CONTROL DATA

Magnetic Storage Concepts

Version W

LEARNING GUIDE

MAGNETIC STORAGE CONCEPTS

LEARNING GUIDE

Pub No. 76770173

1/84

CONTENTS

CONTENTS (cont.)

CONTENTS (cont.)

CONTENTS (cont.)

CONTENTS (cont.)

MAGNETIC STORAGE CONCEPTS

This unit introduces you to the concepts, terminology, and equipment used in magnetic recording. Starting with the basic principles of magnetism, you apply this knowledge to the recording techniques for both tape and disk. Magnetic tape recording is the first section introduced. Tape construction, recording methods, formats, and codes are covered as well as the equipment necessary to record these tapes. Error detection schemes and the movement of tape are also introduced.

The second section deals with the other secondary storage device--disk. The basic principles are covered, and the section introduces the disk cartridge, flexible disk (also known as a floppy disk), the drum, strip file, and mass storage devices.

While studying this unit, if you encounter integrated circuits whose operation you are not familiar with, consult the CYBER 18 Logic Circuits manual.

BLOCK 1: INTRODUCTION TO MAGNETIC RECORDING

This block introduces you to magnetic principles and basic recording techniques. You examine how magnetism works in recording and how magnetic heads and tapes are constructed. This will prepare you to explore recording methods and codes as well as the applications of magnetic tapes, heads, and related mechanisms in the remaining blocks of this unit. The magnetic recording principles presented in this block are applicable to all forms of magnetic recording.

BLOCK 1: INTRODUCTION TO MAGNETIC RECORDING

OBJECTIVE

- Identify basic magnetic principles as applied to magnetic recording.

___1-A PRINCIPLES AND APPLICATIONS OF MAGNETISM

This activity reinforces your knowledge of the principles of magnetism and how these principles are applied to magnetic surface recording.

Resource

Video	"Principles and Applications of Magnetism," pub. no. 76364693

___1-B INTRODUCTION TO MAGNETIC PRINCIPLES

This activity introduces the principles of magnetism and types of magnetics and applies this theory to recording on a magnetic surface.

Resource

Text/ Reading	"Introduction to Magnetic Principles," pages 1-1 through 1-7

___1-C MAGNETISM AND RECORDING

This activity continues with principles and theories of magnetic recording and discusses how magnetism enables the recording of data on certain types of surfaces.

Resource

Text/ Reference	Fundamentals of Digital Magnetic Tape Units, Sperry-Univac, chapter 2

___1-D MAGNETIC PRINCIPLES

This activity reinforces your knowledge of the principles of magnetism as applied to the recording technique.

Resource

CBE "Magnetic Principles"
(PLATO course disk ct-per4, pub. no. 76773090)

OBJECTIVE

- o Identify the basic elements of a magnetic recorder and the functions of these elements.

___1-E INTRODUCTION TO BASIC RECORDING

This activity introduces the five basic magnetic recorder elements (head, tape, transport, record amplifier, and reproduce amplifier) and explains the functions of each.

Resource

Text/ Reference Magnetic Recording, Lowman, chapter 3

OBJECTIVE

- o Identify the construction of a magnetic recording head and the principles of ferromagnetism.

___1-F MAGNETISM AND MAGNETIC HEADS

This activity introduces ferromagnetism and applies it to the recording head. It also covers the types and construction of magnetic recording heads.

Resource

Text/ Reference Magnetic Recording, Lowman, chapters 4 and 5

OBJECTIVE

- o Identify the construction and characteristics of magnetic recording tape.

___1-G TAPE CONSTRUCTION (TEXT)

This activity introduces the magnetic tape, its construction and characteristics, and the EOT and BOT markers.

Resource

Text/ Reading	"Tape Construction (Text)," pages 1-8 through 1-9

___1-H HEAD AND TAPE CONSTRUCTION

This activity continues with tape construction, introducing the processes of tape construction and the types and applications of recording tapes.

Resource

Text/ Reference	Magnetic Recording, Lowman, chapter 6

___1-I TAPE CONSTRUCTION (CBE)

This activity reinforces your knowledge of the construction and characteristics of magnetic recording tape.

Resource

CBE	"Tape Construction (CBE)" (PLATO course disk ct-per4, pub. no. 76773090)

OBJECTIVE

- o Identify the process used in recording and reproducing on magnetic tape.

___1-J READ/WRITE PROCESS

This activity introduces the process of recording on magnetic tape, the hysteresis loop, bias, and how losses affect the recording process.

Resource

Text/ Reference: Magnetic Recording, Lowman, chapter 7

___1-K MAGNETIC RECORDING TAPES/HEADS

This activity reinforces your knowledge of the characteristics of tape and heads used for magnetic recording.

Resource

Text/ Reference: Fundamentals of Digital Magnetic Tape Units, Sperry-Univac, chapter 3

BLOCK 2: RECORDING METHODS AND CODES

This block presents a number of basic recording methods and codes used in recording data. You examine the characteristics and definitions of NRZI recording, group coded recording, frequency modulation, and phase encoded modulation. You also analyze how to decode, translate, or encode messages using ASCII, EBCDIC, and BCD coding methods. These three codes are the most commonly used in the data processing industry for recording data.

BLOCK 2: RECORDING METHODS AND CODES

OBJECTIVE

- Identify the different magnetic recording methods used in data processing.

___2-A RECORDING METHODS (TEXT)

This activity introduces the four common recording methods (NRZI, PE, GCR, and FM) used in the data processing field.

Resource

Text/ Reading	"Recording Methods (Text)," page 2-1

___2-B NRZI RECORDING METHOD

This activity describes the NRZI recording method.

Resource

Text/ Reading	"NRZI Recording Method," pages 2-2 through 2-3

___2-C PHASE ENCODING METHOD

This activity describes the phase modulation recording method.

Resource

Text/ Reading	"Phase Encoding Method," pages 2-4 through 2-5

___2-D GROUP CODED RECORDING METHOD

This activity describes the GCR method.

Resource

Text/ Reading	"Group Coded Recording Method," pages 2-6 through 2-10

___2-E FREQUENCY MODULATION METHOD

This activity describes the frequency modulation recording method.

Resource

Text/ Reading	"Frequency Modulation Method," page 2-11

___2-F RECORDING TECHNIQUES

This activity reinforces your knowledge of the different recording methods and techniques.

Resource

Text/ Reference	Fundamentals of Digital Magnetic Tape Units, Sperry-Univac, chapter 5

___2-G RECORDING METHODS (CBE)

This activity reinforces your knowledge of the different recording methods and the recording signals obtained by each.

Resource

CBE	"Recording Method (CBE)" (PLATO course disk ct-per4, pub. no. 76773090)

OBJECTIVE

- o Identify the reason or need for coding data and various code characteristics.

___2-H CODING METHODS

This activity introduces coding methods and why these methods are necessary in the data processing field.

Resource

Text/ Reading "Coding Methods," page 2-12

___2-I BCD CODE

This activity introduces the BCD code and its characteristics and studies the code characters.

Resource

Text/ Reading "BCD Code," pages 2-13 through 2-16

___2-J ASCII CODE

This activity introduces the ASCII code and its characteristics and studies the code characters.

Resource

Text/ Reading "ASCII Code," pages 2-17 through 2-18

___2-K EBCDIC CODE

This activity introduces the EBCDIC code and its characteristics and studies the code characters.

Resource

Text/ Reading "EBCDIC Code," pages 2-19 through 2-20

___2-L CODING

This activity is an exercise to reinforce your understanding of the different codes and their representative characters.

Resource

CBE "Coding"
(PLATO course disk ct-per4, pub. no. 76773090)

BLOCK 3: TAPE FORMAT, ERROR DETECTION, AND TAPE HANDLING

This block provides you with an introduction to tape formats, error detection techniques, file protection, and the care and handling of magnetic tapes. You identify recorded information on both NRZI and phase encoded tapes and relate error detection methods to their recording methods. You examine tape handling techniques and determine good environmental conditions for magnetic tape. Finally, you identify the two reflective marker positions (the BOT and the EOT) on a reel of magnetic tape and place the marking strips correctly.

BLOCK 3: TAPE FORMAT, ERROR DETECTION, AND TAPE HANDLING

OBJECTIVE

- o Identify tape formats and formatting methods.

___3-A TAPE FORMAT INTRODUCTION

This activity introduces tape formats and the techniques for recording on magnetic tape.

Resource

CBE "Tape Format Introduction"
(PLATO course disk ct-per4, pub. no. 76773090)

___3-B NRZI RECORDING

This activity expands the format method known as NRZI and introduces its use to record data on tape.

Resource

CBE "NRZI Recording"
(PLATO course disk ct-per4, pub. no. 76773090)

___3-C PHASE ENCODED RECORDING

This activity introduces the phase encoding format used to record data on tape.

Resource

CBE "Phase Encoded Recording"
(PLATO course disk ct-per4, pub. no. 76773090)

___3-D TAPE FORMAT/MAGNA-SEE

This activity introduces MAGNA-SEE as a way to check pieces of magnetic tape visually and describes how to interpret the results produced.

Resource

Text/ Reading	"Tape Format/MAGNA-SEE," pages 3-1 through 3-6

___3-E READING TAPE FORMATS

This activity reinforces your knowledge on the ability to "read" tape formats.

Resource

CBE	"Reading Tape Formats" (PLATO course disk ct-per4, pub. no. 76773090)

OBJECTIVE

- Identify the different techniques used to detect errors on magnetic tape.

___3-F ERROR DETECTION TECHNIQUES

This activity introduces and explains the different methods of detecting errors recorded on magnetic tape, including parity, LRC, and CRC.

Resource

Text/ Reading	"Error Detection Techniques," pages 3-7 through 3-9

___3-G ERROR DETECTION

This activity checks your knowledge of the methods used to detect errors on tape.

Resource

CBE	"Error Detection" (PLATO course disk ct-per4, pub. no. 76773090)

OBJECTIVE

- o Identify the position and purpose of a write protect ring.

___3-H FILE PROTECTION

This activity introduces the write protect ring and explains the position and function of this device.

Resource

Text/ Reading	"File Protection," pages 3-10 through 3-11

OBJECTIVE

- o Identify proper and improper tape handling techniques.

___3-I TAPE HANDLING (TEXT)

This activity explains the proper methods for the care and handling of magnetic tape.

Resource

Text/ Reading	"Tape Handling (Text)," pages 3-12 through 3-13

___3-J TAPE HANDLING (CBE)

This activity is an exercise to reinforce your knowledge on the use, care, and handling of magnetic tape.

Resource

CBE	"Tape Handling (CBE)" (PLATO course disk ct-per4, pub. no. 76773090)

OBJECTIVE

- On a reel of magnetic tape, identify the position of the end of tape (EOT) and beginning of tape (BOT) strips, and correctly position the BOT strip.

___3-K TAPE MARKER LAB

This activity familiarizes you with the correct steps in identifying and positioning the reflective markers EOT and BOT.

Resource

Text/ Lab "Tape Marker Lab," pages 3-14 through 3-21

BLOCK 4: INTRODUCTION TO TAPE TRANSPORTS

This block explores tape transports and tape loading methods and devices. You determine whether a loading device is automatic or manual and the correct sequence of operations for loading the magnetic tape, using either type of loading device. You also examine the parts of a tape transport unit and their uses.

BLOCK 4: INTRODUCTION TO TAPE TRANSPORTS

OBJECTIVE

- Identify the components that make up a magnetic tape transport.

___4-A TRANSPORT ARCHITECTURE

This activity introduces the architecture and makeup of magnetic tape transports.

Resource

Text/ Reading	"Transport Architecture," page 4-1

___4-B INTRODUCTION TO TAPE TRANSPORTS

This activity introduces tape transports and their major sections.

Resource

Video	"Introduction to IBM 2401 Tape Drive," pub. no. 76364303

OBJECTIVE

- Identify the different methods for loading magnetic tape on transports.

___4-C TAPE LOADING METHODS

This activity introduces the automatic and manual methods of loading magnetic tape.

Resource

Text/ Reading	"Tape Loading Methods," page 4-2

OBJECTIVE

- o Identify the correct sequence of operations for loading tape on an automatic threading unit.

___4-D AUTOLOAD DEVICES

This activity describes how to load tape on an automatic threading unit.

Resource

Text/ Reading	"Autoload Devices," pages 4-3 through 4-4

OBJECTIVE

- o Identify the sequence of operations for loading magnetic tape on a manual loading type transport.

___4-E MANUAL LOADING (TEXT)

This activity introduces the manual load method and the steps necessary for loading tape correctly.

Resource

Text/ Reading	"Manual Loading (Text)," pages 4-5 through 4-7

___4-F MANUAL LOADING (CBE)

This activity reinforces your knowledge of the correct sequence for loading magnetic tape on a manual loading transport.

Resource

CBE	"Manual Loading (CBE)" (PLATO course disk ct-per4, pub. no. 76773090)

BLOCK 5: TAPE TRANSPORT MECHANICS

This block further explores tape transports, its mechanics, and its parts. You examine tape motion, tape brakes, pinch rollers, and vacuum capstans. You also explore tape buffering principles, pneumatic systems, and transport mechanism devices.

BLOCK 5: TAPE TRANSPORT MECHANICS

OBJECTIVE

- Identify major components of a tape drive to perform tape motion.

___5-A TAPE MOTION

This activity introduces tape motion and the components necessary to move tape.

Resource

Text/ Reading	"Tape Motion," pages 5-1 through 5-2

___5-B TAPE TRANSPORT ARCHITECTURE

This activity introduces the general architecture of tape transports and the major systems common to all transports.

Resource

CBE	"Tape Transport Architecture" (PLATO course disk ct-per4, pub. no. 76773090)

OBJECTIVE

- Identify the types and purposes of tape brakes.

___5-C TAPE BRAKES

This activity introduces the different types of braking assemblies and the purposes of each.

Resource

Text/ Reading	"Tape Brakes," pages 5-3 through 5-7

OBJECTIVE

- o Identify the purpose and location of pinch rollers.

___5-D PINCH ROLLERS

This activity introduces the purpose and location of pinch rollers used in tape transports.

Resource

Text/ Reading "Pinch Rollers," pages 5-8 through 5-11

OBJECTIVE

- o Identify the upper and lower limits of tape travel, and indicate where vacuum and pressure are gated into the buffer columns.

___5-E VACUUM CAPSTANS

This activity introduces the vacuum capstan and indicates the purpose and functions of this device.

Resource

Text/ Reading "Vacuum Capstans," pages 5-12 through 5-15

___5-F TAPE BUFFERING

This activity introduces the principles and purposes of tape buffering.

Resource

Text/ Reading "Tape Buffering," pages 5-16 through 5-18

OBJECTIVE

- o Identify the types, functions, and components of pneumatic systems.

___5-G PNEUMATIC SYSTEMS

This activity lists the purposes of pneumatic systems on a tape transport.

Resource

Text/ Reading	"Pneumatic Systems," pages 5-19 through 5-20

___5-H TAPE SERVO SYSTEMS

This activity introduces the principles used by various tape servo systems and identifies the components of these systems.

Resource

CBE	"Tape Servo Systems" (PLATO course disk ct-per4, pub. no. 76773090)

___5-I TAPE HANDLING MECHANISMS

This activity reinforces your knowledge of the purpose, function, and identification of tape handling mechanisms.

Resource

Text/ Reference	Fundamentals of Digital Magnetic Tape Units, Sperry-Univac, chapter 4

BLOCK 6: TAPE TRANSPORT MECHANICS CONTROL

This block continues your examination of tape transport mechanics. You look at the reel drive control, tachometer, vacuum sensors, loop box photocells, and their functions. You also observe the control process of a typical tape control mechanism.

BLOCK 6: TAPE TRANSPORT MECHANICS CONTROL

OBJECTIVE

- Identify the functions and components of the reel drive control.

___6-A REEL DRIVE CONTROL

This activity introduces the components necessary for controlling reel drive, such as tachometers, reel motors, and photocells.

Resource

Text/ Reading "Reel Drive Control," pages 6-1 through 6-6

___6-B TACHOMETERS

This activity introduces the tachometer, its function and typical locations.

Resource

Text/ Reading "Tachometers," pages 6-7 through 6-9

___6-C VACUUM SENSORS

This activity introduces vacuum sensors, their location and functions.

Resource

Text/ Reading "Vacuum Sensors," pages 6-10 through 6-14

___6-D PHOTOCELLS

This activity introduces the loop box photocells, their functions and locations.

Resource

Text/ Reading	"Photocells," pages 6-15 through 6-18

OBJECTIVE

- Identify the function of each of the electronic assemblies needed for transport control.

___6-E TRANSPORT ELECTRONICS

This activity introduces and describes all electronic assemblies necessary for controlling the tape transport operations.

Resource

CBE	"Transport Electronics" (PLATO course disk ct-per5, pub. no. 76773091)

BLOCK 7: TAPE SENSORS AND READ/WRITE HEADS

In this block, you examine the tape sensor, its operations, and how it works in connection with read/write/erase heads and circuits. You look at particle, disk, and dynamic reel brakes, their functions and operations. You also deal with maintenance problems: whom to contact for assistance and how to identify malfunctions and their probable causes.

BLOCK 7: TAPE SENSORS AND READ/WRITE HEADS

OBJECTIVE

- Identify the types and functions of reel brakes, EOT/BOT sensors, and read/write sensing heads.

___7-A REEL BRAKES

This activity introduces the different braking methods used in most tape transports today.

Resource

Text/ Reading — "Reel Brakes," pages 7-1 through 7-2

___7-B EOT/BOT SENSORS

This activity locates the placement and purpose of the EOT and the BOT sensors.

Resource

Text/ Reading — "EOT/BOT Sensors," pages 7-3 through 7-4

___7-C READ/WRITE/ERASE HEADS

This activity introduces the read, write, and erase heads, showing the location and functions of each device.

Resource

Text/ Reading — "Read/Write/Erase Heads," pages 7-5 through 7-7

___7-D READ/WRITE CIRCUITS

This activity introduces the different circuits used to read and write on magnetic tape and their functions.

Resource

Text/ Reference	Fundamentals of Digital Magnetic Tape Units, Sperry-Univac, chapter 6

___7-E TAPE SENSORS AND READ/WRITE HEADS

This activity shows the relationship and interaction necessary between the EOT/BOT sensors and the read/write heads.

Resource

CBE	"Tape Sensors and Read/Write Heads" (PLATO course disk ct-per5, pub. no. 76773091)

OBJECTIVE

- o Identify the necessary maintenance activities for keeping the tape transport operational.

___7-F MAINTENANCE CONCEPTS

This activity introduces the typical malfunctions that result from failure to perform proper maintenance on a tape transport.

Resource

Text/ Reading	"Maintenance Concepts," pages 7-8 through 7-12

BLOCK 8: INTRODUCTION TO DISK STORAGE DEVICES

This block of activities introduces the rotating magnetic storage devices, more commonly known as disk drives. You study terms common to all disk systems as well as performance parameters and how or what makes up different disk devices. This block also covers common assemblies and the generalized location of certain assemblies.

BLOCK 8: INTRODUCTION TO DISK STORAGE DEVICES

OBJECTIVE

- Identify the correct applications and relative advantages of disk systems.

___8-A MAGNETIC STORAGE EQUIPMENT

This activity views different magnetic storage devices, with particular attention to disk systems. Types, applications, and relative advantages of each are covered.

Resource

Video	"Magnetic Storage Equipment," pub. no. 76364931

OBJECTIVE

- Identify definitions of terms associated with disk systems.

___8-B INTRODUCTION TO DISK STORAGE

This activity defines common terms associated with rotating magnetic storage, such as cylinder, TPI, BPI, and the types of drives.

Resource

Text/ Reading	"Introduction to Disk Storage," pages 8-1 through 8-4

___8-C DISK DRIVE BASIC OPERATION

This activity describes some of the basic disk drive fundamentals currently in use.

Resource

CBE	"Disk Drive Basic Operation" (PLATO course disk ct-per5, pub. no. 76773091)

___8-D DISK STORAGE CLASSIFICATIONS

This activity introduces different specifications of disk drives and the combination of these specifications, which results in different classifications of drives.

Resource

Text/ Reading	"Disk Storage Classifications," pages 8-5 through 8-8

___8-E PIONEERING FOR PEAK PERFORMANCE

This activity shows how, what, and why certain disk drive parameters are needed or reached.

Resource

Video	"Pioneering for Peak Performance," pub. no. 76364737

___8-F COMMON PERFORMANCE PARAMETERS

This activity introduces some of the performance parameters common to all disk drives.

Resource

Text/ Reading	"Common Performance Parameters," pages 8-9 through 8-12

___8-G COMMON ASSEMBLIES

This activity introduces assemblies common to all disk drives.

Resource

Text/ Reading	"Common Assemblies," pages 8-13 through 8-15

OBJECTIVE

- o Identify the location of assemblies in a common disk drive.

___8-H COMPONENT LOCATION

This activity shows the general location of different components common to all disk drives.

Resource

Video	"Component Location," pub. no. 76364932

___8-I SPINDLE AND BRAKING ASSEMBLIES

This activity shows several common spindle and braking assemblies and their operation and function.

Resource

CBE	"Spindle and Braking Assemblies" (PLATO course disk ct-per5, pub. no. 76773091)

BLOCK 9: MAGNETIC RECORDING

This block of activities introduces the recording techniques associated with disk drives. The block begins with a description of the disk pack/platter and some of its characteristics and problems. After studying the technique for recording on the disk pack, you briefly review different encoding techniques and cover several new ones.

The disk drive is a random access device. Because of this, it must be possible to pinpoint the location of the data, in other words, to determine its address. Several activities show you how addressing works. A discussion of the head/arm assembly and its components completes your examination of what the data is written on and read from, how the read/write operation works, and how data is encoded, as well as some of the problems associated with disk drives.

BLOCK 9: MAGNETIC RECORDING

OBJECTIVE

- Identify characteristics of disk recording systems.

___9-A RECORDING FUNDAMENTALS

This activity introduces some of the magnetic disk recording characteristics and disadvantages.

Resource

Text/ Reading	"Recording Fundamentals," pages 9-1 through 9-10

___9-B RECORDING TECHNIQUES

This activity shows how digital data is recorded on magnetic disk drives.

Resource

CBE	"Recording Techniques" (PLATO course disk ct-per5, pub. no. 76773091)

___9-C DIGITAL ENCODING TECHNIQUES

This activity introduces the digital encoding techniques and their advantages and disadvantages.

Resource

Text/ Reading	"Digital Encoding Techniques," pages 9-11 through 9-31

___9-D SIGNAL PROCESSING

This activity introduces the read/write heads and their associated components.

Resource

Text/ Reading	"Signal Processing," pages 9-32 through 9-50

OBJECTIVE

- o Identify the characteristics and descriptions of addressing.

___9-E ADDRESSING

This activity continues the description of addressing on disk and how it is accomplished.

Resource

CBE	"Addressing" (PLATO course disk ct-per5, pub. no. 76773091)

___9-F ERROR CONTROL AND CORRECTION

This activity introduces data recovery and error correction techniques and their use.

Resource

Text/ Reading	"Error Control and Correction," pages 9-51 through 9-57

___9-G INTRODUCTION TO HEADS

This activity introduces the disk recording heads and shows the changes these heads have undergone over the past years.

Resource

Text/ Reading	"Introduction to Heads," pages 9-58 through 9-63

___9-H HEAD COMPONENTS

This activity describes the head components of disk systems (head, head pad, gimbal spring, and floating arm) and lists the functions of each.

Resource

Text/ Reading	"Head Components," pages 9-64 through 9-70

___9-I SUSPENSION SYSTEMS

This activity compares the suspension systems of the automobile and the disk and explains how they are similar.

Resource

Text/ Reading	"Suspension Systems," pages 9-71 through 9-75

___9-J LOAD/UNLOAD SYSTEMS

This activity describes the load/unload systems used in today's removable media disk drives.

Resource

Text/ Reading	"Load/Unload Systems," pages 9-76 through 9-80

BLOCK 10: MOVABLE HEADS

This block continues the study of the head assemblies. In order to perform a read or write on a removable media disk system, the heads must be loaded and unloaded. This block discusses the assemblies required to perform these actions and describes the method for monitoring the position of the head assembly on the disk pack. You examine how the heads are moved, how and why data is accessed, how the location of the heads is monitored, and the basic operation of both closed and open loop servos.

BLOCK 10: MOVABLE HEADS

OBJECTIVE

- o Identify the characteristics and descriptions of actuator assemblies.

___10-A ACTUATOR ASSEMBLIES

This activity shows you the basic characteristics of actuator assemblies and their functions.

Resource

CBE	"Actuator Assemblies" (PLATO course disk ct-per5, pub. no. 76773091)

___10-B ACTUATOR ASSEMBLIES AND CARRIAGE MOTION

This activity describes the operation of voice coil, stepper, hydraulic, and printed circuit actuator assemblies. It also discusses the basic techniques of linear and rotary carriage motion.

Resource

Text/ Reading	"Actuator Assemblies and Carriage Motion," pages 10-1 through 10-9

OBJECTIVE

- o Identify the basic assemblies required to do a seek operation.

___10-C BASIC SEEK MECHANICS

This activity introduces basic seek mechanics and the assemblies required to perform these operations.

Resource

CBE	"Basic Seek Mechanics" (PLATO course disk ct-per5, pub. no. 76773091)

___10-D VELOCITY TRANSDUCER

This activity presents the characteristics and functions of the velocity transducer.

Resource

Text/ Reading	"Velocity Transducer," pages 10-10 through 10-14

___10-E POSITION TRANSDUCER

This activity presents the characteristics and functions of the position transducer.

Resource

Text/ Reading	"Position Transducer," pages 10-15 through 10-22

___10-F CLOSED AND OPEN LOOP SERVO

This activity presents the closed and open loop servo systems and their functions in the disk drive.

Resource

Text/ Reading	"Closed and Open Loop Servo," pages 10-23 through 10-28

___10-G SECTOR AND INDEX ASSEMBLIES

This activity introduces the sector and index assemblies and their functions.

Resource

CBE	"Sector and Index Assemblies" (PLATO course disk ct-per5, pub. no. 76773091)

___10-H ACCESSING/SEEKING

This activity presents the accessing and seeking functions and their characteristics.

Resource

Text/ Reading	"Accessing/Seeking," pages 10-29 through 10-33

BLOCK 11: CONTROL LOGIC

As with any piece of computer equipment, there has to be some logical method of controlling or monitoring the data recording process. This block presents a basic block diagram and description of each segment of disk drive control. You analyze the different control points and how they act upon each other and the logical flow required for disk drives.

BLOCK 11: CONTROL LOGIC

OBJECTIVE

- Identify input data and control signals and their flow.

___11-A DATA AND CONTROL I/O--INPUT SIGNALS

This activity describes the input control signals and their flow through a disk drive.

Resource

Text/ Reading	"Data and Control I/O--Input Signals," pages 11-1 through 11-3

___11-B DATA AND CONTROL I/O--OUTPUT SIGNALS

This activity describes the output control signals and their flow through a disk drive.

Resource

Text/ Reading	"Data and Control I/O--Output Signals," pages 11-4 through 11-6

___11-C POWERING-UP SEQUENCE

This activity describes the logical flow for a powering up of a disk drive.

Resource

Text/ Reading	"Powering-Up Sequence," pages 11-7 through 11-10

___11-D FUNCTION DECODER

This activity presents the function decoder and identifies the bits controlling this device.

Resource

Text/Reading "Function Decoder," pages 11-11 through 11-12

OBJECTIVE

- Identify major areas for servo control and their functions.

___11-E SERVO CONTROL

This activity identifies the major areas and their functions in the servo control logic.

Resource

Text/Reading "Servo Control," pages 11-13 through 11-18

OBJECTIVE

- Identify logic flow for read/write operations.

___11-F READ/WRITE LOGIC

This activity describes the logic flow for basic read/write operations.

Resource

Text/Reading "Read/Write Logic," pages 11-19 through 11-23

OBJECTIVE

- o Identify common faults that may occur in a disk drive.

___11-G FAULT INDICATIONS

This activity identifies the faults or errors that may occur in a disk drive.

Resource

Text/ Reading	"Fault Indications," pages 11-24 through 11-26

BLOCK 12: OTHER MAGNETIC STORAGE DEVICES

This block of activities introduces you to the functions and characteristics of the other magnetic storage devices used in computer systems. The magnetic drum and data cell, though no longer manufactured, were the forerunners of today's mass storage devices, and a few of these may still be found on some sites. The engineering techniques used for these devices helped to produce today's standard disk drives for access times and capacity. This block also introduces the mass storage system, the "supertanker" of magnetic storage devices.

BLOCK 12: OTHER MAGNETIC STORAGE DEVICES

OBJECTIVE

- Identify the characteristics of a multiple disk drive.

___12-A AN INTRODUCTION TO THE MULTIPLE DISK DRIVE FAMILY

This activity shows you the multiple disk drive (MDD) and the characteristics associated with this drive.

Resource

Video	"An Introduction to the Multiple Disk Drive Family," pub. no. 76364306

OBJECTIVE

- Identify the characteristics of the mass storage device.

___12-B INTRODUCTION TO MASS STORAGE DEVICES

This activity introduces the mass storage system (MSS) and explains some of the characteristics of this system.

Resource

Text/ Reading	"Introduction to Mass Storage Devices," pages 12-1 through 12-13

OBJECTIVE

- Identify the descriptions of the operation of a mass storage device.

___12-C MASS STORAGE FUNCTIONAL DESCRIPTION

This activity shows you the functions of the MSS.

Resource

CBE	"Mass Storage Functional Description" (PLATO course disk ct-per5, pub. no. 76773091)

OBJECTIVE

- Identify descriptions of the drum storage device.

___12-D INTRODUCTION TO THE DRUM

This activity introduces the drum device and its characteristics.

Resource

Text/ Reading	"Introduction to the Drum," pages 12-14 through 12-17

___12-E DRUM FUNCTIONAL DESCRIPTIONS

This activity shows you some of the functional descriptions associated with the drum storage device.

Resource

CBE	"Drum Functional Descriptions" (PLATO course disk ct-per5, pub. no. 76773091)

OBJECTIVE

- o Identify characteristics and descriptions of the data cell.

___12-F INTRODUCTION TO THE DATA CELL

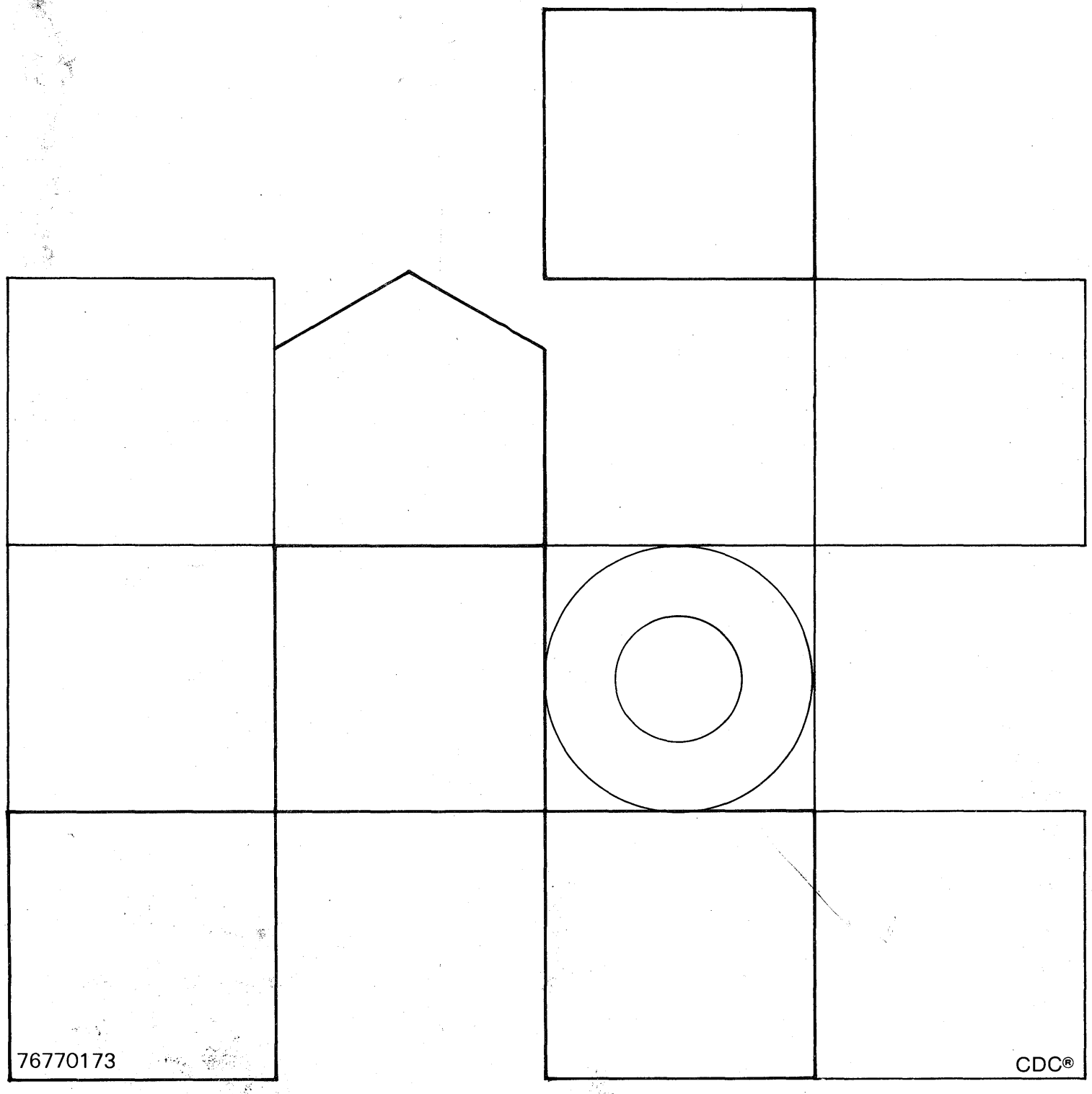
This activity introduces the data cell device (also called the strip file) and describes its function.

Resource

CBE	"Introduction to the Data Cell" (PLATO course disk ct-per5, pub. no. 76773091)

___12-G PROGRESS TEST

At this point you should check your understanding by taking this progress test.



76770173

CDC®