DPS 6 PLUS
MSU9901/9902/9911/9912
Fixed-Disk Units Operation

Honeywell

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SUBJECT

General Description, Operation, and Maintenance Information for the
MSU9901/9902/9911/9912 Fixed-Disk Units

The following notice is provided in accordance with the United States Federal
Communications Commission's (FCC) regulations.

Warning: This equipment generates, uses, and can radiate radio frequency
energy and if not installed and used in accordance with the instruction
manual, may cause interference to radio communications. The equipment
manufactured after October 1, 1983 has been tested and found to comply with
the limits for a Class A computing device pursuant to Subpart J of Part 15 of
FCC Rules, which are designed to provide reasonable protection against such
interference when operated in a commercial environment. Operation of this
equipment in a residential area is likely to cause interference in which case
the user at his own expense will be required to take whatever measures may
be required to correct the interference.

About This Manual

This operation manual provides descriptions and instructions for users of the MSU9901/9902/9911/9912 fixed-disk units.

Section 1 introduces the disk units and contains information concerning the devices' capabilities. It also includes a functional description of how the units actually work. Section 2 describes the controls and indicators with which the user should be familiar before using a disk unit. Section 3 provides information used to operate the disk unit. Included in this section are the power-on and power-off procedures as well as maintenance information about the disk unit filter. Appendix A provides disk unit specifications.

Readers are invited to use the Technical Publications Remarks form at the end of the manual to note any publication errors or to offer any suggestions for improvement.

Contents

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Section 1

Introduction

Two large-capacity fixed-disk units are available on DPS 6 PLUS systems. Both units are environmentally sealed for high reliability.

The MSU9901/9902 is a 132M-byte (formatted) fixed-disk unit that contains six 9-inch discs, each disc having 821 recordable cylinders and 10 heads (161,280 bytes per cylinder). Average seek time (time it takes to position the read/write head over a desired cylinder track to enter or retrieve data) is 30 milliseconds. Data can be transferred at a rate of 1.2M bytes per second. Automatic error detection and correction help to protect data integrity. The MSU9901 includes a cabinet with mounting hardware and cables. MSU9902 is an add-on disk drive with cables.
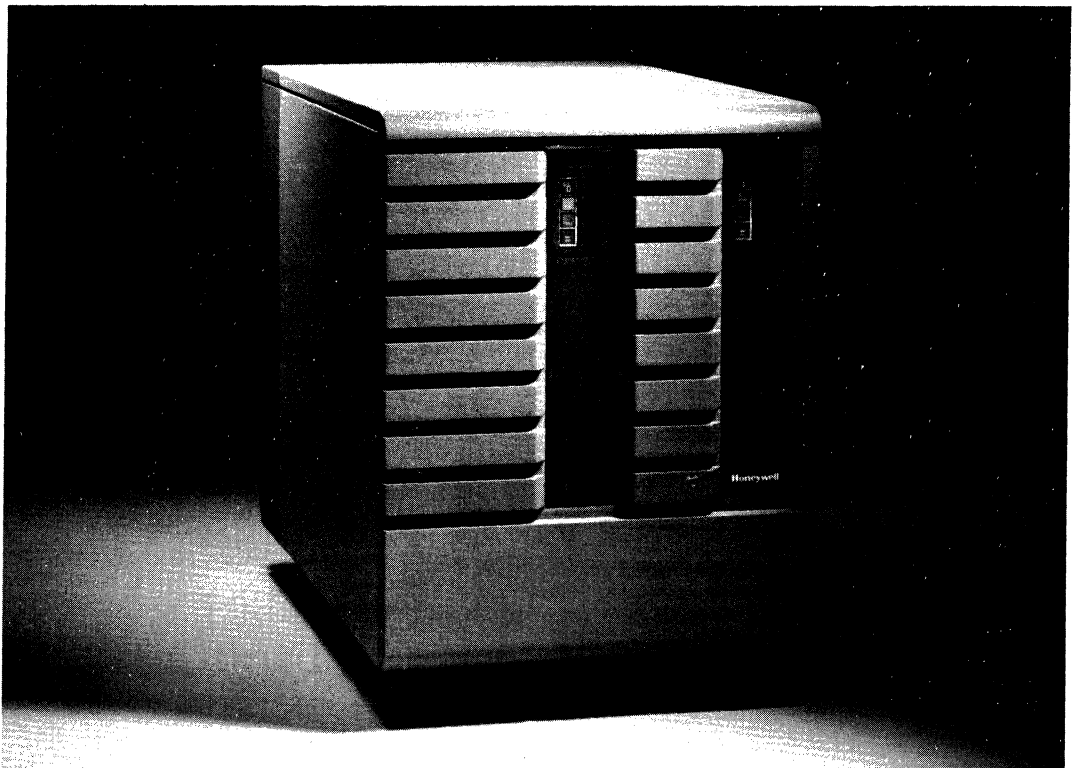

Figure 1-1. MSU9901/9902/9911/9912

The MSU9911/9912 is a 413M-byte (formatted) fixed-disk unit that contains seven 9-inch discs, each disc having 709 recordable cylinders and 24 heads (583,680 bytes per cylinder). Average seek time is 20 milliseconds. Data can be transferred at a rate of 1.83M bytes per second. Automatic error detection and correction help to protect data integrity. The MSU9911 includes a cabinet with mounting hardware and cables. The MSU9912 is an add-on disk drive with cables.

Up to three units can be housed in a single cabinet and up to four units can be connected to one disk controller (MSC9901). The 132M-byte and 413M-byte disk units can be housed in the same cabinet. Fixed-disk units and cabinets can be added to a configuration at any time to increase overall storage capacity. The disk cabinet can be placed up to 20 ft from the system/controller cabinet.

The MSU9901/9902/9911/9912 fixed-disk units feature:

- Choice of 132M-byte (formatted) and/or 413M-byte (formatted) fixed-disk units

- Ability to house 132M-byte and 413M-byte fixed-disk units in same cabinet (up to 3 units)

- Built-in features to help ensure the integrity and protection of data

- Ability, during data transfer on one unit, to perform a simultaneous seek operation on up to three other units

- Multiple-sector read/write capability with automatic track and cylinder switching

- Average access time of 28.3 ms (413M-byte unit); 38.3 ms (132M-byte unit)

- Transfer rate of 1.82M bytes per second (413M-byte unit); 1.2M bytes per second (132M-byte unit) from unit to controller

- Transfer rate of 833K bytes per second between the system and controller

- Automatic self test

- Automatic retry and error correction

- Automatic management of media defects

- Full data path error checking

- High reliability

Marketing Identifiers[1]

MSU9901 — Single 132M-byte fixed-disk unit and cabinet with mounting hardware and cables for one unit for DPS 6 PLUS systems

MSU9902 — 132M-byte fixed-disk unit with add-on mounting hardware and cables for DPS 6 PLUS systems

MSU9911 — Single 413M-byte fixed-disk unit and cabinet with mounting hardware and cables for one unit for DPS 6 PLUS systems

MSU9912 — 413M-byte fixed-disk unit with add-on mounting hardware and cables for DPS 6 PLUS systems

CBL9619 — Two 10-foot cables for disk intercabinet connections for DPS 6 PLUS systems

Prerequisite

MSC9901 — High-performance disk controller with 4 ports and required cable

Functional Description

The disk units contain all the circuits and mechanical devices necessary to record and recover data from the discs. The necessary power for this is provided by an integral power supply, which receives its input power from the cabinet power distribution unit.

All functions performed by the unit are done under direction of the controller. The controller communicates with the unit via interface. This consists of a number of I/O lines carrying the necessary signals to and from the unit.

Some interface lines, including those that carry commands to the unit, are not enabled unless the unit is selected by the controller. Unit selection allows the controller, which can be connected to more than one unit, to initiate and direct an operation on a specific unit.

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[1]Fixed-disk units require a high capacity removable media device for software loading (i.e., streamer, GCR/PE tape, NRZI/PE tape, Cartridge Module or Mass Storage Disk Unit).

All operations performed by the unit are related to data storage and recovery (normally referred to as writing and reading). The actual reading is performed by electromagnetic devices called heads that are positioned over the recording surfaces of the rotating discs. There are two heads for each disc surface on the 413M-byte unit and one head for each disc surface on the 132M-byte unit. The heads are positioned in such a way that data is written in concentric tracks around the disc surfaces.

Before any read or write operation can be performed, the controller must instruct the unit to position the heads over the desired track (seek) and also to use the head located over the surface (head selection) where the operation is to be performed.

After selecting a head and arriving at the data track, the controller still must locate that portion of the track on which the data is to be written or read. This action (track orientation) is done by using the index and sector signals generated by the unit. The index signal indicates the logical beginning of each track, and the sector signals are used by the controller to determine the position of the head on the track with respect to index.

When the desired location is reached, the controller commands the unit to read or write the data. During a read operation, the unit recovers data from the discs and transmits it to the controller. During a write operation, the unit receives data from the controller, processes it and writes it on the discs.

The unit is also capable of recognizing certain errors that may occur during its operation. When an error is detected, it is indicated either by a signal to the controller or by a maintenance indicator on the unit itself.

Section 2

Controls and Indicators

This section describes the various controls and indicators necessary for operating the disk units.

Operation Control Panel

The operation control panel for each disk unit in the subsystem configuration contains four light indicators, three push buttons, and a logic address plug (Figure 2-1).
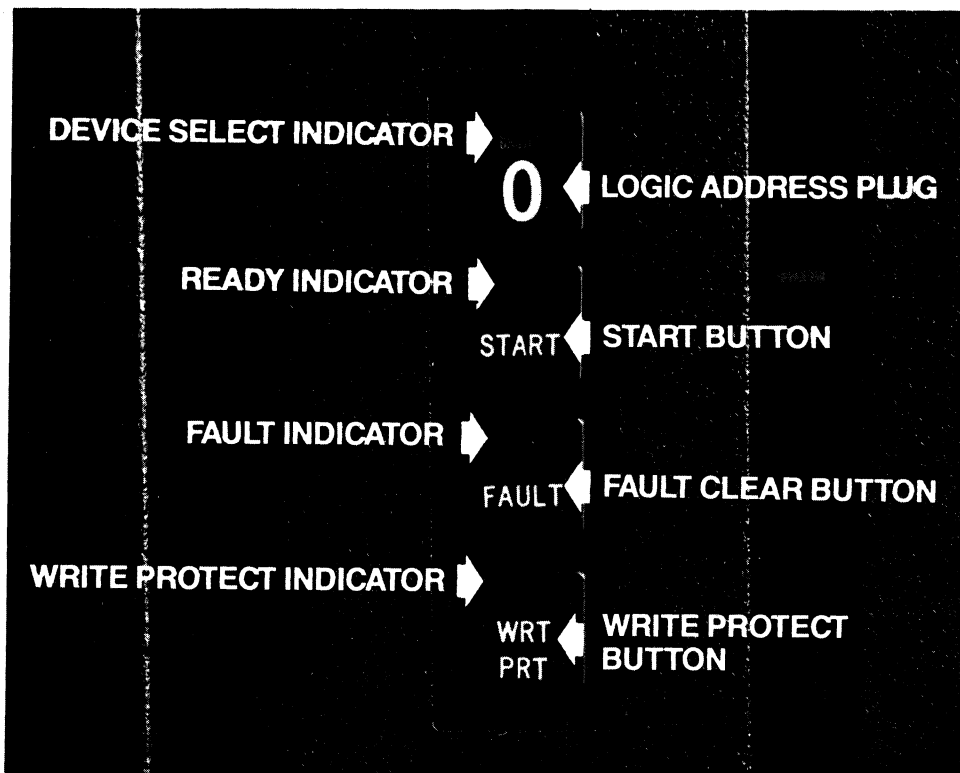

Figure 2-1. Operation Panel

Logic Address Plug/Select Indicator

The logic address plug activates switches that establish the logical address of the device. When the select indicator on the address plug is lit, it indicates activity from the controller. Logic address plugs are available with numbers 0 through 3 and are supplied with the unit. (They are also available as accessories.) Each device must have a different plug number. A single drive subsystem must use plug 0 only.

START Button/READY Indicator

Pressing the START button powers-on the unit. The READY indicator (green) flashes until the discs are up to speed, the heads are loaded, and no-fault condition exists (power-on sequence). The READY indicator lights steadily when the power-on sequence is complete. Pressing the START button again powers-off the unit; the READY indicator flashes until disc rotation has stopped, then goes out.

FAULT Clear Button/FAULT Indicator

The FAULT indicator (red) lights if a fault exists within the disk unit. It is turned off by momentarily pressing the FAULT clear button, by a fault clear command sent by the controller, or by a disk drive power-on operation.

WRITE PROTECT Button/
WRITE PROTECT Indicator

Pressing the WRITE PROTECT button (labeled WRT PRT) places the disk unit in the write protect mode which prevents writing operations; the WRITE PROTECT indicator (red) lights. Pressing the button again deactivates the protection and the indicator goes out.

AC Power Distribution Unit (PDU)

Once the unit is plugged into an active AC outlet, AC power is controlled by the main circuit breaker, located behind the lower right front of the cabinet door (Figure 2-2). For normal operation, the breaker is ON to continue supplying AC power to the drives. This circuit breaker may be used to turn off all power to the drive cabinet.
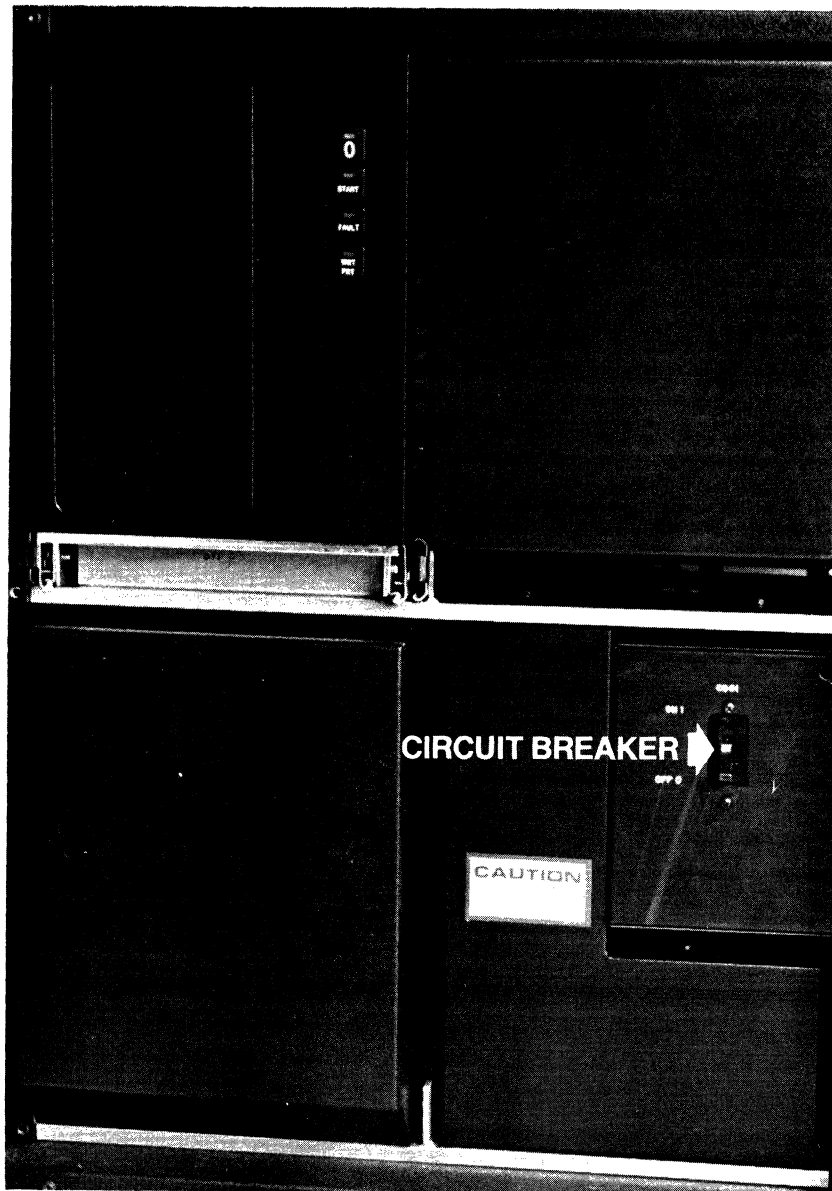

Figure 2-2. Location of Main Cabinet Circuit Breaker

Section 3
Operation

This section describes the operating and maintenance procedures for the MSU9901/9902/9911/9912 fixed-disk units.

CAUTION

Damage to the disk drives may result if the MSU subsystem is relocated.

The MSU cabinet and drives when fully assembled are not designed for mobility.

— Movement of the MSU cabinet with drives installed is allowed for CSD servicing only.

— When relocation is required, the drives must be removed from the cabinet and transported in their shipping container.

Power-On Procedure

In the following procedure, it is assumed that all cables have been properly connected.

1. Open the door on the front of the unit and make sure the MAIN AC circuit breaker is in the ON position (Figure 3-1).

2. Press the START button (Figure 3-2). If the unit is working properly, the READY indicator (located on the START button) will flash, indicating that the power-on sequence is in progress.

3. Observe that the READY indicator lights steadily within 45 seconds, indicating that the power-on sequence has been completed. (The MSU9911/9912 will automatically perform a self-diagnostic test that lasts about ten seconds and causes a buzzing sound on each next power-on sequence.)

4. Observe that the FAULT indicator is not lit.

5. Make sure WRITE PROTECT is not set, if writing is to be performed.
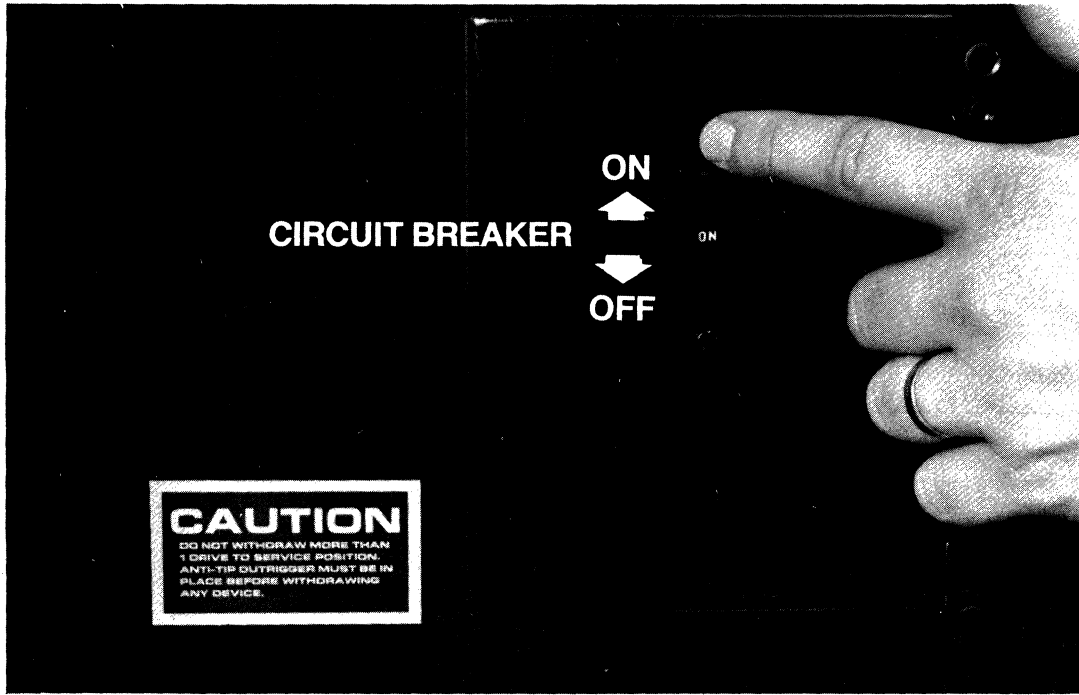
6. The unit is now ready to read or write data.
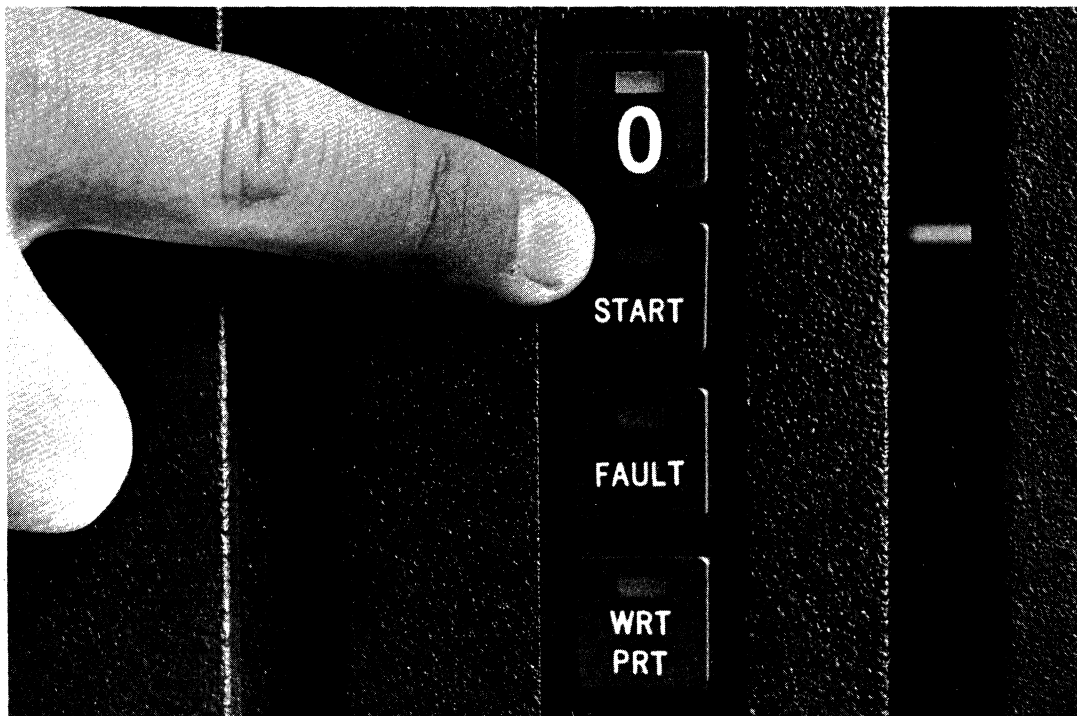

Figure 3-1. Circuit Breaker

Figure 3-2. Initiating Power-On

Power-Off Procedure

1. Press the START button (releasing it from the ON position). The READY indicator will flash, indicating that power-off is in progress.

2. Observe that the READY indicator goes off within 45 seconds, indicating that power-off is complete. Normally, the main circuit breaker is left ON.

Changing the Logic Address Plug

A logic address plug may be changed easily by grasping the plug firmly and pulling out towards you (as you face the unit). Plugs may be interchanged between units. This is useful if a unit should become inoperative. However, no two units connected to the same controller can have the same logical address (number).

Filter Replacement and Cleaning

The air filter for each drive must be clean to ensure proper air circulation through the drive. The filter is located behind the filter cover shown in Figure 3-3. You should inspect the filter of each driver periodically and either replace or clean it when it is dirty. Cleaning the filter is recommended only if replacement filters are not available. The interval for filter maintenance depends on the operating environment. In computer room conditions, a 6-month interval is suggested. In other conditions, the filter should be checked more frequently. Replacement filters are available from Honeywell. (Order a box of ten from the *NDO Supplies and Accessories Sales Catalog*, Order No. GF60, using Catalog No. M1463.)

Filter Replacement

1. Remove the filter cover that is inserted in the front panel by pulling firmly towards you (as you face the drive) to disengage the cover catches (Figure 3-3).

2. Remove the old filter (Figure 3-4). Notice how the filter fits into place so that the new one can be installed in the same position.

3. Install the new filter.

IMPORTANT

Be sure not to disturb the maintenance toggle switch (MSU9911/9912). It must be down (OFF).
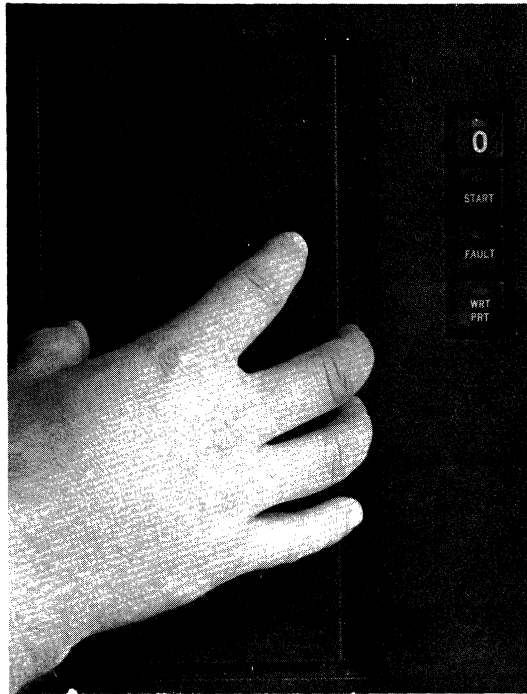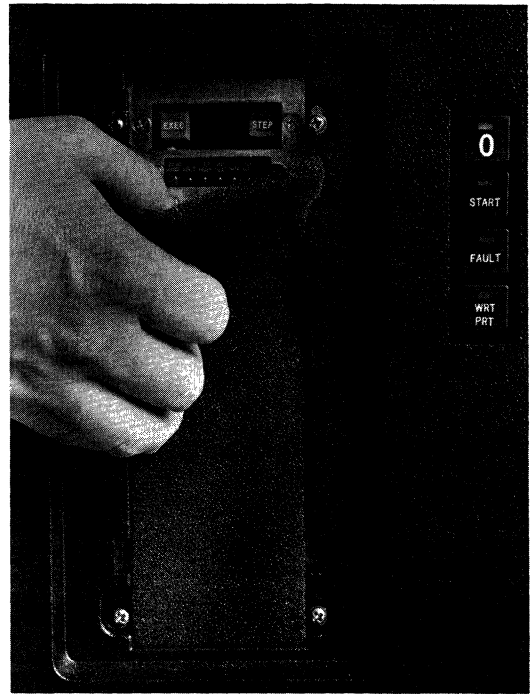
Figure 3-3. Removing Filter Cover

Figure 3-4. Removing Old Filter

4. Replace the filter cover by aligning the catches on the cover with the slots on the panel and pushing until the catches snap into place (Figure 3-5).
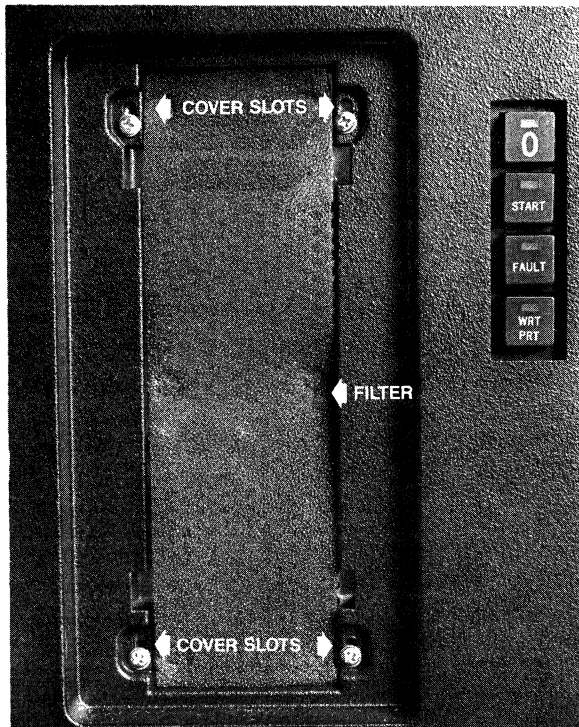

Figure 3-5. Filter Cover Catches

Filter Cleaning

The filter should not be cleaned if replacement filters are available.

1. Remove the filter cover that is inserted in the front panel by pulling firmly towards you (as you face the drive) to disengage the cover catches (see Figure 3-3).

2. Remove the filter (see Figure 3-4).

3. Clean the filter by agitating it in a solution of water and mild detergent.

4. Rinse the filter thoroughly with clean running water and allow it to dry completely.

5. Install the filter.

IMPORTANT

Be sure not to disturb the maintenance toggle switch (MSU9911/9912). It must be down (OFF).

6. Replace the filter cover by aligning the catches on the cover with the slots on the panel and pushing until the catches snap into place (see Figure 3-5).

Appendix

Specifications

MSU9901/9902 Performance Characteristics

Data Capacity:
Storage Capacity (formatted) — 132M bytes
Fixed-discs/unit — 6
Disc Diameter — 9 in.
Cylinders/unit — 821
Tracks/cylinder — 10
Sectors/track — 63
Bytes/sector — 256

Average Latency: 8.3 ms

Average Access Time: 38.3 ms

Seek Time:
Minimum — 7 ms
Average — 30 ms
Maximum — 55 ms

Transfer Rate: 1.2M bytes/second

Spindle Speed: 3600 rpm

MSU9911/9912 Performance Characteristics

Data Capacity:
Storage Capacity (formatted) — 413M bytes
Fixed-discs/unit — 7
Disc Diameter — 9 in.
Cylinders/unit — 709
Tracks/cylinder — 24
Sectors/track — 96
Bytes/sector — 256

Average Latency: 8.33 ms

Average Access Time: 28.3 ms

Seek Time:
Minimum — 5 ms
Average — 20 ms
Maximum — 45 ms

Transfer Rate: 1.82M bytes/second

Spindle Speed: 3600 rpm

Physical Characteristics (Cabinet and One Drive)

Cabinet Height: 30.0 in. (75.0 cm)

Cabinet Width: 20.5 in. (52.0 cm)

Cabinet Depth: 33.0 in. (83.8 cm)

Weight:
MSU9901 — 214 lb (97 kg)
MSU9911 — 230 lb (104 kg)

Electrical Characteristics

Frequency: 60 Hz, ± 0.6 Hz

Voltage: 120 Vac + 10%, –15%, single phase

Power Consumption:
MSU9901/9902 — .36 kVA
MSU9911/9912 — .40 kVA

Heat Generation:
MSU9901/9902 — 832 Btu/hr
MSU9911/9912 — 886 Btu/hr

Environmental Characteristics

Operating Temperature: 50°F to 100.4°F (10°C to 38°C)

Relative Humidity: 20% to 80% (noncondensing)

Cables

Power Cord: 6.0 ft (1.83 m)

Disk Controller to First Cabinet: 25.0 ft (7.62 m)

Cabinet to Cabinet: 10.0 ft (3.0 m)

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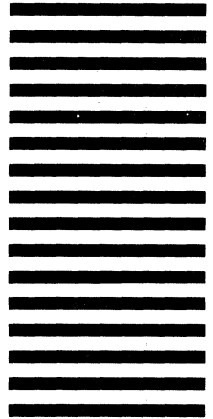
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