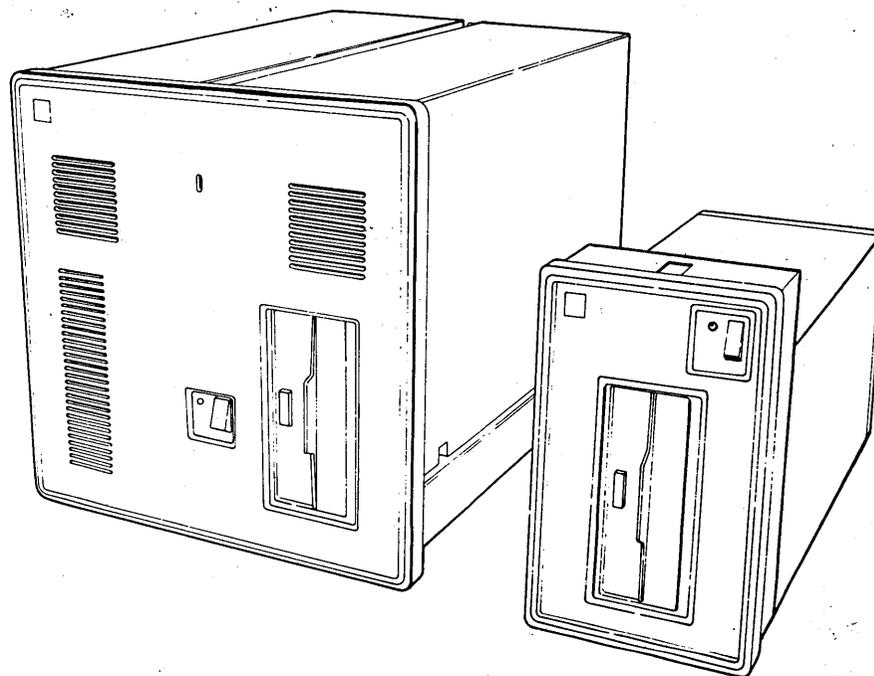# Certainty 210 Series
Flexible Disk Storage System

CONTROL DATA

62947909

CDC® 80210-10/80240
Flexible Disk Drive

HARDWARE MAINTENANCE MANUAL

(Site Information)

Certainty 210 Series
Flexible Disk Storage System

CD
CONTROL
DATA

62947909

CDC® 80210-10/80240
Flexible Disk Drive

HARDWARE MAINTENANCE MANUAL

(Site Information)
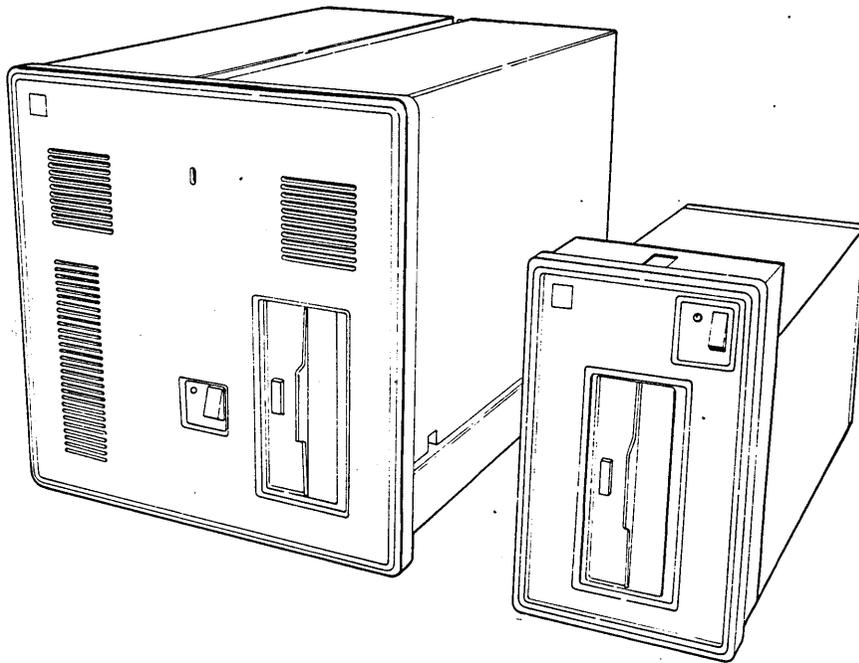

FLEXIBLE DISK STORAGE SYSTEM HARDWARE MAINTENANCE

REVISION RECORD

REVISION	DESCRIPTION
A (03-28-80)	Manual released. Includes product verification changes.
B (03-16-81)	Manual revised per ECOs 01096, 01143, 01173, 01181, 01182, 01270, 01282, 01286, 01293, and 01319. This revision changes series code, text, spare parts lists, and SAMS. Pages changed are: ii, iii/iv, v/vi, vii, xii, 1-2, 1-8, 2-3, 2-4, 2-4.1, 2-4.2, 2-6, 2-7, 3-2, 3-4, 3-6, 3-7, 3-11, 4-1, 4-5, 4-6, SAM 4670-4, SAM 4673-1, and comment sheet.

C1989-2

REVISION LETTERS I, O, Q AND X ARE NOT USED

Address comments concerning this
manual to:

Control Data Corporation
Plymouth Publications Department
2200 Berkshire Lane
Plymouth, Minnesota 55441

or use Comment Sheet in the back
of this manual.

MANUAL TO EQUIPMENT LEVEL CORRELATION SHEET

This manual reflects the equipment configurations listed below.

EXPLANATION: Locate the equipment type and series number, as shown on the equipment FCO log, in the list below. Immediately to the right of the series number is an FCO number. If that number and all of the numbers underneath it match all of the numbers on the equipment FCO log, then this manual accurately reflects the equipment.

EQUIPMENT TYPE	SERIES	WITH FCO'S	COMMENTS
BR808-A	01 02 03	01181	Update by ECO 01319 only
BR808-B	01 02 03	01181	Update by ECO 01319 only
BR812-A	01 02 03	01181	Update by ECO 01319 only
BR812-B	01 02 03	01181	Update by ECO 01319 only
FA741-A	01 02 03 04	00952 01096 01270	Associated ECOs are 01096, 01143, and 01173
MA453-H	01		

01987

LIST OF EFFECTIVE PAGES

New features, as well as changes, deletions, and additions to information in this manual are indicated by bars in the margins or by a dot near the page number if the entire page is affected. A bar by the page number indicates pagination rather than content has changed.

PAGE	REV	PAGE	REV	PAGE	REV
Front Cover	-	3-8 thru 3-10	A	SAM 4603-4	A
Title Page	-	3-11	B	SAM 4603-5	A
ii	B	3-12 thru 3-62	A	SAM 4603-6	A
iii/iv	B	4-1	B	SAM 4610-1	A
v	B	4-2 thru 4-4	A	SAM 4610-2	A
vi	B	4-5, 4-6	B	SAM 4610-3	A
vii	B	A-1 thru A-16	A	SAM 4610-4	A
viii thru xi	A	Notice	-	SAM 4610-5	A
xii	B	SAM 4600-1	A	SAM 4610-6	A
1-1	A	SAM 4600-2	A	SAM 4610-7	A
1-2	B	SAM 4600-3	A	SAM 4610-8	A
1-3 thru 1-7	A	SAM 4600-4	A	SAM 4610-9	A
1-8	B	SAM 4600-5	A	SAM 4611-1	A
1-9 thru 1-12	A	SAM 4600-6	A	SAM 4611-2	A
2-1 thru 2-2	A	SAM 4601-1	A	SAM 4611-3	A
2-3	B	SAM 4601-2	A	SAM 4611-4	A
2-4 thru 2-5	A	SAM 4601-3	A	SAM 4611-5	A
2-6	B	SAM 4601-4	A	SAM 4611-6	A
2-6.1/.2	B	SAM 4601-5	A	SAM 4611-7	A
2-7	B	SAM 4601-6	A	SAM 4611-8	A
2-8 thru 2-17	A	SAM 4602-1	A	SAM 4611-9	A
3-1	A	SAM 4602-2	A	SAM 4620-1	A
3-2	B	SAM 4602-3	A	SAM 4620-2	A
3-3	A	SAM 4603-1	A	SAM 4620-3	A
3-4	B	SAM 4603-2	A	SAM 4620-4	A
3-5	A	SAM 4603-3	A	SAM 4620-5	A
3-6, 3-7	B				

PAGE	REV		PAGE	REV		PAGE	REV
SAM 4620-6	A						
SAM 4621-1	A						
SAM 4621-2	A						
SAM 4621-3	A						
SAM 4621-4	A						
SAM 4621-5	A						
SAM 4670-1	A						
SAM 4670-2	A						
SAM 4670-3	A						
SAM 4670-4	B						
SAM 4671-1	A						
SAM 4671-2	A						
SAM 4672-1	A						
SAM 4672-2	A						
SAM 4673-1	B						
SAM 4673-2	A						
SAM 4673-3	A						
Comment Sheet	B						
Mailer	–						
Back Cover	–						

02092-IA

PREFACE

This manual provides information to aid in the installation,
checkout, and on-site maintenance of the CDC 80210-10/80240
Flexible Disk Drive (FDD). The 80210-10 FDD is a standalone
unit. The 80240 is a unit that has a FDD combined with a mini
module drive (MMD). Site information for the MMD is contained in
another manual (refer to listing on next page).

The standalone and combination versions of the FDD are function-
ally the same. Both include an attachment card and the necessary
cabling to interface with an IBM* Series/1 computer. Product and
equipment number correlation is as follows:

Product Number	Equipment Number	Description
80210-10	BR808-A/B**	FDD
	FA741-A	FDD Attachment Card
	MA453-H	BASIC Diskette (P/N 663107XX)
80240-Series	BR812-A/B**	FDD
	FA741-A	FDD Attachment Card
	BG702-Series	MMD
	FA740-C	MMD Attachment Card
	MA453-H	BASIC Diskette (P/N 663107XX)

Organization of this manual is divided into four sections plus an
appendix.

    Section 1 - General Description

    Section 2 - Installation and Checkout

    Section 3 - Maintenance

    Section 4 - Spare Parts Lists

    Appendix A - Diagnostic Aids

---

 *Registered trademark of International Business Machines
  Corporation.

**BR808-A and BR812-A operate with 208/230-V ac input; BR808-B and
  BR812-B operate with 120-V ac input.

The structured analysis method (SAM) listings contained in the
appendix may be removed from this manual and inserted in the
lefthand side of the associated IBM MAP/MIM maintenance logic
manual (MLM) binder. The remainder of this manual may then be
inserted in the righthand side of the same MLM. This allows for
easy cross-referencing between the SAMs and associated procedures
contained in section 3 of this manual when performing maintenance.

Additional manuals providing reference and support-level informa-
tion on the FDD, MMD, and associated attachment cards are
included in the list that follows. All manuals may be ordered
from:

<div align="center">

Control Data Corporation
Literature and Distribution Services
304 North Dale Street
St. Paul, Minnesota 55103

</div>

Title	Publication Number
80210 Flexible Disk Drive and 80230/80240 Mini Module Drive Reference Manual	62947908
Flexible Disk Drive Attachment Feature FA741-A, 80210 Flexible Disk Drive Cabinet, and 80210/80240 Flexible Disk Drive Power Supply Hardware Maintenance Manual (Support Information)	62947910
Flexible Disk Drive, Model 9406 Hardware Maintenance Manual (Support Information)	75888335
80230/80240 Mini Module Drive Hardware Maintenance Manual (Site Information)	62947905
80230/80240 Mini Module Drive and Mini Module Drive Attachment Feature FA740-C Hardware Maintenance Manual (Support Information)	62947907
Certainty Series System Test and Freelance Reference Manual	62947920
Standalone Utilities Users Guide	62981800

CONTENTS

APPENDIX

FIGURES

TABLES

The flexible disk drive (FDD, figure 1-1) is a random-access
storage, program-load device that interfaces with an IBM Series/1
computer via an attachment card. The FDD mounts in the IBM
Series/1 4997 Rack Enclosure and may be combined with a mini
module drive (MMD) or may be mounted alone. The attachment card
for the FDD is installed either in the Series/1 processor unit or
I/O expansion unit. Two cables connect the FDD to the attachment
card, an I/O cable that carries signal interchange and an attach-
ment power cable that provides +20 V to the attachment card.

The FDD uses the double-frequency-coded method of recording data
and can read/write on CDC 421 and IBM Diskette 1 one-sided disk-
ettes and CDC 424 and IBM Diskette 2 two-sided diskettes that are
soft sectored. Each diskette side contains 77 tracks, 75 for
storage and 2 reserved as alternates. Track numbering begins at
the outer edge with 00 and ends in the center with 76. For-
matting of tracks is programmable and may be eight 512-byte sec-
tors, fifteen 256-byte sectors, or twenty six 128-byte sectors.

ATTACHMENT
POWER CABLE

I/O CABLE
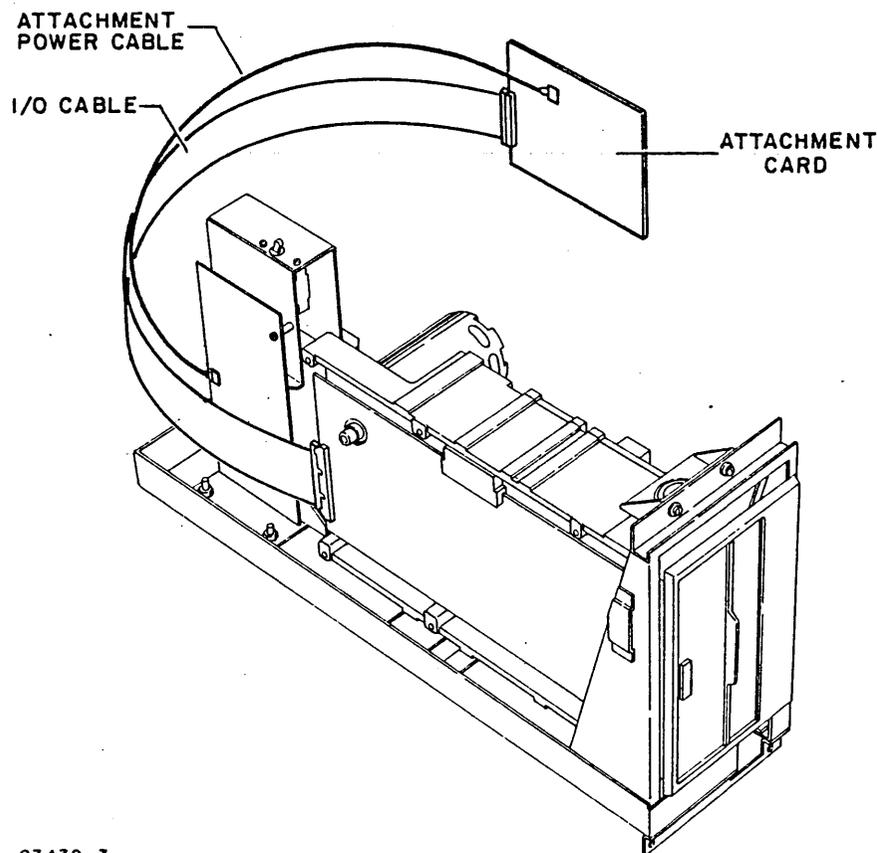
ATTACHMENT
CARD

03439-3

Figure 1-1.   FDD and Attachment Card

Table 1-1 lists the FDD specifications. The remainder of this
section provides a brief physical and functional description of
the FDD and its attachment card. For more detailed descriptions,
refer to the hardware maintenance manuals listed in the preface.

TABLE 1-1.   FDD SPECIFICATIONS

Characteristic	Specification	
Size	Standalone	Nonstandalone
Height	352 mm (13.87 in)	295 mm (11.63 in)
Width	235 mm (9.25 in)	143 mm (5.63 in)
Length	565 mm (22.25 in)	549 mm (21.63 in)
Mass	11.3 kg (25 lb)	11.3 kg (25 lb)

Temperature
  Storage
    Range
    Maximum change
 	
  Operating
    Range
    Maximum change
	
	-35°C to 65°C (-30°F to 150°F)
	33°C/hr (60°F/hr)
	
	10°C to 40.5°C (50°F to 105°F)
	6.7°C/hr (12°F/hr)	

Humidity
  Storage
  Operating
	
	5% to 95%, no condensation
	20% to 80%, no condensation	

Altitude
  Operating
 	
  Transit
	
	305 m (1000 ft) below sea level to 3048 m
	   (10,000 ft) above sea level
	305 m (1000 ft) below sea level to 4560 m
	   (15,000 ft) above sea level	

Power Requirements AC power input	 208/230 V, 60 $\pm$1.2 Hz (BR808-A, BR812-A) 120 V, 60 $\pm$1.2 Hz (BR808-B, BR812-B)	

Recording, Physical
  Bits/byte
  Tracks/surface
  Sectors/track
  Density (nominal)
    Head 0 outer track
          inner track
 	
    Head 1 outer track
          inner track
	
	8
	77
	8, 15, or 26 (format dependent)
	
	1835 b/i (72 b/mm)
	3268 b/i (129 b/mm)
	
	1879 b/i (74 b/mm)
	3408 b/i (134 b/mm)	

Data Capacity*
  Surfaces
  Index
  Tracks
  Tracks/inch
  Sectors/track
  Bytes/sector
  Bits/inch
	
	2, maximum
	1
	154, maximum (77 cylinders, 2 tracks/cylinder)
	48
	8, 15, or 26 (format dependent)
	4096, 3840, or 3328 (format dependent)
	3268	

Unformatted Data Capacity*
  Bytes/track
  Bits/track
  Bits/surface
  Total capacity (bits)
	
	5,208
	41,664
	3,208,128
	6,416,256	

TABLE 1-1. FDD SPECIFICATIONS (CONTD)

Characteristic	Specification
Performance	
Diskette rotation	360 +12.6 r/min
Data transfer rate	249,984 b/s
Latency**	
Average	83.33 ms
Maximum	166.7 ms
Positioning time	
Single track	6 ms, plus 10 ms head setting
Random average	160 ms
Maximum	466 ms
Start/Stop	Less than 2 seconds, maximum

*Based on 8-bit bytes.
**Latency is time required for a particular sector to be located at the selected read/write head after positioning has been completed.

FDD PHYSICAL DESCRIPTION

The FDD is comprised of two field-replacable assemblies, a FDD assembly and a power supply. Figure 1-2 shows the FDD in a combination unit (with a MMD) and in a standalone unit. With the combination unit, the FDD is housed within the MMD cabinet and the front panel On/Off switch controls power to both devices. With the standalone unit, the FDD is housed in a separate cabinet with a separate On/Off switch.
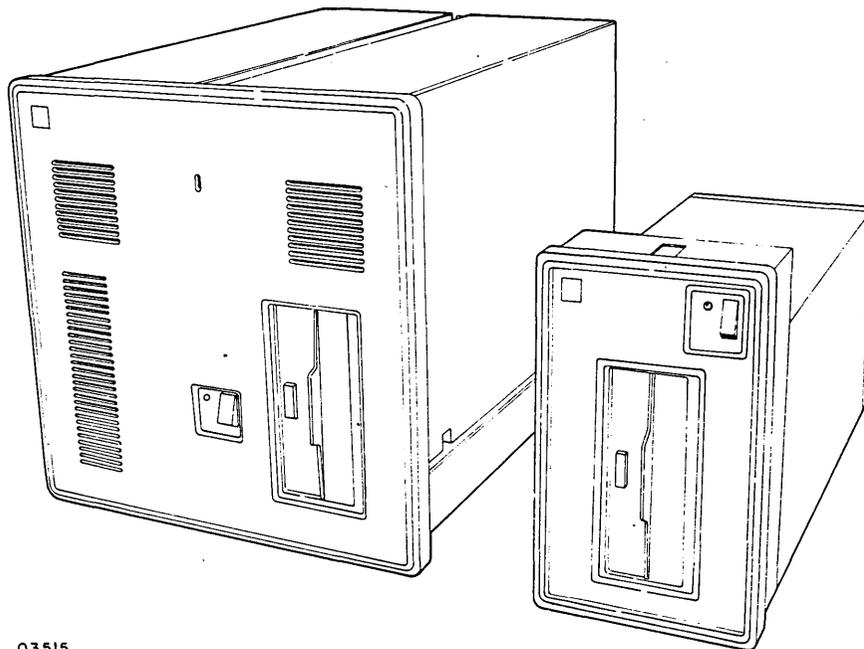
03515

Figure 1-2. Combination and Standalone Units

ATTACHMENT CARD PHYSICAL DESCRIPTION

The attachment card consists of a printed-circuit (PC) card con-
taining large-scale integrated circuits that interface the FDD to
the Series/1 processor (figure 1-3). The card is installed
either in the Series/1 processor unit or I/O expansion unit and
plugs directly into the backpanel I/O connectors. Connection
with the FDD is via the I/O cable, which connects to the front of
the card.

The card receives its required power from two sources, +5 V and
-5 V from the Series/1 power supply via the backpanel and +20 V
from the FDD power supply via the attachment power cable. A
voltage regulator on the card regulates the +20 V to +12 V to
power an integrated circuit that functions as a FDD controller.
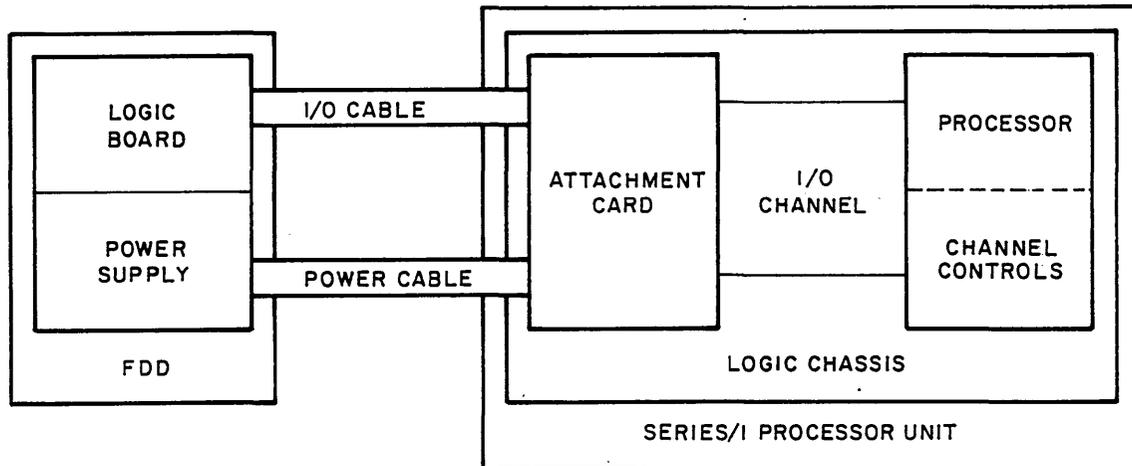
03630

Figure 1-3. Physical Relationship of Attachment Card

FDD FUNCTIONAL DESCRIPTION

The following paragraphs describe the functions of the FDD assem-
bly and power supply that comprise the FDD.

FDD ASSEMBLY FUNCTIONS

The FDD assembly contains the circuits and electromechanical parts necessary to recover and record diskette data. This along with preliminary head movement, head loading, and head selection are all done under direction of the attachment card. The major parts of the assembly (figure 1-4) include the following:

- A spindle and drive motor that holds and rotates the diskette.

- Two carriage-mounted read/write heads (one for each diskette side) designated as heads 0 and 1 that detect magnetized bits on the diskette during a read and record magnetized bits on the diskette during a write. Head 0 is on the right side of the diskette; head 1, on the left.

- A stepping motor that moves the read/write heads back and forth between the inner and outer cylinders of the diskette. (The term cylinder refers to the same track position on two diskette sides.)
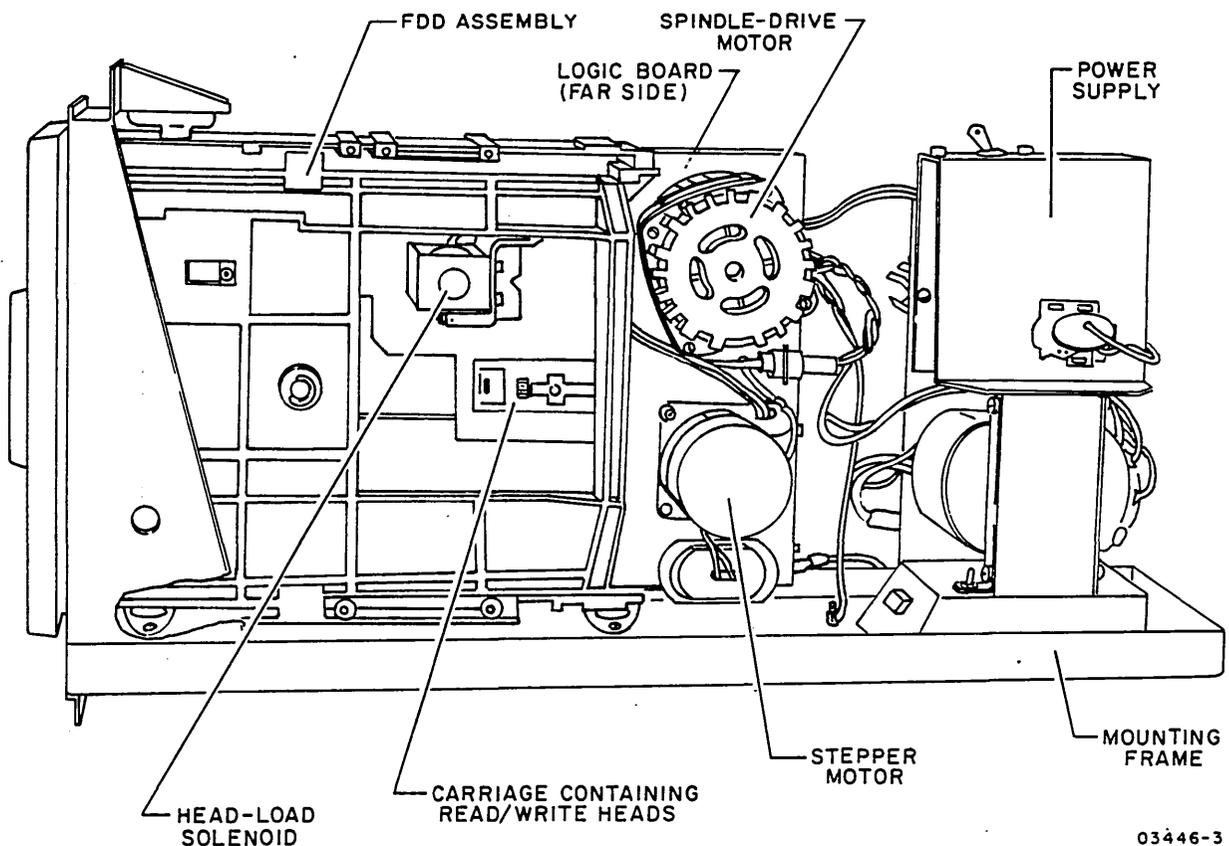
Figure 1-4. Major Components of FDD Assembly

03446-3

- A head-load solenoid that places the heads against the
  diskette.

- A PC logic board that monitors operating status for the
  attachment card and executes its commands.

The next paragraphs describe the status monitoring and command
execution done by the logic board.

Status Monitoring

Following a power-on, the logic board keeps the attachment card
informed of the following status:

- FDD ready
- Diskette type and write protect
- Index
- Heads at cylinder 00
- Write fault

FDD Ready

The logic board sends the attachment card a Ready signal when a
diskette is installed, door is closed, and rotation of the disk-
ette is above 70 percent of nominal 360 rpm. A switch detects if
the door is closed and the rate of Index pulses denote diskette
speed. The Index pulses come from a phototransistor that picks
up the light of a light-emitting diode (LED) each time the index
hole in the diskette rotates between them.

Diskette Type and Write Protect

Diskette Type and Write Protect signals inform the attachment
card whether the installed diskette is one-sided or two-sided and
if it is write protected. These characteristics are detected by
three pairs of LEDs and phototransistors; two of which generate
the previously mentioned Index pulse. The different location of
the index hole in one-sided and two-sided diskettes results in
only one detector outputting an Index pulse, thus distinguishing
diskette type.

The third LED and phototransistor senses whether the write-protect slot in the diskette jacket is open or covered (only CDC diskettes contain this slot). If the slot is open (not covered with opaque tape), the logic board inhibits any writing on the diskette.

Index

The Index pulse is sent to the attachment card to indicate the starting point of the tracks on the diskette and for additional monitoring of diskette speed.

Heads at Cylinder 00

The logic board sends a Track 00 signal when a LED and photo-transistor sense that the carriage containing the heads is fully retracted. In this position, the heads are at cylinder 00 (the outer most cylinder) on the diskette.

Write Fault

If any of the following conditions occur, the logic board sends a Write Fault signal to notify the attachment card that data cannot be properly written:

- Write Enable signal received from attachment card when heads are not loaded.

- Write Enable signal received but no write data.

- Write Enable signal received without erase current being present.

Command Execution

Commands from the attachment card direct all logic board operations. These operations include the following:

- Head movement and selection
- Head load and read/write

Head Movement and Selection

When performing a seek, the attachment card issues a Direction
signal and Step pulses to move the heads and a Head Select signal
that specifies which head is to be used in the subsequent read/
write. For each Step pulse, the logic board alternately ener-
gizes two of the four phases of the stepper motor, moving the
heads one cylinder in or out in accordance with the Direction
signal.

Head Load and Read/Write

To begin a read or write, the attachment card issues a Head-Load
signal that loads the heads against the diskette. The attachment
card then specifies, via a Write Enable signal, whether the
selected head is to read or write. If a read, the recorded bits
sensed by the read/write winding of that head are serially trans-
ferred to the attachment card.

If a write, the erase winding on the selected head is energized
to erase previously recorded data and a write current is applied
to its read/write winding. The polarity of the write current
reverses with each low-to-high transition of the data pulses
received from the attachment card. If the head is on a track
that is 43 or greater, a Low Current signal from the attachment
card causes the write current to be reduced on these more densely
recorded tracks.

After the read or write is complete, the attachment card drops
the Head-Load signal, which retracts the heads from the diskette.

POWER SUPPLY FUNCTIONS

There are two types of power supplies, one that operates with
120-V ac input and another that operates with 208/230-V ac
input. The input voltage comes from the Series/1 ac distribution
panel and is controlled by the On/Off switch on the cabinet
housing the FDD.

The power supply contains a line filter, a transformer, a
rectifier/regulator board, and an ac-entry circuit breaker. The
circuit breaker provides overcurrent protection and has an auxil-
iary coil that trips if any dc output of the power supply goes
exceedingly high. Power supply outputs include the following,
none of which are adjustable:

- +1.5 V that lights the LED adjacent to the On/Off switch to indicate that FDD power is on.

- 104 to 127 V ac that powers the FDD spindle-drive motor.

- +20 V that goes to the attachment card via the attachment power cable.

- +5 V and +24 V that powers the FDD logic board and associated electromechanical parts.

ATTACHMENT CARD FUNCTIONAL DESCRIPTION

The following paragraphs describe the overall functions of the attachment card and its performance during an initial program load (IPL).

OVERALL FUNCTIONS

The attachment card interfaces the FDD to the Series/1 processor and serves as the FDD controller. The attachment card interprets the commands from the processor, checks its status and status of the FDD, performs the instructed operation, and responds with condition codes and interrupt information to indicate if the operation completed successfully. Except during an IPL, all seek, read, and write operations listed in table 1-2 are initiated when the attachment card receives a start command. The accompanying instructions in the start-command device control block (DCB) specify the operation to be performed and contain parameters that govern the operation. Parameters include:

- Seek difference, seek direction, and head selection – given for all seeks except a recalibration seek. These seek parameters specify the number of cylinders the heads are to move, the direction, and the head that is selected for subsequent read/write operations.

- Sector length and cylinder number – given for all read/write operations. Sector length specifies the length of sectors on the diskette, or if a write format, the format that is to be written (eight 512-byte sectors, fifteen 256-byte sectors, or twenty six 128-byte sectors). In conjunction with the head that is selected, the cylinder number indicates the track location for the read/write.

- Sector number - given for all read/write operations except read sector ID and write format. The sector number indicates the starting sector location for the read/write.

- Byte quantity and data address - given for all read/write operations except read-verify and write format. Byte quantity specifies the number of data bytes that are to be read or written. The data address indicates the Series/1 memory location where the first two data bytes read are to be transferred, or if a write, where the first two write-data bytes are to be retrieved. Other data bytes are transferred to/from successive address locations until the byte quantity is satisfied.

TABLE 1-2.   SEEK, READ, AND WRITE OPERATIONS

OPERATION	FUNCTION
Recalibration seek	Moves heads to cylinder 00 and selects head 0.
Seek	Moves heads and selects head per seek parameters.
Read sector ID	Transfers data from the first sector ID field read into Series/1 memory.
Read data	Transfers data from sector data field(s) into Series/1 memory. If the attachment card encounters a control-address marker, reading automatically halts at the end of that sector and the attachment card returns a unit-exception interrupt condition code and sets bit 3 of cycle steal status word 1.
Read-verify	The attachment card reads and checks the accuracy of the data written in the previous operation. No data is transferred to the Series/1 and the attachment card disregards control-address markers.
Write data with data-address marker	Writes data from Series/1 memory in sector data field(s), and attachment card automatically inserts a data-address marker (FB_{16} byte) preceding the data in each sector written. If a written data field is not full, the attachment card pads the remainder of the field with zeros.

TABLE 1-2. SEEK, READ, AND WRITE OPERATIONS (CONTD)

OPERATION	FUNCTION
Write data with control-address marker	Same as other write-data operation except that the attachment card inserts a control address marker ($F8_{16}$ byte) instead of a data-address marker.
Write format	Initializes a track per the format specified in sector-length parameter and fills the data fields of each sector written with a selected data pattern. If the program loaded in the Series/1 determines the track is defective (read-verify of track unsuccessful), the track is formatted into twenty six 128-byte sectors with FF_{16} bytes in every sector ID.

For an operation to be performed, the DCB must contain legal parameters, write data retrieved from Series/1 memory must be free of parity errors, and status of the FDD and attachment card must show that no error condition exists. If any of the preceding errors occur, the attachment card returns an interrupt condition code of unit exception and indicates the reason for unsuccessful completion in cycle steal status (significance of the cycle steal status words is described in appendix A).

In performing the operations, the attachment card issues the necessary commands to the FDD, finds the specified sector for the read or write, assembles the serial data that is read into 16-bit words, serializes the data words that are written, and transfers the data to/from the Series/1 memory. Accuracy of data transfers between the attachment card and Series/1 memory are verified by two parity bits that accompany each word that is transferred. Accuracy of diskette data is verified by two cyclic-redundancy-check (CRC) bytes that are recorded at the end of each sector ID and data field.

When performing a write, the attachment card checks the parity of words retrieved from memory, deletes the parity bits, and automatically calculates and inserts a CRC checksum in each field written. When performing a read, the attachment card adds parity bits to words transferred to memory, calculates a CRC as data is read, and compares the calculated checksum with the previously recorded CRC bytes. If the checksums do not compare, reading automatically halts and the attachment card returns a unit-exception interrupt condition code and sets bit 7 of cycle steal status word 1.

INITIAL PROGRAM LOAD (IPL)

The IPL sequence provides the Series/1 processor with the neces-
sary program data to begin operations. For the sequence to
occur, the diskette containing program data must be installed in
the FDD, the Series/1 IPL Source switch set to correspond with
the IPL assignment of the FDD (primary or alternate), and
Series/1 Load switch pressed. The latter two actions cause the
Series/1 processor to issue an appropriate IPL selection code on
the Status Bus lines and output an Initiate IPL signal. Upon
receipt, the attachment card automatically performs a recalibra-
tion seek, placing the heads at cylinder 00 and selecting
head 0. When the next Index pulse occurs, the attachment card
does an automatic read-data operation using a byte quantity of
256 (two 128-byte sectors) and a data address of 0000_{16}. If
the 255th and 256th bytes read equal a word of $83C4_{16}$, the
attachment card continues the operation until the data from the
remaining 24 sectors on cylinder 00, head 0, has been transferred
to Series/1 memory. The automatic reading of 26 sectors occurs
when loading the diagnostic programs from the BASIC diskette.

If the attachment card detects an error condition during the
sequence, it stores a 6410, 6411, 6412, 6420, or 6421_{16} code in
memory location 0000_{16} to indicate that IPL was unsuccessful.
Processor receipt of any of these codes result in $00E5_{16}$ being
shown on the Series/1 operator/programmer panel indicators.
(Corrective action for these circumstances is given in paper-only
SAMs in appendix A.)

This section contains packaging, installation, and checkout
information for the FDD.

CAUTION

MOS circuit-handling precautions are
given in the maintenance section under
Precautions for Safety and Equipment
(para 3.0.1). Observe these precau-
tions when handling or packaging the
attachment card.

PACKAGING

The following packaging information only applies to the stand-
alone FDD. Packaging of the MMD/FDD combination is covered in
the MMD site information manual (refer to preface for publication
number).

The FDD, mounting parts, and attachment card are shipped in
corrugated containers and no unpackaging instructions are neces-
sary. If the FDD is reshipped, it must be packaged as it was at
the factory. Packaging material and/or instructions may be
obtained from:

Control Data Corporation
Corporate Traffic
8100 34th Avenue South
Minneapolis, Minnesota 55440

When ordering packaging material, specify the exact equipment
number and series code of the FDD as shown on its equipment iden-
tification label.

INSTALLATION

This portion of the section provides instructions for:

- Installing standalone FDD
- Installing attachment card and cabling

INSTALLING STANDALONE FDD

The following installation instructions only apply to the stand-
alone FDD. Installation of the MMD/FDD combination is covered in
the MMD site information manual.

1. Unpackage FDD, mounting parts, and attachment card and
   inspect for shipping damage. File promptly any claim for
   damage with the transporter involved. If a claim is
   filed, save original packaging materials.

                              CAUTION

          Do not use a "lead" pencil to set
          rocker switches. Graphite dust from
          pencil can cause an equipment
          malfunction.

2. Look through perforated cover and verify that the eight
   rocker switches on FDD PC board are set in the following
   positions. If not, remove perforated cover (para 3.1.1 in
   maintenance section) and set switches using a ball-point
   pen. Replace cover when done.

   ● Switches 1 and 5 in ON position (ON side of switch
     pressed down).

   ● Other switches in OFF position (OFF side of switch
     pressed down).

3. Install equipment identification label and FCO log for
   attachment card on FDD as shown in figure 2-1.

4. Remove front panel from Series/1 rack enclosure where FDD
   is to be installed.

5. If mounting location already contains a mounting rack, go
   to step 6. Otherwise, position mounting rack in frame and
   fasten in front with four screws on each side (figure 2-1).

6. Rectangular cutout in bottom of FDD frame engages with one
   of the retaining clips on mounting rack. Be careful not
   to damage power cord or cables and engage FDD in desired
   side of mounting rack.

7. Route power cord, I/O cable, and attachment power cable to
   rear of Series/1 cabinet.
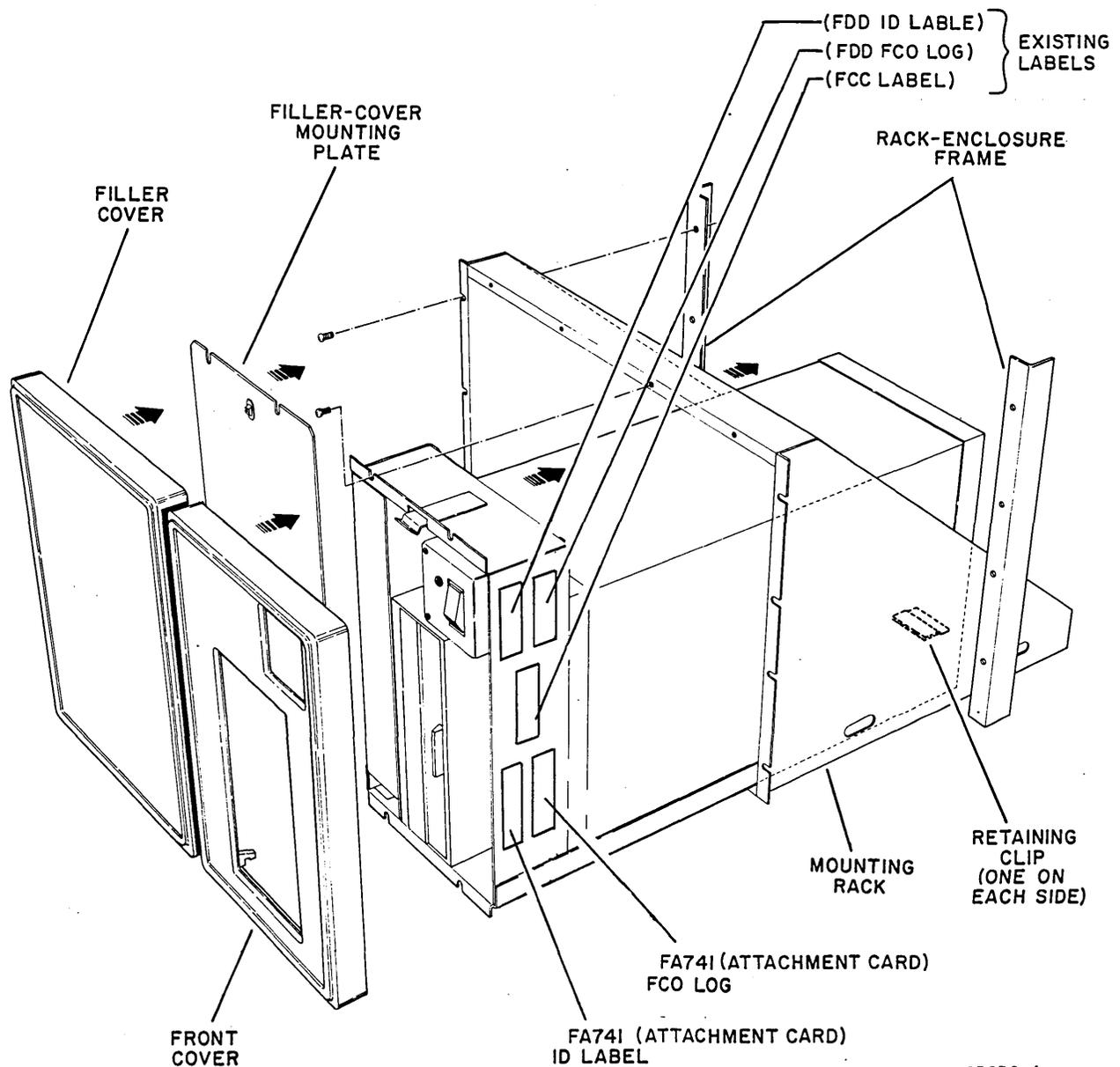
Figure 2-1. Installation of Standalone FDD

8. Using two screws at top and bottom, fasten FDD to front of mounting rack.

9. If other half of mounting rack is vacant, install filler cover:

   a. Position filler-cover mounting plate over vacant side of mounting rack as shown in figure 2-1 and fasten with four screws.

   b. Press filler cover onto mounting plate.

10. Hook bottom of front cover on FDD frame and snap cover into place.

11. If unit is rated for 120 V, go to step 13. See figure 2-1.1 for 120 V, 60 Hz programming plug configuration.

12. For 208 V or 230 V units, proceed as follows:

    a. Measure ac source voltage at outlet to which FDD is to be connected.

    b. If the source voltage is less than or equal to 220 V, then go to step 13. See figure 2-1.1 for 208 V, 60 Hz programming plug configuration.

    c. If the source voltage is greater than 220 V, then the FDD programming plug at location J02 on the power supply must be restrapped for 230 V, 60 Hz. Using a pin extractor (part number 51876100), restrap programming plug using figures 2-1.1 and 2-1.2 as references.

13. Verify that on/off switch for FDD is pressed to OFF and open rear door of Series 1 cabinet. Connect power cord from FDD to Series 1 ac distribution panel, but leave switch off.

115V, 60 Hz   208V, 60 Hz   230V, 60 Hz
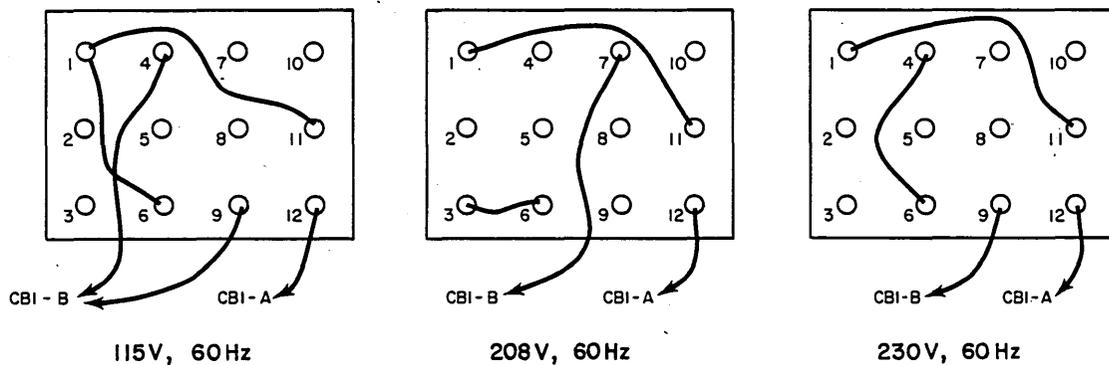
PPG-0412-1A

Figure 2-1.1 FDD Power Supply Programming Plug (J02)
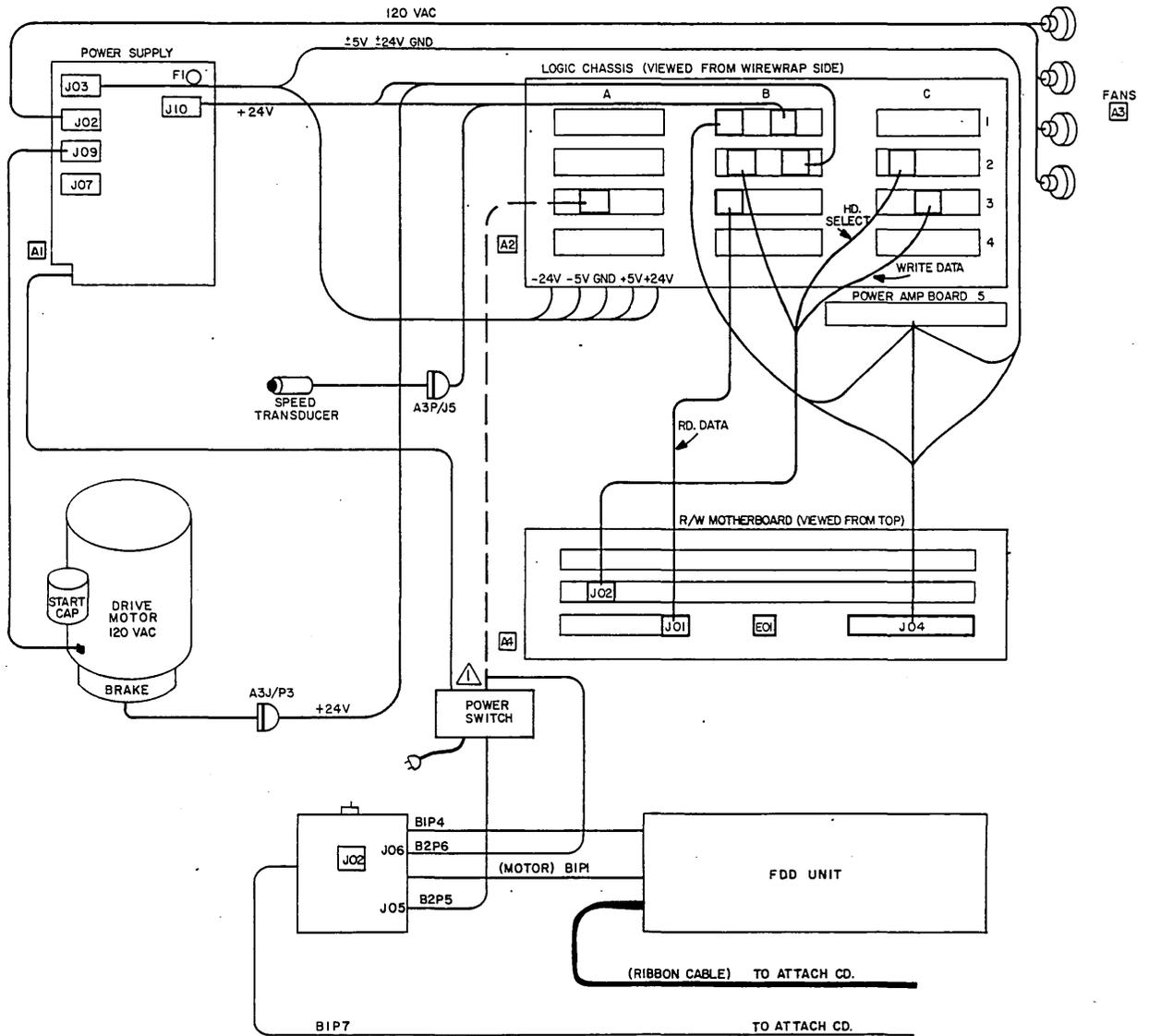
Figure 2-1.2   MMD/FDD Diagram with Jumper Location Codes

INSTALLING ATTACHMENT CARD AND CABLING

Install attachment card and cabling as follows:

NOTE

The attachment card requires +5-V and
-5-V power from the I/O channel. The
card cannot be installed in card loca-
tion A (extreme left location in
chassis) unless the unit is a 4952-A.
A 4952-A is the only model that has
both voltages in location A.

1. Confer with customer to determine required location of
   attachment card in Series/1 (either in processor unit or
   I/O expansion unit), required device address, and whether
   FDD is to be assigned as primary or alternate IPL device.

NOTE

Priority is established in order of
placement from right to left within
each chassis. The processor unit has
higher priority than the I/O expansion
unit.

CAUTION

Do not use a "lead" pencil to set
rocker switches. Graphite dust from
pencil can cause an equipment
malfunction.

2. Set rocker switches on attachment card for FDD device
   address and IPL assignment (figure 2-2). For example, to
   assign device address 13_{16}, set switches S1-6, S1-9, and
   S1-10 so that OPEN side of switch is pressed down (logi-
   cal 1), and set switches S1-3, S1-4, S1-5, S1-7, and S1-8
   so that closed sides are pressed down (logical 0). To
   assign FDD as primary IPL device, set S1-1 to closed posi-
   tion and set S1-2 to OPEN position.

3. Power off processor unit or I/O expansion unit, as appli-
    cable, by pressing associated On/Off switch at front of
    unit.

4. Remove snap-on cover from front of processor unit or I/O
    expansion unit as applicable and loosen I/O cable retain-
    ing bracket at top of unit.

5. Open rear door of Series/1 cabinet and route I/O cable and
    attachment power cable through retaining bracket to front
    of chassis. Allow enough cable to reach attachment card
    and retighten retaining bracket.

6. Connect attachment power cable to connector on side of
    attachment card (connector orientation is not important).

7. Install attachment card in chassis not more than two card
    locations away from any existing card.
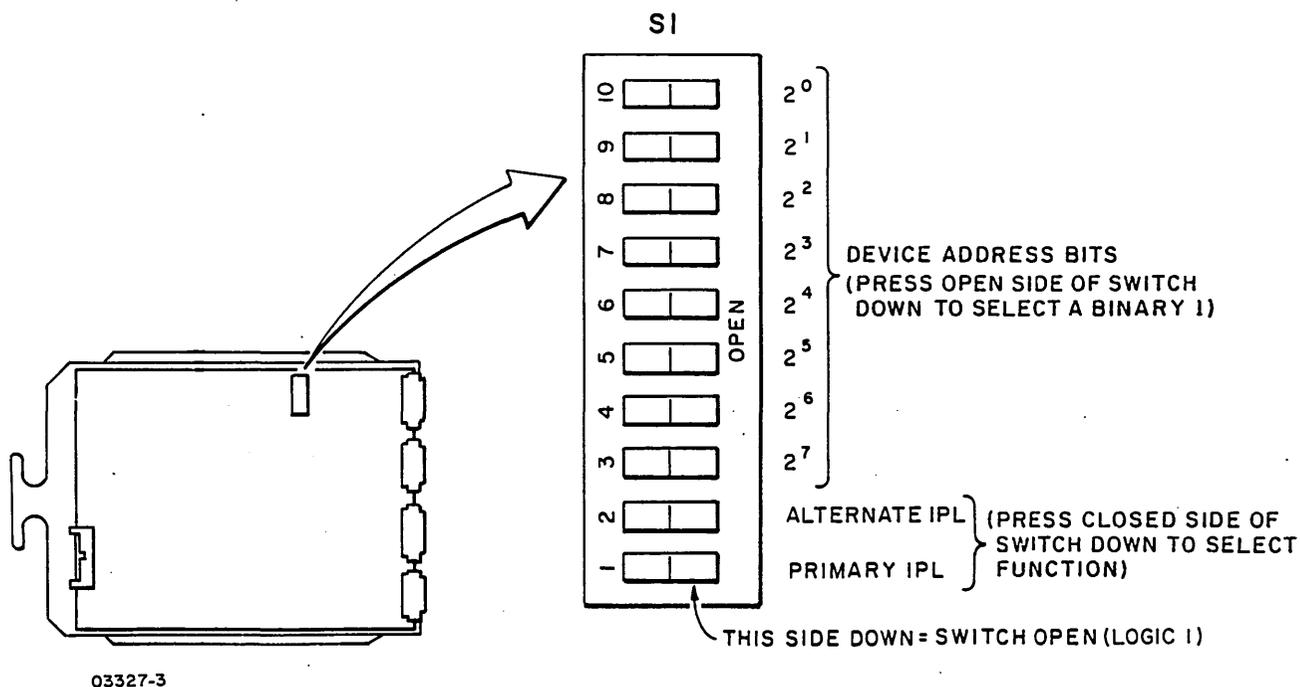
Figure 2-2. Attachment Card Switches

NOTE

> If the attachment card is being
> installed between cards that are sepa-
> rated by more than one open card slot,
> remove the poll-propagate jumper (back-
> panel pins M11 and M12) from the slot
> containing attachment card. In some
> units, poll-propagate jumpers may be
> installed even though an expansion
> chassis is not present. Refer to Poll-
> Propagate Wiring in the applicable
> processor theory manual for additional
> information.

8. Observe direction of arrow (I/O cable is installed so that
   arrow points up to red stripe) on I/O cable connector and
   connect I/O cable to front of attachment card (figure 2-3).

CAUTION

> Existing cables are marked with arrow
> pointing up when correctly installed.
> Newer cables are keyed to be installed
> one way only.

9. Press FDD On/Off switch to On and check that adjacent LED
   lights. If not, go to rear of cabinet and change position
   of circuit breaker on FDD power supply through access hole
   in perforated cover.

10. If attachment card is being installed in a 4952-A, skip
    the following and go to step 11. For all other models,
    adjust overcurrent and +5-V potentiometers as follows:

    a. Apply power to unit in which attachment card is
       installed.

NOTE

> If chassis power does not come up,
> turn overcurrent potentiometer (fig-
> ure 2-3) clockwise one full turn;
> press unit On/Off switch to Off, then
> to On. Keep repeating this clockwise
> adjustment and power sequencing until
> power comes up.

    b. Turn overcurrent potentiometer slowly counterclockwise
       until power goes off. Then turn potentiometer as
       follows:

       ● 4953-A/C (125 watt supply) - eight-full turns
         clockwise.

LOGIC CHASSIS
ATTACHMENT
POWER CABLE

I/O CABLE

EXISTING CARD(S)

PIN I
WH₁

RED
STRIPE

ARROW
POINTING
UP

UP

FDD ATTACHMENT
CARD

PROCESSOR
UNIT OR I/O
EXPANSION UNIT
POWER SUPPLY
LOCATION.
(BEHIND OPERATOR/
PROGRAMMER PANEL
ON PROCESSOR UNIT)
SEE BELOW.

CBI

+5-VOLT
POTENTIOMETER

OVERCURRENT
POTENTIOMETER

+5-VOLT
POTENTIOMETER

OVERCURRENT
POTENTIOMETER

**400-WATT
POWER SUPPLY**

**125-OR 300-WATT
POWER SUPPLY**

02979-10

Figure 2-3.   Overcurrent Potentiometer and Attachment Card Cabling

- 4953-B/D, 4955-A/B/C/D, and 4959 (300-watt supply) – four-full turns clockwise.

- 4952-B, 4955-E (400-watt supply) – seven-full turns clockwise.

c. Press unit On/Off switch to Off, then to On. If Check indicator on Series/1 operator/programmer panel lights following power application, an electrical malfunction exists on attachment card or problem has developed in the Series/1. Replace attachment card and retry. If error persists, remove attachment card and retry to determine if problem is in Series/1.

d. Press On/Off switch to Off and remove backpanel cover from unit logic chassis.

CAUTION

   If probes short a signal pin and volt-
   age pin with power applied, logic cir-
   cuits will be damaged.

e. Connect voltmeter to following backpanel pins (fig-ure 2-4):

- +5-V pin at A2D03
- Ground pin at A2D08

f. Press On/Off switch to On and adjust +5-V potentiometer for +5 ±0.5 V (figure 2-4). Adjust as close to nominal as possible.

g. Press On/Off switch to Off, disconnect voltmeter, and replace backpanel cover.

h. Press On/Off switch to On.
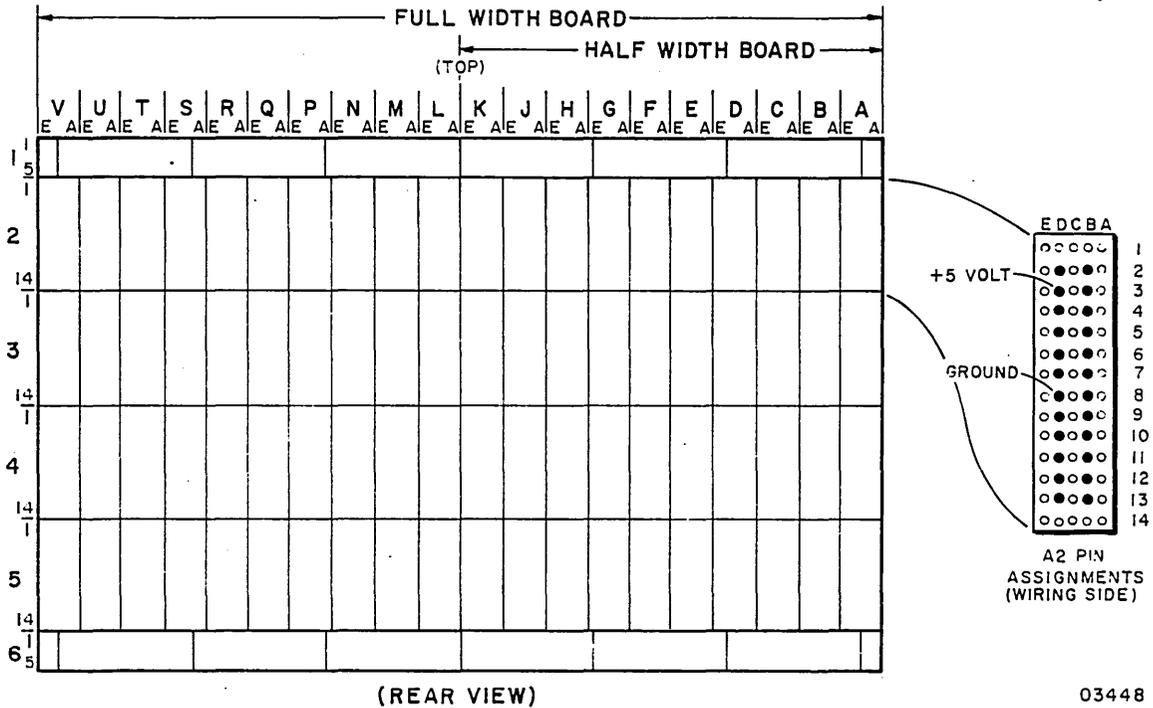
Figure 2-4. Backpanel Pin Configuration

11. The following applies only to a 4952-A model. Verify
    Minimum Load switch is set correctly:

    a. Remove rear cover of power supply and lower hinged
       transformer box to view switch (figure 2-5).

    b. If four cards or less are installed in logic chassis,
       set switch to On (up) position. If five or more cards
       are installed, set switch to Off (down) position.

    c. Swing up transformer box and replace cover.

    d. Press unit On/Off switch to On. If Check indicator on
       Series/1 operator/programmer panel lights following
       power application, an electrical malfunction exists on
       attachment card or problem has developed in the
       Series/1. Replace attachment card and retry. If error
       persists, remove attachment card and retry to determine
       if problem is in Series/1.

MINIMUM LOAD
SWITCH (SHOWN ON)

03443
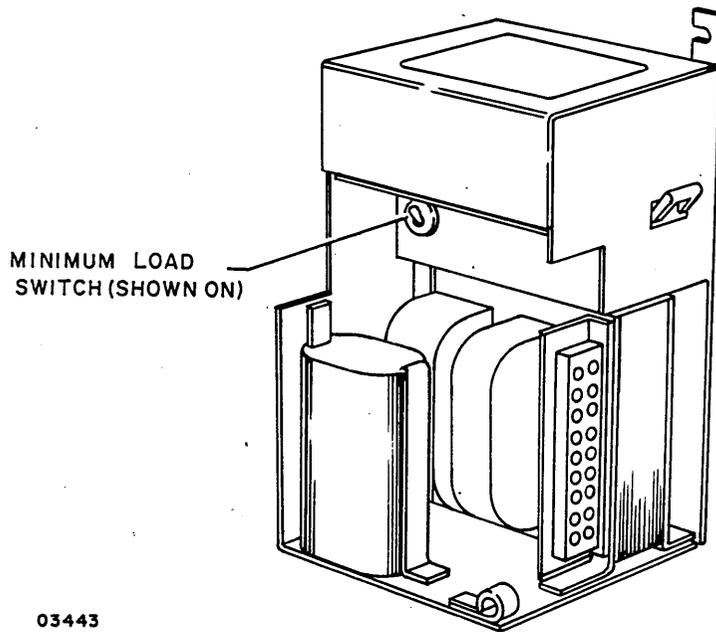
Figure 2-5. Minimum Load Switch (4952-A)

12. Verify that red LED on attachment card is not lit (LED stays on if self-test error occurs). Replace attachment card if LED remains lit.

13. Replace front snap-on panel and close rear door of Series/1 cabinet.

CHECKOUT

Checkout of the FDD involves:

● Configurating BASIC diskette
● Diagnostic checkout

CONFIGURATING BASIC DISKETTE

The FDD must be added to the system configurator table on the applicable CDC BASIC diskette. The configurator table on each diskette must as a minimum contain the configuration information for all devices to be tested by that diskette. The following

procedure describes the steps to be used for updating the configurator table by either adding the devices individually, or by performing the configure system option (0C).

NOTE

The configurators on IBM diskettes do not recognize CDC devices. Therefore, do not attempt to use an IBM configurator to construct the configurator table on a CDC BASIC diskette. All CDC devices will be configured wrong.

1. Install CDC BASIC diskette, part number 663107XX, in FDD (para 3.0.6.2 in maintenance section).

NOTE

The CDC BASIC diskette has a pre-assigned alternate console selected for either a CDC 80610 display or an IBM 4979 display (AATT = 0442).

2. Place IPL Source switch on Series/1 operator/programmer panel to Alternate or Primary position as applicable to enable loading from diskette.

3. Place Mode switch on Series/1 operator/programmer panel to Diagnostic position.

4. Press Load switch on Series/1 operator/programmer panel. This starts IPL execution. Execution time is approximately twenty two seconds. Go to step 4a, 4b, 4c, or 4d as applicable.

NOTE

To enter commands from an assigned alternate console, key in the command characters and press ENTER key if a display station or Carriage Return key if a TTY.

a. If an alternate console is assigned per·the pre-configured diskette (see note of step 1), all messages appear on assigned alternate console and on operator/programmer panel if present.

- If a configurator error message appears on console screen (3822_{16} on operator/programmer panel), this signifies that configurator table does not match system configuration. Go to step 5 to update table.

- If a secure customer interface message appears on screen, ($382A_{16}$ on operator/programmer panel), go to step 11.

- If any other message appears on screen ($38XX_{16}$ on operator/programmer panel), that condition must be corrected before continuing. Refer to para 3.9 for list of halt codes.

b. If either a 80610, 4978, 4979, or TTY display device is present, but no message appears on screen, and an operator/programmer panel is not available, do the following to assign an alternate console:

- Install an existing diskette (IBM or CDC) that has an alternate console assigned correctly.

- Press Load switch to IPL diskette.

- When IPL is complete, message appears on screen. Remove diskette and install diskette that is to be configured.

- Enter B38F9 (menu appears on screen).

- Enter F02 to select patch program option.

- Enter F38F1 (data set name).

- Enter F3008 (start address).

- Enter F0001 (word count).

- Enter device address and device type of desired alternate console using format of FAATT where:
  AA = device address.
  TT = device type of alternate console as follows:
      40 for a TTY device.
      42 for either a CDC 80610 or an IBM 4979 display.
      45 for an IBM 4978 display.

- A patch-complete message indicates that new alternate console assignment has been written on diskette.

- Press Load switch. After IPL is complete, all messages will now appear on assigned alternate console. Go to step 5 to update configurator table.

c. If a display station or TTY is present, and a 3801_{16} halt code appears on operator/programmer panel, but no message appears on screen, do the following to assign an alternate console:

NOTE

(B) = Data Buffer switch
(I) = Console Interrupt switch

- Enter (B),6,(I),(I) to continue.

- Next halt code is a 382A (secure customer interface), a 3822 (configuration errors on system), or a 382E (option table available for entry).

  - If a 382A halt code, secure customer interface and enter:
    (B),6,(I),(I) to advance to 3822 or 382E.

  - If a 3822 halt code, enter:
    (B),1F,(I),(B),0300,(I),(I) to advance to 382E.

  - If a 382E halt code, enter:
    (B),1F,(I),(B),0400,(I),(I) to select alternate console option.

- Next halt code is a 3821 (enter alternate console device address and device type). Enter:
  (B),1F,(I),(B),AATT,(I),(I) where: AA = device address and TT = device type. If a 3829 (no device) halt occurs, an entry error has been made. Enter:
  (B),6,(I),(I) to continue and reselect alternate console option.

- Next halt code is a 382E (option table is available for entry). Enter:
  (B),1F,(I),(B),0D00,(I),(I) to write new alternate console assignment on diskette.

- Next halt code is a 382C (copy configurator table to another diskette?). Enter:
  (B),1F,(I),(B),0500,(I),(I) to terminate.

- A 3800 or 3805 halt code indicates completion of program terminate function.

- Press Load switch to re-IPL. All messages will now appear on assigned alternate console. Go to step 5 to update configurator table.

d. If no display station or TTY console is present and a 3801_{16} halt code appears on operator/programmer panel, perform the following to change configurator table using operator/programmer panel:

NOTE

(B) = Data Buffer switch
(I) = Console Interrupt switch

- Enter (B),6,(I),(I) to continue.

- Next halt code is a 382A (secure customer interface), a 3822 (configuration errors on system), or a 382E (option table available for entry).

  - If a 382A halt code, secure customer interface and enter:
    (B),6,(I),(I) to advance to 3822 or 382E.

  - If a 3822 halt code, enter:
    (B),1F,(I),(B),0300,(I),(I) to advance to 382E.

  - If a 382E halt code, enter:
    (B),1F,(I),(B),0400,(I),(I) to select assign alternate console option.

- Next halt code is a 3821 (enter alternate console device address and device type). Enter:
  (B),1F,(I),(B),0000,(I),(I) to assign operator/ programmer panel as alternate console.

- Next halt code is a 3832 (operator/programmer panel is the assigned alternate console).

- Enter (B),6,(I),(I) to continue.

- Next halt code is a 382E (option table is available for entry). Enter:
  (B),1F,(I),(B),0D00,(I),(I) to write new alternate console assignment on diskette.

- Next halt code is a 382C (copy configurator table to another diskette?). Enter:
  (B),1F,(I),(B),0500,(I),(I) to terminate.

- A 3800 (ready) halt code indicates system is ready for any valid input. Go to para 3.7.1 to update configurator table manually, or to para 3.7.2 to perform configure system option (0C).

5. Enter F03 to display option table.

6. Enter F0B to bypass option table display.

7. Skip steps 8 through 15 if configurator table is to be updated manually and go directly to step 16.

8. Enter F0C to select configure system option and follow series of prompts on alternate console. The new configurator table will automatically be written on diskette.

9. An option to write configurator table on another diskette or to terminate then appears on screen. Terminate by entering F05. A PT RDY ENTER then displays on screen.

10. Enter B38F0 to display option table.

11. Enter F0B to bypass option table display.

NOTE

Some CDC and IBM devices have the same read ID codes assigned. The configure system option assigns CDC device types to all IBM devices that have the same read ID code as the CDC devices. These IBM devices must be manually changed in the configurator table. Also, if a CDC 80270 or 80271 storage module drive having a read ID of 3007 is present in the configurator table, the device type must be changed from 72 to 70. To determine which device types in the table require changing, enter F09 (print system equipment) to display all system devices contained. Compare this listing with customer equipment list to determine which device types to change.

12. Enter F01 to display configurator table.

13. Enter F03 to select modify option.

14. Enter correct device type for each table entry to be modi-
    fied by following prompts on alternate console. Refer to
    table 2-1 for device-type assignments.

15. Go to step 19.

16. Enter F01 to display configurator table.

17. Enter F0A (add option), F02 (delete option), F03 (modify
    option), or any other desired option from option table as
    applicable to make changes or additions to configurator
    table.

TABLE 2-1. IBM/CDC DEVICE-TYPE ASSIGNMENTS

READ ID	IBM PRODUCT/DEVICE TYPE		CDC PRODUCT/DEVICE TYPE	
0406	4979	44	80610	42
0206	4974	64	80420	62
0106	4964	48	80210	46
00AA	4962	78	80230	72
00CA	4962	78	80230	72
0306	4973	68	80450	66

18. Enter FDD device parameters per the following format:

        F XX46 0000 0106 0000 0000 0000 0000 0106
          | | |_____|
          | | Read ID
          | |
          | |__Device Type
          |
          |____Device Address (use address that was established
               by switch settings on attachment card)

    Response to above input is:

    FUNCTION
    ENTER

                              NOTE

        Configuration information for all
        other CDC devices contained in the
        system may be entered at this time.
        Refer to the applicable site informa-
        tion manual for individual device-
        entry parameters.

19. Enter F01 to display configuration table. Verify that parameters were correctly entered.

20. Enter F0D to write new configuration information on diskette. If additional diskettes are to be written, install diskette and repeat this step for each diskette.

21. Enter F05 to terminate program. A PT ENTER message appears. Diskette is ready for running diagnostic tests.

DIAGNOSTIC CHECKOUT

Check out the FDD and attachment card as follows:

1. Run the following FDD diagnostic tests (para 3.6):

   ● Auto-diagnostic tests 4600 through 4603
   ● Manual diagnostic tests 4611 and 4610

2. Run CDC system test and freelance (diskette part number 663092XX) to verify correct system operation. System test and freelance reference manual contains instructions (refer to preface for publication number).

NOTE

New IBM diskettes are formatted,
whereas new CDC diskettes are not.

3. If customer will be using CDC diskettes, be sure that operating personnel are aware that new diskettes require formatting before data storage use. Customer may format diskettes using a standard utility of an operating system, or if a 128-byte-sector format is to be used, diskettes may be formatted using IBM Series/1 Stand-Alone Utilities described in IBM publication GC34-0070.

This section contains on-site maintenance information for the
FDD. This information is divided into the following major para-
graph groups:

NOTE

There is no preventive maintenance for
the FDD.

- 3.0 General Maintenance Information - Contains informa-
  tion that maintenance personnel should be familiar with
  before doing maintenance: precautions for safety and
  equipment (3.0.1); troubleshooting philosophy (3.0.2);
  maintenance tools and materials (3.0.3); FDD controls and
  indicators (3.0.4); physical location codes (3.0.5);
  operating FDD (3.0.6).

- 3.1 Accessing FDD for Maintenance - Contains procedures
  for accessing the FDD in a standalone unit and in a combi-
  nation unit.

- 3.2 through 3.5 - Contain removal and replacement proce-
  dures for the field replaceable parts of the FDD. These
  procedures are associated with the SAM (structured
  analysis method) listings contained in appendix A.

- 3.6 CDC BASIC Diskette Diagnostics - Gives instructions
  for loading and running the FDD diagnostics.

- 3.7 and groups thereafter - Provide a summary of perti-
  nent MAP 0010 Diagnostic Service Guide information.

3.0 GENERAL MAINTENANCE INFORMATION

3.0.1 Precautions for Safety and Equipment

<u>WARNING</u>

Observe the following precautions at
all times. Failure to do so may cause
damage and and/or personal injury.

● When at all possible, do maintenance work with the FDD
  On/Off switch Off. With the switch On, line voltage (120
  or 208/230 V ac) is present at the FDD power supply and
  104 to 127 V ac from the power supply goes to the
  spindle-drive motor.

● Always turn off power when disconnecting/connecting cables.

● Do not install a diskette in the FDD without power being
  on. Failure to do so may damage the diskette or cause the
  spindle-drive belt to slip off.

● The attachment card contains metal-oxide semiconductor
  (MOS) integrated circuits. MOS circuits are susceptible
  to damage from static electricity and require the follow-
  ing handling:

  - Turn off power to Series/1 and FDD before reseating,
    removing, or installing the attachment card.

  - Ensure that any item that comes in contact with the card
    is electrically grounded.

  - Touch logic chassis to bleed off any accumulated static
    charge before handling the card and continue to touch
    chassis while removing or installing it.

  - Handle only a noncircuit portion of the card. Con-
    nector pins and circuit paths must not be touched.

  - When the card is removed and is to be carried to another
    location or is to be shipped, wrap it in static
    protective material, such as aluminum foil or conduc-
    tive foam.

3.0.2 Troubleshooting Philosophy

Aids for troubleshooting the FDD consist of the 46XX diagnostic
tests residing on CDC BASIC diskette part number 663107XX and the
SAMs contained in appendix A. When a diagnostic test detects an
error, the corresponding SAM describes the applicable corrective
action. This may involve doing one of the remove and replace
procedures in this section or going to one of the supplemental
paper-only SAMs to further define the problem.

If another FDD is available, use a scratch diskette (a diskette
that does not contain any wanted information) in the unit to be
tested and load the diagnostics on the BASIC diskette from the
other unit. This assures that the problem in the test unit will
not interfere with program loading. Instructions for loading and
running the diagnostics in this way are given under para 3.6,
which also includes similar instructions for when no other unit
is available.

When no other unit is available, the problem in the FDD may make
it impossible to load the diagnostics so they can be used for
troubleshooting. If this occurs, use the following paper-only
SAMs as applicable:

- SAM 4670 (Power-On and IPL Problems) is to be used when
  IPL of the BASIC diskette cannot be accomplished.

- SAM 4672 (Not Ready Status) is for when IPL is successful,
  but diagnostics do not execute, end abnormally (with or
  without a message), or end with a meaningless abort
  message.

Regardless of the troubleshooting method, always run the FDD
diagnostics afterward to verify that the problem is corrected.

3.0.3 Maintenance Tools and Materials

Besides the usual hand tools (screwdrivers, wrenches, etc.), FDD maintenance requires the items listed in the following table.

MAINTENANCE TOOLS AND MATERIALS

DESCRIPTION	PART NUMBER
Voltohmmeter	Ballantine 345 or equivalent
Extender, card*	CDC 61408349
Pin Extractor	CDC 51876100
*For use with FDD attachment card	

3.0.4 FDD Controls and Indicators

The controls and indicators on the FDD are shown on the next page and the following table explains their functions.

CONTROL/INDICATOR FUNCTIONS

CONTROL/INDICATOR	FUNCTION
On/Off Switch and LED (Light-Emitting Diode)	Pressing the switch to On applies power to the FDD, provides +20 V to the FDD attachment card, lights the LED, and if a combination unit, applies power to the associated MMD. Pressing switch to Off removes power and extinguishes the LED.
Circuit Breaker (2.5 A/120 V ac, 1.5 A/208/230 V ac)	Provides overcurrent protection for the FDD power supply and contains an auxiliary coil that trips if any dc voltage goes exceedingly high.
Rocker Switches	These switches numbered 1 through 8 control the gating of Unit Select and Ready signals to/from the FDD. Switches 1 and 5 must be pressed down in the ON position and the others pressed down in the OFF position.

LED

ON/OFF
SWITCH

ON/OFF
SWITCH

LED

FDD IN
COMBINATION
UNIT

FDD IN
STANDALONE
UNIT

CIRCUIT
BREAKER

POWER
SUPPLY

FDD

ROCKER
SWITCHES

PC
BOARD
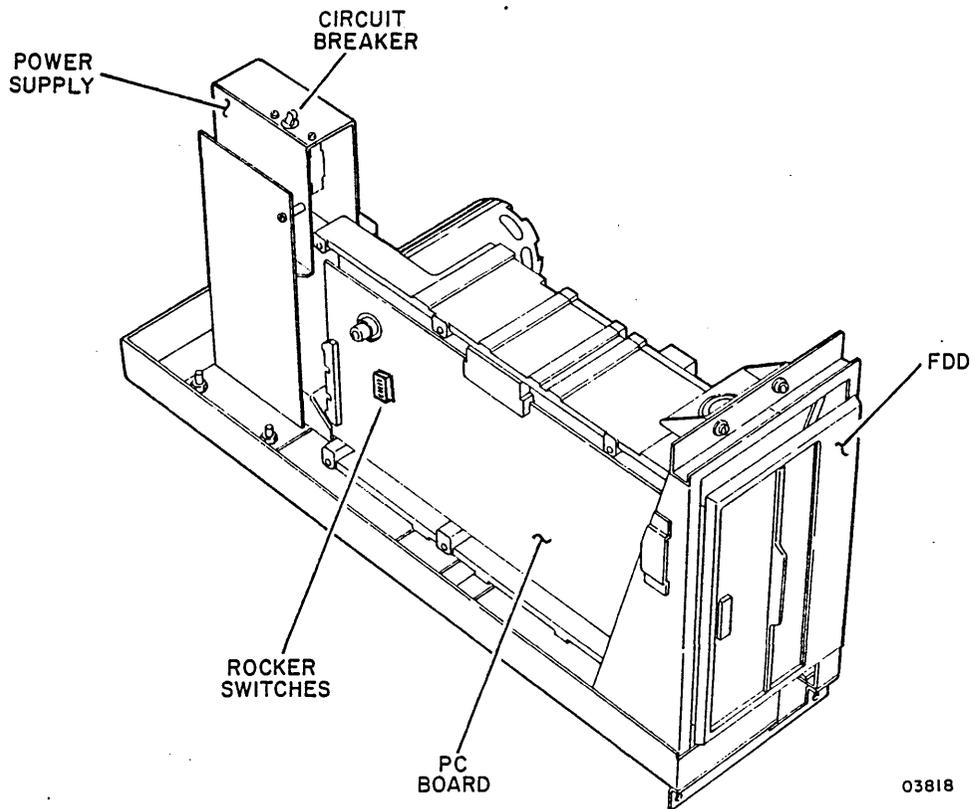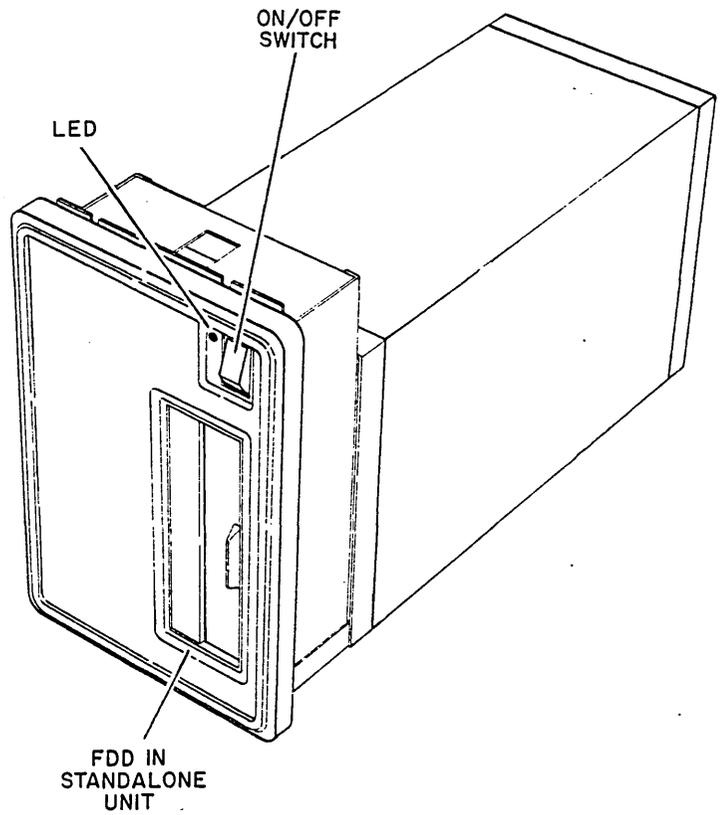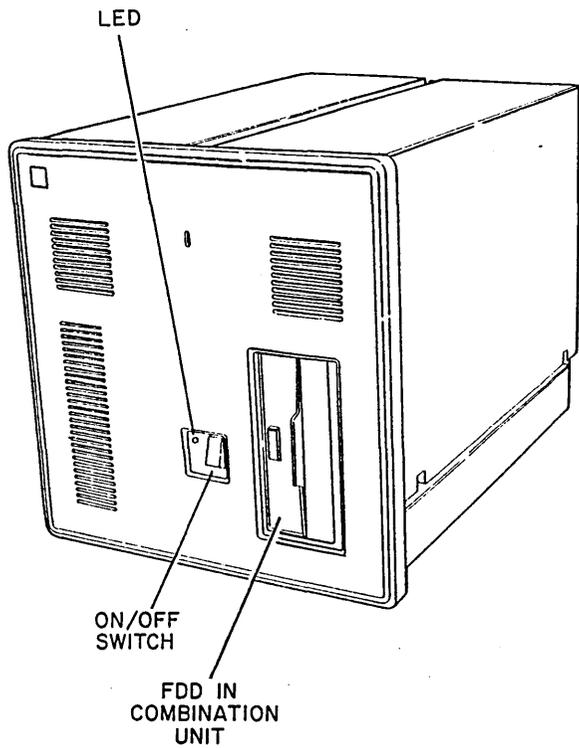
03818

3.0.5 Physical Location Codes

The physical location codes assigned to parts of the FDD are
shown below. The abbreviations used are as follows:

- P = connector, plug
- J = connector, receptacle
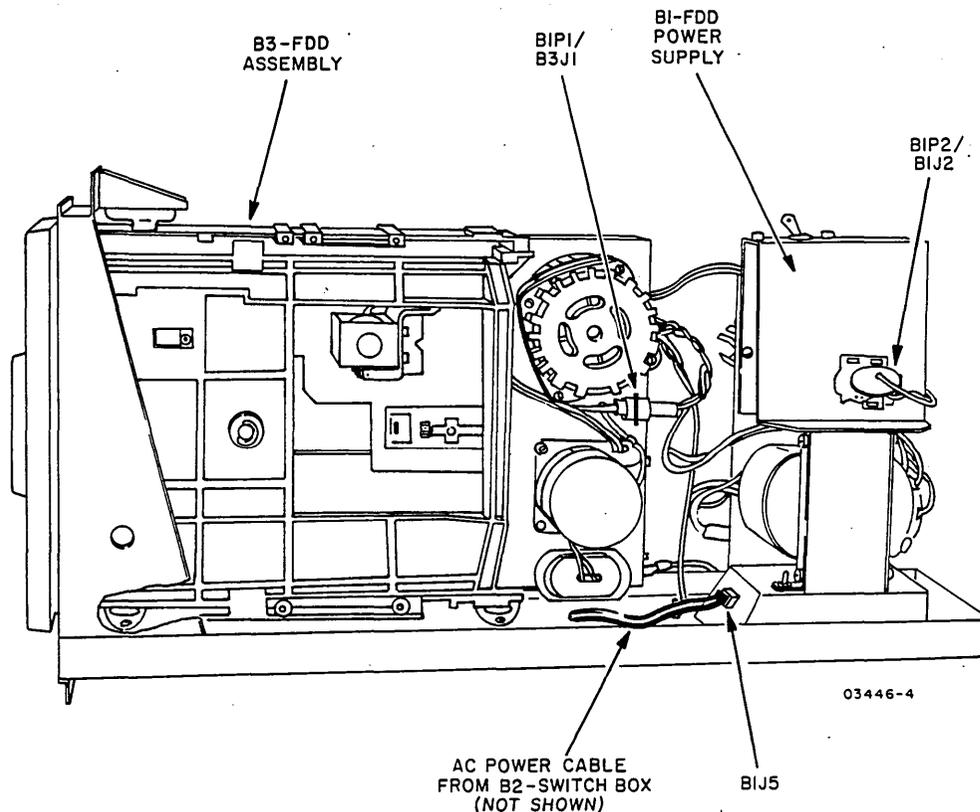
NOTE

One of two different types of B3J1
connectors on the FDD printed circuit
board may be encountered when per-
forming maintenance. One connector
type is keyed to prevent incorrect
installation of the I/O cable to the
B3J1 connector. The other type is
not (and cannot be) keyed. If the
I/O cable is not correctly installed
to this type of connector, damage to
diskettes could result. Install the
I/O cable with the red stripe up
(arrow on cable should point up to
red stripe).

RED
STRIPE

UP

I/O CABLE

POLARIZING
KEY
RETAINING
SLOTS

POWER CABLE TO
ATTACHMENT CARD

BI-FDD
POWER SUPPLY

BIJ7

BIJ6

BIP4/ B3J4

B3JI → FDD PCB
CONNECTOR

B3-FDD
ASSEMBLY

I/O CABLE TO
ATTACHMENT CARD

LED
POWER CABLE
TO B2-SWITCH BOX
(NOT SHOWN)

03613-4

3.0.6 Operating FDD

The following paragraphs describe powering on/off the FDD and
installing a diskette.

3.0.6.1 Powering On/Off FDD

                              CAUTION

            Do not install a diskette before power
            is on. Failure to do so may damage
            the diskette or cause the spindle-
            drive belt to slip off.

    1. To power on FDD, press On/Off switch for FDD to On. LED
       next to switch lights and spindle-drive motor starts
       running.

    2. Apply power to Series/1. Attachment card fully retracts
       heads after a short delay.

    3. To power off FDD, remove installed diskette and press
       On/Off switch to Off. If Series/1 is to be powered off,
       then remove power from Series/1.

3.0.6.2 Installing a Diskette

    1. With power on, open door of FDD.

    2. Remove diskette from storage envelope, being careful not
       to touch recording surface exposed by diskette jacket.

    3. If diskette is to be written on and is a CDC diskette,
       place opaque tape over write-protect slot in jacket.

                               NOTE

            Only two-sided diskettes (the BASIC
            diskette or a scratch diskette) are
            installed when running FDD diagnostics.

    4. Insert diskette into FDD as shown in the following illus-
       tration until jacket is solidly against stops.

    5. Close door and ensure that door latches securely.

    6. When diskette is to be removed, leave power on and open
       door. Opening door automatically stops diskette rotation,
       allowing removal.

INDEX HOLE IN
TWO-SIDED
DISKETTE

WRITE-PROTECT SLOT
(WRITING ON DISKETTE IS
DISABLED WHEN UNCOVERED)
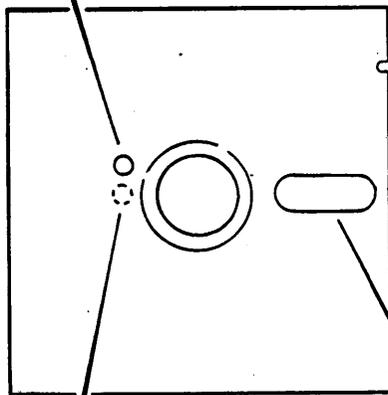
LOCATION OF
INDEX HOLE IN
ONE-SIDED
DISKETTE

EXPOSED
RECORDING
SURFACE
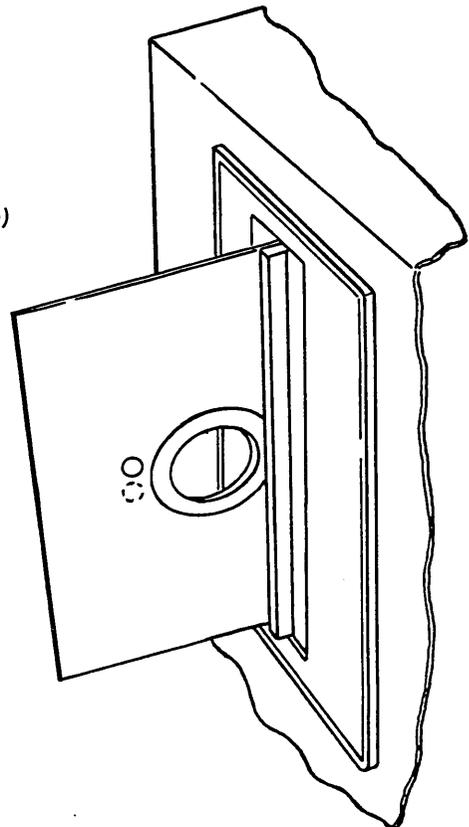
03612

3.1   ACCESSING FDD FOR MAINTENANCE

To access the FDD for maintenance, refer to the following para-
graphs as applicable:

- Para 3.1.1 if the FDD is mounted in a standalone unit

- Para 3.1.2 if the FDD is mounted in a combination unit

3.1.1   Accessing FDD in a Standalone Unit

1. Remove installed diskette and press On/Off switch for FDD
   to Off.

2. Lift bottom of front cover to release cover from unit.

3. Remove four screws securing unit to front of mounting rack.

4. Open rear door of Series/1 cabinet and make sure that FDD
   power cord and cables are free to extend forward when unit
   is removed.

CAUTION

Watch slack in cables during next step.

5. Pull unit forward out of mounting rack and set on floor or
   on a table.

6. Remove eight screws securing perforated cover to frame.

7. Cut cable tie at rear of perforated cover and remove tie
   and cable plate.

8. Lift perforated cover from frame.

9. To reinstall unit, do the preceding steps in reverse order
   and action. When replacing perforated cover, fasten cable
   plate over cables using a new cable tie (CDC part number
   94277422) as shown in illustration.

FOUR SCREWS SECURING
UNIT TO MOUNTING RACK

MOUNTING
RACK

STANDALONE
UNIT

RETAINING CLIP
(ENGAGES CUTOUT IN UNIT
FRAME WHEN UNIT IS INSTALLED)

FRONT
COVER

03636-3

EIGHT SCREWS
SECURING COVER
TO FRAME

PERFORATED
COVER

CABLE
PLATE

CABLE
TIE

03640-1

62947909 B
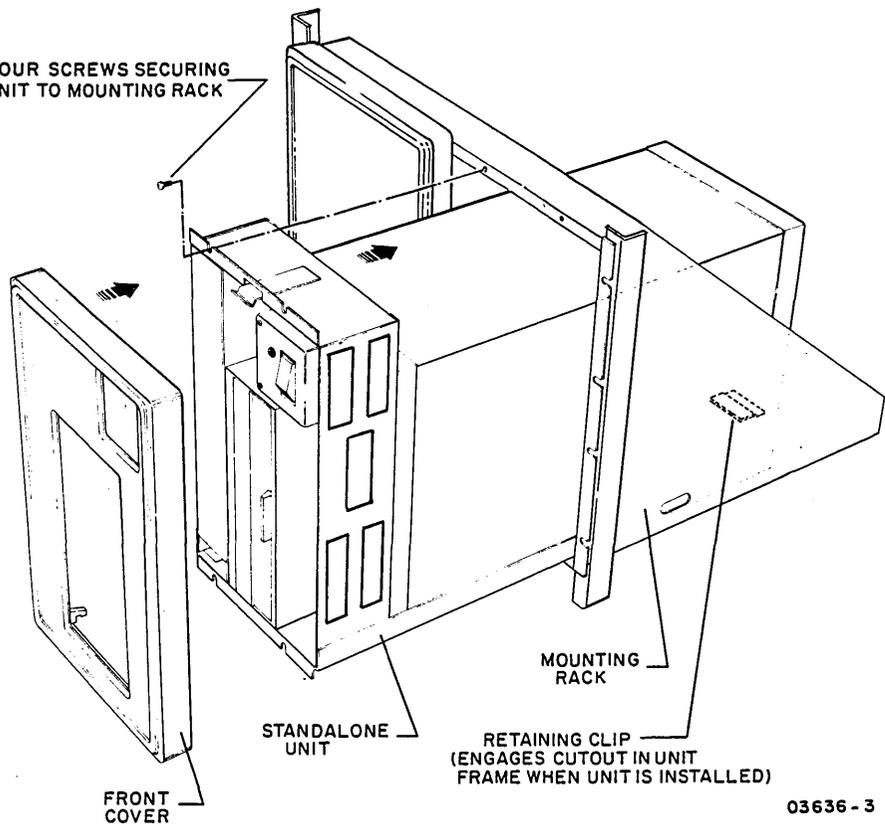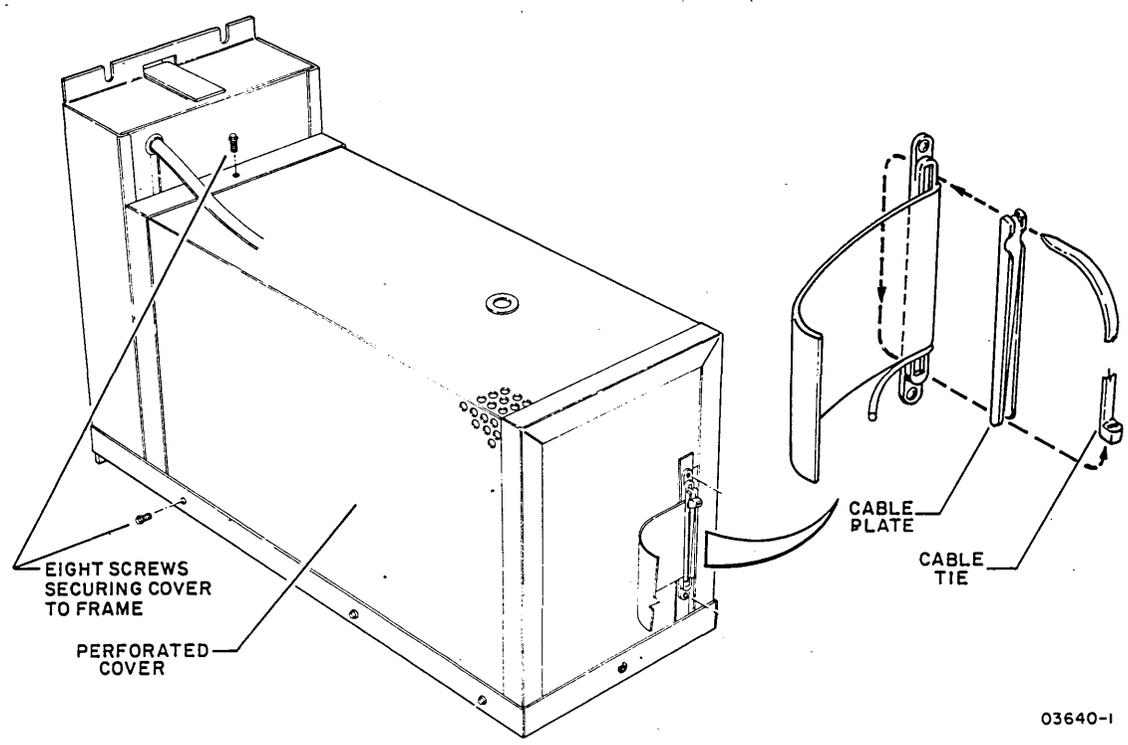
3-11

3.1.2 Accessing FDD in a Combination Unit

1. Remove installed diskette from FDD and press unit On/Off switch to Off.

2. Insert an allen wrench into access hole and turn to release front cover latch.

3. Swing front cover out and lift to remove.

4. Remove four front mounting screws.

5. Slide unit forward until slide locks engage. Spring releases on slides must be pressed to disengage locks when unit is to be slid back.

6. Remove mounting screws and nuts from covers and lift covers off.

7. Release 1/4-turn fastener on top-left side of unit and lower MMD logic chassis to horizontal position.

8. If FDD assembly, FDD power supply, or spindle-drive belt is to be replaced, remove FDD mounting frame from unit as follows:

   a. Open rear door of Series/1 cabinet and disconnect unit power cord from Series/1 ac distribution panel.

   b. Disconnect ac power cable from front of FDD power supply.

   c. Disconnect LED power cable from J6 on FDD power supply board. Pin 1 (white dot) of cable connector must mate with lower pin of J6 during reassembly.

   d. Disconnect attachment power cable from J7 on power supply board. Connector orientation is unimportant during reassembly.

   e. Disconnect I/O (flat ribbon) cable from FDD PC board.

   f. Remove two retaining screws from lower front of FDD mounting frame.

   g. Watch that cables do not snag against MMD power supply and slide FDD mounting frame forward to remove from unit.

9. To reinstall unit, do the preceding steps in reverse order and action.

COVER MOUNTING
NUTS

COVER MOUNTING
SCREWS

ACCESS
HOLE

SPRING
RELEASE

FRONT
COVER

MOUNTING
SCREWS

03519

FDD
ASSEMBLY

I/O CABLE
CONNECTOR
(FAR SIDE)

J6 AND J7
CABLE CONNECTORS
(FAR SIDE)

RETAINING
SCREWS

MOUNTING
FRAME

AC POWER CABLE
CONNECTOR

FDD POWER
SUPPLY
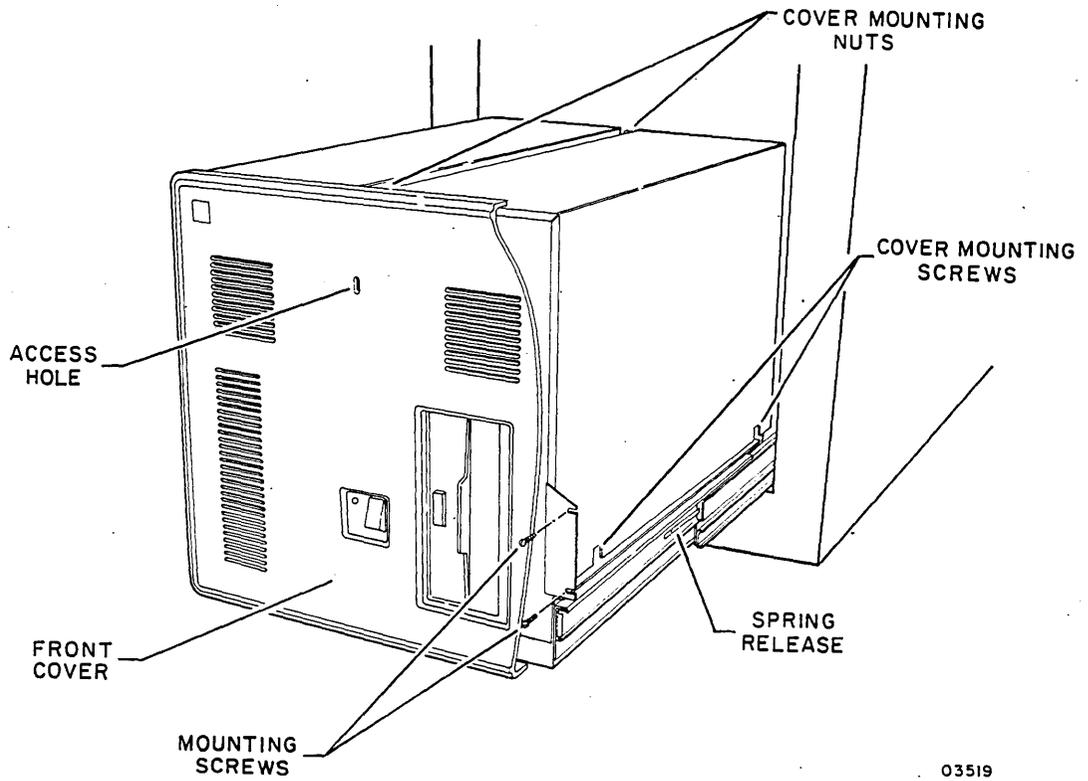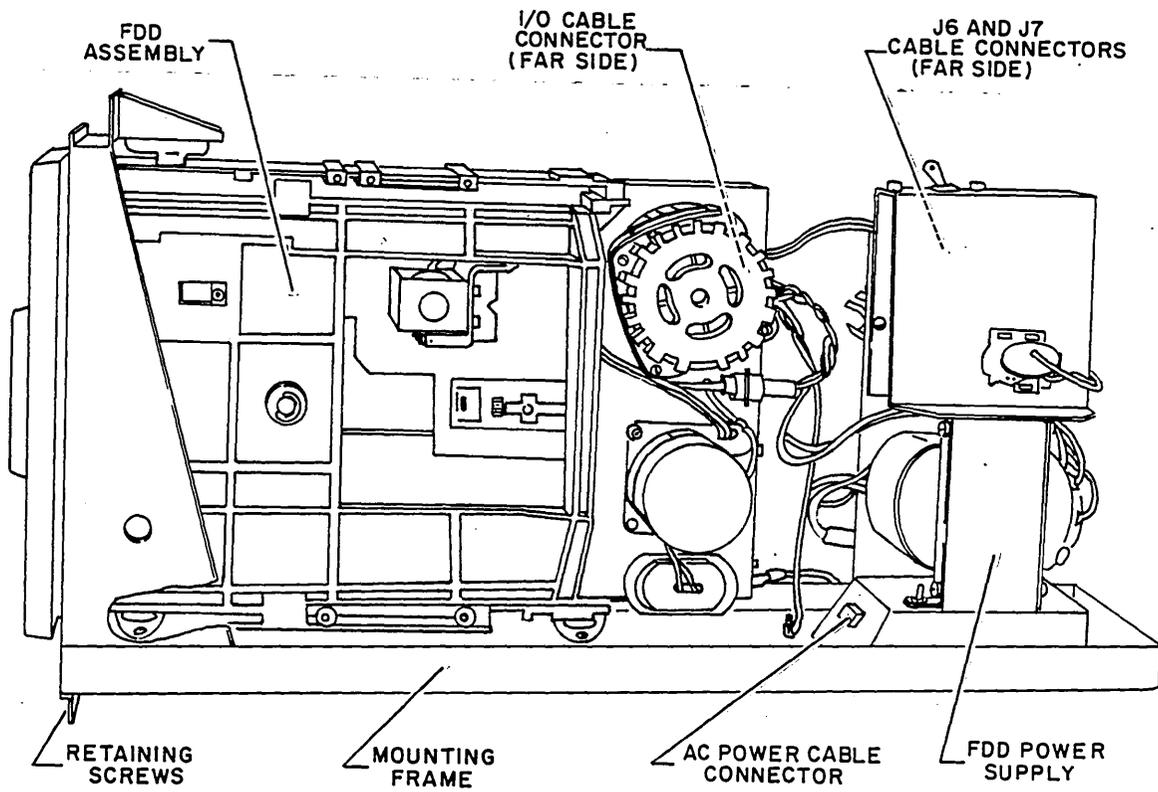
03446-4

3.2 FDD ASSEMBLY (B3)

To remove and replace the FDD assembly, refer to the following
paragraphs as applicable:

- Para 3.2.1 if the FDD assembly is in a standalone unit
- Para 3.2.2 if the FDD assembly is in a combination unit

3.2.1 Removal-Replacement of FDD Assembly in a Standalone Unit

1. Access FDD (para 3.1.1).

2. Open rear door of Series/1 cabinet and disconnect FDD
   power cord from Series/1 ac distribution panel.

3. Disconnect the following cables from FDD assembly:

   - I/O (flat ribbon) cable from PC board
   - 7-pin B1P4 from PC board
   - 3-pin B1P1 from right side

4. Remove screw securing ground wire at top of assembly.

5. Remove two shock mount screws underneath mounting frame.

6. Remove two screws securing shock mount bracket to frame.

7. Remove assembly through front of frame.

8. Remove shock mount screw at top of assembly and remove
   bracket and attached shock mount for mounting on new
   assembly.

CAUTION

Do not use a "lead" pencil to set rocker
switches. Graphite dust from pencil can
cause an equipment malfunction.

9. Set the eight switches on PC board of new FDD assembly to
   the following positions using a ball-point pen:

- Switches 1 and 5 to ON position (ON side of switch pressed down)

- Other switches to OFF position (OFF side of switch pressed down)

10) To replace assembly, do steps 1 through 8 in reverse order and action.

SHOCK MOUNT
SHOCK MOUNT SCREW
SHOCK MOUNT BRACKET
TWO SCREWS SECURING SHOCK MOUNT BRACKET
GROUND WIRE
FDD ASSEMBLY
BIP4
BIP1
MOUNTING FRAME
SHOCK MOUNTS
SHOCK MOUNT SCREWS
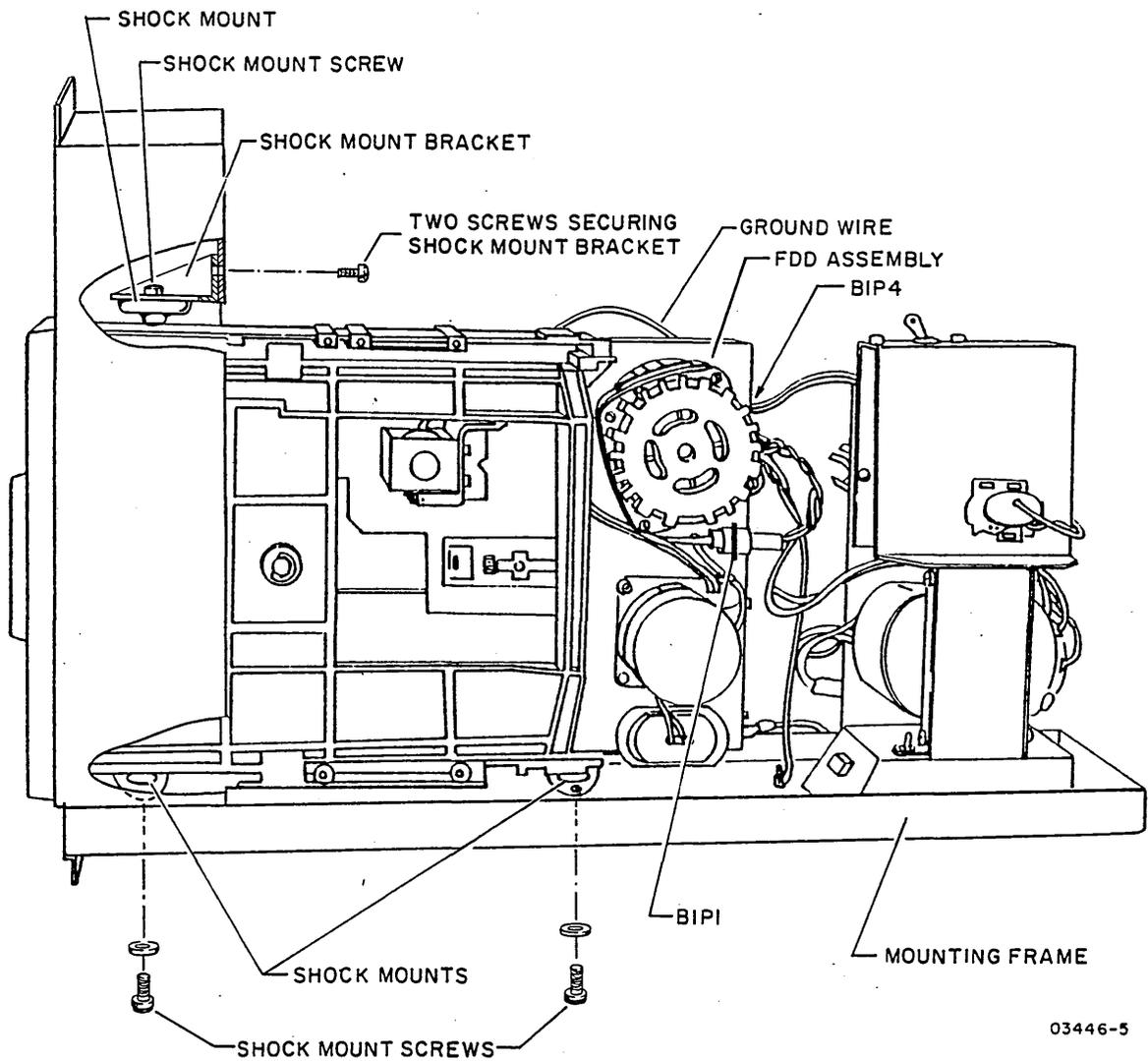
03446-5

3.2.2 Removal-Replacement of FDD Assembly in a Combination Unit

1. Access FDD and remove FDD mounting frame from unit
    (para 3.1.2).

2. Disconnect the following cables from FDD assembly:

    ● 7-pin B1P4 from PC board

    ● 3-pin B1P1 from right side

3. Remove screw securing ground wire at top of assembly.

4. Remove two shock mount screws underneath mounting frame.

5. Remove shock mount screw at top of assembly and remove
    assembly through front of frame.

CAUTION

> Do not use a "lead" pencil to set rocker
> switches. Graphite dust from pencil can
> cause an equipment malfunction.

6. Set the eight switches on PC board of new FDD assembly to
    the following positions using a ball-point pen:

    ● Switches 1 and 5 to ON position (ON side of switch
      pressed down)

    ● Other switches to OFF position (OFF side of switch
      pressed down)

7. To replace assembly, do steps 1 through 5 in reverse order
    and action.

SHOCK
MOUNT SCREW

FDD
ASSEMBLY

GROUND
WIRE

BIP4

SHOCK
MOUNTS

BIPI

MOUNTING
FRAME

SHOCK
MOUNT
SCREWS

03446-6

62947909
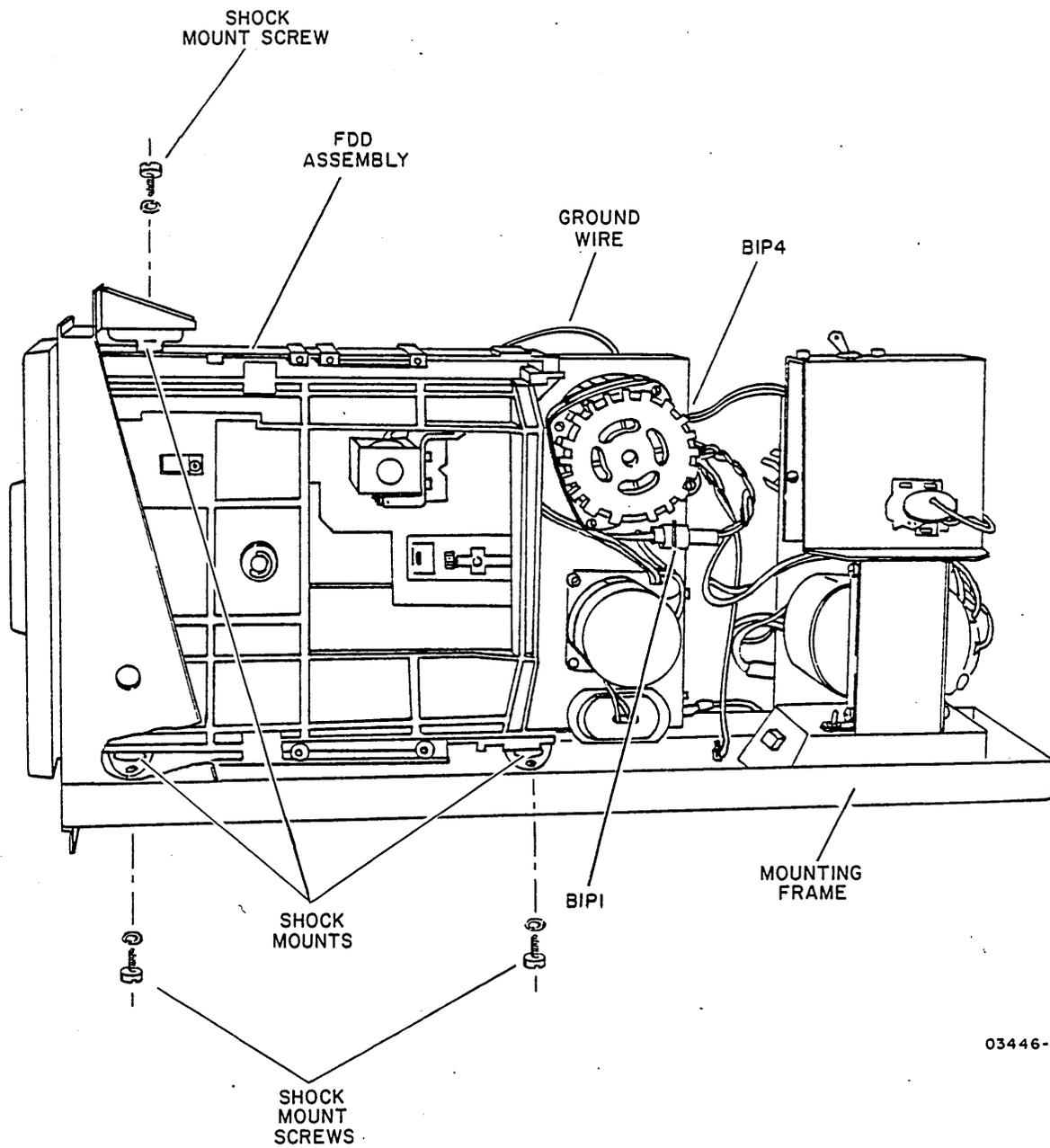
3.3 FDD POWER SUPPLY (B1)

To remove and replace the FDD power supply, refer to the following paragraphs as applicable:

- Para 3.3.1 if the power supply is in a standalone unit

- Para 3.3.2 if the power supply is in a combination unit

3.3.1 Removal-Replacement of FDD Power Supply in a Standalone Unit

1. Access FDD (para 3.1.1).

2. Open rear door of Series/1 cabinet and disconnect FDD power cord from Series/1 ac distribution panel.

3. Disconnect 7-pin B1P4 and 3-pin B1P1 connectors from FDD assembly.

4. Disconnect the following cables from power supply:

   - AC power cable from connector at front of base

   - LED power cable from J6 on power supply board. Pin 1 (white dot) of cable connector must mate with lower pin of J6 during reassembly.

   - Attachment power cable from J7 on power supply board. Connector orientation is unimportant during reassembly.

5. Remove four mounting nuts from base of power supply and lift supply from mounting frame.

6. Press circuit breaker on new power supply toward rear of supply (in On position).

7. To replace power supply, do steps 1 through 5 in reverse order and action.

FDD
ASSEMBLY

J6 AND J7
CABLE
CONNECTORS
(FAR SIDE)

FDD
POWER
SUPPLY

BIP4

MOUNTING
FRAME

BIPI

AC POWER
CABLE
CONNECTOR
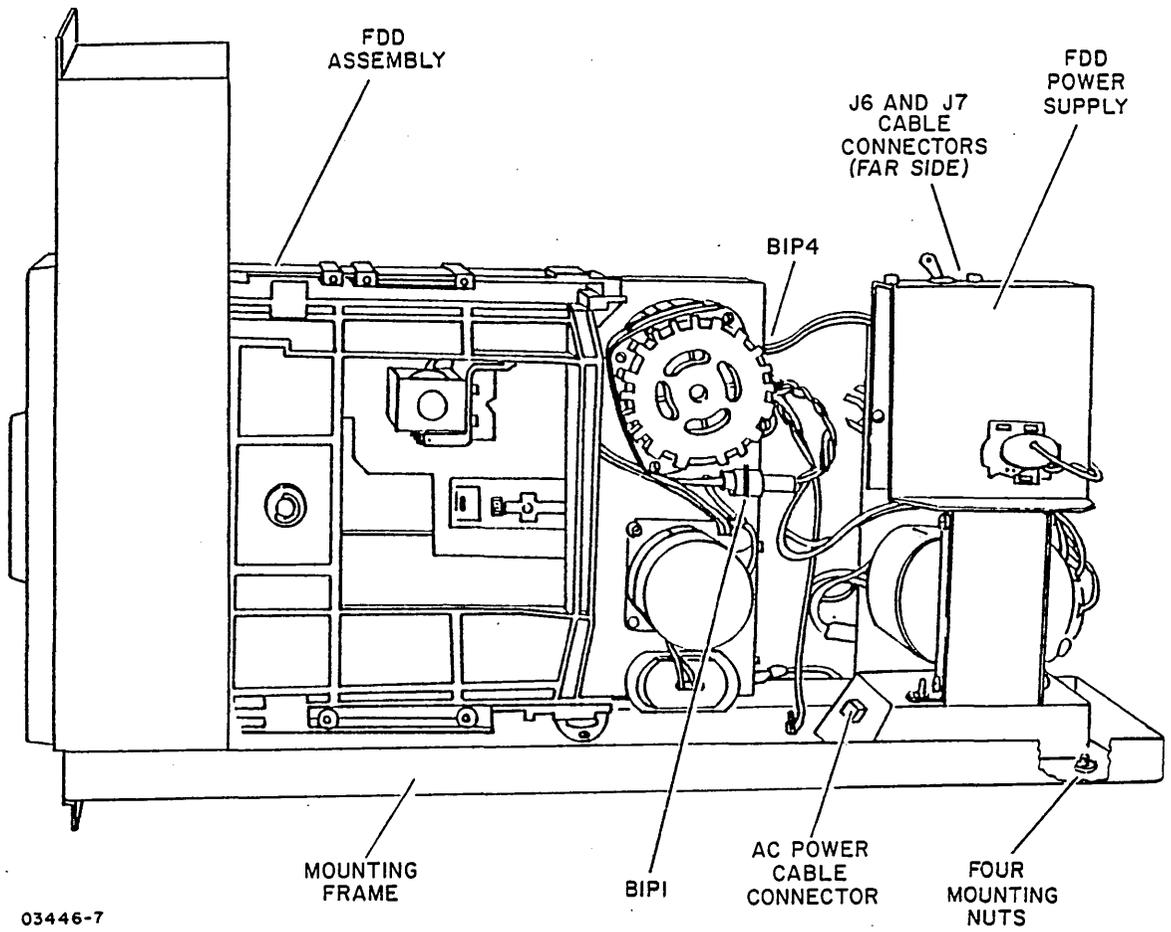
FOUR
MOUNTING
NUTS

03446-7

INTENTIONALLY BLANK

3.3.2 Removal-Replacement of FDD Power Supply in a Combination Unit

1. Access FDD and remove FDD mounting frame from unit (para 3.1.2).

2. Disconnect 7-pin B1P4 and 3-pin B1P1 connectors from FDD assembly.

3. Remove four mounting nuts from base of power supply and lift supply from mounting frame.

4. Press circuit breaker on new power supply toward rear of supply (in On position).

5. To replace power supply, do steps 1, 2, and 3 in reverse order and action.
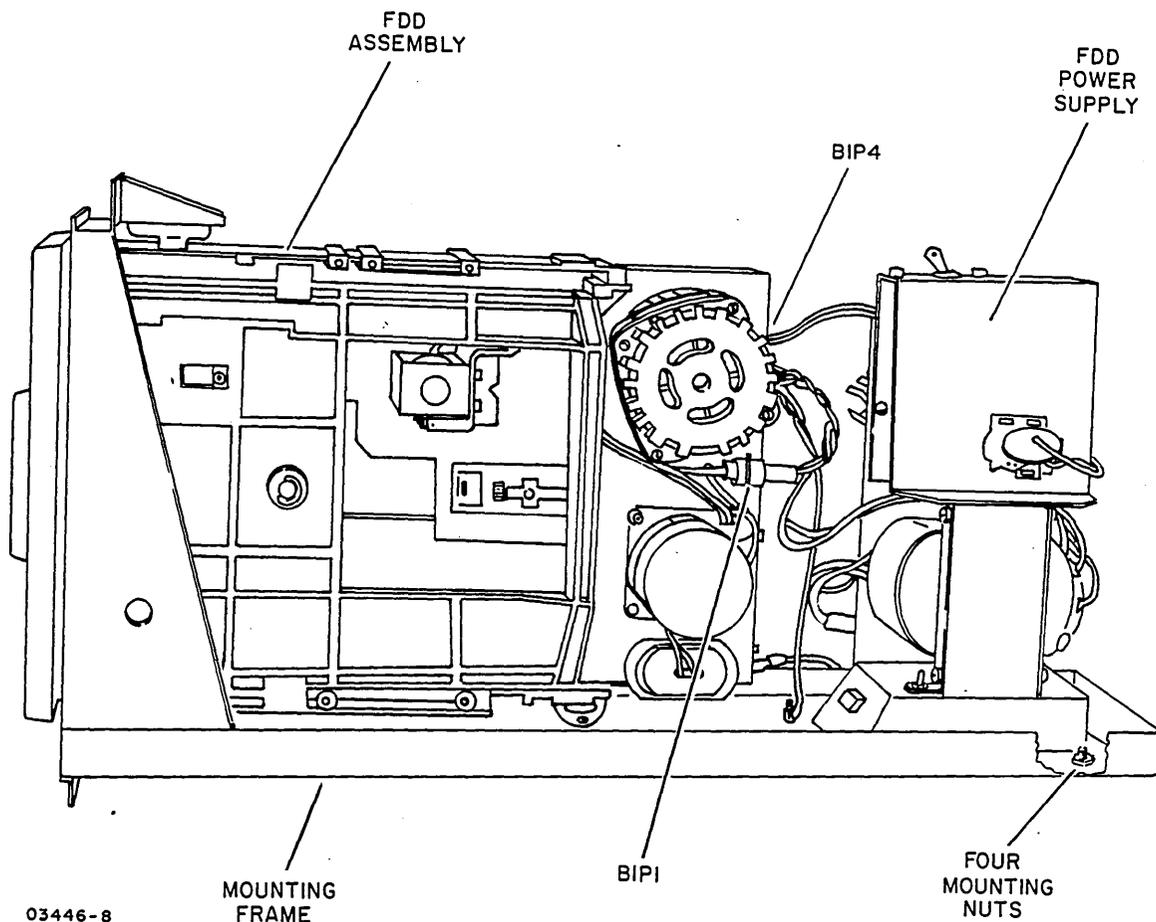
03446-8

3.4   SPINDLE-DRIVE BELT

To remove and replace the spindle-drive belt on the FDD, refer to
the following paragraphs as applicable:

- Para 3.4.1 if the FDD is in a standalone unit

- Para 3.4.2 if the FDD is in a combination unit

3.4.1   Removal-Replacement of Spindle-Drive Belt in a Standalone
        Unit

1. Access FDD (para 3.1.1).

2. Open rear door of Series/1 cabinet and disconnect FDD
   power cord from Series/1 ac distribution panel.

3. Disconnect I/O (flat ribbon) cable and 7-pin B1P4 con-
   nector from FDD PC board.

4. Remove two mounting screws from PC board.

5. Remove screw securing ground wire at top of FDD assembly.

6. Compress four retaining clips to release board from FDD
   assembly.

7. Disconnect three connectors from top of board.

8. Leave two connectors at bottom of board connected and tip
   board outward and remove drive belt.

9. Install new drive belt to the inside of motor pulley and
   center on spindle.

10. To reassemble FDD, do steps 1 through 7 in reverse order
    and action.

GROUND
WIRE

MOTOR PULLEY

FDD DRIVE
BELT

CONNECTOR
BIP4

MOUNTING
SCREWS

I/O CABLE
CONNECTOR

FDD PC
BOARD

RETAINING
CLIPS
(4)

SPINDLE

03613-2
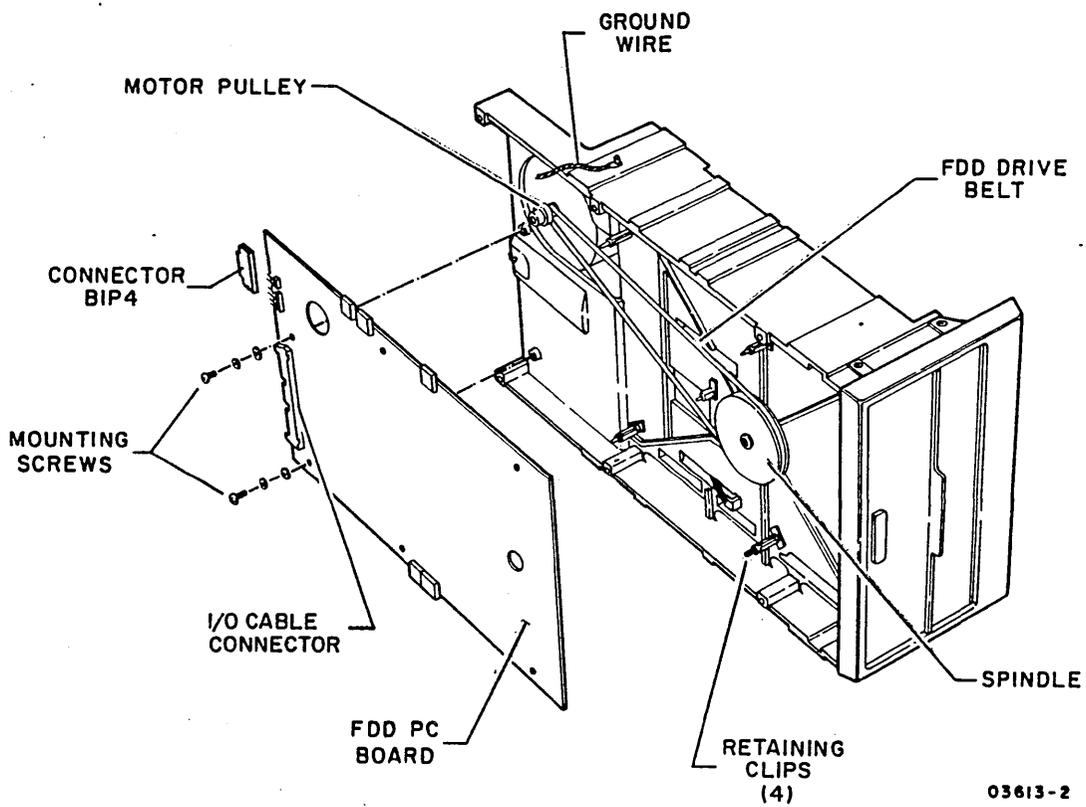
INTENTIONALLY BLANK

3.4.2 Removal-Replacement of Spindle-Drive Belt in a Combination Unit

1. Access FDD and remove FDD mounting frame from unit (para 3.1.2).

2. Disconnect 7-pin B1P4 connector from FDD PC board.

3. Remove two mounting ⁻   ⁻ ⁚ from PC board.

4. Remove screw securing ground wire at top of FDD assembly.

5. Compress four retaining clips to release board from FDD assembly.

6. Disconnect three connectors from top of board.

7. Leave two connectors at bottom of board connected and tip board outward and remove drive belt.

8. Install new drive belt to the inside of motor pulley and center on spindle.

9. To reassemble FDD, do steps 1 through 6 in reverse order and action.
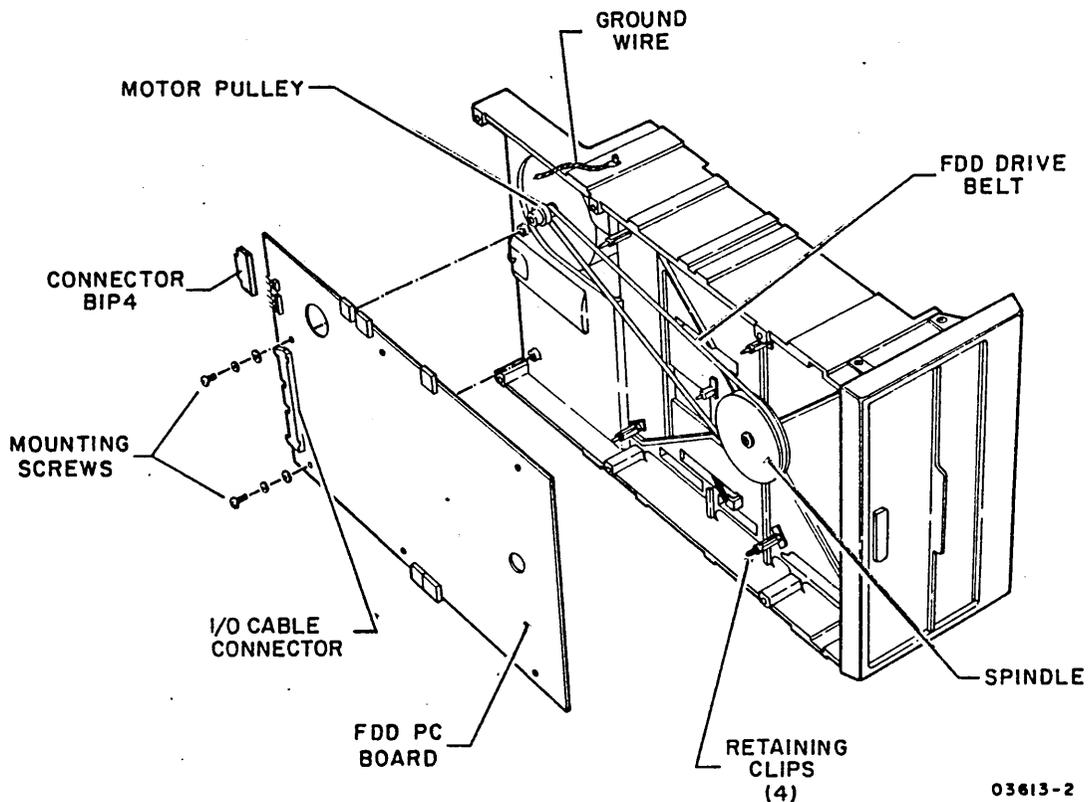
3.5 ON/OFF-SWITCH BOX (B2)

The following paragraph contains removal and replacement instruc-
tions for the On/Off-switch box of a standalone unit. Similar
instructions for the On/Off-switch box of a combination unit are
contained in the MMD site information manual (refer to preface
for publication number).

3.5.1 Removal-Replacement of On/Off-Switch Box in a Standalone
       Unit

1. Access FDD (para 3.1.1).

2. Open rear door of Series/1 cabinet and disconnect FDD
   power cord from Series/1 ac distribution panel.

3. Disconnect LED power cable from J6 on FDD power supply
   board. Pin 1 (white dot) of cable connector must mate
   with lower pin of J6 during reassembly.

4. Disconnect ac power cable from front of FDD power supply.

5. Remove two mounting screws from top of mounting frame to
   unfasten switch box.

6. Remove power cord and cables attached to switch box
   through front of frame.

7. Route power cord and cables of new switch box as shown in
   illustration.

8. To replace switch box, do steps 1 through 5 in reverse
   order and action.

FDD POWER
SUPPLY

FDD POWER CORD
GOING TO SERIES/1 AC
DISTRIBUTION PANEL

TWO
MOUNTING
SCREWS

J6

AC POWER CABLE
GOING TO FRONT
OF POWER SUPPLY

LED POWER CABLE
GOING TO J6

SWITCH
BOX

MOUNTING
FRAME
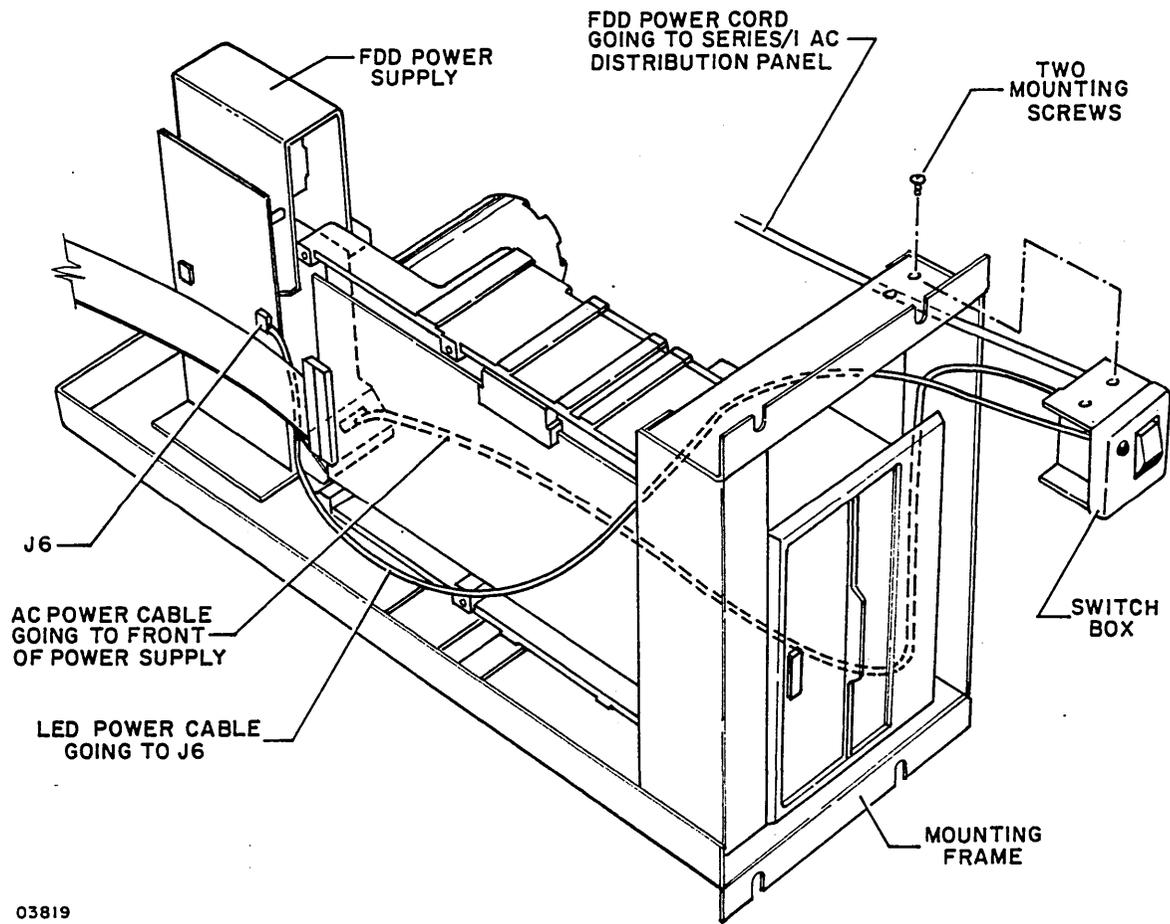
03819

3.6 CDC BASIC DISKETTE DIAGNOSTICS

The following tables list the FDD auto-diagnostic and manual
diagnostic tests that are on the CDC BASIC diskette (part
number 663107XX). The auto-diagnostic tests are linked together
and load and execute in succession until last test 4603 finishes
or an error is detected. Manual diagnostic tests 4610 and 4611
are not linked together and each requires operator interaction.

To IPL the BASIC diskette and run these tests, refer to the
following paragraphs as applicable:

- Para 3.6.1 if no other FDD is available except the unit to
  be tested

- Para 3.6.2 if another FDD is available

NOTE

Before diagnostics can be run, the
system configurator table must be
written on the BASIC diskette as
described under Configurating BASIC
Diskette in section 2.

FDD AUTO-DIAGNOSTIC TESTS

TEST NO.	TITLE AND PURPOSE*
4600	Channel interface - checks the interface between the attachment card and Series/1 and verifies that the attachment card and FDD are ready.
4601	Attachment - verifies that the attachment card responds properly to illegal device-control blocks (DCBs).
4602	Seek and read sector ID - checks if the FDD and attachment card can do seek and read sector ID operations.
4603	Seek and read data - expands on the testing done in test 4602 and checks if the FDD and attachment card can perform read data instructions.

FDD AUTO-DIAGNOSTIC TESTS (CONTD)

TEST NO.	TITLE AND PURPOSE*
4620	Cycle steal status analysis – automatically executes only if an improper condition is detected in one of the preceding auto-tests or in manual tests 4610 or 4611. When the test executes, it displays cycle steal status words on the screen of the assigned alternate console, analyzes the status, and indicates the result.
4621	Continuation of cycle steal status analysis – executes only when test 4620 is unable to fully analyze cycle steal status.

*Appendix A contains a more detailed test description.

FDD MANUAL DIAGNOSTIC TESTS

TEST NO.	TITLE AND PURPOSE*
4610	Write sector ID and data – checks if the FDD and attachment card can format sectors and write data.
4611	Write/read address markers – checks if the FDD and attachment card can write data-address markers and control-address markers and if the attachment card reacts correctly when the markers are read back. After completion, test 4610 must be run to delete the control-address markers from the diskette.
4620 and 4621	Cycle steal status analysis – these tests, which are also listed with the auto-tests, can be called up by entering B4620. However, this is only to be done when another test (auto or manual) stops and gives instructions to do so.

*Appendix A contains a more detailed test description.

3.6.1   IPL and Running FDD Diagnostics with No Other FDD Available
        Except Unit to be Tested

When no other FDD is available to load the diagnostics, IPL and
run the diagnostic tests as follows:

1. Power-on FDD (para 3.0.6.1) and install CDC BASIC disk-
   ette, part number 663107XX (para 3.0.6.2).

2. Place Series/1 operator/programmer panel switches as
   follows:

   ● IPL Source switch to Alternate or Primary as applicable
     to enable loading from diskette

   ● Mode switch to Diagnostic

3. Press operator/programmer panel Load switch. This starts
   execution of IPL diagnostic. Assuming no problem occurs,
   IPL completes in approximately twenty two seconds with:

   ● A message displayed on screen of alternate console (if
     a display station or TTY console is present and
     assigned)

   ● On operator/programmer panel: a $38XX_{16}$ halt code
     shown, Stop indicator extinguished, and Wait indicator
     lit

   If the preceding indications do not occur, press Reset
   switch, then Load switch to try to IPL again. If second
   attempt is still unsuccessful, go to paper-only SAM 4670
   (Power-On and IPL Problems) for corrective action.

                              NOTE

        If a combination of both CDC and IBM
        devices having identical ID codes are
        configured on the same BASIC diskette
        (either a CDC or IBM diskette), the
        following configuration error will
        appear:

        ● On screen, CONFIG ERROR - TABLE
          DEVICE TYPE VS TABLE READ ID

        ● On operator/programmer panel, halt
          code 3842_{16} (configuration error)

        Ignore this error. It is the result
        of both the CDC and IBM devices having
        the same read ID code.

4. If the halt indications being displayed are not the following, go to common halt list (para 3.9) for meaning and appropriate action. When the following indications are obtained, proceed to step 5.

   ● RDY ENTER displayed on screen

   ● 3800_{16} displayed on operator/programmer panel

5. Use assigned alternate console and enter B4600 as follows to load and run FDD auto-tests:

   ● If alternate console is a display station or a TTY, key in B4600 and press ENTER key if a display station, Carriage Return key if a TTY.

                              NOTE

              (B) = Data Buffer switch
              (I) = Console Interrupt switch

   ● If operator/programmer panel is alternate console, enter: (B),B,(I),(B),4600,(I),(I).

   Auto-tests now sequentially load and execute. Running time of tests is approximately two minutes. While tests are running, Run indicator lights and number of current test appears on screen and on operator/programmer panel. When tests stop, result is shown as follows:

   ● Successful completion indicated by:

     - PT ENTER display on screen

     - 3805_{16} displayed on operator/programmer panel

   ● Error stoppage indicated by:

     - An error message displayed on screen that gives failing test and step numbers

     - Number of failing test displayed on operator/ programmer panel

● Error abort indicated by:

   - An abort test message displayed on screen.

   - $46FE_{16}$ displayed on operator/programmer panel

If tests did not load and execute or stopped without one
of these indications, enter B4600 again. If problem
persists, go to paper-only SAM 4672 (Not Ready Status) for
corrective action.

6. If auto-tests ended with error stoppage or error abort, do
   as follows:

   ● If error stoppage occurred, go to SAM that has same
      number as failing test and find failing step number in
      listing for corrective action. If using operator/
      programmer panel, obtain failing step number by press-
      ing Stop switch, Level 3 switch, then R0 switch. This
      displays failing step number on panel indicators.

   ● If error abort occurred, use error abort message to
      determine cause (para 3.10).

                            CAUTION

         Manual tests 4611 and 4610 write on
         the CE (scratch) cylinders of the
         BASIC diskette. However, a malfunc-
         tion may destroy program data on other
         cylinders. For a safeguard, do not
         run these manual tests unless an auto-
         test stops and instructs to do so or
         until auto-tests complete successfully.

7. Load and run FDD manual tests 4611 and 4610 by doing the
   following:

   a. Enter B4611 at assigned alternate console to load
      test 4611:

      ● If using a display station or a TTY, key in B4611
         and press ENTER key if a display station, Carriage
         Return key if a TTY.

      ● If using operator/programmer panel, enter:
         (B),B,(I),(B),4611,(I),(I).

When loaded, test displays:

- A prompt on screen that asks if test should run and write on the CE cylinders of the diskette

- Test number 4611_{16} on operator/programmer panel

If these indications do not appear, enter B4611 again. If second attempt is still unsuccessful, go to paper-only SAM 4672 (Not Ready Status) for corrective action.

b. If BASIC diskette in FDD has the write-protect slot in its jacket uncovered, remove the diskette and cover slot with opaque tape. Then reinstall the diskette.

c. Start test by answering yes to question being asked (if using operator/programmer panel, displayed test number represents question):

- If using a display station or a TTY, key in 1 and press ENTER key if a display station, Carriage Return key if a TTY.

- If using operator/programmer panel, enter: (B),1,(I),(I). Code $FFFF_{16}$ displays on panel indicators and Run indicator lights.

NOTE

When manual tests 4611 and 4610 detect certain errors, an automatic loading and running of test 4620 occurs to analyze cycle steal status. If required, this is followed by the automatic loading and running of test 4621. Therefore, error stoppage or error abort can occur in either of these linked tests or in the originally entered manual test.

When test stops, result is indicated the same as previously described under step 5 in the running of auto-tests. If test ended with error stoppage or error abort, take the action given in step 6. If test ended abnormally (with or without a message), rerun the test. If second attempt ends abnormally, go to paper-only SAM 4672 (Not Ready Status) for corrective action.

d. Repeat steps a and c and enter B4610 to load and run test 4610.

3.6.2   IPL and Running FDD Diagnostics with Another FDD Available

When another FDD is available to load the diagnostics, IPL and
run the diagnostic tests as follows:

1. Power-on both FDDs (para 3.0.6.1).

2. Install CDC BASIC diskette, part number 663107XX, in unit
    that is to do the loading and a two-sided scratch diskette
    in unit that is to be tested (para 3.0.6.2). If the
    scratch diskette is a CDC diskette, make sure that opaque
    tape is covering the write-protect slot in jacket before
    installing (writing enabled).

3. Place Series/1 operator/programmer panel switches as
    follows:

    ● IPL Source switch to Alternate or Primary as applicable
      to enable loading from load unit

    ● Mode switch to Diagnostic

4. Press operator/programmer panel Load switch. This starts
    execution of IPL diagnostic. Assuming no other halt
    occurs, IPL completes in approximately twenty two seconds
    with:

    ● RDY ENTER displayed on screen of alternate console (if
      a display station or TTY console is present and
      assigned)

    ● 3800_{16} displayed on operator/programmer panel

                              NOTE

            If a combination of both CDC and IBM
            devices having identical ID codes are
            configured on the same BASIC diskette
            (either a CDC or IBM diskette), the
            following configuration error will
            appear:

            ● On screen, CONFIG ERROR - TABLE
              DEVICE TYPE VS TABLE READ ID

            ● On operator/programmer panel, halt
              code 3842_{16} (configuration error)

            Ignore this error. It is the result
            of both the CDC and IBM devices having
            the same read ID code.

If any other halt indication appears, go to common halt
list (para 3.9) for meaning and appropriate action. When
the preceding indications are obtained, proceed to step 5.

NOTE

To run FDD diagnostic tests, the
scratch diskette in test unit must be
formatted. If contents of the scratch
diskette are unknown or if its a new
CDC diskette, it needs to be formatted
before tests are run.

5. If scratch diskette in test unit requires formatting, do
the following; if not, go to step 6.

NOTE

After the following substeps are per-
formed, the scratch diskette will be
formatted into 128-byte sectors on
cylinder 00 and 256-byte sectors on
all other cylinders and all data
fields will be filled with zeros.

a. Use assigned alternate console and enter B38F9 as
follows to load general utility program:

● If alternate console is a display station or a TTY,
key in B38F9 and press ENTER key if a display
station, Carriage Return key if a TTY. Program menu
appears on screen.

NOTE

(B) = Data Buffer switch
(I) = Console Interrupt switch

● If operator/programmer panel is alternate console,
enter: (B),B,(I),(B),38F9,(I),(I). Code $388B_{16}$
appears on panel indicators.

b. Enter F0A to load format routine:

● If using a display station or TTY, key in F0A and
press ENTER key if a display station, Carriage
Return key if a TTY. A prompt asks if the diskette
to be formatted is in IPL device.

- If using operator/programmer panel, enter:
  (B),1F,(I),(B),0A00,(I),(I).   Code 3879_{16} appears.

c. Replace BASIC diskette in load unit with scratch disk-
   ette from test unit.

d. Start format routine by answering yes to question being
   asked (if using operator/programmer panel, code 3879_{16}
   represents question):

   - If using a display station or TTY, key in F1 and
     press ENTER key if a display station, Carriage
     Return key if a TTY.

   - If using operator/programmer panel, enter:
     (B),F1,(I),(I).

   When formatting is complete, program displays the
   following:

   - On screen, SELECT ONE OPTION

   - On operator/programmer panel, code $388B_{16}$

e. To permit loading of read-verify routine that is to be
   run next, remove scratch diskette and return BASIC
   diskette to load unit.

f. Enter F0C to load read-verify routine:

   - If using a display station or TTY, key in F0C and
     press ENTER key if a display station, Carriage
     Return key if a TTY. A prompt appears that either
     requests a device address or asks if the diskette to
     be verified is in IPL device.

   - If using operator/programmer panel, enter:
     (B),1F,(I),(B),0C00,(I),(I).   Either code $388A_{16}$
     or 3879_{16} appears.

g. If prompt is requesting a device address ($388A_{16}$ dis-
   played on operator/programmer panel), enter the hexa-
   decimal, two-digit device address of the load unit:

   - If using a display station or TTY, key in address
     and press ENTER key if a display station, Carriage
     Return key if a TTY.

   - If using operator/programmer panel, enter:
     (B),1F,(I),(B),XX (device address) 00,(I),(I).

h. Replace BASIC diskette in load unit with scratch
   diskette.

i. Answer yes to prompt that asks if the diskette to be verified is in IPL device (3879_{16} displayed on operator/programmer panel):

- If using a display station or TTY, key in F1 and press ENTER key if a display station, Carriage Return key if a TTY. A prompt asks if it is desired to retry on each error.

- If using operator/programmer panel, enter: (B),F1,(I),(I). Code $387B_{16}$ appears.

j. Reply no to retry on each error ($387B_{16}$ displayed on operator/programmer panel).

- If using a display station or TTY, key in F0 and press ENTER key if a display station, Carriage Return key if a TTY.

- If using operator/programmer panel, enter: (B),F0,(I),(I).

Entering the preceding reply starts the read-verify routine. If an error is detected, the assigned alternate console gives the following indication as applicable. Record all errors for reference when FDD diagnostic tests are run. Any error stoppage in a read/write at these locations during testing is to be ignored.

- On screen, the following type of error message is displayed and routine continues until completion:

CYL	HEAD	SECT	SECTOR FORMAT
04	0	05	256

- On operator/programmer panel, code 3878_{16} displays and routine stops. To read error message from memory (see preceding example for screen), do as follows:

  - Press Stop switch, Level 3 switch, then R3 switch. This displays starting memory address of error message.

  - Press SAR switch.

  - Enter: (B),1F,(I),(B),XXXX (hexadecimal memory address), (I),(I).

- Press Store switch then Main Storage switch.
  Contents of first memory address is displayed in
  EBCDIC.

- Continue pressing Main Storage switch until
  message is complete. Message is stored in memory
  in the same format (including spaces) as shown in
  the preceding example.

- When message is complete, continue routine by
  entering: (B),6,(I),(I).

When verifying is complete, program displays the
following:

- On screen, SELECT ONE OPTION

- On operator/programmer panel, code $388B_{16}$

k. Enter F09 to exit from general utility program:

- If using a display station or TTY, key in F09 and
  press ENTER key if a display station, Carriage
  Return key if a TTY. PT ENTER appears.

- If using operator/programmer panel, enter:
  (B),1F,(I),(B),0900,(I),(I). Code 3805_{16} appears.

l. Return BASIC diskette to load unit and scratch diskette
   to test unit.

6. Use assigned alternate console and enter the following to
   run FDD auto-tests on test unit:

a. Enter C4600 as follows:

- If using a display station or TTY, key in C4600 and
  press ENTER key if a display station, Carriage
  Return key if a TTY.

NOTE

(B) = Data Buffer switch
(I) = Console Interrupt switch

- If using operator/programmer panel, enter:
  (B),C,(I),(B),4600,(I),(I).

Program waits for option selection.

b. Enter option selection D4000:

- If using a display station or TTY, key in D4000 and press ENTER key if a display station, Carriage Return key if a TTY. A prompt requests device address.

- If using operator/programmer panel, enter: (B),1D,(I),(B),4000,(I),(I). Code $3C01_{16}$ appears.

c. Enter the hexadecimal, two-digit device address of the FDD to be tested:

- If using a display station or TTY, key in address and press ENTER key if a display station, Carriage Return key if a TTY.

- If using operator/programmer panel, enter: (B),1F,(I),(B),XX (device address) 00,(I),(I).

d. Enter A to start auto-tests:

- If using a display station or TTY, key in A and press ENTER key if a display station, Carriage Return key if a TTY.

- If using operator/programmer panel, enter: (B),A,(I),(I).

Auto-tests now sequentially load and execute. Running time of tests is approximately two minutes. While tests are running, Run indicator lights and number of current test appears on screen and on operator/ programmer panel. When tests stop, result is shown as follows:

- Successful completion indicated by:

  - PT ENTER displayed on screen

  - 3805_{16} displayed on operator/programmer panel

- Error stoppage indicated by:

  - An error message displayed on screen that gives failing test and step numbers

  - Number of failing test displayed on operator/ programmer panel

● Error abort indicated by:

  - An abort test message displayed on screen

  - $46FE_{16}$ displayed on operator/programmer panel

If tests did not stop with one of these indications, reseat attachment card of test unit and rerun auto-tests. If problem persists, replace attachment card and I/O cable of test unit one at a time until problem is corrected.*

7. If auto-tests ended with error stoppage or error abort, do as follows:

   ● If error stoppage occurred, go to SAM that has same number as failing test and find failing step number in listing for corrective action. If using operator/ programmer panel, obtain failing step number by pressing Stop switch, Level 3 switch, then R0 switch. This displays failing step number on panel indicators.

   ● If error abort occurred, use error abort message to determine cause (para 3.10).

8. Enter the following to run FDD manual tests 4611 and 4610 on test unit:

   a. Enter C4611 at assigned alternate console as follows:

      ● If using a display station or TTY, key in C4611 and press ENTER key if a display station, Carriage Return key if a TTY.

      ● If using operator/programmer panel, enter: (B),C,(I),(B),4611,(I),(I).

   Program waits for option selection.

   b. Enter option selection D4000:

      ● If using a display station or TTY, key in D4000 and press ENTER key if a display station, Carriage Return key if a TTY. A prompt requests device address.

      ● If using operator/programmer panel, enter: (B),1D,(I),(B),4000,(I),(I). Code $3C01_{16}$ appears.

---

*Set switches on new attachment card for device address and IPL assignment (Installing Attachment Card and Cabling, section 2).

c. Enter the hexadecimal, two-digit device address of the FDD to be tested:

- If using a display station or TTY, key in address and press ENTER key if a display station, Carriage Return key if a TTY.

- If using operator/programmer panel, enter: (B),1F,(I),(B),XX (device address) 00,(I),(I).

d. Enter A:

- If using a display station or TTY, key in A and press ENTER key if a display station, Carriage Return key if a TTY. A prompt asks if test should run and write on the CE cylinders of the diskette.

- If using operator/programmer panel, enter: (B),A,(I),(I). Test number 4611_{16} appears.

e. Start test 4611 by answering yes to question being asked (if using operator/programmer panel, displayed test number represents question):

- If using a display station or TTY, key in 1 and press ENTER key if a display station, Carriage Return key if a TTY.

- If using operator/programmer panel, enter: (B),1,(I),(I). Code $FFFF_{16}$ appears and Run indicator lights.

NOTE

When manual tests 4611 and 4610 detect certain errors, an automatic running of test 4620 occurs to analyze cycle steal status. If required, this is followed by the automatic running of test 4621. Therefore, error stoppage or error abort can occur in either of these linked tests or in the originally entered manual test.

When test stops, result is indicated the same as previously described under step 6 in the running of autotests. If test ended with error stoppage or error abort, take the action given in step 7.

f. Repeat steps a through e and enter C4610 in step a to run test 4610.

3.7 CONFIGURATOR TABLE INFORMATION

NOTE

(B) = Data Buffer switch
(I) = Console Interrupt switch

3.7.1 Changing Configurator Table Manually Using Operator/Programmer
       Panel

This procedure assumes that the operator/programmer panel has
already been assigned as alternate console on the BASIC diskette
(Configurating BASIC Diskette, section 2). To change the table
manually using operator/programmer panel, do as follows:

1. Press Load switch to load configurator program.

2. View and record contents of configurator table per the
   following:

   ● Press Stop switch.

   ● Press SAR (Storage Address Register) switch.

   ● Enter 3000 via input switches.

   ● Press Store switch.

   ● Press Main Storage switch to display first word of
     entry 00 in configurator table. Record contents.

   ● Continue pressing Main Storage switch to view and
     record each word of entry.

NOTE

Each configurator table entry consists
of eight words. Refer to para 3.7.3
for entry format. Entry 00 is the
system entry and entries 01 through XX
are the device entries. The last
entry in the table will contain a 1 in
the bit 2 position of byte 02/03 as
follows:

         02   03
      ┌────────┐   ┌────────┐
      0010 0000 0000 0000

- Continue logging information from configurator table until complete.

3. Press Load switch. Either a 382A (secure customer interface), a 3822 (configuration errors on system), or a 382E (option table available for entry) halt will occur.

   - If a 382A halt code, enter:
     (B),6,(I),(I) to advance to halt 3822 or 382E.

   - If a 3822 halt code, enter:
     (B),1F,(I),(B),0300,(I),(I) to advance to halt 382E.

   - If a 382E halt code, go to step 4.

4. Enter one of the following options as applicable:

   - (B),1F,(I),(B),0200,(I),(I) to delete entire entry from configurator table.

   - (B),1F,(I),(B),0300,(I),(I) to change any portion of an entry in configurator table.

   - (B),1F,(I),(B),0A00,(I),(I) to add a new entry in configurator table.

5. If a 383A halt code occurs (signifying that an 02 or 03 option was selected), enter table number as follows:
   (B),1F,(I),(B),XX00,(I),(I) where XX = entry number.

6. If a 383B or 3846 halt code occurs (signifying that an 03 or 0A option was selected), enter new configurator table data for table entries 01 through XX as follows:
   (B),8F,(I),(B),AATT,(I),(B),0000,(I),(B),IDID,(I),(B),0000,
   (I),(B),0000,(I),(B),0000,(I),(B),0000,(I),(B),IDID,(I),(I)
   where: AA = device address
           TT = device type
           IDID = device read ID

7. Repeat steps 4 through 6 until all additions, deletions, and corrections are complete.

8. Write new configurator table on diskette when complete (halt code 382E), enter:
   (B),1F,(I),(B),0D00,(I),(I).

9. Next halt code will be a 382C (copy table to another diskette?) Terminate program by entering:
   (B),1F,(I),(B),0500,(I),(I).

10. Successful termination of configurator program is indicated by a 3800 (ready) halt code. Diskette is then ready for running diagnostic tests.

3.7.2 Configure System (Option 0C) Using Operator/Programmer
       Panel

This procedure assumes that the operator/programmer panel has
already been assigned as alternate console on the BASIC diskette
(Configurating BASIC diskette, section 2). To configure the
system automatically using operator/programmer panel, do as
follows:

1. Enter (B),B,(I),(B),38F0,(I),(I) to load configurator
   program. When loaded, a 38XX halt code displays. If a
   382A halt code occurs, enter: (B),6,(I),(I).

2. If a 3822 halt code occurs, enter:
   (B),1F,(I),(B),0300,(I),(I).
   A 382E halt will then occur to allow option selection.

3. Enter (B),1F,(I),(B),0C00,(I),(I) to select configure
   system option 0C. Refer to para 3.9 for specific instruc-
   tions pertaining to halt codes being displayed.

4. Continue entering appropriate parameters until a 3800 or
   3805 halt code displays. This indicates that diskette
   configuration is complete and diagnostic tests can be run.

NOTE

Some IBM and CDC devices have the same
read ID codes. These IBM devices are
all assigned CDC device types in the
configurator table and must be
manually changed to the correct device
ID before executing diagnostic tests.
Also, if a CDC 80270 or 80271 storage
module drive having a read ID of 3007
is present in the configurator table,
the device type must be changed from
72 to 70. Refer to table under Check-
out in section 2 for a listing of
device types that have the same read
IDs. To make changes, follow instruc-
tions in para 3.7.1.

3.7.3 Configurator Table Entries

The configurator table contains a system entry (entry 00), and
one entry for each device address used (entries 01-XX). The
formats of the system entry and the device entries are defined in
the next two paragraphs (3.7.3.1 and 3.7.3.2). Para 3.7.3.3
contains a blank table for assembling the entries required for
your system.

3.7.3.1 Definition of Entry 00 (System Entry)

Only bytes 05 through 09 of entry 00 are to be changed. All other information is entered by the configurator program.

Byte	Definition

00 and 01   Constant 00

02   Entry number of last entry in table

03   Configurator flags
                            Bit 00 through 06 are reserved
                            Bit 07 a 1 = diskette has been configured
                            Bit 07 a 0 = diskette has not been configured

04   Not used

05   Processor type ①
                            22 = 4952
                            23 = 4953
                            35 = 4955

06 and 07   Storage word

```
X Y Y Y
  └───ABBBBBBBBBBB
              └A binary number indicating the
               number of 16K units of outer
               storage installed

      ┌A = 0 No address translator
       A = 1 Address translator installed

  ┌ 3 = 16K of inner storage installed
  │ 7 = 32K of inner storage installed
  │ B = 48K of inner storage installed
  └ F = 64K of inner storage installed
```

NOTES

1. Storage word = F803 indicates 112K of total storage installed.

2. If BBBBBBBBBBB is greater than 0, then A must equal 1 and address translator feature must be installed.

3. Inner storage can be addressed only by the storage address register.

4. Outer storage can be addressed only by the address translator feature.

---

① Several device MAPs measure time. Instruction execution time is indicated to the MAPs by processor type. The wrong proccessor-type code will cause MAP failures.

5. Storage word = 7802 indicates one 32K card or two 16K cards installed as inner storage, one 32K card or two 16K cards installed as outer storage, and the address translator installed.

08 and 09	Alternate console address and type (AATT)
0A through 0E	Not used
0F	Release level of this configuration record

3.7.3.2 Definition of Entries 01-XX (Device Entries)

Byte	Definition
00	Device address
01	Device type
02	Flag byte Bit 0 is used by DCP and is always 0. Bit 1 = 1 indicates entry is chained to next entry. Bit 2 = 1 indicates last entry in configurator table. Bit 3 = 1 indicates last entry in sector. Bits 4 through 6 are reserved. Bit 7 = 1 indicates last available entry in configurator table.

NOTES

1. Ignore bits 2, 3, and 7 when making adds or changes. The configurator program will set/reset them at sort time.

2. Chain bit (byte 02 bit 1) is used to pass two or more entries to a MAP program or diagnostic. Wrong use of the chain bit can cause MAP failures. For example: a missing chain bit causes needed information not to be available to the MAP. Extra chain bits can cause MAPs to be bypassed during an auto run.

03 through 09	Device-dependent data. Describes the device to its associated MAPs/diagnostics. If it is wrong, failures will occur. The auto-verify performed when the configurator loads does not check device-dependent data.
0A through 0D	Reserved
0E through 0F	Device ID word

The device entries for alternate console devices are:

```
TTY Console
 DA  40  00  00  00  10  00  00  00  00  00  00  00  00  00  10

4979 Display Station*
 DA  42  00  00  04  06  00  00  00  00  00  00  00  00  04  06

4978 Display Station
 DA  45  00  00  04  0E  00  00  00  00  00  00  00  00  04  0E

4974 Matrix Printer**
 DA  62  00  00  02  06  00  00  00  00  00  00  00  00  02  06

80610 Display Station*
 DA  42  00  00  04  06  00  00  00  00  00  00  00  00  04  06

80420 Matrix Printer**
 DA  62  00  00  02  06  00  00  00  00  00  00  00  00  02  06

80450 Band Printer
 DA  66  00  00  03  06  00  00  00  00  00  00  00  00  03  06
```

The device entries for load devices are:

```
4964 Diskette
 DA  48  00  00  01  06  00  00  00  00  00  00  00  00  01  06

80210 Flexible Disk drive***
 DA  46  00  00  01  06  00  00  00  00  00  00  00  00  01  06
```

NOTE

The configurators on IBM diskettes do
not recognize CDC devices. Therefore,
do not try to use an IBM configurator
to construct the configuration table
on a CDC BASIC diskette. All CDC
devices will be configured wrong.

---

  *Device type 44 must be used when configuring an IBM diskette.
 **Device type 64 must be used when configuring an IBM diskette.
***Format also applies to 80240 series MMDs (contains an FDD
  packaged in the MMD enclosure).

3.7.3.3 Configurator Table Layout (Shown as Stored in Memory)

Use this blank table to assemble a configurator table for your
system.

Entry No.	Storage Address	Byte 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
00	3000	
01	3010	
02	3020	
03	3030	
04	3040	
05	3050	
06	3060	
07	3070	
08	3080	
09	3090	
0A	30A0	
0B	30B0	
0C	30C0	
0D	30D0	
0E	30E0	
0F	30F0	

3.8 ENTERING COMMANDS

The commands are described here as they are entered from the operator/programmer panel. These same commands can be entered from an alternate console by keying in the command character followed by data, where applicable, and pressing the ENTER key (Carriage Return key on TTY). No commas are required.

3.8.1 Single Character Commands (No Data)

Enter as follows, where: (B) = Data Buffer switch, (I) = Console Interrupt switch.

NOTE

Commands must be entered in bits 12
through 15 of the data buffer.

Command	Key Sequence	Result
5	(B),5,(I),(I)	Disable alternate console and assign operator/programmer panel.
6	(B),6,(I),(I)	Continue program execution.
9	(B),9,(I),(I)	Terminate program.
A	(B),A,(I),(I)	Start execution.
0*	(B),0,(I),(I)	Answer question no.
1*	(B),1,(I),(I)	Answer question yes.

---

*Commands 0 and 1 apply to test program responses only. Use the F command to answer yes or no to a question in a utility program, for example: F1 = yes, F0 = no.

3.8.2   Commands that use a Program Number (Commands B and C)

These commands load a program. The program number (XXXX) must be
entered with one of the following commands:

Command	Key Sequence	Result
B	(B),B,(I),(B),XXXX,(I),(I)	Program XXXX loads and goes.
C	(B),C,(I),(B),XXXX,(I),(I)	Program XXXX loads and waits for option selection command D.

3.8.3   Command to set Option Bits On (Command D)

Enter: (B),1D,(I),(B),XXXX,(I),(I)
                                    └────Mask of options to turn On.

                └─Command character

            └─Number of 16-bit words in mask (always 1) and
              used only when command is entered from operator/
              programmer panel.
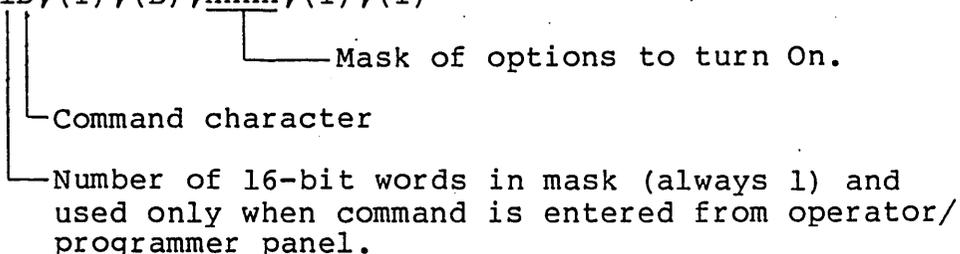
Option bits are as follows:

0   1   2   3 │ 4   5   6   7 │ 8   9   10   11 │ 12   13   14   15

                                                      Stop on no answer
                                                      (enter 6 command to
                                                      continue)

                                                Trace mode

                                         Programmer trace

                                  Loop step to step

                            Loop MAP

                    ───Do not display errors

                  ───Do not display status

              ───Loop on error

          ───Stop on error

      ───Request address of device to be tested
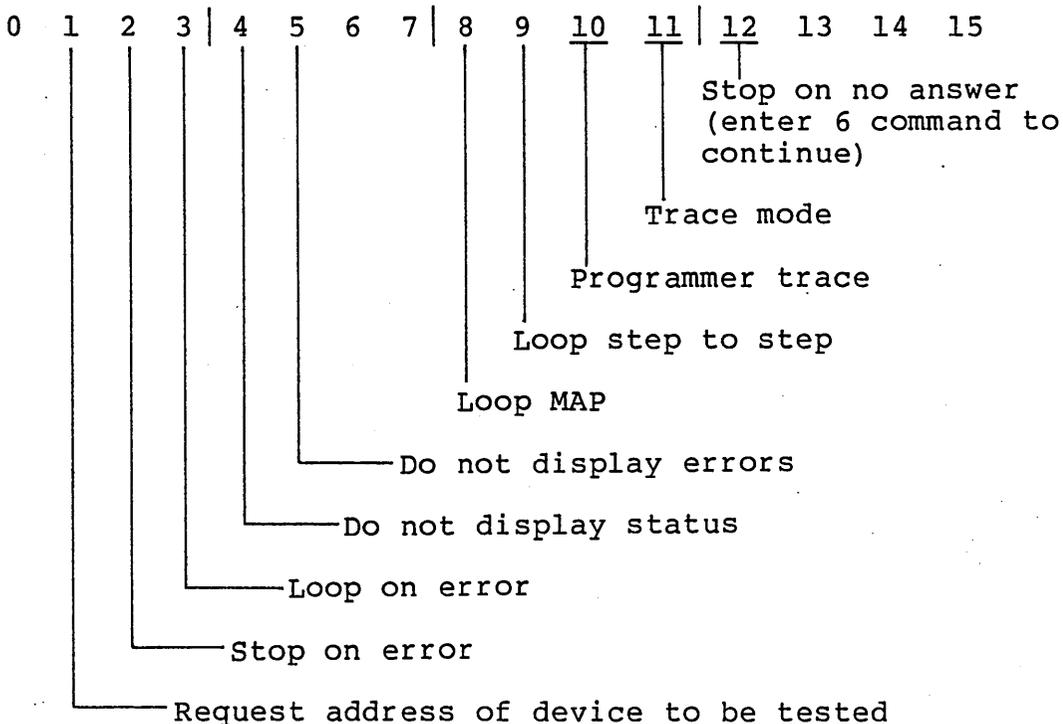
This command must be followed by the A command to start the
execution of the program.

3.8.4 Command to Enter Variable Data (Reply to a Program,
       Command F)

Enter: (B),XF,(I),(B),XXXX,(I),(B),XXXX,(I),(I)
                                                    |
                                                    Second consecutive
                                                    interrupt termi-
                                                    nates the entry.

                                        └─ Enter up to 15 words
                                           of data.

                           └─ First word of entry - if less than
                              four characters, they must be
                              followed with zero(s).

          Number of 16-bit words in this entry (must be a value
          between 1 and F). Used only when F command is entered
          from operator/programmer panel.

3.9   COMMON HALT LIST

Halts are identified by the Wait indicator on the operator/
programmer panel being lit.

3.9.1   Diagnostic Control Program (DCP) Halts

3800   Ready - enter any valid command.

3801   Bad condition code received from alternate console.
        Enter continue command: (B),6,(I),(I).

3802   Program check - see MAP 3871.

3803   Machine check - see MAP 3871.

3804   Power thermal warning.

3805   Program terminated - enter any valid command.

3806   Invalid request - enter any valid command.

3807   Alternate console is off during testing.

3808   Alternate console is on and test is complete.

3809   Unexpected interrupt - R0 level 3 contains the
        interrupt status byte. Location 180A contains the
        MAP number.

380A   Start - the program has started.

380B   Diskette error - IPL and try again. If it still
        fails, try a different diskette.

380C   Program not found - there is no VTOC entry for the
        requested program.

3810   Was not expecting reply (F command) data.

3813   Received a command sequence - to execute, press the
        Console Interrupt switch. To delete the command,
        change the buffer contents and press the Console
        Interrupt switch. Halt 3814 displays and the command
        can be entered again.

3814   Enter data.

3815   Cannot continue execution - IPL and try again. If it
        still fails call for assistance.

3816 Change keyboard definition for 4978 display. Press any
      key within 15 seconds and halt 3817 displays.

3817 Press the key requested for keyboard definition.

FFFF Command or reply has been accepted.

3.9.2 Configurator Halts

3820 This diskette has not been configured before. Enter
      continue command: (B),6,(I),(I).

3821 Enter alternate console device address and device type.
      Example:
      (B),1F,(I),(B),0040,(I),(I) to assign TTY as alternate
      console, or (B),1F,(I),(B),0000,(I),(I) to assign
      programmer panel as alternate console.

3822 Configuration error(s) on system. Reply with one of
      the following:
      01 = Terminate
      02 = Print all errors
      03 = Print options
      04 = Bypass TCS errors
      (B),1F,(I),(B),XX00,(I),(I) where XX = chosen option.

3823 Invalid entry. Enter the correct entry.

3826 Changes not saved. Enter 0D to save the configuration
      table: (B),1F,(I),0D00,(I),(I) or enter 05 to terminate
      (changes made are lost): (B),1F,(I),0500,(I),(I).

3827 Enter correct processor type.
      22 = 4952 processor
      23 = 4953 processor
      25 = 4955 processor
      (B),1F,(I),(B),XX00,(I),(I) where XX = processor type.

3829 Device address or type incorrectly entered. Enter
      correct parameter.

382A Secure the customer interface. Enter continue command
      when customer interface is secure: (B),6,(I),(I).

382B Is an OEMI card installed? Reply 00 = no, 01 = yes:
      (B),1F,(I),(B),0000 or 0100,(I),(I).

382C Copy configuration table to another diskette? Reply 0D
      to copy table or 05 to terminate:
      (B),1F,(I),(B),0D00 or 0500,(I),(I).

382D Is floating point feature installed? Reply 00 = no,
      01 = yes: (B),1F,(I),(B),0000 or 0100,(I),(I).

382E   Option table is available for entry. Enter option
        table information per the following:
        01 = Print table
        02 = Delete
        03 = Modify
        04 = Alternate console*
        05 = Terminate
        06 = Processor type
        07 = Two channel switch
        08 = Storage size
        09 = Print system equipment
        0A = Add
        0B = Bypass option table
        0C = Configure system*
        0D = Diskette write*
        0E = OEMI
        0F = Floating point
        10 = Merge
        (B),1F,(I),(B),XX00,(I),(I) where XX = chosen option.

382F   Initial auto configuration. The diskette has an
        alternate console assigned. The initial auto
        configuration must be completed. Enter 6 to continue:
        (B),6,(I),(I).

3831   Enter station address ID = XY. X = cable address
        (0 to 3), Y = station address (0 to 3).

3832   Programmer or CE console is assigned alternate
        console. Enter 6 to continue: (B),6,(I),(I).

3833   OIO (operator I/O) condition code. R3 = condition
        code and R4 = AATT where: AA = device address and TT =
        device type.

3834   Error - more than one two-channel switch disappeared
        after a select switch was changed. If there is no
        alternate console, enter 6 to continue:
        (B),6,(I),(I).

3835   Interrupt condition code. R3 = interrupt condition
        code and R4 = AATT where: AA = device address and
        TT = device type.

3836   Is customer using common I/O? Reply 00 = no, 01 = yes:
        (B),1F,(I),(B),0000 or 0100,(I),(I).

---

*A new alternate console definition or system configuration must
be followed by a diskette write to save the new information on
the diskette.

3837   Error -- a two-channel switch did not disappear after a
select switch was changed. If there is no alternate
console, enter 6 to continue: (B),6,(I),(I).

3838   RPQ diagnostics are installed on system.

383A   Select entry number in configurator table to be
altered. Enter (B),1F,(I),(B),XX00,(I),(I) where:
XX = table entry number.

383B   Enter the desired entry. Format is: (B),8F,(I),(B),
AATT,(I),(B),0000,(I),(B),IDID,(I),(B),0000(I),(B),0000,
(I),(B),0000,(I),(B),0000,(I),(B),IDID,(I),(I)
where: AA = device address, TT = device type, IDID =
device read ID code.

383C   Error - cannot find reflected two-channel switch. If
there is no alternate console, enter 6 to continue:
(B),6,(I),(I).

383D   Install the from diskette. Used with the merge function
(10) and the print configuration function (20). Install
the from diskette and answer 01 when complete:
(B),1F,(I),(B),0100,(I),(I).

383E   Install the BASIC diskette. Used with the merge
function (10) and the print configuration function (20).
Replace the from diskette with the BASIC diskette and
answer 01 when complete: (B),1F,(I),(B),0100,(I),(I).

3840   Error - a device is in the hardware, but not in the
configuration table. Level 3, R3 contains the address
(AA00). Level 3, R4 contains the ID word. Record the
contents of R3 and R4, then enter continue command:
(B),6,(I),(I).

3841   Error - a device is in the table, but not in the
hardware. Level 3, R3 contains the device address and
configuration table entry number (AAEE). Record the
contents of R3 and enter continue command:
(B),6,(I),(I).

3842   Error - the ID word received does not match the ID
word stored in the configurator table for this address.
Level 3, R3 contains the device address and config-
uration table entry number (AAEE).
Level 3, R4 contains the ID word received.
Record the contents of R3 and R4 and enter continue
command: (B),6,(I),(I).

3843   Error - an entry in the configurator table has a device
        type and device ID that do not match.
        Level 3, R3 contains the device address and configura-
        tion table entry number (AAEE).
        Record the contents of R3 and enter continue command:
        (B),6,(I),(I).

3844   Error - received a bad condition code in response to a
        read ID command.
        Level 3, R3 contains the device address and condition
        code (AACC).
        Record the contents of R3 and enter continue command:
        (B),6,(I),(I).

3845   Error - two-channel switch was in the wrong position.
        If there is no alternate console, enter 6 to continue:
        (B),6,(I),(I).

3846   Enter new configurator table data:
        (B),8F,(I),(B),0001,(I),(B),0203,(I),(B),0405,(I),(B),
        0607,(I),(B),0809,(I),(B),0A0B,(I),(B),0C0D,(I),(B),
        0E0F,(I),(I).

3848   Error - entries do not agree. R1 = entry address of
        from table and R2 = entry address of to table.

3849   Alternate console error. The response from the
        alternate console to a read ID command does not match
        that of a supported console device.
        Level 3, R3 contains the device address and type read
        from the configurator table (AATT).
        R4 contains the response from the read ID command.
        Record the contents of R3 and R4 and enter continue
        command: (B),6,(I),(I).
        Halt 382E displays.
        If R3 has the correct device address and type for the
        alternate console, the console is returning a bad ID.
        Enter: (B),1F,(I),(B),0500,(I),(I), the configurator
        then terminates at halt 3800.
        Enter the assign programmer console command:
        (B),0005,(I),(I), this disables the alternate console.
        If R3 does not contain the correct information, change
        the alternate console bytes at address 3008 and 3009 to
        the address and type for the console device.
        To write the record to the diskette, enter:
        (B),1F,(I),(B),0100,(I),(I).

384A   Configuration table is full.

384B   Configurator chain (byte 02 bit 1) is too long. See MAP
        3880.

384C   Configuration display message. See alternate console
        display for message.

384D   The VTOC does not contain a configurator table (U38F1).
Load the general utility program (38F9) and copy 38F1
from another diskette.

384F   Duplicate address AA, entry EE and EE. There is a
duplicate address in the configuration table. If there
is no alternate console assigned, Level 3 R2 has the
device address, R3 and R4 have the table entry
numbers. Enter 6 to continue: (B),6,(I),(I).

3850   Enter inner storage size:
03 = 16K
07 = 32K
0B = 48K
0F = 64K
(B),1F,(I),(B),XX00,(I),(I) where XX = 03,07,0B, or 0F.

3851   Is address translator installed? Reply 01 = yes,
00 = no: (B),1F,(I),(B),0000 or 0100,(I),(I).

3852   Enter outer storage size. 0XXX = decimal number of 16K
outer storage blocks:
(B),1F,(I),(B),0XXX,(I),(I).

3853   ACCA SL installed (asynchronous control communication
adapter, single line). See MAP 13.

3854   AACA ML installed (asynchronous control communication
adapter, multiline) See MAP 13

3855   BSCA SL installed (bisync communication adapter, single
line). See MAP 13.

3856   BSCA ML installed (bisync communication adapter,
multiline). See MAP 13.

3857   SDLC installed (synchronous data-link control).
See MAP 13.

3858   Error - the specify code entered is not correct.

3859   Error - the specify code entered is correct but does
not match the card.

385A   Remote IPL? Reply 00 = no, 01 = yes:
(B),1F,(I),(B),0000 or 0100,(I),(I).

385B   Error - a multiline controller has an address domain.
See MAP 13.

385C   Error - no interrupt. See MAP 13.

385D   Two-channel switch console message. Change the select
switch to the processor you are using. See MAP 13.

385E Two-channel switch console message. There is more than
      one two-channel switch console installed. See MAP 13.

385F Two-channel switch console message. There is at least
      one two-channel switch console installed. See MAP 13.

3860 Programmable communications subsystem error message.
      See MAP 13.

3861 Programmable communications subsystem error message.
      See MAP 13.

3862 Programmable communications subsystem entry. See
      MAP 13.

3863 Is alternate console being used installed as common
      I/O? Reply 00 = no, 01 = yes:
      (B),1F,(I),(B),0000 or 0100,(I),(I).

3864 Is a programmer or CE console installed on the
      processor being used? Reply 00 = no, 01 = yes:
      (B),1F,(I),(B),0000 or 0100,(I),(I).

3865 Is alternate console being used installed in farthest
      common I/O? Reply 00 = no, 01 = yes:
      (B),1F,(I),(B),0000 or 0100,(I),(I).

3866 The alternate console disappeared after the two-channel
      switch was changed. See MAP 13.

3867 The alternate console did not appear after the
      two-channel switch was changed. See MAP 13.

3868 The alternate console did not disappear after the
      two-channel switch was changed. See MAP 13.

3869 Obtain a programmer or CE console. The configuration
      program needs a programmer or CE console to continue.
      The configuration program has been terminated.

386A ML COMM installed (multiline communication). See
      MAP 13.

3.9.3 MAP Diagnostic Integration (MDI) Halts

3C01 Enter address of device to be tested.

   - From operator/programmer panel:
     (B),1F,(I),(B),XX00,(I),(I).

   - From alternate console: FXX.

3C05 Enter starting step number for loop

- From operator/programmer panel:
  (B),1F,(I),(B),XXXX,(I),(I).

- From alternate console: FXXXX.

3C06 Enter ending step number for loop - same procedure as
      halt 3C05.

3C08 Device at address entered in halt 3C01 is not the
      type address tested by the requested program.
      Enter the correct address.

3C0E No device of that type was found in the configurator
      table, or the MAP executed and attempted to load a MAP
      not in VTOC.

3.10   ERROR ABORT MESSAGE

When a diagnostic is aborted, an error abort message is generated. If a display station or TTY is assigned as the alternate console, the abort message is displayed as shown in the following format:

```
      ABORT TEST
 TEST     EXIT     DEV     CC      ISB      STEP
 4602     309E     0002    0703    0024     0001     4040     4040
 DCB0     DCB1     DCB2    DCB3    DCB4     DCB5     DCB6     DCB7
 0000     0000     0000    0000    0000     0000     0000     3694
 CSS0     CSS1     CSS2    CSS3    CSS4     CSS5     CSS6     CSS7
 36E3     0000     0000    0000    0000     0000     4040     4040
 CSS8     CSS9     CSSA    CSSB    CSSC     CSSD     CSSE     CSSF
 4040     4040     4040    4040    4040     4040     4040     4040
 I3C00    MAP=4602    STEP=0001
```

Where:

   TEST = Number of the test executing at time of abort.
          To determine the operation that was in process,
          go to the SAM for that test and find the step that
          was being executed.

   EXIT = Exit address (last address entered in R6 by a
          branch and link instruction).

   DEV = Device address.

   CC   = Condition code.

   ISB = Interrupt status byte returned, if any.

   STEP = Step number being executed at time of abort.

   DCB0 - DCB7 = Device control block bytes.

   CSS0 - CSSF = Cycle steal status words if available.
                 See Description of Cycle Steal Status
                 Words, appendix A, for significance (with
                 the FDD, only words 0 through 5 are valid).

NOTE

If abort message is meaningless, do
the following as applicable:

● If diagnostics are being loaded from
the FDD being tested, retry test
that was executing. If problem per-
sists, go to paper-only SAM 4672
(Not Ready Status).

● If another FDD is doing loading,
reseat attachment card of test unit
before retrying test. If problem
persists, replace attachment card
and I/O cable of test unit one at a
time. Replacing attachment card
requires that switches on new card
be set for device address and IPL
assignment (Installing Attachment
Card and Cabling, section 2).

If operator/programmer panel is the assigned alternate console,
an error abort is indicated by $46FE_{16}$ being displayed on
indicators. The error abort message can be read from memory as
follows:

NOTE

Level 3 registers R0 through R3 con-
tain the following information:

R0 = Step number
R1 = Test number
R2 = Device address
R3 = Starting address of abort
     message

1. Press Stop switch. Stop indicator lights.

2. Press Level 3 switch.

3. Press R3 switch. This displays the starting memory
   address of the error abort message.

NOTE

The first word at this address con-
tains the test number. The remaining
words shown in the example message
follow in sequence.

4. Press SAR switch.

5. Enter memory address via input switches.

6. Press Store switch.

7. Press Main Storage switch. Contents of first memory
   address displays on indicators.

8. Continue pressing Main Storage switch to view each word in
   sequence.

This section contains the spare parts lists for the FDD and its attachment card. The spare parts lists (SPLs) for the FDD and attachment card are correlated as follows:

- SPL 66308079 applies to the BR808-A (standalone, 208-V ac input) FDD

- SPL 66308617 applies to the BR808-B (standalone, 120-V ac input) FDD

- SPL 66304591 applies to the BR812-A (combination, 208-V ac input) FDD

- SPL 66304592 applies to the BR812-B (combination, 120-V ac input) FDD

- SPL 66308078 applies to the FA741-A (Flex Disk) attachment cards.

DWN	R. Trautman	2-79	(CD)	TITLE		PREFIX	DOCUMENT NO.		REV.
CHKD	E.Trautman	10-11-79	CONTROL DATA	SPARE PARTS LIST FDD		SPL	66308079		A
ENG			CORPORATION						
MFG		10-16-9		FIRST USED ON				SHEET	
APPR		10-22-79	CODE IDENT					1 of 2	
			15920	BRA0AA					

SHEET REVISION STATUS			REVISION RECORD					
	2	1	REV	ECO	DESCRIPTION	DRFT	DATE	APP
	A	A	A	13471-45	RELEASED CLASS 'A'	1	10/26/79	Mch
	A	A	A	10117-76	TRANSFER TO PSG	1	12/11/79	mot

PSG_____Division
controls this document
as of__12-11-79
AA4291

NOTES.

    EQUIPMENT CONFIGURATOR --------15631529

        TOP LEVEL ASSEMBLY ------------15631579

DETACHED LISTS

AA3160 REV. 8-71   PRINTED IN U.S.A.

CONTROL DATA			CODE IDENT	SHEET		DOCUMENT NO.		REV.
			15920	2 of 2	SPL	66308079		A

FIND NO.	PART IDENTIFICATION	QUANTITY REQUIRED									UNIT OF MEAS		NOMENCLATURE OR DESCRIPTION	SPECIFICATIONS, NOTES, OR MATERIAL
1	77618000	1											FDD Assy	
2	61408154	1											Power Supply Assy	
3	61408480	1											Switch Assy	
4	75293203	1											Belt - Flat	

AA3161 REV. 8/71   PRINTED IN U.S.A.

DWN	R Trautman	4-79	**CONTROL DATA** CORPORATION	TITLE SPARE PARTS LIST FDD 120V	PREFIX SPL	DOCUMENT NO. 66308617	REV. A
CHKD	R Trautman	4-25-79					
ENG	C Pfeiffer	10-9-79		FIRST USED ON BR808B		SHEET 1 of 2	
MFG		10-16-9					
APPR	S H Hy	10-22-79	CODE IDENT 15920				
	M Dubb	10-21-79					

SHEET REVISION STATUS | REVISION RECORD

	2	1	REV	ECO	DESCRIPTION	DRFT	DATE	APP
	A	A	A	13471-45	Released Class "A"	1	10/26/79	mch
	A	A	A	10117-86	TRANSFER TO PLVOPS	—	12/17/79	mcT

PSG Division

NOTES:
Equipment Configurator....15631530
Top Level Assembly........15631580

controls this document as of 12-17-79
AA4291

DETACHED LISTS

AA3180 REV. 8 71   PRINTED IN U.S.A.

CONTROL DATA		CODE IDENT 15920	SHEET 2	SPL	DOCUMENT NO. 66308617	REV. A

FIND NO.	PART IDENTIFICATION	QUANTITY REQUIRED										UNIT OF MEAS	NOMENCLATURE OR DESCRIPTION	SPECIFICATIONS, NOTES, OR MATERIAL
1	77618000	1											FDD Assy	
2	61408155	1											Power Supply Assy	
3	61408479	1											Switch Assy	
4	75293203	1											Belt Flat	

AA3181 REV. 8/71   PRINTED IN U.S.A.

DR: R. Trautman 10/2	CONTROL DATA	TITLE		PREFIX	DOCUMENT NO.		REV
CHKD K Trautman 10/3/79		FDD COMBO 208V		SPL	66304591		A
ENG Rhodes		FIRST USED ON					
MFG		8R812A				SHEET	
APPD 11-2-79 CODE IDENT						1 Of 2	
C.E. VI-2-79 15920							

					SHEET REVISION STATUS										2	1	REV	ECO	DESCRIPTION	DRFT	DATE	APP
															A	A	A	13471-49	RELEASED CLASS A	/	11/5/79	meh

NOTES:

EQUIPMENT CONFIGURATOR - 15632308

TOP LEVEL ASSY   - 61408325

DETACHED LISTS

CONTROL DATA			CODE IDENT	SHEET		SPL	DOCUMENT NO.	REV
			15920	2		SPL	66304591	A

FIND NO.	PART IDENTIFICATION				QUANTITY REQUIRED								UNIT OF MEAS		NOMENCLATURE OR DESCRIPTION	SPECIFICATIONS, NOTES, OR MATERIAL
1	77618000	1													FDD Assy MPI	
2	61408154	1													Power Supply	
3	75293203	1													Belt - Drive	

DAT	R. Trautman	10/24	**CONTROL DATA** CORPORATION	FDD COMBO 220V	PREFIX	DOCUMENT NO		REV
CHKD	Trautman	10/24/79			SPL	66304592		B
ENG		5/17/79		FIRST USED ON			SHEET	
MFG				SRF 113			1 OF 2	
APPR		1/2/79	CODE IDENT					
		11-7-79	15920					

SHEET REVISION STATUS | **REVISION RECORD**

2	1	REV	ECO	DESCRIPTION	DRFT	DATE	APP
A	A	A	13+71-47	RELEASED CLASS "A"	/	11/5/79	Inch
H	h	11	10-17-66	ALL IL LABEL / TRANSFER TO FSG	1	12/11/79	n-t
B	B	B	1282	FN 2 WAS 61408326	JL	2/3/81	CF

PSC Division
controls this document
as of 12-10-79
AA4291

NOTES

EQUIPMENT CONFIGURATOR - 15631017

TOP LEVEL ASSY - 61408326

DETACHED LISTS

CONTROL DATA				CODE IDENT	SHEET		SPL	DOCUMENT NO.	REV
				15920	2			66304592	B

FIND NO.	PART IDENTIFICATION	QUANTITY REQUIRED									UNIT OF MEAS	NOMENCLATURE OR DESCRIPTION	SPECIFICATIONS, NOTES, OR MATERIAL
1	77618000	1										FDD Assy MPI	
2	61408155	1										Power Supply	
3	75293203	1										Belt - Drive	

AA3181 REV 8 71

PRINTED IN U.S.A

DWN	R. Trautman	2-79		TITLE				PREFIX	DOCUMENT NO.			REV
CHKD		10-79	**GD** CONTROL DATA CORPORATION	¬FLEX DISK ATTACH CARD				SPL	66308078			D
ENG		10-4-79										
MFG		11-1-9		FIRST USED ON							SHEET	
APPR		11-2-79	CODE IDENT 52810		FA741A						1 of 2	

SHEET REVISION STATUS																				REVISION RECORD					
															2	1	REV	ECO	DESCRIPTION	DRFT	DATE	APP			
															00	00	00	50003.87	RELEASED CLASS B	/	10/5/78				
															A	A	A	13471-48	RELEASED CLASS A	/	11/21/79				
															A	A	A	10117-69	ADD ID LABEL & TRANSFER TO PSG	/					
															B	B	B	00952	TLA WAS 66308082	CF					
															C	C	C	1096	FN 1 WAS 66308082		5-9-20				
															D	D	D	01270	TLA WAS 22245077	CAC	1-20-81	CF			

INTER-DIVISIONAL DOCUMENT
Changes to this document require
approval of all Using Divisions
per CDC-STD 1.01.024.

AA6030

_____PSG_____ Division
controls this document
as of 12-10-79
AA4291

NOTES.
EQUIPMENT CONFIGURATOR -------15631321

TOP LEVEL ASSEMBLY -----------22245137

DETACHED LISTS

AA3180 REV. 8 71

PRINTED IN U.S.A. 7

CONTROL DATA			CODE IDENT 52810	SHEET 2 of 2		S PL	DOCUMENT NO. 66308078	REV. D

FIND NO.	PART IDENTIFICATION	QUANTITY REQUIRED									UNIT OF MEAS	NOMENCLATURE OR DESCRIPTION	SPECIFICATIONS, NOTES, OR MATERIAL
1	22245137											Module w/Firmware FDD	
2	71492620											Frame, Card {Ref.}	

AA3181 REV. 8-71

PRINTED IN U.S.A. 8

This appendix contains:

- Explanation of SAM format - Describes the format and use of the SAM (structured analysis method) listings.

- Description of diagnostic tests - Briefly describes each of the FDD diagnostic programs on the CDC BASIC diskette.

- Description of cycle steal status words - Describes significance of the FDD cycle steal status words.

- SAMS covering the FDD diagnostic tests and paper-only troubleshooting. The SAMs are categorically numbered as follows:

  - SAMs 4600 through 4621 correspond to the FDD diagnostic tests on the CDC BASIC diskette. Each SAM and corresponding diagnostic program have the same number.

  - SAMs 4670 through 4673 are paper-only listings that supplement the diagnostic program SAMs.

EXPLANATION OF SAM FORMAT

A SAM is a formatted listing that documents the flow of a diagnostic program and presents troubleshooting information in a logical manner. Each SAM contains a sequential listing of questions that can be answered yes or no. The response made to a particular question either leads to the next question or to the specific action (or numerical sequence of actions) that is to be taken to correct the problem.

Two types of SAMs are contained in this appendix. One type documents diagnostic programs, and the other gives trouble-shooting information on problems diagnostic programs cannot isolate (paper-only SAMs). Both are structured in the same basic format. Each SAM is identified by a title and four-digit number at the bottom of the page. If a SAM contains more than one page, a hyphen and number follows the four-digit number to identify the pages within the SAM.

The following paragraphs explain how to use the two types of
listings, diagnostic program SAM and paper-only SAM.

DIAGNOSTIC PROGRAM SAM

Figure A-1 shows an example diagnostic program SAM. When an
error is detected in a diagnostic test, go to the SAM that has
the same number as the failing test. Find the failing step
number in the left column and perform the action for that step.

To determine the test portion that completed successfully, go
back from failing step to where an N-response path was taken by
the program. All steps preceding that point were completed
successfully. Advisory information for the program is given at
the top of the first page.

Figure A-1.   Diagnostic Program SAM Example

Before entering a paper-only SAM (figure A-2), verify that the
assumed conditions given at the top of the page are present and
observe any preliminary instructions. Enter listing and answer
yes (Y) or no (N) to the question asked or condition being
tested. Follow down appropriate Y or N column. Column either
leads to another question, or to action numbers. If column leads
to action numbers, perform corresponding actions in numerical
order to correct the problem.
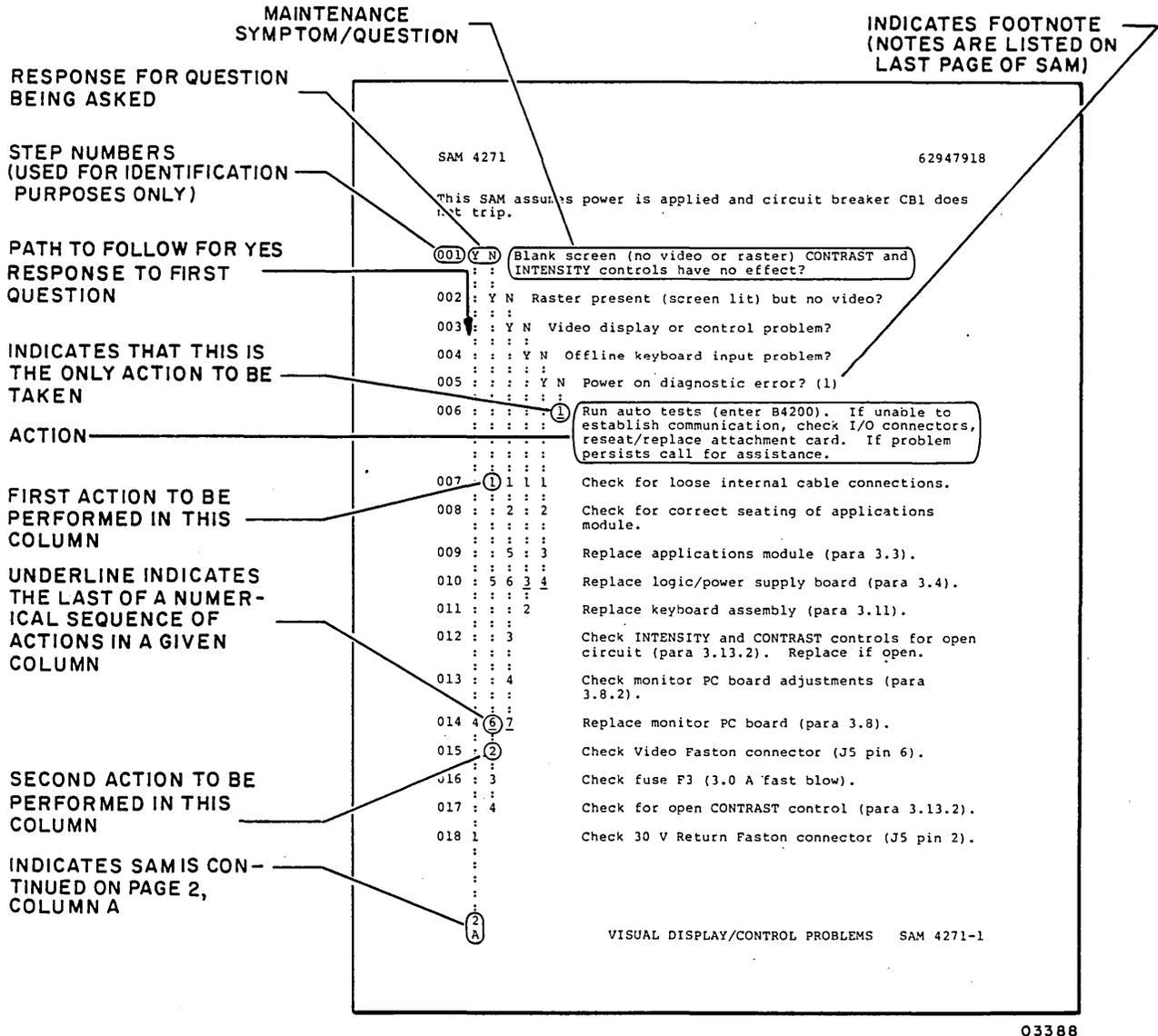
Figure A-2.   Paper-Only SAM Example

DESCRIPTION OF DIAGNOSTIC TESTS

The following paragraphs describe the FDD auto-diagnostic tests and FDD manual diagnostic tests that are on the CDC BASIC diskette (part number 663107XX).

FDD AUTO-DIAGNOSTIC TESTS

The following FDD auto-diagnostic tests 4600 through 4603 are linked together. Execution starts with the test that is called up. Each following test then executes in succession until last test 4603 finishes or an error occurs.

4600 Channel Interface Test

Test 4600 checks the operation of the attachment card under direct program control (DPC) using all legal DCP commands and various illegal command codes. Condition codes returned are checked for command acceptance or rejection as applicable. The test then issues a start diagnostic 1 command and verifies that:

- The read-only memory (ROM) on attachment card outputs the correct checksum.

- The diskette in the FDD is rotating at the correct speed.

- The attachment card and FDD are ready.

If an incorrect speed or not-ready condition exists, the test reads cycle steal status and an automatic branch to routine 4620 occurs to define the problem.

This test automatically branches to test 4601.

4601 Attachment Test

Test 4601 checks if the attachment card responds properly to illegal device-control blocks (DCBs). After verifying that no preset error condition exists, the test issues various invalid DCBs in cycle steal mode. For each DCB issued, the test checks that the attachment card:

- Returns an interrupt condition code of unit exception.

- Sets bit 3 of the interrupt status byte for DCB specification check.

- Indicates the proper error condition in the error-log byte (second byte) of cycle steal status word 4.

If a preset error condition is present at the beginning of the test, an automatic branch to routine 4620 occurs to define the problem.

This test automatically branches to test 4602.

4602 Seek and Read Sector ID Test

Test 4602 checks if the FDD and attachment card can do seek and read sector ID operations correctly. The seek instructions issued by the test cause the following head movement sequence:

- Recalibration seek (heads to cylinder 00).

- One-track incremental seeks from cylinder 00 to cylinder 74, followed by one-track decremental seeks back to cylinder 00 using head 0.

- Repeat of one-track incremental/decremental seeks using head 1.

- Forward and reverse seeks starting from cylinder 00 to cylinder 74 using head 0, then to cylinder 01, cylinder 73, cylinder 02, cylinder 72, etc until cylinder 26 is reached.

- Repeat of forward/reverse seeks using head 1.

To verify that the selected head is on the correct cylinder, the test chains each seek with a read sector ID and samples the cylinder number of the ID field that is read. If a seek and read sector ID operation is not completed, the test reads cycle steal status and an automatic branch to routine 4620 occurs to define the problem.

This test automatically branches to test 4603.

4603 Seek and Read Data Test

This last auto-test expands on the seek and read sector ID
testing done in test 4602. In addition to seeking and read
sector ID, this test checks if the FDD and attachment card can
execute read data instructions. After seeking to the designated
cylinder and verifying the position of the selected head, the
test issues a DCB containing read data instructions. The test
then checks that the returned interrupt condition code is device
end (successful completion). If a seek, read sector ID, or read
data operation is not completed, the test reads cycle steal
status and an automatic branch to routine 4620 occurs to define
the problem.

The data fields in the following diskette locations are read by
both heads during the test:

- Sectors 01 and 15 of cylinder 74.

- Sector 01 of cylinders 01, 73, 02, 72, 03, and 71.

FDD MANUAL DIAGNOSTIC TESTS

Descriptions of the FDD manual diagnostic tests follow. These
tests fall into two categories:

- Tests 4610 and 4611 - not linked together and each
  requires operator interaction.

- Tests 4620 and 4621 - linked tests that do not require
  operator interaction.

4610 Write Sector ID and Data Test

Test 4610 checks if the FDD and attachment card can format
sectors and write data correctly. If the test is run on a CDC
diskette (the BASIC diskette or a scratch diskette), the write-
protect slot of the diskette jacket must be covered with a piece
of opaque tape. The writing done in the test occurs on cylinders
01, 02, 03, 74, 75, and 76. On the BASIC diskette, these
cylinders are allotted for scratch use (CE cylinders).

The sequence of the test is as follows:

- A recalibration seek is done to place the heads at cylinder 00.

- A seek is made to cylinder 01 using head 0 and a read sector ID performed to verify head position.

- Cylinder 01 is formatted into 15 sectors using head 0 and words of 5555_{16} are written in each data field. The sector IDs and data that has been written is then read-verified by the attachment card.

- The data field in sector 01 of the newly formatted track is read back and the 5555_{16} words verified by the test.

- Head 1 is selected and that track of the cylinder is formatted and verified the same.

- The test then continues to cylinder 02 and the process is repeated. At the end of the test, cylinders 01, 02, 03, 74, 75, and 76 are all reformatted.

If the formatting/read-verifying of a track is not completed, the test reads cycle steal status and an automatic branch to routine 4620 occurs to define the problem.

4611 Write/Read Address Marker Test

This test checks if the FDD and attachment card can write data-address markers and control-address markers in data fields correctly, and if the attachment card reacts correctly when the markers are read back in a read data operation. The sequence of the test is similar to test 4610, except that:

- Instead of writing sector format and 5555_{16} data words, the test writes random data and either a data-address marker or a control-address marker in the first sector of the cylinders that are CE cylinders on the BASIC diskette. Data-address markers are written on cylinders 01, 03, and 75 and control-address markers on cylinders 02, 74, and 76.

- Instead of reading back written data for verification, the test does a read data following each write to check attachment card reaction to the address marker. On cylinders that a data-address marker is written, the test checks that an interrupt condition code of device end is returned and that the interrupt status byte equals 00_{16}. On cylinders that a control-address marker is written, the test checks that an interrupt condition code of unit exception is returned and that the interrupt status byte equals 80_{16} (device status available).

- Following each read data, the test reads cycle steal status to check status word 1. On cylinders with a data-address marker, the test checks that word 1 equals 0000_{16}. On cylinders with a control-address marker, the test checks that word 1 equals 1000_{16} (control-address marker found).

After the test is completed, test 4610 must be run to delete the control-address markers that have been written on the diskette. Otherwise, later use of that diskette will cause error stoppage in auto-test 4603.

4620 Cycle Steal Status Analysis Routine

This routine analyzes cycle steal status word 5 and the error-log byte of word 4 that has been read from the attachment card. (These and the other status words are defined in the Description of Cycle Steal Status Words that follows.) The start cycle steal status command that transfers this information from the attachment card is issued in the auto-test or manual test that was in process before this routine. That test may either stop and instruct the running of this routine or enter it automatically through branching.

Sequentially, the routine:

- Displays the six cycle steal status words in hexadecimal on the assigned alternate console.

- Analyzes the FDD health parameters given in status word 5 and, if a failure is recorded, the routine stops and indicates the failure.

- If no failure is recorded in status word 5, the routine continues and decodes the error-log byte of status word 4 and indicates the result. If necessary, an automatic branch to routine 4621 occurs to complete the decoding.

4621 Continuation of Cycle Steal Status Analysis

This routine only executes when the decoding of the error-log byte cannot be completed by routine 4620.

DESCRIPTION OF CYCLE STEAL STATUS WORDS

A start cycle steal status command transfers status words to the Series/1 processor. The significance of the six status words for the FDD is described in the following paragraphs.

CYCLE STEAL STATUS WORD 0 (Residual Address)

When a cycle steal transfer is halted, the processor storage address where the last cycle steal of data occurred remains in the address counter of the attachment card. This is the residual address and is accessible as cycle steal status word 0. If the last attempted transfer was a word, the residual address is the address of the odd byte of the word. Execution of a start cycle steal status command does not affect this address.

CYCLE STEAL STATUS WORD 1 (FDD Status)

This word provides the status at the time of the terminating interrupt of the last start command (table A-1).

TABLE A-1.   CYCLE STEAL STATUS WORD 1 DEFINITION

BIT	TITLE	SIGNIFICANCE
0	Not used	
1	No data field found	Set to 1 if the sector specified in a read-data or read-verify operation was located, but not the associated data field.
2	Overrun	Set to 1 if the processor did not service the cycle steal request within 48 microseconds during a cycle steal transfer operation. This occurs when demands for I/O activity exceeds the capability of the system channel.
3	Control-address marker found	Set to 1 if a control-address marker was found in front of the specified data field. The read-data operation ends after the sector data field containing the control-address marker has been transferred into processor storage. (No check for control-address markers is made during a read-verify operation.)

TABLE A-1. CYCLE STEAL STATUS WORD 1 DEFINITION (CONTD)

BIT	TITLE	SIGNIFICANCE
4	File not ready	Set to 1 if the FDD is not ready to execute or drops ready while executing a seek, recalibration-seek, write-data, read-data, read-verify, read-sector ID, or format-track operation.
5	No record found	Set to 1 if the sector specified in the operation was not found after at least one revolution of the diskette. If the bit is set after a read sector ID operation, the FDD did not find any sector IDs on the track (suspect an unformatted or defective track).
6	End of track	Set to 1 if the last logical sector on track is detected before completing a multiple-sector operation.
7	File data check	Set to 1 if a data error is detected on diskette. Cyclic-redundancy-check bytes are recorded at the end of each sector ID and data field to provide error detection.
8	Index pulse at incorrect time	Set to 1 if diskette speed differs more than 3.5 percent from 360-rpm nominal speed.
9	Invalid diskette side selected	Set to 1 if head 1 is selected for a seek operation on a single-sided diskette.
10	Not used	
11	Not used	
12	Not used	
13	Not used	
14	Not used	
15	Not used	

CYCLE STEAL STATUS WORDS 2 AND 3 (Search Argument)

If a read-data, write-data, or read-verify operation preceded the
reading of status, words 2 and 3 contain the search argument used
in that operation. If the operation was not completed, the words
indicate the sector location that was being accessed when the
operation ended. This information is useful if the operation
failed because of a data error (bit 7 of status word 1 set). The
words indicate the search argument as follows:

- Word 2 - the first byte (bits 0 through 7) indicates the
  sector length (00_{16} for 128-byte sector, 01_{16} for
  256-byte sector, or 02_{16} for 512-byte sector), the
  second byte (bits 8 through 15) indicates the cylinder
  number (00 through $4C_{16}$).

- Word 3 - the first byte indicates the selected head
  (00_{16} for head 0, 01_{16} for head 1), the second byte
  indicates the sector number (01 through $1A_{16}$ for
  128-byte sectors, 00 through $0F_{16}$ for 256-byte sectors,
  or 00 through 08_{16} for 512-byte sectors).

CYCLE STEAL STATUS WORD 4 (Additional FDD Status and Error Log)

Bits 0 through 7 of word 4 supplement the FDD status given in
word 1. The significance of these bits is defined in table A-2.

Bits 8 through 15 of word 4 contain a code that indicates the
type of error encountered during execution of the last command.
This code is defined in table A-3.

TABLE A-2. CYCLE STEAL STATUS WORD 4, BYTE 1 DEFINITION

BIT	TITLE	SIGNIFICANCE
0	Index	Index pulse was detected when cycle steal status words were updated.
1	Write protect active	The diskette in FDD has the write-protect slot in its jacket uncovered thus activating write protect.
2	Heads engaged	Attachment card has instructed the FDD to load heads.
3	Seek error	The attachment card was unable to verify that the desired cylinder was reached in seek.

TABLE A-2. CYCLE STEAL STATUS WORD 4, BYTE 1 DEFINITION (CONTD)

BIT	TITLE	SIGNIFICANCE
4	Write fault	A fault caused data to be improperly written on diskette. Possible faults are: • Write enabled without heads loaded • Write enabled without write data • Write enabled without erase current
5	Track 00	The FDD heads are positioned at cylinder 00.
6	DRQ	Data request is active on attachment card indicating FDD is still attempting to transfer data.
7	FDC busy	The FDD controller chip on attachment card was executing a command when cycle steal status words were updated.

TABLE A-3. CYCLE STEAL STATUS WORD 4, BYTE 2 DEFINITION

HEXADECIMAL ERROR CODE	SIGNIFICANCE
00	No error occurred.
01	DCB input flag set in output operation.
02	DCB input flag not set in input operation.
03	Illegal control word modifier contained in DCB.
04	FDD was not ready when command was issued.
05	A forward seek was specified beyond cylinder 76.
06	A backward seek was specified beyond cylinder 00.
07	DCB byte count not equal to 4 in a read sector ID instruction.
08	A read or write was attempted beyond end of track.
09	The sector register in FDD controller chip on attachment card did not load correctly.
0A	The data register in FDD controller chip on attachment card did not load correctly.
0B	The head-select register on attachment card is incorrect.

HEXADECIMAL ERROR CODE	SIGNIFICANCE
0C	Invalid diskette side specified in DCB.
0D	FDD dropped ready during execution of last command.
0E	A FDD write fault occurred.
0F	A FDD seek error occurred.
10	No sector ID field was found.
11	No data field was found.
12	A CRC error occurred.
13	Data was lost in FDD controller chip on attachment card due to overrun.
14	The starting sector in DCB was out of range.
15	The starting storage address in DCB was odd.
16	The byte count in DCB was odd.
17	The sector length in DCB was greater than 02_{16}.
18	A write was attempted on a write-protected diskette.
19	An invalid format data word was given in DCB word 2.
1A	An invalid N byte (sector length) was given in DCB word 3 of a format track instruction.
1B	An invalid C byte (cylinder number) was given in DCB word 3 of a format track instruction.
1C	A command was received from the processor during a FDD malfunction. The problem is identified in cycle steal status word 5.
1D	The DCB head byte differs from the head that is selected.
1E	The track register in FDD controller chip on attachment card did not load correctly.
1F	The diskette-initialize latch on attachment card failed to set for a format track operation.

TABLE A-3.   CYCLE STEAL STATUS WORD 4, BYTE 2 DEFINITION (CONTD)

HEXADECIMAL ERROR CODE	SIGNIFICANCE
20	Index was detected before a format track operation was completed on track.
21	The FDD write-enable latch on attachment card failed to set for a write operation.
22	The FDD write-enable latch on attachment card failed to clear after a write operation.
23	The last command was not executed within 1.5 seconds and attachment card aborted the operation.
24 to 80	Not used.
81	The processor issued an interface data check to attachment card.
82	Protect check. The storage-access key given in DCB is invalid.
83	Invalid storage address given in DCB.
84	Storage data check. Data accessed from processor memory was out of parity.
85	Not used.
86	DPC command not accepted by attachment card.
87	Not used.
88	Not used.
89	The attachment card issued an interface data check to the processor.
8A	Not used.
8B	Odd DCB address given in IDCB for a start command (70XX).
8C	Odd chaining address given in DCB for a start command (70XX).
8D to 8F	Not used.
90	Odd DCB address given in IDCB for a start diagnostic 1 command (7DXX).

TABLE A-3.   CYCLE STEAL STATUS WORD 4, BYTE 2 DEFINITION (CONTD)

HEXADECIMAL ERROR CODE	SIGNIFICANCE
91	Not used.
92	DCB input flag was not set in a start diagnostic 1 command (7DXX).
93	Odd byte count given in DCB for a start diagnostic 1 command (7DXX).
94	Excessive byte count given in DCB for a start diagnostic 1 command (7DXX).
95	Odd storage address given in DCB for a start diagnostic 1 command (7DXX).
96	Odd DCB address given in IDCB for a start diagnostic 2 command (7EXX).
97	Not used.
98	DCB input flag was set in a start diagnostic 2 command (7EXX).
99	Odd byte count given in DCB for a start diagnostic 2 command (7EXX).
9A	Excessive byte count given in DCB for a start diagnostic 2 command (7EXX).
9B	Odd data address given in DCB for a start diagnostic 2 command (7EXX).
9C to A2	Not used.
A3	Odd DCB address given in IDCB for a start cycle steal status command (7FXX).
A4	Not used.
A5	DCB input flag not set in a start cycle steal status command (7FXX).
A6	Odd byte count given in DCB for a start cycle steal status command (7FXX).
A7	Excessive byte count given in DCB for a start cycle steal status command (7FXX).
A8	Odd storage address given in DCB for a start cycle steal status command (7FXX).

CYCLE STEAL STATUS WORD 5 (FDD Health Parameters)

Word 5 contains a record of the FDD health parameters that are
monitored by the attachment card when no commands are being
executed (table A-4).

TABLE A-4.   CYCLE STEAL STATUS WORD 5 DEFINITION

BIT	SIGNIFICANCE
0	Set to 1 if FDD is not ready - door open, power not on, or diskette speed 70 percent below nominal 360 rpm.
1	Not used.
2	Set to 1 if FDD I/O cable is disconnected or open.
3	Set to 1 if diskette speed is too high - speed exceeds nominal 360 rpm by more than 3.5 percent.
4	Set to 1 if diskette speed is too low - speed below nominal 360 rpm by more than 3.5 percent.
5	Set to 1 if FDD write-fault latch is stuck on.
6	Set to 1 if +20 V from FDD power supply is low.
7	Set to 1 if attachment card 12-V power supply is low.
8	Set to 1 if attachment card reset latch is stuck on.
9	Set to 1 if attachment card test-mode latch is stuck on.
10	Set to 1 if attachment card diskette-initialize latch is stuck on.
11	Set to 1 if attachment card write-fault reset latch is stuck on.
12	Set to 1 if attachment card write-enable latch is stuck on.
13	Set to 1 if attachment card write-enable latch is stuck clear.
14	Set to 1 if attachment card write-request latch is stuck on.
15	Set to 1 if attachment card read-request latch is stuck on.

NOTICE

Before running the FDD diagnostic tests, read and understand the following:

- If diagnostics are to be loaded from a FDD other than the one to be tested, use the instructions in para 3.6.2 and observe the following:

    - The scratch diskette in test unit must be two-sided and formatted. If contents of the scratch diskette are unknown or if its a new CDC diskette, it must be formatted before running diagnotics (para 3.6.2 contains instructions).

    - If diagnostic tests end abnormally (with or without a message) or with a meaningless abort message, reseat the attachment card of the test unit and rerun tests. If the problem persists, replace the attachment card and I/O cable of the test unit one at a time until problem is corrected.*

- If diagnostics are to be loaded from the FDD to be tested, use the instructions in para 3.6.1 and observe the following:

    - A scratch diskette cannot be substituted for the BASIC diskette after IPL. Each diagnostic test is read off the BASIC diskette as it is called up or branched to by the program.

    - If IPL cannot be accomplished from the test unit, go to paper-only SAM 4670 (Power-On and IPL Problems) for troubleshooting information.

---

*Replacing attachment card requires that switches on new card be set for device address and IPL assignment (refer to Installing Attachment Card and Cabling, section 2). Replacing I/O cable requires accessing FDD (para 3.1) and routing new cable (refer to section 2 of this manual if a standalone unit or section 2 of MMD site information manual if a combination unit).

- If diagnostic tests do not execute, end abnormally (with or without a message), or end with a meaningless abort message, go to paper-only SAM 4672 (Not Ready Status).

● Diagnostic tests assume that the Series/1 I/O bus is providing +5 $\pm$0.5 V and -5 $\pm$0.5 V to the attachment card. To verify +5 $\overline{V}$ is correct, refer to Installing Attachment Card and Cabling, section 2. To verify the -5 V, take the precautions given for measuring +5 V and measure between pins G06 and J08 (ground) at the backpanel location of the attachment card. The -5 V is not adjustable on any model Series/1.

● Diagnostic test halts - when the halt code is a diagnostic test number, level 3 registers contain the following:

    R0 - Step number
    R1 - Device address and type code (AATT)
    R3 - If an abort, pointer to starting address in memory containing additional information

● Always turn off power to equipment when reseating/replacing the attachment card or I/O cable.

● Rerun diagnostic tests after troubleshooting to verify proper operation.

This is the first of the linked FDD auto-diagnostics on the CDC
BASIC diskette. If an improper FDD condition is detected in
step 060 or step 064 of this test, a start cycle steal status
command is issued. If the attachment card accepts the command,
an automatic branch to routine 4620 (SAM 4620) occurs to define
the problem.

Use the instructions in para 3.6.1 or para 3.6.2, as applicable,
to run the tests.


```
001   Y N   System reset.  CC = 7?
      : :
002   : 1   Unexpected condition code returned.  Replace attach-
      :     ment card. (1)
      :
003   1   Delay for reset to end.
      :
004   Y N   Read device ID command.  CC = 7?
      : :
      : 1   Go to step 008.
      :
005   Y N   ID = 0106?
      : :
006   : 1   Incorrect device ID.  Replace attachment card. (1)
      :
007   Y N   Device reset command.  CC = 7?
      : :
008   : Y N   Other than CC = 5?
      : : :
009   : : 1   Interface data check.  Replace attachment card. (1)
      : :
010   : Y N   Other than CC = 3?
      : : :
011   : : 1   Device reset command rejected.  Replace attachment
      : :     card. (1)
      : :
012   : Y N   Other than CC = 0?
      : : :
013   : : 1   Device not attached.  Reseat attachment card and
      : :     check that the device address specified by attach-
      : :     ment card switches matches the FDD device address in
      : :     configurator table.  Enter B38F0 to call up con-
      : :     figurator table and refer to Installing Attachment
      : :     Card and Cabling, section 2, for switch assignments.
      : :     If error persists, replace attachment card. (1)
      : :
      : :
      : :
      : :
      2 2
      A B                   CHANNEL INTERFACE TEST    SAM 4600-1
```

```
          A B
          1 1
          : :
014     : Y N   CC = 1?
          : : :
015     : : 1   Device hung busy.  Reseat/replace attachment
          : :     card. (1)
          : :
          : 1   Go to step 016.
          :
016     1   Delay for reset to end.
          :
017     Y N   Prepare command.  CC = 7?
          : :
018     : Y N   Other than CC = 5?
          : : :
019     : : 1   Interface data check.  Replace attachment card. (1)
          : :
020     : Y N   Other than CC = 3?
          : : :
021     : : 1   Prepare command rejected.  Replace-attachment
          : :     card. (1)
          : :
022     : Y N   Other than CC = 2?
          : : :
023     : : 1   Device hung busy after reset.  Replace attachment
          : :     card. (1)
          : :
024     : Y N   Other than CC = 0?
          : : :
025     : : 1   Device not attached.  Reseat attachment card and
          : :     check that the device address specified by attach-
          : :     ment card switches matches the FDD device address in
          : :     configurator table.  Enter B38F0 to call up con-
          : :     figurator table and refer to Installing Attachment
          : :     Card and Cabling, section 2, for switch assignments.
          : :     If error persists, replace attachment card. (1)
          : :
026     : Y N   Other than CC = 1?
          : : :
027     : : 1   Device hung busy.  Reseat/replace attachment
          : :     card. (1)
          : :
028     : 1   Unexpected condition code returned.  If front panel
          :     LED for FDD has extinguished, go to paper-only
          :     SAM 4670 (Power-On and IPL problems).  Otherwise,
          :     access FDD (para 3.1) and check power cable connec-
          :     tions at J7 on FDD power supply board and at attach-
          :     ment card.  If connections are secure, verify that
          :     +20 +2.4 V is present between return J7-2 and J7-1
          :     and J7-3 on power supply board.  If voltage is OK,
          :     replace attachment card (1); if voltage is bad, go to
          :     paper-only SAM 4673 (Bad Power Supply Voltages).
          :
          3
          A              CHANNEL INTERFACE TEST (CONTD)    SAM 4600-2
```

```
029  Y N   Prepare command, level 3.  CC = 7?
     : :
     : 1   Go to step 034.
     :
030  Y N   Prepare command, level 2.  CC = 7?
     : :
     : 1   Go to step 034
     :
031  Y N   Prepare command, level 1.  CC = 7?
     : :
     : 1   Go to step 034.
     :
032  Y N   Prepare command, level 0.  CC = 7?
     : :
     : 1   Go to step 034.
     :
033  Y N   Prepare command with odd parity.  CC = 7?
     : :
034  : Y N   Other than CC = 5?
     : : :
035  : : 1   Interface data check.  Replace attachment card. (1)
     : :
036  : Y N   Other than CC = 3?
     : : :
037  : : 1   Prepare command rejected.  Replace attachment
     : :     card. (1)
     : :
038  : Y N   Other than CC = 2?
     : : :
039  : : 1   Device hung busy after reset.  Replace attachment
     : :     card. (1)
     : :
040  : Y N   Other than CC = 0?
     : : :
041  : : 1   Device not attached.  Reseat attachment card and
     : :     check that the device address specified by attach-
     : :     ment card switches matches the FDD device address in
     : :     configurator table.  Enter B38F0 to call up con-
     : :     figurator table and refer to Installing Attachment
     : :     Card and Cabling, section 2, for switch assignments.
     : :     If error persists, replace attachment card. (1)
     : :
042  : Y N   Other than CC = 1?
     : : :
043  : : 1   Device hung busy.  Reseat/replace attachment
     : :     card. (1)
     : :
     : :
     : :
     : :
     : :
     4 4
     A B          CHANNEL INTERFACE TEST (CONTD)    SAM 4600-3
```

```
        : :
044     : 1   Unexpected condition code returned.  If front panel LED
        :      for FDD has extinguished, go to paper-only SAM 4670
        :      (Power-On and IPL problems).  Otherwise, access FDD
        :      (para 3.1) and check power cable connections at J7 on
        :      FDD power supply board and at attachment card.  If
        :      connections are secure, verify that +20 +2.4 V is
        :      present between return J7-2 and J7-1 and J7-3 on
        :      power supply board.  If voltage is OK, replace attach-
        :      ment card (1); if voltage is bad, go to paper-only
        :      SAM 4673 (Bad Power Supply Voltages).
        :
045     Y N   Illegal command 00.  CC = 3?
        : :
046     : 1   Unexpected condition code returned.  If front panel LED
        :      for FDD has extinguished, go to paper-only SAM 4670
        :      (Power-On and IPL problems).  Otherwise, access FDD
        :      (para 3.1) and check power cable connections at J7 on
        :      FDD power supply board and at attachment card.  If
        :      connections are secure, verify that +20 +2.4 V is
        :      present between return J7-2 and J7-1 and J7-3 on
        :      power supply board.  If voltage is OK, replace attach-
        :      ment card (1); if voltage is bad, go to paper-only
        :      SAM 4673 (Bad Power Supply Voltages).
        :
047     Y N   Illegal command 10.  CC = 3?
        : :
048     : 1   Unexpected condition code returned.  If front panel LED
        :      for FDD has extinguished, go to paper-only SAM 4670
        :      (Power-On and IPL problems).  Otherwise, access FDD
        :      (para 3.1) and check power cable connections at J7 on
        :      FDD power supply board and at attachment card.  If
        :      connections are secure, verify that +20 +2.4 V is
        :      present between return J7-2 and J7-1 and J7-3 on
        :      power supply board.  If voltage is OK, replace attach-
        :      ment card (1); if voltage is bad, go to paper-only
        :      SAM 4673 (Bad Power Supply Voltages).
        :
049     Y N   Illegal command 3F.  CC = 3?
        : :
050     : 1   Unexpected condition code returned.  If front panel LED
        :      for FDD has extinguished, go to paper-only SAM 4670
        :      (Power-On and IPL problems).  Otherwise, access FDD
        :      (para 3.1) and check power cable connections at J7 on
        :      FDD power supply board and at attachment card.  If
        :      connections are secure, verify that +20 +2.4 V is
        :      present between return J7-2 and J7-1 and J7-3 on
        :      power supply board.  If voltage is OK, replace attach-
        :      ment card (1); if voltage is bad, go to paper-only
        :      SAM 4673 (Bad Power Supply Voltages).
        :
051     Y N   Device reset command.  CC = 7?
        : :
        5 5
        A B              CHANNEL INTERFACE TEST (CONTD)    SAM 4600-4
```

```
          A  B
          4  4
          :  :
052       :  1   Unexpected condition code returned.  If front panel LED
          :          for FDD has extinguished, go to paper-only SAM 4670
          :          (Power-On and IPL problems).  Otherwise, access FDD
          :          (para 3.1) and check power cable connections at J7 on
          :          FDD power supply board and at attachment card.  If
          :          connections are secure, verify that +20 +2.4 V is
          :          present between return J7-2 and J7-1 and J7-3 on
          :          power supply board.  If voltage is OK, replace attach-
          :          ment card (1); if voltage is bad, go to paper-only
          :          SAM 4673 (Bad Power Supply Voltages).
          :
053       1   Delay for reset to end.
          :
054       Y  N   Start diagnostic 1 command.  CC = 0703 and ROM (read-
          :  :      only memory) checksum correct?
          :  :
055       :  Y  N   CC = 0703?
          :  :  :
056       :  :  1   Unexpected condition code returned.  If front
          :  :          panel LED for FDD has extinguished, go to paper-
          :  :          only SAM 4670 (Power-On and IPL problems).  Other-
          :  :          wise, access FDD (para 3.1) and check power cable
          :  :          connections at J7 on FDD power supply board and at
          :  :          attachment card.  If connections are secure, verify
          :  :          that +20 +2.4 V is present between return J7-2 and
          :  :          J7-1 and J7-3 on power supply board.  If voltage is
          :  :          OK, replace attachment card (1); if voltage is bad,
          :  :          to to paper-only SAM 4673 (Bad Power Supply
          :  :          Voltages).
          :  :
057       :  Y  N   Checksum for ROM 1 correct?
          :  :  :
058       :  :  1   Checksum for ROM 1 incorrect.  Replace attachment
          :  :          card. (1)
          :  :
059       :  1   Checksum for ROM 2 incorrect.  Replace attachment
          :          card. (1)
          :
060       Y  N   Word 5 = 6000 in diagnostic 1 response (diskette speed
          :  :      OK)?
          :  :
061       :  Y  N   Start cycle steal status command.  CC = 0703?
          :  :  :
062       :  :  1   Cycle steal status failed.  Replace attachment
          :  :          card (1).
          :  :
063       :  1   Branch to test 4620 (SAM 4620).
          :
          :
          :
          :
          6
          A                    CHANNEL INTERFACE TEST (CONTD)    SAM 4600-5
```

```
     :
     :
064  Y  N  Word 6 other than 0040 (not ready status) in diag-
     :  :  nostic 1 response?
     :  :
065  :  Y  N  Start cycle steal status command.  CC = 0703?
     :  :  :
066  :  :  1  Cycle steal status failed.  replace attachment
     :  :     card. (1)
     :  :
067  :  1  Branch to test 4620 (SAM 4620).
     :
068  Y  N  Word 7 = 6E00 in diagnostic 1 response?
     :  :
069  :  1  Word 7 incorrect.  Replace attachment card. (1)
     :
070  1  Branch to test 4601 (SAM 4601).
```

_____

(1) Set switches on new attachment card for FDD device
    address and IPL assignment (Installing Attachment
    Card and Cabling, section 2).

This test links from test 4600 (SAM 4600). If cycle steal
status word 4 or 5 indicates an improper FDD condition in step
008 of this test, an automatic branch to routine 4620 (SAM 4620)
occurs to define the problem.

001 1 Start command with DCB specifying a recalibration seek
     : to reset cycle steal status word 1.
     :
002 Y N Start cycle steal status command. CC = 0703?
     : :
003 : 1 Incorrect condition code for cycle steal status after
     :   reset. Replace attachment card. (1)
     :
004 Y N ISB = 0000?
     : :
005 : 1 Incorrect interrupt status byte. Replace attachment
     :   card. (1)
     :
006 Y N Cycle steal status word 1 = 0000?
     : :
007 : 1 Incorrect cycle steal status word 1. Replace attach-
     :   ment card. (1)
     :
008 Y N Cycle steal status word 4 = XX00 and word 5 = 0000?
     : :
009 : 1 Branch to test 4620 (SAM 4620).
     :
010 Y N Start cycle steal status command with input flag bit
     : : off in DCB. CC = 0702 and ISB bit on for DCB specifi-
     : : cation check?
     : :
011 : 1 Incorrect condition code or interrupt status byte.
     :   Replace attachment card. (1)
     :
012 Y N Cycle steal status word 4 = XXA5?
     : :
013 : 1 Incorrect cycle steal status word 4. Run test 4620
     :   (SAM 4620) to decode status.
     :
014 Y N Start cycle steal status command with odd byte count
     : : in DCB. CC = 0702 and ISB bit on for DCB specifica-
     : : tion check?
     : :
015 : 1 Incorrect condition code or interrupt status byte.
     :   Replace attachment card. (1)
     :
016 Y N Cycle steal status word 4 = XXA6?
     : :
017 : 1 Incorrect cycle steal status word 4. Run test 4620
     :   (SAM 4620) to decode status.
     2
     A   ATTACHMENT TEST   SAM 4601-1

62947909

018 Y N Start cycle steal status command with too large a byte
     : : count in DCB. CC = 0702 and ISB bit on for DCB
     : : specification check?
     : :
019 : 1 Incorrect condition code or interrupt status byte.
     :   Replace attachment card. (1)
     :
020 Y N Cycle steal status word 4 = XXA7?
     : :
021 : 1 Incorrect cycle steal status word 4. Run test 4620
     :   (SAM 4620) to decode status.
     :
022 Y N Start cycle steal status command with odd data address
     : : in DCB. CC = 0702 and ISB bit on for DCB specifica-
     : : tion check?
     : :
023 : 1 Incorrect condition code or interrupt status byte.
     :   Replace attachment card. (1)
     :
024 Y N Cycle steal status word 4 = XXA8?
     : :
025 : 1 Incorrect cycle steal status word 4. Run test 4620
     :   (SAM 4620) to decode status.
     :
026 Y N Start diagnostic 1 command with input flag bit off in
     : : DCB. CC = 0702 and ISB bit on for DCB specification
     : : check?
     : :
027 : 1 Incorrect condition code or interrupt status byte.
     :   Replace attachment card. (1)
     :
028 Y N Start cycle steal status command. Cycle steal status
     : : word 4 = XX92?
     : :
029 : 1 Incorrect cycle steal status word 4. Run test 4620
     :   (SAM 4620) to decode status.
     :
030 Y N Start diagnostic 1 command with odd byte count in DCB.
     : : CC = 0702 and ISB bit on for DCB specification check?
     : :
031 : 1 Incorrect condition code or interrupt status byte.
     :   Replace attachment card. (1)
     :
032 Y N Start cycle steal status command. Cycle steal status
     : : word 4 = XX94?
     : :
033 : 1 Incorrect cycle steal status word 4. Run test 4620
     :   (SAM 4620) to decode status.
     :
     :
     :
     3
     A   ATTACHMENT TEST (CONTD)   SAM 4601-2

```
        :
034  Y  N   Start diagnostic 1 command with too large a byte count
     :  :   in DCB.  CC = 0702 and ISB bit on for DCB specifica-
     :  :   tion check?
     :  :
035  :  1   Incorrect condition code or interrupt status byte.
     :      Replace attachment card. (1)
     :
036  Y  N   Start cycle steal status command.  Cycle steal status
     :  :   word 4 = XX94?
     :  :
037  :  1   Incorrect cycle steal status word 4.  Run test 4620
     :      (SAM 4620) to decode status.
     :
038  Y  N   Start diagnostic 1 command with odd data address in
     :  :   DCB.  CC = 0702 and ISB bit on for DCB specification
     :  :   check?
     :  :
039  :  1   Incorrect condition code or interrupt status byte.
     :      Replace attachment card. (1)
     :
040  Y  N   Start cycle steal status command.  Cycle steal status
     :  :   word 4 = XX95?
     :  :
041  :  1   Incorrect cycle steal status word 4.  Run test 4620
     :      (SAM 4620) to decode status.
     :
042  Y  N   Start diagnostic 2 command with input flag bit on in
     :  :   DCB.  CC = 0702 and ISB bit on for DCB specification
     :  :   check?
     :  :
043  :  1   Incorrect condition code or interrupt status byte.
     :      Replace attachment card. (1)
     :
044  Y  N   Start cycle steal status command.  Cycle steal status
     :  :   word 4 = XX98?
     :  :
045  :  1   Incorrect cycle steal status word 4.  Run test 4620
     :      (SAM 4620) to decode status.
     :
046  Y  N   Start diagnostic 2 command with odd byte count in DCB.
     :  :   CC = 0702 and ISB bit on for DCB specification check?
     :  :
047  :  1   Incorrect condition code or interrupt status byte.
     :      Replace attachment card. (1)
     :
     :
     :
     :
     :
     :
     :
     4
     A                      ATTACHMENT TEST (CONTD)    SAM 4601-3
```

```
        :
048   Y N   Start cycle steal status command.  Cycle steal status
        : :   word 4 = XX99?
        : :
049   : 1   Incorrect cycle steal status word 4.  Run test 4620
        :     (SAM 4620) to decode status.
        :
050   Y N   Start diagnostic 2 command with too large a byte count
        : :   in DCB.  CC = 0702 and ISB bit on for DCB specifica-
        : :   tion check?
        : :
051   : 1   Incorrect condition code or interrupt status byte.
        :     Replace attachment card. (1)
        :
052   Y N   Start cycle steal status command.  Cycle steal status
        : :   word 4 = XX9A?
        : :
053   : 1   Incorrect cycle steal status word 4.  Run test 4620
        :     (SAM 4620) to decode status.
        :
054   Y N   Start diagnostic 2 command with odd data address in
        : :   DCB.  CC = 0702 and ISB bit on for DCB specification
        : :   check?
        : :
055   : 1   Incorrect condition code or interrupt status byte.
        :     Replace attachment card. (1)
        :
056   Y N   Start cycle steal status command.  Cycle steal status
        : :   word 4 = XX9B?
        : :
057   : 1   Incorrect cycle steal status word 4.  Run test 4620
        :     (SAM 4620) to define status.
        :
058   Y N   Start command with illegal control word modifier in
        : :   DCB.  CC = 0702 and ISB bit on for DCB specification
        : :   check?
        : :
059   : 1   Incorrect condition code or interrupt status byte.
        :     Replace attachment card. (1)
        :
060   Y N   Start cycle steal status command.  Cycle steal status
        : :   word 4 = XX03?
        : :
061   : 1   Incorrect cycle steal status word 4.  Run test 4620
        :     (SAM 4620) to define status.
        :
062   Y N   Start command with DCB specifying a read sector ID
        : :   with byte count other than 4.  CC = 0702 and ISB bit
        : :   on for DCB specification check?
        : :
        : :
        5 5
        A B           ATTACHMENT TEST (CONTD)     SAM 4601-4
```

```
         A B
         4 4
         : :
063      : 1  Incorrect condition code or interrupt status byte.
         :    Replace attachment card. (1)
         :
064      Y N  Start cycle steal status command.  Cycle steal status
         : :  word 4 = XX07?
         : :
065      : 1  Incorrect cycle steal status word 4.  Run test 4620
         :    (SAM 4620) to decode status.
         :
066      Y N  Start command with DCB specifying too high a sector
         : :  number.  CC = 0702 and ISB bit on for DCB specifica-
         : :  tion check?
         : :
067      : 1  Incorrect condition code or interrupt status byte.
         :    Replace attachment card. (1)
         :
068      Y N  Start cycle steal status command.  Cycle steal status
         : :  word 4 = XX14?
         : :
069      : 1  Incorrect cycle steal status word 4.  Run test 4620
         :    (SAM 4620) to decode status.
         :
070      Y N  Start command with odd data address in DCB.  CC = 0702
         : :  and ISB bit on for DCB specification check?
         : :
071      : 1  Incorrect condition code or interrupt status byte.
         :    Replace attachment card. (1)
         :
072      Y N  Start cycle steal status command.  Cycle steal status
         : :  word 4 = XX15?
         : :
073      : 1  Incorrect cycle steal status word 4.  Run test 4620
         :    (SAM 4620) to decode status.
         :
074      Y N  Start command with odd byte count in DCB.  CC = 0702
         : :  and ISB bit on for DCB specification check?
         : :
075      : 1  Incorrect condition code or interrupt status byte.
         :    Replace attachment card. (1)
         :
076      Y N  Start cycle steal status command.  Cycle steal status
         : :  word 4 = XX16?
         : :
077      : 1  Incorrect cycle steal status word 4.  Run test 4620
         :    (SAM 4620) to decode status.
         :
078      Y N  Start command with illegal sector length in DCB.
         : :  CC = 0702 and ISB bit on for DCB specification check?
         : :
         : :
         6 6
         A B                   ATTACHMENT TEST (CONTD)    SAM 4601-5
```

```
      A B
      5 5
      : :
079 : 1  Incorrect condition code or interrupt status byte.
      :    Replace attachment card. (1)
      :
080 Y N  Start cycle steal status command.  Cycle steal status
      : :  word 4 = XX17?
      : :
081 : 1  Incorrect cycle steal status word 4.  Run test 4620
      :    (SAM 4620) to decode status.
      :
082 Y N  Start command with odd data address in DCB.  CC = 0702
      : :  and ISB bit on for DCB specification check?
      : :
083 : 1  Incorrect condition code or interrupt status byte.
      :    Replace attachment card. (1)
      :
084 Y N  Start cycle steal status command.  Cycle steal status
      : :  word 4 = XX8B?
      : :
085 : 1  Incorrect cycle steal status word 4.  Run test 4620
      :    (SAM 4620) to decode status.
      :
086 Y N  Start command with odd chain address in DCB.  CC = 0702
      : :  and ISB bit on for DCB specification check?
      : :
087 : 1  Incorrect condition code or interrupt status byte.
      :    Replace attachment card. (1)
      :
088 Y N  Start cycle steal status command.  Cycle steal status
      : :  word 4 = XX8C?
      : :
089 : 1  Incorrect cycle steal status word 4.  Run test 4620
      :    (SAM 4620) to decode status.
      :
090 1  Branch to test 4602 (SAM 4602).
```

---

(1) Set switches on new attachment card for FDD device
    address and IPL assignment (Installing Attachment
    Card and Cabling, section 2).

ATTACHMENT TEST (CONTD)   SAM 4601-6

This test links from test 4601 (SAM 4601). If a seek/read-
sector-ID operation fails in the test, a start cycle steal
status command is issued. If the attachment card accepts the
command, an automatic branch to routine 4620 (SAM 4620) occurs
to define the problem.

```
001  Y N   Start command with DCB specifying recalibration seek
     : :   (head 0 to cylinder 00).  CC = 0703 and ISB = 00?
     : :
002  : Y N   Start cycle steal status command.  CC = 0703?
     : : :
003  : : 1  Cycle steal status failed.  Replace attachment
     : :     card. (1)
     : :
004  : Y N   Cycle steal status word 4 = XX00 and word 5 = 0000?
     : : :
005  : : 1  Branch to test 4620 (SAM 4620).
     : :
006  : 1  Recalibration seek failed.  Replace attachment
     :     card. (1)
     :
007  1   Delay for seek to end.
     :
008  Y N   Start command with DCB specifying read sector ID.
     : :   CC = 0703 and ISB = 00?
     : :
009  : Y N   Start cycle steal status command.  CC = 0703 and
     : : :   ISB = 00?
     : : :
010  : : 1  Cycle steal status failed.  Test aborted.  Replace
     : :     attachment card. (1)
     : :
011  : Y N   Cycle steal status word 4 = XX00 and word 5 = 0000?
     : : :
012  : : 1  Branch to test 4620 (SAM 4620).
     : :
013  : 1  Read sector ID failed.  Replace attachment card. (1)
     :
014  Y N   Head 0 at cylinder 00 following recalibration seek?
     : :
015  : 1  Wrong cylinder location for head 0 following recali-
     :     bration seek.  Go to paper-only SAM 4672 (Not Ready
     :     Status).
     :
016  Y N   Start command with chained DCBs specifying one-track
     : :   seeks to cylinder 74 using head 0, followed by one-
     : :   track seeks back to cylinder 00.  A read sector ID is
     : :   done between each seek.  Final CC = 0703?
     : :
     2 2
     A B                 SEEK AND READ SECTOR ID TEST    SAM 4602-1
```

```
        A B
        1 1
        : :
017  :  Y N   Start cycle steal status command.  CC = 0703?
        : : :
018  :  : 1   Cycle steal status failed.  Test aborted.  Replace
        : :    attachment card. (1)
        : :
019  :  Y N   Cycle steal status word 4 = XX00 and word 5 = 0000?
        : : :
020  :  : 1   Branch to test 4620 (SAM 4620).
        : :
021  :  1     Incremental/decremental seeks with head 0 failed.
        :      Replace attachment card. (1)
        :
022  Y N     Head 0 at cylinder 00 following incremental/
        : :    decremental seeks?
        : :
023  :  1     Head 0 on wrong cylinder after seeks.  Go to paper-
        :      only SAM 4672 (Not Ready Status).
        :
024  Y N     Start command with chained DCBs specifying one-track
        : :    seeks to cylinder 74 using head 1, followed by one-
        : :    track seeks back to cylinder 00.  A read sector ID is
        : :    done between each seek.  Final CC = 0703?
        : :
025  :  Y N   Start cycle steal status command.  CC = 0703?
        : : :
026  :  : 1   Cycle steal status failed.  Test aborted.  Replace
        : :    attachment card. (1)
        : :
027  :  Y N   Cycle steal status word 4 = XX00 and word 5 = 0000?
        : : :
028  :  : 1   Branch to test 4620 (SAM 4620).
        : :
029  :  1     Incremental/decremental seeks with head 1 failed.
        :      Replace attachment card. (1)
        :
030  Y N     Head 1 at cylinder 00 following incremental/decremental
        : :    seeks?
        : :
031  :  1     Head 1 on wrong cylinder after seeks.  Replace FDD
        :      assembly (para 3.2).
        :
032  Y N     Start command with chained DCBs specifying forward and
        : :    reverse seeks using head 0.  Final CC = 0703?
        : :
033  :  Y N   Start cycle steal status command.  CC = 0703?
        : : :
034  :  : 1   Cycle steal status failed.  Test aborted.  Replace
        : :    attachment card. (1)
        : :
        : :
        : :
        3 3
        A B        SEEK AND READ SECTOR ID TEST (CONTD)   SAM 4602-2
```

```
      A B
      2 2
      : :
035   : Y N  Cycle steal status word 4 = XX00 and word 5 = 0000?
      : : :
036   : : 1  Branch to test 4620 (SAM 4620).
      : :
037   : 1  Forward/reverse seeks with head 0 failed.  Replace
      :     attachment card. (1)
      :
038   Y N  Head 0 at cylinder 26 following forward/reverse seeks?
      : :
039   : 1  Head 0 on wrong cylinder after seeks.  Replace FDD
      :     assembly (para 3.2).
      :
040   Y N  Start command with chained DCBs specifying forward and
      : :  reverse seeks using head 1.  Final CC = 0703?
      : :
041   : Y N  Start cycle steal status command.  CC = 0703?
      : : :
042   : : 1  Cycle steal status failed.  Test aborted.  Replace
      : :     attachment card. (1)
      : :
043   : Y N  Cycle steal status word 4 = XX00 and word 5 = 0000?
      : : :
044   : : 1  Branch to test 4620 (SAM 4620).
      : :
045   : 1  Forward/reverse seeks with head 1 failed.  Replace
      :     attachment card. (1)
      :
046   Y N  Head 1 at cylinder 26 following forward/reverse seeks?
      : :
047   : 1  Head 1 on wrong cylinder after seeks.  Replace FDD
      :     assembly (para 3.2).
      :
048   1  Branch to test 4603 (SAM 4603).
```

---

(1) Set switches on new attachment card for FDD device
address and IPL assignment (Installing Attachment
Card and Cabling, section 2).

SEEK AND READ SECTOR ID TEST (CONTD)   SAM 4602-3

This test links from test 4602 (SAM 4602). If a seek, read-
sector-ID, or read-data operation fails in the test, a start
cycle steal status command is issued to check FDD status. If
the attachment card accepts the command and status indicates an
improper condition, an automatic branch to routine 4620
(SAM 4620) occurs to define the problem.


```
001  Y N   Start command with DCB specifying recalibration seek
     : :   (head 0 to cylinder 00).  CC = 0703 and ISB = 00?
     : :
002  : Y N   Start cycle steal status command.  CC = 0703?
     : : :
003  : : 1   Cycle steal status failed.  Replace attachment
     : :     card. (1)
     : :
004  : Y N   Cycle steal status word 4 = XX00 and word 5 = 0000?
     : : :
005  : : 1   Branch to test 4620 (SAM 4620).
     : :
006  : 1   Recalibration seek failed.  Replace attachment card. (1)
     :
007  1 Delay for seek to end.
     :
008  Y N   Start command with DCB specifying read sector ID.
     : :   CC = 0703?
     : :
009  : Y N   Start cycle steal status command.  CC = 0703?
     : : :
010  : : 1   Cycle steal status failed.  Replace attachment
     : :     card. (1)
     : :
011  : Y N   Cycle steal status word 4 = XX00 and word 5 = 0000?
     : : :
012  : : 1   Branch to test 4620 (SAM 4620).
     : :
013  : 1   Read sector ID failed.  Replace attachment card. (1)
     :
014  Y N   Head 0 at cylinder 00?
     : :
015  : 1   Invalid cylinder location for head 0 following recali-
     :     bration seek.  Replace FDD assembly (para 3.2).
     :
016  Y N   Start command with DCB specifying seek to cylinder 74
     : :   using head 0.  CC = 0703 and ISB = 00?
     : :
     : 1   Go to step 061.
     :
     :
     :
     2
     A                         SEEK AND READ DATA TEST    SAM 4603-1
```

:

017 Y N Head 0 at cylinder 74?
: :
018 : 1 Cylinder does not match previous seek. Replace FDD
:   assembly (para 3.2).
:
019 Y N Start command with DCB specifying read data from
: :   cylinder 74, sector 01. CC = 0703?
: :
: 1   Go to step 067.
:
020 Y N Start command with DCB specifying read data from
: :   cylinder 74, sector 15. CC = 0703?
: :
: 1   Go to step 067.
:
021 Y N Start command with DCB selecting head 1. CC = 0703?
: :
: 1   Go to step 061.
:
022 Y N Head 1 at cylinder 74?
: :
023 : 1 Cylinder does not match previous seek. Replace FDD
:   assembly (para 3.2).
:
024 Y N Start command with DCB specifying read data from
: :   cylinder 74, sector 01. CC = 0703?
: :
: 1   Go to step 067.
:
025 Y N Start command with DCB specifying read data from
: :   cylinder 74, sector 15. CC = 0703?
: :
: 1   Go to step 067.
:
026 Y N Start command with DCB specifying seek to cylinder 01
: :   using head 0. CC = 0703?
: :
: 1   Go to step 061.
:
027 Y N Head 0 at cylinder 01?
: :
028 : 1 Cylinder does not match previous seek. Replace FDD
:   assembly (para 3.2).
:
029 Y N Start command with DCB specifying read data from
: :   cylinder 01, sector 01. CC = 0703?
: :
: 1   Go to step 067.
:
:
3
A   SEEK AND READ DATA TEST (CONTD)   SAM 4603-2

```
030  Y N  Start command with DCB selecting head 1.  CC = 0703?
     : :
     : 1  Go to step 061.
     :
031  Y N  Start command with DCB specifying read data from
     : :  cylinder 01, sector 01.
     : :
     : 1  Go to step 067.
     :
032  Y N  Start command with DCB specifying seek to cylinder 73
     : :  using head 0.  CC = 0703?
     : :
     : 1  Go to step 061.
     :
033  Y N  Head 0 at cylinder 73?
     : :
034  : 1  Cylinder does not match previous seek.  Replace FDD
     :    assembly (para 3.2).
     :
035  Y N  Start command with DCB specifying read data from
     : :  cylinder 73, sector 01.  CC = 0703?
     : :
     : 1  Go to step 067.
     :
036  Y N  Start command with DCB selecting head 1.  CC = 0703?
     : :
     : 1  Go to step 061.
     :
037  Y N  Start command with DCB specifying read data from
     : :  cylinder 73, sector 01.  CC = 0703?
     : :
     : 1  Go to step 067.
     :
038  Y N  Start command with DCB specifying seek to cylinder 02
     : :  using head 0.  CC = 0703?
     : :
     : 1  Go to step 061.
     :
039  Y N  Head 0 at cylinder 02?
     : :
040  : 1  Cylinder does not match previous seek.  Replace FDD
     :    assembly (para 3.2).
     :
041  Y N  Start command with DCB specifying read data from
     : :  cylinder 02, sector 01.
     : :
     : 1  Go to step 067.
     :
     :
     :
     4
```

```
      :
042   Y  N   Start command with DCB selecting head 1.   CC = 0703?
      :  :
      :  1   Go to step 061.
      :
043   Y  N   Start command with DCB specifying read data from
      :  :   cylinder 02, sector 01.   CC = 0703?
      :  :
      :  1   Go to step 067.
      :
044   Y  N   Start command with DCB specifying seek to cylinder 72
      :  :   using head 0.   CC = 0703?
      :  :
      :  1   Go to step 061.
      :
045   Y  N   Head 0 at cylinder 72?
      :  :
046   :  1   Cylinder does not match previous seek.   Replace FDD
      :       assembly (para 3.2).
      :
047   Y  N   Start command with DCB specifying read data from
      :  :   cylinder 74, sector 01.   CC = 0703?
      :  :
      :  1   Go to step 067.
      :
048   Y  N   Start command with DCB selecting head 1.   CC = 0703?
      :  :
      :  1   Go to step 061.
      :
049   Y  N   Start command with DCB specifying read data from
      :  :   cylinder 72, sector 01.   CC = 0703?
      :  :
      :  1   Go to step 067.
      :
050   Y  N   Start command with DCB specifying seek to cylinder 03
      :  :   using head 0.   CC = 0703?
      :  :
      :  1   Go to step 061.
      :
051   Y  N   Head 0 at cylinder 03?
      :  :
052   :  1   Cylinder does not match previous seek.   Replace FDD
      :       assembly (para 3.2).
      :
053   Y  N   Start command with DCB specifying read data from
      :  :   cylinder 03, sector 01.   CC = 0703?
      :  :
      :  1   Go to step 067.
      :
      :
      :
      5
      A              SEEK AND READ DATA TEST (CONTD)    SAM 4603-4
```

```
      :
054   Y N  Start command with DCB selecting head 1.  CC = 0703?
      : :
      : 1  Go to step 061.
      :
055   Y N  Start command with DCB specifying read data from
      : :  cylinder 03, sector 01.  CC = 0703?
      : :
      : 1  Go to step 067.
      :
056   Y N  Start command with DCB specifying seek to cylinder 71
      : :  using head 0.  CC = 0703?
      : :
      : 1  Go to step 061.
      :
057   Y N  Head 0 at cylinder 71?
      : :
058   : 1  Cylinder does not match previous seek.  Replace FDD
      :    assembly (para 3.2).
      :
059   Y N  Start command with DCB specifying read data from
      : :  cylinder 71, sector 01.  CC = 0703?
      : :
      : 1  Go to step 067.
      :
060   Y N  Start command with DCB selecting head 1.  CC = 0703?
      : :
061   : Y N  Start cycle steal status command.  CC = 0703?
      : : :
062   : : 1  Cycle steal status failed.  Test aborted.  Replace
      : :    attachment card. (1)
      : : :
063   : Y N  Cycle steal status word 4 = XX00 and word 5 = 0000?
      : : :
064   : : 1  Branch to test 4620 (SAM 4620).
      : :
065   : 1  Incorrect condition code returned for seek.  Replace
      :    attachment card. (1)
      :
066   Y N  Start command with DCB specifying read data from
      : :  cylinder 71, sector 01.  CC = 0703?
      : :
067   : Y N  Start cycle steal status command.  CC = 0703?
      : : :
068   : : 1  Cycle steal status failed.  Test aborted.  Replace
      : :    attachment card. (1)
      : :
      : :
      : :
      : :
      : :
      6 6
      A B        SEEK AND READ DATA TEST (CONTD)    SAM 4603-5
```

```
         A B
         5 5
         : :
069      : Y N   Cycle steal status word 4 = XX00 and word 5 = 0000?
         : : :
070      : : 1   Branch to test 4620 (SAM 4620).
         : :
071      : Y N   Cycle steal status word 1 = 1000?
         : : :
072      : : 1   Incorrect condition code returned for read data.
         : :     Replace attachment card. (1)
         : :
073      : 1 .Control-address marker encountered in read data
         :      operation.  This occurs if diskette in FDD was used
         :      in a prior running of manual test 4611 (write/read
         :      address marker test).  Run test 4610 (SAM 4610) to
         :      delete the control-address markers that test 4611 has
         :      written on diskette.  Then rerun this auto-test.
         :
074      1  Auto-tests completed successfully.
```

---

(1) Set switches on new attachment card for FDD device
     address and IPL assignment (Installing Attachment
     Card and Cabling, section 2).

This FDD manual diagnostic test formats cylinders 01, 02, 03,
74, 75, and 76 into 15 sectors per track, writes words of
5555_{16} in sector data fields, has the attachment card read-
verify the written cylinders, and reads the data back and
checks for errors. On the BASIC diskette, these cylinders are
allotted for scratch use (CE cylinders).

If the recalibration seek in step 004 or the formatting/read-
verifying of a track fails, the test issues a start cycle steal
command. If status indicates an improper FDD condition, an
automatic branch to routine 4620 occurs to define the problem.

Use the instructions in para 3.6.1 or para 3.6.2, as
applicable, to run the test.

NOTE

> If the diskette in the FDD being tested
> is a CDC diskette (the BASIC diskette or
> a scratch diskette), the write-protect
> slot in the diskette jacket must be
> covered with opaque tape before this
> test is run.

CAUTION

> If this test is run on the BASIC disk-
> ette, a malfunction may destroy program
> data. For a safeguard, do not run the
> test unless an auto-test instructs to do
> so or until FDD auto-tests complete
> successfully.

```
001,002  Y N  Wish to run this test and write on CE cylinders of
         : :  diskette?  If so, remove diskette, cover write-
         : :  protect slot, and reinstall before answering.
         : :  Enter 1 for yes, 0 for no.
         : :
003      : 1  No write commands were executed.  Test 4610
         :    terminated.
         :
         :
         :
         :
         :
         :
         2
         A           WRITE SECTOR ID AND DATA TEST    SAM 4610-1
```

```
004  Y N   Start command with DCB specifying recalibration seek
     : :   (head 0 to cylinder 00).  CC = 0703?
     : :
005  : Y N  Start cycle steal status command.  CC = 0703?
     : : :
006  : : 1  Cycle steal status failed.  Test aborted.  Replace
     : :    attachment card. (1)
     : :
007  : Y N  Cycle steal status word 4 = XX00 and word 5 =
     : : :  0000?
     : : :
008  : : 1  Branch to test 4620 (SAM 4620).
     : :
009  : 1   Incorrect condition code for recalibration seek.
     :     Replace attachment card. (1)
     :
010  1   Delay for seek to end.
     :
011  Y N   Start command with chained DCBs specifying seek to
     : :   cylinder 01 using head 0 and read sector ID.
     : :   CC = 0703 and cylinder = 01?
     : :
012  : 1   Incorrect condition code for read sector ID or head 0
     :     is on wrong cylinder.  Run auto-tests starting with
     :     test 4600 (SAM 4600).
     :
013  Y N   Start command with chained DCBs specifying write
     : :   format on cylinder 01 with words of 5555 in data
     : :   fields and then read-verify.  CC = 0703?
     : :
     : 1   Go to step 091.
     :
014  Y N   Start command with chained DCBs specifying read data
     : :   from cylinder 01.  CC = 0703?
     : :
015  : 1   Incorrect condition code for read data.  Run auto-
     :     test 4603 (SAM 4603) or if already run, replace
     :     attachment card. (1)
     :
016  Y N   Data words read = 5555?
     : :
017  : 1   Incorrect data read from formatted track.  Replace
     :     attachment card (1) and I/O cable (2) one at a time.
     :
018  Y N   Start command with DCB selecting head 1.  CC = 0703?
     : :
     : :
     : :
     : :
     : :
     : :
     3 3
     A B          WRITE SECTOR ID AND DATA TEST (CONTD)    SAM 4610-2
```

```
        A  B
        2  2
        :  :
019     :  1   Incorrect condition code for head-reselection seek.
        :      Run auto-tests starting with test 4600 (SAM 4600).
        :
020     Y  N   Start command with chained DCBs specifying write
        :  :   format on cylinder 01 with words of 5555 in data
        :  :   fields and then read-verify.  CC = 0703?
        :  :
        :  1   Go to step 091.
        :
021     Y  N   Start command with chained DCBs specifying read data
        :  :   from cylinder 01.  CC = 0703?
        :  :
022     :  1   Incorrect condition code for read data.  Run auto-
        :      test 4603 (SAM 4603) or if already run, replace
        :      attachment card (1) and I/O cable (2) one at a time.
        :
023     Y  N   Data words read = 5555?
        :  :
024     :  1   Incorrect data read from formatted track.  Replace
        :      attachment card. (1)
        :
025     Y  N   Start command with DCB specifying seek to cylinder 02
        :  :   using head 0.  CC = 0703?
        :  :
026     :  1   Incorrect condition code for seek.  Run auto-tests
        :      starting with test 4600 (SAM 4600).
        :
027     Y  N   Start command with chained DCBs specifying write
        :  :   format on cylinder 02 with words of 5555 in data
        :  :   fields and then read-verify.  CC = 0703?
        :  :
        :  1   Go to step 091.
        :
028     Y  N   Start command with chained DCBs specifying read data
        :  :   from cylinder 02.  CC = 0703?
        :  :
029     :  1   Incorrect condition code for read data.  Run auto-
        :      test 4603 (SAM 4603) or if already run, replace
        :      attachment card. (1)
        :
030     Y  N   Data words read = 5555?
        :  :
031     :  1   Incorrect data read from formatted track.  Replace
        :      attachment card (1) and I/O cable (2) one at a time.
        :
        :
        :
        :
        :
        :
        :
        4
        A       WRITE SECTOR ID AND DATA TEST (CONTD)    SAM 4610-3
```

```
       :
032  Y N  Start command with DCB selecting head 1.  CC = 0703?
       : :
033  :  1  Incorrect condition code for head-reselection seek.
       :   Run auto-tests starting with test 4600 (SAM 4600).
       :
034  Y N  Start command with chained DCBs specifying write
       : :  format on cylinder 02 with words of 5555 in data
       : :  fields and then read-verify.  CC = 0703?
       : :
       :  1  Go to step 091.
       :
035  Y N  Start command with chained DCBs specifying read data
       : :  from cylinder 02.  CC = 0703?
       : :
036  :  1  Incorrect condition code for read data.  Run auto-
       :   test 4603 (SAM 4603) or if already run, replace
       :   attachment card. (1)
       :
037  Y N  Data words read = 5555?
       : :
038  :  1  Incorrect data read from formatted track.  Replace
       :   attachment card (1) and I/O cable (2) one at a time.
       :
039  Y N  Start command with DCB specifying seek to cylinder 03
       : :  using head 0.  CC = 0703?
       : :
040  :  1  Incorrect condition code for seek.  Run auto-tests
       :   starting with test 4600 (SAM 4600).
       :
041  Y N  Start command with chained DCBs specifying write
       : :  format on cylinder 03 with words of 5555 in data
       : :  fields and then read-verify.  CC = 0703?
       : :
       :  1  Go to step 091.
       :
042  Y N  Start command with chained DCBs specifying read data
       : :  from cylinder 03.  CC = 0703?
       : :
043  :  1  Incorrect condition code for read data.  Run auto-
       :   test 4603 (SAM 4603) or if already run, replace
       :   attachment card. (1)
       :
044  Y N  Data words read = 5555?
       : :
       : :
       : :
       : :
       : :
       : :
       5 5
       A B       WRITE SECTOR ID AND DATA TEST (CONTD)     SAM 4610-4
```

```
          A  B
          4  4
          :  :
045       :  1   Incorrect data read from formatted track.  Replace
          :      attachment card (1) and I/O cable (2) one at a time.
          :
046       Y  N   Start command with DCB selecting head 1.  CC = 0703?
          :  :
047       :  1   Incorrect condition code for head-reselection seek.
          :      Run auto-tests starting with test 4600 (SAM 4600).
          :
048       Y  N   Start command with chained DCBs specifying write
          :  :   format on cylinder 03 with words of 5555 in data
          :  :   fields and then read-verify.  CC = 0703?
          :  :
          :  1   Go to step 091.
          :
049       Y  N   Start command with chained DCBs specifying read data
          :  :   from cylinder 03.  CC = 0703?
          :  :
050       :  1   Incorrect condition code for read data.  Run auto-
          :      test 4603 (SAM 4603) or if already run, replace
          :      attachment card. (1)
          :
051       Y  N   Data words read = 5555?
          :  :
052       :  1   Incorrect data read from formatted track.  Replace
          :      attachment card (1) and I/O cable (2) one at a time.
          :
053       Y  N   Start command with DCB specifying seek to cylinder 74
          :  :   using head 0.  CC = 0703?
          :  :
054       :  1   Incorrect condition code for seek.  Run auto-tests
          :      starting with test 4600 (SAM 4600).
          :
055       Y  N   Start command with chained DCBs specifying write
          :  :   format on cylinder 74 with words of 5555 in data
          :  :   fields and then read-verify.  CC = 0703?
          :  :
          :  1   Go to step 091.
          :
056       Y  N   Start command with chained DCBs specifying read data
          :  :   from cylinder 74.  CC = 0703?
          :  :
057       :  1   Incorrect condition code for read data.  Run auto-
          :      test 4603 (SAM 4603) or if already run, replace
          :      attachment card. (1)
          :
          :
          :
          :
          :
          :
          6
          A        WRITE SECTOR ID AND DATA TEST (CONTD)     SAM 4610-5
```

```
      :
058   Y N   Data words read = 5555?
      : :
059   : 1   Incorrect data read from formatted track.  Replace
      :     attachment card (1) and I/O cable (2) one at a time.
      :
060   Y N   Start command with DCB selecting head 1.  CC = 0703?
      : :
061   : 1   Incorrect condition code for head-reselection seek.
      :     Run auto-tests starting with test 4600 (SAM 4600).
      :
062   Y N   Start command with chained DCBs specifying write
      : :   format on cylinder 74 with words of 5555 in data
      : :   fields and then read-verify.  CC = 0703?
      : :
      : 1   Go to step 091.
      :
063   Y N   Start command with chained DCBs specifying read data
      : :   from cylinder 74.  CC = 0703?
      : :
064   : 1   Incorrect condition code for read data.  Run auto-
      :     test 4603 (SAM 4603) or if already run, replace
      :     attachment card. (1)
      :
065   Y N   Data words read = 5555?
      : :
066   : 1   Incorrect data read from formatted track.  Replace
      :     attachment card (1) and I/O cable (2) one at a time.
      :
067   Y N   Start command with DCB specifying seek to cylinder 75
      : :   using head 0.  CC = 0703?
      : :
068   : 1   Incorrect condition code for seek.  Run auto-tests
      :     starting with test 4600 (SAM 4600).
      :
069   Y N   Start command with chained DCBs specifying write
      : :   format on cylinder 75 with words of 5555 in data
      : :   fields and then read-verify.  CC = 0703?
      : :
      : 1   Go to step 091.
      :
070   Y N   Start command with chained DCBs specifying read data
      : :   from cylinder 75.  CC = 0703?
      : :
      : :
      : :
      : :
      : :
      : :
      : :
      7 7
      A B        WRITE SECTOR ID AND DATA TEST (CONTD)    SAM 4610-6
```

```
        A B                                   62947909
        6 6
        : :
071   : 1   Incorrect condition code for read data.  Run auto-
        :     test 4603 (SAM 4603) or if already run, replace
        :     attachment card. (1)
        :
072   Y N   Data words read = 5555?
        : :
073   : 1   Incorrect data read from formatted track.  Replace
        :     attachment card (1) and I/O cable (2) one at a time.
        :
074   Y N   Start command with DCB selecting head 1.  CC = 0703?
        : :
075   : 1   Incorrect condition code for head-reselection seek.
        :     Run auto-tests starting with test 4600 (SAM 4600).
        :
076   Y N   Start command with chained DCBs specifying write
        : :     format on cylinder 75 with words of 5555 in data
        : :     fields and then read-verify.  CC = 0703?
        : :
        : 1   Go to step 091.
        :
077   Y N   Start command with chained DCBs specifying read data
        : :     from cylinder 75.  CC = 0703?
        : :
078   : 1   Incorrect condition code for read data.  Run auto-
        :     test 4603 (SAM 4603) or if already run, replace
        :     attachment card. (1)
        :
079   Y N   Data words read = 5555?
        : :
080   : 1   Incorrect data read from formatted track.  Replace
        :     attachment card (1) and I/O cable (2) one at a time.
        :
081   Y N   Start command with DCB specifying seek to cylinder 76
        : :     using head 0.  CC = 0703?
        : :
082   : 1   Incorrect condition code for seek.  Run auto-tests
        :     starting with test 4600 (SAM 4600).
        :
083   Y N   Start command with chained DCBs specifying write
        : :     format on cylinder 76 with words of 5555 in data
        : :     fields and then read-verify.  CC = 0703?
        : :
        : 1   Go to step 091.
        :
        :
        :
        :
        :
        :
        :
        8
        A         WRITE SECTOR ID AND DATA TEST (CONTD)    SAM 4610-7
```

```
      :
084  Y N   Start command with chained DCBs specifying read data
      : :   from cylinder 76.  CC = 0703?
      : :
085   : 1   Incorrect condition code for read data.  Run auto-
      :     test 4603 (SAM 4603) or if already run, replace
      :     attachment card. (1)
      :
086  Y N   Data words read = 5555?
      : :
087   : 1   Incorrect data read from formatted track.  Replace
      :     attachment card (1) and I/O cable (2) one at a time.
      :
088  Y N   Start command with DCB selecting head 1.  CC = 0703?
      : :
089   : 1   Incorrect condition code for head-reselection seek.
      :     Run auto-tests starting with test 4600 (SAM 4600).
      :
090  Y N   Start command with chained DCBs specifying write
      : :   format on cylinder 76 with words of 5555 in data
      : :   fields and then read-verify.  CC = 0703?
      : :
091   : Y N  Start cycle steal status command.  CC = 0703?
      : : :
092   : : 1  Cycle steal status failed.  Test aborted.  Replace
      : :     attachment card. (1)
      : :
093   : Y N  Cycle steal status word 4 = XX00 and word = 0000?
      : : :
094   : : 1  Branch to test 4620 (SAM 4620).
      : :
095   : 1   Incorrect condition code for write format/read verify
      :     operation.  Replace attachment card (1) and I/O
      :     cable (2) one at a time.
      :
096  Y N   Start command with chained DCBs specifying read data
      : :   from cylinder 76.  CC = 0703?
      : :
097   : 1   Incorrect condition code for read data.  Run auto-
      :     test 4603 (SAM 4603) or if already run, replace
      :     attachment card. (1)
      :
098  Y N   Data words read = 5555?
      : :
      : :
      : :
      : :
      : :
      : :
      : :
      : :
      9 9
      A B        WRITE SECTOR ID AND DATA TEST (CONTD)     SAM 4610-8
```

```
          A B
          8 8
          : :
099       : 1  Incorrect data read from formatted track.  Replace
          :     attachment card (1) and I/O cable (2) one at a time.
          :
100       1  End of test.  No error occurred.
```

---

(1) Set switches on new attachment card for FDD device
    address and IPL assignment (Installing Attachment
    Card and Cabling, section 2).

(2) Access FDD (para 3.1) and route new I/O cable per
    section 2 of this manual if a standalone unit or per
    section 2 of MMD site information manual if a com-
    bination unit.

This FDD manual diagnostic test writes random data with data-
address markers and control-address markers, has the attach-
ment card read-verify what is written, and checks if the
attachment card reacts correctly when the address markers are
read back in a data read. Cylinders 01, 02, 03, 74, 75, and 76
are used in the test. On the BASIC diskette, these cylinders
are allotted for scratch use (CE cylinders). After this test
is completed, run test 4610 (SAM 4610) to delete the control-
address markers that have been written on the diskette. Other-
wise, later use of the diskette will cause error stoppage in
auto-test 4603.

If the recalibration seek in step 004 or a write/read-verify
fails, the test issues a start cycle steal command. If status
indicates an improper FDD condition, an automatic branch to
routine 4620 occurs to define the problem.

Use the instructions in para 3.6.1 or para 3.6.2, as
applicable, to run the test.

                            NOTE

            If the diskette in the FDD being tested
            is a CDC diskette (the BASIC diskette or
            a scratch diskette, the write-protect
            slot in the diskette jacket must be
            covered with opaque tape before this
            test is run.

                          CAUTION

            If this test is run on the BASIC disk-
            ette, a malfunction may destroy program
            data. For a safeguard, do not run the
            test until the FDD auto-tests complete
            successfully.

001,002   Y N   Wish to run this test and write on CE cylinders of
          : :   diskette? If so, remove diskette, cover write-
          : :   protect slot, and reinstall before answering.
          : :   Enter 1 for yes, 0 for no.
          : :
003   : 1   No write commands were executed. Test 4611
          :   terminated.
          :
          2
          A   WRITE/READ ADDRESS MARKER TEST   SAM 4611-1

004 Y N Start command with DCB specifying recalibration
     : : seek (head 0 to cylinder 00). CC = 0703 and
     : : ISB = 00?
     : :
005 : Y N Start cycle steal status command. CC = 0703
     : : : and ISB = 00?
     : : :
006 : : 1 Cycle steal status failed. Test aborted. Replace
     : :   attachment card. (1)
     : :
007 : Y N Cycle steal status word 4 = XX00 and word 5 = 0000?
     : : :
008 : : 1 Branch to test 4620 (SAM 4620).
     : :
009 : 1 Incorrect condition code or interrupt status byte for
     :   recalibration seek. Replace attachment card. (1)
     :
010 1 Delay for seek to end.
     :
011 Y N Start command with chained DCBs specifying seek to
     : : cylinder 01 using head 0 and read sector ID.
     : : CC = 0703, ISB = 00, and cylinder = 01?
     : :
012 : 1 Incorrect condition code, interrupt status byte, or
     :   cylinder for seek and read sector ID. Run auto-
     :   test 4600 (SAM 4600).
     :
013 Y N Start command with chained DCBs specifying write data
     : : (random data) and data-address markers on cylinder 01
     : : and then read-verify. CC = 0703 and ISB = 00?
     : :
     : 1 Go to step 091.
     :
014 Y N Start command with DCB specifying read data from
     : : cylinder 01. CC = 0703 and ISB = 00?
     : :
015 : 1 Incorrect condition code or interrupt status byte for
     :   read data of fields with data-address markers.
     :   Replace attachment card (1) and I/O cable (2) one at a
     :   time.
     :
016 Y N Start cycle steal status command. CC = 0703,
     : : ISB = 00, and cycle steal status word 1 = 0000?
     : :
017 : 1 Incorrect cycle steal status word 1. Replace attach-
     :   ment card. (1)
     :
     :
     :
     :
     3
     A   WRITE/READ ADDRESS MARKER TEST (CONTD)   SAM 4611-2

```
    :
018 Y N  Start command with chained DCBs selecting head 1 and
    : :   specifying read sector ID.  CC = 0703, ISB = 00, and
    : :   cylinder = 01?
    : :
019 : 1   Incorrect condition code, interrupt status byte, or
    :     cylinder for seek and read sector ID.  Run auto-
    :     test 4600 (SAM 4600).
    :
020 Y N  Start command with chained DCBs specifying write data
    : :   (random data) and data-address markers on cylinder 01
    : :   and then read-verify.  CC = 0703 and ISB = 00?
    : :
    : 1   Go to step 091.
    :
021 Y N  Start command with DCB specifying read data from
    : :   cylinder 01.  CC = 0703 and ISB = 00?
    : :
022 : 1   Incorrect condition code or interrupt status byte for
    :     read data of fields with data-address markers.
    :     Replace attachment card (1) and I/O cable (2) one at a
    :     time.
    :
023 Y N  Start cycle steal status command.  CC = 0703,
    : :   ISB = 00, and cycle steal status word 1 = 0000?
    : :
024 : 1   Incorrect cycle steal status word 1.  Replace attach-
    :     ment card. (1)
    :
025 Y N  Start command with chained DCBs specifying seek to
    : :   cylinder 02 using head 0 and read sector ID.
    : :   CC = 0703, ISB = 00, and cylinder = 02?
    : :
026 : 1   Incorrect condition code, interrupt status byte, or
    :     cylinder for seek and read sector ID.  Run auto-
    :     test 4600 (SAM 4600).
    :
027 Y N  Start command with chained DCBs specifying write data
    : :   (random data) and control-address markers on cylin-
    : :   der 02 and then read-verify.  CC = 0703 and ISB = 00?
    : :
    : 1   Go to step 091.
    :
028 Y N  Start command with DCB specifying read data from
    : :   cylinder 02.  CC = 0702 and ISB = 80?
    : :
029 : 1   Incorrect condition code or interrupt status byte for
    :     read data of fields with control-address markers.
    :     Replace attachment card (1) and I/O cable (2) one at a
    :     time.
    :
    4
    A           WRITE/READ ADDRESS MARKER TEST (CONTD)     SAM 4611-3
```

```
      :
030   Y N   Start cycle steal status command.  CC = 0703,
      : :   ISB = 00, and cycle steal status word 1 = 1000?
      : :
031   : 1   Incorrect cycle steal status word 1.  Replace attach-
      :     ment card. (1)
      :
032   Y N   Start command with chained DCBs selecting head 1 and
      : :   read sector ID.  CC = 0703, ISB = 00, and cylinder 02?
      : :
033   : 1   Incorrect condition code, interrupt status byte, or
      :     cylinder for seek and read sector ID.  Run auto-
      :     test 4600 (SAM 4600).
      :
034   Y N   Start command with chained DCBs specifying write data
      : :   (random data) and control-address markers on cylin-
      : :   der 02 and then read-verify.  CC = 0703 and ISB = 00?
      : :
      : 1   Go to step 091.
      :
035   Y N   Start command with DCB specifying read data from
      : :   cylinder 02.  CC = 0702 and ISB = 80?
      : :
036   : 1   Incorrect condition code or interrupt status byte for
      :     read data of fields with control-address markers.
      :     Replace attachment card (1) and I/O cable (2) one at a
      :     time.
      :
037   Y N   Start cycle steal status command.  CC = 0703,
      : :   ISB = 00, and cycle steal status word 1 = 1000?
      : :
038   : 1   Incorrect cycle steal status word 1.  Replace attach-
      :     ment card. (1)
      :
039   Y N   Start command with chained DCBs specifying seek to
      : :   cylinder 03 using head 0 and read sector ID.
      : :   CC = 0703, ISB = 00, and cylinder = 03?
      : :
040   : 1   Incorrect condition code, interrupt status byte, or
      :     cylinder for seek and read sector ID.  Run auto-
      :     test 4600 (SAM 4600).
      :
041   Y N   Start command with chained DCBs specifying write data
      : :   (random data) and data-address markers on cylinder 03
      : :   and then read-verify.  CC = 0703 and ISB = 00?
      : :
      : 1   Go to step 091.
      :
      :
      :
      :
      5
      A          WRITE/READ ADDRESS MARKER TEST (CONTD)    SAM 4611-4
```

042 Y N Start command with DCB specifying read data from
: :   cylinder 03. CC = 0703 and ISB = 00?
: :
043 : 1 Incorrect condition code or interrupt status byte for
:   read data of fields with data-address markers.
:   Replace attachment card (1) and I/O cable (2) one at a
:   time.
:
044 Y N Start cycle steal status command. CC = 0703,
: :   ISB = 00, and cycle steal status word 1 = 0000?
: :
045 : 1 Incorrect cycle steal status word 1. Replace attach-
:   ment card. (1)
:
046 Y N Start command with chained DCBs selecting head 1 and
: :   specifying read sector ID. CC = 0703, ISB = 00, and
: :   cylinder = 03?
: :
047 : 1 Incorrect condition code, interrupt status byte, or
:   cylinder for seek and read sector ID. Run auto-
:   test 4600 (SAM 4600).
:
048 Y N Start command with chained DCBs specifying write data
: :   (random data) and data-address markers on cylinder 03
: :   and then read-verify. CC = 0703 and ISB = 00?
: :
: 1 Go to step 091.
:
049 Y N Start command with DCB specifying read data from
: :   cylinder 03. CC = 0703 and ISB = 00?
: :
050 : 1 Incorrect condition code or interrupt status byte for
:   read data of fields with data-address markers.
:   Replace attachment card (1) and I/O cable (2) one at a
:   time.
:
051 Y N Start cycle steal status command. CC = 0703,
: :   ISB = 00, and cycle steal status word 1 = 0000?
: :
052 : 1 Incorrect cycle steal status word 1. Replace attach-
:   ment card. (1)
:
053 Y N Start command with chained DCBs specifying seek to
: :   cylinder 74 using head 0 and read sector ID.
: :   CC = 0703, ISB = 00, and cylinder = 74?
: :
054 : 1 Incorrect condition code, interrupt status byte, or
:   cylinder for seek and read sector ID. Run auto-
:   test 4600 (SAM 4600).
:
6
A   WRITE/READ ADDRESS MARKER TEST (CONTD)   SAM 4611-5

62947909

055 Y N Start command with chained DCBs specifying write data
     : : (random data) and control-address markers on cylin-
     : : der 74 and then read-verify. CC = 0703 and ISB = 00?
     : :
     : 1 Go to step 091.
     :
056 Y N Start command with DCB specifying read data from
     : : cylinder 74. CC = 0702 and ISB = 80?
     : :
057 : 1 Incorrect condition code or interrupt status byte for
     :   read data of fields with control-address markers.
     :   Replace attachment card (1) and I/O cable (2) one at a
     :   time.
     :
058 Y N Start cycle steal status command. CC = 0703,
     : : ISB = 00, and cycle steal status word 1 = 1000?
     : :
059 : 1 Incorrect cycle steal status word 1. Replace attach-
     :   ment card. (1)
     :
060 Y N Start command with chained DCBs selecting head 1 and
     : : specifying read sector ID. CC = 0703, ISB = 00, and
     : : cylinder = 74?
     : :
061 : 1 Incorrect condition code, interrupt status byte, or
     :   cylinder for seek and read sector ID. Run auto-
     :   test 4600 (SAM 4600).
     :
062 Y N Start command with chained DCBs specifying write data
     : : (random data) and control-address markers on cylin-
     : : der 74 and then read-verify. CC = 0703 and ISB = 00?
     : :
     : 1 Go to step 091.
     :
063 Y N Start command with DCB specifying read data from
     : : cylinder 74. CC = 0702 and ISB = 80?
     : :
064 : 1 Incorrect condition code or interrupt status byte for
     :   read data of fields with control-address markers.
     :   Replace attachment card (1) and I/O cable (2) one at a
     :   time.
     :
065 Y N Start cycle steal status command. CC = 0703,
     : : ISB = 00, and cycle steal status word 1 = 1000?
     : :
     : :
     : :
     : :
     : :
     : :
     7 7
     A B   WRITE/READ ADDRESS MARKER TEST (CONTD)   SAM 4611-6

```
         A B
         6 6
         : :
066      : 1  Incorrect cycle steal status word 1.  Replace attach-
         :    ment card. (1)
         :
067      Y N  Start command with chained DCBs specifying seek to
         : :  cylinder 75 using head 0 and read sector ID.
         : :  CC = 0703, ISB = 00, and cylinder = 75?
         : :
068      : 1  Incorrect condition code, interrupt status byte, or
         :    cylinder for seek and read sector ID.  Run auto-
         :    test 4600 (SAM 4600).
         :
069      Y N  Start command with chained DCBs specifying write data
         : :  (random data) and data-address markers on cylinder 75
         : :  and then read-verify.  CC = 0703 and ISB = 00?
         : :
         : 1  Go to step 091.
         :
070      Y N  Start command with DCB specifying read data from
         : :  cylinder 75.  CC = 0703 and ISB = 00?
         : :
071      : 1  Incorrect condition code or interrupt status byte for
         :    read data of fields with data-address markers.
         :    Replace attachment card (1) and I/O cable (2) one at a
         :    time.
         :
072      Y N  Start cycle steal status command.  CC = 0703,
         : :  ISB = 00, and cycle steal status word 1 = 0000?
         : :
073      : 1  Incorrect cycle steal status word 1.  Replace attach-
         :    ment card. (1)
         :
074      Y N  Start command with chained DCBs selecting head 1 and
         : :  specifying read sector ID.  CC = 0703, ISB = 00, and
         : :  cylinder = 75?
         : :
075      : 1  Incorrect condition code, interrupt status byte, or
         :    cylinder for seek and read sector ID.  Run auto-
         :    test 4600 (SAM 4600).
         :
076      Y N  Start command with chained DCBs specifying write data
         : :  (random data) and data-address markers on cylinder 75
         : :  and then read-verify.  CC = 0703 and ISB = 00?
         : :
         : 1  Go to step 091.
         :
         :
         :
         :
         :
         :
         8
         A      WRITE/READ ADDRESS MARKER TEST (CONTD)    SAM 4611-7
```

```
      :
077   Y N   Start command with DCB specifying read data from
      : :   cylinder 75.  CC = 0703 and ISB = 00?
      : :
078   : 1   Incorrect condition code or interrupt status byte for
      :     read data of fields with data-address markers.
      :     Replace attachment card (1) and I/O cable (2) one at a
      :     time.
      :
079   Y N   Start cycle steal status command.  CC = 0703,
      : :   ISB = 00, and cycle steal status word 1 = 0000?
      : :
080   : 1   Incorrect cycle steal status word 1.  Replace attach-
      :     ment card. (1)
      :
081   Y N   Start command with chained DCBs specifying seek to
      : :   cylinder 76 using head 0 and read sector ID.          .
      : :   CC = 0703, ISB = 00, and cylinder = 76?
      : :
082   : 1   Incorrect condition code, interrupt status byte, or
      :     cylinder for seek and read sector ID.  Run auto-
      :     test 4600 (SAM 4600).
      :
083   Y N   Start command with chained DCBs specifying write data
      : :   (random data) and control-address markers on cylin-
      : :   der 76 and then read-verify.  CC = 0703 and ISB = 00?
      : :
      : 1   Go to step 091.
      :
084   Y N   Start command with DCB specifying read data from
      : :   cylinder 76.  CC = 0702 and ISB = 80?
      : :
085   : 1   Incorrect condition code or interrupt status byte for
      :     read data of fields with control-address markers.
      :     Replace attachment card (1) and I/O cable (2) one at a
      :     time.
      :
086   Y N   Start cycle steal status command.  CC = 0703,
      : :   ISB = 00, and cycle steal status word 1 = 1000?
      : :
087   : 1   Incorrect cycle steal status word 1.  Replace attach-
      :     ment card. (1)
      :
088   Y N   Start command with chained DCBs selecting head 1 and
      : :   specifying read sector ID.  CC = 0703, ISB = 00, and
      : :   cylinder = 76?
      : :
089   : 1   Incorrect condition code, interrupt status byte, or
      :     cylinder for seek and read sector ID.  Run auto-
      :     test 4600 (SAM 4600).
      :
      9
      A       WRITE/READ ADDRESS MARKER TEST (CONTD)    SAM 4611-8
```

```
      :
090  Y N  Start command with chained DCBs specifying write data
      : :    (random data) and control-address markers on cylin-
      : :    der 76 and then read-verify.  CC = 0703 and ISB = 00?
      : :
091  : Y N  Start cycle steal status command.  CC = 0703 and
      : : :    ISB = 00?
      : : :
092  : : 1  Cycle steal status failed.  Test aborted.  Replace
      : :      attachment card. (1)
      : :
093  : Y N  Cycle steal status word 4 = XX00 and word 5 = 0000?
      : : :
094  : : 1  Branch to test 4620 (SAM 4620).
      : :
095  : 1  Incorrect condition code or interrupt status byte for
      :      write data/read verify operation.  Replace attachment
      :      card (1) and I/O cable (2) one at a time.
      :
096  Y N  Start command with DCB specifying read data from
      : :    cylinder 76.  CC = 0702 and ISB = 80?
      : :
097  : 1  Incorrect condition code or interrupt status byte for
      :      read data of fields with control-address markers.
      :      Replace attachment card (1) and I/O cable (2) one at a
      :      time.
      :
098  Y N  Start cycle steal status command.  CC = 0703,
      : :    ISB = 00, and cycle steal status word 1 = 1000?
      : :
099  : 1  Incorrect cycle steal status word 1.  Replace attach-
      :      ment card. (1)
      :
100  1  End of test.  No error occurred.
```

---

(1) Set switches on new attachment card for FDD device
    address and IPL assignment (Installing Attachment
    Card and Cabling, section 2).

(2) Access FDD (para 3.1) and route new I/O cable per
    section 2 of this manual if a standalone unit or per
    section 2 of MMD site information manual if a com-
    bination unit.

This routine automatically executes when an improper condition is
detected in the FDD auto-tests or in manual tests 4610 or 4611.
If the previous test instructed that this routine be run,
initiate routine manually by entering B4620. Sequentially, the
routine:

- Displays (on assigned alternate console) the six cycle
  steal status words that were read from the attachment
  card during the previous test.

- Analyzes the FDD health parameters given in word 5 and
  if a failure is recorded, the routine stops and indi-
  cates the failure.

- If no failure is recorded in word 5, the routine con-
  tinues and decodes the error-log byte (second byte) of
  word 4 and indicates the result. If necessary, an
  automatic branch to routine 4621 (SAM 4621) occurs to
  complete the decoding.


```
001  1   Display cycle steal status words on assigned alternate
     :   console.
     :
002  Y N  Mask word 5 with 8000.  Bit 0 = 0?
     : :
003  : 1  FDD not ready - door open, power not on, or diskette
     :    speed 70 percent below normal.  If FDD power is turned
     :    on and door is closed, go to paper-only SAM 4672 (Not
     :    Ready Status).
     :
004  Y N  Mask word 5 with 2000.  Bit 2 = 0?
     : :
005  : 1  FDD I/O cable disconnected or open.  Access FDD
     :    (para 3.1) and check I/O cable connections at FDD PC
     :    board and attachment card.  If connections are OK,
     :    replace I/O cable. (2)
     :
006  Y N  Mask word 5 with 0200.  Bit 6 = 0?
     : :
007  : 1  +20 V from FDD power supply is low.  Access FDD
     :    (para 3.1) and check power cable connections at J7 on
     :    power supply board and at attachment card.  If connec-
     :    tions are OK, go to paper-only SAM 4673 (Bad Power
     :    Supply Voltages).
     :
008  Y N  Mask word 5 with 0100.  Bit 7 = 0?
     : :
     : :
     2 2
     A B        CYCLE STEAL STATUS ANALYSIS ROUTINE    SAM 4620-1
```

```
        : :
009     : 1    Attachment card +12-V power supply low.  Replace
        :      attachment card. (1)
        :
010     Y N    Mask word 5 with 0800.  Bit 4 = 0?
        : :
011     : 1    Diskette speed too low.  Access FDD (para 3.1) and
        :      check that 104 to 127 V ac is present between brown
        :      and blue (neutral) wires of B1P1 connector at right-
        :      rear of FDD assembly.  If voltage is OK, replace FDD
        :      assembly (para 3.2); if voltage is bad, replace FDD
        :      power supply (para 3.3).
        :
012     Y N    Mask word 5 with 1000.  Bit 3 = 0?
        : :
013     : 1    Diskette speed too high.  Replace FDD assembly
        :      (para 3.2).
        :
014     Y N    Mask word 5 with 0400.  Bit 5 = 0?
        : :
015     : 1    FDD write-fault latch stuck on.  Replace FDD assembly
        :      (para 3.2) and I/O cable (2) one at a time.  After
        :      replacement, run test 4610 (SAM 4610) to delete any
        :      garbled or erased fields that may have been placed on
        :      diskette by the malfunction.  Otherwise, invalid read
        :      errors of data or sector ID may occur in auto-tests
        :      when verifying operation.
        :
016     Y N    Mask word 5 with 0080.  Bit 8 = 0?
        : :
017     : 1    Attachment card reset latch stuck on.  Replace attach-
        :      ment card (1) and I/O cable (2) one at a time.
        :
018     Y N    Mask word 5 with 0040.  Bit 9 = 0?
        : :
019     : 1    Attachment card test-mode latch stuck on.  Replace
        :      attachment card. (1)
        :
020     Y N    Mask word 5 with 0020.  Bit 10 = 0?
        : :
021     : 1    Attachment card disk-initialize latch stuck on.
        :      Replace attachment card. (1)
        :
022     Y N    Mask word 5 with 0010.  Bit 11 = 0?
        : :
023     : 1    Attachment card write-fault reset latch stuck on.
        :      Replace attachment card. (1)
        :
024     Y N    Mask word 5 with 0002.  Bit 14 = 0?
        : :
        : :
        3 3
        A B    CYCLE STEAL STATUS ANALYSIS ROUTINE (CONTD)    SAM 4620-2
```

```
       A B
       2 2
       : :
025    : 1  Attachment card write-request latch stuck on.  Replace
       :    attachment card. (1)
       :
026    Y N  Mask word 5 with 0001.  Bit 15 = 0?
       : :
027    : 1  Attachment card read-request latch stuck on.  Replace
       :    attachment card. (1)
       :
028    Y N  Mask error-log byte with FF.  Byte other than 00?
       : :
       : 1  Go to step 077.
       :
029    Y N  Error-log byte other than 04?
       : :
030    : 1  FDD went not ready when last command was issued -
       :    door open, power not on, or diskette speed 70 percent
       :    below normal.  If FDD power is turned on and door is
       :    closed, go to paper-only SAM 4672 (Not Ready Status).
       :
031    Y N  Error-log byte other than 09?
       : :
032    : 1  Sector register in FDD controller chip on attachment
       :    card did not load correctly.  Replace attachment
       :    card. (1)
       :
033    Y N  Error-log byte other than 0A?
       : :
034    : 1  Data register in FDD controller chip on attachment
       :    card did not load correctly.  Replace attachment
       :    card. (1)
       :
035    Y N  Error-log byte other than 0B?
       : :
036    : 1  Head-select register on attachment card is incorrect.
       :    Replace attachment card. (1)
       :
037    Y N  Error-log byte other than 0D?
       : :
038    : 1  FDD went not ready during execution of last command -
       :    door open, power not on, or diskette speed 70 percent
       :    below normal.  If FDD power is on and door is closed,
       :    go to paper-only SAM 4672 (Not Ready Status).
       :
039    Y N  Error-log byte other than 0E?
       : :
       : :
       : :
       : :
       : :
       : :
       4 4
       A B  CYCLE STEAL STATUS ANALYSIS ROUTINE (CONTD)    SAM 4620-3
```

```
          A  B
          3  3
          :  :
040       :  1  FDD write fault.  Replace FDD assembly (para 3.2) and
          :     I/O cable (2) one at a time.  After replacement, run
          :     test 4610 (SAM 4610) to delete any garbled or erased
          :     fields that may have been placed on diskette by the
          :     malfunction.  Otherwise, invalid read errors of data
          :     or sector ID may occur in auto-tests when verifying
          :     operation.
          :
041       Y  N  Error-log byte other than 0F?
          :  :
042       :  1  FDD seek error.  Replace FDD assembly (para 3.2).
          :
043       Y  N  Error-log byte other than 10?
          :  :
044       :  1  Sector ID field not found.  Replace FDD assembly
          :     (para 3.2).
          :
045       Y  N  Error-log byte other than 11?
          :  :
046       :  1  Data field not found.  Replace FDD assembly
          :     (para 3.2).
          :
047       Y  N  Error-log byte other than 12?
          :  :
048       :  1  Cyclic-redundancy-check error.  Problem may be a bad
          :     diskette.  Replace diskette and rerun previous test.
          :     If condition persists, replace FDD assembly (para 3.2).
          :
049       Y  N  Error-log byte other than 13?
          :  :
050       :  1  Lost data in FDD controller chip on attachment card.
          :     Replace attachment card. (1)  If malfunction occurred
          :     during write test 4610 or 4611, run test 4610
          :     (SAM 4610) after replacement.  This deletes the
          :     garbled or erased fields that may have been placed on
          :     the diskette by the malfunction.  Otherwise, invalid
          :     read errors of data or sector ID may occur in auto-
          :     tests when verifying operation.
          :
051       Y  N  Error-log byte other than 1C?
          :  :
052       :  1  Command was received from processor during a malfunc-
          :     tion.  Problem is identified in status word 5.  Only
          :     bits 12 and 13 of word 5 have not been tested (FDD
          :     write-enable latch on attachment card either stuck set
          :     or clear following a write).  Replace attachment card.
          :     (1) After replacement, run test 4610 (SAM 4610) to
          :     delete any garbled or erased fields that may have
          :     placed on diskette by the malfunction.  Otherwise,
          :     invalid read errors of data or sector ID may occur in
          :     auto-tests when verifying operation.
          5
          A     CYCLE STEAL STATUS ANALYSIS ROUTINE (CONTD)    SAM 4620-4
```

053 Y N   Error-log byte other than 1D?
     : :
054 : 1   DCB head byte differs with the head that is selected.
     :   Replace attachment card. (1)
     :
055 Y N   Error-log byte other than 1E?
     : :
056 : 1   Track register in FDD controller chip on attachment
     :   card did not load correctly. Replace attachment
     :   card. (1)
     :
057 Y N   Error-log byte other than 1F?
     : :
058 : 1   Attachment card disk-initialize latch failed to set
     :   for write-format operation. Replace attachment
     :   card. (1)
     :
059 Y N   Error-log byte other than 20?
     : :
060 : 1   Index detected before write-format operation completed
     :   track. Replace attachment card. (1) After replacement,
     :   run test 4610 (SAM 4610) to delete any garbled or
     :   erased fields that may have been placed on diskette by
     :   the malfunction. Otherwise, invalid read errors of
     ·:   data or sector ID may occur in auto-tests when veri-
     :   fying operation.
     :
061 Y N   Error-log byte other than 21?
     : :
062 : 1   Attachment card write-enable latch failed to set for
     :   write operation. Replace attachment card. (1)
     :
063 Y N   Error-log byte other than 22?
     : :
064 : 1   Attachment card write-enable latch failed to clear
     :   after write operation. Replace attachment card. (1)
     :   After replacement, run test 4610 (SAM 4610) to delete
     :   any garbled or erased fields that may have been
     :   placed on diskette by the malfunction. Otherwise,
     :   invalid read errors of data or sector ID may occur in
     :   auto-tests when verifying operation.
     :
065 Y N   Error-log byte other than 81?
     : :
066 : 1   Interface data check from Series/1 processor to
     :   attachment card. Replace attachment card. (1)
     :
     :
     :
     :
     :
     6
     A   CYCLE STEAL STATUS ANALYSIS ROUTINE (CONTD)   SAM 4620-5

```
      :
067   Y N   Error-log byte other than 82?
      : :
068   : 1   Protect check for storage-access key given in DCB.
      :     Replace attachment card. (1)
      :
069   Y.N   Error-log byte other than 83?
      : :
070   : 1   Invalid storage address thought to be given in DCB.
      :     Replace attachment card. (1)
      :
071   Y N   Error-log byte other than 84?
      : :
072   : 1   Storage data check.  Data accessed from Series/1
      :     memory thought to be out of parity.  Replace attach-
      :     ment card. (1)  If condition persists, problem is in
      :     Series/1.
      :
073   Y N  ·Error-log byte other than 89?
      : :
074   : 1   Interface data check from attachment card to Series/1
      :     processor.  Attachment card believes a parity error
      :     occurred on Series/1 I/O bus.  Replace attachment
      :     card. (1)  If condition persists, some other device
      :     attachment card is bad or problem is in Series/1.
      :
075   Y N   Error-log byte other than 23?
      : :
076   : 1   Last command was aborted by attachment card after
      :     1.5-second timeout.  Go to paper-only SAM 4672 (Not
      :     Ready Status).
      :
077   1   Branch to routine 4621 (SAM 4621).
```

----

(1) Set switches on new attachment card for FDD device
    address and IPL assignment (Attachment Card and I/O
    Cable Installation, section 2).

(2) Access FDD (para 3.1) and route new I/O cable per
    section 2 of this manual if a standalone unit or per
    section 2 of MMD site information manual if a
    combination unit.

CYCLE STEAL STATUS ANALYSIS ROUTINE (CONTD)   SAM 4620-6

This routine automatically executes when decoding of the error-
log byte cannot be completed by routine 4620 (SAM 4620).

001   Y N   Mask error-log byte with FF. Byte other than 00?
      : :
      : 1   Go to step 070.
      :
002   Y N   Error-log byte other than 01?
      : :
003   : 1   Input flag bit set in output operation. DCB decoded
      :   incorrectly. Replace attachment card. (1)
      :
004   Y N   Error-log byte other than 02?
      : :
005   : 1   Input flag bit not set in input operation. DCB
      :   decoded incorrectly. Replace attachment card. (1)
      :
006   Y N   Error-log byte other than 03?
      : :
007   : 1   Illegal control word modifier. DCB decoded incor-
      :   rectly. Replace attachment card. (1)
      :
008   Y N   Error-log byte other than 05?
      : :
009   : 1   Forward seek specified beyond cylinder 76. DCB
      :   decoded incorrectly. Replace attachment card. (1)
      :
010   Y N   Error-log byte other than 06?
      : :
011   : 1   Backward seek specified beyond cylinder 00. DCB
      :   decoded incorrectly. Replace attachment card. (1)
      :
012   Y N   Error-log byte other than 07?
      : :
013   : 1   Byte count other than 4 in read sector ID operation.
      :   DCB decoded incorrectly. Replace attachment card. (1)
      :
014   Y N   Error-log byte other than 08?
      : :
015   : 1   Read or write attempted past end of track. DCB
      :   decoded incorrectly. Replace attachment card. (1)
      :
016   Y N   Error-log byte other than 0C?
      : :
      : :
      : :
      : :
      : :
      2 2   CONTINUATION OF CYCLE STEAL
      A B   STATUS ANALYSIS   SAM 4621-1

```
        A B
        1 1
        : :
017     : 1   Invalid diskette side specified.  If a scratch disk-
        :     ette is installed in the FDD being tested, verify that
        :     diskette is two-sided (refer to illustration in
        :     para 3.0.6.2).  If scratch diskette is OK or BASIC
        :     diskette is installed, DCB was decoded incorrectly or
        :     FDD is sensing the wrong diskette type.  Replace
        :     attachment card (1), FDD assembly (para 3.2), and I/O
        :     cable (2) one at a time.
        :
018     Y N   Error-log byte other than 14?
        : :
019     : 1   Specified sector is not in range of track formatting.
        :     DCB decoded incorrectly.  Replace attachment card. (1)
        :
020     Y N   Error-log byte other than 15?
        : :
021     : 1   Starting address for storage accessing is illegal.
        :     DCB decoded incorrectly.  Replace attachment card. (1)
        :
022     Y N   Error-log byte other than 16?
        : :
023     : 1   Byte count for storage accessing is illegal.  DCB
        :     decoded incorrectly.  Replace attachment card. (1)
        :
024     Y N   Error-log byte other than 17?
        : :
025     : 1   Illegal sector length specified.  DCB decoded incor-
        :     rectly.  Replace attachment card. (1)
        :
026     Y N   Error-log byte other than 18?
        : :
027     : 1   Write attempted on write-protected diskette.  If
        :     test 4610 or 4611 was being run, remove diskette and
        :     place a piece of opaque tape over write-protect slot
        :     in jacket.  Install diskette in FDD and restart test
        :     that was in process.  If condition persists, replace
        :     FDD assembly (para 3.2) and I/O cable (2) one at a
        :     time.  If any other tests were being run, replace
        :     attachment card. (1)
        :
028     Y N   Error-log byte other than 19?
        : :
029     : 1   Invalid format data word.  DCB decoded incorrectly.
        :     Replace attachment card. (1)
        :
030     Y N   Error-log byte other than 1A?
        : :
        : :
        : :
        : :
        3 3                 CONTINUATION OF CYCLE STEAL
        A B                 STATUS ANALYSIS (CONTD)        SAM 4621-2
```

```
        A  B
        2  2
        :  :
031     :  1   Invalid sector length specified for write-format
        :      operation.  DCB decoded incorrectly.  Replace attach-
        :      ment card. (1)
        :
032     Y  N   Error-log byte other than 1B?
        :  :
033     :  1   Invalid cylinder number specified for write-format
        :      operation.  DCB decoded incorrectly.  Replace attach-
        :      ment card. (1)
        :
034     Y  N   Error-log byte other than 86?
        :  :
035     :  1   Command under direct program control not accepted by
        :      attachment card.  DCB decoded incorrectly.  Replace
        :      attachment card. (1)
        :
036     Y  N   Error-log byte other than 8B?
        :  :
037     :  1   Odd DCB address in IDCB for start command.  IDCB
        :      decoded incorrectly.  Replace attachment card. (1)
        :
038     Y  N   Error-log byte other than 8C?
        :  :
039     :  1   Odd chain address in DCB for start command.  DCB
        :      decoded incorrectly.  Replace attachment card. (1)
        :
040     Y  N   Error-log byte other than 90?
        :  :
041     :  1   Odd DCB address in IDCB for start diagnostic 1
        :      command.  IDCB decoded incorrectly.  Replace attach-
        :      ment card. (1)
        :
042     Y  N   Error-log byte other than 92?
        :  :
043     :  1   Input flag bit not set in start diagnostic 1 command.
        :      DCB decoded incorrectly.  Replace attachment card. (1)
        :
044     Y  N   Error-log byte other than 93?
        :  :
045     :  1   Odd byte count in DCB for start diagnostic 1 command.
        :      DCB decoded incorrectly.  Replace attachment card. (1)
        :
046     Y  N   Error-log byte other than 94?
        :  :
047     :  1   Excessive byte count in DCB for start diagnostic 1
        :      command.  DCB decoded incorrectly.  Replace attach-
        :      ment card. (1)
        :
        :
        :
        4              CONTINUATION OF CYCLE STEAL
        A              STATUS ANALYSIS (CONTD)        SAM 4621-3
```

```
048  Y N   Error-log byte other than 95?
     : :
049  : 1   Odd storage address in DCB for start diagnostic 1
     :     command.  DCB decoded incorrectly.  Replace attachment
     :     card. (1)
     :
050  Y N   Error-log byte other than 96?
     : :
051  : 1   Odd DCB address in IDCB for start diagnostic 2
     :     command.  IDCB decoded incorrectly.  Replace attach-
     :     ment card. (1)
     :
052  Y N   Error-log byte other than 98?
     : :
053  : 1   Input flag bit set in start diagnostic 2 command.  DCB
     :     decoded incorrectly.  Replace attachment card. (1)
     :
054  Y N   Error-log byte other than 99?
     : :
055  : 1   Odd byte count in DCB for start diagnostic 2 command.
     :     DCB decoded incorrectly.  Replace attachment card. (1)
     :
056  Y N   Error-log byte other than 9A?
     : :
057  : 1   Excessive byte count in DCB for start diagnostic 2
     :     command.  DCB decoded incorrectly.  Replace attachment
     :     card. (1)
     :
058  Y N   Error-log byte other than 9B?
     : :
059  : 1   Odd storage address in DCB for start diagnostic 2
     :     command.  DCB decoded incorrectly.  Replace attachment
     :     card. (1)
     :
060  Y N   Error-log byte other than A3?
     : :
061  : 1   Odd DCB address in IDCB for start cycle steal status
     :     command.  IDCB decoded incorrectly.  Replace attach-
     :     ment card. (1)
     :
062  Y N   Error-log byte other than A5?
     : :
063  : 1   Input flag bit not set in start cycle steal status
     :     command.  DCB decoded incorrectly.  Replace attachment
     :     card. (1)
     :
064  Y N   Error-log byte other than A6?
     : :
     : :
     : :
     5 5                 CONTINUATION OF CYCLE STEAL
     A B                 STATUS ANALYSIS (CONTD)        SAM 4621-4
```

```
      A  B
      4  4
      :  :
065   :  1  Odd byte count in DCB for start cycle steal status
      :     command.  DCB decoded incorrectly.  Replace attachment
      :     card. (1)
      :
066   Y  N  Error-log byte other than A7?
      :  :
067   :  1  Excessive byte count in DCB for start cycle steal
      :     status command.  DCB decoded incorrectly.  Replace
      :     attachment card. (1)
      :
068   Y  N  Error-log byte other than A8?
      :  :
069   :  1  Odd storage address in DCB for start cycle steal
      :     status command.  DCB decoded incorrectly.  Replace
      :     attachment card. (1)
      :
070   1  No error or failure reported in cycle steal status.
         Rerun previous test that was in process.  If condition
         persists, replace attachment card. (1)
```

---

(1) Set switches on new attachment card for FDD device
    address and IPL assignment (Installing Attachment
    Card and Cabling, section 2).

(2) Access FDD (para 3.1) and route new I/O cable per
    section 2 of this manual if a standalone unit or per
    section 2 of MMD site information manual if a com-
    bination unit.

CONTINUATION OF CYCLE STEAL
STATUS ANALYSIS (CONTD)   SAM 4621-5

This paper-only SAM covers FDD power-on and IPL (initial-program-load) problems. The SAM assumes that attachment card cabling is connected, the power cord from On/Off switch is connected to Series/1 ac distribution panel, and Series/1 power is on. For IPL problems, it also assumes that another FDD unit is not available to IPL the CDC BASIC diskette and that the diskette is being loaded in diagnostic mode.

NOTE

The Series/1 ac-entry circuit breaker
controls power to the FDD On/Off
switch on front panel. This circuit
breaker is above the ac distribution
panel at the rear of the Series/1.

Instructions: Access FDD (para 3.1).

001 N Y LED on front panel remains lit when On/Off switch is
     : : pressed to On?
     : :
002 : N Y Diskette rotates after closing door?
     : : :
003 : : N Y Operator/programmer panel show any code within 30
     : : : : seconds after pressing Load switch?
     : : : :
004 : : : N Y Other than $00E0_{16}$ shown?
     : : : : :
005 : : : : N Y Other than $00E5_{16}$ shown?
     : : : : : :
006 : : : : : N Y Stop indicator extinguished, Wait indicator
     : : : : : : : lit, and $38XX_{16}$ halt code shown?
     : : : : : : :
007 : : : : : : 1 Power-on and IPL occurred successfully.
     : : : : : :
008 : : : : : 1 If system contains another IPL device, open
     : : : : : : FDD door, turn off Series/1 and other IPL
     : : : : : : device, and disconnect that device attachment
     : : : : : : card from Series/1. Try to IPL again. If IPL
     : : : : : : is successful, other device either has same
     : : : : : : primary/alternate IPL assignment as FDD or
     : : : : : : attachment card for that device is bad.
     : : : : : :
     : : : : : :
     : : : : : :
     : : : : : :
     : : : : : :
     3 3 2 2 2 2
     A B C D E F   POWER-ON AND IPL PROBLEMS   SAM 4670-1

009 : : : 2 Problem may be a bad diskette. Replace BASIC
    : : : : diskette and try to IPL again.
    : : : :

010 : : : 3 Replace attachment card (1) and try to IPL again.
    : : : :

011 : : : 4 Replace FDD assembly (para 3.2) and I/O cable (2)
    : : : : one at a time.
    : : : :

012 : : : 5 Problem is in Series/1.
    : : :

013 : : 1 Go to paper-only SAM 4671 (IPL Fault Isolation).
    : :

014 : 1 Open FDD door and turn off FDD and Series/1. Reseat
    : : attachment card and check that primary/alternate
    : : setting of IPL-selection switches on attachment card
    : : match setting of IPL Source switch (refer to Install-
    : : ing Attachment Card and Cabling, section 2, for
    : : attachment card switch assignments). Try to IPL
    : : again. If condition occurs again, replace attachment
    : : card. (1)
    : :

015 : 2 Probable problem in Series/1 I/O bus or operator/
    :   programmer panel.
    :

016 1 Check that red LED on attachment card is extinguished.
    : If LED is lit, replace attachment card. (1)
    :

017 2 If system contains another IPL device, open FDD door,
    : turn off Series/1 and other IPL device, and disconnect
    : that device attachment card from Series/1. Try to IPL
    : again. If IPL is successful, other device either has
    : same primary/alternate IPL assignment as FDD or attach-
    : ment card for that device is bad.
    :

018 3 Check that +5 +0.5 V is present on Series/1 I/O bus
    : (Installing Attachment Card and Cabling, section 2).
    : If voltage is bad and cannot be adjusted, check
    : voltage with attachment card removed. If voltage is
    : OK with attachment card removed, replace attachment
    : card (1); if voltage remains bad with attachment card
    : removed, problem is in Series/1.
    :

019 4 Probable problem in Series/1 processor or operator/
       programmer panel. If not already done, replace
       attachment card (1) to verify problem is in Series/1.

POWER-ON AND IPL PROBLEMS (CONTD)   SAM 4670-2

```
          A B
          1 1
          : :
020       : 1   If spindle motor (top motor on FDD) is running, drive
          : :   belt is off spindle.  Reinstall or replace drive belt
          : :   (para 3.4).
          : :
021       : 2   Check that 104 to 127 V ac is present between brown and
          : :   blue (neutral) wires of B1P1 connector at right-rear of
          : :   FDD assembly.  If voltage is bad, replace power supply
          : :   (para 3.3).
          : :
022       : 3   Replace FDD assembly (para 3.2).
          :
023       1     Check if circuit breaker on FDD power supply is tripped.
          :     If so, leave breaker off and disconnect following
          :     connectors:
          :
          :        ● 3-pin B1P1 from right side of FDD assembly
          :
          :        ● 7-pin B1P4 from FDD PC board
          :
          :        ● 3-pin attachment power cable from J7 on power supply
          :          board
          :
          :        ● 2-pin LED power cable from J6 on FDD power supply
          :          board
          :
          :     Identify short through following steps:
          :
```

Steps	Replace if Breaker Trips
a. Turn breaker on.	FDD power supply (para 3.3).
b. Turn breaker off. Connect B1P1 and B1P4 connectors. Turn breaker on.	FDD assembly (para 3.2)
c. Turn breaker off. Connect LED power cable to J6. Turn breaker on.	On/Off-switch box (para 3.5)
d. Turn breaker off. Connect attachment power cable to J7. Turn breaker on.	Sequentially: attachment card (1), attachment power cable (2)

```
024)      2     Check for +1.5 V between J6-1 and return J6-2 on FDD
          :     power supply board.  If voltage is present, replace
          :     On/Off-switch box (para 3.5).
          :
          4
          A           POWER-ON AND IPL PROBLEMS (CONTD)    SAM 4670-3
```

A
3
:

025 3 : Press On/Off switch to Off and disconnect ac power cable
: from front of FDD power supply. Press On/Off switch to
: On and check that ac input (120 or 208/230 V ac) is
: present between black and white wires of power cable
: (white wire is neutral for 120 V ac). If voltage is
: not present, replace On/Off-switch box (para 3.5).
:

026 <u>4</u> : Check that following wires are secure in 12-pin B1P2
: connector on right side of FDD power supply. If wires
: are OK, replace power supply (para 3.3).

    o 120-V ac unit - brown circuit breaker wires in
      pins 4, 9, and 12; blue jumper wires in pin 1 to
      pin 11 and pin 11 to pin 6.

    ● 208-V ac unit - brown circuit breaker wires in
      pins 7 and 12; blue jumper wires in pin 1 to
      pin 11 and pin 3 to pin 6.

    ● 230-V ac unit - brown circuit breaker wires in
      pins 9 and 12; blue jumper wires in pin 4 to pin 6
      and pin 1 to pin 11.

---

(1) Set switches on new attachment card for FDD device
    address and IPL assignment (Installing Attachment
    Card and Cabling, section 2).

(2) Route new I/O cable or attachment power cable per
    section 2 of this manual if a standalone unit or per
    section 2 of MMD site information manual if a com-
    bination unit.

Assumption: Entry from paper-only SAM 4670 (Power-On and IPL
Problems).

001 Y N With 00E5$_{16}$ showing on operator/programmer panel
     : : indicators, press Reset switch then Main Storage
     : : switch. Indicators show 6410$_{16}$?
     : :
002 : Y N Indicators show 6411$_{16}$?
     : : :
003 : : Y N Indicators show 6412$_{16}$?
     : : : :
004 : : : Y N Indicators show 6420 or 6421$_{16}$?
     : : : : :
005 : : : : 1 If system contains another IPL device, make
     : : : : : sure that IPL Source switch is set to match
     : : : : : the primary/alternate setting of IPL-selection
     : : : : : switches on FDD attachment card (refer to
     : : : : : Installing Attachment Card and Cabling, for
     : : : : : attachment card switch assignments).
     : : : : :
006 : : : : 2 Replace attachment card. (1) If condition per-
     : : : :   sists, problem is in Series/1.
     : : : :
007 : : : 1 Check that head connectors are secure at bottom of
     : : : : FDD PC board.
     : : : :
008 : : : 2 Problem may be a bad diskette. Replace BASIC
     : : : : diskette and try to IPL again.
     : : : :
009 : : : 3 Replace attachment card (1), FDD assembly
     : : :   (para 3.2), and I/O cable (2) one at a time until
     : : :   IPL is successful.
     : : :
010 1 : 1 Problem in Series/1 I/O bus or attachment card is
     :   bad. Replace attachment card (1) and try to IPL
     :   again to verify problem is in Series/1.

                                   IPL FAULT ISOLATION   SAM 4671-1

011 1 Verify that the following items are OK. If not, correct
and try to IPL again.

- Check connections of I/O cable at attachment
  card and FDD and connections of power cable
  at attachment card and FDD power supply. Also
  verify that all connectors on FDD PC board are
  secure.

- Check that drive belt on left side of FDD has
  not slipped off spindle. If so, reinstall or
  replace drive belt (para 3.4).

- Verify that switches 1 and 5 on FDD PC board
  are pressed down in ON position and that other
  switches are pressed to OFF.

012 2 Check following voltages. If any are bad, go to
SAM 4673 (Bad Power Supply Voltages).

- +5 +0.25 V between J4-2 and return J4-3 on FDD PC
  board

- +24 +2.4 V between J4-4 and return J4-6 on FDD PC
  board

- +20 +2.4 V between return J7-2 and J7-1 and J7-3
  on FDD power supply board

- 104 to 127 V ac between brown and blue (neutral)
  wires of B1P1 connector at right-rear of FDD
  assembly

013 3 Replace attachment card (1), FDD assembly (para 3.2),
I/O cable (2), and attachment power cable (2) one at
a time until IPL is successful.

---

(1) Set switches on new attachment card for FDD device
    address and IPL assignment (Installing Attachment
    Card and Cabling, section 2).

(2) Route new I/O cable or attachment power cable per
    section 2 of this manual if a standalone unit or per
    section 2 of MMD site information manual if a com-
    bination unit.

IPL FAULT ISOLATION (CONTD)   SAM 4671-2

This paper-only SAM is to be used when instructed by a diag-
nostic test or when the diagnostics do not load or execute
correctly. The SAM assumes that FDD power was turned on and
door was closed when the diagnostics were in process.

Instructions: Access FDD (para 3.1).

001   Y N   Turn on power. LED on front panel lights and spindle
      : :   motor runs?

      : :
002   : 1   Circuit breaker on FDD power supply is tripped. Leave
      :   breaker off and disconnect following connectors:

      :
      :   ● 3-pin B1P1 from right side of FDD assembly
      :
      :   ● 7-pin B1P4 from FDD PC board
      :
      :   ● 3-pin attachment power cable from J7 on power
      :   supply board
      :
      :   ● 2-pin LED power cable from J6 on FDD power
      :   supply board
      :
      :   Identify short through following steps:
      :

Steps	Replace if Breaker Trips
a. Turn breaker on.	FDD power supply (para 3.3)
b. Turn breaker off. Connect B1P1 and B1P4 connectors. Turn breaker on.	FDD assembly (para 3.2)
c. Turn breaker off. Connect LED power cable to J6. Turn breaker on.	On/Off-switch box (para 3.5)
d. Turn breaker off. Connect attachment power cable to J7. Turn breaker on.	Sequentially: attachment card (1), attachment power cable (2)

003   Y N   Diskette rotates when door is closed?
      : :

      : 2 2
      : A B   NOT READY STATUS   SAM 4672-1

```
         :  :
004      :  1  Drive belt has slipped off spindle.  Reinstall or
         :  ‾  replace drive belt (para 3.4).
         :  .  :
005      1  If diagnostics are being loaded from a different FDD
         ‾  :  than the one being tested, verify that the following
         :  items on test unit are OK.  If not, correct and rerun
         :  diagnostic tests.
         :
         :  :  o  Check connections of I/O cable at attachment
         :  :  :     card and FDD.  Also check that all connectors
         :  :  :     on FDD PC board are secure.
         :  :  :
         :  :  :  o  Verify that switches 1 and 5 on FDD PC board
         :  :  :     are pressed down in ON position and that other
         :  :  :     switches are pressed to OFF.
         :  :  :
006      Y  N  Check following voltages.  Are they OK?
         :  :
         :  :     •  +5 +0.25 V between J4-2 and return J4-3 on FDD
         :  :        PC board
         :  :
         :  :     •  +24 +2.4 V between J4-4 and return J4-6 on FDD
         :  :        PC board
         :  :
         :  :     •  +20 +2.4 V between return J7-2 and J7-1 and J7-3
         :  :        on FDD power supply board
         :  :
         :  :     •  104 to 127 V ac between brown and blue (neutral)
         :  :        wires of B1P1 connector at right-rear of FDD
         :  :        assembly
         :  :
007      :  1  Go to paper-only SAM 4673 (Bad Power Supply Voltages).
         :
008      1  Replace FDD assembly (para 3.2) and rerun diagnostic
         ‾  tests.  If same error stoppage occurs, replace attach-
            ment card (1), I/O cable (2), and attachment power
            cable (2) one at a time.
```

---

(1) Set switches on new attachment card for FDD device
    address and IPL assignment (Installing Attachment
    Card and Cabling, section 2).

(2) Route new I/O cable or attachment power cable per
    section 2 of this manual if a standalone unit or
    per section 2 of MMD site information manual if a
    combination unit.

Assumption: Entry from paper-only SAM 4671 or 4672, or low
+20 V detected during diagnostic tests.

Instructions: Access FDD (para 3.1).

001 N Y   104 to 127 V ac present between brown and blue
     : :   (neutral) wires of B1P1 connector at right-rear of
     : :   FDD assembly?
     : :
002 : N Y   +5 +0.25 V present between J4-2 and return J4-3 on
     : : :   FDD PC board?
     : : :
003 : : N Y   +24 +2.4 V present between J4-4 and return J4-6
     : : : :   on FDD PC board?
     : : : :
004 : : : N Y   +20 +2.4 V present between return J7-2 and
     : : : : :   J7-1 and J7-3 on FDD power supply board?
     : : : : :
005 : : : : 1   Power supply voltages are OK. If low +20 V
     : : : :   was reason for entry, check continuity of
     : : : :   attachment power cable and replace if
     : : : :   open. (2) If continuity is OK, replace
     : : : :   attachment card. (1)
006 : : : 1 "Replace power supply (para 3.3).
     : : :
007 1 1 1   Check that following wires are secure in 12-pin
     : : :   B1P2 connector on right side of FDD power supply.
     : : :
     : : :   ● 120-V ac unit - brown circuit breaker wires
     : : :   in pins 4, 9, and 12; blue jumper wires in
     : : :   pin 1 to pin 11 and pin 11 to pin 6.
     : : :
     : : :   ● 208-V ac unit - brown circuit breaker wires
     : : :   in pins 7 and 12; blue jumper wires in pin 1
     : : :   to pin 11 and pin 3 to pin 6.
     : : :
     : : :   ● 230-V ac unit - brown circuit breaker wires
     : : :   in pins 9 and 12; blue jumper wires in pin 4
     : : :   to pin 6 and pin 1 to pin 11.
008 : 2 2   If voltage was higher than specified tolerance,
     :   replace power supply (para 3.3).
009 2   Replace power supply (para 3.3).

BAD POWER SUPPLY VOLTAGES   SAM 4673-1

010 : 3 Determine whether power supply or a load fault is
      : : causing low +24 V:

      : :   a. Turn power off and disconnect following cables:

      : :   ● 7-pin B1P4 from J4 on FDD PC board

      : :   ● 2-pin LED power cable from J6 on power supply
      : :   board

      : :   ● 3-pin attachment power cable from J7 on power
      : :   supply board

      : :   b. Turn power on and remeasure for +24 +2.4 V
      : :   between pin 4 and return pin 6 of B1P4 connec-
      : :   tor. If voltage is still low, replace power
      : :   supply (para 3.3).

011 : 4 Isolate load fault - turn power off and reconnect
      :   cables in following order until +24 V between B1P4-4
      :   and B1P4-6 goes low. Turn power off while making
      :   connections.

Connect	Replace if +24 V Goes Low
Attachment power cable	Attachment card (1)
LED power cable	On/Off-switch box (para 3.5)
Not applicable	FDD assembly (para 3.2)

012 3 Determine whether power supply or a load fault is
      :   causing low +5 V:

      :   a. Turn power off. Disconnect 7-pin B1P4 connector
      :   from J4 on FDD PC board and 2-pin LED power cable
      :   from J6 on power supply board.

      :   b. Turn power on and remeasure for +5 +0.25 V
      :   between pin 2 and return pin 3 of B1P4 connector.
      :   If voltage is still low, replace power supply
      :   (para 3.3).

3
A

A
2

013 <u>4</u> Isolate load fault:

   a. Turn power off and reconnect LED power cable to
      J6 on power supply board.

   b. Turn power on and check if +5 V between B1P4-2
      and B1P4-3 went low. If so, replace On/Off-
      switch box (para 3.5); if voltage is still OK,
      replace FDD assembly (para 3.2).

(1) Set switches on new attachment card for FDD device
    address and IPL assignment (Installing Attachment
    Card and Cabling section 2)

(2) Route new attachment power cable per section 2 of
    this manual if a standalone unit or per section 2
    of MMD site information manual if a combination
    unit.

COMMENT SHEET

MANUAL TITLE: 80210-10/80240 Flexible Disk Drive
Hardware Maintenance Manual (Site Information)

PUBLICATION NO.: 62947909   **REVISION:** B

NAME:_____

COMPANY:_____

STREET ADDRESS:_____

CITY:_____**STATE:**_____**ZIP CODE:**_____

This form is not intended to be used as an order blank. Control Data Corporation welcomes your evaluation of this manual. Please indicate any errors, suggested additions or deletions, or general comments below (please include page number references).
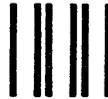
BUSINESS REPLY MAIL

FIRST CLASS   PERMIT NO. 8241   MINNEAPOLIS, MINN.

POSTAGE WILL BE PAID BY

CONTROL DATA CORPORATION

Publications and Graphics Division
2200 Berkshire Lane
Plymouth, MN   55441

CONTROL DATA

CORPORATE HEADQUARTERS, P.O. BOX 0, MINNEAPOLIS, MINNESOTA 55440
SALES OFFICES AND SERVICE CENTERS IN MAJOR CITIES THROUGHOUT THE WORLD