I SERIES II/III

I. SERIES II/III

    A. MDS-720 LOW PROFILE DOUBLE DENSITY DISKETTE SYSTEM

    B. INTEGRAL CRT P/N 4501244-01

    C. THE EIGHT (∅ THROUGH 7) INTERRUPT SWITCHES OF THE IPB OR IPC

    D. MDS-220/221/222, MDS-225/226/227, MDS-230/231/232,
        MDS-235/236/237, MDS-240/241, MDS-245/246, or MDS-286/287.

        THE SYSTEM FEATURES DETERMINE THE MDS NUMBER, I.E., BASE
        NUMBER OF:

        2<u>2</u>0 = IPB, NO. 32K MEM. BD., INTEGRAL FLOPPY DRIVE, NO.
              MDS-720, BLUE COLOR, AND 60HZ 120V.

        22<u>1</u> = CHANGES ARE POWER 50HZ 240V IF 1 IS ADDED TO BASE
              NUMBER.

        2<u>2</u>2 = CHANGES ARE POWER 50HZ 240V AND GRAY COLOR.

        22<u>5</u> = CHANGES ARE IPC INSTEAD OF IPB AND 32K MEM. BD.

   2<u>3</u>0 = CHANGES ARE MDS-720, 64K TOTAL MEMORY, NO INTEGRAL
              DRIVE

        2<u>4</u>0 = CHANGES ARE MDS-740 (HARD DISK), INTEGRAL DRIVE,
              MDS-720 ARE OPTIONAL

        <u>286</u> = SERIES III CHANGES ARE MDS-225/230/235/240/OR 245 PLUS
              AN RPB AND 64K MEMORY BD.

    E. MDS-201/202 EXPANSION CHASSIS

    F. SERIES II/III KEYBOARD P/N 4001238-07

    G. FROM LEFT TO RIGHT RUN LIGHT THEN RESET SWITCH OF THE IPB OR
        IPC

    H. OFF/ON SWITCH P/N 101933-001

    I. INTEGRAL DRIVE

   J. FROM LEFT TO RIGHT ON LIGHT AND OFF/ON SWITCH OF THE MDS-720

I SERIES II/III (FRONT)

MDS-03
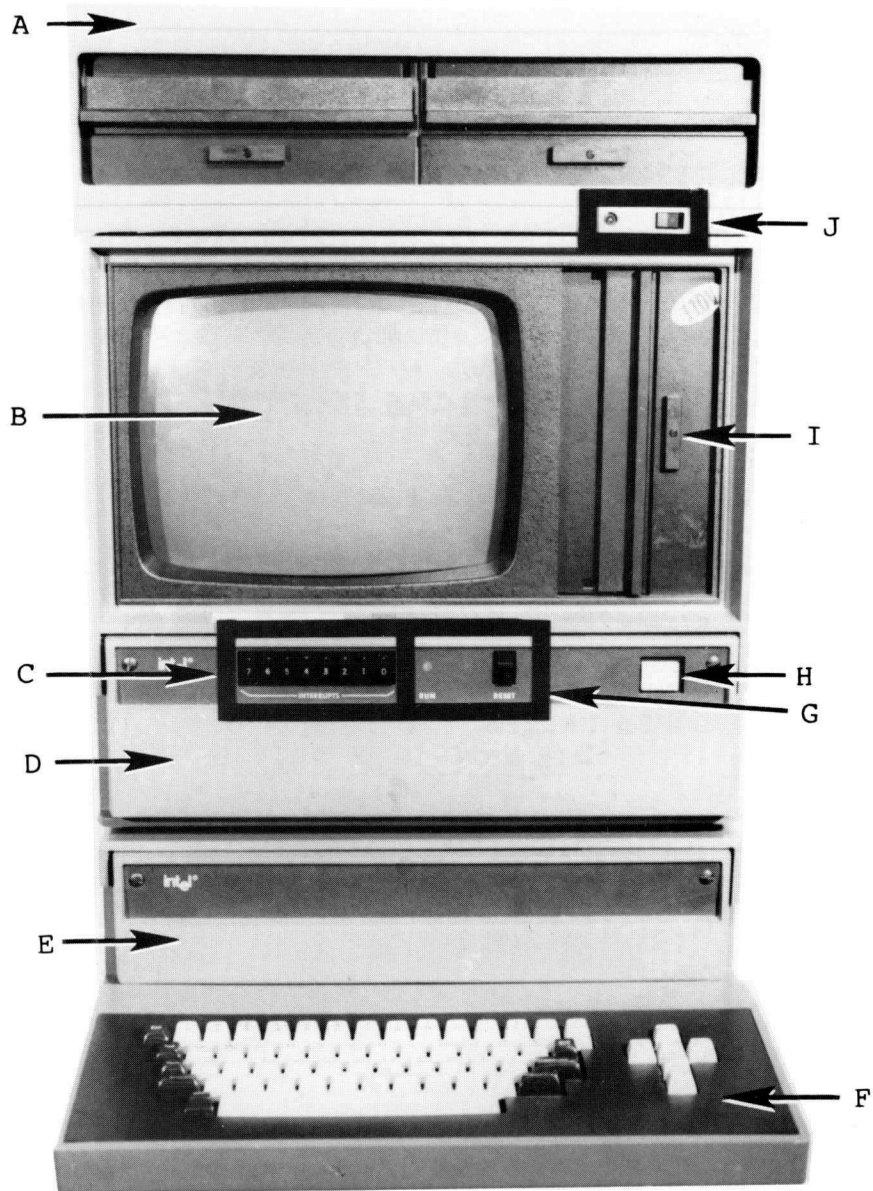
I. SERIES II/III (REAR)

    A. MDS-720

    B. MDS-720 TO SERIES II/III GROUNDING BRACE P/N 3002282-01

    C. FROM TOP TO BOTTOM: CRT CONTRAST CONTROL POTENTIOMETER, CRT
        BRIGHTNESS CONTROL THUMB WHEEL, AND THREE POSITION CONTROL
        SWITCH (UP = DIAGNOSTICS, MIDDLE = ONLINE, AND DOWN = LOCAL)

    D. SERIES II/III KEYBOARD CONNECTOR

    E. MDS-201/202 TO SERIES II/III GROUNDING BRACE P/N 3002283-02

    F. A/C POWER CONNECTOR WITH FUSE AND POWER INPUT SELECTION CARD
        BELOW THE FUSE. THE NUMBER YOU CAN SEE ON THE CARD BELOW
        THE FUSE IS THE EXPECTED A/C POWER IN. IF INCORRECT A/C
        POWER IN IS VISIBLE, RETURN TO CE DIAGNOSTIC SYSTEM TEST
        MANUAL (121619-001) PAGE 3.

    G. PERIPHERAL CONNECTORS OF THE IOC BD.

    H. MCS-201/202 4 SLOT EXPANSION CHASSIS

    I. CONNECTOR SLOTS FOR FLOPPY AND HARD DISK

            J8 = FLOPPY DRIVES Ø & 1
            J9 - FLOPPY DRIVES 2 & 3
            J10, J11, J12 = HARD DISK DRIVES

    J. SERIES II/III BASE NUMBER OF MDS-220/225/230/235/240/245/286

    K. FLOPPY DISKETTE PERIPHERAL CABLE FOR DOUBLE DENSITY DISKETTE
        SYSTEMS FOR DRIVE Ø AND 1 AS SHOWN

I SERIES II/III (REAR)

MDS-05
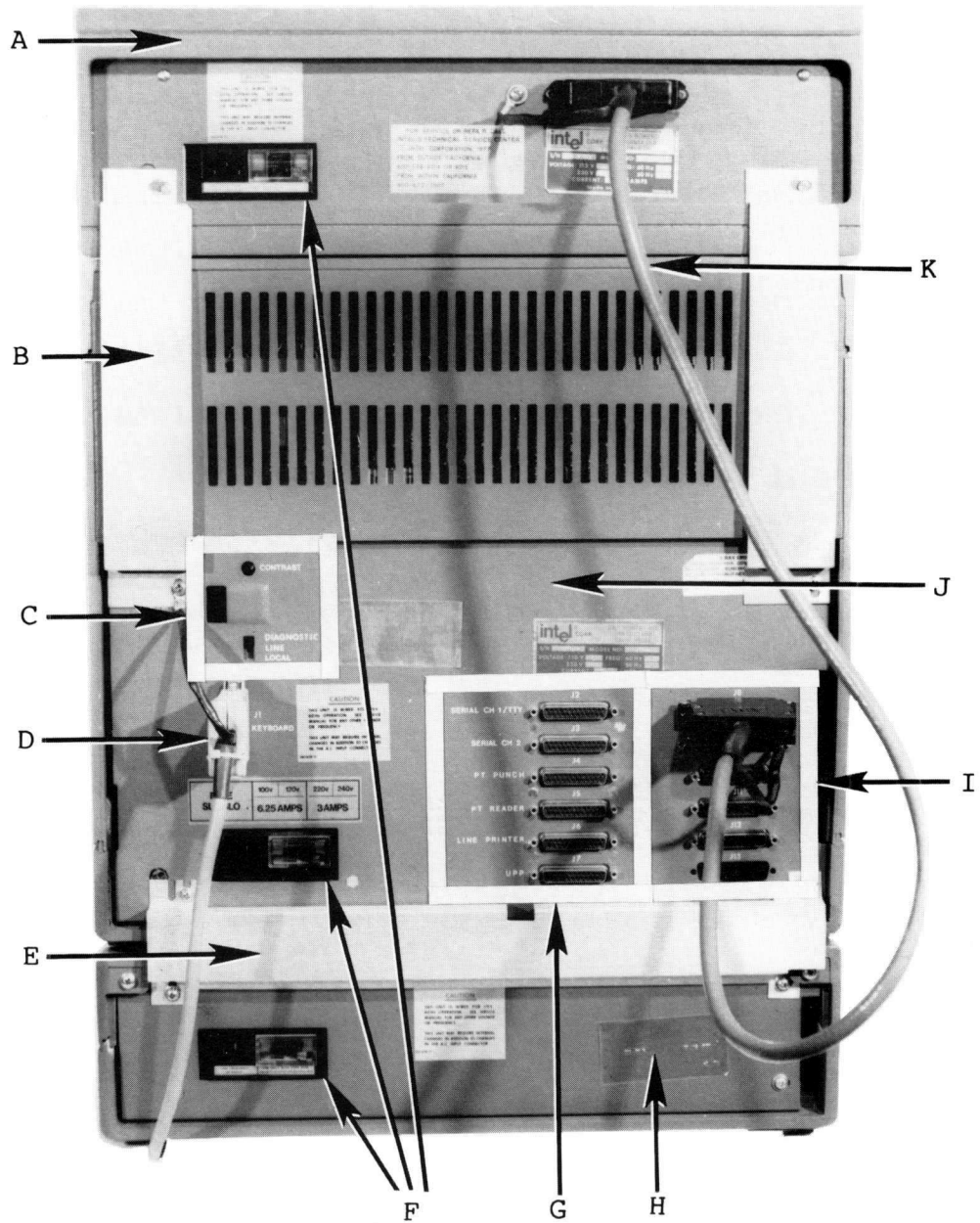
I. SERIES II/III (INTERNAL)

A. INTEGRAL FLOPPY DISKETTE DRIVE. NOTE: DRIVE CANNOT BE
    ALIGNED IN THE SERIES II. IT MUST BE PLACED IN A LOW
    PROFILE OR AN UPRIGHT FOR ALIGNMENT.

B. FLOPPY DISKETTE SIGNAL CABLE (4001256-02) FOR SINGLE
    DENSISTY. NOTE: FOR DOUBLE DENSITY, THE SIGNAL CABLE WILL
    NOT BE CONNECTED TO THE IOC BD. IT WILL HAVE A SPECIAL
    CABLE CONNECTING IT TO J8 ON THE BACK OF THE SERIES II (SEE
    MDS-05 I)

C. CONNECTOR FOR THE KEYBOARD

D. FLOPPY DISKETTE POWER DC CABLE (4001522-01)

E. IOC DC POWER CABLE FOR POWER SUPPLY (4501253-01)

F. CRT CABLE (4001615-02) FROM IOC TO CRT

G. DC POWER CABLE (9 PIN, 4001608-02) FROM POWER SUPPLY TO
    BACKPLANE

H. DC POWER CABLE (7 PIN, 4001515-02) FROM POWER SUPPLY TO
    BACKPLANE

I. DATA CABLE FROM IPB/IPC TO IOC

J. POWER SUPPLY (4501253-01) NOTE: THERE ARE TWO TYPES OF
    POWER SUPPLIES: POWER ONE CP214 AND XENTEK 2838B402

K. CRT (4501244-01), CRT SHIELD (TOP, 3001625-01) AND CRT
    SHIELD (BOTTOM, 3001488-01)

    NOTE: IT IS RECOMMENDED TO REPLACE XXX-01 WITH XXX-02
    LEVELS OF F, G, H CABLES.
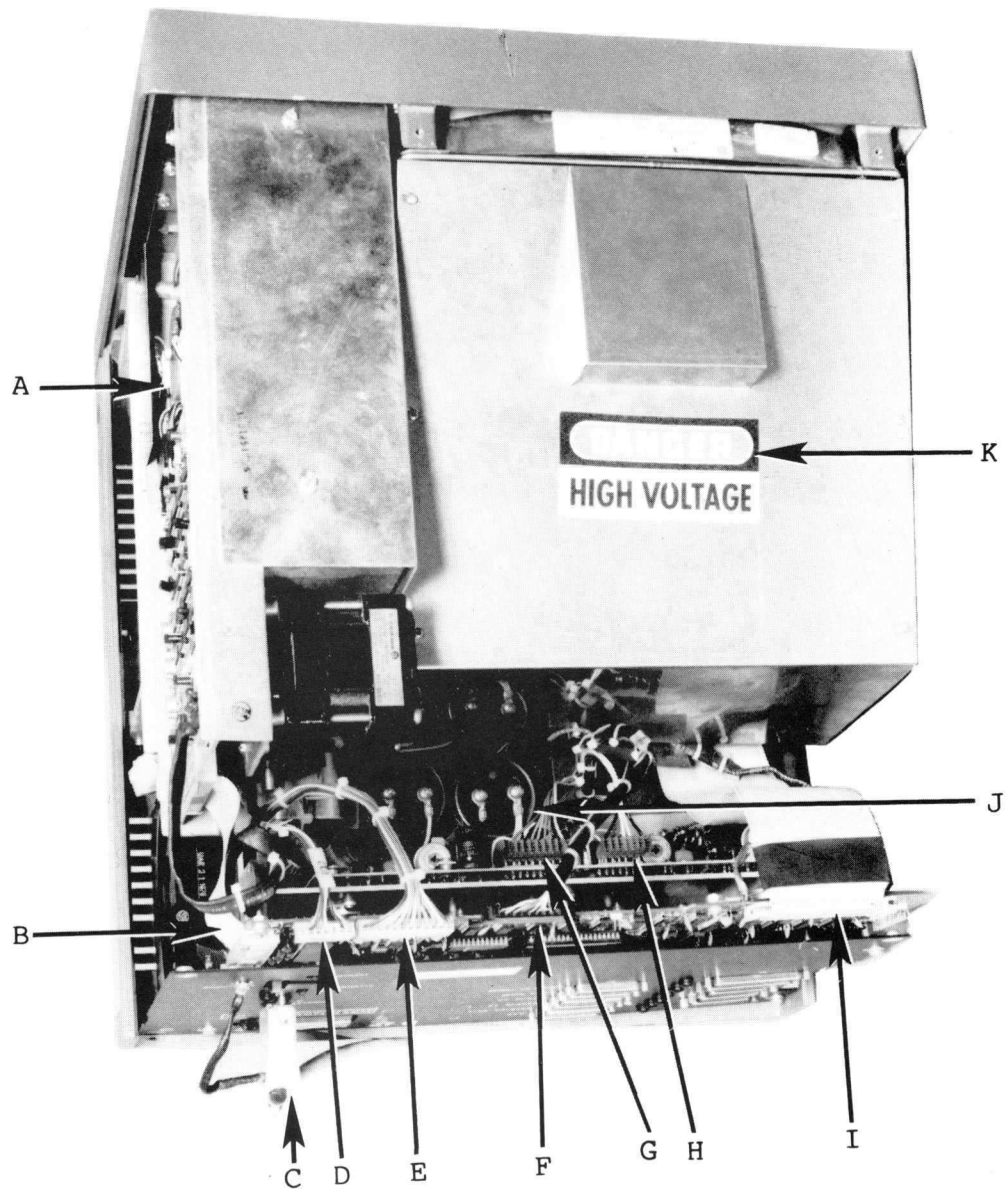
I. POWER SUPPLY BRACKET

    A. OBSOLETE BRACKET (3001450-01) - GOOD FOR POWER ONE TYPE SUPPLY ONLY.

    B. OBSOLETE BRACKET (3001450-02) - GOOD FOR POWER ONE TYPE SUPPLY ONLY.

    C. CURRENT BRACKET (3001450-03) - GOOD FOR BOTH TYPES OF POWER SUPPLIES. NOTE: THIS BRACKET MUST BE USED WITH A XENTEK POWER SUPPLY.

II. 6-SLOT BACKPLANE FOR SERIES II/III

    A. DATA CABLE CONNECTING THE IPB/IPC TO THE IOC

    B. 6-SLOT BACKPLANE (1002078-03) NOTE: CONNECTORS MUST BE BLACK. IF THEY ARE GREEN, REPLACE THE BACKPLANE.

    C. GROUNDING CONNECTORS TO THE MDS-201 EXPANSION CHASSIS

    D. TERMINATION JUMPERS. JUMPERS MUST BE IN IF THE MDS-201 EXPANSION CHASSIS IS NOT TO BE CONNECTED AND REMOVED IF IT IS TO BE CONNECTED.

    E. BUS EXPANSION CONNECTORS TO THE MDS-201.

    F. 9-PIN DC POWER CABLE CONNECTOR FROM POWER SUPPLY

    G. POWER PINS OF THE MULTIBUS. SEE NOTE BELOW.

   H. 7-PIN DC POWER CABLE CONNECTOR FROM POWER SUPPLY

NOTE: THE MULTIBUS PINS IN THE SERIES II ARE AS FOLLOWS: ODD ON THE TOP, EVEN ON THE BOTTOM, PINS 1 AND 2 ARE ON THE RIGHT, AND PINS 86 AND 85 ARE ON THE LEFT. THE VOLTMETER PROBE MAY BE INSERTED INTO THE CONNECTOR WITHOUT ANY DANGER OF DAMAGE TO THE CONNECTOR OR SHORTING OF VOLTAGES.

VOLTAGE PINS ARE AS FOLLOWS FOR BOTH 800 & SERIES II/III:

```
    GND PINS ARE 1 & 2, 11 & 12, 75 & 76, 85 & 86
    +5V PINS ARE 3 & 4, 5 & 6, 81 & 82, 83 & 84
    +12V PINS ARE 7 & 8
    -12V PINS ARE 79 & 80
    -10V PINS ARE 77 & 78
  * -5V PINS ARE 9 & 10
```

    * SERIES II/III ONLY; NOT USED IN 800

I POWER SUPPLY BRACKET
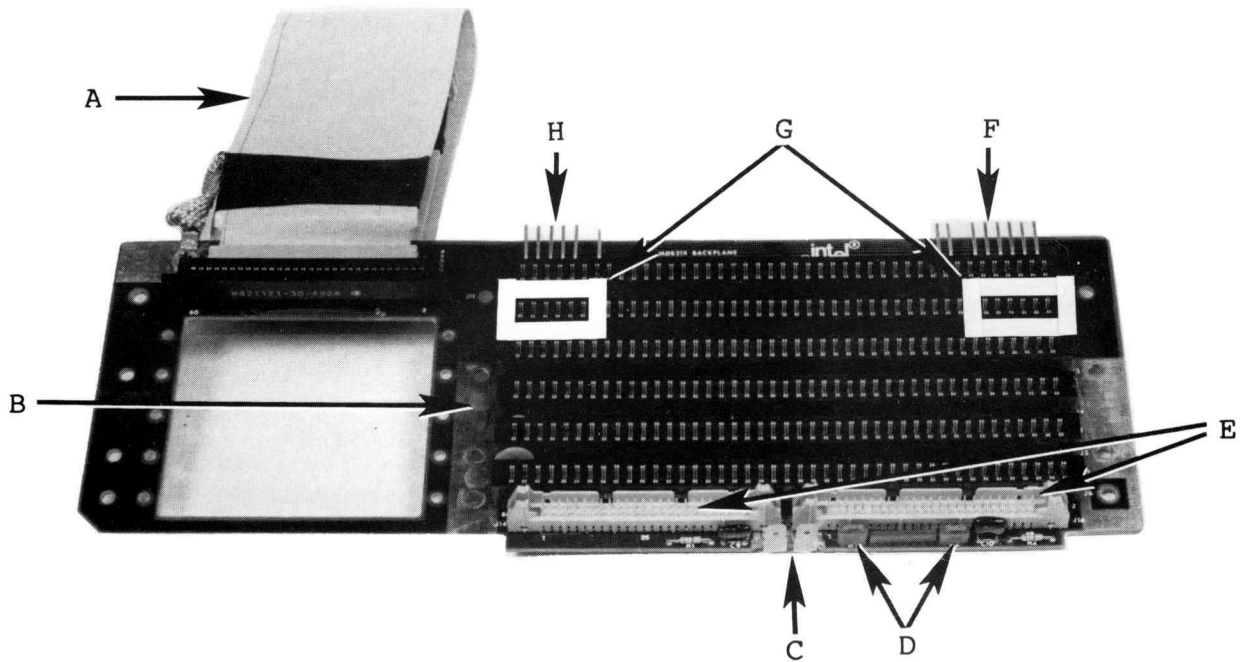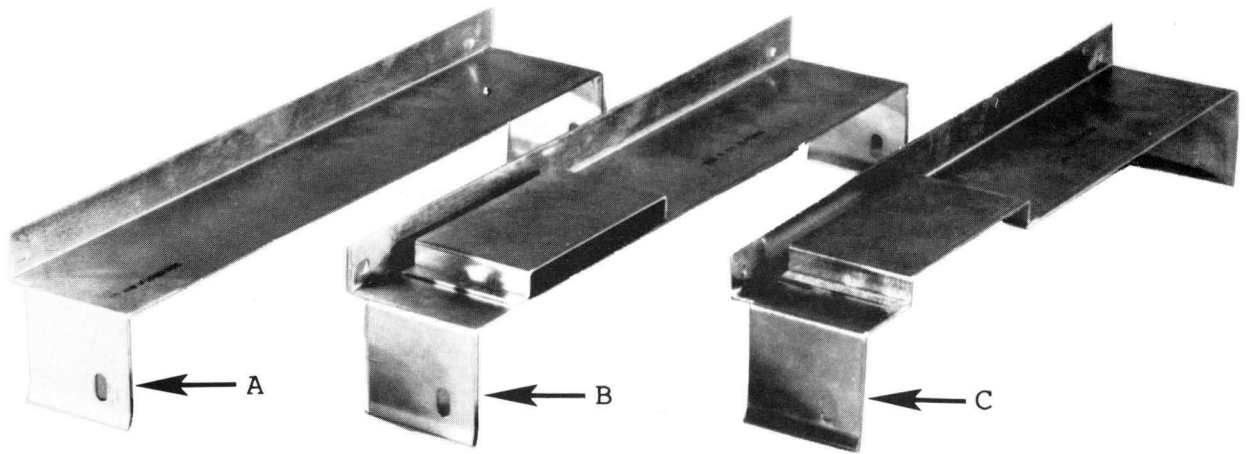
I.   IPB 4001246-05

    A.   RESET SWITCH FOR SYSTEM

    B.   RUN LIGHT IN ON WHEN IPB (HOST CPU) IS ACTIVE

    C.   8080A HOST CPU IDENTIFYING THIS BOARD AS AN IPB

    D.   A SMALL PIGGYBACK BOARD MODIFICATION IS REQUIRED FOR THIS
         IPB TO WORK AS A SERIES III. THE PIGGYBACK HAS NO EFFECT ON
         SERIES II OPERATION.

    E.   CHECK PART TYPE. IF 8251A'S, THIS BOARD SHOULD PASS DIAG-
         NOSTICS WITH NO JUMPER CHANGES. IF 8251'S, THEN REMOVE
         JUMPER 11 TO 12 OF F TO PASS DIAGNOSTICS.

    F.   JUMPER CONFIGURATIONS FOR NORMAL OPERATION ARE AS FOLLOWS:
         1 TO 2; 4 TO 5; 7 TO 8; 11 TO 12; AND 14 TO 15.

    G.   32K MEMORY ARRAY

    H.   INTERRUPT SWITCHES Ø THROUGH 7

II. 32K RAM MEMORY BD. 4601293-03 OR 142705-004
     NOTE: JUMPER CONFIGURATION IS FOR 32 TO 64K MEMORY RESPONSE.
     FOR DIFFERENT MEMORY RESPONSE JUMPER CONFIGURATIONS AND MEMORY
     ARRAY SIZE IDENTIFICATION THROUGH RAM CHIP TYPES, REFER TO THE
     iSBC 032/048/064 RAM BD. HAND. REF. MAN. 9800488-03 PAGE
     4-5/4-6.

    A.   JUMPER E4 TO E15 AND E1 TO E10

    B.   JUMPER E5 TO E21 ONLY

    C.   JUMPER E8 TO E18 AND E7 TO E17

    D.   JUMPER E29 TO E30

    E.   JUMPER IN E50 TO E51

    F.   MEMORY ARRAY CHIPS FOR 32K ARE AS FOLLOWS:

         INTEL 2109/L OR 2109/H OR EQUIVALENT, NON-INTEL MANUFACTURED

I IPB (210, SERIES II/III)
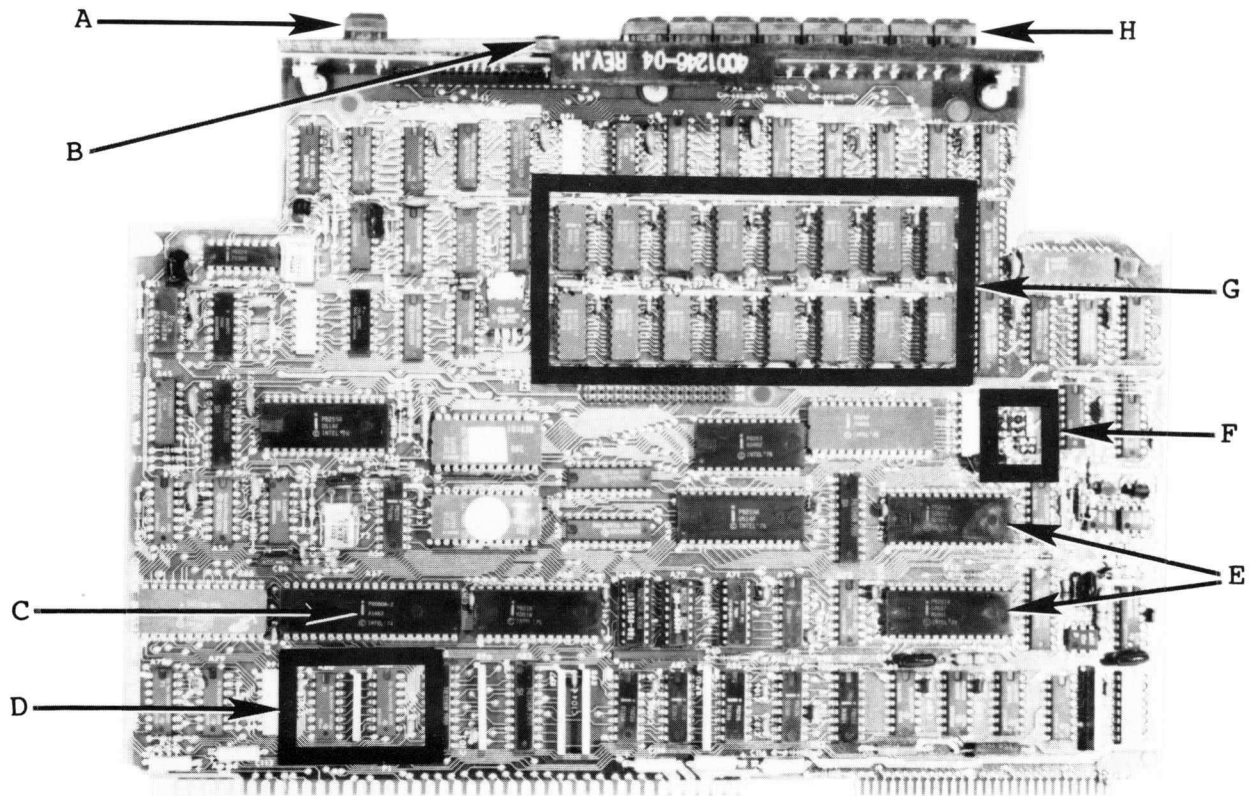
II 32K RAM MEMORY BOARD (210, SERIES II/III)
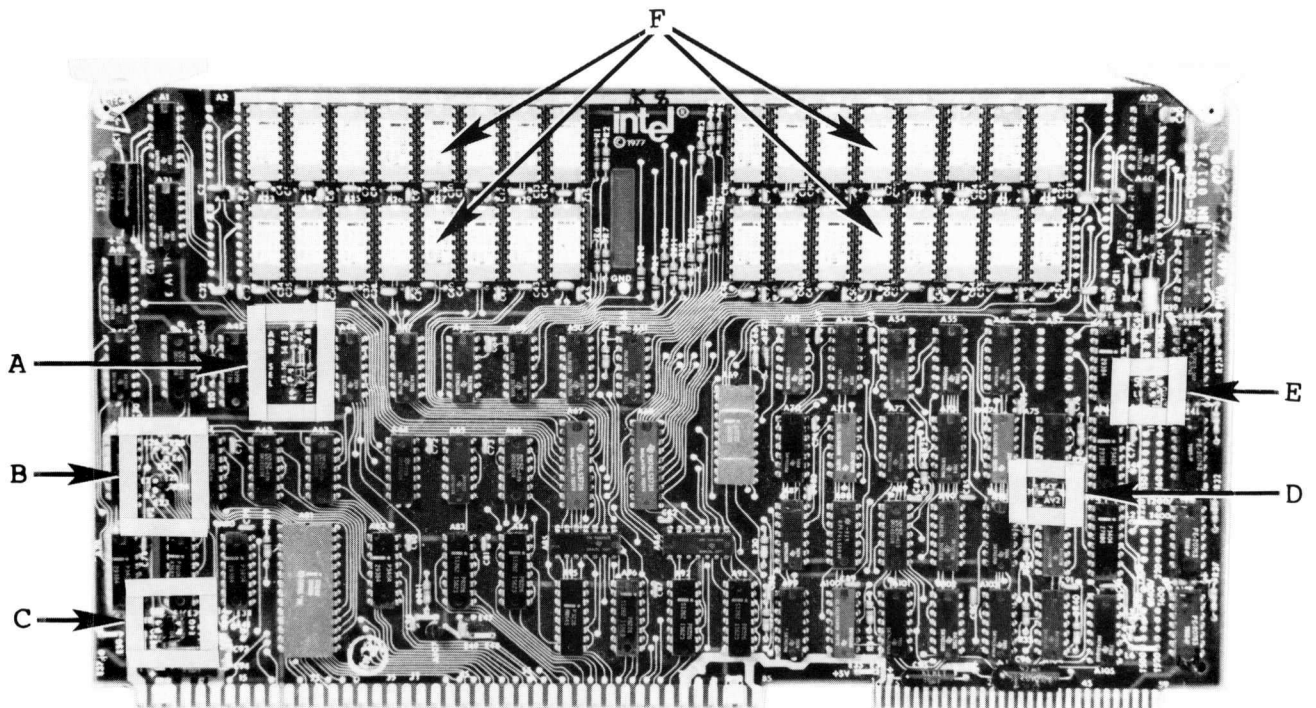
I. IPC 4002695-05

   A. RESET SWITCH FOR SYSTEM

   B. 64K RAM MEMORY ARRAY

   C. JUMPER 23 TO 24

   D. THE BOARDS NAME AND PART NUMBER THAT IS INCORRECT FOR
   REORDERING.

   E. THE PIGGYBACK MODIFICATION FOR PROPER OPERATION OF A SERIES
       III.

   F. THIS CHIP SHOULD BE AN 8202A. IF NOT, REPLACE CHIP AND/OR
       BOARD.

   G. THIS IS THE HOST CPU, AN 8085A-2.

   H. THIS CHIP SHOULD BE AN 8259-A. IF NOT, REPLACE CHIP AND/OR
       BOARD.

   I. THESE CHIPS SHOULD BE 8251A'S TO PASS THE DIAGNOSTICS WITH
       NO JUMPER CHANGES. IF 8251'S, THEN REMOVE JUMPER 11 TO 12
       OF J TO PASS THE DIAGNOSTICS.

   J. JUMPER CONFIGURATIONS FOR NORMAL OPERATION ARE AS FOLLOWS:
       1 TO 2, 4 TO 5, 7 TO 8, 11 TO 12, AND 14 TO 15.

   K. JUMPER 19 TO 21

   L. JUMPER 25 TO 26

   M. INTERRUPT SWITCH Ø TO 7

   N. RUN LIGHT IS ON WHEN HOST CPU IS ACTIVE

       NOTE: JUMPER C TO D IS LOCATED HALF WAY DOWN THE ARROW LINE
              OF L.

I IPC (SERIES II/III)
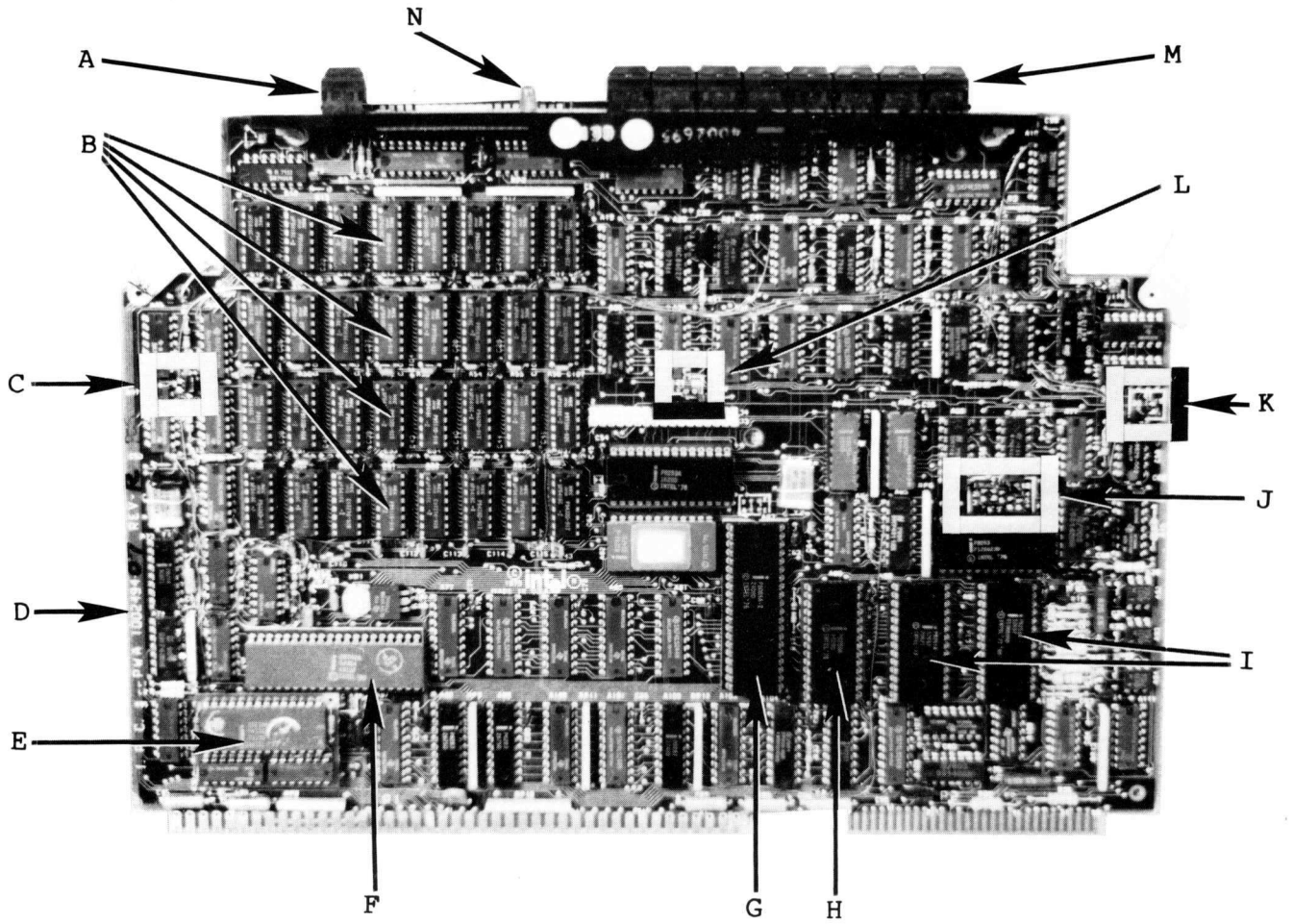
I. IOC PWA1001241-10 OR 1002104-10

    A. 8271 FLOPPY DISKETTE CONTROLLER (INTEGRAL DRIVE)

    B. DATA CABLE CONNECTOR FOR THE INTEGRAL DRIVE

    C. CONTRAST POTENTIOMETER FOR CRT

    D. BRIGHTNESS CONTROL SWITCH FOR CRT

    E. MODE CONTROL SWITCH. POSITIONS FROM TOP TO BOTTOM ARE DIAGNOSTICS, ON-LINE AND LOCAL.

    F. KEYBOARD CONNECTOR

    G. AUDIO BEEPER

    H. SUPPORTED PERIPHERAL CONNECTORS. THE CONNECTORS ARE LABELED ON THE REAR OF THE SERIES II/III.

    I. FIRMWARE FOR IOC OPERATION

    J. JUMPERS FOR SERIAL CHANNEL COMMUNICATIONS

    K. DATA CABLE CONNECTOR FROM THE IPB OR IPC

    L. 50HZ JUMPER FOR CRT, W8 A TO B FOR 50HZ

    M. DATA AND POWER CONNECTOR FOR CRT

    N. POWER CONNECTOR FOR IOC

    O. POWER CONNECTOR FOR INTEGRAL DRIVE
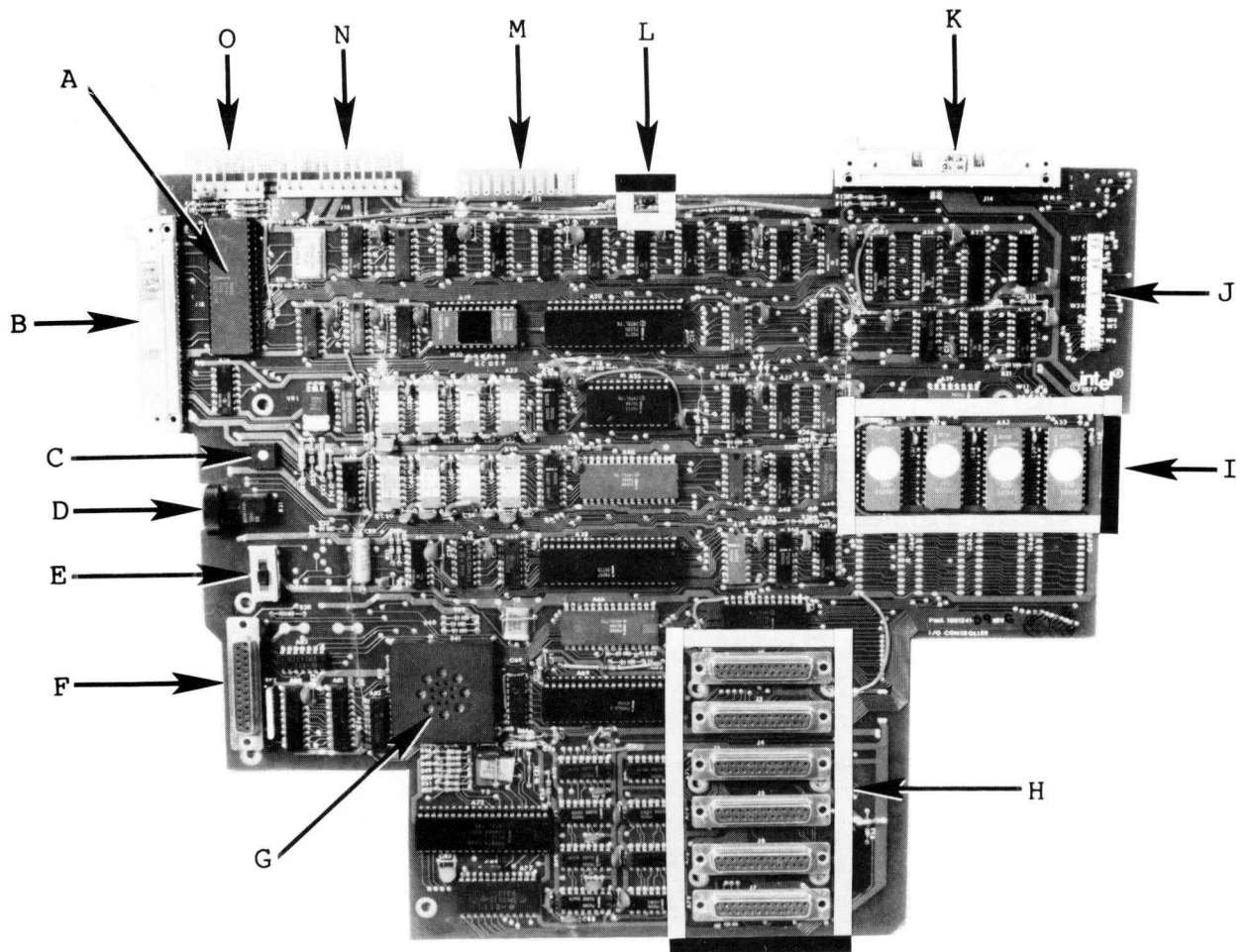
I.   RPB PWA 123329-001

     A.   8086A CPU CHIP

     B.   8-BIT SWITCH. ONLY BIT 7 IS ON.

     C.   JUMPER 44 TO 45

     D.   iSBC 300 32K RAM MULTIMODULE

     E.   BOARD ID AND PART NUMBER

     * NOTE: BETWEEN THE LETTERS B AND C ON THE EDGE OF THE BOARD IS
               A JUMPER (131 TO 130)

II. 64K RAM BOARD PWA 142705-001

     A.   BANK SELECT JUMPERS E3 TO E14; E4 TO E15; E1 TO E10; E2 TO E12

     B.   PAGE SELECT JUMPERS E5 TO E22 ONLY

     C.   JUMPERS E8 TO E18 AND E7 TO E17

     D.   JUMPERS E29 TO E30

     E.   JUMPERS E50 TO E51

     F.   MEMORY CHIPS FOR 64K ARE INTEL 2117'S

I RPB (SERIES III)
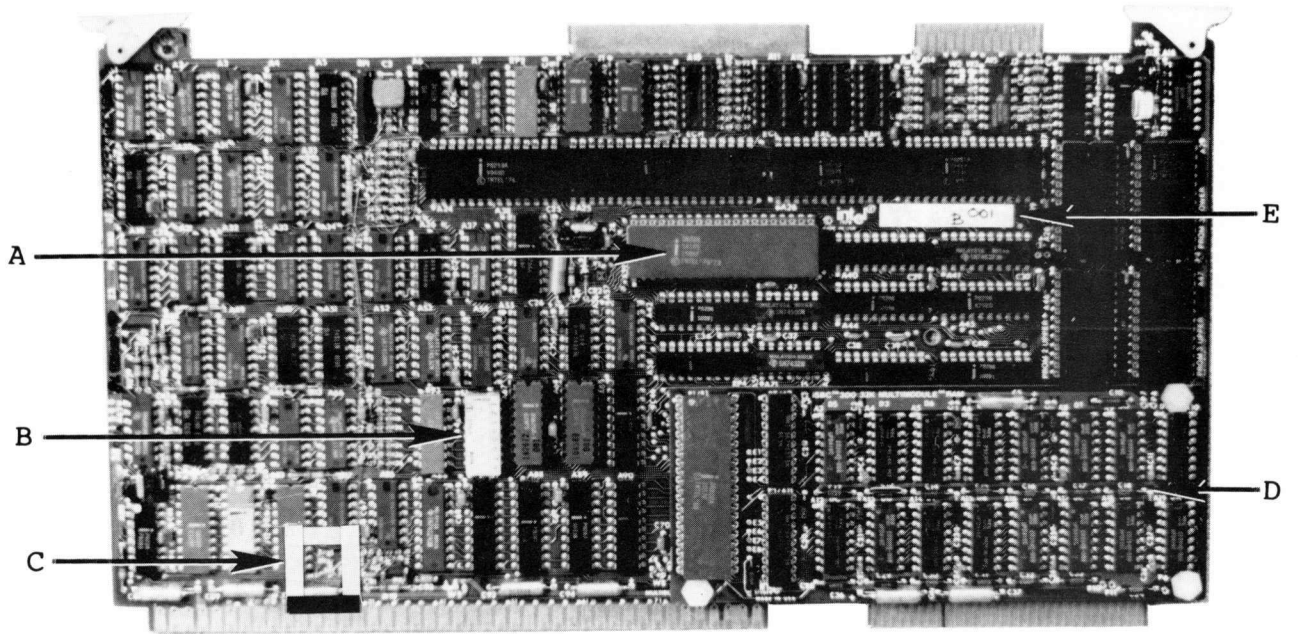
II 64K RAM MEMORY BOARD (SERIES III)
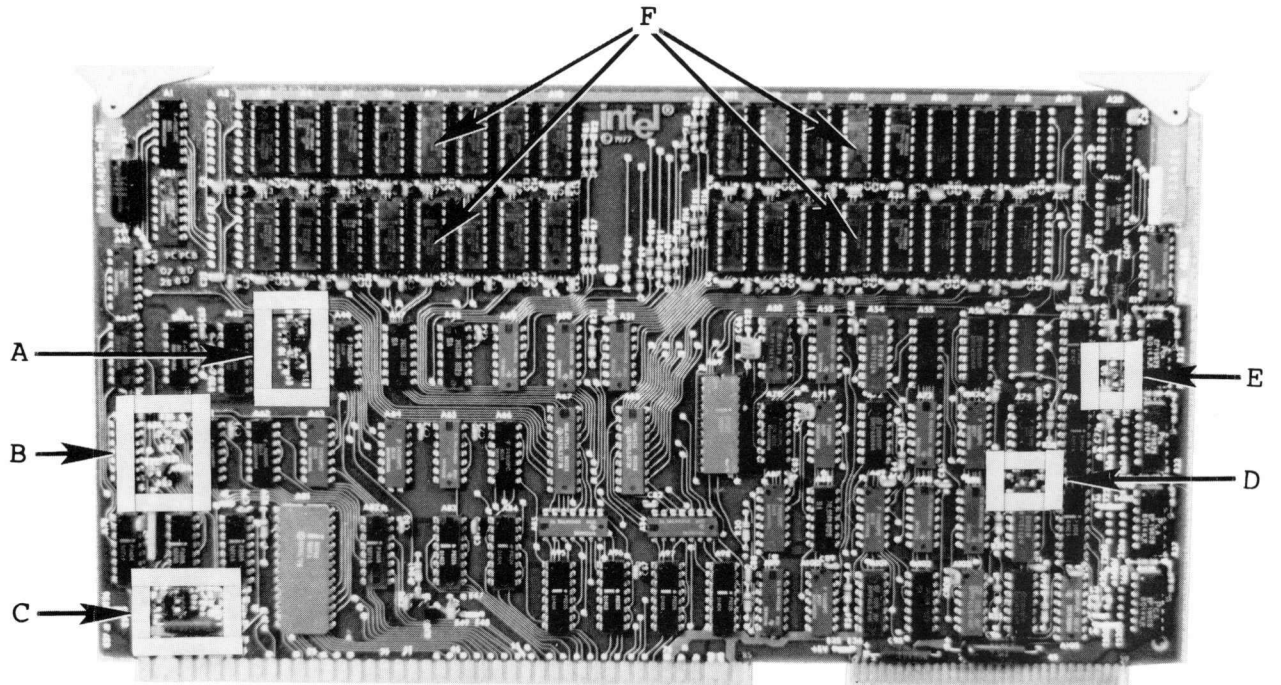
I.   MDS-201 EXPANSION CHASSIS (FRONT)

    A.   SLOT FOR CABLES AND GROUND STRAPS TO SERIES II/III BACKPLANE

    B.   REMOVEABLE FRONT PANEL FOR ACCESS TO CARD SLOTS

II. MDS-201 EXPANSION CHASSIS (REAR)

    A.   A/C POWER CONNECTOR WITH FUSE AND POWER INPUT SELECTION CARD
         BELOW THE FUSE. THE NUMBER YOU CAN SEE ON THE CARD BELOW
         THE FUSE IS THE EXPECTED A/C POWER IN. IF INCORRECT A/C
         POWER IN IS VISIBLE, RETURN TO CE DIAGNOSTIC SYSTEM TEST
         MANUAL (121619-001) PAGE 3.

    B.   SLOTS FOR INSTALLING EITHER FLOPPY DISKETTE OR HARD DISK
         CONTROL CABLES

I MDS 201 (FRONT)
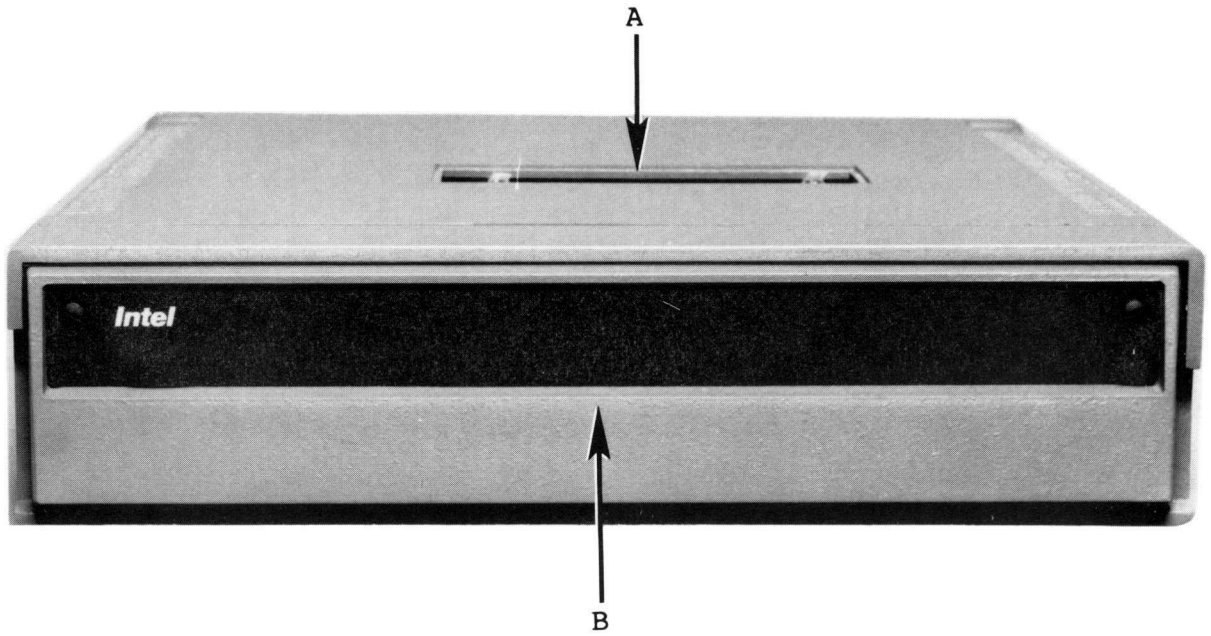
II MDS 201 (REAR)
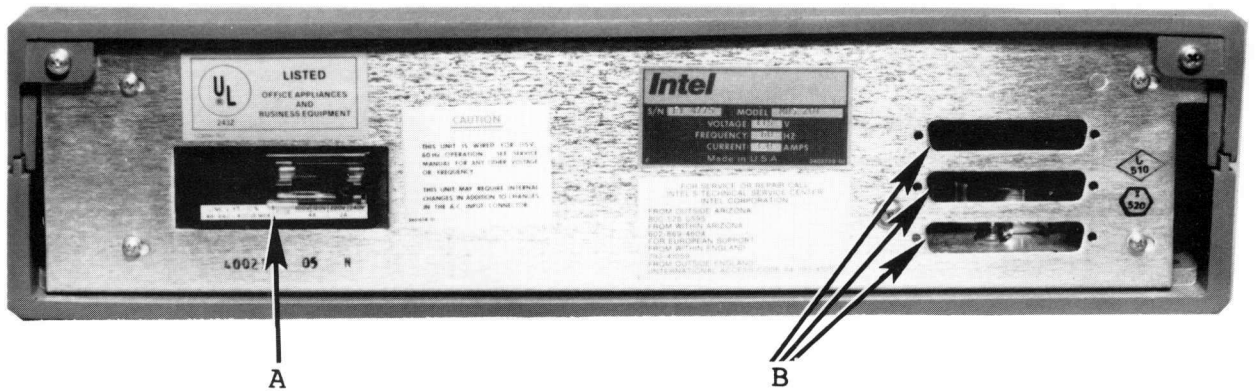
I. MDS-201 EXPANSION CHASSIS (INTERNAL)

    A. 4-SLOT BACKPLANE (PWA 1001226-02) WITH CONNECTORS FOR DATA CABLES FOR THE SERIES II/III BACKPLANE

    B. A/C POWER PLUG ON THE BACKPLANE

    C. POWER ON RELAY ACTIVATED BY THE SERIES II/III

    D. COOLING FANS PART NUMBER 102999-001

    E. A/C POWER CONNECTOR WITH FUSE AND POWER INPUT SELECTION CARD

    F. POWER SUPPLY PART NUMBER 4501268-01

    G. D/C POWER CONNECTORS TO BACKPLANE

    H. FLOPPY OR HARD DISK CONTROLLER CABLES
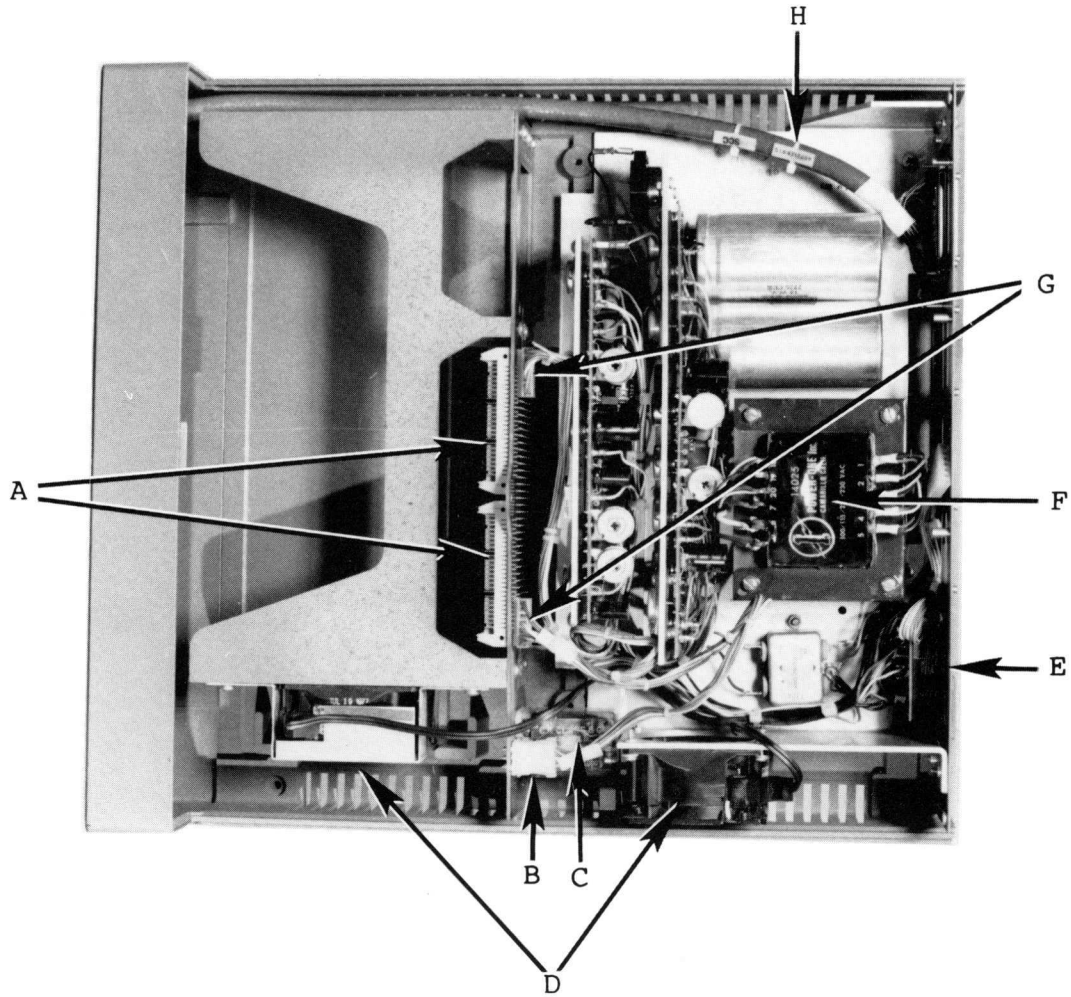
I.   MDS-210 (FRONT)

   A.   8 INTERRUPTS SWITCH OF THE IPB

   B.   RUN LIGHT IS ON WHEN IPB (HOST CPU) IS ACTIVE

   C.   RESET SWITCH FOR THE SYSTEM

   D.   POWER ON/OFF SWITCH FOR THE SYSTEM

II. MDS-210 (REAR)

   A.   A/C POWER CONNECTOR WITH FUSE AND POWER INPUT SELECTION CARD
        BELOW THE FUSE. THE NUMBER YOU CAN SEE ON THE CARD BELOW
        THE FUSE IS THE EXPECTED A/C POWER IN. IF INCORRECT A/C
        POWER IN IS VISIBLE, RETURN TO CE DIAGNOSTIC SYSTEM TEST
        MANUAL (121619-001) PAGE 3.

   B.   PERIPHERAL CONNECTORS OF THE PI/O BD. AND FLOPPY DISKETTE
        CONTROLLER CABLE CONNECTORS.

I MDS 210 (FRONT)
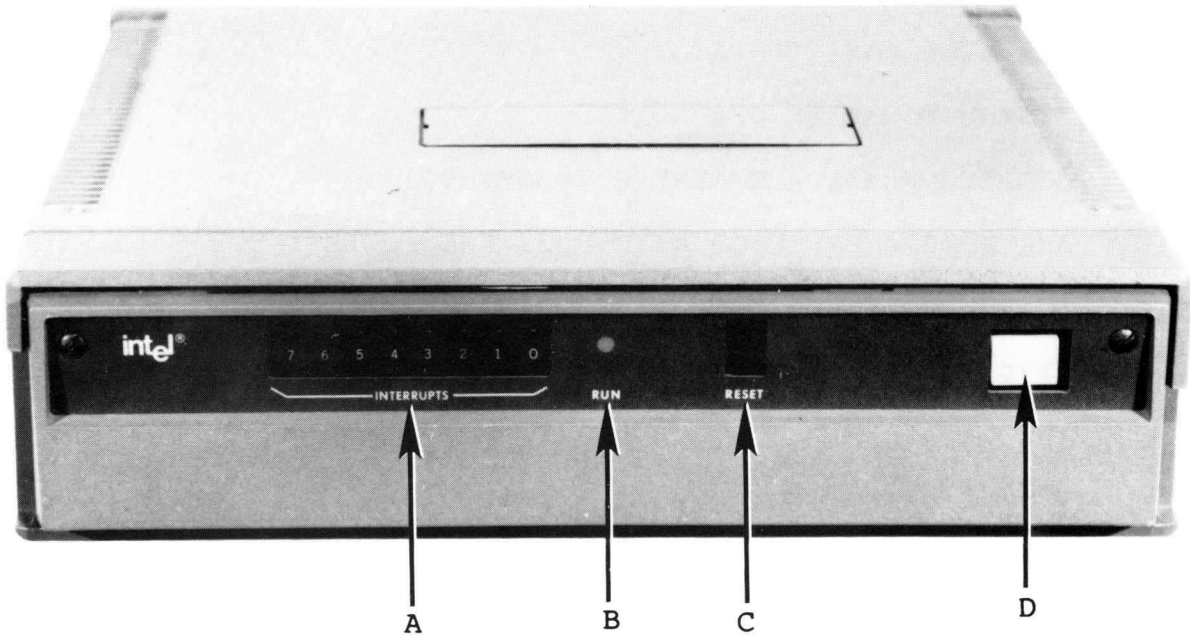
II MDS 210 (REAR)
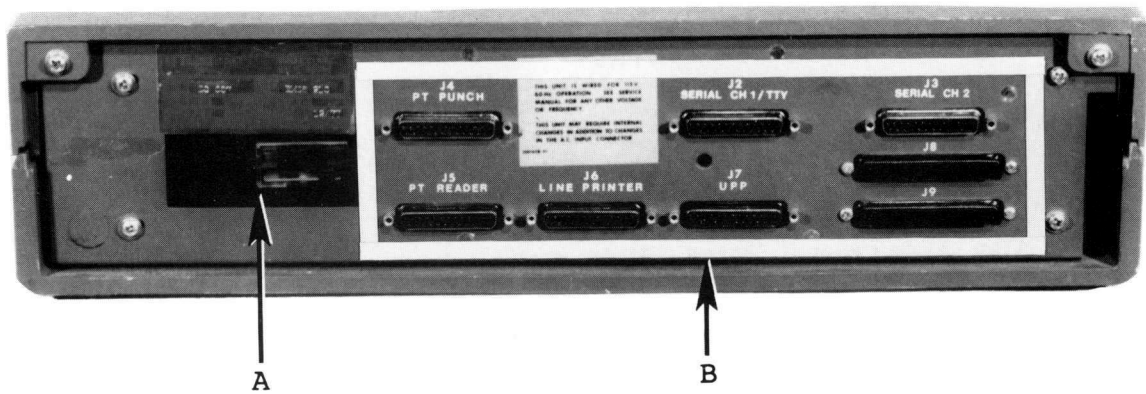
I.   MDS-210 (INTERNAL)

  A.   IPB (PWA 4001246-05)

  B.   SYSTEM POWER ON/OFF SWITCH

  C.   COOLING FANS PART NUMBER 102999-001

  D.   A/C POWER CONNECTOR WITH FUSE AND POWER INPUT SELECTION CORD

  E.   POWER SUPPLY PART NUMBER 4501268-01

  F.   PI/O BD. PWA 1001166-01

  G.   IPB DATA CABLE TO PI/O BD

  H.   FLOPPY DISKETTE CONTROLLER CABLE

  I.   D/C POWER CONNECTORS TO THE BACKPLANE (PWA 1002171-02)

II. PI/O BOARD PWA 1001166-01

  A.   D/C POWER CONNECTOR

  B.   SUPPORT PERIPHERAL CONNECTORS. THE CONNECTORS ARE LABELED
       ON THE REAR OF THE MDS-210.

  C.   PART NUMBER OF THE BD.

  D.   NAME OF THE BD.

  E.   IPB DATA CABLE CONNECTOR

  F.   8741 OR 8041 MICROCOMPUTER CHIP

I MDS 210 (INTERNAL)
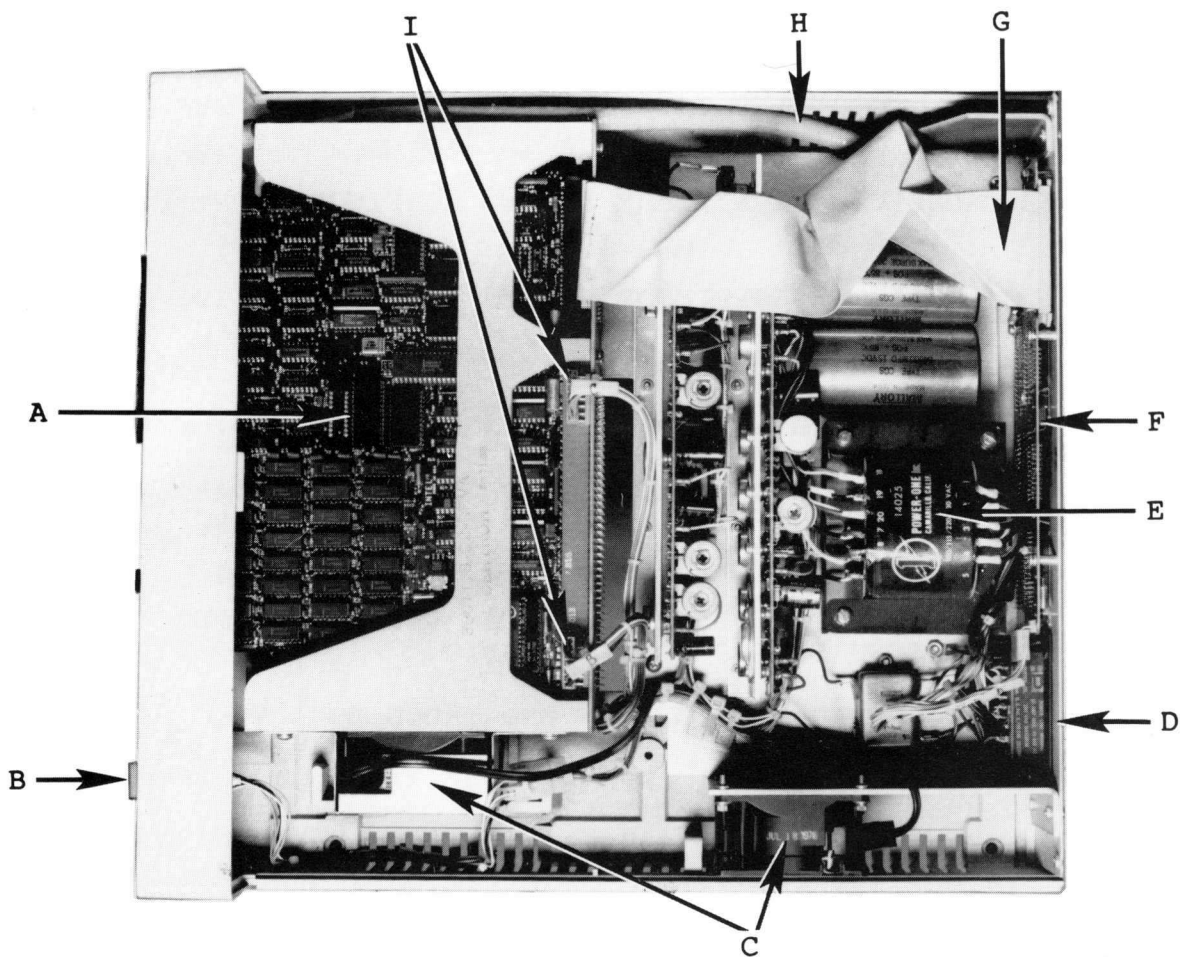
II PIO (MDS 210)
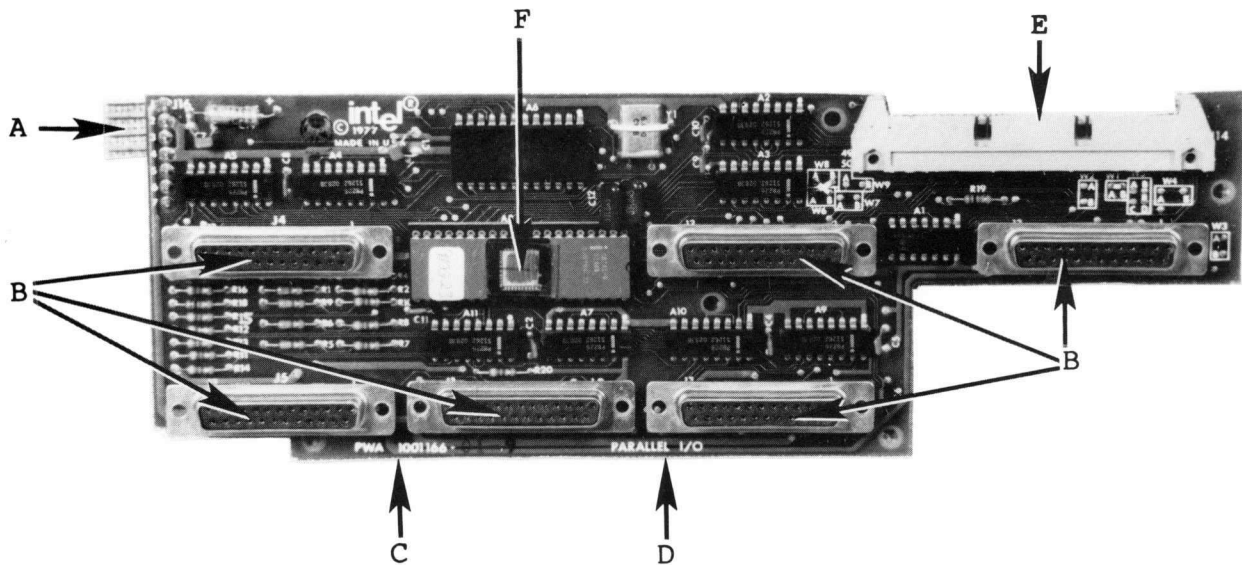
USING THE TROUBLESHOOTING FLOW CHARTS

ALWAYS TROUBLESHOOT MINIMUM SYSTEM CONFIGURATION AS FOLLOWS:

1. IOC AND POWER SUPPLY OF SERIES II/III WITH IOC DIAGNOSTIC

2. THEN ADD IPC OR IPB WITH Z$

3. THEN ADD 32K BD. (ADDRESSED FROM 32K TO 64K) WITH IPB WITH Z$

4. THEN PLACE 32K BD. (ADDRESSED FROM 32K TO 64K) IN THE EXPANSION
    CHASSIS AND RUN Z$. NOTE: IF EXPANSION CHASSIS IS WORKING, Z$
    WILL PASS WITH IPB AND WILL <u>FAIL</u> WITH <u>IPC</u>.

5. THEN ADD FLOPPY DISKETTE SYSTEM AND TROUBLESHOOT FLOPPY DISKS
    FIRST, THEN SERIES II DIAGNOSTIC.

6. THEN ADD HARD DISK SYSTEM AND TROUBLESHOOT.

7. THEN ADD SERIES III (RPB AND 64K RAM BD.) AND TROUBLESHOOT. SEE
    SERIES II/III DIAGNOSTICS.

8. THEN ADD ICE PRODUCTS, ONE AT A TIME, AND TROUBLESHOOT.

NOTE: WHEN ADDING A SYSTEM, ALWAYS CHECK FOR PROPER BD SEATING IN THE
      CARD CAGE, GOOD DUAL AUX. CONNECTORS, PROPER CABLES, CABLE
      CONNECTIONS, AND <u>GOOD</u> DIAGNOSTIC FLOPPY DISKETTES.

(A)

REMOVE ALL BDS FROM SERIES II & EXPANSION CHASSIS. SET DIAG SWITCH ON IOC TO DIAG. POWER UP SERIES I1

(1) →

ALL IOC DIAGNOSTICS PASS? — YES → **(B)**

NO ↓

HEAR FIRST BEEP? — NO → CHECK POWER SUPPLY (REFER TO MOTHERBOARD)

YES ↓

HEAR 5 BEEPS? — NO → IS POWER OK?

YES ↓

IS POWER OK? — YES → REPLACE IOC → **(1)**

NO → REPLACE POWER SUPPLY → **(1)**

IS THERE A CRT DISPLAY? — NO → **(C)**

YES ↓ **(2)**

---

(2) ↓

TYPE TEST PASS? — NO → REPLACE KEYBOARD

YES ↓

REPLACE KEYBOARD ↓ TYPE TEST PASS? — YES →

NO ↓ REPLACE IOC → **(1)**

G TEST PASS? — NO → (back to TYPE TEST PASS area)

YES ↓

K TEST PASS? — NO → 96 CHARACTER DISPLAY

YES ↓

D TEST PASS? — YES → **(1)**

NO → REPLACE FLOPPY DISK DRIVE → **(D)**

96 CHARACTER DISPLAY — YES → REPLACE KEYBOARD → **(1)**

NO → REPLACE IOC → **(1)**

(B)

POWER DOWN & SET
DIAG SWITCH ON IOC
TO ON-LINE. REPLACE
IPB OR IPC. POWER UP
& RESET THE SERIES

IS
THERE A
DISPLAY FAILURE
OR NO
MONITOR
?

YES

NO

(3)

IF IPB INSTALLED,
POWER DOWN & REPLACE
32K BOARD. JUMPER
IT FOR 32-64K.
POWER UP & RESET THE
SERIES II.

DOES
Z$ PASS?

NO

(5)

YES

(4)

VERIFY DC POWER
IN THE EXPAN-
SION CHASSIS

POWER OK?

YES

NO

REPLACE POWER
SUPPLY

(4)

POWER DOWN &
REPLACE IPB OR
IPC

POWER UP &
RESET SERIES II

IS
THERE
A FAILURE
DISP.?

NO

(3)

YES

REPLACE IOC

(A)

(5)

IS
FAILURE IN
MEMORY FROM
32-64K?

YES

REPLACE 32K
MEMORY BOARD OR
IPC

(3)

NO

REPLACE IPB OR
IPC

DOES
Z$ PASS NOW?

YES

(4)

NO

REPLACE IOC

(A)

POWER DOWN, REPLACE
F/D CONTROLLER BDS.
POWER UP SERIES II &
F/D DRIVE. LOAD
DIAGNOSTIC DISK AND
PRESS RESET

DID
ISIS-II LOAD?

NO

GO TO F/D DRIVE
TROUBLESHOOTING

YES

RUN SERIES II
DIAGNOSTIC
NEXT PAGE

(C)

ADJUST BRIGHTNESS

↓

RASTERS PRESENT? — NO →

↓ YES

ADJUST DISPLAY CONTRAST

↓

DISPLAY PRESENT? — YES → **1**

↓ NO

REPLACE IOC

↓

DISPLAY PRESENT? — YES → **1**

↓ NO

REPLACE CRT

↓ **1**

CHECK THE CRT CABLE SEATING

↓

ARE RASTERS OR DISPLAY PRESENT? — YES → **1**

↓ NO

CHECK 15V TO CRT J16, P11 W/J15 DISCONNECTED

↓

15V PRESENT? — YES → REPLACE CRT → **1**

↓ NO

REPLACE POWER SUPPLY

↓ **1**

(D)

↓

D TEST PASS? — YES → **1**

↓ NO

REPLACE IOC

↓

D TEST PASS? — YES → **1**

↓ NO

REPLACE POWER SUPPLY

↓ **1**

SERIES II/III DIAGNOSTICS

THERE ARE THREE (3) ROM BASED DIAGNOSTICS AND (1) FLOPPY DISKETTE BASED DIAGNOSTIC. THE THREE (3) ROM BASED DIAGNOSTICS ARE AS FOLLOWS:

1. IOC DIAGNOSTIC - INITIALIZED BY THE 3 POSITION SWITCH ON THE IOC PLACED IN THE UPPER MOST POSITION AND RESET OR POWER ON. FOR OPERATION AND SYSTEM FAULT ISOLATION, REFER TO THE CE DIAGNOSTIC SYSTEM TEST OPERATING INSTRUCTIONS FOR SERIES II SYSTEMS (121619-001) PAGES 5, 6, AND 39 THROUGH 46.

2. INVISIBLE IPB/IPC BOOTSTRAP DIAGNOSTIC - IT IS INITIALIZED BY A RESET OR POWER UP. THE PASS INDICATION IS "MDS MONITOR VX.X" DISPLAYED OR THE LOADING OF THE FLOPPY DISKETTE. IF A FAILURE OCCURS, A DISPLAY MUCH THE SAME AS Z$ FAILURES APPEAR BEFORE "MDS MONITOR VX.X", LOADING OF THE FLOPPY DISKETTE OR NO BOOTING ACTION AT ALL WITH JUST A CURSOR PRESENT. THESE FAILURES ARE CAUSED BY THE IPB/IPC OR A SUBSYSTEM, I.E., FLOPPY DISK, HARD DISK, ICE, ETC., RESPONDING TO I/O ADDRESS PORT RANGE F0 TO FF.

3. MONITOR'S Z$ DIAGNOSTIC - TO LOOP Z$ CONTINUOUSLY AFTER RUNNNG Z$ ONCE, PRESS INTERRUPT 0 AND TYPE GEB00<CR>. PRESS RESET TO STOP. FOR OPERATION AND SYSTEM FAULT ISOLATON, REFER TO THE C.E. DIAGNOSTIC SYSTEM TEST OPERATING INSTRUCTIONS FOR SERIES II SYSTEMS (121619-001) PAGES 3, 4, 5, 6, 47 AND 48.

THE FLOPPY DISKETTE BASED DIAGNOSTIC IS STFS BASED AND CALLED "FIELD". IT HAS A SUBMIT FILE AVAILABLE FOR AUTOMTAIC TEST SELECTION FOR SERIES II OR III, SEE PAGE 10 OF C.E. DIAGNOSTIC SYSTEM TEST OPERATING IN-STRUCTIONS FOR SERIES II SYSTEMS (121619-001). NOTE: TEST 1 WILL FAIL IF THE IPB/IPC CONTAINS 8251'S. SEE PAGES MDS 10 AND 11, E AND F FOR IPB AND PAGES MDS 12 AND 13, I AND J FOR IPC. FOR MORE INFORMA-TION ON THE DIAGNOSTIC, REFER TO THE REST OF THE C.E. DIAGNOSTIC SYSTEM TEST OPERATING INSTRUCTIONS FOR SERIES II SYSTEMS (121619-001) MANUAL.

SPACE BAR ----> 3SD86-M-1-11

BOARDS	ORDER NUMBER
PWA PARALLEL I/O (210 ONLY)	1001166-01
IPB ASSY PWA 1001194-07 OR 1002321-05	4001246-05
IPC PWA (225, 235)	4002695-06
IOC PWA	*old* {1001241-10 OR 1002104-10} *NEW*
32K MEMORY BD PWA	{4601293-03 OR 142705-004}
RPB86 (SBC 8612 SERIES III ONLY)	123329-001
64K MEMORY BD (SERIES III ONLY)	142705-001

BACKPLANES	
6-SLOT BACKPLANE (SERIES II/III EXCEPT 210)	1002078-03
4-SLOT BACKPLANE (210 ONLY)	1002171-02
4-SLOT BACKPLANE (EXPANSION CHASSIS ONLY, 201)	1001226-02

POWER SUPPLIES	
201 & 21X POWER SUPPLY	4501268-01
22X, 23X, 286 POWER SUPPLY	4501253-01
POWER SUPPLY BRACKET (SERIES II/III)	3001450-03

SERIES II CRT	
CRT SHIELD (BOTTOM)	3001488-01
CRT SHIELD (TOP)	3001625-01

SERIES II KEYBOARD	4001238-07
KEYBOARD PWA	4501240-03

CONNECTING BRACE FOR SERIES II/III TO FLOPPY DISK	3002282-01
CONNECTINB BRACE FOR SERIES II/III TO EXPANSION CHASSIS	3002283-02

FANS	
MDS-201 & 210	102999-001
SERIES II/III	103001-001

CABLES	
AC LINE CORD (ALL UNITS)	102196-001
POWER SWITCH CABLE ASSY (210)	4001262-03
POWER SWITCH CABLE ASSY (SERIES II/III)	101934-001
DC POWER CABLE (7 PIN; SERIES II/III)	4001515-02
DC POWER CABLE (9 PIN; SERIES II/III)	4001608-02
SIGNAL CABLE, FLOPPY DISK (220, 225, 240)	4001256-02
KEYBOARD CABLE (SERIES II/III)	4002197-01
EXP. CHS. DATA CABLE (201 TO SERIES II BACKPLANE)	4001269-01
GROUND STRAPS (SERIES II/III)	3002063-01
GROUND STRAPS (201 TO SERIES II BACKPLANE)	4002182-01
POWER SWITCH (ALL EXCEPT 201)	101933-001
RELAY (201 ONLY)	102032-001
CRT CABLE (SERIES II/III)	4001615-02
FLOPPY DISK POWER CABLE	4001522-01
RUBBER FEET	103715-001

MANUAL LIST FOR EMDS 201, 21X, 22X, 23X & 286

SERIES II 22X, 23X SERVICE INFO   9800878-01

SERIES II EXPANSION CHASSI SERVICE INFO (EMDS 201)   9800879-01

SERIES II/225 SERVICE INFO   121569-001

C.E. DIAG. SYSTEM TEST FOR SERIES II/III   121619-001

SERIES III FIELD SERVICE MANUAL   121640-001

UPGRADE PREPARATION KIT INST. MANUAL (RIP FIX)   121721-001

iSBC 032/048/064 RAM BD. HAND. REF. MANUAL   9800488-03

INTELLEC SERIES III MICROCOMPUTER DEVELOPMENT
SYSTEM INSTALLATION AND CHECKOUT MANUAL   121612-001

IOC CHECKOUT PROCEDURE

1. PUT THE 3-POSITION SLIDE SWITCH IN UPPER POSITION (DIAGNOSTIC) AND APPLY POWER.

   Note: Switch must be in position before power is applied. For this first part, nothing else is needed (i.e., CRT, Keyboard, Floppy, or IPB Board).

   The Beeper should Beep 5 times--if it does, go on to Step 2. Otherwise, do one of the following, depending on how many times the Beeper Beeped.

   1.1 The Beeper didn't Beep at all, or Beeps with a long continuous sound. This indicates a complete malfunction, and all of the following should be checked.

   - That all socketable chips are inserted, that they are the correct chips, and that no pins have been bent.

   - That all voltages are present--particularly -5 Volts, which is generated on the IOC Board (VRI).

   - That the two main clocks are present; 22.032 MHZ, with Ø1 and Ø2 (Sheet 2 of Schematic) and 8 MHZ (Y1, Sheet 3).

   - That the "RST" output of 8224 is low (Sheet 2), and that the "Master Reset" is high (Sheet 2).

   - That Pin 13 of A81 is low (Sheet 5).

   - That the "HRQ" output of 8257 (Sheet 2) is not stuck high.

   - That the "MEMR/" of 8228 is Pulsing (Sheet 2).

   - That the Jumpers in W11 are inserted correctly (Sheet 11).

   - That Pin 10 of the 8253 (Sheet 1) is pulsing.

   That is the limit of the obvious malfunctions. Assuming that the Beeper works (this can be checked by grounding °A83-PIN 3; See Sheet 5), the problem is more subtle.

   1.2 The Beeper Beeped once. This indicates that the problem is in the DMA area (8257, A58). Check the following:

   - That A49 Pin 6 is pulsing (Sheet 1).

   - That "HRQ" output of 8257 is pulsing.

● That "DACKØ" output of 8257 is pulsing.

● That "HLDA" output of 8080A-2 is pulsing.

Note: These should pulse once for each 15 ms period, at this stage.

Note: Also check that A81·Pin 13 is low. If the switch is faulty,
        then the IOC Board thinks it's in "online" mode, where it
        would Beep once normally.

1.3   The Beeper Beeped <u>twice</u>. This indicates that the problem is
      in the RAMS. Remove the 8080A-2 and insert ICE 80. Try to
      determine which RAM Chips appear bad by using the ICE 80
      "Fill" command. You should attempt to Fill RAM alternately
      with FF, ØØ, AA, 55. The Ram resides in address space 4000
      to 5FFF. 'XF M 4 T 5 U' (to map RAM unguarded) 'FI M 4000H
      T 5FFFH = FFH' (or ØØ, 55H, AAH). If just one RAM Chip is
      bad, this will flag it for you. If all Chips appear bad,
      then check that:

          ● All RAM Chips are of the same type (ABL OR ABH,
            but not mixed).

   ● That Jumper W9 is correctly configured for that type
            of Chip.

      Otherwise, you will have to scope it. Still using ICE-80,
      'XF M 4 T 5 U'
      'XF M Ø I 7'
      'CH M Ø = 21H, ØØH, 4ØH, 3EH, FFH, 77H, 7EH, C3H, ØØH, ØØH
      'GO FR Ø'

      The statements above put a program into ICE which executes out
      of the MDS Memory, but writes and reads from IOC Ram. The Byte
      in address 04 (FF in the example above) should be whatever Byte
      failed during the previous Fill command.

      With this program executing, Sync on "MEMW/" (ASB·10 Sheet 8)
      and check all the RAM inputs during the Write Cycle - the 7
      address inputs to RAMS should be high using the program
      given. (Sheet 9)

      To get a clean trigger on "MEMR/" to check out the RAM Chips
      during a read is a bit harder, because "MEMR/" pulses for
      other than RAM reads, too. However, you generally can tell
      if things are bad, even if non-RAM reads are mixed in. Check
      that D out is the same as the previous D in--sometimes the out-
      puts are marginal, not quite high enough for a plus.

1.4 The Beeper Beeped <u>three</u> times. This indicates something wrong in the CRT area. (Sheet 10) Check "vertical drive/" and "horizontal drive" on CRT connector (Pins 9 & 6, J15). SHOULD BE:

PIN 9 — 16.7 MS

PIN 6 — 61 μs
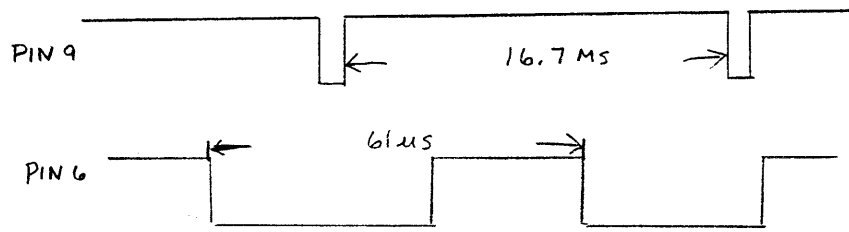
Check VRTC and HRTC on 8275. SHOULD BE:

VRTC A20.8 — 16.7 MS

HRTC A20.7 — 61 μs
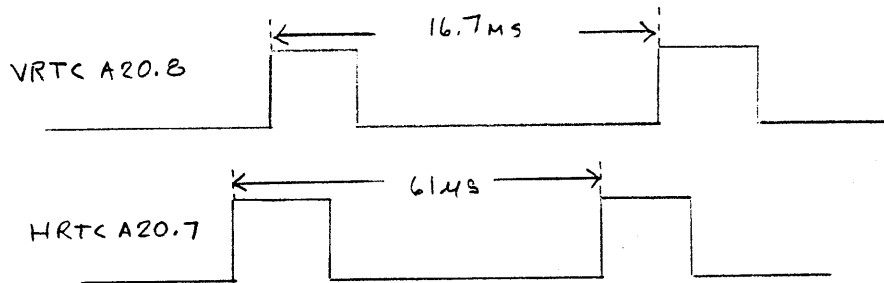
- Check "CCLK" Input to 8275.
- Check "DRQ" Output.
- Check "DACK" Input.

CCLK — 630 ns

25 GROUPS

DRQ

DACK/ — 630 μs — 16.7 MS
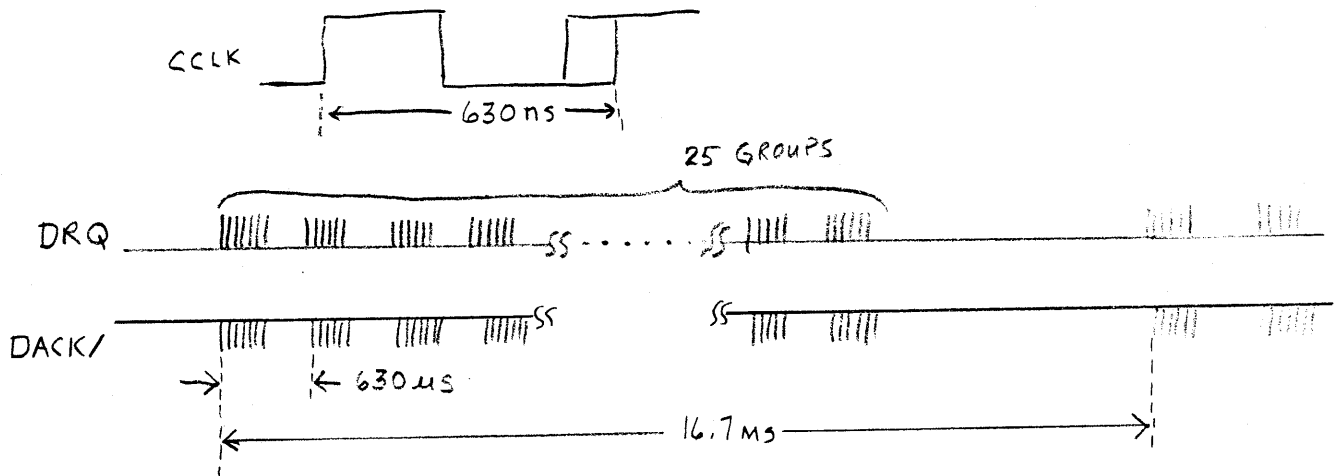
Note: If "DRQ" appears like:

16.7 MS
≈ 630 μs
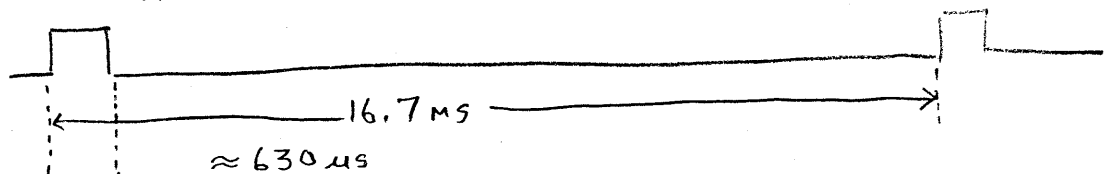
While DACK/ is always high, problem is in DMA Chip (8257) area, not in 8275 area.

1.5 As presently written, the Diagnostic won't Beep just 4 times--the fifth Beep is free.

2.0 The Beeper Beeps <u>five</u> times. Kill power, attach a CRT and Keyboard, and re-apply power (with switch still in upper position). A message should appear on screen. If not, check contrast pot and brightness pot, then proceed as in Section 1.4. If those signals OK, problem is likely in Logic shown on Sheet 10.

- Check 8 outputs of character generator PROM (A19).

- Check that A4.13 has pulses.

- Check that A5.6 has pulses.

If characters appear on screen, but they're garbled...check Jumper W1Ø for 2708/2716.

3.0 The message appears legibly on screen. Hit the 4 keys as requested.

3.1 No Response...Check that 3KB outputs J1-9, J1-10, J1-11 are OK. "Read KB/" and "status/Data" should be pulsing. Verify that "KB Reset/" is not holding KB reset continually.

3.2 Incorrect Response...This indicates that data lines are bad (shorted, crossed, whatever) from KB. The Diagnostic should indicate which.

4.0 Correct Response From Keyboard...Put slide switch in Local (bottom) position. Turn power off and on again. A cursor will appear at upper left. Verify that all characters look good on screen, after entering them from KB.

5.0 To check out the remainder of the IOC Board, it is necessary to hook up to an <u>IPB</u>. Connect IOC and IPB, put slide switch in line (middle) position. Apply power to both Boards. Sign-on message should appear on CRT. If it doesn't, problem is most likely in Logic shown on Sheet 4 of schematic.

- Remove cable connecting IPB and IOC; leave switch in line position. Apply power to IOC and check that A23 Pins 4,6,8 are low. Re-attach cable connecting IOC to IPB.

- The inputs from IPB to IOC will only pulse for a short while after hitting the reset button, in this failure mode. After a second or so, the IPB times out and will no longer try. You have to keep hitting the reset button to catch anything on the scope.

- Sync on A23 Pin 1 and check that the IPB is getting the correct status.

- This problem area is the hardest to debug, because to do it correctly you may have to move ICE-80 from the IOC to IPB at times. If all the status latches are working correctly, the problem usually turns out to be stuck bits on the "Master Data" Lines.

6.0 To check out the 8741 and 8226's at the bottom of the Board, it is also necessary to have the IPB.

- First, check that the 8741 2 and 3 have the crystal waveform, and that Pin 11 of the 8741 is pulsing, with a period of 2.5 us (this assumes a 6 MHS XTAL) 8741, Pin 11.

$$\longleftarrow 2.5 \mu s \longrightarrow$$ $\longleftarrow$ (ASSUMES 6 MHZ CLOCK)
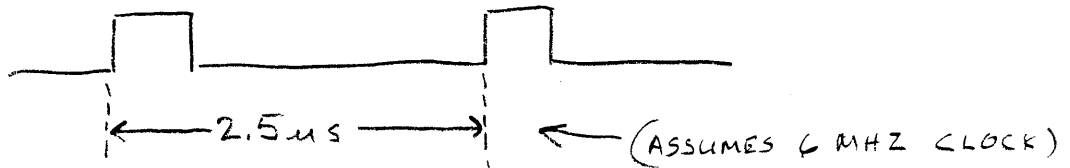
- If none of the parallel devices work (line printer, UPP, paper tape reader, punch), the problem is in the 8741 or its inputs (Sheet 6).

- If at least one device works correctly, then the problem is in the putput section (Sheet 7).

7.0 There is no Logic associated with the teletype on the IOC Board, just traces and Jumpers. Check the Jumpers on the upper right-hand-side of Board, if TTY doesn't work.
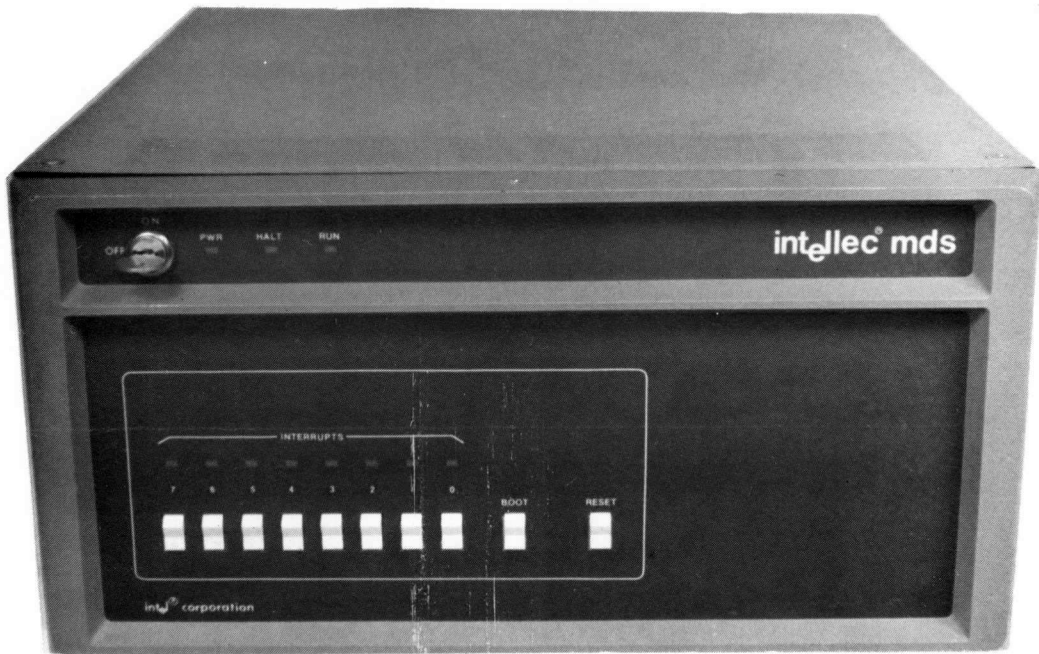
FIGURE   Left to Right

   I.   A.   1   Power Key Switch

            2   Power light driven by 5V power supply

            3   Halt indicator driven by CPU Bd.

            4   Run indicator driven by CPU Bd.

        B.   1   Interrupt switches and indicator   7 thru 0

            2   Boot switch   (2 position)

            3   Reset switch (momentary contact)

  II.   A.   1   Input/Output Connectors

                Column 1   Single Density Drives 0 & 1
                Column 2   Top Double Density Drives 0 & 1
                Column 3   Bottom Double Density Drives 2 & 3
                Columns 4 thru 6   See II B.

        B.   Supported Input Output Configuration

        C.   Top - Connector for chassis ground and signal ground
                  (connected)
             Middle - Power selector for 115V or 230V AC
             Bottom - AC Power connector

        D.   Top - +12, -12, and -10V Fuse   (2A 115V, 1A 230V)
             Bottom - +5V Fuse   (5A 115V, 3A 230V)

I. INTELLEC 800 (Front)

II. INTELLEC 800 (Rear)

800-03

FIGURE   Beehive CRT & Keyboard   (PN 4000714-02)

I.   Beehive CRT (Rear)

Left to Right

A.   1   OFF/ON Switch

2   Fuse(3A 115V, 1.5A 230V)

3   AC Power Connector

B.   1   Cable Connector to the 800

2   Contrast Potentiometer

3   Baud rate selection rotory switch
(normally set at 16)

4   X150/X100 Switch   (set at X150)

5   HDX/FDX Switch   (Set at FDX)

II. Beehive CRT Keyboard

A.   1   Brightness control switch for CRT

B.   1   Power Indicator   (ON)

2   Parity Indicator   (OFF)

3   On Line/Local Switch   (On Line)

I. Beehive CRT (Rear)

II. Beehive CRT Keyboard

+5V POWER SUPPLY

J1

J18

**±12V
−10V
POWER
SUPPLY**

**AUXILIARY
CONNECTOR
LOCATIONS**

J18A

J1A

**FRONT PANEL
CONTROLLER**

CPU
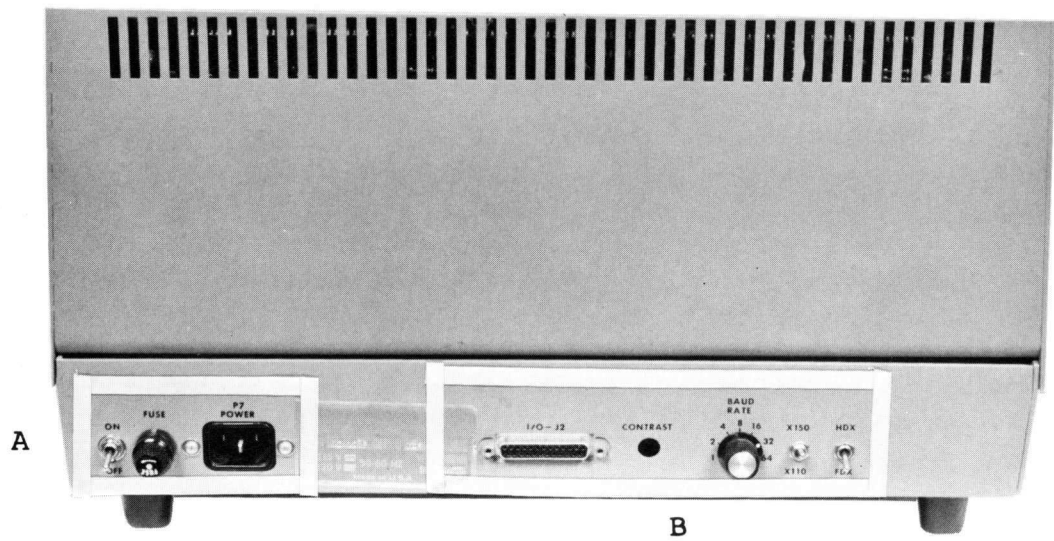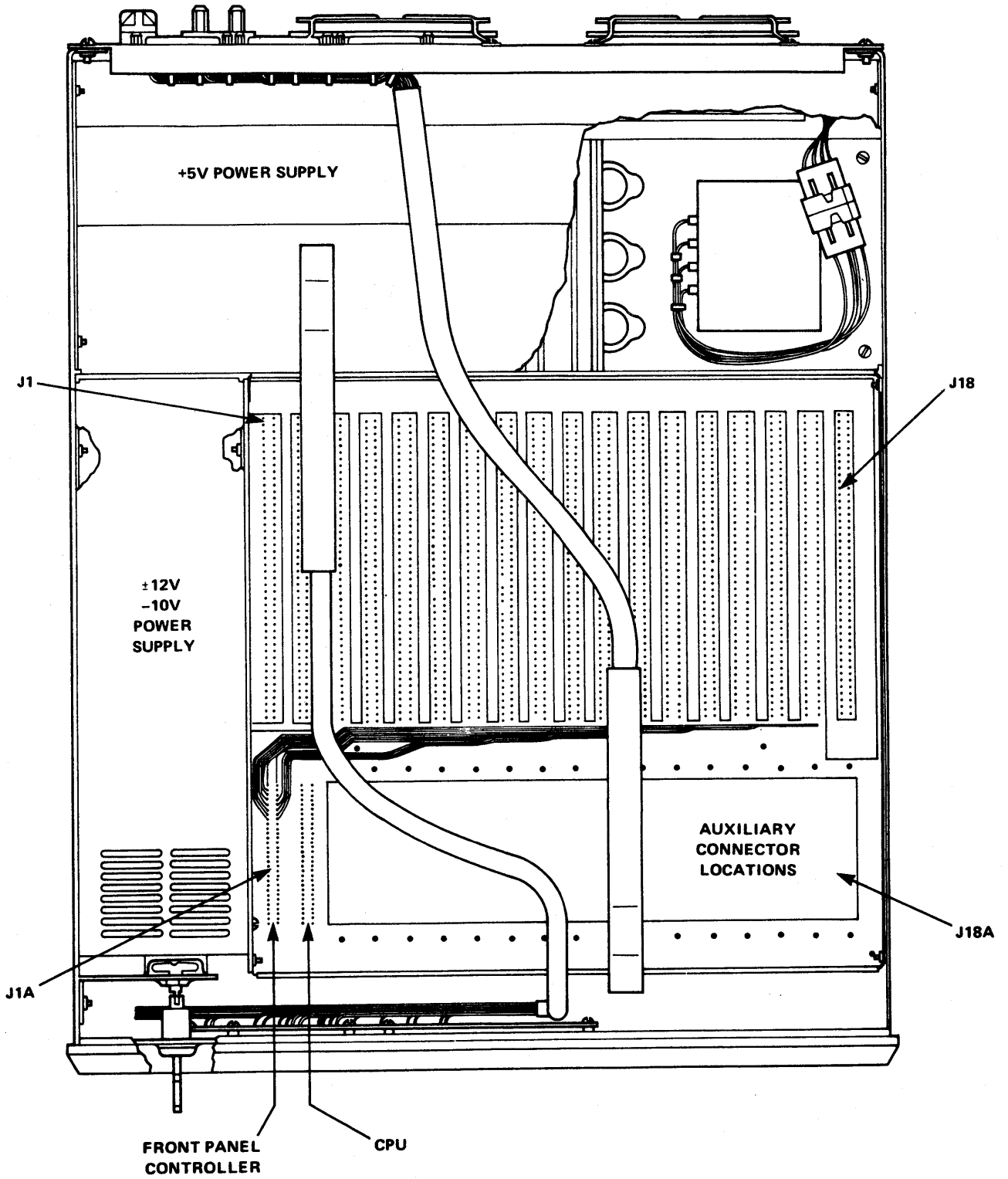
FIGURE

   I.   A.   ±12 and -10V Power Supply (PN 4500380-01)

         B.   5V Power Supply (PN 4500343-01)

         C.   800 Supported Peripherals I/O Connector (PN 4000376-01)
             (See back of 800 for assignments)

         D.   Double Density Diskette Cable (PN 4001113-01)

         E.   Single Density Diskette Cable (PN 4000522-01)

         F.   Monitor Bd (Normal Position) (PN 1000351-04)

         G.   16K Memory Bd (4 boards shown) (PN 1001125-01)

         H.   Front Panel   (PN 4000370-0)

         I.   CPU Module Slot 2 (PN 1000340-01)

         J.   OFF/ON Switch

         K.   Card Cage

         L.   Front Panle Contol Module Slot 1 (PN 1000343-02)

         M.   Floppy Disk Controller Boards
             (For PN see Floppy Disk Section)

INTELLEC 800 (Internal)

800-08

I. Front Panel Control Module (PN 1000343-02)
   This card must go into Slot 1 of the card cage.

   A. Failsafe Timeout Indicator

   B. Jumper 5 to 6 is soldered in for 10 MHz
       "B" Clock to the Intellec Bus

   C. Bootstrap PROM (check seating of PROM)

   D. The Board's Name & PN Location

   E. Failsafe timeout Jumper Selection
       Jumper in 3 to 4
       Jumper out of 1 to 2

II. CPU Module (PN 1000340-01)
    This card must go into Slot 2 of the card cage.

    A. The Board Name Location

    B. The Board PN Location

    C. Jumper A to B not required. Can be in or out.

    D. System 8080 CPU (check for proper seating of chip)

I. Front Panel Control Module
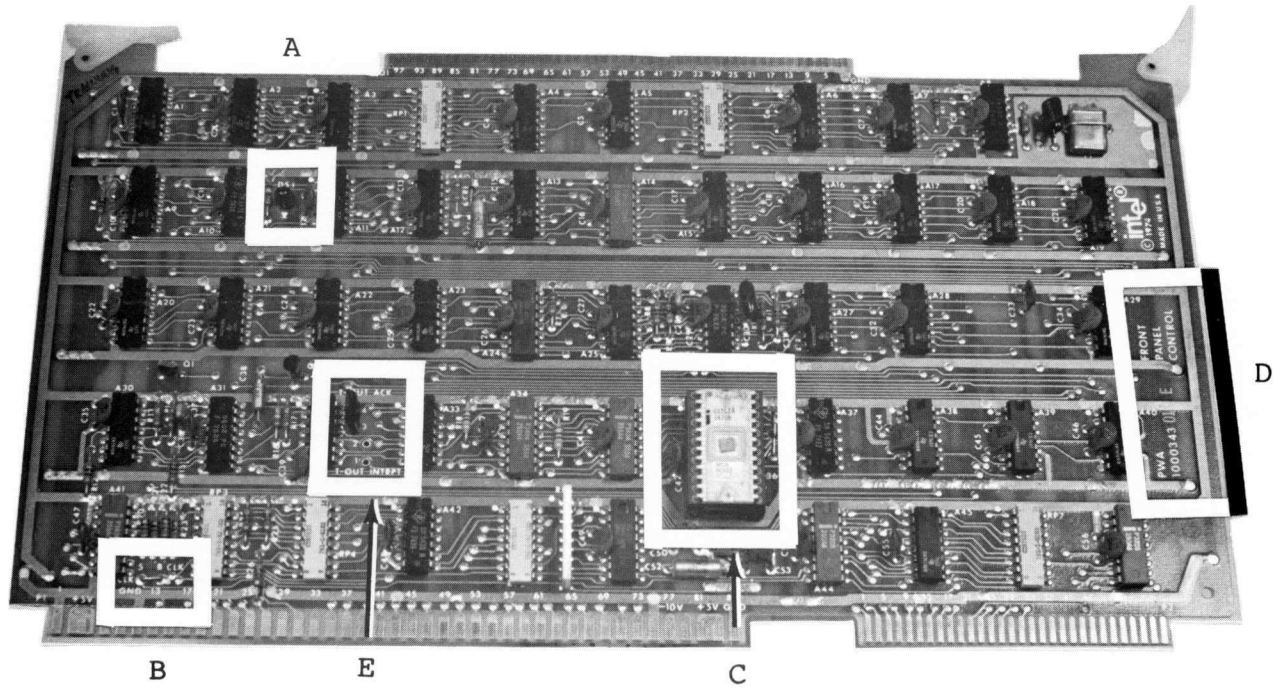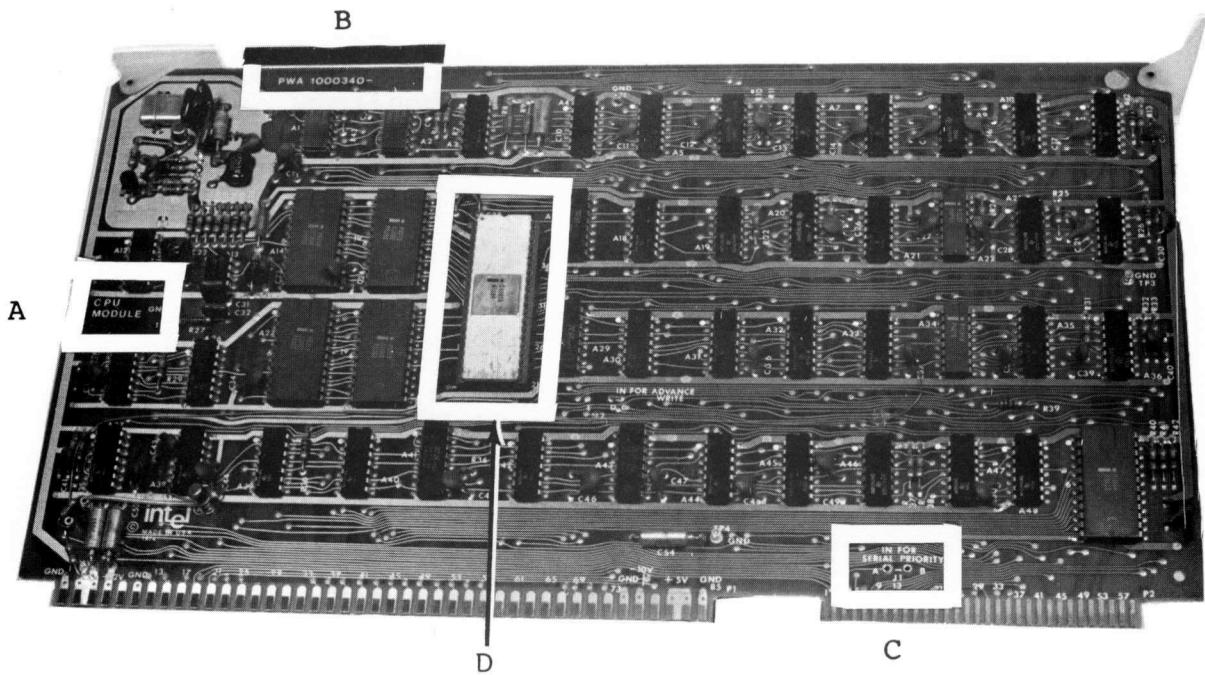
II. CPU Module

I.   16K Memory Bd (RAM) (PN 1000292-01)
     These boards may go into any slots except for 1 or 2. Up to
     4 boards may be in the system at any time if the jumper
     selections are set properly. (See IC)

     A.   The Board Name & P/N Location

     B.   Jumper in 1 to 2 out of 3 to 4

     C.   These jumper select address response range

          16K means Ø to 16K Range
          32K means 16K to 32K Range
          48K means 32K to 48K Range
          64K means 48K to 64K Range

     D.   Resistor pack goes in Low Byte for data bits 0-7
          Resistor Pack goes in High Byte for data bits 8-F
          (One Resistor Pack Only)

II. Monitor Module (PN 1000351-04)
     This board may go into any slot in the card cage except
     slots 1 and 2. Normally found in Slot 18.

     A.   The Board Name & PN Location

     B.   Monitor PROM in left socket, right socket normally open
          or contains customer's monitor PROM (check chip seating)

     C.   PROM Socket Selector Switch
          Switch should point to the non component side of the
          board to select left socket for monitor.

     D.   Usart chips for TTY and CRT (check chip seating)

I. 16K RAM Memory Module
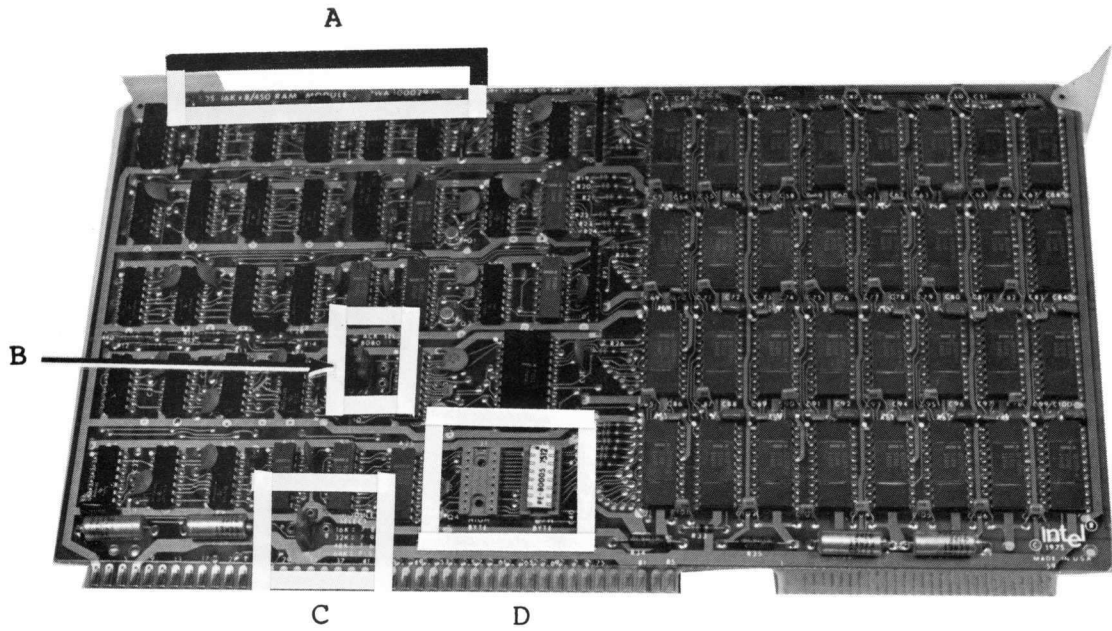
II. Monitor Module
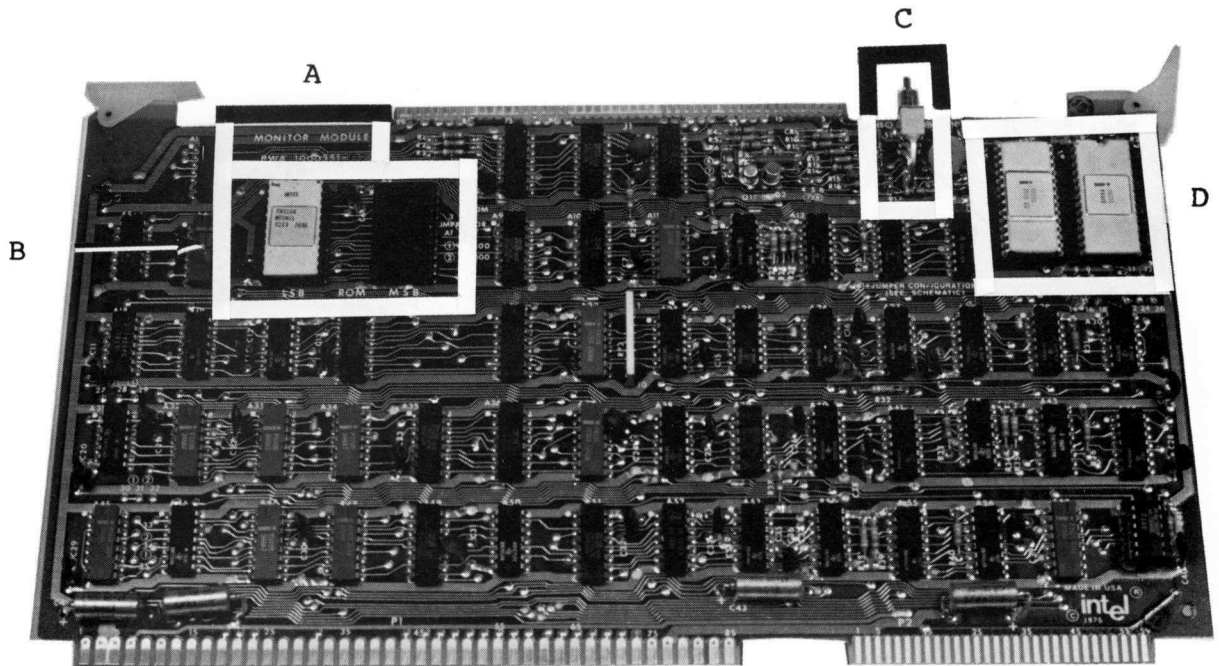
USING THE TROUBLESHOOTING FLOW CHARTS

First reseat all boards in the 800 and try booting the monitor. If
the problem still exists, go to the following flow charts.

BOOT UP TO INITIATE THE MONITOR

1. Turn on System with key
2. TTY or CRT to "On Line"
3. Boot Switch "on"
4. Reset Switch "on"
5. Type space on TTY or CRT
   Printout: "MDS Monitor V2.Ø
6. Boot Switch "off"
7. The Prompt of a "." appears
   two lines below "MDS Monitor
   V2.Ø"

COMMANDS INCLUDE:

```
    .A  Assign I/O device
*   .D  Display contents of memory
    .F  Fill Ram with constant
    .G  Execute program (go)
    .S  Substitute memory
    .Q  I/O status query
    .X  Examine/Modify registers
```

* for the D command to work on the
  CRT, enter via the keyboard:

      AL=C (Carriage Return)

INITIALIZING ISIS-II DOS

1. Power-up System
2. Insert System Diskette into
   Drive Ø and close door.
3. Boot Switch "on"
4. Press Reset
**5. Select the Console by typing a
   space.
6. Set Intellec Bootstrap off
7. Program loads and automatically
   runs and/or sends prompt to CRT.

**For a new Front Panel Control Board
  (1000343-02) Steps 5 and 6 may need
  to be reversed.

INTELLEC 800 Troubleshooting
Flow Chart Sheet 1

(A)

Power Up
The
Intellec
800

Power Lite? —No→ Check 5 vdc
Fuse and
Main Pwr → (A)

↓Yes

Power Up
CRT

Beep?
Pwr Lite-Kybd
And Cursor? —No→

↓Yes

Boot Up
Intellec 800

"System
Monitor" On
CRT? —No→ (B)

↓Yes

(2)→

Boot Floppy
Use 800 Conf.
Test in F/D

Boot
Successful? —No→ Go To F/D
Trouble
Diagnosis

↓Yes

(1)

Have
"Beep" and
Cursor? —No→

↓Yes

Power Lite
On
Kybd?

↓No

Is
Kybd Plugged
In? —Yes→ (B)

↓No

Plug In
Kybd → (A)

---

(1)

Conf.
Test Success-
ful? —No→ Refer to
Confidence
Test Manual → (2)

↓Yes

End

Check
Fuse

Fuse Good? —No→ Replace
Fuse → (A)

↓Yes

Replace
CRT → (A)

INTELLEC 800 Troubleshooting
Flow Chart Sheet 2

(B)

Go to Local Mode

Verify Kybd — No → Replace CRT → (A)

Yes ↓

Go To On Line Mode

Check Cable 400418 or 4000417 — Bad → Replace Cable → (A)

Good ↓

X150/X110 To X150

Check HDX/FDX To FDX

Baud Rate To 16 Baud

Reboot Successful? — No → Baud Rate To 32 Baud

Yes → (2)

Reboot Successful? — No → Baud Rate To 8 Baud

Yes → (2)

Reboot Successful? — No → Baud Rate To 16 Baud → (C)

Yes → (2)

800-15

C

Power Down
800

Is CRT Cable in CRT Jack — No → Place Cable In Correct Jack → A

Yes ↓

Is 12 Volt Fuse Good? — No → Replace Fuse → A

Yes ↓

Is F.P. Cable seated? — No →

Yes ↓

Is Mon. Cable Seated? Sw. Correct? — No → Reseat Cable and/or Place Switch In Proper Position → A

Yes ↓

Remove All Boards Except FPC, CPU, Mem, & Mon

↓

Reboot Successful? — No →

Yes ↓

D

Replace Mon. and FPC

↓

Reboot Successful? — Yes →

No ↓

Remove Mem. & Replace with Good Spare, Address 0

↓

Reboot Successful? — Yes →

No ↓

Replace CPU

↓

Reboot Successful? — Yes →

No ↓

Is DC Power OK? — No → Replace Power Supply → A

Yes ↓

Check CRT Cable, Mon. Harness, F.P. Cable, or Mother-Board

↓

E

D

↓

Replace Orig. Boards, 1 at a time, and reboot

↓

2

E

↓

Replace Bad Cable, Harness and/or Mother Board.

↓

A

800 DIAGNOSTICS

The only one we have for the 800 is the "Intellec Development Sys-
tem Confidence Test" (Single Density P/N 92000059-01, Doble Density
P/N 9700001-01)

After determining which density the system is using (refer to
floppy diskette section) select the proper floppy diskette and
refer to the Intellec Microcomputer Development System Diagnostic
Confidence Test Operator's Manual (9800386) for operating instruc-
tions and error indications.

CPU MOD	1000340-01	
F.P. CONT *(FRONT PANEL CONTROLLER)* — — —	1000343-01	*(02)*
MONITOR MOD	1000351-04	
16K RAM	1000292	
	1001125-01	
	142795-001	
032K RAM	142705-004	
048K RAM	142705-002	
064K RAM	142705-001	
MOTHER BD	1000305-01	
DUAL AX	1000515-01	

POWER SUPPLIES

+5V POW SUP	4500379-01
+10V, +-12V PS	4500380-01

CABLES & STRAPS

MONITOR HAR	4000376-01
DC POW HA (12V)	4000381-01
DC P HAR (5V)	4000405-01
TTY CAB ASSY	4000415-02
AC POW CORD - - - - - - - - — — —	102595-001
AC POW HAR	4000400-01
AC POW HAR 2	4000401-01
FAN	102996-001
FAN GRD	102995-001
FUSE 250V, 2A	102050-007
FUSE 250, 1A	102052-001
FRONT PANEL ASSEMBLY	4000370-01

MDS CRT (BEEHIVE)   4000714-02

|	
CRT CABLE	4000417
AC POWER CORD	102196-001
FUSE 250V 2A	102050-007
SPACE BAR	*3SD86-M-1-11*

MANUAL LIST FOR 800

1. Intellec Microcomputer Development System Diagnostic Confidence
   Test Operator's Manual   9800386
                                       Order Number 403965

2. Intellec Microcomputer Development System Operator's Manual
   9800129
                                       Order Number 403980

3. Intellec Microcomputer Development System Hardware Reference
   Manual   9800132
   Order Number 403985

I.   MDS 710, 720, or 730
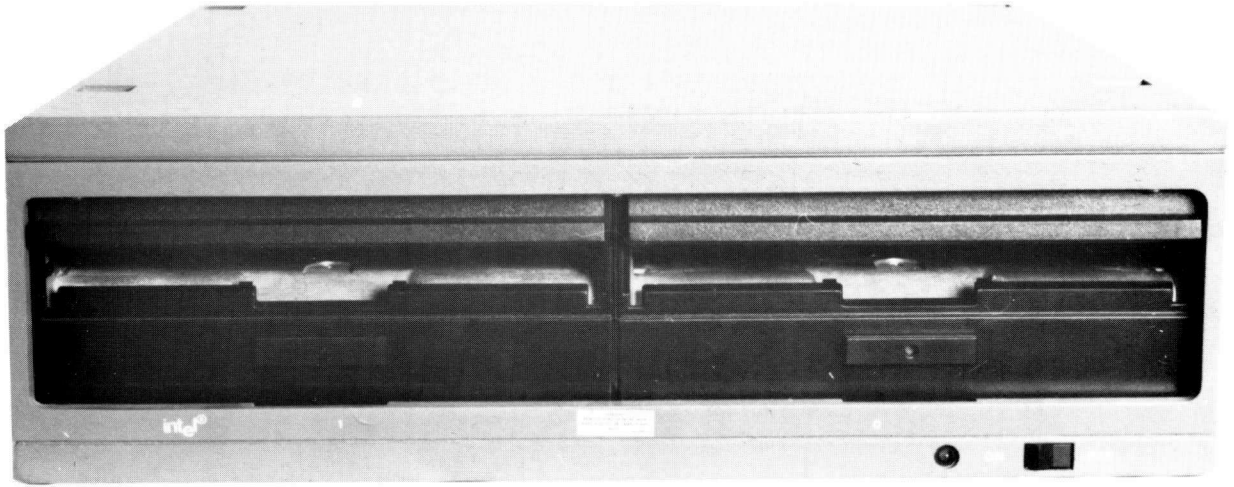
II.   MDS 2DS, DDS, or DDR
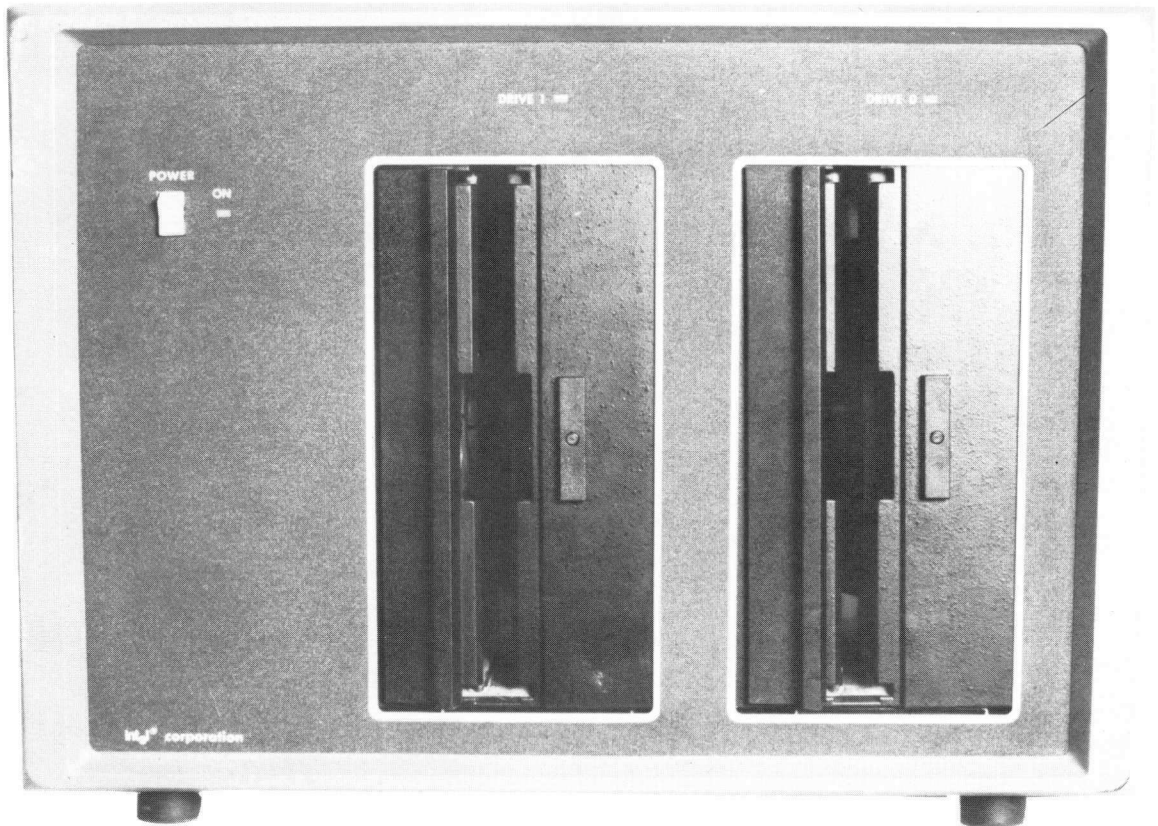
I. LOW PROFILE FLOPPY DISKETTE SYSTEM
   (MDS 710 IF CONTROLLER BDS ARE SINGLE DENSITY; MDS 720 IF CON-
   TROLLER BDS ARE DOUBLE DENSITY; MDS 730 WITHOUT CONTROLLER BDS)

   A. DRIVE SELECT INDICATORS & DOOR LATCH RELEASE SWITCHES

   B. LEFT TO RIGHT ARE POWER ON INDICATOR THEN POWER ON SWITCH

II. LOW PROFILE (INTERNAL)

   A. FUSE, AC CONNECTOR, AND POWER SELECTOR CARD
      (10V, 15V, 220V, OR 240VAC)

   B. PERIPHERAL CABLE CONNECTOR (LOCATED UNDER THE FAN)

   C. POWER SUPPLY (4501498-02)

   D. INTERNAL FAN (102999-001)

   E. INTERNAL SIGNAL (DATA) CABLE (4001496-01) WITH SIGNAL
      ADAPTER BDS (1002242-01)

   F. DRIVE Ø

   G. OFF/ON SWITCH AND POWER ON INDICATOR & CABLING (4001012-02)
      (LOCATED UNDER DRIVE Ø)

   H. DRIVE 1

I. LOW PROFILE FLOPPY DISKETTE SYSTEM
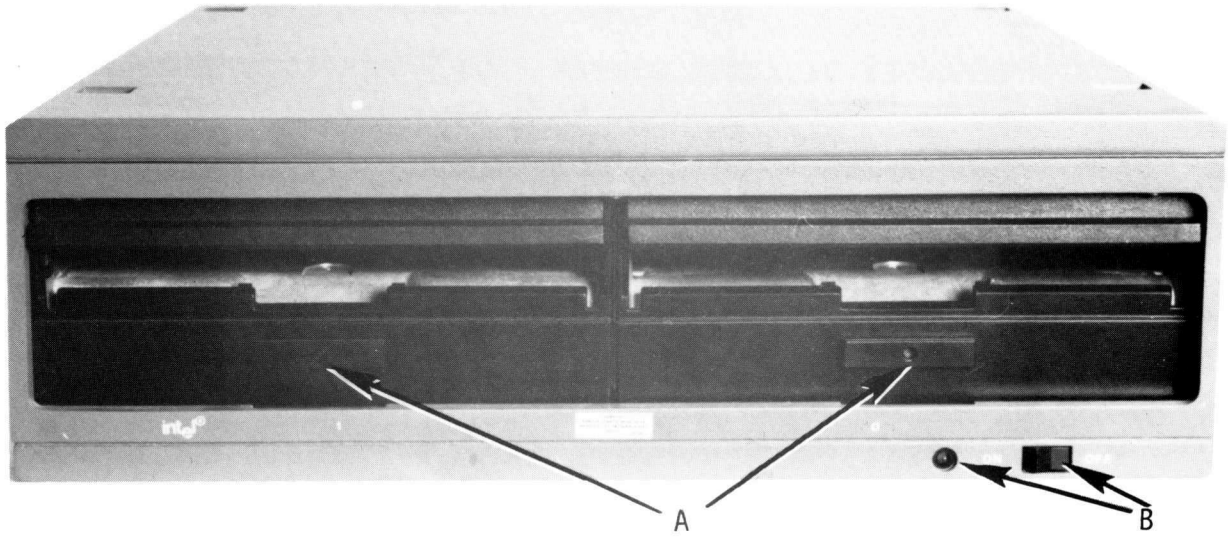

II. LOW PROFILE (INTERNAL)
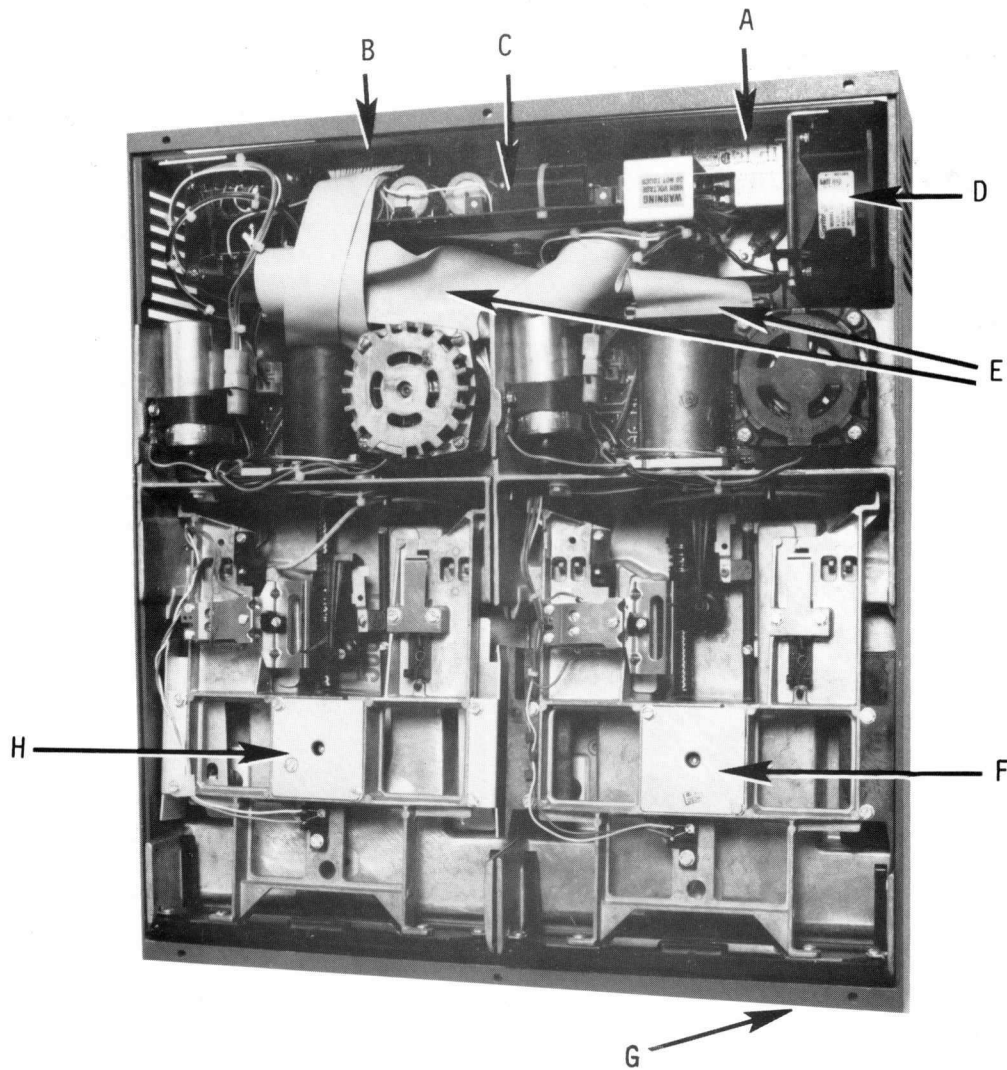
I. UPRIGHT FLOPPY DISKETTE SYSTEM (2DS = MDS710 SYSTEM; DDS = MDS
    720 SYSTEM; DDR = MDS 730 SYSTEM)

    A. OFF/ON SWITCH

    B. DRIVE SELECT INDICATORS

    C. DOOR LATCH RELEASE SWITCH & DRIVE SELECT INDICATORS
        (NO DRIVE SELECT INDICATOR ON CDC DRIVES)

II. UPRIGHT DRIVE (INTERNAL)

    A. POWER SUPPLY (REPLACEMENT ORDER #98133 FOR CDC DRIVES &
        CP155 FOR SHUGARTS OR SIEMENS DRIVES)

    B. FUSE, AC POWER CONNECTOR, AND POWER SELECT SWITCH
        (115V/220VAC)

    C. PERIPHERAL CABLE CONNECTOR (LOCATED UNDER THE FAN)

    D. INTERNAL FAN (102996-001)

    E. INTERNAL SIGNAL (DATA) CABLE (4001000-01) WITH SIGNAL
        ADAPTER BDS. (SHUGART & SIEMENS DRIVES ONLY -
        DRIVE 0 1001325-01; DRIVE 1 1001325-02)

    F. DRIVE 0

    G. DRIVE SELECT INDICATORS (FRONT PANEL)

    H. DRIVE 1

    I. OFF/ON SWITCH

I. UPRIGHT FLOPPY DISKETTE SYSTEM
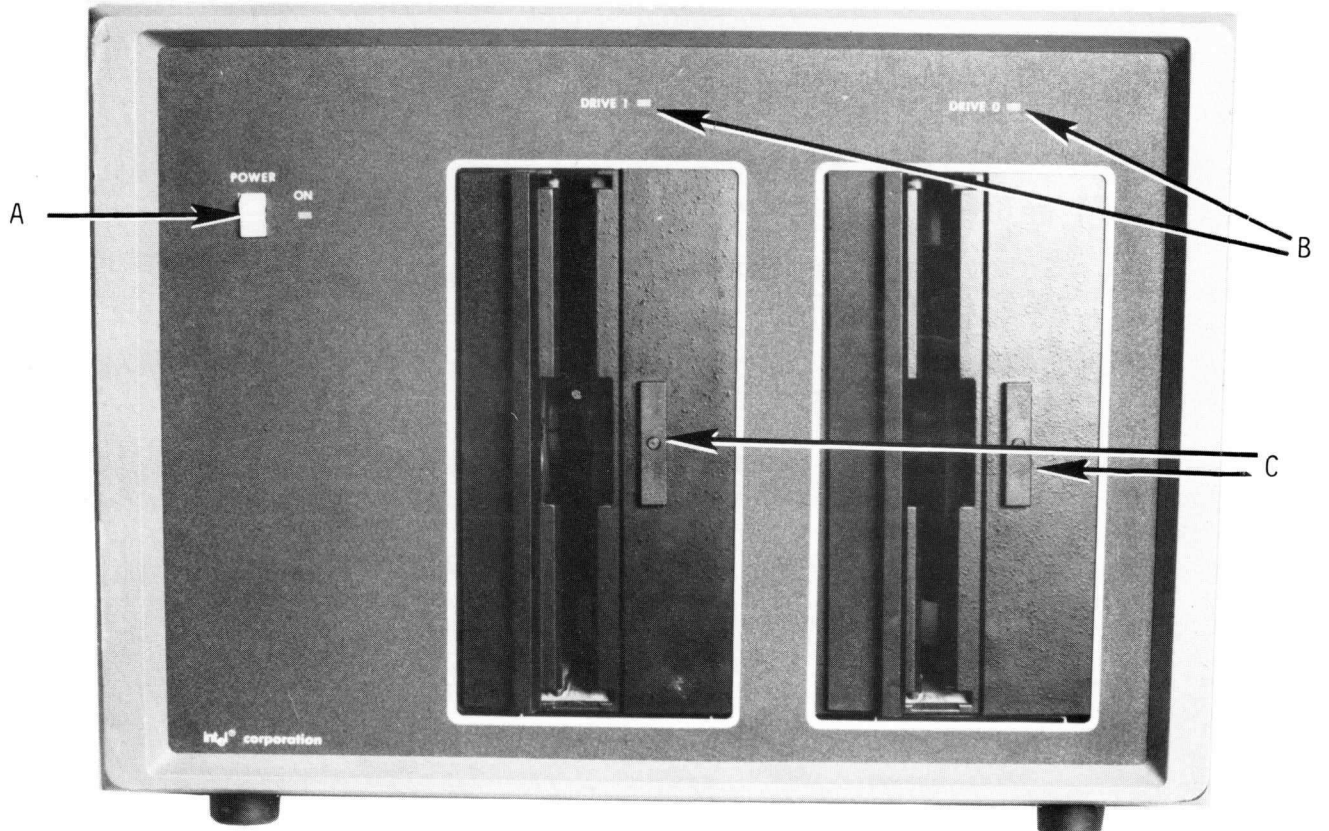
II. UPRIGHT DRIVES (INTERNAL)
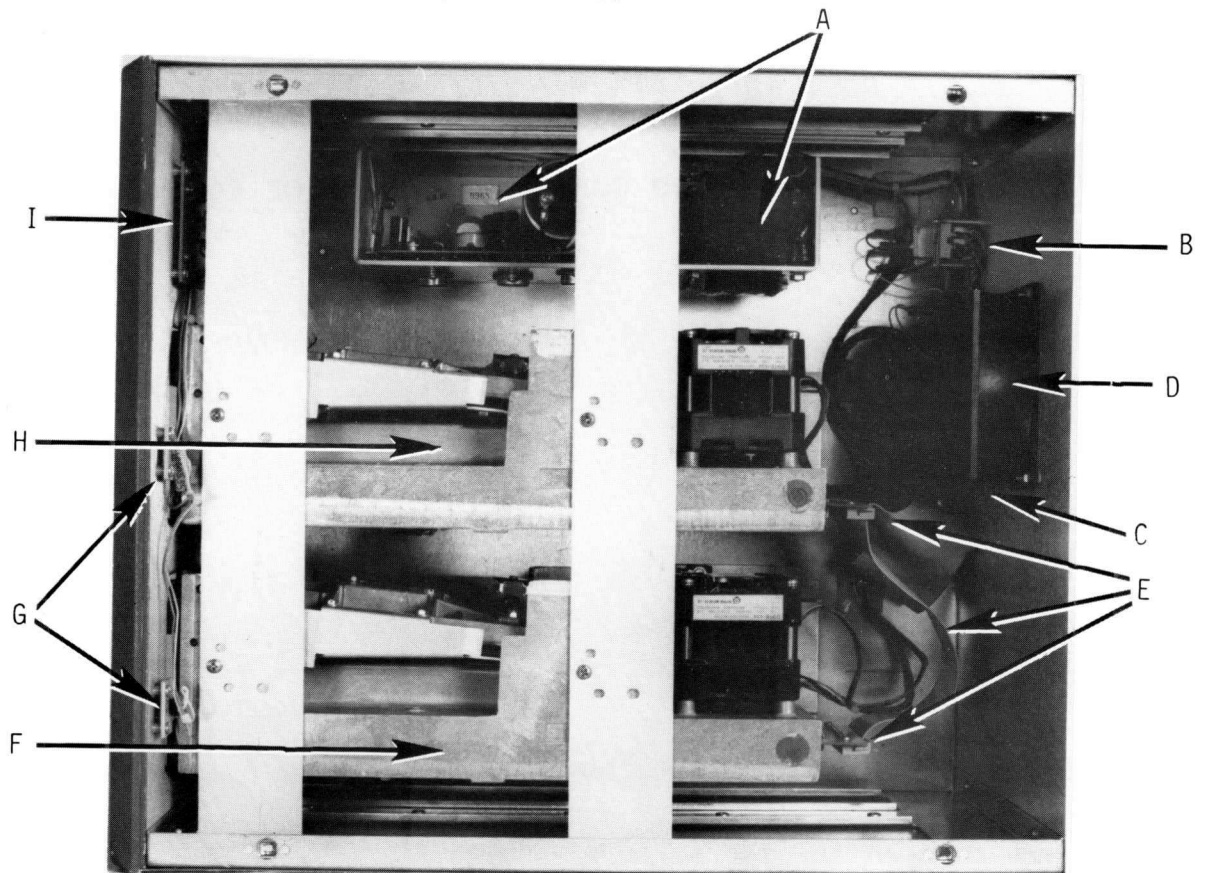
I. SINGLE DENSITY FLOPPY DISKETTE
   CHANNEL BD. PWA 1000467

   A. THE FOUR PROM SET MARKED AS FOLLOWS:
       A10, A11, A12, A13 OR P52-6XX

   B. THE CPU CHIP (3001) THAT CONTROLS THE OPERATION OF THE
       FLOPPY DISKETTE SYSTEM

   C. UNIT ADDRESS SWITCh; PRIMARY SETTING IS 1, 2, 3, 8 ON (78)
       AND 4, 8 OFF (88)

   D. BD NAME - FLOPPY DISK CONTROLLER CHANNEL

   E. BD PART NUMBER - PWA 1000467

II. SINGLE DENSITY FLOPPY DISKETTE INTERFACE BD. PWA 1000603

   A. BD PART NUMBER: PWA 1000603

   B. BD NAME; FLOPPY DISK CONTROLLER INTERFACE (CDC)

   C. FLOPPY DISKETTE INTERRUPT LEVEL SELECTION SWITCH - A
       POSITION ROTARY. ROTATE THE SWITCH COUNTER-CLOCKWISE UNTIL
       THE SWITCH LOCKS, THEN TURN THE SWITCH CLOCKWISE TWO POSI-
       TIONS FOR SYSTEM INTERRUPT LEVEL 2.

   D. JUMPER MUST BE IN PLACE.

       NOTE: INTERFACE BD GOES IN ODD SLOT OF 800

I. SINGLE DENSITY FLOPPY DISKETTE CHANNEL BD.

FLOPPY DISK
CONTROLLER CHANNEL

II. SINGLE DENSITY FLOPPY DISKETTE INTERFACE BD.

FLOPPY DISK CONTROLLER INTERFACE (CDC)

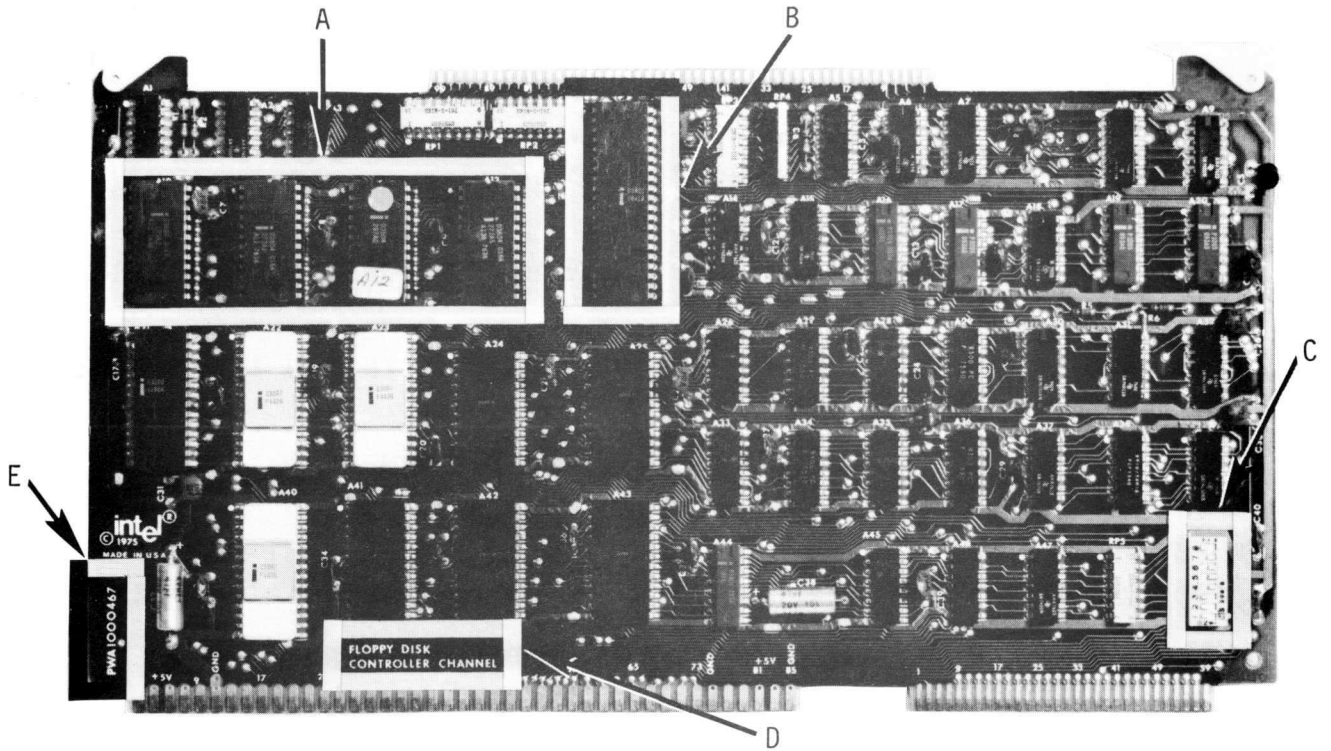I. DOUBLE DENSITY FLOPPY DISKETTE CHANNEL BD:
PWA 1000467

    A. THE FOUR PROM SET MARKED AS FOLLOWS:
       P52-7XX OR XXXXXX XXX 023X

    B. THE CPU CHIP (3001) THAT CONTROLS THE OPERATION OF THE
       FLOPPY DISKETTE SYSTEM

    C. UNIT ADDRESS SWITCH: PRIMARY ONLY SETTING IS 1, 2, 3, 8 ON
       AND 4, 5, 6, 7 OFF (78)

    D. BD. NAME - FLOPPY DISK CONTROLLER CHANNEL

    E. BD. PART NUMBER: PWA 1000467

II. DOUBLE DENSITY FLOPPY DISKETTE INTERFACE BD: PWA 1001036
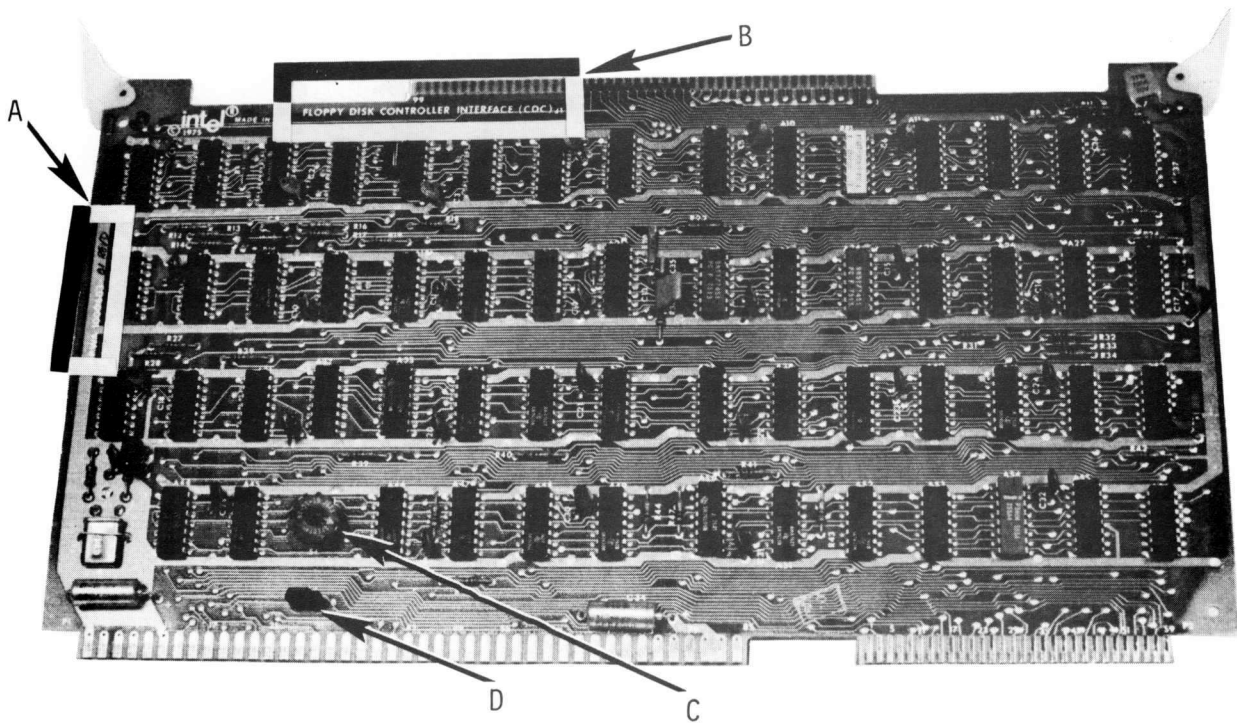
    A. CRYSTAL FREQUENCY ADJUSTMENT POTENTIOMETER
       NOTE: DO NOT ADJUST

    B. CRYSTAL OSCILLATOR - 4 LEGS SOLDER GLOB TOWARDS THE TOP OF
       THE BOARD

    C. BD NAME - FLOPPY DISK INTERFACE - DOUBLE DENSITY
       BD PART NUMBER PWA 1001036

    D. SYSTEM INTERRUPT LEVEL SELECTION SWITCH
       (3RD POSITION EQUALS SYSTEM LEVEL 2)

    E. 8218 BUS CONTROL, CHECK SETTING

       NOTE: INTERFACE BD GOES IN ODD SLOT OF 800

I. DOUBLE DENSITY FLOPPY DISKETTE CHANNEL BD.
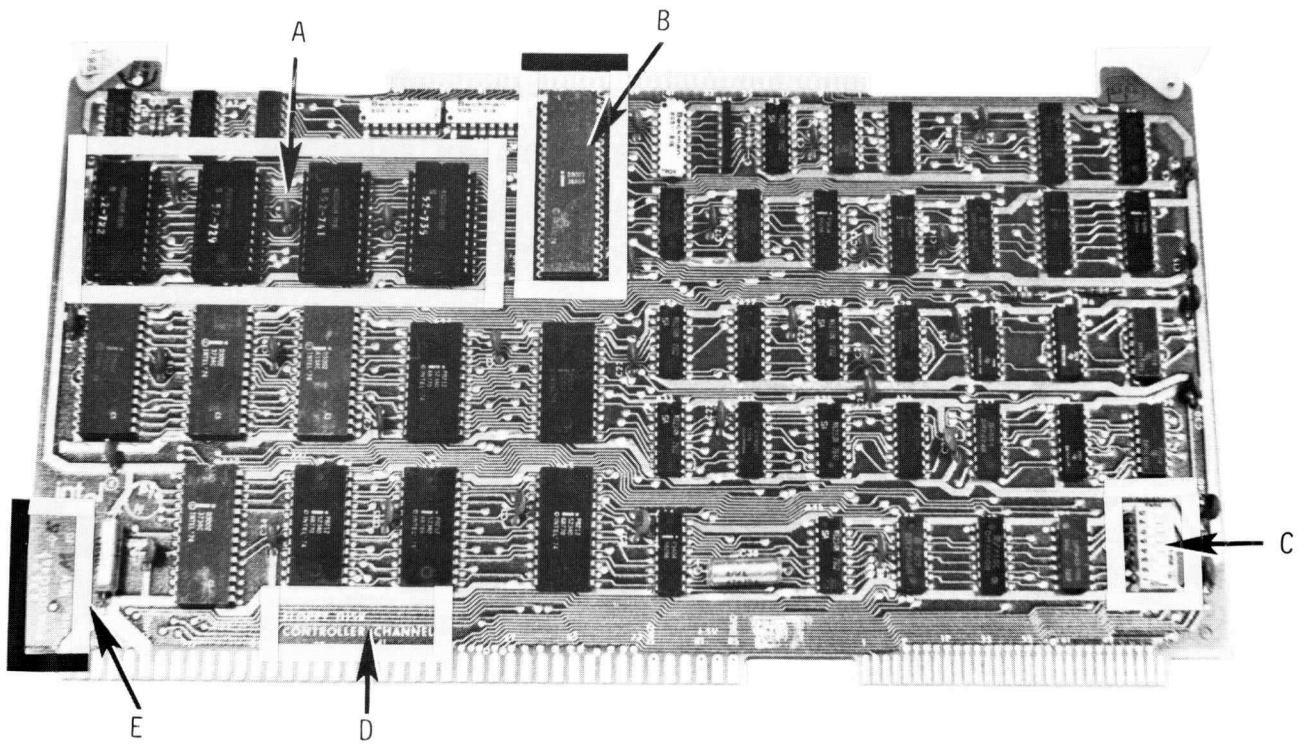
II. DOUBLE DENSITY FLOPPY DISKETTE INTERFACE BD.
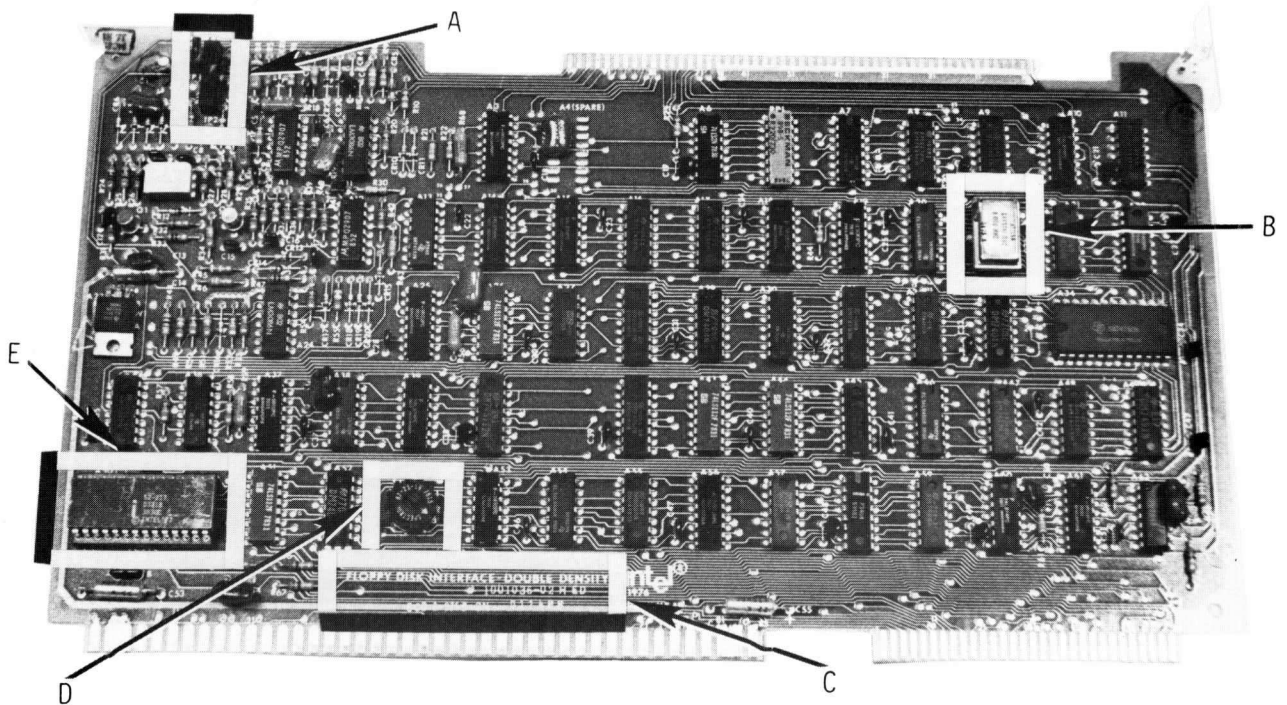
I. FLOPPY DISKETTE CONTROLLER CABLES

A. SINGLE DENSITY CONTROLLER CABLE FOR AN 800:
    PART NUMBER 4000522-01

B. DOUBLE DENSITY CONTROLLER CABLE FOR AN 800:
    PART NUMBER 4001113-01

C. OLD DOUBLE DENSITY CONTROLLER CABLE FOR SERIES II:
    PART NUMBER 4001516-02

D. NEW DOUBLE DENSITY CONTROLLER CABLE FOR SERIES II:
    PART NUMBER 4002175-01

NOTE: NEW SINGLE DENSITY CONTROLLER CABLE FOR A SERIES II LOOKS
       LIKE A DOUBLE DENSITY CABLE, EXCEPT IT ONLY HAS 1 REAR
       CONNECTOR. PART NUMBER 4001979-01

I.   FLOPPY DISKETTE CONTROLLER CABLES
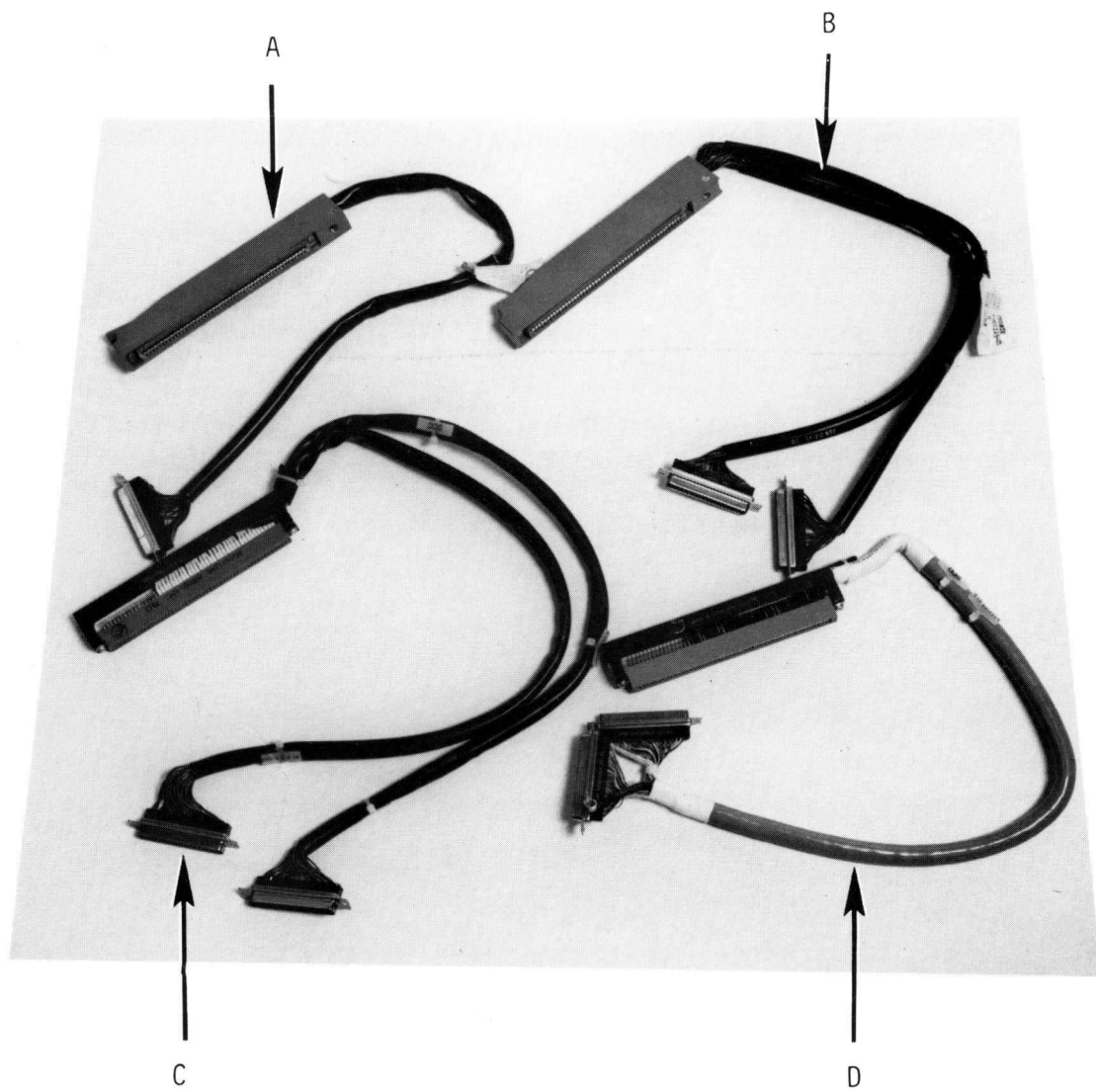
I.   PERIPHERAL CABLES (DOUBLE DENSITY)

   A.   NEW CABLE NUMBER 4002176-01
        CONNECTOR FOR THE DEVELOPMENT SYSTEM IS ON THE LEFT AND THE
        CONNECTOR FOR THE DRIVE BOX IS ON THE RIGHT

   B.   OLD CABLE NUMBER 4001114-01
        CONNECTOR FOR THE DEVELOPMENT SYSTEM IS ON THE LEFT AND THE
        CONNECTOR FOR THE DRIVE BOX IS ON THE RIGHT

II. SIGNAL ADAPTER BOARDS FOR SHUGART AND SIEMENS DRIVES

   A.   CURRENT SIGNAL ADAPTER BD FOR LOW PRO DRIVES.   JUMPER
        SELECTABLE FOR DRIVE Ø AND 1.   PWA 1002242-01

   B.   OBSOLETE SIGNAL ADAPTER BD FOR LOW PRO DRIVES.   TRACE
        CUTTING REQUIRED FOR DRIVE SELECTION.   SHOULD BE LABELED
        ALREADY PWA 1002242-01

   C.   SIGNAL ADAPTER BD FOR UPRIGHT DRIVES.   TRACE CUTTING
        REQUIRED FOR DRIVE SELECTION.   SHOULD BE LABELED ALREADY
        DRIVE Ø PWA 1001325-01
        DRIVE 1 PWA 1001325-02

I. FLOPPY DISKETTE PERIPHERAL CABLES
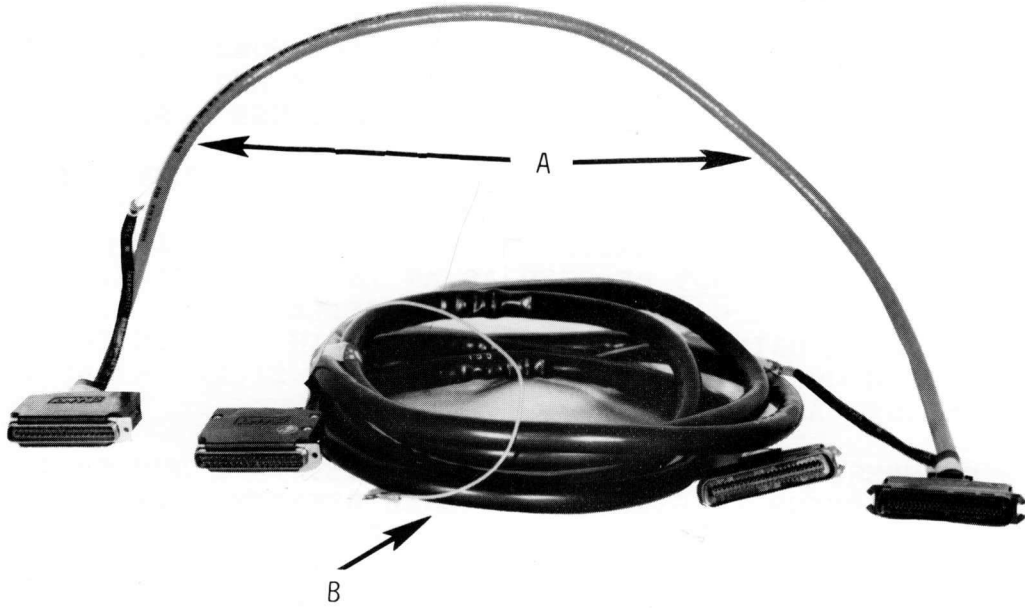
II. SIGNAL ADAPTER BDS.
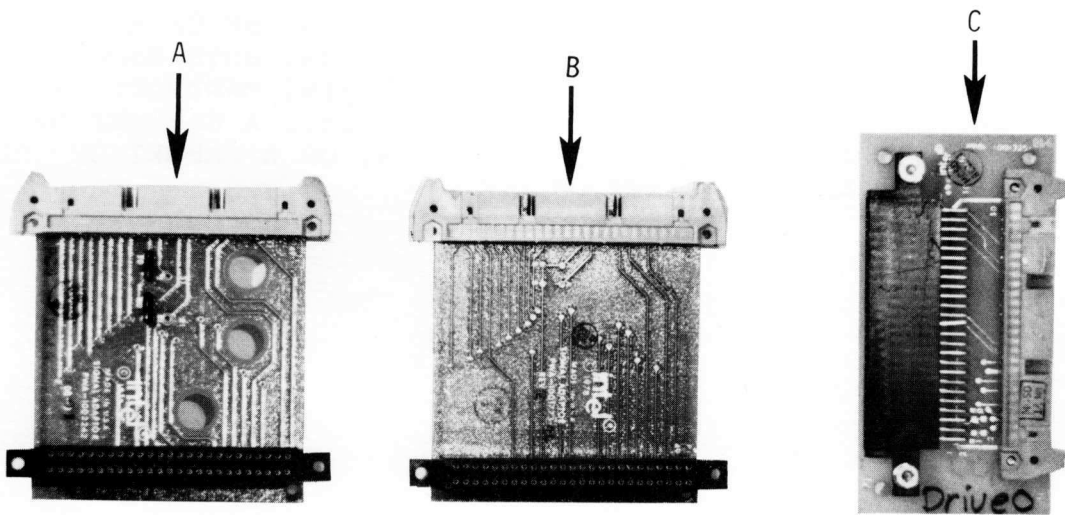
I. FLOPPY DISKETTE DRIVE TYPES IDENTIFICATION

   A. CDC FLOPPY DISKETTE DRIVE U.S. PART NUMBER 4500613-01.
      THE CDC DRIVE IS SINGLE DENSITY ONLY AND CAN ONLY BE PLACED
      IN AN UPRIGHT CABINET. IT DOES NOT USE A SIGNAL ADAPTER BD.

   B. SHUGART FLOPPY DISKETTE DRIVE U.S. PART NUMBER 4500963-01.
      THERE ARE 3 TYPES OF SHUGART DRIVES (SEE ALIGNMENT PROCE-
      DURES FOR TYPE IDENTIFICATION). ONE TYPE IS DOUBLE DENSITY
      ONLY AND CAN NOT BE USED AS AN INTEGRAL DRIVE. THE OTHER 2
      TYPES CAN BE USED IN THE LOW PROFILE, UPRIGHT, OR AS THE
      INTEGRAL DRIVE. WHEN ANY SHUGART IS USED IN THE LOW PROFILE
      OR THE UPRIGHT CABINETS, THE PROPER SIGNAL ADDAPTER BD MUST
      BE USED AS WELL.

   C. SIEMMENS FLOPPY DISKETTE DRIVE U.S. PART NUMBER 4502558-02.
      THE SIEMENS IS SINGLE OR DOUBLE DENSITY. IT CAN BE PLACED
      IN A LOW PROFILE, AN UPRIGHT, OR SOMETIMES USED AS AN
      INTEGRAL DRIVE (IT IS RECOMMENDED TO USE A SHUGART WHEN EVER
      IT IS POSSIBLE AS AN INTEGRAL). THE SIEMENS DRIVE REQUIRES
      THE PROPER SIGNAL ADAPTER BD. EXCEPT WHEN USED AS AN
      INTEGRAL DRIVE.

      *NOTE: THE 2 DRIVES IN A CABINET MUST BE OF MATCHING MANU-
              FACTURERS, I.E., BOTH SIEMENS, BOTH SHUGART, OR BOTH
              CDC. CABINETS OF NON-MATCHING MANUFACTURERS MAY BE
              USED IN THE SAME SYSTEM, I.E., A CABINET OF SIEMENS
              AND A CABINET OF SHUGARTS, OR A CABNET OF SHUGARTS
              AND A CABINET OF CDC.

A

B

C

I. FLOPPY DISKETTE HEAD LOAD PADS

WHEN YOU FIRST GAIN ACCESS TO THE FLOPPY DISKETTE DRIVES BY
REMOVING THE TOP COVERS OF THE DRIVE BOXES, PERFORM A VISUAL
INSPECTION OF THE HEAD LOAD PADS. TO DO THIS, CAREFULLY SWING
THE HEAD LOAD ARM AWAY FROM THE DRIVE AND LOOK TO SEE IF THE PAD
(SEE A BELOW) IS MISSING OR IF IT IS SHINEY BROWN WHERE THE PAD
MAKES CONTACT WITH THE HEAD (SEE B BELOW). IN EITHER CASE,
REPLACE THE HEAD LOAD PAD IF POSSIBLE, OR USE A BURNISHING BRUSH
TO REMOVE THE IRON OXIDE FROM THE PAD.

HEAD LOAD PAD REPLACEMENT

CDC DRIVE: THE HEAD LOAD PAD REPLACEMENT PART NUMBER IS
83460701-2. THE CDC HEAD PAD (JUST THE RED PART) IS ADHESIVE-
BACKED AND IS REMOVED BY PEELING THE PAD OFF OF THE HEAD LOAD
ARM USING YOUR FINGER NAIL OR A PAIR OF NEEDLE NOSE PLIERS.

SHUGART DRIVE: THE HEAD LOAD PAD ASSEMBLY REPLACEMENT PART
NUMBER IS 50542. THE HEAD LOAD PAD IS PERMANENTLY ATTACHED TO A
COLLAR. TO REMOVE THE COLLAR USE A PAIR OF NEEDLE NOSE PLIERS
AND COMPRESS THE 2 SNAP FINGERS AT REAR OF THE HEAD LOAD PAD AND
PUSH THROUGH THE HEAD LOAD ARM.

SIEMENS DRIVE: THE HEAD LOAD PAD IS NOT REPLACEABLE. CLEAN THE
PAD WITH A BURNISHING BRUSH OR REPLACE THE DRIVE.
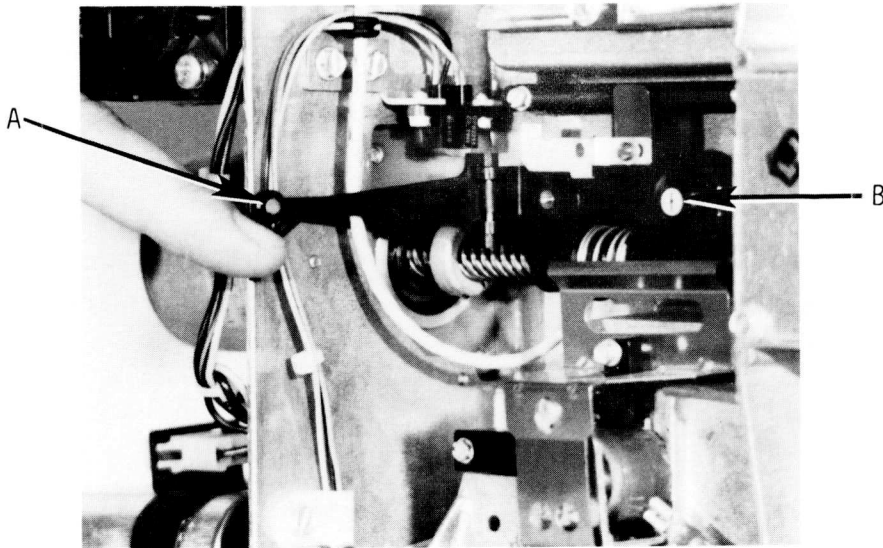
FLOPPY DISK TROUBLESHOOTING FLOW CHARTS

Before trying to troubleshoot the Floppy Diskette System, the following are required:

1. The Development System must be verified in good working order up to Floppy Diskette Diagnostic verification.

2. Only the Development System with a minimum of 32K and maximum of 64K plus the Floppy Diskette System should be the configuration at this time (i.e., no ICE products, Hard Disk, Memory above 64K, RPB [Series III], Network, etc. should be installed in the Development System).

3. A known good set of Floppy Diskette Controller Boards and a working matching Floppy Drive available.

4. Four (4) known good Floppy Diskettes

    (1) ISIS II System Diskette with Disk or DISKDI
    (2) Two System Scratch Diskettes (No Recorded Information)
    (3) Alignment Diskette Part Number (A360)

5. Bd. seating problems and bad cable connections are <u>not</u> taken into consideration.

6. Ensure Address Switch is set as follows:
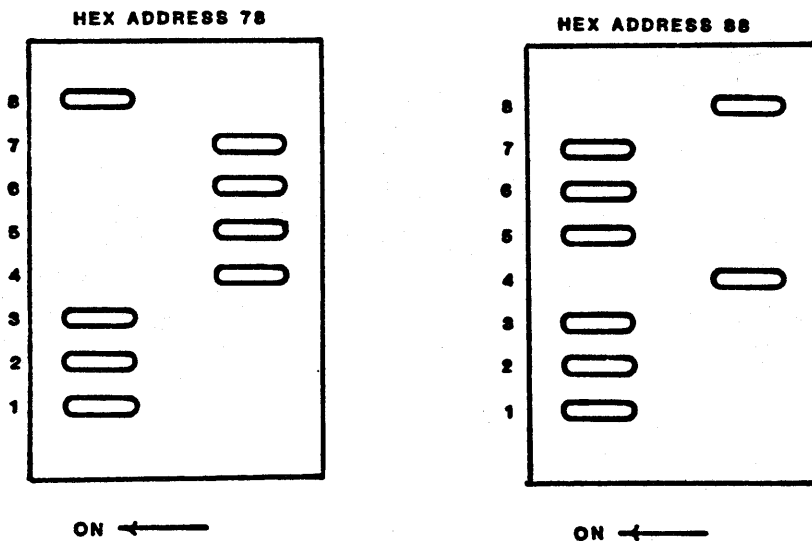
NOTE: Double Density can only be a primary and only one to a system. Whereas, Single Density can be a primary if one is used by itself, or as a secondary if used with another Single or Double Density Conroller set.

FLOPPY DISKETTE TROUBLESHOOTING
FLOW CHART   SHEET 1

FD-18

(B)   NO   NO   (C)

```
┌─────────────────────────┐                                    ┌─────────────────────────┐
│    Is Peripheral Cable   │────────────────┬─────────────────│    Is Peripheral Cable   │
│  Connected to Single     │                │                  │  Connected to Double     │
│  Density Connector on    │                │                  │  Density Connector for   │
│  the System              │                │                  │  Drives Ø & 1            │
│                          │                │                  │  on the System           │
└─────────────────────────┘                │                  └─────────────────────────┘
```

              YES   ┌──────────────────┐   YES
                                   │ Connect Cable   │
                                   │   Properly   │
                                   └──────────────────┘

                                          (A)

```
┌─────────────────────────┐                                    ┌─────────────────────────┐
│  Is the Single Density   │      NO              NO            │  Is the Double Density   │
│  Internal Control Cable  │────────────────┬─────────────────│  Internal Control Cable  │
│  Connected to the        │                │                  │  Connected to the        │
│  Interface Bd?  (Interface Bd              │                  │  Interface Bd?  (Interface Bd
│  must go in an odd slot  │                │                  │  must go in an odd slot  │
│      in the 800)         │                │                  │      in the 800)         │
└─────────────────────────┘                │                  └─────────────────────────┘
```
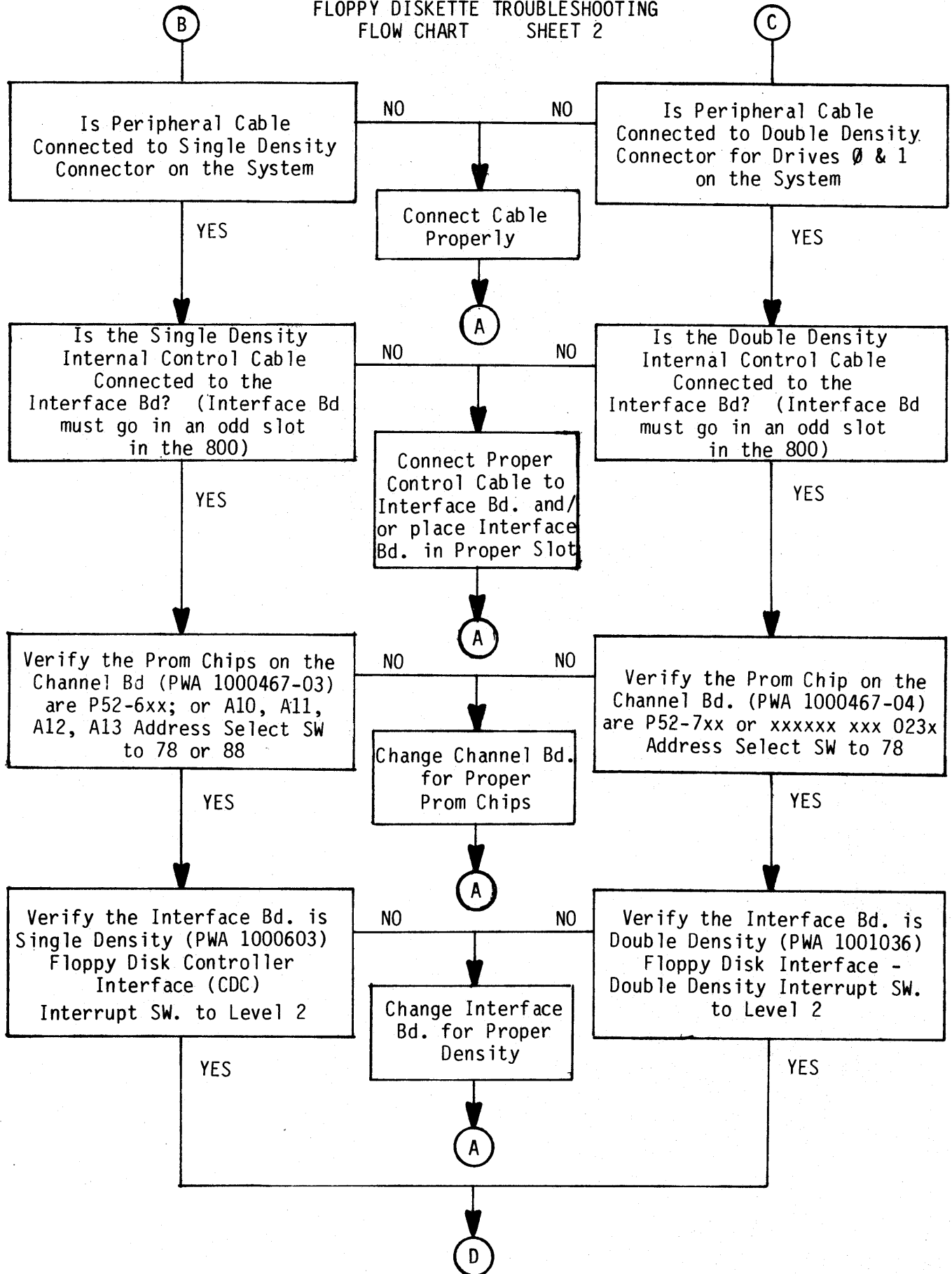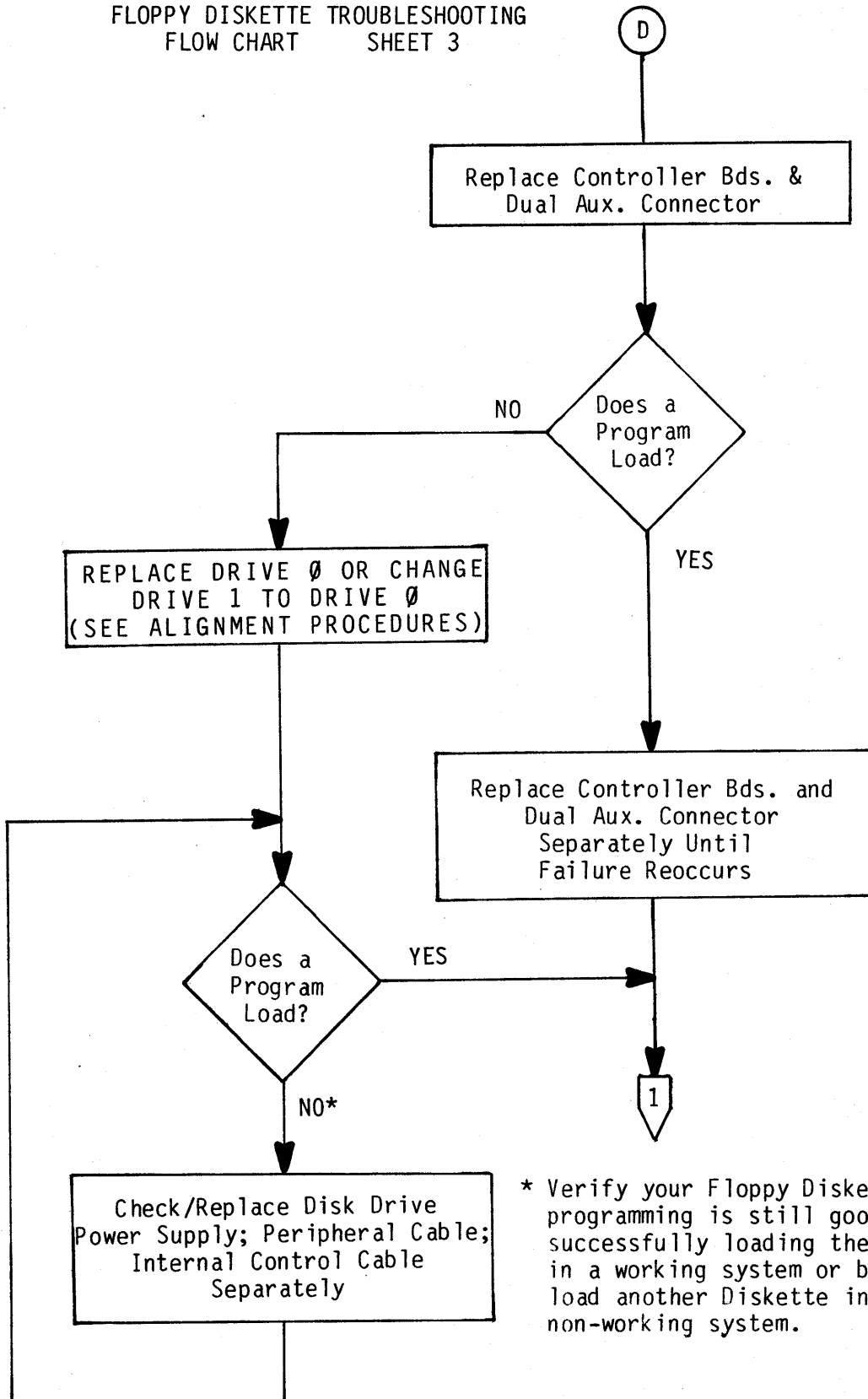
              YES   ┌──────────────────┐   YES
                                   │ Connect Proper │
                                   │ Control Cable to│
                                   │ Interface Bd. and/│
                                   │ or place Interface│
                                   │ Bd. in Proper Slot│
                                   └──────────────────┘

                                          (A)

```
┌─────────────────────────┐                                    ┌─────────────────────────┐
│ Verify the Prom Chips on │     NO              NO             │ Verify the Prom Chip on  │
│ the Channel Bd (PWA      │────────────────┬─────────────────│ the Channel Bd. (PWA     │
│ 1000467-03) are P52-6xx; │                │                  │ 1000467-04) are P52-7xx  │
│ or A10, A11, A12, A13    │                │                  │ or xxxxxx xxx 023x       │
│ Address Select SW to     │                │                  │ Address Select SW to 78  │
│ 78 or 88                 │                │                  │                          │
└─────────────────────────┘                │                  └─────────────────────────┘
```

              YES   ┌──────────────────┐   YES
                                   │ Change Channel Bd.│
                                   │ for Proper   │
                                   │ Prom Chips   │
                                   └──────────────────┘

                                          (A)

```
┌─────────────────────────┐                                    ┌─────────────────────────┐
│ Verify the Interface Bd. │     NO              NO             │ Verify the Interface Bd. │
│ is Single Density (PWA   │────────────────┬─────────────────│ is Double Density (PWA   │
│ 1000603) Floppy Disk     │                │                  │ 1001036) Floppy Disk     │
│ Controller Interface     │                │                  │ Interface - Double       │
│ (CDC) Interrupt SW. to   │                │                  │ Density Interrupt SW.    │
│ Level 2                  │                │                  │ to Level 2               │
└─────────────────────────┘                │                  └─────────────────────────┘
```

              YES   ┌──────────────────┐   YES
                                   │ Change Interface │
                                   │ Bd. for Proper   │
                                   │   Density   │
                                   └──────────────────┘

                                          (A)

                                          (D)

FD-19

FLOPPY DISKETTE TROUBLESHOOTING
FLOW CHART   SHEET 3

(D)

```
Replace Controller Bds. &
Dual Aux. Connector
```

Does a
Program
Load?

NO

YES

```
REPLACE DRIVE Ø OR CHANGE
DRIVE 1 TO DRIVE Ø
(SEE ALIGNMENT PROCEDURES)
```

```
Replace Controller Bds. and
Dual Aux. Connector
Separately Until
Failure Reoccurs
```

Does a
Program
Load?

YES

NO*

(1)

```
Check/Replace Disk Drive
Power Supply; Peripheral Cable;
Internal Control Cable
Separately
```

* Verify your Floppy Diskette's
  programming is still good by
  successfully loading the Diskette
  in a working system or by trying to
  load another Diskette in the
  non-working system.

FLOPPY DISKETTE DIAGNOSTICS

There are 3 diagnostics released in the field. Two are to be used for alignment of the drives, and the third is not to be used by the C.E.

The alignment diagnostics are DISK and DISKDI. DISK was originally written for Double Density but is now found in both Single and Double Densities. DISKDI was originally written for Single Density but is also found in both densities. The Siemens and Shugart Drives may be aligned in either Single or Double Density. A drive may be aligned using Single Density diagnostics for future use in a Double Density system as well as using a Double Density diagnostic to align a drive that will be placed in a Single Density system. CDC drives may only be aligned in Single Density.

The third program is DDISK. DDISK is used by the Repair Center for detailed error information use in component level repair of Control Bd and Drives.

DIAGNOSTIC ROUTINES
SINGLE DENSITY OR DOUBLE DENSITY

NAME: DISK/DISKDI

USES: 1. DRIVE VERIFICATION
       2. ALIGNMENT POSITIONING

FEATURE: HELP FILE
         1. H = LISTS COMMANDS

EXAMPLE: SØ – SELECT Ø
         0   – ORIGIN
                (SEEK TO TRACK Ø)
         FX – FORMAT ALL TRACKS
         TA – TEST ALL DRIVES

DRIVE VERIFICATION

1. INSTALL SYSTEM DISKETTE   ☐

2. LOAD APPLICABLE DIAGRAM   ☐

    A. SINGLE DENSITY – DISKDI

    B. DOUBLE DENSITY – DISK

3. REMOVE SYSTEM DISKETTE   ☐

4. INSTALL SCRATCH DISKETTES IN   ☐
    DRIVES Ø AND 1

5. TYPE H TO LIST ALL VALID   ☐
    COMMANDS

6. SELECT DRIVE Ø, SEEK TO   ☐
    TRACK Ø, AND FORMAT ALL
    TRACKS; SØ 0 FX

7. SELECT DRIVE 1, SEEK TO   ☐
    TRACK Ø, AND FORMAT ALL
    TRACKS; S1 0 FX

8. WHEN FORMAT IS COMPLETE, TEST   ☐
    ALL DRIVES (TA)

9. ALLOW SEVERAL MINUTES FOR TESTING ☐

10. HIT ANY KEY TO TERM. TEST   ☐
    TYPE E TO PRINT ERRORS

11. SWAP DISKETTES BETWEEN DRIVES   ☐
    Ø AND 1

12. TEST ALL DRIVES   ☐

13. ALLOW SEVERAL MINUTES FOR TESTING ☐

14. TERMINATE TEST AND DISPLAY ERRORS ☐

NOTE: EACH COMMAND IS FOLLOWED BY A CARRIAGE RETURN

ALIGNMENT OPERATOR ENTRIES

ALIGNMENT DISKETTE IS <u>NOT</u> FORMATTED

USE THE FORMATTED SCRATCH DISKETTE FOR <u>ALL TRACK SEEKS</u>

ALL ENTRIES ARE ENTERED AS: HEX (38T=26H, 76T=4CH)

EXAMPLE:

<u>PROCEDURES STATE:</u>

<u>TO PERFORM PROCEDURES:</u>

1. SEEK TO TRACK Ø, THEN SEEK TO TRACK 1 AND READ

   INSERT FORMATTED SCRATCH DISKETTE AND TYPE IN AØ cr, THEN TYPE IN A1 cr. REPLACE THE FORMATTED SCRATCH DISKETTE WITH THE ALIGNMENT DISKETTE AND THEN TYPE IN RK cr.

2. SEEK TO TRACK 38 AND READ

   INSERT FORMATTED SCRATCH DISKETTE AND TYPE IN A26 cr. THEN REPLACE FORMATTED SCRATCH DISKETTE WITH THE ALIGNMENT DISKETTE AND TYPE IN RK cr.

3. SEEK TO TRACK 76 AND READ

   INSERT FORMATTED SCRATCH DISKETTE AND TYPE IN A4C cr. THEN REPLACE FORMATTED SCRATCH DISKETTE WITH ALIGNMENT DISKETTE AND TYPE IN RK cr.

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I. CDC FLOPPY DRIVE P/N 4500613-01

THE CDC DRIVE IS SINGLE DENSITY ONLY. IT CAN ONLY BE PLACED IN
AN UPRIGHT CABINET. IT CONTAINS A DOOR RELEASE HANDLE ONLY AND
DOES NOT HAVE A DRIVE SELECT INDICATOR ON THE FRONT PANEL OF THE
DRIVE ITSELF. THE DRIVE SELECT INDICATORS ARE LOCATED ON THE
FRONT PANEL OF THE UPRIGHT CABINET.

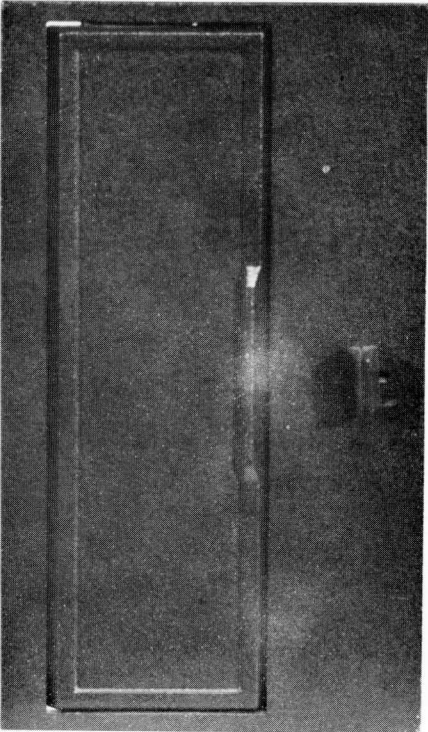II. CDC DRIVE (COMPONENT SIDE)

A. TEST POINTS (TP1 & TP2)

B. TERMINATOR CHIP TO BE IN DRIVE AT THE END OF THE DATA CABLE
(NORMALLY DRIVE Ø)

C. DRIVE SELECT SWITCHES. SWITCHES 1 & 2 ON, ALL OTHERS OFF =
DRIVE Ø. SWITCHES 3 & 4 ON, ALL OTHERS OFF = DRIVE 1.

D. CHIP U13 HAS 14 PINS. SYNC GOES TO PIN 9 (SECOND PIN FROM
THE TOP ON THE LEFT SIDE) USING A CHIP CLIP

E. AJUSTMENT FOR BURST TO INDEX.

I.   CDC DRIVE (FRONT)

II.   CDC DRIVE (COMPONENT SIDE)
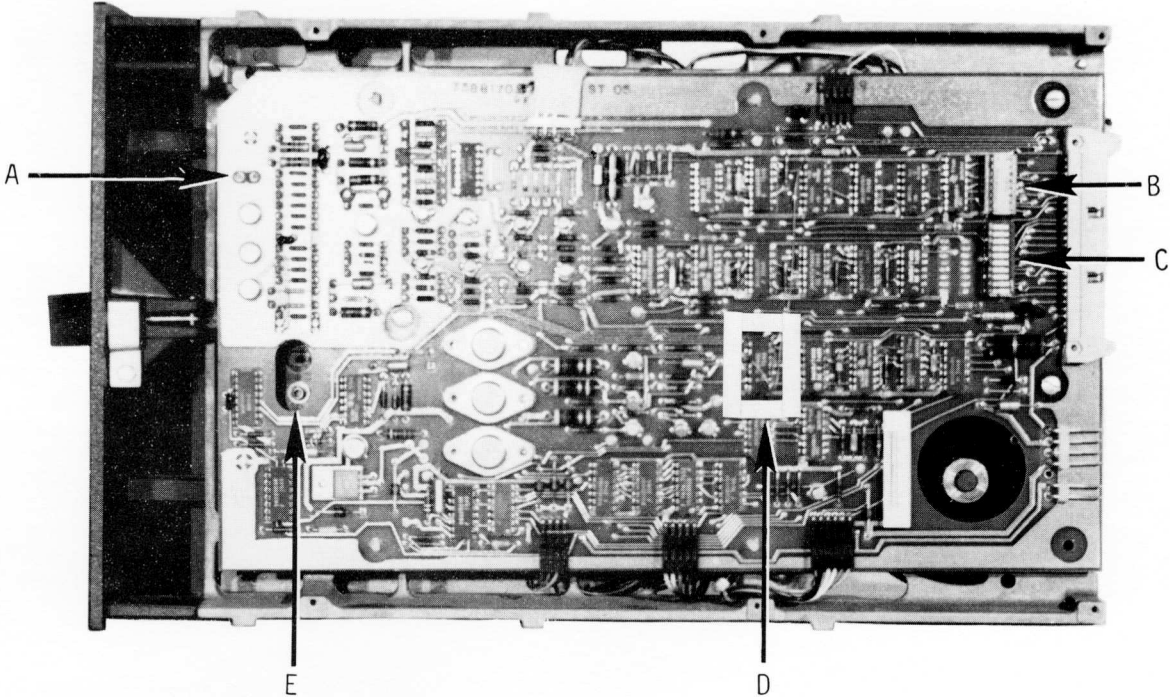
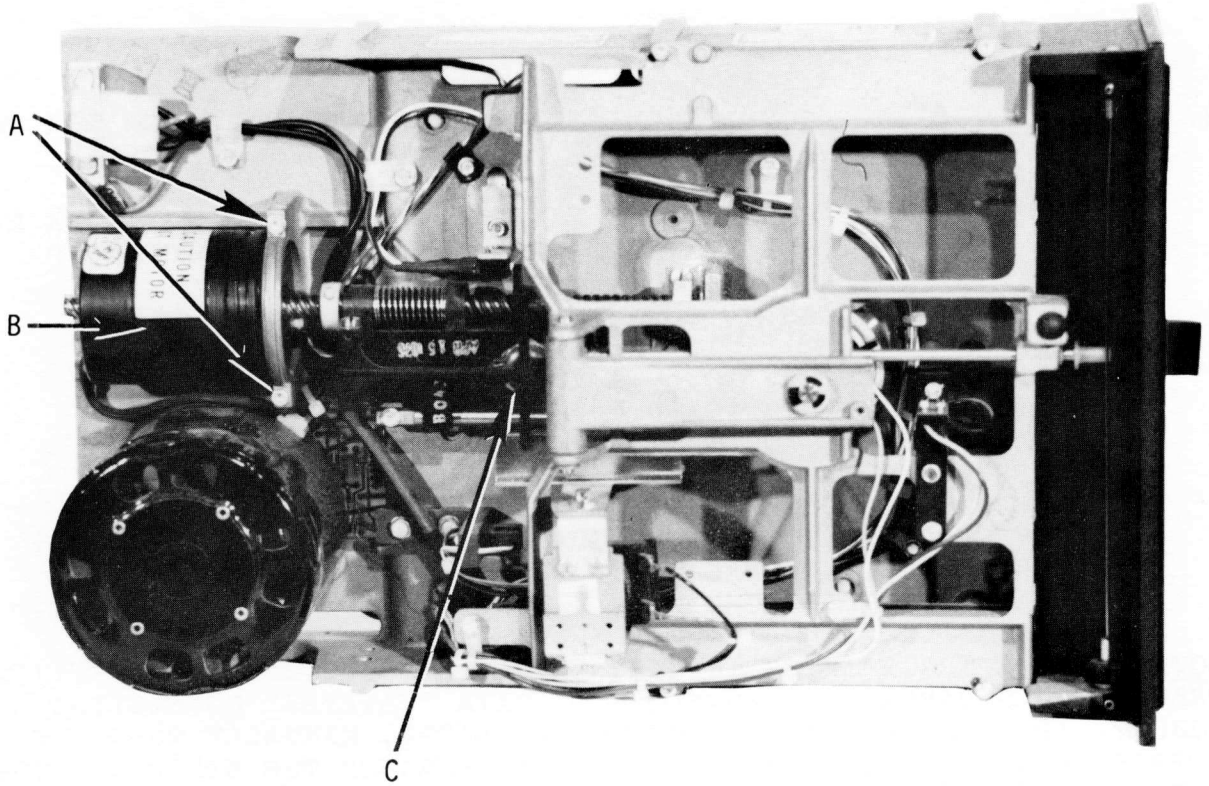III. CDC DRIVE (MECHANICAL SIDE)

   A. HEX SCREWS FOR LOOSENING MOTOR CLAMP FOR CATSEYE ADJUSTMENT

   B. STEPPER MOTOR FOR CATSEYE ADJUSTMENT
       NOTE: MOTOR DOES GET VERY HOT

   C. HEAD LOAD ARM. SWING ARM OUT TO INSPECT THE HEAD LOAD PAD
       (P/N 83460701-2)

III. CDC DRIVE (MECHANICAL SIDE)

## CDC ACTUATOR ALIGNMENT *- USE ALIGNMENT DISK*

1. STEP TO TRACK 38 (26H) AND PERFORM A READ.

2. <u>MODEL 75736110</u>   CONNECT CHANNEL 1 OF SCOPE TO TP1 ON THE PWA
    AND CHANNEL 2 TO TP2 ON THE PWA

    CONNECT THE EXTERNAL SYNC PROBE TO INDEX AT
    U13 PIN 9 ON PWA BY MEANS OF AN ICC CLIP

3. SET UP THE SCOPE AS FOLLOWS:

    CHANNEL 1: VOLTS/DIV TO: 0.1 VOLTS/DIV AC
    CHANNEL 2: VOLTS/DIV TO: 0.1 VOLTS/DIV (INVERTED) AC
    VERTICAL MODE TO: ADD
    SLOPE (SYNC) TO: POSITIVE
    TRIGGER SOURCE TO: EXTERNAL
    TRIGGER COUPLING TO: LOW FREQUENCY (HIGH FREQUENCY REJECT)
    TRIGGER MODE TO: NORMAL
    TIME BASE TO: ~~20 MSEC/DIV~~ → 20mS/DIV

<u>NOTE:</u>   SCOPE TRACE AFTER TRIGGER LEVEL IS ADJUSTED FOR REPETITIVE
TRACE SHOULD DISPLAY AN ENVELOPE OF DATA "CATEYES" CONSISTING OF TWO
LOBES.   IF NO SUCH PATTERN CAN BE DISPLAYED, MANUALLY TURN THE
STEPPER MOTOR SHAFT EXTENDING FROM THE REAR OF THE STEPPER MOTOR
ONE-QUARTER TURN EITHER WAY TO LOCATE PATTERN.   THEN PROCEED.

AMPLITUDE
DIFFERENCE
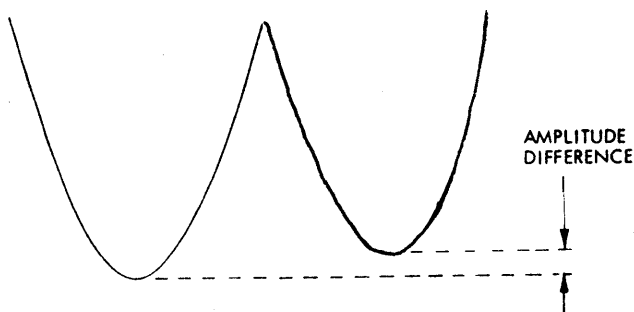
4. CHANGE THE VOLTS/DIV OF CHANNEL 1 AND CHANNEL 2 OF 0.02 VOLTS/
    DIV. MOVE THE TRACE ON THE SCOPE (POSITION KNOB) UP UNTIL THE
    BOTTOM OF THE TWO LOBES ARE SETTING APPROXIMATELY ON THE BASE
    LINE.   FOR AN ACCEPTABLY ALIGNED UNIT, THE VOLTAGE DIFFERENCE
    BETWEEN THE BOTTOMS OF BOTH LOBES MUST BE LESS THAN 5 MV.

CDC ACTUATOR ALIGNMENT (CONT.)

5. IF NOT IN ALIGNMENT, LOOSEN THE STEPPER MOTOR CLAMP MOUNTING
    SCREWS TO WHERE A GAP EXISTS BETWEEN THE CLAMP AND CASTING AND
    SLOWLY ROTATE THE STEPPER MOTOR TO ADJUST THE AMPLITUDE UNTIL
    THE AMPLITUDE OF BOTH LOBES IS THE SAME, THAT IS, THE DIFFERENCE
    BETWEEN THE BOTTOMS OF BOTH LOBES IS LESS THAN 5 MV.

6. TIGHTEN THE STEPPER MOTOR CLAMP. RETURN TO TRACK 00, THEN
    SEEK BACK TO TRACK 38. VERIFY THAT THE 5 MV SPECIFICATION IS
    STILL MET. IF THE SPECIFICATION IS NOT MET, READJUST THE
    STEPPER MOTOR, RETURN TO ZERO AND SEEK BACK TO TRACK 38. REPEAT
    THE ADJUSTMENT UNTIL THE 5 MV SPECIFICATION IS MET.

CDC BURST TO INDEX CHECK AND ADJUSTMENT

1. SEEK TO TRACK ZERO, THEN SEEK TO TRACK ONE, THEN READ.

2. MODEL 75736110   CONNECT CHANNEL 1 OF SCOPE TO TP1
                       CONNECT CHANNEL 2 OF SCOPE TO U13, PIN9 (USE IC
                       CLIP)

3. SCOPE SETTINGS   CHANNEL 1 VOLT/DIV TO: 0.1 VOLT/DIV
                       CHANNEL 2 VOLT/DIV TO: 2 VOLT/DIV

       CHANNEL 1 VOLTAGE TO: AC   SOURCE TO: CHANNEL 1
       CHANNEL 2 VOLTAGE TO: AC   COUPLING TO: LOW FREQUENCY
                                       (HIGH FREQUENCY REJECT)

       VERT. MODE TO: ADD   TRIG. MODE TO: NORMAL
       SLOPE (SYNC) TO: POS.   TIME BASE TO: 50 µS/DIV

4. ADJUST THE TIME FROM WRITE SPLICE BIT TO THE LEADING EDGE OF THE
    INDEX PULSE UNTIL IT MEASURES 450+100US (FROM 350US TO 550US).
    LOOSEN THE ALLEN HEAD SCREW HOLDING THE PHOTOTRANSISTOR LOCATED
    ON THE BOTTOM OF CHASSIS TOWARD THE FRONT OF THE UNIT. USING
    THE ADJUSTMENT HANDLE PROTRUDING THROUGH THE CASTING, MOVE THE
    PHOTOTRANSISTOR UNTIL THE SPECIFICATION IS MET. TIGHTEN THE
    ALLEN SCREW WHILE OBSERVING THE SCOPE SIGNAL. VERIFY THAT THE
    ADJUSTMENT DID NOT CHANGE.

5. SEEK TO TRACK ZERO THEN SEEK TO TRACK 76 AND READ. ADJUST THE
    SYNC LEVEL TO STABILIZE THE TRACE. VERIFY THE INDEX PULSE IS
    450+100US (FROM 350US TO 550US). IF NOT, PERFORM THE ADJUSTMENT
    ROUTINE AGAIN.

450 ± 100 µs

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I.   SHUGART FLOPPY DRIVE P/N 4500963-01

THE SHUGART FLOPPY DRIVE COMES IN 3 MODELS UNDER THE SAME PART
NUMBER. TWO MODELS (FIGURES III & IV) CAN BE USED AS EITHER
SINGLE OR DOUBLE DENSITY. ONE MODEL (FIGURE V) CAN ONLY BE USED
AS DOUBLE DENSITY, THEREFORE CAN NOT BE USED AS THE INTEGRAL
DRIVE IN A SERIES II. THE FRONT PANEL OF THE SHUGART CONTAINS A
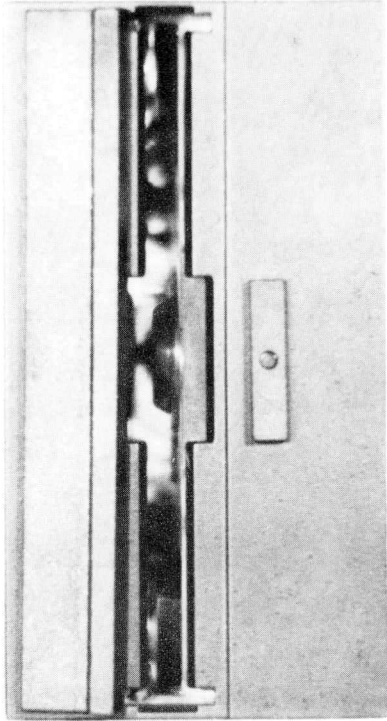DOOR RELEASE HANDLE AND A DRIVE SELECT INDICATOR.

II. SHUGART DRIVE (REAR)

A. MOTOR LOOSENING SCREWS FOR CATSEYE ADJUSTMENT

B. MOTOR PLATE ADJUSTMENT SCREWS FOR FINE AZIMUTH ADJUSTMENT

C. SCREWDRIVER PRY SLOT FOR GROSS AZIMUTH ADJUSTMENT

D. STEPPER MOTOR FOR CATSEYE ADJUSTMENT
    NOTE: MOTOR GETS VERY HOT

III. SHUGART DRIVE (COMPONENT SIDE) STANDARD SINGLE OR DOUBLE DENSITY
     DRIVE

A. TEST POINTS (TP1 & TP2)

B. JUMPER SELECTABLE LINE TERMINATION AND DRIVE SELECT
    T3, T4, T5, AND T6 JUMPERED FOR TERMINATION OF LAST DRIVE ON
    THE DATA CABLE (NORMALLY DRIVE Ø) DS1 JUMPERED FOR DRIVE Ø
    OR DS2 FOR DRIVE 1

C. TEST POINT FOR SYNC (TP12)

D. POTENTIOMETER FOR ADJUSTING BURST TO INDEX

I. SHUGART DRIVE (FRONT)   II. SHUGART DRIVE (REAR)
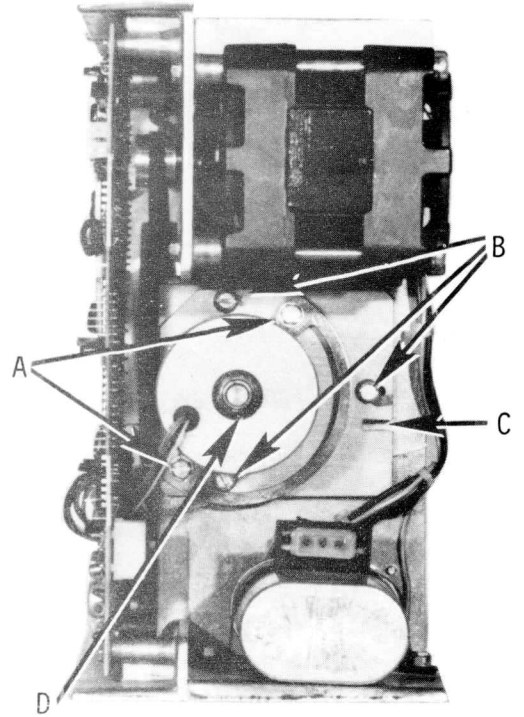
III. SHUGART DRIVE (COMPONENT SIDE)
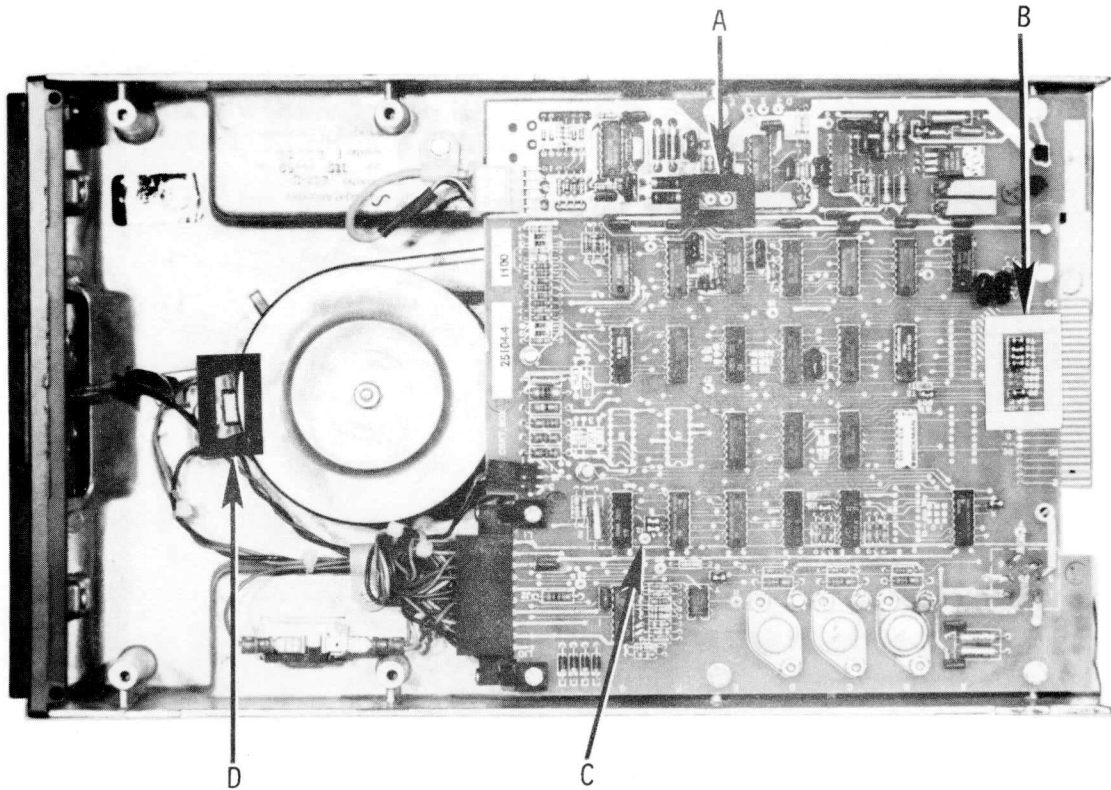
IV. SHUGART "SINGLE CHIP" DRIVE (COMPONENT DRIVE)

  A. TEST POINTS (TP1 & TP2)

 B. TERMINATION AND DRIVE SELECT JUMPERS

      1. T3, T4, T5, T6 JUMPERS IN FOR TERMINATION
          (LAST DRIVE ON DATA CABLE, NORMALLY Ø)

   2. JUMPER ON DS1 FOR DRIVE Ø; JUMPER ON DS2 FOR DRIVE 1

  C. TEST POINT (TP12 FOR SYNC)

  D. POTENTIOMETER FOR BURST TO INDEX ADJUSTMENT

  E. THE CHIP THAT GIVES THE DRIVE ITS NAME OF "SINGLE CHIP"
      DRIVE

V. SHUGART DOUBLE DENSITY ONLY DRIVE (COMPONENT SIDE)

  A. TEST POINTS (TP1 & TP2)

  B. MISSING COMPONENTS THAT IDENTIFY THIS AS A DOUBLE DENSITY
      ONLY DRIVE

  C. TERMINATION AND DRIVE SELECTION JUMPERS

      1. T3, T4, T5, T6 JUMPERS IN FOR TERMINATION
          (LOST DRIVE ON DATA CABLE, NORMALLY DRIVE Ø)

      2. JUMPER ON DS1 FOR DRIVE Ø; JUMPER ON DS2 FOR DRIVE 1

  D. TEST POINT (TP12 FOR SYNC)

  E. POTENTIOMETER FOR BURST TO INDEX ADJUSTMENT

IV. SHUGART DRIVE (COMPONENT SIDE)
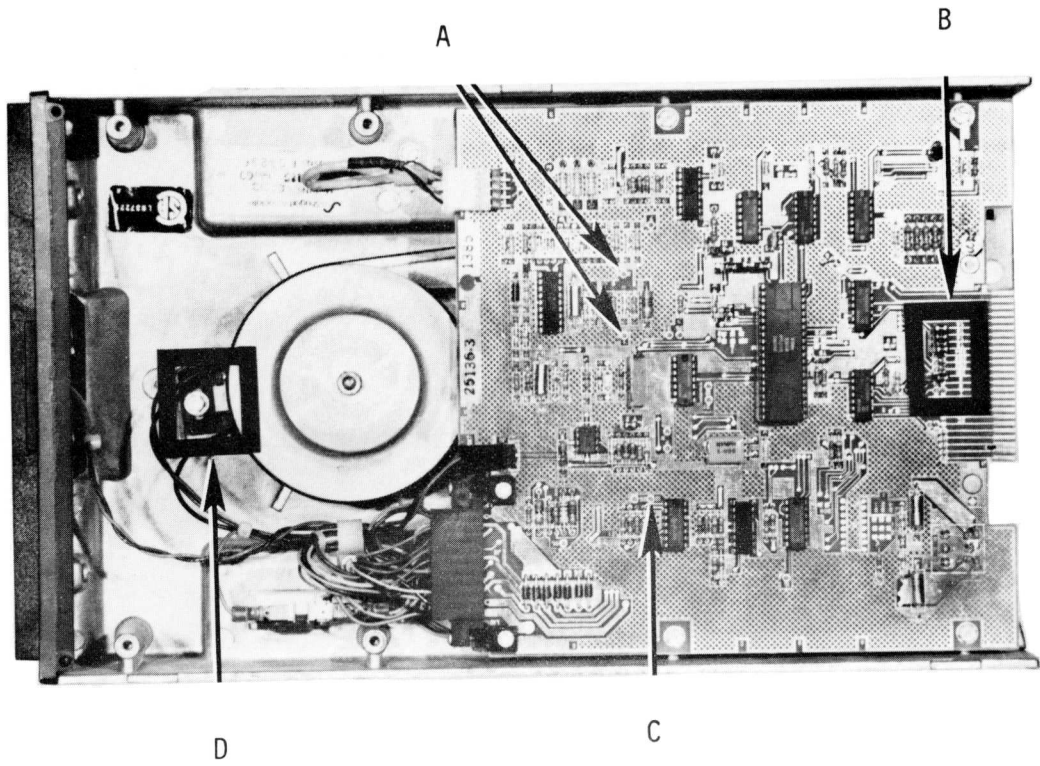
V. SHUGART DRIVE (COMPONENT SIDE)
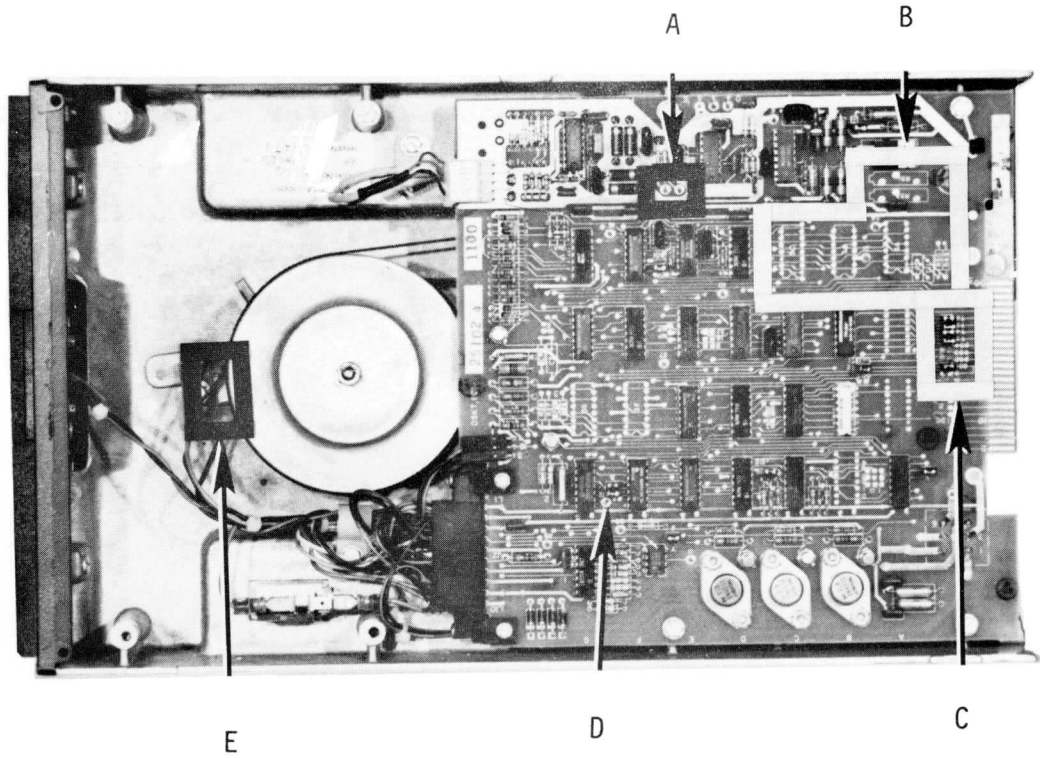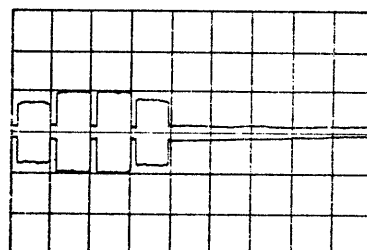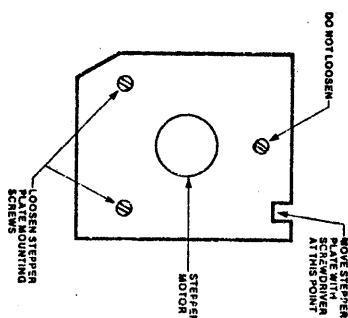
SHUGART R/W HEAD RADIAL ALIGNMENT

centering of drive head to tracks.

1. CONNECT CHANNEL A TO TP1

2. CONNECT CHANNEL B TO TP2

3. CONNECT SYNC TO TP12

4. SET UP SCOPE AS FOLLOWS:

    A. TIME BASE-20MS/DIV

    B. SYNC EXT-LEVEL TO: NEG.(-) *(SCOPE)*

    C. ADJUST TRIGGER LEVEL

    D. VERTICAL MODE TO: ADD *(A + B)*

    E. TRIGGER COUPLING TO: LOW FREQUENCY

    F. TRIGGER MODE TO: NORMAL

5. INSERT FORMATTED DISKETTE. STEP TO TRACK 26HEX ENTER A26 CR

6. REMOVE FORMATTED DISKETTE AND INSERT ALIGNMENT DISKETTE. ENTER RK CR

7. OBSERVE WAVEFORM. IF THE AMPLITUDE DIFFERENCE BETWEEN THE TWO LOBES IS LESS THAN 80% PROCEED TO STEP 8. IF THE AMPLITUDE DIFFERENCE IS EQUAL OR WITHIN 80% PROCEED WITH NEXT ALIGNMENT.

8. LOOSEN TWO MOUNTING SCREWS HOLDING THE MOTOR CLAMP TO THE MOUNTING PLATE.

9. SLOWLY ROTATE THE STEPPER MOTOR UNTIL BOTH LOBES ARE WITHIN TOLERANCE, THEN TIGHTEN THE MOUNTING SCREWS.

10. REPEAT STEPS 5 THROUGH 7 APPROACHING TRACK 26 FROM BOTH 0 AND 4C

SHUGART R/W HEAD AZIMUTH ALIGNMENT

1. CONNECT CHANNEL A TO TP1

2. CONNECT CHANNEL B TO TP2

3. CONNECT SYNC TO TP12

4. SET UP SCOPE AS FOLLOWS:

    A. TIME BASE-2MS/DIV

    B. SYNC EXT-LEVEL TO: NEG.(-) (SLOPE)

    C. VERTICAL MODE TO: ADD (A+B)

    D. TRIGGER COUPLING TO: LOW FREQUENCY

    E. TRIGGER MODE TO: NORMAL

    F. ADJUST TRIGGER LEVEL

5. INSERT FORMATTED DISKETTE. STEP TO TRACK 4C HEX ENTER A4C CR

6. REMOVE FORMATTED DISKETTE AND INSERT ALIGNMENT DISKETTE. ENTER RK CR

7. VERIFY THAT THE TWO MIDDLE AMPLITUDES APPEAR EQUAL AND THAT THE TWO OUTSIDE AMPLITUDES ARE LESS THAN THE ONES IN THE MIDDLE.

8. IF NOT, SLIGHTLY LOOSEN THE TWO STEPPER PLATE MOUNTINNG SCREWS.

9. USING A MEDIUM SCREWDRIVER, PRY ON THE STEPPER PLATE UNTIL THE TWO OUTSIDE AMPLITUDES ARE LESS THAN THE MIDDLE TWO.

10. TIGHTEN THE TWO STEPPER PLATE MOUNTING SCREWS.

11. IF EITHER OF THE TWO OUTSIDE AMPLITUDES INCREASE TO GREATER THAN THE TWO MIDDLE ONES, REPEAT STEPS 8 THROUGH 11.

12. PROCEED TO NEXT ALIGNMENT.

aligning drive head so it is exactly parallel to the disk. An "angled" or "crooked" head will increase disk wear.

SHUGART BURST TO INDEX ALIGNMENT

1. CONNECT CHANNEL A TO TP1

2. CONNECT CHANNEL B TO TP2

3. CONNECT SYNC TO TP12

4. SET UP SCOPE AS FOLLOWS:

   A. TIME BASE-50US/DIV

   B. SYNC EXT-LEVEL TO: NEG.(-)

   C. ADJUST TRIGGER LEVEL

   D. VERTICAL MODE TO: ADD $(A+B)$

   E. TRIGGER COUPLING TO: LOW FREQUENCY

   F. TRIGGER MODE TO: NORMAL

5. INSERT FORMATTED DISKETTE. STEP TO TRACK 1, ENTER Al CR

6. REMOVE FORMATTED DISKETTE

7. INSTALL ALIGNMENT DISKETTE, ENTER RK CR

8. VERIFY THAT THE ELAPSE TIME BETWEEN THE START OF THE SWEEP AND THE FIRST DATA PULSE IS 200 ± 100 US.

9. IF NOT, ADJUST THE POTENTIOMETER JUST IN FRONT OF THE SPINDLE.

Make sure the this is the true start of sweep. Check horizontal positioning.

200µS
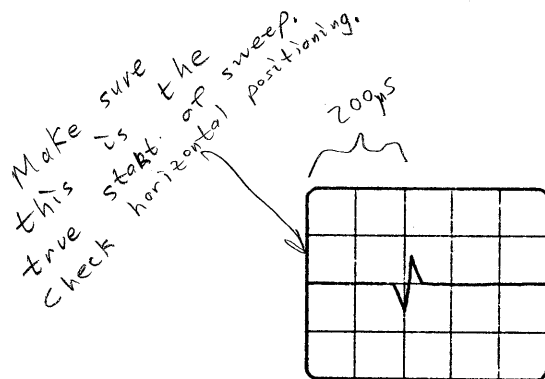
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I.   SIEMENS DRIVE P/N 4502558-03

     THE SIEMENS DRIVE IS BOTH SINGLE AND DOUBLE DENSITY. THE FRONT
     PANEL CONTAINS A DOOR RELEASE LATCH WITH A DRIVE SELECT
     INDICATOR. THE SIEMENS DRIVE DOOR WILL <u>NOT</u> CLOSE WITHOUT A
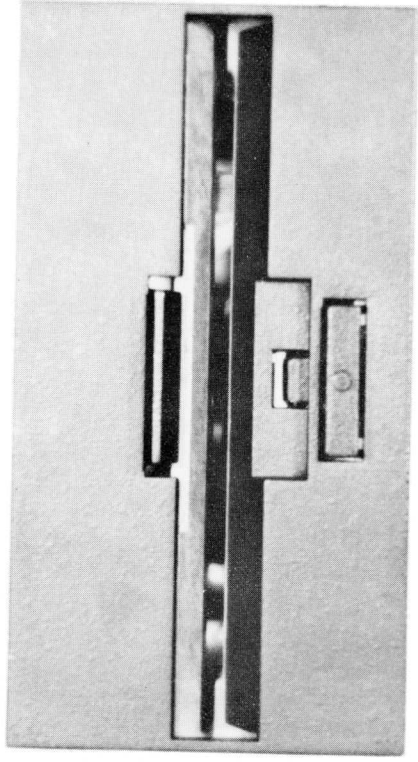   FLOPPY DISKETTE INSERTED.

II. SIEMENS DRIVE (REAR)

     A. STEPPER MOTOR USE IN CATSEYE ADJUSTMENT

     B. STEPPER MOTOR LOOSENING SCREWS

III. SIEMENS DRIVE (COMPONENT SIDE)

     A. TEST POINTS   (TP15 & TP16)

     B. TERMINATION CHIP (CHIP IS IN THE LAST DRIVE ON THE DATA
         CABLE, NORMALLY DRIVE Ø)

     C. DRIVE SELECT JUMPERS. JUMPER 0 TO OPT FOR DRIVE Ø OR 1 TO
         SEL FOR DRIVE 1. NOTE: IF BOTH JUMPERS ARE IN TOGETHER
         (NORMALLY 1 IS A JUMPER AND THE OTHER IS WIRE WRAPPED)
         REMOVE THE WIRE WRAP OR THE UNWANTED JUMPER AND SELECT THE
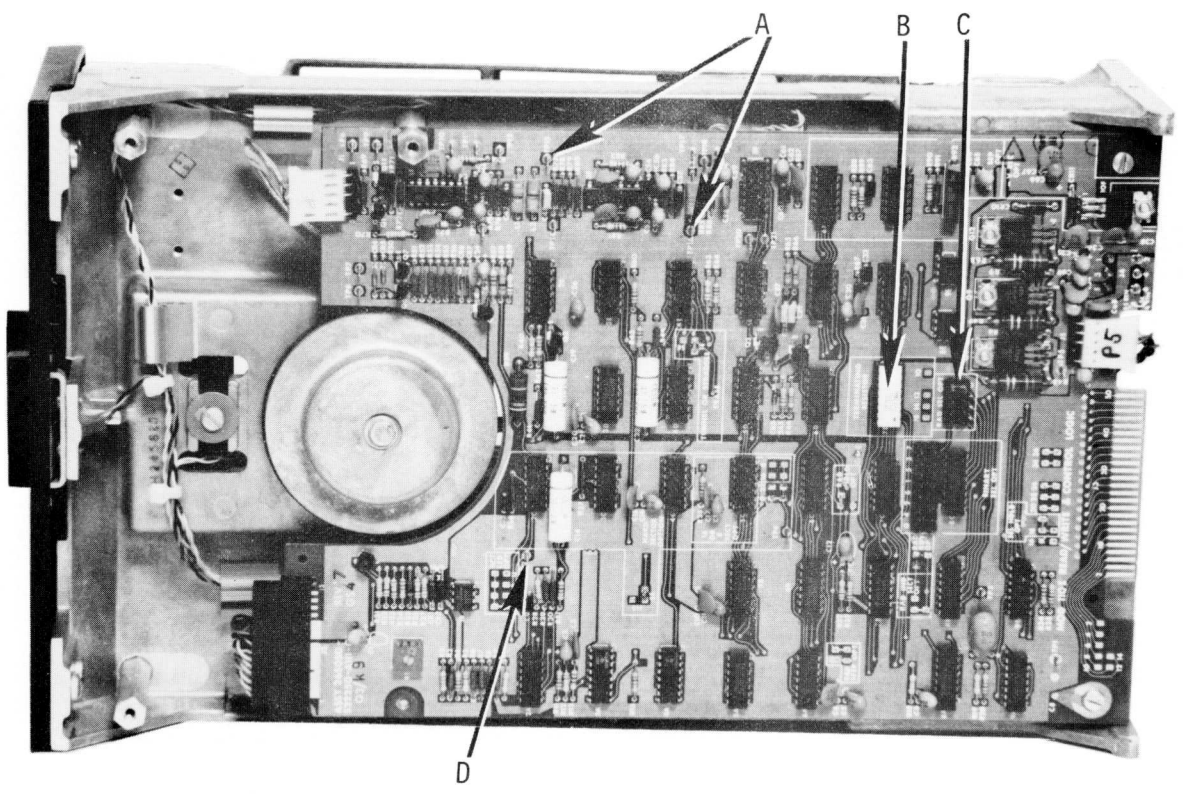   PROPER DRIVE JUMPER

     D. TEST POINT (TP2 FOR SYNC)

I. SIEMENS DRIVE (FRONT)   II. SIEMENS DRIVE (REAR)
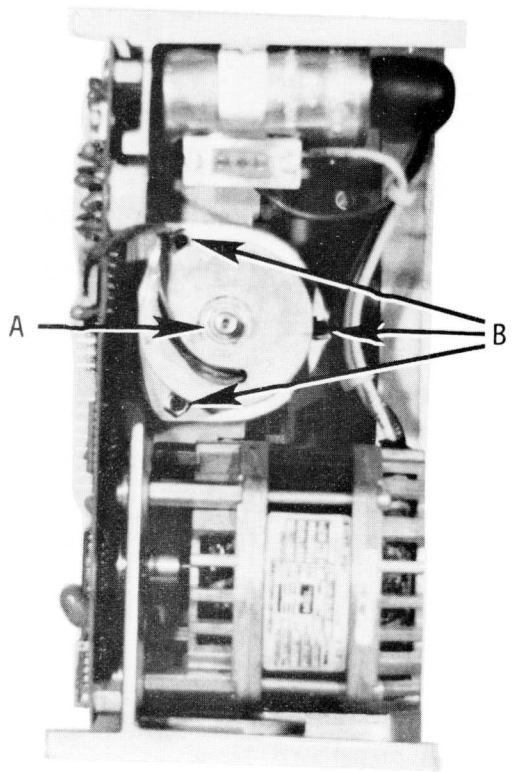
III. SIEMENS DRIVE (COMPONENT SIDE)

SIEMANS R/W HEAD RADIAL ALIGNMENT

1. SET UP SCOPE AS FOLLOWS:

    A. CHANNEL A TO TP15-VERTICAL TO 50MU/CM

    B. CHANNEL B TO TP16-VERTICAL TO 50MU/CM

    C. SYNC TO TP2-EXT-LEVEL POS (+)

    D. TIME BASE TO 20MS/CM

2. INSERT FORMATTED DISKETTE. STEP TO TRACK 26 HEX. ENTER A26 CR

3. REMOVE FORMATTED DISKETTE AND INSERT ALIGNMENT DISKETTE. ENTER RK CR

4. OBSERVE WAVEFORM. IF THE TWO LOBES ARE NOT EQUAL TO EACH OTHER, LOOSEN THE THREE MOTOR HOLDING SCREWS AND MANUALLY ROTATE STEPPER MOTOR UNTIL THE LOBES ARE EQUAL. THEN TIGHTEN THE THREE STEPPER MOTOR HOLDING SCREWS.

5. CONFIRM ALIGNMENT BY ACCESSING TRACK 26 HEX FROM BOTH DIRECTIONS

SIEMENS HEAD LOADING ADJUSTMENT

1. VERIFY THAT THE SIEMENS DRIVE LOADS AND UNLOADS THE HEAD BY
    INSERTING A FORMATTED DISKETTE AND CLOSING THE DOOR. THE HEAD
    LOAD PAD SHOULD NOT BE ON THE DISKETTE. IF IT IS, THEN ADJUST
    THE HEAD LOAD ADJUST SCREW UNTIL THE HEAD LOAD PAD IS OFF THE
    DISKETTE. IF THIS IS NOT ENOUGH, THEN CAREFULLY BEND THE SOLE-
    NOID BAIL EVENLY. VERIFY THE LOADS AND UNLOADS AT TRACK Ø AND
    4C HEX.
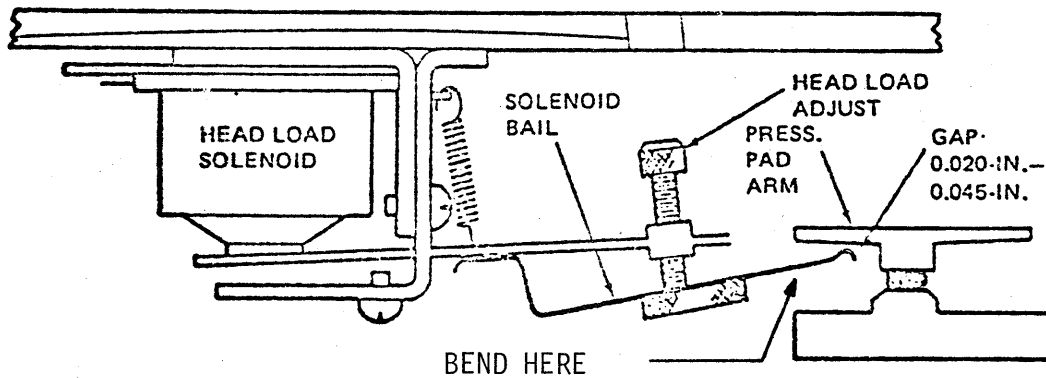
MDS71X, 72X, 73X (FLOPPY) PARTS LIST

SD CHANNEL PWA	1000467-03
SD INTERFACE PWA	1000603-01
DD CHANNEL PWA	1000467-05
DD INTERFACE PWA	1001036-05
MDS800 DUAL AUX CONT	1000515-01
SERIES II DUAL AUX CONT	1000751-01
SIG ADAP PWA DRV 0 (SHU UPRIGHT)	1001325-01
SIG ADAP PWA DRV 1 (SHU UPRIGHT)	1001325-02
SIG ADAP PWA (LOW PRO 7XX)	1002242-01
CDC FLOPPY 110V	4500613-01
CDC FLOPPY 220V	4500613-02
SHUGART FLOPPY 110V	4500963-01
SHUGART FLOPPY 220V	4500963-02
SIEMENS FLOPPY 110V	4502558-03

POWER SUPPLIES

UPRIGHT DRIVE	
FLOPPY MNFRM SUPPLY	4500527-01
CDC VER REQUIRES: A.C. HARN	4000529-01
D.C. HARN	4000530-01
STOCKED AS 98133	
SHUGART VER REQS: A.C. HARN	4000969-01
D.C. HARN	4000970-01
STOCKED AS CP155	
LOW PROFILE DRIVE (MDS 710, 720, 730)	4501498-02
(ALL VOLTAGES)	
A.C. POWER CORD	102196-001
FAN, 60 CMF (UPRIGHT)	102996-001
FAN, 35 CMF 3.12" SQ (LOW PRO 7XX)	102999-001

HEAD PADS

CDC DRIVE	83460701-2
SHUGART DRIVE	50542
FUSES UPRIGHT 3A 115V	102050-009
FUSES LOW PRO 2A 115V	102050-007

CABLES & STRAPS

S.D. CONTROLLER CABLE (SERIES II)	4001979-01
S.D. CONTROLLER CABLE (800)	4000522-01
S.D. PERIP CABLE-NEW (GRAY)	4001990-01
S.D. PERIP CABLE-OLD (BLACK) 4000521-01	4001990-01
D.D. CONTROLLER CABLE (SERIES II)	4002175-01
D.D. CONTROLLER CABLE (800)	4001113-01
D.D. PERIP CABLE-NEW (GRAY)	4002176-01
D.D. PERIP CABLE-TOO SHORT (GRAY) 4001499-01	4002176-01
D.D. PERIP CABLE-OLD (BLACK) 4001114-01 (•2)	4002176-01
SIGNAL CABLE (INTERNAL DATA CABLE FOR UPRIGHT)	4001000-01
SIGNAL CABLE (INTERNAL DATA CABLE FOR LOW PRO)	4001496-01
GROUND STRAPS (LOW PRO TO 22X)	3002282-01
GROUND STRAPS (LOW PRO TO 21X)	3002284-01
OFF/ON SWITCH - POWER ON LED & CABLING (LOW PRO)	4001612-02
OFF/ON SWITCH - POWER ON LED - DRIVE SELECT LEDS & CABLING (UPRIGHT)	4000535

MANUAL LIST

PRIMARY

1. INTELLEC DISKETTE OPERATING SYSTEMS   9800880-01
    MODELS 710/711/712, MODELS 720/721/722,
    AND MODELS 730/731/732 SERVICE INFORMATION
    (ONE FOR REPAIR CENTER)

SECONDARY

2. DOS REFERENCE MANUAL   9800212
    (SINGLE DENSITY)

3. INTELLEC DOUBLE DENSITY DOS   9800422
    HARDWARE REFERENCE MANUAL