you want dots to appear on the screen when sectors or tracks are written to or read from the hard disk drive. If you respond **N** the following query appears:

```
LBA:
```

LBA is the logical block address and number, the default value shown is the current LBA. LBA is a decimal value.

Debug?

Type **Y** or **N** to indicate whether or not you want to use the Debugger. If you choose Y and a disk error occurs, the following query appears:

```
Enter the debugger?
```

Type Y to enter the Debugger or N to continue with the diagnostics. If you enter the Debugger by mistake, press **Go**. This returns you to your previous location in the diagnostics.

The following query appears next:

Filler data

Enter a hexadecimal number to change the data pattern written to the hard disk drive. The default, 7272, is a worst-case pattern, maximizing the testing value of the diagnostics. It causes the greatest response from the hard disk drive during the write/read process.

Record defect information on cylinder 0 of disk?

The hard disk drive saves drive parameters and bad spot information on cylinder 0 of the disk. Answer **N** if you do not want to save the information.

Selecting Individual Tests

If you answered N to the run quick verification query and N to the run full verification query, you now can individually select the tests you wish to run. A series of prompts appear, giving the names of the individual tests.

The following test descriptions apply to both the floppy disk drive and the hard disk drive selected for testing. Tests which apply exclusively to the floppy drive or the hard drive are called out in the test description heading.

Recalibrate test

The recalibrate test checks the basic functioning of the read/write head positioning mechanism.

This test issues a recalibrate command to the disk controller, followed by a seek command, which moves the read/write head to the last cylinder on the disk under test.

Any errors detected during recalibration are displayed.

Sequential seek test

The sequential seek test checks the functioning of the head positioning mechanism by stepping the head from track 00 to the innermost track on the disk, one track at a time.

Any errors detected during sequential seek are displayed.

Format disk (destructive)

The format disk test formats the disk (or disks, if both drives are selected). The disks are formatted one track at a time.

Random seek with ID scan test

The random seek with ID scan test checks the functioning of the head positioning mechanism by stepping the head from cylinder CPD/2 to cylinder CPD/2-1, to cylinder CPD/2+1, to cylinder CPD/2-2, to cylinder CPD/2+2, and so on. (CPD represents the number of cylinders per hard disk.)

This test also reads the identification areas of the sectors. Any errors detected during the random seek test are displayed.

Write/read all tracks (destructive)

The write/read all tracks test sequentially writes a ramp pattern (0123456789) to every track on the disk being tested. The test then reads the data back to verify that it was correctly written.

Sequential write/read single sectors (destructive)

The sequential write/read single sectors test writes data to each sector on a track, one sector at a time.

First, the odd-numbered logical sectors are written using a ramp pattern (0123456789). Next, the even-numbered logical sectors are written, using the 1s complement of the ramp pattern. After all the sectors on the track are written, the data in each sector are verified against the data written. The test is repeated on three cylinders: cylinder 00, cylinder CPD/2, and cylinder CPD-1.

Random write/read single sectors (destructive)

The random write/read single sectors test performs a write/read of a random number of sectors on each track tested.

All tracks in each cylinder are tested. All cylinders are tested, from cylinder CPD/2 to cylinder CPD/2-1, to cylinder CPD/2+1, to cylinder CPD/2-2, to cylinder CPD/2+2, and so on.

Sequential write/read multiple sectors (destructive)

The sequential write/read multiple sectors test writes data to each sector on a track, one-half track at a time.

First, sectors 1 to SPT/2 are written using a ramp pattern (0123456789). Then sectors SPT/2+1 to SPT are written. (SPT represents the number of sectors per track on the hard disk.) The data in each sector is then verified against the data written. All the cylinders of the hard disk are tested.

Read Track Format Function (Floppy Drive Only)

This test is performed only on the floppy disk drive.

The read track format function prompts for a cylinder number and a head number. Press **Return** in response to the cylinder number prompt to exit the function. Invalid entries are reported with a beep. If this happens, backspace and enter the numbers again.

Once the first 256 bytes in the buffer are displayed, the following query is displayed:

```
More?
```

Type **Y** to display the next 256 bytes in the buffer. Type **N** to read another track.

Display/modify sector

The display/modify sector function allows you to display and, optionally, modify any sector on the hard disk.

This function issues prompts for a cylinder number, a sector number, and a head number. Invalid entries are reported with a beep. If this happens, backspace and enter the numbers again.

This test is interactive, and while it is running you are asked to respond to several more queries and prompts.

Enter a cylinder number in response to the following prompt:

```
cylinder:
```

If you want to discontinue, press **Return** at this point to terminate the display/modify sector function.

If you want to continue, enter the appropriate numbers when the following prompts appear:

```
head number:
```

```
sector number:
```

The sector specified is then read into the DMA buffer, and the first 256 bytes are displayed.

```
More?
```

Type **Y** to display the next 256 bytes in the buffer. Type **N** to modify the sector or inspect another sector.

```
Modify?
```

Type **Y** to modify the sector. Type **N** to inspect another sector.

```
Byte?
```

Enter the decimal number of the byte to be modified.

The function then displays the byte number and its hexadecimal value. Type a new hexadecimal value to change the byte, or press **Return** to leave the byte unchanged.

After the sector has been modified, the following query appears:

```
Write sector?
```

Type **Y** to rewrite the sector on the floppy disk with the modified data. Type **N** to leave the modified sector unchanged.

```
Copy Drive to Drive Function
```

The Copy Drive to Drive function is not supported for SCSI devices. The query appears for the floppy drive in SCSI modules, but the function test is not available. If the function is selected in the preliminary dialog, the diagnostic displays "Function Not Supported by This Controller" when the tests are run.

```
Read Disk Address Function
```

The read disk address function prompts you to enter the cylinder number and head number for the disk you have selected. The diagnostic responds and indicates whether or not the read is successful.

Read Boot ROM Function

The read boot ROM function reads and displays the contents of the SCSI hard disk's bootstrap ROM.

This function prompts you for the cylinder number and the head number. It is designed to support troubleshooting using test equipment and runs until you press **Finish**.

Loop on Track Format Function

The loop on track format function continuously formats one track on the disk.

This function prompts you for the cylinder number and the head number. It is designed to support troubleshooting using test equipment and runs until you press **Finish**. When you press finish, the diagnostic returns to the start-up screen.

Loop on Sector Read Function

The loop on sector read function continuously reads one track on the disk. The diagnostic prompts you to enter the cylinder number and the head number. Press and hold down the **Finish** key to exit this test. When you press finish, the diagnostic returns to the start-up screen.

Loop on Sector Write Function

The loop on sector write function continuously writes one track on the disk.

This function prompts you for the cylinder number and the head number. It is designed to support troubleshooting using test equipment and runs until you press **Finish**. When you press finish, the diagnostic returns to the start-up screen.

Read Sequential Tracks Function

This function reads each track on the entire hard disk, one track at a time.

Loop on Full Track Read Function

The loop on full track read function continuously reads a full track of the disk.

This function prompts you for the cylinder number and head number. It is designed to support troubleshooting using test equipment and runs until you press **Finish**.

Read/Write/Read Full Tracks With Filler Pattern Test (Hard Disk Only)

In this test the entire disk is first written with the filler pattern. Next, cylinder 1 is read/verified, written, and then read/verified again. This sequence is repeated for cylinders 2, CPD-1, and so on until the middle operation comes to CPDS-2. At this point the test is complete.

If you responded N to the run full verification query, the following query now appears:

```
Change detail parameters?
```

The detail parameters are described under "Detail Parameters" earlier in this section.

Error Message Format

When an error is detected during the SCSI hard disk diagnostics, a brief description of the error condition is displayed on the screen. This is followed by information on the status of the hard disk controller. The status information includes any or all of the following:

- The most recently executed hard disk controller command. This command is displayed as a hexadecimal byte and a written message.
- The contents of the status and error registers of the hard disk controller, as of the most recent command.
- The residual byte count from the last DMA transfer.
- The cumulative number of soft errors that have occurred during the execution of the current tests. These errors accumulate over all tests and all passes, for both drives.

  Soft errors are errors that occur intermittently. Often they are recoverable, if the tests are run again. The number of soft errors, the diagnostics will ask below the module icon, on the left side of the slash mark. (For example, 8/0 indicates 8 soft errors and 0 hard errors.)

- The cumulative number of hard errors that have occurred during the execution of the current tests.

  Hard errors indicate a failure of some portion of the hardware inside a module or submodule. They are generally not recoverable, even if the tests are run again. The number of hard errors is displayed in full-bright below the module icon to the right of the slash mark. (For example, 0/5 indicates 0 soft errors and 5 hard errors).

The interpretation of the bytes displayed in the error message format above can be found in tables listing the controller flag, controller command, and status register summaries in the *SCSI Upgrades and Expansions Manual.*

SCSI Tape Expansion Module Diagnostic Tests

Introduction

The following subsection describes diagnostic tests for the B25-TS2, B25-DDS, and HSB-002 SCSI Tape Expansion Modules. These diagnostic tests are on Visinostics distribution diskette #5 SCP/SSP.

Note: *Refer to Section 5 of this manual when testing nonSCSI tape drives such as the B25-TS or HB001.*

CAUTION

The SCSI Tape Expansion Module diagnostic tests can destroy the data on the tape cartridge in the module. Diagnostic prompts appear to confirm running any destructive tests.

Initial Dialog

When you select the SCSI tape diagnostics the following queries and prompts appear on the screen.

Stop diagnostic on a tape error?

Type Y if you want the diagnostic to stop in the event of an error.

Run quick verification? (some of the tests will destroy data)

Type Y to run a quick verification or N to have the full set of tests available. If you type N, the following query appears:

Run full verification? (some of the tests will destroy data)

Type **Y** to run a full verification (all tests) or **N** to select specific tests to be run. (For more information, see "Selecting Individual Tests" later in this section.)

Detail Parameters

If your response to the run full verification query is Y, the queries that follow are displayed next. If your response is N, these queries will appear after the individual test selection is complete.

```
Change detail parameters?
```

If you choose Y in response to this query, the following queries appear on the screen:

```
Debug?
```

Type **Y** if you want debug statements to appear on the screen while the test is running. These are non interactive statements that provide you with detailed information regarding code execution. Type **N** if you do not want debug statements to appear on the screen.

```
Show activity (dots)?
```

Type **Y** if you want dots to appear on the screen for each block of data transferred. Type **N** to suppress the activity dots.

```
Use buffered mode?
```

Type **Y** to use buffered mode, or type **N** to use unbuffered mode. In buffered mode, test results are qualified when data is transferred to the buffer of the tape module. In unbuffered mode, test results are not qualified until data is actually written to the tape.

```
Use DMA transfer mode?
```

Type **Y** to use DMA transfer mode, or type **N** to use programmed I/O mode.

```
Use Connect/Disconnect mode?
```

This option appears only if you selected DMA transfer mode in the previous query. Type **Y** to use DMA transfer mode . Type **N** to prevent the tape drive from disconnecting from the SCSI bus.

```
Data Mode (1 = Constant Data (29CF), 2 = Ramp Pattern)
```

Answer **1** or **2** depending on the type of data pattern you want written to the tape.

The following query is displayed next:

```
Filler data?
```

This option only appears if you specified **1** in response to the previous query. Enter a four-digit hexadecimal number if you want to change the data pattern written to the tape. The default value, 29CF, is a worst-case pattern requiring the most activity from the tape drive module.

Note: *If you specify the maximum on all 3 of the following parameters, the drive will reach the end of the tape and an error will be displayed. This is useful to those diagnosing a malfunctioning module. To avoid this error you should enter values less than the maximum capacity of the tape.*

```
Number of 512-byte blocks per transfer (127 max)
```

By responding, you can set the blocking factor for most of the tests. In most cases the tests run faster if the blocking factor is large.

```
Number of transfers per file (256 max)
```

Respond by entering the size of the file to be written to the tape.

```
Number of files (100 max)
```

Enter the number of files to be written on the tape.

Selecting Individual Tests

If you answered N to the run quick verification query and to N to the run full verification query, you can now individually select the tests you wish to run. A prompt appears for each test. Type **Y** or **N** to indicate whether or not you wish to run the test.

Rewind to Beginning of Tape Test

This test checks the functioning of the tape transport mechanism by rewinding the tape cartridge to the beginning of the tape.

Retension Tape Test

This test performs a retension operation on the tape cartridge. The retension test rewinds the tape and puts tension on the tape to ensure that the tape will not break.

Note: *Retensioning a tape cartridge is required before reading a tape that has been exposed to abnormal temperatures or stored for a long time.*

Erase Entire Tape (Destructive)

This test erases the entire tape cartridge and reads the tape to verify erasure.

Write/Read/Compare (Short Test)

This test writes blocks and file marks to the tape, rewinds the tape, reads the blocks and file marks, and verifies the data. This test does not write to the entire tape.

Write/Read/Compare (Whole Tape) Test

This test writes blocks to the tape, rewinds the tape, reads the blocks, and verifies the data. This test writes to the entire tape.

Read Whole Tape and Compare Test

This test reads the entire tape and verifies the previously written data. The write/read/compare (whole tape) test must be run on the tape before running this test.

Read and Display Data by 512 byte blocks

This test reads the entire tape and displays data in 512-byte blocks. The write/read/compare (whole tape) test must be run before this test.

Selecting Functions

If you answered N to the run quick verification query and N to the run full verification query, you can select the following functions in addition to the individual tests.

Perform Mode Sense

This function reports the current mode settings of the tape drive.

Perform Inquiry

This function reports the vendor code, product code, and product revision level.

B25-CDX / B25-CDC / CD-001 / CD-002 SCSI CD-ROM Module

Introduction

The Diagnostic tests for the CD-ROM module are on floppy disk #5, SCP / SSP of Visinostics 5.5.

The CD-ROM diagnostic tests the basic functions of the CD-ROM drive unit and also tests the SCSI controller and SCSI bus functions.

To run the CD-ROM diagnostic you need any CD-ROM data disc. To run the audio verification test you need any audio compact disc and a set of headphones.

Note: *A Polynomial disc is available for running data tests on the CD-ROM Module, however, any CD-ROM data disc will suffice.*

The preliminary dialog queries appear when you select the module for testing.

Test operation is described in "Running the Diagnostic" at the end of this section.

Preliminary Dialog

Stop on error?

Answer **Y** to this query if you want the diagnostic to stop on an error.

Run audio verification?

Answer **Y** to this query if you want to test the audio function to the CD-ROM drive. See "Audio Verification Test" later in this section.

Run quick verification?

Type **Y** to run a quick verification that tests the basic operation of the CD-ROM module or **N** to have the full set of tests available, or to choose specific tests from the full list.

If you answer Y to run quick verification? the following tests are run.

```
Test 1 -- SCSI Controller/Drive Controller Test
Test 3 -- Sequential CD Seek Test
```

If you answer **N** to quick verification, the following query will appear.

Run full verification?

Type **Y** to run a full verification (all tests) or **N** to select specific tests to be run. (For more information, see "Selecting Individual Tests" later in this section.)

If your response is Y, the queries that follow are displayed next. If your response is N, these queries will appear after the individual test selection is complete.

Change detail parameters?

Type **Y** to change the detail parameters.

If you respond **Y**, the following queries appear on the screen:

Number of retries?

Type the number of retries during a read that you want performed during the test.

Use DMA transfer mode?

Type Y to use DMA transfer mode. Type N to use programmed I/O mode. Programmed I/O mode uses less circuitry and the test will run slower. Use Programmed I/O mode if you want to run a thorough test of the module.

Use Connect/Disconnect mode?

This option appears only if you selected DMA transfer mode in the previous field. Type Y to use DMA transfer mode . Type N to prevent the CD-ROM drive from disconnecting from the SCSI bus.

Show Activity (dots)?

Type Y if you want dots to appear on the screen for each tape block transferred. Type N to suppress the activity dots.

Selecting Individual Tests

If you answered N to Run Quick Verification? and to Run Full Verification?, you can now individually select the tests you wish to run.

A prompt appears for each test. Type Y or N to indicate whether or not you want to run the test.

SCSI Controller/Drive Controller Test

The SCSI controller / drive controller test checks the general functions of the SCSI controller and the CD-ROM drive controller.

Recalibration Test

The recalibration test seeks to the last and first tracks on the compact disc.

Sequential CD Seek Test

The sequential seek test checks the functioning of the head positioning mechanism by stepping the head from track 00 to the innermost track on the disc.

Oscillating CD Seek Test

The oscillating seek test positions the head at the first track and then the last track. The head is then positioned at the second track and then at the next to last track. This pattern is repeated until all of the track headers have been read twice.

The oscillating seek test positions the head in a ping pong pattern starting with the first and last tracks working toward the middle and then back to the first and last tracks.

Sequential CD Read & Compare Test

The sequential read and compare test reads a block of data from the beginning of each track. The test moves sequentially from the outermost track to the innermost track.

Oscillating CD Read & Compare Test

The oscillating read and compare test reads a block of data from the beginning of each track. The head movement pattern is the same as described above in "oscillating CD seek test".

The oscillating test pattern is a rigorous test of the head positioning mechanism.

Perform Inquiry?

This function reports the vendor code, product code, and product revision level.

Audio Verification Test

If you answered **Y** to the run audio verification query, the following messages are displayed:

```
Passed Initial SCSI Data Buffer Test.

Test 1 -- Audio Test.

How does it sound?

Press any key to end the audio verification test.
```

The diagnostic plays the audio compact disc starting with track 1. Be sure that your headphones are plugged into the drive. Adjust the volume control on the CD-ROM drive to a comfortable listening level. The test will play the remainder of the audio tracks. Pressing any key will end the audio verification test.

Running the Diagnostic

Enter number of times to run diagnostic.

Type the number of times you want to run the diagnostic and then press **Return** to start the test.

The diagnostic always runs a SCSI data buffer test before running any of the selected tests.

If there is no compact disc in the drive the diagnostic prompts:

```
Please insert a CD-ROM.  Press any key to continue.
```

Interrupting the Tests.

The diagnostic tests can be interrupted while they are running. The following table shows keystrokes available to run the tests.

Cancel	to skip current test.
Go	to resume testing
Finish	to terminate testing.

Please Insert a CD-ROM.

This query appears if there is no compact disc in the drive. Insert a caddy containing a CD-ROM disc into the drive and press **Return**.

Section 9
Intelligent X-Bus Modules

Introduction

This section describes tests for X-Bus coprocessor modules. A coprocessor module is any X-Bus module equipped with a processor. Tests described in this section are on Visinostics distribution diskette #6 CCP/CSP.

B25-EN3 Module Diagnostic Tests

The B25-EN3 is an Ethernet module equipped with a micro processor. Tests for the B25-EN3 are described in this section. Refer to Section 6 in this manual for test descriptions of the XE-001 Ethernet module.

Preliminary Dialog

Stop diagnostic on LAN CPU error?

This test checks the general register functions of the 80186 processor.

Stop on a LAN memory error?

Answering Y to this query causes the diagnostics to stop if a memory error occurs.

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

The Galpat (galloping pattern) test is an exhaustive test of memory and takes several hours to run.

Stop diagnostic on LAN coprocessor error?

This test checks the general register functions of the 82586 coprocessor.

Are both terminators connected to the LAN module?

To test the I/0 circuitry of the LAN module answer **Y** to this query and terminate the BNC connector on the LAN transceiver. Use a BNC "T" connector and two 50 ohm BNC terminators. This simulates a typical load on the LAN. Respond **N** to skip this portion of the test.

General-Purpose Register Test

A general-purpose register test is performed to verify that the internal control/status register can perform autoincrement, wraparound, and data write/read. This test is performed with each pass of the diagnostic, even if no other tests are specified.

When the diagnostic is run the screen displays the following message while the internal registers in the module are reset:

```
Resetting the module please wait.
```

Error Message Display

These are some of the possible error messages displayed by the diagnostic. The diagnostic will indicate the number of failures (if any) when the tests are finished running. For example:

```
External loopback test through the transceiver -- FAILED

Mail box status register not updated

Continue?
```

Respond **Y** if you want to continue the test.

This error message indicates a failure of the LAN transceiver test. Make sure that both BNC terminators are installed at the LAN transceiver.

B25-IDS / B25-ID2 Diagnostic Tests

Introduction

The test descriptions that follow apply to both the B25-IDS and B25-ID2 coprocessor modules. Tests for the B25-IDS and B25-ID2 are the same. The difference between the two modules is that the B25-ID2 has an X.21 port where as the B25-IDS does not.

Configuration

- The B25-IDS must be installed to the left of the LAN and Token Ring Modules.
- A maximum of two B25-IDS modules can be used in any configuration.

Required Loopback Cable Assembly

A loopback cable assembly with the following pin assignments is required to perform tests on the B25-IDS Module:

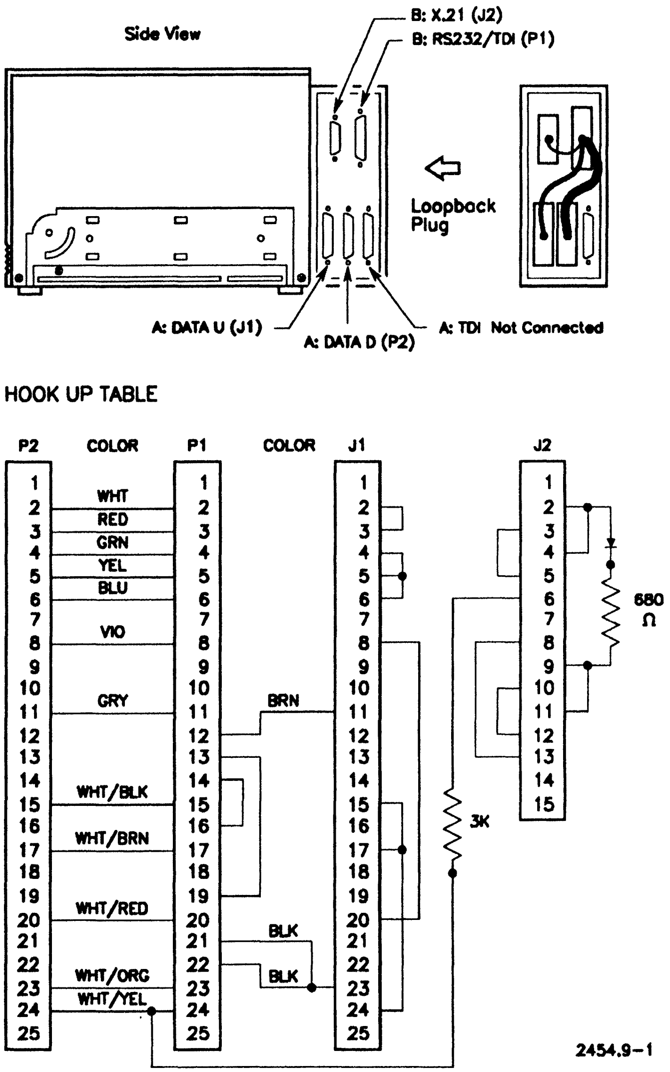

Figure 9-1. B25-IDS Loopback Cable Assembly

Preliminary Dialog

Stop diagnostic on LAN CPU error?

This test checks the general register functions of the 80186 processor.

Stop diagnostic on an IDS memory error?

Answering **Y** to this query causes the diagnostics to stop if a memory error occurs.

Do you want to run the Galpat test rather that the standard?

The Galpat (galloping pattern) test is an exhaustive test of memory and takes several hours to run.

Stop diagnostic on an SCC error?

Respond **Y** if you want the diagnostic to stop in the event of an 82530 Serial Communication Controller error.

Run quick verification?

Type **Y** if you want to run a quick verification of the tests, type **N** to have the full set of tests available.

Stop diagnostic on a control logic error?

Respond **Y** if you want the diagnostic to stop on a control logic error.

Stop Diagnostic on an RS-232 error?

Respond **Y** if you want the diagnostic to stop in the event of an RS-232 communication error.

Are Loopback plugs connected on all RS-232 ports?

Respond **Y** if you are using a loopback cable to test the RS-232 ports. Refer to the Loopback Cable Assembly pictured earlier. This cable assembly is also used to test the X.21 port.

Stop diagnostic on a TDI error?

Type Y to stop the diagnostics on a TDI port error.

Stop diagnostic on an X.21 error?

Type Y to stop the diagnostics in the event of an X.21 error.

Is loopback plug connected at X.21 port?

Respond Y if you are using the loop back cable assembly to test the X.21 port. This is the cable assembly pictured earlier in this section. The X.21 port is tested through RS-232 port B, the loopback cable assembly must be installed to test the X.21 port.

After the test is started, the diagnostic displays the following message as the diagnostic resets the internal registers in the module:

```
Resetting the module please wait
```

General-Purpose Register Test

A general-purpose register test is performed to verify that the internal control/status register can perform autoincrement, wraparound, and data write/read. This test is performed with each pass of the diagnostic, even if no other tests are specified.

B25-1PC / PC-001 PC Emulator Module Diagnostic Tests

Introduction

The following test descriptions are for the B25-1PC and PC-001, PC Emulator modules. Tests are on Visinostics distribution diskette #6 CCP/CSP.

Initial Dialog

The diagnostics performs tests from the main processor as well as tests that are downloaded into the PC Emulator's memory.

The diagnostics begins with the following query:

Stop on PC Emulator error?

If you answer Y to this query the diagnostics will stop if an error occurs.

Selecting Individual Tests

You can select the tests you want to run by answering the queries that follow.

Test PC Emulator Memory From Main CPU?

This test verifies that the PC Emulator memory is operational. It runs on the main Processor Module. The test performs writes and reads of an all-1s pattern, an all-0s pattern, an address pattern, and an address that is not a pattern.

The test then verifies that the PC Emulator 64K memory bank selector is functioning by writing and reading a memory bank pattern to all locations within each of the 12 memory banks. The main processor then downloads a diagnostic program into the PC Emulator's memory and performs a checksum to ensure that the transfer was completed properly.

Test PC Emulator Memory From CoProcessor?

This test verifies that the PC Emulator memory is operational by running the diagnostic program that has been downloaded into the PC Emulator's memory. The test writes and reads an all-1s pattern, an all-0s pattern, an address pattern, and an address that is not a pattern. Status is passed back to the main processor.

Test PC Emulator Video Dirty Bits?

This test verifies that the PC Emulator video dirty bits are operational by running the diagnostic program that has been downloaded into the PC Emulator's memory. The test performs writes to the first byte of each of the 128 byte blocks within the PC Emulator's video address space. The test then checks that the proper dirty bit has been set and that no other dirty bits were set.

Test PC Emulator I/O Trapping?

This test verifies that the PC Emulator I/O trapping mechanism is operational by running the diagnostic program that has been downloaded into the PC Emulator's memory. The test performs 8-bit I/O to both odd and even I/O addresses and 16-bit I/O to even I/O addresses. The diagnostics tests both input and output to these addresses.

Test PC Emulator Interrupts?

This test verifies that the PC Emulator interrupt mechanism is operational by running the diagnostic program that has been downloaded into the PC Emulator's memory. The test resets the interrupt vector, sends an End of Interrupt (EOI) to the interrupt controller and then restarts the PC Emulator.

Test PC Emulator Timer?

This test verifies that the PC Emulator timer is operational by running the diagnostic program that has been downloaded into the PC Emulator's memory. The test sets up the PC Emulator's 8253 timer and enables timer interrupts. The test then polls the timer interrupt bit within the PC Emulator's status register to confirm success.

B25-TR2 / TR-001 Token Ring Module Diagnostic Tests

Introduction

Tests for the B25-TR2 and TR-001 Token Ring modules are described in the following test descriptions. Tests are the same for both modules.

Preliminary Dialog

Stop on a LAN memory error?

Answering **Y** to this query causes the diagnostics to stop if a memory error occurs.

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

The Galpat (galloping pattern) test is an exhaustive test of memory and takes several hours to run.

Stop diagnostic on LAN CPU error?

This test checks the general register functions of the 80186 processor in the Token Ring Module.

Stop diagnostic on LAN coprocessor error?

This test checks the general register functions of the TI 380 coprocessor.

Loopback Tests

There are two loopback tests that make up the coprocessor test, the internal loopback test, and the external loopback test. Your answers to the following two queries determine which test is performed.

Is a cable connected to the Token Ring module?

If you answer **Y** to this query, the following query appears.

```
Is the Token Ring module connected to a HUB?
```

This table shows which test is performed depending on your response to the queries.

HUB?	Cable connected ... ?	Test Run
Y	**Y**	external loopback test
N	**Y**	internal loopback test
X	**N**	coprocessor test not run

You must respond **Y** to both queries if you want to run the external loopback test. To run the external loopback test, connect a Token Ring cable to the module with the other end of the cable unplugged from the HUB.

General-Purpose Register Test

A general-purpose register test is performed to verify that the internal control/status register can perform autoincrement, wraparound, and data write/read. This test is performed with each pass of the diagnostic, even if no other tests are specified.

B25-DN1/DN2 ISDN Module Diagnostic Tests

Visinostics tests that run on the B25-DN1 and B25-DN2 ISDN (Integrated Services Digital Network) controllers are described below. These tests are run by booting Visinostics diskette #6 or the *CCP.run* file.

Refer to the "CTOS B25-DN1/DN2 Hardware Service Reference Guide" for details on ISDN controller hardware.

The B25-DN1 is an X-Bus card that plugs directly into an available X-Bus slot in B2X/B3X workstations. The B25-DN2 is an X-Bus module that uses the same ISDN controller card as the B25-DN1.

For the purpose of simplicity, the term "ISDN module" is used in this text to refer to either the B25-DN1 or the B25-DN2.

FRUs for the B25-DN2 ISDN module are listed below.

- ISDN controller board assembly
- SIMMs
- motherboard assembly
- DC/DC converter
- cooling fan

For instructions on replacing these FRUs and troubleshooting procedures, refer to the *CTOS B25-DN1 / DN2 Hardware Service Reference Guide.*

Hardware Requirements

The ISDN module can be installed in any B2X or B3X workstation configuration with a 286 (or better) processor module.

Loopback tests performed by the diagnostic are performed internally to the ISDN module. No external loopback connections are required. ISDN diagnostic tests can be run with the module connected to or disconnected from the S/T interface.

Preliminary Dialog

Several queries appear in the preliminary dialog for the ISDN module diagnostics. If you select the entire ISDN module icon in the icon menu, all of these queries appear. If you select only ISDN module subicons, the preliminary dialog for each subcomponent selected appears. Each query in the preliminary dialog is given below followed by an explanation of the query. The default response is shown. See "ISDN Diagnostic Test Descriptions" later in this section for details on diagnostic tests for the ISDN controller.

```
Stop diagnostic on an ISDN memory error?  [Y]
```

Respond Y to this query if you want the diagnostic to stop in the event of a memory error. Type N to have diagnostic tests continue if an error occurs.

```
Do you want to run the Galpat test rather than the standard?  [N]
```

Respond Y to this query to run the Galpat (galloping pattern) memory diagnostic test. When you select the Galpat test, several data patterns are written to each memory location. This is an extensive test of memory and takes several hours to run.

```
Stop Diagnostic on an LSI logic error? [Y]
```

Respond Y to this query to have the diagnostic stop in the event of an error while running the LSI chips access diagnostic tests. Type N to continue testing in the event of an error.

```
Stop diagnostic on and ISDN timer error?  [Y]
```

Respond Y to this query to have the diagnostic stop in the event of an error while running the timer controller diagnostic tests. Type N to continue testing in the event of an error.

```
Stop diagnostic on an ISDN Interrupt error?  [Y]
```

Respond Y to this query to have the diagnostic stop in the event of an error while running the interrupt controller diagnostic tests. Type N to continue testing in the event of an error.

```
Stop diagnostic on and ISDN DMA error?  [Y]
```

Respond Y to this query to have the diagnostic stop in the event of an error while running the ISDN DMA diagnostic tests. Type N to continue testing in the event of an error.

```
Stop diagnostic on an ISDN XBus DMA error?  [Y]
```

Respond Y to this query to have the diagnostic stop in the event of an error while running the X-Bus DMA diagnostic tests. Type N to continue testing in the event of an error.

```
Stop diagnostic on a USC error?  [Y]
```

Respond Y to this query to have the diagnostic stop in the event of an error while running the universal serial controller diagnostic test. Type N to continue testing in the event of an error.

```
Stop diagnostic on an ISDN DSC error?  [Y]
```

Respond Y to this query to have the diagnostic stop in the event of an error while running the DSC (digital subscriber test). Type N to continue testing in the event of an error.

ISDN Diagnostic Test Descriptions

Diagnostic tests for each ISDN subcomponent is described below. The module is reset before testing begins. The tests performed depend on your response to queries in the preliminary dialog and also depend on which subcomponents you mark in the icon display.

Memory Test

The memory diagnostic test checks memory installed in the ISDN module. The full range of installed memory is tested. If this test fails, the suspect FRUs are the SIMMs in the ISDN module and the ISDN controller board.

The diagnostic writes 8-bit data patterns of 55h and AAh to memory. A 16-bit data pattern is then written to memory using the following patterns: 55AAh, and AA55h. The data is read after each pass to verify that the write is successful.

When a memory error occurs, the address, expected value, and the actual value read are displayed. If a memory error occurs repeatedly at the same address, the internal memory installed in the ISDN module is suspect. Confirm that SIMMs in the ISDN module are installed correctly.

LSI Chips Access Tests

The LSI chips access diagnostic tests check the LSI (Large Scale Integration) components on the ISDN controller board. If any of these tests fail, the suspect FRU is the ISDN controller board. The following components are involved in these tests.

- Universal Serial Controller (USC)
- Programmable Interrupt Controller (PIC)
- Direct Memory Access (DMA) controller
- ISDN transceiver

Data patterns are written to and read from all writable registers on thes chips.

Interrupt Controller Test

In this test, the master mode register of the PIC is initialized. A register test is performed on the PIC by writing data patterns of 00h and FFh to register OCW1. These data patterns are read and verified. An interrupt is then generated to test the PIC. After the interrupt is generated, the diagnostic confirms that the interrupt occurred. If this test fails, the suspect FRU is the ISDN controller board.

Universal Serial Controller Test

This test confirms that the Universal Serial Controller (USC) functions properly. A register test is performed on the USC by writing data patterns of 55h and AAh to all USC registers. An internal data loopback test is run through the ISDN transceiver in DMA mode. If this test fails, the suspect FRU is the ISDN controller board.

Timer Test

This test checks the timer chip on the ISDN controller board. Each channel of the timer is set to generate an interrupt after a timer count down. If an interrupt is not generated, the test registers as a failure. During the countdown, a RAM timer is used to clock the test. If this test fails, the suspect FRU is the ISDN controller board.

X-Bus DMA Controller Test

The X-Bus DMA controller test checks the ability of the ISDN module to perform X-Bus DMA transfers. If this test fails, the suspect FRU is the ISDN controller board. Also suspect are X-Bus connections and the CPU module. Run diagnostics on the other suspect components to isolate the failure.

First, all DMA controller registers are tested by writing and reading data patterns of 55h and AAh. A DMA transfer is then performed by transferring data from local memory to local memory. A DMA transfer from the host CPU processor module is then performed over the X-Bus.

ISDN DMA Controller Test

The ISDN DMA controller tests the ISDN DMA controller in the ISDN module. If this test fails, the suspect FRU is the ISDN controller board.

All read/write registers are tested by writing data patterns of 55h and AAh to the DMA controller. The register contents are read after the data is written. An internal data loopback test is performed thru the ISDN transceiver in DMA mode.

Digital Subscriber Controller Test

This test checks the digital subscriber controller (DSC) in the ISDN module. If this test fails, the suspect FRU is the ISDN controller board. The diagnostic performs a write/read test on all DSC internal registers. An internal loopback test is then performed thru the DSC.

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Distribution lists:	System:	Series NGEN/B39
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Section 1
General Description

This Software Release Announcement describes Visinostics 5.7 Customer Service Engineer (CSE) version. It provides a product description and installation instructions for Visinostics 5.7 CSE Version. It also provides information on how to order the product.

Visinostics 5.7 consists of six **Control programs** (actual diagnostic runfiles) and six **Selection programs** (CTOS/BTOS applications).

The Visinostics 5.7 package contains the standard, disk, extended, protected mode, scsi and coprocessor diagnostic **control programs** (CP, DCP, XCP, PCP, SCP and CCP) and the standard, disk, extended, protected mode, scsi and coprocessor diagnostic **selection programs** (SP, DSP, XSP, PSP, SSP and CSP).

The **control programs** run on currently available NGEN, CWS, B25 and B28/38/39 hardware. The protected mode diagnostic control program (PCP) will only function on NGEN or B28/38/39 systems that include processor modules which are based on the 80286 or 80386 microprocessors. The control programs DO NOT execute under the CTOS operating system, they are bootable programs.

The **selection programs**, which execute as CTOS applications, configure the default operation of the control programs.

TERMS USED IN THIS DOCUMENT

Since this document serves both channels of distribution, some synonomous terms are equated below:

NGEN - refers to any XBus modules in general, as well as the following processor modules: CP-001, CP-002 and CP-0A2 (abbr. CP-0x2), CP-003 and CP-0A3 (abbr. CP-0x3), B28, B28-LCW, B28-EXP, and B38 and B38-EXP.

NewGen or "**i**" **processor** - refers to any 286i, 386i or B39 processors.

B39 - 386i processor.

386i - anywhere you see this term, B39 is also implied, if not explicitly specified.

B25 - generic term for XBus modules created by Unisys before the merger.

Section 2
New Release Functionality

This release of Visinostics 5.7 provides the following new functional items:

- Bug Fixes including previously open UCF's
- B25-ISDN functional tests
- SG-101-K keyboard support
- Added 3.68Mbs support to Cluster Communication tests
- Vendor code identification for SCSI disks is no longer required
- Text strings have been consolidated into nationalizable files

The CSE version of Visinostics is designed to isolate hardware failures to a specific module. All hardware failures detected by Visinostics are displayed on the screen as flashing icons that correspond to specific modules in which these failures likely occurred. Finer grained hardware failure isolation can be determined through text messages reported to the display.

2.1 New Hardware Configuration Options

2.2 UCF'S Closed in 5.7 release

UCF #16688568: Visinostics does not test cluster at 3.68Mbs.

UCF #26251591: CRC errors on ECC disk during Read Sequential Test.

2.3 UCF'S Opened in 5.7 release

UCF #PLE-15437502: PCP.img does not boot on a B38-EXP/GXP/GXL using Standard Software Bootstrap command Version12.0 and above.

2.4 B25-ISDN

The INTEGRATED SERVICE DIGITAL SERVICE NETWORK (B25-ISDN) Module has been added to Visinostics. The software automatically configures itself to the runtime hardware system configuration.

The B25-ISDN tests include the following tests:

- Local Memory Test
- LSI Chips Access Test
- 82C59 Interrupt Controller Test
- Z16C30 Univeral Serial Controller Test
- 82C54 Timer Test
- 9516 XBUS DMA Controller Test
- 8237 ISDN DMA Controller Test
- Digital Subscriber Controller Test

For further information on the above tests, refer to Section 9 of *Visinostics Operations Guide.*

2.5 SG-101-K Supergen Keyboard

The keyboard tests have been modified to support the SG-101-K keyboard.

For further information refer to the Keyboard Diagnostic Tests in Section 4 of the *Visinostics Operations Guide.*

2.6 RS-422 Cluster Communication Test

The cluster interprocessor test has been modified to support 3.68Mbs.

The information to run this test is documented in Section 4 of the *Visinostics Operations Guide.*

2.7 SCSI Disk Vendor Codes

SCSI disk vendor code information no longer required to run the SCSI disk tests.

The SCSI tests for these devices are documented in Section 8 of the *Visinostics Operations Guide.*

2.8 Nationalization

Text strings have ben removed from individual source files and put in to nationalizable text files. A future release will provide a Product Localization Kit (PLK) for Visinostics 5.7.

Section 3
Product Interdependencies

3.1 Software

Visinostics 5.7 is a bootable, single threaded, standalone operating environment. The software automatically configures itself to the runtime hardware system configuration. There is a one-to-one correspondence between the display icon and the module being tested.

3.1.1 Requirement

The diagnostic control programs are self-contained and have no software dependencies.

The diagnostic selection programs require CTOS 9.1 or later.

3.1.2 Recommended Additional Software

Visinostics 5.7 does not require any additional software.

3.2 Hardware

Visinostics 5.7 supports all currently available NGEN/B25 hardware with the following exceptions:

No support for B24 or B27 processors
No support for any AGP graphics module
No support for B25-GPP graphics module

Hardware support by diskette listed below:

The standard **diagnostic control program (CP)** supports the following CWS, NGEN and B25 hardware.

CWS Workstations

CM-002	512 Kb processor
CM-003	1 Mb processor

NGEN/B25 Modules

CP-001/8	8 Mhz 80186 processor
CP-001/9	8 Mhz 80186 processor
B26-CPU	8 Mhz 80186 processor
HIA/HID	Hardware ID option
KM-001	Keyboard (K1)
B25-K2-K5	All K2, K4, K3/K5 Keyboards
B25-SG-101-K	Supergen Keyboard
B25-MOU	2 button Mouse
PD-001/MO3	3 button Mouse

The **disk diagnostic control program (DCP)** supports the following hardware.

FD-001	dual floppy disk
B25-M0	single floppy disk
HD-002	10 Mb floppy/hard disk
HD-003	20 Mb floppy/hard disk
HD-0A3	20 Mb floppy/hard disk
HD-006	20 Mb hard disk upgrade
HD-011	32 Mb hard disk upgrade
HD-020	85 Mb hard disk upgrade
HD-010	40 Mb hard disk upgrade
HX-002	10 Mb hard disk expansion
HX-003	20 Mb hard disk expansion
HX-011	32 Mb hard disk expansion
HX-020	85 Mb hard disk expansion
HB-001	tape backup
B25-TS	tape backup
B25-Mx	all ECC floppy/hard disks
B25-MCx	all ECC hard disk upgrades
B25-CXx	all ECC hard disk expansions

The **XBus diagnostic control program (XCP)** supports the following hardware.

GC-001/GRE	Graphics controller
GC-102	Enhanced Video Controller
GC-003	Bitmapped graphics
GC-103	Bitmapped graphics

GC-004/VGX	Vga+ Video Controller
GC-104	Vga+ Video Controller
VC-001	15" color monitor
VC-002	15" color monitor
VM-001	12" monochrome monitor
VM-002	14" monochrome monitor
VM-003	15" high res. monochrome monitor
VC-003/CA1	15" Color HiRes analog monitor
VM-005/GS1	15" Mono HiRes analog monitor
VA-001/VA1	12" Color/Mono analog monitor
TM-001	Voice processor (with modem)
VP-002	Voice processor (without modem)
XE-001	Ethernet
XE-101	Ethernet
XC-002	RS-232 port expander
XC-102	RS-232 port expander
B25-DCX	

The **protected mode diagnostic control program (PCP)** supports the following hardware.

CP-002	8 Mhz 80286 processor
B28-CPU	8 Mhz 80286 processor
CP-002/287	8 Mhz 80286 processor
CP-0A2	8 Mhz 80286 with Enhanced Video
CP-0A2/287	8 Mhz 80286 with Enhanced Video
B28-EXP	8 Mhz 80286 with EV, 14 meg memory
B28-LCW	8 Mhz 80286 with EV, 8 meg memory
CP-003	16 Mhz 80386 processor
B38-CPU	16 Mhz 80386 processor
CP-003/287	16 Mhz 80386 processor
CP-0A3	16 Mhz 80386 with Enhanced Video
CP-0A3/287	16 Mhz 80386 with Enhanced Video
B38-EXP/GXP	25 Mhz 80386 with Enhanced Video
B38-GXL	25 Mhz 80386 with Enhanced Video
PHD-010	Series 286i processor
PHD-011	Series 286i processor
PHD-020	Series 286i processor
PHD-14x	Series 386i processor
PHD-32x	Series 386i processor
B39-x	Series 386i/B39 processors
B25-ASB	12-Bit Sync comm option
B25-HIA/HID	Hardware ID option

The **SCSI diagnostic control program (SCP)** supports the following hardware.

PHD-xxx	all PHD-CPU internal SCSI hard disks
HSX-020/XS6	80 Mb SCSI hard disk expansion
B25-MS5	40 Mb SCSI Hard & Floppy Disk Module
B25-MS6	80 Mb SCSI Hard & Floppy Disk Module
B25-XS6	80 Mb SCSI Hard & Floppy Disk Expansion
B25-MS7	140 Mb SCSI Hard Disk Module
B25-XS7	140 Mb SCSI Hard Disk Expansion
B25-MS8	320 Mb SCSI Hard Disk Module
B25-XS8	320 Mb SCSI Hard Disk Expansion
B25-MS9	240 Mb SCSI Hard Disk Module
B25-MSA	425 Mb SCSI Hard Disk Module
B25-XSA	425 Mb SCSI Hard Disk Expansion
CD-001/CDC	CDROM

CD-002/CDX	CDROM
HSB-002/TS2	Tape Backup
B25-DDS	Tape Backup Module
B25-MF1	Dual Floppy Module

The **Coprocessor diagnostic control program** (CCP) supports the following hardware.

PC-001	PC Emulator module
PC-101	PC Emulator Board
B25-EN3	Smart Ethernet
B25-IDS	ID2 Smart Comm
B25-TR2	Token Ring Comm
B25-ISDN	ISDN Comm

3.2.1 Requirement

3.2.1.1 Memory Requirements

The diagnostic control programs require 256 K of memory with one exception. To execute the base memory diagnostic, an additional 256 K RAM expansion is required on T1 (B26) processors.

The diagnostic selection programs require a minimum 300 K memory partition.

3.2.1.2 Disk Requirements/Utilization

The disk requirements are

CP.run	560 sectors (280 K)
DCP.run	540 sectors (270 K)
XCP.run	604 sectors (302 K)
PCP.img	560 sectors (280 K)
SCP.run	560 sectors (280 K)
CCP.run	640 sectors (320 K)
SP.run	310 sectors (155 K)
DSP.run	290 sectors (146 K)
XSP.run	310 sectors (160 K)
PSP.run	202 sectors (101 K)
SSP.run	320 sectors (160 K)
CSP.run	260 sectors (130 K)
PCP.run	570 sectors (286 K)

Section 4
Migration Requirements

4.1 Compatibility with Previous Versions

This version of Visinostics supercedes the previous version in its entirety.

4.2 Hardware Configuration Changes Required

The Visinostics Diagnostic Selection Programs runs on the NGEN and, B28/38/39, workstations under CTOS.

For the details of the supported hardware refer to *the Visinostics Operations Guide*.

4.3 Software Configuration Changes Required

The diagnostic control programs are self-contained and have no software dependencies.

The diagnostic selection programs require CTOS 9.1 or later.

4.4 Submit File and Macro Changes Required

No changes are required to submit files for compatibility with this version.

4.5 Application Compatibility

No applications run on the top of or in conjunction with Visinostics .

4.6 Supplementary Information

Bootstrap Visinostics either from floppy disk, from the master, or using the Bootstrap command.

4.6.1 Booting From a Floppy Disk

To boot from floppy disk, power on the workstation, place a bootable Visinostics diskette in the floppy drive, close the floppy door, and press the reset button on the processor module.

A Visinostics distribution diskette may be used for this purpose, however, this is not recommended. Copy the distribution diskette using the **Floppy Copy** utility and use the copy as the working bootable diskette.

If a Visinostics distribution diskette is not available, create a bootable Visinostics diskette as follows:

Initialize a floppy using the **IVolume** command. Fill in the [System Image] field with **700** and the [Primary Fileheaders Only?] field with **Y.** You need not fill in the other optional fields.

Copy one of the diagnostic control programs (CP.run, DCP.run, XCP.run, PCP.**img**, SCP.run or CCP.run) from the hard disk to <Sys>SysImage.sys on the floppy disk, overwriting the previous contents.

CAUTION: After Visinostics has booted, immediately remove the boot diskette from the floppy drive. This will prevent an accidental erasing of the boot diskette if the floppy disk diagnostic is executed.

4.6.2 Booting From the Master

Boot an NGEN or CWS cluster workstation from the master as follows:

At the master workstation, copy CP.run, DCP.run, XCP.run, PCP.**img**, SCP.run or CCP.run to [Sys]<Sys>wsNNN>SysImage.sys where NNN is in the range 0 to 255.

Note that 000 to 015, 100, and 200 to 255 are reserved by Unisys/Convergent and should not be used.

Check that the workstation is connected to the master by a cluster cable.

Hold down the space bar on the keyboard and turn on the workstation or, if the workstation is already on, press the reset button on the processor module while holding down spacebar.

When the BOOTROM menu is displayed **(B,D,L,M,P,T:)**, release the space bar and then press T.

When **OS:** is displayed, type in the SysImage.sys number, (e.g. 186) and press RETURN.

When the boot ROM menu is redisplayed **(B,D,L,M,P,T:)**, press B.

4.6.3 Using the Bootstrap Command

To boot Visinostics from a hard disk using the Bootstrap command, enter one of the following commands depending on the diagnostic you want to run.

Command **Bootstrap** RETURN
Bootstrap
File name **[Sys]<Sys>CP.run** GO
[Sys volume or wsNNN]

\- or -

Command **Bootstrap** RETURN
Bootstrap
File name **[Sys]<Sys>DCP.run** GO
[Sys volume or wsNNN]

\- or -

Command **Bootstrap** RETURN
Bootstrap
File name **[Sys]<Sys>XCP.run** GO
[Sys volume or wsNNN]

\- or -

Command **Bootstrap** RETURN
Bootstrap
File name **[Sys]<Sys>PCP.img** GO
[Sys volume or wsNNN]

\- or -

Command **Bootstrap** RETURN
Bootstrap
File name **[Sys]<Sys>SCP.run** GO
[Sys volume or wsNNN]

\- or -

Command **Bootstrap** RETURN
Bootstrap
File name **[Sys]<Sys>CCP.run** GO
[Sys volume or wsNNN]

4.6.4 Hard Disk Drive Vendor Codes

Hard drive information is automatically obtained from the SCSI drive and requires no user input. However, for non-SCSI drives you must enter a drive vendor code if prompted by the hard disk diagnostic.
Note: The SIZE field is unformatted/formatted capacity, the SPT field is "Sectors Per Track."

CODE	VENDOR	SIZE	CYLS	HDS	SPT
A	Tandon	12.7/10 Mb	306	4	16
B	Seagate	12.7/10 Mb	306	4	16
C	Miniscribe	12.7/10 Mb	612	2	16
D	Atasi	46.5/37 Mb	645	7	16
E	Quantum	42/33 Mb	512	8	16
F	MiniScribe	26/20 Mb	612	4	16
G	Seagate	26/20 Mb	612	4	16
H	Honeywell/Vertex	56/50 Mb	987	7	16
J	Miniscribe	85/67 Mb	1024	8	16
K	Micropolis	85/67 Mb	1024	8	16
L	Vertex	85/67 Mb	1166	7	16
M	Atasi	85/67 Mb	1024	8	16
N	Hitachi	40/36 Mb	699	7	16
O	Toshiba	80/65 Mb	830	10	16
P	CDC	40/37 Mb	989	5	16
Q	Hitachi	40/36 Mb	823	6	16
A1	Seagate	50/40 Mb	977	5	16

For additional information refer to *the Visinostics Operations Guide.*

4.6.5 Running the Mouse Diagnostics

After selecting the mouse for testing, enter the number of times to run the diagnostic and press GO. **DO NOT** move the mouse until the test screen is fully displayed. To verify proper functionality of the mouse movement, move the mouse in a random motion and verify cursor movement on the screen. To verify proper functionality of the mouse buttons, press the buttons in any combination while MOVING the mouse. Failure to move the mouse while verifying button operation may result in the buttons not being highlighted on the screen or in the buttons being left highlighted after they have been released. When testing is completed, press the Finish key. **DO NOT** move the mouse while the original test screen is being restored, or at any other time during which the mouse diagnostic is not executing.

4.6.6 Using the SCSI Selection Programs

The configurations drawn in SSP include duplicate SCSI disk/tape/CD expansion modules. This is to allow distinction between HSD-controlled expansions and 286i/386i- controlled expansions. In SSP, if you want to test an xSCSI module controlled by either "i" processor, select the one directly on the right of the 386i. If you want to test an HSD-controlled xSCSI, select the one directly on the right of the HSD. The same logic applies to tape and CD expansions, right side of HSD expansions are for HSD-controlled, otherwise PHD-controlled.

4.6.7 Using the Protected Mode Selection Program

The Protected Mode Selection Program functions the same as the Standard Selection Programs with the following exception:

After running the Protected Mode Selection Program the output file must be converted into an image file. This is done using the PMake command which is part of Standard Software 11.0 or later. The parameters **must** be entered as shown below.

PMake	
Run file	**new>PCP.run**
[Extra GDT slots (16)]	**48**
[IDT slots (256)]	
[Load offset (0)]	**2560**
[Include symbols?]	
[Symbol file (-.sym)]	
[List file (-.gdt)]	
[Image file (-.img)]	
[Realnub file]	**[Sys]<sys>realNub.sys**

The bootable customized diagnostic will be named **new>PCP.img**.

A submit file is provided for your convenience as part of this release, installed to **[Sys]<sys>new>PMake.sub** by the installation script. As an alternative to the command above, you may instead use the following:

Submit	
File(s)	**[Sys]<sys>new>PMake.sub**
[Parameters]	{*optionalFileSpec*}
[force expansion?]	
[show expansion?]	

The {*optionalFileSpec*} parameter is only required if you supplied a non-default response to the "Output File Spec" query of PSP. If you used an alternate output filename in your PSP session, type the same filename in the parameters field as shown above. (minus the braces) Leave the field blank if you used the default output file spec in PSP.

Section 5
Corrections

The following corrections have been made since the last version (5.6) of Visinostics:

1. The B38-EXP cache and RS422 tests now pass when the individual test is selected and more than 8MB of memory is present.

2. The B38-EXP cache and RS422 tests now pass if a B25-MS5/6 or B25-MC5/6 is present.

3. The B38-EXP RS232 test now passes if selected by itself and a B25-ASB is installed.

4. B38-EXP HID test now passes if more than one pass is selected.

5. The "Warning Label" is now displayed for Valid Volumes using the NEW disk format.

6. The B25-MF1 Recalibration test now passes if the SCP.run file is booted from the master using the 'T' option.

7. X-Bus power plug display for Controller and Expansions corrected.

8. A B25-DDS on the HSD bus is now displayed properly.

9. The SCSI Selection Program (SSP) now supports the B25-DDS.

Section 6
Restrictions and Known Limitations

1. The Standard Visinostics will always recognize a 3-button (3B) mouse as being present on a Series i or B39 system, whether you have one or not. If a 3-button mouse is present the mouse diagnostic will execute properly. The 2-button (2B) mouse is not supported on these processors.
   For all NGEN processors, mouse recognition is dynamic,(except for the model KM-001 AG keyboard), and the displayed configuration should agree with reality: none, 2B, or 3B.

2. Standard Visinostics will not recognize a mouse on a CWS system.

3. When running the mouse diagnostic on a Series 286i, a T2 with a GC3, or a T3 with a GC3, occasionally the buttons will remain highlighted even though the button has been released. Please refer to Section 9.5 for proper execution of the mouse diagnostic.

4. The Series 286i/386i should not be configured with a GC-001 Graphics Controller, these hardware modules are not compatible.

5. The maximum size of the output file specifications in the Selection programs is 32 characters. Typing filespecs of greater than 32 characters will produce undefined results.

6. When running SCSI disk diagnostic "format test," pressing FINISH has no effect. This is a SCSI limitation, not a Visinostics one. SCSI drives perform format with one command, not several (interruptable ones) like winchesters.

7. 286i, 386i, and HSD floppies perform the "Read Disk Address" function differently than FD or HD floppies. Due to a hardware limitation of the NEC-type controllers, the test reports "Read OK" instead of displaying the gap, ID, & CRC bytes like the 2797-controlled floppies.

8. Processor subicons (the little x's) are intermittently drawn when any bitmap video is used (GC3 or 286i internal video). Usually, they do not appear until you MARK a submodule for testing. The cursor positioning and label above the icon work correctly.

9. On T1 and CWS processors only, selecting base memory and running the Galpat test results in no operation. The message "Base Memory will not be tested" appears and the test proceeds to high memory, if selected. This is normal operation.

10. For SCSI disk drives, no "Enter Bad Spots" prompt is given during the dialog phase. We let the SCSI drives correct errors using ECC.

11. On 286i processors only, attempting to run internal Floppy diagnostics when no floppy is inserted results in "Abnormal Seek End Status" message and a hard error, rather than a prompt for insertion of a diskette as with other floppies. This is due to a hardware limitation of the 286i's floppy controller.

12. In video, graphics, and monitor diagnostics, the "Manual Step Mode" query is "global." If you are selecting both the monitor and controller, and if you are asked twice for "Manual Step Mode", the last response will dictate the behavior of both diagnostics. This is normal operation.

13. If your system is equipped with a PC Emulator module and any IDS, EN3 or TR2 modules, the PC Emulator module must be installed to the right of these comm modules.

14. If your system is equipped with more than one module from this list, IDS, EN3 or TR2 then the following installation order on the XBus is recommended:
    IDS leftmost, EN3, TR2 rightmost.

15. Tape diagnostics record "Read Soft Errors" as hard errors in the error counter below the module. "Write Soft Errors" are recorded as soft errors in the counter below the module. SCSI tape diagnostics exit immediately upon encountering a Read Soft Error, with the module flashing in the "failed" state. Non-SCSI tape diags proceed, incrementing the hard error count, and not flashing the module as failed at the end of the test (unless some other "real" hard error also occurred during the run). In the log, Read Soft Errors are described as "Read data error."

16. B28/38-EXP processors with more than 8 MB of memory AND any winchester module on the XBus will have their memory expansion

subicons adjusted down to 8 MB of total system memory. This is not a bug, but a hardware constraint of non-SCSI winchester modules. This paragraph is merely for reference to those posessing this rare hardware combination, explaining the difference between what's seen in the module and what's indicated in the icon.

17. For SCSI-disk diagnostic queries: the "Bytes Per Sector", "Sectors Per Track", "Tracks Per Cylinder" and "Cylinders Per Disk" queries (under detail parameters) are provided for parameter echo only. Changing these values has no effect on test operation.

18. 2-Button mouse (B25-MOU) displays only half of the screen using GC-003.

19. The keyboard echo test may fail with an overrun error if too many keys are depressed simultaneously.

20. On a B28-EXP or B38-EV, the GC3 mouse test occasionally hangs, and the test screen does not get fully refreshed. Please refer to Section 9.5 for proper execution of the mouse diagnostic.

21. On B39 systems, an internal graphics module is displayed to the right of SCSI expansion modules but to the left of a SCSI controller module. This is normal operation.

22. If a hard disk drive was formatted under Standard Software 12.0 or greater, the vendor code is not displayed when running Visinostics. This occurs because Standard Software 12.0 and above does not support the vendor code field in the Volume Home Block.

23. For all NGEN processors the mouse is not recognized on a KM-001 AG keyboard. Refer to item 1 for further clarification.

24. The "dump error log to printer" feature of the Tape Backup test is not supported.

25. The sub-icons for memory expansion on a B39 will only appear when the system is booted from diskette 4 (PCP).

26. While running the Full Verification Tests on the Tape Backup Module, if the tape diagnostic stops on error in test 6, the response to the print query will terminate the test, and the test 7 Check ROM banner will be displayed.

27. Automatic query selection for the Dual Floppy Test may fail on a New>DCP.run file generated by the Disk Selection Program.

28. The B25-EN3, B25-IDS, and B25-TR2 communication tests will fail with a timeout error if they are run on a CP-001 (80186) Processor.

29. The B25-IDS, B25-EN3, B25-TR2, and B25-ISDN tests will fail with a timeout error on the SECOND pass if a B25-1PC module is present.

30. A maximum combination of four B25-IDS, B25-EN3, B25-TR2, or B25-ISDN modules may be tested at the same time.

Section 7
Customer Product Information

7.1 Required Product Documentation

Part Number	Manual Name
09-02454	CTOS Visinostics Operations Guide,
09-02635	CTOS Visinostics Operations Guide Update 1
4357 4508-120	CTOS Visinostics Operations Guide Update 2
4357 4508-122	CTOS Visinostics Operations Guide Errata 2
4358 2899-001	Base Manual with binder and slipcase including Update 1, Update 2 and Errata

Section 8
Support

8.1 Warranty

Visinostics 5.7 is a warranted Unisys software product.

Unisys warrants that Visinostics 5.7, in its unaltered form, will substantially conform to Unisys current published functional specifications when used in Unisys supported configurations. The customer is responsible for reporting suspected deviations using the User Communication Form (UCF) process within ninety (90) days following delivery. The product is neither field repairable nor field modifiable. Corrections to reported deviations are provided to the user via updated code files.

This standard warranty is not a substitute for Unisys Service Agreement offerings.

8.2 Support Category

Visinostics 5.7 is fully supported by Unisys.

Support services for Visinostics 5.7 are offered under the SURETY (United States) or A la Carte (International) support programs and are consistent with the support services offered for the entire CTOS Hardware and Software family of products.

Unisys SureNet is an electronic bulletin board service, providing customers in the United States access to technical information seven days a week, 24 hours a day. SureNet Technical Information Services are available at no additional cost to customers with a current Unisys service agreement or software license and include access to system alerts, customer technical bulletins and online UCF entry. Registration is required. SureNet Support Services are available on an annual subscription basis. For more information, contact Unisys Direct at 1-800-448-1424, prompt 5. You may register for Technical Information Services and/or Support Services either online (by dialing 1-800-828-8796 (8 data bits, 1 stop bit, no parity, asynchronous, VT100 emulation) or by calling Unisys Direct.

If you need further assistance or information regarding support services, please contact your Unisys representative or your local Unisys office.

8.3 Support Discontinuance

UNISYS supports the current release level 5.7, and one level back, 5.6. Levels prior to 5.6 are not supported.

Section 9
Ordering Procedures

Please complete and return the attached Update Service Request (USR) form to order this product. Media provided by Unisys Corporation may not be returned for credit.

You can order manuals from the following address:

Unisys Corporation
Publications Distribution Center
13250 Haggerty Road North
Plymouth, Michigan 48170

Section 10
List of Files on Product Media

10.1 Contents of the Distribution Diskettes

The Visinostics distribution diskette set is your master copy and has been shipped write-protected. Visinostic disks should not be write-enabled, nor should they be used as a working copies.

The distribution diskette 1 of 6 contains the following files

in the <Sys> directory:

SysImage.sys (CP.run)

HdInstall.sub
Install.sub

in the <CT> directory:

SP.run

in the <ReleaseNote> directory:

ReleaseNotice

The distribution diskette 2 of 6 contains the following files

in the <Sys> directory:

SysImage.sys (DCP.run)

in the <CT> directory:

PCP.run

RealNub.sys

The distribution diskette 3 of 6 contains the following files

in the <Sys> directory:

SysImage.sys (XCP.run)

In the <CT> directory:

XSP.run
t1Diag.font
new>PMake.sub
HiResGC003Diag.font
LoResGC003Diag.font

In the <PMake> directory:

PMake.run

The distribution diskette 4 of 6 contains the following files

in the <Sys> directory:

SysImage.sys (PCP.img)

In the <CT> directory:

PSP.run
DSP.run

The distribution diskette 5 of 6 contains the following files

in the <Sys> directory:

SysImage.sys (SCP.run)

In the <CT> directory:

SSP.run

The distribution diskette 6 of 6 contains the following files

in the <Sys> directory:

SysImage.sys (CCP.run)

In the <CT> directory:

CSP.run

SysImage.sys contains:

CP on diskette 1 of 6

DCP on diskette 2 of 6

XCP on diskette 3 of 6

PCP on diskette 4 of 6

SCP on diskette 5 of 6

CCP on diskette 6 of 6

SP.run is the standard diagnostic selection program.

DSP.run is the disk diagnostic selection program.

XSP.run is the extended diagnostic selection program.

PSP.run is the protected mode diagnostic selection program.

SSP.run is the scsi diagnostic selection program.

CSP.run is the coprocessor diagnostic selection program.

HdInstall.sub is a submit file that installs the product onto a hard disk for CTOS systems.

Install.sub is a submit file that installs the product onto a hard disk for BTOS systems.

Section 11
Installation Procedure

11.1 Overview

Visinostics 5.7 should only be used on Unisys/Convergent Information Processing Systems which are equipped with a hard or floppy disk, or cluster systems where the master is equipped with hard disk.

Use the installation procedure described below. Characters that you must type are shown in **boldface**. Special keys, such as RETURN and GO, are shown in upper case. Optional parameters that you may be required to type are shown in *italics* surrounded by {} braces. Do not type the braces.

11.2 Types of Systems

The following information explains how to install Visinostics 5.7 on two types of systems:

- Hard disk systems
- Standalone floppy disk systems

11.2.1 Hard Disk Systems

A. Signon and set the path at the workstation. If the Signon form is displayed, fill it in and press GO. Set the path as follows:

Command **Path** RETURN

Path	
[Volume]	**Sys** RETURN
[Directory]	**Sys** RETURN
[Default file prefix]	RETURN
[Password]	**(if any)** GO
[Node]	

If your hard disk has a volume password on [Sys], fill this password into the [Password] field before pressing GO.

B. Insert the Visinostics distribution diskette 1 of 6 into floppy drive [f0].

If the "Install" command (CTOS) or "Install Software" command (BTOS), which is included in Standard Software 10.0 or later, is available on your workstation, type

Command **Install** GO (CTOS workstations)

- or -

Command **Software Install** GO (BTOS ws)

Otherwise, (CTOS or BTOS) type

Command **Submit** RETURN
Submit
File list **[f0]<Sys>HdInstall.sub** GO
[Parameters]
[Force expansion?]
[Show expansion]

When prompted, insert the Visinostics distribution diskettes 2 thru 6 into floppy drive [f0] and press GO to continue.

11.2.2 Standalone Floppy Disk Systems

Visinostics cannot be installed on a standalone floppy disk system, Visinostics may only be booted and run from a bootable floppy.(See Section 4.6.1 Booting From Floppy Disk).

11.3 Required Files

The SysImage.sys is required to execute Visinostics from a floppy disk. See subsection 4.6.3 for details on how to boot Visinostics using the Bootstrap command.

The files SP.run, DSP.run, XSP.run, PSP.run, SSP.run and CSP.run are required in the [Sys]<Sys> directory to execute the Visinostics Diagnostic Selection Programs.