

Self-Paced Hardware Training Guide
HP 9000 Series 300, Models
362/382 Service Training



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First Edition

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First Edition August 1991



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Introduction

Before You Begin ...

This 1 day course, Level II video course has been designed to provide a self-paced means of training CEs to support and service the HP 9000 Series 300 362/382 Controllers. The course consists of a videotape presentation as well as this guidebook. The video, quizzes and final exam teaches the students the skills necessary to repair and maintain this product as well as familiarizing them with all relevant documentation.

Course Objectives

Upon successful completion of this course, you (the student) will be able to do the following.

- Install both of the controllers and expanders
- Troubleshoot and Isolate hardware failures to the Field Replaceable Unit
- Run all diagnostics tools for the controllers
- Replace all Field Replaceable Units

Student Performance Objectives

- The student, using any of the course materials, will score 80% or better on the final review. The test will cover features, installation, troubleshooting, theory of operation and disassembly.
- If hardware is available, the student will remove and replace all of the Field Replaceable Units.
- The units must be restored to full operation and pass self test, to be successful.

Prerequisites

- CED1-79XXA Mass Storage
- NEN1-CBT1B Introduction to Data Communication (P/N 99076+49A-90002)
- CEG1-PSOOA Problem-Solving KT (P/N 99070+49A-90101)
- CE92-S300 SPU Self-Paced (P/N H2507+49A-90002)
- HP-UX

Profile

The targeted student for this course is a HP CE with Series 300 Controller training and experience.

Equipment/Material List

Hardware

The following hardware is recommended, but not required for this course:

HP A1413A R/362 Integrated Controller **List = \$9,990.00**

362 SPU
2mb Parity RAM
9" Internal Grayscale Display
52mb Internal Disk Drive
3.5" Floppy Drive
4 DIO I/O and 1 DIO Accessary Slot
HP BASIC/WS

HP A2250A M382 Wkstation Cntrlr Bndl **List = \$7,900.00**

382 SPU
4mb ECC RAM
640 X 480 VGA Graphics
14" VGA Color Monitor
1 DIO Slot

#AMK 400mb Disk drive w/HP-UX **3,500.00**

\$11,400.00

Software

- BASIC 6.5
- HP-UX Version 8.0
- A1421-10034 Test Stimulus Code (Computer Tests)

Nonstandard Tools

- 7 mm Nutdriver

Library List

- HP 9000 Series 300 Model 362/382 A1473A Service Manual (P/N A1473-90030)
- HP 9000 Series 300 Model 362/382 A1473A Service Handbook (P/N A1473-90039)
- HP 9000 Series 300 Model R362/R382 A1314A Service Manual (P/N A1301-90001)

Student Materials

- HP 9000 Series 300, 362/382, Service Training Self-Paced Training Kit (A1473A+49A-60001 NTSC Format or A1473+49A-60002, PAL Format) containing:
 - HP 9000 Series 300, 362/382, Service Training Self-Paced Training Guide and Final Exam Package (A1473+49A-90001)
 - HP 9000 Series 300 362/382 Service Training Video

Learning Centers may also wish to order the following separately:

- HP 9000 Series 300 362/382 Controller Self-Paced Training Guide (A1473+49A-90001)

Instructor Materials

- Not Applicable

Presentation Materials

- VCR with NTSC (VHS) or PAL Format

Electronic Reproduction Materials

- Not Applicable

How to Take This Course

1. Read Appendix A in this workbook before continuing. It has some corrections and additions to the video.
2. Read the following chapters in the Service manual and/or handbook, before watching the particular video section.

Section	Manual	Handbook
Features		Chapter 1
Installation		Chapter 3
Theory of Operation	Chapter 3	
Troubleshooting		Chapter 4 & 5
Disassembly	Chapter 2	

3. View the video, stopping as directed or as you want to. Answer the questions at the end of each lesson.
4. Read and observe all Cautions, Warnings and Safety guidelines.
5. Keep a record of your progress using the Course Completion Checklist on at the end of this section.
6. After completing all of the sections, take the final examination. If you did not answer 80% of the questions correctly, review the lessons where you were weakest and retake the final examination.

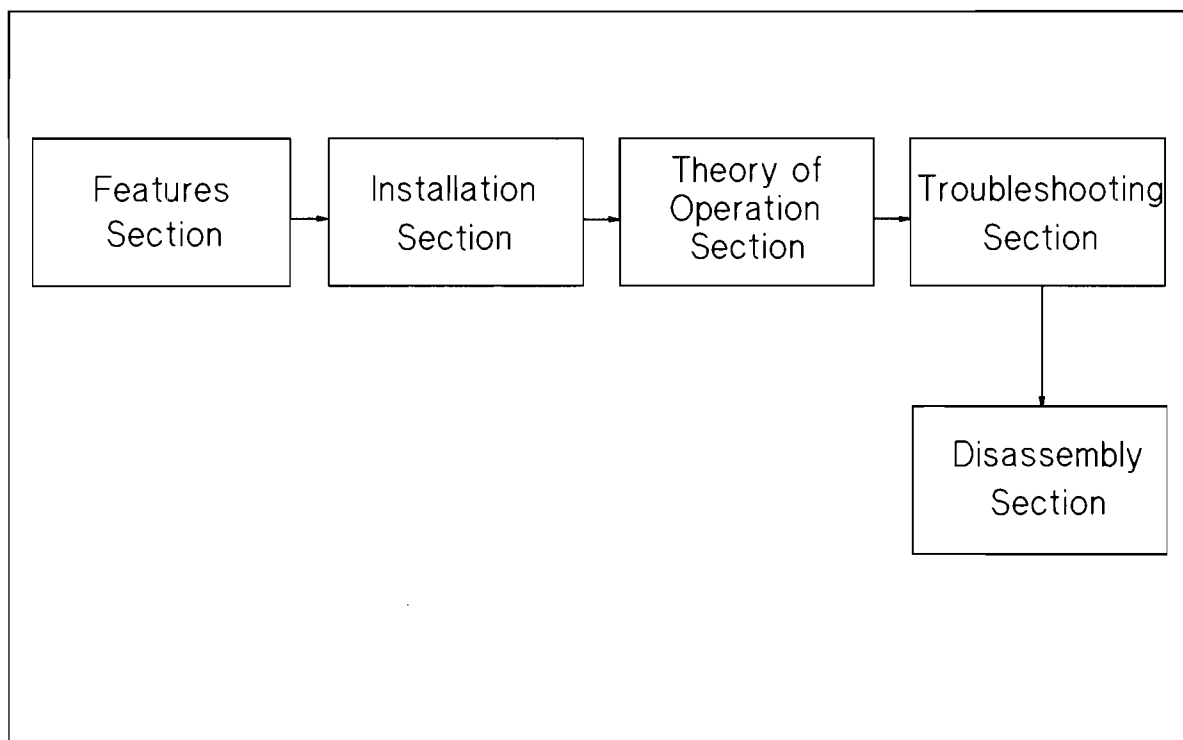
Lesson Locations

In order to facilitate the use of individual lessons, the approximate starting footages are listed below.

Lesson	Starting Footage
0 Introduction	0
1 Features	195
2 Installation	675
3 Theory of Operation	1520
4 Troubleshooting	1995
5 Disassembly	2545

Course Structure

The following flowchart illustrates the organization of the technical material in this course:



Safety Procedures

There are various flags used throughout this course that must be followed to ensure your safety and the safety of the product. Be sure to pay special attention to the following symbols and text:

Warning



The **WARNING** symbol will be used above text where potential danger to an individual may occur.

Caution



The **CAUTION** symbol will be used above text where potential danger to equipment may occur.

Note



The **NOTE** symbol will be used above text where attention to special instructions appear.



The **STOP** symbol will be used above text where student involvement is required.

Course Completion Checklist

HP 9000 Series 300, Models 362/382 Service Training

Course Completion Checklist

Lesson Title	Date Completed	Time Required	Supervisor's Initials
Features	_____	_____	_____
Installation	_____	_____	_____
Theory of Operation	_____	_____	_____
Troubleshooting	_____	_____	_____
Disassembly	_____	_____	_____

Program Completion Date _____

Student's Signature _____

Final Exam Administered by: _____ Date: _____



Features

Lesson Overview

This section will introduce the student to the features of the HP 9000 Series 300 362/382 Controllers.

Read Chapter 1, "Product Information" in the CE Handbook. Then, view the Features section of the video and complete the quiz.

Student Performance Objectives

Upon successful completion of this lesson, the student will be able to do the following:

- List which Motorola CPUs are used where
- List the different Memory and where they are used
- List the graphics options
- List the different mass storage devices
- List all of the interfaces
- List the LAN
- List the expanders
- List the operating systems

Features (1)

Features: (1)

- Two sets of Products
- Two Processors
- Two types of Memory
- Three types of Graphics

Features (2)

Features: (2)

- Three types of Mass Storage
- Standard S300 Interfaces
- DIO slot
- Expanders
- Operating Systems

Integrated Workstations

	Workstation	Integrated
030	362	R362
040	382	R382

Sets of Products (1)

Sets of Products
- Two Controllers: 1-Slot, 4-Slot - Controllers: 68030 or 040 System/Processor Board - 030: 362/R362 - 040: 382/R382

Sets of Products (2)

Sets of Products: (2)

- System Boards sold as Stand Alone Products
- System Boards sold as Board Upgrade Products

Processors

Processors:

- 25Mhz Motorola 68030 or 68040 Microprocessor
- 25Mhz Motorola 68882 Floating Point Coprocessor (Optional on 030, Built in on 040)

Graphics

Graphics:

- 640 X 480 Video Used on
All Models
- 1024 X 760 Color Graphics
Used on Some High End
Bundles of Model 382's

Mass Storage

Mass Storage:		
	Workstation	Integrated
HARD	52*, 200 or 400	52 or 400
Floppy	3.5"	3.5"
CD-ROM	Yes	No

Note



In the video it was stated the 52Mb drive was only used on the Integrated controller. Not true, it is used on both controllers.

Operating Systems

Operating Systems:

- BASIC 6.2
- BASIC on HP-UX Same as 6.2
- Pascal 3.25
- HP-UX 8.0



Key Points (1)

Key Points (1)

- Two Controller Boxes
- Two Microprocessors
Motorola 68030 & 68040
- Motorola 68882 Coprocessor
Optional on 68030

Key Points (2)

Key Points (2)

- PC Parity RAM on 68030's & Workstation ECC on 040's
- Up to Two Mass Storage Devices
- Optional LAN

Key Points (3)

Key Points (3)

- Two Expanders for 1-Slot Controllers & None for 4-Slot
- BASIC and Pascal Supported on 68030's and All Four Operating Systems on 040's



Now complete the Lesson 1 Quiz.

When you have answered 80% or more of the questions correctly, move on to Lesson 2, "Installation".

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Lesson 1 Quiz

1. What Motorola CPU chip is used in the 362 and R362?
 - a. MC68010
 - b. MC68020
 - c. MC68030
 - d. MC68040
2. What memory boards are used on the 68040 system boards?
 - a. PC Parity RAM
 - b. Workstation ECC RAM
 - c. A or B
 - d. Neither
3. Where is the graphics circuit located?
 - a. On the graphics board
 - b. On the system board
 - c. External graphics engine
 - d. There isn't any
4. What is the maximum number of internal mass storage devices in the Workstation controller?
 - a. One
 - b. Unlimited
 - c. None
 - d. Two
5. The LAN is optional on both controllers.
 - a. True
 - b. False
6. Which controllers have expanders?
 - a. Model 362 and 382
 - b. R362 and R382
 - c. All
 - d. None
7. Which two operating systems are supported on the MC68030 controllers?
 - a. HP-UX and BASIC
 - b. BASIC and BASIC on HP-UX
 - c. BASIC and Pascal
 - d. None of the above



Installation

Lesson Overview

This section will cover the installation of the HP 9000 Series 300 362/382 Controllers.

Read Chapter 3, "Configurations" in the CE Handbook. Then view the installation section of the video and complete the related program notes and quizzes.

Student Performance Objective

Upon successful completion of this lesson, the student will be able to do the following:

- Install both controllers and expanders
- Install RAM Upgrades
- Install Mass Storage Upgrades
- Install MC 68882 coprocessor

Installation (1)

Installation: (1)

- Remove All Products From Shipping Containers
- Install Any DIO, I/O or Accessory Cards Shipped Separately From SPU

Installation (2)

Installation: (2)

- Make Sure Addresses Are Unique on any Card You Install
- Connect All Cables Between Products and Power On

Operating Systems (1)

Operating Systems: (1)

- Only A2245A RMB-UX Bundle Always Ships with OS Installed
- A1473A SPU & A2251A Bundle Never Ships with OS Installed

Operating Systems (2)

Operating Systems: (2)

- All other Workstation Controllers
Only Ship With OS Installed
(When Hard Drive Ordered
as an Option)
- OS in Bundle Will Be Installed
& Shipped With That Bundle

Operating Systems (3)

Operating Systems: (3)

- On Integrated Controller, All
Bundles Ship With OS
Installed on Hard Drive
- OS Training is Available

Key Points (1)

Key Points: (1)

- There Are Two Expanders for the Workstation Controllers
- Expanders Swap Covers with Controllers as in Other 300's
- Integrated Controllers Do Not Have Expanders or Upgrades

Key Points (2)

Key Points: (2)

- Largest Memory in Slot 0
- Coprocessor Only in 68030
- Set Jumpers to Unique Settings When Installing Mass Storage Devices



Now complete the Lesson 2 Quiz.

When you have answered 80% or more of the questions correctly, move on to Lesson 3, "Theory of Operation".

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Lesson 2 Quiz

1. All Integrated Controller Bundles ship with the Operating System installed.
 - a. True
 - b. False
2. How many screws hold the Expander to the Workstation Controller?
 - a. 2
 - b. 4
 - c. 6
 - d. 8
3. The Integrated Controller has two Expanders.
 - a. True
 - b. False
4. Largest memory goes in slot or slots?
 - a. Towards the rear of the product
 - b. Zero or the ones nearest the front of the product
 - c. Doesn't matter
 - d. Last
5. The flat corner of the MC 68882 Coprocessor goes where?
 - a. Towards the front of the product and RAM connectors
 - b. Towards the rear of the product
 - c. Doesn't matter
 - d. There isn't a flat corner



Theory of Operation

Lesson Overview

This section covers the Theory of Operation of the major assembly level functions of the HP 9000 Series 300 362/382 Controllers.

Read Chapter 3, "Functional Description" in the Service Manual. Then view the Theory of Operation section of the video and complete the quiz.

Student Performance Objectives

Upon completion of this lesson, the student will be able to do the following:

- List each major assembly in the controllers
- Explain the difference between the two controllers
- Explain which circuits are on which boards
- Explain how many and which Mass Storage devices are used in each Controller

System Board (1)

System Board: (1)

- Workstation Product 362/382
(Desktop or Rackmounted)
- Integrated Product R362/R382
(Desktop or Rackmounted)

System Board (2)

System Board: (2)

- Board Upgrade for Existing
Series 300's
- Single Board Sales to OEM's

System Board (3)

System Board: (3)		
	Workstation	Integrated
030	VGA	VGA
040	VGA or 1024	VGA

Theory of Operation (1)

Theory of Operation (1)	
Vectra Memory Includes:	
- D2381A 2mb Board	
- D2156A 4mb Board	
- D2152A 8mb Board	
(Minimum of 2mb & Maximum of 16mb)	

Theory of Operation (2)

Theory of Operation (2)
Workstation Memory Includes:

- A2200A 4mb Board Set or Pair
- A2201A 8mb Board Set
- A2202A 16mb Board Set
(Minimum of 4mb & Maximum
of 32mb)

Theory of Operation (3)

Theory of Operation (3)
Memory Rules

- Largest Memory Start in
Slot or Slots 0
- ON 040's, RAM Boards Must
Be Installed in Like Pairs

Mass Storage Devices

Mass Storage Devices (1)

Workstation

Left

Bay

52*, 200 or 400

Right

Bay

52*, 200, 400, 3.5"
or CD-ROM

Note



In the video it was stated the 52Mb drive was only used on the Integrated controller. Not true, it is used on both controllers.

Mass Storage Devices (2)

Mass Storage Devices (2)	
	Integrated
Top Slot	3.5 Only
Middle Slot	Custom Assembly*
Bottom Slot	52 or 400

Note



The middle slot is wired for possible future use of the 3.5 floppy and hard drives. At this time, there aren't any trays that have holes for mounting the hard drives. There is for the floppy, but it is not formally sold as an upgrade.

Standard Interfaces

Standard Interfaces:
(No Changes)

- HP-IB
- HP-HIL
- HP-Parallel
- Internal SCSI (External is Optional)

Workstation Controller Board

Workstation Controller
Board

- System (030 or 040)
- Memory (Vectra or 425e)
- Backplane
- LAN

Integrated Controller (1)

Integrated Controller: (1)
Boards

- Touchscreen Controller Board
- Touchscreen Bezel Board
- CRT Assembly (CRT Board)
- Connector Board

Integrated Controller (2)

Integrated Controller: (2)

- Up to Two Mass Storage
Devices
- Power Supply
- Fan

Key Points

Key Points:

- Three System Boards With Different processors and Graphics
- Two Types of Memory
- Only Two MS Devices
- Interfaces are Basically the Same
- LAN is Optional



Now complete the Lesson 3 Quiz.

When you have answered 80% or more of the questions correctly, move on to Lesson 4, "Troubleshooting".

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Lesson 3 Quiz

1. Which CPU Processors are used on the controllers?
 - a. HP-Risc
 - b. 386/486
 - c. MC 68030 and 68040
 - d. None
2. What clock speed does the processor run at?
 - a. 10Mhz
 - b. 15Mhz
 - c. 20Mhz
 - d. 25Mhz
3. The MC 68882 coprocessor is a separate chip on the MC 68030.
 - a. True
 - b. False
4. There can be up to two hard disk drives in the Workstation Controller.
 - a. True
 - b. false
5. Which two resolutions of Graphics are on the System Boards?
 - a. 1024 X 768 and 1280 X 1024
 - b. 640 X 480 and 1024 X 768
 - c. 560 X 480 and 320 X 520
 - d. None of the above
6. What is the normal display use on a Integrated Controller?
 - a. 1024 X 768 color monitor
 - b. 560 X 480 VGA grayscale monitor
 - c. 640 X 480 VGA grayscale internal monitor
 - d. 1280 X 1024 color monitor
7. How many memory slots on the MC 68030 System Boards?
 - a. 1
 - b. 2
 - c. 4
 - d. 6

8. The serial ports on the MC 68030 and MC 68040 are the same.
 - a. True
 - b. False
9. The CRT and CRT board, on the Integrated Controller, is sent back to SMO as one assembly.
 - a. True
 - b. False
10. The touchscreen is optional on the Workstation Controller.
 - a. True
 - b. False

Troubleshooting

Lesson Overview

This section will demonstrate the use of the new diagnostic tools available for troubleshooting the new HP 9000 Series 300 Controllers.

Read Chapter 4, "Troubleshooting" and Chapter 5, "Diagnostics" in the CE Handbook. Then view the Troubleshooting section of the video and complete the quiz.

Student Performance Objectives

Upon completion of this lesson, the student will be able to do the following:

- Identify defective FRUs
- Identify what diagnostics are used
- Run the new diagnostics

Troubleshooting Objectives

**Troubleshooting:
Objectives**

- How to Identify the Defective FRU
- What Diagnostics are Available
- How to Run Diagnostics

Diagnostics

Diagnostics:

- Boot ROM Selftests and
Extended Tests
- Computer Tests or Test
Stimulus Code
- CE.utilities on HP-UX

Disk Part Number

Disk Part Number:

A1421-10034

RODIME R03000T

```
:RODIME R03000T, 1406, 0
  1H SYSHPUX
  1D SYSDEBUG
  1B SYSBACKUP
  1S SYSTEST
```

TSC Message

TSC Message

```
Series 400 Tests Rev 4.1
Copyright 1991, Hewlett-Packard Company
TSC (A1421-10034) Config f:21 D:f1 B:FE 9:BF, date 92/03/25
Autostart: 0 1 21 43 2 4 41 40 9 27 20 25 35 37 50 28 29 46 47
&: 49 48 57 56 53 51 45 26 63 19
SPU 425e, MC68040, 32bit, PMMU
ROM: BootROM Rev. ej2.10 20 Feb 91, size 128kb
ROM: MD11 REV 2.10 1991/02/14.11:42:05 size 128kb
Boot System: HP-UX, SERVICE mode
Test Select Mode
1S
1S What?
34 RUN-ONCE
Test Execute Mode
Pass cycle = 1, @ 0 days 0 hr 0 min 29 sec
To hold display, STOP/HOLD, else RETURN/ENTER
17 RUN-ONCE
Test Execute Mode
```

CE.utilities

CE.utilities

Console Login: root

Password:

```
# cd /usr/diag/Ce.utilities/SCSIIdisk
```

```
# ls
```

```
exerciser  help      helptext  scsi.new
```

```
# ./exerciser
```

```
Enter device file (? for usage, quit to terminate): /dev/rdisk/3s0
```

SELECT:

(D)evice selection

(R)ead check entire disk

(B) lock read

(N)umber of passes through disk for results

(I)nquiry data

(L)og display

(S)elftest initiate

(C)E mode (allow writing on disk): DISABLED

(Q)uit

? r

Reading on pass number 1

SELECT:

- (D)evice selection
- (R)ead check entire disk
- (B) lock read
- (N)umber of passes through disk for results
- (I)nquiry data
- (L)og display
- (S)elftest initiate
- (C)E mode (allow writing on disk): DISABLED
- (Q)uit

? c

THE DATA ON THE DISK MAY BE DESTROYED!

If you are positive, enter the password: corium

SELECT:

- (D)evice selection
- (R)ead check entire disk
- (B) lock read
- (W)rite pattern on entire disk, then read
- (P)attern specification: WORSE CASE
- (A)uto-spare bad logical blocks enable: DISABLED
- (T)est block
- (M)anually spare a logical block
- (X) List Defects
- (Z) Clear Logs
- (F)ormat Disk
- (N)umber of passes through disk for results
- (I)nquiry data
- (L)og display
- (S)elftest initiate
- (C)E mode (allow writing on disk): ENABLED
- (Q)uit

? a

SELECT:

- (D)evice selection
- (R)ead check entire disk
- (B) lock read
- (W)rite pattern on entire disk, then read
- (P)attern specification: WORSE CASE
- (A)uto-spare bad logical blocks enable: ENABLED
- (T)est block
- (M)anually spare a logical block
- (X) List Defects
- (Z) Clear Logs
- (F)ormat Disk
- (N)umber of passes through disk for results
- (I)nquiry data
- (L)og display
- (S)elftest initiate
- (C)E mode (allow writing on disk): ENABLED
- (Q)uit

? w

WARNING: THIS WILL DESTROY THE DATA IN THE DISK!

Are you sure? [n/y] y

Writing on pass number 1

SELECT:

- (D)evice selection
- (R)ead check entire disk
- (B) lock read
- (W)rite pattern on entire disk, then read
- (P)attern specification: WORSE CASE
- (A)uto-spare bad logical blocks enable: ENABLED
- (T)est block
- (M)anually spare a logical block
- (X) List Defects
- (Z) Clear Logs
- (F)ormat Disk
- (N)umber of passes through disk for results
- (I)nquiry data
- (L)og display
- (S)elftest initiate
- (C)E mode (allow writing on disk): ENABLED
- (Q)uit

? q

```
#cd ../Crtadjust
#./adjust
0) exit utility
```

- 1) 2623A, 2393A, or 2397A graphics terminal
- 2) 98542, 98543, (and 318 built-in mono) medium-res
- 3) 98544, 98545, and 98547 high-res (monochrome or color)
- 4) 98548, 98549, 98550 graphics processor boards
- 5) 98700, graphics processor
- 6) 98710 graphics accelerator for 98700
- 7) 98720 graphics processor
- 8) 98730 Turbo Srx graphics processor
- 9) 98705 graphics processor
- 10) 98735 graphics processor
- 11) A1499A graphics processor

If you want to test a device other than the one you are presently using, ensure no process is waiting for input from that device. You should not test a monitor/terminal currently being used by another user.

Enter the number corresponding to the output device.
11

Enter the device file (typically /dev/crt) for the monitor interface, that you want to send the alignment pattern to (If device file is unknown, BREAK from this program and do an 'll /dev | more' to determine device file.)

Enter device file, then press RETURN (form /dev/nnn)
/dev/crt.

Compiling test program

PLEASE WAIT -- It takes about 30 seconds to compile

CRT Monitor Alignment Utility

CRT MONITOR ALIGNMENT UTILITY

Test sequence:

Test 1: Grid pattern with concentric circles.

Test 2a: Focus pattern (# signs).

Test 2b: Inverted Focus pattern (# signs).

Test 3a: Full-on raster (white).

Test 3b: Full-on raster (red).

Test 3c: Full-on raster (green).

Test 3d: Full-on raster (blue).

Test 4: Color Bars.

Test 5a: Gray Scale Bars.

Test 5b: Red Scale Bars.

Test 5c: Green Scale Bars.

Test 5d: Blue Scale Bars.

Hit **CR** to sequentially step through the various alignment patterns.

Hit **CR** to begin test.

Tests Not in Crtadjust

IF MODEL 425e TESTS ARE NOT IN Crtadjust

If the test 11 is not part of the menu, you will have to modify a couple of files to add the test. To modify the files, do the following:

vi adjust (Then go to the end of number 10, add a blank line
and the following eight lines of text)

```
11) # Woody
informalname="Woody"
cat catdevname
read devfname
drivername=hpevr
driver=-lddevr
driver=/usr/lib/libddevr.a
;;
```

Then: vi devmenu (And add test #11 after the test #10 line)

```
11) A1499A graphics processor
```

Key Points (1)

Key Points: (1)

- TSC's are Located From HP-UX
System Disk Under SYSTEST
- SCSI Disk Exerciser Has
Been Added to CE.utilities
- Always Back Up Drive Before
Running a Write on it

Key Points (2)

Key Points: (2)

- Only One Password is Used
- SFT's No Longer Supported



Now complete the Lesson 4 Quiz.

When you have answered 80% or more of the questions correctly, move on to Lesson 5, "Disassembly".

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Lesson 4 Quiz

1. There aren't any extended tests in this Boot ROM.
 - a. True
 - b. False
2. Which diagnostics have the new SCSI tests?
 - a. Self Tests
 - b. Extended Tests
 - c. CE.utilities
 - d. TSC's
3. The TSC's are on the same system disk as the HP-UX Operating System.
 - a. True
 - b. False
4. What Operating System will CE.utilities run on?
 - a. BASIC
 - b. Pascal
 - c. HP-UX
 - d. DOS
5. SFT's are no longer supported.
 - a. True
 - b. False



Disassembly

Lesson Overview

This section will demonstrate the disassembly procedures for the new HP 9000 Series 300 362/382 Controllers.

Read Chapter 2, "Assembly Replacement" in the Service Manual. Then view the Disassembly section of the video and complete the quiz.

Student Performance Objectives

Upon completion of the lesson, the student will be able to do the following:

- Explain how to disassemble the different products
- Replace each FRU
- Reassemble Certain Parts/Assemblies

Disassembly Tools (1)

Disassembly Tools - 6mm Nutdriver - 3/16" Nutdriver - 5/16" Nutdriver - 9/32" Nutdriver
--

Disassembly Tools (2)

Disassembly Tools

- No. 1 Phillips
- Light Duty, Flat
Tipped Screwdriver

Disassembly

Disassembly:

- Only Hard Drives Can Be In
Left Bay
- Either Hard or Removable
Drives Can Be In Right Bay

DIO Expander

DIO Expander
Tools:

- 6mm Nutdriver
- No. 1 Phillips
- 5/16" Nutdriver
or Wrench

Integrated Controller Tools (1)

Integrated Controller (1)
Tools:

- Offset Pliers
- 3/16" Nutdriver
- 5-16" Nutdriver
- 9/32" Nutdriver

Integrated Controller Tools (2)

Integrated Controller (2) Tools:

- No. 10 Torx Driver
- No. 1 Pozi Driver
- No. 2 Pozi Driver
- Light Duty, Flat
Tipped Screw Driver

Key Points (1)

Key Points: (1)

- Reinstall Largest Memory
Boards Starting in Slots 0
- 1 Inch Drop Will Damage
Hard Drives
- To Replace Battery, Remove
Card Cage

Key Points (2)

Key Points: (2)

- Remove Right Side Cover
To Remove LAN Board on
Integrated
- Make Sure System Board Fits
Between Tabs or Tabs And
Rail When Reinstalling

Key Points (3)

Key Points: (3)

- Don't Remove CRT Bracket
Screws in Bezel Unless
Removing CRT
- Center Slot on Integrated
Normally has Nothing or
Customized Board

Key Points (4)

Key Points: (4)

- Make Sure Jumpers and Switches are Set Correctly on Replacement Assemblies



Now complete the Lesson 5 Quiz.

When you have answered 80% or more of the questions correctly, take the Final Exam. You must answer 80% or more of the final exam questions correctly to complete the course.

Lesson 5 Quiz

1. To remove a defective memory board, in a Workstation controller with a CD-ROM drive, you first have to remove?
 - a. Top cover
 - b. Disk tray
 - c. Front bezel and top cover
 - d. Both a and b
2. To remove the fan, in both controllers, you first need to remove?
 - a. Front bezel and speaker
 - b. Top cover
 - c. Power supply
 - d. Both b and c
3. To remove the Workstation system board, you have to remove the LAN board's hardware.
 - a. True
 - b. False
4. Transfer the good memory and LAN boards to the new system board.
 - a. True
 - b. False
5. A one inch drop, while the hard disk drives are upside down will damage the heads.
 - a. True
 - b. False
6. To replace the battery, on either system board, you first have to remove?
 - a. Top cover and support brace
 - b. DIO card cage
 - c. Power supply
 - d. Fan
7. The only time you remove the four screws in the Integrated's front bezel that hold the CRT, is?
 - a. When replacing the power supply
 - b. When replacing the touchscreen LED board
 - c. When replacing the hard drive
 - d. When replacing the CRT
8. Where is the terminator on the internal SCSI cable on the Integrated Controller?
 - a. Rear panel
 - b. On the cable next to the top floppy connector
 - c. On the system board
 - d. On the disk tray



Video Corrections and Additional Information

52mb Hard Drive:

It was stated in the video that the 52mb hard drive was only used in the Integrated Controller. Wrong, it can be used on both controllers.

3.5" Floppy Drive Cables:

The 3.5" floppy drive's data connector is reversed from the other drives connectors. That is why, on the Integrated controller's data cable harness, there are two connectors for the center slot. They are keyed 180 out from one another. Also, the floppy has an adapter cable that plugs in between the drive and the normal SCSI power cable. This is true on both the Workstation and Integrated controllers.

Integrated Shipping Bracket Removal:

There is a shipping bracket on the rear of the Integrated models that needs to be removed before installation. Use the four screws removed from the bracket to install the rear guards. The guards are provided to protect the loopback hood and SCSI terminator.

Integrated Upgrades:

We said there would not be any upgrades on the Integrated Controller. Now it looks like there will be at least memory upgrades. The workstation type memory will have a chapter added to the existing installation guide for the A2200A. The PC type memory used on the MC68030 system boards, will have a chapter added in the SPU installation guide. And, after you go through the disassembly portion of the video, you will have a good idea on how to install them anyway.

System Board Controller Circuitry:

Keep in mind, that the controller circuitry for memory, LAN and SCSI is on the system board. So when there is an error displayed, indicating bad memory, LAN or a disk drive, the system board should also be suspect. Replace whatever assembly is easier to replace first, which usually is not the system board.

Integrated Supplemental Disk:

There will be another Supplemental Disk for the Integrated Controllers, similar to the disk on the R/332. There will be some touch routines, TSC code and graphics demos. Part Number, of the new disk, will be A1301- 60905. They hope to have this available for first customer shipments, end of September 1991.

Coprocessor Orientation:

The coprocessor's socket has the mating flat corner for chip orientation.

Tools:

We referenced a 6mm Nutdriver in the Video. It should be a 7mm.

Filter Wire Clip:

There is a spring wire clip that holds the filter in place on the Integrated controller. One end is held in place by one of the screws holding the fan to the rear housing. The other end snaps into place in the opposite corner of the fan area.

Configuration Switches and Jumpers:

When replacing drives make sure the configuration switches are set correctly. This information can be found in the Configuration Chapter, #5 of the service manual and handbook.

Integrated CRT Assembly:

When replacing the CRT assembly on the Integrated controller, I stated to return the assembly to SMO as one assembly. Wrong, this assembly is not on the exchange program. It is a throw away. But, SMO will send you the new one as one assembly.

Integrated Hard Drive Removal:

When replacing a hard drive in a Integrated Controller, the drive may be removed without removing the front bezel. The top, side and bottom covers will still have to be removed. If there is a customized engineering board in the center slot, you will not be able to remove the hard drive from the top. But, if there isn't anything in the center slot, you should be able to remove the hard drive from the bottom slot.

Once the covers are removed, remove the four screws holding the drive to the chassis. Reach behind the floppy drive if one is present and lift the drive until you can remove the power and data cables.

Configuration Control Mode:

There is a way to set the Select Codes, Interrupt Levels, Parity and Bus Addresses on the LAN, SCSI, HP-Parallel and HP-IB interfaces other than with hard switches or jumpers. The Boot ROM has a configuration routine that will set these codes, levels and addresses at boot up, from the keyboard.

You can also set the Auto System Selection, which will allow you to set which operating system you want booted each time the system is turned on.

All of the procedures to make these changes are in chapter 5 of the service manual or chapter 3 of the service handbook, under the Boot ROM Functions, Configuration Control Mode section.

RS-232:

The Domain products use a 25 pin connector on their serial port. There are three RS-232 ports on the one connector. There is a cable that breaks out the one port to three. Only having one port on the rear panel, saves panel space.

The Domain products were never in the multiuser market, so there was never any need to have a remote console or terminal capability. On the other hand, HP Workstations have historically had multiusers, consequently needing remote console support.

So, there needed to be remote console support as well as having three ports on the new controllers. The lab solved this by having the first of the three ports being the same as the M375 and the last two the same as the last two Domain ports.

Anonymous FTP to hpfscse

With 8.0 HP-UX, the TSC Tests are on the system disk. If you boot the system in the attended mode, you will see the last bootable system is 1S SYSTEST, or the TSC tests. These tests are located on the system disk, but they are not part of HP-UX.

The TSC test on the 8.0 system disk is release 4.1. They do not work on the new controllers due to new graphics. So, we have loaded a updated version on the SE machine here at Ft. Collins. You will need to ftp this updated version if you want to run TSC tests on the 362/382s.

The release that will fully cover the 362/382s is 4.2, which probably won't be available until HP-UX 9.0, depending if the HP-UX people will allow us to change the TSC code between HP-UX releases.

Run the SYSTEST on the product you have. If they run, you have a good version. If all you get is a highlighted screen with no text, you have the defective tests and need to log on to Ft. Collins's SE machine to get the correct tests.

First, you have to be logged on as ROOT in order to do the ftp.

1. Log on to your system:

```
root [Return]
```

```
(password) [Return]
```

2. CD to the directory on your machine that will hold the retrieved file, /tmp directory is usually a good choice.

```
cd /tmp [Return]
```

3. ftp to the SE machine with:

```
ftp hpfscse.fc.hp.com [Return]
```

4. Answer the name prompt with:

```
ftp [Return]
```

5. Answer the password prompt with:

```
[Return]
```

6. Move to the directory on the SE machine that contains the file you need, with:

```
cd UNSUPP/diag/tsc [Return]
```

7. Then type binary:

```
binary [Return]
```

8. Copy the file to your system with:

```
get SYSTEST [Return]
```

9. Then leave ftp:
bye [Return]
10. To replace the old test file with the new:
mv ./SYSTEST /SYSTEST [Return]
11. Change permissions on new file with:
chmod 555 /SYSTEST [Return]
12. You are finished with the installation of the new TSC tests.
13. To run the new tests, power cycle the machine and do a attended boot.
Press any key after the keyboard message appears on screen and/or you hear a double beep, to get into the attended mode.
14. Type the ID code of SYSTEST, usually 1s to run the tests.
(ID Code) [Return]

The following files can also be ftp'd from the hpfscse.fc.hp.com.. They are not needed to run the TSC tests, but can be useful.

There is a buglist file that will keep you current on TSC bug fixes.

There is a configuration file that allow you to turn the different tests on and off and change the order of how the tests are ran.

And last, there is a document file that gives instructions on how to make changes to the configuration file.

The file names are:

Description	File Name
List of bug fixes:	buglist
Configuration file:	tsc_cfg
Configuration instructions:	tsc_cfg.6

Also, there is a new Test Tools Manual out for the TSC tests. The part number is A1421-90030.

Quiz Answers

Lesson 1 Quiz Answers

1. What Motorola CPU chip is used in the 362 and R362?
 - a. MC68010
 - b. MC68020
 - c. **MC68030**
 - d. MC68040
2. What memory boards are used on the 68040 system boards?
 - a. PC Parity RAM
 - b. **Workstation ECC RAM**
 - c. A or B
 - d. Neither
3. Where is the graphics circuit located?
 - a. On the graphics board
 - b. **On the system board**
 - c. External graphics engine
 - d. There isn't any
4. What is the maximum number of internal mass storage devices in the Workstation controller.
 - a. One
 - b. Unlimited
 - c. None
 - d. **Two**
5. The LAN is optional on both controllers?
 - a. **True**
 - b. False
6. Which controllers have expanders?
 - a. **Model 362 and 382**
 - b. R362 and R382
 - c. All
 - d. None
6. Which two operating systems are supported on the MC68030 controllers?
 - a. HP-UX and BASIC
 - b. BASIC and BASIC on HP-UX
 - c. **BASIC and Pascal**
 - d. None of the above



Lesson 2 Quiz Answers

1. All Integrated Controller Bundles ship with the Operating System installed.
 - a. **True**
 - b. False
2. How many screws hold the Expander to the Workstation Controller?
 - a. 2
 - b. **4**
 - c. 6
 - d. 8
3. The Integrated Controller has two Expanders.
 - a. True
 - b. **False**
4. Largest memory goes in slot or slots?
 - a. Towards the rear of the product
 - b. **Zero or the ones nearest the front of the product**
 - c. Doesn't matter
 - d. Last
5. The flat corner of the MC 68882 Coprocessor goes where?
 - a. **Towards the front of the product and RAM connectors**
 - b. Towards the rear of the product
 - c. Doesn't matter
 - d. There isn't a flat corner

Lesson 3 Quiz Answers

1. Which CPU Processors are used on the controllers?
 - a. HP-Risc
 - b. 386/486
 - c. **MC 68030 and 68040**
 - d. None
2. What clock speed does the processor run at?
 - a. 10Mhz
 - b. 15Mhz
 - c. 20Mhz
 - d. **25Mhz**
3. The MC 68882 coprocessor is a separate chip on the MC 68030.
 - a. **True**
 - b. False
4. There can be up to two hard disk drives in the Workstation Controller.
 - a. **True**
 - b. false
5. Which two resolutions of Graphics are on the System Boards?
 - a. 1024 X 768 and 1280 X 1024
 - b. **640 X 480 and 1024 X 768**
 - c. 560 X 480 and 320 X 520
 - d. None of the above
6. What is the normal display use on a Integrated Controller?
 - a. 1024 X 768 color monitor
 - b. 560 X 480 VGA grayscale monitor
 - c. **640 X 480 VGA grayscale internal monitor**
 - d. 1280 X 1024 color monitor
7. How many memory slots on the MC 68030 System Boards?
 - a. 1
 - b. **2**
 - c. 4
 - d. 6

8. The serial ports on the MC 68030 and MC 68040 are the same.
 - a. True
 - b. **False**
9. The CRT and CRT board, on the Integrated Controller, is sent back to SMO as one assembly.
 - a. True
 - b. **False**
10. The touchscreen is optional on the Workstation Controller.
 - a. True
 - b. **False**

Lesson 4 Quiz Answers

1. There aren't any extended tests in this Boot ROM.
 - a. True
 - b. **False**
2. Which diagnostics have the new SCSI tests?
 - a. Self Tests
 - b. Extended Tests
 - c. **CE.utilities**
 - d. TSC's
3. The TSC's are on the same system disk as the HP-UX Operating System.
 - a. **True**
 - b. False
4. What Operating System will CE.utilities run on?
 - a. BASIC
 - b. Pascal
 - c. **HP-UX**
 - d. DOS
5. SFT's are no longer supported.
 - a. **True**
 - b. False

Lesson 5 Quiz Answers

1. To remove a defective memory board, in a Workstation controller, with a CD-ROM drive, you first have to remove?
 - a. Top cover
 - b. Disk tray
 - c. Front bezel and top cover
 - d. **Both a and b**
2. To remove the fan, in both controllers, you first need to remove?
 - a. Front bezel and speaker
 - b. Top cover
 - c. Power supply
 - d. **Both b and c**
3. To remove the Workstation system board, you have to remove the LAN board's hardware.
 - a. True
 - b. **False**
4. Transfer the good memory and LAN boards to the new system board.
 - a. **True**
 - b. False
5. A one inch drop, while the hard disk drives are upside down will damage the heads.
 - a. **True**
 - b. False
6. To replace the battery, on either system board, you first have to remove?
 - a. Top cover and support brace
 - b. **DIO card cage**
 - c. Power supply
 - d. Fan
7. The only time you remove the four screws in the Integrated's front bezel that hold the CRT, is?
 - a. When replacing the power supply
 - b. When replacing the touchscreen LED board
 - c. When replacing the hard drive
 - d. **When replacing the CRT**
8. Where is the terminator on the internal SCSI cable on the Integrated Controller?
 - a. Rear panel
 - b. **On the cable next to the top floppy connector**
 - c. On the system board
 - d. On the disk tray

**D**

Course Evaluation Form

HP 9000 Series 300, Models 362/382 Service Training

Student Name: _____ Date: _____

Division: _____ Manager: _____

	Yes	No
Do you feel the course objectives were met?	_____	_____
Did you find the video easy to view and understand?	_____	_____
Did you find the course easy to view and understand?	_____	_____
Do you feel you need additional training on this subject?	_____	_____

How would you rate the following? (check one)

	Excellent	Very Good	Good	Acceptable	Poor
Quality of the program notes?	_____	_____	_____	_____	_____
Quality of the video?	_____	_____	_____	_____	_____
Quantity of the information provided?	_____	_____	_____	_____	_____
Quality of the workbook?	_____	_____	_____	_____	_____
Overall rating of this course?	_____	_____	_____	_____	_____

Was the level of this course? _____ too trivial _____ about
right _____ too technical Why? _____
Additional Comments: _____

If you are taking this course without a Course Instructor, please fill this form out, fold it, staple it, and mail it to us as part of the course completion requirements. Thank you.

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