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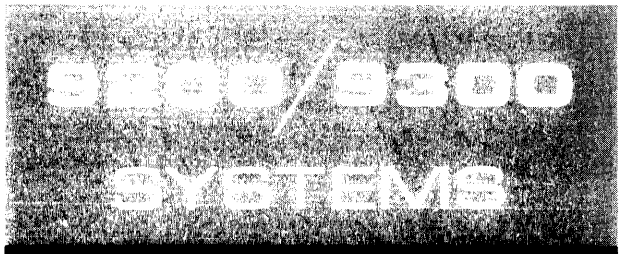

8410 DISC FILE

DIRECT ACCESS SUBSYSTEM

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CONTENTS

1. INTRODUCTION

This manual contains preliminary information to meet the immediate needs of the programmer and operator of the 8410 Disc File Direct Access Subsystem (DAS) for the UNIVAC 9200/9300 Systems.

Background information for the Central Processor Unit (CPU) is contained in "UNIVAC 9200/9300 Central Processor and Peripherals, Programmer Reference Manual," UP-7546 (current version).

This manual is divided into three basic sections.

- Subsystem Description
- Programming
- Operation

2. SUBSYSTEM DESCRIPTION

2.1. GENERAL

The Disc File Direct Access Subsystem (DAS) provides a UNIVAC 9200/9300 System with millisecond random or sequential access to large data files for online use. Each subsystem consists of a minimum configuration containing a Control Unit, a dual disc file master (two disc drives), and a nonaddressable core memory buffer.

To this minimum configuration may be added up to three dual disc file slaves (each with two disc drives) or up to three single disc file slaves (each with one disc drive and space for an additional disc drive). Any combination of dual and single disc file slaves may be added to the subsystem to a maximum of 8 disc drives for a Control Unit. Interchangeable magnetic disc cartridges with a storage capacity of 1.6 million bytes per surface are available for use with the disc drives.

The subsystem contains a Control Unit which performs the following:

- receives and interprets control command information in the for of a command byte from the Central Processor Unit (CPU);
- directs activity of the disc file unit selected by the address byte;
- accepts data from the addressed disc file unit and makes it available to the Central Processor Unit;
- requests data from the Central Processor Unit and controls writing of this data in the selected disc file unit;
- informs the Central Processor Unit of results by means of a status byte.

The disc file performs the following:

- receives control signals from the Control Unit;
- notifies the Control Unit of various conditions within the disc file unit when it is selected and during the course of an operation;
- accepts data to be written on the disc from the Control Unit via the buffer;
- sends data read from the disc to the Control Unit via the buffer.

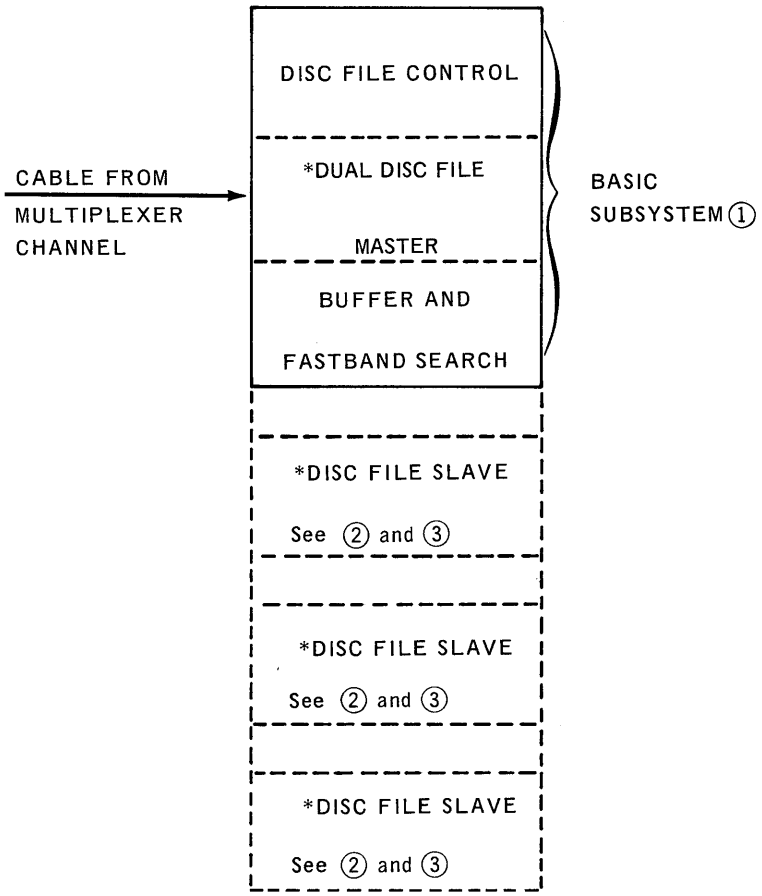
Table 2–1 is a summary of the UNIVAC 8410 Disc File Direct Access Subsystem Capabilities.

PARAMETER	SPECIFICATION
DISC DRIVES PER SUBSYSTEM	2–8
CABINETS PER SUBSYSTEM	1–4
DRIVE PER CABINET MASTER SLAVE	 2 1 or 2
POSITIONERS PER DRIVE	1
TRACKS PER DISC SURFACE PHYSICAL ADDRESSABLE	 201 (two physical tracks comprise one addressable track) 101 (Fastband track consists of one physical track)
TRACK DENSITY	100/inch
SECTORS PER TRACK	100 (51 on Fastband track)
SECTOR CAPACITY	160 8-bit bytes
RECORDING DENSITY	2580 bits/inch (per head)
NUMBER OF HEADS	3
DISC STORAGE CAPACITY	1,600,000 8-bit bytes per surface plus 8,160 on Fastband track
DATA TRANSFER RATE	85,000 bytes/second (maximum)
SECTOR PARITY (OVER INTERFACE LINES)	Odd vertical parity on command, address, status, sense, and data bytes
DISC SPEED	1200 RPM
DISC DIAMETER	14 inches

Table 2–1. UNIVAC 8410 Disc File Subsystem Capabilities

2.2. CONFIGURATIONS

The minimum configuration has a capacity for two disc cartridges (3.2 million bytes) and can be expanded by adding either single or dual disc file slaves which increase the subsystem capacity by 1.6 million bytes per additional handler (disc drive and disc cartridge). The maximum configured subsystem (basic subsystem and 6 disc drive slaves) provides an online capacity of 12.8 million bytes. A block diagram of the DAS is shown in Figure 2–1.



	COMPONENT NAME	TYPE OR FEATURE NUMBER (60 HZ)	TYPE OR FEATURE NUMBER (50 HZ)
①	BASIC SUBSYSTEM:		
	**CONTROL UNIT	F1023-00 or 01	F1023-00 or 01
	DUAL DISC FILE MASTER	8410-00	8410-01
	BUFFER AND FASTBAND SEARCH	F1015-00	F1015-01
②	DUAL DISC FILE SLAVE	8410-92	8410-93
③	SINGLE DISC FILE SLAVE	8410-02***	8410-03***

**The disc file cartridge required is feature number F1102-00.*

***F1023-00 is used for 9200/9300 systems not having a 1001 adapter.*

The Control Unit is mounted in the space the adapter would occupy in the main frame. F1023-01 is used for 9200/9300 systems having a 1001 adapter. Special mounting hardware is required to mount the control unit in the main frame.

****Second disc drive feature number F1016-00 (60 HZ), F1016-01 (50 HZ) can be added to 8410-02 or 03.*

Figure 2–1. UNIVAC 8410 Disc File Direct Access Subsystem Configurations

2.3. SUBSYSTEM COMPONENTS

The DAS utilizes from one to eight disc files and a Control Unit.

2.3.1. Disc File

The disc file storage medium is an aluminum disc plated with materials having magnetic properties. Each disc is permanently encased in a cartridge to protect its recording surfaces. The combined weight of both the disc and the cartridge is approximately 7.5 pounds.

The disc surface is segmented into 10,000 sectors, each with a capacity of 160 bytes. A track (two physical tracks) is addressable as a single track. Each addressable track contains 100 sectors. There are 100 addressable tracks on each disc surface. In addition there is an addressable fast-access track called a Fastband.

The 10,000 addressable sectors on the disc surface are individually identified by a unique four decimal digit number (derived from four bytes) ranging from 0000 to 9999. The first two digits of the number identify each of the 100 addressable tracks. The last two digits identify each sector within a given track. These addresses are recorded on the disc together with the data they identify. Distinction between multiple online discs (maximum of eight) is made by the addition of a digit (0 to 7) to the left of the four digit track and sector address. The complete address is a five decimal digit number (00000 to 79999) capable of uniquely identifying each of the possible 80,000 sectors in a maximum configured subsystem. The address will have the following format:

	U	T_M	T_L	S_M	S_L
Bit	01234567	01234567	01234567	01234567	01234567
	BYTE 1	BYTE 2	BYTE 3	BYTE 4	BYTE 5

Where:

U = Disc File unit address (from 0 to 7 in BCD).

T_M = Most significant digit of track address (from 0 to 9 in BCD).

T_L = Least significant digit of track address (from 0 to 9 in BCD).

S_M = Most significant digit of sector address (from 0 to 9 in BCD).

S_L = Least significant digit of sector address (from 0 to 9 in BCD).

Bit number 3 of the most significant digit of the track address (byte T_M) will specify whether the movable arm or fixed Fastband head is being address. A 0 in this bit position indicates a head on the movable arm, while a 1 indicates the fixed Fastband head.

The reading and writing of data are accomplished by two sets of magnetic read/write heads located in fixed positions on a movable access arm. The first read/write head is assigned to the outer portion of the disc which contains sectors 00–54 of each track. The second read/write head is assigned to the inner portion of the disc which contains sectors 55–99 of each track. The access arm moves radially across the disc with both sets of read/write heads moving in tandem. Access to tracks is made by stopping the access arm at one of 100 discrete positions. At each of these positions, one complete addressable track is accessible. The availability of the complete track results from the placement of the two read/write heads exactly 100 tracks apart. When the outer read/write head is positioned on sectors 00–54 of a track. the inner is automatically positioned on sectors 55–99 of the same track. The selection of the read/write head is determined by the sector specified in the five byte address.

Although an addressable track occupies two physical tracks, the organization of the disc may be assumed to provide 100 tracks of 100 sectors each. An artist's conception of the disc file layout is shown in Figure 2–2.

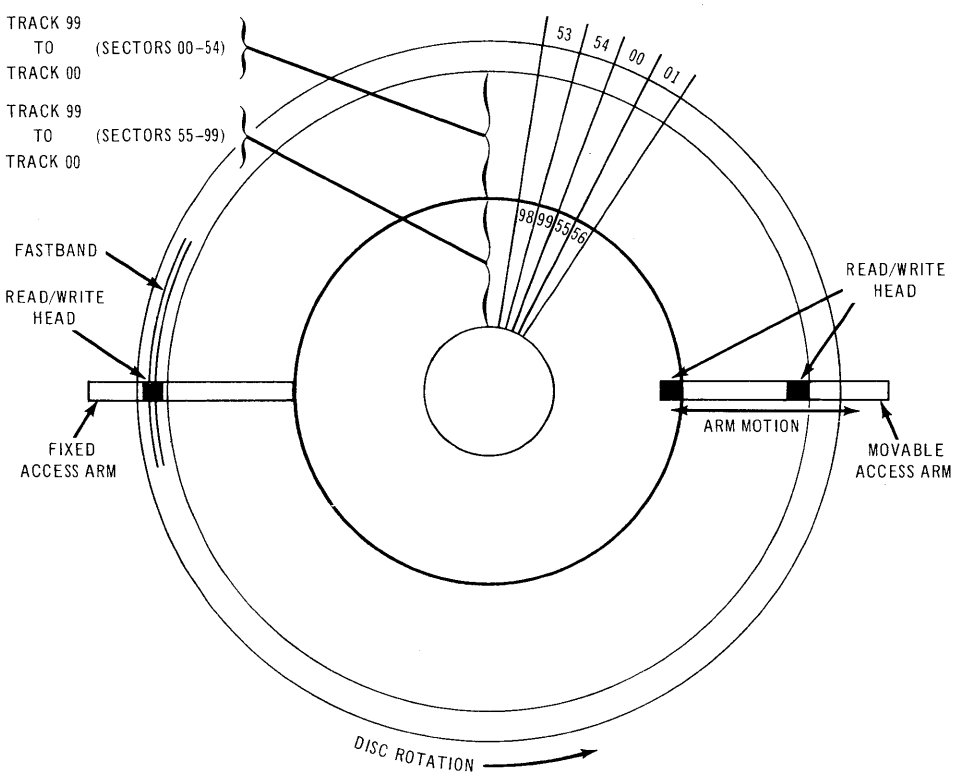


Figure 2–2. Disc Address Structure

The positioning of the read/write heads on an addressable track *permits the selection of one of the 100 sectors on that track.* The selection of a sector on an addressable track is made possible by the rotation of the disc which causes the sectors of the two physical tracks to pass *under a read/write head one at a time.*

The Fastband is accessed by a permanently assigned read/write head. The fast access capability of the Fastband results from the fixed nature of the read/write head. Access to the Fastband is performed with no head movement time involved. This track has 59 sectors, 8 of which are spares. Sectors are addressable 00 to 50. Sector 50 must be all zeros to avoid a find on sector 50 during a Magnitude Search command.

The first Disc File (Dual) in a system is a master unit containing circuitry to control the operation of all other units in the subsystem. Drives, although functionally independent, are housed in pairs with separate operator controls for each of the two drives in a cabinet.

2.3.2. Control Unit

The Control Unit is an integral part of the basic subsystem. The Control Unit is connected to the UNIVAC 9200/9300 CPU by the Multiplexer Channel. It can control up to eight disc drives.

The Control Unit provides a one byte data path to the disc file units, over which data may be transferred in either direction. Concurrent transfer in both directions between the channel and the Control Unit, or between disc file units and the Control Unit, is not possible.

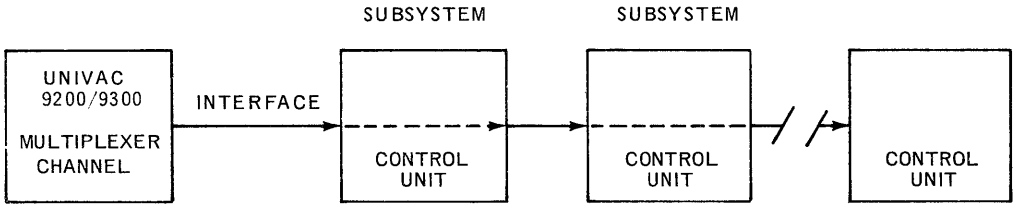
The generalized functions of a Control Unit have already been listed in section 2.1. In particular, a Control Unit performs the following:

- Assumes and relinquishes control of the interface lines between the CPU and the subsystem.
- Checks incoming data for odd vertical parity and generates the parity bit for all outgoing bytes to assure odd vertical parity.
- Initiates an operation at an addressed disc file unit.
- Assures correct data and address recording by a combination of parity, bit count, and phase error checking.

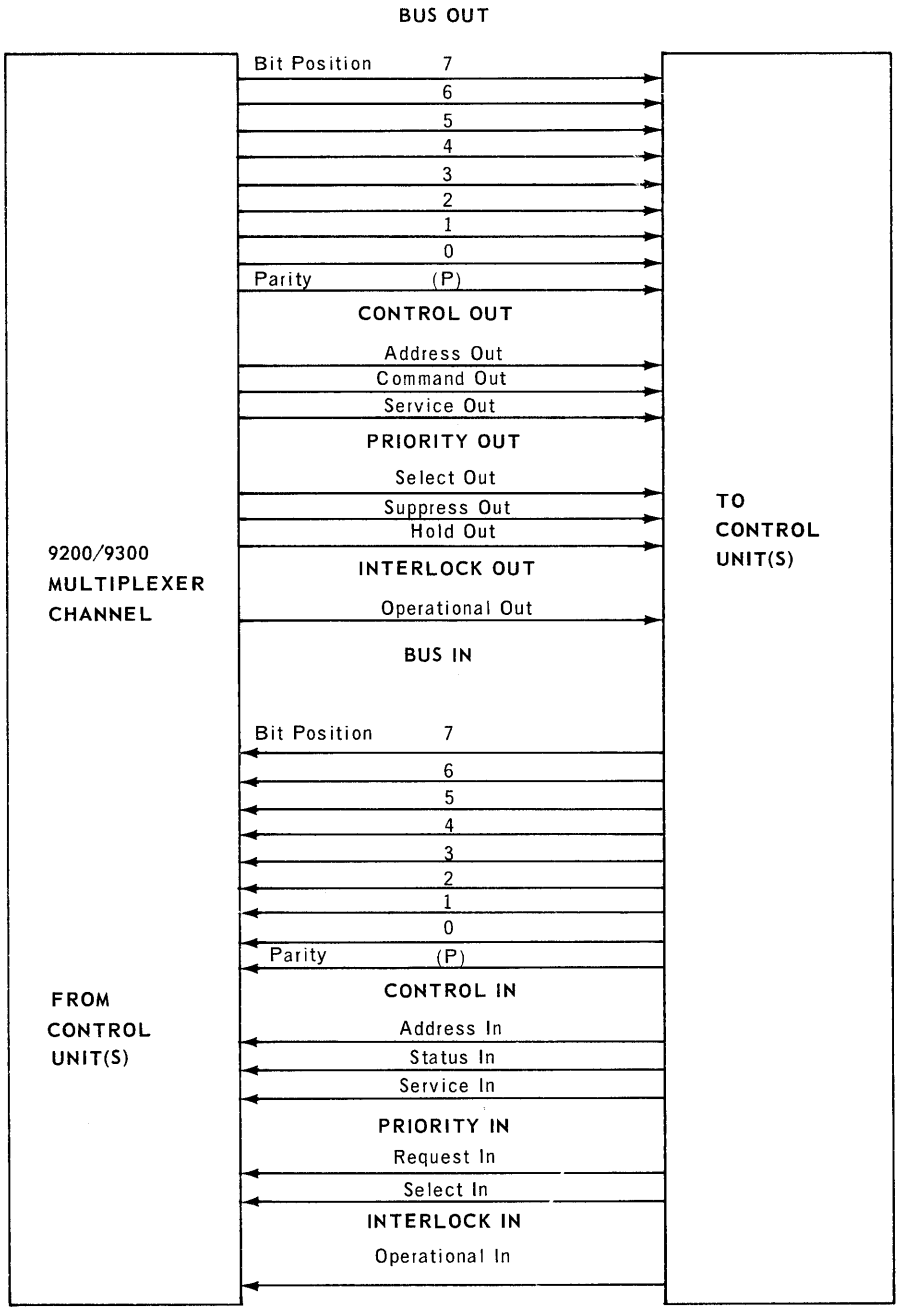
2.4. INTERFACE BETWEEN PROCESSOR AND SUBSYSTEM

The interface consists of four groups of control lines: I/O busses, priority, and interlock, as shown in Figure 2–3.

Time sharing of the interface is achieved by the priority line carrying the Select Out signal. This signal is initiated at the multiplexer channel either because a subsystem has initiated a request for service or because the processor initiated an I/O operation. The Select Out is first sent to the subsystem of highest priority. If that subsystem is not addressed or it does not require service, the Select Out is passed to the next subsystem, and so on. If none of the subsystem recognizes the address or does not require service, the Select Out is returned to the multiplexer channel as a Select In signal from the subsystem of lowest priority. When a subsystem is addressed or requires service, it will capture the interface and block further propagation of the Select Out. Normally the subsystem will retain control of the interface for a short interval (execution of immediate functions or transfer of a single byte) before it relinquishes control and propagates the Select Out signal to the next subsystem. In the next polling sequence, another byte is transferred. This process is repeated until the operation is completed and the channel notified of operation status. In the normal mode, a subsystem cannot capture the interface until it has been polled by the Select Out signal. No more than one Control Unit can have control of the interface at any one time.



NOTE: 1. A maximum of eight Control Units may be connected to the interface.
2. The normal system configuration allots one of these Control Units to the 8410 Direct Access Subsystem.



NOTE: Bit Position 7 contains least significant bit; bit position 0, most significant bit.

Figure 2–3. Interface to Multiplexer Channel

3. PROGRAMMING

3.1. GENERAL

This section is intended to familiarize the programmer with the following:

(1) formats of commands, status bytes, and sense data bytes,

(2) programming considerations, and

(3) timing factors of the subsystem.

3.2. COMMAND BYTES

The UNIVAC 8410 Disc File Direct Access Subsystem will recognize the command bytes listed in Table 3–1 as valid. The command byte is checked for vertical parity and validity before being accepted by the Control Unit. The descriptions of status bytes generated in response to specifications are described in 3.3.

The command byte is transferred to the subsystem with an Execute I/O or Test I/O instruction. The Buffer Control Word contains the address of the first data byte to be transferred from main storage to the Control Unit. The first five data bytes are the five-byte address of the disc file.

COMMAND BYTE	BIT POSITION							
	0	1	2	3	4	5	6	7 ①
TEST I/O	X②	X	0	0	0	0	0	0
SET INHIBIT STATUS	0	X	0	1	0	0	0	0
RESET INHIBIT STATUS	0	X	1	0	0	0	0	0
SET AND RESET INHIBIT STATUS	0	X	1	1	0	0	0	0
SENSE	0	X	X	X	0	1	0	0
WRITE	0	0	0	1	0	X	0	1
READ	0	1	1	0	X	X	0	1
WRITE AND CHECK	0	1	0	1	0	X	0	1
SEEK TRACK	0	0	0	0	X	X	0	1
MAGNITUDE SEARCH	0	1	1	1	X	X	0	1
SEARCH EQUAL	0	0	1	1	X	X	0	1
PREP WRITE NORMAL	0	1	0	1	1	X	0	1
PREP WRITE BAD SPOT	0	0	0	1	1	X	0	1
UNLOAD BUFFER	A③	X	X	1	X	X	1	0

NOTE:

① *Bit Position 7 = least significant bit position.*

② *X is ignored by the subsystem.*

③ *A is used as a detail bit in UNLOAD BUFFER, if A is a 1 this specifies a maintenance Unload Buffer and no data will be unloaded from the disc file buffer (see 3.2.1.4).*

Table 3–1. Function Bytes

3.2.1. Test I/O

This command tests the status of the unit specified by the address byte. If the addressed unit is busy, this command is aborted and the Busy condition status byte is returned. Otherwise, the status byte will contain:

- 0 bits to indicate that the addressed unit is ready for operation, or
- the stored status of the addressed unit from a previous operation.

When the stored status byte is accepted by the channel, the Status-In-Pending state is cleared. No new status byte is generated by the Test I/O function.

3.2.2. Set Inhibit Status

This command performs the same function as a Test I/O. In addition, it sets the Inhibit-Status-In condition at the Control Unit to inhibit it from presenting a status byte to the channel. This condition exists until cleared by a System Reset or Selective Reset sequence or by a Reset Inhibit Status command.

3.2.3. Reset Inhibit Status

This command performs the same function as a Test I/O. In addition it clears any Inhibit-Status-In condition at the Control Unit.

3.2.4. Set and Reset Inhibit Status

This combination command is the same as a Test I/O, but it does not affect the Inhibit-Status-In.

3.2.5. Sense

This command tests current status of the subsystem and then proceeds to transfer the Sense Data byte (see 3.4) to the channel. The sense is transferred to the CPU as input data at the nominal data transfer rate. The sense byte provides detail information concerning any unusual conditions detected in the last operation.

3.2.6. Write

The Write command initiates the transfer of data from main storage to the disc file buffer and then causes the data to be written on a specified sector.

The first five bytes of the transferred data contain the disc file unit, track, and sector address. This address is compared to the address in the buffer and if they do not agree, the read/write head is then positioned as specified by the address from the CPU. The data following the five-byte address is written on the disc sector until the channel terminates the transfer of data.

If more than six bytes (including the five address bytes) but less the capacity of the sector (160 bytes) are transferred, those locations in the sector not receiving data will contain binary zeros. If five or six bytes are transferred, those locations not receiving data will contain the data previously stored.

Normal termination of the Write operation is indicated by an end status byte which includes 1 bits in positions 4 and 5 (Channel End bit and Device End bit respectively).

3.2.7. Read

The Read command causes data to be read from a specified disc track and sector into the disc file buffer for subsequent transfer to main storage. The five-byte address is transferred from the processor into the disc file buffer. The disc file compares the address from the processor with the address read from the track under the movable access arm. If the addresses do not agree, the disc file positions the arm to the correct track. If agreement takes place, the data is read from the sector into the disc file buffer for transfer to main storage by use of an Unload Buffer command. Normal termination of the Read operation is indicated by an end status byte which includes 1 bits in positions 4 and 5 (Channel End bit and Device End bit).

3.2.8. Write and Check

This command is the same as the Write command described in 3.2.6. However, an additional disc revolution (50ms) occurs to permit validation of the data written. Data validation is provided by parity checking, check bytes, and phase error checking. As data is written, check bytes are developed and stored in each sector. Transfers from a sector are validated by recomputation and comparison of the check bytes.

The Write and Check command causes the data written to be read back on the next disc revolution. At this time, check bytes are recomputed and compared to the check bytes in the sector. In addition, each byte in the sector is compared to the byte received from main storage. If the bytes compared do not agree, bit 3 (Equipment Check) of the Sense Data byte will set.

3.2.9. Seek Track

This command will cause the read/write heads to be positioned at the track specified in the five-byte address from the channel. A Busy condition will be returned to the Control Unit until the correct position is located. This command is a preparatory command for a Search command. It can also be used prior to Read or Write commands.

3.2.10. Magnitude Search

The Magnitude Search command instructs the subsystem to read data bytes from a physical track starting at the sector specified in the five-byte address. The search will be made on sectors 00 to 54 if the addressed sector is within that range, or on sectors 55 to 99 if the addressed sector is in that range. When a data track is searched, the read/write heads must have been previously positioned by a Seek Track command. The data bytes read are compared with an identifier byte(s) (maximum of 160 contiguous bytes) from the channel.

This Magnitude Search is used to find a data record on a physical track. Both the Fastband and data tracks can be searched. When the Fastband is searched, the search is made on the first 50 sectors (00–49). Sector 50, the 51st sector, must contain all binary zeros. When the data area read from a sector is less in magnitude than the identifier byte(s) and is followed by a sector in which the data area read is equal to or greater in magnitude than the identifier byte(s), a search-find is made.

The address of that sector containing the equal to or greater than byte(s) is transferred to the disc file buffer. It remains in the buffer until an Unload Buffer command is executed.

When the identifier is less than 160 bytes, all bytes preceding and the first byte after it must be masked by sentinel characters. The sentinel character is an FF in hexadecimal (a byte of all 1 bits).

3.2.11. Search Equal

This command is performed like the Magnitude Search described in 3.2.10. This search is completed when a data area read from a sector is equal in magnitude to the identifier byte(s). Unlike the Magnitude Search, however, the data in the matching sector is read into the buffer along with the address.

3.2.12. Prep Write Normal (For Univac Maintenance Personnel Only)

This command is used to write sector addresses on a disc, one track at a time after a bad spot sector has been masked out.

3.2.13. Prep Write Bad Spot (For Univac Maintenance Personnel Only)

There are four bad spot sectors reserved on each track. This command causes all binary ones to be written in a sector address to make a bad sector nonaddressable.

3.2.14. Unload Buffer

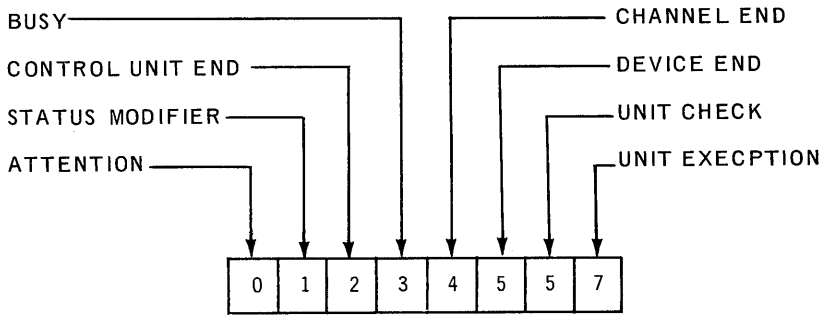
This command will transfer the contents of the disc file buffer to the multiplexer channel for use by the CPU. Both the address and data stored in the buffer are transferred.

If bit 0 of this function byte is a 1, no data will be unloaded from the disc file buffer and there will be no effect on the disc file. Data returned to the channel will be the data byte stored in the Control Unit data register as a result of the last Write command. The Control Unit will respond with status information the same as if the disc file were making the response. This data byte will continue to be sent until the channel signals a termination.

3.3. STATUS BYTE

The status byte provides information about the acceptance of a function, status of the subsystem, or unit, and performance of the function. The status byte is cleared when the status byte presented to the channel is accepted.

The bits of a status byte have the designations shown in Figure 3–1.



NOTE: Designations are effective only if position 6 has a 1-bit.

Figure 3–1. Status Byte Format

3.3.1. Attention

Not used. Bit is always 0.

3.3.2. Status Modifier

This bit is set with the Busy bit to indicate that the Control Unit is busy with a previously initiated function.

3.3.3. Control Unit End

Not used. Bit is always 0.

3.3.4. Busy

The Busy bit is set:

- with the Status Modifier bit to indicate the Control Unit is busy;

  or

- when the Control Unit has a stored status byte from a previous function for an addressed unit other than Test I/O and Set or Reset Inhibit Status.

3.3.5. Channel End

This bit is set when data transfers between the channel and the Control Unit are completed. This bit can only be set when the Device End bit is set.

3.3.6. Device End

This bit is set when any function other then Seek Track is completed. When set due to Seek Track, it indicates that read/write head motion control has begun.

3.3.7. Unit Check

This bit is set when any or all of Sense Data Byte bits 0, 1, 2, or 3 are set.

3.3.8. Unit Exception

Not used. Bit is always 0.

3.4. SENSE DATA BYTE

Sense Data byte is stored and sent in response to a Sense command (see 3.2.5). The data describes detailed information about unusual conditions detected in the last operation and current status of the specified disc file. Sense Data bits that are set as a result of error or fault conditions during an operation remain set until cleared by the issuance of a new command (except for Sense or Test I/O commands).

The bits of the Sense Data byte have the designations shown in Figure 3–2.

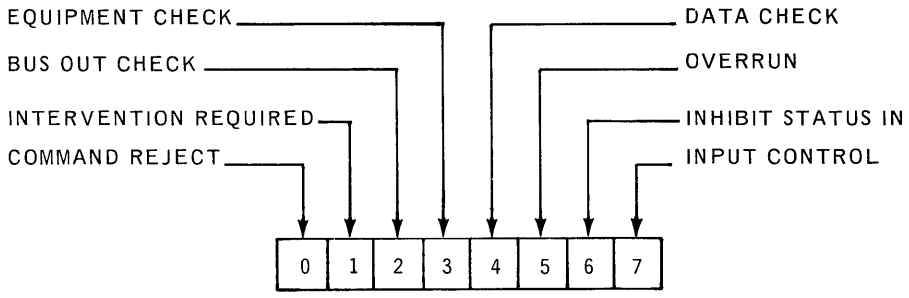


Figure 3–2. Sense Data Byte Format

3.4.1. Command Reject

This bit is set if an invalid command is received by the control unit (it will not be set if the command byte has bad parity, instead, the Bus Out Check bit, bit 2, will be set).

3.4.2. Intervention Required

This bit is set when a "find" is not made on a Search command if this bit and bit 3 (Equipment Check) are set. This means that more than one disc file unit has been selected as the same numbered 1 logical unit or disc file power has failed. A catastrophic failure is not program recoverable and requires operator intervention.

3.4.3. Bus Out Check

This bit is set when a command or data arrive on the Bus Out lines with even parity. If set during a Write operation, the operation is terminated and the faulty byte is not written. If the Bus Out Check bit is set, the Command Reject bit will not be set for an invalid command.

3.4.4. Equipment Check

The following errors cause this bit to be set. To determine which error or errors caused the bit to be set, it is necessary to execute an Unload Buffer command. The first five bits of the Unit Address byte (see 2.3.1) when set indicate which error has occurred as follows:

BIT	FAULT
0	Error on Write Check
1	Error on Bit Count, Operation Incomplete after three revolutions, or Error on Motion Control
2	Error on Parity
3	No Data Written or Invalid Track Address
4	Error on Phase

If the Equipment Check bit is set with the Intervention Required bit, it indicates a catastrophic failure in that more than one disc file unit has been selected as the same numbered logical unit or disc file power has failed. A catastrophic failure is not program recoverable and requires operator intervention.

3.4.5. Data Check

Not used. Bit is always 0.

3.4.6. Overrun

Not used. Bit is always 0.

3.4.7. Inhibit-Status-In

This bit is set when a Set Inhibit Status command (see 3.2.2) is sent to the control Unit.

3.4.8. Input Control

This bit is set to indicate that the Control Unit is in Prep Write mode.

3.5. PROGRAMMING CONSIDERATIONS

This section describes command overlap and the operating conventions which should be adhered to.

3.5.1. Commands Addressing Same Disc File

When addressing the same disc file, all commands except Seek Track can be accepted by the disc file while it is executing a previous Seek Track once motion control has started. The dropping of the disc file Busy status signals start of motion control to the Control Unit. This second command will load the disc file buffer with bytes from the Control Unit. The second command must wait until motion control is completed before being executed.

3.5.2. Commands Addressing Different Disc File

When addressing a different disc file, all commands except Seek Track or Sector Search can be accepted by the disc file while it is executing a previous Seek Track once motion control has started. The dropping of the disc file busy status signals start of motion control to the Control Unit. This second command, if not requiring motion control, will proceed concurrently with the previous Seek Track. If, however, the second command requires motion control, it will load the disc file buffer with bytes from the Control Unit. The command will not be executed until motion control from the previous Seek Track is completed.

3.5.3. Write Command Address Format

When addressing the subsystem, five address bytes should be transferred when executing a Write command. If less than five are transferred, no abnormal condition will be indicated, but the resulting address used by the disc file will be the bytes transferred overlaying the address bytes already stored in the disc file buffer from a previous command. The data last stored in the disc file buffer is written in the sector specified by the newly formed address. If the address is illegal, a parity error will occur and bit 2 of the Sense Data byte will be set.

3.5.4. Read Command Address Format

When addressing the subsystem, five address bytes should be transferred when executing a Read command. If less than five are transferred, no abnormal conditions will be indicated. The address formed will be as described in 3.5.3. and the data will be read from that address.

3.5.5. Seek Track Command Address Format

When executing a Seek Track command, five address bytes should be transferred to the disc file. If less than five bytes are transferred, no motion will occur and no abnormal indications will be generated.

3.5.6. Data Transfers

The number of data bytes transferred to the disc file should not exceed the capacity of the sector (160 bytes). If this capacity is exceeded, the extra characters will be stored in the buffer, but not written on the disc file. If the number of data bytes transferred should exceed 251, the address stored in the buffer memory will be overlayed with data. If the resulting address should be a legal one, no abnormal indications will result when the Write takes place. If the address resulting is not a legal address, a parity error will result when the Write is attempted.

3.6. TIMING

The basic timing factors of the subsystem are start/stop, access arm movement, and disc rotation time. Table 3–2 lists the read, write, and search times of the subsystem.

	MINIMUM	AVERAGE	MAXIMUM
READ TIME			
Arm Movement*	0 ms	110 ms	242 ms
Disc Rotation	0 ms	25 ms	50 ms
Total	0 ms	135 ms	292 ms
WRITE TIME			
Arm Movement*	0 ms	110 ms	242 ms
Disc Rotation**	0 ms	25 ms	50 ms
Total	0 ms	135 ms	292 ms
SEARCH TIME***	0 ms	25 ms	50 ms

*There is no arm movement delay if head is prepositioned.

**A write check function requires one additional rotation (50 ms) to read data.

***Sector search times are 50 ms longer if the record identification (key) does not start in the first data position of the sector.

Table 3–2. Subsystem Timing Considerations

4. OPERATION

4.1. OPERATOR RESPONSIBILITIES

The operator is responsible for turning on and turning off power to the subsystem, disc cartridge loading and unloading, and observing and responding to indications on the Control/Indicator panel.

4.2. CONTROLS AND INDICATORS

Each disc file unit includes a Control/Indicator panel available to the operator across the front top of the unit as illustrated for a dual master disc file in Figure 4–1. On each additional dual or single slave, all switches and indicators except Power ON and Power OFF are duplicated. Table 4–1 details their use.

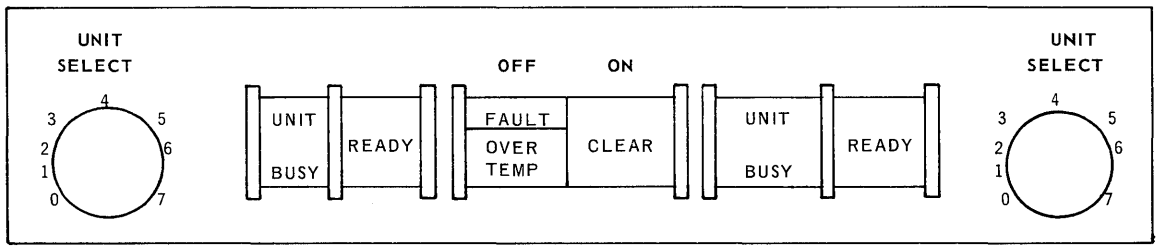


Figure 4–1. Dual Disc File Master, Control/Indicator Panel

CONTROL/INDICATOR	FUNCTION/INDICATION
Power ON and CLEAR pushbutton-indicator	When pressed applies operating power to subsystem. Lights when pressed to indicate AC and DC power is on. Also serves to clear error indicators when pressed after power is applied.
Power OFF and FAULT/OVER TEMP pushbutton-indicator	When pressed removes operating power from subsystem and extinguishes power ON indicator. Upper portion of indicator will light to indicate a fault in the subsystem. Lower portion lights to indicate an overtemperature condition in the subsystem. Both portions of this indicator are extinguished by pressing the CLEAR pushbutton-indicator after the fault has been corrected.
Load and READY pushbutton-indicator	When pressed will light to indicate that disc is properly loaded and rotating and that cabinet cover interlock is engaged.
Unload and UNIT BUSY pushbutton-indicator	When pressed will stop disc rotation. Lights when its associated disc file is under CPU control.
UNIT SELECT rotary switch	This switch is used to electrically connect a disc file to the CPU as logical unit 0, unit 1, ... etc., regardless of its physical location.

Table 4–1. DAS Controls and Indicators

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