



Technical Educational Services

Course Specification

Course Number: N9000

Course Title: MAXION System Maintenance

Course Duration: 5 Days

Purpose:

The Concurrent 9000-series MAXION is a realtime, symmetric multiprocessing, super-micro-computer based on the MIPS R4000 microprocessor. Ranging from single to four-processor configurations with integral dual VMEbus interfaces, the MAXION system provides the customer with commercial off-the-shelf technology coupled with industry standard I/O interfaces to satisfy their realtime processing demands.

In order to effectively perform system installation/configuration, preventive maintenance and initial corrective maintenance procedures, support personnel require some knowledge of the MAXION system hardware and MAXOS operating system software. The primary course objective of the MAXION System Maintenance course is to provide the student with the necessary instruction and hands-on experience to achieve this level of knowledge.

This course is designed to provide the necessary instruction required for line replaceable unit (LRU) level corrective maintenance of any MAXION 9000-series computer system. Major course topics include system physical description, a detailed console command set description, and in-depth functional overviews of all major system components. Hardware installation procedures are presented, and the 9000-series diagnostic products are described in full. Finally, students are presented with proper system backup and restore procedures to allow for a quick recovery from the loss of a system disk.

Intended Audience:

The MAXION System Maintenance course is designed for those support personnel who are required to perform corrective maintenance to the LRU level of the 9000-Series computer system. This includes Customer Support personnel and customer service engineers responsible for the preventive and corrective maintenance of 9000-series computer systems.

Course Objectives:

Upon successful completion of this course students are able to:

- Perform various system operational procedures, including system power-up, initialization and boot procedures for both MAXOS and the Diagnostic Monitor.
- Utilize Console Monitor commands to perform system initialization, configuration, booting and initial fault analysis.

Course Objectives (cont.):

Upon successful completion of this course students are able to:

- Boot MAXOS into both Single and Multi-user modes of operation, and define the purposes of each mode.
- Execute powerup, standalone diagnostics and online exercisers, to both verify system operation and perform detailed fault analysis of system malfunctions.
- Define the physical architecture of the MAXION system, including system rack breakdown, major assembly locations, power distribution and peripheral device capabilities. Also identify both intra-rack and external cabling requirements.
- List all modules required by the MAXION computer system, and provide brief functional descriptions of each module.
- Define the components which make up the disk, tape and communications subsystems, and provide brief functional descriptions of each component.
- Interpret error indicators and messages to identify the most probable cause of a system failure.
- Perform a complete system backup of all disk-based filesystems to a tape device.
- Perform a complete system restore onto a new disk drive, using complete system backup tapes.
- Perform corrective maintenance to the Line Replaceable Unit (LRU) level on the MAXION computer system and associated peripherals.

Prerequisites:

- Prior completion of the Unix Software Overview course (EW1900), or completion of a comparable UNIX Introduction training regimen.
- Past computer maintenance experience is highly desirable, though not required.

Course Topic Outline:

- I. MAXION System Overview (4 hours)
 - A. MAXION Hardware Architecture
 - B. MAXION System Modules
 - C. MAXION Peripherals
 - D. MAXOS Operating System Overview
 - E. MAXION Documentation Overview

Course Topic Outline (cont.):

- II. MAXION System Physical Description (4 hours)
 - A. MAXION System Chassis Descriptions
 - B. MAXION Line Replaceable Units (LRUs)
 - C. MAXION 95xx Chassis Breakdown
 - D. MAXION Printed Circuit Cards and Backplanes
 - E. LRU Removal and Replacement Student Exercise
- III. MAXION System Startup and Shutdown..... (12 Hours)
 - A. MAXION Controls and Indicators
 - B. System Boot Process Overview
 - C. Console Monitor Description
 - 1. Console Monitor Menus
 - 2. Console Montior Commands
 - 3. NVRAM Machine Environment
 - 4. Console **boot** Command
 - 5. Console Monitor Command Student Exercise
 - D. MAXOS Boot Sequence
 - 1. Kernel Initialization
 - 2. MAXOS Init States
 - 3. **/etc/inittab** Description
 - 4. MAXOS Init Script Execution
 - E. MAXOS System Shutdown
 - F. MAXOS System Intialization/Shutdown Student Exercise
- IV. MAXION Diagnostic Tools..... (8 Hours)
 - A. MAXION Diagnostic Overview
 - B. MAXION Diagnostic Monitor (DMON)
 - C. Standalone Diagnostic Loading and Execution
 - D. Online Diagnostic Execution
 - E. Diagnostic Student Exercise
- V. Managing Storage Devices (2 Hours)
 - A. MAXOS Storage Devices

Course Topic Outline (cont.):

- B. MAXOS Device Names
- C. MAXOS Disk Management
- D. MAXOS Tape Management
- VI. Managing Disk File Systems (2 Hours)
 - A. MAXOS Directory Tree
 - B. File System Types and Descriptions
 - 1. **ufs** File Systems
 - 2. **xfs** File Systems
 - C. File System Management
 - 1. Creating File Systems
 - 2. Mounting and Unmounting File Systems
 - 3. Monitoring and Maintaining File Systems
- VII. File System Backup and Restore (6 Hours)
 - A. MAXOS Backup and Restore Tools
 - 1. The **ufsdump** and **ufsrestore** Commands
 - 2. The **xfsdump** and **xfsrestore** Commands
 - 3. The **cpio** Command
 - B. Restoring MAXOS File Systems
 - 1. Restoring a Master Disk (Boot Drive).
 - 2. Restoring Individual File Systems
 - C. Performing Crash Dumps
 - D. MAXOS Backup and Restore Student Exercise

Laboratory Exercises:

Students practice system operational procedures, diagnostic execution, system backup and restore operations, and basic troubleshooting on dedicated MAXION training systems. Students are provided with proven lab exercises to assist them in understanding course lectures. All laboratory sessions are designed to allow the student to develop logical troubleshooting techniques, and are monitored by the instructor.