



**PUBLICATIONS
REVISION**

General

**8405/8430/8433 Disk Drives
Operator Reference**

UP-8343 Rev. 1

This Library Memo announces the release and availability of "SPERRY® 8405/8430/8433 Disk Drives Operator Reference", UP-8343 Rev. 1.

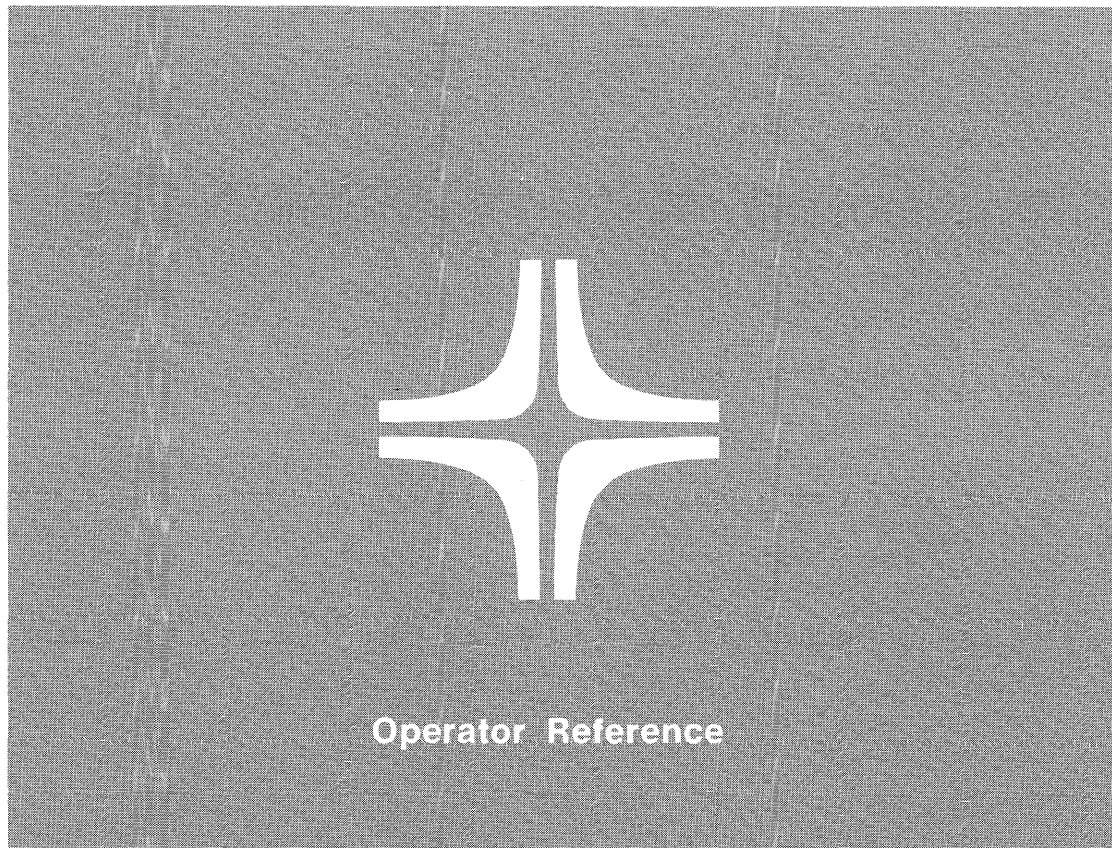
This manual provides instructions and procedures for operating the SPERRY 8405/8430/8433 Disk Drives.

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8405/8430/8433 Disk Drives



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1. Introduction

1.1. GENERAL

The SPERRY 8405/8430/8433 Disk Subsystem (Figure 1-1) provides real-time random access operation for a large capacity of data stored online in a system. The disk subsystem consists of a SPERRY 5039 Storage Control Unit (SCU) that interfaces with SPERRY systems and controls SPERRY 8405 Fixed Head Disk (FHD) Drives, SPERRY 8430 Disk Drives, SPERRY 8433 Disk Drives, or a combination of the three disk drives. The data is densely packed on the disk packs and is sensitive to handling. Correct handling procedures are outlined in this manual.

1.2. OPERATOR RESPONSIBILITIES

The operator is responsible for preparing the disk subsystem for operation and for performing the routines required for efficient operation.

To assume these responsibilities, the operator must know the location and function of all operator-oriented controls and indicators, and be able to perform the operating and maintenance procedures given in this manual.

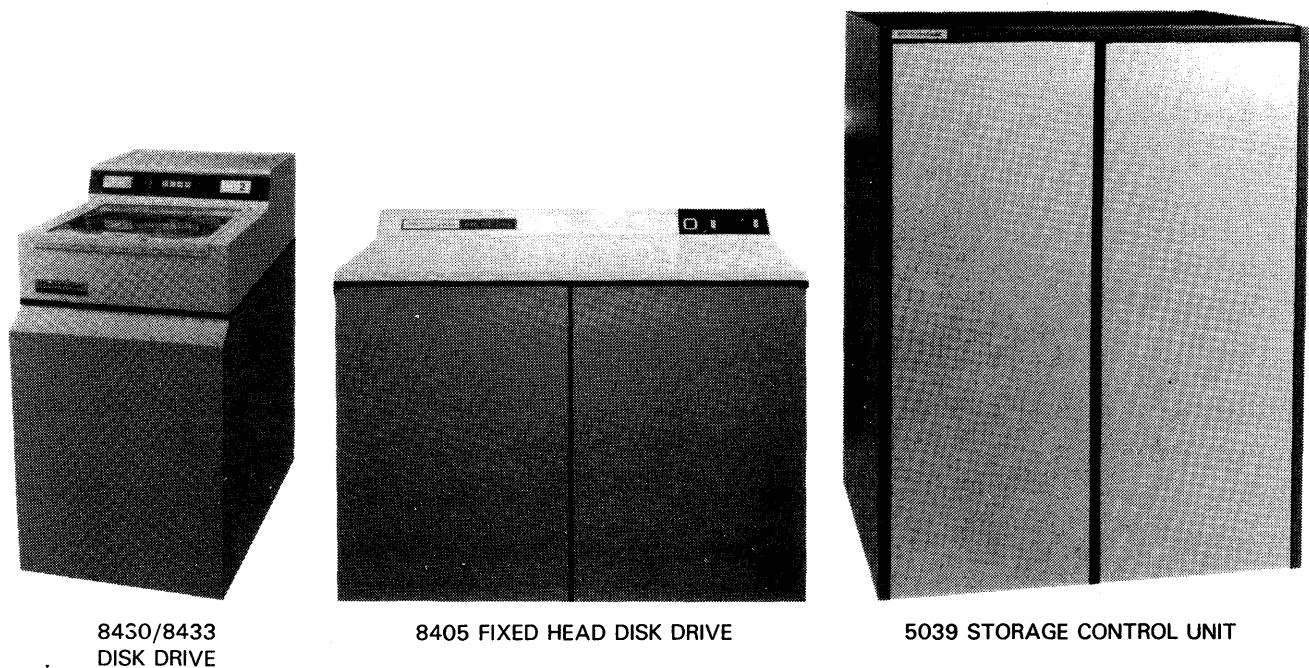


Figure 1-1. 8405/8430/8433 Disk Subsystem

2. Description

2.1. GENERAL

The basic 8405/8430/8433 disk subsystem (Figure 2-1) comprises an SCU and from one to eight 8405 FHDs, or an SCU and from two to eight 8430 disk drives or 8433 disk drives.

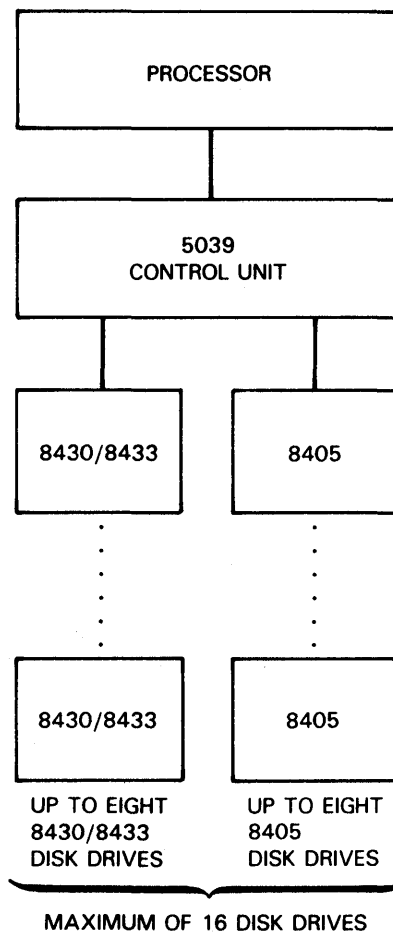


Figure 2-1. 8405/8430/8433 Disk Subsystem, Block Diagram

2.2. 5039 STORAGE CONTROL UNIT

The SCU provides the data, control interface, and byte compatibility between the disk drives and the Series 90 system I/O interface.

The channel interface consists of 68 lines for the Series 90 system and provides the means of attaching the input/output devices and the control unit to the system.

The interface establishes the requirements for signal transfers between control units and the servicing processor channel. Therefore, interface lines provide a common information format and signal sequence for all input/output devices. Only one control unit at a time is logically connected to a single channel interface and, after selection, it remains logically connected to the interface until the control unit transmits or receives the required information, or until the channel signals the control unit to disconnect.

2.3. 8405 FIXED HEAD DISK DRIVE

The 8405 FHD permits the retrieval of specific records without a sequential search through the record files. This retrieval permits direct access to active files and gives more efficient throughput for the processor. Random inquiries also can be made while records are being processed, or the records can be supplied sequentially for processing. Data transfers to and from the subsystem are made at a rate of 625,000 bytes per second. Two models of 8405 FHD are available. One has 6 disks in the disk stack and can store up to 64 million bits. The other has 3 disks in the disk stack and can store up to 32 million bits.

Fixed heads are used in the 8405 FHD. Each disk surface has eight read/write head pads, each pad containing eight read/write elements (or channels) plus one spare. This arrangement provides 64 read/write channels and 8 spares per disk surface. There is a read/write channel for each track in the disk stack (including spares). Disks turn at the rate of 3600 revolutions per minute (rpm). Because the heads are fixed and switched electronically, latency time is reduced to an average of 8.34 milliseconds.

2.4. 8430 DISK DRIVE

The 8430 disk is a high-speed, random access storage device containing a single removable disk pack. The upper portion of the disk drive cabinet contains the operator control and removable disk pack, as well as the accessing head assembly of the unit. The center and bottom portions of the cabinet include the read/write and control circuitry (essentially all located on printed-circuit boards installed in a card cage), the drive motor, the power control panel, and the power supplies.

Twenty heads are mounted on a single accessor mechanism: 19 for writing and reading data and 1 for reading servo information. The 20 heads move in unison between the periphery and the central area of each disk. Each data recording surface is assigned 1 of the 19 read/write heads. The accessing arm can assume any of the 411 positions on the 404 data tracks and the 7 spare tracks on each of the 19 data recording surfaces.

2.5. 8430 DISK PACK (F1230)

The disk pack installed by the operator on the drive is the storage medium for up to 100 million 8-bit bytes of variable-length data records. The disk packs are interchangeable between all 8430 disk storage units. Each disk pack weighs approximately 20 pounds and contains 10 disks (Figure 2-2). Nineteen of the 20 disk surfaces are used for data recording; one surface is used for reference information required in head positioning. A circular protective plate is mounted above the top disk and under the bottom disk.

CAUTION

*The 8430 disk pack is **not** interchangeable with the 8433 disk pack. Severe damage could occur to the disk drive and/or disk pack if this interchange is attempted.*

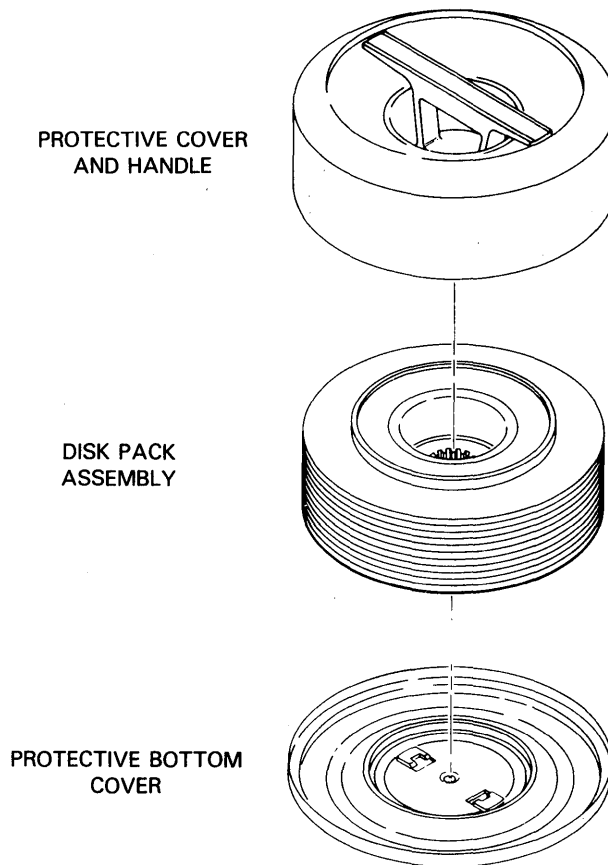


Figure 2-2. SPERRY Disk Pack (F1230 for 8430 Disk Drive, F1223 for 8433 Disk Drive)

2.6. 8433 DISK DRIVE

The 8433 disk is a high-speed, random access storage device containing a single disk pack. The upper portion of the disk drive cabinet contains the operator controls and removable disk pack, as well as the accessing head assembly of the unit. The center and bottom portions of the cabinet include the read/write and control circuitry (essentially all located on printed-circuit boards installed in a card cage), the drive motor, the power control panel, and the power supplies.

Twenty heads are mounted on a single accessor mechanism: 19 for writing and reading data and 1 for reading information. The 20 heads move in unison between the periphery and the central area of each disk. Each data recording surface is assigned 1 of the 19 read/write heads. The accessing arm can assume any of the 815 positions on the 808 data tracks and the 7 spare tracks on each of the 20 data recording surfaces.

2.7. 8433 DISK PACK (F1223)

The disk pack installed by the operator on the drive is the storage medium for up to 200 million 8-bit bytes of variable-length data records. The disk packs are interchangeable between all 8433 disk drives. Each disk pack weights approximately 20 pounds and contains 10 disks (Figure 2-1). Nineteen of the 20 disk surfaces are used for data recording; one surface is used for reference information required in head positioning. A circular protective plate is mounted above the top disk and under the bottom disk.

CAUTION

The 8433 disk pack is not interchangeable with the 8430 disk pack. Severe damage could occur to the disk drive and/or disk pack if this interchange is attempted.

3. Controls and Indicators

3.1. GENERAL

Operating controls and indicators of the 8405/8430/8433 disk subsystem are located on the operator control panels of the 5039 SCU and 8405, 8430, 8433 disk drives.

3.2. 5039 STORAGE CONTROL UNIT

The SCU is a single cabinet that houses the control portion of the subsystem. The control portion (Figure 3-1) contains a power control panel, operator control panel, and maintenance panel. The operator need be concerned with only the operator control panel. The other panels are for Sperry customer engineer use only.

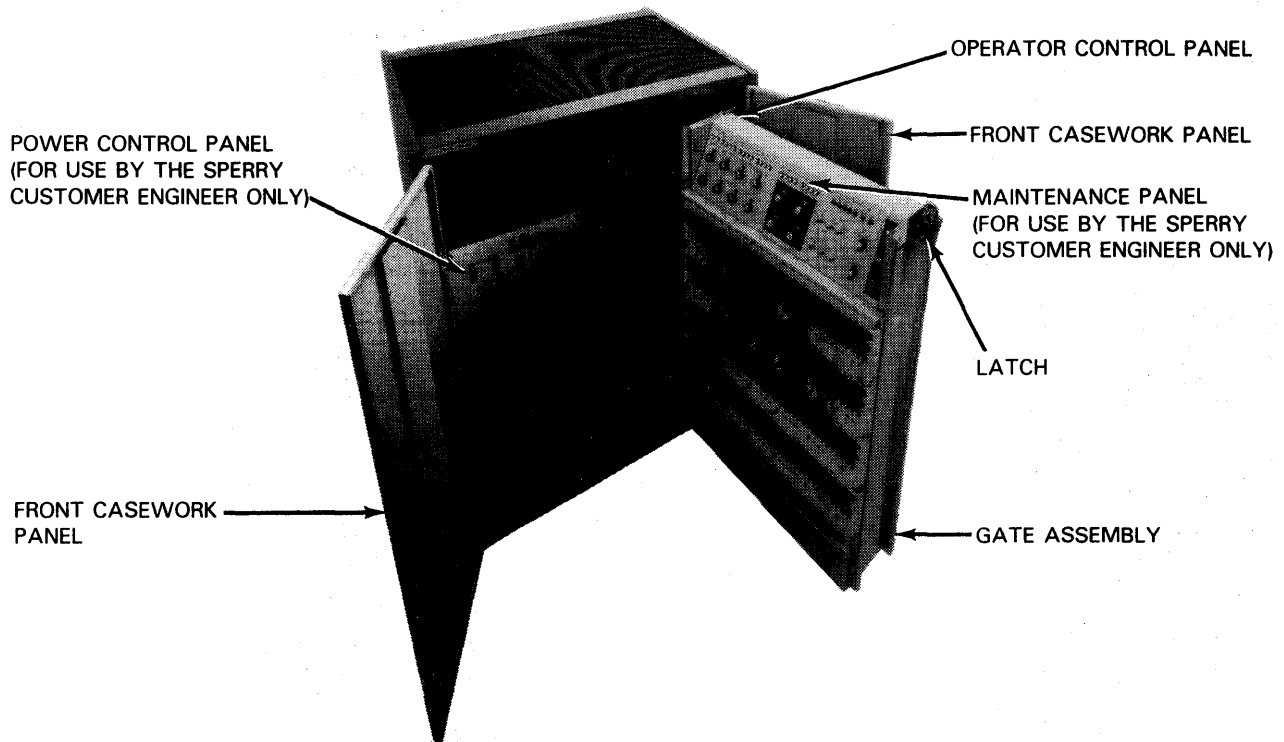


Figure 3-1. 5039 SCU Control and Maintenance Panels

3.2.1. Operator Control Panel

The operator control panel (Figure 3-2) is located on the top of the hinged gate assembly. The panel includes up to four backlighted pushbutton switches and an indicator.

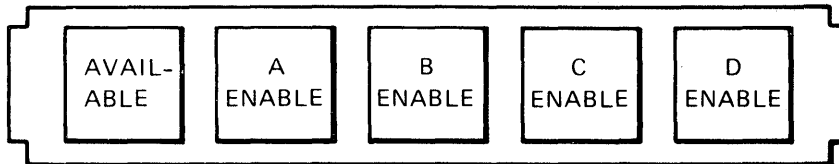


Figure 3-2. 5039 SCU Operator Control Panel (Control Portion)

Table 3-1 describes the functions of the controls and indicators.

Table 3-1. 5039 SCU Operator Control Panel, Controls and Indicators

Switch/Indicator	Function
AVAILABLE indicator	Indicates control unit power is on and at least one channel interface is enabled to one processor
A ENABLE switch/indicator	Provides the communication link between the SCU and one selector channel of the processor. Lights when communication line is available/open
B ENABLE switch/indicator	Provides the communication link between the SCU and a second selector channel of the processor. Lights when communication line is available/open
C ENABLE switch/indicator	Provides the communication link between the SCU and a third selector channel of the processor. Lights when communication line is available/open
D ENABLE switch/indicator	Provides the communication link between the SCU and a fourth selector channel of the processor. Lights when communication line is available/open

3.2.2. Accessing the Operator Control Panel

To access the SCU panels:

1. Pull the two front casework panels open.
2. Release the latch located at the top left of the gate assembly.
3. Swing the gate assembly away from the inside of the SCU.

3.3. 8405 FIXED HEAD DISK DRIVE (SINGLE DRIVE)

The 8405 FHD contains a power control panel and an operator panel; see Figure 3-3 for locations.

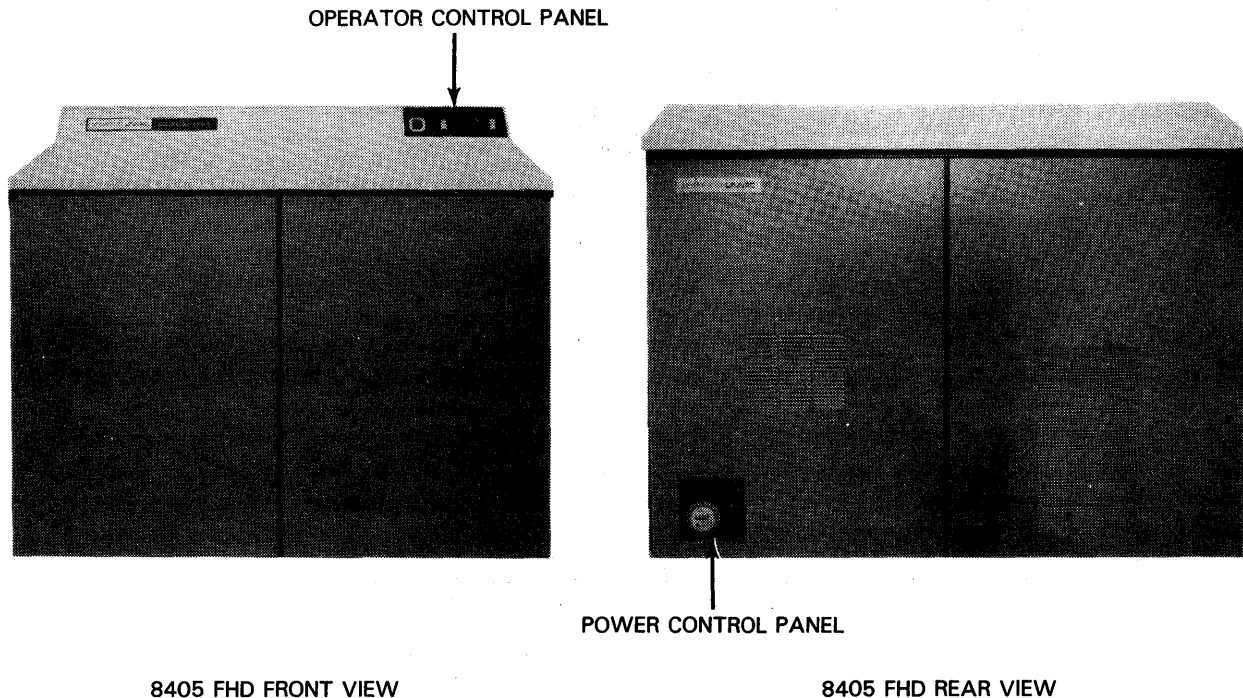


Figure 3-3. 8405 Fixed Head Disk, Control Panels

3.3.1. Power Control Panel

Main power for the disk drive is turned on at the disk drive power control panel (Figure 3-4) on the lower left at the rear of the drive. A circuit breaker (CB1) on the power control panel is set to the ON position to apply operating power to the drive, and an associated indicator adjacent to the circuit breaker illuminates to indicate that power is on.

In normal operation, the circuit breaker on the disk drive power control panel is left in the ON position, and operation is controlled from the operator control panel.

There is an elapsed time meter located on the power control panel. The meter indicates the total time that ac power has been applied to the disk drive. The meter is for the use of maintenance personnel.

Table 3-2 lists the power control switches and indicators with their functions.

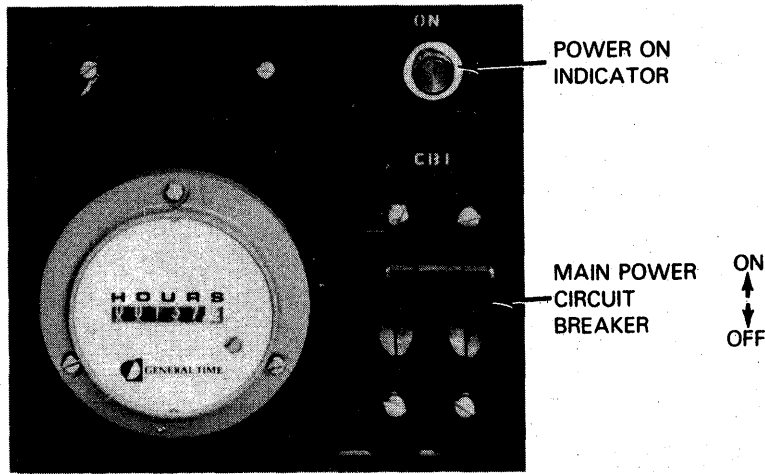


Figure 3-4. 8405 Fixed Head Disk, Power Control Panel

Table 3-2. 8405 Fixed Head Disk, Power Control Panel, Controls and Indicators

Switch/Indicator	Function
ON indicator	Lights when power is available within the disk drive
CB1 circuit breaker	Provides circuit protection for the main ac power to the disk drive
Elapsed time indicator	Indicates, in hours and tenths of an hour, the total time power has been applied to the disk drive

3.3.2. Operator Control Panel

The operator control panel (Figure 3-5) is located at the top right of the disk drive. Table 3-3 describes the function of each control and indicator on the operator control panel.

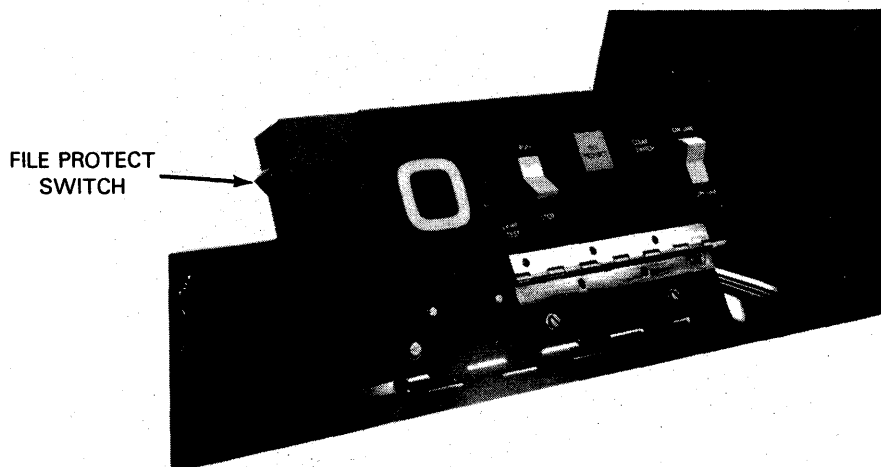


Figure 3-5. 8405 Fixed Head Disk, Operator Control Panel

Table 3-3. 8405 Fixed Head Disk, Operator Control Panel, Controls and Indicators

Switch/Indicator	Function
Device number indicator	Removable lens indicates logical number assigned to disk drive.
LAMP TEST pushbutton switch	When pressed, causes all indicator lamps to light for a lamp test
RUN/STOP rocker switch	Two-position rocker switch: <ul style="list-style-type: none"> ■ When set to RUN position, causes disk drive to start unit sequence operation. Disks are sequentially energized in a programmed sequence through a system of interlock to prevent overload of power distribution circuits. ■ When set to STOP position, causes read/write heads to be unloaded from disk, and disk drive motor to be deenergized (disk stop turning)
RUN indicator (green)	Illuminates after read/write heads are loaded into a flying position near disk surface. Indicates that disk drive is available for commands from control unit, and remains lit until RUN/STOP switch is placed in STOP position or unit power is turned off; visible only when lit
STOP indicator (red)	When lit, indicates RUN/STOP switch is placed in STOP position and circuit breaker on disk drive power control panel is set to ON position. Indicates that power is present in disk drive; visible only when lit
FILE PROTECT indicator (yellow)	Indicates that FILE PROTECT switch has been left in ON position to inhibit write operations on disk; visible only when lit
DEVICE CHECK indicator (red)	Indicates that an unsafe condition is detected in disk storage unit circuits. Safety circuits are reset by pressing CLEAR switch, and DEVICE CHECK indicator is extinguished. If indicator does not extinguish, maintenance is required. Visible only when lit
CLEAR pushbutton switch	Resets safety circuits when pressed and released. DEVICE CHECK indicator is extinguished.
TEMP CHECK indicator (red)	Illuminates when temperature in disk unit exceeds limit of normal operating range. Indicator warns of an overheat condition, which causes power in disk drive to go off. Indicator remains lit until disk drive has cooled or power is turned off. Visible only when lit
OFF-LINE indicator (white)	When lit, indicates ON-LINE/OFF-LINE switch is set to OFF-LINE position to prevent processor access to data in the disk drive. Visible only when lit
ON-LINE/OFF-LINE rocker switch	Two position rocker switch: <ul style="list-style-type: none"> ■ When set to ON-LINE position, permits data in disk drive to be accessed by processor for read/write operations ■ When set to OFF-LINE position, alerts control unit that disk drive is not available for normal use
FILE PROTECT rocker switch	Two-position rocker switch, located on left side of operator control panel; accessible only when top cover is open; for use only by Sperry customer engineer: <ul style="list-style-type: none"> ■ When set to ON position, inhibits write operations on disk drive ■ When set to OFF position, permits normal read/write operation

3.4. 8430/8433 DISK DRIVE (SINGLE DRIVE)

The 8430 and 8433 disk drives contain an operator control panel located on the top of the unit. (See Figure 3-6.) Table 3-4 describes the function of each of the controls and indicators.

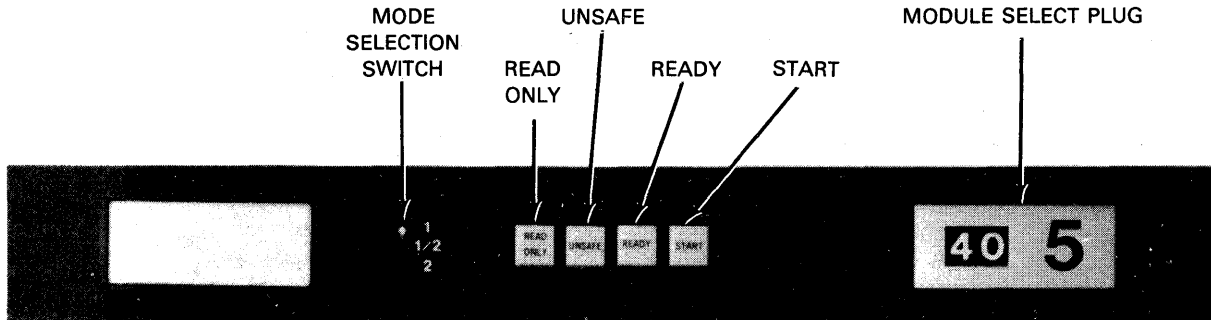


Figure 3-6. 8430/8433 Disk Drive, Operator Control Panel

Table 3-4. 8430/8433 Disk Drive, Operator Control Panel, Controls and Indicators

Switch/Indicator	Function
START switch/indicator	<p>Switch functions only when source power is available, enabling signals are supplied, a disk pack is installed, and the operator access cover is closed.</p> <p>In the backlit START position, the switch enables power to the spindle motor, initiating the brush cycle. At 70 percent of speed, the SEQUENCE ENABLE signal is provided for the next drive to start. At full speed, the heads are loaded.</p> <p>In the off (stop) position, the heads are unloaded, power is removed from the spindle motor, and the drive comes to a halt.</p>
READ ONLY switch/indicator	<p>In the backlit READ ONLY position, the switch prohibits execution of write commands.</p> <p>In the off (read/write) position, the switch permits execution of both read and write commands.</p>
Mode selection switch (used with dual access feature) ½ (center position) 1 (up position) 2 (down position)	<p>Accesses 1 and 2 of the disk drive are enabled, permitting dynamic operation from two control units.</p> <p>Access 1 is enabled and access 2 is disabled.</p> <p>Access 2 is enabled and access 1 is disabled.</p>
READY indicator	<p>When lit, indicates the power-on sequence is complete, the module select plug is installed, and the disk drive is ready to accept commands</p>
UNSAFE indicator	<p>When lit, indicates the drive safety circuits detected an unsafe condition. Blocks the disk drive from accepting commands or performing write operations (Certain unsafe conditions also cause the heads to retract from the disk pack.)</p>
Module select plug	<p>Provides a logical address for the disk drive within a subsystem. The module select plug is removable and can be interchanged with only a plug from the same type of disk drive. The 8430 and 8433 disk drive plugs <i>cannot</i> be interchanged.</p>

4. Operation

4.1. GENERAL

Operation of the 8405/8430/8433 disk subsystem includes turning power on and off, as required; placing individual drives (or the subsystem itself) online and offline; loading and unloading disk packs in the disk drives; address programming (bootstrap) and initial loading of the 5039 SCU; and observing and responding to any fault conditions that occur during operation.

4.2. POWER TURN ON

If the disk subsystem is in a completely turned-off condition (no power present in the SCU or the disk drives), it should be placed in the offline condition by the Sperry customer engineer. At times, however, the operator may be required to initiate operations from a completely shutdown condition. In the offline condition, power is present in all units.

4.2.1. 5039 Storage Control Unit

Power is normally applied to the SCU by the POWER ON/OFF switch on the system processor operator/maintenance panel. See Figure 3-1 for location.

4.2.2. 8405 Fixed Head Disk Drive

If the 8405 FHD is in a completely turned-off condition, it should be placed in the offline condition by the Sperry customer engineer. At times, however, the operator may be required to initiate operations from a completely shutdown condition. Refer to Figure 3-4 and Table 3-2 for locations and use of controls and indicators.

With all power to the 8405 FHD off, the recommended turn-on procedure is as follows:

1. Ensure that no maintenance is being performed on the drive and that all covers are closed.
2. At the power control panel, set circuit breaker to ON position; indicator will light to indicate that power is on.
3. Press the RUN switch, located on the operator control panel.

4.2.3. 8430/8433 Disk Drive

If the 8430 and 8433 disk drives are in a completely turned-off condition, a Sperry customer engineer will place the units in an offline mode. Power is supplied by the SCU from the power control panel, which is used only by authorized maintenance personnel.

4.3. POWER TURN OFF

Only partial turn off of the disk subsystem is required at the close of regular day-to-day operations. Complete power turn off – accomplished by the Sperry customer engineer – is necessary only when extensive maintenance is to be performed or when the subsystem is to be shut down for a prolonged period.

For partial power turn off, the ac power controls located on the power control and power distribution panels of the subsystem units remain on. Partial turn off results when the operator places the POWER ON/OFF switch on the processor console in the POWER OFF position.

Emergency power turn off is accomplished by placing the wall-mounted power safety switch to its off position. This shuts off all ac power to the disk subsystem.

4.3.1. 5039 Storage Control Unit

Complete power turn off should be accomplished by authorized maintenance personnel.

4.3.2. 8405 Fixed Head Disk Drive

Turn off of the 8405 FHD is performed by reversing the order of the power turn-on procedure. This procedure removes power from the 8405 FHD cabinet. If the 8405 FHD is turned off because of some abnormal condition, check the power indicator light on the power control panel. If the indicator light is out and the circuit breaker is in the ON position, set the circuit breaker to OFF and then to ON; if indicator light remains off, call Sperry customer engineer.

4.3.3. 8430/8433 Disk Drive

Turn off of the 8430 and 8433 disk drives is performed by a Sperry customer engineer.

4.4. DISK DRIVE OPERATION

The 8430 and 8433 disk drives utilize removable disk packs and are loaded and unloaded in the same manner as described in the following paragraphs. The disk packs for the 8430 disk drives are interchangeable with all other 8430 disk drives. The disk packs for the 8433 disk drives are interchangeable with all other 8433 disk drives. A disk pack for 8430 disk drives *cannot* be used on 8433 disk drives; likewise, a disk pack for 8433 disk drives *cannot* be used on 8430 disk drives.

4.4.1. Disk Pack Handling

Disk packs must be protected against improper handling and environmental abuse. The operator should use the instructions provided by the disk pack manufacturer as a reference source.

The disk pack, conditioned to room temperature before installation, is carried by the built-in handle on the top cover. A self-locking device in the handle permits removal of the disk pack top cover only when the pack is mounted on the drive. Other precautions are listed in subsequent paragraphs.

4.4.1.1. Loading Precautions

1. Do not drop the disk pack onto the disk drive spindle; the first threads of the spindle may be damaged.
2. Ensure that the protective cover is completely released from the disk pack before attempting removal; an upward pull applied to the driveshaft lock can damage the threads.
3. Avoid excessive loading torque; extra clockwise twisting to ensure that the disk pack is locked on the shaft is not necessary and can damage the spindle threads.

4.4.1.2. Loading the Disk Pack

Loading the disk pack in preparation for operation requires operator attention to both the operator controls and the disk pack.

1. Push and release the cover latch. The cover will spring open (Figure 4-1). Slide the cover straight back to fully expose the spindle area.

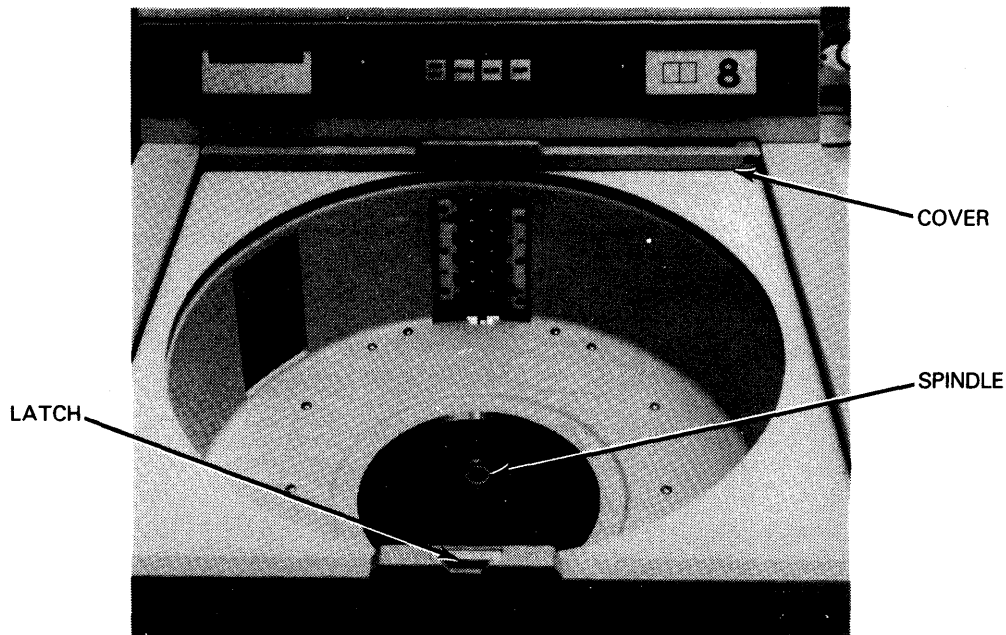


Figure 4-1. 8430/8433 Disk Drive with Access Cover Open

- Remove the disk pack bottom cover by squeezing the release mechanism (Figure 4-2).

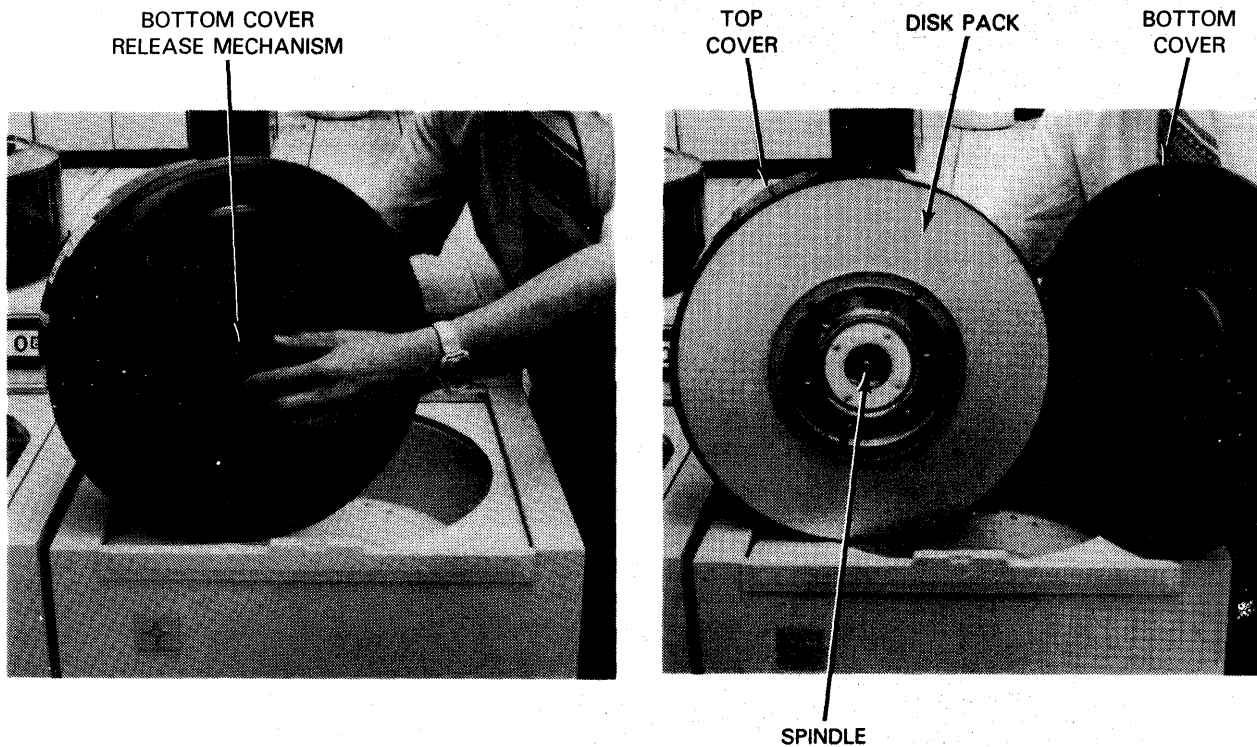


Figure 4-2. Removing the Disk Pack Bottom Cover

- Place the disk pack on the spindle.
- Turn the disk pack top-cover handle (Figure 4-3) in a clockwise direction until it comes to a full stop. Continue to turn the handle, even though the cover may disengage, to ensure that the full-stop point is reached and that the pack-on switch is closed.
- Remove the disk pack top cover.
- Close and latch the drive operator cover. Store the disk pack top and bottom covers in a designated area.

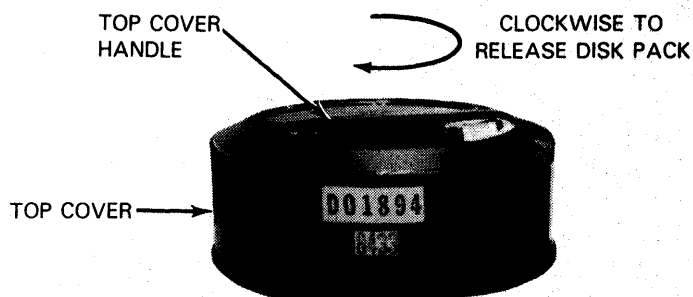


Figure 4-3. Releasing the Disk Pack from the Top Cover

- Press the START switch to its latched-down (backlighted) position.

4.4.2. Unloading the Disk Drive

4.4.2.1. Unloading Precautions

1. To prevent damage to the threads, do not attempt to lift the disk pack from the spindle threads until the pack is completely disengaged.
2. A clicking sound can be heard when the spindle releases the disk pack (after the pack is turned counterclockwise for removal); do not permit more than one or two clicks before removing the pack or damage to the threads can result.
3. Store the disk pack in the same environment as the disk drive.

4.4.2.2. Removing or Replacing a Disk Pack

To remove or replace a disk pack:

1. Press the START switch to its unlatched position. Note that the indicator is extinguished.

NOTE:

A solenoid-operated latch locks the operator cover closed until pack rotation stops.

2. Once pack rotation stops, release the operator cover latch and push the cover straight back to fully expose the spindle area.
3. Position the disk pack cover over the pack.
4. Turn the cover counterclockwise for two full turns so that the cover becomes securely fastened to the disk pack, thus forming an integral unit.
5. Remove the disk pack by its top handle.
6. Immediately attach the bottom cover to create a positive dust seal and store in a designated area.
7. Close and latch the operator cover.

4.5. ONLINE/OFFLINE OPERATION

4.5.1. 5039 Storage Control Unit Placed Online

To place a disk subsystem online:

1. At the processor console, provide the operating system with the addresses of the SCUs and each disk drive to be placed online.
2. Press the ENABLE switch for each channel to be used to its latched-down (backlighted) position. Note that the AVAILABLE indicator lights.

4.5.2. 5039 Storage Control Unit Placed Offline

To place an online disk subsystem offline:

1. At the processor console, provide the operating system with the addresses of the SCUs and disk drives to be placed offline.
2. At the control portion of the SCU, press the ENABLE switch for each channel interface to its unlatched position. Note that the ENABLE and AVAILABLE indicators are extinguished.
3. At each disk drive, place the unit offline.

4.5.3. 8405 Fixed Head Disk Drive Placed Online

With the disk subsystem online, a single 8405 FHD is placed online as follows:

1. Press RUN/STOP rocker switch, located on disk drive operator control panel, to RUN position. Note that the RUN indicator lights.
2. Press ON-LINE/OFF-LINE rocker switch, located on disk drive operator control panel, to ON-LINE position.

CAUTION

The disk drive must operate with all cabinet doors and top covers closed to maintain a clean-air atmosphere in the cabinet. It is recommended that all covers be closed with blowers operating for at least 20 minutes prior to placing the disk drive online.

4.5.4. 8405 Fixed Head Disk Drive Placed Offline

To place an online 8405 FHD offline:

1. At the processor console, provide the operating system with the address of the drive to be placed offline.
2. Press ON-LINE/OFF-LINE rocker switch, located on the disk drive operator control panel to the OFF-LINE position. Note that OFF-LINE indicator lights.
3. Press RUN/STOP rocker switch to STOP position. Note that the STOP indicator is lit.

4.5.5. 8430/8433 Disk Drive Placed Online

With the disk subsystem online, a single 8430 or 8433 disk drive is placed online as follows:

1. At the disk drive, remove the module select plug.
2. Install the correct disk pack (4.4.1.2), if necessary; then close and latch the sliding operator cover. Press the START switch to its latched-down (backlighted) position.

3. At the processor console, provide the operating system with the address of the drive as notice that the unit will be placed online.
4. At the disk drive, reinstall the module select plug. Note that the READY indicator lights.

4.5.6. 8430/8433 Disk Drives Placed Offline

To place an online 8430 or 8433 disk offline:

1. At the processor console, provide the operating system with the address of the drive to be placed offline.
2. At the disk drive, press the START switch to its unlatched position. Note that the START and READY indicators go out.

4.6. RECOVERY PROCEDURES

Operator response to an indicated fault is limited to observing the indications and, in most cases, making one or more efforts to restart the halted operation.

4.6.1. 8405 Fixed Head Disk Drive Recovery Procedures

Table 4-1 lists the fault indications an operator can observe, as well as the causes and recommended operator actions. The table does not call out faults resulting solely from defective indicator bulbs and/or lamp drivers. If the indicator does not light, but the proper function occurs, notify the Sperry customer engineer of the condition so it can be corrected at a convenient time.

Table 4-1. 8405 Fixed Head Disk Drive Recovery Procedures (Part 1 of 2)

Indication	Probable Cause	Operator Actions
RUN indicator does not light (after 2-minute delay) when RUN/STOP switch is set to RUN position. (Lamp test indicates bulb is good.)	An unsafe condition exists in the power-up sequencing of the subsystem.	Notify Sperry customer engineer.
STOP indicator does not light before placing drive in RUN mode. (Lamp test indicates bulb is good.)	Main circuit breaker on disk drive power control panel is not set to ON position; or circuit breaker has tripped.	If blower motors on disk drive are not operating, set main circuit breaker to ON position. Check wall circuit breakers supplying power to subsystem in this installation, and set to ON position, if necessary. If main circuit breaker on disk drive has tripped, contact Sperry customer engineer.
FILE PROTECT indicator lit	FILE PROTECT switch beneath top cover has been left to ON position.	Inform Sperry customer engineer of lit FILE PROTECT indicator and check whether maintenance is being performed on disk drive.

Table 4-1. 8405 Fixed Head Disk Drive Recovery Procedures (Part 2 of 2)

Indication	Probable Cause	Operator Actions
DEVICE CHECK indicator lit	An unsafe condition has been detected in the subsystem.	Press CLEAR switch and note that DEVICE CHECK indicator extinguishes. If it does not extinguish, contact Sperry customer engineer.
TEMP CHECK indicator lit	Temperature within the drive is approaching an overheat condition.	<ol style="list-style-type: none"> 1. Set STOP/RUN switch to STOP position. 2. After approximately 15 minutes, press CLEAR switch. 3. If TEMP CHECK indicator remains lit, or becomes lit after a short period, contact Sperry customer engineer.

4.6.2. 8430/8433 Disk Drive Recovery Procedures

Table 4-2 lists the fault indications an operator can observe, as well as the causes and recommended operator actions. The table does not call out faults resulting solely from defective indicator bulbs and/or lamp drivers. If the indicator does not light, but the proper function occurs, notify the Sperry customer engineer of the condition so it can be corrected at a convenient time.

Table 4-2. 8430/8433 Disk Drive Recovery Procedures

Indication	Probable Cause	Operator Action
Control unit AVAILABLE indicator off (and no communication with processor)	Control unit-channel interface disabled.	<ol style="list-style-type: none"> 1. Attempt to enable interface with Enable switch (SCU). 2. Notify Sperry customer engineer.
READY indicator off	Disk drive is turned off, system power is down, seek incomplete occurred, or module select plug is removed.	<ol style="list-style-type: none"> 1. Check module select plug for proper installation. 2. Restart drive with START switch. 3. Notify Sperry customer engineer.
UNSAFE indicator on	One of several possible unsafe conditions in drive.	<ol style="list-style-type: none"> 1. Restart drive with START switch. UNSAFE indicator extinguishes and stays unlit if problem is corrected. 2. Notify Sperry customer engineer.

4.7. OPERATOR-PERFORMED MAINTENANCE

Preventive maintenance is performed by Sperry customer engineers on a scheduled basis for the 8405/8430/8433 disk subsystem. Therefore, involvement of operating personnel in maintenance is limited as specified in the following procedures.

4.7.1. 5039 Storage Control Unit

Preventive maintenance is performed by Sperry customer engineers on a scheduled basis for the SCU.

External cleaning may be performed at the discretion of the local Sperry maintenance organization.

4.7.2. 8405 Fixed Head Disk Drive

Sperry customer engineers perform preventive maintenance on a scheduled basis for the 8405 FHD. Therefore, operating personnel are not required to adjust, clean, or replace any internal items in the drive. External cleaning may be performed at the discretion of the local Sperry maintenance organization.

Operator-performed maintenance of the drive is limited to attempting a restart when the indications stated in Table 4-1 occur.

4.7.3. 8430/8433 Disk Drive

Sperry customer engineers perform preventive maintenance on a scheduled basis for the 8430/8433 disk drive. Therefore, operating personnel are not required to adjust, clean, or replace any internal items. External cleaning may be performed at the discretion of the local Sperry maintenance organization.

Operator-performed maintenance of the drive is limited to attempting a restart when the indications stated in Table 4-2 occur.



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