⊖⊜ CONTROL DATA

A Guide for the Disk Drive Operator
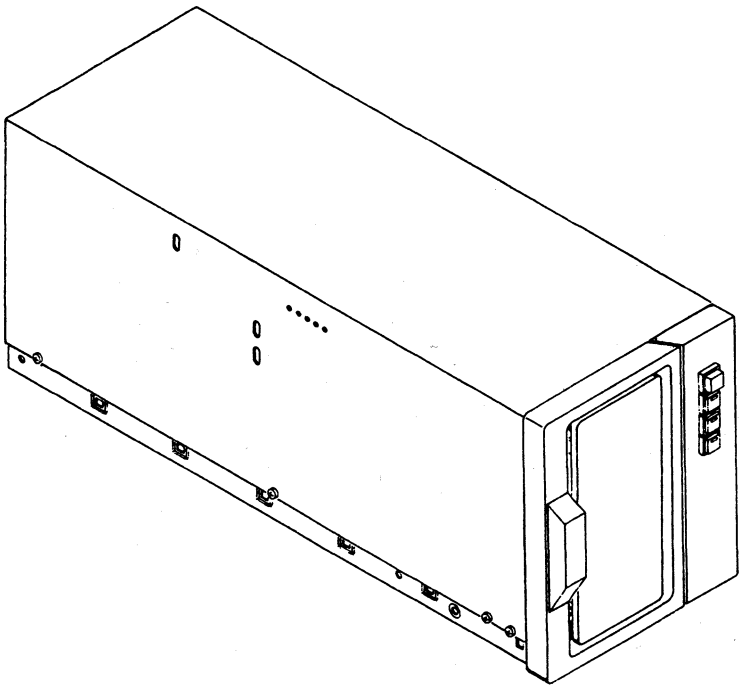
RSD's

REVISION RECORD

REVISION	DESCRIPTION
A (2-8-83) B (12-8-86)	Original Release Revised with new information about storing data packs. Shows newer operator panel with Unit Selected indicator.

CONTENTS

INTRODUCTION

Your disk drive is shipped with a manual
covering operation and installation of the
drive. That manual, and others that can be
ordered, are written primarily for the
customer engineers who service the drive.
This booklet is intended for you, the disk
drive operator. After reading it, you will
know how to operate the drive correctly.
Also, you will be aware of what you can do
to keep the drive and its data packs
functioning properly. With a little TLC
(tender loving care), they will serve you
well.

WARNING

This equipment generates, uses and can
radiate radio frequency energy and if not
installed and used in accordance with the
instructions manual, may cause interference
to radio communications. It has been
tested and found to comply with the limits
for a Class A computing device pursuant to
Subpart J of Part 15 of the 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.

GETTING TO KNOW YOUR DRIVE

As you read this section, it will acquaint
you with features of your Removable Storage
Drive (RSD). These drives are designed to
store data on removable data packs. The
data packs contain magnetic disks. In
normal operation, a motor in the drive
rotates the disks, and recording heads,
which move over the disk surfaces, transfer
data to and from the disks. Your RSD
resembles the drive in the following
picture:
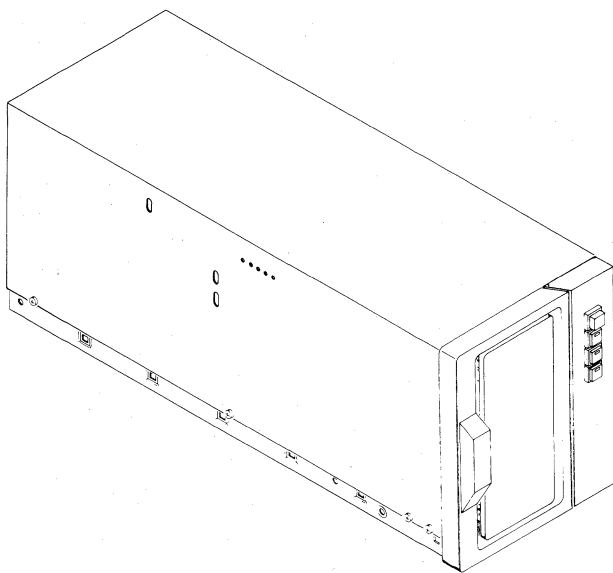
Use this section as a guide in locating
essential parts of your disk drive. First,
find the operator control panel (on the
upper righthand part of the front panel).

4

START

FAULT

WRITE
PROTECT

OPERATOR
CONTROLS
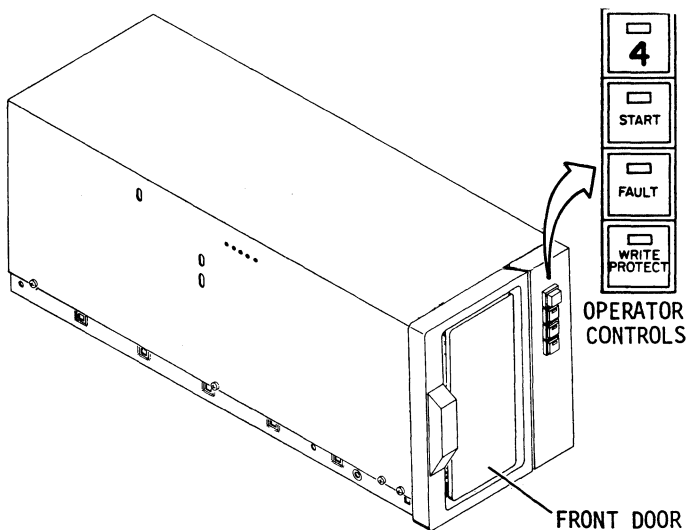
FRONT DOOR

The operator control panel contains the
controls and indicators used to operate the
drive. The individual parts on the
operator control panel are discussed in
detail in the "Controls and Indicators"
section.

The front door, located to the left of the
operator control panel, provides access for
installing and removing the data pack. The
drive is equipped with safety devices which
lock the front door when the disks are
rotating or when the drive is not receiving
power. Once the front door has been
opened, a data pack is installed by sliding
it into the pack receiver and closing the
door. Detailed information about pack
installation is given in the "Data Pack
Installation and Removal" section.

In normal operation, the drive does not
need to be extended out of its position in
the equipment rack. In those situations
where drive extension is necessary, ask
your supervisor for assistance in extending
the drive. There are no circumstances
where an operator should remove the top
cover or change any cabling on the rear
panel. Any maintenance activities in these
areas require the attention of a trained
customer engineer (CE).

PROPER DRIVE ENVIRONMENT

This section discusses the proper environment for the disk drive and common sense rules to be observed in the vicinity of the drive. By putting these instructions into practice, you can guarantee increased operating life and reliability for your drive. The guidelines pertaining to temperature and relative humidity apply to electronic equipment in general. The other guidelines reflect the importance of keeping the area around the drive clean.

During operation, room temperature and its rate of change are both important. The drive will operate in a range of 10°C to 45°C (50°F to 114°F). The room temperature should not change more than 10°C (18°F) per hour.

Relative humidity should be kept between 20% and 80%. High relative humidity is a problem because it can cause condensation in the drive. Very low relative humidity should also be avoided because it can lead to particle attraction and accumulation by static electricity.
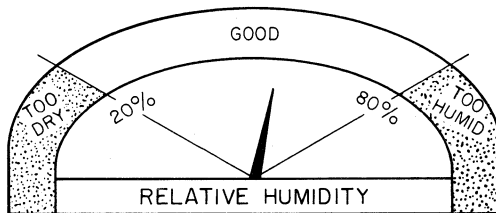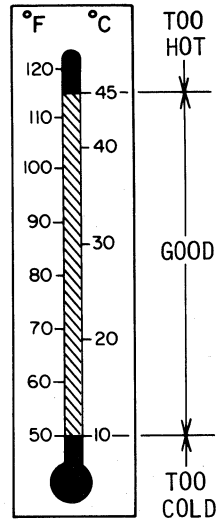
Lint, dust, smoke, and other dirt particles
are enemies of disk drive operation.
However, with proper planning and
discipline, you can reduce their threat to
the drive. The following paragraphs offer
solutions to basic contamination problems.

Carpeting and drapes, while
esthetically pleasing, are
to be avoided if at all
possible. They not only
produce lint but also
collect all kinds of dirt.
Eliminate them if you can -
otherwise, ensure that they
are the antistatic variety
and vacuum them frequently.
Tile floors are preferable;
if you have them, damp mop
them regularly.
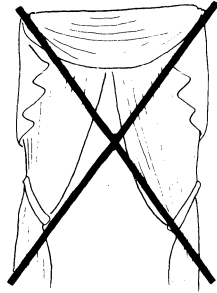
Another aspect of
proper environment
is where the drive
is located within
the computer
center. For one
thing, it should
be installed in a
low-traffic area.
High-traffic areas
have problems such
as people stirring
up dust or bumping
into the drive.
Also, it should
not be located
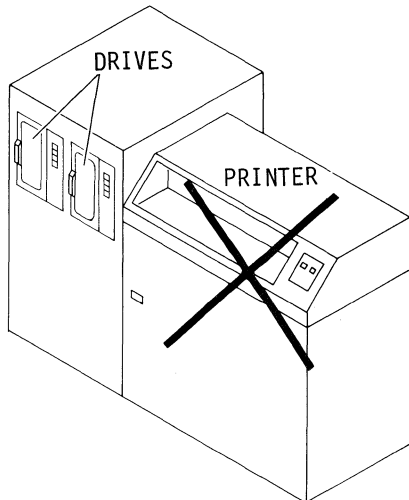
DRIVES

PRINTER

near air conditioners, printers, card punches, or paper tape punches. Particles of dirt, ink, carbon, and paper, generated by these machines, are hazardous to disk drives.

Food and beverages should not be consumed near disk drives. If they are spilled in the drive, the cleanup could require costly downtime.

NO

Last but not least is the problem of smoking. Smoke particles are approximately thirteen times larger than the distance between a disk and a head flying over it. Furthermore, since smoke particles are very sticky, they clog the drive's absolute filter rapidly. Prohibit smoking in the area around the drive.

The following illustration emphasizes the importance of eliminating dust, smoke, and other contaminants in the drive's environment. Notice that all of these contaminants are considerably larger than the head flying distance.

HEAD

HEAD
FLYING
DISTANCE
16-19 MICRO IN.

HEAD
SURFACE

OXIDE
COATING
30-40
MICRO IN.

AVERAGE
DIAMETER
OF SMOKE
PARTICLE
250 MICRO IN.

ABRASIVE
(HARD AS
SAND OR
GLASS)

DUST PARTICLES

ALUMINUM
SUBSTRATE
.075 IN.

DISK

AVERAGE
DIAMETER
OF HUMAN
HAIR
.003 IN.

1OR208
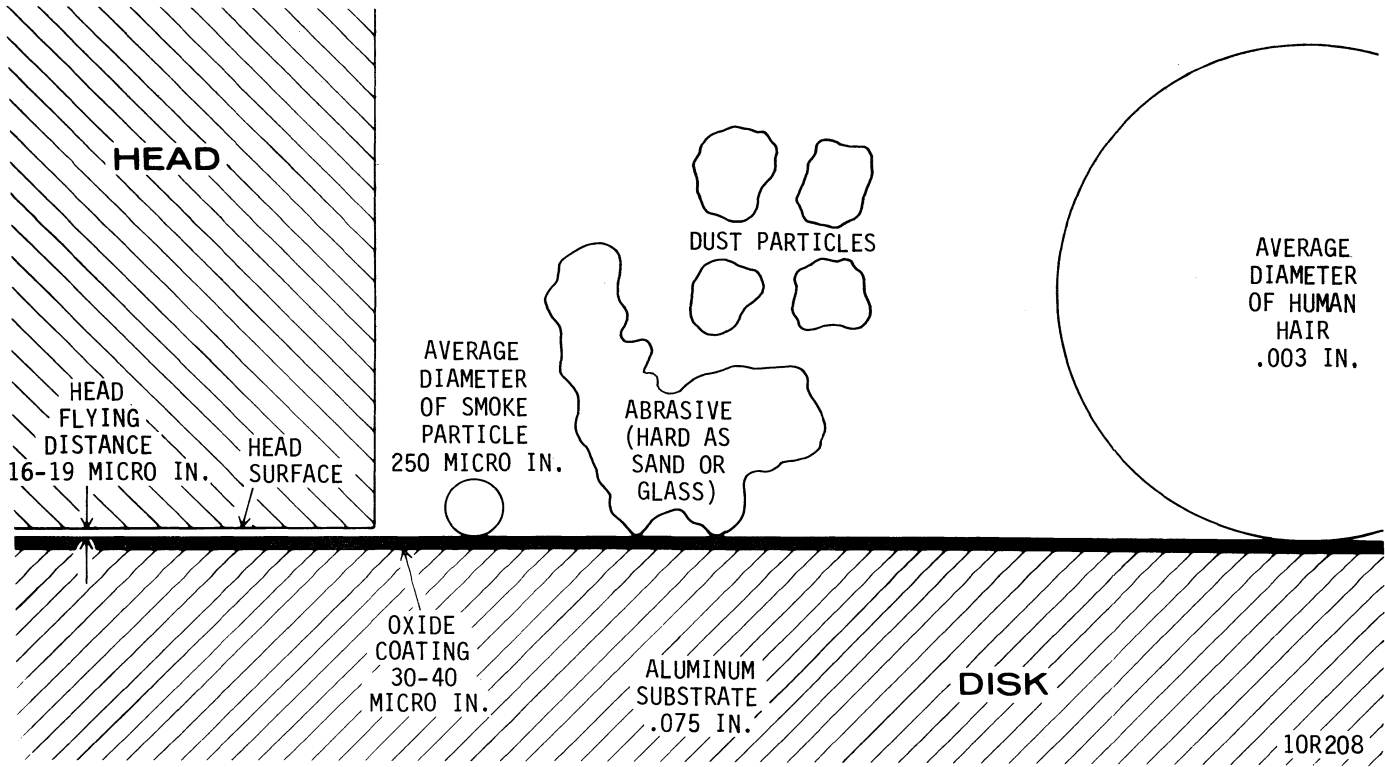
DATA PACK CARE AND HANDLING

Data packs are manufactured with great
precision to ensure that their surfaces are
extremely flat and smooth. This precision
is maintained when the data packs are
stored and handled in accordance with the
following guidelines. The guidelines
presented below fall into two categories.
Certain precautions are aimed at
cleanliness; in ordinary use,
contamination of the data packs is
minimized when these measures are
followed. Other instructions relate to
handling the data packs in such a way that
their mechanical precision is maintained.
Refer to "Data Pack Installation and
Removal" for the correct procedures for
installing and removing data packs.
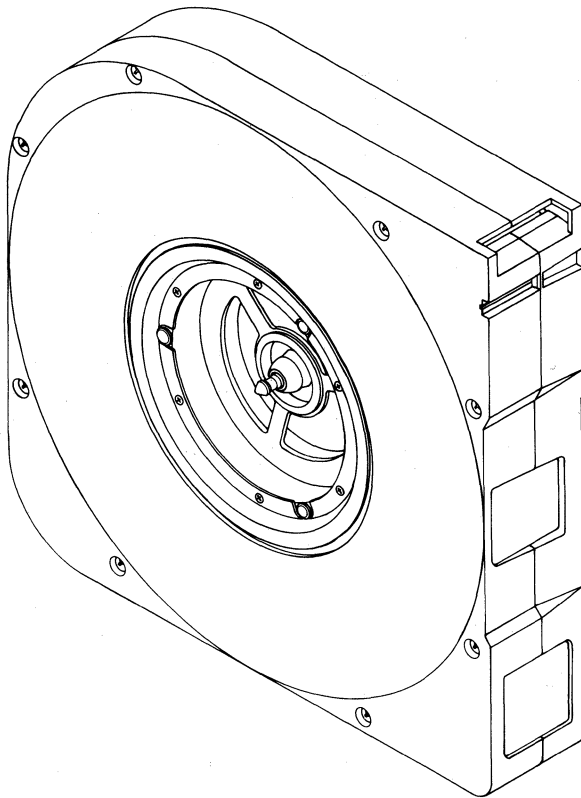
The data pack consists of magnetic disks which are mounted on a hub and housed in a sealed plastic case. When the pack is installed in the drive, two ports open automatically to allow the heads to enter and to allow clean air to circulate through the pack. Although the case shields the disks from contaminants in the surrounding air, you should use common sense in storing and handling the packs so that they remain clean.

The case protects the disks inside from contamination but not from physical abuse. If, during handling, the data pack is dropped or banged against another object, it in necessary to inspect the data pack for bent disks. Ask your pack sales representative to perform this inspection. Failure to do this could result in serious damage to the drive.
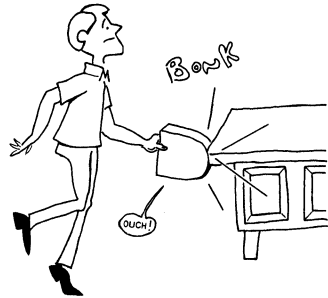
In labelling data packs, write on a label with a pen or felt tip marker that does not produce any residue. Do not use a lead or grease pencil. Then attach the label to the plastic case of the pack in the indentation provided. If the label is attached to other surfaces of the case, it could be scraped off during pack installation or it could interfere with functioning of the pack. After removing a label, use isopropyl alcohol to remove any remaining adhesive residue on the case before attaching a new label. Adhesive left on the case can contaminate both the pack and the drive.

DATA PACK

INDENTATION

LABEL
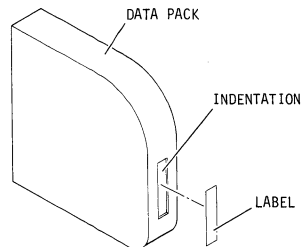
Proper storage is an important part of data
pack care. We recommend that you store
packs either in file drawers or on
shelves. In either case, place the packs
on edge and restrain them so they can't
slide or tip over. If you choose to store
the packs flat, do not stack them. The
problem with stacking the packs is that one
pack could slide off the others and damage
its disks. When storing the data packs
flat, make sure that the hub cavity faces
down to keep the parts inside the hub
cavity clean.

Ideally, the storage area for the data
packs should be located in the
computer-room environment and should be
kept free of lint and dust. If the storage
area is located in a different room, allow
the pack to adjust to the computer room
temperature for one hour before using it.
Packs transported during extreme winter or
summer conditions should be given more time
to adjust to room temperature. Refer
questions about this time interval to your
pack sales representative.

Make sure that storage
areas are never in
direct sunlight or in
the vicinity of high
magnetic fields.
Direct sunlight causes
unnecessary heating of
the pack. Magnetic
fields can alter the
data written on the
data pack; the fields
are high in regions
near electrical
equipment such as
motors, transformers,
and bus bars.
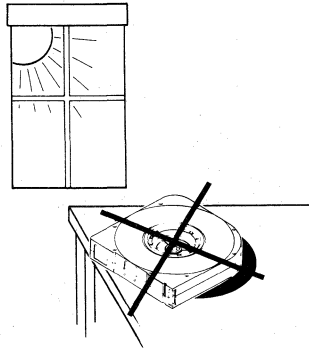
Finally, some considerations apply to shipping and receiving packs. If a new pack arrives in a damaged shipping carton, inspect the pack for bent disks before using it. The pack sales representative will assist you in obtaining this inspection. Allow a new pack one hour to adjust to the temperature of the computer room. Also, it is a good idea to save data pack shipping cartons; if you ever need to ship a data pack, it is recommended that you use the original shipping materials.

By following the guidelines for data pack care and handling provided in this section, you will minimize problems with your packs.

DRIVE CARE AND HANDLING

Taking care of a disk drive is a team
effort involving both the operators and the
customer engineers. As an operator, you
contribute to drive care by operating it
correctly and notifying the customer
engineer immediately when problems occur.
Also, it is important that you keep the
drive clean, especially the area around the
front door.

Do not leave the front
door open longer than
necessary when
installing or removing
a data pack. The front
door contains the inlet
filter for cooling air
that circulates through
the drive. Leaving the
door open allows
unfiltered air to enter
the drive.
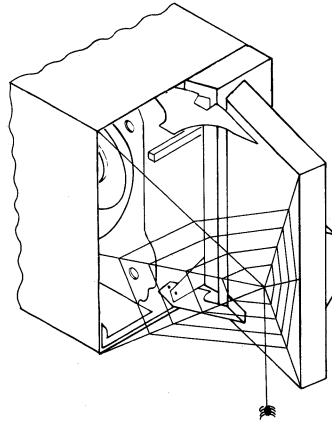
At many sites, it is
the operator's
responsibility to check
and (if necessary) to
replace the inlet air
filter on the drive. Ask your supervisor
to show you where this procedure is
described in the hardware maintenance
manual supplied with the drive.

It is a good idea to leave a data pack
installed in the drive in periods when the
drive is not being used. The pack provides
a seal for certain areas in the drive that
should remain dust-free.

Inform the customer engineer immediately if
you see any dirt in the pack receiver
(visible when the front door is open). The
customer engineer is responsible for
performing any corrective maintenance on
the drive. Part of this responsibility
includes cleaning the internal surfaces of
the drive. Unauthorized personnel should
not attempt to clean the drive; to be
effective, the job should be done with the
proper procedure and materials.
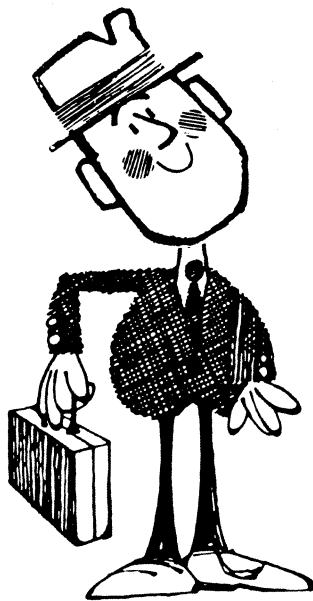
CONTROLS AND INDICATORS

This section contains instructions on the
operator control panel. The switches on
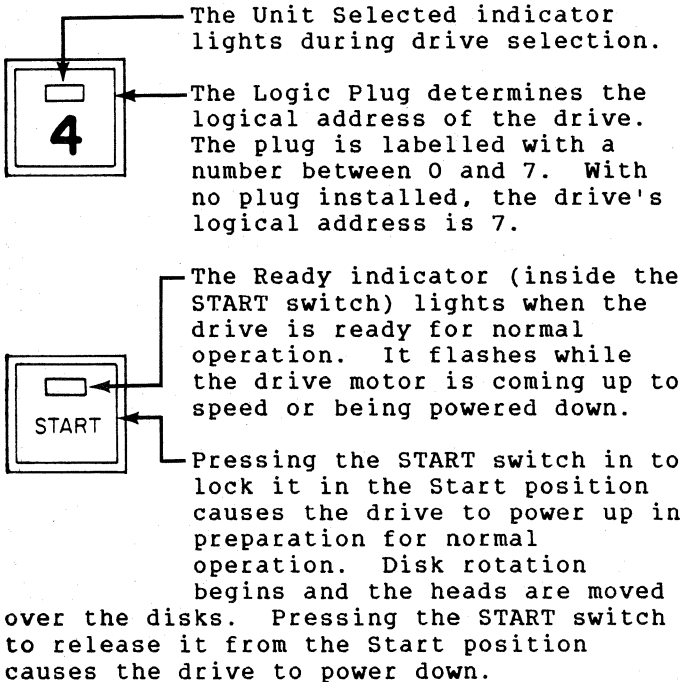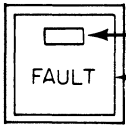the panel are used by the
operator to turn the drive on and
off, to clear fault conditions in
the drive, and to prevent the
drive from writing on the data
pack. The Logic Plug, which is
inserted in an opening in the
panel, identifies the drive in an
installation having more than one
drive. Finally, the indicator
lights on the panel show whether
the drive is selected, whether it
is in a ready or fault condition,
or whether its write function has
been disabled.
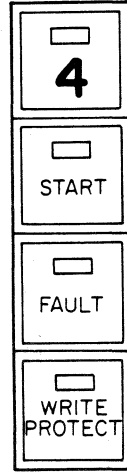
The operator control panel is
shown to the right. A
description of each switch and
indicator follows:

The Unit Selected indicator
lights during drive selection.

The Logic Plug determines the
logical address of the drive.
The plug is labelled with a
number between 0 and 7. With
no plug installed, the drive's
logical address is 7.

The Ready indicator (inside the
START switch) lights when the
drive is ready for normal
operation. It flashes while
the drive motor is coming up to
speed or being powered down.

Pressing the START switch in to
lock it in the Start position
causes the drive to power up in
preparation for normal
operation. Disk rotation
begins and the heads are moved
over the disks. Pressing the START switch
to release it from the Start position
causes the drive to power down.

The FAULT indicator lights when something is wrong with the drive.

Pressing the Fault Clear switch turns off the FAULT indicator if the drive problem is no longer present. If you cannot turn off the FAULT indicator, call a customer engineer.

The WRITE PROTECT indicator indicates that the drive is in the write protect mode. In the write protect mode the drive cannot write data.

Pressing the WRITE PROTECT switch places the drive in the write protect mode and turns on the WRITE PROTECT indicator. Pressing the switch again restores the drive's data-writing capability and turns off the WRITE PROTECT indicator.

Individual data packs may be write-protected by means of the write protect tab located on the edge of the pack. The tab positions are shown below. Always check with your supervisor before moving a tab out of the write protect position. Another operator may have decided that the data on that pack should be protected from further write operations.

NORMAL
POSITION

WRITE
PROTECT
POSITION
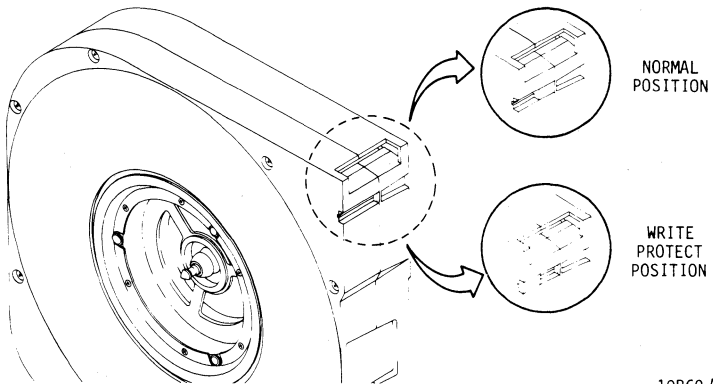
10R60 A

DATA PACK INSTALLATION AND REMOVAL

Introduction

Proper handling of data packs is an essential part of operating your disk drive. The set of data packs at your computer site is like a library; at times, you will need to change packs in the drive to make different information available to the computer.

Data Pack Installation

The disk drive will not operate until a data pack has been installed. This installation consists of placing the START switch in the off position, opening the front door, sliding the pack into the pack receiver, and closing the front door. To do this, perform the following steps:

PACK RETAINER

FRONT DOOR

DATA PACK

PACK RECEIVER
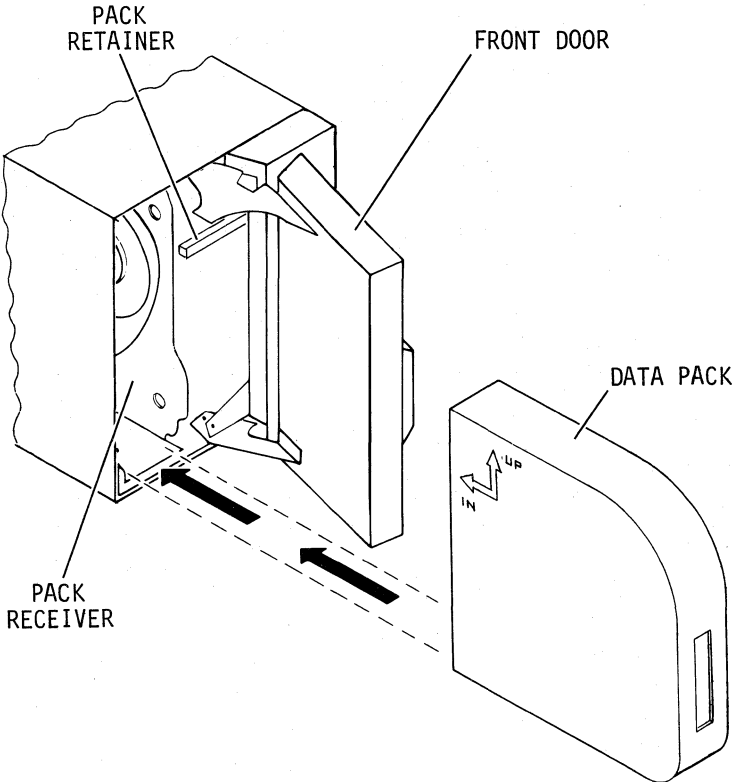
1. Press the START switch if the Ready
    indicator is on and wait until the
    Ready indicator stops flashing.

2. Pull the door handle to open the
    front door. If front door will not
    open, ask your supervisor to check
    that the circuit breaker for the
    power supply is on.

3. Position the data pack according to
    arrows on the pack housing prior to
    inserting it into the drive.

4. Slide the data pack into the pack
    receiver. Observe that the pack
    retainer secures the data pack when
    it is fully inserted into the pack
    receiver.

5. Close the front door.

Data Pack Removal

Data pack removal consists of placing the
START switch in the off position, opening
the front door, releasing the pack from the
pack receiver, and closing the front door.
To do this, perform the following steps:

1. Press the START switch if the Ready
    indicator is on and wait until the
    Ready indicator stops flashing.

2. Pull the door handle to open the
    front door. If the front door will
    not open, ask your supervisor to
    check that the circuit breaker for
    the drive's power supply is on.

3. Observe that the pack retainer
    releases the data pack and that the
    data pack partially ejects when the
    door is opened fully.

4. Slide the data pack out of the pack
    receiver.

5. Close the front door. Refer to "Data
    Pack Care and Handling" for tips on
    storing the data pack.

DRIVE POWER ON AND POWER OFF

Introduction

This section contains instructions on how
to start and stop your disk drive. It is
necessary to stop the drive to change data
packs. If the drive is not being used for
an extended time, you may decide to turn it
off.

The Power On procedure assumes that other
units in the system including the
controller and drive power supply are
already receiving power. Furthermore, in
some installations, the drive will not
power up unless it receives a signal from
the system. If you have problems when
performing the Power On and Power Off
procedures, refer to the section entitled
"Problems to Look For."

Power On

Perform the following steps to power up the
drive:

1. Ensure that a data pack is installed
    and that the front door is closed.
    The drive will not operate unless
    both conditions are met. Refer to
    "Data Pack Installation" if necessary.

2. Press the START switch to engage it
    in the Start position.

3. Observe that the Ready indicator
    (located in the START switch)
    flashes, indicating that power up is
    in progress. If not, the drive may
    be waiting for a signal from the
    system.

4. Observe that the Ready indicator
    lights steadily within 60 seconds,
    indicating that the drive is now
    ready for use by the system.

5. Ensure that the FAULT indicator is
    off.

Power Off

The drive must be powered down before a
data pack can be removed. Perform the
following steps to power down the drive:

1. Press the START switch to release it
    from the Start position.

2. Observe that the Ready indicator
    (located in the START switch)
    flashes, indicating that power down
    is in progress.

3. Observe that the Ready indicator goes
    off after 35 seconds, indicating that
    power down is complete.

4. If desired, remove the data pack
    according to directions in "Data Pack
    Installation and Removal."

PROBLEMS TO LOOK FOR

This section discusses how you, the
operator, should be on the lookout for
problems with your disk drive. Sometimes
you can solve a problem yourself. If not,
try calling your customer engineer (CE) on
the phone to get directions on how to solve
it. For a more serious problem, it will be
necessary for the CE to make a service
call. By approaching a problem in these
three steps, you can often avoid an
unnecessary service call.

Except for replacing the inlet air filter,
which your supervisor may ask you to do,
all maintenance on the drive should be
performed by a trained CE. You should
never remove the top cover from the drive
or attempt any "do-it-yourself" repairs.
If you call your CE about a drive problem,
you may be asked to check the individual
fault indicator lights located on the left
side of the drive. In that case, ask your
supervisor for assistance in extending the
drive from the cabinet and in interpreting
the indicators.

The following table lists the solutions to
some common drive problems.

PROBLEM	WHAT TO DO
START/STOP	
Drive is not receiving power. (WRITE PROTECT indicator stays off when WRITE PROTECT switch is pressed twice.)	1. Ask supervisor to ensure that power cable is connected to site power. 2. Ask supervisor to ensure that power supply for drive is turned on. 3. Call CE.
Drive is receiving power but Ready indicator stays off after START switch is pressed.	1. Ask supervisor to ensure that controller is turned on. 2. Ask supervisor whether power up depends on the system furnishing a power up signal to drive. 3. Ensure that data pack is installed. 4. Ensure that front door is closed. 5. Call CE.
Table Continued on Next Page	

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PROBLEM	WHAT TO DO
FAULT CONDITION	
FAULT light stays on after Fault Clear switch is pressed.	1. Do not power down the drive before calling CE. 2. Call CE.
DATA PACK INSTALLATION	
Front door will not open.	1. Ensure that Ready indicator is off. 2. Ask supervisor to check that power supply for drive is turned on. 3. Call CE.
Data pack does not slide into pack receiver completely.	1. Ensure that pack is positioned according to arrows on pack. 2. Call CE.
Table Continued on Next Page	

PROBLEM	WHAT TO DO
DATA PACK	
Data pack has been dropped.	1. Ask vendor to inspect data pack before you use it again.
Data pack has crack in plastic case.	1. Replace data pack.
A head crash may have occurred. Its symptoms are: • Screeching or pinging noise • Burning odor • High data error rate	1. Turn off drive immediately. 2. Do not put crashed pack in another drive. 3. Do not put a good pack in crashed drive. 4. Call CE.