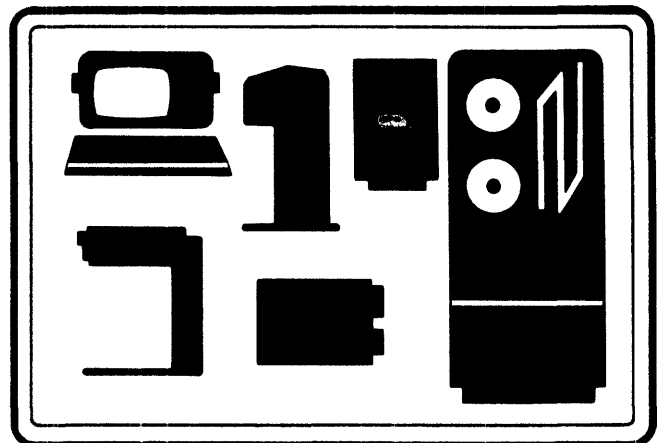
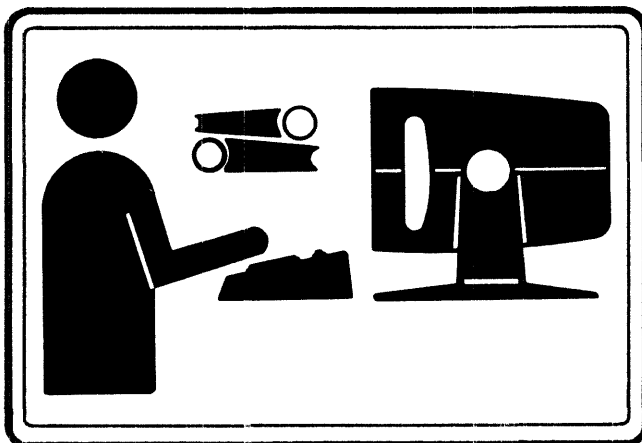
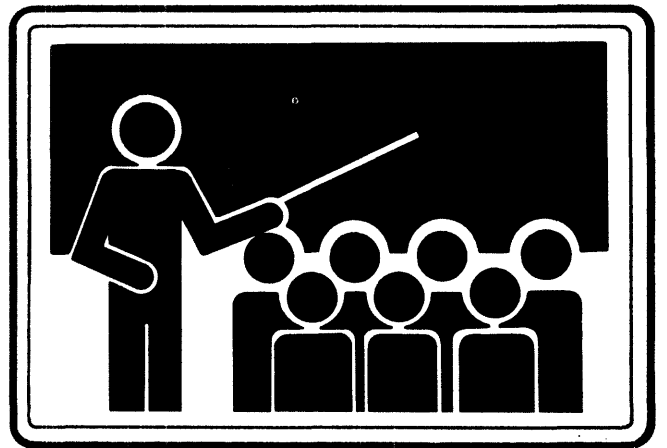
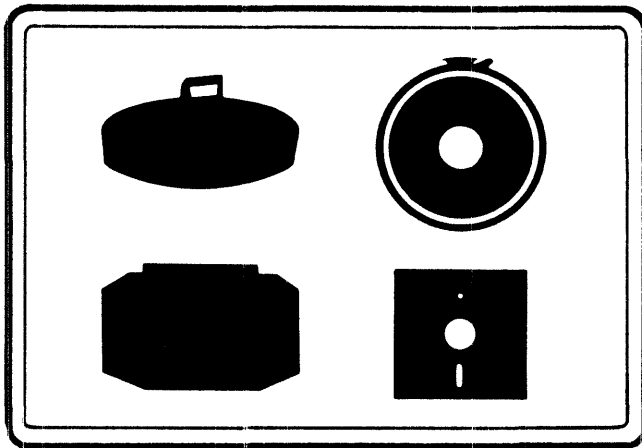


AOS, AOS/VS OPERATOR SELF-STUDY COURSE

LICENSED MATERIALS

STUDENT GUIDE



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AOS, AOS / VS OPERATOR SELF-STUDY COURSE

STUDENT GUIDE

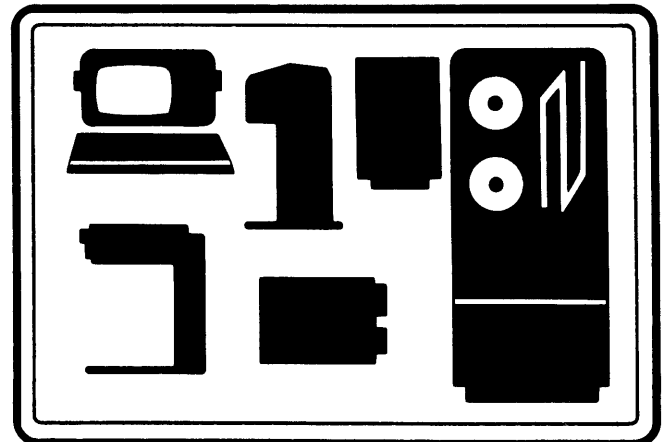
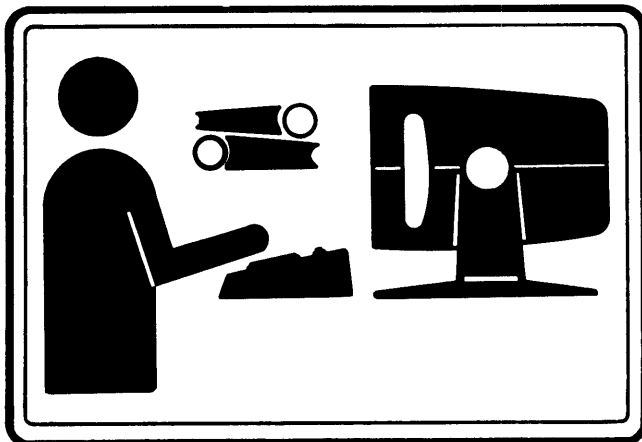
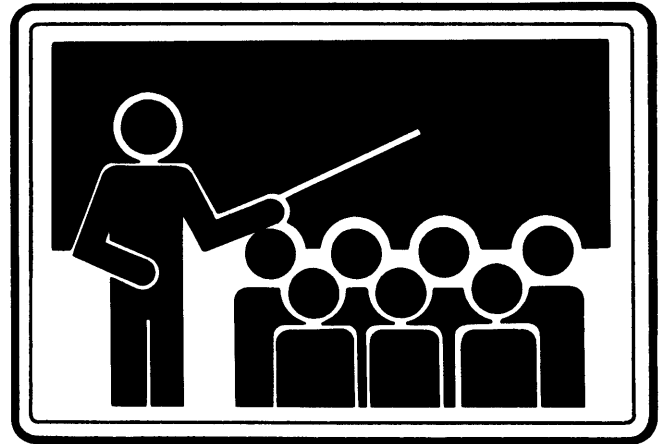
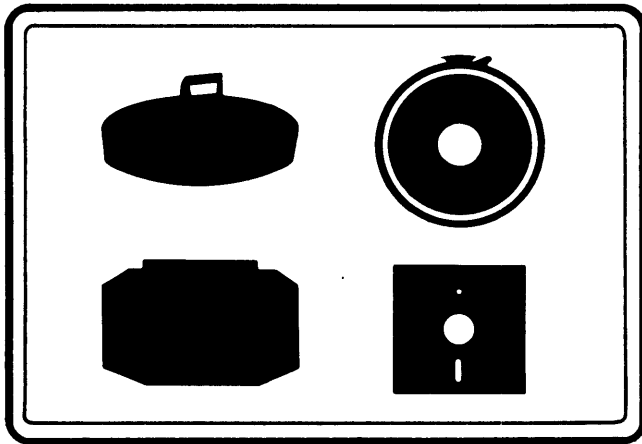


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Student Orientation

Course Description

This course teaches you to perform routine operator-level tasks on your AOS or AOS/VS system. You will learn to operate and maintain a typical AOS configuration. You will also learn to use the CLI, macros, EXEC, and system utilities to perform, monitor, and control system operations. Some of the operations that you will learn to perform include: startup and shutdown of the system; diagnosis of errors; and preventive maintenance.

Prerequisites

The prospective AOS, AOS/VS Operator Self-Study Course student must be familiar with some basic computer terminology and concepts; he should recognize the components of a computer and an operating system. No knowledge of any higher-level computer language is assumed.

Ideally, the student should have demonstrated mastery of the concepts contained in one of the following Data General Corporation courses.

- Introduction to Small Computers (S100 lecture course)
- *Introduction to Small Computers Self-Study Course* (053-000015-00)
- *Interactive Systems Concepts Self-Study Course* (053-000011-00)

Course Goals

Upon successful completion of this course, you should be able to:

1. Discuss basic minicomputer concepts.
2. Power up, operate, and power down a typical AOS or AOS/VS configuration.
3. Perform routine operation and maintenance at the operator level.
4. Communicate with AOS or AOS/VS through the CLI.

5. Control the AOS process environment using the CLI.
6. Use the EXEC logon, batch, and spooling features.
7. Invoke system utilities for given uses.
8. Maintain system files using backups.
9. Interpret system error messages and identify appropriate corrective action.

Resources

To complete this course, you need:

- Student Guide.
- Audiotapes for 14 modules.
- Audiotape playback unit.

Course Organization

This course is completely self-contained and is arranged in a modular, self-paced format. You can progress through the course at your own pace and in your own setting. The course contains 14 modules, each of which covers a specific topic or theme. Most modules consist of two parts:

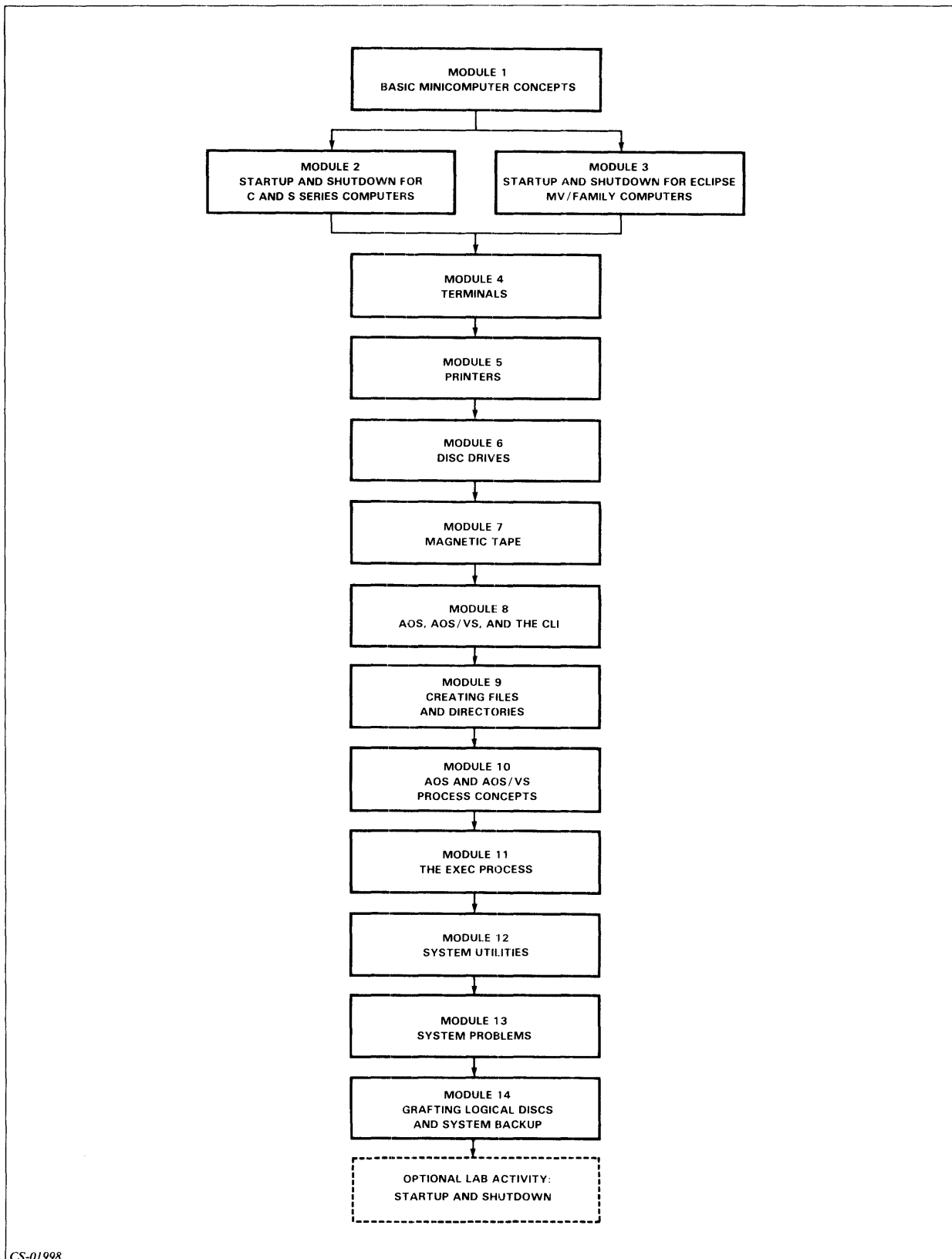
1. An audiocassette tape
2. A section of text, figures, and exercises contained in this Student Guide.

When you are instructed, listen to the audiotape as you follow along in the Student Guide. You may stop the audiotape and review the material in the Student Guide as you wish.

At the beginning of each module of the Student Guide, there is a list of Module Objectives that tell you exactly what you should learn in the module. You can evaluate your performance of these Module Objectives by completing the Segment Exercises and Module Quiz contained in each module. Answers are provided so that you can score your own quiz to see how well you do. Some modules also contain Lab Activities that allow you to practice what you have learned. If you successfully complete the material, then you may continue with the next module; otherwise, you should restudy the module material before proceeding.

On the next page is a Course Map. It illustrates the order in which you should progress through this course. As you can see, most modules should be studied consecutively as they appear in the Student Guide. Note that Modules 2 and 3 deal with start-up and shut-down procedures. You need only study the module that relates to your particular computer system.

Course Map



CS-01998

Figure 1 Course Map

Course Organization

This course covers the following topics:

1. Basic Minicomputer Concepts
 - a. Minicomputers
 - b. Memory and the CPU
 - c. Input and output devices
 - d. Data communications and the operating system
2. Startup and Shutdown for C and S Series Computers
 - a. Start-up and shut-down procedures: overview
 - b. Normal startup and shutdown
3. Startup and Shutdown for ECLIPSE® MV/Family Computers
 - a. Start-up and shut-down procedures: overview
 - b. Normal startup and shutdown
4. Terminals
 - a. Terminals: overview
 - b. Terminal operations
5. Printers
 - a. Introduction to printers
 - b. Line printers
 - c. Character printers
6. Disc Drives
 - a. Introduction to disc drives
 - b. Types of disc drives
 - c. Disc drive operations
7. Magnetic Tape
 - a. Introduction to magnetic tape
 - b. Tape transport operations
8. AOS, AOS/VS, and the CLI
 - a. AOS and AOS/VS principles
 - b. CLI command line syntax
 - c. References

- d. More CLI commands
 - e. Coding aids
 - f. The CLI environment: overview
 - g. CLI commands to change the environment
 - h. More environmental CLI commands
9. Creating Files and Directories
- a. Directories
 - b. Files and pathnames
 - c. Accessing and securing files
 - d. FILESTATUS
 - e. Macros
 - f. Pseudo-macros
10. AOS and AOS/VS Process Concepts
- a. Process concepts
 - b. Creating processes
 - c. Process control
11. The EXEC Process
- a. EXEC, logon, and spooling
 - b. Related CLI commands
 - c. More about EXEC
 - d. Deleting a queue
 - e. The batch function
 - f. MOUNT and DISMOUNT
12. System Utilities
- a. PED and Hook
 - b. SYSLOG and REPORT
 - c. ERRLOG
 - d. LABEL and LOCK_CLI

13. System Problems
 - a. Error conditions
 - b. Recovery measures
 - c. System aids
14. Grafting Logical Discs and System Backup
 - a. Grafting logical discs
 - b. System backup
 - c. DUMP/LOAD procedures
 - d. PCOPY

Course Description

This is a self-paced instruction course. Work at your own pace; there is no specific completion time for this course. However, with diligent attention to the instructional materials, an average completion time is three to five working days.

Typesetting Conventions

This course uses the following typesetting formats to illustrate the various AOS and AOS/VS system procedures:

THIS TYPEFACE TO SHOW YOUR ENTRY.

THIS TYPEFACE TO SHOW SYSTEM RESPONSES.

[Arguments enclosed in square brackets are optional.]

{Arguments enclosed in curly brackets are required; you must enter one of them.}

This concludes the Student Orientation. Continue to Module 1.

Module 1

Basic Minicomputer Concepts

Introduction

Module 1 discusses the fundamental concepts of minicomputers. This module reviews the topics that are covered in a typical introductory level data processing course. The discussion also includes the basic elements of a computer system and the role of an operating system.

Module Objectives

Upon successful completion of this module, you should be able to:

1. List the four major components of a minicomputer.
2. Recognize the functions and organization of the four major components of a minicomputer.
3. Identify a given device as input, output, or storage.
4. List three input devices.
5. List three output devices.
6. Recognize descriptions of an operating system, the Command Line Interpreter, and a program.
7. Recognize the ways in which data is represented in memory.
8. List three responsibilities of an operator.

Resources

To complete this module, you need:

- Module 1 audiotape.
- Module 1 of your Student Guide.
- Audiotape playback unit.

Optional Resources

- *Advanced Operating System Operator's Guide* (093-000194-05)

Module Outline

Module 1 discusses the following topics:

1. Minicomputers
 - a. Introduction
 - b. Computer components
2. Memory and the CPU
 - a. Memory
 - b. Central Processing Unit (CPU)
3. Input and Output Devices
 - a. Input devices
 - b. Output devices
 - c. Input, output, and storage devices
4. Data Communications and the Operating System
 - a. Data communications
 - b. Operating system

Directions

Now start the Module 1 audiotape. As you listen, follow along in Module 1 of your Student Guide.

Segment A

Minicomputers

Introduction

Computers aid in:

- Gathering data.
- Storing data.
- Sorting data.
- Processing data.

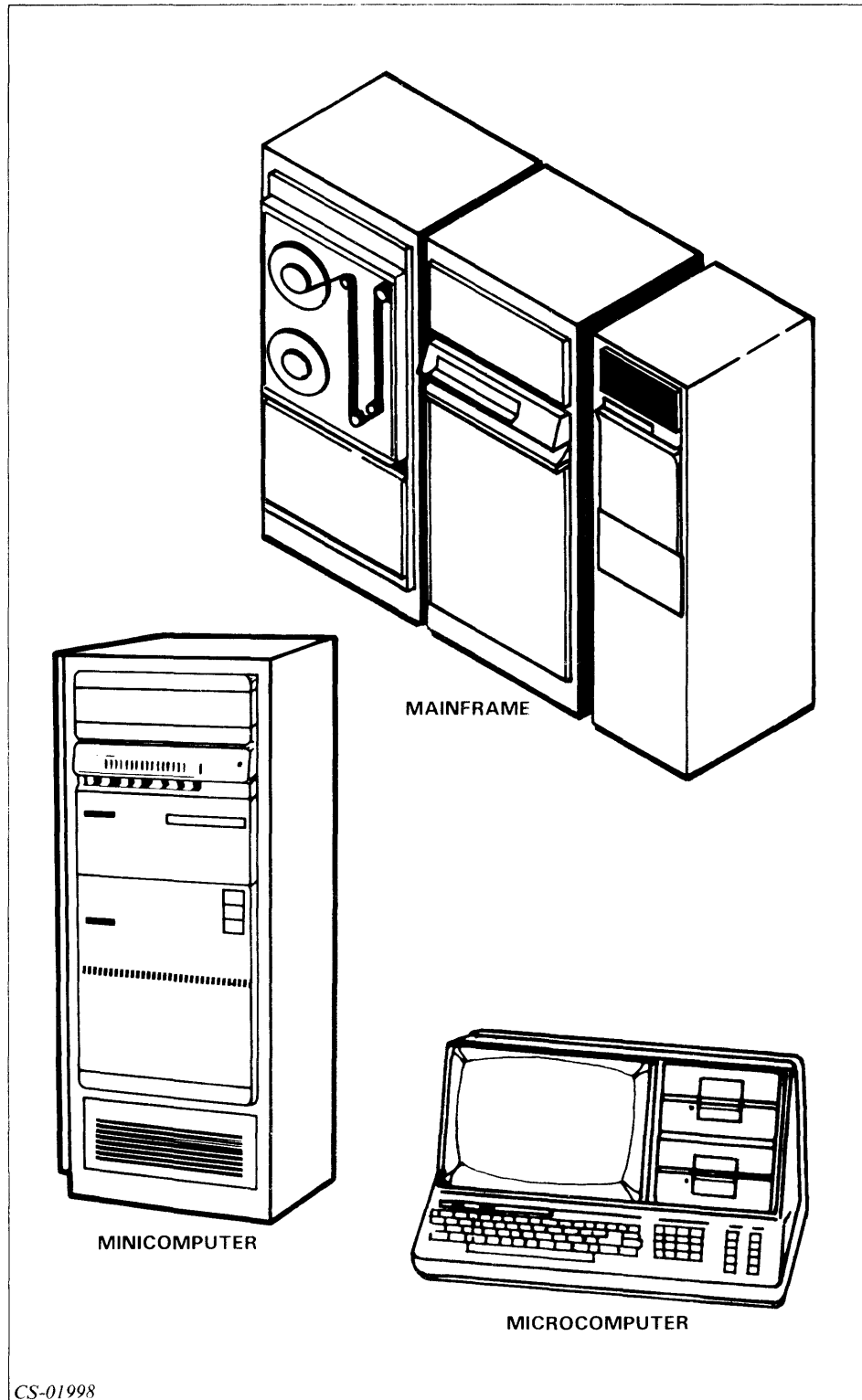


Figure 1.1 Types of Computers

Computer Components

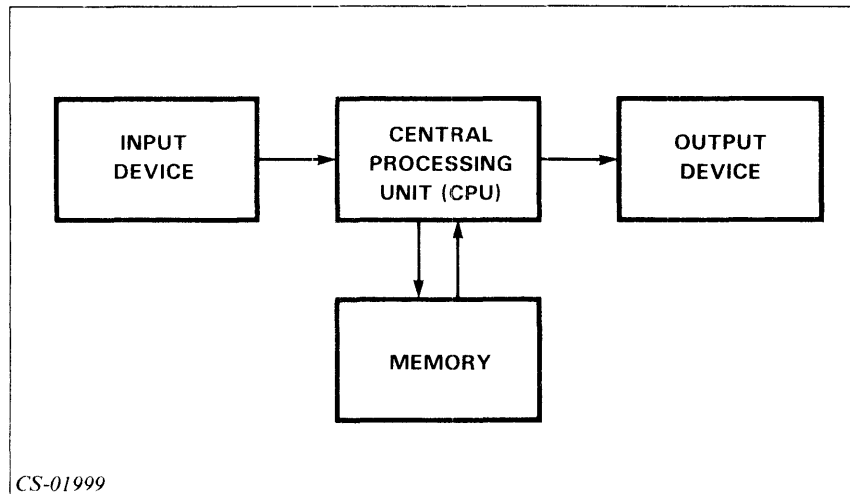
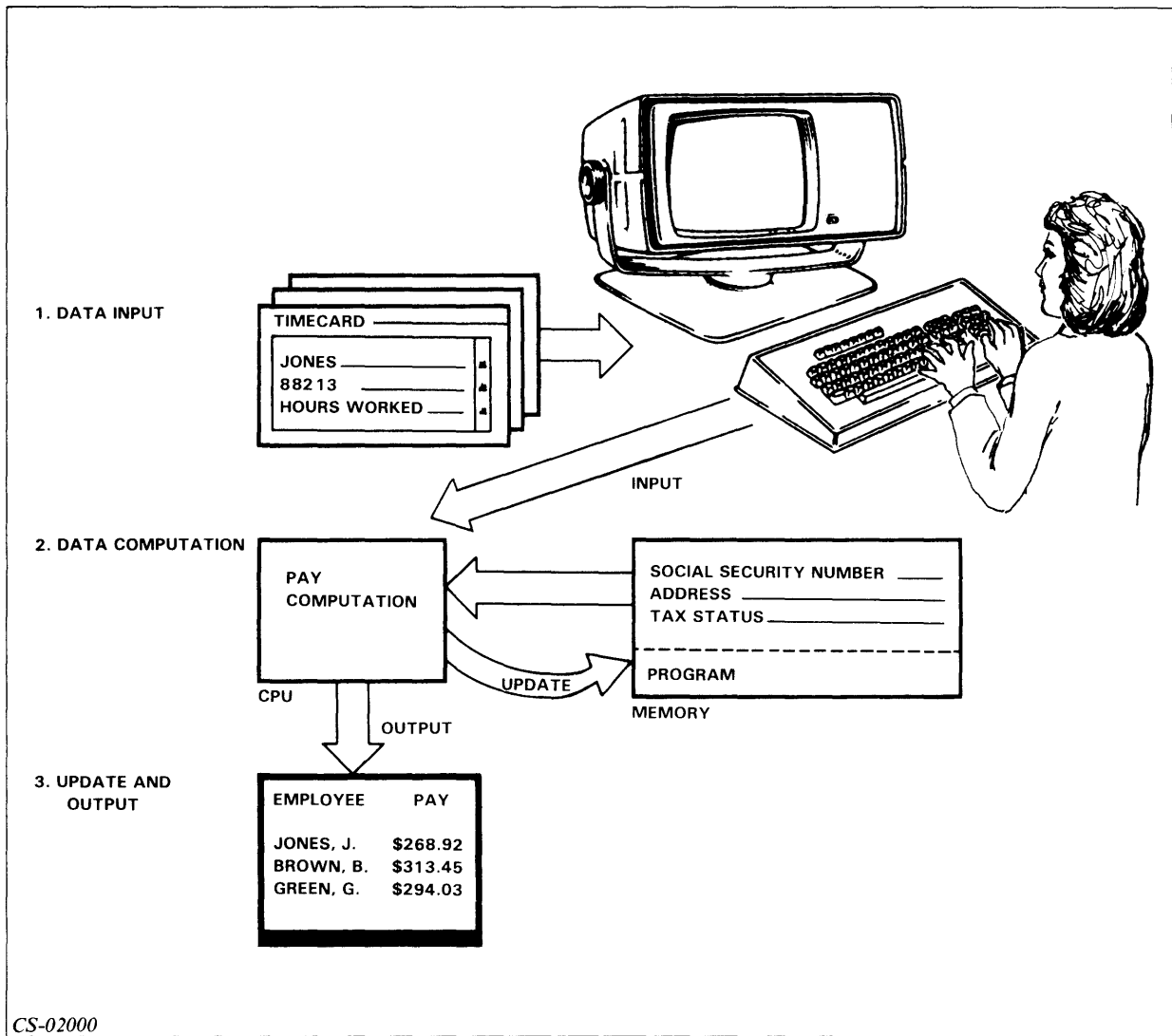


Figure 1.2 Computer Components

- Input Device — Receives data and instructions from user.
- Central Processing Unit (CPU) — Processes data according to instructions.
- Memory — Stores data and instructions.
- Output Device — Transmits results to user.



CS-02000

Figure 1.3 Payroll Processing

Directions

Now do the Segment A Exercise on the next page.

Segment A

Minicomputers

Exercise

Circle the letter of the correct answer.

1. The sequence of operations performed by a computer may be represented as:
 - a. Process-input-output.
 - b. Output-process-output.
 - c. Input-process-output.
 - d. Process I/O.
2. A program may be defined as:
 - a. A sequence of instructions designed to accomplish a task.
 - b. Input-process-output.
 - c. A set of switches.
 - d. A value physically stored at a particular location within memory.
3. The device that provides the results of the computer's processing is the:
 - a. Input device.
 - b. Memory.
 - c. CPU.
 - d. Output device.
4. Information is permanently stored in the:
 - a. Input device.
 - b. Memory.
 - c. CPU.
 - d. Output device.

5. In the space below, draw and label a simple block diagram of the four main elements of a computer.

Directions

Now check your answers with those on the next page.

Segment A

Minicomputers

Exercise Answers

1. c
2. a
3. d
4. b
5. Compare your drawing to Figure 1.4.

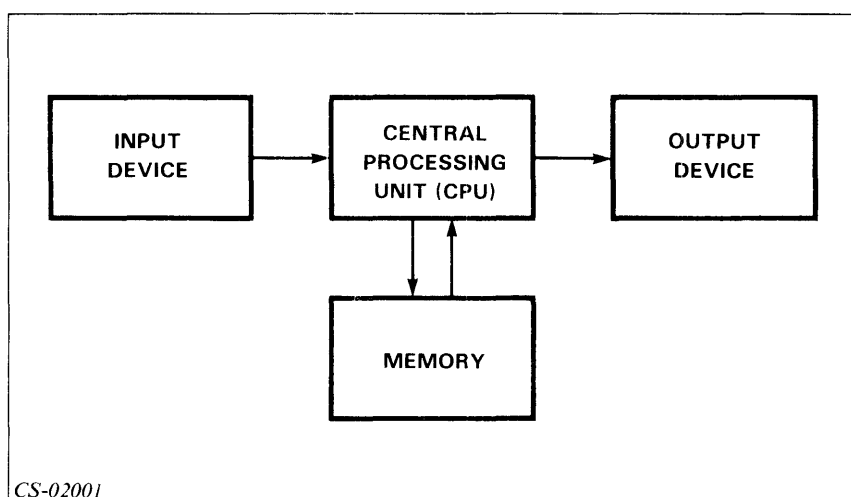


Figure 1.4 Segment A: Exercise Answer

Directions

If you answered all the questions in the segment exercise correctly, restart the Module 1 audiotape to continue.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Segment B Memory and the CPU

Memory

- Memory = Information Storage
- Primary Memory = Main Memory = Internal Storage
- Secondary Memory = External Storage
- One Storage Location = Cell = Memory Cell
- Address = Location
- Contents = Information in Location

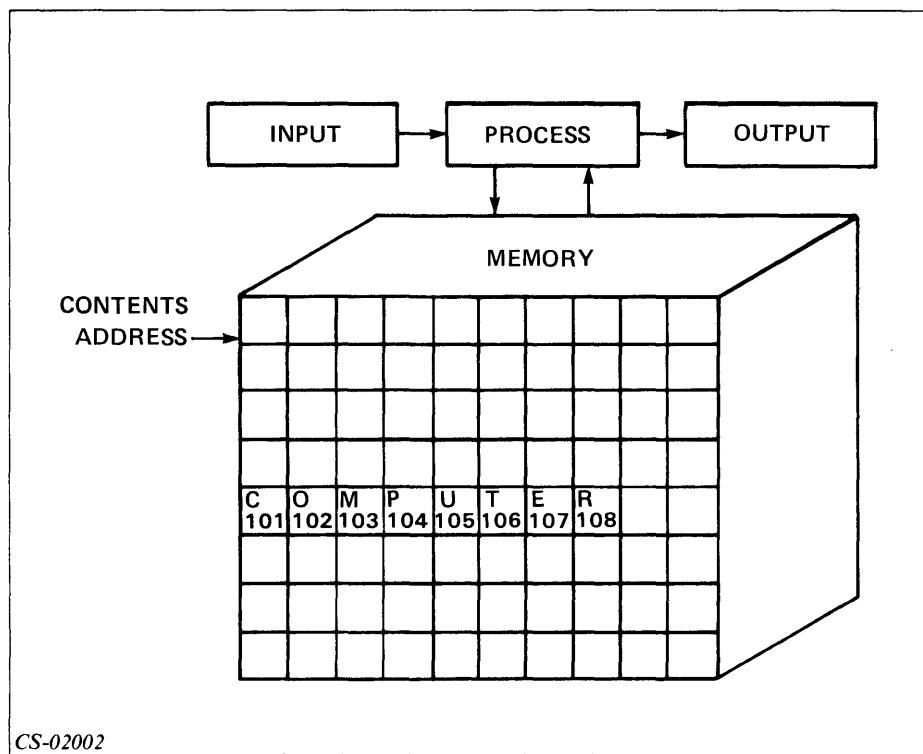


Figure 1.5 Memory

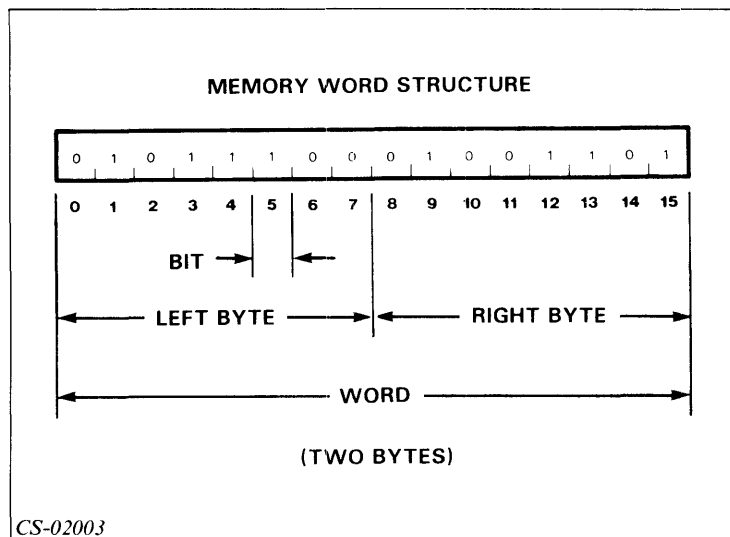


Figure 1.6 Binary Code

Bit

- Defines one binary position in memory.
- Represents 1 or 0.

Byte

- Eight bits.
- Represents one character.

Word

- Two or more bytes.
- Represents an instruction or one data word.

Kilobyte (Kb)

- 1 Kb = 1,024 bytes

Megabyte (Mb)

- 1 Mb = 1,048,576 bytes

Kiloword (Kw)

- 1 Kw = 1,024 words

Megaword (Mw)

- 1 Mw = 1,048,576 words

$$1000\text{Kb} = 1\text{Mb} = 500\text{Kw} = 0.5\text{Mw (for two-byte words)}$$

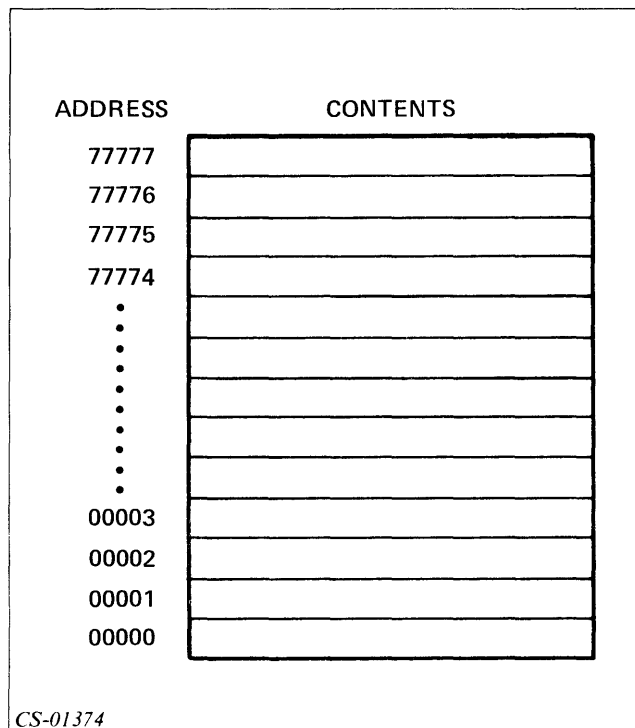
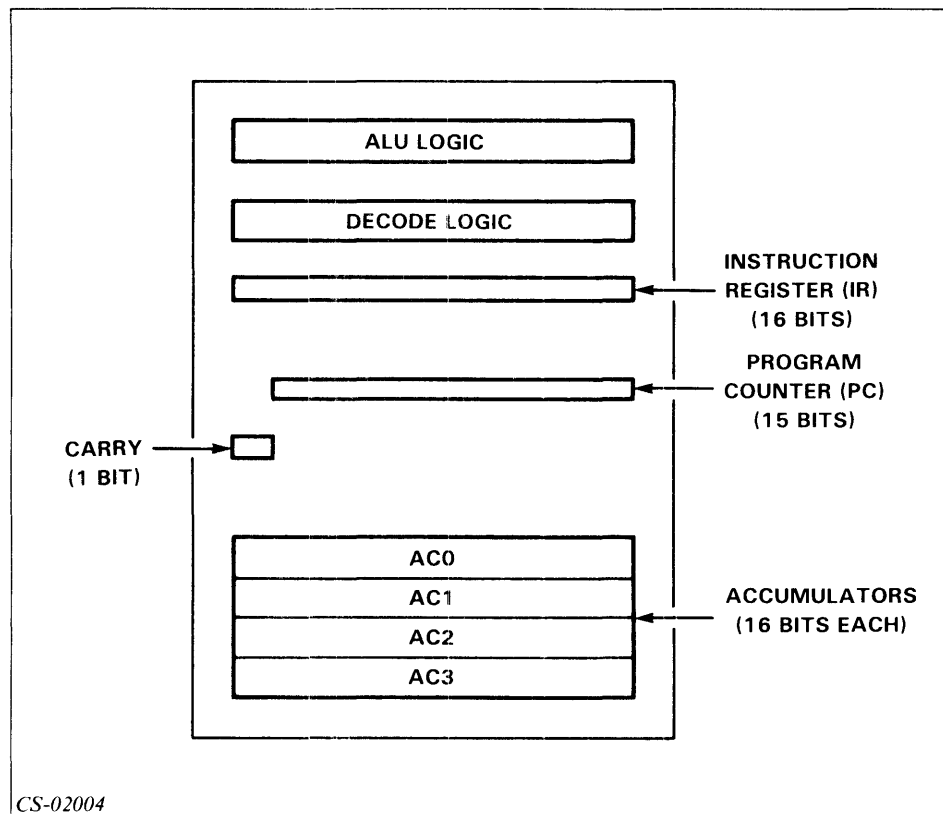


Figure 1.7 Structure of Internal Memory
Each memory location has two parts.

- Address — Where the word is.
- Contents — What the word is.

Central Processing Unit (CPU)

- Performs arithmetic operations.
- Performs logical operations.
- Controls flow of information.
- Schedules computer operations.



CS-02004

Figure 1.8 Central Processing Unit (CPU)

- Program Counter (PC) — Holds the address of the next instruction to be executed.
- Instruction Register (IR) — Holds a copy of the current instruction for decoding and execution.
- Decoding Logic — Interprets the instruction from the IR for the ALU.
- Arithmetic and Logic Unit (ALU) — Manipulates data.
- Carry — Indicates arithmetic overflow.
- Accumulators — Have limited storage.

Directions

Now do the Segment B Exercise on the next page.

Segment B

Memory and the CPU

Exercise

Circle the letter of the correct answer.

1. A computer's main memory is also called:
 - a. Peripheral storage.
 - b. Internal storage or primary memory.
 - c. Input or output.
 - d. An operating system.
2. A memory address is:
 - a. A value stored at a particular location in memory.
 - b. A numeric value which specifies a location in memory.
 - c. A bit.
 - d. A file.
3. Memory contents may also be referred to as:
 - a. A value stored at a particular location in memory.
 - b. A numeric value that specifies a location in memory.
 - c. A byte.
 - d. A chip.
4. A byte is:
 - a. A binary digit.
 - b. Two or more words.
 - c. The smallest data item.
 - d. Eight bits.

5. The ALU:
 - a. Is the primary storage unit.
 - b. Provides I/O support.
 - c. Handles mathematical calculations.
 - d. Is the analog-to-digital converter.

Directions

Now check your answers with those on the next page.

Segment B

Memory and the CPU

Exercise Answers

1. b
2. b
3. a
4. d
5. c

Directions

If you answered all the questions in the segment exercise correctly, restart the Module 1 audiotape to continue.

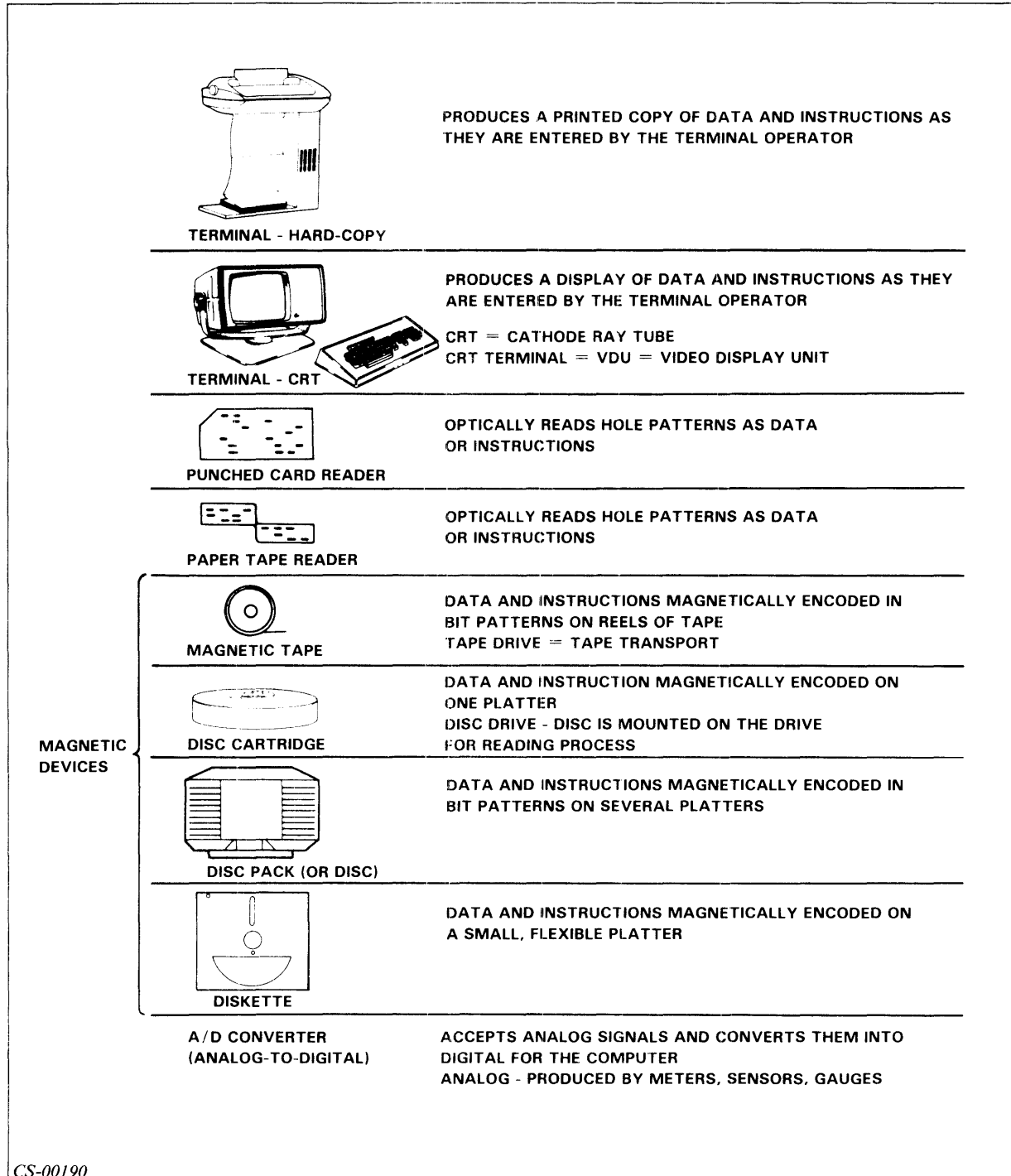
If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Segment C

Input and Output Devices

Input Devices

- Supply data and instructions to the computer.
- Medium — The surface holding the information.
- Device — Drive or transport.

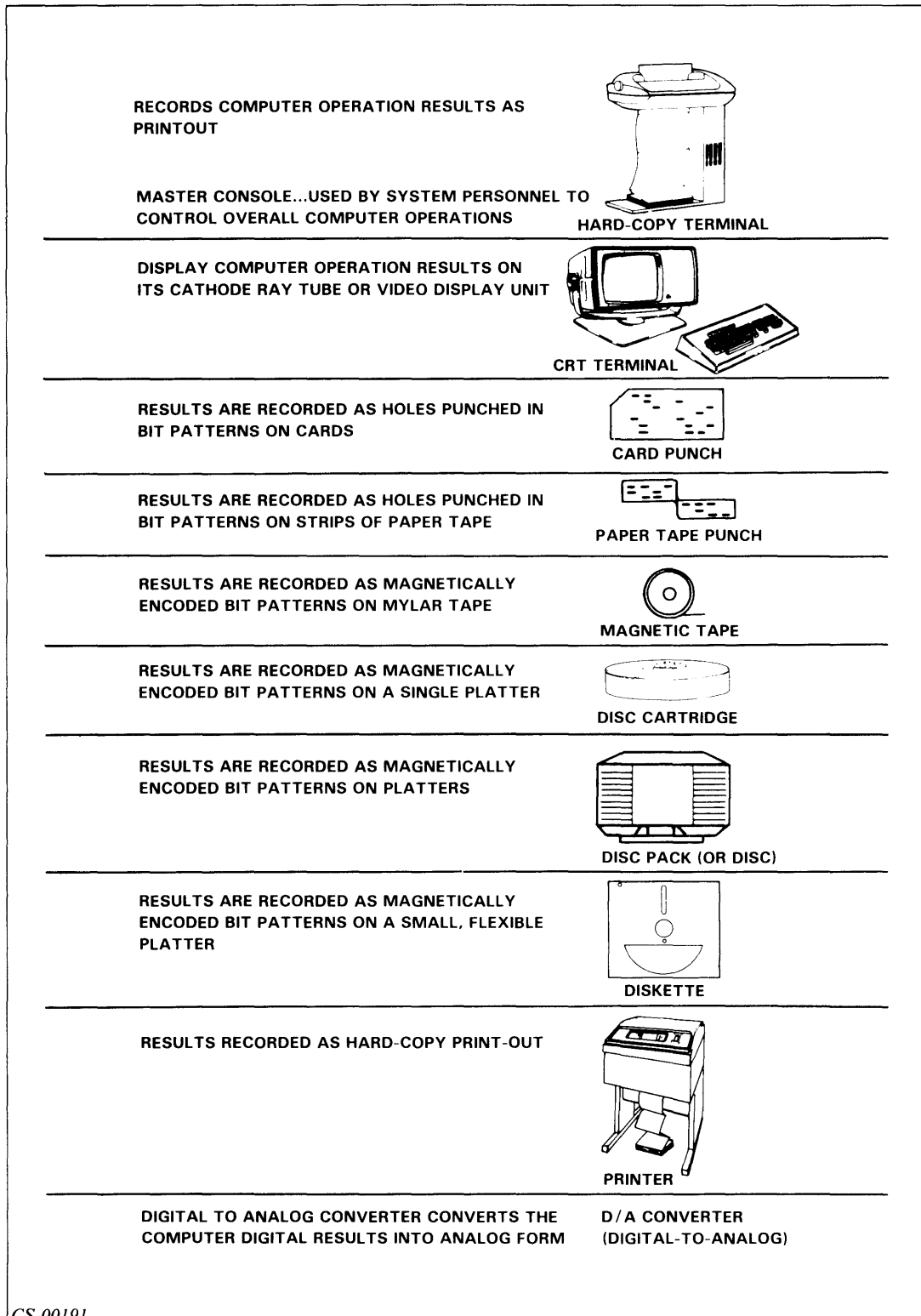


CS-00190

Figure 1.9 Input Devices

Output Devices

- Accept or record the results of computer operations.



CS-00191

Figure 1.10 Output Devices

Input, Output, and Storage Devices

- Input Device — Supplies data and instructions to the computer system.
- Output Device — Makes the results of computer operations available to people.
- Storage Device — Holds information for later use.

Table 1.A Input, Output, and Storage Devices

Device	Input	Output	Storage
Card Reader	X		
Card Punch		X	
Paper Tape Reader	X		
Paper Tape Punch		X	
Video Display Unit (CRT)	X	X	
KSR Terminal* (Hard-copy)	X	X	
RO Terminal**		X	
Printer		X	
Magnetic Tape	X	X	X
Disc Pack	X	X	X
Disc Cartridge	X	X	X
Diskette	X	X	X
A/D Converter	X		
D/A Converter		X	

*KSR = Keyboard Send and Receive

**RO = Receive Only

Directions

Now do the Segment C Exercise on the next page.

Segment C

Input and Output Devices

Exercise

Circle the letter of the correct answer.

1. Input devices:
 - a. Include main memory.
 - b. Supply data and instructions.
 - c. May double as CPU devices.
 - d. Are not part of I/O.
2. Which of the following is not an output device?
 - a. Card reader
 - b. Printer
 - c. Magnetic tape
 - d. D/A converter
3. Which of the following is a storage device?
 - a. Card reader
 - b. Printer
 - c. Magnetic tape
 - d. D/A converter
4. List any three input devices.
5. List any three output devices.

Directions

Now check your answers with those on the next page.

Segment C

Input and Output Devices

Exercise Answers

1. b
2. a
3. c
4. Any three of the following are correct:
 - Hard-copy terminal
 - CRT terminal
 - Punch card reader
 - Paper tape reader
 - Magnetic tape
 - Disc cartridge
 - Disc pack
 - Diskette
 - A/D converter
5. Any three of the following are correct:
 - Hard-copy terminal
 - CRT terminal
 - Card punch
 - Paper tape punch
 - Magnetic tape
 - Disc cartridge
 - Disc pack
 - Diskette
 - Printer
 - D/A converter

Directions

If you answered all the questions in the segment exercise correctly, restart the Module 1 audiotape to continue.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Segment D

Data Communications and the Operating System

Data Communications

Types of Data Transfers

Byte Transfers

- One character transferred at a time.

Data Channel Transfer

- Group of words (one block) transferred at a time.

Byte Devices

- Consoles
- Low-speed printers

Data Channel Devices

- Discs
- Magnetic tape
- High-speed printers

Controllers

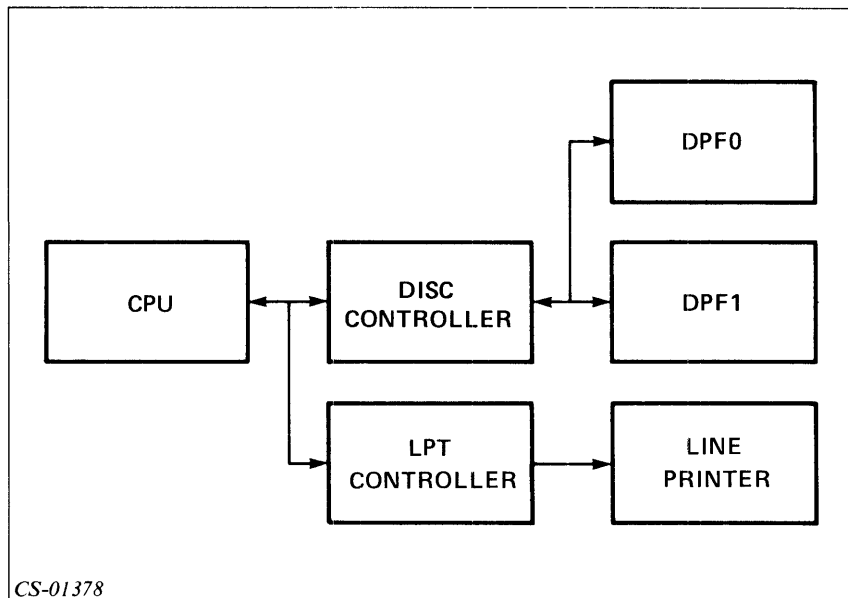


Figure 1.11 Controllers

- An interface between the CPU and a peripheral.
- Able to handle more than one device.

Device Codes

- What the CPU uses to communicate with a peripheral.
- Six-bit binary code assigned to a peripheral to identify it uniquely.
- Used during start up to determine the location of the bootstrap program to be loaded.

Table 1.B Examples of Device Codes

Device	Octal Code
First console input device	10
First console output device	11
First disc controller	27 or 33
Second disc controller	67 or 73
First line printer controller	17
Second line printer controller	57
First magnetic tape controller	22
Second magnetic tape controller	62

Note: The second controller's device code (if one exists) is always the first controller's device code plus 40_8 .

Directions

Restart the Module 1 audiotape to continue.

Data Representation

- **Bit:**
 - A binary digit
 - 0 or 1
- **Byte:**
 - Eight contiguous bits
 - Stores one character
- **Word:**
 - Two or more contiguous bytes
 - Varies with computer

Note: Bits per byte may vary with different computer architectures. Other common lengths are four bits per byte and six bits per byte. We use eight bits per byte, the most common size.

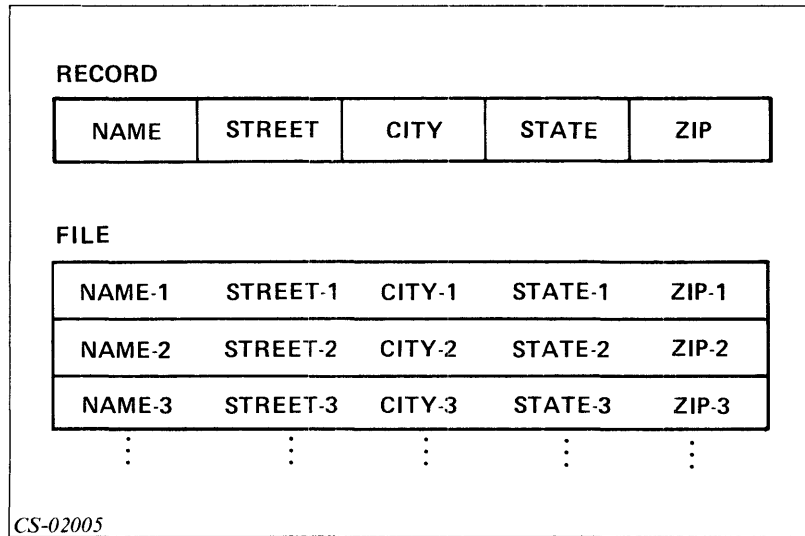


Figure 1.12 Data Representation

- Record:
Logically related group of characters.
No universally fixed length.
- File — Logically related group of records.
- Database — Logically related groups of files.

Operating System

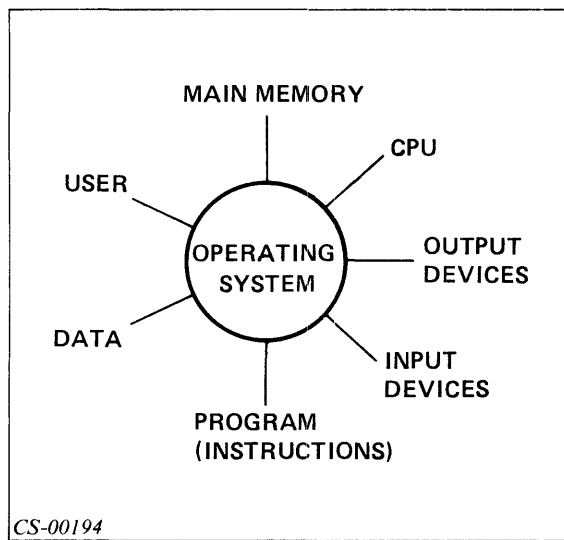


Figure 1.13 Operating System

Operating System — Manages the resources of the computer.

- Schedule execution
- I/O supervision
- Accounting
- Program development aids
- Security
- File Management
- DGC operating systems include AOS and AOS/VS

Interface Program — Allows the user to manage the operating system.

- User to operating system
- Access to operating system functions
- For AOS and AOS/VS, the interface program is the Command Line Interpreter (CLI)

Operator Responsibilities

The operator:

- Routinely starts up and operates the system.
- Tells the operating system what jobs have to be run.
- Tells the operating system what jobs are most important.
- Mounts and dismounts tape reels and disc packs.
- Tells the operating system what I/O devices a job can use.
- Backs up important information for recovery in case of failure.

Directions

Now do the Segment D Exercise on the next page.

Segment D

Data Communications and the Operating System

Exercise

Circle the letter of the correct answer.

1. A controller is:
 - a. Part of main memory.
 - b. An interface between the CPU and I/O devices.
 - c. A computer operator.
 - d. A mathematical calculator.
2. Devices that transfer information one character at a time are called:
 - a. Bit devices.
 - b. Byte devices.
 - c. Data channel devices.
 - d. Database devices.
3. The CPU identifies a particular peripheral device by its:
 - a. Device pattern.
 - b. Bit code.
 - c. Pathname.
 - d. Device code.
4. A logically related group of characters is a:
 - a. Record.
 - b. File.
 - c. Database.
 - d. Operating system.
5. A logically related group of files is a:
 - a. Record.
 - b. File.
 - c. Database.
 - d. Operating system.

Directions

Now check your answers with those on the next page.

Segment D

Data Communications and the Operating System

Exercise Answers

1. b
2. b
3. d
4. a
5. c

Directions

If you answered all the questions in the segment exercise correctly, continue to the Module 1 Quiz on the next page.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Module 1 Quiz

Circle the letter of the correct answer.

1. A byte is:
 - a. Binary digit.
 - b. Eight bits.
 - c. The smallest data item.
 - d. Two or more words.
2. A record is defined as:
 - a. A logically related group of characters.
 - b. A logically related group of files.
 - c. Two or more contiguous files.
 - d. Name-address-city-state-zip code.
3. A file is defined as:
 - a. A logically related group of characters.
 - b. A logically related group of records.
 - c. Two or more contiguous bytes.
 - d. Name-address-city-state-zip code.
4. A database is defined as:
 - a. A logically related group of characters.
 - b. A logically related group of records.
 - c. A logically related group of files.
 - d. Name-address-city-state-zip code.
5. An operating system's primary function is to:
 - a. Serve as the control unit of the computer.
 - b. Provide a series of CPUs.
 - c. Manage the resources of the computer.
 - d. Perform math calculations.

6. The part of the computer that performs arithmetical and logical operations is the:
 - a. Input device.
 - b. Output device.
 - c. CPU.
 - d. Memory.

7. The interface program that allows the user to communicate with AOS is called the:
 - a. Controller.
 - b. Operating system.
 - c. AOS program.
 - d. CLI.

8. List any three responsibilities of an operator.

9. Identify the following devices as input, output, storage, by checking the appropriate column:

Device	Input	Output	Storage
Disc			
Magnetic tape			
Terminal			
Printer			
A/D converter			

10. In the space below, draw and label a simple block diagram of the four main elements of a computer.

Directions

Now check your answers with those in Appendix A.

Module 2

Startup and Shutdown for C and S Series Computers

Introduction

Module 2 discusses the procedures for the startup and shutdown of Data General Corporation C and S Series Computers. The discussion includes normal start-up and shut-down procedures. Shutdown and startup following a power failure is covered in Module 13. This course does not cover the procedure to initially generate the operating system. System generation is typically performed by the system manager and is detailed in *Managing Your AOS System*.

Module Objectives

Upon successful completion of this module, you should be able to:

1. Recognize the major steps in the initial installation of AOS.
2. Select the steps necessary for normal startup of your system.
3. Select the steps necessary for normal shutdown of your system.

Resources

To complete this module, you need:

- Module 2 audiotape.
- Module 2 of your Student Guide.
- Audiotape playback unit.

Optional Resources

- *Managing Your AOS System* (093-000217-04)

Module Outline

Module 2 discusses the following topics:

1. Start-Up and Shut-Down Procedures: Overview
 - a. Introduction
 - b. Initial installation
 - c. C and S Series computers
 - d. Logical discs
2. Normal Startup and Shutdown
 - a. System start-up procedures
 - b. System shut-down procedures

Directions

Now start the Module 2 audiotape. As you listen, follow along in Module 2 of your Student Guide.

Segment A

Start-Up and Shut-Down Procedures: Overview

Introduction

- ECLIPSE® MV/Family — See Module 3.
- Abnormal shutdown — See Module 13.
- Initial installation procedures:
Usually done by system manager.
Covered in *Managing Your AOS System*.

Initial Installation

1. System loading — Load AOS from tape to disc.
 - a. Load bootstrap program.
 - Bootstrap — Program used to load or “boot” another program.
 - b. Format disc.
 - c. Load AOS.
2. System generation — Tailor AOS to fit your needs.

C and S Series Computers

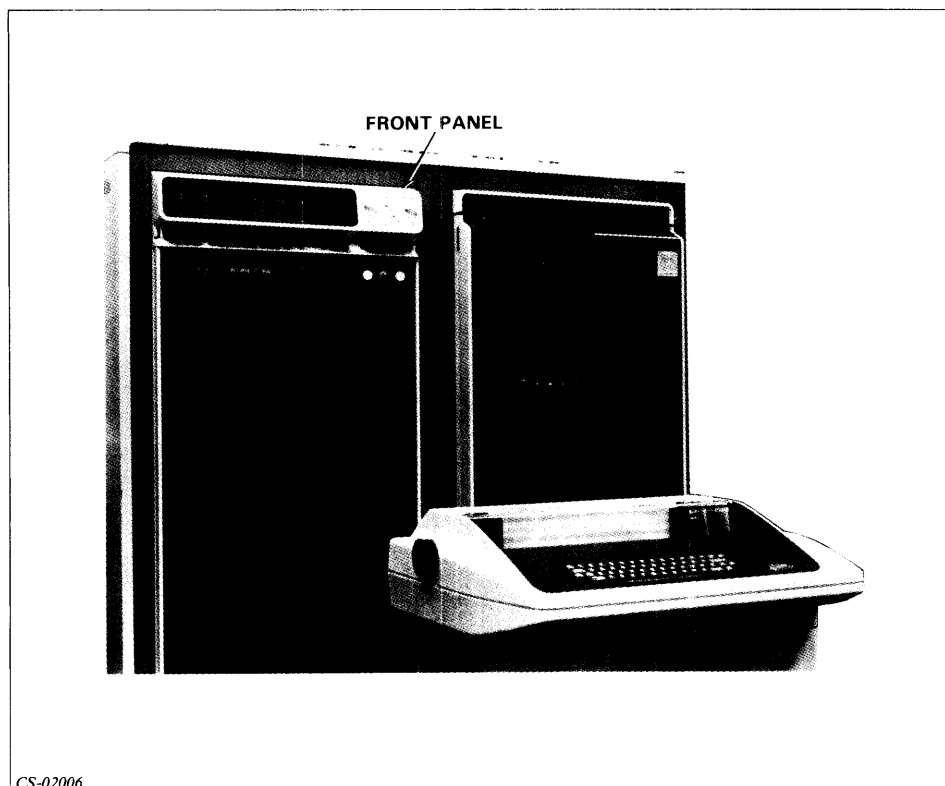


Figure 2.1 C350 System

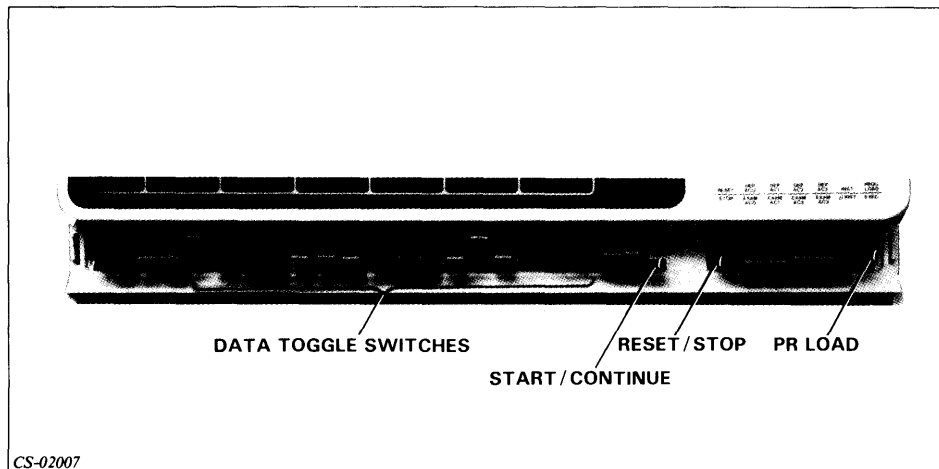


Figure 2.2 C350 Front Panel

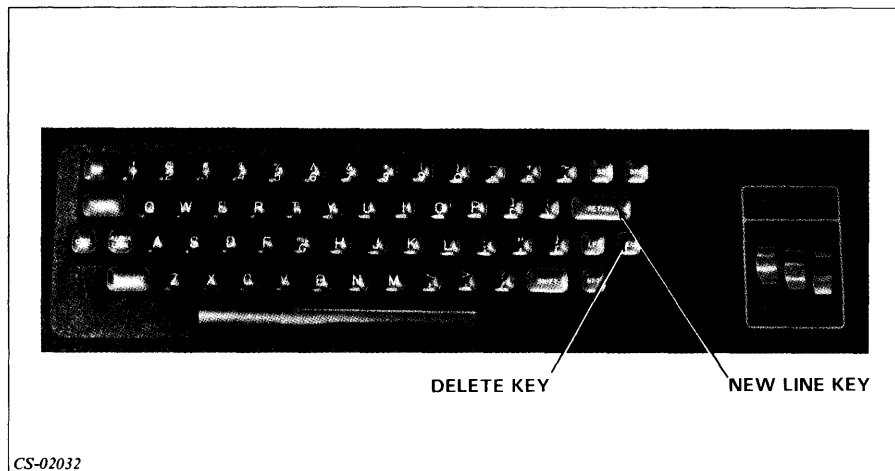


Figure 2.3 Hard-Copy Console

- **NEW LINE** key — Used to terminate an input line. Symbolized by `␣` in this module.
Example: `BYE ␣`
- **DELETE** key — Used to delete the previous character in an unterminated line.

Logical Discs

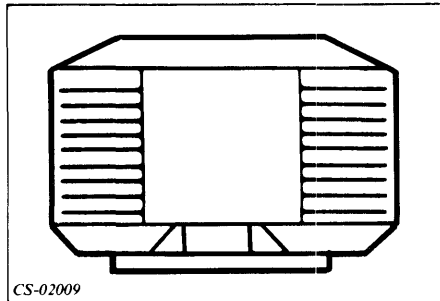


Figure 2.4 Physical Disc

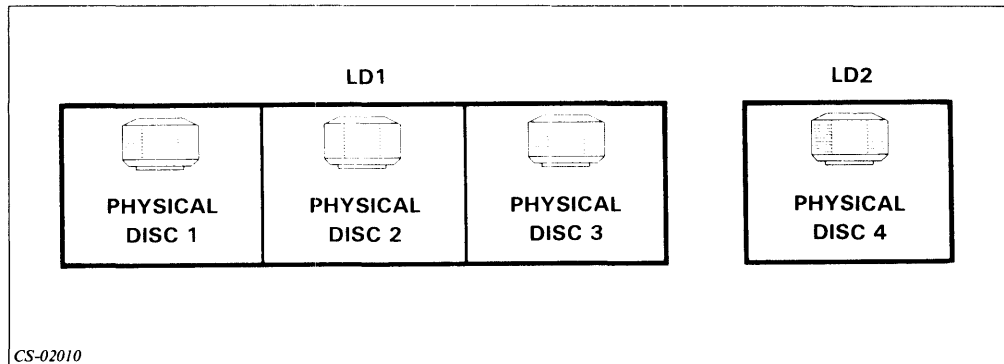


Figure 2.5 Logical Disc

- Master logical disc:
 - Runs AOS.
 - Contains AOS starter system.
- Pathname — Location of a file on a logical disc.

Directions

Now do the Segment A Exercise on the next page.

Segment A

Start-Up and Shut-Down

Procedures: Overview

Exercise

Circle the letter of the correct answer.

1. A short program used to load another program is called a(n):
 - a. Bootstrap program.
 - b. Formatter program.
 - c. System generator.
 - d. Installer.
2. The process by which AOS is tailored to fit your installation's needs is called:
 - a. Bootstrapping.
 - b. Formatting.
 - c. Loading.
 - d. System generation.
3. A file is located on a disc by its:
 - a. Code.
 - b. Pathname.
 - c. Address.
 - d. Number.
4. Discs are organized into conceptual units called:
 - a. Physical discs.
 - b. Logical discs.
 - c. Disc drives.
 - d. Formatter.

5. The disc on which AOS runs is the:
 - a. Logical disc.
 - b. Master logical disc.
 - c. Physical disc.
 - d. Installation disc.

Directions

Now check your answers with those on the next page.

Segment A
Start-Up and Shut-Down
Procedures: Overview
Exercise Answers

1. a
2. d
3. b
4. b
5. b

Directions

If you answered all the questions in the segment exercise correctly, restart the Module 2 audiotape to continue.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Segment B

Normal Startup and Shutdown

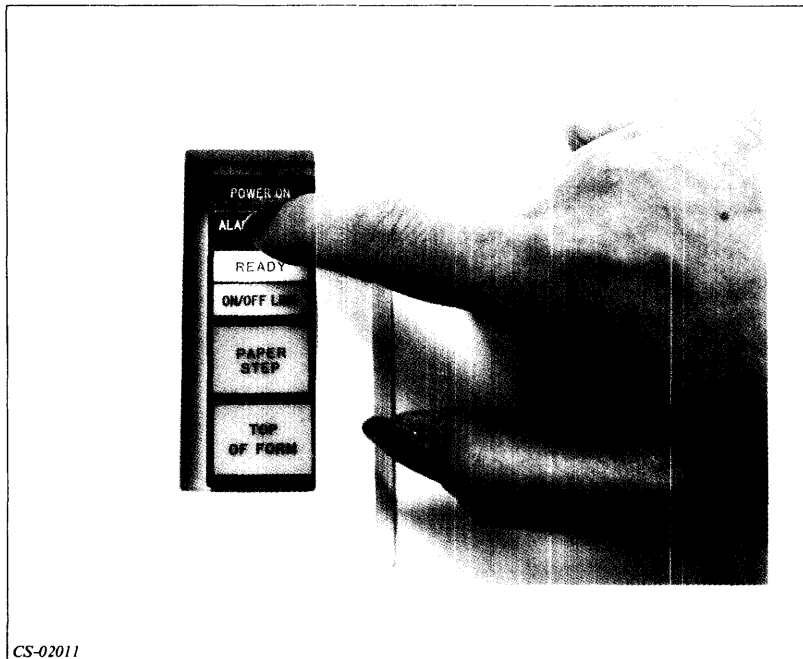
System Start-up Procedures

Three phases of system startup:

- Steps before loading system.
- Bootstrapping your system.
- System initialization.

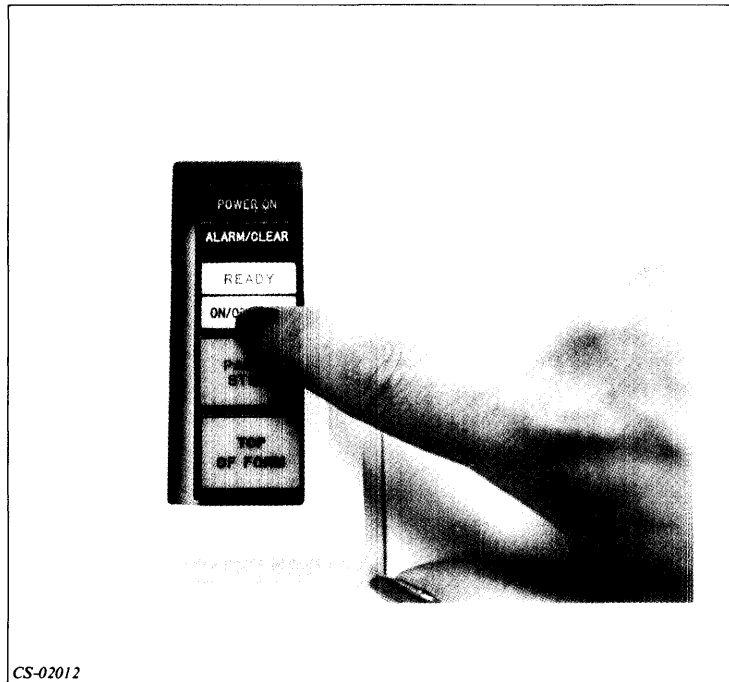
1. Steps before loading system.

- a. Turn on power to all equipment.



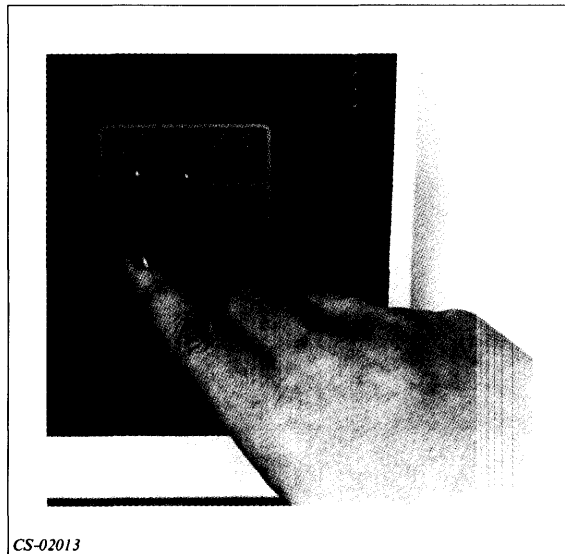
CS-02011

Figure 2.6 Turn On Power to All Printers



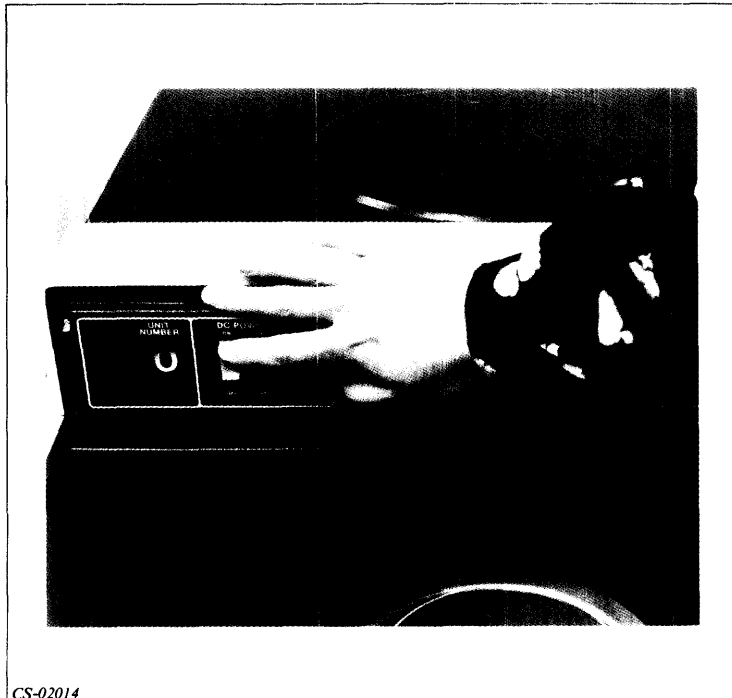
CS-02012

Figure 2.7 Put All Printers On-Line



CS-02013

Figure 2.8 Turn System Console On and Put On-Line



CS-02014

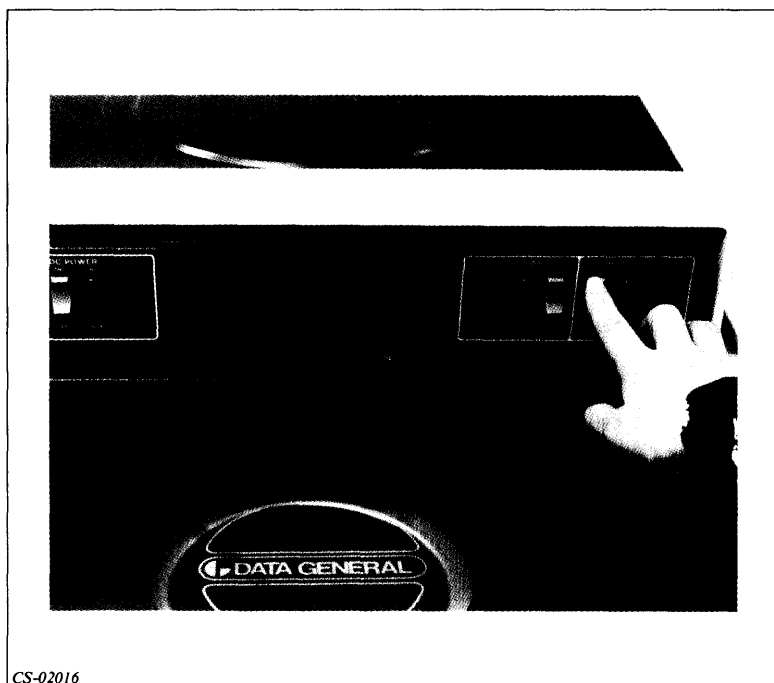
Figure 2.9 Power Up All Discs

b. Mount and bring all discs to READY.



CS-02015

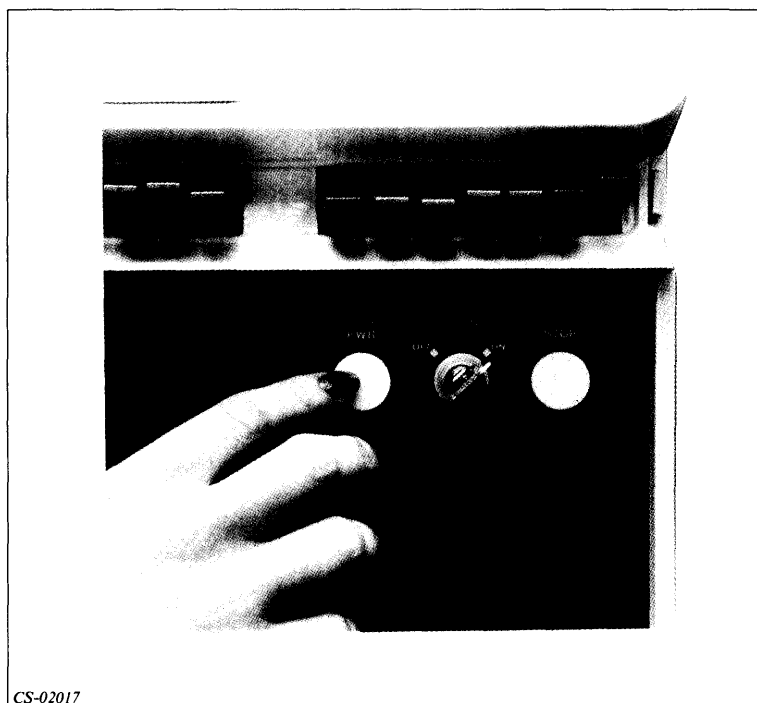
Figure 2.10 Mount System Disc



CS-02016

Figure 2.11 Bring Discs to Ready

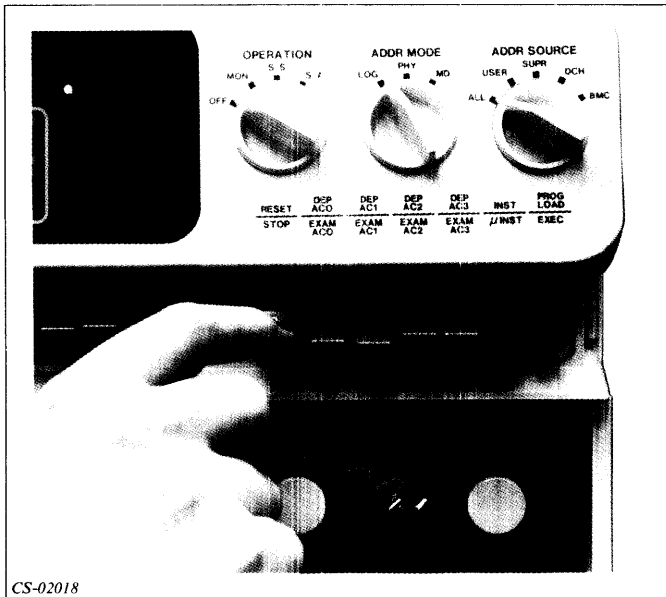
c. Press the power key to ON on the computer front panel.



CS-02017

Figure 2.12 Press Power Key to On

d. Press STOP switch.

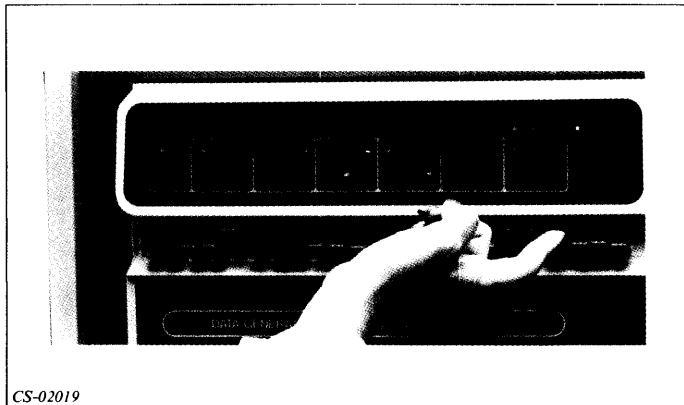


CS-02018

Figure 2.13 Press STOP Switch

2. Bootstrapping your system.

a. Set data switches to device code of controller for system disc.

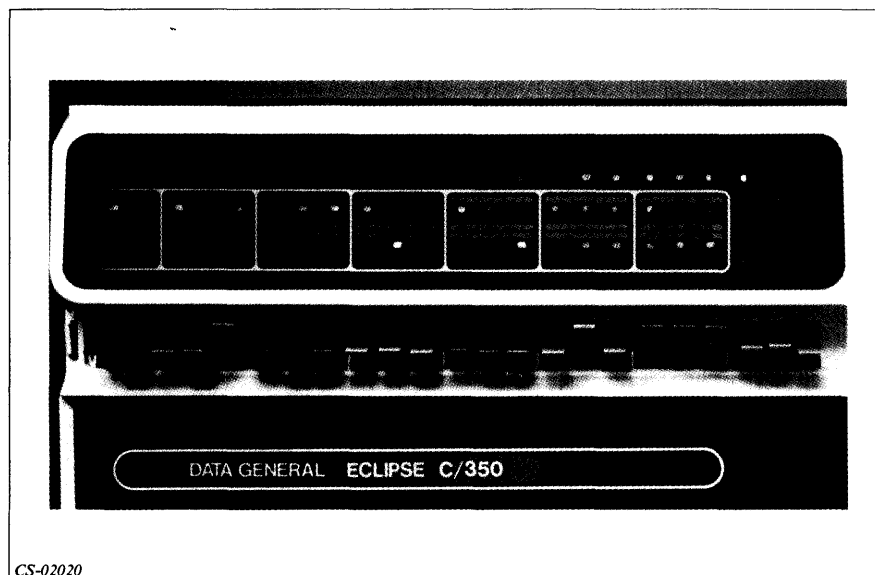


CS-02019

Figure 2.14 Set Data Switches

Table 2.A Device Codes

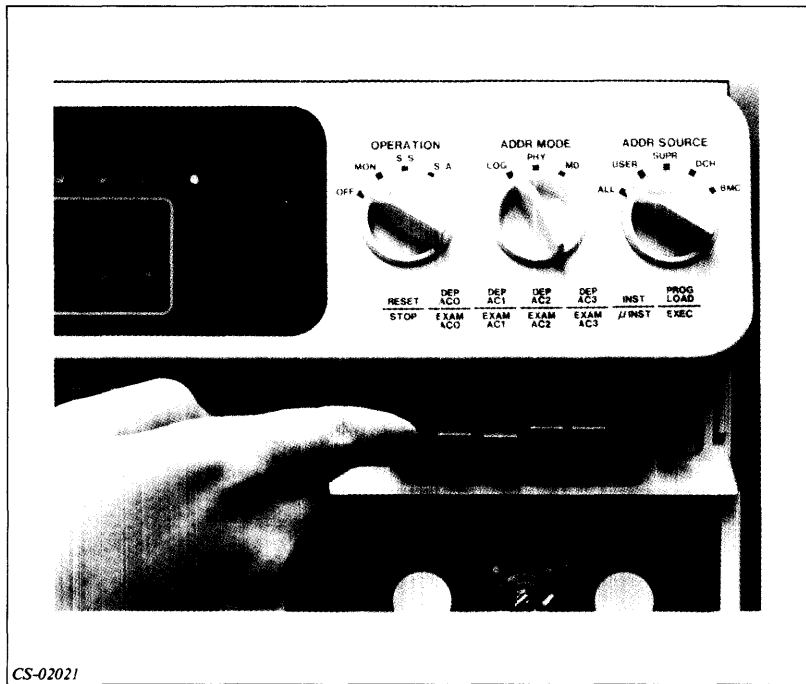
Devices	Device Code (Octal)	Switches Set to UP Position
Model 6060 Disc units DPF0-DPF3	27	0, 11, 13, 14, 15
Model 6060 Disc units DPF10-DPF13	67	0, 10, 11, 13, 14, 15
All other disc units DPD0-DPD7 DPE0-DPE3	33	0, 11, 12, 14, 15
All other disc units DPD10-DPD17 DPE10-DPE13	73	0, 10, 11, 12, 14, 15



CS-02020

Figure 2.15 Data Switches

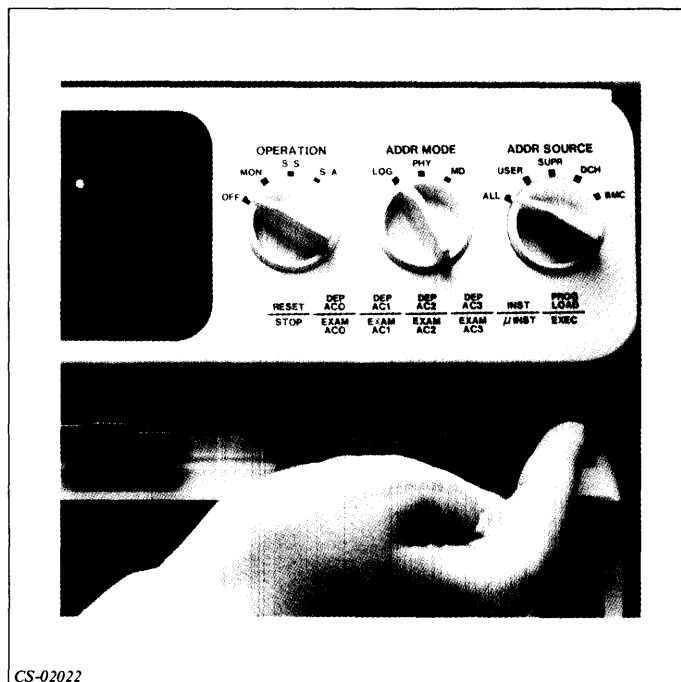
- b. Lift and release RESET switch to clear accumulators and registers in CPU.



CS-02021

Figure 2.16 Lift and Release RESET Switch

c. Lift and release PR LOAD to load bootstrap program.



CS-02022

Figure 2.17 Lift and Release PR LOAD

d. Name disc units and device codes in master logical disc.

```
DISC UNIT ? DPF0 }  
DEVICE CODE ? }  
DISC UNIT ? }
```

e. Enter system pathname.

```
SYSTEM PATHNAME }  
AOS REV. 1.00  
DATE ?
```

3. System initialization.

- a. Turn the front panel power key to LOCK to disable switches.

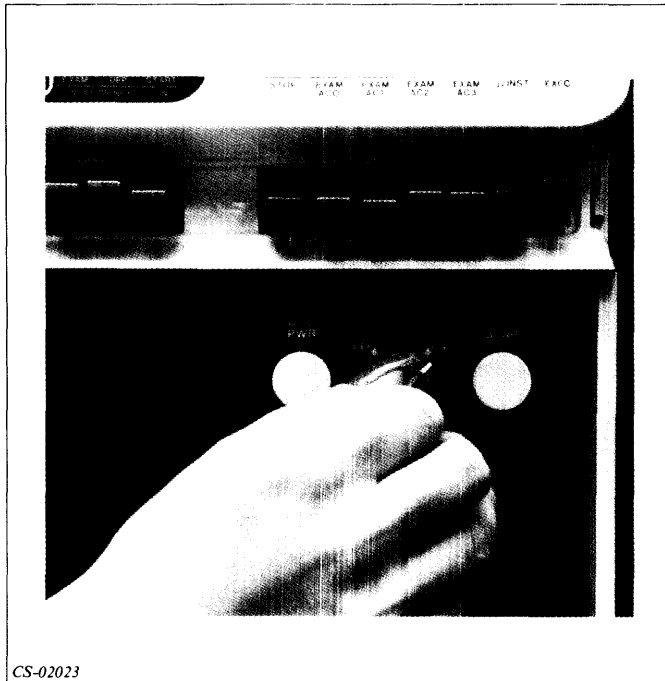


Figure 2.18 Turn Power Key to LOCK

- b. Enter date.

```
AOS REV. 1.00
DATE ? 08/13/82 )
```

- c. Enter time.

```
TIME ? 10:30:00 )
```

- d. Answer OVERRIDE DEFAULT SPECS? prompt.

```
OVERRIDE DEFAULT SPECS ? NO )
```

- e. Enter instructions to finish bringing up system.

- See your system manager for instructions.
- May use a macro as shown below.

```
UP )
```

```
FROM PID 3: (EXEC) Rev 01.00 READY
FROM PID 3: (EXEC) 10:31:30
FROM PID 3: (EXEC) ENABLED CONSOLE, @CON1
FROM PID 3: (EXEC) ENABLED CONSOLE, @CON2
FROM PID 3: (EXEC) ENABLED CONSOLE, @CON3
FROM PID 3: (EXEC) ENABLED CONSOLE, @CON4
FROM PID 3: (EXEC) ENABLED CONSOLE, @CON5
THE SYSTEM IS UP!
```

System Shut-Down Procedures

1. Warn users that system is to be shut down.
2. Type **BYE** from the top-level operator process.

BYE)

DO YOU REALLY WANT TO SHUT THE SYSTEM DOWN? YES)

STARTING SYSTEM SHUTDOWN 13-AUG-82 10:45:30

SYSTEM SHUTDOWN

Summary:
Normal Start-Up and Shut-Down Procedures
for C and S Series Computers

Start-Up Procedures

1. Before loading the system:
 - a. Turn on power to all equipment to be used by the system.
 - Turn on power to all printers and put them on-line.
 - Turn system console on and put it on-line.
 - Power up all discs.
 - b. Mount and bring all discs to **READY**.
 - c. Press the power key on the computer front panel.
 - d. Press **STOP** switch on the computer front panel.
2. Bootstrapping your system:
 - a. Set data switches to device code of controller for system disc.
 - b. Press **RESET** switch to clear accumulators and registers in CPU.
 - c. Press **PR LOAD** to load bootstrap program.
 - d. Name disc units and device codes in master logical disc.
 - e. Enter system pathname.
3. Initializing the system:
 - a. Turn the front panel power key to **LOCK** to disable switches.
 - b. Enter date.
 - c. Enter time.
 - d. Answer **OVERRIDE DEFAULT SPECS?** prompt. Answer **NO**, unless instructed otherwise by your system manager.
 - e. Enter instructions to finish bringing up system. See system manager for specific instructions.

System Shut-Down Procedures

1. Warn users that system is to be shut down.
2. Type **BYE** from the top-level operator process.

Directions

Now take the Module 2 Quiz on the next page.

Module 3

Startup and Shutdown for ECLIPSE MV/Family Computers

Introduction

Module 3 discusses the procedures for the startup and shutdown of Data General ECLIPSE MV/Family computers. The discussion includes normal start-up and shut-down procedures. Shutdown and startup following a power failure is covered in Module 13. This course does not cover how to initially start up and generate the operating system. This task is typically performed by the system manager and is detailed in *Running the Advanced Operating System (AOS) on your ECLIPSE MV/8000® Computer*.

If your computer is a C or S series computer, and not an ECLIPSE® MV/Family computer, go to Module 2.

Module Objectives

Upon successful completion of this module, you should be able to:

1. Recognize the basic components of an ECLIPSE MV/Family computer.
2. Recognize the functions of the SCP.
3. Recognize the major steps in the initial installation of your operating system.
4. Select the steps necessary for normal startup of your operating system.
5. Select the steps necessary for normal shutdown of your operating system.

Resources

To complete this module, you need:

- Module 3 audiotape
- Module 3 of your Student Guide
- Audiotape playback unit

Optional Resources

- *Running the Advanced Operating System (AOS) on Your ECLIPSE MV/8000 Computer* (093-000259-00)
- *How to Generate and Run AOS/VS on Your ECLIPSE MV/Family Computer* (093-000243-01)

Module Outline

Module 3 discusses the following topics:

1. Start-Up and Shut-Down Procedures: Overview
 - a. Introduction
 - b. Basic components of ECLIPSE MV/Family computers
 - c. The System Control Processor (SCP)
 - d. Initial installation of AOS/VS
 - e. ECLIPSE MV/8000 switches
 - f. ECLIPSE MV/6000™ switches
 - g. Logical disc
2. Normal startup and shutdown
 - a. Start-up procedures
 - b. Shut-down procedures

Directions

Now start the Module 3 audiotape. As you listen, follow along in Module 3 of your Student Guide.

Segment A

Start-Up and Shut-Down Procedures: Overview

Introduction

- C and S Series computers — See Module 2.
- Initial installation procedures:
Usually done by system manager.
Covered in *How to Generate and Run AOS/VS on Your ECLIPSE MV/Family Computer*.
- Abnormal shutdown — See Module 13.

Basic Components of ECLIPSE MV/Family Computers

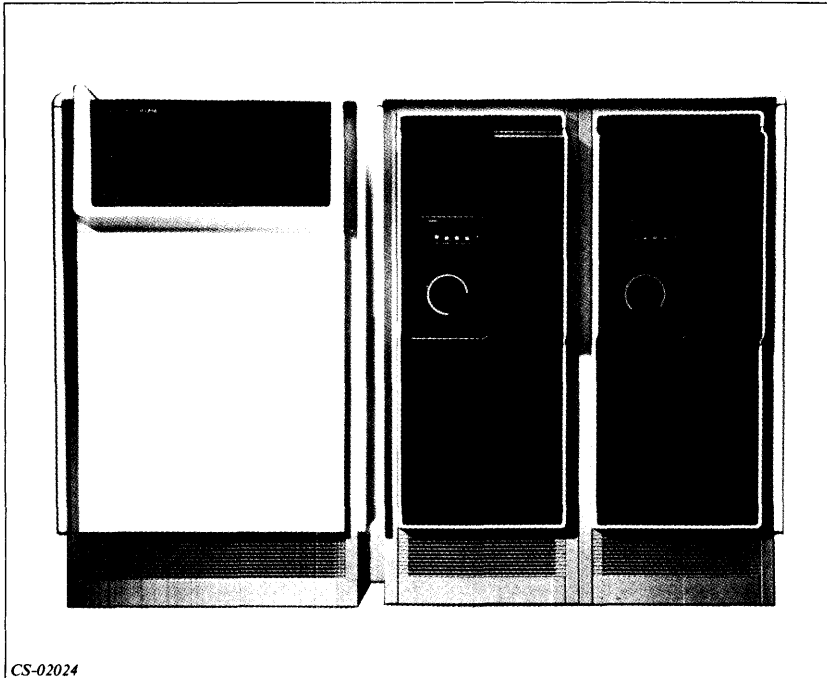
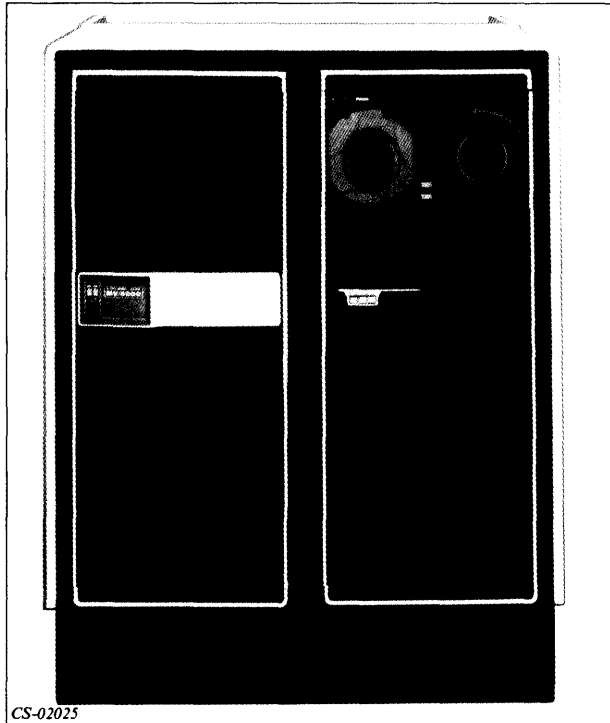
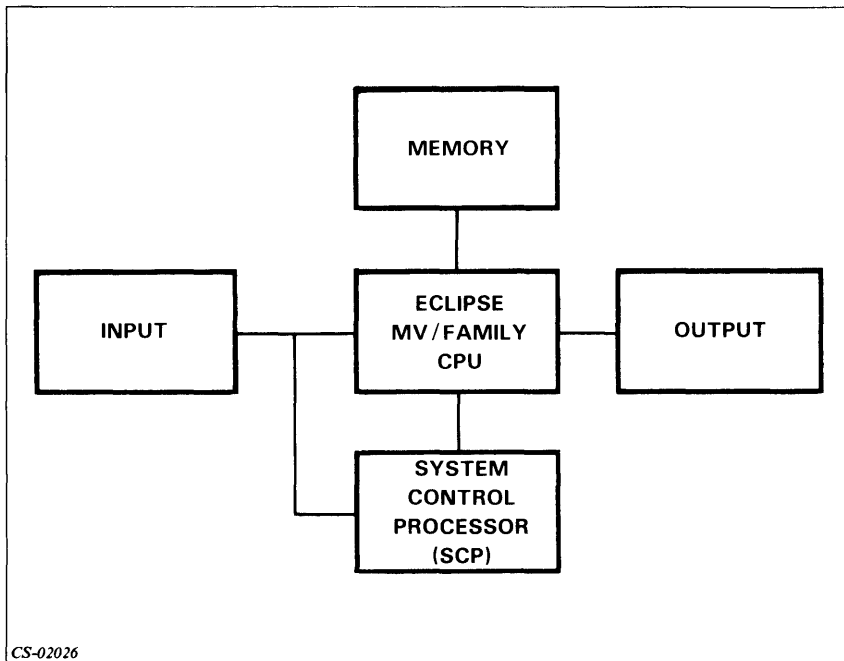


Figure 3.1 ECLIPSE MV/8000



CS-02025

Figure 3.2 ECLIPSE MV/6000



CS-02026

Figure 3.3 Basic Components of the ECLIPSE MV/8000 and the ECLIPSE MV/6000

System Control Processor (SCP)

- Serves as soft console — Allows you to communicate directly with the computer before AOS/VS is up and running.
- Performs diagnostic functions.
- Maintains error log.
- Loads microcode — A set of machine-level instructions that tells the system's hardware how to operate.

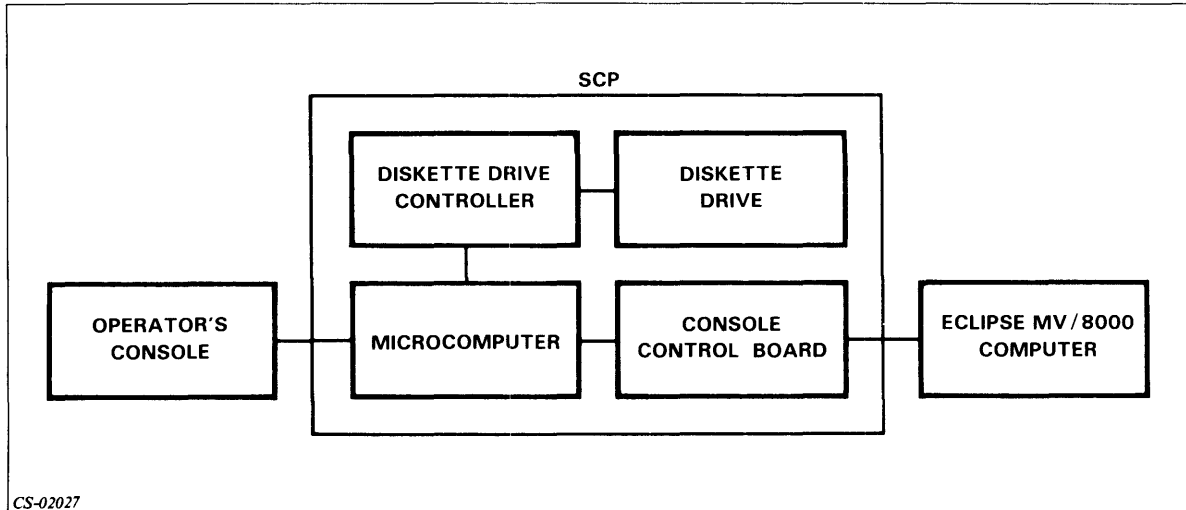


Figure 3.4 Components of the SCP: ECLIPSE MV/8000

- Has operating system: SCP-OS
- Uses command language: SCP-CLI

Two Operating Modes

- TTY (Teletype) mode — Data entered on console is sent through the SCP to the ECLIPSE MV/Family computer.
Can be entered only when ECLIPSE MV/8000 is running.
Can be entered from command mode by entering TTY command.
- Command mode — Data entered on the console is sent to SCP only.
Entered when powering up ECLIPSE MV/8000.
Entered when ECLIPSE MV/8000 computer halts.
Entered when you input an operator command.

Initial Installation of AOS/VS

Load SCP-OS.

- From diskette to memory on ECLIPSE MV/8000.
- From tape to memory on ECLIPSE MV/6000.

Load AOS/VS (loaded from tape onto system disc).

1. Load bootstrap program from tape to main memory.
Tells computer how to load or boot AOS/VS from tape to disc.
2. Format system disc using FORMATTER utility.
FORMATTER lays down structure that organizes data stored the disc.
3. Load AOS/VS.

Generate AOS/VS.

- Tailor AOS/VS to fit your needs.

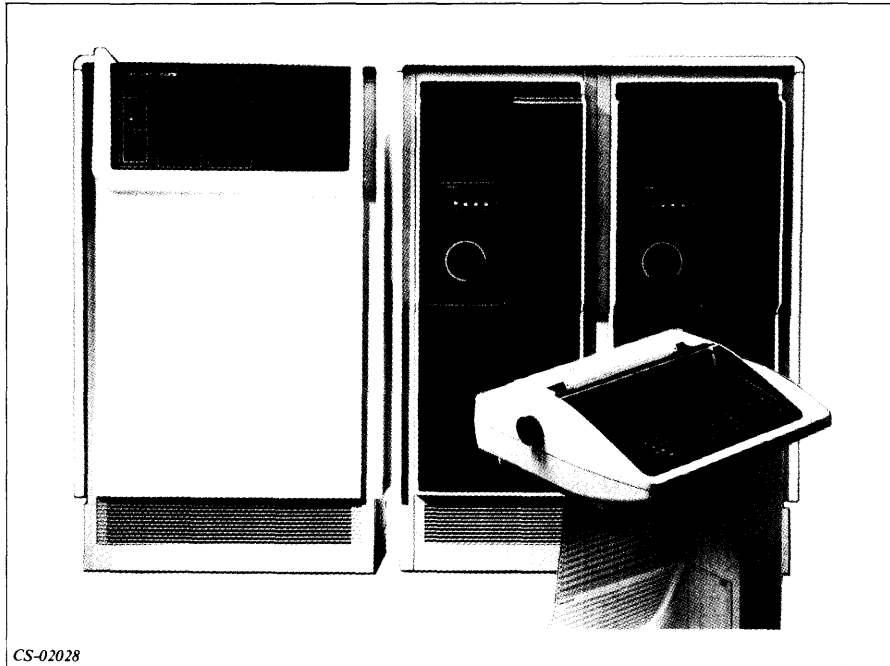


Figure 3.5 Hard-Copy Console with ECLIPSE MV/8000

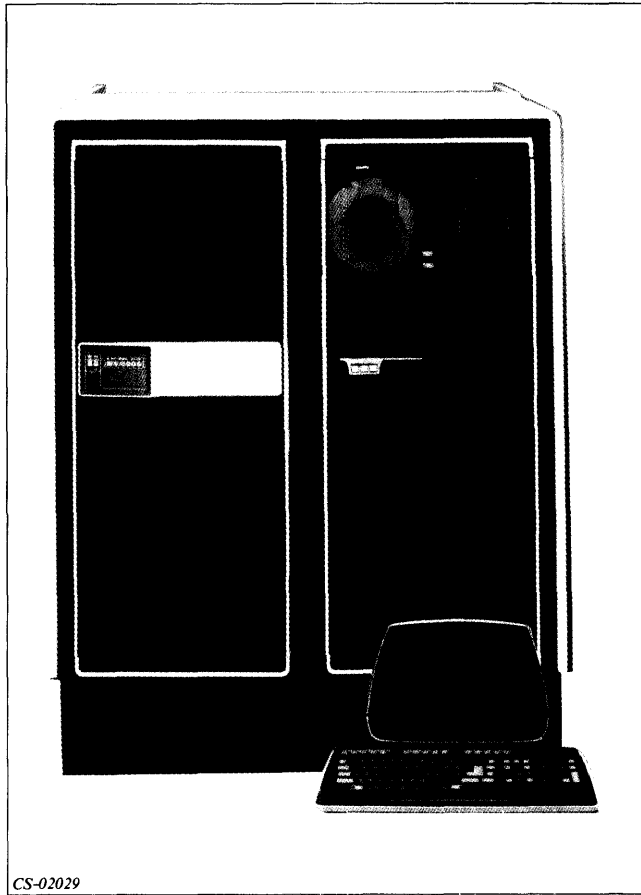


Figure 3.6 CRT Console with ECLIPSE MV/6000

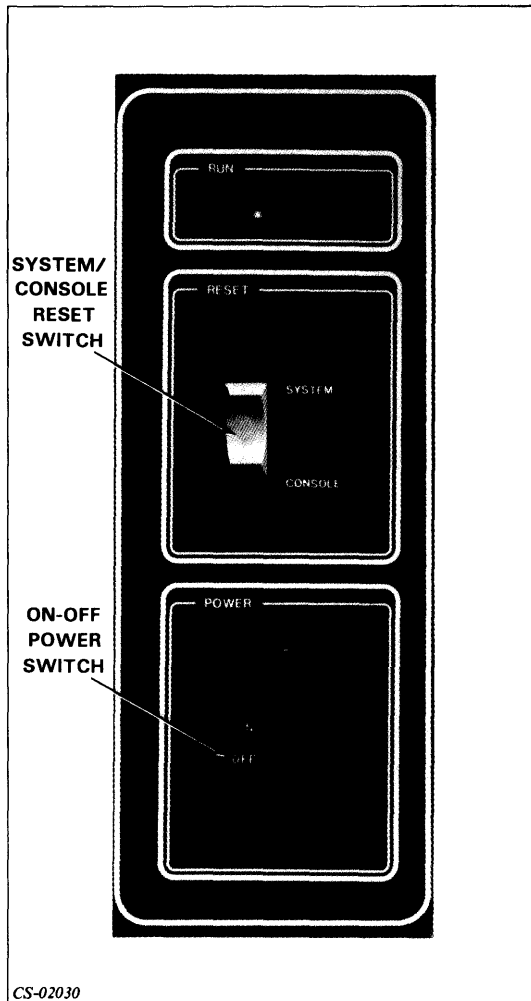


Figure 3.7 Front Panel Switches: ECLIPSE MV/8000

ECLIPSE MV/8000 Switches

- ON-OFF power switch.
- SYSTEM RESET switch — Halts and resets ECLIPSE MV/8000.
- CONSOLE RESET switch — Returns you to the command mode and brings up SCP-CLI.

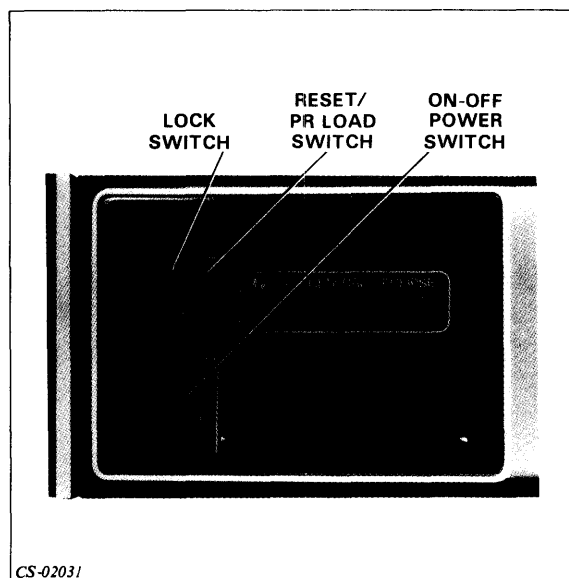


Figure 3.8 Front Panel Switches: ECLIPSE MV/6000

ECLIPSE MV/6000 Switches

- ON-OFF power switch.
- RESET switch — Brings up SCP-CLI.
- PR LOAD switch — Loads SCP.
- LOCK — Identifies the system disc.

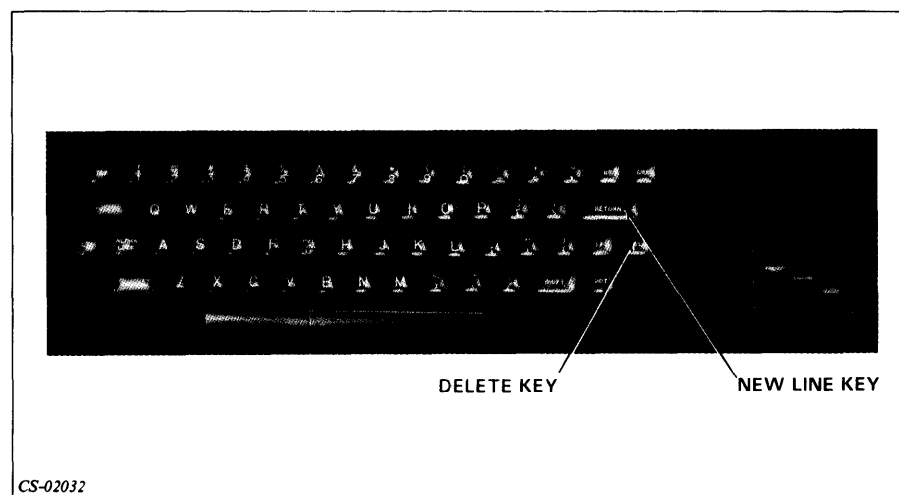


Figure 3.9 Console Keyboard

- NEW LINE key — Used to terminate an input line. Symbolized by `]` in this module.
Example: `BYE]`
- DELETE key — Used to delete the previous character in an unterminated line.

Logical Disc

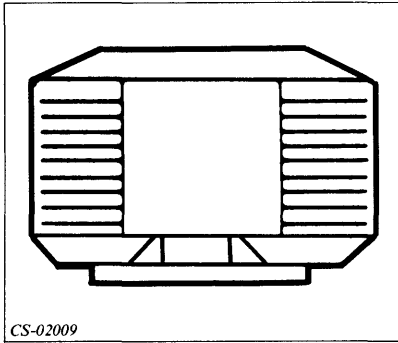


Figure 3.10 Physical Disc

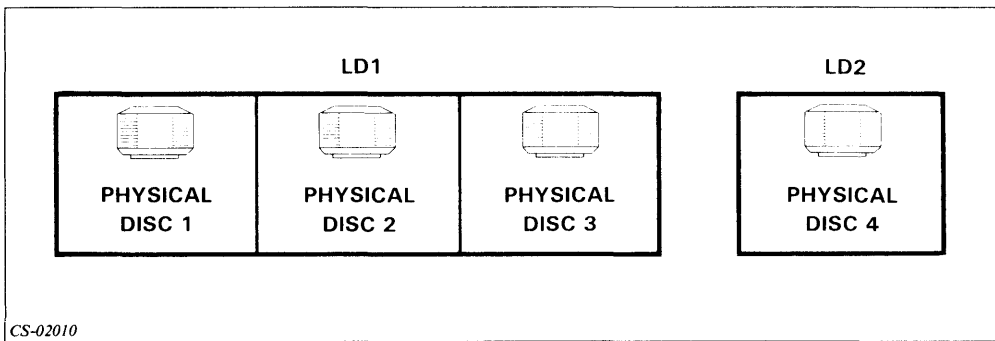


Figure 3.11 Logical Discs

Master Logical Disc

- Holds AOS/VS.
- Contains AOS/VS starter system.
- Referred to as system disc.

Pathname

- Location of a file on a logical disc.

Directions

Now do the Segment A Exercise on the next page.

Segment A

Start-Up and Shut-Down

Procedures: Overview

Exercise

Circle the letter of the correct answer.

1. A short program used to load another program is called a(n):
 - a. Bootstrap program.
 - b. Formatter program.
 - c. System generator.
 - d. Installer.
2. The process by which AOS/VS is tailored to fit your installation's needs is called:
 - a. Bootstrapping.
 - b. Formatting.
 - c. Loading.
 - d. System generation.
3. A file is located on a disc by its:
 - a. Code.
 - b. Pathname.
 - c. Address.
 - d. Number.
4. The disc that stores AOS/VS is called the:
 - a. Physical disc.
 - b. Logical disc.
 - c. Master logical disc.
 - d. Master physical disc.

5. When the SCP is in TTY mode, data you enter on the console is sent:
 - a. To the diskette drive.
 - b. Back to the console.
 - c. To the SCP only.
 - d. Through the SCP to the ECLIPSE MV/Family computer.

Directions

Now check your answers with those on the next page.

Segment A
Start-Up and Shut-Down
Procedures: Overview
Exercise Answers

1. a
2. d
3. b
4. c
5. d

Directions

If you answered all the questions in the segment exercise correctly, restart the Module 3 audiotape to continue.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Segment B

Normal Startup and Shutdown

Normal Startup

General Procedures

- Turn power on (if not already on).
- Load microcode and SCP-OS.
- Identify system disc by name and device code.
- Identify the location of AOS/VS on system disc by pathname.
- Load AOS/VS from disc to main memory.
- Initialize AOS/VS.

Cold Start

- CPU power turned off.
- Need to load microcode and SCP operating system.
- Different procedures for ECLIPSE MV/6000 and ECLIPSE MV/8000.

Warm Start

- Follows normal shutdown, in which power to CPU remained on.
- Microcode and SCP operating system already loaded.
- Same procedures for ECLIPSE MV/6000 and ECLIPSE MV/8000.

Directions

Now turn to the cold start start-up procedures for your computer.

ECLIPSE MV/8000 Start-Up Procedures: Cold Start, CPU Power Off

Turn power on.

1. Turn system console ON and put it on-line.

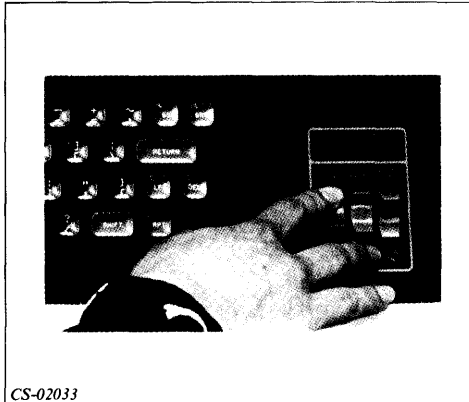


Figure 3.12 Putting System Console On-Line

2. Press the switches on the disc drives to the ON, START, and WRITE ENABLE positions.

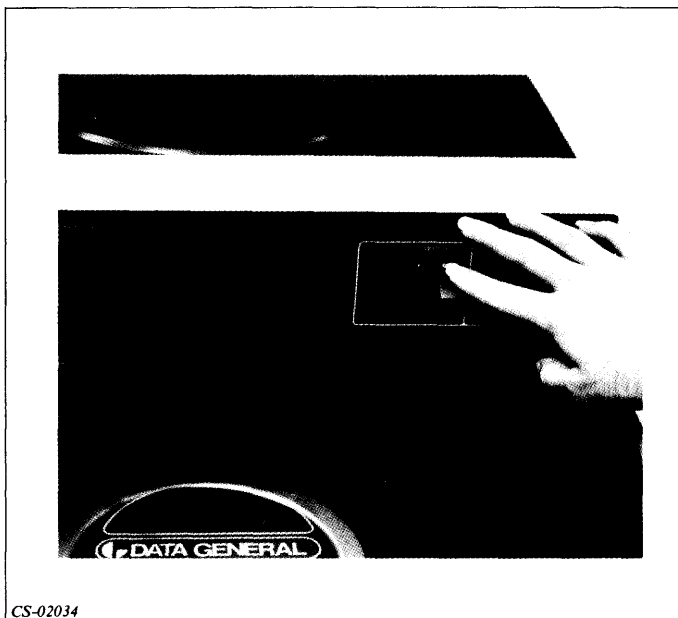


Figure 3.13 Press WRITE ENABLE on Disc Drives

3. Make sure supplied diskette is inserted correctly in its CPU slot and diskette door is latched.

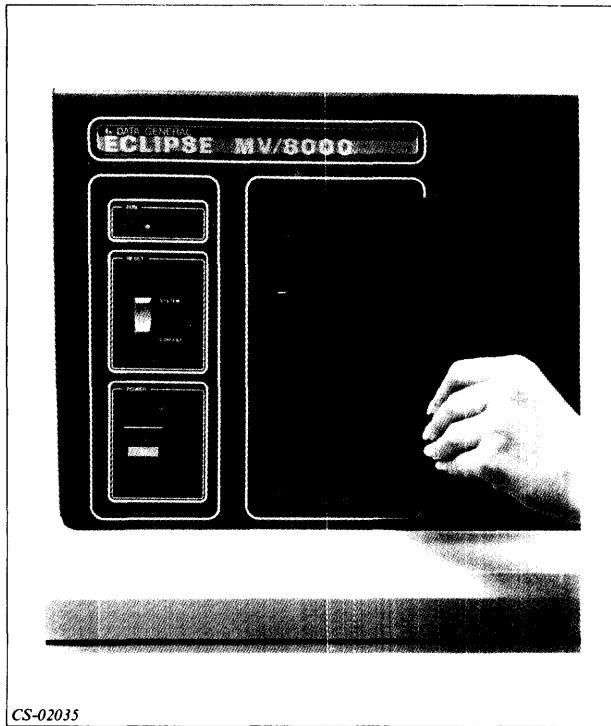


Figure 3.14 Insert Diskette

4. Turn CPU power switch ON. Power light should be lit.

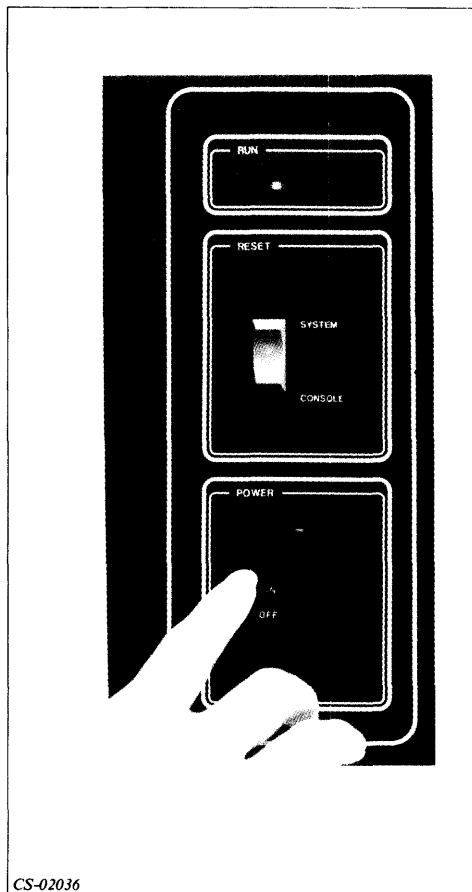


Figure 3.15 Turn CPU On

Load microcode and SCP-OS.

1. After you complete the previous four steps, the computer runs power-up tests, and responds with the message:

```
**CONSOLE READY**
```

If one or more power-up tests fails, the console shows no ****CONSOLE READY**** message, or only a partial message. Turn the CPU power off and on again. If the problem recurs, report it to your system manager.

2. The computer presents the message below and requests the date. Enter the date in numeric form with two digits for month, day, and year. Don't forget to terminate your entry by pressing the NEW LINE key (symbolized by ↵).

```
MV/8000 SYSTEM CONTROL PROGRAM  
TYPE H <CR> FOR HELP
```

```
COPYRIGHT DATA GENERAL . . .  
STARTING POWER UP SEQUENCE
```

```
ENTER DATE (MO DAY YEAR)  
08 13 82 ↵
```

3. Enter the time, as on a 24 hour clock. Midnight is 00:00. Noon is 12:00, 2 PM is 14:00.

```
TIME (HR MIN SEC)  
14:00:00 ↵
```

4. The computer presents the message below as it loads SCP-OS and ECLIPSE MV/8000 microcode. Loading takes little more than a minute. If you see an error message, make sure the diskette is inserted properly; turn power to the CPU off and on again. If the error recurs, try another diskette or report it to your system manager. Loading is completed when the SCP-CLI prompt appears.

```
LOADING MICROCODE FROM FILE MV8000  
LOADING COMPLETE  
VERIFY . . .
```

```
BEGIN SYSTEM INITIALIZATION  
# OF 256 KB MEMORY MODULES - n*  
MV/8000 MICROCODE REVISION - n* END SYSTEM INITIALIZATION
```

```
SCP-CLI>
```

* These numbers vary from installation to installation.

Identify system disc by name and device code.

1. Reset the disc controller by entering the command **RESET**.

```
SCP-CLI> RESET )
```

2. Identify the device code of the device from which you want to bootstrap. In the example below, the system is booted from the disc with device code 27.

```
SCP-CLI> BOOT 27 )
```

3. The computer requests the name of each disc in the logical disc that holds AOS/VS. Your system manager will give you this information. In the example below, the unit name of the logical disc that holds AOS/VS is DPFO.

```
SPECIFY EACH DISC IN THE LDU  
DISC UNIT NAME? DPFO )
```

4. Next the computer requests the device code of the logical disc that holds AOS/VS. Unless your system manager instructs you to enter a nonstandard device code, select the default by pressing NEW LINE.

```
DEVICE CODE? )
```

Identify the location of AOS/VS on the system disc by pathname.

1. The computer requests the location or pathname of AOS/VS on your system disc. Your system manager gave the location its name during system generation. Ask your system manager for the correct entry here. In the example below, the pathname is SYSGEN:SYS_1.40.

```
SYSTEM PATHNAME? SYSGEN:SYS_1.40 )
```

Load AOS/VS from disc to main memory.

1. After you enter the pathname of AOS/VS, the computer automatically loads the operating system into main memory. The computer then presents the revision number and the name of the master logical disc.

```
AOS/VS REV 1.00  
MASTER LDU: DPFO
```

Initialize AOS/VS.

1. Next the computer requests the date. Enter the date as two-digit numbers for month, day, and year. Separate each two-digit number by spaces or slashes. In the example below, the date, August 13, 1982, is entered as 08/13/82.

```
DATE (MM/DD/YY)?  
08/13/82 )
```

2. Enter the time based on a 24-hour clock, in hours, minutes and seconds. Minutes and seconds are optional. Use spaces or colons to separate each number pair. The example shows the time 2:35 PM.

```
TIME (HH:MM:SS)? 14 35 ↵
```

3. Next the computer asks if you wish to override the default specifications. The specifications are characteristics given to your system by your system manager during system generation. Unless otherwise instructed by your system manager, enter a NEW LINE for no override.

```
OVERRIDE DEFAULT SPECS [N]? ↵
```

4. After a pause, AOS/VS CLI comes up. A message showing the revision number of the CLI and the present date and time appears followed by the CLI prompt. You may bring up the rest of the multiuser AOS/VS by issuing the appropriate commands. Ask your system manager for the commands most appropriate for your system. Typically the commands are grouped into a file called an UP macro. With a macro, you only need to enter its name and all the commands within it are executed.

In the example below, the UP macro brings up a process called EXEC and enables the user consoles. EXEC is a process that allows many users to utilize the system. (See Module 11.) When a console is enabled, it is brought under the control of the operating system. Note that without the UP macro, the operator would have to issue a separate enable command for each console.

```
AOS/VS CLI REV 1.00 08/13/82 14:35
```

```
UP ↵
```

```
FROM PID 3: (EXEC) Rev 01 00 READY
FROM PID 3: (EXEC) 14:35:00
FROM PID 3: (EXEC) ENABLED CONSOLE, @CON1
FROM PID 3: (EXEC) ENABLED CONSOLE, @CON2
FROM PID 3: (EXEC) ENABLED CONSOLE, @CON3
FROM PID 3: (EXEC) ENABLED CONSOLE, @CON4
FROM PID 3: (EXEC) ENABLED CONSOLE, @CON5
THE SYSTEM IS UP!
```

5. The system is now up and ready for use.

Directions

Now turn to the start-up procedures for warm starts for ECLIPSE MV/8000 and ECLIPSE MV/6000 computers.

ECLIPSE MV/6000 Start-Up Procedures: Cold Start, CPU Power Off

Turn power on.

1. Turn system console ON and ON-LINE.

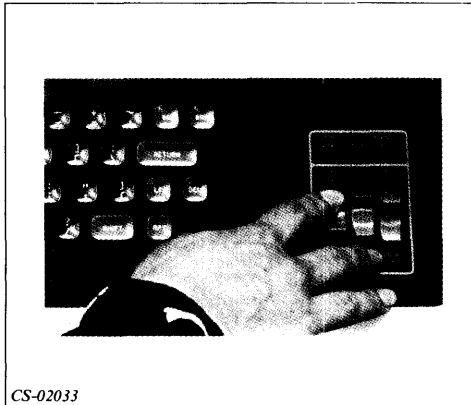


Figure 3.16 Turn Console ON

2. Press the switches on the disc drives to the ON, START, and WRITE ENABLE positions.

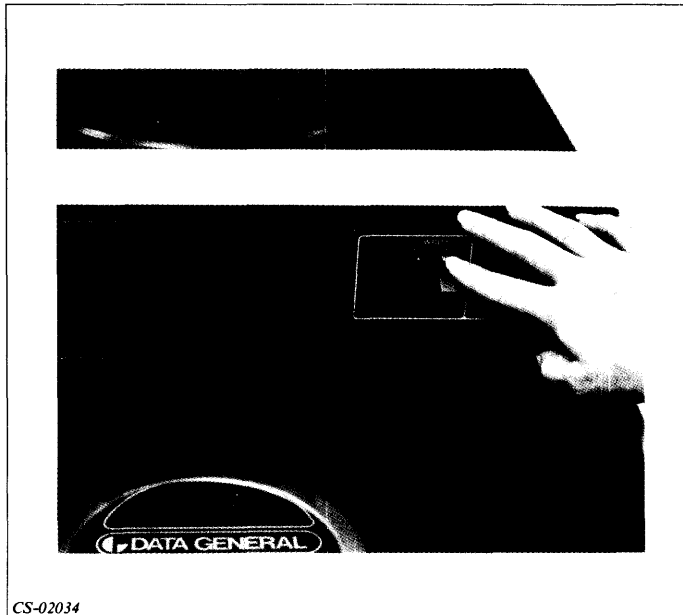
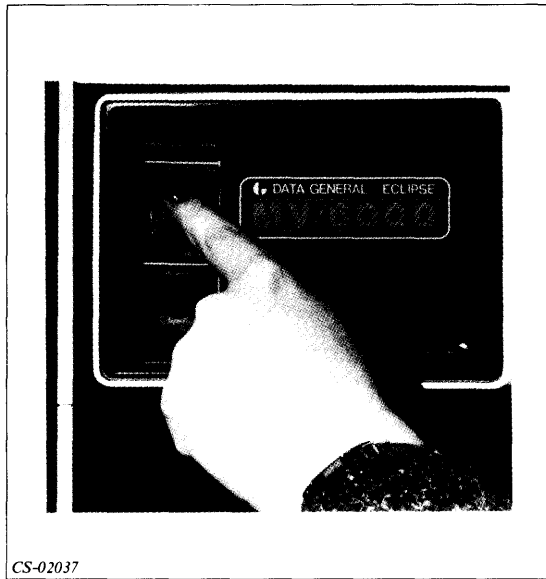


Figure 3.17 Press WRITE ENABLE on Disc Drives

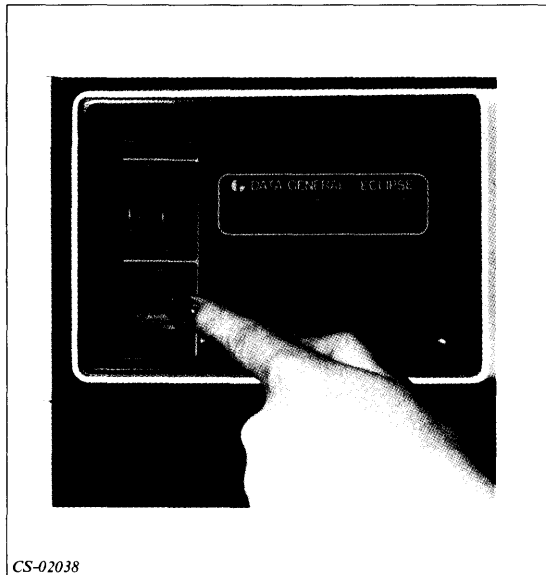
3. Press the CPU LOCK switch to LOCK, unless you want to cold start from magnetic tape.



CS-02037

Figure 3.18 Press CPU LOCK Switch

4. Turn the CPU power switch ON. The power lamp should light.



CS-02038

Figure 3.19 Turn CPU On

5. The system automatically runs power-up tests and then displays the message:

****POWER UP TESTING COMPLETED****

If this entire message does not appear, try again. UNLOCK switch, power OFF, LOCK switch, power ON. If this does not work, report the problem to your system manager.

Identify system disc by name and device code.

1. The system requests the name of each disc in the logical disc that holds AOS/VS. Your system manager will give you this information. In the example below, the unit name of the logical disc that holds AOS/VS is DPF0.

```
SPECIFY EACH DISC IN THE LDU
DISC UNIT NAME? DPF0 )
```

2. If the LOCK switch is in the unlock position, the computer now asks BOOT DEVICE? and you must specify the device code, e.g., 22 for magnetic tape. The device you specify must contain a file with the SCP operating system and microcode. If the switch is in the LOCK position, the system automatically boots from disc.
3. Next, the system requests the device code of the logical disc that holds AOS/VS. Unless your system manager instructs you to enter a nonstandard device code, select the default by pressing NEW LINE.

```
DEVICE CODE? )
```

Load microcode and SCP-OS.

1. The system requests the name of the file that contains microcode. Unless you want to load microcode from another file, press NEW LINE.

```
uCODE FILE [:MV6000.MCF]? )
```

2. The system presents the message below as it loads SCP-OS and ECLIPSE MV/6000 microcode. Loading takes little more than a minute. If you see an error message, press UNLOCK, power OFF, press LOCK, power ON to try again. If this does not work, see your system manager.

```
MV/6000 SYSTEM CONTROL PROGRAM REV 1.00
COPYRIGHT DATA GENERAL . . . .
CHECK-SUM OK
```

```
BEGIN SYSTEM INITIALIZATION
# OF 256 KB MEMORY MODULES - n*
END SYSTEM INITIALIZATION
```

```
LOADING MV/6000 MICROCODE REV - n*
```

* These numbers will vary from installation to installation.

Identify the location of AOS/VS on the system disc by pathname.

1. The system requests the location or pathname of AOS/VS on your system disc. Your system manager gave the location its name during system generation. Ask your system manager for the correct entry here. In the example below, the pathname is SYSGEN:SYS_1.40.

```
SYSTEM PATHNAME? SYSGEN:SYS_1.40 )
```

Load AOS/VS from disc to main memory.

1. After you enter the pathname of AOS/VS, the system automatically loads the system into main memory. The system then presents the revision number and the name of the master logical disc.

```
AOS/VS REV 1.00
MASTER LDU: DPFO
```

Initialize AOS/VS.

1. Next the system requests the date. Enter the date as two-digit numbers for month, day, and year. Separate each two-digit number by spaces or slashes. In the example below, the date, August 13, 1982, is entered as 08/13/82.

```
DATE (MM/DD/YY)?
08/13/82 )
```

2. Enter the time based on a 24-hour clock, in hours, minutes, and seconds. Minutes and seconds are optional. Use spaces or colons to separate each number pair. The example shows the time as 2:35 PM.

```
TIME (HH:MM:SS)? 14 35 )
```

3. Next the system asks if you wish to override the default specifications. The specifications are characteristics given to your system by your system manager during system generation. Unless otherwise instructed by your system manager, enter a NEW LINE for no override.

```
OVERRIDE DEFAULT SPECS [N]? )
```

4. After a pause, AOS/VS CLI comes up. A message showing the revision number of the CLI and the present date and time appears, followed by the CLI prompt, a right parenthesis. You may bring up the rest of the multiuser AOS/VS system by issuing the appropriate commands. Ask your system manager for the commands most appropriate for your system. Typically the commands are grouped into a file called an UP macro. With a macro you only need to enter its name, and all the commands within it are executed.

In the example below, the UP macro brings up a process called EXEC and enables the user consoles. EXEC is a process that allows many users to utilize the system. (See Module 11.) When a console is enabled, it is brought under the control of the operating system. Note that without the UP macro, the operator would have to issue a separate enable command for each console.

```
AOS/VS CLI REV 1.00 08/13/82 14:35
```

```
UP ↓
```

```
FROM PID 3: (EXEC) REV 01 00 READY
FROM PID 3: (EXEC) 14:35:00
FROM PID 3: (EXEC) ENABLED CONSOLE, @CON1
FROM PID 3: (EXEC) ENABLED CONSOLE, @CON2
FROM PID 3: (EXEC) ENABLED CONSOLE, @CON3
FROM PID 3: (EXEC) ENABLED CONSOLE, @CON4
FROM PID 3: (EXEC) ENABLED CONSOLE, @CON5
THE SYSTEM IS UP!
```

5. The system is now up and ready for use.

Directions

Now turn to the start-up procedures for warm start of ECLIPSE MV/8000 and ECLIPSE MV/6000 computers.

ECLIPSE MV/8000 and ECLIPSE MV/6000 Start-Up Procedures: Warm Start, CPU Running

You can warm start your system if AOS/VS was shut down normally and power to the CPU remained on. Since power to the CPU remained on, the microcode and SCP-OS still are in main memory and do not have to be reloaded.

Turn power on.

1. Press the switches on the disc drives to the ON, START, and WRITE ENABLE positions.

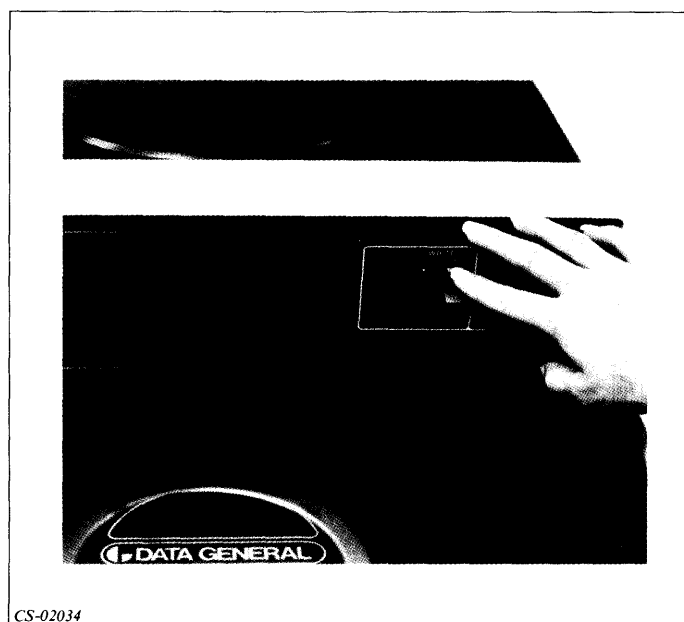


Figure 3.20 Turn Disc Drives On

Identify the system disc by name and device code.

1. Reset the controller by entering the command, **RESET**.

```
SCP-CLI> RESET ↵
```
2. Identify the device code of the device from which you want to bootstrap. In the example below, the system is booted from the disc with device code 27.

```
SCP-CLI> BOOT 27 ↵
```

3. The system requests the name of each disc in the logical disc that holds AOS/VS. Your system manager will give you this information. In the example below, the unit name of the logical disc that holds AOS/VS is DPF0.

```
SPECIFY EACH DISC IN THE LDU
DISC UNIT NAME? DPF0 )
```

4. Next the system requests the device code of the logical disc that holds AOS/VS. Unless your system manager instructs you to enter a nonstandard device code, select the default by pressing NEW LINE.

```
DEVICE CODE? )
```

5. For the ECLIPSE MV/6000 only, you are asked if you want to reinitialize the microcode and the SCP-OS. If you type Y, it asks for the SCP-OS/microcode filename which you must supply or press NEW LINE for the default value, no. Unless otherwise instructed by your system manager, press NEW LINE for the default no.

```
uCODE ALREADY LOADED.
DO YOU WANT TO REINITIALIZE IT? [N] )
```

Identify the location of AOS/VS on the system disc by pathname.

1. The system requests the location or pathname of AOS/VS on your system disc. Your system manager gave the location its name during system generation. Ask your system manager for the correct entry here. In this example, the pathname is SYSGEN:SYS_1.40.

```
SYSTEM PATHNAME? SYSGEN:SYS_1.40 )
```

Load AOS/VS from disc to main memory.

1. After you enter the pathname of AOS/VS, the system automatically loads the system into main memory. The system then presents the revision number and the name of the master logical disc.

```
AOS/VS REV 1.00
MASTER LDU: DPF0
```

Initialize AOS/VS.

1. Next the system requests the date. Enter the date as two-digit numbers for month, day, and year. Separate each two-digit number by spaces or slashes. In the example below, the date, August 13, 1982, is entered as 08/13/82.

```
DATE (MM/DD/YY)?
08/13/82 )
```

2. Enter the time based on a 24-hour clock, in hours, minutes and seconds. Minutes and seconds are optional. Use spaces or colons to separate each number pair. The example shows the time 2:35 PM.

```
TIME (HH:MM:SS)? 14 35 ↵
```

3. Next the system asks if you wish to override the default specifications. The specifications are characteristics given to your system by your system manager during system generation. Unless otherwise instructed by system manager, enter a NEW LINE for no override.

```
OVERRIDE DEFAULT SPECS [N]? ↵
```

4. After a pause AOS/VS CLI comes up. A message showing the revision number of the CLI and the present date and time appears, followed by the CLI prompt. You may bring up the rest of the multiuser AOS/VS by issuing the appropriate commands. Ask your system manager for the commands most appropriate for your system. Typically the commands are grouped into a file called an UP macro. With a macro, you only need to enter its name and all the commands within it are executed.

In the example below, the UP macro brings up a process called EXEC and enables the user consoles. EXEC is a process that allows many users to utilize the system. (See Module 11.) When a console is enabled, it is brought under the control of the operating system. Note that without the UP macro, the operator would have to issue a separate enable command for each console.

```
AOS/VS CLI REV 1.00 08/13/82 14:35  
UP ↵
```

```
FROM PID 3: (EXEC) Rev 01 00 READY  
FROM PID 3: (EXEC) 14:35:00  
FROM PID 3: (EXEC) ENABLED CONSOLE, @CON1  
FROM PID 3: (EXEC) ENABLED CONSOLE, @CON2  
FROM PID 3: (EXEC) ENABLED CONSOLE, @CON3  
FROM PID 3: (EXEC) ENABLED CONSOLE, @CON4  
FROM PID 3: (EXEC) ENABLED CONSOLE, @CON5  
THE SYSTEM IS UP!
```

5. The system is now up and ready for use.

Directions

When ready, restart the audiotape to learn the procedures for shutting down your system.

System Shutdown

- Normal shutdown — At end of shift, end of the day, for routine maintenance.
- Abnormal shutdown — See Module 13.

Shut-Down Procedures

1. Use the SEND command to warn users that the system will be shut down.
2. Type BYE from the top-level operator process to shut down the operating system. The system asks for verification. If you type NO, the shutdown is aborted and the CLI prompt reappears. If you type Y or YES, the operating system displays a shut-down message and shuts down. A sample dialog is shown below.

BYE)

DO YOU REALLY WANT TO SHUT THE SYSTEM DOWN? Y)

STARTING SYSTEM SHUTDOWN 08/13/82 15:00:00

SYSTEM SHUTDOWN

CPU HALTED

ACO	AC1	AC2	AC3	PC	C	MAP
000000	017640	022000	142170	055272	0	PHYS

SCP-CLI>

3. AOS/VS has shut down, and the main CPU has halted. The SCP-CLI has control. If the last AOS/VS message is **ABNORMAL SHUTDOWN**, see your system manager. Since the CPU power has not been turned off, you can boot AOS/VS using the warm-start procedure. To power down, press **POWER OFF** on an ECLIPSE MV/8000 or press the **LOCK** switch to **UNLOCK** and press **POWER OFF** on an ECLIPSE MV/6000. Note that powering down an ECLIPSE MV/6000 deletes the SCP error log.

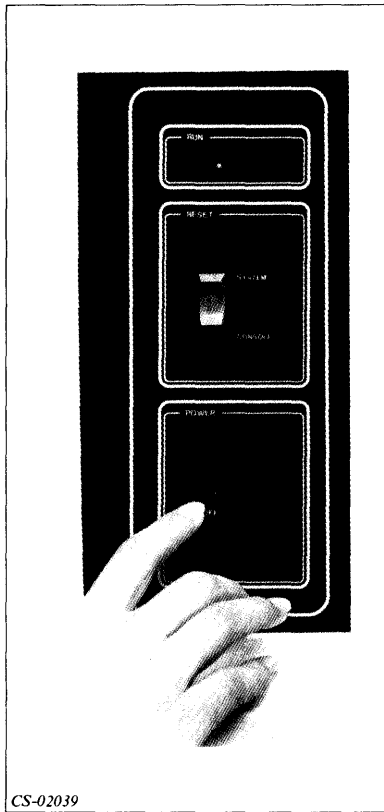


Figure 3.21 Power Off: ECLIPSE MV/8000

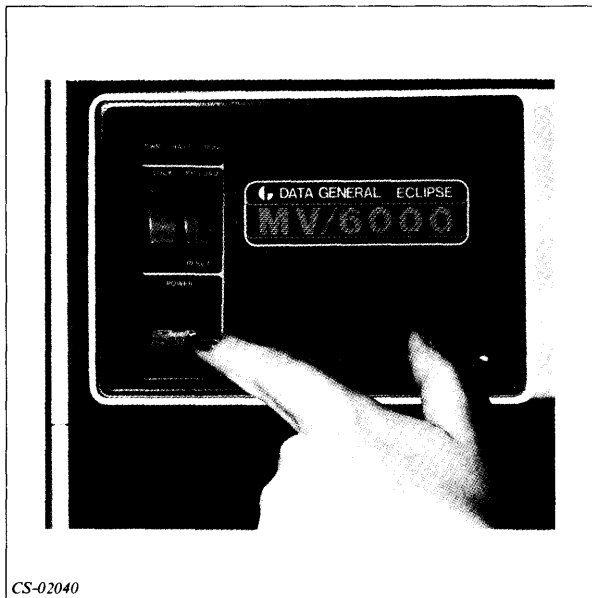


Figure 3.22 Power Off: ECLIPSE MV/6000

4. Your AOS/VS system is now shutdown. To restart, use the cold-start procedures.

Directions

The tables on the next few pages summarize the procedures you have just learned. Review these tables carefully. Then do the Segment B Exercise, which follows Table 3.D.

Summary: Start-Up and Shut-Down Procedures for ECLIPSE MV/Family Computers

Table 3.A ECLIPSE MV/8000 Start-Up Procedures: Cold Start, CPU Power Off

General Procedures	Device / Prompt	Operator's Response
Turn power on.	System console Disc drive Diskette drive Computer front panel	Press ON and ON-LINE switches. Press ON, START, and WRITE ENABLE switches. Insert diskette into diskette drive. Turn CPU power switch ON.
Load microcode and SCP-OS.	** CONSOLE READY ** MV/8000 SYSTEM CONTROL PROGRAM TYPE H <CR> FOR HELP COPYRIGHT DATA GENERAL . . . STARTING POWER UP SEQUENCE. ENTER DATE (MO DAY YEAR) TIME (HR MIN SEC)	If one or more power-up tests fail, the console shows a partial or no **CONSOLE READY** message. Turn the CPU power off and on again. If problem recurs, report it to your system manager. 08 13 82 }* 14:00:00 }*
Identify system disc by name and device code.	SCP-CLI> SCP-CLI> SPECIFY EACH DISC IN THE LDU DISC UNIT NAME? DEVICE CODE?	RESET } BOOT 27* } DPFO* } }
Identify the location of AOS/VS on the system disc by pathname.	SYSTEM PATHNAME?	SYSGEN:SYS_1.40* }
Load AOS/VS from disc to main memory.	AOS/VS REV 1.00 MASTER LDU: DPFO*	

Table 3.A ECLIPSE MV/8000 Start-Up Procedures: Cold Start, CPU Power Off (Cont.)

General Procedures	Device/Prompt	Operator's Response
Initialize AOS/VS.	DATE (MM/DD/YY)? TIME (HH:MM:SS)? OVERRIDE DEFAULT SPECS [IN]? AOS/VS CLI REV 1.00 08/13/82 14:35 FROM PID 3: (EXEC) REV 01.00 READY FROM PID 3: (EXEC) 14:35:00 FROM PID 3: (EXEC) ENABLED CONSOLE, @CON1 FROM PID 3: (EXEC) ENABLED CONSOLE, @CON2 FROM PID 3: (EXEC) ENABLED CONSOLE, @CON3 FROM PID 3: (EXEC) ENABLED CONSOLE, @CON4 FROM PID 3: (EXEC) ENABLED CONSOLE, @CON5 The system is UP!	08/13/82) 14:35)) UP*)

* These values are specific to this example. Values for your installation may differ.

Table 3.B Summary: ECLIPSE MV/6000 Start-Up Procedures: Cold Start, CPU, Power Off

General Procedures	Device / Prompt	Operator's Response
Turn power on.	System console Disc drive Computer front panel Computer front panel **POWER UP TESTING COMPLETED**	Press ON and ON-LINE switches. Press ON, START, and WRITE ENABLE switches. Press CPU LOCK switch to LOCK, unless you want to cold start from mag tape. Turn CPU switch ON. If this entire message does not appear, try again. Unlock switch, power OFF, LOCK switch, Power ON. If this does not work, report problem to your system manager.
Identify system disc by name and device code.	SPECIFY EACH DISC IN THE LDU	
Load microcode and SCP-OS.	DISC UNIT NAME? DEVICE CODE? u CODE FILE [.:MV6000.MCF]? MV/6000 SYSTEM CONTROL PROGRAM REV.1.00* COPYRIGHT DATA GENERAL... CHECK-SUM OK BEGIN SYSTEM INITIALIZATION # OF 256KB MEMORY MODULES - n* END SYSTEM INITIALIZATION LOADING MV/6000 MICROCODE REV-n*	DPFO*)) If you see an error message, press UNLOCK, power OFF, press LOCK, power ON to try again. If this does not work, see your system manager.
Identify the location of AOS/VS on the system disc by pathname.	SYSTEM PATHNAME?	SYSGEN:SYS_1.40*)
Load AOS/VS from disc to main memory.	AOS/VS REV 1.00* MASTER LDU: DPFO*	
Initialize AOS/VS.	DATE (MM/DD/YY)? TIME (HH:MM:SS)? OVERRIDE DEFAULT SPECS [N]? AOS/VS CLI REV 1.00 08/13/82 14:35 FROM PID 3: (EXEC) REV 01 00 READY FROM PID 3: (EXEC) 14:35:00 FROM PID 3: (EXEC) ENABLED CONSOLE, @CON1 FROM PID 3: (EXEC) ENABLED CONSOLE, @CON2 FROM PID 3: (EXEC) ENABLED CONSOLE, @CON3 FROM PID 3: (EXEC) ENABLED CONSOLE, @CON4 FROM PID 3: (EXEC) ENABLED CONSOLE, @CON5 THE SYSTEM IS UP!	08/13/82*) 14:35*)) UP*)

* These are values specific to this example. Values for your installation may differ.

Table 3.C ECLIPSE MV/8000, ECLIPSE MV/6000 Start-Up Procedures: Warm Start, CPU Running

General Procedures	Device/Prompt	Operator's Response
<p>Turn power on.</p> <p>Identify the system disc by name and device code.</p> <p>For ECLIPSE MV/6000 only.</p> <p>Identify location of AOS/VS on the system disc by pathname.</p> <p>Load AOS/VS from disc to main memory.</p> <p>Initialize AOS/VS.</p>	<p>Disc drives</p> <p>SCP-CLI></p> <p>SCP-CLI></p> <p>SPECIFY EACH DISC IN THE LDU</p> <p>DISC UNIT NAME?</p> <p>DEVICE CODE?</p> <p>u CODE ALREADY LOADED.</p> <p>DO YOU WANT TO REINITIALIZE IT? [N]</p> <p>SYSTEM PATHNAME?</p> <p>AOS/VS REV 1.00*</p> <p>MASTER LDU:DPFO*</p> <p>DATE (MM/DD/YY)?</p> <p>TIME (HH:MM:SS)?</p> <p>OVERRIDE DEFAULT SPECS [N]?</p> <p>AOS/VS CLI REV. 1.00 08/13/82 14:35</p> <p>FROM PID 3: (EXEC) REV 01 00 READY</p> <p>FROM PID 3: (EXEC) 14:35:00</p> <p>FROM PID 3: (EXEC) ENABLED CONSOLE. @CON1</p> <p>FROM PID 3: (EXEC) ENABLED CONSOLE. @CON2</p> <p>FROM PID 3: (EXEC) ENABLED CONSOLE. @CON3</p> <p>FROM PID 3: (EXEC) ENABLED CONSOLE. @CON4</p> <p>FROM PID 3: (EXEC) ENABLED CONSOLE. @CON5</p> <p>THE SYSTEM IS UP!</p>	<p>Press ON, START, and WRITE ENABLE</p> <p>RESET)</p> <p>BOOT 27)*</p> <p>DPFO*)</p> <p>)</p> <p>)</p> <p>SYSGEN:SYS_1.40*)</p> <p>08/13/82*)</p> <p>14:35*)</p> <p>)</p> <p>UP *)</p>

* These are values specific to this example. Values for your installation may differ.

Table 3.D ECLIPSE MV/8000, ECLIPSE MV/6000: Shut-Down Procedures

General Procedures	Device/Prompt	Operator's Response														
<p>Warn users of shut-down. Shut down AOS/VS.</p> <p>Turn CPU power off. ECLIPSE MV/8000 ECLIPSE MV/6000</p>	<p>)</p> <p>)</p> <p>DO YOU REALLY WANT TO SHUT THE SYSTEM DOWN? STARTING SYSTEM SHUTDOWN 08/13/82 15:00:00 SYSTEM SHUTDOWN CPU HALTED</p> <table border="1"> <tr> <td>AC0</td> <td>AC1</td> <td>AC2</td> <td>AC3</td> <td>PC</td> <td>C</td> <td>MAP</td> </tr> <tr> <td>000000</td> <td>017640</td> <td>022000</td> <td>142170</td> <td>055272</td> <td>0</td> <td>PHYS</td> </tr> </table> <p>SCP-CLI ></p> <p>Computer front panel Computer front panel</p>	AC0	AC1	AC2	AC3	PC	C	MAP	000000	017640	022000	142170	055272	0	PHYS	<p>Use SEND command to send warning.</p> <p>BYE) Must be done from top-level operator's process. Y)</p> <p>If last AOS/VS message is ABNORMAL SHUTDOWN, see your system manager.</p> <p>Since the CPU power has not been turned off, you can boot AOS/VS using the warm start procedure.</p> <p>Press POWER OFF switch. Press LOCK switch to unlock and press POWER OFF switch.</p>
AC0	AC1	AC2	AC3	PC	C	MAP										
000000	017640	022000	142170	055272	0	PHYS										

Directions

Now try the Segment B Exercise on the next page.

Segment B

Normal Startup and Shutdown

Exercise

Circle the letter of the correct answer.

1. A short program that allows you to simply execute several CLI commands is called a:
 - a. Macro.
 - b. Formatter.
 - c. Installer.
 - d. Instructor.
2. Following normal shutdown in which power to the CPU was turned off, a restart is called a:
 - a. Warm start.
 - b. Cold start.
 - c. Head start.
 - d. Installation.
3. The general procedures for normal startup of your computer do not include:
 - a. Turning power on.
 - b. Loading AOS/VS from disc to main memory.
 - c. Generating your system.
 - d. Initializing AOS/VS.
4. To warn users that you are going to shut down the system, you might use the command:
 - a. BYE.
 - b. SEND.
 - c. EXEC.
 - d. UP.

5. An example of a macro used to start up the system is:
 - a. UP.
 - b. BYE.
 - c. EXEC.
 - d. SEND.

Directions

Now check your answers with those on the next page.

Segment B

Normal Startup and Shutdown

Exercise Answers

1. a
2. b
3. c
4. b
5. a

Directions

If you answered all the questions in the segment exercise correctly, continue to the Module 3 Quiz on the next page.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Module 3

Quiz

Circle the letter of the correct answer.

1. During normal startup AOS/VS is loaded from _____ to _____.
 - a. Disc, tape.
 - b. Tape, disc.
 - c. Disc, main memory.
 - d. Main memory, disc.
2. Following normal shutdown in which power to the CPU remained on, a restart is called a:
 - a. Warm start
 - b. Cold start
 - c. Head start
 - d. Installation
3. In the normal startup of an AOS/VS computer, after you load AOS/VS from disc to main memory, you need to:
 - a. Load microcode.
 - b. Identify system disc by name and device code.
 - c. Identify the location of AOS/VS by pathname.
 - d. Initialize AOS/VS.
4. To start shutdown of AOS/VS during normal shutdown, you must enter the command _____ from the highest level operator process.
 - a. EXEC
 - b. STOP
 - c. BYE
 - d. CLI
5. When you terminate AOS/VS, control of the computer passes to:
 - a. AOS CLI.
 - b. EXEC.
 - c. SCP-CLI.
 - d. PID.

6. Which of the following is not a major step in initial installation?
 - a. Load SCP-OS.
 - b. Load AOS/VS.
 - c. Generate AOS/VS.
 - d. Load EXEC.
7. The SCP:
 - a. Serves as a soft console.
 - b. Performs diagnostic functions.
 - c. Maintains an error log.
 - d. All of the above.
8. In the space below, draw a diagram showing the basic components of an ECLIPSE MV/Family computer.

Directions

Now check your answers with those in Appendix A.

Module 4

Terminals

Introduction

This module discusses the basic components and operation of computer terminals. It covers the common characteristics of all terminals and describes the CRT terminal in detail. Cleaning and troubleshooting procedures for CRT terminals are also discussed. A practice exercise to familiarize you with your terminal is provided at the end of the module.

Module Objectives

Upon successful completion of this module, you should be able to:

1. Recognize the basic components of a CRT terminal.
2. Perform simple terminal operations, including:
 - a. Turning the terminal off and on.
 - b. Adjusting the brightness of the display.
 - c. Reading the baud rate and parity settings.
 - d. Using the DELETE, NEW LINE, and cursor control keys.
3. Recognize descriptions of baud rate and parity.
4. Select the appropriate steps for cleaning and troubleshooting your CRT terminal.

Resources

To complete this module, you need:

- Module 4 audiotape.
- Module 4 of your Student Guide.
- Audiotape playback unit.

Module Outline

Module 4 discusses the following topics:

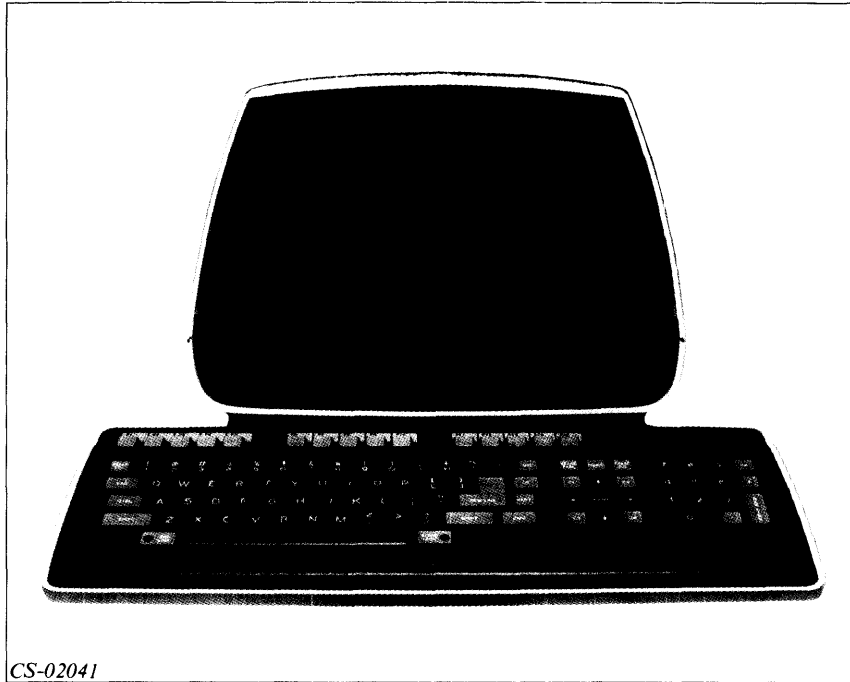
1. Terminals: Overview
 - a. Types of terminals
 - b. Terminal components
 - Keyboard
 - Cathode Ray Tube (CRT)
 - Terminal-computer interface
2. Terminal Operations
 - a. Data communication
 - Transmission speed
 - Parity
 - b. Terminal maintenance
 - Placement
 - Cleaning
 - c. Troubleshooting

Directions

Now start the Module 4 audiotape. As you listen, follow along in Module 4 of your Student Guide.

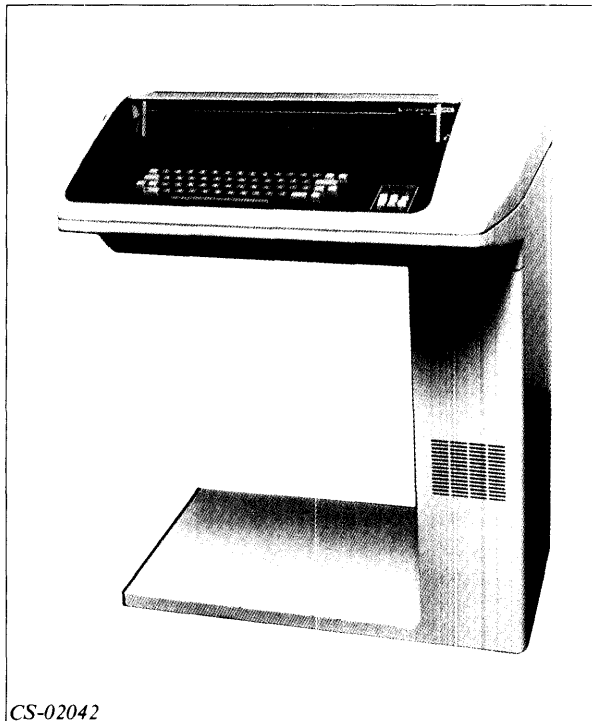
Segment A Terminals: Overview

Types of Terminals



CS-02041

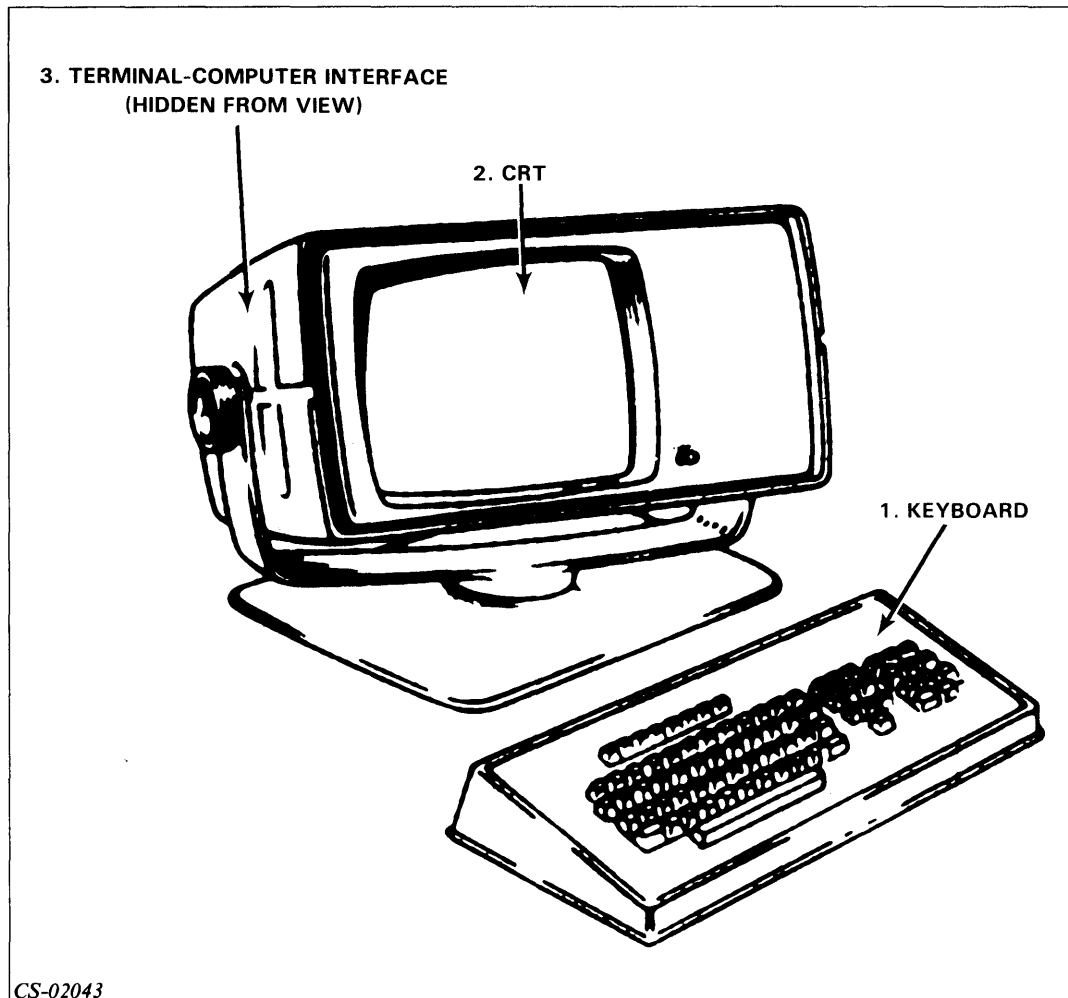
Figure 4.1 CRT Terminal



CS-02042

Figure 4.2 Hard-copy Terminal (KSR Printer)

Terminal Components



CS-02043

Figure 4.3 CRT Terminal

- Keyboard
- CRT = Cathode Ray Tube = Screen = Tube = VDU = Visual Display Unit
- Terminal-computer interface:
 - Terminal interface
 - Communications cable
 - Multiplexor

Keyboard

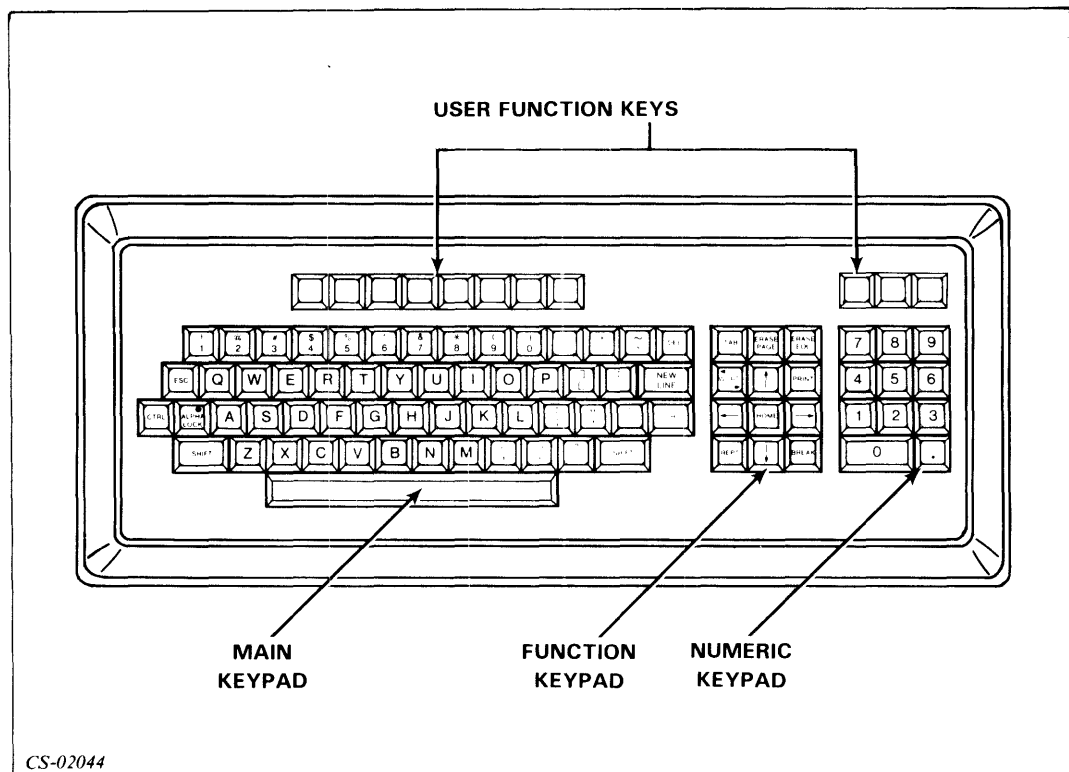


Figure 4.4 Terminal Keyboard

- Key arrangement — Location designated for each key
- Main keypad — Typewriter keys
- Numeric keypad — Numeric data entry
- Function keypad — Screen management and cursor control
- User function keys — User-defined control functions

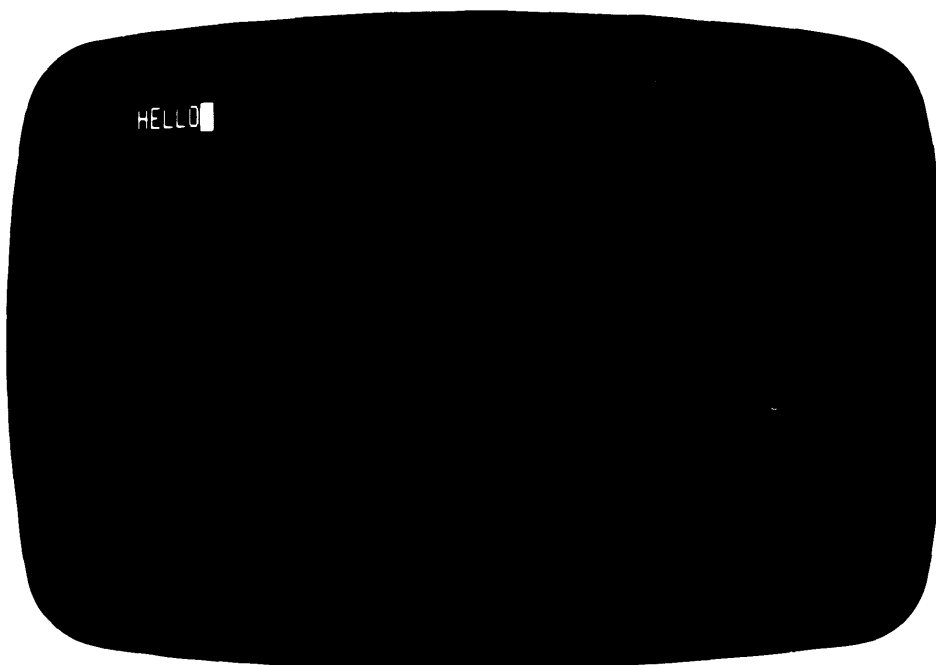


Figure 4.5 Cursor

Cathode Ray Tube (CRT)

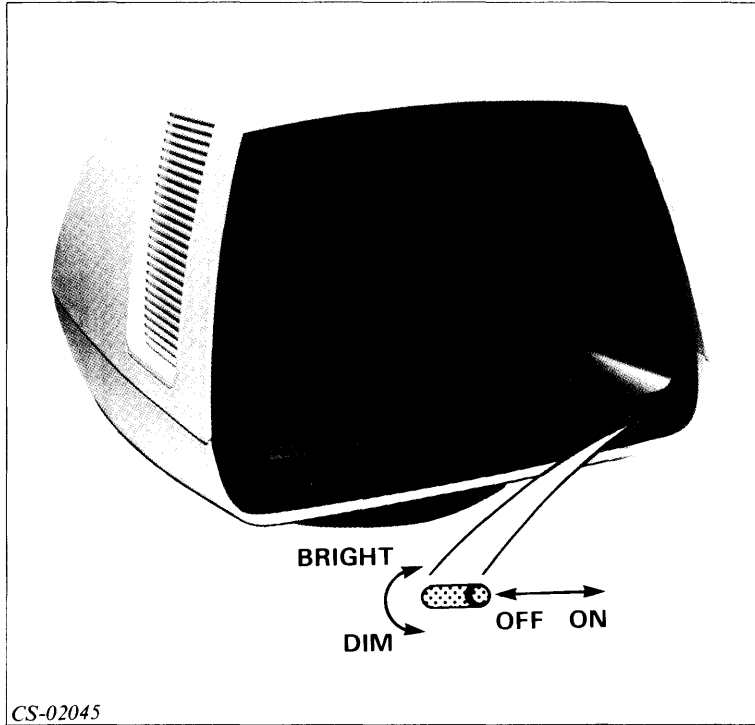


Figure 4.6 CRT Terminal with ON/OFF Switch

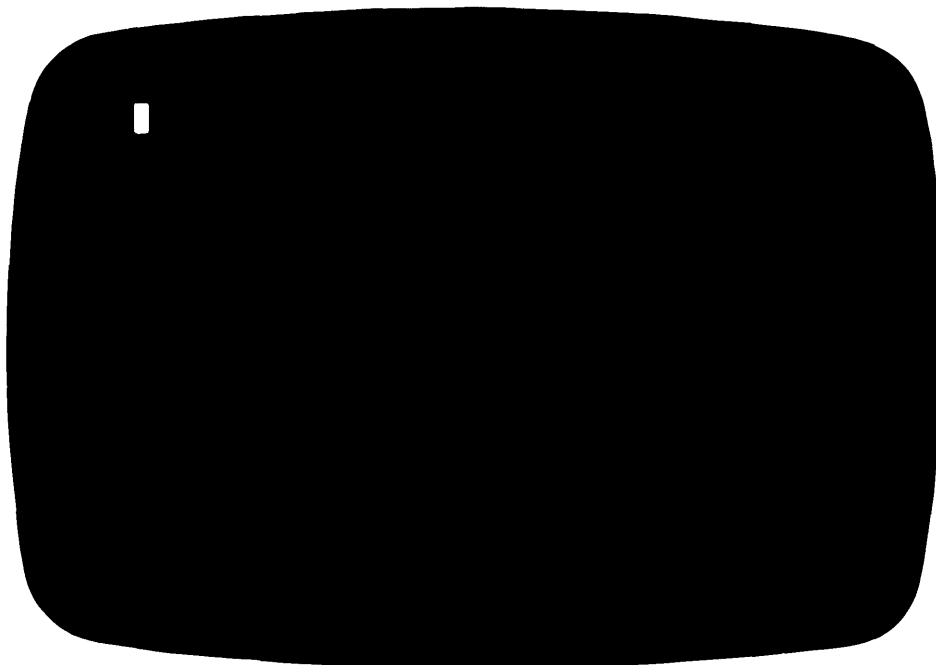


Figure 4.7 CRT Terminal: Power Up

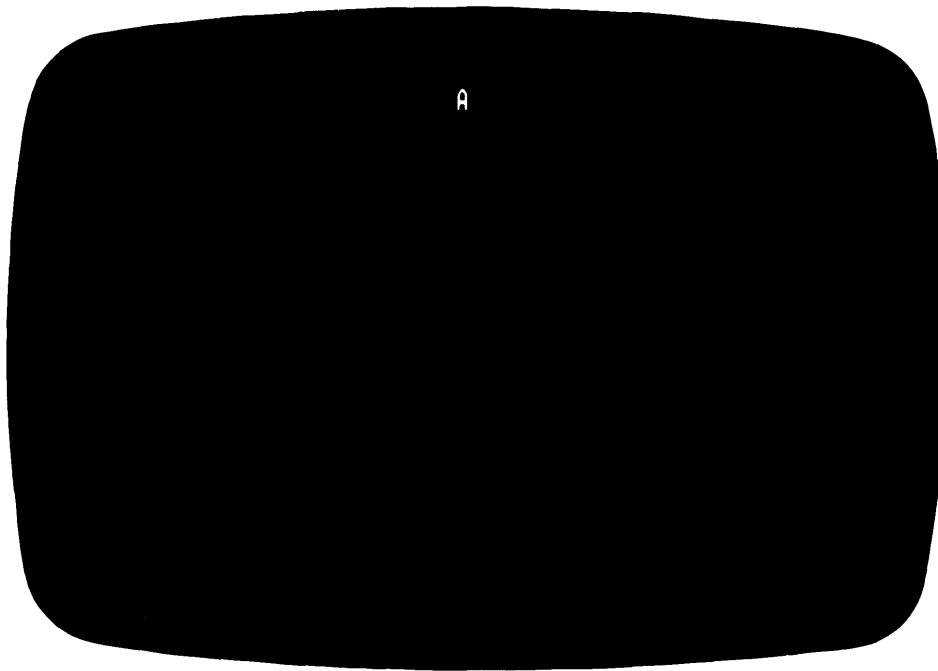
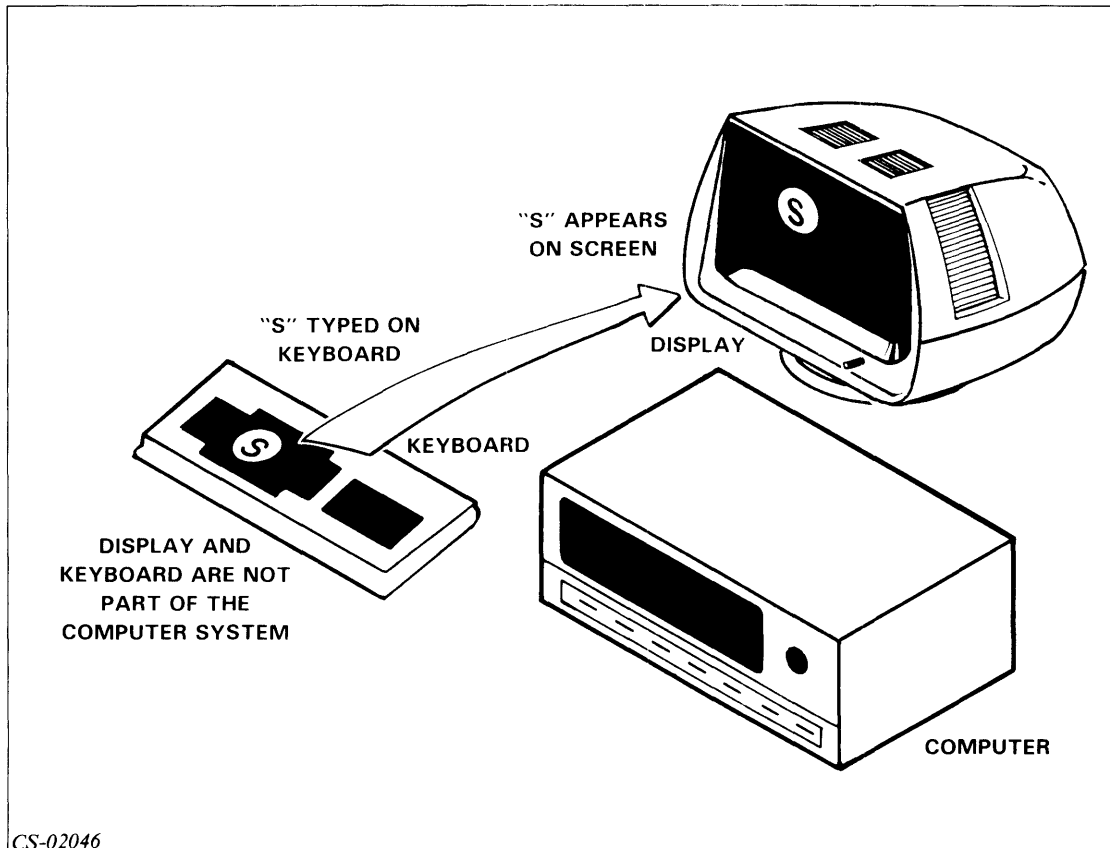
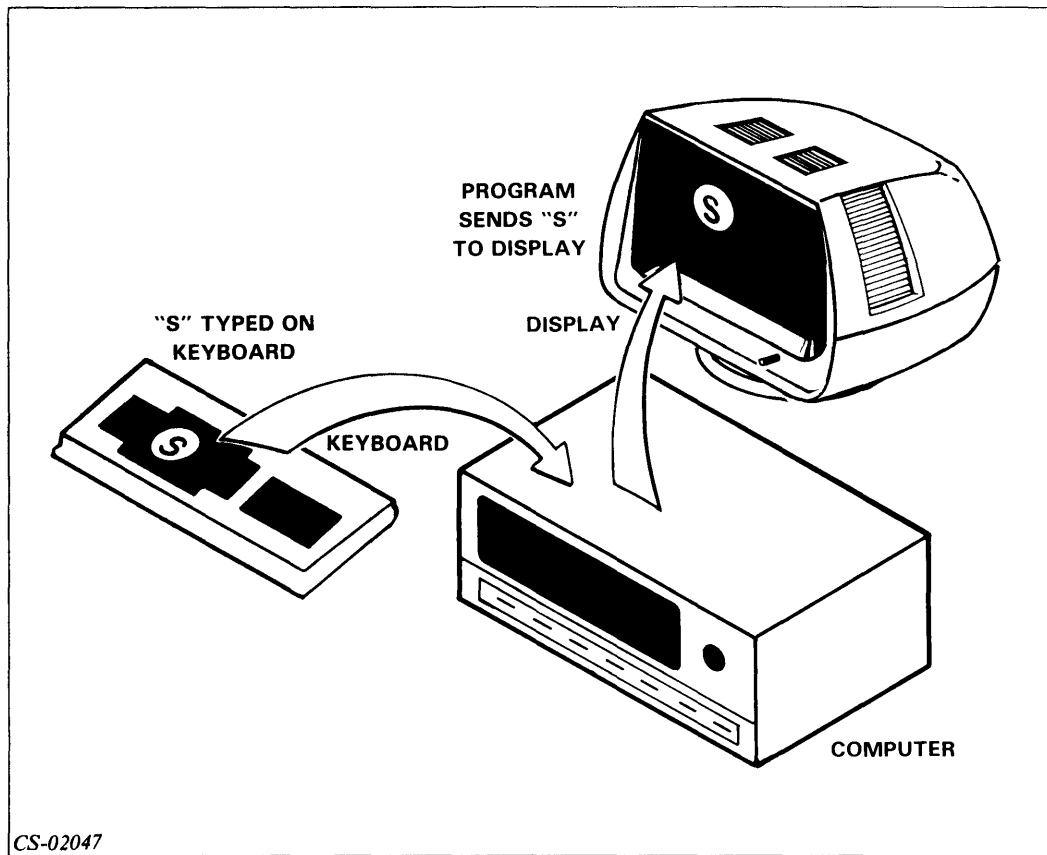


Figure 4.8 CRT Display Malfunction



CS-02046

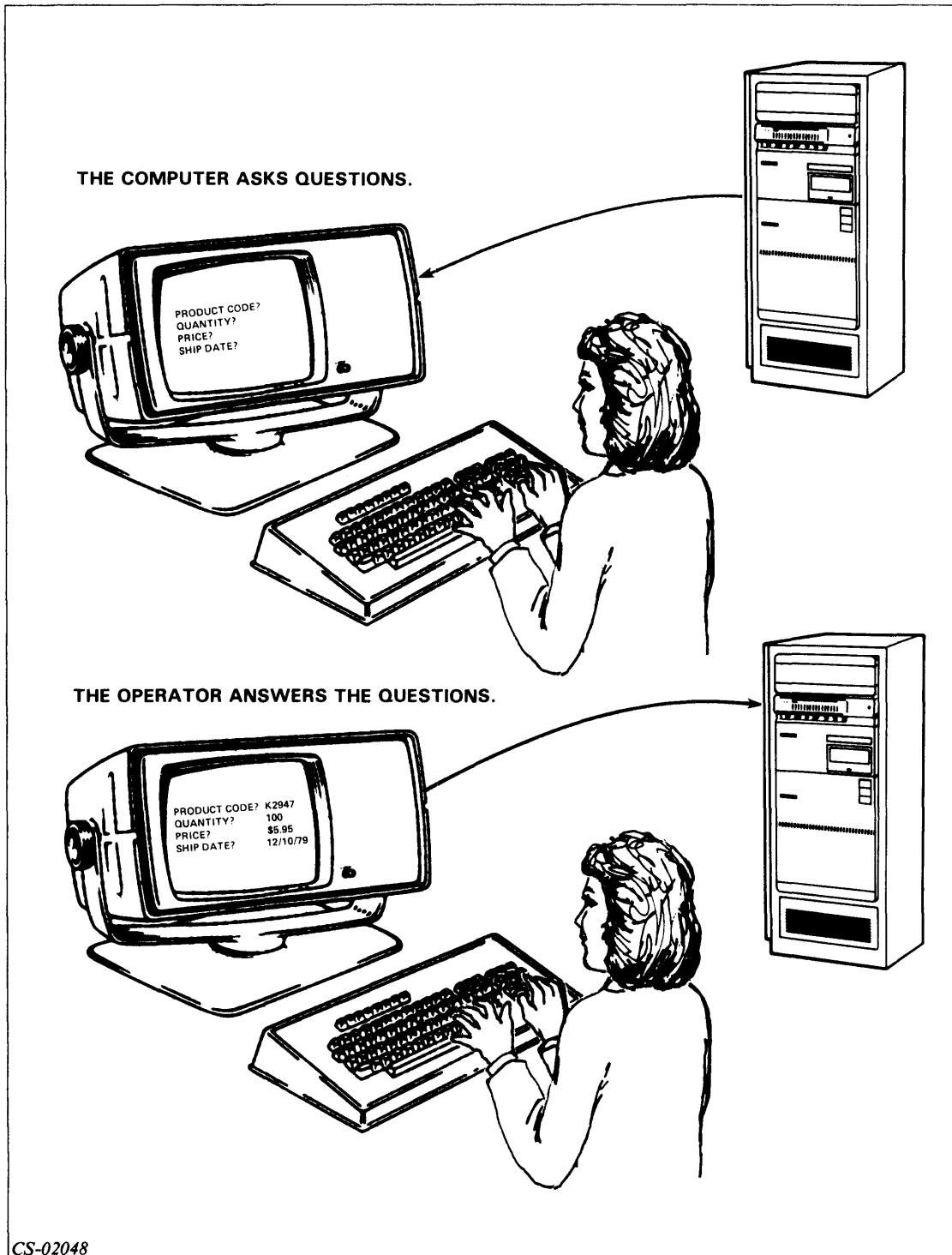
Figure 4.9 Off-Line Operation



CS-02047

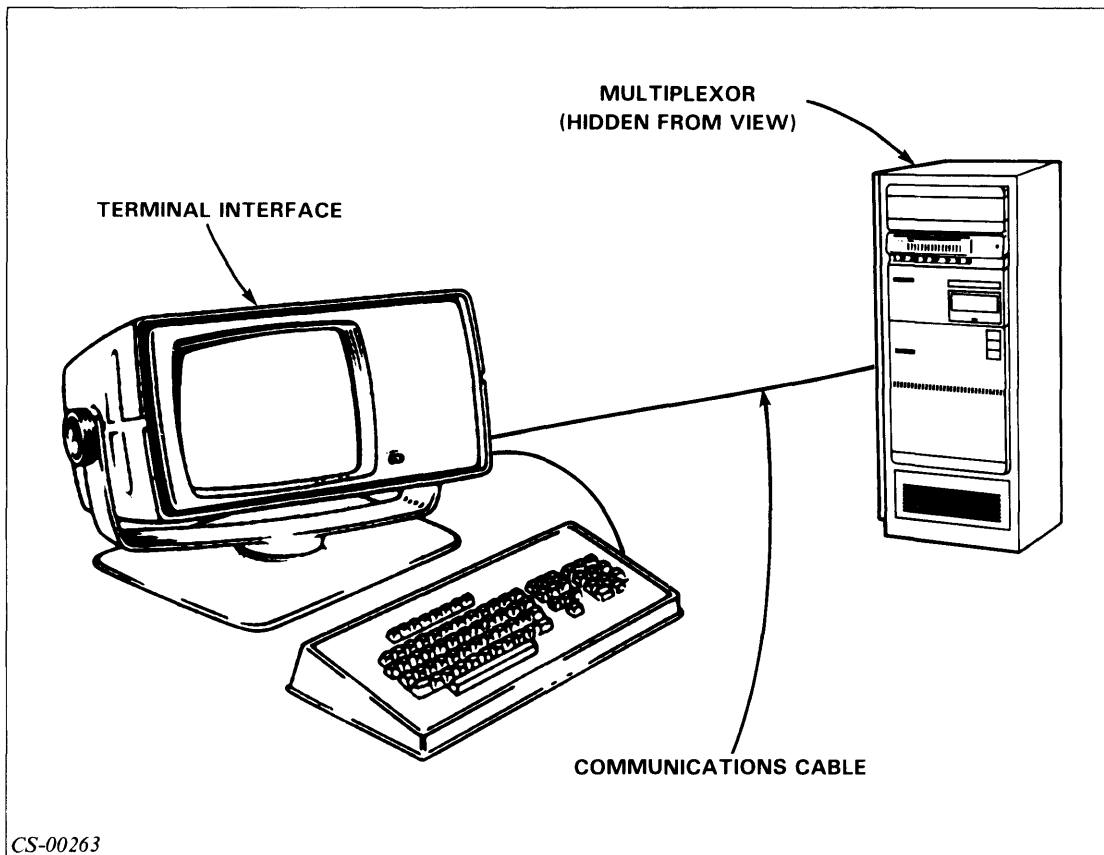
Figure 4.10 On-Line Operation

Terminal-Computer Interface



CS-02048

Figure 4.11 Terminal-Computer Interface



CS-00263

Figure 4.12 Components of the Terminal-Computer Interface

- Terminal interface — Internal terminal component that sends or receives data.
- Communications cable — Physical data path between terminal and computer.
- Multiplexor — Control device inside computer that enables processor to be connected to a number of incoming and outgoing lines.

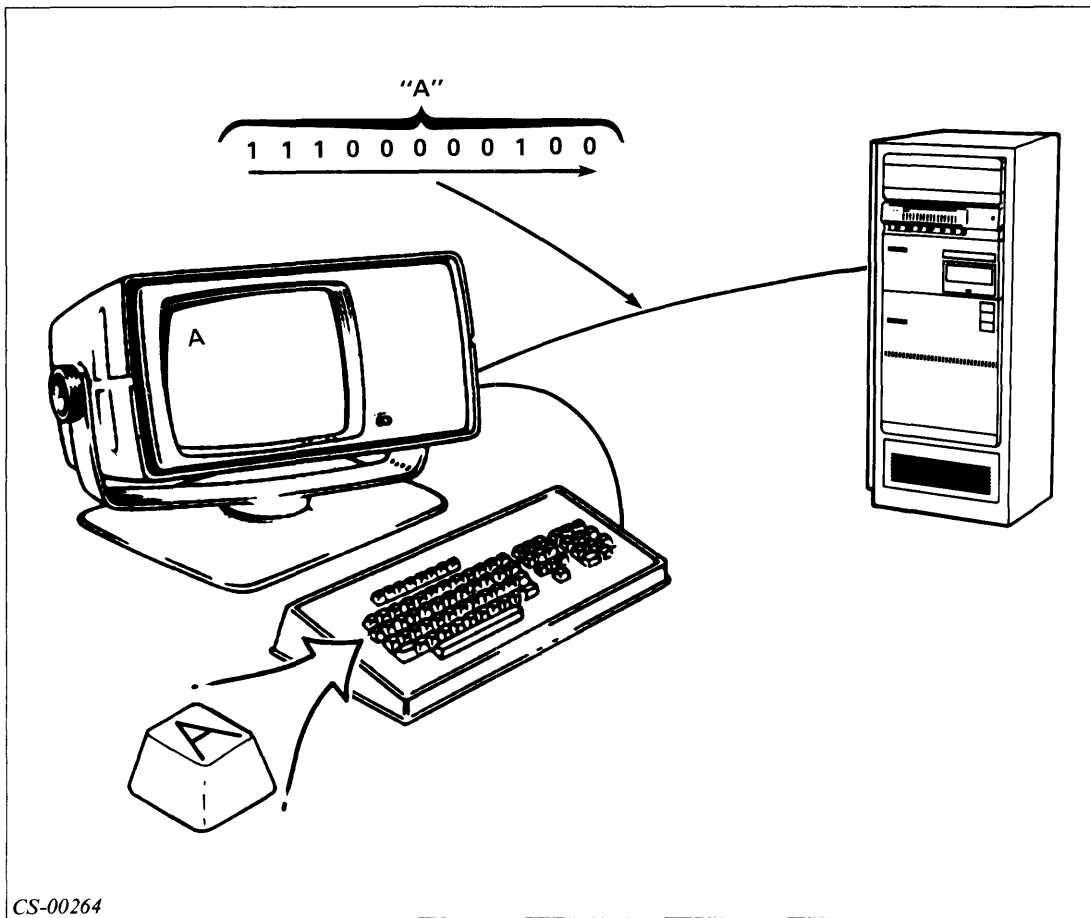


Figure 4.13 The Role of the Communications Cable

Directions

Now do the Segment A Exercise on the next page.

Segment A

Terminals: Overview

Exercise

Circle the letter of the correct answer.

1. Which of the following is not a component of a CRT terminal?
 - a. Interface
 - b. Cathode Ray Tube
 - c. CPU
 - d. Keyboard
2. When a CRT terminal is off-line, data entered on the keyboard:
 - a. Is displayed on the screen only.
 - b. Is sent to the computer and displayed on the screen.
 - c. Is sent to the computer and displayed on the screen, if there is a program to do so.
 - d. Has no effect.
3. The prompt that indicates where your next entry will be on the screen is called a:
 - a. CRT.
 - b. Cursor.
 - c. Keypad.
 - d. VDU.
4. A terminal that produces a physical printout is called a:
 - a. VDU terminal.
 - b. CRT terminal.
 - c. Hard-copy terminal.
 - d. Tube terminal.

5. If, when you turn on your terminal, it beeps and displays a letter at the top center of the screen:
 - a. The terminal is ready for operation.
 - b. The terminal's diagnostic has detected a problem.
 - c. The terminal has not warmed up yet.
 - d. You turned on the wrong button.

Directions

Now check your answers with those on the next page.

Segment A

Terminals: Overview

Exercise Answers

1. c
2. a
3. b
4. c
5. b

Directions

If you answered all the questions in the segment exercise correctly, restart the Module 4 audiotape to continue.

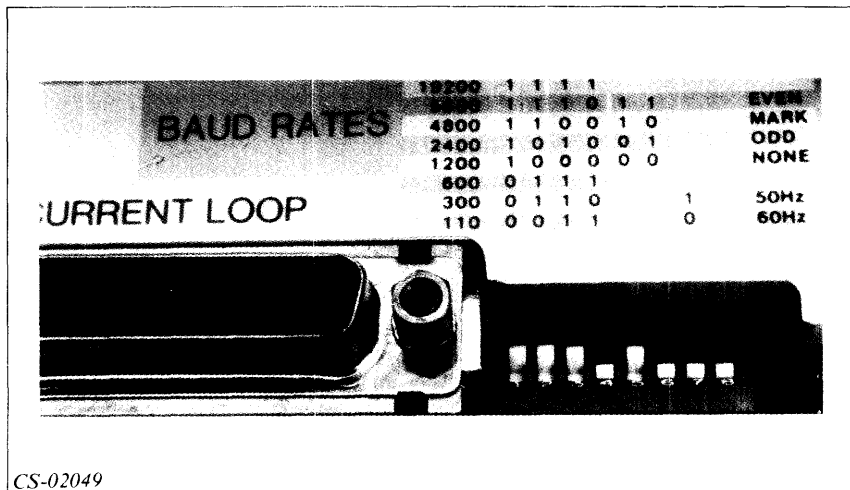
If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Segment B Terminal Operations

Data Communications

Transmission Speed

- BPS (Bits Per Second) — Bit rate to or from terminal in one second.
- Baud — Communications line signaling rate. Usually one bps = one baud.
- Line speeds:
 - Teletypewriters — 110 baud
 - 30 cps terminals — 300 baud
 - Video Display Terminals — Up to 9600 baud

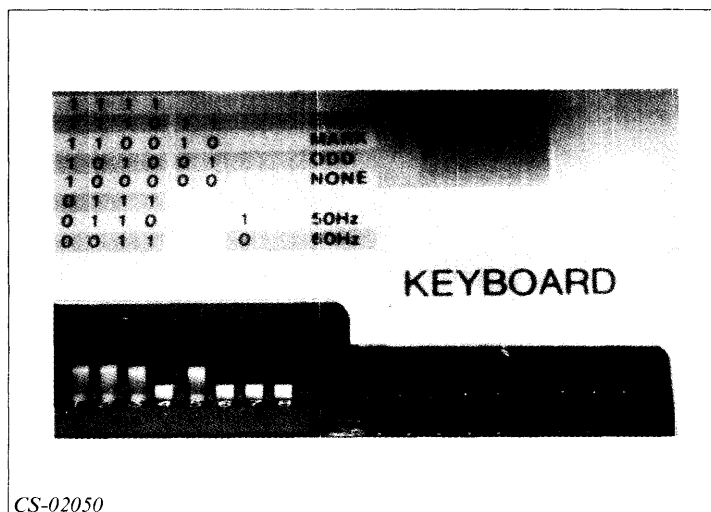


CS-02049

Figure 4.14 Baud Rate Switch

Parity

- Data communication error check.



CS-02050

Figure 4.15 Parity Switch

Terminal Maintenance

Placement

- Place terminal so that it will not easily be jostled or knocked over.
- Place cables and power lines so that they are:
 - Free of tension.
 - Not likely to be stepped on.
 - Not likely to be tripped over.
- Do not cover the ventilation slots on top of the terminal.

Cleaning

- Turn off and unplug terminal.
- Wipe the external surfaces of the keyboard and display with a soft, dry, lint-free cloth.
- If necessary, dampen your cleaning cloth with a mild detergent solution and rinse with a soft cloth dampened with water; then dry.
- Do not use solvents, such as alcohol or freon, on the plastic surfaces.
- Before plugging in the terminal and turning power on, be sure all surfaces are completely dry.

Troubleshooting

Table 4.A Terminal Troubleshooting

Symptom	Troubleshooting Sequence
Display screen is blank.	<p>Check ON-OFF switch to see if it is on.</p> <p>Check brightness control to see if display is bright enough to be seen.</p> <p>Check communications cable and power line for bad connections.</p> <p>If computer is on-line, check for display interrupt by CLI command. (The interrupt command is explained in Module 8.) Undo interrupt by pressing the control key (CTRL), and while holding it down, pressing Q.</p> <p>Call system manager.</p>
Bell rings and a character signal is displayed in the top center of the display screen.	<p>Call system manager. The character is a sign of a display malfunction.</p>
Display is frozen with the cursor still on the screen. The ON-LINE light is on.	<p>Check communications cable to computer for bad connections.</p> <p>Check for system crash. (Explained in Module 13.)</p> <p>Check for display interrupt by CLI command. (The interrupt command is explained in Module 8.) Undo interrupt by pressing the control key (CTRL), and while holding it down, pressing Q.</p> <p>Call system manager.</p>
Display responses are garbled.	<p>Check baud rate and parity switches for proper settings.</p> <p>Call system manager.</p>

Directions

Now try the Segment B Exercise on the next page.

Segment B

Terminal Operations

Exercise

Circle the letter of the correct answer.

1. The signaling rate of a communications line is measured by:
 - a. Entry rate.
 - b. Parity.
 - c. Baud rate.
 - d. Capacity.
2. BPS refers to:
 - a. Bits per system.
 - b. Bits per second.
 - c. Bauds per second.
 - d. Bauds per switch.
3. Parity is:
 - a. A measure of transmission speed.
 - b. Equivalent to baud rate.
 - c. Measured in bits per second.
 - d. A means of checking errors in transmission.
4. The first step in cleaning your terminal is to:
 - a. Wipe the external surfaces of the keyboard.
 - b. Unplug the terminal.
 - c. Wipe the display.
 - d. Dust the cables.

Directions

Now check your answers with those on the next page.

Segment B

Terminal Operations

Exercise Answers

1. c
2. b
3. d
4. b

Directions

If you answered all the questions in the segment exercise correctly, continue to Lab Activity 4-1 on the next page.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Lab Activity 4-1

This lab activity is designed to familiarize you with your CRT terminal. It is designed for a Data General Corporation DASHER® D200 terminal; the operation of your terminal may differ.

Complete each step below. If you have any difficulty, review Module 4, check your operator's manual, or see your system manager.

1. Identify the screen, the keyboard, the power line, and the communications cable for your terminal.
2. Look at the back of the terminal and find the baud rate and parity switches for your terminal. Read the baud rate and parity settings. Check your operator's manual or check with your system manager to see if the settings are correct.
3. Find the ON-OFF knob. Pull the knob to the ON position. Wait for the cursor to appear in the upper-left corner of the screen. It should take about 10 seconds to appear. If it does not appear, check for problems, using Table 4.A.
4. Observe the cursor as you turn the brightness knob all the way in one direction, and then all the way in the other direction. After you have seen the effect of the brightness knob operation, adjust the brightness to your liking.
5. Check the ON-LINE light. Turn it off-line. On most terminals this is done by pressing the command key (CMD), and while holding it down, pressing the ON-LINE key. You use the same procedure to put your terminal back on-line.
6. With the terminal off-line, type in your name and address. Use the NEW LINE or RETURN key to move to the beginning of the next line. Use the SHIFT key for upper-case characters.
7. Press ALPHA LOCK. This key is similar to a shift-lock on a typewriter. The terminal will now print only upper-case letters. Type in your name and address again.
8. Find the cursor control keys. They are marked with arrows and move the cursor in the direction of the arrow. Move the cursor to the bottom right corner of the screen using the cursor control keys. Then move the cursor to the left side of the screen, two lines below your address.
9. Type in the message **GOOD BYW**. Change the incorrect letter, W, by moving the cursor over the letter W, using your cursor control keys. Then enter the correct letter, E. Remember, when your terminal is on-line, you can erase the character before the cursor by pressing DEL.
10. Turn your terminal off by pressing the ON-OFF knob.

Directions

If you completed the lab successfully and feel that you fully understand it, continue to the Module 4 Quiz on the next page.

If you had any problems or did not understand the procedures you just performed, go back and review the segment; then try the lab again.

Module 4 Quiz

Circle the letter of the correct answer.

1. What marks the screen location where the next character will be displayed?
 - a. Audible beep
 - b. Parity switch
 - c. Cursor
 - d. VDU
2. The device that displays visual characters is a:
 - a. Controller.
 - b. CRT.
 - c. Baud rate switch.
 - d. Interface.
3. Which of the following is not part of the terminal computer interface?
 - a. Terminal interface
 - b. Communications cable
 - c. Multiplexor
 - d. Keyboard
4. The user can converse with the computer when the terminal is:
 - a. On-line.
 - b. Off-line.
 - c. Intelligent.
 - d. Multiplexed.
5. Baud rate or transmission speed is usually measured in:
 - a. CPS.
 - b. Lines/min.
 - c. MPH.
 - d. BPS.

6. Accuracy of transmitted data is usually checked through:
 - a. Parity.
 - b. Baud rate.
 - c. Multiplexion
 - d. Redundacy
7. A measure of the speed with which data is transmitted is given by:
 - a. Parity.
 - b. Redundancy.
 - c. Baud rate.
 - d. Multiplexion.

Use the information in Segment B to answer Questions 8 through 10.

8. If the responses to your input are garbled, you should:
 - a. Check the brightness switch.
 - b. Check the power line.
 - c. Press the CTRL key and the Q key.
 - d. Check the baud rate and the parity switches.
9. When cleaning your terminal with a damp cloth, the first step should be to:
 - a. Clean the screen.
 - b. Clean the parity switches.
 - c. Unplug the terminal.
 - d. Turn the brightness down.
10. If the display screen of your CRT terminal is blank, you should:
 - a. Check the ON-OFF switch to see if it is on.
 - b. Check the brightness control to see if it is set too dim.
 - c. Check the cables and power line for bad connections.
 - d. All of the above.

Directions

Now check your answers with those in Appendix A.

Module 5

Printers

Introduction

Module 5 discusses the characteristics and operating procedures for printers. The discussion includes the operator's controls, routine operating procedures, routine maintenance, and troubleshooting.

Module Objectives

Upon successful completion of this module, you should be able to:

1. Identify the operator's controls for a typical line printer or DASHER® printer.
2. Perform routine operating procedures, including:
 - a. Powering up the printer and putting it on-line.
 - b. Removing the printout.
 - c. Shutting down the printer.
 - d. Installing the paper.
 - e. Changing the ribbon.
 - f. Routine upkeep.
 - g. Correcting problems.

Resources

To complete this module, you need:

- Module 5 audiotape.
- Module 5 of your Student Guide.
- Audiotape playback unit.
- Operator's manual for your printer.

Module Outline

Module 5 discusses the following topics:

1. Introduction to Printers
 - a. Input-output capabilities
 - b. Printer characteristics
 - c. Types of printers
2. Line Printers
 - a. Overview
 - b. Operator controls
 - Control panel
 - Internal controls
 - c. Operating procedures
3. Character printers
 - a. Overview
 - b. Operator controls
 - c. Operating procedures

Directions

Now start the Module 5 audiotape. As you listen, follow along in Module 5 of your Student Guide.

Segment A

Introduction to Printers

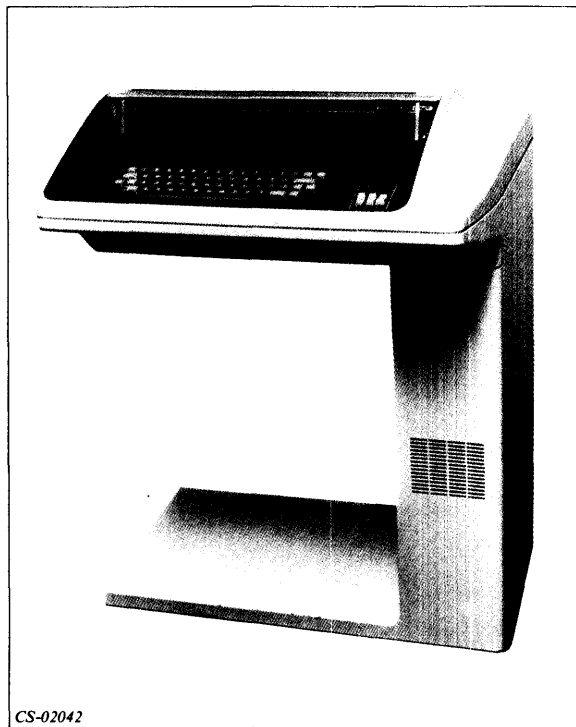
Input-Output Capabilities

Output-Only Printers

- Receive information only.
- Hard-copy of computer output.

Input-Output Printers

- Receive and send information.
- Also called printing terminals, Keyboard-Send-Receive (KSR) terminals, or hard-copy terminals.



CS-02042

Figure 5.1 Input-Output Printer (KSR Terminal)

Printer Characteristics

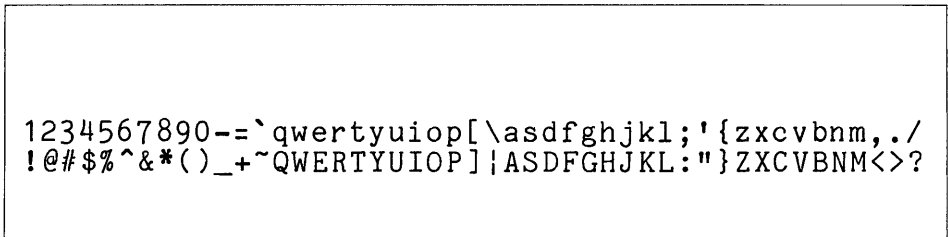


Figure 5.2 Character Set

Character Set

- Typewriter characters plus special characters
- Number — Typically between 64 and 136 characters
- Font — Typeface style
- Size — Height of character

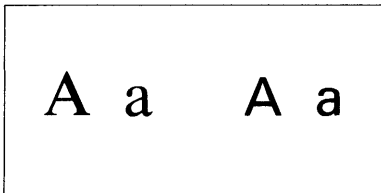


Figure 5.3 Different Fonts

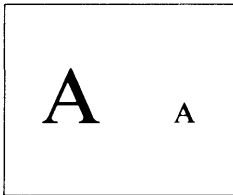


Figure 5.4 Different
Character Sizes

Print Rate

- Speed of printing
- Characters Per Second (CPS) for slow printers
- Lines per minutes for high-speed printers

Methods of Printing

- Impact — Character stamped on paper
- Nonimpact — Character drawn on paper by noncontact device

Maximum Characters per Line

- Typical values — 40 to 136 characters per line

Vertical Line Spacing

- Measured in lines per inch
- Typical values — six to eight lines per inch

Paper Characteristics

- Constant or variable width

Methods of Paper Advance

- Friction feed
- Tractor feed

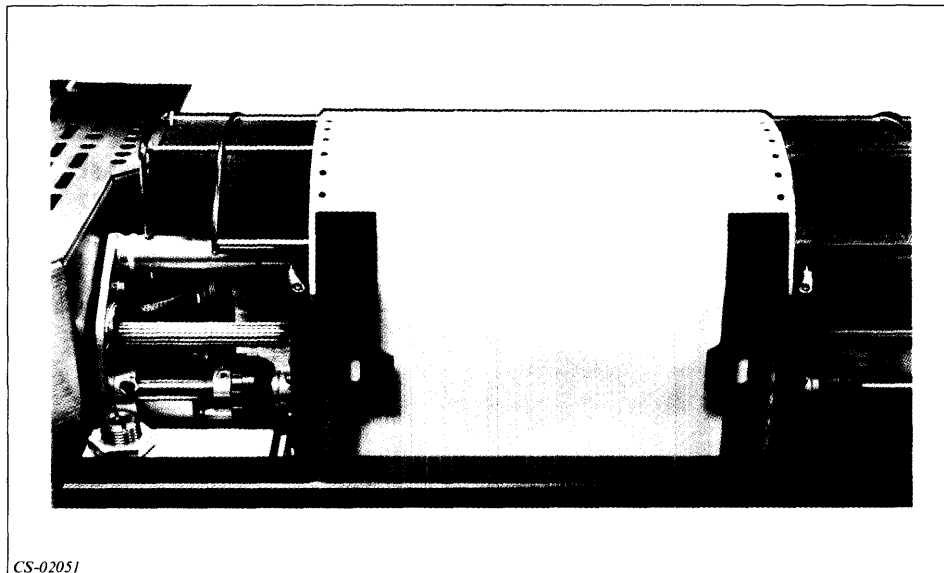


Figure 5.5 Tractor-Feed Printer

Types of Printers

- Character printer
- Line printer

Directions

Now try the Segment A Exercise on the next page.

Segment A

Introduction to Printers

Exercise

Circle the letter of the correct answer.

1. CPS refers to:
 - a. Paper width.
 - b. Character print rate.
 - c. Characters in a line.
 - d. Paper characteristics.
2. A terminal that receives and sends information is called a:
 - a. KSR terminal.
 - b. Hard-copy terminal.
 - c. Printing terminal.
 - d. All of the above.
3. A printer that draws a character without touching the paper is called a:
 - a. Line printer.
 - b. CRT terminal.
 - c. Nonimpact printer.
 - d. All of the above.
4. Tractor feed refers to:
 - a. A method for advancing paper.
 - b. Speed of printing.
 - c. Font size.
 - d. Vertical line spacing.

5. Printers that print a line at a time are called:
- a. Line terminals.
 - b. Character printers.
 - c. Line printers.
 - d. All of the above.

Directions

Now check your answers with those on the next page.

Segment A

Introduction to Printers

Exercise Answers

1. b
2. d
3. c
4. a
5. c

Directions

If you answered all the questions in the segment exercise correctly, and your installation has a line printer, restart the audiotape to continue.

If you answered all the questions in the segment exercise correctly, and your installation has a character printer only, omit Segment B of this module, and go to Segment C of your Student Guide. Restart the audiotape at Segment C.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Segment B Line Printers

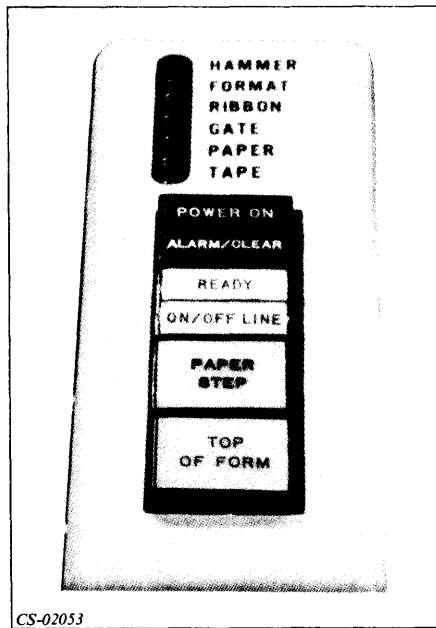
Overview



Figure 5.6 Model 4215 Line Printer

Model 4215

- 64 different printable characters.
- Prints 600 lines per minute.
- Impact printer.
- 136 characters per line.
- Vertical line spacing of six or eight lines per inch.
- Tractor-feed printer.
- Nylon or silk ink-roll ribbon.



CS-02053

Figure 5.7 Line Printer Control Panel
(Model 4215)

Operator Controls

Control Panel

POWER ON Indicator

- Lights up when power is on.

ALARM/CLEAR Indicator

- Lights up when a problem exists.
- After correcting problem, press to clear indicator.

READY Indicator

- Indicates power is on, no fault exists, and the printer is ready to be placed on-line.
- If both READY and ALARM/CLEAR indicators are lit, internal Print Inhibit switch is on, signaling a problem. Notify system manager.

ON/OFF LINE Indicator

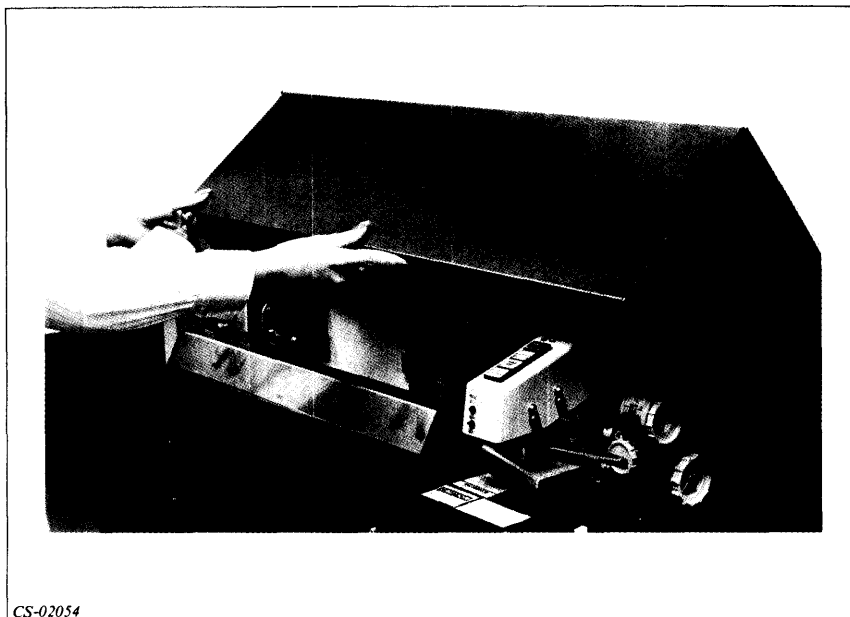
- Press to change mode of operation.
- Lit when on-line.
- Not lit when off-line.

PAPER STEP Button

- Press to advance paper one line.
- Works only when printer is off-line.

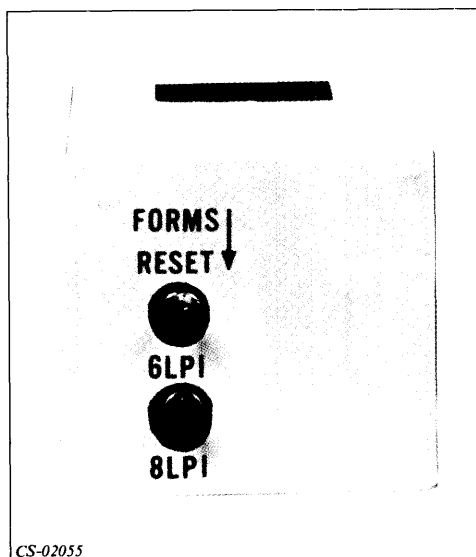
TOP OF FORM Button

- Press to advance paper to the first printing line on next form.
- Works only when printer is off-line.



CS-02054

Figure 5.8 Lifting Cover



CS-02055

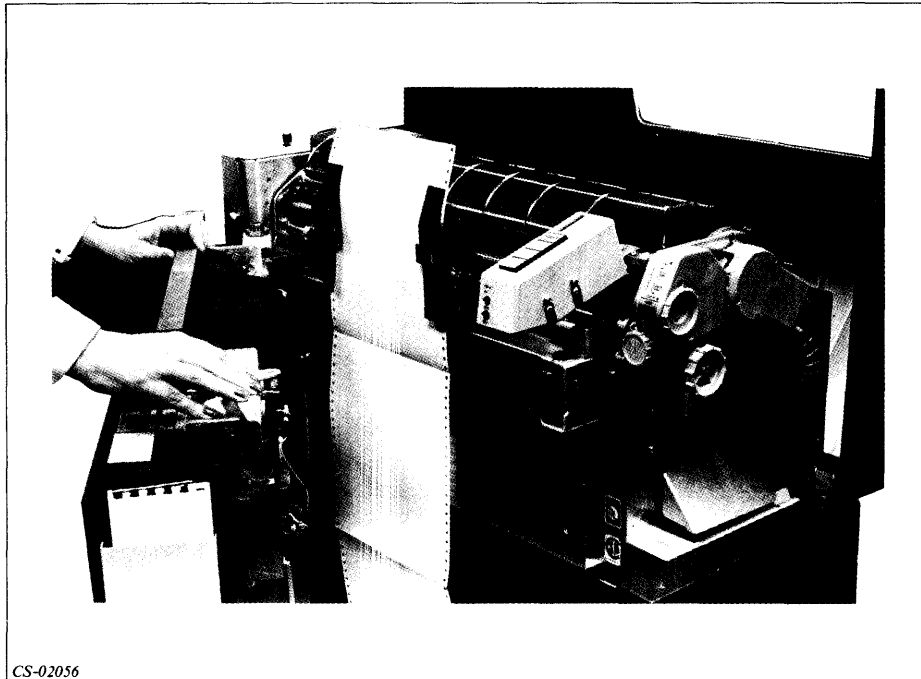
Figure 5.9 FORMS RESET and 6/8 LPI Switches

FORMS RESET Switch

- Press to manually override paper feeding system.
- Used for form positioning.

6/8 LPI Switch

- Used to select either six or eight lines per inch printing.



CS-02056

Figure 5. 10 Opening Drum Gate

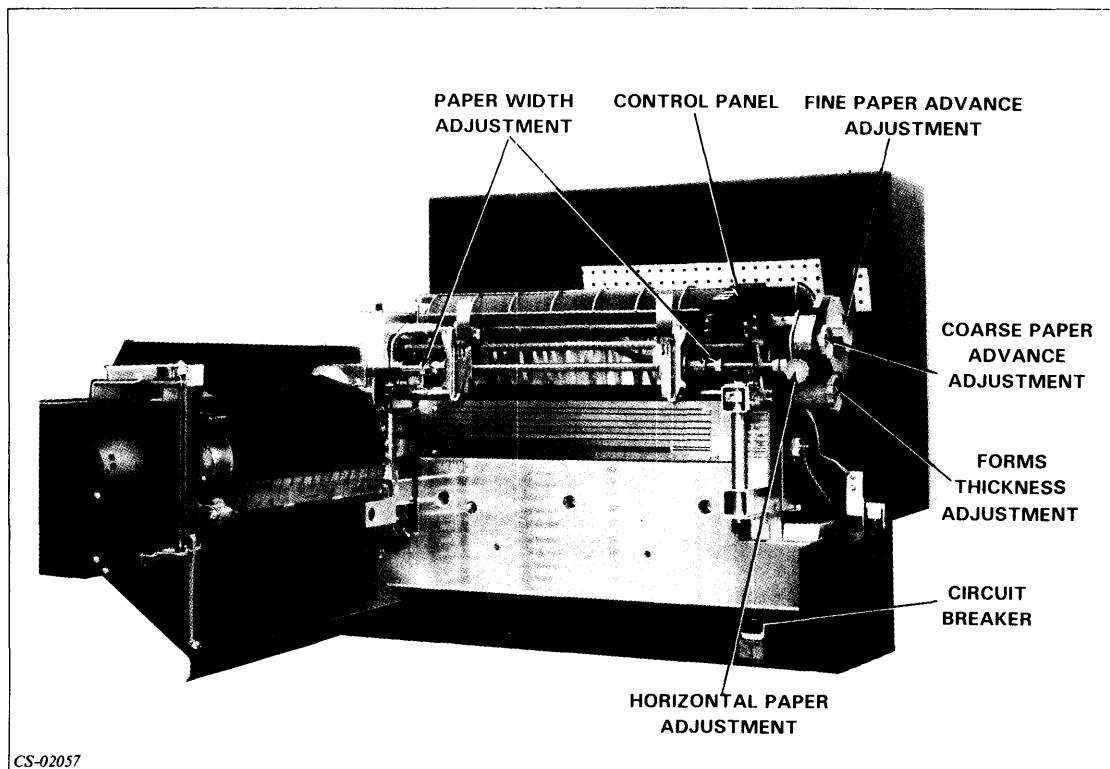


Figure 5.11 Internal Controls

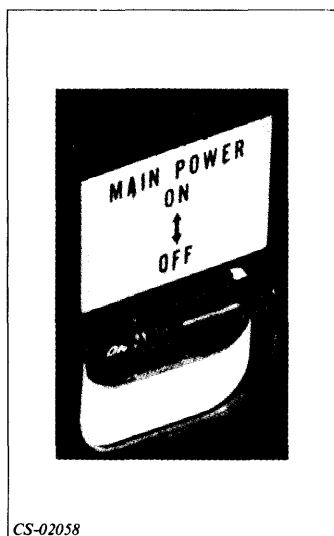


Figure 5.12 Circuit Breaker

Internal Controls

Circuit Breaker

- Lift switch up to apply AC power to printer.
- When up, the POWER ON indicator on the control panel should be lit.
- Press down to turn off power.

Forms Thickness Adjustment Knob

- Turn to accommodate single or multiple copies.
- Setting shown on Copies Control lever.

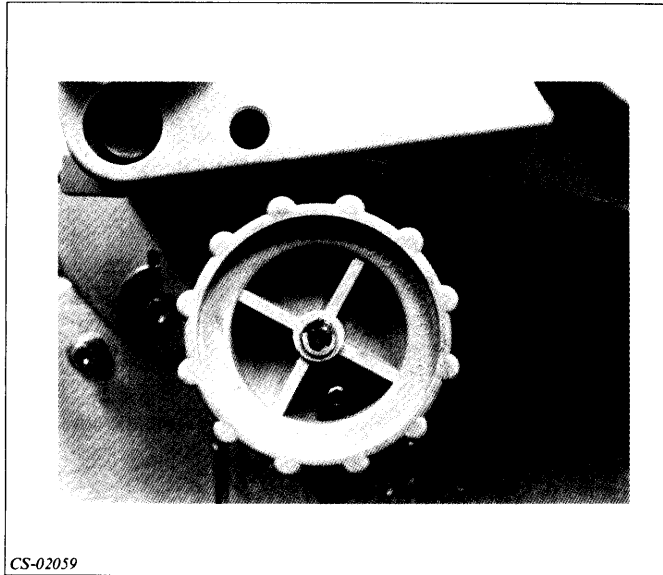


Figure 5.13 Forms Thickness Adjustment Knob

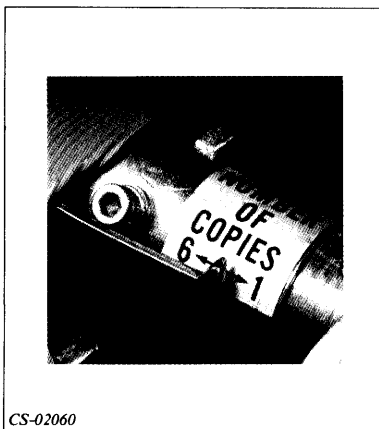


Figure 5.14 Copies Control Lever

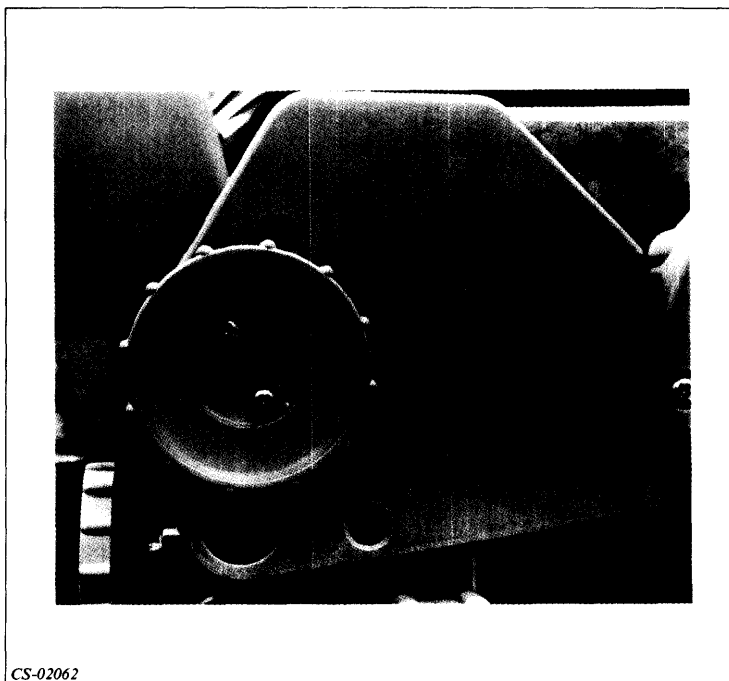


CS-02061

Figure 5.15 Paper Width Adjustment Lever

Paper Width Adjustment Levers

- Used to adjust tractor for paper widths.
- Lift to slide tractors.
- Lower to lock tractors in place.



CS-02062

Figure 5.16 Coarse Paper Adjustment Knob

Coarse Paper Adjustment Knob

- Can use only when printer off-line and with FORMS RESET button down.
- Use to position paper vertically.
- Turn knob clockwise to advance paper.



Figure 5.17 Fine Paper Adjustment Knob

Fine Paper Adjustment Knob

- Use to adjust paper vertically within a plus or minus one line range.
- Can be used on-line.

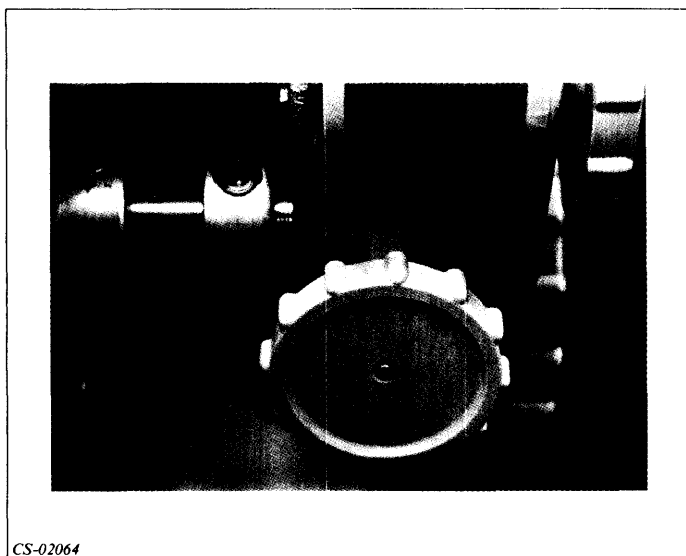


Figure 5.18 Horizontal Paper Adjustment Knob

Horizontal Paper Adjustment Knob

- Turn knob in either direction to move the tractors left and right, and to adjust paper position horizontally.

Operating Procedures

- Powering up the printer and putting it on-line.
- Removing the printout.
- Shutting down the printer.
- Installing paper.
- Changing the ribbon.
- Routine care and maintenance.
- Correcting problems.

Directions

Now try Segment B Exercise on the next page.

Segment B

Line Printers

Exercise

To complete this exercise, you must have access to a line printer and its operator's manual. You are asked in the exercise to identify the operator's controls discussed in Segment B. You are also asked to become familiar with routine operating procedures.

There is a wide variety of printer models. Not all models have the same switches and operating procedures. You may need to refer to your operator's manual to complete this exercise.

1. For your line printer, use your operator's manual to fill in the blanks appropriately.

Model number	_____
Number of characters	_____
Print rate	_____
Method of printing (impact or nonimpact)	_____
Maximum characters per line	_____
Vertical line spacing	_____
Paper size (Constant or variable)	_____
Paper advance (friction or tractor feed)	_____

2. Place a check next to the name of each indicator you can find on the control panel.

POWER ON	_____
ALARM/CLEAR	_____
READY	_____
ON/OFF LINE	_____
PAPER STEP	_____
TOP OF FORM	_____

3. If the ON/OFF LINE indicator is off, then the printer is off-line. If indicator is lit, then turn the printer off-line by pressing the ON/OFF LINE indicator.
4. Open the drum gate by pulling the drum gate latch.
5. Find the power switch. Place in the ON position if not already so. The POWER ON indicator should come on. The ALARM/CLEAR indicator and the GATE fault light should also come on because of the open gate. The READY light should be off, since the fault exists and has not been corrected and cleared.
6. Identify the Forms Thickness Adjustment knob and the Copies Control lever. Note the setting on the Copies Control lever. Turn the knob all the way in one direction, then in the other. Observe the change in the Copies Control lever setting as you turn the knob. After you have finished, turn the knob to its original setting.

7. Identify the Paper Width Adjustment lever. Unlock the right side tractor. Slide the tractor along the rail and then return it to its original position. Relock the tractor.
8. Identify the Coarse Paper Adjustment knob and the FORMS RESET button. While holding the FORMS RESET button down, turn the adjustment knob until the next paper fold is at print line. Release the FORMS RESET button.
9. Identify the Fine Paper Adjustment knob. Turn the knob in either direction to move the paper up slightly; then return it to its original position.
10. Identify the Horizontal Paper Adjustment knob. Turn the knob to move the tractors approximately one inch to the right, and then turn the knob in the opposite direction to return the tractors to their original position.
11. Close the drum gate. Press ALARM/CLEAR to clear the fault indicator. The READY light should come on.
12. Press the TOP OF FORM button. Paper should advance one full page. If, after stopping, the printer makes a high pitched sound, press the TOP OF FORM button again.
13. Press the PAPER STEP button. The paper should advance one step.
14. Turn off the printer by moving the power switch to off.
15. Review the procedures in your operator's manual for installing paper. Follow the procedures to remove the paper from your printer, and then to reinstall the paper. Seek the advice of your supervisor if you have difficulty.
16. Review the procedures in your operator's manual for changing ribbons. Follow the procedures to remove and then to reinstall your printer's ribbon. Seek the advice of your supervisor if you have difficulty.
17. Review the section on Correcting Problems in your operator's manual. Use the manual to complete the following:
 - a. The FORMAT indicator light is lit and the printer has gone off-line. To correct the situation, you should first _____, and then _____.
 - b. The PAPER indicator lights up. You correct the paper fault. To continue operation of the printer, you must now _____.
 - c. You correct a GATE fault by _____.

Directions

Now check your answers with those on the next page.

Segment B

Line Printers

Exercise Answers

17.
 - a. Press and release the FORMS RESET switch; press the ALARM/CLEAR button.
 - b. Press the ALARM/CLEAR button.
 - c. Closing and latching the gate, and then pressing the ALARM/CLEAR button.

Directions

If you did not complete all the steps, or answer all the questions in the Segment B Exercise, go back and review the segment and try the exercise again before continuing.

If you completed all the steps successfully, and answered all the questions in the segment exercise correctly, read the directions below.

If you have a character printer:

Continue to Segment C of this module by restarting the Module 5 audiotape.

If you do *not* have a character printer:

Continue to the Module 5 Quiz at the end of the module.

Segment C Character Printers

Overview

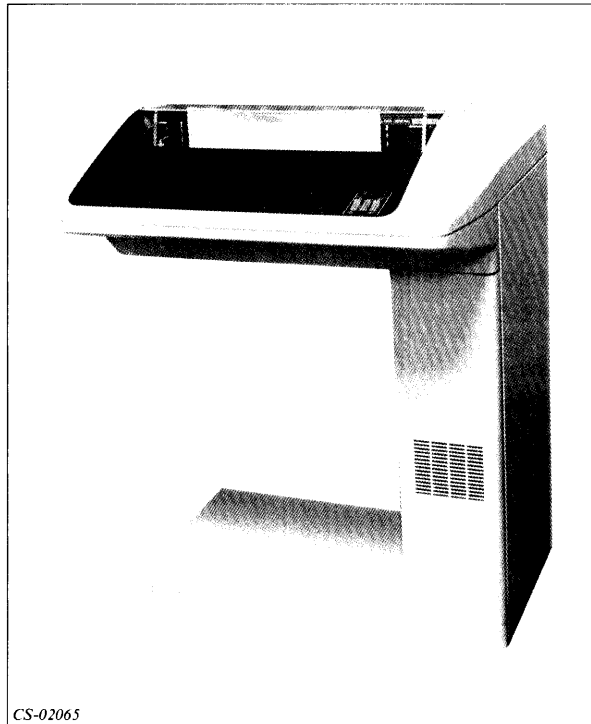


Figure 5.19 DASHER LP2

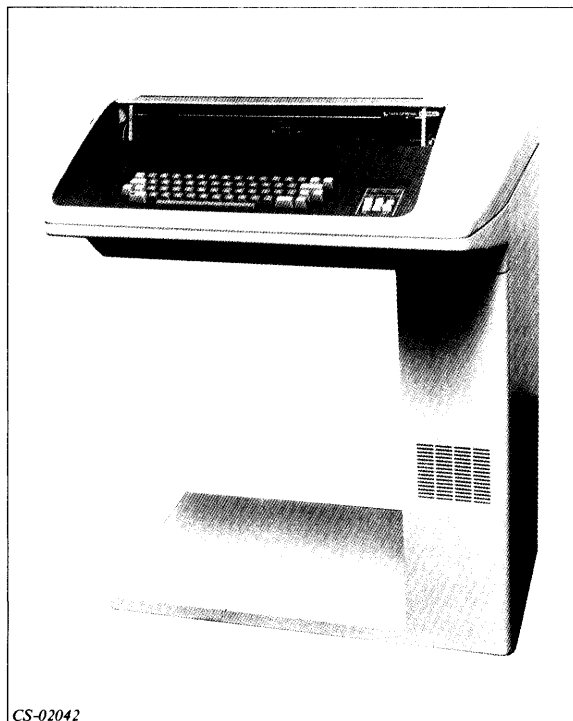


Figure 5.20 DASHER TP2

DASHER LP2

- 96 printable characters.
- Prints 180 characters per seconds.
- Impact printer.
- 132 characters per line.
- Vertical line spacing of six or eight lines per inch.

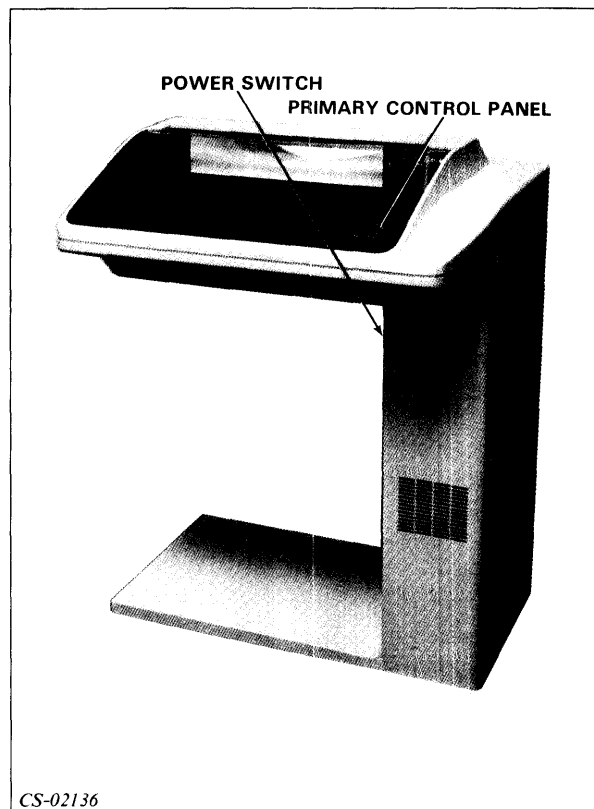
Operator Controls

Figure 5.21 Operator Controls

Power Switch

- Up position — Power on, fan on.
- Down position — Power off, fan off.

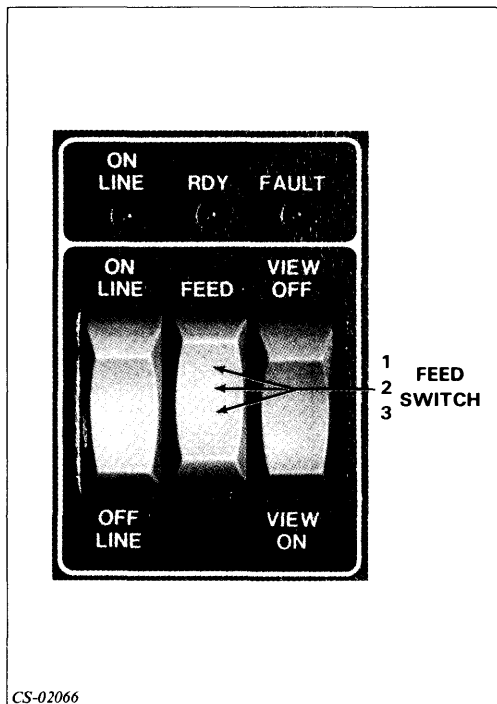


Figure 5.22 Primary Control Panel

ON LINE indicator

- Lights when printer is on-line and can receive information from the computer for printing.

RDY indicator (Ready indicator)

- Indicates printer is ready to accept characters.
- If RDY light is off, it indicates one of the following:
 - Printer is off-line.
 - Printer is not powered up.
 - A fault condition exists.
 - Printer is not able to accept characters at the rate at which they are being entered.

FAULT indicator

- Lights up when one of the following occurs:
 - Printer is out of paper.
 - Paper-feed mechanism is jammed.
 - Ribbon cartridge is jammed.
 - Some hardware fault exists.

ON-OFF LINE switch

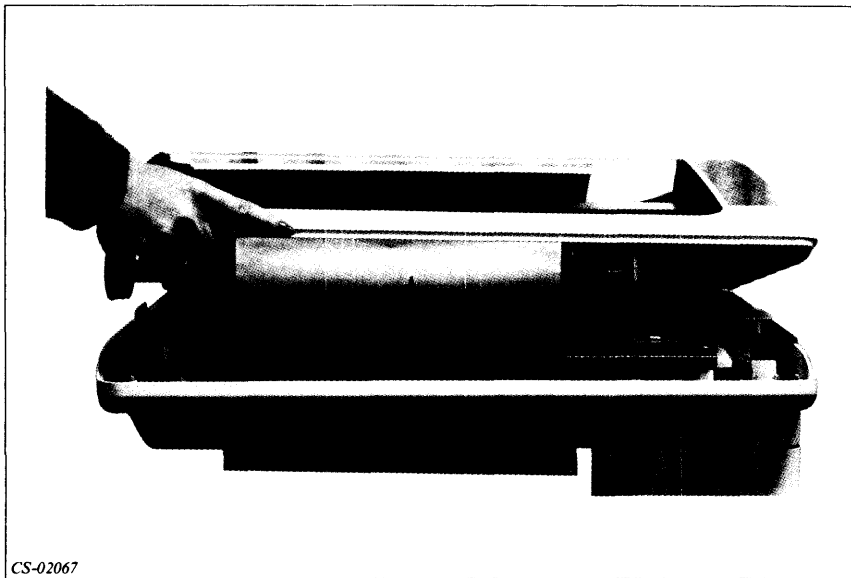
- When off-line, the printer is not under the control of the computer.
- When on-line, the printer is under control of the computer unless a fault exists.

FEED switch

- Has three positions.
- Pressing top position advances paper one line.
- Middle position is neutral.
- If your printer has Automatic Form Feed option, pressing the bottom position advances the paper to the top of the next form.
- If your printer does not have the Automatic Form Feed option, pressing the bottom position advances the paper until you release the switch.

VIEW ON-OFF switch

- Pressing VIEW ON turns on view feature.
- View feature causes the printing mechanism to move aside whenever there is a pause in the printing.



CS-02067

Figure 5.23 Lifting the Cover

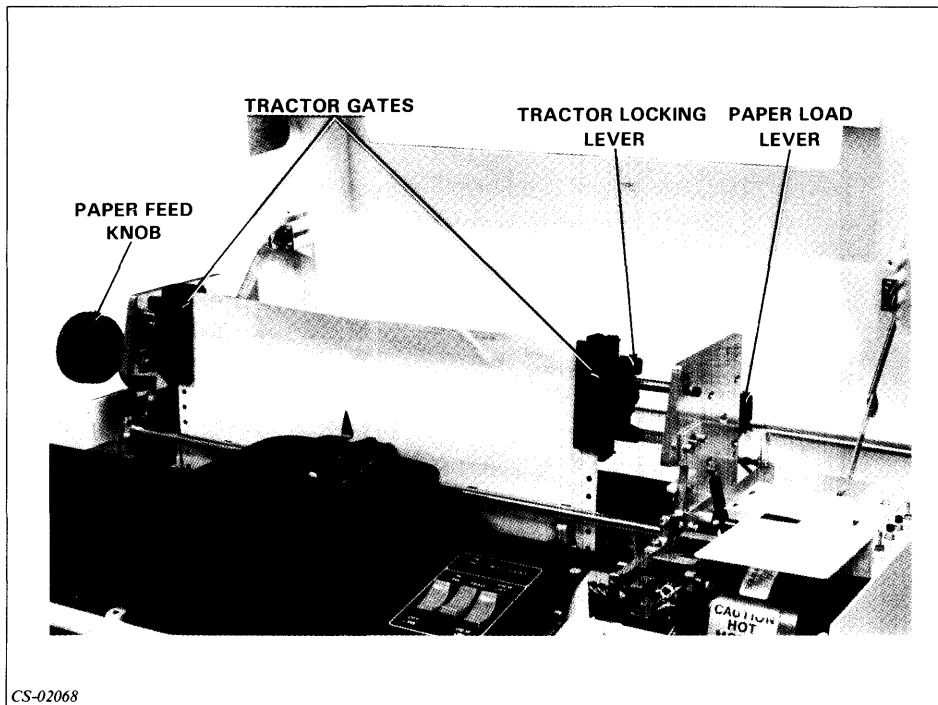


Figure 5.24 Operator Controls

Tractor gates

- Hold paper in place.
- Swing open for paper removal or installation.

Tractor Locking lever

- When closed or locked, the tractor gates cannot be moved along rail.
- When open or unlocked, the tractor gates can be moved.

Paper Feed knob

- Used to adjust the vertical position of the paper.

Paper Load lever

- Used to adjust the printing mechanism for multiple copies.
- Can accommodate one to six copies.

Operating Procedures

- Powering up the printer and putting it on-line.
- Removing the printout.
- Shutting down the printer.
- Installing paper.
- Changing the ribbon.
- Routine upkeep.
- Correcting problems.

Directions

If you have a DASHER printer:

Continue to the Segment C Exercise on the next page.

If you do *not* have a DASHER printer:

Continue to the Module 5 Quiz at the end of this module.

Segment C

Character Printers

Exercise

To complete this exercise, you must have access to a DASHER printer and its operator's manual. You are asked in the exercise to identify the operator's controls discussed in Segment C. You are also asked to become familiar with routine operator procedures.

There are a wide variety of DASHER models. Not all models have the same switches and operating procedures. You may need to refer to your operator's manual from time to time in order to complete the exercise.

1. For your printer, use your operator's manual to fill in the blanks appropriately.

Model number	_____
Number of characters	_____
Print rate	_____
Method of printing (impact or nonimpact)	_____
Maximum characters per line	_____
Vertical line spacing	_____
Paper size (constant or variable)	_____
Paper advance (friction or tractor feed)	_____

2. Place a check next to the name of each indicator or switch you can find on the control panel.

ON LINE indicator	_____
RDY indicator	_____
FAULT indicator	_____
ON/OFF LINE switch	_____
FEED switch	_____
VIEW ON/OFF switch	_____

3. If the ON LINE indicator is off, then the printer is off-line. If the indicator is lit, then turn the printer off-line by pressing the ON/OFF LINE indicator.
4. Find the power switch. Place in the on position, if it is not already so. The RDY light should come on.
5. Raise the printer cover. Identify the Paper Load Lever.
6. Press the bottom of the FEED switch to advance the paper. If you have the automatic feed option, the paper will advance one page. If you do not have the automatic feed option, the paper will advance until you release the switch.
7. Press the top of the FEED switch. The paper will advance one line.
8. Turn the printer off by pressing the ON/OFF switch to off.
9. Review the procedures in your operator's manual for installing paper. Follow the procedures to remove the paper from your printer, and then to reinstall the paper. Seek the advice of your supervisor if you have difficulty.
10. Review the procedures in your operator's manual for changing ribbons. Follow the procedures to remove and then to reinstall your printer's ribbon. Seek the advice of your supervisor if you have difficulty.
11. Review the section on Troubleshooting or Correcting Problems in your operator's manual. Use the manual to complete the following:
 - a. Before making any adjustments to your printer, you should _____ and _____.
 - b. If the FAULT light is on, the printer is probably _____.
 - c. If the RDY light won't come on, you should first check _____.
 - d. If the print is too light, you should _____.

Directions

Now check your answers with those on the next page.

Segment C

Character Printers

Exercise Answers

11.
 - a. Switch the printer to off-line; turn the power off.
 - b. Out of paper.
 - c. The power cord.
 - d. Adjust the Paper Load lever.

Directions

If you answered all the questions in the Segment C Exercise correctly, continue to the Module 5 Quiz on the next page.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Module 5 Quiz

Circle the letter of the correct answer.

1. The RDY indicator lights up when:
 - a. Power is on and a fault exists.
 - b. The printer is on and no fault exists.
 - c. A fault exists.
 - d. The ALARM/CLEAR switch is on.
2. Tractor feed requires:
 - a. No special paper.
 - b. Paper with carbons.
 - c. Paper with punched holes along the edges.
 - d. Single sheets of paper.
3. The Automatic Form Feed switch:
 - a. Clears paper jams.
 - b. Advances paper a preset number of lines.
 - c. Adjusts for multiple copies.
 - d. Adjusts for different paper widths.
4. The indicator that shows whether the printer can communicate with the computer or not is:
 - a. ALARM CLEAR
 - b. ON-OFF.
 - c. ON-LINE.
 - d. FAULT.
5. If a problem exists with the printer, which indicator will probably light up?
 - a. RDY
 - b. ON-OFF
 - c. ON-LINE
 - d. FAULT

6. The Paper Load lever or Forms Thickness Adjustment Knob is used to adjust for:
 - a. Multiple copies.
 - b. Different paper widths.
 - c. Different paper lengths.
 - d. Different feed rates.

Directions

Now check your answers with those in Appendix A.

Module 6

Disc Drives

Introduction

Module 6 describes the basic components and operation of disc drives and common characteristics of all disc drives. Five types of disc drives are briefly described. The module includes a practice exercise to familiarize you with your disc drive.

Module Objectives

Upon successful completion of this module, you should be able to:

1. Recognize the basic functions and components of a disc drive.
2. Recognize how head crashes are caused.
3. Recognize how head crashes are prevented.
4. Recognize descriptions of data storage on a disc drive.
5. Identify the characteristics of your disc drive.
6. Perform routine operations on your disc drive.
This is an optional objective.

Resources

To complete this module, you need:

- Module 6 audiotape.
- Module 6 of your Student Guide.
- Audiotape playback unit.

Optional Resource

- Operator's Reference Guide for your disc drive.

Module Outline

Module 6 discusses the following topics:

1. Introduction to Disc Drives
 - a. Disc drives
 - b. Read/write heads
 - c. Data storage
2. Types of Disc Drives
 - a. Disc pack drive
 - b. Cartridge disc drive
 - c. Diskette drive
 - d. Fixed-head disc drive
 - e. Rigid disc drive
3. Disc Drive Operations
 - a. Powering up
 - b. Powering down
 - c. Bringing to ready
 - d. Loading and unloading the disc
 - e. Setting the write protection feature
 - f. Setting the device code

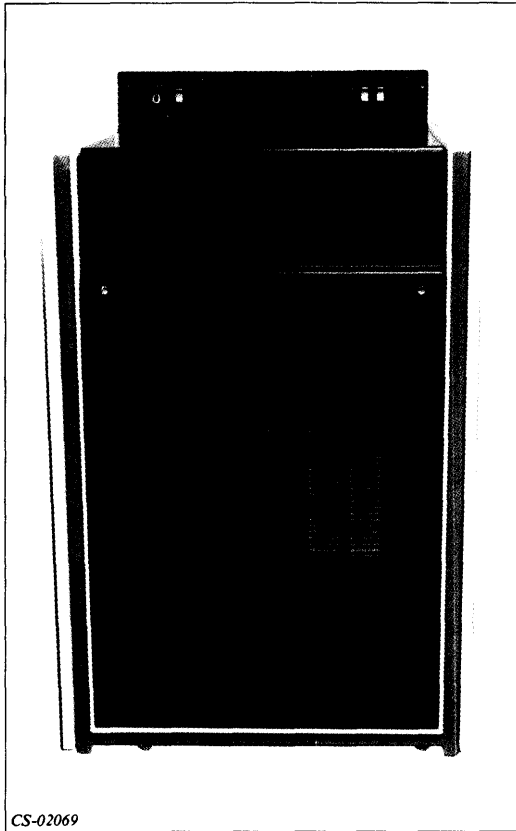
Directions

Now start the Module 6 audiotape. As you listen, follow along in Module 6 of your Student Guide.

Segment A

Introduction to Disc Drives

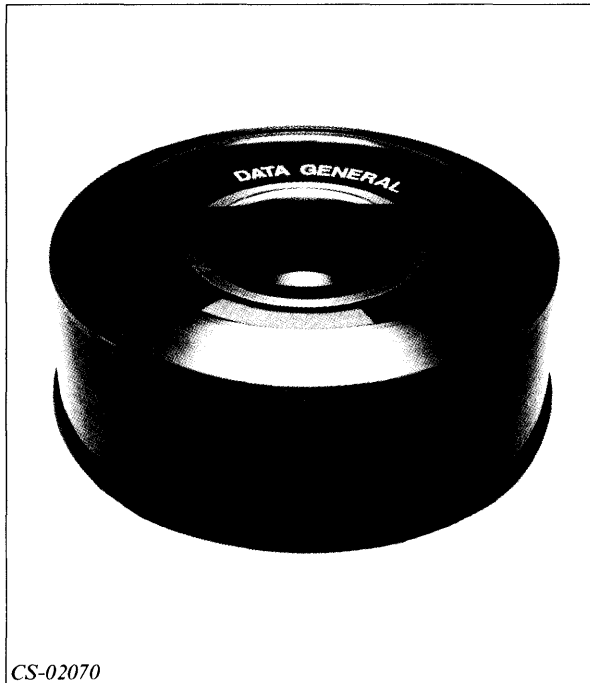
Disc Drives



CS-02069

Figure 6.1 Model 6060 Disc Drive

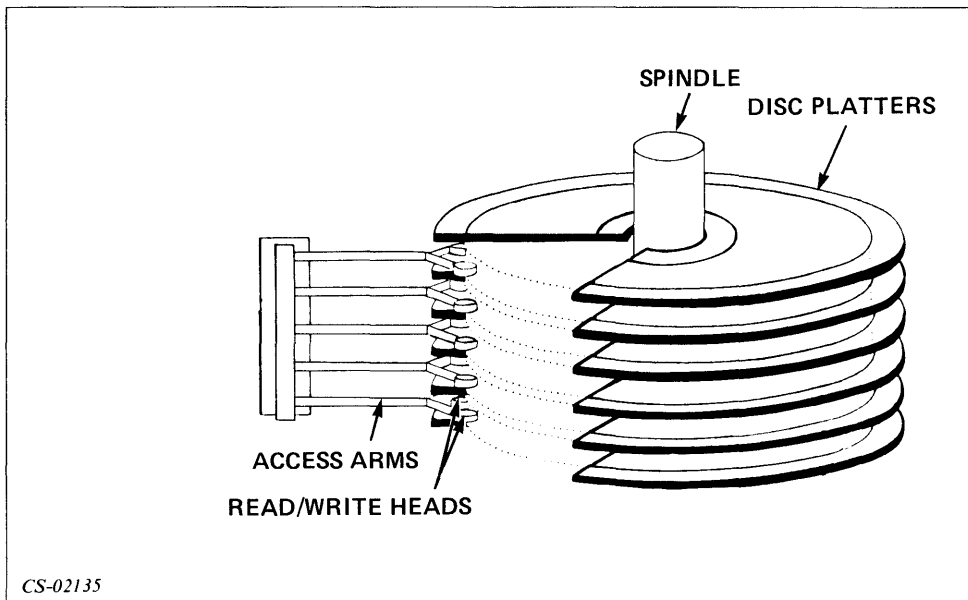
- Storage device — Enables you to store and retrieve data.
- Peripheral storage — Not part of CPU.
- Physical device that performs data storage and retrieval.
- Disc:
 - Surface or medium on which data is stored.
 - Consists of magnetic medium coated on a platter.
 - Comes with single or multiple-stacked platters.
 - Fixed in the drive.
 - Removable from the drive.



CS-02070

Figure 6.2 Disc Pack

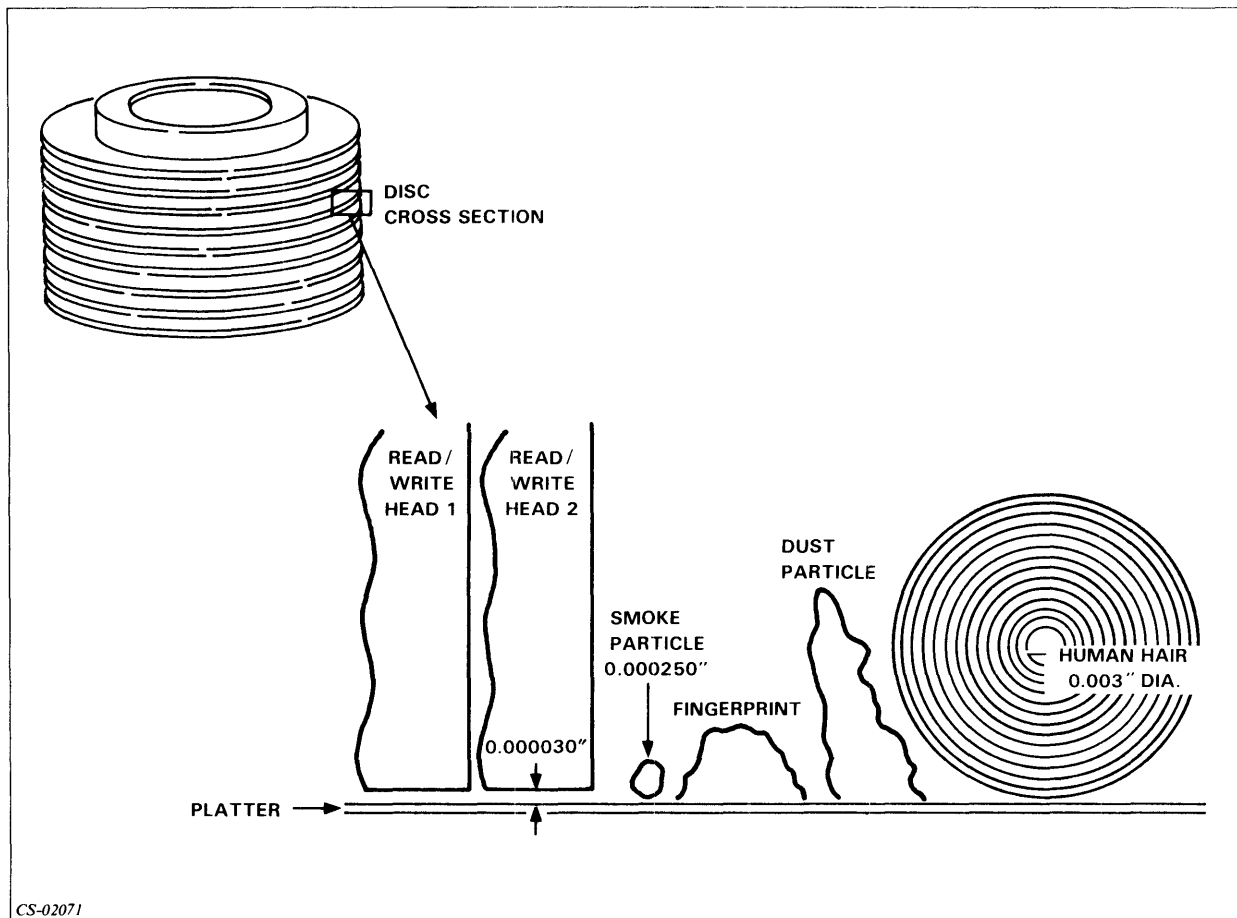
Read/Write Heads



CS-02135

Figure 6.3 Read/Write Heads

- Electromagnetic devices.
- Write data on and read data from disc as it spins.



CS-02071

Figure 6.4 Cross-Section of Disc

- Ride cushion of air close to platter's surface.
- Crashes if head accidentally touches disc and destroys data.
- Crashing is prevented by keeping environment clean and free of particles.
- Protect disc by:
 - Keeping disc cover on when disc is not in use.
 - Storing disc in a dust-free environment.
 - Never touching or blowing on disc surface.
 - Keeping disc away from strong magnetic fields.

Data Storage

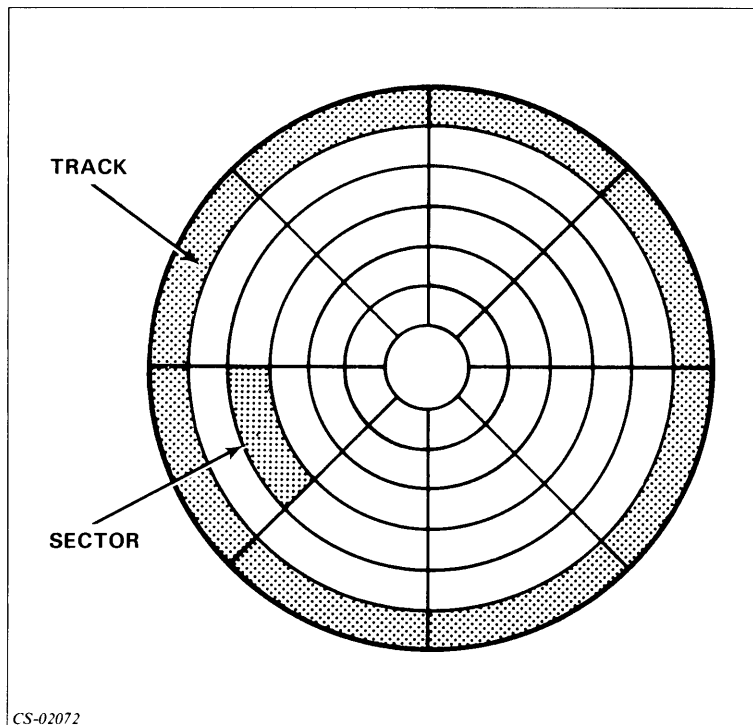


Figure 6.5 Tracks and Sectors

Tracks

- Area of data on disc defined by concentric circles.
- Typically 200 or more tracks per disc pack.
- Comprised of sectors.

Sectors

- Smallest unit of data that can be addressed on a disc.
- Usually 512 bytes per sector.

Random Access Data

- Data located directly by its track and sector.

Initialization or Formatting

- Organizes the disc to ensure that the drive selects the appropriate sector when transferring data.
- Usually done by system manager.

Directions

Now try the Segment A Exercise on the next page.

Segment A

Introduction to Disc Drives

Exercise

Circle the letter of the correct answer.

1. A head crash occurs if the:
 - a. Platters are removed.
 - b. Access arm does not move.
 - c. Head touches the disc and destroys data.
 - d. Spindle stops spinning.
2. The device that transfers data onto the disc is the:
 - a. Platter.
 - b. Read/write head.
 - c. Access arm.
 - d. Spindle.
3. A disc track is:
 - a. A dust cover.
 - b. A groove in the disc.
 - c. The smallest unit of data that can be addressed.
 - d. An area defined by concentric circles.
4. You can protect a disc by:
 - a. Storing the disc in a dust-free environment.
 - b. Never touching or blowing on a disc surface.
 - c. Keeping the disc away from strong magnetic fields.
 - d. All of the above.

Directions

Now check your answers with those on the next page.

Segment A

Introduction to Disc Drives

Exercise Answers

1. c
2. b
3. d
4. d

Directions

If you answered all the questions in the segment exercise correctly, restart the Module 6 audiotape to continue.

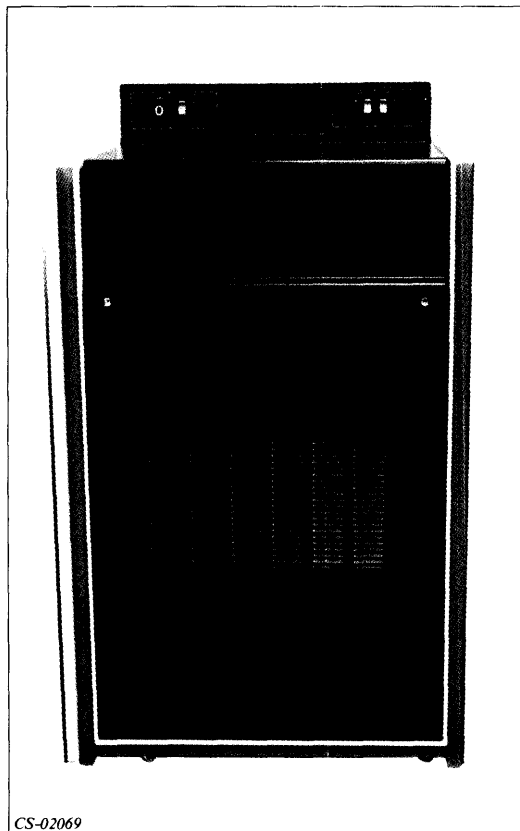
If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Segment B

Types of Disc Drives

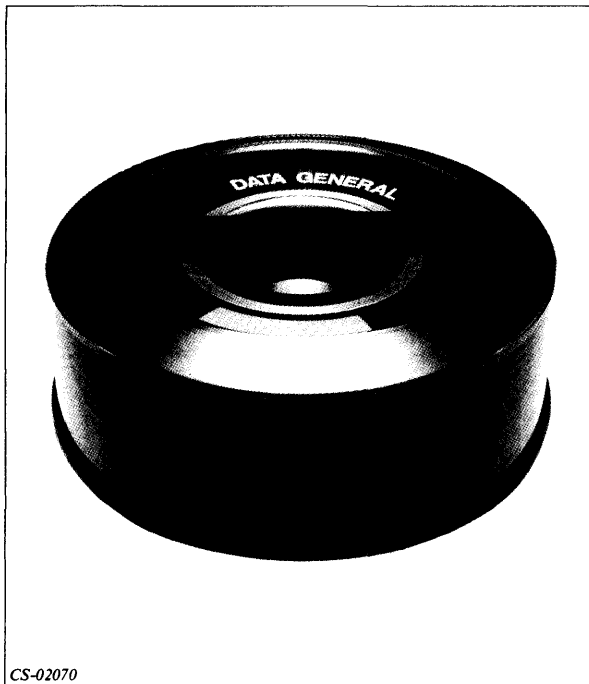
- Disc pack drive
- Cartridge disc drive
- Diskette drive
- Fixed-head drive
- Rigid disc drive

Disc Pack Drive



CS-02069

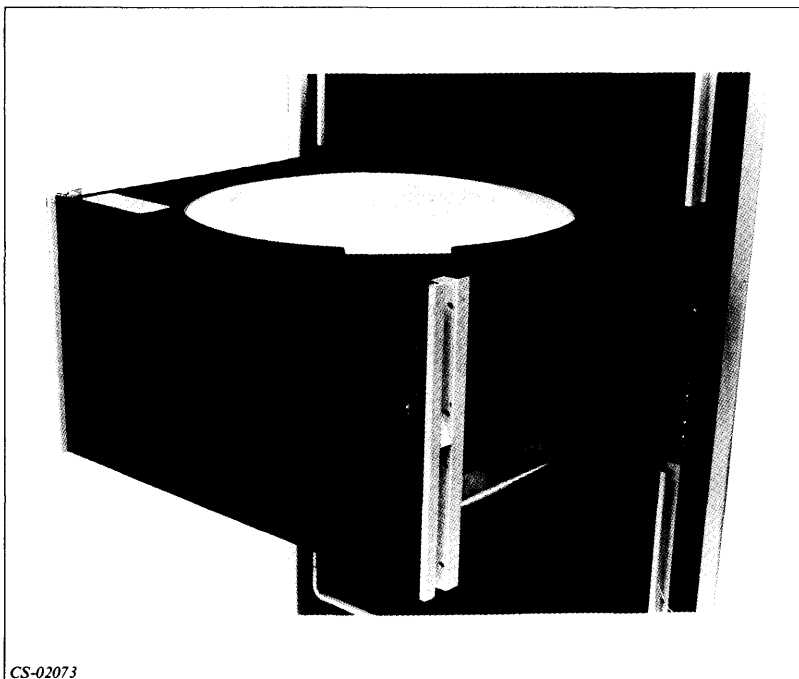
Figure 6.6 Disc Pack Drive



CS-02070
Figure 6.7 Disc Pack
Disc Pack

- A removable stack of platters.
- Protected by dust cover that is removed prior to operation.
- Have storage capacity between 50 and 300 megabytes.

Cartridge Disc Drive



CS-02073
Figure 6.8 Cartridge Disc Drive

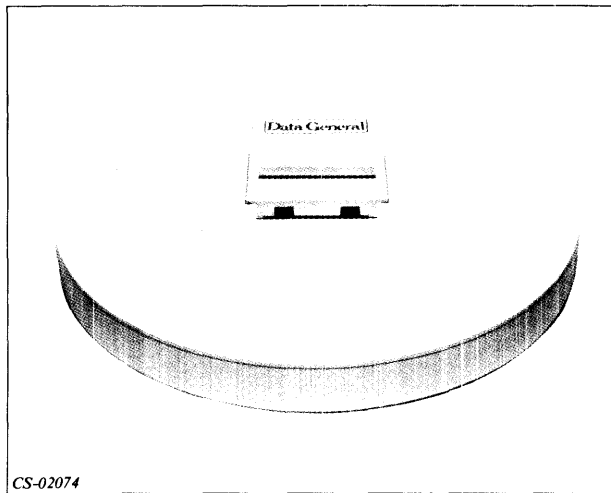


Figure 6.9 Disc Cartridge

Disc Cartridge

- Removable single platter cartridges.
- Contained in protective plastic housing.
- Disc and housing placed in disc drive during operation.
- Storage capacity between 2.5 and 20 megabytes.
- Lightweight and easily transported.

Diskette Drive

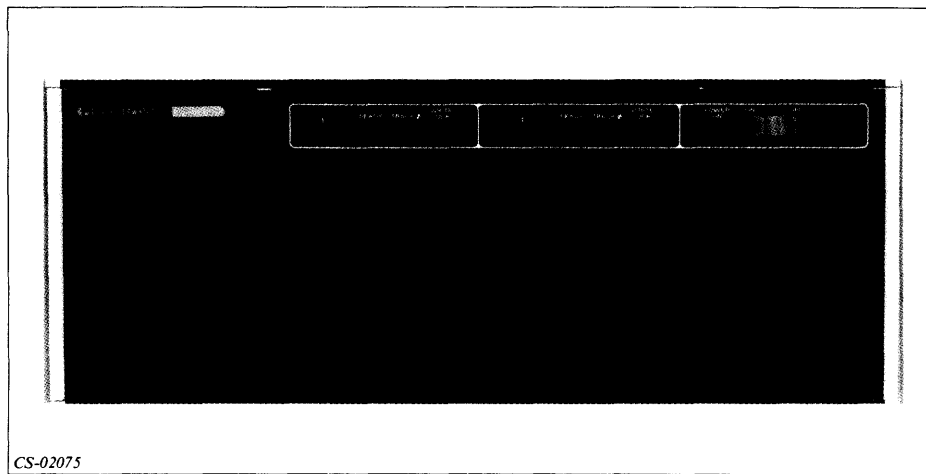


Figure 6.10 Diskette Drive

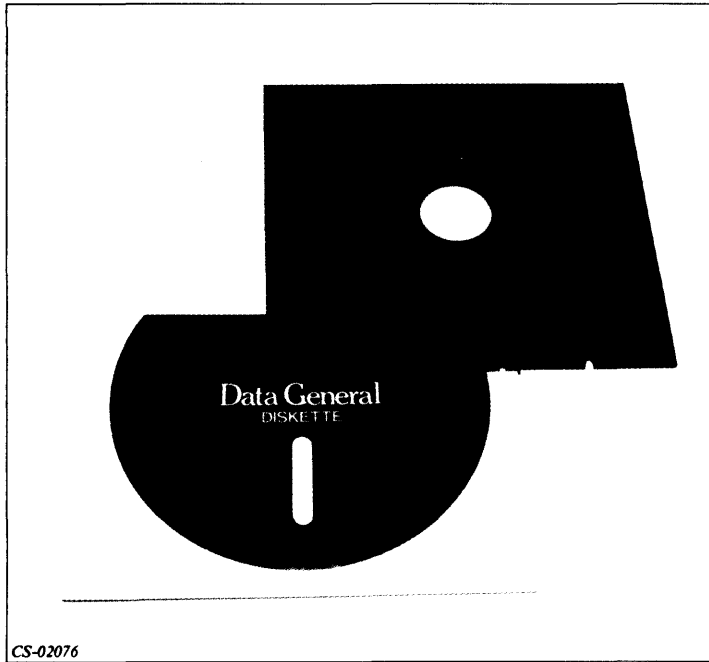


Figure 6.11 Diskette
Diskette

- Removable flexible or floppy disc.
- Contained inside a dust cover made of heavy paper.
- Typical storage capacity of 300K bytes.

Fixed-Head Disc Drive

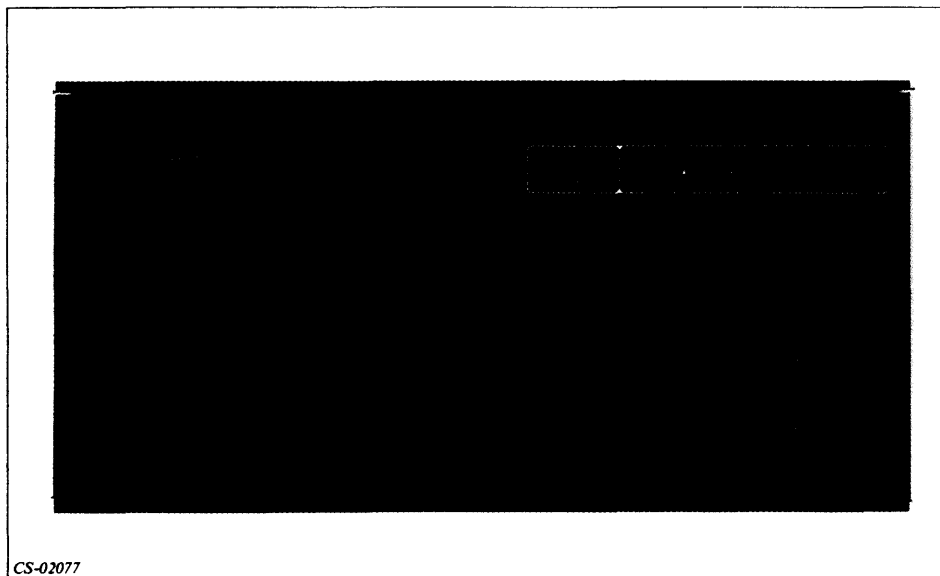
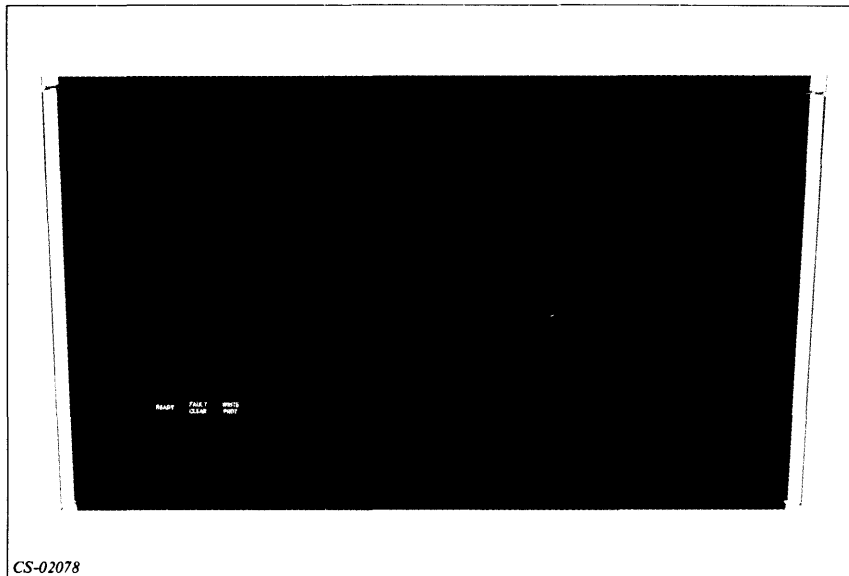


Figure 6.12 Fixed-Head Disc Drive

Fixed-Head Disc Drive

- Fully enclosed disc unit.
- Has single, nonremovable platter.
- Read/write heads do not move.
- Has a head for each track.
- Typical storage capacity between one and two megabytes.

Rigid Disc Drive

CS-02078
Figure 6.13 Rigid Disc Drive

Rigid Disc Drive

- Fully enclosed disc unit.
- Has single, nonremovable platter.
- Has two movable read/write heads for each surface.
- Storage capacity over 10 megabytes.

Directions

Now try the Segment B Exercise on the next page.

Segment B

Types of Disc Drives

Exercise

To complete this exercise, you need a disc drive and its operator's manual. If you do not have access to a disc drive, restart your Module 6 audiotape and continue to Segment C.

Using your operator's manual, fill in the following information for your disc drive(s).

	Disc Drive 1	Disc Drive 2	Disc Drive 3
Model Number	_____	_____	_____
Type of Drive (pick one)			
Diskette	_____	_____	_____
Disc Pack	_____	_____	_____
Disc Cartridge	_____	_____	_____
Fixed-Head	_____	_____	_____
Rigid Head	_____	_____	_____
Storage Capacity	_____	_____	_____
Device Code Setting	_____	_____	_____
Single or Multiple Platter Discs	_____	_____	_____
Removable or Nonremovable Discs	_____	_____	_____

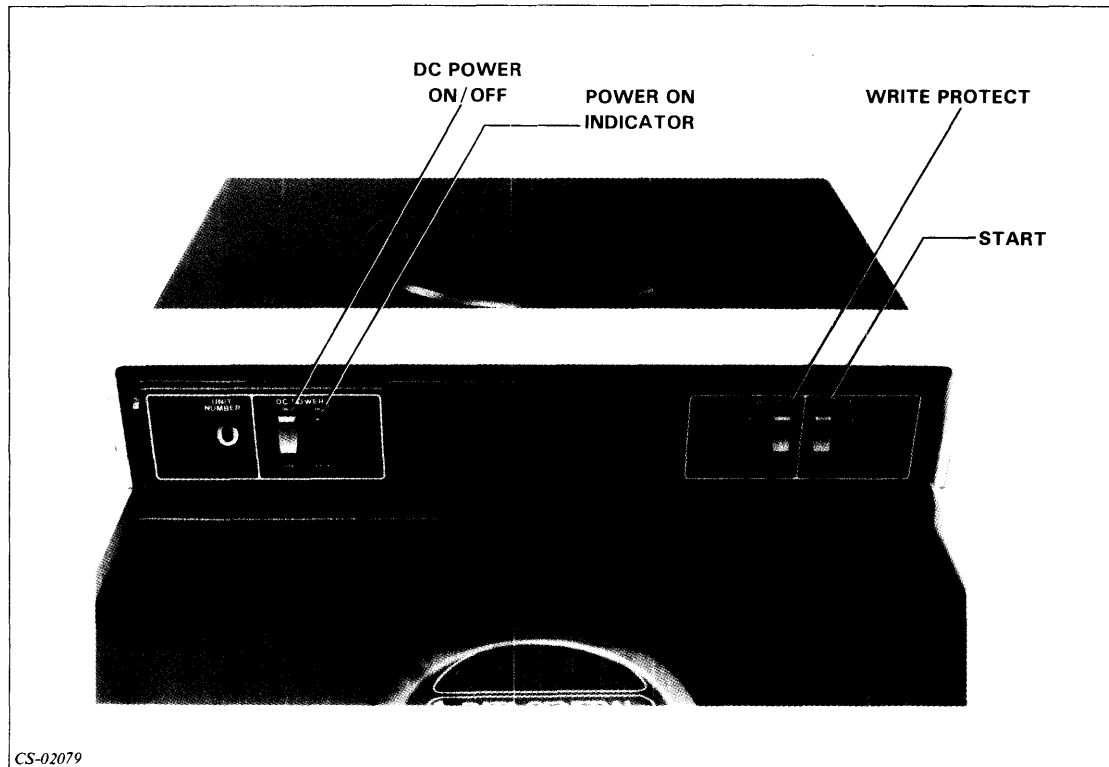
Directions

Since every installation is different, there is no set of correct answers for this exercise. However, if you feel uncertain of your answers, check with your system manager.

Restart the Module 6 audiotape to continue.

Segment C

Disc Drive Operations



CS-02079

Figure 6.14 Disc Pack Drive Operator's Controls

Powering Up

- Turn on AC power.
- For disc pack drives, turn on AC power and DC power.
- POWER ON indicator lights up when power is switched on.

Powering Down

- Turn off power.

Bringing to Ready

- A disc is ready when it is spinning at an appropriate speed and ready to receive or transfer data.
- Some drives have a single switch for powering up and bringing to ready.
- Some drives have two separate switches for power on and ready.

Loading and Unloading the Disc

- Not performed with fixed-head and rigid disc drives.

Setting the Write-Protect Feature

- Prevents disc from being written on.
- Should be used routinely to prevent a disc from being accidentally written over.

Setting the Device Code

- Signal used to recognize a particular peripheral device.
- On some devices, device code set by switch.
- On some devices, device code determined by way drive is connected to computer.
- Usually done by system manager.

Directions

Now try the Segment C Exercise on the next page.

Segment C

Disc Operations

Exercise

The following exercise should only be performed under the supervision of your system manager.

To complete this exercise you need:

- A disc drive with the disc removed, if it is removable.
- A disc.
- The operator's manual for your disc drive.

Perform the following operations. Since disc drives differ in their operation, the following steps may not be in the proper order. Refer to your operator's manual for the proper sequence of steps.

1. Turn on the write-protect feature.

The **WRITE PROTECT** indicator should come on. Note that not all disc drives have a write-protect feature. Note also that diskettes are write protected by removing a tab from the write-protect hole on the diskette.

2. If your disc drive has a removable disc, load a disc.

With some drives, the power must first be turned on.

3. Power up the disc drive.

With disc pack drives, you must turn on both AC and DC power. After turning on power, the **ON** indicator should light.

4. Bring the disc to ready.

With some drives, the disc is automatically brought to ready when you turn on the power. With other drives, you must press a **READY** or **START** switch to bring the disc to ready. When ready, the **READY** indicator should come on.

5. Power down the drive.

As a first step, always make sure the disc drive is released from the computer system. The procedure depends on your particular system. If you do not release the drive, you may lose data. Follow your operator's manual to complete the rest of the power-down sequence.

6. Unload the disc, if the disc is removable.

With some drives, the disc drive's power must be on in order to unload the disc.

Directions

If you completed this exercise successfully, continue to the Module 6 Quiz on the next page.

If you had any problems in completing these procedures, go back and review the segment and try the segment exercise again before continuing.

Module 6 Quiz

Circle the letter of the correct answer.

1. Disc drives are:
 - a. Storage devices.
 - b. Peripheral devices.
 - c. Physical devices.
 - d. All of the above.
2. The medium on which a disc drive stores data is a:
 - a. Head.
 - b. Disc.
 - c. Spindle.
 - d. Motor.
3. If a read/write head touches the disc surface and destroys data, it is called a:
 - a. Shutdown.
 - b. Landing.
 - c. Head crash.
 - d. Near miss.
4. The smallest unit of data that you can normally address on a disc is a:
 - a. Track.
 - b. Sector.
 - c. Head.
 - d. Diskette.
5. Data on a disc that you can locate and move to directly is called:
 - a. Tracked data.
 - b. Sector data.
 - c. Sequential access data.
 - d. Random access data.

6. Initializing or formatting a disc:
 - a. Ensures that the drive selects the appropriate sector when transferring data.
 - b. Identifies a disc by your initials.
 - c. Is not necessary for use.
 - d. Prevents head crashes.
7. Bringing a disc to ready means that the disc drive is ready to:
 - a. Be shutdown.
 - b. Be powered on.
 - c. Receive and transfer data.
 - d. Be removed.
8. A write protected disc:
 - a. Cannot be read.
 - b. Cannot be removed.
 - c. Cannot be written on.
 - d. All of the above.
9. Head crashes may be caused by:
 - a. Smoke particles.
 - b. Fingerprints.
 - c. Dust particles.
 - d. All of the above.
10. Which of the following is *not* a good method of preventing head crashes?
 - a. Periodically blowing dust off the disc surface.
 - b. Storing the disc in a dust-free environment.
 - c. Keeping the disc cover on when not in use.
 - d. Never touching the disc surface.

Directions

Now check your answers with those in Appendix A.

Module 7

Magnetic Tape

Introduction

This module describes the basic components and operation of tape transports and the common characteristics of all tape transports. Methods of storing data on tape are also covered.

Module Objectives

Upon successful completion of this module, you should be able to:

1. Recognize the functions of a tape transport and its components.
2. Recognize the methods of data storage on tape.
3. Recognize the components of tape transport and tape.
4. Recognize the functions of the operator's controls.
5. Perform, with supervision, the following operations:
 - a. Loading tape.
 - b. Unloading tape.
 - c. Cleaning the tape transport.

Resources

To complete this module, you need:

- Module 7 audiotape.
- Module 7 of your Student Guide.
- Audiotape playback unit.

Module Outline

Module 7 discusses the following topics:

1. Introduction to Magnetic Tape
 - a. Magnetic tape
 - b. Tape transports
 - c. Data storage
2. Tape Transport Operations
 - a. Components of tape transports
 - b. Write enable ring
 - c. Operator's controls
 - d. Routine operations

Directions

Now start the Module 7 audiotape. As you listen, follow along in Module 7 of your Student Guide.

Segment A

Introduction to Magnetic Tape

Magnetic Tape

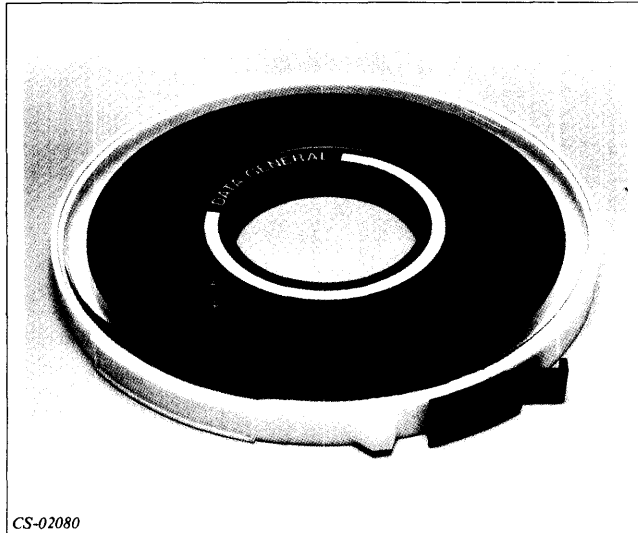
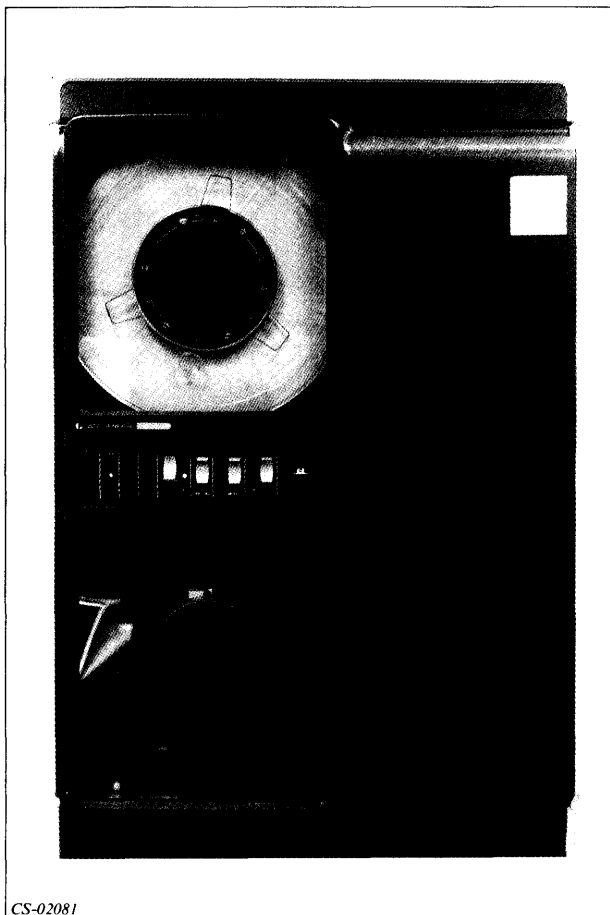


Figure 7.1 Reel of Magnetic Tape

- Recording medium that permits storage of large quantities of data.
- Stored on reels.
- Up to 2400 ft. of tape on each reel.
- Maximum reel diameter of 10-1/2 in.

Tape Transports

- Tape transport or drive — Device used to transfer data between the magnetic tape and the computer system.



CS-02081

Figure 7.2 Model 6026 Tape Transport

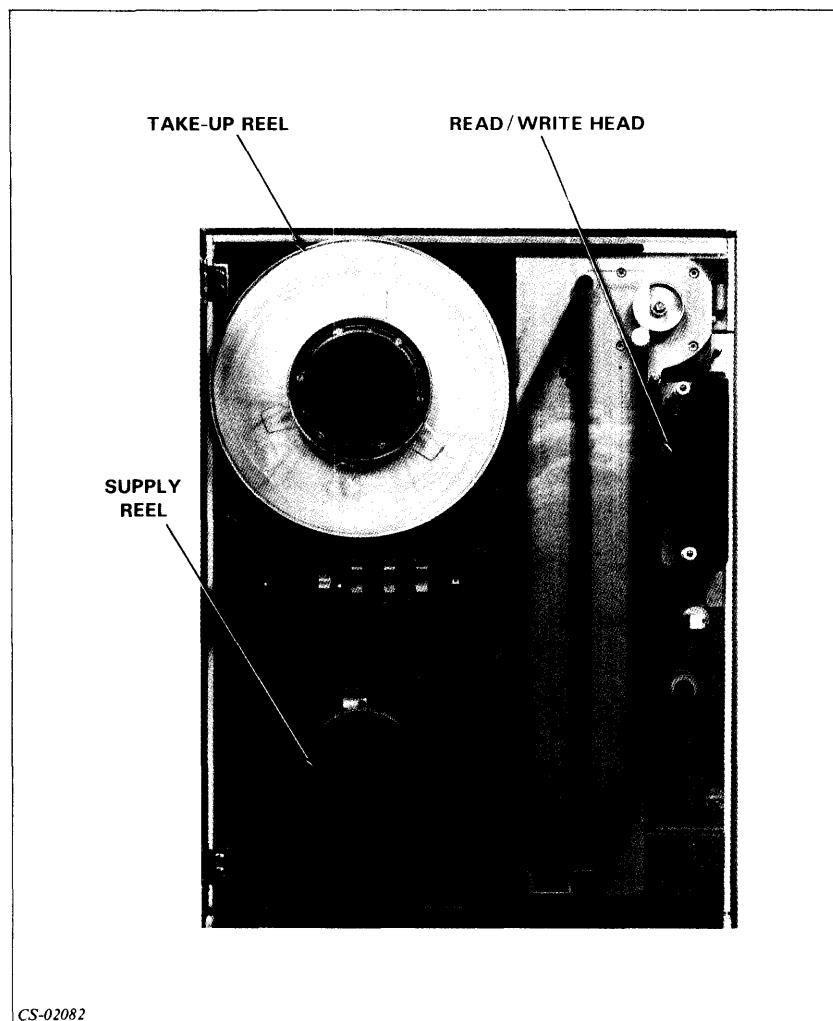


Figure 7.3 Close-Up of Tape Transport

- Read/write head — Reads or writes data on tape.
- Supply reel — Removable, used to store the tape.
- Take-up reel — Usually nonremovable, used to temporarily hold the tape as it unwinds for reading or writing.

Data Storage

Serial or Sequential Access Data

- All preceding tape must move past read/write head to access a particular data location.

Recording Techniques

- Non Return to Zero Inverted (NRZI)
- Phase Encoded (PE)
- Not interchangeable

Track Format

- Seven or nine tracks

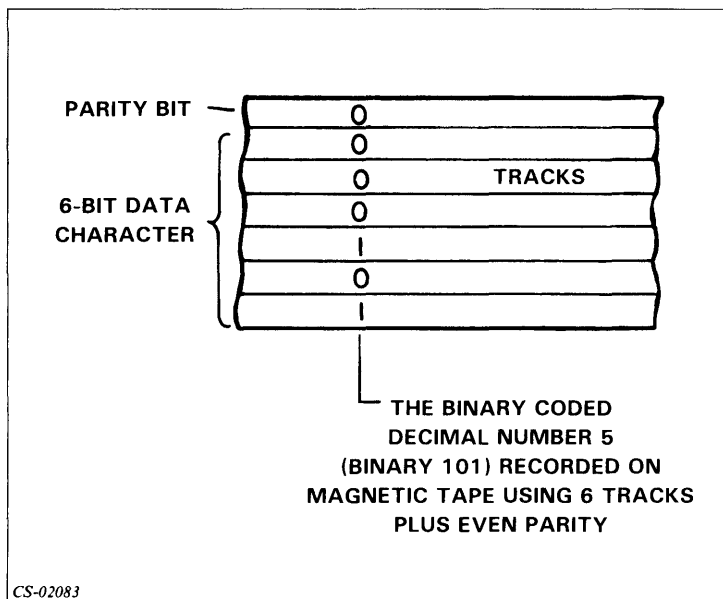


Figure 7.4 Seven-Track Format

- Seven-track format — Six bits for data, plus one parity bit.
- Nine-track format — Eight bits for data, plus one parity bit.
- One read and one write head per track.
- Not interchangeable.

Data Density

- Calculated in bits per inch (bpi).
- Ranges from 556 bpi to 1600 bpi.
- One or two density settings.
- Not interchangeable.

Tape Markers

- Indication of beginning or end of tape.
- Provides the operator with an indication where tape can be handled without destroying data.
- Provides the tape transport with a reference point for its operations.

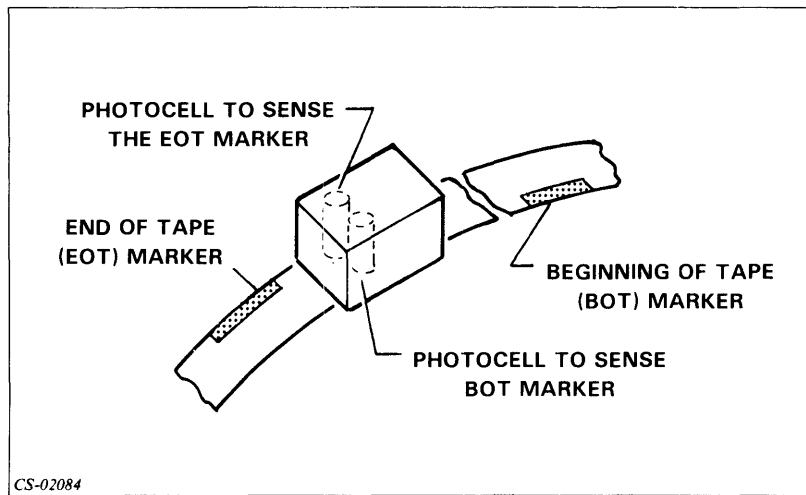


Figure 7.5 Tape Markers

- Small pieces of reflective tape.
- Sensed by photodetector.
- Beginning-of-tape (BOT) marker:
 - Placed at least 10 ft. from the leading edge of tape to allow for threading.
 - Placed parallel to and not more than 0.03 in. from edge of tape closest to operator.
- End-of-tape (EOT) marker:
 - Placed about 25 ft. from trailing edge of tape.
 - Must be parallel to and not more than 0.03 in. from edge of tape.
 - Placed on tape edge closest to tape unit.
 - Placed on edge opposite BOT marker.

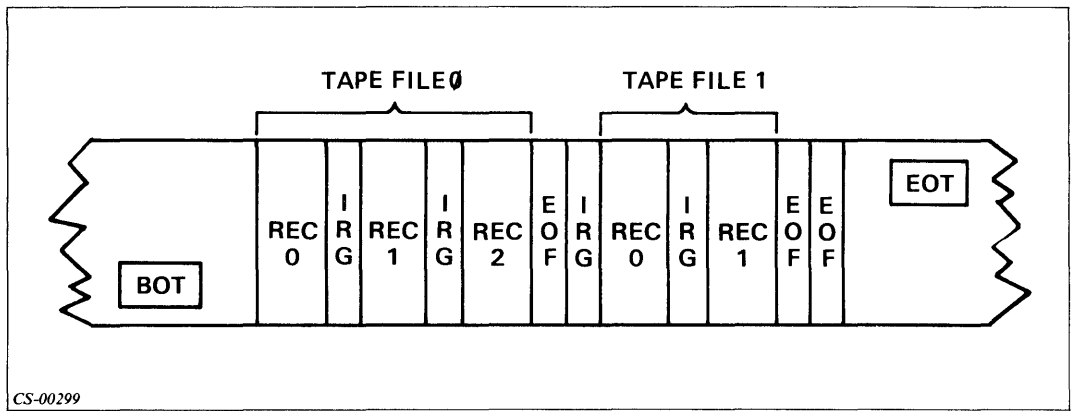


Figure 7.6 Tape Recording Structure

- BOT — Beginning of-tape marker, load point.
- Rec 0 — First record of first file.
- IRG — Interrecord gap, separates records.
Blank spot on tape about 1/2 in. long.
- File 0 — Group of records including Rec 0, Rec 1, and Rec 2.
- EOF — End-of-file marker indicates no more records exist for preceding file. Two end-of-file markers indicate the end of data on tape.
- EOT — End of tape marker.

Directions

Now take the Segment A Exercise on the next page.

Segment A

Introduction to Magnetic Tape

Exercise

Circle the letter of the correct answers.

1. Data is transferred between the magnetic tape and the computer system by a:
 - a. Reel.
 - b. Read/write head.
 - c. Capstan.
 - d. Disc drive.
2. NRZI refers to one type of:
 - a. Data.
 - b. Tape recording technique.
 - c. Disc drive.
 - d. Terminal.
3. Data stored on tape is known as:
 - a. Serial access data.
 - b. Random access data.
 - c. Arranged data.
 - d. Video data.
4. EOT refers to a marker near the end of:
 - a. A record.
 - b. A file.
 - c. A gap.
 - d. The tape.
5. Data density is measured in:
 - a. bpi.
 - b. bps.
 - c. mph.
 - d. fps.

6. Data written in seven-track format can be read in:
 - a. Seven-track format.
 - b. Nine-track format.
 - c. Seven and nine-track format.
 - d. All of the above.
7. Two EOF markers in a row indicate:
 - a. The end of data on tape.
 - b. An interrecord gap.
 - c. The end of the first file.
 - d. The beginning of a file.

Directions

Now check your answers with those on the next page.

Segment A
Introduction to Magnetic Tape
Exercise Answers

1. b
2. b
3. a
4. d
5. a
6. a
7. a

Directions

If you answered all the questions in the segment exercise correctly, restart the Module 7 audiotape to continue.

If all your answers are not correct, go back and review the segment and try the segment exercise before continuing.

Segment B

Tape Transport Operations

Components of Tape Transports

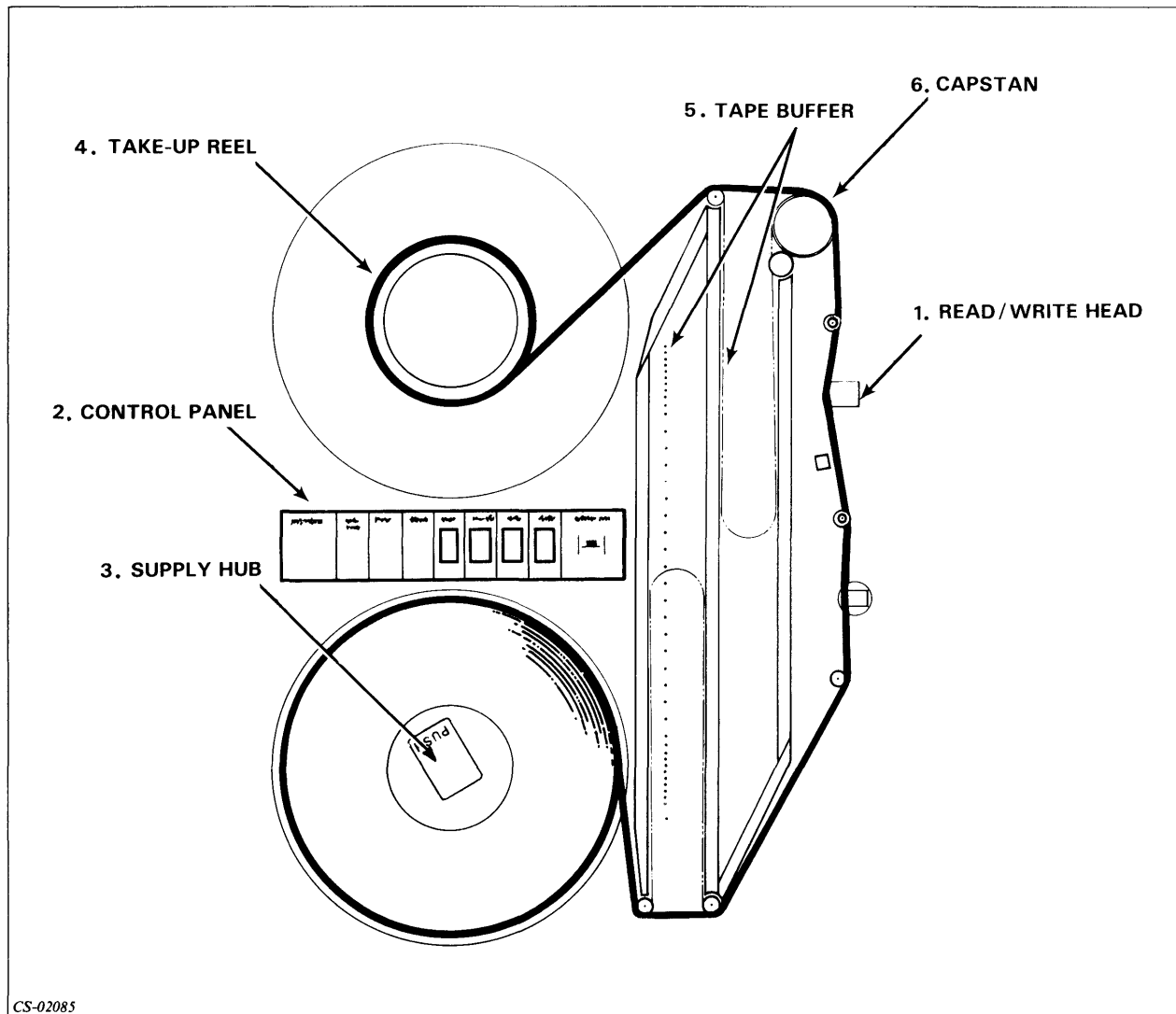


Figure 7.7 Tape Transport Components

- Read/write head assembly
- Operator control panel
- Supply hub for attaching supply reel
- Nonremovable take-up reel
- Capstan — Motor-driven roller that moves tape at constant speed.
- Tape buffer:
 - Holds a reserve of tape, allowing transport to accelerate.
 - Vacuum columns or swinging arms.

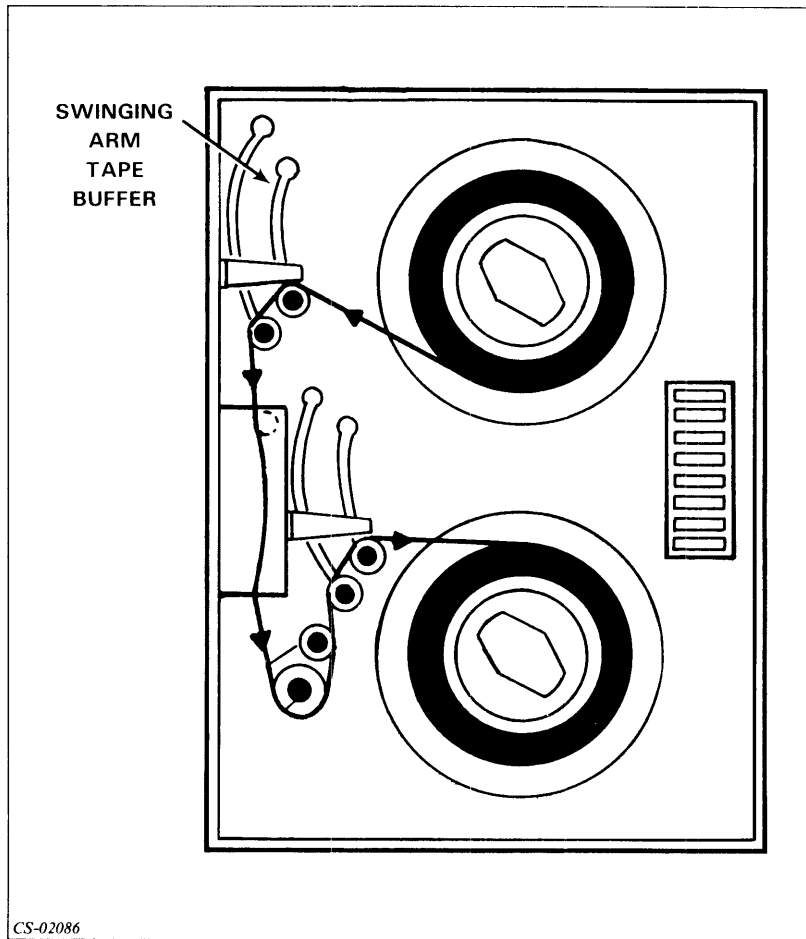


Figure 7.8 Tape Transport with Swinging Arm
• Streamers — No tape buffer or capstans.

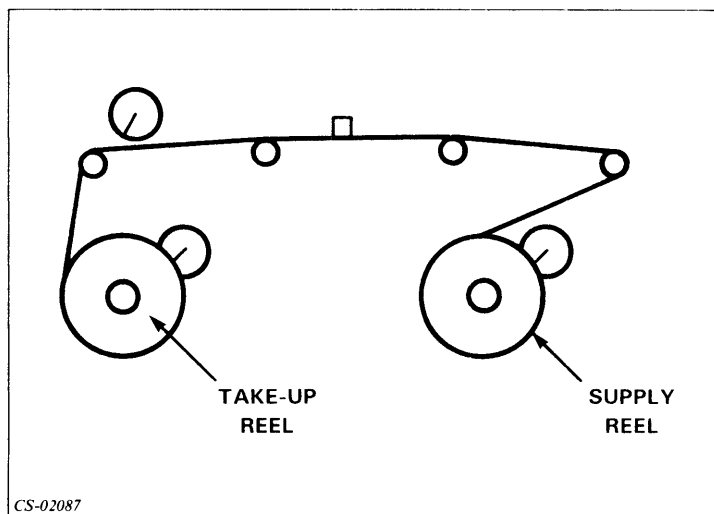


Figure 7.9 Streamer Type of Tape Transport
• Microprocessor controls reel movement.

Write Enable Ring

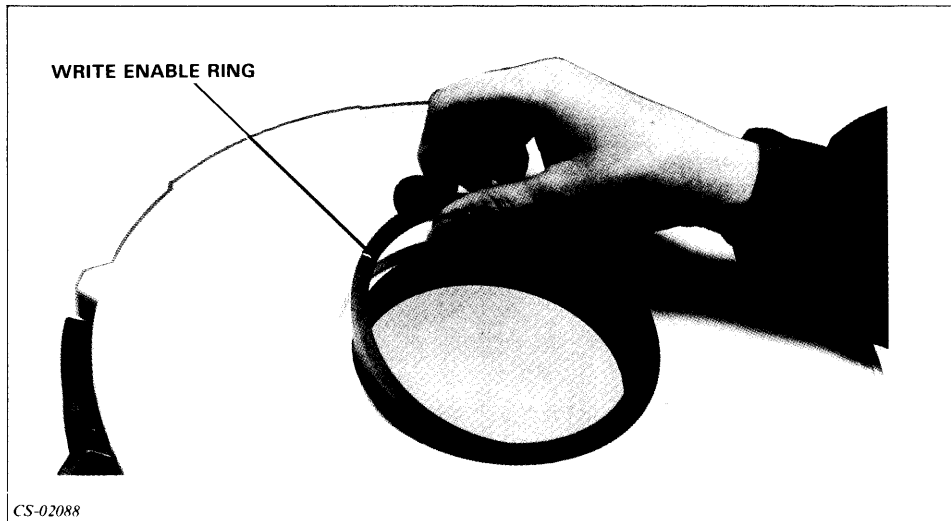


Figure 7.10 Write Enable Ring

- When placed on supply reel, allows you to write new data on tape.
- When you write on tape, previously stored data is destroyed.
- Without a write enable ring, the tape is write protected.

Operator's Controls

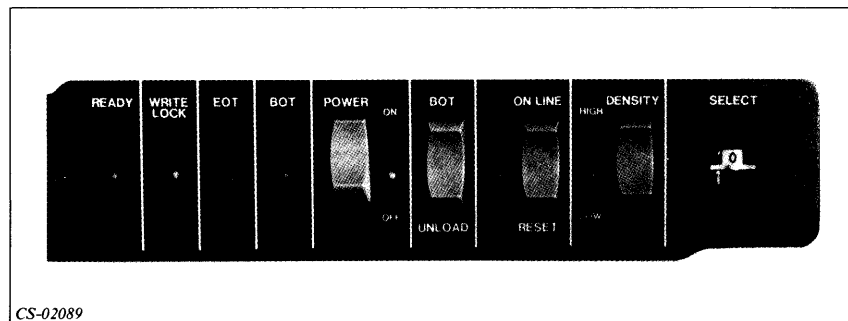


Figure 7.11 Model 6026 Tape Transport: Control Panel

READY Indicator

Lights when:

- Power is on.
- Tape transport is on-line.
- Tape transport is ready to receive and execute the commands of the program.

WRITE LOCK Indicator

- Lights when the tape transport is disabled from writing data on tape.
- Indicator goes out if tape reel has a write enable ring on it.

EOT Indicator

- Goes on when photodetector senses the EOT marker.
- Stays on until you unload the tape, rewind it, or move it in the reverse direction past the EOT under program control.

BOT Indicator

- Goes on when photodetector senses the BOT marker.
- Goes off when tape moves away from BOT marker.

POWER Switch

- When power is on, the tape transport is powered up and the indicator is lit.
- When power is off, the tape transport is powered down and the indicator is off.

BOT/UNLOAD Switch

- Used to load, rewind, and unload tape.
- Effective only when tape transport is off-line.
- If tape is unloaded:
 - Pressing BOT starts vacuum system and advances tape to BOT marker.
 - Pressing UNLOAD rewinds tape slowly into supply reel.
- If tape is loaded:
 - Pressing BOT rewinds tape to BOT marker.
 - Pressing UNLOAD rewinds tape to BOT marker and shuts off vacuum column.

ON LINE/RESET Switch

Push to ON LINE:

- Places transport on-line.
- Lights up ON LINE and READY indicators.
- Makes transport ready to receive and execute program commands.
- Cannot use BOT/UNLOAD and DENSITY switches.

Push to RESET:

- Transport goes off-line.
- ON LINE indicator goes out.
- Tape stops.
- Can use BOT/UNLOAD and DENSITY switches.

DENSITY Switch

- Use to select reading/writing density of the tape transport.
- Set to HI to select 1600 bpi Phase Encoded format.
- Set to LO to select 800 bpi NRZI format.
- Indicator is on when set to HI.
- Indicator is off when set to LO.
- Can change density only when transport is off-line.

SELECT Switch

- Eight-position switch.
- Unit identification code for tape transport.
- Select code when transport is off-line.
- Need different number for each transport.

DC Circuit Breakers

- Two DC circuit breakers at back of transport.
- Usually left ON and power controlled by front panel POWER switch.

Routine Operations

- Loading tape.
- Backward loading to correct problem in which the tape has gone past the EOT and come off the supply reel.
- Unloading tape.
- Changing density.
- Changing a take-up reel.
- Performing correction procedures following a power failure.
- Cleaning.

Directions

If you have access to a tape transport, its operator's manual, a reel of tape, and supervision, then try Lab Activity 7-1 on the next page. This lab is optional; if you do not have any of the required resources, continue to the Segment B Exercise.

Lab Activity 7-1

If you have access to a tape transport, its operator's manual, a reel of tape, and supervision, then try this lab activity.

The basic operation of all tape transports is generally the same, although some aspects may vary. Read the instructions on loading and unloading tape in your operator's manual. Then, with supervision, perform the steps below.

Loading Tape

1. Open the transport door.
2. Release the supply hub latch.
3. Obtain a reel of tape. Remove the write enable ring, if one is installed.
4. Mount the supply reel on the supply hub and latch the supply hub latch.
5. Thread the tape as indicated on the threading diagram on the tape transport, and wind several turns of tape onto the take-up reel.
6. Close the transport door.
7. Set the power switch to the ON position.
8. Momentarily press the LOAD switch (BOT on some transports) to bring the tape to the load point. (This switch is located on the operator control panel.) The tape should then move until the BOT reflective marker is positioned over the BOT sensor. The tape has now reached the proper tension.
9. Press the ON LINE switch. When the ON LINE and READY indicators are lit, the transport is ready to accept and execute commands from the computer. (Model 6026 transports go on-line only at BOT.)

On-line operation commences when the transport is selected by its controller. During on-line operation, the executing program controls tape motion and the reading and writing of data.

Unloading Tape

Always rewind the tape onto the supply reel before you power down the tape transport.

1. Place the tape transport off-line.
2. Press UNLOAD (REWIND on some models).
3. When the tape stops at the BOT point, press the UNLOAD switch again. Hold the switch down until the tape has completely rewound onto the supply reel.
4. Open the transport door.
5. Manually wind the remaining end of the tape onto the supply reel.

6. Remove the supply reel. Do not attempt to remove the reel by pulling on the flanges.
7. Place a tape retainer over the leading edge of the tape to prevent the tape from unwinding; then place the tape reel in its container.

Cleaning

You must keep your tape transport clean for it to function properly. Your operator's manual provides a schedule and a description of cleaning procedures.

1. Clean the tape path surfaces.
2. Clean the capstan (if your transport has one).
3. Clean the door.

Directions

Now try the Segment B Exercise on the next page.

Segment B

Tape Transport Operations

Exercise

Circle the letter of the correct answer.

1. A signal that the transport is ready to receive and execute the commands of the program is given by the:
 - a. POWER indicator.
 - b. WRITE LOCK indicator.
 - c. LOAD indicator.
 - d. READY indicator.
2. The EOT indicator goes on when the:
 - a. Tape is loaded.
 - b. Photodetector senses the end of the tape marker.
 - c. Transport is powered down.
 - d. Transport is powered up.
3. The DENSITY switch is used to select the:
 - a. Device code.
 - b. Power mode.
 - c. bpi.
 - d. EOT marker.
4. If the tape is loaded, pressing the BOT switch:
 - a. Advances the tape to the BOT marker.
 - b. Resets the tape transport.
 - c. Changes the density.
 - d. Changes the device code.

5. If the WRITE LOCK indicator is on, the transport:
 - a. Cannot write on the tape.
 - b. Has sensed the EOT marker.
 - c. Has sensed a write enable ring.
 - d. Cannot read the tape.

Directions

Now check your answers with those on the next page.

Segment B

Tape Transport Operations

Exercise Answers

1. d
2. b
3. c
4. a
5. a

Directions

If you answered all the questions in the segment exercise correctly, continue to the Module 7 Quiz on the next page.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Module 7 Quiz

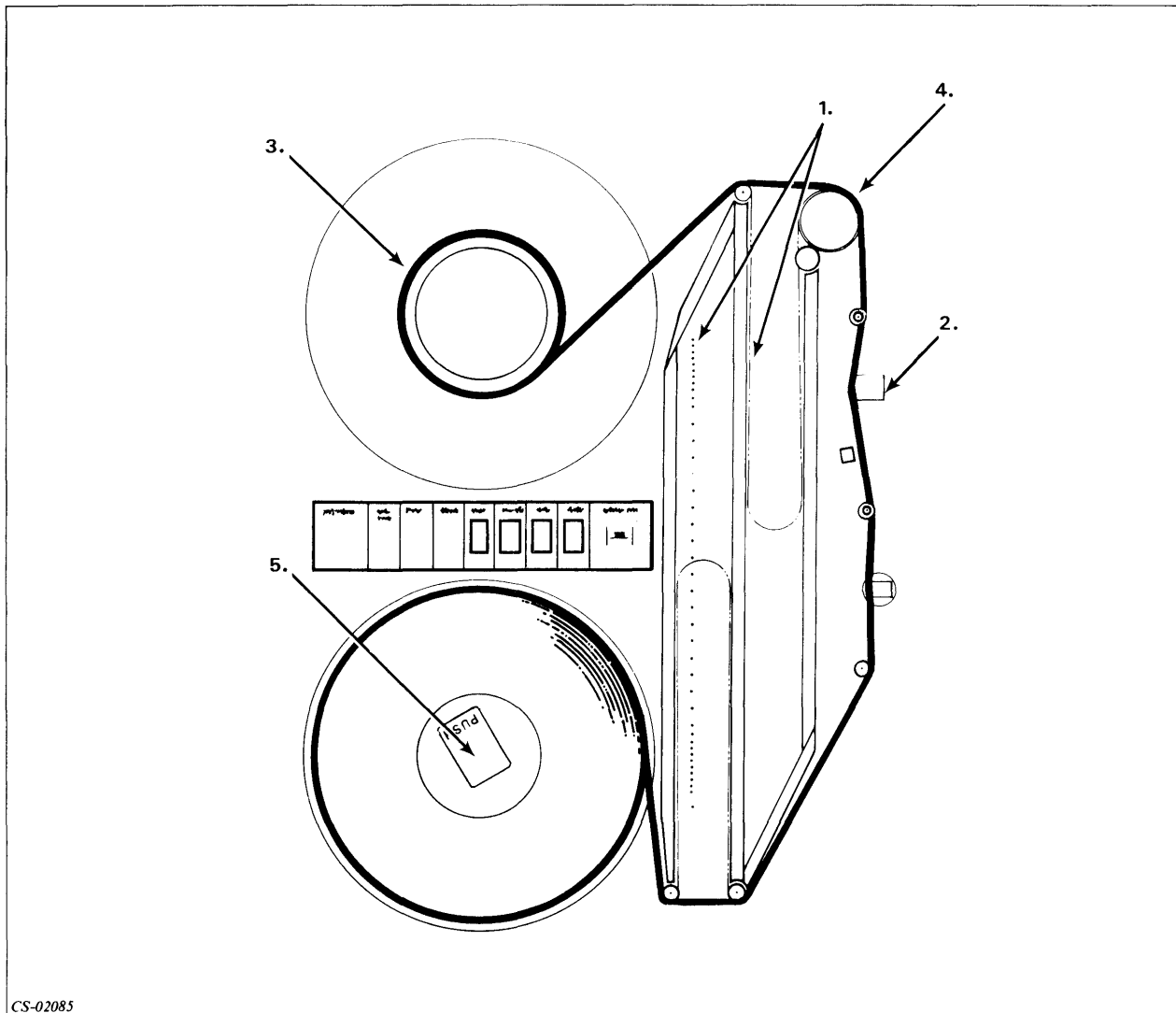
Circle the letter of the correct answer.

1. The read/write heads are used to:
 - a. Transfer data between the tape and computer system.
 - b. Detect EOT markers.
 - c. Detect BOT markers.
 - d. Move the tape from reel to reel.
2. PE refers to a type of:
 - a. Data.
 - b. Tape recording technique.
 - c. Disc drive.
 - d. Terminal.
3. BOT refers to a marker near the beginning of:
 - a. A record.
 - b. A file.
 - c. A gap.
 - d. The tape.
4. Bpi is a measure of:
 - a. Transmission speed.
 - b. Distance to end of tape.
 - c. Data density.
 - d. Read/write speed.
5. An IRG:
 - a. Is a recording format.
 - b. Is a measure of transmission speed.
 - c. Is serial access data.
 - d. Separates records.

6. To select 1600 bpi, you would press the:
 - a. EOT switch.
 - b. BOT switch.
 - c. DENSITY switch.
 - d. RESET switch.
7. If a loaded tape has a write enable ring on it, the WRITE LOCK indicator will be:
 - a. On.
 - b. Off.
 - c. On momentarily, then off.
 - d. Blinking.
8. The reel on which you permanently store tape is called the _____ reel.
 - a. Take-up
 - b. Supply
 - c. Capstan
 - d. Tape buffer
9. Two consecutive end of file markers indicate:
 - a. The end of a record.
 - b. The end of data on a tape.
 - c. An interrecord gap.
 - d. An interfile gap.
10. To routinely rewind tape, you would press the:
 - a. EOT switch.
 - b. SELECT switch.
 - c. UNLOAD switch.
 - d. LOAD switch.

11. Match each of the tape transport components listed below with the number of its corresponding arrow in Figure 7.12.

- a. Read/write head _____
- b. Take-up reel _____
- c. Supply hub _____
- d. Capstan _____
- e. Tape buffer _____



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Figure 7.12 Module 7: Quiz

Directions

Now check your answers with those in Appendix A.

Module 8

AOS, AOS/VS, and the CLI

Introduction

This module introduces the AOS and AOS/VS operating systems by discussing the purpose and function of these operating systems. Most of this module deals with the various aspects of the Command Line Interpreter (CLI).

Module Objectives

Upon successful completion of this module, you should be able to:

1. Given a list of terms, complete a statement of the function and purpose of the AOS and AOS/VS operating systems.
2. Identify the primary function of the CLI.
3. Select and code syntactically correct CLI commands to perform selected operations.
4. Identify the proper SCREENEDIT commands to perform selected functions.
5. Identify and correct errors in CLI commands.
6. Identify a process.
7. Demonstrate an understanding of CLI coding aids by expanding given CLI command lines.
8. Define the CLI environment.

Resources

To complete this module, you need:

- Module 8 audiotape.
- Module 8 of your Student Guide.
- Audiotape playback unit.

Optional Resources

- *AOS and AOS/VS User's Handbook* (093-000150-02)
- *Command Line Interpreter (CLI) User's Manual (AOS and AOS/VS)* (093-000122-05)

Module Outline

Module 8 discusses the following topics:

1. AOS and AOS/VS Principles
 - a. Purpose
 - b. Functions and features
 - c. Responsibilities
 - d. The process concept
2. CLI Command Line Syntax
 - a. Function
 - b. Command line format
 - c. Switches
 - d. Delimiters
 - e. Terminators
3. References
 - a. HELP
 - b. Other references
4. More CLI Commands
 - a. COPY
 - b. DELETE
 - c. RENAME
 - d. TYPE

5. Coding Aids
 - a. Multiple-command lines
 - b. Multiple-line commands
 - c. WRITE
 - d. Parentheses
 - e. Angle brackets
6. The CLI Environment: Overview
 - a. Levels of the CLI environment
 - b. PUSH and POP
 - c. CURRENT and PREVIOUS
7. CLI Commands to Change the Environment
 - a. The /P switch
 - b. Superuser privilege
 - c. Superprocess privilege
 - d. Control characters and sequences
 - e. SCREENEDIT
8. More Environmental CLI Commands
 - a. PROMPT
 - b. CHARACTERISTICS

Directions

Now start the Module 8 audiotape to begin. As you listen, follow along in Module 8 of your Student Guide.

Segment A

AOS and AOS/VS Principles

Purpose

- AOS — (Advanced Operating System)
- AOS/VS — (Advanced Operating System/Virtual Storage)
- General-purpose
- Disc-based
- Operating systems
- Control and monitor processing
- Data General Corporation ECLIPSE® computers
- Multiprogramming systems
- Users share resources of the computer

Functions and Features

- Time-sharing — Many users use a single computer at the same time. The computer treats each user as if he were the only one.
- Batch — Traditional type of operation. Jobs are collected into groups and processed sequentially.
- Real-time — Computer system controls the environment by receiving data, processing the data, and returning the results quickly enough to affect the environment.

Security

- User privileges are assigned by the system manager.
- User protects files by limiting access.

Process

- User of the system's resources.
- AOS — Up to 64 processes.
- AOS/VS — Up to 255 processes.

AOS and AOS/VS as a Resource Manager

- Controls input and output requests.
- Controls file processing.
- Controls process activities.

The operating system manages the following resources:

- Processor — Users share the Central Processing Unit (CPU).
- Memory — Memory is shared by swapping processes to disc.
- Files of information — The operating system supports four types of files (fixed, variable, dynamic, and data sensitive).
- Devices — The operating system keeps track of device characteristics.

Responsibilities

Bookkeeping

- What new jobs are coming in?
- Where is new information to be stored?
- What old jobs do I have?
- What new jobs do I have to do?

Supervision

- Is a job allowed to get the information it wants?
- Which job runs next?
- Can a job write to the space it wants?

Directions

Restart the Module 8 audiotape to continue.

The Process Concept

A process is a set of system resources composed of:

- Program
- Unique ID
- Username
- Memory
- Priority
- Privileges
- State
- Type

Directions

Restart the Module 8 audiotape to continue.

Process state

- Determines the ability of a process to access the CPU.
- Three possible states:
 - Eligible
 - Ineligible
 - Blocked

Command Line Interpreter (CLI)

- User's primary interface with operating system.
- Allows execution of programs.
- Allows control of peripheral devices.
- Allows setting and displaying of system variables.
- Over 90 commands.

Directions

Now do the Segment A Exercise on the next page.

Segment A

AOS and AOS/VS Principles

Exercise

Circle the letter of the correct answer. Some questions have more than one answer.

1. An operating system is:
 - a. The computer hardware that controls processing.
 - b. An interface between the CLI and the user.
 - c. The resource manager of the computer.
 - d. A process in which jobs are collected and processed sequentially.
 - e. Responsible for bookkeeping.
2. AOS and AOS/VS are:
 - a. Disc-based.
 - b. Disc controllers.
 - c. Operating systems.
 - d. Data General Corporation buzzwords.
 - e. Databases.
3. The CLI:
 - a. Manages the computer memory.
 - b. Is an operating system.
 - c. Is dedicated to a single user.
 - d. Is an interface between the user and the operating system.
4. A process:
 - a. Is a user of system resources.
 - b. Controls the files.
 - c. Has numerous components.
 - d. Can be in one of three states.
 - e. Is a resource manager.

Directions

Now check your answers with those on the next page.

Segment A

AOS and AOS/VS Principles

Exercise Answers

1. c, e
2. a, c
3. d
4. a, c, d

Directions

If you answered all the questions in the segment exercise correctly, restart the Module 8 audiotape to continue.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Segment B

CLI Command Line Syntax

Function

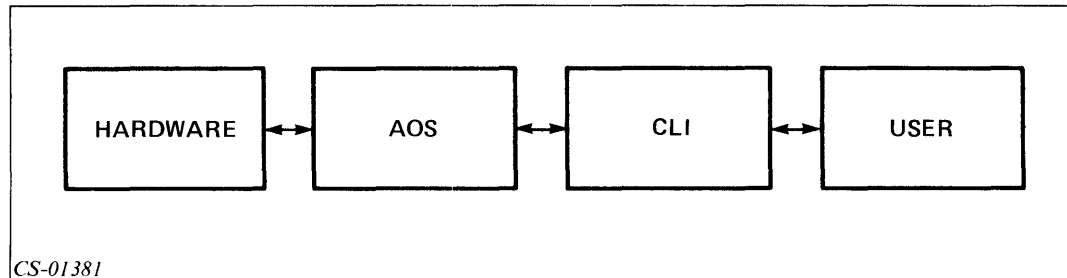


Figure 8.1 The Command Line Interpreter (CLI) Interface

What is the Command Line Interpreter?

- Interface between user and operating system via terminal.
- The user talks to AOS or AOS/VS by entering CLI commands.
- Run user programs and system utilities.
- Control files and peripheral devices.
- Set, display, or control the environment.
- Used both in batch and interactive mode.

Command Line Format

- `COMMAND[/SWITCH1.../SWITCHX],[ARGUMENT1.....,ARGUMENTX]`

Note: Brackets [] indicate optional information and do not have to be coded.

- Command — Identifies operation to be performed.
- Switch — Modifies the function of the command.
- Argument — Filename, pathname, or device that the command affects.

Abbreviations

- Commands
- Switches
- Unique identification required

For the TIME command:

T	Not unique
TI	Unique
TIM	Unique
TIME	Unique

For the **TYPE** command:

T Not unique

TY Unique

TYP Unique

TYPE Unique

Possible variations of the **/SORT** switch:

/S

/SO

/SOR

/SORT

Abbreviation too short:

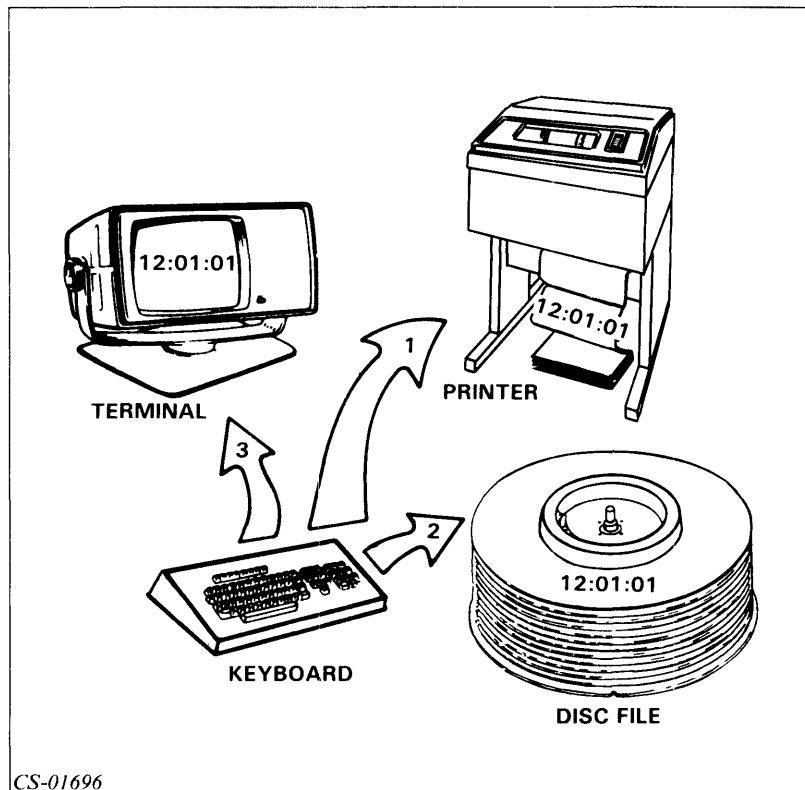
- Command: **COMMAND ABBREVIATION NOT UNIQUE**
- Switch: **SWITCH ABBREVIATION NOT UNIQUE**

Switches

- Format: Slash (/) followed by a word, number, or expression.
- Modify default action of a CLI command.
- Types:
 - Simple
 - Keyword

Table 8.A The TIME Command

Command	Switch	Effect
TIME/L	/L	Sends output to the current listfile. (1)
TIME/L=PATHNAME	Simple switch /L=PATHNAME Keyword switch	Sends output to the file specified by filename. (2)
TIME	None	Sends output to your console. (3)



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Figure 8.2 TIME Going to the Printer, Disc File, and Console

Five common switches used with all CLI commands:

- /1=
- /2=
- /L
- /L=PATHNAME
- /Q

/1= and /2= pertain to error handling.

- Invalid commands cause errors (exceptional conditions).
- Two classes:
 - Class 1 — Severe; attempt to change environment.
 - Class 2 — Less serious; no attempt to change environment.

Table 8.B Four Error Actions

Setting	Result
IGNORE	No effect. The exception is ignored and processing continues.
WARNING (Default class 2)	A warning message is displayed and processing continues.
ERROR (Default class 1)	Execution of the current command stops. A message is displayed and CLI prompts for a new command.
ABORT	Return to creating process. If you are in CLI, you are logged off the system.

- /L Command's output goes to listfile (usually the line printer).
- /L= Command's output goes to file specified by pathname.
- /Q Compresses CLI command output.

Example 1

Output without SQUEEZE

Command line: F

DIRECTORY :UDD:FLUFF:MORT

-FLUFF.TMP	TXT	11-FEB-82	13:39:58	0
-FLUFF.TUBE	TXT	11-FEB-82	13:40:02	6
MORT.FR	UDF	20-MAR-81	11:15:50	1096
TEMP	TXT	11-FEB-82	13:41:06	0
MOUT	TXT	10-FEB-82	16:24:06	3579
TEMP.BU	TXT	11-FEB-82	13:39:46	195
MORTIN	UDF	10-FEB-82	16:26:10	18
MORT.PR	PRG	25-SEP-80	11:11:50	65536
PRCMORT	UDF	10-FEB-82	16:21:38	61

Example 2

Same output with SQUEEZE

Command line: F/Q

DIRECTORY :UDD:FLUFF:MORT

```
-FLUFF.TMP TXT 11-FEB-82 13:39:58 0
-FLUFF.TUBE TXT 11-FEB-82 13:40:02 6
MORT.FR UDF 20-MAR-81 11:15:50 1096
TEMP TXT 11-FEB-82 13:41:06 0
MOUT TXT 10-FEB-82 16:24:06 3579
TEMP.BU TXT 11-FEB-82 13:39:46 195
MORTIN UDF 10-FEB-82 16:26:10 18
MORT.PR PRG 25-SEP-80 11:11:50 65536
PRCMORT UDF 10-FEB-82 16:21:38 61
```

Argument

- Format: Delimiter, argument, [delimiter,argument]
- Required only by some commands.

Delimiters

- Separate command and each of its arguments
- Space or spaces
- Tab or tabs
- Single comma
- Any combination

Example

These commands are equivalent:

TYPE FILE1 (single space)

TYPE,FILE1 (comma)

TYPE FILE1 (tab)

TYPE , FILE1 (space, comma, tab, space)

Directions

Restart the Module 8 audiotape to continue.

Terminators

- CLI command line must end with a terminator.
- NEW LINE
- Carriage return
- Form-feed (CTRL-L)
- End-of-file (CTRL-D)

Example

These commands are equivalent:

TIME (NEW LINE)

18:41:26

TIME (carriage return)

18:41:26

TIME (form-feed)

18:41:26

TIME (end-of-file)

18:41:26

Directions

Now do the Segment B Exercise on the next page.

Segment B

CLI Command Line Syntax

Exercise

In Questions 1 through 4, match the terms with the elements of the command line.

TYPE/L,FILE1
↑ ↑↑ ↑
A BC D

1. ____ Delimiter
2. ____ Command
3. ____ Argument
4. ____ Switch

Indicate which of the following command lines are coded correctly by writing a C for correct and an I for incorrect. If the command line is *not* correctly coded, explain why.

5. ____ TYPE /L FILE1
6. ____ TYPE/L,FILE1
7. ____ TYPE/L FILE1
8. ____ TYPE/L FILE1
9. ____ TYPE L,FILE1

Directions

Now check your answers with those on the next page.

Segment B

CLI Command Line Syntax

Exercise Answers

1. C
2. A
3. D
4. B
5. I (Space between command and switch.)
6. C
7. C
8. C
9. I (No slash in switch.)

Directions

If you answered all the questions in the segment exercise correctly, restart the Module 8 audiotape to continue.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Segment C References

HELP

The HELP command provides information about CLI commands.

```
)HELP
TOPICS ARE:

*1_SWITCH      *2_SWITCH      *AFTER_SWITCH  *CLI_INPUT     *COMMANDS
*CONDITIONALS *CONTROL_CHARS *CURSOR_CONTROL *DBMS          *DISPLAY
*ENROLL_DOC    *ENVIRONMENT  *EXCEPTIONS    *EXEC
*FILENAMES
*GENERIC_FILES *HISTO        *I_SWITCH      *LINK          *LINKS
*LOGSCALL      *L_SWITCH    *MACROS        *MAIL          *M_SWITCH
*NEWLINE       *OVTRAC      *PATCH        *PATHNAMES    *PED
*PSEUDO-MACROS *P_SWITCH    *QUEUES        *Q_SWITCH     *REPORT
*SED           *SNAP        *SWITCHES      *TEMPLATES    *TOOLS
*TOPICS        *XRO

FOR MORE HELP ABOUT ANY ITEM ABOVE, TYPE 'HELP *ITEM'
)
```

Figure 8.3 Result of the HELP Command
/V Switch

- Invokes verbose option.
- Provides more detailed information.

Example
Enter **HELP/V,HELP**

```

HELP      PROVIDE HELPFUL INFORMATION

FORMAT:  HELP <ITEM> ...

COMMAND SWITCHES:  /1= /2= /L(=) /O
                  /V      PROVIDE MORE INFORMATION IF AVAILABLE

IF YOU TYPE HELP WITH NO ARGUMENTS, YOU WILL BE SHOWN A LIST OF TOPICS
ABOUT WHICH YOU MAY ASK FOR HELP.  EACH TOPIC BEGINS WITH AN ASTERISK.
YOU MAY GIVE ONE OR MORE OF THESE TOPICS AS ARGUMENTS TO A HELP COMMAND.
YOU MUST INCLUDE THE ASTERISK.  ALL AOS SYSTEMS PROVIDE THE TOPICS
*COMMANDS AND *PSEUDO-MACROS.  YOUR SYSTEM WILL PROBABLY HAVE OTHER
TOPICS
AS WELL.

HELP *COMMANDS
      WILL GIVE YOU A LIST OF ALL CLI COMMANDS.  YOU CAN FIND OUT THE
      ARGUMENT REQUIREMENTS OF A COMMAND AND ITS COMMAND SWITCHES BY TYPING
      THE COMMAND NAME AS AN ARGUMENT TO A HELP COMMAND.  IF THERE IS
      ADDITIONAL
      INFORMATION AVAILABLE ON YOUR SYSTEM FOR THAT COMMAND, YOU WILL BE
      REMINDED
      THAT YOU CAN RE-ISSUE THAT HELP COMMAND WITH THE /V COMMAND SWITCH TO SEE
      THE ADDITIONAL INFORMATION.

```

Figure 8.4 Result of the HELP/V, HELP Command

HELP Command Summary

- Provides information:
 - CLI
 - For system users:
 - Some provided by Data General Corporation.
 - Some provided by system users.

Other References

- *AOS and AOS/VS User's Handbook* (093-000150-02)
- *Command Line Interpreter (CLI) User's Manual (AOS and AOS/VS)* (093-000122-05)


```

)HELP/V CREATE
CREATE CREATE A FILE

FORMAT: CREATE PATHNAME <RESOLUTION-PATHNAME>
        WHERE RESOLUTION-PATHNAME IS THE PATHNAME
        TO WHICH THE LINK WILL RESOLVE
        (IF /LINK SWITCH IS USED)

COMMAND SWITCHES: /1= /2= /L(=) /Q
/DATASENSITIVE RECORD TYPE OF CREATED FILE
/DIRECTORY      CREATE A DIRECTORY OR CONTROL POINT DIRECTORY
/DYNAMIC       RECORD TYPE OF THE CREATED FILE
/ELEMENTSIZE=N NUMBER OF DISK BLOCKS FILE WILL GROW BY
/FIXED=N       RECORD TYPE OF THE CREATED FILE
/HASHFRAMESIZE=N SIZE OF HASH FRAME (DEFAULT 7)
                (DIRECTORIES ONLY)
/I            CONTENTS OF FILE TAKEN FROM @INPUT
/INDEXLEVELS=N MAXIMUM NUMBER OF INDEX LEVELS (DEFAULT=3)
/LINK        CREATE A LINK
/M          FILE TAKEN FROM REMAINDER OF MACRO FILE
/MAXSIZE=N  CREATE A CONTROL POINT DIRECTORY OF THE SPECIFIED
            MAXIMUM SIZE (IN DISK BLOCKS) -- VALID ONLY
            WITH THE /DIRECTORY SWITCH
/TYPE=N     CREATE A FILE OF THE SPECIFIED TYPE (63 < N < 256)

```

Figure 8.6 HELP Output for the CREATE Command

Directions

Restart the Module 8 audiotape to continue.

- CREATE command — Creates a file.

Example 1

```
CREATE,FILE1
```

Example 2

```
CREATE/I,NEWFILE
)THIS IS THE TEXT.
))
```

Directions

Now do the Segment C Exercise on the next page.

Segment C

References

Exercise

Write the CLI commands to do the following.

1. Supply information about the DATE command.
2. Create a text file that allows you to enter data from your console. Call the file DATA_FILE.
3. Supply a list of CLI commands.

Directions

Check your answers with those on the next page.

Segment C

References

Exercise Answers

1. **HELP,DATE** or **HELP/V,DATE**
2. **CREATE/I,DATA_FILE**
3. **HELP,*COMMANDS**

Directions

If you answered all the questions in the segment exercise correctly, restart the Module 8 audiotape to continue.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Segment D

More CLI Commands

COPY

- Format: COPY,DESTINATION_FILE,SOURCE_FILE [SOURCE_FILE]...
- Create exact copy of one or more files.
- Switches are used when destination file exists:
 - /A — Appends source file to destination file.
 - /D — Deletes old file, then replaces it with source file.

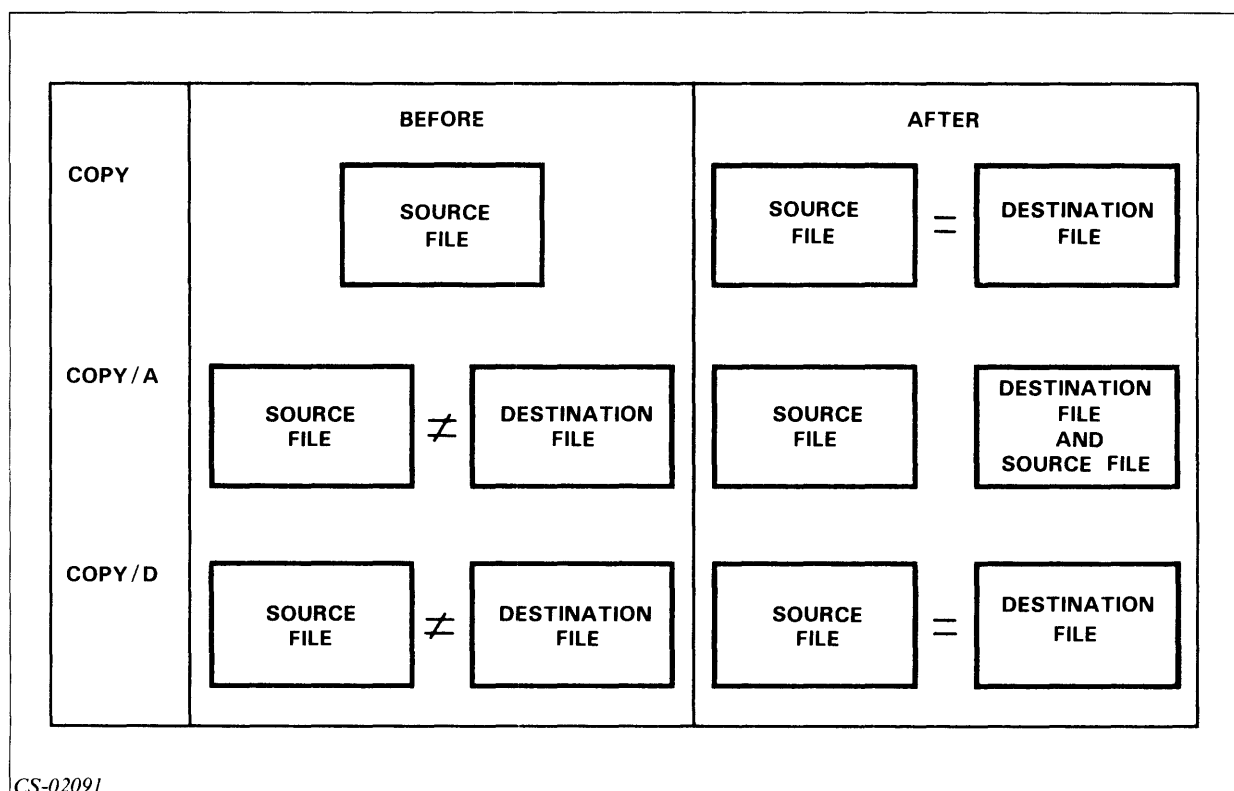


Figure 8.7 The COPY Command

Example 1

COPY,CAR,BUS

Create CAR. Copy BUS into CAR.

Before this command was issued, CAR did not exist, and BUS contained data B. After the COPY command is issued, both CAR and BUS contain data B.

Example 2

COPY/A,CAR,BUS

Append BUS to CAR.

Before this command was issued, CAR contained data A, and BUS contained data B. After the COPY command is issued, CAR contains both data A and data B, and BUS contains its original data B.

Example 3
COPY/D,CAR,BUS

Replace the contents of CAR with BUS.

Before this command was issued, CAR contained data A, and BUS contained data B. After the COPY command is issued, CAR contains data B, and BUS also contains data B. Data A, the original contents of CAR, has been deleted as a result of the /D switch.

Example 4
COPY/D,CAR,BUS,TRUCK

Replace the contents of CAR with BUS and TRUCK.

Before this command was issued, CAR contained data A, BUS contained data B, and TRUCK contained data C. After the COPY command is issued, CAR contains data B and data C. Data A, the original contents of CAR, has been deleted as a result of the /D switch.

DELETE

- Format: DELETE,FILENAME [FILENAME].
- Deletes one or more files.
- Switches:
 - Help prevent accidental deletion of files.
 - /C — Confirm before deleting files.
 - /V — Verify after deleting files.

Example 1
DELETE/C,FILE_ONE
FILE_ONE? Y**Example 2**
DELETE/C/V,FILEA,FILEB
FILEA? N
FILE NOT DELETED
FILEB? Y
FILEB DELETED

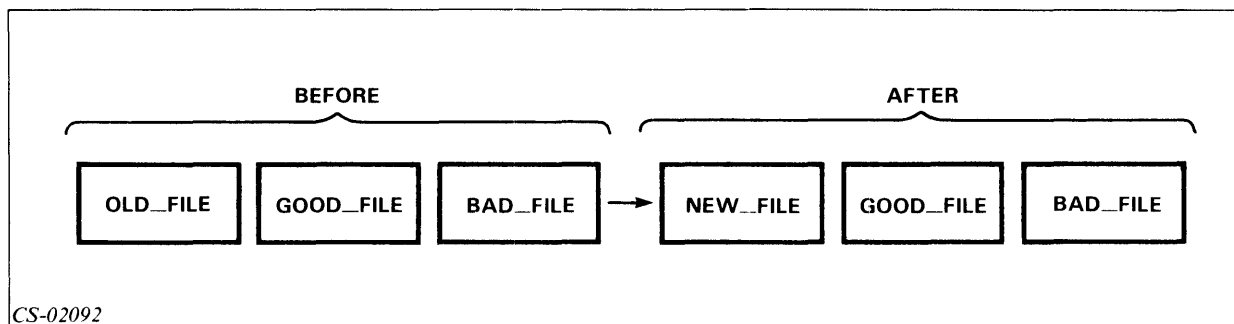
Note: Always use the /C and /V switches when deleting files.

RENAME

- Format: RENAME,PATHNAME,NEWNAME
- Changes filename.

Example
RENAME,OLD_FILE,NEW_FILE

Original file (OLD_FILE) now NEW_FILE. No OLD_FILE after execution.



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Figure 8.8 The RENAME Command

TYPE

- Format: TYPE,FILENAME
- Displays file's contents.
- Switches:
 - /1 =
 - /2 =
 - /L
 - /L =
 - /V
 - /Q (has no effect)

Example 1

```
CREATE/I,TESTFILE
)TEST LINE 1
)TEST LINE 2
))
TYPE,TESTFILE
TEST LINE 1
TEST LINE 2
```

Example 2

```
CREATE/I/FIXED=30,TESTFILE2
)TEST LINE 1
)TEST LINE 2
))
TYPE/V,TESTFILE2
```

```
FILE TESTFILE2
RECORD FORMAT: FIX, RECORD LENGTH: 30
```

```
TEST LINE 1
TEST LINE 2
```

Directions

Now do the Segment D Exercise on the next page.

Segment D

More CLI Commands

Exercise

Write the CLI commands to do the following.

1. Append the contents of FILEX to the contents of FILEY.
2. Replace the contents of FILEX with the contents of FILEZ.
3. Delete FILE1 and FILE2, ask for confirmation before deletion, and verify the results.
4. Create FILEV and put the contents of FILEK into FILEV in one command.
5. Change the name of a file called JUNK to GOOD_STUFF.
6. Display the contents of a file called GOOD_STUFF.

Directions

Check your answers with those on the next page.

Segment D

More CLI Commands

Exercise Answers

1. **COPY/A,FILEY,FILEX**
2. **COPY/D,FILEX,FILEZ**
3. **DELETE/C/V,FILE1,FILE2**
4. **COPY FILEV,FILEK**
5. **RENAME,JUNK,GOOD_STUFF**
6. **TYPE,GOOD_STUFF**

Directions

If you answered the questions in the segment exercise correctly, continue to Lab Activity 8-1 on the next page.

If all your answers are not correct, go back and review the segment and do the segment exercise again before continuing.

Lab Activity 8-1

If you have a computer system available, follow the steps listed below. If you do *not* have access to a computer system, simply read these steps carefully.

1. Log on (any terminal will do).
2. Enter **HELP R**.

The CLI is confused. It does not know which command starting with R you want information about.

3. Now enter **HELP RENAME**.

That response is better, isn't it? The CLI tells us that the RENAME command requires some arguments, and it uses the common switches. The CLI tells you how to get more information. You can do that now.

4. Type **HELP/V RENAME**.
What did the /V switch do for you?

Sometimes the minimal amount of information is all you need. Other times you may need more information, such as what is provided here.

5. Enter the following:

```
CREATE/I FILE1  
This is the first file I'm creating.  
It is 2 lines long.  
)
```

6. Now type **TYPE/V FILE1**.

A copy of your file has been returned. Did you make any typing errors?

7. Now enter **RENAME FILE1 FILE2**.

8. Type in the **TYPE** command from Step 6 again.

The error message you received is a result of our renaming FILE1. FILE1 no longer exists.

9. Type **TYPE FILE2**.

As you see, the contents of FILE1 are still available, but as FILE2.

10. Now enter **COPY FILE_COPY FILE2**.

11. Type **TYPE/V FILE2 FILE_COPY**.

Both files are identical. Also, the **TYPE** command has allowed you to type multiple files at one time.

12. Type **DELETE/C/V FILE2 FILE_COPY**.
What response did you get?

The CLI is giving you an opportunity to save the file.

13. Reply **Y**.

The CLI now verifies that it did delete FILE2 and asks if you want to delete FILE_COPY. You do, so reply Y.

Directions

If you had any problems or did not understand the procedures you just performed, go back and review the segment; then try the lab again.

If you completed the lab successfully and feel that you fully understand it, restart the Module 8 audiotape to continue.

Segment E

Coding Aids

Multiple-Command Line

- Multiple commands on one line.
- Semicolon separates commands.

Example

```
TYPE,FILE_ONE;RENAME,FILE_ONE,NEW_FILE;TYPE,NEW_FILE
```

Multiple-Line Commands

- One command requiring more than one line.
- Ampersand (&) used to continue to next line.

Example 1

```
TYPE,FILE_ONE,FILE_TWO,SPECIAL_FILE_DATA,FILE_THREE,&
&)FILE_FOUR
```

Example 2

```
TYPE,FILE.F,FILE.V,&
&)FILE.X,&
&)FILE.B
```

WRITE

- Displays its arguments on your terminal.

Example

```
WRITE This is an aardvark.
This is an aardvark.
```

Parentheses

- Allows command repetition.

Example 1

TYPE (A B C) expands to:

```
TYPE A
TYPE B
TYPE C
```

Example 2

WRITE A (B C) D expands to:

```
WRITE A B D
WRITE A C D
```

At your terminal, you see:

```
A B D
A C D
```

Example 3

(TYPE DELETE) FILE_ONE expands to:

```
TYPE FILE_ONE
DELETE FILE_ONE
```

Example 4

WRITE (A B C)(X Y) expands to:

```
WRITE AX
WRITE BY
WRITE C
```

At your terminal, you see:

```
AX
BY
C
```

Angle Brackets

- Argument expansion
- Same command line, one command with several arguments

Example 1

TYPE FILE<1 2 3> expands to:

```
TYPE FILE1 FILE2 FILE3
```

Example 2

WRITE <A B C><1 2> expands to:

```
WRITE A1 A2 B1 B2 C1 C2
```

At your terminal, you see:

```
A1 A2 B1 B2 C1 C2
```

The following examples illustrate ways that parentheses and angle brackets can be combined to produce differing expansions.

Example 1

WRITE (A B C)(1 2) expands to:

```
WRITE A1
WRITE B2
WRITE C
```

At your terminal you see:

```
A1
B2
C
```

Example 2

WRITE (A B C)<1 2> expands to:

WRITE A<1 2>

WRITE B<1 2>

WRITE C<1 2>

At your terminal, you see:

A1 A2

B1 B2

C1 C2

Example 3

WRITE <A B C><1 2> expands to:

WRITE A<1 2> B<1 2> C<1 2>

At your terminal you see:

A1 A2 B1 B2 C1 C2

Example 4

WRITE <A B C>(1 2) expands to:

WRITE <A B C>1

WRITE <A B C>2

At your terminal, you see:

A1 B1 C1

A2 B2 C2

Directions

Now do the Segment E Exercise on the next page.

Segment E

Coding Aids

Exercise

Answer the following questions.

1. Correctly write the following two CLI commands on a single line:
TYPE FILE1
RENAME FILE3 OLD_FILE

2. What character is used to extend a command line to a second line?

3. Write a single CLI command using parentheses and/or angle brackets to accomplish the following tasks.
 - a. TYPE FILE1 FILE2 FILE3

 - b. TYPE FILE1 FILE2 TEST1 TEST2

 - c. TYPE FILE12
TYPE FILE22
TYPE FILE32

Directions

Now check your answers with those on the next page.

Segment E

Coding Aids

Exercise Answers

1. TYPE,FILE1;RENAME,FILE3,OLD_FILE
2. Ampersand (&)
3.
 - a. TYPE,FILE<1,2,3>
 - b. TYPE,<FILE,TEST> <1,2>
 - c. TYPE,FILE(1,2,3)2

Directions

If you answered all the questions in the segment exercise correctly, restart the Module 8 audiotape to continue

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Segment F

The CLI Environment: Overview

Your CLI environment is composed of several parameters. These parameters are:

LEVEL	VARIABLES
SUPERUSER	LISTFILE
SUPERPROCESS	DATAFILE
SCREENEDIT	DIRECTORY
SQUEEZE	SEARCHLIST
CLASS1	DEFACL
CLASS2	STRING
TRACE	PROMPT
	CHARACTERISTICS

These parameters are set to their default values when you log on. Use the **CURRENT** command to list the settings.

- Format: **CURRENT**

```

)CURRENT
LEVEL          0
SUPERUSER      ON
SUPERPROCESS   OFF
SCREENEDIT     ON
SQUEEZE        OFF
CLASS1         ERROR
CLASS2         WARNING
TRACE
VARIABLES      0      0      0      0      0
                0      0      0      0      0

LISTFILE       @LIST
DATAFILE       @DATA
LOGFILE
DIRECTORY      :UDD:BUBBIE:MODULE?
SEARCHLIST     :UTIL,:UTIL:INFOS:UDD:BUBBIE
DEFACL         BUBBIE,OWARE+.RE
STRING         TIME
PROMPT         TIME,DIRECTORY
CHARACTERISTICS /605X/LPP=24/CPL=80
                /ON/ST/EB0/ULC/PM/WRP

/OFF/SFF/EPI/BBT/SPO/RAF/RAT/RAC/NAS/OTT/EOL/UCO/LT/FF/EB1/NRM/MOD/T0/TSP
/PBN/ESC/FKT/NNL

```

Figure 8.9 Sample Output of the **CURRENT** Command

Levels of the CLI Environment

LEVEL

- Location within the CLI environment.
- Zero — Highest level.
- Displays current level.
- Each level contains all environment parameters.

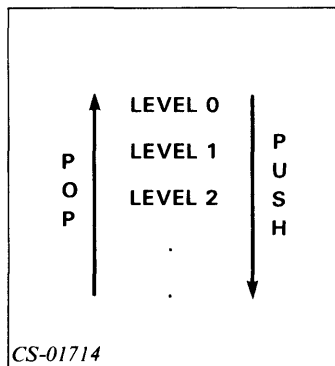
Example

LEVEL

LEVEL 0

PUSH and POP

- PUSH — Move one level down.
- POP — Move one level up.



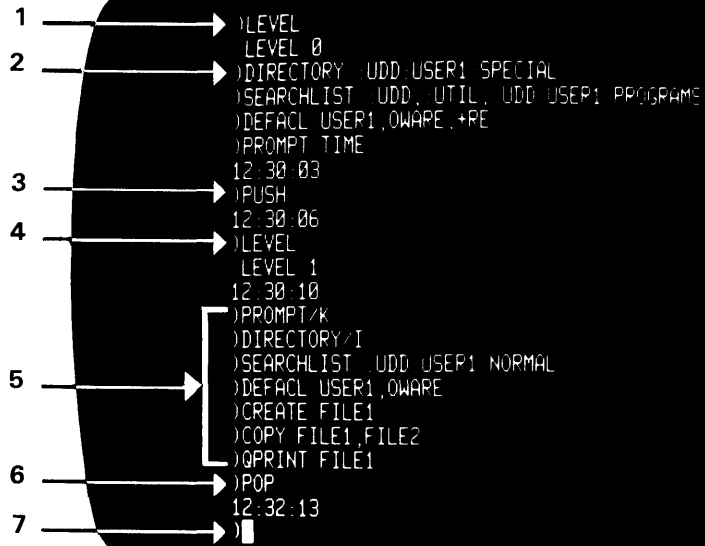
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Figure 8.10 The PUSH and POP Commands

CURRENT and PREVIOUS

PREVIOUS

- Format: PREVIOUS
- Displays parameters for next higher level.



```
1 → )LEVEL
2 → )LEVEL 0
  )DIRECTORY UDD USER1 SPECIAL
  )SEARCHLIST UDD ,UTIL , UDD USER1 PROGRAMS
  )DEFACL USER1 ,OWARE ,+PE
  )PROMPT TIME
3 → 12:30:03
4 → )PUSH
  )LEVEL
  )LEVEL 1
  )PROMPT /K
5 → )PROMPT /K
  )DIRECTORY /I
  )SEARCHLIST UDD USER1 NORMAL
  )DEFACL USER1 ,OWARE
  )CREATE FILE1
  )COPY FILE1 ,FILE2
  )QPRINT FILE1
6 → )POP
7 → 12:32:13
  )
```

Figure 8.11 Changing Your Environment Level

Directions

Now do the Segment F Exercise on the next page.

Segment F

The CLI Environment: Overview

Exercise

Write the command to do the following.

1. Move down one level.
2. Move up one level.
3. Display the current setting of the environment's variables.
4. Display your location in the environment.

Directions

Now check your answers with those on the next page.

Segment F

The CLI Environment: Overview

Exercise Answers

1. **PUSH**
2. **POP**
3. **CURRENT**
4. **LEVEL**

Directions

If you answered all the questions in the segment exercise correctly, restart the Module 8 audiotape to continue.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Segment G

CLI Commands to Change the Environment

The /P Switch

- Sets parameters to those of the previous level.

Example
 DIRECTORY :UTIL
 PUSH
 DIRECTORY :UDD:ME
 .
 .
 .
 DIRECTORY/P
 DIRECTORY
 :UTIL

Superused Privilege

- Format: SUPERUSER { ON }
 { OFF }
- Access any file (bypass ACLs).
- Turn on from operator's console.
- No argument displays status.

Example 1
 To display the status:

```
SUPERUSER
OFF
```

Example 2
 To turn SUPERUSER on:

```
SUPERUSER ON
*)
```

Example 3
 To turn SUPERUSER off:

```
*)SUPERUSER OFF
```

Example 4
 Error condition (user cannot use):

```
SUPERUSER ON
ERROR: CALLER NOT PRIVILEGED FOR THIS ACTION
```


Table 8.C Control Characters

Control Character	Result
CTRL-L	Clears the display screen.
CTRL-S	Stops the scrolling display of information.
CTRL-Q	Restarts the scrolling display of information.
CTRL-O	Cancel the display of information.
CTRL-A	Recalls previous command line.
CTRL-E	Inserts characters into command line.
CTRL-U	Deletes command line.

CTRL-A

- Modification of selected characters.

Example

QPRINT FILE1

(CTRL-A)

QPRINT FILE2A

(CTRL-A)

QPRINT FILE2B

Control Sequences

- Entry — Two control characters as a pair.

Table 8.D Control Sequences

Control Sequence	Result
CTRL-C, CTRL-A	Cancel current CLI command.
CTRL-C, CTRL-B	Cancel current process and return to creating process.
CTRL-C, CTRL-C	Echos ^C^C on screen (use to see if system is still running).
CTRL-C, CTRL-E	Terminates process and creates a breakfile.

Segment G

CLI Commands to Change the Environment

Exercise

Write the CLI command or SCREENEDIT control characters to perform the operations named below.

1. Turn on SUPERUSER.
2. Turn off SCREENEDIT.
3. Recall the previous command line.
4. Move the cursor to the end of the character string.
5. Enter/exit the insert character mode.
6. Cancel the current process.
7. Cancel the display of information.

Directions

Now check your answers with those on the next page.

Segment G

CLI Commands to Change the Environment

Exercise Answers

1. SUPERUSER,ON
2. SCREENEDIT,OFF
3. CTRL-A
4. CTRL-A
5. CTRL-E
6. CTRL-C,CTRL-B
7. CTRL-O

Directions

If you answered all the questions in the segment exercise correctly, restart the Module 8 audiotape to continue.

If your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Segment H

More Environmental CLI Commands

Table 8.F Review of Three CLI Commands

Command	Result
DIRECTORY	Sets or displays your working directory.
SEARCHLIST	Sets or displays your searchlist.
DEFACL	Sets or displays your default: Access Control List.

PROMPT

Table 8.G Superuser and Superprocess Prompts

Prompt	Superprocess	Superuser
)	OFF	OFF
*)	OFF	ON
+))	ON	OFF
#))	ON	ON

Example 1

1. SUPERPROCESS
OFF
2. SUPERPROCESS ON
3. +)SUPERPROCESS
ON
4. +)SUPERUSER
OFF
5. +)SUPERUSER ON
6. #)SUPERPROCESS OFF
7. *)SUPERUSER OFF

The PROMPT command sets or displays the prompt (information that appears before the CLI prompt).

Example 2

```
PROMPT,TIME
08:30:01
PROMPT,TIME,DATE
08:31:05
10-MAR-82
PROMPT/K
```

CHARACTERISTICS

The CHARACTERISTICS command sets or displays the characteristics of your terminal. (Use one of the first five switches to identify your console.)

Table 8.H Setting and Displaying the Characteristics of Your Terminal

Switch	Result
/HARDCOPY	Hardcopy terminals.
/40101	DGC Model 40101.
/6012	DGC Model 6012.
/605x	DGC Model 6052 or 6053.
/CRT4	Other CRTs.
/LPP= <i>n</i>	Lines per page, in decimal.
/CPL= <i>n</i>	Characters per line, in decimal.
/ON	Set the bit in the device-characteristics words for each of the command switches that follow. This bit remains set until you issue an /OFF switch or a delimiter. (Note: This bit is automatically set unless you include the /OFF switch. Therefore, this switch is optional.)
/EBO	If you want echoing to occur on your console, you must set /EBO or /EB1. This causes the system to echo control characters such as ^A, and ^B, and to echo ESC as \$. For more information see ?GCHR in the <i>AOS Programmer's Manual</i> .
/EPI	Accept only even parity on input; if this switch is off, accept any parity on input.
/EOL	Do not output a NEW LINE if CPL length is exceeded on output.
/ESC	ESC character produces ^C^A interrupt.
/FF	Output a form-feed on open.
/LT	Output 60 (decimal) nulls on open and close.
/MOD	Device is on a modem interface.
/NAS	Set non-ANSII standard bit.
/NRM	Do not allow this console to receive SEND messages.
/OTT	On input, covert octal 175 and 176 to octal 33.
/PBN	(Card readers only.) Packed format on binary read, 4 columns are put in 3 words. If you don't include this switch, columns are right-justified in memory.
/PM	Page mode. On output, write LPP lines per page, then suspend output until you type CTRL-Q.
/RAC	Send two rubouts after each NEW LINE and carriage return.
/RAF	Send 21 (decimal) rubouts after each form-feed.
/RAT	Send two rubouts after each tab (CTRL-I).
/SFF	Simulate form-feed.
/SPO	Output characters in even parity; if this switch is off, output characters as sent by program.
/ST	Simulate tab stop every eight columns.
/TO	Enable time-outs.
/TSP	(Card readers only.) Include trailing blanks; if this switch is off, trailing blanks are suppressed.
/UCO	On output, convert lower-case to upper-case.
/ULC	On input, accept both upper-case and lower-case; if this switch is off, lower-case input is converted to upper-case.
/WRP	Hardware generates NEW LINE on line-too-long.

Example 1

To turn on page mode:

```
CHARACTERISTICS/ON/PM
```

Example 2

To turn off page mode:

```
CHARACTERISTICS/OFF/PM
```

Example 3

To set characters-per-line to 132:

```
CHARACTERISTICS/CPL=132
```

Example 4

To convert output to upper-case:

```
CHARACTERISTICS/ON/UCO
```

The CHARACTERISTICS command only changes those characteristics listed in the CLI command. All those not specified remain at their previous setting.

Directions

Now do the Segment H Exercise on the next page.

Segment H

More Environmental CLI Commands

Exercise

Write the commands to do the following.

1. Display the date and directory before each CLI prompt.
2. Change your terminal's characteristics so that it does not accept lower-case input.
3. Set lines-per-page to 60, using the CHARACTERISTICS command.

Directions

Now check your answers with those on the next page.

Segment H

More Environmental CLI Commands

Exercise Answers

1. **PROMPT,DATE,DIRECTORY**
2. **CHARACTERISTICS/OFF/ULC**
3. **CHARACTERISTICS/LPP=60**

Directions

If you answered all the questions in the segment exercise correctly, continue with Module 8 by doing Lab Activity 8-2.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Lab Activity 8-2

Log onto your system. Write the commands to do each of the following. Use any references necessary before entering the command at your terminal. (Your system manager may not want you to use some commands, so check with him prior to making the entries.) Check your answers with those on the next page if you are unsure of your response.

1. Display your current level and the present setting of all of the parameters associated with this level.
2. Move up one level. Note what happens.
3. Change your prompt to display the current level.
4. Move down one level.
5. Change your prompt to display the date, time, and directory.
6. Display the characteristics of your terminal.
7. Display the environment of level zero.
8. Change your prompt to what it was at level zero.
9. Move back to level zero.
10. Turn on SCREENEDIT.
11. Enter **CA** and note the results.

12. Correct the command using the SCREENEDIT facilities so that it displays the current characteristics.

13. Create a file with the name DOG. The following line is to be entered into the file, but do *not* press the NEW LINE key.

MY DOG IS BLACK, HAS 4 LEGS, AND IS CUTE.

14. Change BLACK to WHITE, and then end the creation process.

15. Display the contents of the file DOG on your terminal, then delete the file using the SCREENEDIT facilities to change the command.

Directions

Now check your answers with those on the next page.

Lab Activity 8-2

Answers

1. Enter **CURRENT**.
2. Enter **POP**. The screen displays **ERROR: CAN'T POP FROM LEVEL ZERO**.
3. Enter **PROMPT LEVEL**.
4. Enter **PUSH**.
5. Enter **PROMPT DATE TIME DIRECTORY**.
6. Enter **CHARACTERISTICS**.
7. Enter **PREVIOUS**.
8. Enter **PROMPT/P**.
9. Enter **POP**.
10. Enter **SCREENEDIT,ON**.
11. The screen displays **ERROR: NOT A COMMAND OR MACRO,CA**
12. **CTRL-A**
CTRL-Y
HAR
13. **CREATE/I DOG**
MY DOG IS BLACK, HAS 4 LEGS, AND IS CUTE.
14. **CTRL-H**
CTRL-F
CTRL-F
CTRL-F
WHITE
)
15. **TY DOG**
CTRL-A
CTRL-H
DE
CTRL-E
L/C/V

Directions

If you successfully completed Lab Activity 8-2, continue to the Module 8 Quiz.

If you had any difficulty with the lab, review the material and do the Lab Activity again before continuing.

Module 8

Quiz

Complete the statement of the function and purpose of AOS, AOS/VS using the terms provided below. Some terms will not be used at all.

1. AOS and AOS/VS are general purpose, (a)_____ (b)_____. They (c)_____ and monitor the processing of your programs on Data General Corporation computers. These operating systems are multiprogramming systems that can be used as (d)_____, batch, or real-time systems. A process is a user of the system's resources. AOS can support up to (e)_____ processes simultaneously, and AOS/VS (f)_____ processes. These systems are (g)_____ that manage the process, (h)_____, files and (i)_____. They are also responsible for (j)_____ and supervision.

bookkeeping	time-sharing
CLI	process
control	resource manager
devices	user
disc-based	32
eligible	64
memory	255
operating systems	

Circle the letter of the best answer.

2. The Command Line Interpreter (CLI) primarily functions as:
- An operating system.
 - A user process.
 - An interface between the operating system and the user.
 - A dedicated controller to a specific user.
3. A process is:
- Just another name for a program.
 - A set of procedures.
 - A user of system resources.
 - A Data General Corporation buzzword.

Identify the elements of the following command line:

```

CREATE/DYNAMIC,NEWFILE
  ↑   ↑       ↑   ↑
  4   5       6   7

```

4. _____ a. CLI prompt
 5. _____ b. Argument
 6. _____ c. Delimiter
 7. _____ d. Command
 e. Switch

Which of the following command lines are coded correctly? Mark C for correct and I for incorrect. Write the correct version for those that are incorrect.

8. _____ HELP /V HELP
 9. _____ RENAME,FILE1 FILE3
 10. _____ TYPE FILE4
 11. _____ DELETE /C /V FILE9
 12. _____ WRITE X

Write the CLI commands that perform the following operations. Use your *AOS and AOS/VS User's Handbook* and/or *CLI User's Manual* if necessary.

13. Delete a file named XYZ.
14. Display the contents of a file called NEWS_FILE.
15. Change the name of a file called GOOD_STUFF to OLD_JUNK.
16. Create a file and allow data to be entered from the terminal. Call the file TERMINAL_DATA.
17. Copy the contents from a file called PAYROLL into a file called PERSONNEL. PERSONNEL does not yet exist.
18. Display at your terminal information about the DELETE command.

Expand the commands as shown in the example.

Example

DELETE FILE(A B)

Expands to:

DELETE FILEA

DELETE FILEB

19. COPY/A,MASTER_FILE,FILE<1 2><A B>

20. (TYPE DELETE),USELESS_FILE

21. TYPE,<FILE TEST><1 2>

22. DELETE FILE<1 2 3>.OLD

23. TYPE,(FILE TEST)(1 2) (Note: Compare this to Question 21.)

In each of the following questions, select the best answers. Use your *AOS and AOS/VS User's Handbook* and/or *CLI User's Manual* if necessary.

24. The environment is:

- a. The computer room.
- b. The device that holds your operating system.
- c. A level.
- d. A set of parameters that identifies the CLI's responses to your inputs.

25. Which of the following are part of the environment's make-up?

- a. AOS (AOS/VS)
- b. Level
- c. Directory
- d. ACL
- e. Superuser

26. Select the command to move down one level.
 - a. POP
 - b. DOWN
 - c. PUSH
 - d. LEVEL +1
27. Select the command to move up one level.
 - a. POP
 - b. UP
 - c. PUSH
 - d. LEVEL -1
28. Select the command to display only the present level of the environment.
 - a. POP
 - b. LEVEL
 - c. PREVIOUS
 - d. CURRENT
29. Which of the following commands can you use to gain access to any file in the system?
 - a. SUPERPROCESS
 - b. SEARCHLIST
 - c. SUPERUSER
 - d. SQUEEZE
30. Which of the following stops the display of information on your terminal, then restarts it?
 - a. CTRL-C,CTRL-B
 - b. CTRL-S,CTRL-Q
 - c. CTRL-O,CTRL-Q
 - d. CTRL-C,CTRL-O
31. Which of the following cancels the display of information on your terminal?
 - a. CTRL-O
 - b. CTRL-S
 - c. CTRL-E
 - d. CTRL-Q

32. Which of the following terminates the current process?
 - a. CTRL-C,CTRL-A
 - b. CTRL-C,CTRL-C
 - c. CTRL-A,CTRL-E
 - d. CTRL-C,CTRL-B
33. Which of the following moves the cursor to the end of the character string?
 - a. CTRL-A
 - b. CTRL-B
 - c. CTRL-E
 - d. CTRL-F
34. Which of the following allows insertion of characters?
 - a. CTRL-A
 - b. CTRL-B
 - c. CTRL-E
 - d. CTRL-F

Write the command that performs the following operations. Use your *AOS and AOS/VS User's Handbook* and/or *CLI User's Manual* if necessary.

35. Move up to the previous level.
36. Display the settings of the environment.
37. Set your prompt to display the time of day.
38. Display the setting of the superuser privilege.
39. Turn superprocess on.

Directions

Now check your answers with those in Appendix A.

Module 9

Creating Files and Directories

Introduction

This module introduces the concept of the directory and the directory structure. It teaches how to select a particular file from within the structure, and how directories are created. This module also introduces special files called macros and psuedo-macros.

Module Objectives

Upon successful completion of this module, you should be able to:

1. Identify the major components of a directory structure.
2. Write the pathname of a file given a directory structure.
3. Write CLI command lines to perform selected functions.
4. Code CLI command lines using templates.
5. Identify the characteristics of logical and physical discs.
6. Apply the ACL capability.
7. Define and write a macro.
8. State the types and function of pseudo-macros.
9. Demonstrate an ability to use macros and pseudo-macros

Resources

To complete this module, you need:

- Module 9 audiotape.
- Module 9 of your Student Guide.
- Audiotape playback unit.

Optional Resources

- *AOS and AOS/VS User's Handbook* (093-000150-02)
- *Command Line Interpreter (CLI) User's Manual (AOS and AOS/VS)* (093-000122-05)

Module Outline

Module 9 discusses the following topics:

1. Directories
 - a. Physical and logical discs
 - b. Directory structure
 - c. Directory creation
2. Files and Pathnames
 - a. Filenames
 - b. Working directory
 - c. Pathname
 - d. Prefixes
3. Accessing and Securing Files
 - a. Searchlist
 - b. File templates
 - c. ACL
4. FILESTATUS

5. Macros
 - a. Definition
 - b. Invoking Macros
 - c. Passing arguments
6. Pseudo-macros

Directions

Now start the Module 9 audiotape to begin. As you listen, follow along in Module 9 of your Student Guide.

Segment A Directories

Physical and Logical Discs

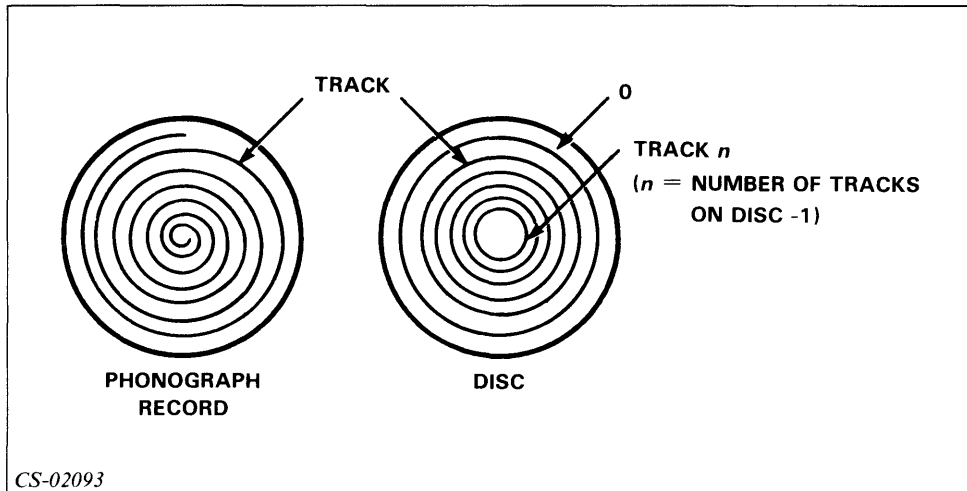


Figure 9.1 Comparison of Tracks

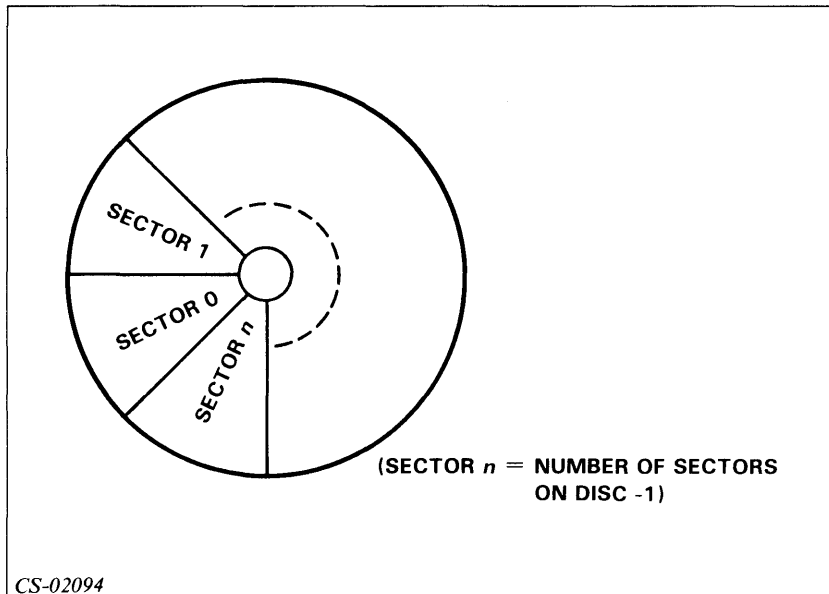


Figure 9.2 Disc Sectors

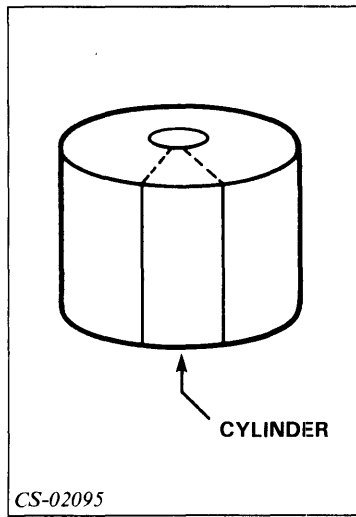


Figure 9.3 Disc Cylinder

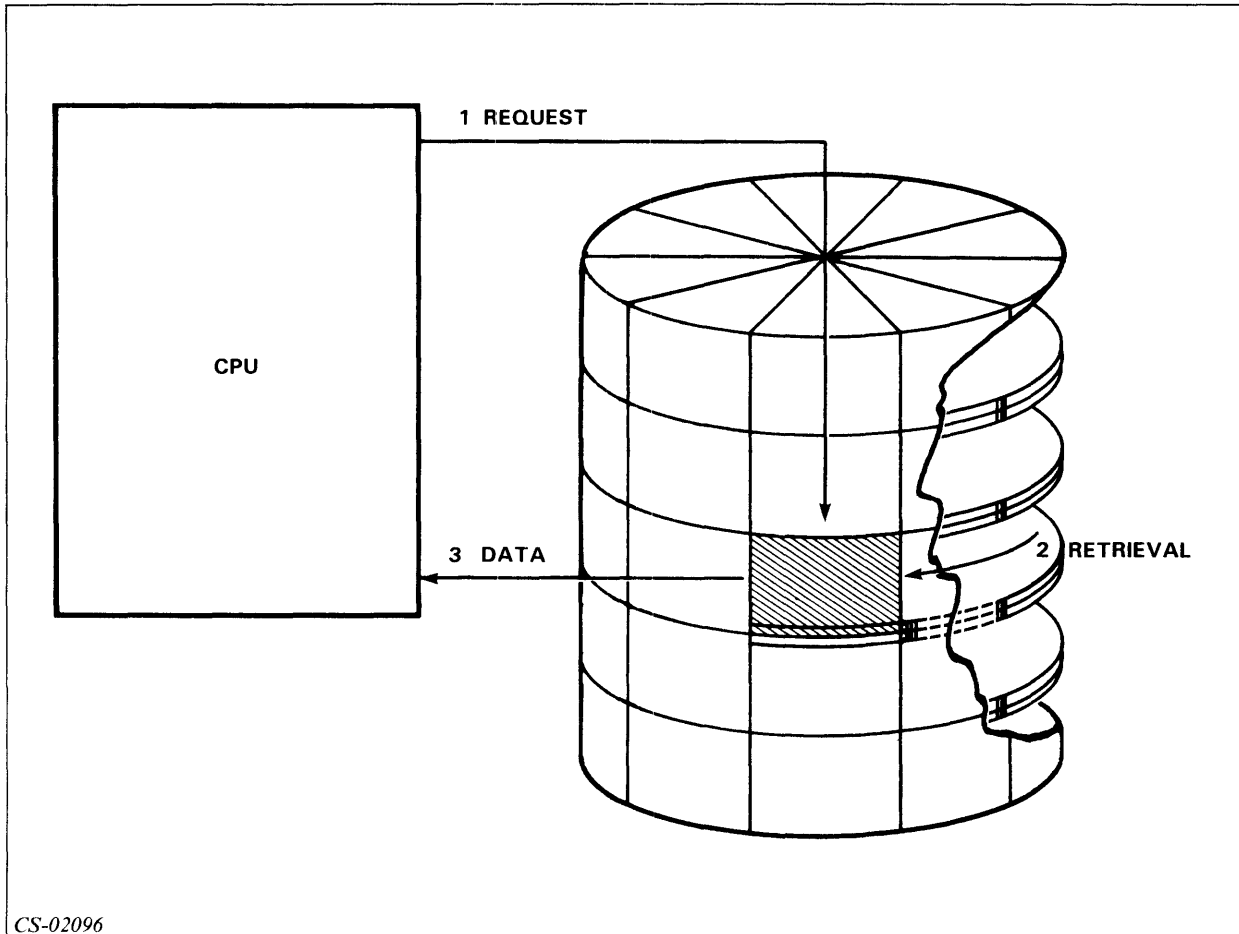


Figure 9.4 Data Transfer Process

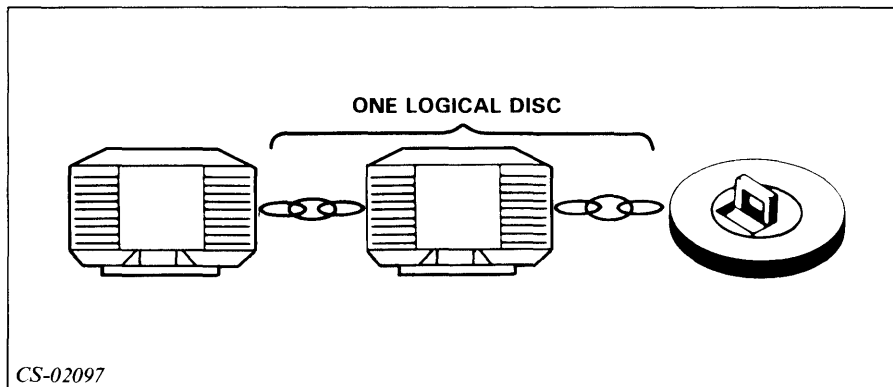


Figure 9.5 Single Logical Disc with Multiple Physical Discs

Physical Disc

- Hardware
- Tracks
- Sectors
- Cylinders

Logical Disc

- Logical entity
- One or more physical discs
- Master logical disc contains system root directory (:)

Directory Structure

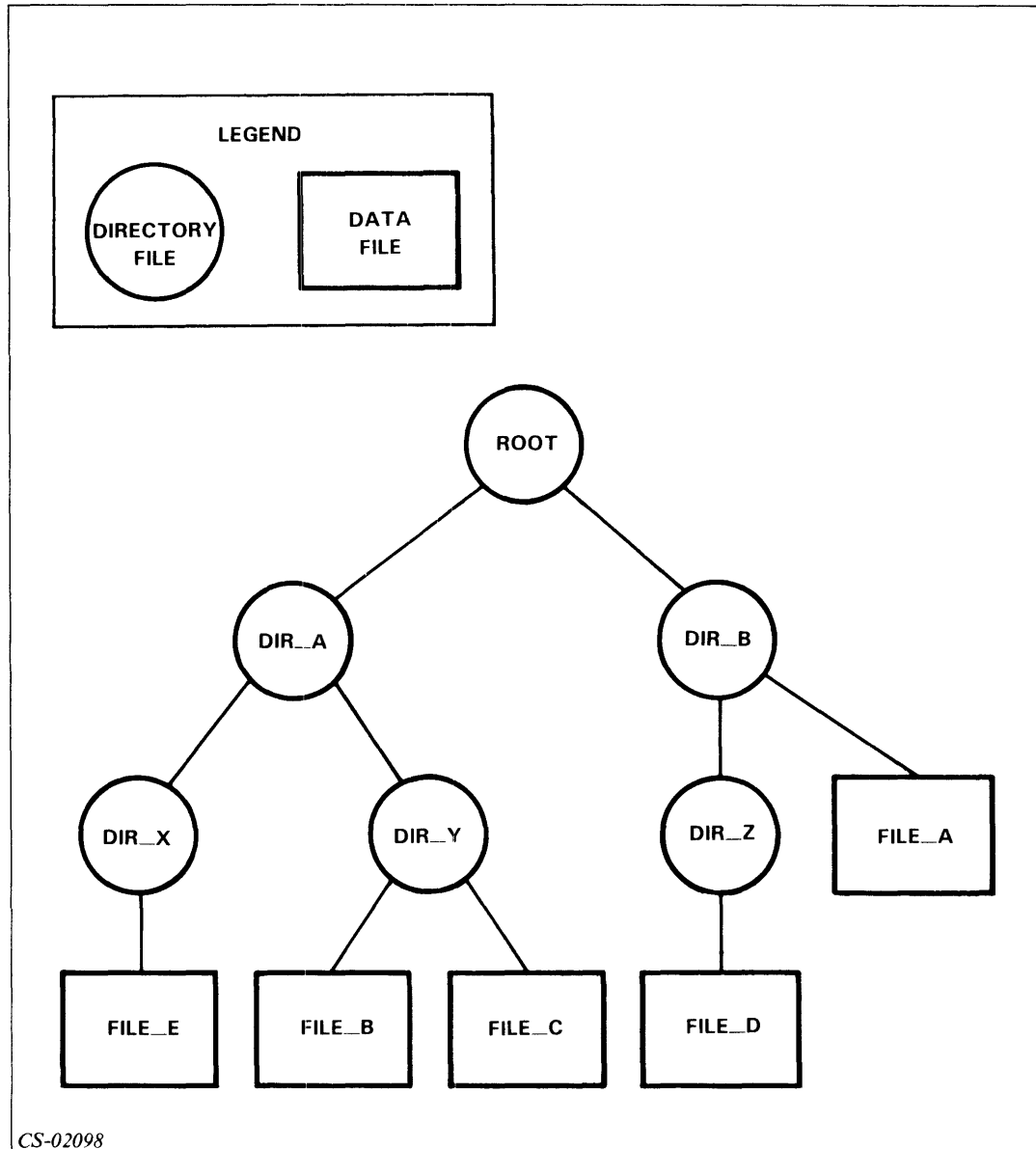
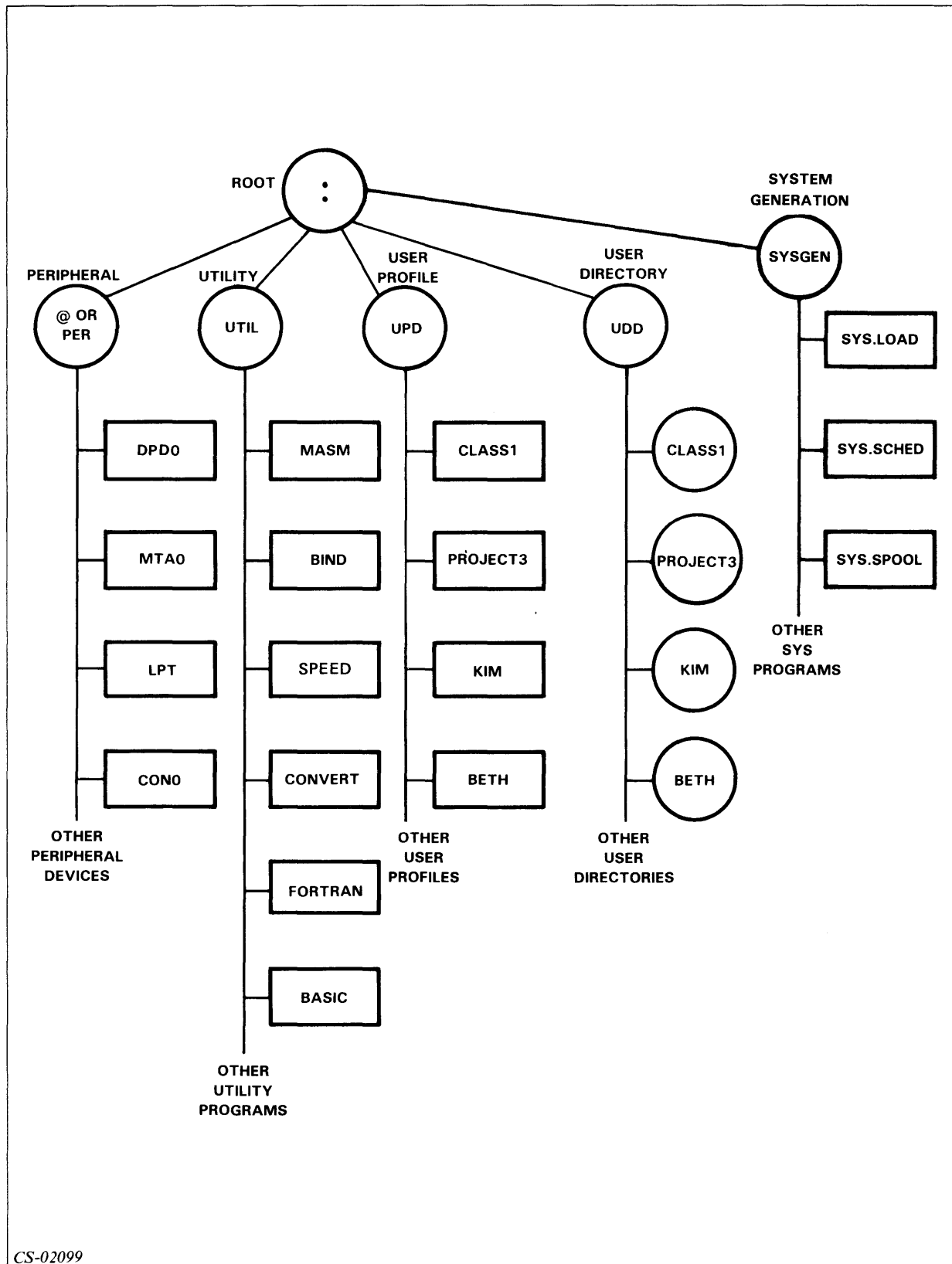


Figure 9.6 Sample Directory Structure

- File containing bookkeeping information and pointers.
- Two types:
 - Control Point Directory (CPD) — Fixed maximum disc space.
 - Directory — No space limit.
- Inverted tree structure.
- Inferior (subordinate) directories lower in structure.
- Superior directories higher in structure.



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Figure 9.7 Typical Directory Structure

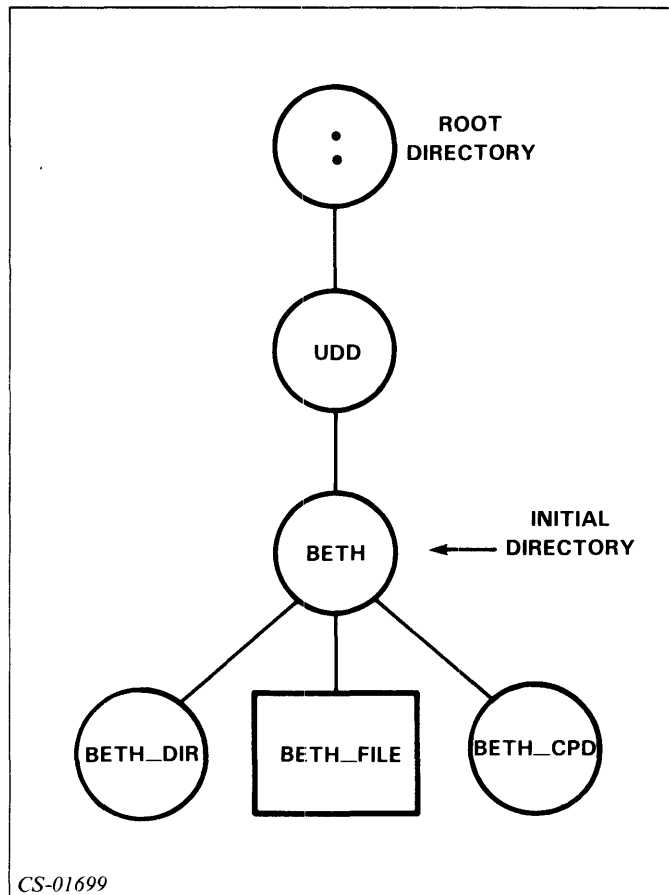


Figure 9.8 Partial Directory Structure

Directory Creation

- /DIRECTORY switch on the CREATE command.
- /MAXSIZE switch in blocks for Control Point Directory (CPD) (1 block = 512 characters).
- /DIRECTORY switch not required for CPD.

Example 1

CREATE/DIRECTORY,BETH_DIR

Example 2

CREATE/DIRECTORY/MAXSIZE=100,BETH_CPD

Directions

Now do the Segment A Exercise on the next page.

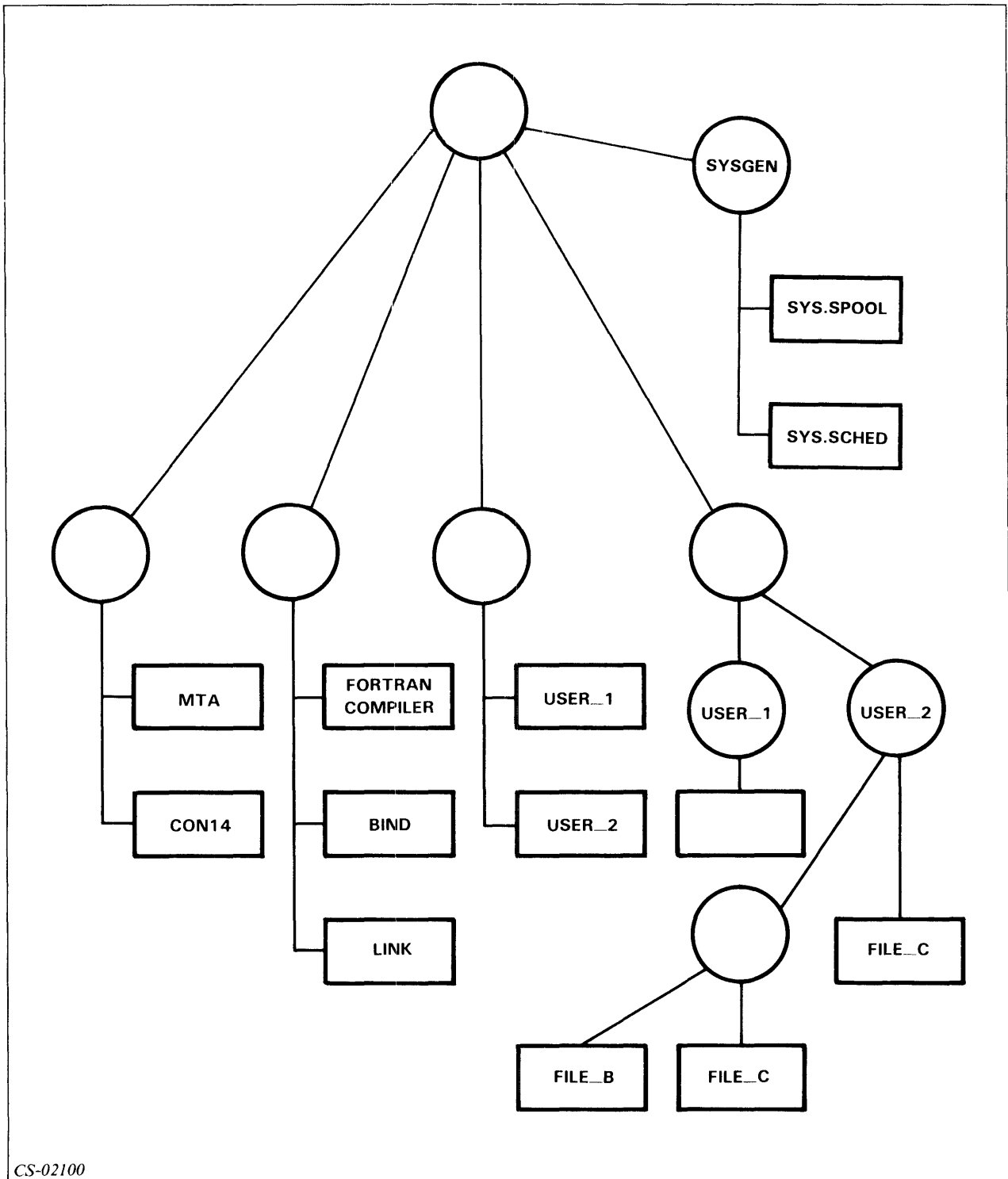
Segment A

Directories

Exercise

1. Use the following labels to fill in the blanks in the directory structure shown in Figure 9.9.

:
UPD
UDD
USER_DIRECTORY
USER_FILE
UTIL
@ or PER
SYSGEN



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Figure 9.9 Segment A: Exercise

Use Figure 9.9 to answer Questions 2 through 7.

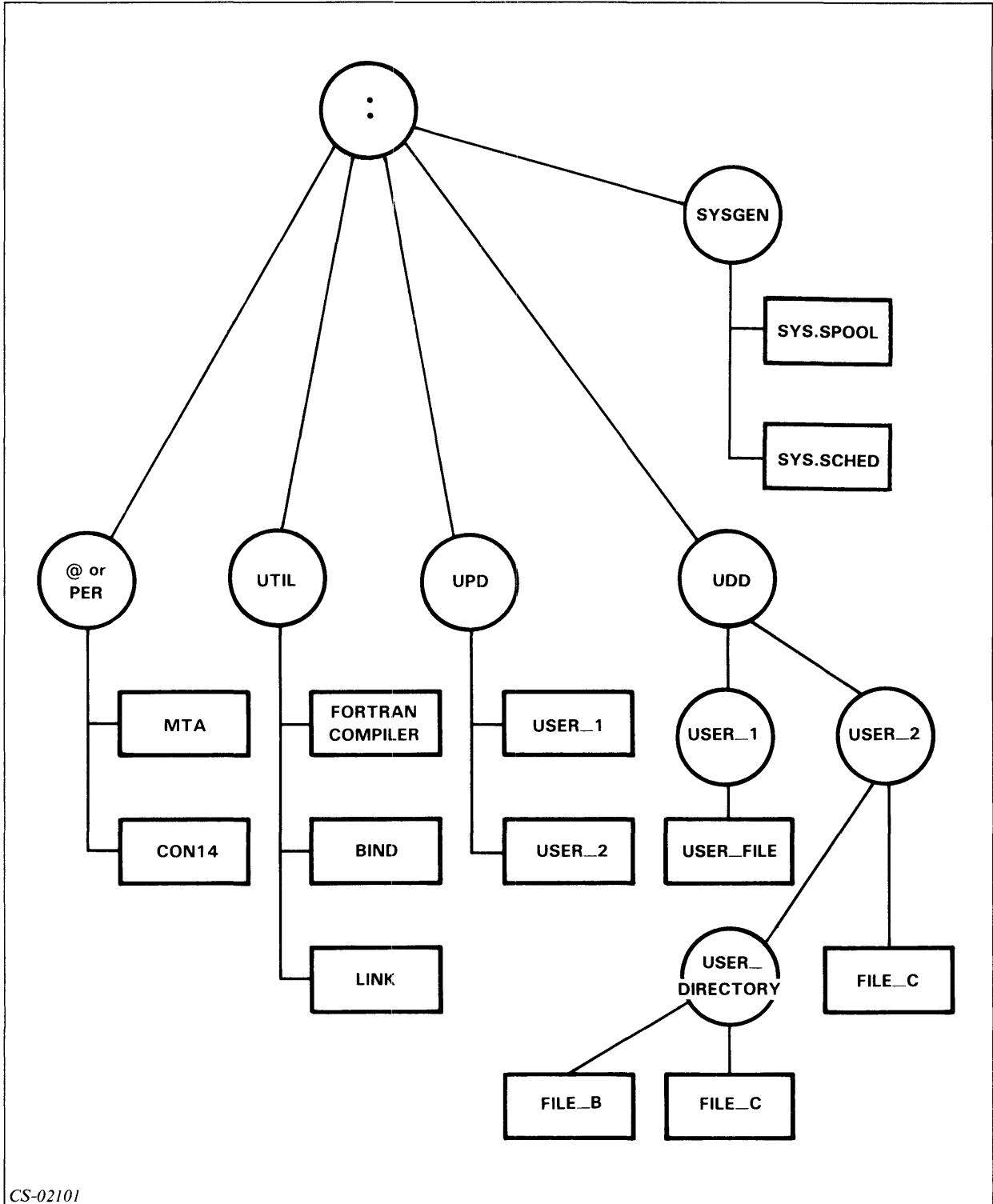
2. Which files/directories are subordinate to directory USER_2?
3. Which directories are superior to directory USER_1?
4. When is the /MAXSIZE switch required?
5. What do the files in the directory PER represent?
6. What is the relationship between file USER_1 and directory USER_1?
7. Write the command to create a directory file named REPORTDIR.

Directions

Now check your answers with those on the next page.

Segment A Directories Exercise Answers

1.



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Figure 9.10 Segment A: Exercise Answers

2. USER_DIRECTORY
FILE_C
3. UDD
:
4. The /MAXSIZE switch is required whenever a Control Point Directory (CPD) is created.
5. The files in directory PER are the peripheral devices associated with the system, such as printer, consoles, disc drives, and tape transports.
6. The file USER_1 was created when the user's profile was created. It is a file containing all necessary information about the user, including his username, password, and privileges. Directory USER_1 was created at the same time as a direct result of the creation of the file USER_1. It is a directory in which the user creates his subordinate directories and files.
7. **CREATE/DIRECTORY, REPORTDIR**

Directions

If you answered all the questions in the segment exercise correctly, restart the Module 9 audiotape to continue.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Segment B

Files and Pathnames

Filenames

- Maximum of 31 characters
- Valid characters:
 - A through Z (upper-case and lower-case)
 - 0 through 9
 - ? (question mark)
 - . (period)
 - _ (under score)
 - \$ (dollar sign)

Table 9.A Examples of Valid and Invalid Filenames

Invalid	Reason	Valid
FILE 1	Invalid space	FILE.1
FILE#2	# not allowed	FILE_2
FILE/NUMBER/THREE	/ not allowed	FILE_NUMBER_THREE
WHAT*IS*THIS?	* not allowed	WHAT_IS_THIS?
MONEY\$_STUFF!	! not allowed	MONEY\$_STUFF

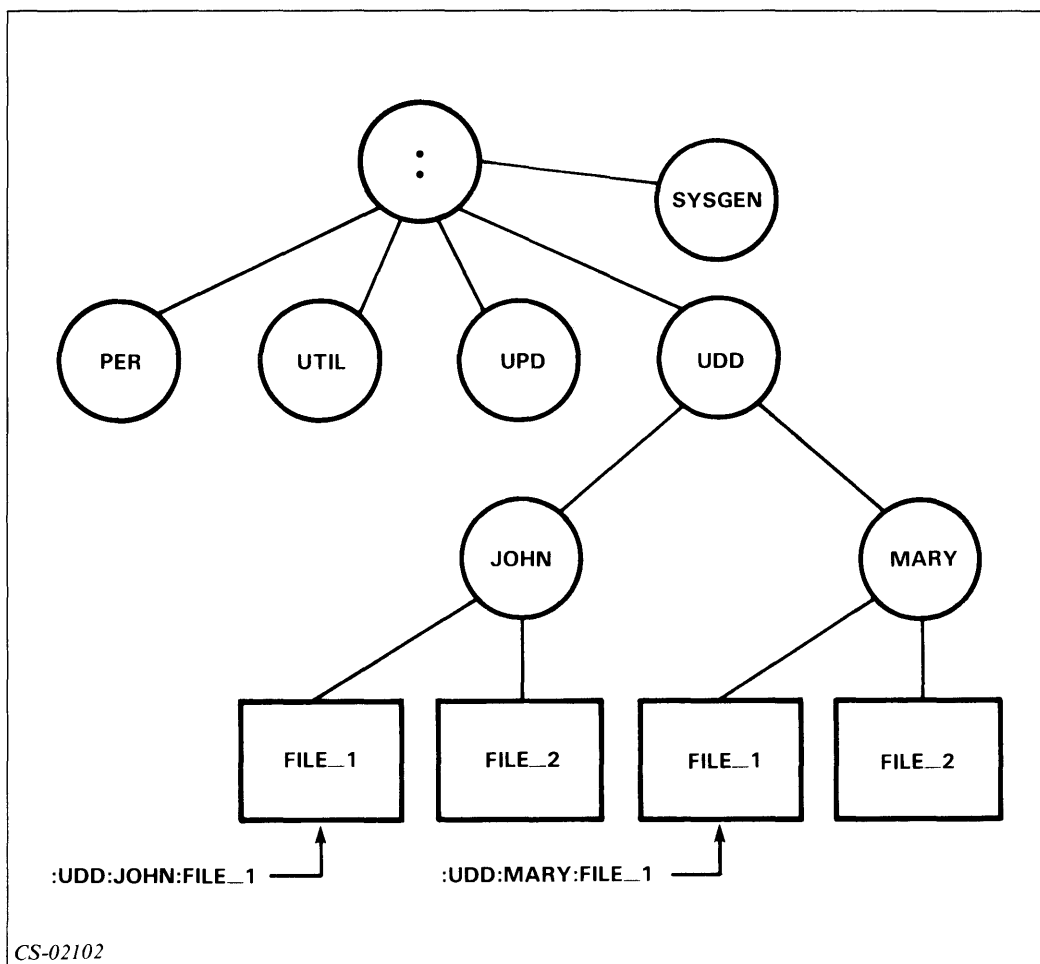


Figure 9.11 Directory Tree with Two Pathnames

Working Directory

- Reference point
- Displayed by DIRECTORY command
- Log onto initial working directory

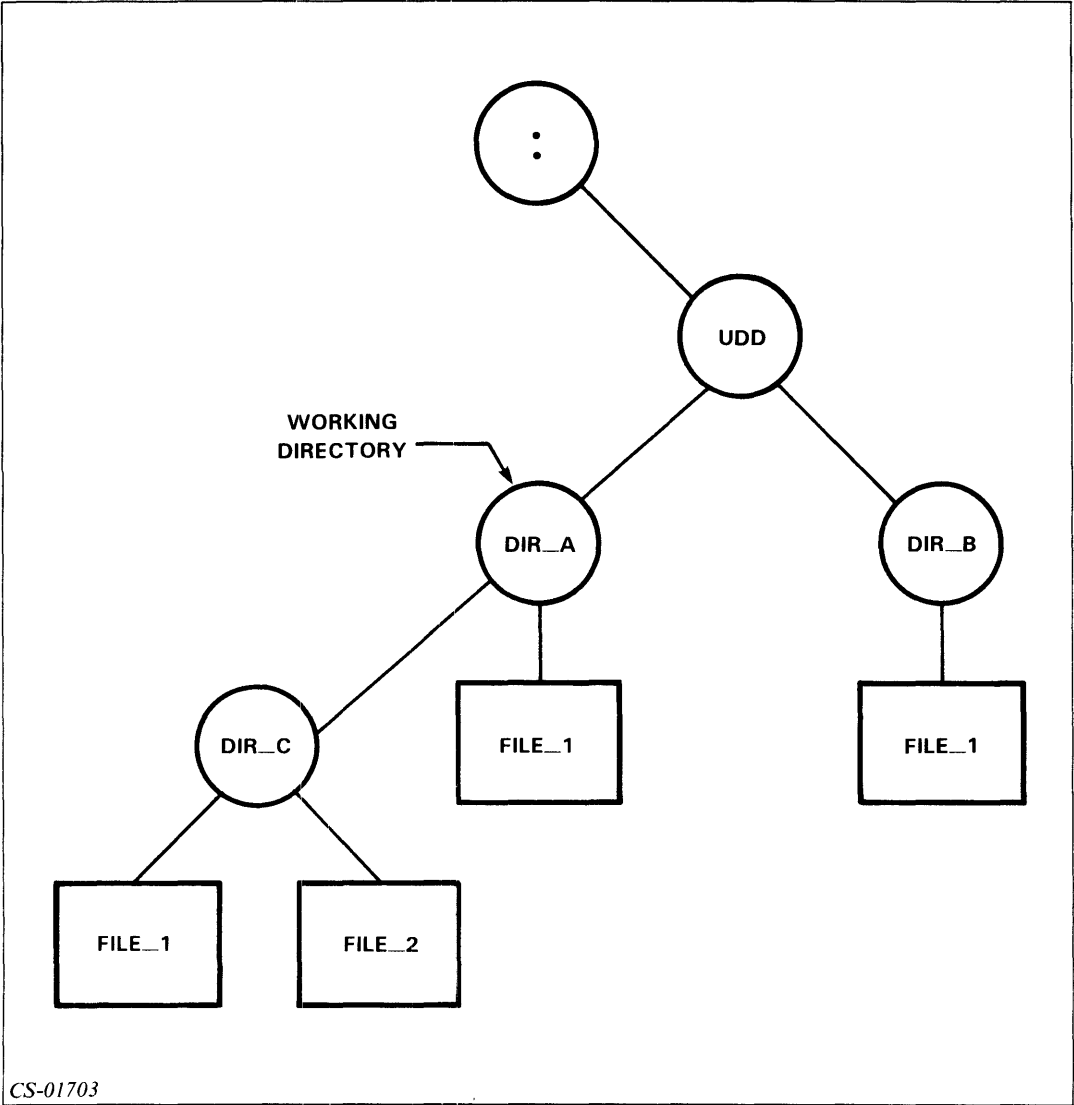


Figure 9.12 Working Directory

Moving through the directory structure in Figure 9.12:

DIRECTORY Returns name of your working directory.

DIRECTORY,DIR_C Makes DIR_C your current working directory.

DIRECTORY/I Returns to initial working directory.

Pathname

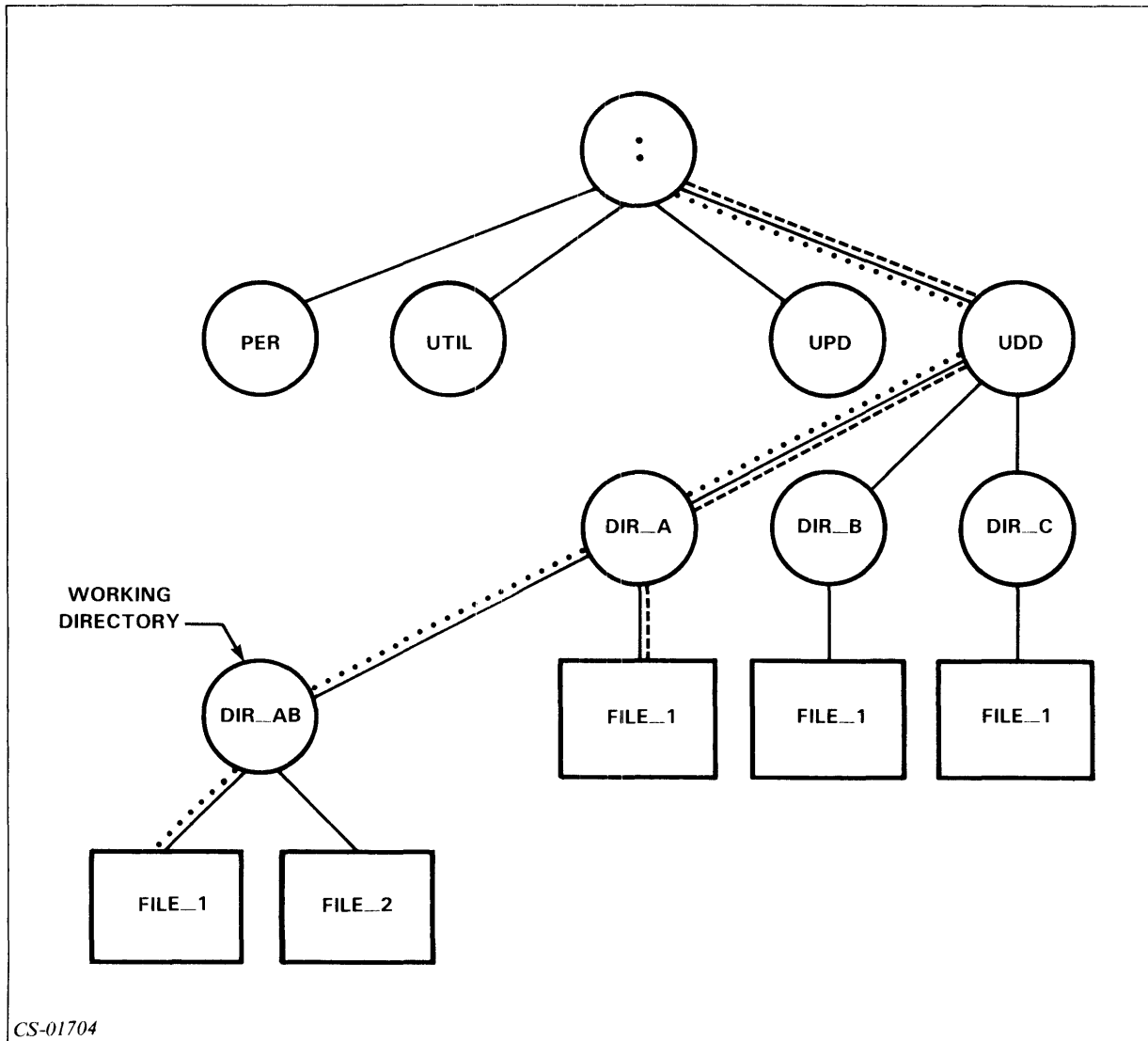
- Path through the directory structure to locate a file.
- Optional prefix and/or a series of filenames separated by colons.
- Each filename, except possibly the last, is a directory.
- Each directory is inferior to the one before it.
- Fully qualified (absolute) pathname starts with colon.

Prefixes

Table 9.B Valid Pathname Prefixes

Prefix	Result
:	Start with root directory.
↑	Move up to superior directory.
=	Start with working directory.
@	Start with peripheral directory.

- There is no colon (:) between prefix and inferior filename.



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Figure 9.13 Hypothetical Directory Structure

Example 1

(Illustrated by dots)

Assume DIR_AB in Figure 9.13 is your working directory. To access FILE_1, which is subordinate to DIR_AB, enter the pathname FILE_1, or =FILE_1, or :UDD:DIR_A:DIR_AB:FILE_1.

Example 2

(Illustrated by dashes)

To access FILE_1, which is subordinate to DIR_A, enter the pathname ↑ FILE_1, or :UDD:DIR_A:FILE_1.

Example 3

The PATHNAME command displays the fully qualified pathname. Assume DIR_AB is your working directory.

```
PATHNAME FILE_1
:UDD:DIR_A:DIR_AB:FILE_1
```

Directions

Now do the Segment B Exercise on the next page.

Segment B

Files and Pathnames

Exercise

Mark the following filenames V for valid or I for invalid.

1. ____ more_information
2. ____ here_is_my_favorite_file_in_the_whole_world
3. ____ THIS.IS.A good.file
4. ____ DATA#FILE
5. ____ importnt_stuff
6. ____ I_don't_know?
7. ____ PAYROLL!
8. ____ 9to5

Use Figure 9.14 to answer Questions 9 through 14.

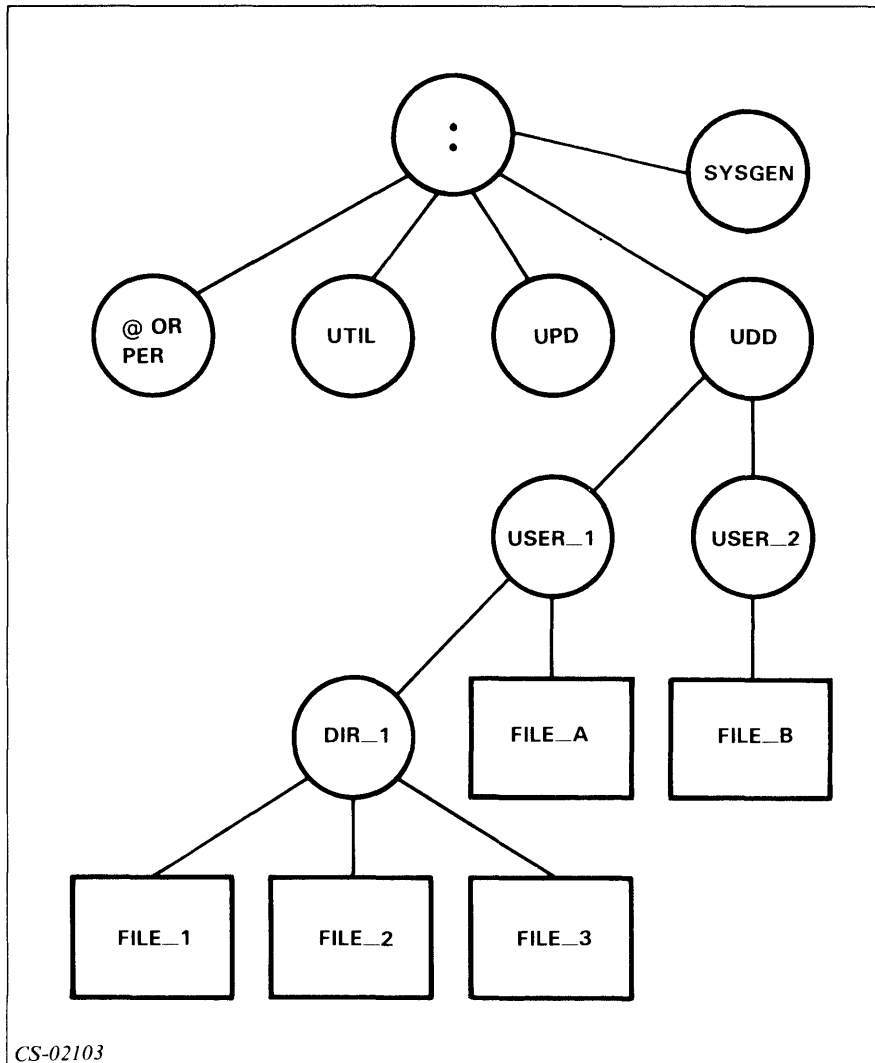


Figure 9.14 Segment B: Exercise

Assuming `USER_1` is your working directory in Figure 9.14, write the pathnames for each of the following files.

9. `FILE_1`

10. `FILE_A`

11. `FILE_B`

Assuming `USER_2` is your working directory in Figure 9.14, write the pathnames for each of the following files.

12. `FILE_2`

13. FILE_A

14. FILE_B

Directions

Now check your answers with those on the next page.

Segment B

Files and Pathnames

Exercise Answers

1. V
2. I (This filename contains more than 31 characters, and therefore is too long.)
3. I (Embedded space not allowed.)
4. I (# is an invalid character.)
5. V
6. I (Single quote is an invalid character.)
7. I (! is an invalid character.)
8. V
9. DIR_1:FILE_1 or :UDD:USER_1:DIR_1:FILE_1 or =DIR_1:FILE_1
10. FILE_A or :UDD:USER_1:FILE_A or =FILE_A
11. ↑USER_2_:FILE_B or :UDD:USER_2:FILE_B
12. ↑USER_1:DIR_1:FILE_2 or :UDD:USER_1:DIR_1:FILE_2
13. ↑USER_1:FILE_A or :UDD:USER_1:FILE_A
14. FILE_B or :UDD:USER_2:FILE_B or =FILE_B

Directions

If you answered all the questions in the segment exercise correctly, continue to Lab Activity 9-1.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Lab Activity 9-1

If you have a computer available, follow the steps listed below. If you do not have access to a computer, please read these steps carefully.

1. Log on (any terminal will do).
2. Enter **DIRECTORY**. Write the system response.

This is your initial working directory.

3. Enter **CREATE/DIRECTORY AOS.OPR**. What did you just do?
4. Now that you have created the directory **AOS.OPR**, move to it by entering **DIRECTORY AOS.OPR**.
5. Enter **CREATE/DIRECTORY GUIDE**. What did you just do?
6. Let's create one more directory subordinate to the directory **AOS.OPR**. Enter **CREATE/DIRECTORY TAPE**.
7. Enter **DIRECTORY GUIDE**. Where are you?
8. Enter **CREATE/I MOD1**
Student Guide Module 1
)

You have just created the file **MOD1** in directory **:UDD:your username:AOS.OPR:GUIDE**.

9. Create the files listed below with the information provided.

MOD2	Student Guide Module 2
MOD3	Student Guide Module 3
MOD9	Student Guide Module 9
10. Enter **DIRECTORY ↑TAPE**. Where are you?
11. You are in the directory **:UDD:your username:AOS.OPR:TAPE**. To check it, enter **DIRECTORY**.
12. Create the files listed below with the information provided.

MOD1	Student Guide Module 1
MOD2	Student Guide Module 2
MOD3	Student Guide Module 3
MOD9	Student Guide Module 9
13. Enter **DIRECTORY/I**. Where should you be now?

14. You should be in the directory you were in when you logged on. Check it with the **DIRECTORY** command and compare the result with the result from Step 2.
15. Go back to the directory **TAPE**. Did you have any trouble?

Remember, that directory is two levels below where you started. Did you use only one command (**DIRECTORY AOS.OPR:TAPE**) or two (**DIRECTORY AOS.OPR** and **DIRECTORY TAPE**)? Either will work.
16. Enter **DIRECTORY @**. Where are you?

17. Log off using the **BYE** command.

Directions

If you had any problems or if you do not understand the procedures you just performed, go back and review the segment. Then try this lab again.

If you are comfortable with your results, restart the Module 9 audiotape to continue.

Segment C

Accessing and Securing Files

Searchlist

- List of directories to be searched in sequence when a file is not found in working directory.
- Only searched when pathname has no prefix.

Example 1

SEARCHLIST

:UDD, :UTIL

Example 2

SEARCHLIST :UDD,:UTIL,:UDD:MYNAME:MYDIR

SEARCHLIST

:UDD, :UTIL, :UDD:MYNAME:MYDIR

File Templates

- Multiple files with entry of only one filename.

Table 9.C Template Characters

Character	Matches
*	Matches any one character, except a period or space.
-	Matches any string of characters, except those including a period.
+	Matches any series of characters, including those with a period within a single directory.
#	Matches all files in all directories subordinate to the working directory
\	Excludes all files matching the character string following it.

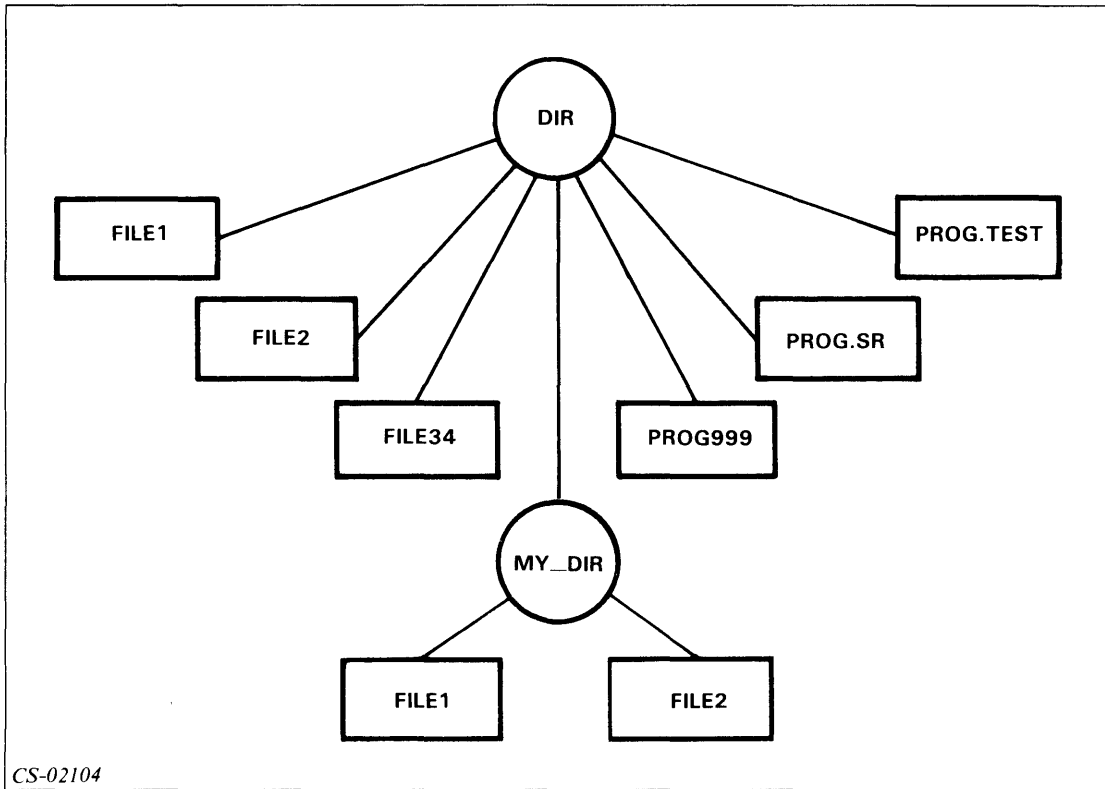


Figure 9.15 The Use of Templates

Table 9.D Templates

Template	Filenames Matched
FILE1	DIR:FILE1
FILE*	DIR:FILE1, DIR:FILE2
FILE-	DIR:FILE1, DIR:FILE2, DIR:FILE34
PROG.-	DIR:PROG.SR, DIR:PROG.TEST
PROG+	DIR:PROG.SR, DIR:PROG.TEST, DIR:PROG.999
+	All filenames in directory DIR
--	DIR:PROG.SR, DIR:PROG.TEST
#	All filenames in both directories
#\+1	All filenames in both directories EXCEPT DIR:FILE1 and DIR:MYDIR:FILE1

ACL

- Access Control List
- Limits access to files (key)

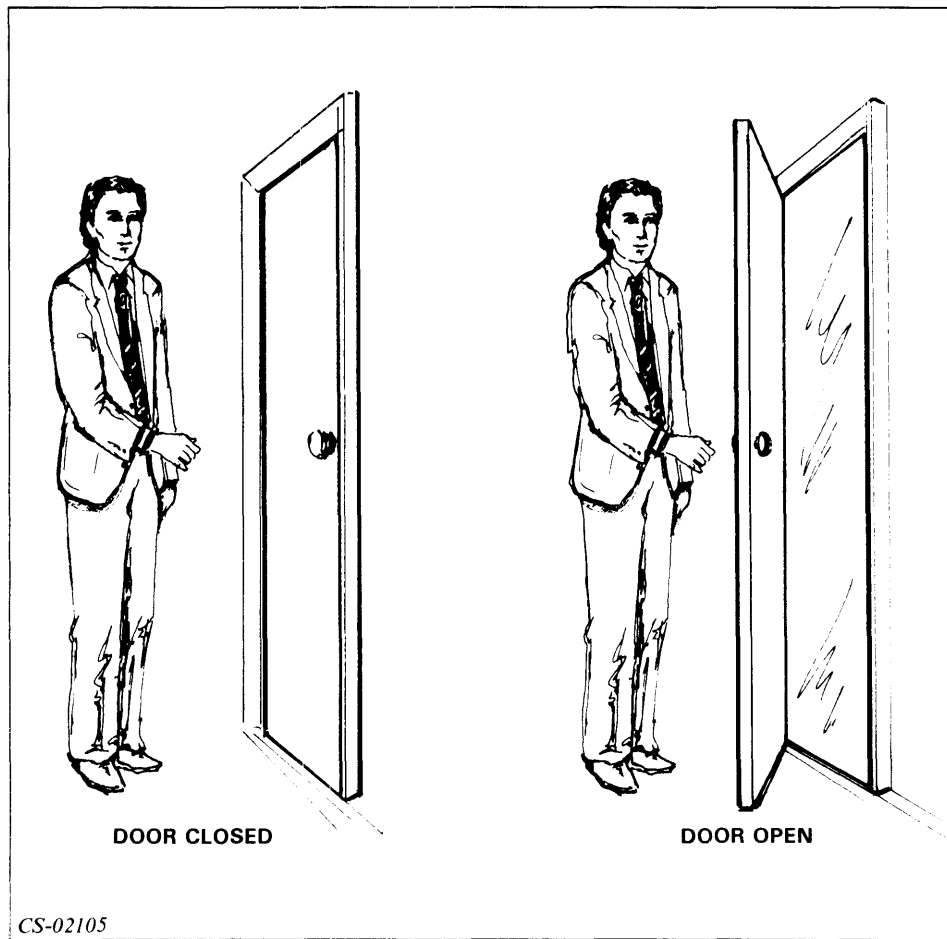


Figure 9.16 ACL: Key to Files

- Format: ACL,pathname,[user,access]
- Templates allowed

Table 9.E Access Codes

Access	Abbreviation	Nondirectory File	Directory File
Execute	E	User can execute file.	User can use directory's name in a pathname.
Read	R	User can read (examine) data in file.	User can examine list of files in directory.
Append	A	N/A	User can insert names of new files into directory.
Write	W	User can modify file's contents.	User can insert and delete files from directory and change ACLs.
Owner	O	User can change file's ACL and delete file.	User can change directory's ACL or delete the directory.

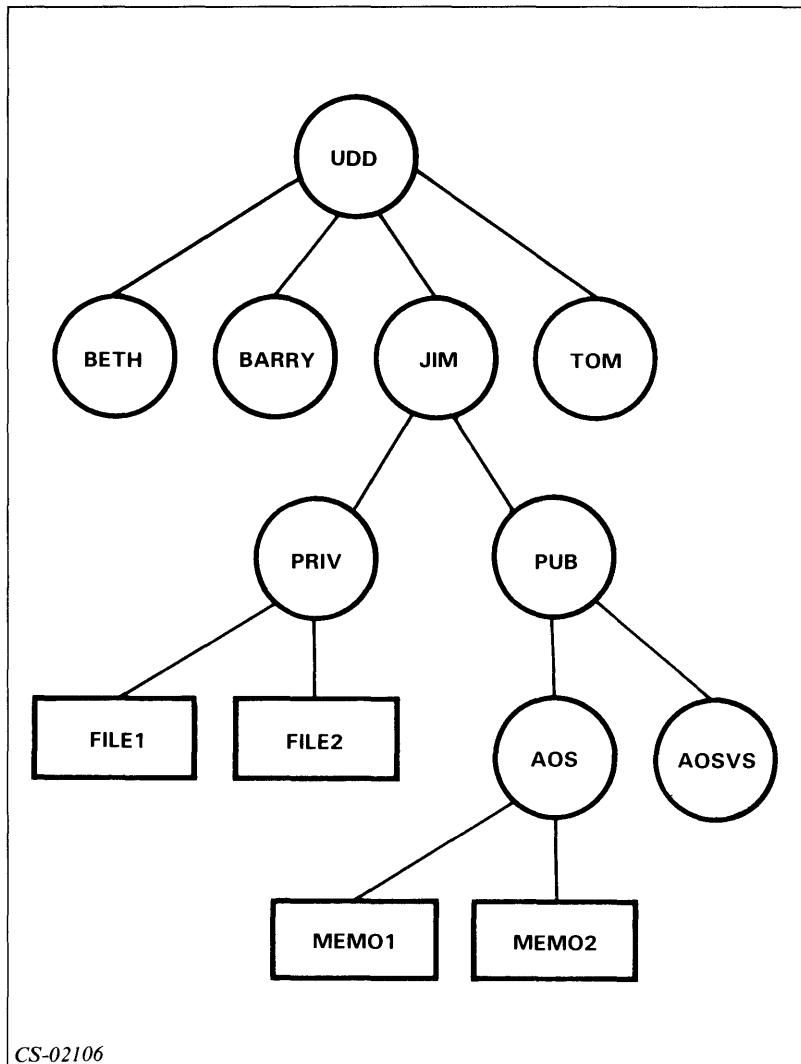


Figure 9.17 Directory Structure for JIM

Example 1

ACL PUB JIM OWARE,BETH WARE,+ E

Example 2

ACL AOS JIM OWARE,BARRY E,+ WARE

Example 3

ACL MEMO1 JIM OWARE,BARRY E,BETH WARE

Example 4

ACL MEMO2 JIM OWARE,BETH WARE

Example 5
ACL PRIV JIM OWARE

Example 6
ACL FILE1 JIM OWARE,BETH WARE

Directions
Now do the Segment C Exercise on the next page.

Segment C

Accessing and Securing Files

Exercise

Use Figure 9.18 to answer the following questions.

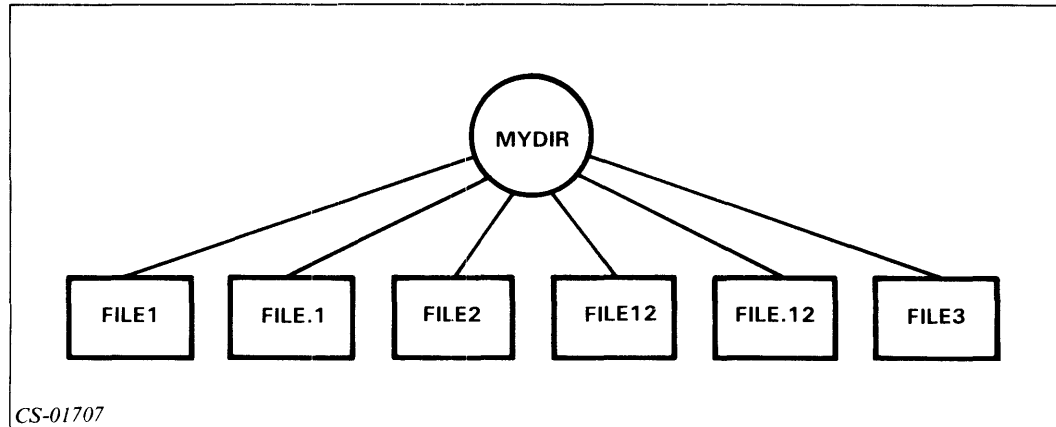


Figure 9.18 Segment C: Exercise

In Figure 9.18, which files are selected by the following templates? Assume that MYDIR is the working directory.

1. FILE*
2. FILE-
3. FILE+
4. FILE1*
5. FILE1+
6. FILE1-

Directions

Now check your answers with those on the following page.

Segment C

Accessing and Securing Files

Exercise Answers

1. FILE1, FILE2, FILE3
2. FILE1, FILE2, FILE12, FILE3
3. All files.
4. FILE12
5. FILE1, FILE12
6. FILE1, FILE12

Directions

If you answered all the questions in the segment exercise correctly, restart the Module 9 audiotape to continue.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Segment D

FILESTATUS

- Format: FILESTATUS[switch],[pathname]
- Displays names of files in working directory.
- Many switches on this command

Most common:

/ASSORTMENT

/SORT

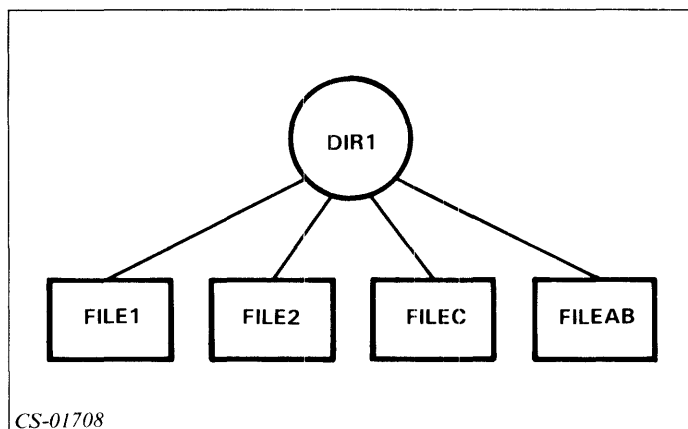


Figure 9.19 Directory Structure of DIR1

Example 1

FILESTATUS

```
FILE1  FILE2  FILEC  FILEAB
```

Example 2

FILESTATUS/ASSORTMENT

```
FILE1  UDF  25-SEP-79  10:54:50  1090
FILE2  UDF  25-OCT-80  10:50:50   80
FILEC  PRG  10-NOV-80  09:20:15  65536
FILEAB UDF  11-OCT-80  10:20:19   100
```

Example 3
FILESTATUS/TYPE FILE*

FILE1	UDF	FILE2	UDF	FILEC	PRG
-------	-----	-------	-----	-------	-----

Directions

Now do the Segment D Exercise on the next page.

Segment D

Filestatus Command

Exercise

Given the directory structure shown in Figure 9.20, which file(s) will be selected by the following commands?

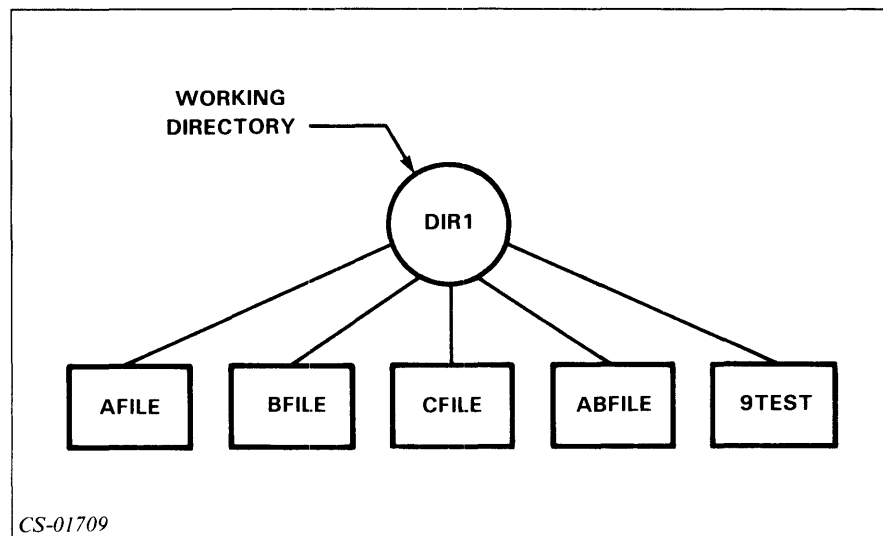


Figure 9.20 Segment D: Exercise

1. FILESTATUS
2. FILESTATUS -FILE
3. FILESTATUS *FILE
4. FILESTATUS *TEST

Directions

Now check your answers with those on the next page.

Segment D

Filestatus Command

Exercise Answers

1. AFILE BFILE CFILE ABFILE 9TEST
2. AFILE BFILE CFILE ABFILE
3. AFILE BFILE CFILE
4. 9TEST

Directions

If you answered all the questions in the segment exercise correctly, continue to Lab Activity 9-2.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Lab Activity 9-2

If you have a computer available, follow the steps listed below. If you don't have access to a computer, please read these steps carefully.

1. Log on (any terminal will do).

2. Enter **SEARCHLIST**.

Remember, this is the list of the directories CLI will search for a file that is not fully qualified or subordinate to your working directory.

3. Let's add a new directory to that list. Enter **SEARCHLIST** (your current searchlist from Step 2), **:UDD:(your username):AOS.OPR**.

4. What is your searchlist now?

5. Type **ACL AOS.OPR**. What is the access for AOS.OPR?

6. Type **ACL AOS.OPR (your username), OWARE +,E**.

Now all users have only execute access to your directory AOS.OPR.

7. Enter **FILESTATUS/S #**.

Notice that the template **#** allows us to list the two subordinate directories **GUIDE** and **TAPE** and all of their subordinate files.

8. Enter **TYPE/V +: + 2**. How many files are listed?

9. The two files listed both have the same name but are in different directories; remember, this is permissible.

Let's go to another directory and see what files are in it. Go to the **AOS.OPR:GUIDE** directory.

10. Enter **FILESTATUS/AS/S**. These are all the files in the directory **GUIDE**. Notice that they are in alphabetical order.

11. Enter **FILESTATUS** again, but without the switches. Notice the difference in format.

12. Enter **DIRECTORY @**. Which directory are you in?

Did you use the **DIRECTORY** command with no arguments to check?

13. Enter **FILESTATUS**.

The peripheral directory :PER has a very large number of files in it, doesn't it!

14. Let's just look at consoles using templates. Enter **FILESTATUS/AS/S CON+**.
(Check with your system manager to be sure that CON is the correct prefix for the consoles on your system.)
15. Log off.

Directions

If you had any problems or if you do not understand the procedures you just performed, go back and review the segment. Then try this lab again.

If you are comfortable with your results, restart the Module 9 audiotape to continue.

Segment E

Macros

Definition

- File containing a list of commands.
- Created using CREATE command or an editor.
- Filename ends with .CLI.

Example 1

```
1. CREATE/I DUMPER.CLI
2. )DUMP,@MTA1:0,FILE_1
   )DUMP,@MTA1:1,DATA_FILE
   )DUMP,@MTA1:2,SPECIAL_DATA
   )DUMP,@MTA1:3,PERSONNEL_FILE
   )DUMP,@MTA1:4,PAYROLL_FILE
   )DUMP,@MTA1:5,ACCOUNT_DATA
3. ))
```

Invoking Macros

- Type in macro name.

DUMPER

Back up files using the DUMPER macro:

Monday	Tuesday	Wednesday	Thursday
DUMPER	DUMPER	DUMPER	DUMPER

Example 2

If you wanted to also have a file TRANSACTION_01_22_82 (01_22_82 is the transaction date) in your dump file, you would write DUMPER this way:

```
CREATE/I DUMPER.CLI
)DUMP,@MTA1:0,FILE_1
)DUMP,@MTA1:1,DATA_FILE
)DUMP,@MTA1:2,SPECIAL_DATA
)DUMP,@MTA1:3,PERSONNEL_FILE
)DUMP,@MTA1:4,PAYROLL_FILE
)DUMP,@MTA1:5,ACCOUNT_DATA
)DUMP,@MTA1:6,TRANSACTION_%1%      (Add this line to include transaction file.)
))
```

You would run DUMPER this way:

DUMPER 01_22_82

Passing Arguments

%1% First argument
 %2% Second argument
 %3% Third argument
 .
 .
 %n% nth argument
 %0% Macro name

Example 1

```

CREATE/I EASY_MACRO.CLI
)WRITE THIS IS A TEST WRITTEN FOR %1%.
)
  
```

To execute and see the results:

```

EASY_MACRO GARY
THIS IS A TEST WRITTEN FOR GARY.
  
```

```

EASY_MACRO,GARY
  ↑      ↑
%0%     %1%
  
```

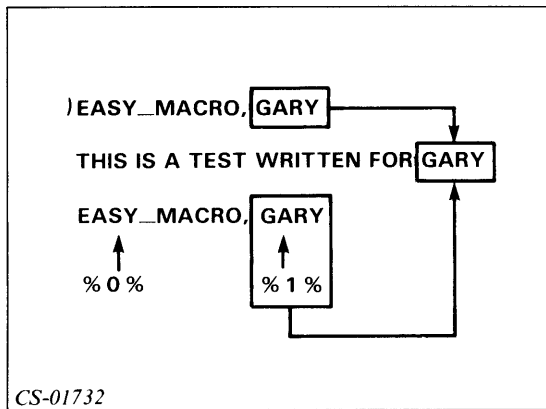


Figure 9.21 Results of EASY_MACRO

Example 2

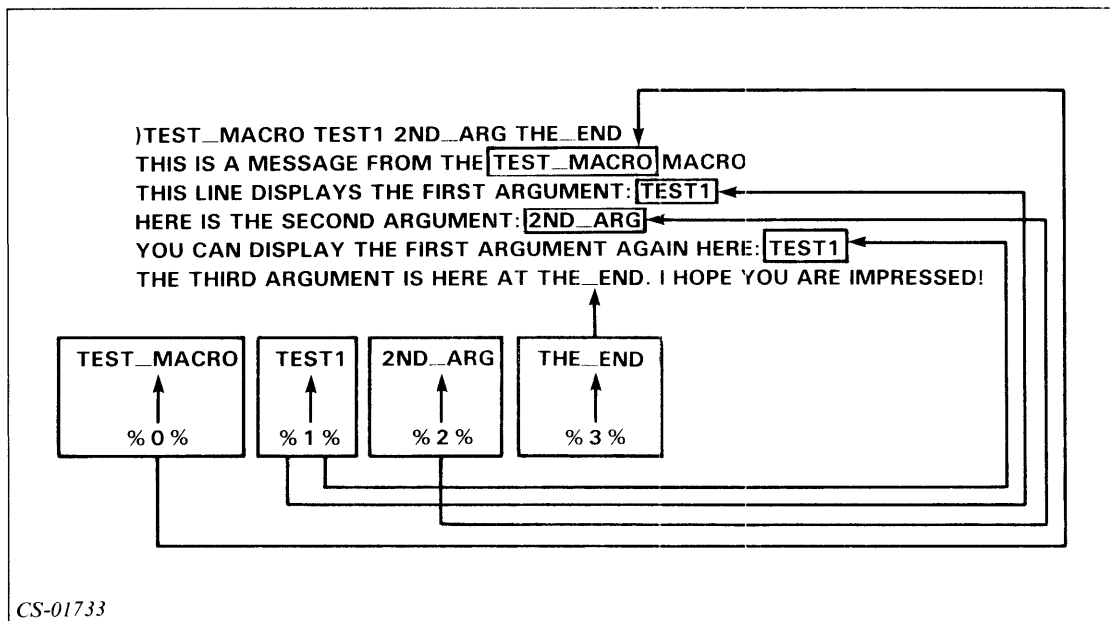
```

CREATE/I TEST_MACRO.CLI
1. )WRITE THIS IS A MESSAGE FROM THE %0% MACRO
2. )WRITE THIS LINE DISPLAYS THE FIRST ARGUMENT: %1%
3. )WRITE HERE IS THE SECOND ARGUMENT: %2%
4. )WRITE YOU CAN DISPLAY THE FIRST ARGUMENT AGAIN HERE: %1%
5. )WRITE THE THIRD ARGUMENT IS HERE AT %3%. I HOPE YOU ARE IMPRESSED!
)
  
```

To execute and see the results:

```
TEST_MACRO TEST1 2ND_ARG THE_END
THIS IS A MESSAGE FROM THE TEST_MACRO MACRO
THIS LINE DISPLAYS THE FIRST ARGUMENT: TEST1
HERE IS THE SECOND ARGUMENT: 2ND_ARG
YOU CAN DISPLAY THE FIRST ARGUMENT AGAIN HERE: TEST1
THE THIRD ARGUMENT IS HERE AT THE_END. I HOPE YOU ARE IMPRESSED!
```

```
TEST_MACRO TEST1 2ND_ARG THE_END
      ↑      ↑      ↑      ↑
      %0%    %1%    %2%    %3%
```



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Figure 9.22 Results of TEST_MACRO

Directions

Now do the Segment E Exercise on the next page.

Segment E

Macros

Exercise

Circle the letter of the correct answer.

1. To invoke macros, you must enter:
 - a. X followed by the macro name.
 - b. EXEC followed by the macro name.
 - c. The macro name, without the .CLI.
 - d. The macro name, including the .CLI.
2. The symbol for the macro name itself is:
 - a. %0%
 - b. %1%
 - c. The first argument.
 - d. The last argument.
3. The primary purpose of a macro is:
 - a. To save storage space.
 - b. To save work for the computer user.
 - c. To reduce computer usage.
 - d. To create back-up tapes.
4. You can pass arguments to a macro.
 - a. True
 - b. False

Construct macros for the following.

5. Write a macro called `SEE_FILES` that displays the names of all of the files in your working directory and writes the message `ALL FINISHED` after the display.

6. Write a macro called **SPECIAL** that accepts a name as an argument and returns **THIS IS ESPECIALLY FOR** and the name that was entered.

Directions

Now check your answers with those on the next page.

Segment E

Macros

Exercise Answers

1. c
2. a
3. b
4. a
5.

```
CREATE/I SEE_FILES.CLI
FILESTATUS
WRITE ALL FINISHED
)
```
6.

```
CREATE/I SPECIAL.CLI
THIS IS ESPECIALLY FOR %1%
)
```

Directions

If you answered all the questions in the segment exercise correctly, restart the Module 9 audiotape to continue.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Segment F

Pseudo-macros

Pseudo-macros

- Return values for use in processing.
- Three types:
 - Environmental settings (i.e., SEARCHLIST, TIME, DATE).
 - Conditional execution (i.e., EQUAL, ELSE).
 - Conversions (i.e., OCTAL, DECIMAL).

Table 9.F Commonly Used Pseudo-macros

Pseudo-macro	Value Returned
[!ACL]	ACL of a file.
[!ASCII]	ASCII character corresponding to value.
[!date]	System date.
[!decimal]	Decimal value of octal number.
[!defacl]	Current default ACL.
[!directory]	Working directory.
[!else]	Conditional.
[!end]	Conditional.
[!equal]	Conditional.
[!explode]	Expanded argument with spaces.
[!nequal]	Conditional.
[!octal]	Octal value of a decimal number
[!pid]	Process ID.
[!read]	Displays text and accepts argument.
[!searchlist]	Your searchlist.
[!time]	System time.
[!username]	Your username.

General Rules

- Always enclosed in square brackets.
- Preceded by exclamation point.

Example 1

```
WRITE,THE DATE IS: [!DATE]
THE DATE IS: 16-MAY-82
```

Example 2

```
WRITE,[!SEARCHLIST] IS MY SEARCHLIST.
:UTIL, :UTIL:INFOS, :UDD:RYAN IS MY SEARCHLIST.
```

Example 3

```
WRITE,[!OCTAL 999] IS EQUAL TO DECIMAL 999.
1747 IS EQUAL TO DECIMAL 999.
```

Example 4

```
WRITE,[!DECIMAL 777] IS EQUAL TO OCTAL 777.  
511 IS EQUAL TO OCTAL 777.
```

Example 5

```
WRITE ![ASCII 207]  
You will hear a beep tone (CTRL-G).
```

Example 6

```
WRITE ![USERNAME] IS P.I.D ![PID]  
RYAN IS P. I. D. 14
```

Example 7

```
SEARCHLIST  
:UTIL, :UTIL:INFOS  
SEARCHLIST,[!SEARCHLIST],:UDD:PROJECT_X  
SEARCHLIST  
:UTIL, :UTIL:INFOS, :UDD:PROJECT_X
```

Example 8

```
DIRECTORY  
:UDD  
DIRECTORY ![DIRECTORY]:MODULE_9  
DIRECTORY  
:UDD:MODULE_9
```

Example 9

```
ACL OLDFILE  
RYAN,OWARE,JOE,RE  
ACL,OLDFILE,[!ACL,OLDFILE],+,E  
ACL OLDFILE  
RYAN,OWARE,JOE,RE,+,E
```

Conditional pseudo-macros allow selected execution of commands.

Example 1

```
CREATE/I AM_PM.CLI  
)[!EQUAL %1% 0]  
) WRITE MORNING  
) [!ELSE]  
) WRITE AFTERNOON  
) [!END]  
)  
AM_PM 0  
MORNING  
AM_PM 1  
AFTERNOON
```

Example 2

```
CREATE/I SAFETY.CLI
) [EQUAL [!USERNAME] MANAGER]
) XEQ ACCOUNTS
) [ELSE]
) WRITE *** EXECUTION DENIED INVALID USER ***
) [END]
))
```

For any user not logged on as username `MANAGER`, the program `ACCOUNTS` will not execute. This method can be used to add a level of security beyond ACLs.

Directions

Now do the Segment F Exercise on the next page.

Segment F

Pseudo-macros

Exercise

Fill in the appropriate returned value, given the following conditions.

Username: TRICIA
Time: 10:45 PM
Date: 10-24-82
Working Directory: :UDD:MACRO_DIR
PID: 21

Example

WRITE [!TIME] 22:45:00 (Remember the proper format.)

1. WRITE [!DATE]
2. WRITE YOUR WORKING DIRECTORY IS [!DIRECTORY]
3. WRITE [!USERNAME] IS PROCESS I.D. [!PID]
4. WRITE [!EXPLODE [!USERNAME]]
5. WRITE THIS IS THE END
6. In the space below, write a macro to write the time of day if you enter a T, and write the date otherwise. Call the macro TIDA.CLI.

Directions

Now check your answers with those on the next page.

Segment F

Pseudo-macros

Exercise Answers

1. 24-OCT-82
2. YOUR WORKING DIRECTORY IS :UDD:MACRO__DIR
3. TRICIA IS PROCESS I.D. 21
4. T R I C I A
5. THIS IS THE END
6.

```
CREATE/I TIDA.CLI
)[!EQUAL,% 1 %,T]
)WRITE [!TIME]
)[!ELSE]
)WRITE [!DATE]
)[!END]
))
```

or:

```
CREATE/I TIDA.CLI
)[!EQUAL,% 1 %,T]
)TIME
)[!ELSE]
)DATE
)[!END]
))
```

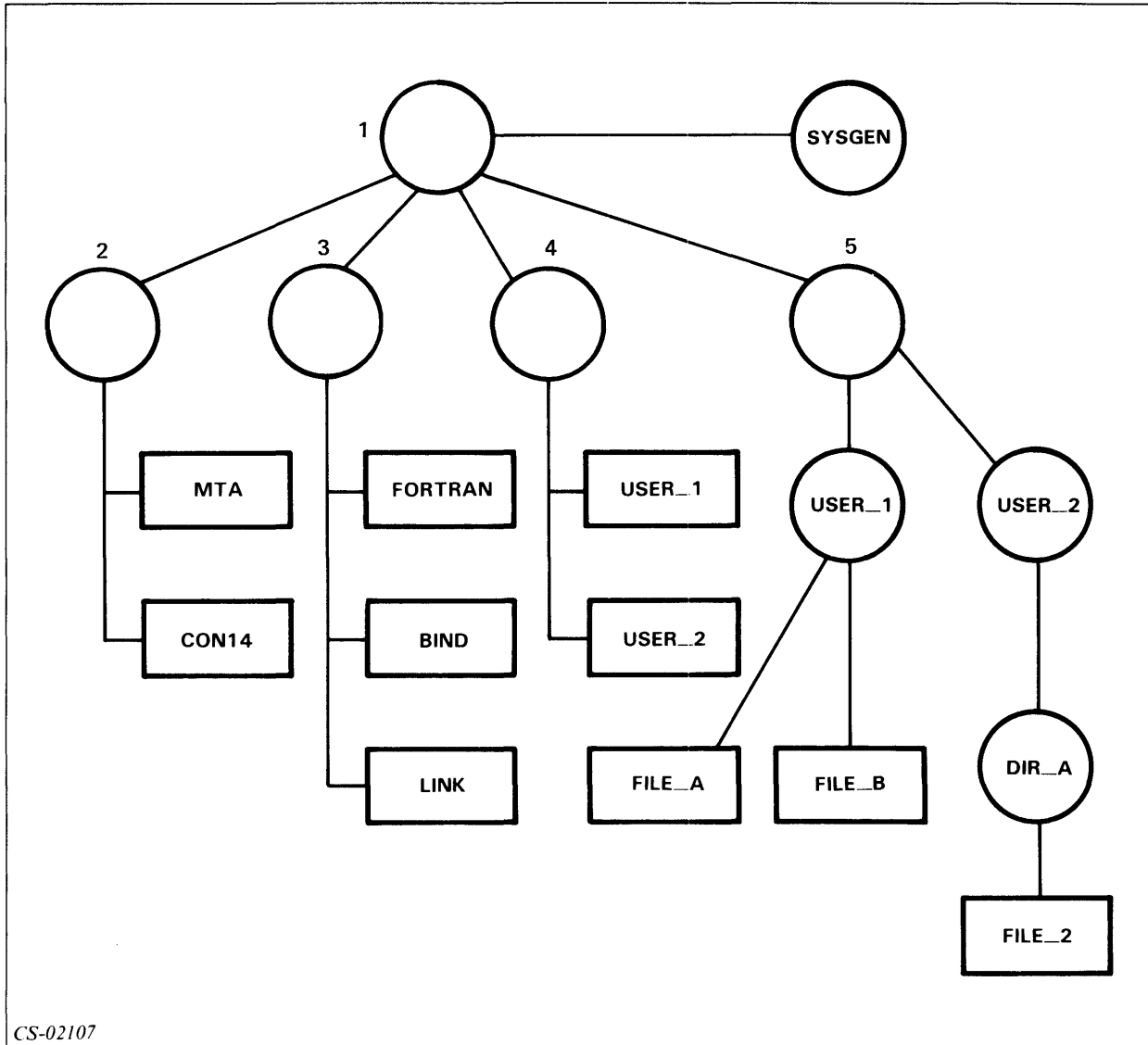
Directions

If you answered all the questions in the segment exercise correctly, continue to the Module 9 Quiz.

If all of your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Module 9 Quiz

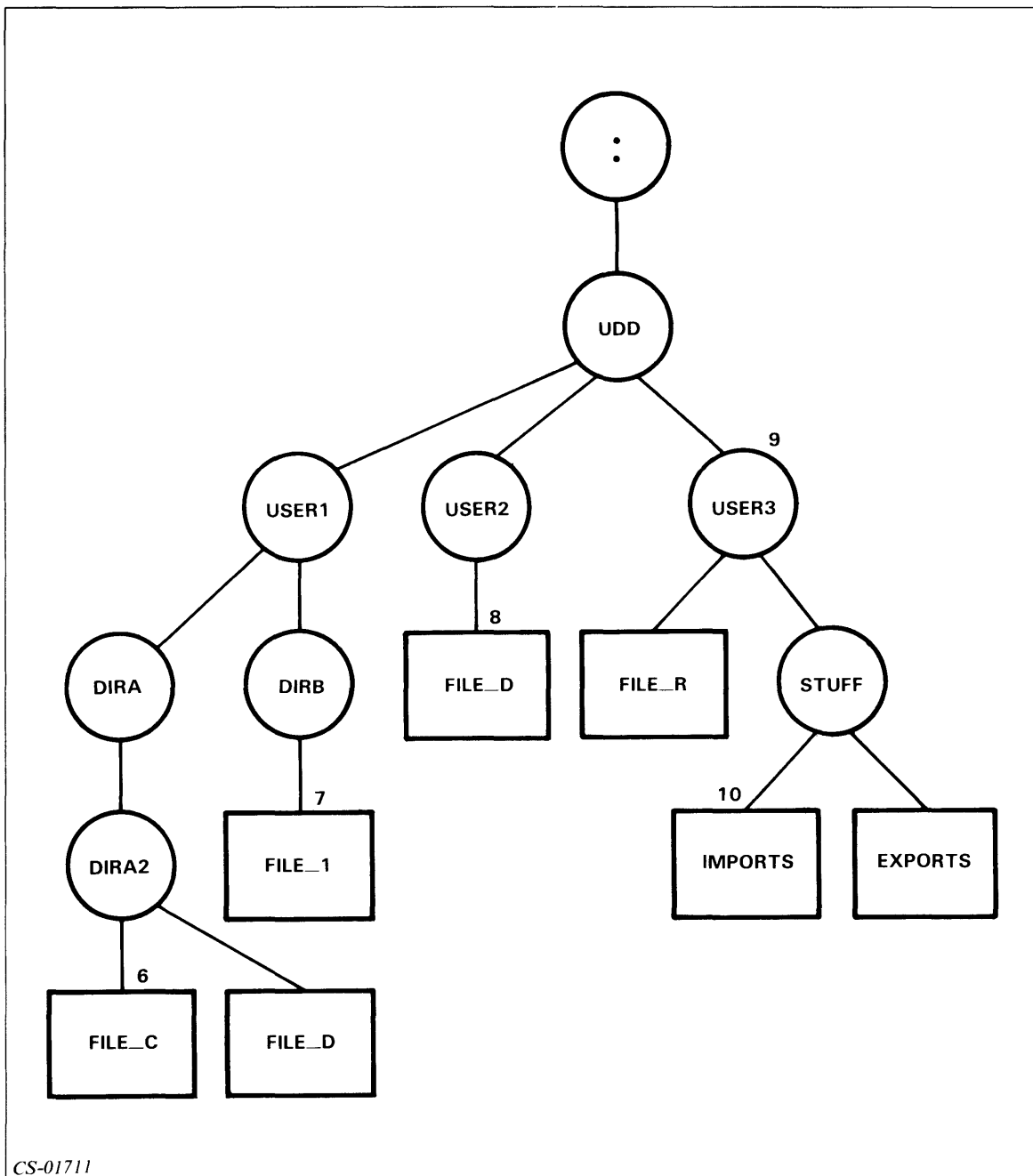
Fill in the blanks numbered 1 through 5 in the directory structure in Figure 9.23.



CS-02107

Figure 9.23 Module 9: Quiz

Given the partial directory structure in Figure 9.24, write the fully qualified pathname for the files labeled 6 through 10.



CS-01711

Figure 9.24 Module 9: Quiz

6.

7.

8.

9.

10.

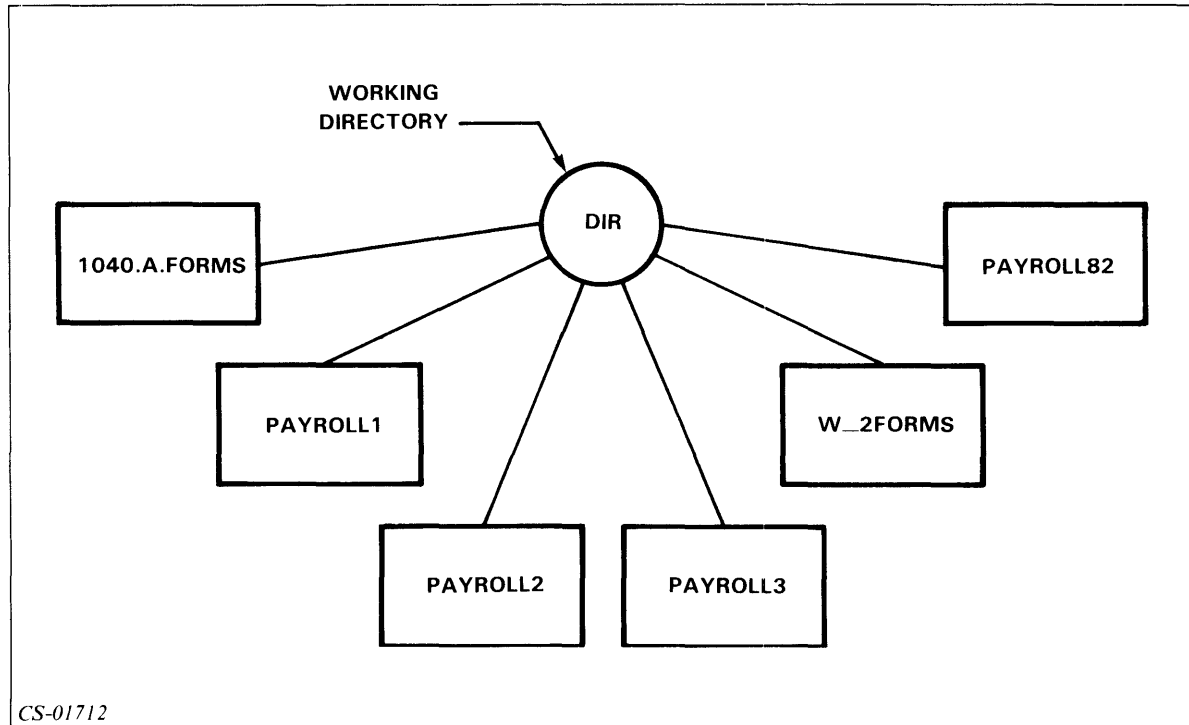


Figure 9.25 Module 9: Quiz

Write the templates to make the following selections from the directory structure in Figure 9.25.

11. All of the files with PAYROLL in the name.
12. PAYROLL1, PAYROLL2, PAYROLL3.
13. All of the files with FORMS in the name.
14. All of the files except those with a period (.) in the name.
15. All of the files with a 2 in the name.

Write the CLI command to:

16. Create a directory with the name SUPER_DIR.
17. Create a Control Point Directory with 10 blocks of space called LITTLE_C.P.D.
18. List all of the files in your working directory.
19. Display your working directory.
20. Change your working directory to :UTIL.
21. Display your searchlist.
22. Change your searchlist to include only :UTIL.
23. Determine the pathname of FORTRAN.PR.
24. Give JOHN READ and EXECUTE access to testfile. (Use ME as your username.)
25. Give all users EXECUTE access to SUB. (Use ME as your username.)
26. Display your ACL for DIRA.

Answer the following questions by circling the letter of the correct response.

27. The ACL command provides:
 - a. Security.
 - b. A list of users whose files you can access.
 - c. A list of files you can access.
 - d. Whatever the system manager designs it to provide.

-
28. A physical disc:
 - a. Has one track that spirals in toward the center.
 - b. Is divided into sectors.
 - c. Can hold only one file.
 - d. Holds multiple files having a common relation.
 29. Logical discs:
 - a. Exist in the CPU.
 - b. Are viewed as logical entities.
 - c. Are all contained on a single physical disc.
 - d. May consist of no more than one physical disc.
 30. Which of the following is in the correct format for a pseudo-macro?
 - a. {!DATE }
 - b. [!DATE]
 - c. {DATE }
 - d. [DATE]
 31. Which of the following commands converts an octal 111 to decimal?
 - a. WRITE [!DECIMAL 111]
 - b. WRITE [!DECIMAL 73]
 - c. WRITE [!OCTAL 111]
 - d. WRITE [!OCTAL 73]
 32. To access the macro name within a macro, which would you use?
 - a. %0%
 - b. %1%
 - c. %2%
 - d. %3%

Answer the following questions.

33. What are the three types of pseudo-macros?

34. What functions do pseudo-macros perform?

35. Write a macro that executes `PROG1` if you enter a 1 as an argument, and executes `PROG2` otherwise. Call the new macro `PROG.MACRO`.

36. Write a command line using pseudo-macros to add the directory `:UTIL` to your searchlist.

37. Write the command to execute the macro `RUN_BBASIC.CLI`.

38. What is a macro?

Directions

Now check your answers with those in Appendix A.

Module 10

AOS and AOS/VS Process Concepts

Introduction

This module discusses the process tree, which is the relationship of one process to another. You will learn to create and terminate a process. This module also discusses the CLI commands that relate directly to processes.

Module Objectives

Upon successful completion of this module, you should be able to:

1. Identify the controlling process of the process tree.
2. Select or write the CLI commands that perform specified functions.
3. Discuss the differences between a program and a process.
4. State the types of processes and characteristics of each type.
5. Describe the possible process states.
6. Given a set of processes, demonstrate the effect of priority on process scheduling by indicating the order in which these processes access the CPU.
7. Demonstrate a knowledge of the typical process hierarchy by:
 - a. Completing a process tree using the TREE and WHO commands.
 - b. Identifying the processes in a given process tree.
8. Create a process.

Resources

To complete this module, you need:

- Module 10 audiotape.
- Module 10 of your Student Guide.
- Audiotape playback unit.

Optional Resources

- *AOS and AOS/VS User's Handbook* (093-000150-02)
- *Command Line Interpreter (CLI) (AOS and AOS/VS) User's Manual* (093-000122-05)

Module Outline

Module 10 discusses the following topics:

1. Process Concepts
 - a. Definitions
 - b. Process hierarchy
 - c. Privileges
2. Creating Processes
 - a. EXECUTE
 - b. PROCESS
 - c. Chaining
3. Process Control
 - a. TERMINATE
 - b. SUPERPROCESS
 - c. RUNTIME and CHECKTERMS

Directions

Now start the Module 10 audiotape to begin. As you listen, follow along in Module 10 of your Student Guide.

Segment A

Process Concepts

Definitions

Process

- A set of system resources
- Components
 - Program
 - Unique ID
 - Username
 - Memory
 - Privileges
 - Type
 - Priority
 - State

Table 10.A Components of a Process

Component	Explanation
Program	Set of instructions supplied by the user or the system.
Process ID	Unique number. PID, or process ID (1-255). Lowest number available assigned. (Refer to Figure 10.1.)
Username	Your unique username, assigned by the system manager.
Memory	Physical storage. Where the system stores the program while executing. Allocated during execution.
Privileges	Set by system manager. Established in user file in UPD. Can be passed to subordinate process.
Type	Resident: Always in main memory. Preemptible: Can be moved to disc, but usually in memory. Swappable: Can be moved to disc to allow other processes to execute.
Priority	1-3 or 1-255, dependent on type. Determines use of main storage. (Refer to Figure 10.2.)
State	Eligible. Ineligible. Blocked.

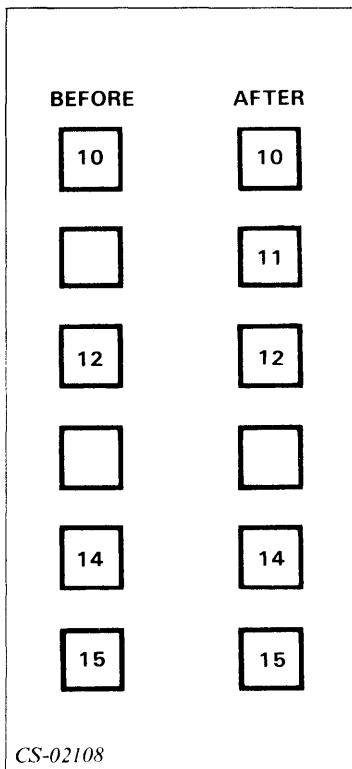


Figure 10.1 PID Assignment Process

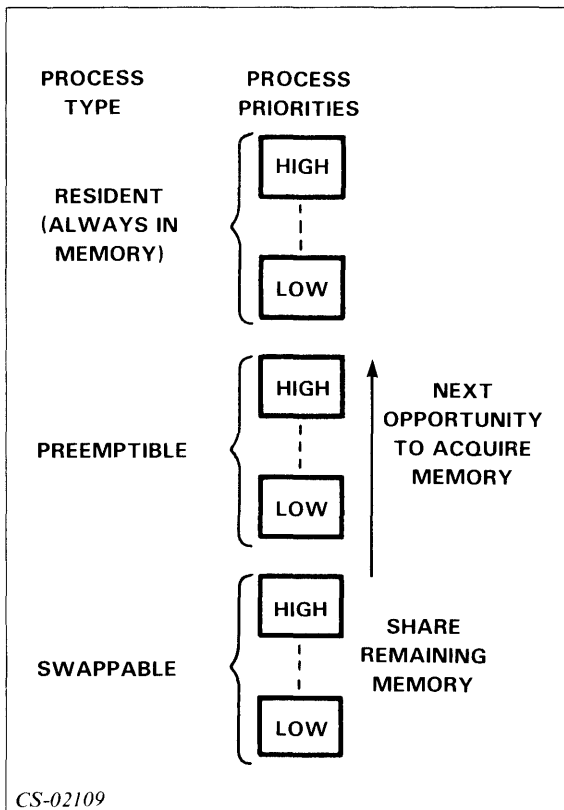


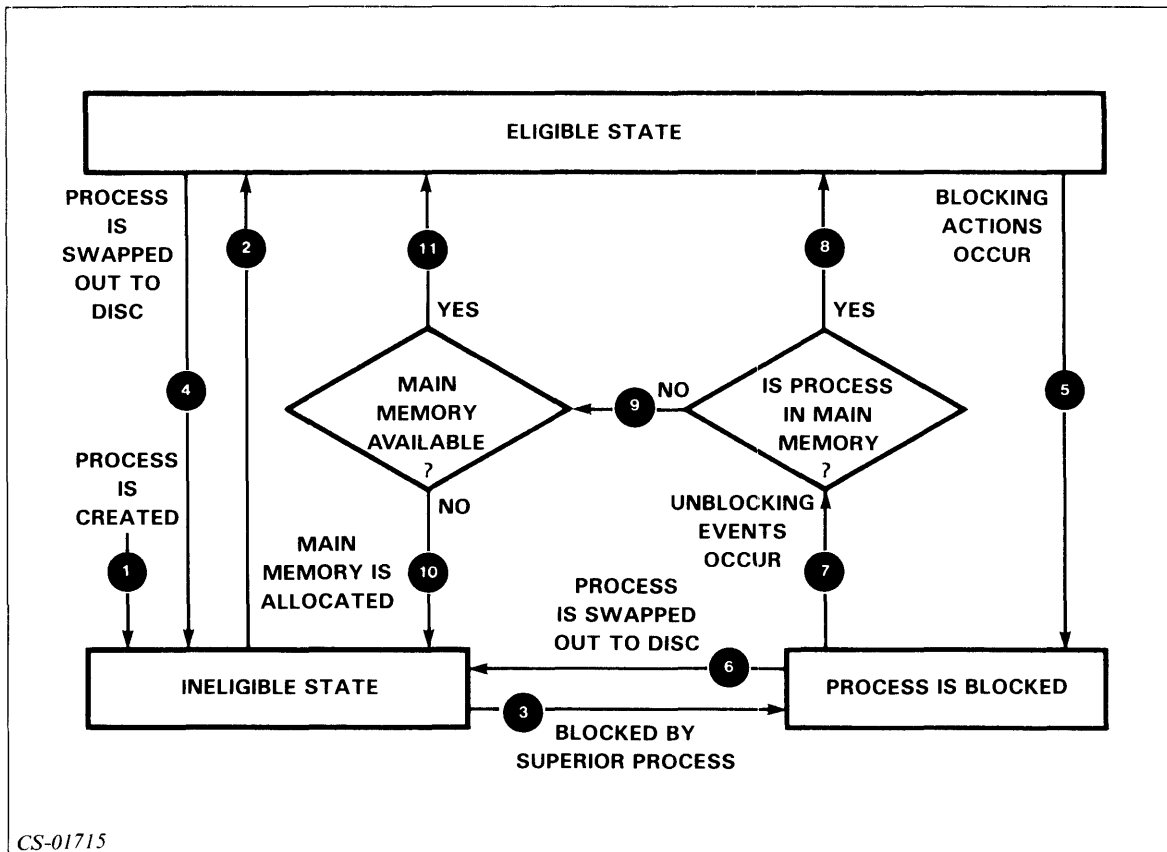
Figure 10.2 Process Types and Priorities

Process States

Table 10.B Factors That Determine Process State

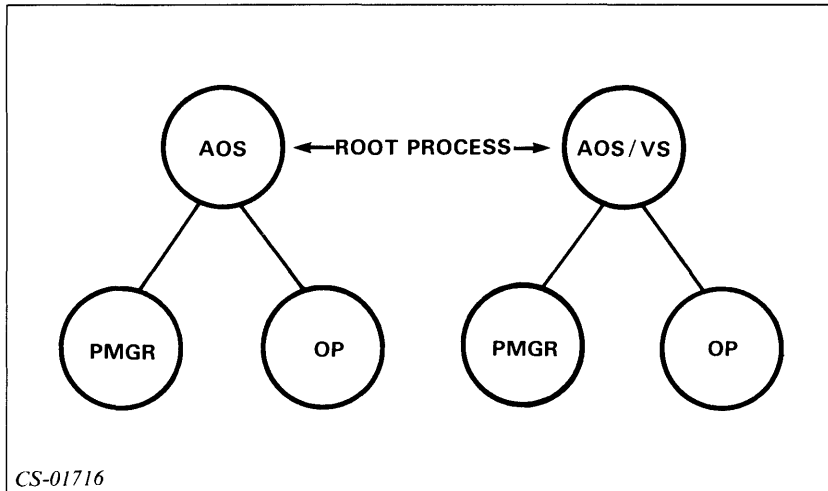
State	Ready?	Memory?	Awaiting Action?
Eligible	Yes	Yes	
Ineligible	Yes	No	
Blocked		Yes or No	Yes

- Ability of a process to access the CPU.
- States:
 - Eligible — Allocated main memory.
(Required to gain CPU control.)
 - Ineligible — Not allocated main memory.
(Becomes eligible when memory allocated.)
 - Blocked — Awaiting external event to occur.



CS-01715

Figure 10.3 State Transitions of a Process



CS-01716

Figure 10.4 Basic Process Tree

PMGR

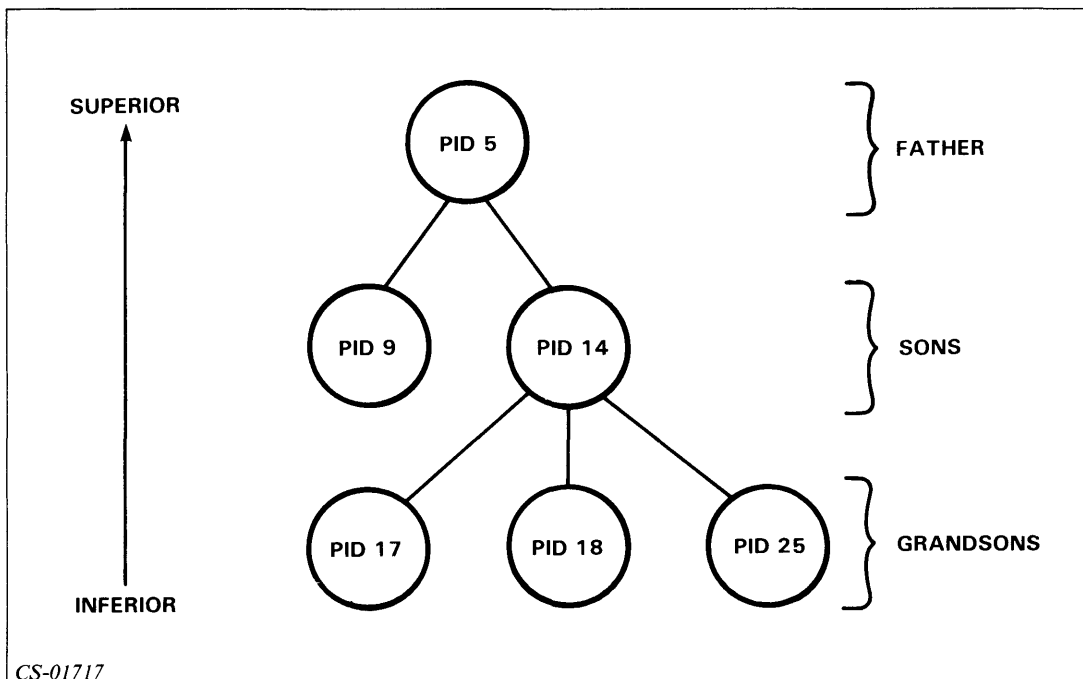
- Peripheral manager.
- Controls character I/O devices.
- “P-MANGR.”

OP

- Operator process.
- Has all privileges.
- Creates other processes.

Process Hierarchy

- Similar to data file and directory structures.



CS-01717

Figure 10.5 Process Tree

Example 1
WHO 3

PID: 3 OP EXEC :UTIL:EXEC.PR

Example 2
TREE 14

PID:14, FATHER: 5 SONS: 17 18 25

Steps to construct a process hierarchy:

1. **TREE 1**

PID: 1 FATHER: 0 SONS:

2. **WHO 1**

PID:1 PMGR PMGR :PMGR.PR

3. **TREE 2**

PID: 2 FATHER: 0 SONS: 3 4 17 26

4. **WHO 2**

PID:2 OP OP :CLI.PR

5. **WHO 3**

PID:3 EXEC EXEC :UTIL:EXEC.PR

6. **WHO 4**

PID:4 OP INFOS :INFOS.PR

7. **WHO 17**

PID:17 OP FORMQ :UTIL:AZTEXT:FORMQ.PR

8. **TREE 3**

PID: 3 FATHER: 2 SONS: 5 6 9

9. **WHO 5**

.
 .
 .

Note: The TREE and WHO commands do not work for PID 0.

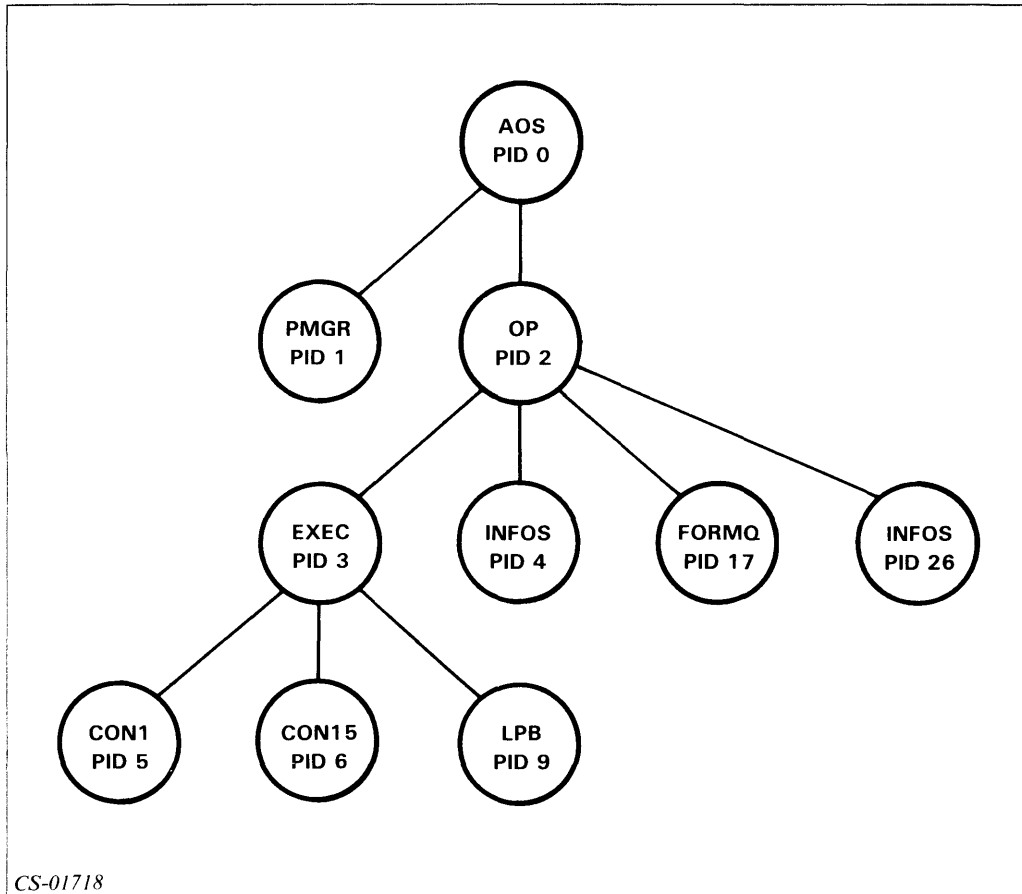


Figure 10.6 Resultant Process Hierarchy

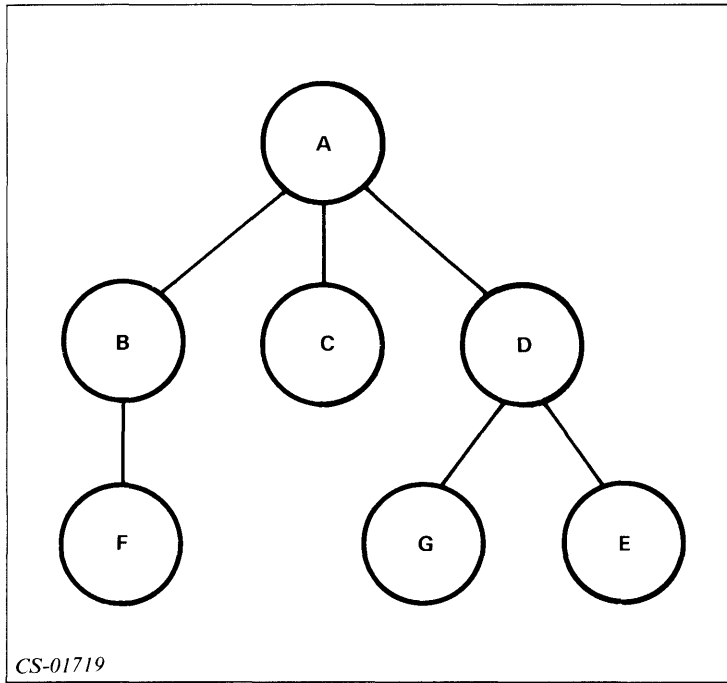


Figure 10.7 Creating Sons

Table 10.C Process Relationships

Subordinate Processes	Father Process
B, C, D	A
F	B
E, G	D

Privileges

- Father passes to son.
- Father can only pass the privileges he has.

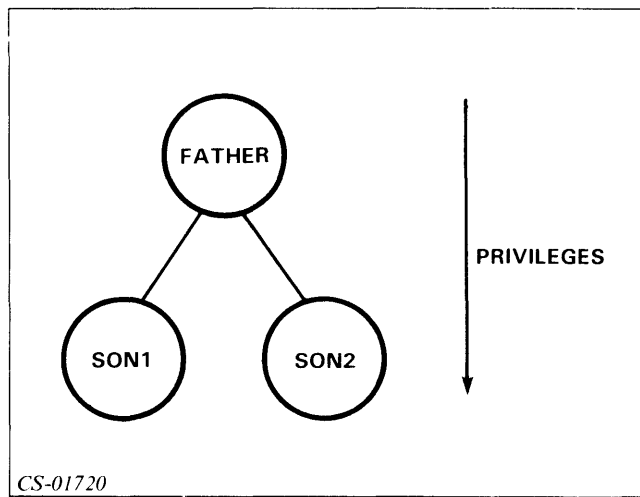


Figure 10.8 Passing Privileges

Directions

Now do the Segment A Exercise on the next page.

Segment A Process Concepts Exercise

Fill in the blanks in the process tree in Figure 10.9.

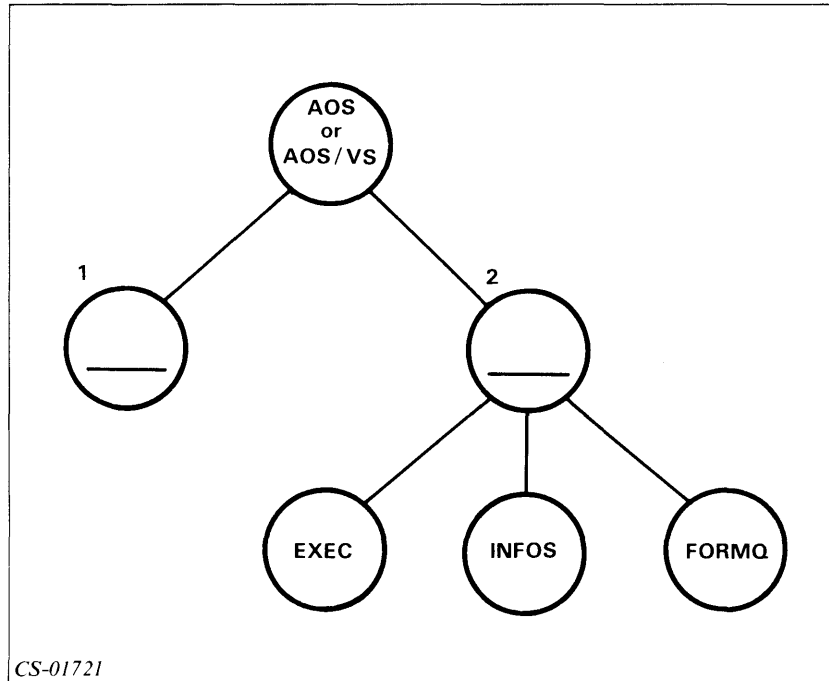


Figure 10.9 Segment A: Exercise

Use the process tree in Figure 10.10 to answer Questions 3 through 7.

3. Process D is subordinate to:

4. Process D is superior to:

5. Process A is superior to:

6. The father of process F is:

7. The sons of process D are:

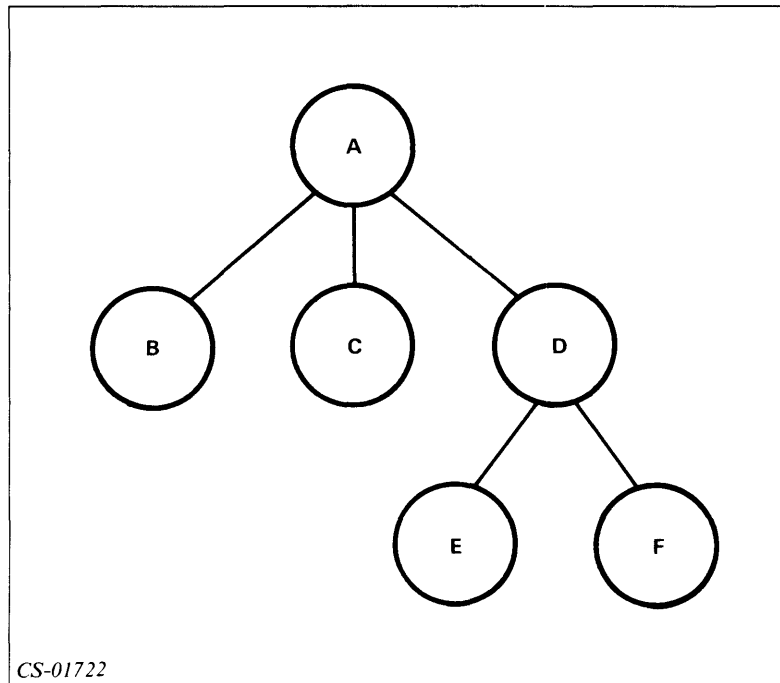


Figure 10.10 Segment A: Exercise

Match the letter of the definition in Column B with the term in Column A.

Column A

8. ____ Blocked
9. ____ Program
10. ____ Priority
11. ____ Eligible
12. ____ PMGR
13. ____ Unique ID
14. ____ Resident
15. ____ Swappable

Column B

- a. State in which process does not have memory allocated.
- b. Unique number automatically assigned by the system.
- c. A number from 1-255 that determines use of main memory.
- d. A set of instructions.
- e. A user of system resources.
- f. State in which process is waiting for an external action to occur.
- g. Type of process that is always in main memory.
- h. The peripheral manager.
- i. State in which a process must be to run.
- j. Highly privileged process used for creating other processes.
- k. Gets last chance at main memory.

Directions

Now check your answers with those on the next page.

Segment A

Process Concepts

Exercise Answers

1. PMGR
2. OP
3. A
4. E,F
5. B, C, D, E, F
6. D
7. E, F
8. f
9. d
10. c
11. i
12. h
13. b
14. g
15. k

Directions

If you answered all the questions in the segment exercise correctly, continue to Lab Activity 10-1 on the next page.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Lab Activity 10-1

Try to determine the process hierarchy on your system. Remember, the hierarchy may be changing while you are doing this exercise.

1. Use the **TREE** command on Process 1.
2. Use the **WHO** command to determine the name of each process listed as a result of Step 1.
3. Repeat Steps 1 and 2 for Process 2.
4. Repeat Step 3 for the sons of Process 2.
5. Continue with the grandsons of Process 2.

Remember, some of the processes in Steps 4 and 5 may terminate as you are working.

Directions

Now check your answers with those on the next page.

Lab Activity 10-1

Answers

The process hierarchy differs from system to system. Refer to the steps shown prior to Figure 10.6. You should have performed these steps. Your figure should resemble Figure 10.6, but it will not be identical.

Directions

If you successfully completed this Lab Activity, restart the Module 10 audiotape to continue.

If you had any problems, go back and review the portion of the audiotape and the Student Guide that discusses the WHO and TREE commands. Then try Lab Activity 10-1 again before continuing.

Segment B

Creating Processes

EXECUTE

- Format: EXECUTE pathname
- Creates subordinate swappable process.
- Same priority and privileges.
- Program is the file specified as argument.
- Parent process blocked.

Example

EXECUTE PROG1

- Invokes program PROG1.
- Creates subordinate process whose program is PROG1.
- PROG1 has same priority and privileges as YOU.

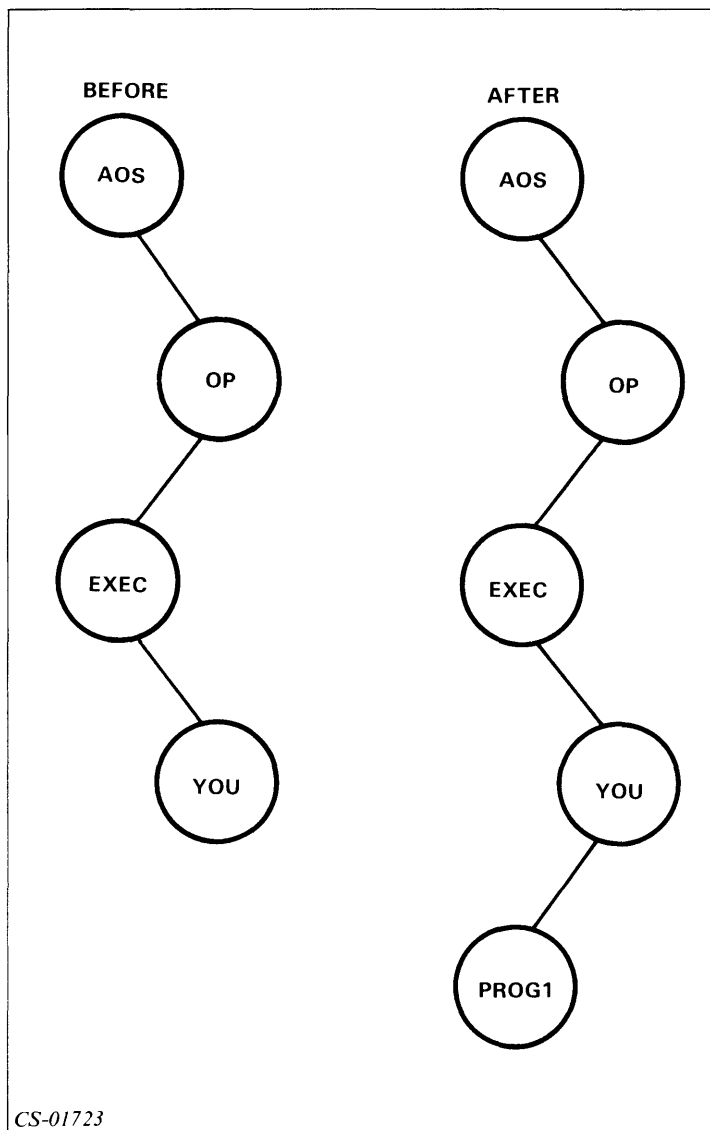


Figure 10.11 Process Tree Before and After EXECUTE Command

PROCESS

- Format: PROCESS pathname
- Creates son process.
- Program is the file specified as argument.
- Determine priority, type, and privileges by switches (no switches, no privileges).
- Process not always blocked.
- Numerous switches — See reference manuals.
- Trying to pass privilege you do not have produces this message:

ERROR: CALLER NOT PRIVILEGED FOR THIS ACTION

Example 1
PROCESS PR1

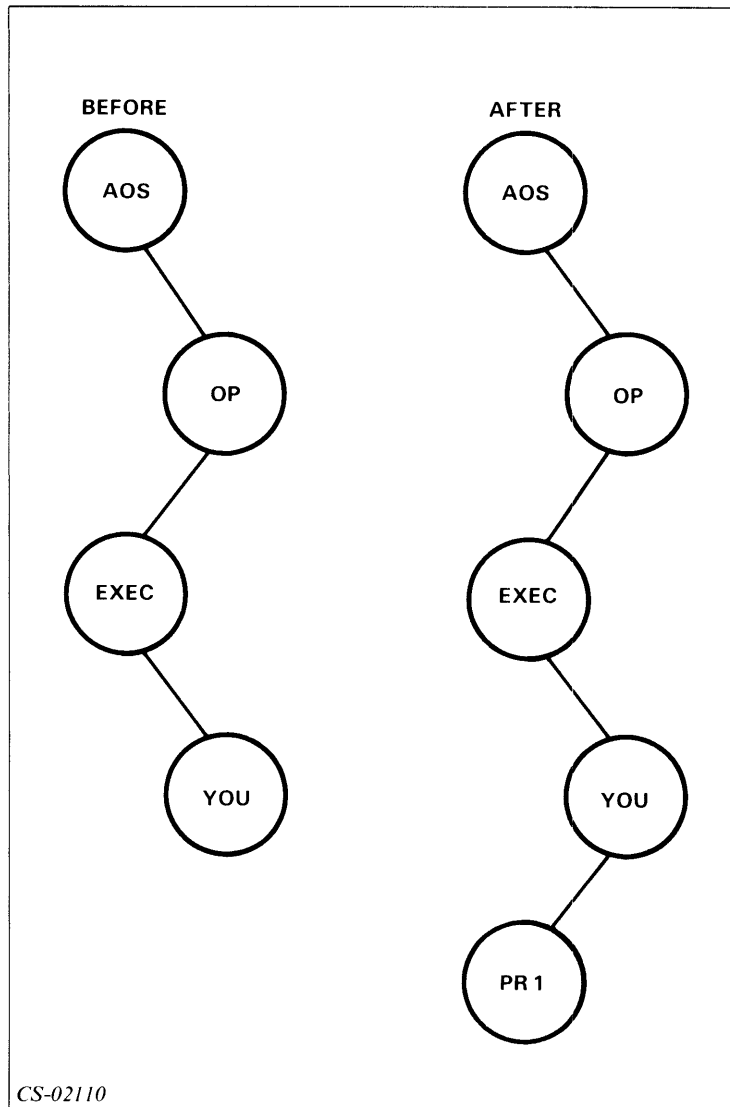


Figure 10.12 Process Tree Before and After PROCESS Command

- No privileges are passed to PR1.

Example 2
PROCESS/BLOCK/IOC CLI.PR

- Process blocked.
- New CLI created.
- Uses same console for input and output.
- If /IOC switch used, must also use /BLOCK switch. (See note.)

Example 3**PROCESS/RESIDENT/PRIORITY=1/SONS/SUPERUSER PAYROLL_3**

- Process resident with priority 1.
- Process can create sons.
- Process has SUPERUSER privilege.
- Program is PAYROLL_3.

Note: You may set the input, output, and console switches to be a file or a console name.
Example 2 used /IOC switch.

Chaining

- Creates new process.
- Replaces old process.
- May log you off unexpectedly.

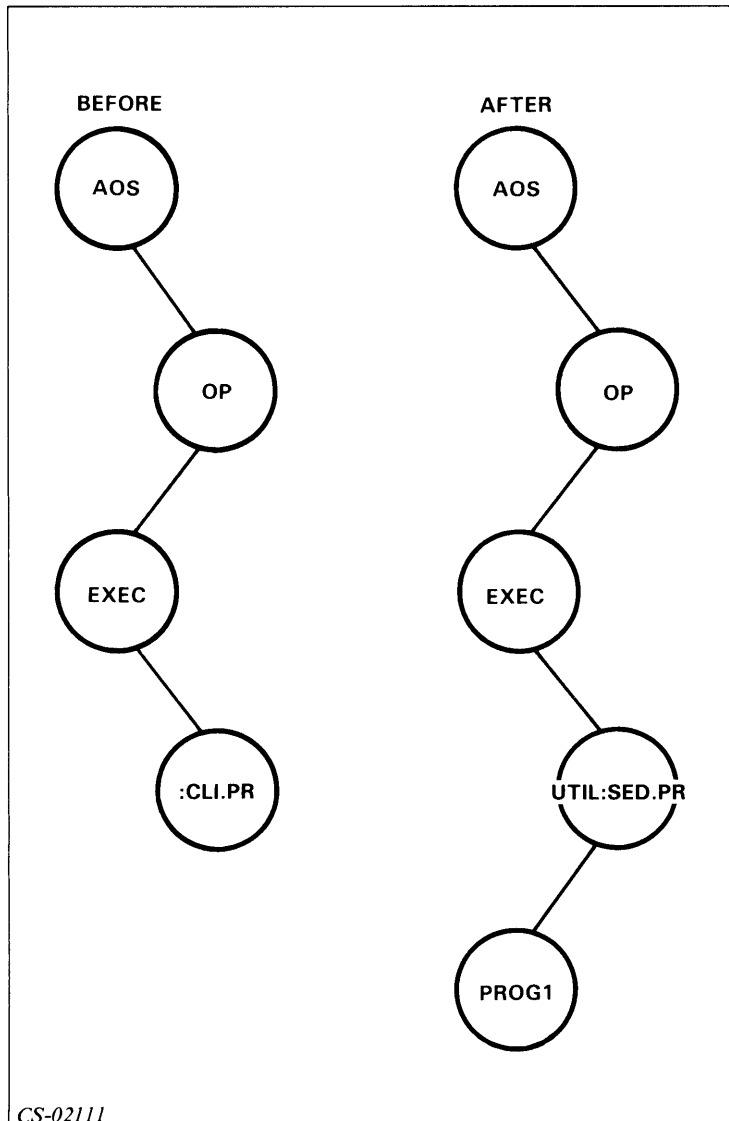


Figure 10.13 Process Tree Before and After CHAIN Command

Example
WHO

```
PID 13 YOU CON3 :CLI.PR
```

CHAIN SED
WHO 13

```
PID 13 YOU CON3 :UTIL:SED.PR
```

BYE

```
PROCESS 13 TERMINATED
```

Directions

Now do the Segment B Exercise on the next page.

Segment B

Creating Processes

Exercise

Given the process tree shown in Figure 10.14, redraw the process tree after process USER issued the following command. (Use the space provided at the top of the next page to draw your process tree.)

EXECUTE USER_PROG_TEN

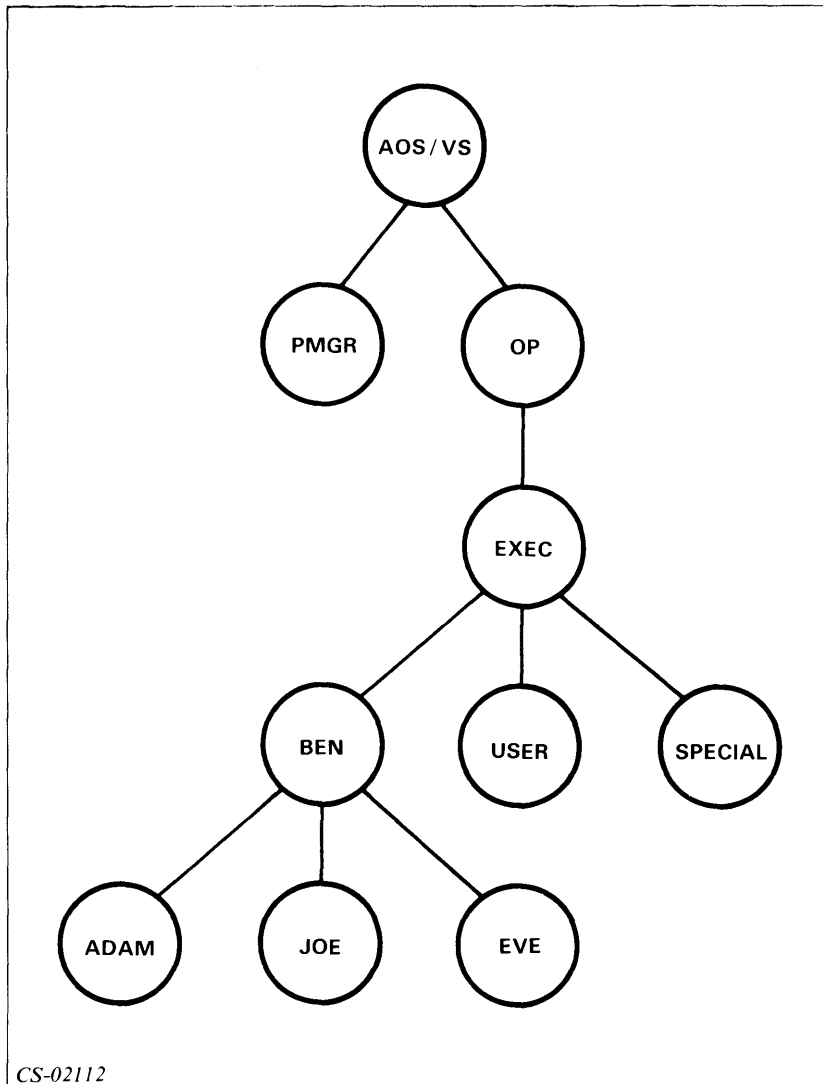


Figure 10.14 Segment B: Exercise

1.

Answer the following questions.

2. If you pass no privilege to a process that you create, it will have:
 - a. All privileges.
 - b. No privileges.
3. Can you pass a privilege that you do not have?
 - a. Yes
 - b. No
4. Write the command to create a process to run `PROG_1`, block your process, and use your terminal for input, output, and console files.
5. Write the command to create a process to run `PGM_10`. The new process should have the same privilege as your process.

Directions

Now check your answers with those on the next page.

Segment B

Creating Processes

Exercise Answers

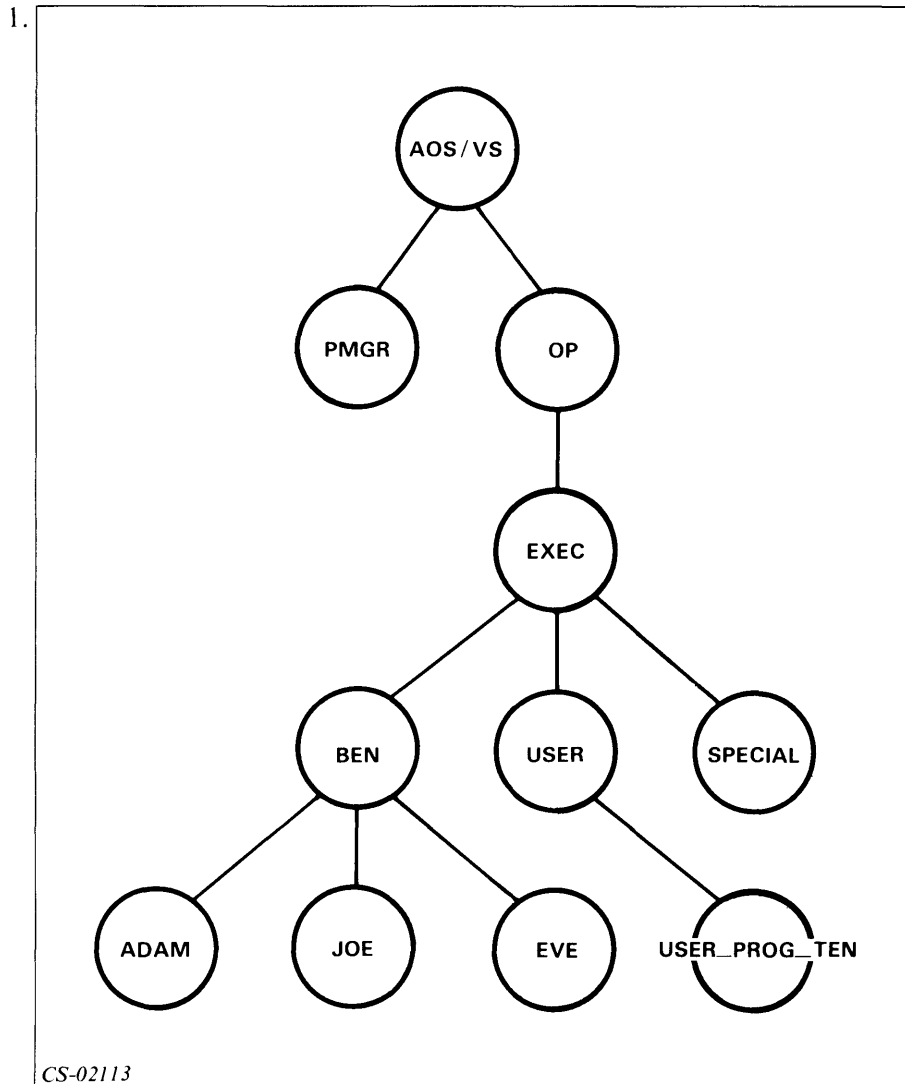


Figure 10.15 Segment B: Exercise Answer

2. b
3. b
4. **PROCESS/IOC/BLOCK PROG_1** or **EXECUTE PROG_1**
5. **PROCESS/DEFAULT PGM_10** or **EXECUTE PGM_10**

Directions

If you answered all the questions in the segment exercise correctly, restart the Module 10 audiotape to continue.

If all your answers were not correct, go back and review the segment and try the segment exercise again before continuing.

Segment C

Process Control

TERMINATE

- Format: TERMINATE PID

Example 1
TERMINATE 14

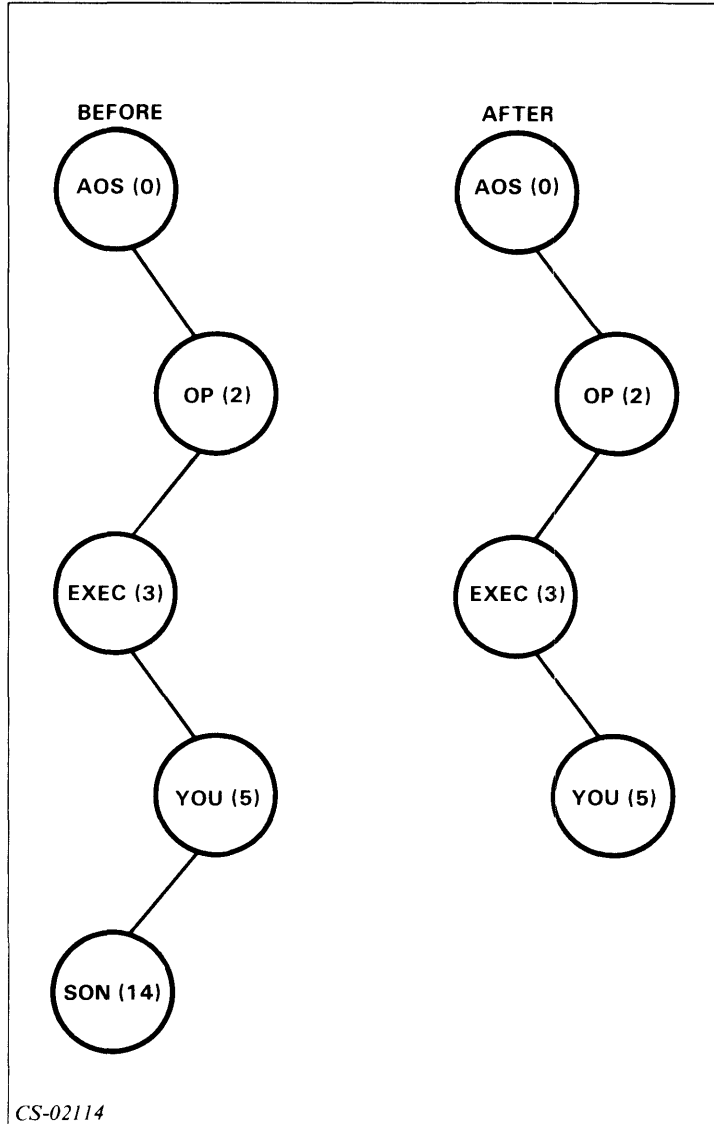


Figure 10.16 Process Tree Before and After TERMINATE Command

Example 2
TERMINATE 14

- PID 14 and PID 31 both terminated.

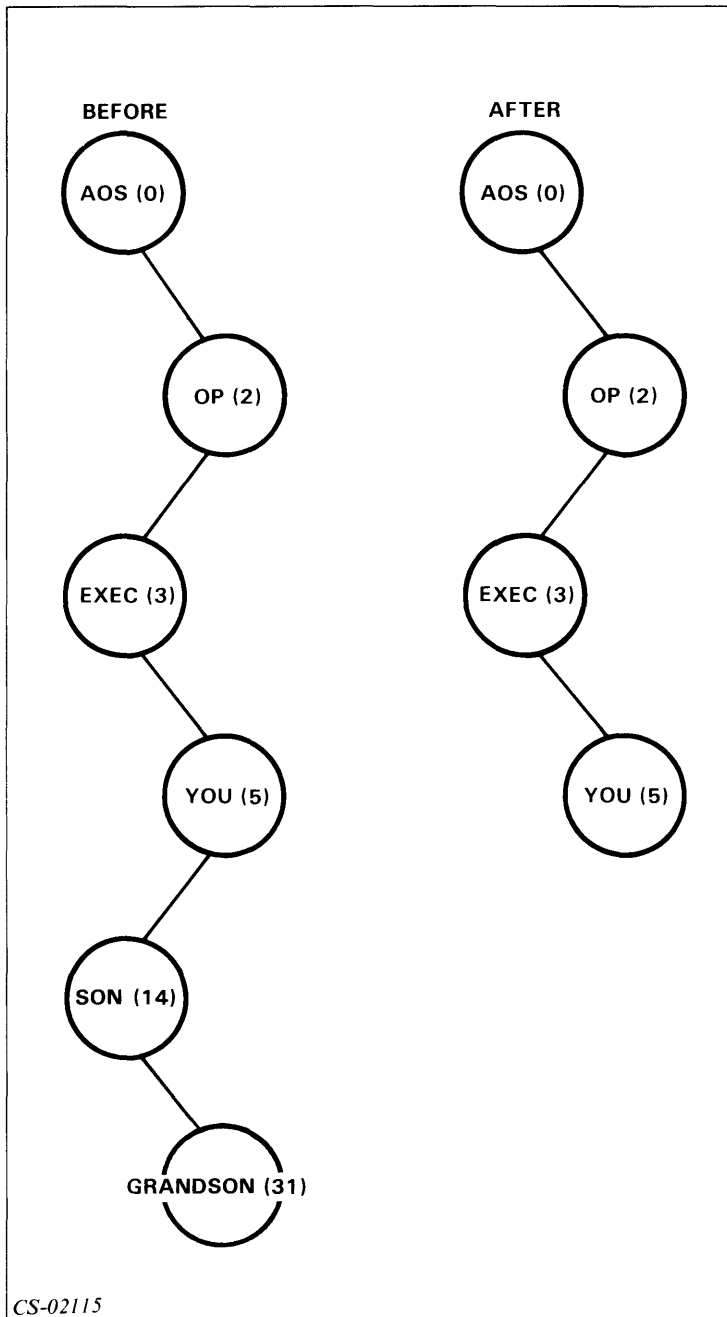


Figure 10.17 Process Tree Before and After TERMINATE Command

Segment C

Process Control

Exercise

Use the process tree in Figure 10.18 to answer Questions 1 through 3. Write the command to:

1. Terminate process XYZ.
2. Terminate USER_2 and ABC in one command.
3. Turn on the superprocess privilege.

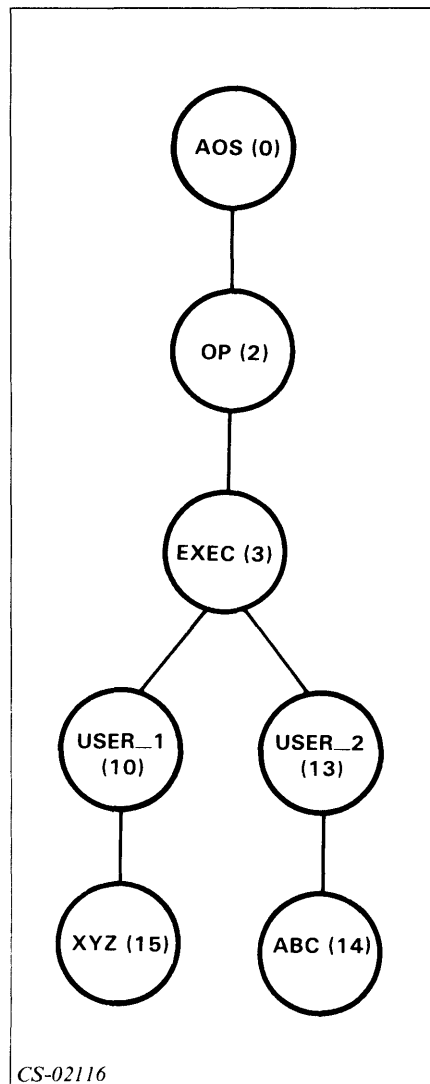


Figure 10.18 Segment C: Exercise

Directions

Now check your answers with those on the next page.

Segment C

Process Control

Exercise Answers

1. **TERMINATE 15**
2. **TERMINATE 13**
3. **SUPERPROCESS ON**

Directions

If you answered all of the questions correctly, continue to Lab Activity 10-2.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Lab Activity 10-2

1. Using a terminal other than the operator's console, create a process. Make this process execute another copy of the CLI (:CLI.PR). Determine the process ID of the new process.
2. Terminate the new process, but do not affect the creating process.
3. Determine the PID of the creating process in Step 1.
4. Move to the operator's console and with your system manager's approval, turn on the superprocess privilege.
5. Terminate your original process using the PID obtained in Step 3.
6. Turn off the superprocess privilege.

Directions

Now check your answers with those on the next page.

Lab Activity 10-2

Answers

1. **PROCESS/BLOCK/IOC :CLI.PR** or
EXECUTE :CLI.PR
WHO
2. **TERMINATE NN** (NN is the PID returned in Step 1.)
3. **WHO**
4. **SUPERPROCESS ON**
5. **TERMINATE XX** (XX is the PID returned in Step 3.)
6. **SUPERPROCESS OFF**

Directions

If you successfully completed Lab Activity 10-2, continue to the Module 10 Quiz on the next page.

If you had any problems, go back and review the segment and try Lab Activity 10-2 again before continuing.

Module 10 Quiz

1. Identify the processes in the process tree shown in Figure 10.19.

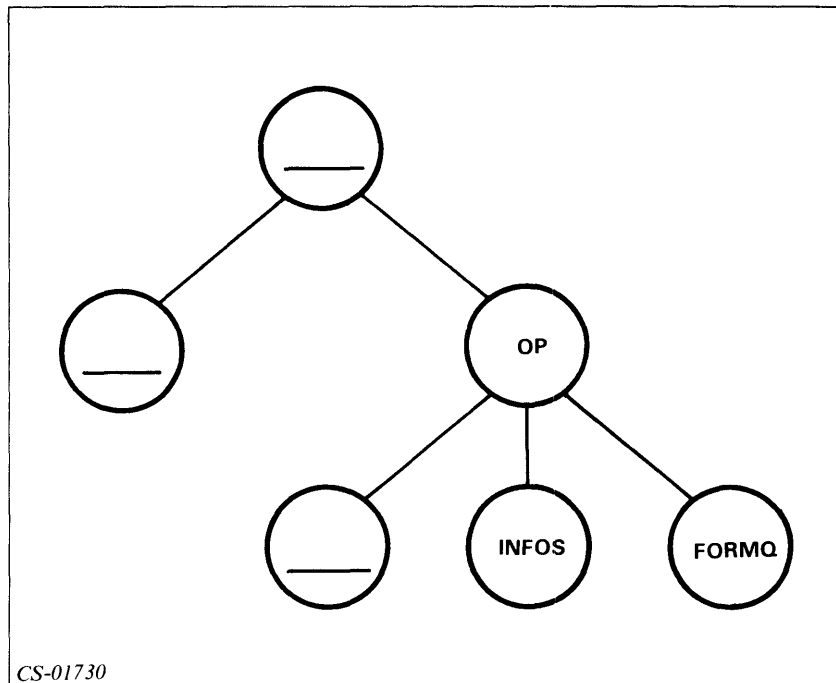


Figure 10.19 Module 10: Quiz

Circle the letter of the correct answer.

2. The command that determines the father process of a process is:
 - a. TREE
 - b. PARENT
 - c. PROCESS
 - d. SON
3. The command that determines the son of a process is:
 - a. TREE
 - b. PARENT
 - c. PROCESS
 - d. SON
4. The command that ends a subordinate process, but keeps your process intact is:
 - a. BYE
 - b. TERMINATE
 - c. CANCEL
 - d. OFF

5. The command that creates a new subordinate process is:
 - a. START
 - b. CREATE
 - c. PROCESS
 - d. SON
6. The command that allows you to control any process is:
 - a. SUPERUSER
 - b. BOSS
 - c. MASTER
 - d. SUPERPROCESS

Write the command to:

7. Find the father and any sons of process 14.
8. Terminate process 17.
9. Turn on the superprocess privilege.
10. Determine the process name of process 13.
11. Create a process that blocks your process, uses your console for input and output, and runs a program called GOOD_STUFF.
12. Create a process that has no privileges and executes a program called MODULE_EIGHT_CONCLUSION.
13.
 - a. What is a program?
 - b. What is a process?
 - c. How do they differ?

Use Figure 10.20 to answer Questions 14 through 16.

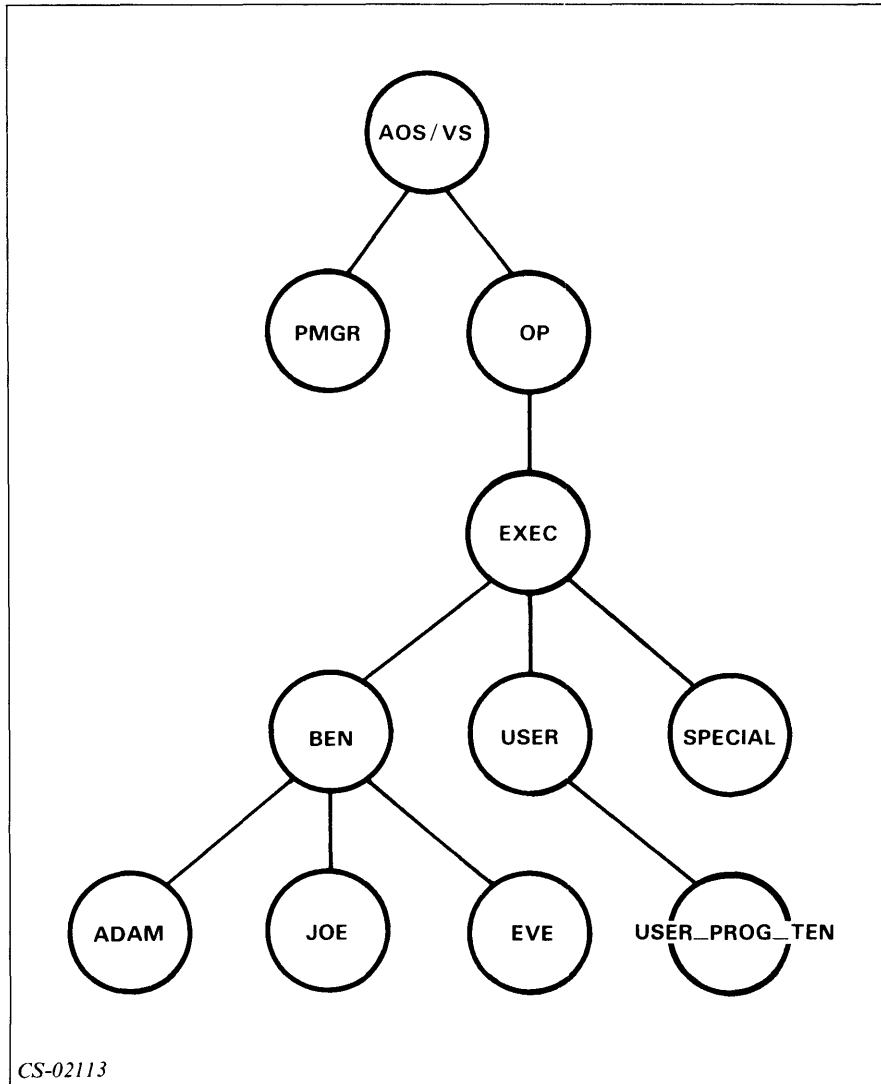


Figure 10.20 Module 10: Quiz

14. What process is BEN's father?

15. What process is superior to all other processes?

16. What process is subordinate to USER?

Answer the following questions by filling in the blanks.

17. The three process types are:

- a.
- b.
- c.

18. What are the characteristics of each type of process listed in Question 17?

Type	Characteristics
a.	
b.	
c.	

19. Describe the states that a process can attain.

- a.
- b.
- c.

20. The state in which all processes begin is:

- a. Ineligible.
- b. Eligible.
- c. Blocked.
- d. Resident.

21. Indicate the order in which the processes listed below will receive access to the CPU.

- a. _____ Resident process with priority 3.
- b. _____ Swappable process with priority 1.
- c. _____ Swappable process with priority 250.
- d. _____ Preemptible process with priority 1.
- e. _____ Preemptible process with priority 3.

If you have a computer available, use it to perform the following tasks. If not, write the commands that you would use.

22. Log onto your system and determine the process hierarchy. Draw it in the space below. (Stop after PID 10.)

23. Create another CLI process subordinate to your current process.

24. Terminate the process you just created and log off.

Directions

Now check your answers with those in Appendix A.

Module 11

The EXEC Process

Introduction

This module discusses the EXEC process. It presents the four functions that EXEC performs and a number of EXEC commands needed to accomplish these functions. This module also discusses related CLI commands and tape label concepts.

Module Objectives

Upon successful completion of this module, you should be able to:

1. State and describe the four functions of EXEC.
2. Diagram the steps involved in developing a spooling process.
3. Code CLI command lines to perform specified functions.
4. Code EXEC command lines to perform specified functions.
5. Discuss the differences between unlabeled and labeled tapes.

Resources

To complete this module, you need:

- Module 11 audiotape.
- Module 11 of your Student Guide.
- Audiotape playback unit.

Module Outline

1. EXEC, Logon, and Spooling
 - a. EXEC
 - b. Logon
 - c. Spooling
 - Queues
 - QDISPLAY
2. Related CLI Commands
 - a. QBATCH
 - b. QSUBMIT
 - c. QHOLD
 - d. QUNHOLD
 - e. QCANCEL
 - f. QPRINT
 - g. QPLOT
 - h. QPUNCH (AOS only)
3. More About EXEC
 - a. CPL
 - b. LPP
 - c. HEADERS
 - d. TRAILERS
 - e. DEFAULTFORMS
 - f. FORMS
 - g. LIMIT
 - h. UNLIMIT
 - i. FLUSH
 - j. PURGE
4. Deleting a Queue

5. The Batch Function
 - a. Batch
 - b. Batch commands
6. MOUNT and DISMOUNT
 - a. Mounting tapes
 - b. Dismounting tapes
 - c. Unlabeled tapes
 - d. Labeled tapes

Directions

Now start the Module 11 audiotape to begin. As you listen, follow along in Module 11 of your Student Guide.

Segment A

EXEC, Logon, and Spooling

EXEC

- Format: CONTROL @EXEC command (abbreviation CE)
- Handles user interaction at consoles.
- Creates only swappable processes.
- Functions:
 - Logging on
 - Spooling
 - Batch processing
 - Mount/dismount of tapes
- User-level accounting information.
- Only process OP talks directly to EXEC.

Logon

- Waits for NEW LINE.
- Prompts for username and password.
- Checks username and password against UPD.
- Commands:
 - ENABLE
 - DISABLE
 - TERMINATE

Example 1

```
CONTROL @EXEC ENABLE @CON3
```

Example 2

```
CONTROL @EXEC DISABLE @CON3
```

Example 3

```
CONTROL @EXEC TERMINATE @CON3
```

Spooling

- Key responsibility.
- Simultaneous Peripheral Operation On Line (SPOOL).
- CPU continues processing.
- Eliminates impact of slow devices.

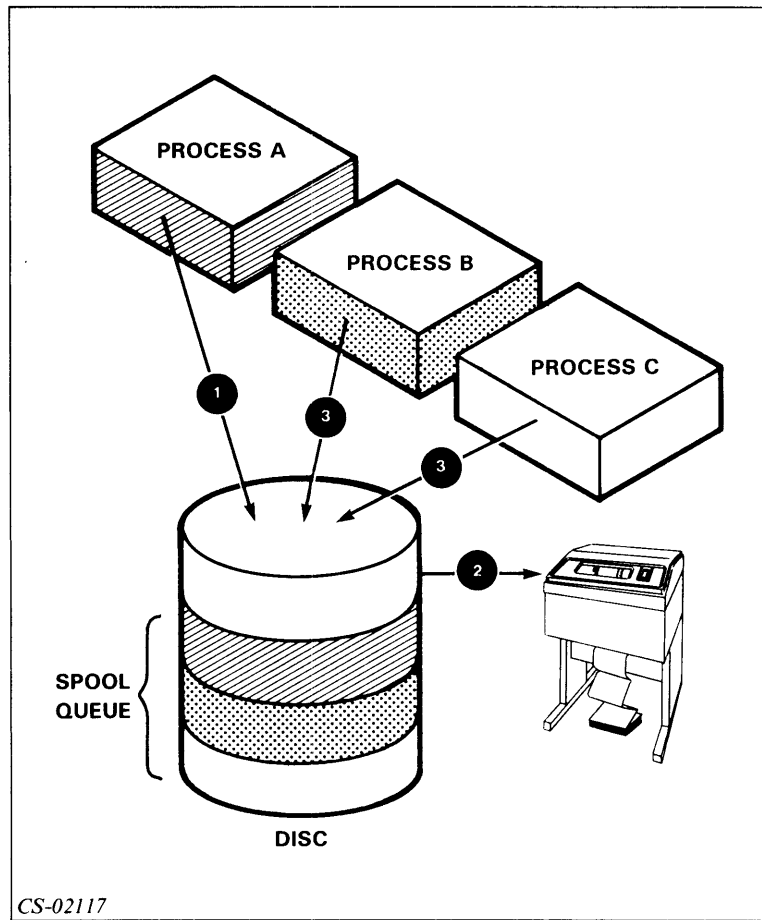


Figure 11.1 The Spool Concept

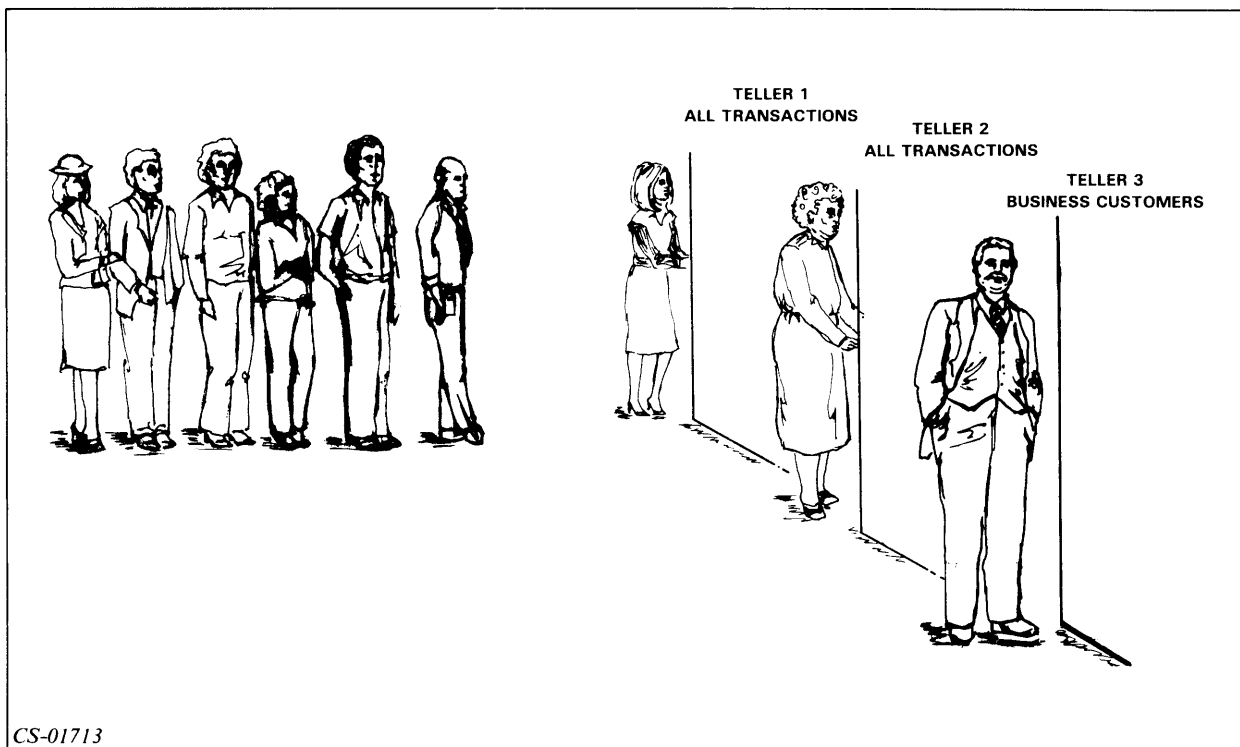


Figure 11.2 A Queue in a Bank

Queues

- Ordered list of elements
- Types:
 - Batch processing
 - Printing
 - Plotting
 - Punching (AOS only)

QDISPLAY

The QDISPLAY command displays the queue status.

- Format: QDISPLAY
- Switches:
 - /QUEUE= Display only a specific queue
(BATCH_INPUT, BATCH_OUTPUT...)
 - /TYPE= Display only a specific type of queue
(BATCH, PRINT, PUNCH, PLOT)

Example 1**QDISPLAY**

Displays all queues.

1. BATCH__INPUT BATCH OPEN
2. BATCH__OUTPUT PRINT OPEN
* 362 D AXNANNETTE :QUEUE:AXNANNETTE.OUTPUT.362
3. BATCH__LIST PRINT OPEN
4. LPT PRINT OPEN
367 N VXWAGNER :UDD:VXWAGNER:AMOD6:QSIXBI
368 N VXWAGNER :UDD:VXWAGNER:AMOD6:QSIX
369 N VXWAGNER :UDD:VXWAGNER:AMOD6:QSIX1
370 N VXWAGNER :UDD:VXWAGNER:AMOD6:QSIXI
5. LQP PRINT OPEN
* 366 AXMENARD :UDD:AXMENARD:OEM
6. FLAGS EXPLANATION:
D = /DELETE
N = /NOTIFY
* = ACTIVE

Example 2

QDISPLAY/QUEUE=BATCH_INPUT

Displays only the BATCH_INPUT queue.

BATCH_INPUT	BATCH	OPEN
* 360 DN	XXCAROL	:UDD:XXCAROL:TRAINING_CREDITS:2020.CLI.003.JOB
362	AXNANNETTE	:LD1:REGISTRATION:MACROS:BLUE_BOOK

FLAGS EXPLANATION:

D = /DELETE

N = /NOTIFY

* = ACTIVE

Example 3

QDISPLAY/TYPE=PRINT

Displays all PRINT queues.

BATCH_OUTPUT	PRINT	OPEN
BATCH_LIST	PRINT	OPEN
LPT	PRINT	OPEN
ID_LPT	PRINT	OPEN
LQP	PRINT	OPEN
* 97 N	VXGARYS	:UDD:VXGARYS:N3:1ST:M1:SCR3.LP
98 N	VXGARYS	:UDD:VXGARYS:N3:INFO:CONTENTS

FLAGS EXPLANATION:

N = /NOTIFY

* = ACTIVE

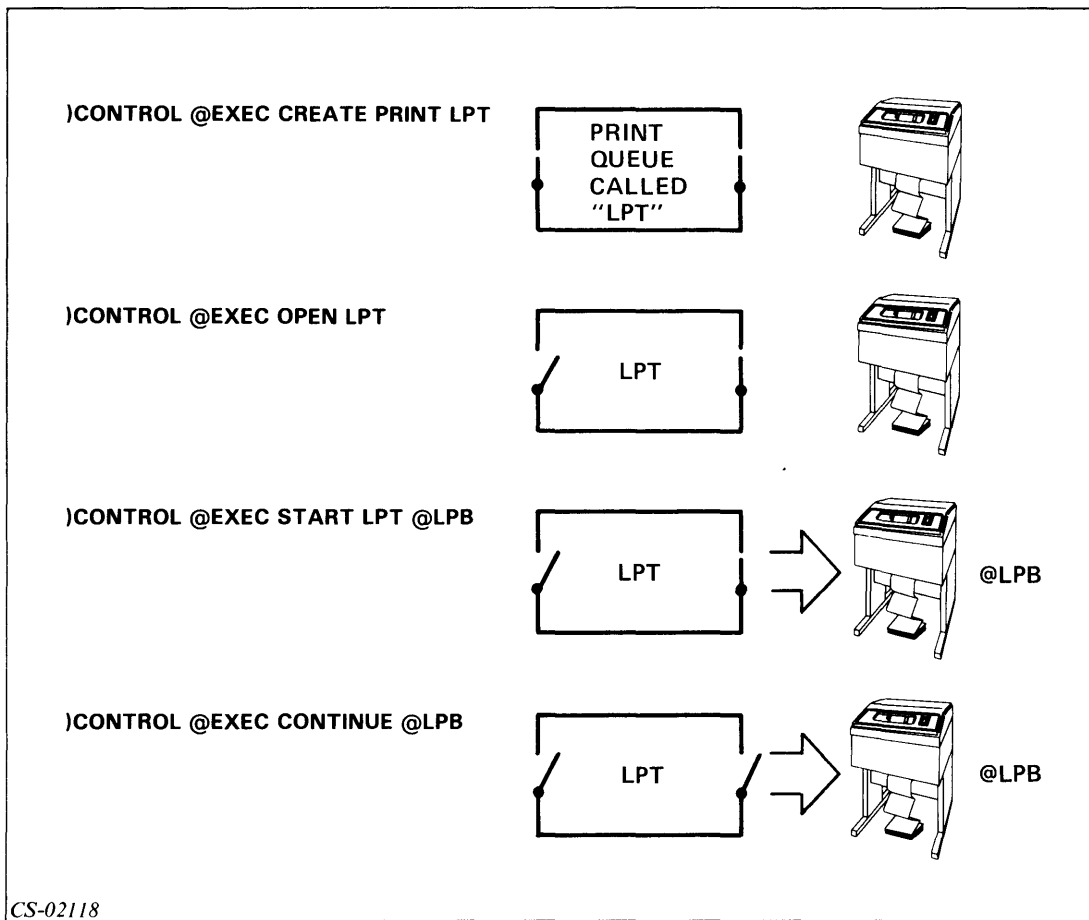


Figure 11.3 Creating a Spooling Process

- Create queue.
- Open input door.
- Create logical output door.
- Open output door.

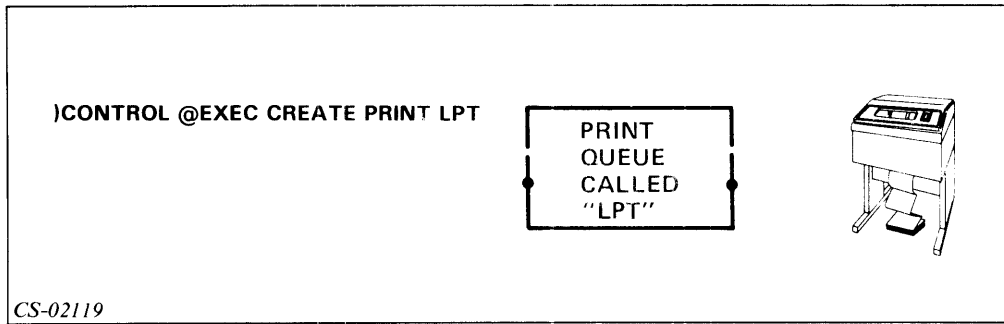


Figure 11.4 Creating the Queue

- Format: `CONTROL @EXEC CREATE queuetype queueName`

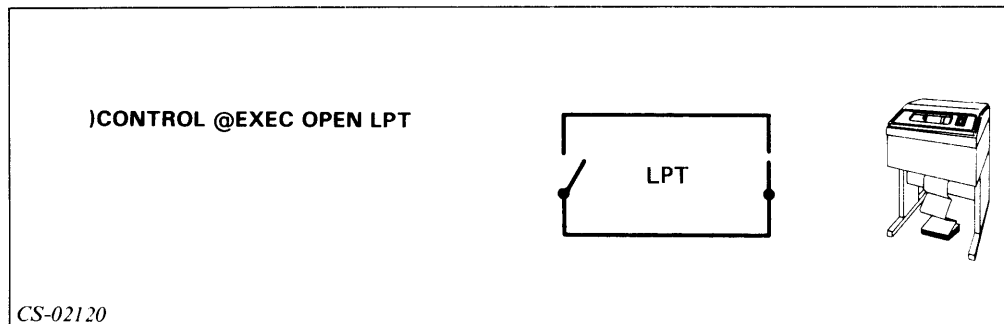


Figure 11.5 Opening Input Door

- Format: `CONTROL @EXEC OPEN queueName`

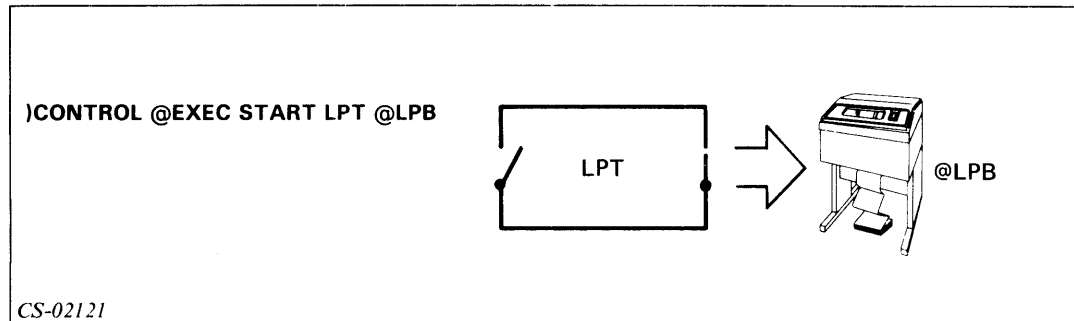


Figure 11.6 Creating Logical Output Door

- Format: `CONTROL @EXEC START queueName devicename`

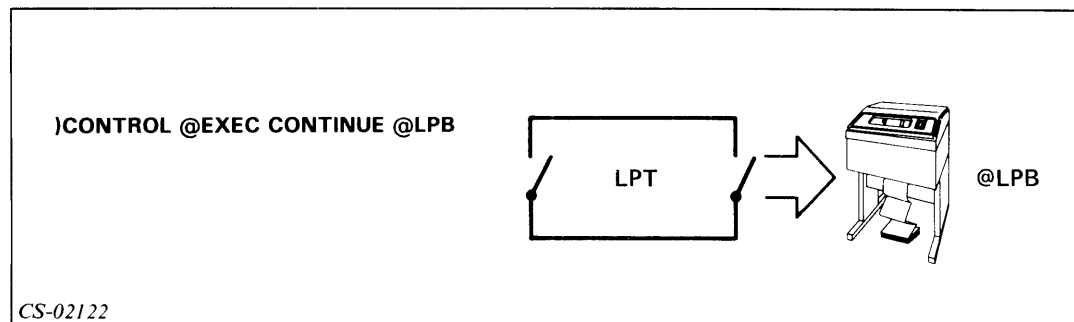


Figure 11.7 Opening Output Door

- Format: `CONTROL @EXEC CONTINUE devicename`

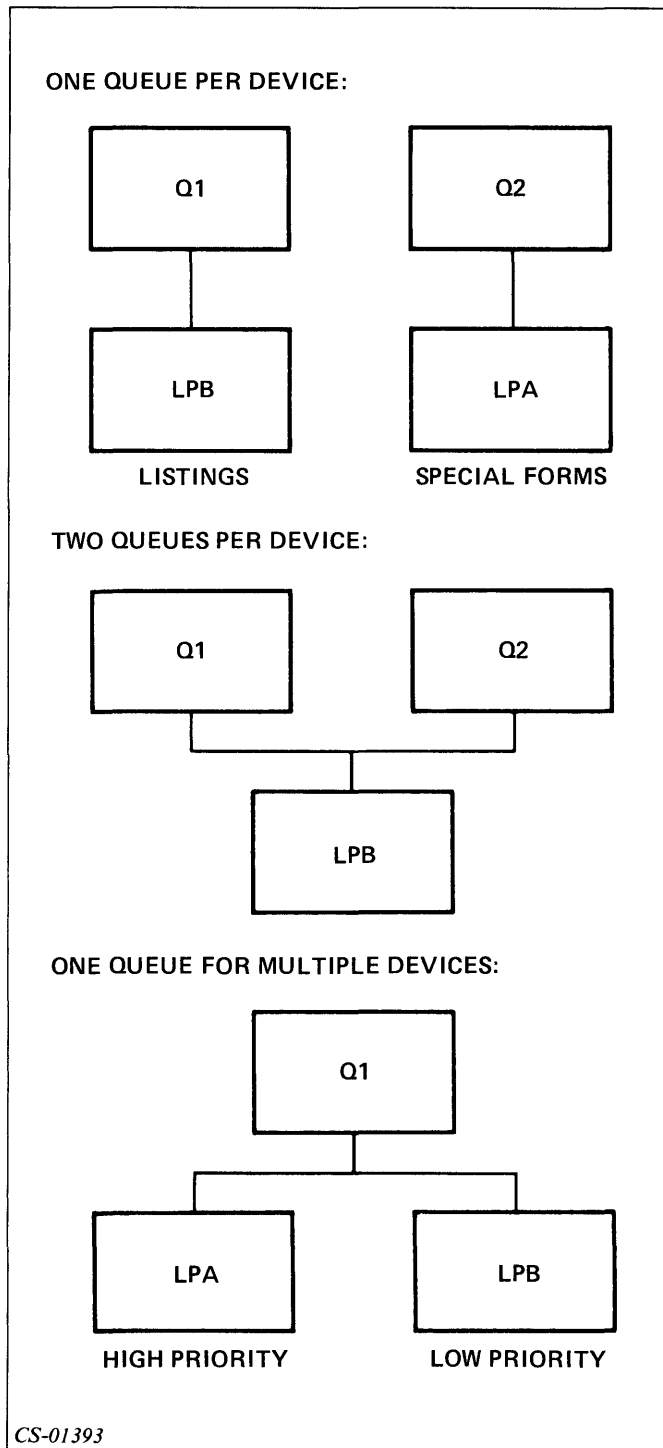


Figure 11.8 Spooling Variations

Directions

Now do the Segment A Exercise on the next page.

Segment A

EXEC, Logon, and Spooling

Exercise

Answer the following questions.

1. What are the four functions of EXEC?
 - a.
 - b.
 - c.
 - d.

2. What are the four steps in creating a SPOOL process?
 - a.
 - b.
 - c.
 - d.

Match the descriptions in Column B with the terms in Column A.

Column A	Column B
3.____ Queue	a. A command that shows the status of a queue.
4.____ Spooling	b. The only process that talks directly to EXEC.
5.____ QDISPLAY	c. Creates only swappable processes.
6.____ SPOOL Queue	d. An ordered list of elements.
7.____ CONTINUE	e. Reduces impact of slow devices on processing.
8.____ ENABLE	f. A holding area on disc.
9.____ TERMINATE	g. A command that logs a user off a specified console.
10.____ OP	h. The command that allows a terminal to be recognized by EXEC.
11.____ EXEC	i. Opens the output door.
12.____ START	j. Creates the logical output door.

Directions

Now check your answers with those on the next page.

Segment A

EXEC, Logon, and Spooling

Exercise Answers

1.
 - a. Logging on
 - b. Spooling
 - c. Batch processing
 - d. Mount/dismount of tapes
2.
 - a. Create the queue.
 - b. Open an input door.
 - c. Create a logical output door.
 - d. Open the output door.
3. d
4. e
5. a
6. f
7. i
8. h
9. g
10. b
11. c
12. j

Directions

If you answered all the questions in the segment exercise correctly, restart the Module 11 audiotape to continue.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Segment B

Related CLI Commands

QBATCH

- Format: QBATCH argument [argument]
- First argument — Often CLI EXECUTE command.
- Subsequent arguments — Arguments of CLI command.

Table 11.A QBATCH Switches

Switch	Result
/HOLD	Does not execute the job until released by owner.
/NOTIFY	Informs the user when job is complete.
/QPRIORITY=	Gives this job the specified priority.
/AFTER=	Does not execute job until time specified.
/JOBNAME=	Gives the job a name by which it can be accessed.
/I	Creates the job from lines that follow.

- Creates batch job.
- Places job in batch input queue.
- Job executes independently of CLI process.

Example 1

QBATCH XEQ NET

Example 2

QBATCH/HOLD/NOTIFY/QPRIORITY=100 XEQ NET

- Do not run job until released by user.
- Notify user when completed.
- Give the job a priority of 100 when it runs.

Example 3

QBATCH/AFTER= +12/JOBNAME=PAYROLL XEQ PAY

- Execute program PAY 12 hours after submission.
- Allow job to be accessed using name PAYROLL.

Example 4

```
QBATCH/I
XEQ PROG1
DIR DIR4
XEQ PROG4
)
```

- Create a batch job using the information that follows.
- Execute PROG1.
- Change to directory to DIR4.
- Execute PROG4.
- End job submission (single right parenthesis).

QSUBMIT

- Format: QSUBMIT pathname [pathname]
- Similar to QBATCH command.
- Can specify any queue:
 /QUEUE= switch.
- BATCH_INPUT default queue.

Example 1

QSUBMIT FILE1

- Place FILE1 in the BATCH_INPUT queue.

Example 2

QSUBMIT/HOLD/NOTIFY/QPRIORITY=100/QUEUE=PRINT TEXT1

- Do not run job until released by user.
- Notify user when completed.
- Give the job a priority of 100 when it runs.
- Place the job in the print queue.
- Get data from file TEXT1.

QHOLD

- Format: QHOLD jobname (or sequence number)
- Puts job in a wait status.

Example 1

QHOLD PAYROLL

- Holds entry called PAYROLL.
- /JOBNAME switch used when entry created.

Example 2

QHOLD 36

- Holds queue entry 36.

QUNHOLD

- Format: QUNHOLD jobname (or sequence number)
- Puts job back into active status.

Example 1

QUNHOLD PAYROLL

- Releases PAYROLL.
- /JOBNAME switch specified.

Example 2
QUNHOLD 36

- Releases queue entry 36.

QCANCEL

- Format: QCANCEL jobname (or sequence number)
- Deletes a queue entry.
- Use caution; results are irrevocable.

Example 1
QCANCEL JOB1

- Cancels entry JOB1.
- /JOBNAME switch specified.

Example 2
QCANCEL 36

- Cancels entry 36.

QPRINT

- Format: QPRINT pathname
- Places entry in printer queue.

Table 11.B QPRINT Switches

Switch	Result
/NOTIFY	Informs the user when printing is finished.
/COPIES= <i>n</i>	Creates <i>n</i> copies of the output.
/TITLES	Includes titles on printed document.
/FORMS=	Uses special forms for printing.

Example 1
QPRINT DATA1

- Prints file DATA1.

Example 2
QPRINT/NOTIFY/TITLES DATA1

- Prints DATA1.
- Notifies user when printing complete:


```
FROM PID3: (EXEC) @LPB COMPLETED :UDD:USER1:DATA1
```
- Provides page headings (titles) in following format:

UDD:USER1:DATA1 24-SEP-82 10:40:48 PAGE 11

Example 3**QPRINT/FORMS=FORM2 DATA1**

- Prints file DATA1.
- Not printed until forms of type FORM2 mounted on printer and EXEC advised.

QPLOT

- Format: QPLOT pathname
- Places entry in the plotter queue.
- Switches:
 - /COPIES=*n* Plot *n* copies of the file.
 - /NOTIFY Inform user when plotting is finished.

Example**QPLOT/COPIES=3/NOTIFY DATA_PLOT**

- Makes three plotted copies of DATA_PLOT.
- Notifies user when plotting complete.

**QPUNCH
(AOS only)**

- Format: QPUNCH pathname
- Places entry in punch queue.
- Switches:
 - /COPIES=*n* Punch *n* copies of the file.
 - /NOTIFY Inform user when punching is complete.

Example**QPUNCH/COPIES=2/NOTIFY DATA_PUNCH**

- Punches two copies of DATA_PUNCH.
- Notifies user when punching complete.

Directions

Now do the Segment B Exercise on the next page.

Segment B

Related CLI Commands

Exercise

Match the following commands with their results.

- | | |
|-------------------|---|
| 1. _____ QPRINT | a. Prevents an entry from being processed until a later time. |
| 2. _____ QPLOT | b. Deletes an entry from a queue. |
| 3. _____ QPUNCH | c. Submits an entry for CPU processing. |
| 4. _____ QDISPLAY | d. Places an entry in the printer queue. |
| 5. _____ QBATCH | e. Lists the queues and their contents. |
| 6. _____ QCANCEL | f. Places an entry in the paper-tape punch queue. |
| 7. _____ QHOLD | g. Places an entry into the plotter queue. |

Mark the following statements True or False.

8. The QPRINT command actually causes the file to be printed. _____
9. The QDISPLAY command can be used to print a file on the line printer. _____
10. You can use the /FORMS switch to have a file printed on special paper. _____
11. You can check the contents of the queues by using the QDISPLAY command. _____
12. The QPUNCH command is used to place output in a paper-tape queue. _____
13. If a queue entry is placed on hold, it must be released by the QRELEASE command. _____
14. An entry can be put on hold either by the QHOLD command or by the /HOLD switch. _____
15. To cancel an entry in the batch queue, use the QUNBATCH command. _____

Directions

Check your answers with those on the next page.

Segment B

Related CLI Commands

Exercise Answers

1. d
2. g
3. f
4. e
5. c
6. b
7. a
8. False
9. False
10. True
11. True
12. True
13. False
14. True
15. False

Directions

If you answered the questions in the segment exercise correctly, continue to Lab Activity 11-1 on the next page.

If your answers are not correct, go back and review the segment and do the segment exercise again before continuing.

Lab Activity 11-1

To complete this Lab Activity, you need access to a computer system. Log on and perform the following activities. If you do not have access to a system, write the commands to perform the functions in the spaces provided.

If you have any problems, you can check the answers on the next page.

1. Create a file with the following information in it. Call it `JOB_ONE.CLI`.

```
PUSH
LEVEL
CURRENT
PREVIOUS
PUSH
LEVEL
DIR
DIR/I
DIR
POP
POP
```

2. Create a batch job to execute `JOB_ONE` and put it on hold.
3. Display all of the queues.
4. Release the job. (If you do not have a computer system, assume that the job sequence number for `JOB_ONE` is 3.)
5. Create a job that executes the following steps:
 - a. Change the working directory to `:UDD:MYDIR:SPECIAL`.
 - b. Execute `MYJOB`.
 - c. Return to the initial directory.
 - d. Execute `MYJOB_ONE`.
(Note: This job should be put on hold when created.)

6. Find the sequence number of the job in Step 5.
7. Cancel this job.
8. Create a job to execute PGM_NO_TWO. Send the output to HOLD_OUT_TWO.
(Use the /QOUTPUT= switch.)
9. Print on the printer the output of Step 8.

Directions

Now check your answers with those on the next page.

Lab Activity 11-1

Answers

```
1. CREATE/I JOB_ONE.CLI
   PUSH
   LEVEL
   CURRENT
   PREVIOUS
   PUSH
   LEVEL
   DIR
   DIR/I
   DIR
   POP
   POP
   )
```

```
2. QBATCH/HOLD JOB_ONE
```

```
3. QDISPLAY
```

```
4. QUNHOLD XXX
```

(XXX is the sequence number returned from the QDISPLAY. If you do not have access to a computer system, XXX should be 3.)

```
5. QBATCH/HOLD/I
   DIRECTORY :UDD:MYDIR:SPECIAL
   XEQ MYJOB
   DIRECTORY/I
   XEQ MYJOB_ONE
```

```
6. QDISPLAY/TYPE=BATCH
```

```
7. QCANCEL XXX
```

(XXX is the sequence number returned from the QDISPLAY in Step 6.)

```
8. QBATCH/QOUTPUT=HOLD_OUT_TWO XEQ PGM_NO_TWO
```

```
9. QPRINT HOLD_OUT_TWO
```

Directions

If you successfully completed Lab Activity 11-1, restart the Module 11 audiotape to continue.

If you had any problems, go back and review the segment and try Lab Activity 11-1 again before continuing.

Segment C

More About EXEC

CPL

- Format: CONTROL @EXEC CPL devicename number
- Characters Per Line
- Number: 16 – 136
- Default = 80

Example

CONTROL @EXEC PAUSE @LPB

(Device must be idle to change the characters per line.)

FROM PID 3:(EXEC) @LPB PAUSED [IDLE]

CONTROL @EXEC CPL @LPB 120

(Sets the characters per line for device LPB to 120.)

CONTROL @EXEC CONTINUE @LPB

(Resumes printing of the jobs in the queue.)

LPP

- Format: CONTROL @EXEC LPP devicename number
- Lines Per Page
- Number: 6 – 144
- Default = 66

Example

CONTROL @EXEC PAUSE @LPB

(Device must be idle to change the lines per page.)

FROM PID 3:(EXEC) @LPB PAUSED [IDLE]

CONTROL @EXEC LPP @LPB 56

(Sets the lines per page for device LPP to 56.)

CONTROL @EXEC CONTINUE @LPB

(Resumes printing of the jobs in the queue.)

HEADERS

- Format: CONTROL @EXEC HEADERS @devicename {0, 1, 2}
- Page printed before file printed.
- Default = 1
- Information provided:
 - Username.
 - Destination of the file.
 - Pathname of the file.
 - Date file was created, queued, and processed.
 - Complete list in reference manuals.

Example**CONTROL @EXEC PAUSE @LPB**

(Device must be idle to change the header feature.)

FROM PID 3:(EXEC) @LPB PAUSED [IDLE]

CONTROL @EXEC HEADERS @LPB 1

(Sets the device LPB to print one header page before each job.)

CONTROL @EXEC CONTINUE @LPB

(Resumes printing of the jobs in the queue.)

Note: See Figure 11.9 for example.**TRAILERS**

- Format: **CONTROL @EXEC TRAILERS @devicename {0, 1, 2}**
- Page printed after file printed.
- Default = 0
- Information provided:
 - User name.
 - Destination of the file.
 - Number of pages.
 - Complete list in reference manuals.

Example**CONTROL @EXEC PAUSE @LPB**

(Device must be idle to change the trailer feature.)

FROM PID 3:(EXEC) @LPB PAUSED [IDLE]

CONTROL @EXEC TRAILERS @LPB 1

(Sets the device LPB to print one trailer page after each job.)

CONTROL @EXEC CONTINUE @LPB

(Resumes printing of the jobs in the queue.)

Note: See Figure 11.10 for example.

DEFAULTFORMS

- Format: **CONTROL @EXEC DEFAULTFORMS @devicename formname**
- Identifies standard form on the device.
- Any request with different form held.
- Formname:
 - In :UTIL:FORMS
 - Contains formatting commands

Example

CONTROL @EXEC PAUSE @LPB

(Device must be idle to set the default forms.)

FROM PID 3:(EXEC) @LPB PAUSED [IDLE]

CONTROL @EXEC DEFAULTFORMS @LPB ONE_PART

(Sets default to one part paper.)

CONTROL @EXEC CONTINUE @LPB

(Resumes printing of the jobs in the queue.)

FORMS

- Format: **CONTROL @EXEC FORMS @devicename formname**
- Formname:
 - :UTIL:FORMS
 - Contains formatting commands
- Identifies form currently on device.
- Allows change from default forms.
- Special forms for special jobs.
- Default = Defaultforms

Example

CONTROL @EXEC PAUSE @LPB

(Device must be idle to change forms on the device.)

FROM PID 3:(EXEC) @LPB PAUSED [IDLE]

CONTROL @EXEC FORMS @LPB W2

(Sets the forms on device LPB to W-2s; default not changed.)

CONTROL @EXEC CONTINUE @LPB

(Resumes printing of the jobs in the queue.)

LIMIT

- Format: CONTROL @EXEC LIMIT @devicename
- System estimates number of pages.
- Stops print after estimated number of pages.
- User can provide estimate.

Example

CONTROL @EXEC LIMIT @LPB

(Limits the number of pages of output for device LPB.)

UNLIMIT

- Format: CONTROL @EXEC UNLIMIT @devicename
- Reverses LIMIT command.
- Prints any number of pages.

Example

CONTROL @EXEC UNLIMIT @LPB

(Allows device LPB to print any number of pages.)

FLUSH

- Format: CONTROL @EXEC FLUSH @devicename
- Active job.
- Stops print.
- Next job printed.
- Device *not* idle.

Example

CONTROL @EXEC FLUSH @LPB

(Stops the output on device LPB.)

FROM PID 3:(EXEC) @LPB FLUSHING CURRENT JOB

FROM PID 3:(EXEC) @LPB SEQ=5 USR=USER1

PURGE

- Format: **CONTROL @EXEC PURGE @queuename**
- Deletes all files from queue.
- No files being printed.

Example

CONTROL @EXEC CLOSE LPT

(Stops any more jobs from going into the queue.)

CONTROL @EXEC STOP LPT

(Stops any more jobs from becoming active.)

CONTROL @EXEC PURGE LPT

(Deletes all jobs from the queue.)

Directions

Now do the Segment C Exercise on the next page.

Segment C

More About EXEC

Exercise

Match the following commands with their results.

Command	Result
1. _____ PURGE	a. Causes print to stop after a certain number of pages is printed.
2. _____ FORMS	b. Inserts a page before printing a file.
3. _____ CPL	c. Deletes all jobs from a queue.
4. _____ FLUSH	d. Sets the number of lines per page.
5. _____ TRAILERS	e. Tells the system the forms currently on a device.
6. _____ DEFAULTFORMS	f. Prints any number of pages.
7. _____ LPP	g. Assigns the forms that are normally on a device.
8. _____ HEADERS	h. Stops printing the current job.
9. _____ UNLIMIT	i. Sets the number of characters in a line.
10. _____ LIMIT	j. Prints a page after a file is printed.

Directions

Now check your answers with those on the next page.

Segment C

More About EXEC

Exercise Answers

1. c
2. e
3. i
4. h
5. j
6. g
7. d
8. b
9. f
10. a

Directions

If you answered all the questions in the segment exercise correctly, restart the Module 11 audiotape to continue.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Segment D

Deleting a Queue

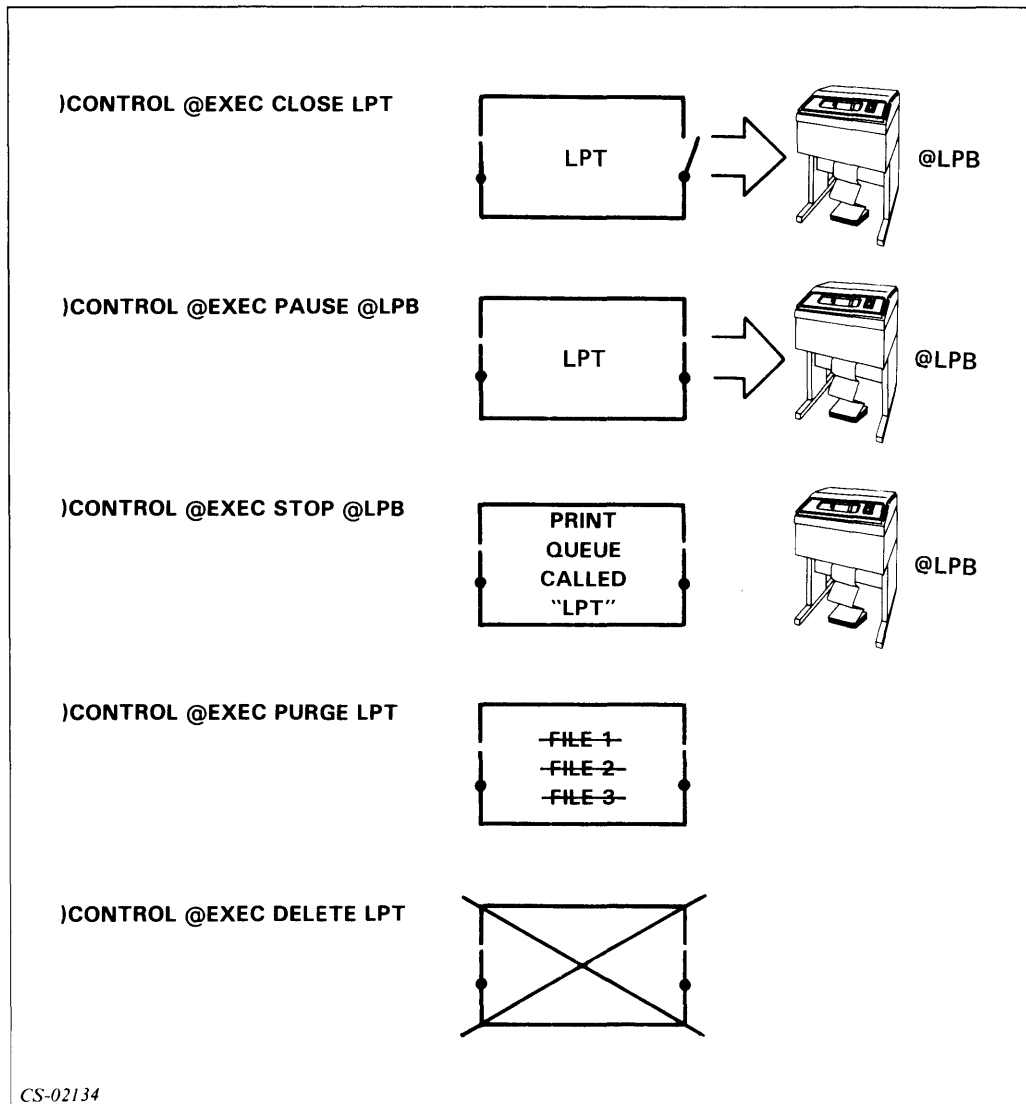


Figure 11.11 Deleting a Queue

- Close input door — CLOSE
- Close output door — PAUSE
- Disconnect queue from device — STOP
- Purge the queue — PURGE
- Delete the queue — DELETE

Table 11.C Deletion/Creation Command Relationship

Deletion Command	Creation Command
CLOSE	OPEN
PAUSE	CONTINUE
STOP	START
PURGE	
DELETE	CREATE

Directions

Now try the Segment D Exercise on the next page.

Segment D

Deleting a Queue

Exercise

What are the five steps required to delete a queue?

- 1.
- 2.
- 3.
- 4.
- 5.

Directions

Now check your answers with those on the next page.

Segment D

Deleting a Queue

Exercise Answers

1. Close the input door with the CLOSE command.
2. Close the output door with the PAUSE command.
3. Disconnect the queue from the device with the STOP command.
4. Remove all the remaining jobs from the queue with the PURGE command.
5. Delete the queue with the DELETE command.

Directions

If you answered all the questions in the segment exercise correctly, restart the Module 11 audiotape to continue.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Segment E

The Batch Function

Batch

- Noninteractive processing.
- Terminal submission:
QBATCH
QSUBMIT
- Card reader submission:
Username and password on cards.
Card reader required.
- Four batch streams supported simultaneously.
- Three permanent queues created:
BATCH_INPUT
BATCH_OUTPUT
BATCH_LIST

Example

1. **CONTROL @EXEC OPEN BATCH_INPUT**
CONTROL @EXEC OPEN BATCH_OUTPUT
CONTROL @EXEC OPEN BATCH_LIST

Open queues.
2. **CONTROL @EXEC CONTINUE 1**

Start processing in BATCH_INPUT.
3. **CONTROL @EXEC START BATCH_OUTPUT @LPB**
CONTROL @EXEC START BATCH_LIST @LPB

Direct output to a device.
4. **CONTROL @EXEC CONTINUE @LPB**

Open the output door.

Batch Commands

- Similar to interactive commands
- Two exceptions:
 - LIMIT and UNLIMIT refer to CPU time.
 - STACK command:
 - Format: **CONTROL @EXEC STACK** pathname
 - Accepts multiple job from a single file.

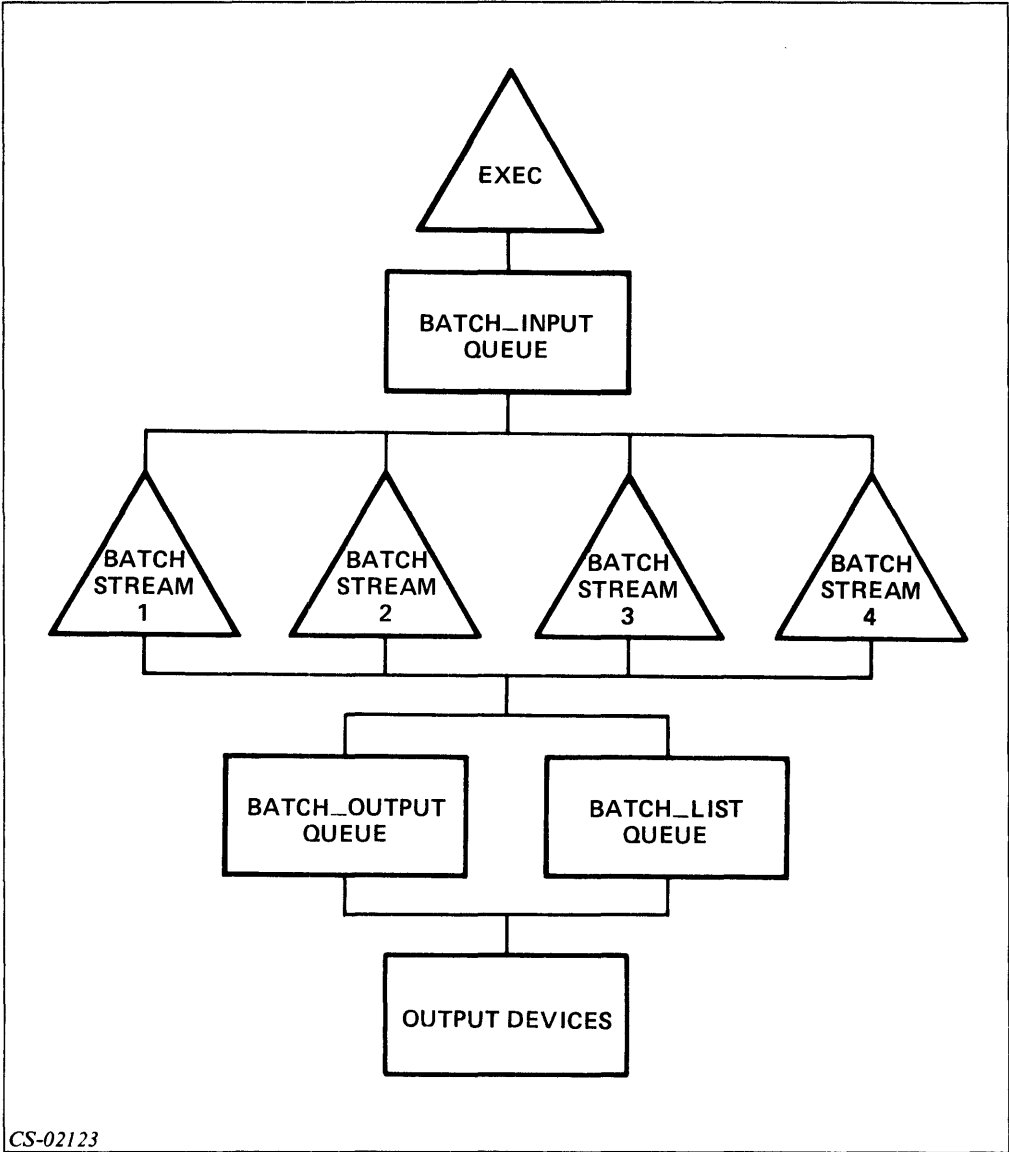


Figure 11.12 Batch Processing Relationships

Directions

Now do the Segment E Exercise on the next page.

Segment E

The Batch Function

Exercise

Circle the letter of the correct answer.

1. How many batch streams can EXEC support at one time?
 - a. Two.
 - b. Four.
 - c. Six.
 - d. An unlimited number.
2. How many jobs can each batch stream process at one time?
 - a. One.
 - b. Two.
 - c. Three.
 - d. Four.
3. Jobs can be submitted to the batch streams via:
 - a. Terminals only.
 - b. Card readers only.
 - c. Card readers and terminals.
 - e. Terminals and discs.

Directions

Now check your answers with those on the next page.

Segment E

The Batch Function

Exercise Answers

1. b
2. a
3. c

Directions

If you answered all the questions in the segment exercise correctly, restart the Module 11 audiotape to continue.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Segment F

MOUNT and DISMOUNT

Mounting Tapes

CLI MOUNT command

- Format: MOUNT linkname message
- Linkname — User name for file once on tape.
- Message — Specific tape; special instructions.

Responses — EXEC command

- Mounted:
 - Format: CONTROL @EXEC MOUNTED
 - Requested tape mounted.
 - Unit released to user for his use.
- Refused:
 - Format: CONTROL @EXEC REFUSED
 - Requested tape not mounted.
 - Send message using CLI SEND command
 - Format: SEND {PID} {USERNAME:PROCNAME} message {CONSOLENAME}
- No operator:
 - Format: CONTROL @EXEC OPERATOR {ON} {OFF}
 - Out of computer room.
 - OPERATOR set to OFF.
 - EXEC automatically responds: NO OPERATOR.

Dismounting Tapes

- CLI Command
 - Format: DISMOUNT linkname message
- Response:
 - DISMOUNTED
 - Format: CONTROL @EXEC DISMOUNTED
- Unit available for another user

Unlabeled Tapes

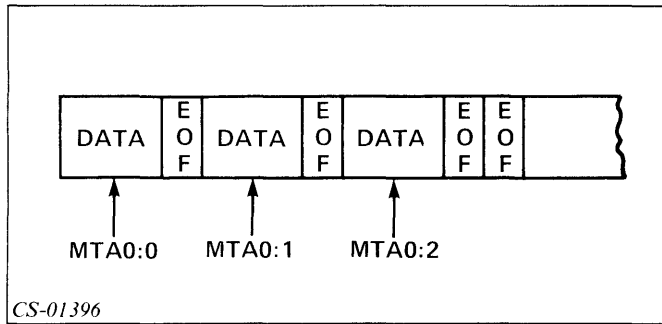


Figure 11.13 Typical Unlabeled Tape

Example 1

@MTA0:0

Example 2

@MTA0:1

- Multiple files on one tape.
- EOF marker between files.
- Files numbering:
 - After devicename.
 - Separated by colon.
 - Start at zero.
- Device referred to by physical name.
- Can *not* use multiple tapes.

Labeled Tapes

- Multiple tapes for single file.
- Formats:
 - ANSI (Default)
 - IBM
- Allow interface between computers.
- Access tapes by file name.

Table 11.D Types of Labels

Label	Purpose
Volume (VOL) Label	Identifies the reel of magnetic tape. Occurs only at the start of the reel.
File Header (HDR) Label	Identifies the magnetic tape file and its characteristics. Occurs at the beginning of each file.
End-Of-File (EOF) Label	Identifies the end of a file. Occurs at the end of every file.
End-Of-Volume (EOV) Label	Indicates that a file continues on another reel of tape. Occurs at the end of a reel.

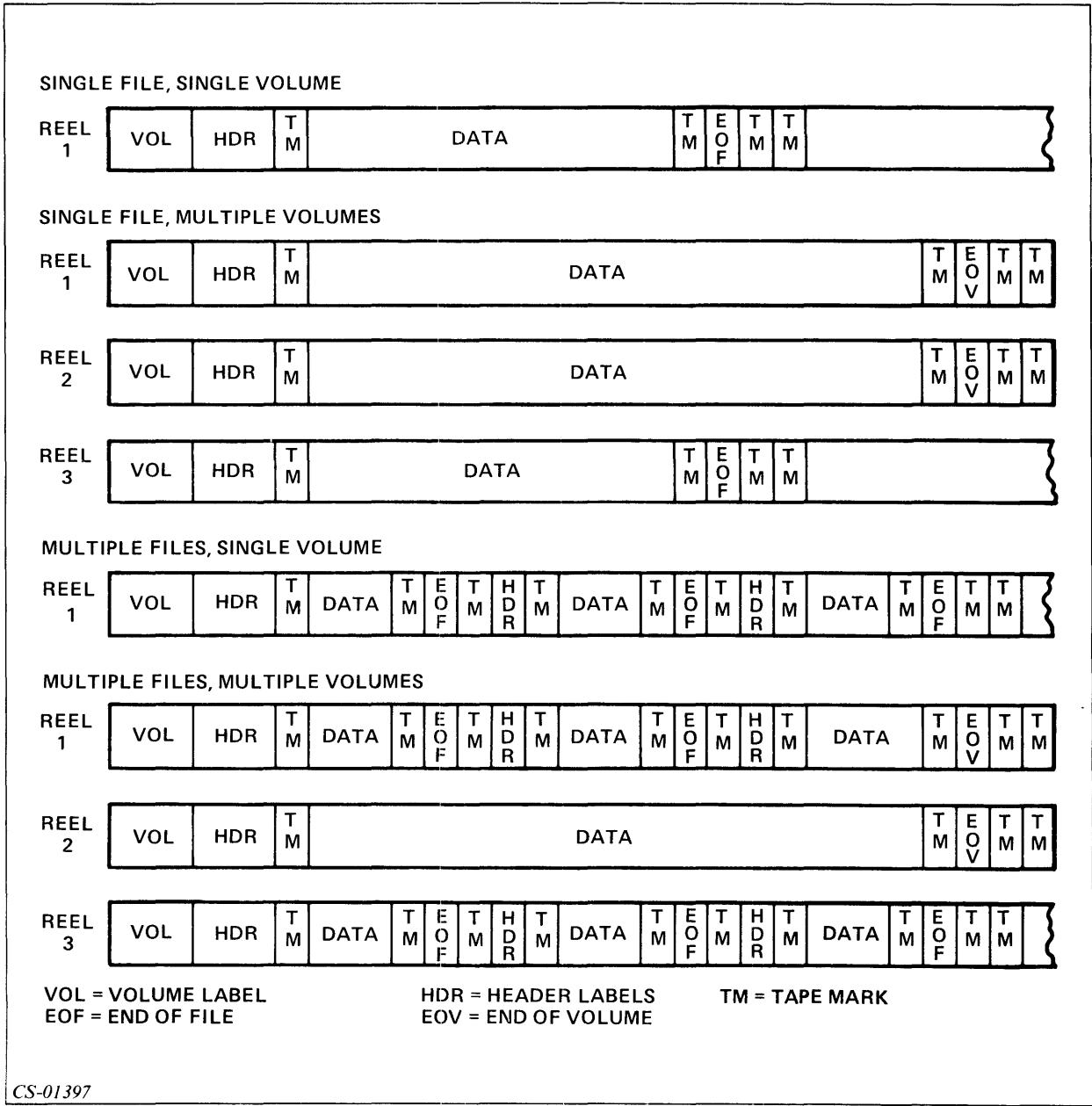


Figure 11.14 Examples of Labeled Tape Construction

Table 11.E Legal Label Characters

Type	Characters
Letters	A-Z
Digits	0-9
Characters	Space ! " % & ' () * + , - . / : ; < > ?

- Created with LABEL utility.
- Good for 90 days.
- Referenced by device name @LMT (Labeled Magnetic Tape).
- Tapes labeled before use.

Directions

Now do the Segment F Exercise on the next page.

Segment F

MOUNT and DISMOUNT

Exercise

Answer the following questions either by filling in the blanks or circling the letter of the correct response.

1. What are the two types of tape you may be using?
 - a.
 - b.
2. Labeled tapes can have:
 - a. Only one file per tape.
 - b. Many files on one tape, but only one tape.
 - c. Many files on many tapes.
 - d. Many tapes, but only one file.
3. Unlabeled tapes can have:
 - a. Only one file per tape.
 - b. Many files on one tape, but only one tape.
 - c. Many files on many tapes.
 - d. Many tapes, but only one file.
4. Which of the following is a valid file identification for the first file on an unlabeled tape?
 - a. @MTA0:1
 - b. @MTA0:0
 - c. @MTA0:file1
 - d. @MTA1:1

5. How many different formats are allowable on labeled tapes?
 - a. None; all tapes are formatted identically.
 - b. One.
 - c. Two.
 - d. Three.

Directions

Now check your answers with those on the next page.

Segment F
MOUNT and DISMOUNT
Exercise Answers

1. a. Unlabeled or Nonlabeled
b. Labeled
2. c
3. b
4. b
5. c

Directions

If you answered all the questions in the segment exercise correctly, continue to the Module 11 Quiz on the next page.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Module 11 Quiz

Answer the following questions.

1. What are the four functions that EXEC performs?
 - a.
 - b.
 - c.
 - d.

2. Describe each of these functions.
 - a.
 - b.
 - c.
 - d.

3. In the space below, diagram and label the steps required to create a spooling process.

Write the CLI command to do the following.

4. Place a file named PRINT_1 in the print queue and notify you when finished.
5. Place a file named PLOT_FILE in the plotter queue and notify you when finished plotting five copies.
6. Display the contents of the plotter queue only.
7. Cancel entry 453.
8. Hold entry 29.
9. Release entry 90.
10. Place a file named INDEPENDENT_1 in the batch queue.

Use the information below to answer Questions 11 through 17.

Queue name:	MINE	
Printer:	@LPB	
Jobs:	Name	Sequence number
	PRINT1	530
	TEST1	531
	REPORT	532
	PRINT2	533
Standard forms:	FORMA	
Report forms:	RPT	

Code the EXEC commands to do the following. (Assume the actions are performed sequentially and PRINT1 is now printing.)

11. Set the current forms on the printer to report forms.
12. Set the printer to print 50 characters per line and 10 lines per page.
13. Print the job REPORT.

14. Set the forms back to the default.

15. Limit the number of pages per job.

16. Allow TEST1 to print. Then delete the queue and all remaining jobs.

17. a. How do label and unlabeled tapes differ?

b. When would you use each?

Directions

Now check your answers with those in Appendix A.

Module 12

System Utilities

Introduction

This module introduces some common system utilities. It discusses the PED utility; the HOOK macro; and the SYSLOG, REPORT, ERRLOG, LABEL, and LOCK_CLI utilities.

Module Objectives

Upon successful completion of this module, you should be able to:

1. Define a utility.
2. Select and use the proper utility to perform selected tasks.
3. Identify the differences between running a utility in a stand-alone mode and under AOS or AOS/VS control.
4. Use the hook macro (?) to determine the current processes on your system.

Resources

To complete this module, you need:

- Module 12 audiotape.
- Module 12 of your Student Guide.
- Audiotape playback unit.

Optional Resources

- *AOS and AOS/VS Console User's Handbook* (093-000150-02)
- *Advanced Operating System Operator's Guide* (093-000194-05)
or
How to Generate and Run AOS/VS on Your ECLIPSE® MV/Family Computer
(093-000243-01)
- *ECLIPSE MV/8000® System Control Processor* (014-000649-00)

Module Outline

Module 12 discusses the following topics:

1. PED and Hook
 - a. Utilities: Overview
 - b. PED
 - c. Hook macro
2. SYSLOG and REPORT
 - a. SYSLOG
 - b. REPORT
3. ERRLOG (ECLIPSE MV/Family computers only)
4. LABEL and LOCK_CLI
 - a. LABEL
 - b. LOCK_CLI

Directions

Now start the Module 12 audiotape to begin. As you listen, follow along in Module 12 of your Student Guide.

Segment A PED and Hook

Utilities: Overview

- Programs
- Perform common functions
- Run on any system
- Stand-alone — Exclusive use of system
- Under system control — Run with other processes

PED

- Format: EXECUTE PED
- Process Environment Display
- Provides information about processes on the system.

```

# USER  PROCESS  PROGRAM  WELAPSED  CPU-TIME  WIO  PG-SEC  BS  FP  SH  US
1 PMGR  PMGR      PMGR     1:38:11  0:00:25.368  0    548      0  0  0  22
2 OP    OP        CLI      1:38:07  0:00:03.356  171   80 B     0  0  19  2
3 OP    EXEC     EXEC     1:37:42  0:00:02.654  503   71 B     2  1  24
4 OP    CON1     XLPT     1:37:34  0:00:00.191  22    1        3  4  3
5 OP    LPB      XLPT     1:37:33  0:00:02.166  106   19 B     3  4  3
6 OP    INFOS_II INFOS_I  1:37:27  0:00:00.051  76    1 BS    2 12 20
7 OP    NETOP    NETOP    1:37:25  0:00:00.317  81    5 B     2  0  14
8 OP    X25      X25      1:37:16  0:00:06.386  0     131     7  0  23
9 OP    RMA      RMA      1:37:13  0:00:00.007  0     0 B     7  0  17
10 OP   SVTA     SVTA     1:37:12  0:00:06.691  0     106 B    7  0  16
11 OP   FTA      FTA      1:37:10  0:00:01.421  200   33 B     7 16  7
12 MORSE CON21    CLI      1:27:27  0:00:01.722  145   40 B     3 19  2
13 FOGG  VCON8   CLI      0:30:57  0:00:00.459  33    10 B     3 19  2
14 MORSE CON5     CLI      0:43:39  0:00:00.504  45    11 B     3 19  2
15 MORSE 015     ZIP      0:01:26  0:00:01.606  76    49 B    12 18 11
16 JOHN  CON4     CLI      0:06:50  0:00:00.126  3     2 B     3 19  2
17 JOHN  017     PED      0:06:36  0:00:07.283  4     79 B    16  1  8
18 JOHN  CON6     CLI      0:06:18  0:00:00.089  0     2 B     3 19  2
19 JOHN  019     SED      0:06:07  0:00:00.564  168   19 B    18 21 11
20 JOHN  020     CLI      0:01:56  0:00:00.039  0     0 B     22 19  2
21 JOHN  021     CLI      0:05:36  0:00:00.057  1     1 B     19 19  2
22 JOHN  022     SED      0:05:34  0:00:00.480  0     16 B    21 21 11
PED REV 04.20 13 46-17 SPACE MAX 186710 CUR 167057 REM 19653

```

Figure 12.1 AOS PED Display

```

PID USERNAME PROCESS PROGRAM ELAPS CPU BS SH7 US7 I/O FTA WSS
1 PMGR PMGR PMGR 4-02 18:04 0 1 29 392 62
7 OP NETOP NETOP 4-02 1:18 0 14 34968 23098 54
8 OP X25_LMGR X25_LMGR 4-02 13:03 85 110 20576 1077 232
23 DK 023 SPEED 42:00 2:02 B 4 17 3793 8845 42
25 ERIC.S20 025 PED 1:15 1:22 B 15 45 0 241 8
31 JOHN.S20 031 PED 4:17 3:72 B 15 45 0 707 28
39 JOHN.S20 039 PED 18:00 0:41 15 45 0 70 56

```

PED Rev 01.60.34.00 Monday 6-Dec-82 1:34:16 PM Aristotle/VS - Customer Ed

Figure 12.2 AOS/VS PED Display

Table 12.A PED Default Information

AOS Heading	AOS/VS Heading	Information
ID	PID	PID number.
USER	USERNAME	First five characters of user name.
PROCESS	PROCESS	First eight characters of simple process name.
PROGRAM	PROGRAM	Name of program running.
WELAPSED	ELAPS	Total time process has been on system.
CPU-TIME	CPU	Total CPU time the process has used.
WIO	I/O	Number of transfers of data blocks.
PG-SEC		Number of pages used in core times the number of seconds in core.
BS	BS	Whether the process is blocked or swapped.
FP		PID of the father process.
SH	SH n	Number of pages of shared memory.
US	US m	Number of pages of unshared memory.
	FTA	Sum of logical and physical page faults.
	WSS	Current working set size.

Information Requests

- AOS — Arguments
- AOS/VS — Switches

References

- *Advanced Operating System Operator's Guide*
- *How to Generate and Run AOS/VS on your ECLIPSE MV/Family Computer*

Display Update

- Automatic
- Every 10 seconds
- To change frequency:
 - AOS — DELAY TIME argument
 - AOS/VS — /CYCLE= switch

Termination

- AOS — CTRL-C CTRL-B control character sequence
- AOS/VS — B, E, Q, or CTRL-C CTRL-B control character sequence.

Commands

- AOS/VS only
- Executed while PED running

Table 12.B AOS/VS PED Commands

Command	Result
A	Changes /ALL to active PIDs, then active to /ALL, and so on.
B	BYE; returns to the CLI.
E	Exit; returns to the CLI.
H	Gives help.
Q	Quits; return to the CLI.
R	Refreshes the screen; useful after the screen has been changed by a message sent by another user.
CTRL-S	Freezes display; works with any program.
CTRL-Q	Unfreezes display; works with any program.
^ (SHIFT-6)	Increases Minpid minimum PID number by five.
V (V KEY)	Decreases Minpid by five.
<	Decreases PED cycle time by one second.
=	Resets PED cycle time to 10 seconds.
>	Increases PED screen cycle time by one second.

Directions

Restart the Module 12 audiotape to continue.

**Example 1
EXECUTE PED**

ID	USER	PROCESS	PROGRAM	WELAPSED	CPU-TIME	WIO	PG-SEC	BS	FP	SH	US
1	PMGR	PMGR	PMGR	1:38:11	0:00:25.368	0	548			0	22
2	OP	OP	CLI	1:38:07	0:00:03.356	171	80	B		19	2
3	OP	EXEC	EXEC	1:37:42	0:00:02.654	503	71	B	2	1	24
4	OP	CON1	XLPT	1:37:34	0:00:00.191	22	1		3	4	3
5	OP	LPB	XLPT	1:37:33	0:00:02.166	106	19	B	3	4	3
6	OP	INFOS_II	INFOS_I	1:37:27	0:00:00.051	76	1	BS	2	12	20
7	OP	NETOP	NETOP	1:37:25	0:00:00.317	81	5	B	2	0	14
8	OP	X25	X25	1:37:16	0:00:06.386	0	131		7	0	23
9	OP	RMA	RMA	1:37:13	0:00:00.007	0	0	B	7	0	17
10	OP	SVTA	SVTA	1:37:12	0:00:06.691	0	106	B	7	0	16
11	OP	FTA	FTA	1:37:10	0:00:01.421	200	33	B	7	16	7
12	MORSE	CON21	CLI	1:27:27	0:00:01.722	145	40	B	3	19	2
13	FOGG	VCON8	CLI	0:30:57	0:00:00.459	33	10	B	3	19	2
14	MORSE	CON5	CLI	0:43:39	0:00:00.504	45	11	B	3	19	2
15	MORSE	015	ZIP	0:01:26	0:00:01.606	76	49	B	12	18	11
16	JOHN	CON4	CLI	0:06:50	0:00:00.126	3	2	B	3	19	2
17	JOHN	017	PED	0:06:36	0:00:07.283	4	79	B	16	1	8
18	JOHN	CON6	CLI	0:06:18	0:00:00.889	0	2	B	3	19	2
19	JOHN	019	SED	0:06:07	0:00:00.564	168	19	B	18	21	11
20	JOHN	020	CLI	0:01:56	0:00:00.039	0	0	B	22	19	2
21	JOHN	021	CLI	0:05:36	0:00:00.057	1	1	B	19	19	2
22	JOHN	022	SED	0:05:34	0:00:00.480	0	16	B	21	21	11
PED REV 04.20 13:46:17 SPACE: MAX						106710	CUR	167057	REM	19653	

Figure 12.3 AOS PED Display (Detail)

Directions

Restart the Module 12 audiotape to continue.

PTD	USERNAME	PROCESS	PROGRAM	ELAPS	CPU	BS	SH7	US7	I/O	FTA	MSG
1	PMGR	PMGR	PMGR	4-02 18:04		0	1	29	392	62	
7	OP	NETOP	NETOP	4-02 1:18		0	14	34968	23098	54	
8	OP	X25_LMGR	X25_LMGR	4-02 13:03		85	110	20576	1077	232	
23	OP	023	SPEED	42:00 2:02	B	4	17	3793	8845	42	
25	ERIC	025	PED	1:15 1:22	B	15	45	0	241	8	
31	JOHN	031	PED	4:17 3:72	B	15	45	0	707	28	
39	JOHN	039	PED	18:00 0:41		15	45	0	70	56	

PED Rev 01.60.34.00 Monday 6-Dec-82 1:34:16 PM Aristotle/VS - Customer Ed

Figure 12.4 AOS/VS PED Display (Detail)

Example 2

EXECUTE PED 5 (AOS)
 EXECUTE PED/CYCLE=5 (AOS/VS)

- Display updated every five seconds.

Example 3

EXECUTE PED PROCESS CPU-TIME (AOS)

PROCESS	CPU-TIME	PROCESS	CPU-TIME	PROCESS	CPU-TIME
PMGR	0:00:26.772	CON8	0:00:00.127		
OP	0:00:03.356	024	0:00:00.887		
EXEC	0:00:02.655	025	0:00:00.254		
CON1	0:00:00.191	026	0:00:00.359		
LPB	0:00:02.166	027	0:00:02.922		
INFOS_II	0:00:00.051	CON22	0:00:00.083		
NETOP	0:00:00.317	029	0:00:01.443		
X25	0:00:06.386				
RMA	0:00:00.007				
SVTA	0:00:06.691				
FTA	0:00:01.421				
CON21	0:00:01.864				
VCON0	0:00:00.459				
CON5	0:00:00.504				
015	0:00:00.039				
CON4	0:00:00.126				
017	0:00:08.329				
CON6	0:00:00.089				
019	0:00:00.564				
020	0:00:00.039				
021	0:00:00.057				
022	0:00:00.480				
PED REV 04.20	13:47:16	SPACE: MAX	186710 CUR	167058 REM	19652

Figure 12.5 AOS PED Display of Selected Items

EXECUTE PED/PID/PROCESS/CPU (AOS/VS)

```

PID PROCESS CPU
1 PMGR 18.07
2 DP 5.41
3 EXEC 1.12
4 LPB 3.49
5 0 0.00
6 0 0.00
7 0 0.00
8 X25_LMGR 13.03
9 0 0.00
10 0 0.00
11 CEO_PDA 0.05
12 CEO_FSA 0.05
13 CEO_QMA 0.04
14 CEO_FSA 0.06
15 015 0.04
16 CON3 0.07
18 018 5.04
19 019 0.06
20 020 0.67
21 CON26 0.13
23 023 0.38
24 CON4 0.77
PED Rev 01.60.34.00 Monday 6-Dec-82 1:36:11 PM Aristotle/VS - Customer Ed

```

Figure 12.6 AOS/VS PED Display of Selected Items

- Multiple columns
- Update every 10 seconds

Table 12.C Special Switches (AOS/VS only)

Switch	Result
/ALL	All PIDs are displayed. Active PIDs brighter.
/PRIORITY	Priority of process provided.
/SUPERMODE	Identify PIDs with superuser or superprocess.
/SUPERPRIVILEGES	Identify PIDs with superuser or superprocess.

Hook Macro

- Format: ?
- WHO command for all processes on the system.
- Executes once.
- Returns to CLI.

```

page 1 line 1
PID 9 OF X25 :NET:X25.PR
PID 9 OF RMA :NET:RMA.PR
PID 10 OF SVTA :NET:SVTA.PR
PID 11 OF FTA :NET:FTA.PR
PID 12 MORSE CON21 :CLI.PR
PID 13 FOGG VCON0 :CLI.PR
PID 14 MORSE CON5 :CLI.PR
PID 15 MORSE 015 :UTIL:DGL:DGL2.PR
PID 16 JOHN S209 CON4 :CLI.PR
PID 17 JOHN S209 017 :UTIL:PED.PR
PID 18 JOHN S209 CON6 :CLI.PR
PID 19 JOHN S209 019 :UTIL:SED.PR
PID 20 JOHN S209 020 :CLI.PR
PID 21 JOHN S209 021 :CLI.PR
PID 22 JOHN S209 022 :UTIL:SED.PR
PID 23 ERIC S209 CON8 :CLI.PR
PID 24 ERIC S209 024 :UTIL:SED.PR
PID 25 ERIC S209 025 :CLI.PR
PID 27 JOHN S209 027 :UTIL:PED.PR
PID 28 FOGG CON22 :CLI.PR
PID 29 FOGG 029 :UTIL:PED.PR

```

Figure 12.8 Sample ? Macro Display

Directions

Now try the Segment A Exercise on the next page.

Segment A

PED and Hook

Exercise

Circle the letter of the correct answer or fill in the correct answer.

1. A utility is:
 - a. The source of the power for the computer.
 - b. A macro.
 - c. A program to perform a common function.
 - d. Used to boot the system.
2. The PED utility:
 - a. Displays information about what is happening on the system.
 - b. Can only be used on an AOS system.
 - c. Logs all system operations into the system log file.
 - d. Produces summary reports.
3. By default the PED utility updates the display every:
4. The time between PED utility updates can be changed using the:
(Respond for your system: AOS or AOS/VS.)
5. How do you halt the PED utility?
(Respond for your system: AOS or AOS/VS.)
6. The information displayed by the PED utility can be changed by using:
(Respond for your system: AOS or AOS/VS.)
7. The hook macro:
 - a. Displays the same information as the WHO command, except for all processes on the system, rather than only one.
 - b. Updates the information on the screen periodically.
 - c. Displays user name, CPU time, and whether or not the process is blocked.
 - d. Is the same as the PED utility, except it does not provide automatic updates of the information on the screen.

8. A utility running stand-alone:
 - a. Has exclusive use of the system.
 - b. Must run with other utilities.
 - c. Must be initiated by the EXEC process.
 - d. Is the same as running under system control.

Directions

Now check your answers with those on the next page.

Segment A

PED and Hook

Exercise Answers

1. c
2. a
3. 10 seconds
4. Delay time argument (AOS)
/CYCLE= switch (AOS/VS)
5. Use the CTRL-C CTRL-B control character sequence (AOS).
Use the B, E, or Q command, or CTRL-C CTRL-B control character sequence (AOS/VS).
6. Arguments (AOS)
Switches (AOS/VS)
7. a
8. a

Directions

If you answered all the questions in the segment exercise correctly, continue to Lab Activity 12-1 on the following page.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Lab Activity 12-1

If you have access to a computer, follow the steps listed below. If you do not have access to a computer, please read through these steps carefully.

1. Log on (any terminal will do).
2. Enter **EXECUTE PED**.

Observe the screen as it changes every 10 seconds. How many processes are displayed? AOS/VS users, notice that only the active PIDs are displayed. Resolve this by entering **EXECUTE PED/ALL**. Now note that the active PIDs are brighter than the rest.

3. (AOS) Enter **EXECUTE PED ID USER WELAPSED CPU-TIME BS**

(AOS/VS) Enter **EXECUTE PED/PID/USERNAME/WELAPSED/CPU/BS**

There are now multiple columns on the display. This allows more than 22 processes to be displayed.

4. End the PED utility.

AOS operators use the CTRL-C CTRL-B control character sequence. AOS/VS users can use commands for this, or the control character sequence. Any one of the commands B, E, or Q would have worked.

5. Enter ?

Can you identify your PID? Look for your username; then check the process hierarchy, if necessary.

6. Log off with the **BYE** command.

Directions

If you completed this lab without any problems, restart the Module 12 audiotape to continue.

If you experienced any problems, go back and review the segment and try Lab Activity 12-1 again before continuing.

Segment B

SYSLOG and REPORT

SYSLOG

- Format: SYSLOG
- Switches:
 - /START — Starts logging process.
 - /STOP — Ends logging process.
- SYStem LOGging
- Logs a variety of information into SYSLOG file :SYSLOG
- Automatic once command issued
- Only issued by master CLI process (PID 2)

Information Recorded

- Hardware errors
- Usernames
- Total elapsed time
- Elapsed CPU time
- I/O disc blocks read and written
- Memory page usage (pages x CPU time) in pages per millisecond
- Disc space usage
- MOUNT and DISMOUNT requests
- Privileged logons

Example 1

```
SYSLOG  
OFF
```

Example 2

```
SYSLOG/START
```

Example 3

```
SYSLOG/STOP
```

Manual Entries

- CLI LOGEVENT command
- Format: LOGEVENT message

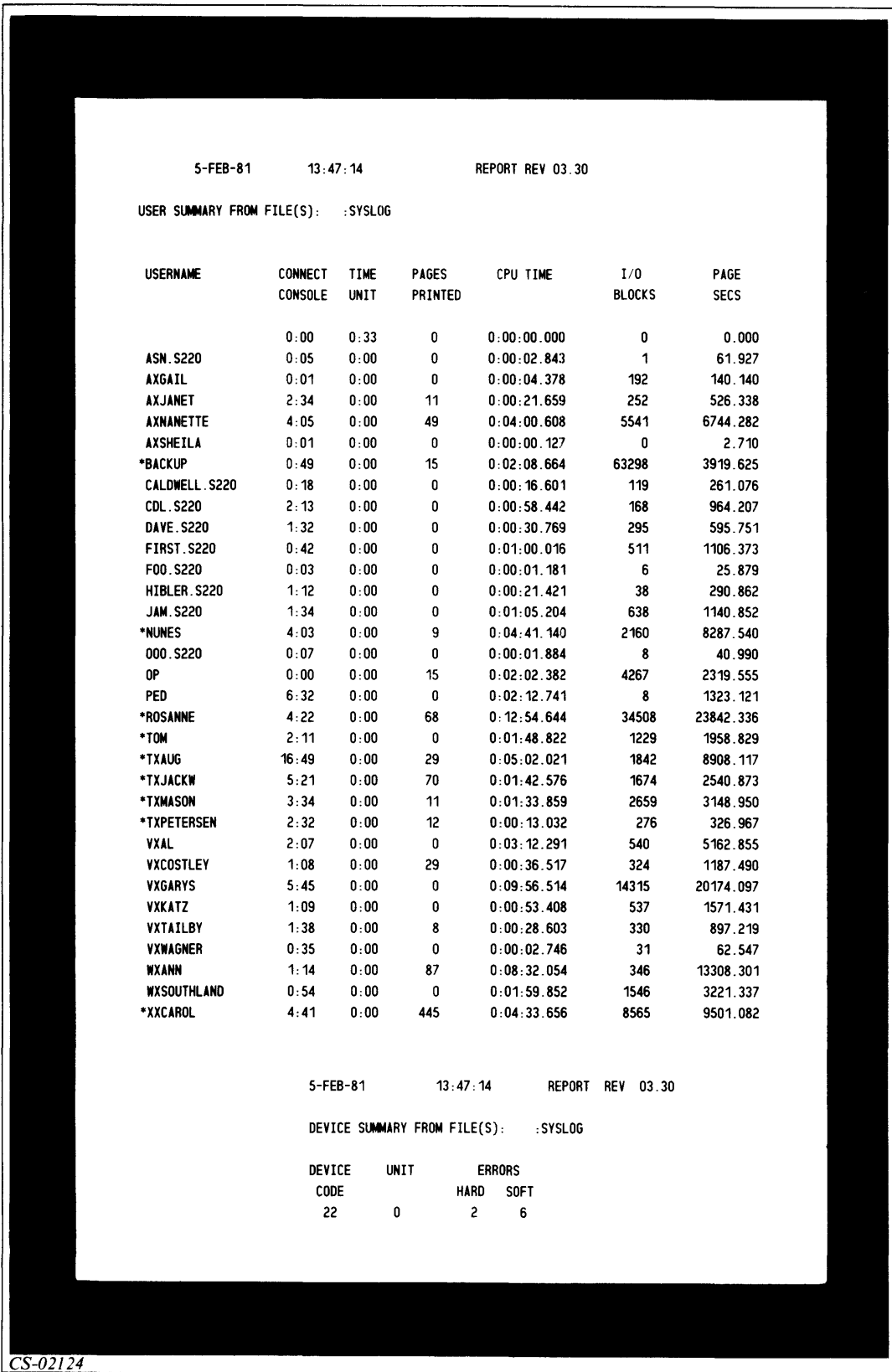
Example 4
LOGEVENT RUNNING REV 1.40

- Message placed in :SYSLOG

REPORT

- Formats information from SYSLOG
- Two summaries:
 - Hardware errors
 - User information
- Numerous switches:
 - /L — Report sent to generic @LIST (Default line printer)
 - /L=PATHNAME — Report sent to file specified

Example 1
EXECUTE REPORT



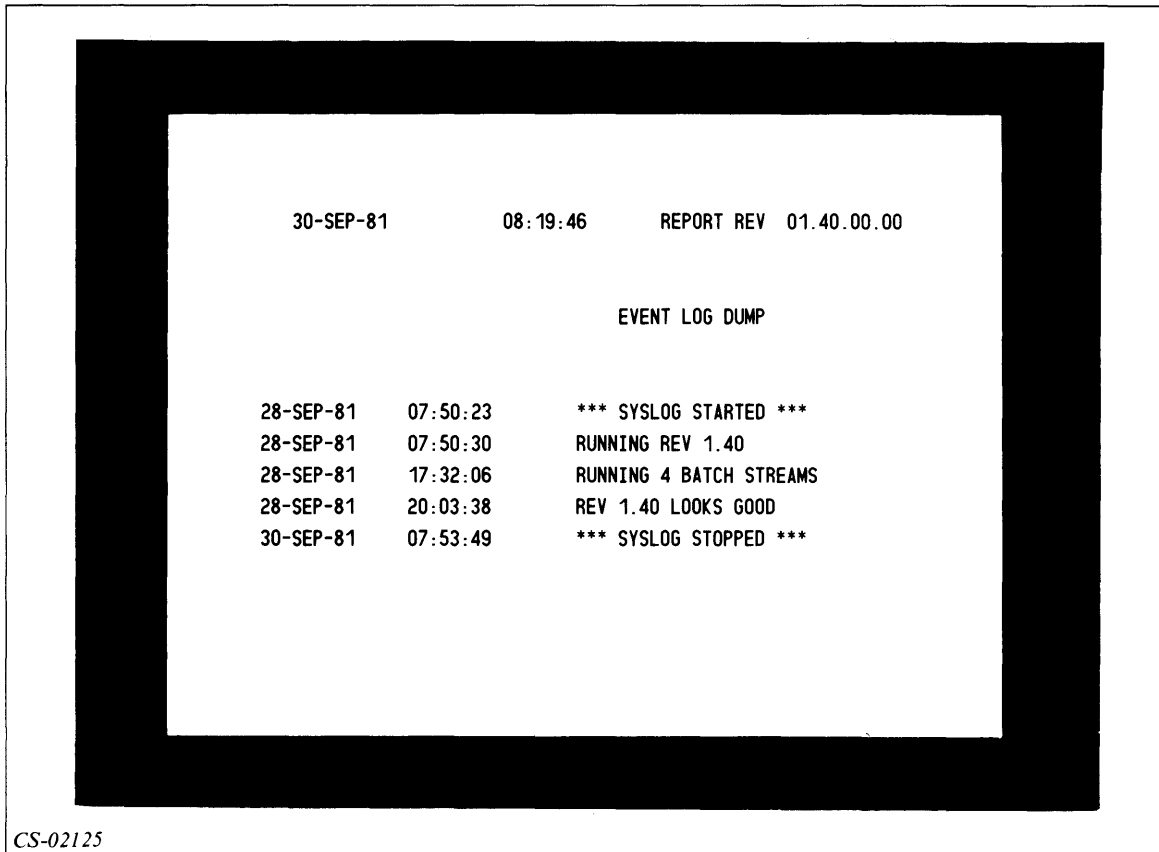
CS-02124

Figure 12.9 Default Report

- User Summary Report and Device Summary Report are only reports produced.
- Report sent to line printer.

Example 2

EXECUTE REPORT/L=@CON24/EV



CS-02125

Figure 12.10 User Event Report (/EV Switch)

- Report sent to console 24.
- All comments entered manually, using LOGEVENT command.

Example 3
EXECUTE REPORT/L=:REPORT.TERM/PT

30-SEP-81 08:19:46		REPORT REV 01.40.00.00				
PROCESS TERMINATION DUMP						
		PROCESS NAME	ELAPSED TIME	CPU TIME	I/O BLOCKS	PAGE SECS
28-SEP-81	07:50:23	*** SYSLOG STARTED ***				
28-SEP-81	07:51:25	OP:003	0:00:07	0:00:00.077	107	2
28-SEP-81	08:52:45	GAMMA:011	0:00:08	0:00:00.156	9	6
28-SEP-81	08:53:01	GAMMA:011	0:00:10	0:00:00.312	9	12
28-SEP-81	08:53:10	GAMMA:012	0:00:03	0:00:00.047	13	2
28-SEP-81	08:53:16	GAMMA:012	0:00:03	0:00:00.095	13	4
28-SEP-81	08:53:17	GAMMA:STREAM_1	0:00:56	0:00:01.345	163	83
28-SEP-81	08:53:23	OP:CONO	0:00:56	0:00:00.041	0	2
28-SEP-81	08:53:28	LUCY:CON45	0:00:59	0:00:01.345	12	73
28-SEP-81	08:53:35	BRIDGET:CON44	0:03:35	0:00:01.410	184	86
.
.
.

CS-02126

Figure 12.11 Process Termination Report (/PT Switch)

- All terminated jobs are displayed in report.
- Report sent to file :REPORT.TERM.

Directions

Now try the Segment B Exercise on the next page.

Segment B

SYSLOG and REPORT

Exercise

Circle the letter of the correct answer or fill in the correct answer.

1. Logging system information:
 - a. Is initiated using the CLI command SYSLOG/START.
 - b. Places system information in the file :UTIL:SYSLOG.
 - c. Produces a report automatically each 24 hours.
 - d. Does not allow any manual entries.
2. Both hardware errors and various types of system information are automatically placed in a single file by the:
 - a. PED utility.
 - b. ? macro.
 - c. SYSLOG command.
 - d. REPORT utility.
3. The REPORT utility formats the information in the _____ file into a minimum of _____ summary reports.
4. The REPORT utility is capable of producing a wide variety of reports, depending on the:
 - a. Commands coded with it.
 - b. Arguments coded with it.
 - c. Report names coded with it.
 - d. Switches coded with it.

Directions

Now check your answers with those on the next page.

Segment B

SYSLOG and REPORT

Exercise Answers

1. a
2. c
3. :Syslog
two
4. d

Directions

If you answered all the questions in the segment exercise correctly, continue with Module 12 by doing one of the following:

- If you are an AOS/VS operator, continue to Segment C on the next page of the Student Guide. There is no audio portion for Segment C.
- If you are an AOS operator, continue to Segment D by restarting the Module 12 audiotape at the correct point and turning to Segment D in your Student Guide.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Segment C

ERRLOG

(AOS/VS only)

Note: There is no audio portion for this segment.

The ECLIPSE MV/Family of computers has a special utility designed to assist in error detection and recovery. This is the ERRor LOG utility (ERRLOG). When the System Control Processor (SCP) starts running, it should start logging any errors encountered in a manner similar to SYSLOG. For ERRLOG to work, SCP logging must be on. Check this by entering **FLAGS**, as shown in the example below. The system returns the values of all SCP flags.

Example 1

```
SCP-CLI> FLAGS
ELOG Y
```

If the error logging flag is not on, turn it on, as shown in Example 2.

Example 2

```
SCP-CLI> FLAGS ELOG Y
```

Three files exist for logging any errors. They are the ERRLOG file, the IOC file, and the MEMLOG file.

- The ERRLOG file contains uncorrectable CPU errors and key system information.
- The IOC file contains I/O channel parity errors.
- The MEMLOG file contains all Error Checking and Correction (ERCC) codes.

All these files have limited space; therefore, when they are filled, new data overwrites the data currently on the file.

To run the Error Log utility, enter the command line **EXECUTE ERRLOG**. Once ERRLOG is running, you can perform a number of functions using the five commands listed in Table 12.D.

Table 12.D ERRLOG Functions

Command	Result
CLI	Returns you to the SCP CLI mode.
HELP	Displays information about the error log commands.
INIT	Clears the selected error log file.
LIST	Displays the contents of the selected file.
TIME	Changes the SCP clock. The AOS/VS clock is not affected.

The following example illustrates running the utility to clear the ERRLOG and MEMLOG files. Once the EXECUTE command is entered, the error log prompt SCP-ERR is displayed.

Example

```

SCP-CLI> EXECUTE ERRLOG
LOADING REQUIRED UTILITY      System response, ECLIPSE MV/8000 only.
SCP-ERR> INIT                ERRLOG prompt and operator entered command.
INITIALIZATION              System response.
ENTER FILE: ERRLOG          System request and operator response.
CLEAR ERRLOG? Y             System request and operator response to clear file.
SCP-ERR> INIT                System prompt and operator response.
INITIALIZATION              System response.
ENTER FILE: MEMLOG          System request and operator response.
CLEAR MEMLOG? Y             System request and operator response to clear file.
SCP-ERR>                     System response.

```

There are many types of errors logged in the files. The codes for each type and their meanings are listed in *How to Generate and Run AOS/VS on Your ECLIPSE MV/Family Computer* and *The ECLIPSE MV/8000 System Control Processor* reference manuals.

The LIST command provides a variety of reports depending on the type of error requested. The report produced by the LIST command is columnar in format and provides the event date and time, a mode, and a text explanation. The mode describes the status of the main process and the SCP at the time of the event. The modes are listed in Table 12.E.

Table 12.E LIST Mode Descriptions

Mode	Meaning
0	The SCP was in TTY mode when the event occurred. In other words, AOS/VS had control of the system console when it occurred.
1	The SCP was in command mode (had control of the system console) and the ECLIPSE MV/Family CPU was running (not halted) when the event occurred.
2	The SCP was in command mode and the ECLIPSE MV/Family CPU was halted when the event occurred. This event occurs, for example, after the SCP displays CPU HALTED and someone types a command like RESET or BOOT to the SCP CLI.

When you execute the LIST command, ERRLOG prompts you for the type of errors you want on the report and the beginning and ending dates and times. The following example illustrates a typical dialog.

In this example, the NEW LINE symbol (␣) indicates that you should press the NEW LINE key to accept the default value.

Example

```
SCP-ERR> LIST
ERRLOG DISPLAY PROGRAM
INPUT TYPE(S) (ALL, LOG, SOFT, IOC, MEMORY, OR CODES 140 TO 176)
TYPE: LOG           This provides a report of the ERRLOG file.
INPUT DATE(MM DD YY) Prompt for date of the report.
FIRST DATE: ␣      NEW LINE is the default and provides all
                   the data from the time the logging process
                   started.
LAST DATE: ␣       NEW LINE is the default of today.
INPUT TIME (HH MM) Prompt for the start time of the report.
FIRST TIME: 09 00  Report is to start at 9 AM of the start day.
LAST TIME: ␣       NEW LINE is the default of right now.
```

Once the report is produced, the prompt SCP-ERR> appears.

Directions

Now try the Segment C Exercise on the next page.

Segment C

ERRLOG

Exercise

Circle the letter of the correct answer or fill in the correct answer.

1. ERRLOG accesses three files in its processing. They are:
 - a.
 - b.
 - c.
2. How many commands does ERRLOG provide to assist in its operation?
 - a. Three
 - b. Four
 - c. Five
 - d. Six
3. Which ERRLOG command allows you to look at the contents of the files?
 - a. LOOK
 - b. TYPE
 - c. PRINT
 - d. LIST
4. Which ERRLOG command allows you to clear the contents of the files?
 - a. RESET
 - b. INIT
 - c. CLEAR
 - d. SET

Directions

Now check your answers with those on the next page.

Segment C

ERRLOG

Exercise Answers

1. a. ERRLOG file
b. IOC file
c. MEMLOG file
2. c
3. d
4. b

Directions

If you answered all the questions in the segment exercise correctly, restart the Module 12 audiotape to continue.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Segment D

LABEL and LOCK_CLI

LABEL

- Format: EXECUTE LABEL devicename VOLID
 Devicename — Drive on which tape is mounted.
 VOLID — Volume Identifier — 1 to 6 characters.
- Places label information at beginning of magnetic tape.
- Switches:
 - /I — IBM standard (default ANSI standard)
 - /S — Scratch the tape

Example

```
EXECUTE LABEL @MTA0 JT0001
```

- Labeled tape created on tape drive @MTA0.
- Tape label is JT0001.

LOCK_CLI

- Format: EXECUTE LOCK_CLI
- Added protection.
- Restricts master console.
- UNLOCK — Requires a password established by system manager.
- Console still usable:
 - Privileged commands ignored.
 - Prevents unintentional or unauthorized shutdown.

Example

1. EXECUTE LOCK_CLI
 SUPERPROCESS
)
 SUPERPROCESS ON
2. SUPERPROCESS
)
3. UNLOCK
4. PASSWORD
5. SUPERPROCESS ON
 +)

Directions

Now try the Segment D Exercise on the next page.

Segment D

LABEL and LOCK_CLI

Exercise

Circle the letter of the correct answer.

1. The LABEL utility places labels on:
 - a. Tapes.
 - b. Discs.
 - c. Diskettes.
 - d. Tapes, discs, or diskettes.
2. The default labels that the LABEL utility creates are:
 - a. ANSI labels.
 - b. IBM labels.
 - c. There are no default label types.
 - d. AOS, AOS/VS labels.
3. The LOCK_CLI utility:
 - a. Secures the master logical disc.
 - b. Restricts use of the master console.
 - c. Restricts use of user terminals.
 - d. Prevents selected username-password combinations from logging onto the system.
4. The LOCK_CLI utility can be unlocked:
 - a. Only by the system manager.
 - b. By using the command UNLOCK.
 - c. Only with a password.
 - d. By any user with the superprocess privilege.

Directions

Now check your answers with those on the next page.

Segment D

LABEL and LOCK_CLI

Exercise Answers

1. a
2. a
3. b
4. c

Directions

If you answered all the questions in the segment exercise correctly, continue to Lab Activity 12-2 on the next page.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Lab Activity 12-2

Before you begin this lab activity, get your system manager's permission to perform the following procedures.

If you have access to a computer, follow the steps listed below. If you do not have access to a computer, please read through these steps carefully.

1. **Check with your system manager**, then log on (to the master console, preferably).
2. Enter **SYSLOG**.
Is the logging feature on?
3. If the logging feature is not on, check with your system manager, then start it by entering **SYSLOG/START**.
4. Enter **LOGEVENT YOURNAME USING LOGGING FEATURE**.
5. AOS/VS operators should perform Steps 6 through 13. AOS operators should skip to Step 14.
6. Enter **FLAGS**.
Is the error logging feature on?
ELOG Y
7. Enter **LIST**.
8. Pick any type of error you want in response to the **TYPE** prompt.
9. Enter the first day of the current month in response to the **FIRST DAY** prompt.
10. Press **NEW LINE** in response to the **LAST DAY** prompt.
11. Enter **06 00** in response to the **FIRST TIME** prompt.
12. Press **NEW LINE** in response to the **LAST TIME** prompt.
13. Repeat Steps 8 through 12, but press **NEW LINE** in response to **FIRST DAY** and **FIRST TIME**.
How do the reports differ? (The first should be contained in the second.)
14. **Check with your system manager**, then mount a tape on drive MTA0.
15. Enter **EXECUTE LABEL @MTA0 (your initials)“TP1”** (EX. JMTTP1)
16. **Ask your system manager** if you have the **LOCK_CLI** utility on your system and what the password is. If you do not have the **LOCK_CLI** utility or cannot use it, go to Step 23.
17. Enter **LOCK_CLI**.

18. Enter **SUPERUSER ON**.

What happened? You should have received a right parenthesis as the system prompt.

19. Is the superuser feature on? Why not?

Superuser should not be on, because the command **SUPERUSER** is not recognized when **LOCK_CLI** is on.

20. Enter **UNLOCK**, then press **NEW LINE**.

21. Enter the the password you received from your system manager. Note that it did not appear when you typed it in.

22. Try turning superuser on again. Did it work? You can tell by the prompt that was returned. It should be *).

23. Enter **LOGEVENT YOUR NAME "I AM DONE"**.

24. Enter **EXECUTE REPORT/EV**. Are your messages there?

25. Leave the console. Do *not* log off if you are on the master console!

Directions

If you completed this lab activity without any problems, continue to the Module 12 Quiz on the next page.

If you experienced any problems, go back and review the segment and try Lab Activity 12-2 again before continuing.

Module 12

Quiz

Answer the following questions in the space provided.

1. A utility is:
2. The utilities _____ and _____ work in conjunction with each other to provide information on evaluating system performance and errors.
3. Your installation has one terminal designated for constant monitoring of the system. What utility is running on that terminal?
4. You are preparing to send some development programs to an affiliate running IBM equipment. Which utility will you use to prepare the tapes for these programs?
5. A user asks you to terminate his process. He doesn't know his PID. How can you find out what it is?
6. You are the only operator in your installation and are out of the computer room much of the time. Therefore, all personnel in the installation have access to the computer room and master console. What utility can you use to provide security while you are gone?
7. (ECLIPSE MV/Family operators only)
How many files does the ERRLOG utility have access to in performing its processing?
8. (ECLIPSE MV/Family operators only)
MEMLOG is full. How do you clear it?
9. Some utilities run stand-alone and others under system control. What is the difference between these two means of running?

Before attempting the rest of the Module 12 Quiz, get the permission of your system manager to perform the following procedures.

Log onto the master console and perform the following actions.

10. Lock the console.
11. Find out who is on the system.
12. Unlock the console.
13. Check if the logging function is on. If not, turn it on.
14. Put the message I AM TAKING THE MODULE 12 QUIZ in the log file.
15. Produce a Process Termination Report and an Event Log Report, and put them into a file named :REPORT.FILE.
16. If you turned SYSLOG on, turn it off.
17. Check what is happening on the system. (You may have to go to another terminal to do this.)
18. Create a tape with the IBM label IBM01.
19. Print :REPORT.FILE.

Directions

Now check your answers with those in Appendix A.

Module 13

System Problems

Introduction

This module discusses four problems you may encounter with your system and steps to take in resolving them. These problems are: system trap, system panic, system deadlock, and system crash. You will also learn to produce a core dump and run the FIXUP and Disc Formatter (DFMTR) utilities.

Module Objectives

Upon successful completion of this module, you should be able to:

1. Given a series of error situations, identify the type of error encountered.
2. Given selected error situations, identify the correct error recovery procedure.
3. Take the steps necessary to produce a core dump.
4. Describe and execute the FIXUP and DFMTR utilities.

Resources

To complete this module, you need:

- Module 13 audiotape.
- Module 13 of your Student Guide.
- Audiotape playback unit.

Optional Resources

- *Advanced Operating System Operator's Guide* (093-000194-05)
or
- *How to Generate and Run AOS/VS on Your ECLIPSE® MV/Family Computer* (093-000243-01)

Module Outline

Module 13 discusses the following topics:

1. Error Conditions
 - a. System trap
 - b. System panic
 - c. System deadlock
 - d. System crash
2. Recovery Measures
 - a. Core dump
 - b. FIXUP
 - c. DFMTR
3. System Aids
 - a. Emergency shutdown procedure
 - b. Powerfail/auto restart
 - c. Abnormal shutdown
 - d. Software Trouble Report (STR)

Directions

Start the Module 13 audiotape to begin. As you listen, follow along in Module 13 of your Student Guide.

Segment A

Error Conditions

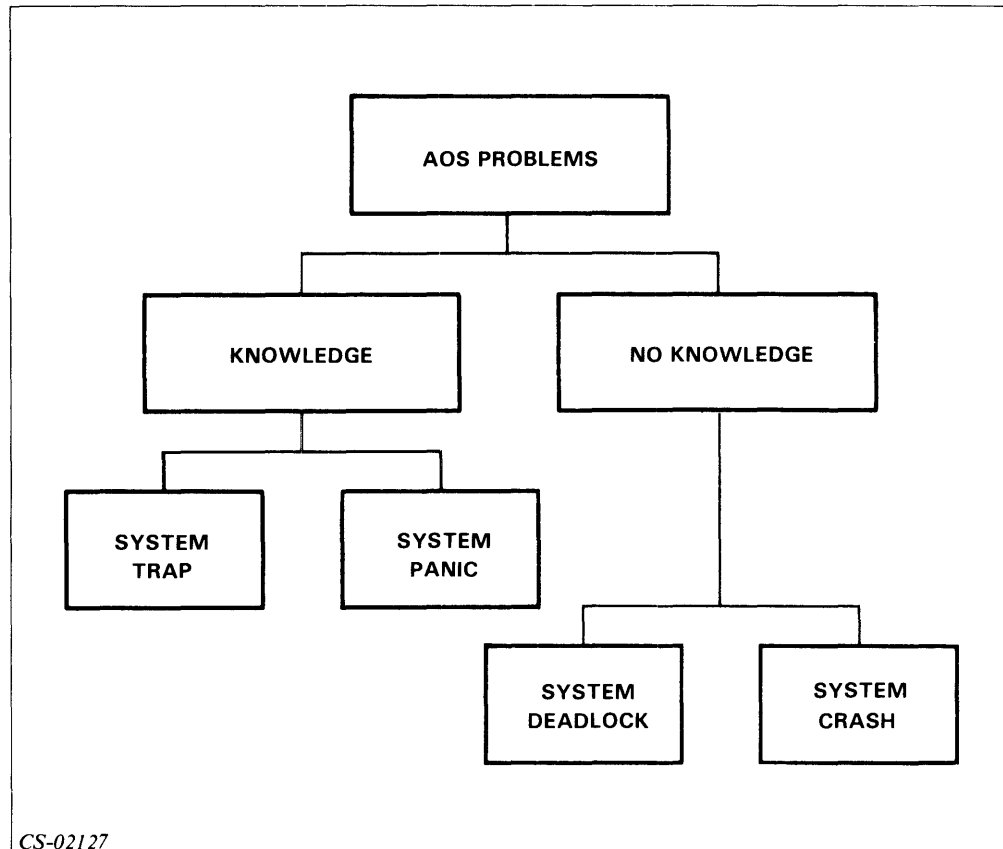


Figure 13.1 Classes of System Errors

System Trap

- Caused by user process or program.
- Caused by an attempt to:
 - Write to area to which program does not have access.
 - Refer to area to which user does not have access.
 - Perform functions outside capabilities of system or language.
- System:
 - Terminates problem process.
 - Produces break file — Process information for programmer
Filename —?(PID).(time).BRK
 - Displays trap message: ABORT USER TRAP message
 - Message format:
 - 6-digit message code
 - Carry bit, space, 0 or 1
 - Program counter
 - Accumulators

Example 1

ABORT

USER TRAP, 000006

C 1, PC 000000, AC0 100177, AC1 000224, AC2 000000, AC3 777777

- Operator responsibilities:
 - Record trap message.
 - Notify programmer.
 - Give programmer trap message and break file.
- Usually no effect on system.
- Check with system manager for recovery requirements (probably none).

System Panic

- Failure of system database or hardware.
- AOS (AOS/VS) terminates self.
- Produces error message: FATAL AOS ERROR error code
- Error code format: MMMXXX
 - MMM — Major error group code
 - XXX — Minor error code within group
 - Described in AOS.PANICS.SR file

PANIC CODE	ROUTINE	PANIC DESCRIPTION
-----	-----	-----
;***** PANIC CODE 5 *****		
005001	IDSWP	<p>AN EVENT HAS CAUSED THE RESPECTIVE PROCESS'S DISK "SWAP" AREA TO HAVE TO BE CHANGED. FIRST THE SYSTEM WILL RELEASE THE OLD "SWAP" AREA THEN ATTEMPT TO FIND ANOTHER AREA LARGE ENOUGH TO CONTAIN THE NEW PROCESS SIZE. IN THIS CASE, THE OLD "SWAP" AREA IS BEING RELEASED AND THE SWAP FILE BIT MAP INDICATES THAT THE AREA HAD BEEN MARKED AS NOT "IN-USE" -- A DEFINITE INCONSISTANCY.</p> <p>VALUE #1= NEG # BITS FOR SWAP AREA VALUE #2= WORD/BIT ADDRESS VALUE #3= BUFFER HEADER ADDRESS FOR BIT MAP</p>
005002	IWSWP	<p>SAME GLOBAL EVENTS AS IN "005001" EXCEPT THAT NOW THE NEW "SWAP" AREA IS BEING ASSIGNED. THIS AREA HAD BEEN DETERMINED TO BE FREE BUT WHEN THE ACTUAL ALLOCATION IS DONE IN THE SWAP FILE "BIT" MAP, AN AREA IS FOUND ALREADY SET "IN-USE".</p> <p>VALUE #1= NEG # BITS FOR SWAP AREA VALUE #2= FIELD ADDRESS VALUE #3= WORD/BIT ADDRESS</p> <p>NOTE THAT EACH BIT IN THE SWAP FILE BIT MAP CORRESPONDS TO 1 MEMORY PAGE WHICH IS 4 DISK BLOCKS.</p>

Figure 13.2 Sample Page of AOS Panic Codes Printout

Example

010 001

- Operator responsibilities:
 - Produce a core dump.
 - Run Emergency Shutdown Procedure.
 - If Emergency Shutdown Procedure fails, run FIXUP.
 - Rebootstrap the system.

System Deadlock

- Sluggish response or no response on master or user consoles.
- AOS — Processing stops.
- EXEC — Cannot log on or start batch processes.
- Process does not respond to ^C^B character sequence.
- Operator responsibilities:
 - Terminate apparent problem process.
 - Terminate OP.
 - Treat as system crash.

System Crash

- All processing stops.
- No messages.
- Possible causes:
 - Hardware malfunction
 - Overheating
 - Power failure or fluctuation
 - Static electricity
 - Humidity
 - Worn-out circuitry
- Operator responsibilities:
 - Force core dump.
 - Run Emergency Shutdown Procedure.
 - If Emergency Shutdown Procedure fails, run FIXUP.
 - Reboot system.

Directions

Now do the Segment A Exercise on the next page.

Segment A

Error Conditions

Exercise

Answer the following questions.

1. What are the four types of system errors you may encounter?
 - a.
 - b.
 - c.
 - d.
2. What are the two types of errors about which the system has some knowledge?
 - a.
 - b.
3. What are the two types of errors about which the system has no knowledge?
 - a.
 - b.
4. If you see the message `ABORT USER TRAP:`
 - a. What type of a problem probably exists?
 - b. What steps should you take?

5. If EXEC does not respond to attempts by users to log on:
 - a. What type of a problem probably exists?

 - b. What steps should you take?

6. If your air conditioning has malfunctioned, the temperature in the computer room is 90°, and all processing has stopped:
 - a. What type of a problem probably exists?

 - b. What actions should you take?

Directions

Now check your answers with those on the next page.

Segment A

Error Conditions

Exercise Answers

1.
 - a. System trap
 - b. System panic
 - c. System deadlock
 - d. System crash
2.
 - a. System trap
 - b. System panic
3.
 - a. System deadlock
 - b. System crash
4.
 - a. System trap.
 - b. Record the trap message.
Notify the programmer or user.
Give the programmer or user the trap message and break file.
Check with your system manager to see if recovery is required.
5.
 - a. System deadlock.
 - b. Attempt to terminate EXEC.
If that fails, terminate OP.
Force a core dump.
Run Emergency Shutdown Procedure.
If it fails, run FIXUP.
Reboot the system.
6.
 - a. System crash
 - b. Force a core dump.
Run Emergency Shutdown Procedure.
If it fails, run FIXUP.
Reboot the system.

Directions

If you answered all the questions in the segment exercise correctly, restart the Module 13 audiotape to continue.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Segment B

Recovery Procedures

Core Dump

- Octal listing of memory
- System panic:
 - Automatically produced.
 - Displays system panic error message:
AOS PROCESSING ABORTED
STRIKE "D" FOR AOS DUMP, "S" FOR SHUTDOWN, OR "R" FOR OPEN FILE REPORT
- Response: **D**
- Message that dump is beginning and tape or diskette should be mounted.
- Mount tape or diskette.
- Put on-line.
- Response: Any key.
- Contents of main memory written to tape or diskette.
- Message: STRIKE "S" FOR AOS SHUTDOWN, OTHER KEY TO HALT
- Response:
 - S — Emergency Shutdown Procedure run.
 - Other — System halts; FIXUP must be run.
- Reboot system.

Example 1

1. FATAL AOS ERROR 007003
2. AOS PROCESS ABORTED
STRIKE "D" FOR AOS DUMP, "S" FOR SHUTDOWN, OR "R" FOR OPEN FILE REPORT
? **D**
3. BEGINNING AOS CORE DUMP
LOAD TAPE FOR DUMPING ON MTAO
STRIKE ANY KEY WHEN READY: **C**
4. STRIKE "S" FOR AOS SHUTDOWN, OTHER KEY TO HALT
? **S**

Nonstandard Dialog

- S or R
DUMPS MUST BE TAKEN BEFORE ESD/REPORT.
DO YOU WISH TO TAKE A DUMP? [N]
- N — Material needed for dump overwritten.
- Y — Dump taken.

Failure

FATAL ERROR

BAD MEMORY DUMP

RESTART MEMORY DUMP? PRESS CONTINUE

1. Mount new tape or diskette.
2. Front panel: Press CONTINUE.
Programmed system console: !P.

Forcing a Dump

- System deadlock or crash.
- Front panel:
 - Set octal 14 (switches 12 and 13 up; others down).
 - Lift, then depress STOP/RESTART switch.
 - Lift START switch.
- Programmed system console:
 - All machines except ECLIPSE MV/8000®: ! 14R
 - ECLIPSE MV/8000: ! START 14
- Normal procedure continues.
- Label tape or diskette and retain for system manager and/or Data General representative.

FIXUP

- Locates and corrects errors on logical disc.
- Run periodically to delete temporary files.
- Must run when Emergency Shutdown Procedure fails after:
 - System panic
 - System deadlock
 - System crash
 - Any abnormal shutdown
- Produces a report.
- Stand-alone or under system control.

Stand-alone

- To fix master logical disc.
- Load boot program in normal fashion.
- Load from disc — FIXUP
- Load from tape — MTA0:1
- Load from diskette — FIXUP (on diskette 1)

Example 1

(Stand-alone from master LDU)

Note: Throughout the remainder of this module, this symbol (↓) indicates that you should press NEW LINE to accept the default values.

Check all discs mounted.

1. SPECIFY EACH DISK IN THE LDU

DISK UNIT NAME? **DPF0**
DEVICE CODE? ↓

2. *****WARNING***** DISK IS IN USE - FIXUP MUST BE RUN ON LDU
SYSTEM PATHNAME? **FIXUP**

Example 2

(Stand-alone from tape)

Check all discs mounted.

1. Start the process to boot system.
2. FROM MT-0: **1**

Example 3

(Stand-alone from disc or diskette requiring booting)

Check all discs mounted.

1. Start the process to boot system.
2. SPECIFY EACH DISK IN THE LDU

DISK UNIT NAME? **DPF0** (disc) **DPI0** (diskette)
DEVICE CODE? ↓
3. SYSTEM PATHNAME? **FIXUP**

Under System Control

- Only nonmaster logical discs
- EXECUTE :UTIL:FIXUP

Dialog

- Discs in Logical Disc Unit
- Device code of disc:
Standard device — NEW LINE
- Know logical disc structure

Verbosity

1. No report: 0
2. Brief report: 1
3. Complete report: 2
4. Response of 1 or 2:
Error Log produced.
Report closing any open files.

Fix Disc

1. Correct inconsistencies.
2. Correct disc errors.
3. File deletion:
Temporary
Start with ?
End with .TMP

Checks information regarding file structure.

Example 4

1. AOS DISK FIXER REV n
SPECIFY EACH DISK UNIT IN THE LOGICAL DISK
2. DISK UNIT NAME? @DPF0
3. DEVICE CODE?)
4. VERBOSITY (0-2)? 2
5. ERROR LOG FILE? LPB
6. SHOULD I REPORT CLOSING FILES? Y
7. MAY I FIX IT? Y
8. DONE!

DFMTR

- Stand-alone:
Exclusive use of system
Boot — tape: file 2
Boot — disc: :DFMTR
Must be used for master logical disc unit
- Under system control:
Runs with other processes
Called — EXECUTE :UTIL:DFMTR
Cannot format master logical disc unit

- Full format:
 - Either stand-alone or under system control.
 - Destroys any data on disc.
 - Must be used on new discs.
 - May be used on old discs.
- Partial format:
 - Either stand-alone or under system control.
 - Does not destroy data.
- Dialog — Both start the same way.

Example 1

1. AOS DISK FORMATTER REV XX.XX
FULL FORMAT DESTROYS ANY AOS DISK STRUCTURE.
PARTIAL FORMAT RETAINS IT.
FULL (F) OR PARTIAL (P OR <NL>)? F
2. FULL FORMAT
3. ENTER UNIT NAMES FOR EACH UNIT IN THE LDU (<NL> WHEN DONE)
DISK UNIT NAME? DPF1
DEVICE CODE? 27
4. DISK UNIT NAME?
5. DISK NUMBER 1: 0000000000 THRU 00000001325657

Directions

Restart the Module 13 audiotape to continue.

- Type (full or partial) determined.
- Physical disc identified.
- Logical addresses assigned.

Example 2

(Full disc formatter dialog)

1. LOGICAL DISK UNIQUE ID (1 TO 6 CHARS) ROOT1
LOGICAL DISK NAME ID (1 TO 31 CHARS) ROOT1
2. ACCESS CONTROL LIST
USERNAME OR TEMPLATE (1 TO 15 CHARS)? OP
PRIVILEGES (O,W,A,R,E)? OWARE
USERNAME OR TEMPLATE (1 TO 15 CHARS)? PROJ.+
PRIVILEGES (O,W,A,R,E)? RE
USERNAME OR TEMPLATE (1 TO 15 CHARS)?
3. SURFACE ANALYSIS? [N] Y
DISK NUMBER? 1
DISK NUMBER?

4. WHAT PATTERNS (1-155555, 2-133333, 3-066666)? **123**
 - RUNNING PATTERN 066666
 - RUNNING PATTERN 155555
 - RUNNING PATTERN 133333
5. PRINT BAD BLOCK STATISTICS? [N]
ADDITIONAL BAD BLOCK NUMBER (<NL> WHEN DONE):
PRINT BAD BLOCK STATISTICS? [N]
6. BITMAP SIZE: 133
BITMAP ADDRESS? [00000420141]
SYSTEM DISK? [Y]
OVERLAY AREA SIZE? [000620]
OVERLAY AREA ADDRESS? [00000420274]
DISK NUMBER 1 REMAP AREA SIZE? [000176]
DISK NUMBER 1 REMAP AREA ADDRESS? [000000]
7. - LOGICAL DISK CREATED
DONE!

Directions

Restart the Module 13 audiotape to continue.

1. Logical disc identified:
 - ID
 - Name
 - Legal characters — A - Z, a - z, 0 - 9, . , \$, ? , _
2. ACL established:
 - Username
 - Privileges
3. Surface analysis:
 - Destroys file structure.
 - Run on unformatted disc.
 - Run if reformatting disc.
 - Write/read patterns:
 - Pattern 1 — 155555
 - Pattern 2 — 133333
 - Pattern 3 — 066666
 - Octal
4. Bad block information.
5. Printed.
 - Additional bad blocks — manual.

6. Mapping memory:
Bitmap
System disc — Overlay information
Remap
System manager will handle, if not defaults.
7. Process complete — Logical disc created!

Example 3

1. NEW LOGICAL DISK UNIQUE ID? [ACCOUNTS]
NEW LOGICAL DISK NAME? [ACCOUNTS]
2. NEW ACCESS CONTROL LIST? [N]
3. READ ONLY SURFACE ANALYSIS? [N] Y
DISK NUMBER? 1
DISK NUMBER?
4. PRINT BAD BLOCK STATISTICS? [N] Y
DISK NUMBER? 1
DISK NUMBER?
5. 006 BAD DISK BLOCKS

ADDR:00000003241 CYL:23 HEAD:2 SECT:12
ADDR:00000005324 CYL:41 HEAD:5 SECT:17
** ADDR:00000005325 CYL:41 HEAD:5 SECT:20
* ADDR:00000005327 CYL:41 HEAD:5 SECT:22
** ADDR:00000007511 CYL:67 HEAD:6 SECT:3
* ADDR:00000007512 CYL:67 HEAD:6 SECT:4

* NEW BAD BLOCK WHICH WAS NOT ALLOCATED
** NEW BAD BLOCK WHICH WAS ALLOCATED (MUST RUN FIXUP!)

UPDATE BAD BLOCK TABLE? [N] N
PRINT BAD BLOCK STATISTICS? [N]
6. BITMAP SIZE: 000001
NEW BITMAP ADDRESS? [00000000000]
NEW OVERLAY AREA SIZE? [000620]
NEW OVERLAY AREA ADDRESS? [000620]
NEW OVERLAY AREA ADDRESS? [00000001256]
NEW DISK NUMBER 1 REMAP AREA SIZE? [000176]
NEW DISK NUMBER 1 REMAP AREA ADDRESS? [00000006543]
7. - LOGICAL DISK CREATED

DONE!

Directions

Restart the Module 13 audiotape to continue.

1. Logical disc changed — No change ↓
2. ACL changed — No change ↓
3. Surface analysis:
Read only — Discs run on.
Does not destroy data.
4. Bad block information.
5. Printed.
Update table.
Additional bad blocks — Manual.
6. Memory mapping changed:
Bitmap
Remap
System manager will handle, if not defaults.
7. Process complete — Logical disc created!

Directions

Now do the Segment B Exercise on the next page.

Segment B

Recovery Procedures

Exercise

Circle the letter of the correct answer.

1. A core dump is automatically produced after a:
 - a. System trap.
 - b. System panic.
 - c. System deadlock.
 - d. System crash.
2. A core dump must be forced after:
 - a. A system trap.
 - b. A system panic.
 - c. A system deadlock.
 - d. The FIXUP utility is run.
3. You receive the message STRIKE "D" FOR AOS DUMP, "S" FOR SHUTDOWN, OR "R" FOR OPEN FILE REPORT. What response should you enter?
 - a. D
 - b. S
 - c. R
4. Once the response in Questions 3 is entered, your next step is to:
 - a. Strike any key.
 - b. Mount a tape.
 - c. No other actions are required, as the system handles everything.
 - d. Enter "S" to shutdown the system.
5. When forcing a core dump which of the following must be done?
 - a. Set 14 on front panel; or enter 14R or START 14 depending on your system.
 - b. Set 22 on front panel; or enter 22R or START 22 depending on your system.
 - c. Enter LOAD MTA0:1
 - d. Turn off all power to the system, then start it up again.

6. FIXUP:
 - a. Locates and corrects errors on logical discs.
 - b. Must be run after every system problem.
 - c. Must be run stand-alone.
 - d. Must always be run from the system tape.
7. On which file on the system tape is FIXUP located?
 - a. 0
 - b. 1
 - c. 2
 - d. 3
8. FIXUP provides a complete report if _____ is entered in response to the prompt `VERBOSITY`.
 - a. 0
 - b. 1
 - c. 2
 - d. 3
9. What are the two versions of DFMTR?
 - a. Partial and complete disc formatter.
 - b. Stand-alone and complete.
 - c. Under system control and full.
 - d. Partial and full.
10. What is the difference between the two versions of DFMTR?
 - a. One checks the entire disc, the other only checks selected portions of the disc.
 - b. One destroys all data on the disc, while the other does not.
 - c. One produces a report and the other does not.
 - d. One must run stand-alone; the other can run either stand-alone or under system control.

Directions

Now check your answers with those on the next page.

Segment B

Recovery Procedures

Answers

1. b
2. c
3. a
4. b
5. a
6. a
7. b
8. c
9. d
10. b

Directions

If you answered all of the questions in the segment exercise correctly, continue with Lab Activity 13-1 on the next page.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Lab Activity 13-1

Check with your system manager to be sure that you can perform all the following procedures before you begin this lab activity.

Log onto the operator console and perform the following steps.

Note: The dialog illustrated here may differ from that on your system, depending on the revision of the operating system and utility you have installed.

1. Place the disc you will use off-line using the command **RELEASE DEVICENAME**. Make sure this is *not* the master disc!
2. Enter **EXECUTE :UTIL:FIXUP**. (Check with your system manager to ensure that **FIXUP** is in the **:UTIL** directory; then run it.)
3. **AOS DISK FIXER REV N**
SPECIFY EACH DISK UNIT IN THE LOGICAL DISK
DISK UNIT NAME? **DPF1**

(Check with your system manager to ensure unit number is correct.)

4. **DEVICE CODE? 1**
5. **VERBOSITY (0-2)? 2**
6. **ERROR LOG FILE? @CONXX**
XX is your console number.
7. **SHOULD I REPORT CLOSING FILES? Y**
8. **MAY I FIX IT? N**

The report will now appear on your console. It will take a few minutes to complete.

9. **DONE!**
10. **EXECUTE :UTIL:DFMTR**
Check with your system manager to ensure the Disc Formatter is in **:UTIL**.
11. **AOS DISK FORMATTER REV XX.XX**
FULL FORMAT DESTROYS ANY AOS DISK STRUCTURE
PARTIAL FORMAT RETAINS IT.
FULL(F) OR PARTIAL(P OR <NL>)? **P**

Make sure you enter **P**.

12. PARTIAL FORMAT

ENTER UNIT NAME FOR EACH UNIT IN THE LDU(<NL>WHEN DONE):
DISK UNIT NAME? DPF1

Check this unit number with your system manager.

DISK UNIT NAME?)
DISK NUMBER 001:00000000000 THRU 00001324617

This may differ on your system.

13. NEW LOGICAL DISK UNIQUE ID? [XXXXXX])

XXXXXX is your current ID.

NEW LOGICAL DISK NAME? [XXXXXX])

XXXXXX is your current name.

NEW ACCESS CONTROL LIST? [N])

Make sure no changes are made.

14. READ ONLY SURFACE ANALYSIS?[N] Y

DISK NUMBER? 1

DISK NUMBER?)

ANALYZING DISK 1

This will take about 20 minutes for a 96 megabyte disc.

15. PRINT BAD BLOCK STATISTICS? [N] Y

DISK NUMBER? 1

DISK NUMBER?)

Bad block statistics will now appear as noted below.

ADDR: 00000055221 CYL 000062 HEAD 000022 SEC 000011
ADDR: 00000055344 CYL 000630 HEAD 000001 SEC 000024

* NEW BAD BLOCK WHICH WAS NOT ALLOCATED

** NEW BAD BLOCK WHICH WAS ALLOCATED (MUST RUN FIXUP!)

2 OLD BAD BLOCKS

0 NEW UNALLOCATED BAD BLOCKS

0 NEW ALLOCATED BAD BLOCKS

16. UPDATE BAD BLOCK TABLE? [N] N

PRINT BAD BLOCK STATISTICS? [N])

17. BITMAP SIZE: 000056
NEW BITMAP ADDRESS? [00000211164] ↓
NEW OVERLAY AREA SIZE? [000620] ↓
NEW OVERLAY AREA ADDRESS? [00000211242] ↓
NEW DISK NUMBER 1 REMAP AREA SIZE? [000176] ↓
NEW DISK NUMBER 1 REMAP AREA ADDRESS? [00000000174] ↓

Entering NEW LINE (↓) at the end of each system response line indicates that you accept the default value.

Directions

If you completed this lab activity without any problems, restart the Module 13 audiotape to continue.

If you experienced some problems, go back and review the segment and try this Lab Activity again before continuing.

Segment C

System Aids

Emergency Shutdown Procedure (ESD)

- Runs after Core Dump.
- Orderly system shutdown.
- Attempts to close open files.
- Attempts to flush modified data into files.
- Messages provided advising actions occurring.
- Bring AOS, AOS/VS backup (reboot).
- Fail:
 - Retry ESD.
 - Run Open File Report.
 - Run FIXUP.
 - Notify system manager.

Note: If your version of ESD is not the current revision, do not run it if fatal AOS errors 14047 or 14077 occur.

- Run FIXUP if ESD fails after:
 - System panic
 - System deadlock
 - System crash
 - Any abnormal shutdown

Example

1. STRIKE "S" FOR AOS SHUTDOWN. OTHER KEY TO HALT S
2. FILE SYSTEM RESTART
 - NOW RESTARTING DEVICE 27 UNIT 0
 - NOW RESTARTING DEVICE 67 UNIT 0
 - NOW RESTARTING DEVICE 67 UNIT 1
3. FLUSHING BUFFERS
4. OPEN FILE PROCESSING
5. SYSTEM SHUTDOWN

Powerfail/Auto Restart

- Loss or drop in power.
- Automatic if specified during system generation.
- Must have core memory or battery-powered backup.
- Must lock computer:
 - Key
 - Toggle switch
- Allows time for orderly shutdown.
- Automatic recovery:
 - Short periods
 - Battery not drained
- Message:


```
THERE HAS BEEN A POWERFAIL
NOW RESTARTING DEVICE dd UNIT u

dd — Specific type device
u — Specific device number
```
- Waits until disc comes on-line.
- Brings up each disc in logical directory.
- Tape restart:
 - Asks if drive should be restarted.
 - You reply Y or N. (One minute time frame.)
 - Y
 - PLEASE REMOUNT TAPE AND TURN ON LINE
 - Waits indefinitely for tape to come on-line.
 - Tape must be remounted and repositioned.

Example

1. THERE HAS BEEN A POWERFAIL
2. NOW RESTARTING DEVICE 27 UNIT 0
NOW RESTARTING DEVICE 67 UNIT 0
NOW RESTARTING DEVICE 67 UNIT 1
3. DO YOU WANT TO RESTART THE TAPE? Y PLEASE REMOUNT TAPE AND TURN ON-LINE
4. AUTO RESTART COMPLETED

Abnormal Shutdown

- Problem occurs during normal shutdown.
- Treat as system crash.
- Force core dump.
- ESD.
- Attempt to bring system up.
- Notify system manager.

Software Trouble Report (STR)

- Relates problem to Data General representative.
- Discussion in reference manuals.
- Handled by system manager.

Adequate Backup

- Maintain adequate backup to assist in reloading system.

Directions

Now take the Segment C Exercise on the next page.

Segment C

System Aids

Exercise

Circle the letter of the correct answer.

1. A drop in power should be resolved by:
 - a. ESD.
 - b. Powerfail/auto restart.
 - c. A core dump.
 - d. The abnormal shut-down procedure.
2. ESD:
 - a. Runs automatically if there is a system panic.
 - b. Attempts to close open files.
 - c. Waits until each disc comes on-line.
 - d. Forces a core dump.
3. Powerfail/auto restart:
 - a. Runs automatically if there is a system panic.
 - b. Attempts to close open files.
 - c. Provides automatic recovery for a short-term problem.
 - d. Forces a core dump.
4. Powerfail/auto restart requires the operator to:
 - a. Remount any tape to be restarted and place it on-line.
 - b. Identify the device to be restarted.
 - c. Identify the units to be restarted.
 - d. Enter S to start the device.

Directions

Now check your answers with those on the next page.

Segment C
System Aids
Exercise Answers

1. b
2. b
3. c
4. a

Directions

If you answered all the questions in the segment exercise correctly, continue to the Module 13 Quiz on the next page.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Module 13

Quiz

Identify the probable error condition (trap, panic, deadlock, or crash) described by the following statements.

1. An error message appears on your console, but the system is not affected.
2. A user says he cannot log on.
3. AOS (or AOS/VS) terminates itself after producing an error message.
4. A user says he cannot cancel his process with the CTRL-C, CTRL-B control character sequence.
5. The entire system comes to a halt and no error messages are produced.
6. There has been a hardware failure and AOS (or AOS/VS) produces an error message indicating this.
7. A programmer asks for the break file created by his program.

Identify the error recovery procedure that should be used in the following situations.

8. The system displays the following message.
ABORT
USER TRAP

C 1,PC 001777,AC0 000000,AC1 777777,AC2 111111,AC3 010101
9. The lights went off for approximately one minute. You have battery backup. When the lights come back on, the system starts the recovery process.
10. ESD has just failed.
11. Core dump has completed and returns the message for continuation.

Enter the appropriate responses to produce a core dump.

12. The system is deadlocked. What is the first action?

13. STRIKE "D" FOR AOS DUMP, "S" FOR SHUTDOWN, OR "R" FOR OPEN FILE REPORT
?

14. BEGINNING AOS CORE DUMP
LOAD TAPE FOR DUMPING ON MTAO
STRIKE ANY KEY WHEN READY:

15. STRIKE "S" FOR AOS SHUTDOWN, OTHER KEY TO HALT
?

Check with your system manager to be sure that you can perform all the following procedures.

Log onto the operator console and execute the utilities to provide the specified information.

16. Run FIXUP to produce only a report of what it would have done had you let it fix the disc. Do not let FIXUP fix the disc!
17. Run the disc formatter only to check for bad blocks. Run the surface analysis READ ONLY, and produce a report of the bad blocks. Make no changes to the disc.

Directions

Now check your answers with those in Appendix A.

Module 14

Grafting Logical Discs and System Backup

Introduction

Module 14 discusses the procedures for grafting logical discs (LDs) and performing system backup. The concept of LDs is explained, and the procedures for grafting LDs are shown. The two methods of system backup, DUMP/LOAD and PCOPY, are compared, and the procedures for both are presented.

Module Objectives

Upon successful completion of this module, you should be able to:

1. Recognize descriptions of logical discs and master logical discs.
2. Recognize procedures used to graft LDs.
3. Recognize procedures used to release LDs.
4. Recognize relative advantages and disadvantages of using DUMP/LOAD or PCOPY to back up files.
5. Recognize the steps used to back up files using DUMP/LOAD.
6. Recognize the steps used to back up files using PCOPY.

Resources

To complete this module, you need:

- Module 14 audiotape.
- Module 14 of your Student Guide.
- Audiotape playback unit.

Module Outline

Module 14 discusses the following topics:

1. Grafting Logical Discs
 - a. Logical discs
 - Physical disc
 - Logical disc
 - Master logical discs
 - b. Grafting logical discs
2. System Backup
 - a. Backup
 - b. Back-up methods
 - DUMP
 - PCOPY
 - DUMP/LOAD or PCOPY
3. DUMP/LOAD Procedures
 - a. DUMP
 - b. DUMP with unlabeled tape
 - c. DUMP with labeled tape
 - d. LOAD
4. PCOPY
 - a. PCOPY procedure
 - b. PCOPY dialogs

Directions

Now start the Module 14 audiotape to begin. As you listen, follow along in Module 14 of your Student Guide.

Segment A

Grafting Logical Discs

Logical Discs

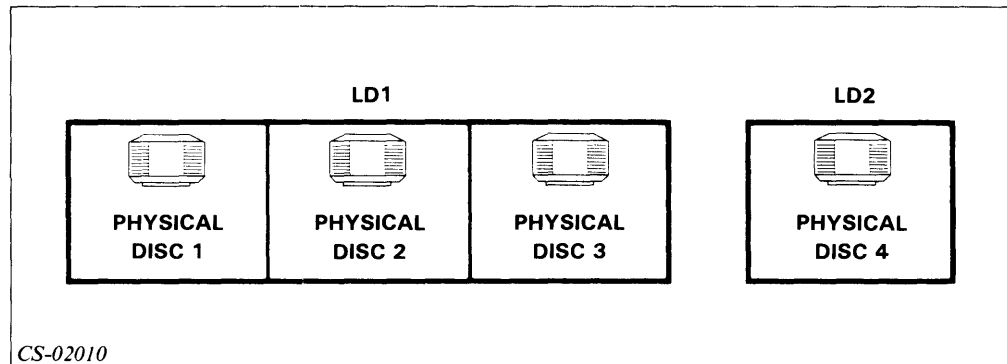


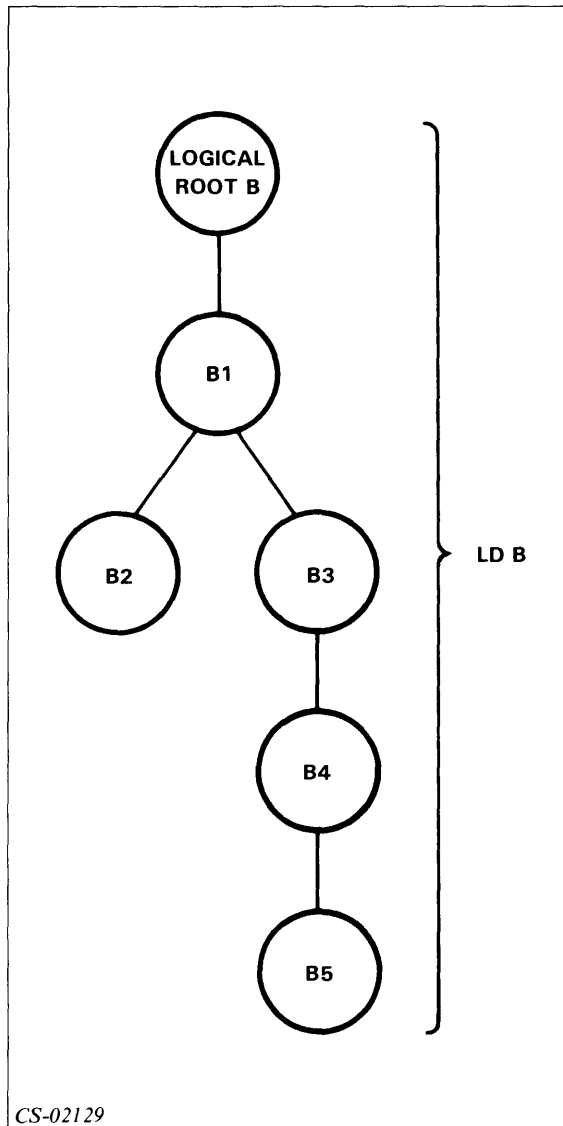
Figure 14.1 Logical Discs

Physical Disc

- Actual hardware on which information is stored.

Logical Disc

- Grouping of one or more physical discs.
- System treats as a logical entity.
- Holds AOS file system.
- Managed by AOS as a single file system.
- A file hierarchy.
- An independent directory tree.
- Has a logical root that is:
 - Root directory of entire tree structure.
 - Superior to every other directory.



CS-02129

Figure 14.2 Logical Disc File Hierarchy
Master Logical Disc

- LD containing system root directory.
- Bears name : (colon).

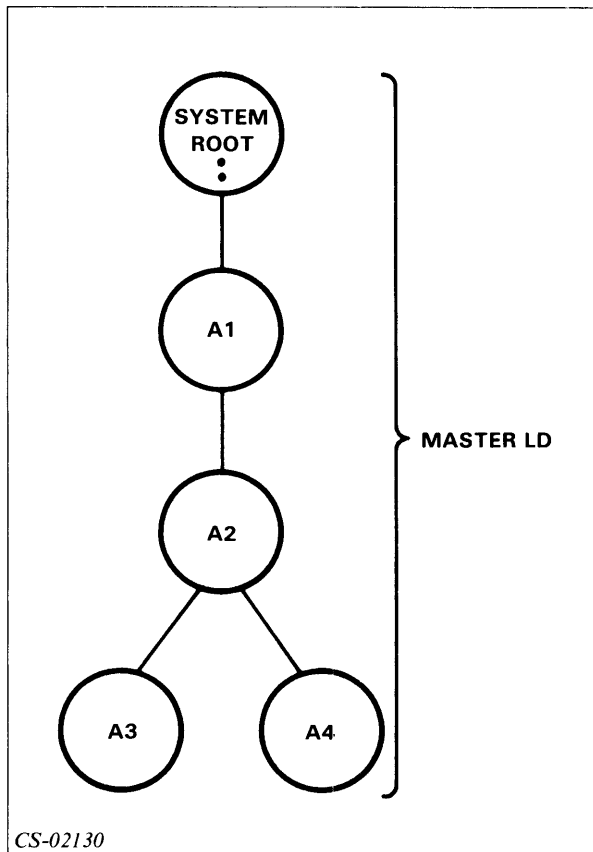


Figure 14.3 Master Logical Disc

- All physical discs in master LD must be mounted and ready to bring the system up.
- Frequently single-disc because of following advantages:
 1. Need only one operative disc drive.
 2. Only need to type in one disc unit name.
 3. FIXUP and PCOPY operations are simpler.
- Multiple-disc LDs are used when a file spans more than one disc.

Grafting LDs

- Adding one LD to another.

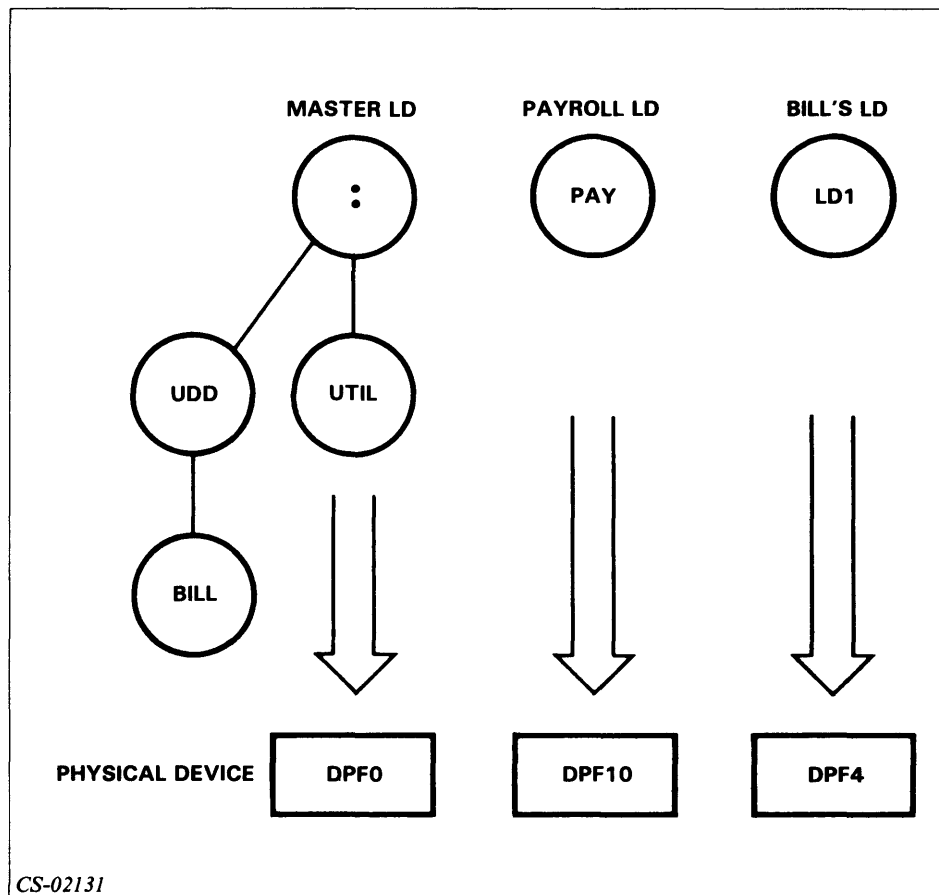


Figure 14.4 Three LDs

- Grafted LD's file hierarchy is part of existing file structure.

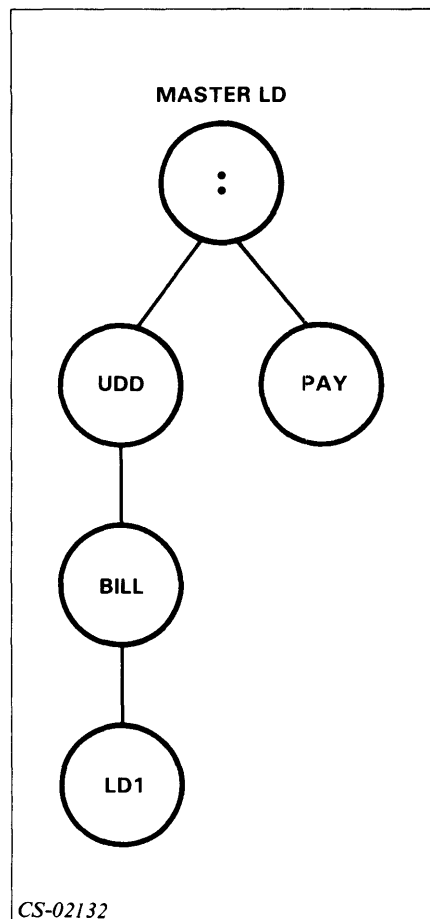


Figure 14.5 Grafted LDs

- To graft an LD into the working directory:
Issue initialize command, followed by physical disc unitname.
- To graft the payroll LD into the root directory:

```

DIR :
INITIALIZE @DPF10
PAY

```

RELEASE

- Command used to remove a grafted LD.
- Example of RELEASE command:

```

DIR :
RELEASE PAYROLL

```

Directions

Now do the Segment A Exercise on the next page.

Segment A

Grafting Logical Discs

Exercise

Circle the letter of the correct answer.

1. The root directory of an LD's entire tree structure is called the:
 - a. Master root.
 - b. File root.
 - c. Disc root.
 - d. Logical root.
2. The system root directory is contained in the:
 - a. Logical root.
 - b. Master LD.
 - c. Root LD.
 - d. File LD.
3. The operating system cannot be brought up if:
 - a. All physical discs in the master LD are not mounted and ready.
 - b. The master LD has more than one physical disc.
 - c. The system has a system root directory.
 - d. The system has a grafted LD.
4. The CLI command used to graft an LD is:
 - a. RELEASE.
 - b. INITIALIZE.
 - c. GRAFT.
 - d. ROOT.

5. The CLI command used to remove a grafted LD is:
 - a. RELEASE.
 - b. INITIALIZE.
 - c. GRAFT.
 - d. ROOT.

Directions

Now check your answers with those on the next page.

Segment A

Grafting Logical Discs

Exercise Answers

1. d
2. b
3. a
4. b
5. a

Directions

If you answered all the questions in the segment exercise correctly, restart the Module 14 audiotape to continue.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Segment B System Backup

Backup

- Adds data security.
- Protects against disasters.
- Protects against mistaken deletions.
- Protects against hardware problems.
- Archiving — Back-up procedures.
- Archive — Medium used for backup.

Back-Up Methods

DUMP

- Preserves file structure.
- Allows all or part of dumped files to be restored with LOAD.
- Used while the operating system is up.
- Designed for disc-to-tape work.
- Allows use of either labeled or unlabeled tape.

PCOPY

- Runs when the operating system is down.
- Copies entire LD.
- Designed for disc-to-tape or disc-to-disc work.

DUMP/LOAD or PCOPY

Table 14.A Characteristics of DUMP/LOAD and PCOPY

DUMP/LOAD	PCOPY
Runs while the operating system is up.	Cannot run while the operating system is up.
Selective; allows you to specify individual directories and files, by date and/or template.	Nonselective; backs up or restores one LD as a single file.
Allows you to dump or load files onto more than one LD.	Copies or restores one LD.
Can be started in batch, with predetermined volume IDs; EXEC prompts for next volume.	Requires shutdown and tape or disc mounting at operator's discretion.
Cannot dump or restore an installed operating system; you must install a system from tape with the installer if desired. (They will dump and load system .SY files, and you can always bring up one of these system files without installing it.)	Copies everything, including an installed system.
Works best with a destination medium that has a large capacity (disc or labeled tape).	Works with a destination medium of tape, disc, or diskette.
Often slower than PCOPY.	Often faster than DUMP/LOAD; PCOPY data transfer is significantly faster, but it copies everything, whereas DUMP copies only what you specify.

Directions

Restart the Module 14 audiotape to continue.

Consider DUMP/LOAD if:

- You do not have two identical disc units with removable packs.
- Your system cannot be shut down for an hour each day.
- The versatility of DUMP/LOAD appeals to you.

Consider PCOPY if:

- You have two identical disc units with removable packs.
- Your system can be shut down for an hour or two each day.
- You may do PCOPYs of entire LD each week and incremental DUMPs more frequently each day.

Directions

Now do the Segment B Exercise on the next page.

Segment B

System Backup

Exercise

Circle the letter of the correct answer.

1. Using the DUMP command to back up files:
 - a. Preserves the file structure.
 - b. Allows all or part of the file structure to be restored with the LOAD command.
 - c. Allows you to use either labeled or unlabeled tape.
 - d. All of the above.
2. Using PCOPY to back up files:
 - a. Requires AOS/VS.
 - b. Allows you to copy individual files or directories.
 - c. Is usually faster than DUMP/LOAD.
 - d. All of the above.
3. If your system cannot be shut down, you can back up files with the:
 - a. DUMP commands.
 - b. PCOPY program.
 - c. INITIALIZE command.
 - d. GRAFT command.
4. Backup is done to:
 - a. Protect against disasters.
 - b. Protect against mistaken deletions.
 - c. Protect against hardware problems.
 - d. All of the above.

Directions

Now check your answers with those on the next page.

Segment B

Exercise Answers

1. d
2. c
3. a
4. d

Directions

If you answered all the questions in the segment exercise correctly, restart the Module 14 audiotope to continue.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Segment C

DUMP/LOAD Procedures

DUMP

- Format: DUMP dumpfilename [source pathname]
- Dumpfilename is destination filename on archive.
- Default source pathname # (pound sign).

Table 14.B DUMP Command Switches

Switch	Result
/V	Verifies dumped files on @OUTPUT.
/FLAT	Does not maintain tree structure; dumps all files from the specified directories into one directory.
/NACL	Dumps files without ACLs.
/BUFFERSIZE = bytes	Blocks dumped to the tape will have a block size of bytes.
/BEFORE/TLM = time	Where time is in the form hh:mm:ss. Dumps only those files modified before the specified time.
/BEFORE/TLM = date	Where date is in the form dd-mmm-yy. Dumps only those files modified before the specified date.
/BEFORE/TLM = date:time	Where date:time is in the form dd-mmm-yy:hh:mm:ss. Dumps only those files modified before the specified date and time.
/BEFORE/TLA =	Dumps only those files last accessed before the specified time, date, or date-time. See /BEFORE/TLM for format.
/AFTER/TLM =	Dumps only those files modified after the specified time, date, or date-time. See /BEFORE/TLM for format.
/AFTER/TLA =	Dumps only those files last accessed after the specified time, date, or date-time. See /BEFORE/TLM for format.

Directions

Restart the Module 14 audiotape to continue.

- May use labeled or unlabeled tapes.
- Labeled tapes:
 - Allow you to dump to multiple reels.
 - Are recommended.

DUMP with Unlabeled Tapes

Example 1

```
DIR :UDD:MYDIR
DUMP/V @MTB0:0 MYFILE +
MYFILE1
MYFILE2
MYFILE3
```

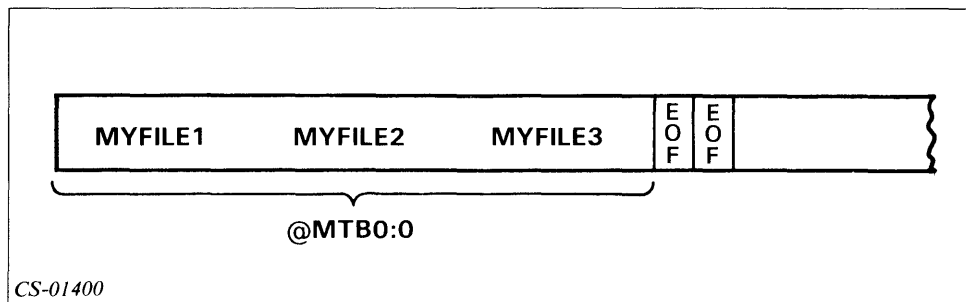


Figure 14.6 Dumped Files on Unlabeled Tape

DUMP with Labeled Tape

Procedure

1. Label all tapes.
 - Use LABEL utility.
 - 192 megabyte disc fills six 2400 ft. tapes.
2. Put first tape on transport.
3. Issue DUMP command.
 - From user's console.
 - From directory superior to files to be dumped.
 - DUMP command format: DUMP dumpfilename [source pathname]
 - Dumpfile name format: @LMT:[VOLID]:[filename]
 - Implicit mounting:
 - User console locks.
 - Message to mount tape sent to operator's console.
4. Type **CONTROL @EXEC MOUNTED.**
 - From operator's console.
 - Computer dumps the files.
 - EXEC prompts you to mount another tape or to dismount the tape when everything is dumped.
5. Type **CONTROL @EXEC DISMOUNTED.**
 - From operator's console.

Example 2

1. Label the tape.
X LABEL @MTA0 MYTAPE
2. Put the tape on the transport.
3. Issue the DUMP command from the user's console.
DUMP @LMT:MYTAPE:FILE1 MYFILE +

4. Type **CONTROL @EXEC MOUNTED** from the operator's console.
5. Type **CONTROL @EXEC DISMOUNTED** from the system console.

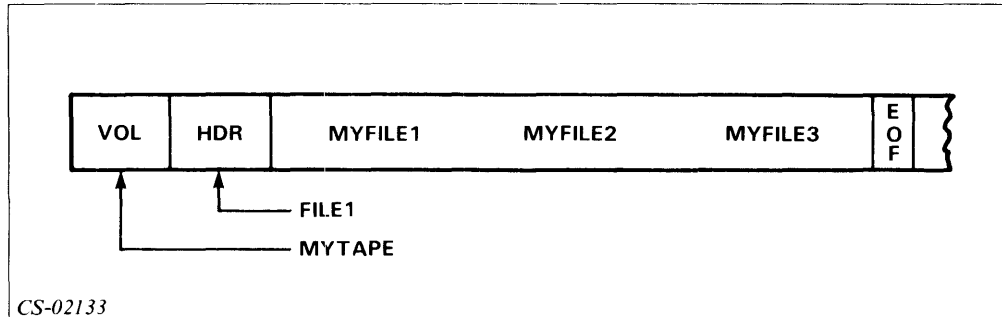


Figure 14.7 Dumped Files with Labeled Tapes

LOAD

- Format: **LOAD dumpfilename [source pathname]**
- Used to restore dumped files to disc.
- Default source pathname is #.
- Working directories for **LOAD** and **DUMP** of same files should be the same.

Example 3

LOAD with unlabeled tapes

LOAD/V @MTB0:0

MYFILE1

MYFILE2

MYFILE3

Example 4

LOAD with labeled tapes

LOAD @LMT:MYTAPE:FILE1 (From user's console)

CONTROL @EXEC MOUNTED (From operator's console)

⋮

CONTROL @EXEC DISMOUNTED

Directions

Now do the Segment C Exercise on the next page.

Segment C

DUMP/LOAD Procedures

Exercise

Circle the letter of the correct answer.

1. The switch /AFTER/TLM with the DUMP command is used to dump only those files:
 - a. Modified after a specified time.
 - b. Accessed after a specified time.
 - c. That have been verified.
 - d. Previously dumped.
2. DUMP/LOAD:
 - a. Runs while AOS is up.
 - b. Is nonselective.
 - c. Can be used to dump the AOS system.
 - d. All of the above.
3. The switch /V with the DUMP command is used to:
 - a. Dump a variety of files.
 - b. Dump files very quickly.
 - c. Verify files dumped.
 - d. Add volumes.
4. The DUMP command must be followed by a:
 - a. Source pathname.
 - b. #.
 - c. Dumpfile name.
 - d. Label.

5. The command used to restore dumped files is:
 - a. PCOPY.
 - b. LOAD.
 - c. DUMP.
 - d. GRAFT.

Directions

Now check your answers with those on the next page.

Segment C

DUMP/LOAD Procedures

Exercise Answers

1. a
2. a
3. c
4. c
5. b

Directions

If you answered all the questions in the segment exercise correctly, restart the Module 14 audiotape to continue.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Segment D

PCOPY

- Copies or restores entire contents of a logical disc.
- Copies or restores to disc, tape, or diskette.
- Stand-alone program.
- Booted directly from disc.
- File PCOPY in the root directory.
- Pathname is :PCOPY.
- Cannot specify a particular directory or file.
- PCOPY to tape requires labeled tapes.

PCOPY

Three steps:

1. Prepare the destination medium.
 - Disc-to-disc requires identical logical discs.
 - Disc-to-tape requires sufficient tapes with write enable rings installed.
2. Bootstrap PCOPY.
 - Shutdown AOS or AOS/VS normally.
 - Boot PCOPY from disc using the system pathname :PCOPY.
3. Complete the dialog with the PCOPY program.

PCOPY Dialogs

Six possible PCOPY dialogs:

- Disc-to-disc — all discs on-line
- Disc-to-disc — all discs not on-line
- Disc-to-tape
- Tape-to-disc
- Disc-to-diskette
- Diskette-to-disc

PCOPY Dialog, Disc-to-Tape

Note: Throughout the remainder of this module, this symbol (↓) indicates that you should press NEW LINE to accept the default values.

```
AOS DISK COPIER REV 4.20

ENTER TODAY'S DATE (MM DD YY)? 12 1 82

WILL THIS BE A DISK TO DISK PCOPY [N]? ↓
IS SOURCE A LOGICAL DISK (D), LABELED TAPE (T), OR FLOPPY [F]? D
SPECIFY SOURCE LDU
ENTER DISK NAMES FOR EACH DISK IN LDU (<NL> WHEN DONE)
DISK UNIT NAME? DPF0
DEVICE CODE? ↓
DISK UNIT NAME? ↓

LDU UNIQUE ID = LD1
LDU NAME = LD1

COPY TO DISK (D), LABELED (T) OR FLOPPY (F)? T

TAPE UNIT NAME? MTB0
SPECIFY VOLUME ID PC0000
TAPE UNIT NAME? ↓

EXPIRATION DATE (DEFAULT IS MM DD YY) ↓

SHOULD THE TAPES BE LABELED? [Y] N
COPY TO DISK FROM TAPE. PLEASE CONFIRM (N/Y)? Y
CONFIRMED
GENERATION NUMBER? [current] ↓
PCOPY TO TAPE COMPLETE. DO YOU WANT TO VERIFY THE TAPE? [N] Y
.
.
.
CONFIRMED

DONE !
```

Directions

Now try the Segment D Exercise on the next page.

Segment D

PCOPY

Exercise

Circle the letter of the correct answer.

1. PCOPY is:
 - a. A stand-alone program.
 - b. A CLI command.
 - c. An AOS command.
 - d. A macro.
2. The system pathname of PCOPY on disc is:
 - a. :
 - b. :UTIL.
 - c. :PCOPY.
 - d. :BOOT.
3. PCOPY between two discs requires:
 - a. The CLI.
 - b. Identical logical discs.
 - c. Labeled discs.
 - d. All of the above.
4. PCOPY:
 - a. Backs up only those files you specify.
 - b. Copies only from disc-to-disc.
 - c. Copies an entire logical disc.
 - d. All of the above.

Directions

Now check your answers with those on the next page.

Segment D

PCOPY

Exercise Answers

1. a
2. c
3. b
4. c

Directions

If you answered all the questions in the segment exercise correctly, then continue by doing one of the following:

- The Optional Lab Activity on the next page. This lab activity takes you step-by-step through the DUMP/LOAD and PCOPY procedures. However, only attempt this lab activity with the **supervision of your system manager**.
- The Module 14 Quiz.

If all your answers are not correct, go back and review the segment and try the segment exercise again before continuing.

Lab Activity 14-1

Optional

The following lab activities should be performed only with **supervision**.

To complete these activities, you need:

- Supervision.
- Your Student Guide.
- Your AOS or AOS/VS Operator's Guide.
- An AOS or AOS/VS computer system.
- Access to the operator's console.
- Several reels of tape.

Back-Up Procedures: DUMP/LOAD

1. Follow the procedures described in Segment C of this module to dump to tape the directory AOS.OPR:GUIDE, which you created earlier.
2. After you have completed the dump, delete the directory AOS.OPR:GUIDE from your user's directory.
3. Now load the directory AOS.OPR:GUIDE from tape, using the procedures described in this module.
4. Issue the command **F/AS/S AOS.OPR:GUIDE** to verify that you loaded the directory correctly.

Back-Up Procedures: PCOPY

Follow the procedures described in Segment D of this module to run the program PCOPY.

Note: You should have close supervision while running this program. Do not attempt to run PCOPY without the supervision of your system manager.

Directions

Now try the Module 14 Quiz on the next page.

Module 14 Quiz

Circle the letter of the correct answer.

1. The CLI command used to back up files is:
 - a. BACKUP.
 - b. LOAD.
 - c. DUMP.
 - d. VOLID.
2. A grouping of one or more physical discs treated as one entity by AOS is a:
 - a. File.
 - b. Record.
 - c. Root disc.
 - d. Logical disc.
3. The RELEASE command is used to:
 - a. Graft on an LD.
 - b. Remove a grafted LD.
 - c. Initialize an LD.
 - d. Establish a root.
4. The AOS command used to combine two LDs is:
 - a. RELEASE.
 - b. INITIALIZE.
 - c. GRAFT.
 - d. ROOT.
5. The /V switch is used with the DUMP command to:
 - a. Dump a variety of files.
 - b. Dump files very quickly.
 - c. Verify files dumped.
 - d. Add volumes.

6. The LD containing the system root directory is the:
 - a. Master LD.
 - b. Logical root.
 - c. File LD.
 - d. Root LD.
7. PCOPY is often:
 - a. Faster than DUMP/LOAD.
 - b. Slower than DUMP/LOAD.
 - c. Same speed as DUMP/LOAD.
 - d. Better than DUMP/LOAD.
8. The command sequence LOAD @MTB0 loads:
 - a. File LOAD.
 - b. No files.
 - c. File @.
 - d. All files on the tape.
9. DUMP/LOAD is:
 - a. More selective than PCOPY.
 - b. Less selective than PCOPY.
 - c. Equally as selective as PCOPY.
 - d. Is not selective.
10. The command used to restore dumped files is:
 - a. PCOPY.
 - b. LOAD.
 - c. DUMP.
 - d. VOLID.

Directions

Now check your answers with those in Appendix A.

Optional Lab Activity: Startup and Shutdown

Before you begin this lab activity, get your system manager's permission to perform the following procedures.

To complete this lab activity, you need:

- **Supervision.**
- Your AOS or AOS/VS Operator's Guide.
- Your Student Guide.
- Access to an AOS or AOS/VS computer system that has been shut down.

You learned to start up and shut down your system in either Module 2 or Module 3 of this course. This start-up and shut-down lab activity has been postponed until this point to give you more information on peripheral operations, CLI commands, and system problem recognition. You should now be ready and able to perform this lab **under supervision**.

1. Start up your system, following the directions in your Operator's Guide and in this Student Guide.
2. Shut down your system. Prior to actually doing this, use the SEND command to warn any users that you intend to shut the system down.

If you have completed this final lab activity successfully, you have finished this course. Congratulations!

If you had any problems, ask your system manager to help you, and try the procedures again, following the steps outlined in your Student Guide.

Appendix A

Module Quiz Answers

Module 1 Quiz Answers

1. b
2. a
3. b
4. c
5. c
6. c
7. d
8. Any of the following answers are correct:
 - Routinely starts up and operates the system.
 - Tells the operating system what jobs have to be run.
 - Tells the operating system what jobs are most important.
 - Mounts and dismounts tape reels and disc packs.
 - Tells the operating system what I/O devices a job can use.
 - Backs up important information for recovery in case of failure.
9. Compare your answers to those below.

Device	Input	Output	Storage
Disc	X	X	X
Magnetic Tape	X	X	X
Terminal	X	X	
Printer		X	
A/D Converter	X		

10. Compare your answer to Figure 1.14.

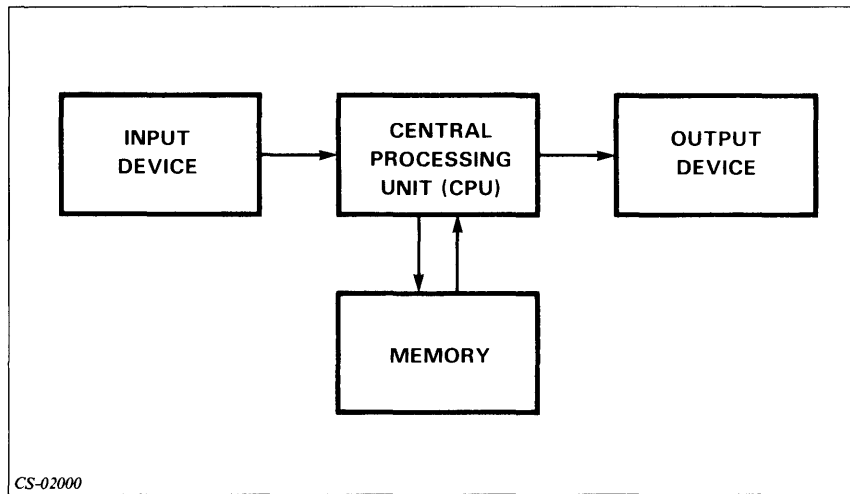


Figure 1.14 Module 1: Quiz Answer

Directions

If all your answers are not correct, go back and review the module and take the Module 1 Quiz again before continuing.

If you answered all the questions in the Module 1 Quiz correctly, continue to the directions below.

- If your computer is part of the C or S series of machines, turn to Module 2.
- If your computer is part of the ECLIPSE® MV/Family of machines, turn to Module 3.

This concludes Module 1.

Module 2 Quiz Answers

1. c
2. a
3. d
4. The `DISC UNIT?` prompt appears. Enter each disc unit in the master logical disc.
5. Answer **NO** unless your system manager instructs you otherwise.

Directions

If you answered all the questions in the Module 2 Quiz correctly, continue to Module 4.

If all your answers are not correct, go back and review the module and take the Module 2 Quiz again before continuing.

This concludes Module 2. Continue to Module 3.

Module 3 Quiz Answers

1. c
2. a
3. d
4. c
5. c
6. d
7. d
8. Compare your drawing to Figure 3.23.

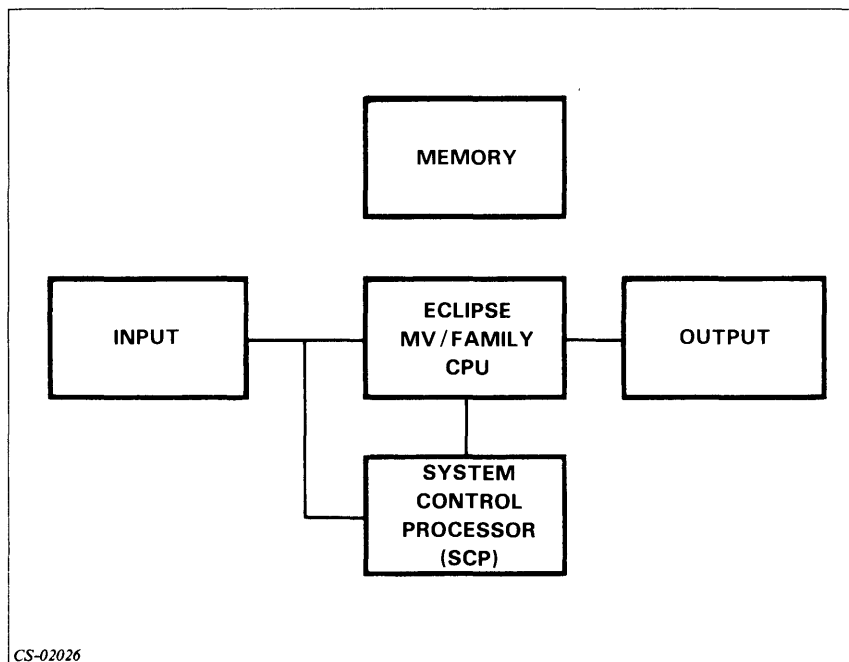


Figure 3.23 Module 3: Quiz Answer

Directions

If you answered all the questions in the Module 3 Quiz correctly, continue to Module 4.

If all your answers are not correct, go back and review the module and take the Module 3 Quiz again before continuing.

This concludes Module 3. Continue to Module 4.

Module 4 Quiz Answers

1. c
2. b
3. d
4. a
5. d
6. a
7. c
8. d
9. c
10. d

Directions

If you answered all the questions in the Module 4 Quiz correctly, continue to Module 5.

If all your answers are not correct, go back and review the module and take the Module 4 Quiz again before continuing.

This concludes Module 4. Continue to Module 5.

Module 5 Quiz Answers

1. b
2. c
3. b
4. c
5. d
6. a

Directions

If you answered all the questions in the Module 5 Quiz correctly, continue to Module 6.

If all your answers are not correct, go back and review the module and take the Module 5 Quiz again before continuing.

This concludes Module 5. Continue to Module 6.

Module 6 Quiz Answers

1. d
2. b
3. c
4. b
5. d
6. a
7. c
8. c
9. d
10. a

If you answered all the questions in the Module 6 Quiz correctly, continue to Module 7.

If all your answers are not correct, go back and review the module and take the Module 6 Quiz again before continuing.

This concludes Module 6. Continue to Module 7.

Module 7 Quiz Answers

1. a
2. b
3. d
4. c
5. d
6. c
7. b
8. b
9. b
10. c
11. Read/write head — 2
Take-up reel — 3
Supply hub — 5
Capstan — 4
Tape buffer — 1

Directions

If you answered all the questions in the Module 7 Quiz correctly, continue to Module 8.

If all your answers are not correct, go back and review the module and take the Module 7 Quiz again before continuing.

This concludes Module 7. Continue to Module 8.

Module 8

Quiz Answers

1. a. Disc-based
b. Operating systems
c. Control
d. Time-sharing
e. 64
f. 255
g. Resource managers
h. Memory
i. Devices
j. Bookkeeping
2. c
3. c
4. d
5. e
6. c
7. b
8. I HELP/V HELP
9. C
10. C
11. I DELETE/C/V FILE9
12. C
13. **DELETE/C/V XYZ**
or
DELETE XYZ
14. **TYPE NEWS_FILE**
15. **RENAME GOOD_STUFF,OLD_JUNK**
16. **CREATE/I TERMINAL_DATA**
17. **COPY PERSONNEL,PAYROLL**
18. **HELP/V DELETE**
or
HELP DELETE
19. **COPY/A,MASTER_FILE,FILE1A,FILE1B,FILE2A,FILE2B**
20. **TYPE,USELESS_FILE**
DELETE,USELESS_FILE

21. TYPE,FILE1,FILE2,TEST1,TEST2
22. DELETE FILE1.OLD,FILE2.OLD,FILE3.OLD
23. TYPE,FILE1 TYPE,TEST2
24. d
25. b,c,e
26. c
27. a
28. b
29. c
30. b
31. a
32. d
33. a
34. c
35. **POP**
36. **CURRENT**
37. **PROMPT,TIME**
38. **SUPERUSER**
39. **SUPERPROCESS,ON**

Directions

If you answered all the questions in the Module 8 Quiz correctly, continue to Module 9.

If all your answers are not correct, go back and review the module and take the Module 8 Quiz again before continuing.

This concludes Module 8. Continue to Module 9.

Module 9 Quiz Answers

1. :
2. @ or PER
3. UTIL
4. UPD
5. UDD
6. :UDD:USER1:DIRA:DIRA2:FILE_C
7. :UDD:USER1:DIRB:FILE_1
8. :UDD:USER2:FILE_D
9. :UDD:USER3
10. :UDD:USER3:STUFF:IMPORTS
11. PAYROLL+ or PAYROLL-
12. PAYROLL*
13. +FORMS
14. -
15. +2+
16. CREATE/DIRECTORY SUPER_DIR
17. CREATE/DIRECTORY/MAXSIZE=10,LITTLE_CPD
or
CREATE/MAXSIZE=10,LITTLE_CPD
18. FILESTATUS
19. DIRECTORY
20. DIRECTORY,;UTIL
21. SEARCHLIST
22. SEARCHLIST,;UTIL
23. PATHNAME,FORTRAN.PR
24. ACL TESTFILE ME,OWARE JOHN,RE
25. ACL SUB ME,OWARE +,E
26. ACL DIRA
27. a
28. b

- 29. b
- 30. b
- 31. a
- 32. a
- 33. a. Environmental settings
b. Conditional settings
c. Conversions
- 34. They return values that can be used in processing.
- 35. **CREATE/I PROG.MACRO**
 [!EQUAL %1%,1]
 EXECUTE PROG1
 [!ELSE]
 EXECUTE PROG2
 [!END]
- 36. **SEARCHLIST,[!SEARCHLIST];UTIL**
 (Note: The comma is required before :UTIL.)
- 37. **RUN_BBASIC**
- 38. A file containing a list of commands.

Directions

If you answered all the questions in the Module 9 Quiz correctly, continue to Module 10.

If all your answers are not correct, go back and review the module and take the Module 9 Quiz again before continuing.

This concludes Module 9. Continue to Module 10.

Module 10

Quiz Answers

1. Compare your answer to Figure 10.21.

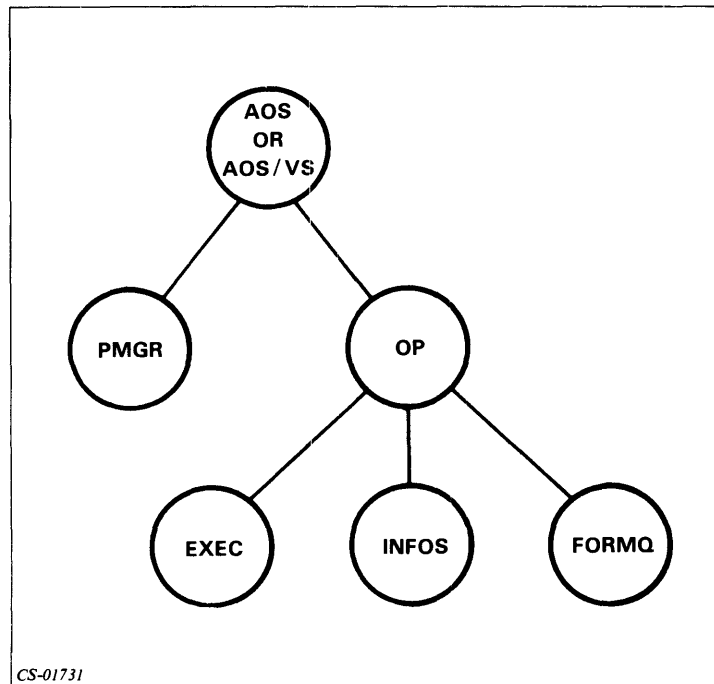


Figure 10.21 Module 10: Quiz Answers

2. a
3. a
4. b
5. c
6. d
7. **TREE 14**
8. **TERMINATE 17**
9. **SUPERPROCESS ON**
10. **WHO 13**
11. **PROCESS/BLOCK/IOC GOOD_STUFF**
or
EXECUTE GOOD_STUFF
12. **PROCESS MODULE_EIGHT_CONCLUSION**
13.
 - a. A set of instructions.
 - b. A user of system resources comprised of many components.
 - c. A program is a component of a process, while the process has a program, plus state, type, priority, and many other components.

- 14. EXEC
- 15. AOS/VS
- 16. USER_PROG_TEN
- 17. a. Resident
b. Preemptible
c. Swappable

18.

Type	Characteristic
Resident	Always in memory, real-time critical.
Preemptible	Can be swapped if high priority job needs the memory.
Swappable	Swapped in and out of memory to allow equal share of CPU time to all processes.

- 19. a. Eligible — Has memory and is ready to run.
b. Ineligible — Ready to run, but has no memory.
c. Blocked — Awaiting completion of some external event.
- 20. a
- 21. a. 1
b. 4
c. 5
d. 2
e. 3
- 22. Your system hierarchy should resemble that shown in Figure 10.22. They will not be identical, because each system is unique.

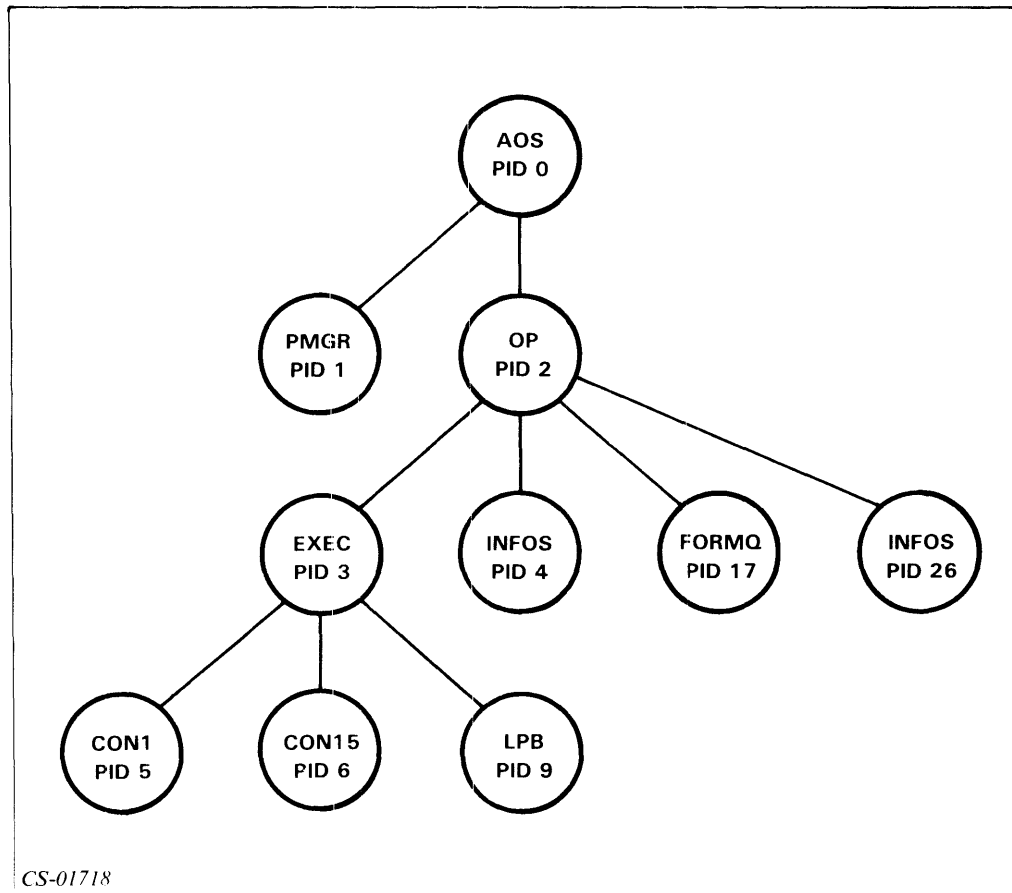


Figure 10.22 Module 10: Quiz Answers

23. **EXECUTE CLI.PR**

or

PROCESS BLOCK/IOC CLI.PR

24. First, determine the PID using the WHO command:

WHO

The system will return a PID number. To terminate, enter the **TERMINATE** command and the PID number returned by the system:

TERMINATE XX

Directions

If you answered all the questions in the Module 10 Quiz correctly, continue to Module 11.

If all your answers are not correct, go back and review the module and try the Module 10 Quiz again before continuing.

This concludes Module 10. Continue to Module 11.

Module 11 Quiz Answers

1. a. Logon
b. Spooling
c. Batch processing
d. Mount/dismount of magnetic tapes
2. a. Logon — Monitor terminals, prompt for and verify usernames and passwords.
b. Spooling — Handle queueing and hard-copy output.
c. Batch processing — Create and maintain the batch queues.
d. Mount and dismount — Provide communication between the user and operator to mount and dismount magnetic tapes.
3. Compare your answer to Figure 11.15.

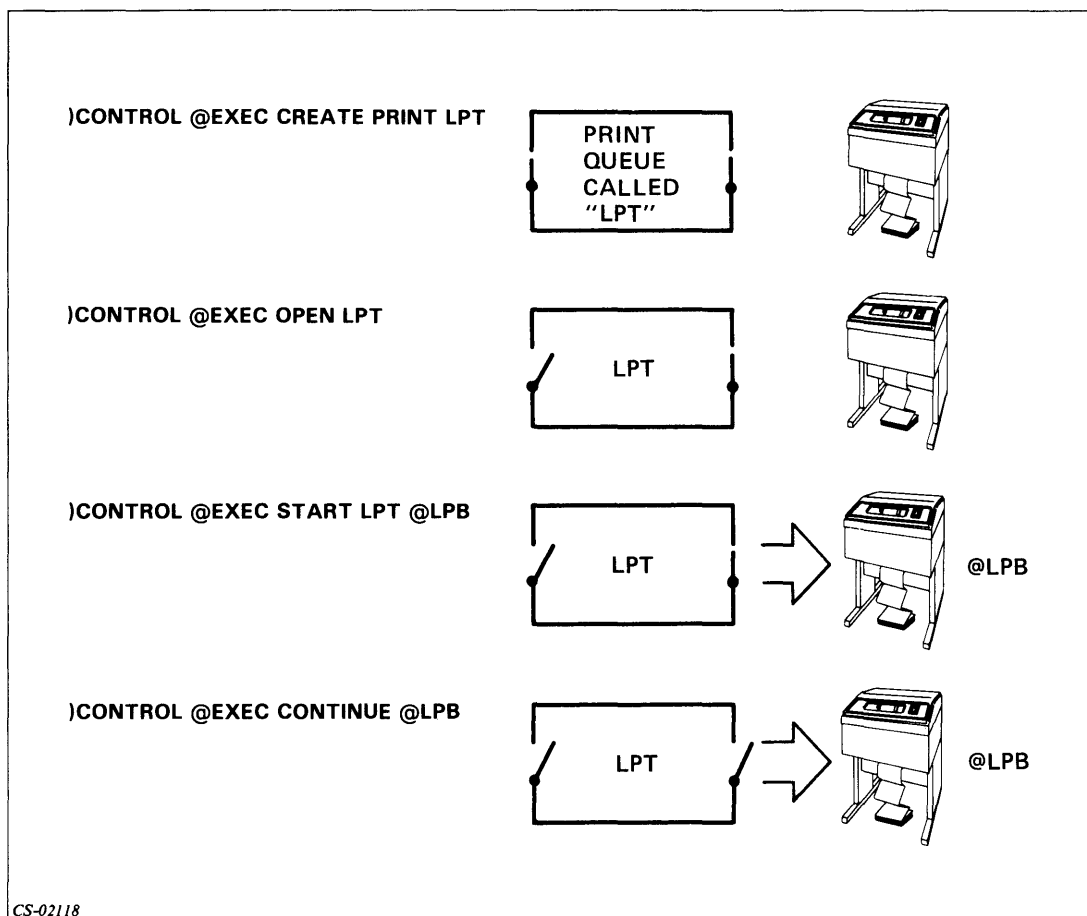


Figure 11.15 Module 11: Quiz Answers

4. `QPRINT/NOTIFY PRINT_1`
5. `QPLOT/COPIES=5/NOTIFY PLOT_FILE`
6. `QDISPLAY/TYPE=PLOT`
7. `QCANCEL 453`

8. QHOLD 29
9. QUNHOLD 90
10. QBATCH INDEPENDENT_1
11. CONTROL @EXEC PAUSE @LPB
CONTROL @EXEC FORMS @LPB RPT
12. CONTROL @EXEC CPL @LPB 50
CONTROL @EXEC LPP @LPB 10
13. CONTROL @EXEC HOLD 531, 533
CONTROL @EXEC CONTINUE @LPB
14. CONTROL @EXEC PAUSE @LPB
CONTROL @EXEC FORMS @LPB FORMA
15. CONTROL @EXEC LIMIT @LPB
CONTROL @EXEC CONTINUE @LPB
16. CONTROL @EXEC UNHOLD 531
CONTROL @EXEC CLOSE LPT
CONTROL @EXEC PAUSE @LPB
CONTROL @EXEC STOP @LPB
CONTROL @EXEC PURGE LPT
CONTROL @EXEC DELETE LPT
17. a. Nonlabeled tapes have no labels, and the files must all fit on one tape. They are identified by the file number immediately following the name of the physical device to which they are going.

Labeled tapes have labels. Their files can span more than one tape, and they can be referenced by filename.

b. Nonlabeled tapes are used for the normal copying of files.

Labeled tapes are used for copying very large files or files that are being sent to non-AOS installations.

Directions

If you answered all the questions in the Module 11 Quiz correctly, continue to Module 12.

If all your answers are not correct, go back and review the module and try the Module 11 Quiz again before continuing.

This concludes Module 11. Continue to Module 12.

Module 12

Quiz Answers

1. A program designed to perform a specified function on any computer.
2. SYSLOG
REPORT
3. PED
4. LABEL
5. You could use the ? macro or PED. The ? macro is the preferred method.
6. LOCK_CLI
7. 3
8. Execute ERRLOG process, then issue the INIT command; finally, enter MEMLOG as the file to be initialized.
9. Programs running stand-alone have exclusive use of the system. Programs running under system control run with other processes.

For Questions 10 through 18, enter the following commands.

10. EXECUTE LOCK_CLI
11. ? or PED.
12. UNLOCK J
PASSWORD (Enter the password obtained from your system manager.)
13. SYSLOG (IF SYSLOG is off, enter SYSLOG/START.)
14. LOGEVENT I AM TAKING THE MODULE 12 QUIZ
15. REPORT/PT/EV/L=:REPORT.FILE
16. SYSLOG/STOP
17. PED
18. EXECUTE LABEL/I @MTA0 IBM01
19. QPRINT :REPORT.FILE

Directions

If you answered all the questions in the Module 12 Quiz correctly, continue to Module 13.

If all your answers are not correct, go back and review the module and take the Module 12 Quiz again.

This concludes Module 12. Continue to Module 13.

Module 13

Quiz Answers

1. System trap
2. System Deadlock
3. System Panic
4. System deadlock
5. System crash
6. System panic
7. System trap
8. Write down the error message information, notify the user, and supply him with the break file.
9. Powerfail/auto restart
10. Retry ESD.
11. Enter S to run ESD.
12. Enter 14, 14R, or START 14 into the computer, either through the front panel switches or the programmed console.
13. D
14. Load a magnetic tape on drive MTA0; then press any key on the keyboard.
15. S
16. Enter EXECUTE :UTIL:FIXUP (Check with your system manager to ensure that FIXUP is in the :UTIL directory; then run it.) A suggested dialog follows:

```
AOS DISK FIXER REV N
SPECIFY EACH DISK UNIT IN THE LOGICAL DISK
DISK UNIT NAME? @DPF0
```

(Check with your system manager to ensure disc unit is correct.)

```
DEVICE CODE? 1
VERBOSITY? (0 - 2)? 2
ERROR LOG FILE? @LPT
SHOULD I REPORT CLOSING FILES? Y
MAY I FIX IT? N
DONE!
```

17. EXECUTE :UTIL:DFMTR

(Check with your system manager to ensure the disc formatter is in :UTIL.) A suggested dialog follows:

```
AOS DISK FORMATTER REV XX.XX
FULL FORMAT DESTROYS ANY AOS DISK STRUCTURE
PARTIAL FORMAT RETAINS IT.
FULL (F) OR PARTIAL (POR <NL>)? P
```

(Make sure you enter P.)

```
PARTIAL FORMAT
ENTER UNIT NAME FOR EACH UNIT IN THE LDU (<NL> WHEN DONE):
DISK UNIT NAME? DPF0
```

(Check this with your system manager.)

```
DEVICE CODE? 27
DISK UNIT NAME? ↓
DISK NUMBER 001:00000000000 THRU 00001324617
```

(This may differ on your system.)

```
NEW LOGICAL DISK UNIQUE ID? [XXXXXXX] ↓
NEW LOGICAL DISK NAME? [XXXXXXX] ↓
NEW ACCESS CONTROL LIST? [N] ↓
```

(Make sure no changes are made.)

```
READ ONLY SURFACE ANALYSIS? [N] Y
DISK NUMBER? 1
DISK NUMBER? ↓
```

```
PRINT BAD BLOCK STATISTICS? [N] Y
DISK NUMBER? 1
DISK NUMBER? ↓
```

(Bad block statistics will now appear.)

```
UPDATE BAD BLOCK TABLE/ [N] N
PRINT BAD BLOCK STATISTICS? [N] ↓
```

```
BITMAP SIZE: 000001
NEW BITMAP ADDRESS? [00000000000] ↓
NEW OVERLAY AREA SIZE? [000620] ↓
NEW OVERLAY AREA ADDRESS? [00000001256] ↓
NEW DISK NUMBER 1 REMAP AREA SIZE? [000176] ↓
NEW DISK NUMBER 1 REMAP AREA ADDRESS? [00000006543] ↓
```

Directions

If you answered all the questions in the Module 13 Quiz correctly, continue to Module 14.

If all your answers are not correct, go back and review the module and take the Module 13 Quiz again before continuing.

This concludes Module 13. Continue to Module 14.

Module 14

Quiz Answers

1. c
2. d
3. b
4. b
5. c
6. a
7. a
8. d
9. a
10. b

Directions

If you answered all the questions in the Module 14 Quiz correctly, continue to the optional System Startup and Shutdown Lab Activity that follows Module 14.

If all your answers are not correct, go back and review the module and try the Module 14 Quiz again before continuing.

This concludes Module 14.

Now try the System Startup and Shutdown Lab Activity, located at the end of Module 14.

Appendix B

EXEC Command Summary

EXEC Command Summary

Precede all EXEC commands with

CONTROL @EXEC

GENERAL PURPOSE Commands

CONSOLESTATUS / @consolename /
Display status of one or all consoles enabled by EXEC.

OPERATOR { ON }
 { OFF }
OFF - Stop accepting user MOUNT requests, and don't run jobs with /OPERATOR switch.

ON - Resume processing MOUNT requests and ignore /OPERATOR switch.

PROMPTS { ON }
 { OFF }
OFF - Display only CLI prompt, ""

ON - Display current time of day when ready to accept command.

LOG-ON Commands

DISABLE @consolename
Remove log-on capability from consolename.

ENABLE @consolename
Give consolename log-on capability.

TERMINATE @devicename
Terminate the cooperative or user process running on the specified device and, if a user process, log that user off.

BATCH Commands

(If you omit an optional stream number argument in a batch command, the command applies to all batch streams.)

BRIEF [n]
Set BRIEF mode on. When stream accepts a job, display: stream number, job sequence number in queue, username.

CANCEL sequence-number
Cancel a specified entry in a queue.

CONTINUE [n]
Continue processing in a paused stream.

FLUSH n
Stop processing current job in stream and process next job in batch queue.

HOLD { sequence-number }
 { username }
Do not process this entry until an UNHOLD or CANCEL command is issued.

LIMIT [n/HH:MM:SS]
Limit the amount of CPU time for a batch stream(s). Maximum CPU time is 36:24:32 (HH:MM:SS).

PAUSE [n]
Suspend processing in stream at end of current job. (Orderly shutdown).

QPRIORITY [n] [high-value low-value]
Let specified stream process only batch jobs with batch queue selection priorities between highpriority and lowpriority (0-255). 0 is the highest priority.

SILENCE [n]
Stop announcing jobs in specified stream.

STACK { @devicename }
 { pathname }
Accept batch jobs in stacked format from pathname, or devicename.

STATUS [n]
Display status of jobs being process in specified stream.

UNHOLD { sequence-number }
 { username }
Cancel a previous operator HOLD command (negates HOLD command).

UNLIMIT [n]
Stop LIMIT function; allow unlimited CPU time usage.

UNSILENCE [n]
Resume announcing jobs processed in specified stream (negates SILENCE command).

VERBOSE [n]
Announce jobs in VERBOSE mode; when stream accepts a job, display stream number, request sequence number in batch queue, username, user PID, and complete pathname to file.

EXEC SPOOLING Commands

ALIGN/[CONTINUE] @devicename [/-]n/
Halt or continue XLPT processing in the middle of a job.

BINARY @devicename { filename }
 { OFF }
Direct an XLPT cooperative process to turn binary mode on or off. filename is the cleanup file in :UTIL:FORMS.

BRIEF @devicename
Announce files in BRIEF mode; when device starts processing a file, display the request sequence number in spool queue and the username.

CANCEL sequence-number
Cancel a specified entry in a queue.

CLOSE queue-name
Prevent queue-name from accepting any more job requests.

CONTINUE @devicename
Continue processing on a paused device.

CPL @devicename number
Set number of characters per line for printer (16-255).

CREATE { PRINT }
 { PUNCH }
 { PLOT }
 { HAMLET }
 { FTA }
 } queue-name

Create spool queue named queue-name for line printer, paper tape punch, plotter, FTA, or HAMLET.

DEFAULTFORMS @devicename [form-name]
Set the characteristics of the default form for a device as specified in the file form-name.

DELETE queue-name
Delete queue-name from peripheral directory. Queue should already be empty (PURGE) and closed (CLOSE).

ELONGATE @devicename { ON }
 { OFF }

Turn elongated printing for devicename on or off. The devicename must refer to a DASHER LP2 line printer device.

EVEN @devicename { ON }
 { OFF }
Turn even pagination on or off for a spooled device. Default is ON.

FLUSH @devicename [m]
Stop processing current output request on device and process next request in spool queue. You may specify a particular stream (m) the device is processing.

FORMS @devicename [form-name]
Process all output requests that specify the special form name.

HEADERS @devicename { 0 }
 { 1 }
 { 2 }
Insert n headers preceding output for each file processed on device. Default is 1.

HOLD { sequence-number }
 { username }
Do not process this entry until an UNHOLD or CANCEL command is issued.

LIMIT @devicename [max]
Limit the number of pages (0 to 65535) or feet (0 to 65535) of output a user may submit for printing or tape punching to a device.

LOGGING [/[START][MAX=n]pathname/
 [/STOP]
Start or stop logging system console messages to the specified file. You may specify a maximum size for the file. With no arguments, EXEC tells you whether messages are being logged and, if so, to what file.

LPP @devicename number
Set maximum lines per page for this device (6-144)

MESSAGE message
Send the specified text message to the EXEC logging file.

OPEN queue-name
Make queue-name available for users to submit requests.

PAUSE @devicename
Suspend processing on device at end of current job.

PRIORITY [[SWAPPABLE] { n }
 [PREEMPTIBLE] { @devicename }
 [RESIDENT]
] priority

Set the system priority and process type (optional) for batch streams and cooperative processes. Priority is 1 to 3 for swappable processes, 1 to 255 for preemptible and resident processes.

PURGE queue-name
Delete all entries in a queue.

QPRIORITY @devicename [high-value low-value]
Limit device to process only those files with spool queue selections priorities between high priority and low priority (0-255). 0 is the highest priority. If you omit priority ranges, the system displays priority range for the device.

RESTART @devicename [begin page # [end page #]]
Restart output of the current file on the device. You may specify a particular beginning and ending page.

SILENCE @devicename
Stop announcing files that start processing on device, including batch job files.

EXEC Command Summary (cont.)

SPOOLSTATUS [*queuename*]
 @*devicename*
queuename - list names of all devices processing
 queuename.

@*devicename* - list names of all queues being
 processed by this device.

No arguments - list all spooled devices and queue(s)
 they process.

START *queuename* @*devicename* [*UPPER*]
Start processing user requests queued to *queuename* on
device. *UPPER* enables conversion of lowercase
letters to uppercase for printer devices.

STATUS @*devicename*
Display status of files being processed on device.
Information includes process ID for cooperative
process, request sequence number within spool queue,
username, and complete pathname to file.

STOP { *queuename*
 @*devicename*
 queuename @*devicename* }

Stop processing spooled files at end of current file:
from *queuename*, or on @*devicename*, or from
queuename on @*devicename* (orderly shutdown). Type
START to restart after a STOP command.

TRAILERS @*devicename* { 0
 1
 2 }

Insert *n* trailer pages following output for each file
processed on device. Default is 0.

UNHOLD { *sequence-number*
 username }

Cancel a previous operator HOLD command.

UNLIMIT @ *devicename*
Stop LIMIT function: give each file as many pages / feet
of output as required.

UNSILENCE @*devicename*
Resume announcing jobs processed on device (negates
SILENCE command).

VERBOSE @*devicename*
Announce files in VERBOSE mode; when device starts
processing a file, display ID of EXEC cooperative
process, request sequence number in spool queue, the
username, and the complete pathname to file.

XBIAS { *n*
 @*devicename* } *bias-factor*

Set the bias factor and turn biasing on or off for a batch
stream or device.

EXEC MOUNT/DISMOUNT Commands

DISMOUNTED [*mid*]
 @*devicename*
Tell EXEC that you physically dismounted one or more
tapes. *mid* identifies a particular entry in the mount
chain. With no argument, EXEC dismounts the current
outstanding (default) mount request.

MOUNTED[/*MID*=*n*] | @*devicename* | [*valid*]
Tell EXEC that the tape is physically mounted. /*MID*
designates a mount identifier; *valid* is a volume identifier
for implicit mount requests.

MOUNTSTATUS [*mid*]
Display status of each of the entries on the EXEC
mount chain, or the status of the identified (*mid*) entry.

PREMOUNT[/*IBM*] @*devicename* *valid* *username*
Tell EXEC you have mounted a volume before there
was a specific request. /*IBM* indicates the *valid* should
be converted from ASCII to EBCDIC before comparison
with the *valid* on the tape.

REFUSED [*mid*]
Type this when you cannot satisfy a MOUNT request.
You can use the CLI SEND command to explain refusal.
mid identifies the request you are refusing.

UNITSTATUS @*devicename*
Display the status of all the magnetic tape drives, or of
the specified unit.

Spooler Command Summary

Precede all Spooler commands with:

CONTROL @SPOOL

(If you omit an optional @*devicename* argument in a
Spooler command, the command applies to all spooled
devices.)

CONTINUE /@*devicename*
Continue processing on a paused device

DISABLE [@*devicename*]
Do not accept any more requests for device, but
process all spooled files remaining in queue. (Orderly
shutdown)

ENABLE @*devicename* [*switches*]
Start processing user output requests queued to device.
Switches:

/TEST - Text output mode (default mode).

/BINARY - Binary output mode.

/EITHER - Text or binary output mode.

NEXT @*devicename*
Stop processing current file; begin processing next file
in queue.

PAUSE [*switches*] /@*devicename*
Suspend processing on device at end of current job.
Switches:

/P - Halt device before top of next available page.

/F - Halt device before next file in spool queue.

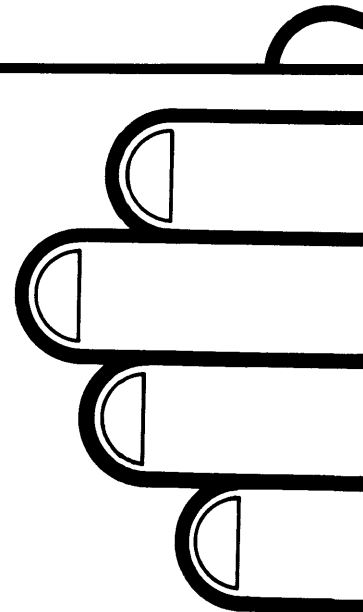
Default: Halt as soon as possible.

RESTART @*devicename*
Restart output of current file on device.

SHUTDOWN /@*devicename*
Shut down device immediately. Current output
processing is interrupted and lost. Queued filenames
are lost. Device cannot be renewed (automatically
restarted) on Spooler start-up. With no *devicename*
argument, command applies to Spooler and all spooled
devices.

TERMINATE
Terminate Spooler process immediately. Current output
can be renewed automatically on Spooler start-up.

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EXEC
Command Summary

Pocket Reference Card

HOW TO RECEIVE YOUR AOS, AOS/VS OPERATOR COURSE COMPLETION CERTIFICATE!

Please complete this questionnaire and return it to us after finishing the course. We will then send you an *Official Certificate of Course Completion!* Fill in the charts below to rate the course on the items listed. (Check one box for each item.)

Items	Excel- lent	Good	Fair	Poor
1. Organization and Style 2. Technical Content: Level of Detail 3. Ease of Listening to the Audio 4. Pace of the Audio 5. Quality of the Audio 6. Pace of the Student Guide 7. Usefulness of Quizzes 8. Effectiveness of Exercises 9. Effectiveness of Illustrations 10. Technical Reference Materials				

Items	Too Little Detail	Too Much Detail	Unclear	Other
11. If you said that technical content was fair or poor, what did you mean? 12. If you said the pace of the audio was fair or poor, what did you mean? 13. If you said the pace of the Student Guide was fair or poor, what did you mean?				

Items	Always	Almost Always	Rarely	Never
14. Was the information in the course interesting? 15. Was the manner of presenting the information interesting? 16. Did you understand what you were supposed to learn? 17. Were the materials directly related to the objectives? 18. Were there enough practice exercises? 19. Were the practice exercises appropriate? 20. Was there enough information explaining the answers to the practice exercises? 21. Did the module quizzes really measure your performance of the objectives? 22. Was the information in the audio consistent with the information in the Student Guide?				

23. Have you any comments on specific modules?

24. What did you like best about the course?

25. What did you like least about the course?

26. Would you use another self study on other Data General products?

____ Yes ____ No If No, why? _____


27. Suggestions for improvement: (Write your comments here and on the back of this page.)

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