<table>
<thead>
<tr>
<th>Error Description</th>
<th>Diagnostic Action</th>
</tr>
</thead>
</table>
| Control Panel     | 9. Remove forms from printer. Press the online switch. Does the alarm sound?  
YES: Go to step 10.  
NO: Measure for approximately $+5 \text{ Vdc}$ from pin CN6-18 on driver circuit card to ground pin on driver circuit card.  
Is there $+5 \text{ Vdc}$?  
YES: Replace print mechanism assembly. See Section 5, “Removal/Replacement and Adjustments.”  
NO: Measure for a voltage pulsing from 0 to $+12 \text{ Vdc}$ at pin 10 of control panel. Use pin 8 for ground. See Section 4, “Locations.” Power off and back on before taking voltage reading. It will only pulse eight times.  
Does voltage pulse 0 to $+12 \text{ Vdc}$?  
YES: Replace control panel. See Section 5, “Removal/Replacement and Adjustments.”  
NO: Replace control cards. See Section 5, “Removal/Replacement and Adjustments.” |
<table>
<thead>
<tr>
<th>Error Description</th>
<th>Diagnostic Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Panel</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10. Does the No Paper light go on?</td>
</tr>
<tr>
<td></td>
<td>YES: Control panel checks good. Return to page 3-1400-1, “Printer Entry.”</td>
</tr>
<tr>
<td></td>
<td>NO: Measure for approximately +10 to +12 Vdc at pin 3 of control panel.</td>
</tr>
<tr>
<td></td>
<td>Is there +12 Vdc?</td>
</tr>
<tr>
<td></td>
<td>YES: Replace both control cards. See Section 5, “Removal/Replacement and Adjustments.”</td>
</tr>
<tr>
<td></td>
<td>NO: Replace control panel. See Section 5, “Removal/Replacement and Adjustments.”</td>
</tr>
</tbody>
</table>

3-1400-34
Offline Diagnostic Test

Description

An offline diagnostic test can be run to verify correct operation of the printer mechanism (motors, ribbon drive, print head, etc.) and print quality. A sample of the ripple patterns is shown below.

Operating Procedure

Press and hold the line feed switch while you position the printer Power switch to ON.

To stop the test before it is completed:

Set the printer Power switch to OFF.

IBM 80 CPS Matrix Printer

IBM 80 CPS Graphics Printer
Synchronous Data Link Control (SDLC) Communications Adapter

You have entered this PIC because you have an 15XX error code or have identified a Synchronous Data Link Control (SDLC) communications failure.

1. Set the Power switch on the system unit (and expansion unit if attached) to Off.
2. Insert your Advanced Diagnostics diskette in drive A.
3. Set the Power switch on the expansion (if attached) and the system unit to On.

The screen shown below should be displayed.

---

The IBM Personal Computer
ADVANCED DIAGNOSTICS
Version 2.XX (C)Copyright IBM Corp 1981, 1982

SELECT AN OPTION

0 – RUN DIAGNOSTIC ROUTINES
1 – FORMAT DISKETTE
2 – COPY DISKETTE
3 – PREPARE SYSTEM FOR RELOCATION
9 – EXIT TO SYSTEM DISKETTE

ENTER THE ACTION DESIRED

? – HELP –

---

CONTINUE

3-1500-1
Follow the steps below to run the diagnostic routines.

1. Press 0 (RUN DIAGNOSTIC ROUTINES) then press Enter.

(Skip Step 2 if you only have one display adapter installed.)

2. Press Y or N (IS A MONITOR ATTACHED TO EVERY DISPLAY ADAPTER (Y/N) ?) then press Enter.

3. Press Y or N (IS THE LIST CORRECT (Y/N) ?) then press Enter. (If the list is not correct, follow the instructions on your display and correct the list before answering yes.)

4. Press 0 (RUN TESTS ONE TIME) then press Enter.

5. Select 15 (SDLC COMMUNICATIONS ADAPTER) then press Enter.

6. Press Y or N (IS AN IBM COMMUNICATIONS CABLE ATTACHED?) then press Enter.

The screen should now say to install the wrap plug on either the SDLC adapter, or on the IBM Communications Cable.

---

**TESTING – SDLC COMMUNICATIONS ADAPTER**

**IS AN IBM COMMUNICATIONS ADAPTER CABLE ATTACHED TO THE SDLC ADAPTER? (Y/N) y**

**DISCONNECT THE CABLE AT THE MODEM AND INSTALL THE WRAP PLUG ON THE END OF THE CABLE.**

**PRESS ENTER WHEN READY — —**

---

**IS AN IBM COMMUNICATIONS CABLE ATTACHED?**

**NO** Go to page 3-1500-4.

**YES**

3-1500-2
1. Refer to the figure below and install the wrap plug on the modem end of the IBM Communications Adapter Cable.
2. Press Enter to begin the test. The test may take up to 15 seconds.

**IBM Communications Adapter Wrap Plug (IBM Part 8529280)**

**DOES THE MESSAGE ON YOUR DISPLAY INSTRUCT YOU TO INSTALL THE WRAP PLUG ON THE SDLC ADAPTER?**

**NO**  Go to page 3-1500-5.

**YES**
1. Remove the communications cable (if attached) from the SDLC adapter.
2. Refer to the figure below and install the wrap plug on the SDLC adapter.
3. Press Enter to begin the test. The test may take up to 15 seconds.

DID THE TEST RUN WITHOUT AN ERROR?

NO If the error message says to replace the cable, do so. If it says to replace the SDLC adapter, do so. See Section 5, "Removal/Replacement and Adjustments.”

YES
You have gone through the PICs without solving your problem. The following steps should help you find additional audio or visual symptoms.

1. Check the entire system for loose or damaged connectors.
2. Return to page 3-2 and review "Start."
3. Select "UTILITIES" in the diagnostic menu, start an error log, and select "RUN TESTS MULTIPLE TIMES." This will allow you to operate the machine thoroughly and identify the failing symptom. When you have identified the symptom, go to page 3-2, "Start," or the appropriate PIC for the symptom you received.

If you have followed these procedures and still have an unsolved problem, you should seek technical assistance.
Fixed Disk Drive

You have entered this PIC because you have a 17XX error code or have identified a fixed disk drive problem.

**WARNING:** Normal shipping and handling can result in permanent loss of all data and formatting on the fixed disk drive(s). It is recommended that all files be backed up onto diskettes.

1. Set the Power switch on the system unit and expansion unit to Off.
2. Load your Advanced Diagnostics diskette in drive A.
3. Set the Power switch on the expansion unit and system unit to On.
4. After the diskette loads, press 0 (RUN DIAGNOSTIC ROUTINES).
5. Verify the installed devices. If any devices are missing from the installed devices list, follow the instructions on the display to add the missing options.
6. When the SYSTEM CHECKOUT Menu is displayed, select 0 (RUN TESTS ONE TIME).

The following screen is displayed:

```
1 - SYSTEM BOARD
18 - EXPANSION OPTION
2 - 512KB MEMORY
3 - KEYBOARD
4 - MONOCHROME & PRINTER ADAPTER
6 - 1 DISKETTE DRIVE(S) AND ADAPTER
9 - PRINTER ADAPTER
11 - ASYNC COMMUNICATIONS ADAPTER
17 - 2 FIXED DISK DRIVE(S) & ADAPTER
14 - 2 MATRIX PRINTER

ENTER THE NUMBER(S) OF OPTIONS TO TEST OR PRESS ENTER TO SELECT ALL OPTIONS
```

CONTINUE

3-1700-1
1. Select 17 (FIXED DISK DRIVE AND ADAPTER) and then press Enter.

The fixed disk drive adapter is then tested, if the test completes without an error the following is displayed.

```
TESTING – X FIXED DISK DRIVE(S) & ADAPTER

0 – RUN FIXED DISK TEST
1 – RUN MEASUREMENTS TEST
2 – FORMAT FIXED DISK
9 – EXIT FIXED DISK TESTS

ENTER THE ACTION DESIRED? – 
```
If your system only has one fixed disk drive, go to page 3-1700-4.

1. Set the Power switch on the system unit and expansion unit to Off.
2. Disconnect the data connector J3 and control connector J1 from fixed disk drive D (see Section 4, "Locations").
3. Load your Advanced Diagnostics diskette in drive A.
4. Set the Power switch on the expansion unit and system unit to On.
5. After the diskette loads, press 0 (RUN DIAGNOSTIC ROUTINES).
6. Verify the installed devices. If any devices are missing from the installed devices list, follow the instructions on the display to add the missing options.
7. Press 0 (RUN TESTS ONE TIME) then press Enter.
8. Select 17 (FIXED DISK DRIVE AND ADAPTER) and then press Enter.

The following screen is displayed:

```
TESTING – X FIXED DISK DRIVE(S) & ADAPTER

0 – RUN FIXED DISK TEST
1 – RUN MEASUREMENTS TEST
2 – FORMAT FIXED DISK
9 – EXIT FIXED DISK TESTS

ENTER THE ACTION DESIRED ? – ½ –
```

CONTINUE
1. Press 0 (RUN FIXED DISK TEST) and then press Enter.
2. When "ENTER DRIVE ID (C/D)" is displayed, press C (for drive C) then press Enter.
3. When "DO YOU WANT TO PERFORM FIXED DISK WRITE TESTS ON DRIVE C: (Y/N)" is displayed, press Y (yes) or N (no) and then Enter.

The following message should be displayed:

```
PERFORMING SEEK TEST
PERFORMING WRITE TEST
PERFORMING TRACK ZERO TEST
PERFORMING SURFACE SCAN
PLEASE STAND BY

0 – RUN FIXED DISK TEST
1 – RUN MEASUREMENTS TEST
2 – FORMAT FIXED DISK
9 – EXIT FIXED DISK TESTS

ENTER THE ACTION DESIRED? – \n```

**DID THE TEST COMPLETE WITHOUT AN ERROR?**

**NO** If the error prompt is "REPLACE DRIVE C", go to page 3-1700-11 and format drive C. If the error prompt is "CHECK DRIVE C: AND ADAPTER", go to the next page.

**YES** Go to page 3-1700-11 and format drive D.
1. Set the Power switch on the system unit and expansion unit to Off.
2. Remove fixed disk drive C from the expansion unit. See Section 5, "Removal/Replacement and Adjustments."
3. Set the fixed disk drive on the power supply cover so that the logic board faces up and the face plate faces the right side of the unit as shown below.
4. Reconnect control connector J1, data connector J2, and the power connector.
1. Load your Advanced Diagnostics diskette in drive A.
2. Set the Power switch on the expansion unit and system unit to On.
3. After the diskette loads, press 0 (RUN DIAGNOSTIC ROUTINES) then press Enter.
4. Verify the installed devices. If the fixed disk drive is missing from the installed devices list, follow the instructions on the display to add option 17 (fixed disk drive).
5. When the SYSTEM CHECKOUT Menu is displayed, press 0 (RUN TESTS ONE TIME) then Enter.

The following screen is displayed:

1 - S SYSTEM BOARD
18 - S EXPANSION OPTION
2 - S 128KB MEMORY
3 - S KEYBOARD
4 - S MONOCROME & PRINTER ADAPTER
6 - S 1 DISKETTE DRIVE(S) AND ADAPTER
9 - S PRINTER ADAPTER
11 - S ASYNC COMMUNICATIONS ADAPTER
17 - E 2 FIXED DISK DRIVE(S) & ADAPTER
14 - S MATRIX PRINTER

ENTER THE NUMBER(S) OF OPTIONS TO TEST OR PRESS ENTER TO SELECT ALL OPTIONS
1. Select 17 (FIXED DISK DRIVE AND ADAPTER) and then press Enter.
2. Press 1 (RUN MEASUREMENTS TEST) then press Enter.
3. When "ENTER DRIVE ID (C/D)?" is displayed, press C then press Enter.
4. Measurement Test 1 is now running. Take the voltage readings at the power connector lands indicated below. Do not press any keys on the keyboard until you are instructed to do so by the PIC.

<table>
<thead>
<tr>
<th>Fixed Disk Drive Power Connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min Vdc</td>
</tr>
<tr>
<td>+ 4.8</td>
</tr>
<tr>
<td>+11.5</td>
</tr>
</tbody>
</table>

ARE THE VOLTAGES CORRECT?

NO  Go to PIC 3-020-1, "Power."

YES
With Measurement Test 1 still running, measure the voltages for a high or low reading as indicated in tables A and B.

**Note:** A High reading is 2.5 Vdc to 3.0 Vdc. A Low reading is .1 Vdc to .5 Vdc.

<table>
<thead>
<tr>
<th>Table A</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Connector</td>
<td>Pin</td>
<td>Voltage</td>
</tr>
<tr>
<td>J1</td>
<td>2</td>
<td>Low</td>
</tr>
<tr>
<td>J1</td>
<td>4</td>
<td>Low</td>
</tr>
<tr>
<td>J1</td>
<td>14</td>
<td>Low</td>
</tr>
<tr>
<td>J1</td>
<td>18</td>
<td>Low</td>
</tr>
<tr>
<td>J1</td>
<td>26</td>
<td>Low</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table B</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Connector</td>
<td>Pin</td>
<td>Voltage</td>
</tr>
<tr>
<td>J1</td>
<td>8</td>
<td>Low</td>
</tr>
<tr>
<td>J1</td>
<td>10</td>
<td>Low</td>
</tr>
<tr>
<td>J1</td>
<td>12</td>
<td>High</td>
</tr>
<tr>
<td>J1</td>
<td>22</td>
<td>Low</td>
</tr>
</tbody>
</table>

**Control Connector J1**

**Type 1**

**Type 2**

**ARE THE VOLTAGES IN TABLES A AND B CORRECT?**

**NO** If any of the voltages in Table A are incorrect, check the fixed disk cable then replace the fixed disk adapter.
If any of the voltages in Table B are incorrect, go to page 3-1700-11 and format drive C.
If both tables have incorrect voltages, replace the fixed disk adapter. See Section 5, "Removal/Replacement and Adjustments."

**YES**

3-1700-8
1. Press the spacebar once. "MEASUREMENT TEST 2 RUNNING" is now displayed on your screen. Do not press another key or spacebar until instructed to do so by the PIC.

2. Measure the voltages for a high or low reading as indicated in tables C and D.

Note: A High reading is 2.5 Vdc to 3.0 Vdc. A Low reading is .1 Vdc to .5 Vdc.

<table>
<thead>
<tr>
<th>Table C</th>
<th>Table D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connector</td>
<td>Pin</td>
</tr>
<tr>
<td>J1</td>
<td>24</td>
</tr>
<tr>
<td>J1</td>
<td>26</td>
</tr>
<tr>
<td>J1</td>
<td>34</td>
</tr>
</tbody>
</table>

ARE THE VOLTAGES IN TABLES C AND D CORRECT?

NO If any of the voltages in Table C are incorrect, check the fixed disk cable then replace the fixed disk adapter.
   If any of the voltages in Table D are incorrect, go to page 3-1700-11 and format drive C.
   If both tables have incorrect voltages, replace the fixed disk adapter. See Section 5, "Removal/Replacement and Adjustments."

YES
1. Press the spacebar once. "MEASUREMENT TEST 3 RUNNING" is now displayed on your screen. Do not press another key or spacebar until you complete the measurement test.

2. Measure the voltages for a high or low reading as indicated in tables E and F.

   **Note:** A High reading is 2.5 Vdc to 3.0 Vdc. A Low reading is .1 Vdc to .5 Vdc.

### Table E

<table>
<thead>
<tr>
<th>Connector</th>
<th>Pin</th>
<th>Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>J1</td>
<td>6</td>
<td>Low</td>
</tr>
</tbody>
</table>

### Table F

<table>
<thead>
<tr>
<th>Connector</th>
<th>Pin</th>
<th>Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>J1</td>
<td>12</td>
<td>Low</td>
</tr>
</tbody>
</table>

---

**ARE THE VOLTAGES IN TABLES E AND F CORRECT?**

**NO** If the voltage in Table E is incorrect, check the fixed disk cable then replace the fixed disk adapter.

If the voltage in Table F is incorrect, go to page 3-1700-11 and format drive C.

If the voltages in both tables are incorrect, replace the fixed disk adapter. See Section 5, "Removal/Replacement and Adjustments."

**YES** Go to page 3-1700-14.
You have entered this page because you have identified a failing fixed disk drive. Before replacing a drive, you should try to format that drive first, then rerun diagnostics. Since all data on the fixed disk drive is destroyed during format, this should be the very last step taken before replacing a drive. After you format a fixed disk drive, the lost data can be loaded from the backup diskette onto the fixed disk drive.

**To Format a Fixed Disk Drive**

**WARNING:** All data on the fixed disk drive will be destroyed when formatted. Before loading data from backup diskettes, refer to the DOS manual for a description of the FDISK, FORMAT, BACKUP and RESTORE commands.

1. Set the Power switch on the system unit to Off.
2. Install any fixed disk drives and reconnect any data/control connectors that were removed while testing.
3. Load your Advanced Diagnostics diskette in drive A.
4. Set the Power switch on the expansion unit and system unit to On.
5. After the diskette loads, press 0 (RUN DIAGNOSTIC ROUTINES) then press Enter.
1. Verify the installed devices. If any devices are missing from the installed devices list, follow the instructions on the display to add the missing options.

2. When the SYSTEM CHECKOUT menu is displayed, press 0 (RUN TEST ONE TIME) then Enter.

3. Select 17 (FIXED DISK DRIVE AND ADAPTER) then press Enter.

The following screen is displayed:

```
TESTING - X FIXED DISK DRIVE(S) & ADAPTER

0 - RUN FIXED DISK TEST
1 - RUN MEASUREMENTS TEST
2 - FORMAT FIXED DISK
9 - EXIT FIXED DISK TESTS

ENTER THE ACTION DESIRED?  
```

CONTINUE
1. Press 2 (FORMAT FIXED DISK) then press Enter.
2. When “ENTER DRIVE ID (C/D)” is displayed, press C or D (depending on which drive you want to format) then press Enter.
3. When “ARE YOU SURE YOU WANT TO CONTINUE (Y/N)” is displayed, press Y then press Enter.
4. After the format routine completes, go to page 3-1700-1 and rerun fixed disk diagnostics. Then return to this page and answer the question below.

DID THE ERROR REMAIN AFTER USING THE FORMAT ROUTINE?

**NO** The problem has been corrected and the backup data can be loaded from diskette.

**YES** Replace the fixed disk drive that failed. See Section 5, “Removal/Replacement and Adjustments.”
You have gone through the PICs without solving your problem. The following steps should help you find additional audio or visual symptoms.

1. Check the entire system for loose or damaged connectors.
2. Return to page 3-2 and review “Start.”
3. Select “UTILITIES” in the diagnostic menu, start an error log, and select “RUN TESTS MULTIPLE TIMES.” This will allow you to operate the machine thoroughly and identify the failing symptom. When you have identified the symptom, go to page 3-2, “Start,” or the appropriate PIC for the symptom you received.

If you have followed these procedures and still have an unsolved problem, you should seek technical assistance.

3-1700-14
Expansion Unit

You have entered this PIC because you were unable to complete the POST, you have an 18XX error code, or you suspect the expansion unit is failing. Make sure that all cables are seated correctly.

1. Set the Power switch on the system unit and expansion unit to Off.
2. Insert your Advanced Diagnostics diskette in drive A.
3. Set the Power switch on the expansion unit to On.
4. Set the Power switch on the system unit to On.
5. Proceed with running diagnostic routines, verify installed devices, and choose the system checkout you desire.
6. Select 18 (EXPANSION OPTION) then press Enter.

You may receive an error message similar to the one below.

```
TESTING - EXPANSION OPTION
X:XX:XX
ERROR - EXPANSION OPTION 18XX S
Data - XXXX = XX / XX SW = X
PRESS ENTER TO CONTINUE
```

DID YOU GET AN 18XX ERROR CODE SIMILAR TO THE ONE ABOVE?

NO  Go to page 3-2 "Start."

YES
Find the error code listed below.

<table>
<thead>
<tr>
<th>Error Code</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1810</td>
<td>3-1800-3</td>
</tr>
<tr>
<td>1811</td>
<td>3-1800-3</td>
</tr>
<tr>
<td>1812</td>
<td>3-1800-3</td>
</tr>
<tr>
<td>1813</td>
<td>3-1800-3</td>
</tr>
<tr>
<td>1814</td>
<td>3-1800-3</td>
</tr>
<tr>
<td>1815</td>
<td>3-1800-3</td>
</tr>
<tr>
<td>1816</td>
<td>3-1800-3</td>
</tr>
<tr>
<td>1817</td>
<td>3-1800-3</td>
</tr>
<tr>
<td>1818</td>
<td>3-1800-3</td>
</tr>
<tr>
<td>1819</td>
<td>3-1800-12</td>
</tr>
<tr>
<td>1820</td>
<td>3-1800-4</td>
</tr>
<tr>
<td>1821</td>
<td>3-1800-4</td>
</tr>
</tbody>
</table>

Go to the page listed in the table above for your error code.

3-1800-2
1. Set the Power switch on the system unit and expansion unit to Off.
2. Disconnect the expansion cable at the system unit.
3. Make sure the Advanced Diagnostics diskette is loaded.
4. Set the Power switch on the system unit to On.
5. Proceed with running diagnostic routines, verify your installed devices and, choose the system checkout desired.
6. Select 18 (EXPANSION OPTION) then press Enter.

**DID YOU GET AN 1820 ERROR CODE?**

**NO** Replace the extender card. See Section 5, "Removal/Replacement and Adjustments."

**YES**
1. Set the Power switch on the system unit and expansion unit to Off.
2. Connect the expansion cable at the system unit. (If it was removed in an earlier step.)
3. Remove all option adapters from the expansion unit, except the receiver card.
4. Make sure the Advanced Diagnostics diskette is loaded.
5. Set the Power switch on the expansion unit to On.
6. Set the Power switch on the system unit to On.
7. Proceed with running diagnostic routines, verify devices installed, and choose the system checkout desired.
8. Select 18 (EXPANSION OPTION) then press Enter.

**TESTING – EXPANSION OPTION**

X:XX:XX

**ERROR – EXPANSION OPTION** 18XX S

Data – XXXX = XX / XX  SW = X

PRESS ENTER TO CONTINUE

DID YOU GET AN 18XX ERROR CODE?

**NO** Go to page 3-1800-11.

**YES**
You may have a voltage problem.

1. Set your multimeter to the 12 Vdc scale.
2. Check the expansion board power connector for the voltages listed in the table.

<table>
<thead>
<tr>
<th>Voltage Connectors</th>
<th>Min Vdc</th>
<th>Max Vdc</th>
<th>-Lead</th>
<th>+ Lead</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.4</td>
<td>5.2</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>4.8</td>
<td>5.2</td>
<td>5</td>
<td>10</td>
</tr>
</tbody>
</table>

ARE ANY OF THE VOLTAGES NOT WITHIN THE CORRECT VALUES?

**NO** Replace the receiver card. See Section 5, “Removal/Replacement and Adjustments.”

**YES**
1. Set the Power switches on the system unit and expansion unit to Off.
2. Remove the power connector from the right side fixed disk drive.
3. Set the Power switch on the expansion unit to On.
4. Set the Power switch on the system unit to On.

---

**DID THE FAILING SYMPTOM REMAIN?**

**NO** Replace the right side fixed disk drive assembly. See Section 5, "Removal/Replacement and Adjustments."

**YES**
Note: If you only have one fixed disk drive, continue on the next page.

1. Set the Power switches on the system unit and expansion unit to Off.
2. Remove the power connector from the left side fixed disk drive.
3. Set the Power switch on the expansion unit to On.
4. Set the Power switch on the system unit to On.

DID THE FAILING SYMPTOM REMAIN?

NO Replace the left side fixed disk drive assembly. See Section 5, "Removal/Replacement and Adjustments."

YES
Check the rest of the power supply output voltages to the expansion board.

1. Set your multimeter to the 12 Vdc scale.
2. Check the expansion board power connector for the voltages listed in the table.

<table>
<thead>
<tr>
<th>Voltage Connectors</th>
<th>Min Vdc</th>
<th>Max Vdc</th>
<th>-Lead</th>
<th>+ Lead</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4.5</td>
<td>5.4</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>11.5</td>
<td>12.6</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>10.8</td>
<td>12.9</td>
<td>4</td>
<td>8</td>
</tr>
</tbody>
</table>

ARE THE VOLTAGES WITHIN THE CORRECT VALUES?

**NO** Replace the expansion unit power supply. See Section 5, “Removal/Replacement and Adjustments.”

**YES**

3-1800-8
Check the fixed disk drive voltages.

1. Reconnect the fixed disk drive power supply connectors.
2. Refer to the diagram below for the proper voltage readings. You should get the same readings on both fixed disk drive connectors.

<table>
<thead>
<tr>
<th>Fixed Disk Drive Connector</th>
<th>Min Vdc</th>
<th>Max Vdc</th>
<th>-Lead</th>
<th>+ Lead</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4.8</td>
<td>5.2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>11.5</td>
<td>12.6</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

ARE THE VOLTAGES WITHIN THE CORRECT VALUES?

NO  Replace the expansion unit power supply. See Section 5, “Removal/Replacement and Adjustments.”

YES

3-1800-9
1. Set the Power switch on the system unit and the expansion unit to Off.
2. Set your multimeter to the Ohms × 1 scale.
3. Remove all option adapters (including the receiver card) from the expansion slots in the expansion unit.
4. Remove the expansion board power connectors and take resistance measurements on the expansion board pins listed in the table.

<table>
<thead>
<tr>
<th>- Lead</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>8</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ Lead</td>
<td>3</td>
<td>4</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>Minimum Resistance</td>
<td>ohms</td>
<td>ohms</td>
<td>ohms</td>
<td>ohms</td>
<td>ohms</td>
<td>ohms</td>
</tr>
</tbody>
</table>

**ARE ANY OF THE RESISTANCE MEASUREMENTS BELOW THE MINIMUM SHOWN IN THE TABLE?**

**NO** Replace the expansion unit power supply. See Section 5, "Removal/Replacement and Adjustments."

**YES** Replace the expansion board. See Section 5, "Removal/Replacement and Adjustments."

3-1800-10
One of the option adapters plugged into the expansion board may be failing.

1. Set the Power switches on the system unit and the expansion unit to Off.
2. Replace one option adapter.
3. Make sure the Advanced Diagnostics diskette is loaded.
4. Set the Power switch on the expansion unit to On.
5. Set the Power switch on the system unit to On.
6. Proceed with running diagnostic routines, verify installed devices, and choose the system checkout you desire.
7. Select 18 (EXPANSION OPTION) then press Enter.

TESTING – EXPANSION OPTION
X:XX:XX
ERROR – EXPANSION OPTION 18XX S
  Data – XXXX = X / X  SW = X
PRESS ENTER TO CONTINUE
?

DID YOU GET AN 18XX ERROR CODE?

NO  Repeat the steps above until the failing option adapter is found.

YES Replace the option adapter you just plugged in the expansion board. See Section 5, “Removal/Replacement and Adjustments.”

3-1800-11
Your screen will look similar to the one below. Verify that the switch settings on the extender card correctly reflect the "Memory Segment." Use the "Extender Card Switch Settings" chart in Section 6.

"Memory Segment"

<table>
<thead>
<tr>
<th>TESTING - EXPANSION OPTION</th>
<th>1819 S</th>
</tr>
</thead>
<tbody>
<tr>
<td>X:XX:XX</td>
<td></td>
</tr>
<tr>
<td>ERROR - EXPANSION OPTION</td>
<td></td>
</tr>
<tr>
<td>Data - XXXX = X</td>
<td>X SW = X</td>
</tr>
<tr>
<td>PRESS ENTER TO CONTINUE</td>
<td></td>
</tr>
<tr>
<td>?</td>
<td></td>
</tr>
</tbody>
</table>

ARE THE EXTENDER CARD SWITCHES SET TO CORRECTLY REFLECT THE "MEMORY SEGMENT"?

NO  Set the extender card switches to reflect the correct "Memory Segment."

YES Replace the extender card. See Section 5, "Removal/Replacement and Adjustments."

3-1800-12
Binary Synchronous Communications (BSC)

You have entered this PIC because you have a 20XX error code or have identified a problem with binary synchronous communications (BSC).

1. Check that the jumpers are set correctly on the BSC adapter(s). See Section 4, "Locations."
2. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
3. Insert your Advanced Diagnostics diskette in drive A.
4. Set the Power switch on the expansion unit (if attached) and the system unit to On.

The menu below should be displayed.

---

The IBM Personal Computer
ADVANCED DIAGNOSTICS
Version 2.XX (C)Copyright IBM Corp 1981,1982

SELECT AN OPTION

0 – RUN DIAGNOSTIC ROUTINES
1 – FORMAT DISKETTE
2 – COPY DISKETTE
3 – PREPARE SYSTEM FOR RELOCATION
9 – EXIT TO SYSTEM DISKETTE

ENTER THE ACTION DESIRED
?

---

CONTINUE

3-2000-1
Follow the steps below to run the diagnostic routines.

1. Press 0 (RUN DIAGNOSTIC ROUTINES) then press Enter.

(Skip Step 2 if you have only one display adapter installed.)

2. Press Y or N (IS A MONITOR ATTACHED TO EVERY DISPLAY ADAPTER (Y/N)?) then press Enter.

3. Press Y or N (IS THE LIST CORRECT (Y/N)?) then press Enter. (If the list is not correct, follow the instructions on your screen and correct the list before answering yes.)

4. Press 0 (RUN TESTS ONE TIME) then press Enter.

5. Select 20 (BSC ADAPTER) then press Enter.

6. Press Y or N (IS AN IBM COMMUNICATIONS ADAPTER CABLE ATTACHED TO THE BSC ADAPTER (Y/N)?) then press Enter.

The screen should now instruct you to install the wrap plug on either the BSC adapter, or on the IBM Communications Adapter Cable.

---

**TESTING – BSC ADAPTER**

**IS AN IBM COMMUNICATIONS ADAPTER CABLE ATTACHED TO THE BSC ADAPTER? (Y/N)?**

Y

**DISCONNECT THE CABLE AT THE MODEM AND INSTALL THE WRAP PLUG ON THE END OF THE CABLE.**

**PRESS ENTER WHEN READY.**

?  

**IS AN IBM COMMUNICATIONS ADAPTER CABLE ATTACHED?**

**NO** Go to page 3-2000-4.

**YES**

3-2000-2
1. Refer to the figure below and install the wrap plug on the modem end of the IBM Communications Adapter Cable.
2. Press Enter to begin the test. The test may take up to 15 seconds.

IBM Communications Adapter Cable (Modem End)

IBM Communications Adapter Wrap Plug (IBM Part 8529280)

DOES THE MESSAGE ON YOUR SCREEN INSTRUCT YOU TO MOVE THE WRAP PLUG FROM THE END OF THE CABLE TO THE CONNECTOR ON THE BSC ADAPTER?

**NO**  Go to page 3-2000-5.

**YES**
1. Remove the communications cable (if attached) from the BSC Adapter.
2. Refer to the figure below and install the wrap plug on the BSC Adapter.
3. Press Enter to begin the test. This test takes up to 15 seconds.

**DID THE TEST RUN WITHOUT AN ERROR?**

**NO** If the error message says to replace the cable, do so. If it says to replace the BSC Adapter, do so. See Section 5, "Removal/Replacement and Adjustments."

**YES** Go to page 3-2000-6.
You may have an error message similar to the one below:

X:XX:XX
ERROR – BSC ADAPTER  20XX X
REPLACE THE BSC ADAPTER.

DID THE TEST RUN WITHOUT AN ERROR MESSAGE?

**NO**  Replace the BSC Adapter.

**YES**
You have gone through the PICs without solving your problem. The following steps should help you find additional audio or visual symptoms.

1. Check the entire system for loose or damaged connectors.
2. Return to page 3-2 and review "Start."
3. Select "UTILITIES" in the diagnostic menu, start an error log, and select "RUN TESTS MULTIPLE TIMES." This will allow you to operate the machine thoroughly and identify the failing symptom. When you have identified the symptom, go to page 3-2, "Start," or the appropriate PIC for the symptom you received.

If you have followed these procedures and still have an unsolved problem, you should request technical assistance.
Alternate Binary Synchronous Communications (Alt. BSC.)

You have entered this PIC because you have a 21XX error code or have identified a problem with alternate binary synchronous communications (Alt. BSC).

1. Check that the jumpers are set correctly on the BSC and alternate BSC adapters and that you do not have an SDLC adapter installed. See Section 4, "Locations."
2. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
3. Insert your Advanced Diagnostics diskette in drive A.
4. Set the Power switch on the expansion unit (if attached) and the system unit to On.

The menu below should be displayed.

---

**The IBM Personal Computer**  
**ADVANCED DIAGNOSTICS**  
**Version 2.XX (C)Copyright IBM Corp 1981, 1982**

**SELECT AN OPTION**

0 - RUN DIAGNOSTIC ROUTINES  
1 - FORMAT DISKETTE  
2 - COPY DISKETTE  
3 - PREPARE SYSTEM FOR RELOCATION  
9 - EXIT TO SYSTEM DISKETTE

ENTER THE ACTION DESIRED

? __

---

CONTINUE

3-2100-1
Follow the steps below to run the diagnostic routines.

1. Press 0 (RUN DIAGNOSTIC ROUTINES) then press Enter.

(Skip Step 2 if you have only one display adapter installed.)

2. Press Y or N (IS A MONITOR ATTACHED TO EVERY DISPLAY ADAPTER (Y/N)?) then press Enter.

3. Press Y or N (IS THE LIST CORRECT (Y/N)?) then press Enter. (If the list is not correct, follow the instructions on your screen and correct the list before answering yes.)

4. Press 0 (RUN TESTS ONE TIME) then press Enter.

5. Select 21 (ALT BSC ADAPTER) then press Enter.

6. Press Y or N (IS AN IBM COMMUNICATIONS ADAPTER CABLE ATTACHED TO THE ALT BSC ADAPTER (Y/N)?) then press Enter.

The screen should now instruct you to install the wrap plug on either the Alternate BSC Adapter, or on the IBM Communications Adapter Cable.

---

TESTING – ALT BSC ADAPTER
IS AN IBM COMMUNICATIONS ADAPTER CABLE
ATTACHED TO THE ALT BSC ADAPTER (Y/N)?

Y

DISCONNECT THE CABLE AT THE MODEM AND
INSTALL THE WRAP PLUG ON THE END OF
THE CABLE.
PRESS ENTER WHEN READY.

?

---

IS AN IBM COMMUNICATIONS ADAPTER CABLE ATTACHED?

NO Go to page 3-2100-4.

YES
1. Refer to the figure below and install the wrap plug on the modem end of the IBM Communications Adapter Cable.
2. Press Enter to begin the test. The test may take up to 15 seconds.

IBM Communications Adapter Cable (Modem End)

IBM Communications Adapter Wrap Plug (IBM Part 8529280)

DOES THE MESSAGE ON YOUR SCREEN INSTRUCT YOU TO MOVE THE WRAP PLUG FROM THE END OF THE CABLE TO THE CONNECTOR ON THE ALT BSC ADAPTER?

NO   Go to page 3-2100-5.

YES
1. Remove the communications cable (if attached) from the Alternate BSC Adapter.
2. Refer to the figure below and install the wrap plug on the Alternate BSC Adapter.
3. Press Enter to begin the test. This test takes up to 15 seconds.

**DID THE TEST RUN WITHOUT AN ERROR?**

**NO** If the error message directs you to replace the cable, do so. If it says to replace the Alternate BSC Adapter, do so. See Section 5, "Removal/Replacement and Adjustments."

**YES** Go to page 3-2100-6.
You may have an error message similar to the one below.

```
X:XX:XX
ERROR - ALT BSC ADAPTER 21XX X
REPLACE THE ALT BSC ADAPTER.
```

**DID THE TEST RUN WITHOUT AN ERROR MESSAGE?**

**NO** Replace the Alternate BSC Adapter.

**YES**

3-2100-5
You have gone through the PICs without solving your problem. The following steps should help you find additional audio or visual symptoms.

1. Check the entire system for loose or damaged connectors.
2. Return to page 3-2 and review “Start.”
3. Select “UTILITIES” in the diagnostic menu, start an error log, and select “RUN TESTS MULTIPLE TIMES.”
   This will allow you to operate the machine thoroughly and identify the failing symptom. When you have identified the symptom, go to page 3-2, “Start,” or the appropriate PIC for the symptom you received.

If you have followed these procedures and still have an unsolved problem, you should request technical assistance.

3-2100-6
SECTION 4. LOCATIONS

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Type 1 Spindle Assembly
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Type 2 Diskette Drive Assembly
Type 2 Diskette Drive Logic
Printed Circuit Board
Expansion Unit

(Rear View)
Expansion Unit
(Top View)
Extender Card
(Right View)

Receiver Card
(Right View)
10 Megabyte Fixed Disk Drive

Type 2

Type 1

Power Connector

Data Connector J2 or J3

Control Connector J1

Data Connector J2 or J3

Control Connector J1

Power Connector

Note: The top of type 1 drives may vary slightly in appearance.

Fixed Disk Drive
(Rear View)
Notes:
Print Mechanism Assembly
(Front View)
## Printer Signal Cable

<table>
<thead>
<tr>
<th>Printer Connector Pin Number</th>
<th>System Unit Connector Pin Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
</tr>
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<td>24</td>
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<td>30</td>
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</tr>
</tbody>
</table>
Printer
(Top View)

<table>
<thead>
<tr>
<th>Pin</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Online Light</td>
</tr>
<tr>
<td>2</td>
<td>Key</td>
</tr>
<tr>
<td>3</td>
<td>No Paper Light</td>
</tr>
<tr>
<td>4</td>
<td>Ready Light</td>
</tr>
<tr>
<td>5</td>
<td>Online Switch</td>
</tr>
<tr>
<td>6</td>
<td>Forms Feed</td>
</tr>
<tr>
<td>7</td>
<td>Line Feed</td>
</tr>
<tr>
<td>8</td>
<td>Ground</td>
</tr>
<tr>
<td>9</td>
<td>+12 Vdc</td>
</tr>
<tr>
<td>10</td>
<td>Alarm</td>
</tr>
</tbody>
</table>

Control Panel Connector
Print Head and Cable (Rear View)

Left Margin Sensor (Front View)
The Number To The Upper Left Designates The Key Position In The Parts Catalog (See Section 7)
Option Adapters

Asynchronous Communications Adapter and Adapter Address (Right View)
Color/Graphics Monitor Adapter
(Right View)

Communications Adapter Cable
5 1/4" Diskette Drive Adapter (Right View)

Fixed Disk Drive Adapter (Right View)
Game Control Adapter (Right View)

64 KB Memory Expansion Option (Right View)
64/256 KB Memory Expansion Option (Right View)

IBM Monochrome Display and Printer Adapter (Right View)
Printer Adapter
(Right View)

Prototype Card
(Right View)
Binary Synchronous Communications Adapter
And Adapter Address
(Right View)

Synchronous Data Link Control Adapter
(Right View)
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## Option Parameters

<table>
<thead>
<tr>
<th>Component</th>
<th>Installation Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monochrome Display and Printer Adapter</td>
<td>May be installed in the system unit only.</td>
</tr>
<tr>
<td>5-1/4&quot; Diskette Drive Adapter</td>
<td></td>
</tr>
<tr>
<td>32KB Memory Expansion Option</td>
<td></td>
</tr>
<tr>
<td>64KB Memory Expansion Option</td>
<td></td>
</tr>
<tr>
<td>64/256KB Memory Expansion Option</td>
<td></td>
</tr>
<tr>
<td>BSC Adapter</td>
<td>May be installed in the system unit or expansion unit. SDLC and Alternate BSC are incompatible.</td>
</tr>
<tr>
<td>Game Control Adapter</td>
<td></td>
</tr>
<tr>
<td>SDLC Communications Adapter</td>
<td></td>
</tr>
<tr>
<td>Prototype Card</td>
<td></td>
</tr>
<tr>
<td>Printer Adapter</td>
<td></td>
</tr>
<tr>
<td>Color/Graphics Monitor Adapter</td>
<td>May be installed in the system unit. May be installed in the expansion unit only if the monochrome display and printer adapter is installed in the system unit.</td>
</tr>
<tr>
<td>Fixed Disk Drive Adapter</td>
<td>Will be installed in the expansion unit.</td>
</tr>
<tr>
<td>Asynchronous Communications Adapter</td>
<td>May be installed in the system unit or expansion unit.</td>
</tr>
</tbody>
</table>
Safety Ground Locations

Note: JJ, H1, VV, AA and DD joined by printed circuit lands on board.

IBM Monochrome Display

Legend

- Screw Connection
- Soldered Connection
- Plugged Connection
- Ground Lead
- Primary Ground
- Chassis Ground

This lead only present on 220/240 Vac machines.
System Unit & Expansion Unit Power Supply

Legend

- Screw Connection
- Primary Ground
- Ground Post
- Chassis Ground

Note: This lead present on 220/240 Vac machines only.

4-36
IBM 80 CPS Printer

Legend

- Screw Connection
- Primary Ground
- Ground Lead
- Chassis Ground
IBM Color Display

Legend

- Screw Connection
- Soldered Connection
- Plugged Connection
- Ground Lead
- Primary Ground
- Chassis Ground

Note: Points 103, 105, 110, 111, 112, 113, and P201-1&2 on main board are joined by printed circuit lands.

1 Not present on U.S. only displays
2 Present only on model-002 displays
System Unit

(System Unit (Rear View))
System Unit
(Top View)
System Board
(Top View)
SECTION 5. REMOVAL/REPLACEMENT AND ADJUSTMENTS

To use this section, locate the assembly you are servicing in the section index. Each removal, replacement, or adjustment for a field replaceable unit (FRU) is identified by a reference number. Reference numbers are located in the upper right hand corner of each page. Note that they refer to both the removal and replacement procedure for that FRU.

When a step is explained fully by another procedure, you can refer back to that procedure by using the reference number in parenthesis. For example:

1. Set the Power switch to Off.
2. Remove the system unit cover (5900).
3. Remove the screw holding the speaker.
   etc.

In the example, step 2 refers you to reference number 5900 for complete instructions on removal of the system unit cover.
Notes:
**Diskette Drive Type 1**

<table>
<thead>
<tr>
<th>Component</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5100 Cone Assembly</td>
<td>5-7</td>
</tr>
<tr>
<td>5105 Cone Lever Arm</td>
<td>5-9</td>
</tr>
<tr>
<td>5110 Diskette Drive A</td>
<td>5-11</td>
</tr>
<tr>
<td>5115 Diskette Drive B</td>
<td>5-15</td>
</tr>
<tr>
<td>5120 Diskette Drive Logic Printed Circuit Board</td>
<td>5-19</td>
</tr>
<tr>
<td>5125 Drive Belt</td>
<td>5-23</td>
</tr>
<tr>
<td>5130 Drive Motor</td>
<td>5-24</td>
</tr>
<tr>
<td>5135 Drive Motor Speed (adjustment)</td>
<td>5-26</td>
</tr>
<tr>
<td>5136 Drive Motor Preliminary Speed (adjustment)</td>
<td>5-31</td>
</tr>
<tr>
<td>5140 Front Panel</td>
<td>5-35</td>
</tr>
<tr>
<td>5145 Latch Assembly</td>
<td>5-37</td>
</tr>
<tr>
<td>5150 LED Assembly</td>
<td>5-39</td>
</tr>
<tr>
<td>5155 Left Guide</td>
<td>5-40</td>
</tr>
<tr>
<td>5160 Right Guide</td>
<td>5-41</td>
</tr>
<tr>
<td>5165 Servo Board</td>
<td>5-42</td>
</tr>
<tr>
<td>5170 Spindle Assembly</td>
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</tr>
<tr>
<td>5180 Write Protect Switch</td>
<td>5-47</td>
</tr>
</tbody>
</table>

**Diskette Drive Type 2**

<table>
<thead>
<tr>
<th>Component</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5181 Cone Assembly</td>
<td>5-49</td>
</tr>
<tr>
<td>5182 Cone Lever Arm</td>
<td>5-51</td>
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Diskette Drive Type 1

Cone Assembly Removal

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Set all external Power switches off (printer, TV, etc.).
3. Unplug the system unit's (and expansion unit's) power cords from the wall outlet.
4. Disconnect all cables from the rear of the system unit.
5. Remove the system unit's cover (5900).
6. Remove the diskette drive printed circuit board (5120).
7. Remove the cone lever arm (5105).
8. Compress the cone assembly to relieve spring tension and remove the retaining clip from the top of shaft.
9. Release the spring tension and allow the cone assembly to separate from cone lever arm.

![Diagram of cone assembly with labeled parts: Retaining Clip, Cone Lever Arm, Washers, Shoulder Washer (Large), Shoulder Washer (Small), Bearing, Cone, Cone Shaft]
1. Arrange the cone assembly parts as shown in the figure with the shaft through the cone lever arm and the spring compressed.
2. Replace the retaining clip on the shaft.
3. Replace the cone lever arm.
4. Replace the diskette drive’s printed circuit board.
5. Replace the system unit’s cover.
6. Reconnect all cables.
1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Set all external Power switches off (printer, TV, etc.).
3. Unplug the system unit’s (and expansion unit’s) power cord(s) from the wall outlet.
4. Disconnect all cables from the rear of the system unit.
5. Remove the system unit’s cover (5900).
6. Remove the diskette drive’s printed circuit board (5120).
7. Remove the wire tie attaching the index cable to the cone lever assembly.
8. Remove the index assembly.
9. Remove the two mounting screws for the cone lever arm and remove the wire tie(s) at the rear of the cone lever arm.
10. Slide the head carriage to the front of the diskette drive.
11. Release the upper arm by sliding the cone lever arm to the rear of the diskette drive.
12. Lift the cone lever arm out of the diskette drive.
1. Insert the latch assembly in its tracks; move the latch to the front of the diskette drive.
2. Carefully lower the cone lever arm and lift the upper arm over the cone lever arm.
3. Replace the mounting screw(s); do not tighten.
4. Replace the index assembly with the mounting screw.
5. Tie the emitter harness to the cone lever arm.
6. Close the latch assembly to engage the cone and hub.
7. Place the cone lever arm so that the cone assembly is centered over the drive hub; tighten the screw(s).
8. Replace the diskette drive’s printed circuit board (5120).
9. Replace the system unit’s cover (5900).
10. Reconnect all cable(s).
Diskette Drive A Removal

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Set all external Power switches off (printer, TV, etc.).
3. Unplug the system unit’s (and expansion unit’s) power cords from the wall outlet.
4. Disconnect all cables from the rear of the system unit.
5. Remove the system unit’s cover (5900).
6. Disconnect the signal cable from the diskette drive printed circuit board.

7. Some of the option adapters have to be removed in order to remove the diskette drive mounting screws.
8. Remove the two mounting screws on the left side of diskette drive A.

9. Slide the diskette drive approximately two inches out of the system unit. Remove the power connector from the diskette drive printed circuit board.

10. Remove the diskette drive from the system unit.

Type 1 5-12
1. Slide diskette drive A in until the front panel is approximately two inches from the frame. Connect the power cable to the diskette drive printed circuit board.
2. Slide diskette drive A in until the face plate is even with the front panel.
3. Route the signal cable between the diskette drive and power supply.
4. Connect the end of the signal cable to the diskette drive.
5. Install the two mounting screws. Adjust the diskette drive in or out for a clearance of .040" between the rear of the front panel and the face plate. Tighten the screws.

6. Install the option adapter(s) you removed.
7. Install the system unit's cover (5900).
8. Reconnect all cables.

Type 1 5-14
1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Set all external Power switches off (printer TV, etc.).
3. Unplug the system unit's (and expansion unit's) power cords from the wall outlet.
4. Disconnect all cables from the rear of the system unit.
5. Remove the system unit's cover (5900).
6. Disconnect the signal cable from the diskette drive printed circuit board.

7. Remove the two mounting screws on the right side of the diskette drive.
8. Slide the diskette drive approximately two inches out of the system unit. Remove the power connector from the diskette drive printed circuit board.
9. Remove the diskette drive's signal cable.
10. Remove the diskette drive from the system unit.

(Side View)
1. Slide the diskette drive in until the front panel is approximately two inches from the frame. Connect the power cable to the diskette drive printed circuit board.
2. Slide the diskette drive in until the face plate is even with the front panel.
3. Route the signal cable between the diskette drive and power supply.
4. Connect the end of the signal cable to the diskette drive.
5. Install the two mounting screws. Adjust the diskette drive in or out for a clearance of .040" between the rear of the front panel and the face plate. Tighten the screws.

(B) (Side View)

6. Remove the terminating resistor only on drive B.
7. Replace the system unit’s cover (5900).
8. Reconnect all cables.
Diskette Drive Logic Printed Circuit Board Removal

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Set all external Power switches off (printer, TV, etc.).
3. Unplug the system unit’s (and expansion unit’s) power cords from the wall outlet.
4. Disconnect all cables from the rear of the system unit.
5. Remove the system unit’s cover (5900).
6. Disconnect connectors 8 through 13 from the left rear of the diskette drive printed circuit board.
7. Disconnect connectors 5 and 6 from the right front of the diskette drive printed circuit board.
8. Disconnect the diskette drive’s signal cable from the diskette drive printed circuit board.

(Top View)
9. Remove the two retaining screws from the top of the diskette drive printed circuit board.

10. Slide the diskette drive printed circuit board to the rear until the notches, A, line up with the guide brackets, B, then lift the diskette drive printed circuit board from the diskette drive assembly.

11. Disconnect the diskette drive power connector from the left rear of the diskette drive printed circuit board.

(Rear View)

(Top View)

This connector is present only on 320KB drives
1. Connect the diskette drive's power connector at the left rear of the diskette drive printed circuit board.

2. Align the notches, \textbf{A}, on the sides of the diskette drive printed circuit board with the guide brackets, \textbf{B}, then lower the diskette drive printed circuit board onto the brackets.

3. Slide the diskette drive printed circuit board toward the front of the diskette drive until the holes in the diskette drive printed circuit board line up with the threaded holes in the frame of the diskette drive.
4. Replace the diskette drive printed circuit board retaining screws.
5. Connect connectors 8 through 13 at the left rear of the diskette drive printed circuit board.
6. Connect connectors 5 and 6 at the right front of the diskette drive printed circuit board.
7. Connect the diskette drive’s signal cable to the right rear of the diskette drive printed circuit board.

8. Remove the terminating resistor only on drive B.
9. Replace the system unit’s cover (5900).
10. Reconnect all cables.
Drive Belt Removal

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Set all external Power switches off (printer, TV, etc.).
3. Unplug the system unit’s (and expansion unit’s) power cords from the wall outlet.
4. Disconnect all cables from the rear of the system unit.
5. Remove the system unit’s cover (5900).
6. Remove the diskette drive (5110) or (5115).
7. Carefully place the diskette drive on a work surface with drive belt and pulleys facing up.
8. Lift the belt off the large pulley, then off the small pulley.

(Bottom View)

Drive Belt Replacement

1. Place the drive belt around the small pulley (dark, shiny side facing pulleys), then place the belt around the large pulley.
2. Replace the diskette drive (5110) or (5115).
3. Replace the system unit’s cover (5900).
4. Reconnect all cables.
1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Set all external Power switches off (printer, TV, etc.).
3. Unplug the system unit's (and expansion unit's) power cords from the wall outlet.
4. Disconnect all cables from the rear of the system unit.
5. Remove the system unit's cover (5900).
6. Remove the diskette drive printed circuit board (5120).
7. Remove the diskette drive (5110) or (5115).
8. Carefully place the diskette drive on a work surface with the drive belt and pulleys facing up.
9. Disconnect connector 21 from the servo board.
10. Remove the drive belt (5125).
11. Remove the drive motor's mounting screws and shouldered washers.
12. Carefully pull the drive motor out of the diskette drive.
1. Place the drive motor in position, with the threaded holes in the motor aligned with the holes in the frame (motor wiring harness should face the rear of the machine).
2. Replace the mounting screws and shouldered washers.
3. Replace the drive belt (5125).
4. Connect the drive motor's cable to the servo board at connector 21.
5. Replace the diskette drive (5110) or (5115).
6. Replace the diskette drive printed circuit board (5120).
7. Replace the system unit's cover (5900).
8. Reconnect all cables.
1. Insert Advanced Diagnostics diskette.
2. Set the Power switch on the expansion unit (if attached) and the system unit to On.
3. Advance to diagnostic menu 8 (refer to Diagnostic Menu Reference, Section 2).
4. In menu 8, select option 4, SPEED TEST for the diskette drive you are testing. The diskette drive’s speed and the adjustment specification appear on the screen.

Note: If you are unable to load the Advanced Diagnostics diskette, or if the Speed Test will not execute, refer to the “Drive Motor Preliminary Speed Adjustment (5136)”

SPEED IS 2000
ADJUST FOR 1980 TO 2020
PRESS ANY KEY TO EXIT
SPEED IS 1999
ADJUST FOR 1980 TO 2020
5. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
6. Set all external Power switches off (printer, display, etc.).
7. Unplug the system unit’s (and expansion unit’s) power cord from the wall outlet.
8. Disconnect all cables from the rear of the system unit.
9. Remove the system unit’s cover (5900).
10. Remove the two mounting screws on the diskette drive that needs adjusting (5110) or (5115).
11. Slide the diskette drive out of the system unit, approximately two inches.
12. Reconnect all cables.
13. Insert the Advanced Diagnostics diskette.
14. Set the Power switch on the expansion unit (if attached) and the system unit to On.
15. Advance to diagnostic menu 8 (refer to Diagnostic Menu Reference, Section 2).
16. Select option 4, SPEED TEST for the drive you are adjusting. The diskette drive’s speed and the adjustment specification appear on the screen.

SPEED IS 2000
ADJUST FOR 1980 TO 2020
PRESS ANY KEY TO EXIT

SPEED IS 1999
ADJUST FOR 1980 TO 2020
17. The adjustment for the diskette drive's speed is a variable resistor on the servo board. To adjust the speed, carefully insert an insulated screwdriver down past the left end of the diskette drive's signal cable, to the adjusting screw on the top of the variable resistor.
18. Turn the screw until the speed shown on the screen is within the required specifications.

SPEED IS 2000
ADJUST FOR 1980 TO 2020
PRESS ANY KEY TO EXIT
SPEED IS 1999
ADJUST FOR 1980 TO 2020

19. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
20. Set all external Power switches off (printer, display, etc.).
21. Unplug the system unit’s (and expansion unit’s) power cord from the wall outlet.
22. Disconnect all cables from the rear of the system unit.
23. Reinstall diskette drive (5110) or (5115).
24. Replace the system unit’s cover (5900).
25. Reconnect all cables.

Type 1 5-30
Drive Motor Preliminary
Speed Adjustment

Use this procedure for diskette drive A or B, or both, when the Advanced Diagnostics diskette will not load, or the Speed Test will not execute. You will need a fluorescent light for this adjustment.

1. Remove the diskette drive (5110) or (5115).

2. Insert a scratch diskette into the diskette drive.

3. Connect a jumper between test points 10 and 13 on the diskette drive printed circuit board.

Type 1 5-31
4. Place the diskette drive (left side up) on the system unit's power supply as shown below.
5. Plug the power connector into the diskette drive printed circuit board, and leave the signal cable unplugged.
6. Plug the system unit's power cord into the system unit, then into the wall outlet.
7. Set the system unit's Power switch to On.

(Rear View)
8. Observe the black strobe marks on the outer ring of the drive pulley and adjust the variable resistor on the servo board until the strobe marks appear to stand still, in fluorescent light.

**Note:** The outer ring of strobe marks is for 60 hertz, and the inner ring is for 50 hertz.
9. Set the system unit’s Power switch to Off.
10. Disconnect the system unit’s power cord from the wall outlet.
11. Disconnect the system unit’s power cord from the rear of the system unit.
12. Install the diskette drive (5110) or (5115).
13. Use “Drive Motor Speed Adjustment (5135)” to verify the speed is within specification. Adjust if necessary.
14. Replace the system unit’s cover (5900).
15. Reconnect all cables.
Front Panel Removal

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Set all external Power switches off (printer, TV, etc.).
3. Unplug the system unit’s (and expansion unit’s) power cord(s) from the wall outlet.
4. Disconnect all cables from the rear of the system unit.
5. Remove the system unit’s cover (5900).
6. Remove the diskette drive (5110) or (5115).
7. Remove the diskette drive printed circuit board (5120).
8. Remove the retaining collar that holds the LED assembly to the front panel.
9. Remove the LED assembly from the front panel.
10. Remove the retaining bushings.

11. Carefully place the diskette drive on its side and remove the front panel mounting screws.
12. Remove the front panel from the diskette drive.
1. Insert the front panel’s latch in its tracks and set the panel in place on the locating pins.
2. Install the two mounting screws that attach the front panel to the diskette drive.
3. Push the LED assembly into the grommet.
4. Push the retaining collar over the back of the LED grommet.
5. Replace the retaining bushings.

6. Replace the diskette drive printed circuit board (5120).
7. Replace the system unit’s cover (5900).
8. Reconnect all cables.

Type 1 5-36
1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Set all external Power switches Off (printer, TV, etc.).
3. Unplug the system unit’s (and expansion unit’s) power cords from the wall outlet.
4. Disconnect all cables from the rear of the system unit.
5. Remove the system unit’s cover (5900).
6. Remove diskette drive printed circuit board (5120).
7. Close the latch and lightly hold the cone lever arm down while removing the latch mounting screws.
8. Lift the latch inhibitor out of the diskette drive.
9. Slide the latch assembly out through the slots in the rear of the front panel.
1. Slide the latch assembly into the slots at the rear of the front panel.

2. Lightly hold the cone lever arm down, and align the two mounting holes in the latch assembly with the holes in the front of the cone lever arm.

3. Align the latch inhibitor with the two holes in the latch assembly and replace the screws; do not tighten the screws.

4. Align the latch with the front panel, and align the latch inhibitor so it will just touch a fully inserted diskette; then tighten the screws.

5. Replace the diskette drive printed circuit board (5120).

6. Replace the system unit’s cover (5900).

7. Reconnect all cables.
1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Set all external Power switches off (printer, TV, etc.).
3. Unplug the system unit’s (and expansion unit’s) power cord(s) from the wall outlet.
4. Disconnect all cables from the rear of the system unit.
5. Remove the system unit’s cover (5900).
6. Remove the diskette drive.
7. Remove the diskette drive printed circuit board.
8. Remove the retaining bushings.
9. Carefully place the diskette drive on its side and remove the front panel mounting screws.
10. Remove the front panel from the diskette drive.
11. Remove the retaining collar that holds the LED assembly to the front panel.
12. Remove the LED assembly from the front panel.

LED Assembly Replacement

1. Push the LED assembly into the grommet.
2. Push the retaining collar over the back of the LED grommet.
3. Insert the front panel’s latch in its tracks and set the panel in place on the locating pins.
4. Install the two mounting screws that attach the front panel.
5. Replace the diskette drive printed circuit board (5120).
6. Replace the system unit’s cover (5900).
7. Reconnect all cables.
Left Diskette Guide Removal

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Set all external Power switches off (printer, TV, etc.).
3. Unplug the system unit’s (and expansion unit’s) power cord(s) from the wall outlet.
4. Disconnect all cables from the rear of the system unit.
5. Remove the system unit’s cover (5900).
6. Remove the diskette drive’s printed circuit board (5120).
7. Remove the front panel (5140).
8. Remove the retaining bushings.
9. Slide the blade of a screw driver between the frame and the rear of the left guide, carefully pry the left guide from the frame.

Left Diskette Guide Replacement

1. Align the pins on the left guide with the mounting holes on the top of the left side frame, then lower the guide onto the frame.
2. Replace the front panel (5140).
3. Replace the diskette drive printed circuit board (5120).
4. Replace the system unit’s cover (5900).
5. Reconnect all cables.

Type 1 5-40
Right Diskette Guide Removal  5160

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Set all external Power switches Off (printer, TV, etc.).
3. Unplug the system unit’s (and expansion unit’s) power cord(s) from the wall outlet.
4. Disconnect all cables from the rear of the system unit.
5. Remove the system unit’s cover (5900).
6. Remove the diskette drive’s printed circuit board (5120).
7. Remove the front panel (5140).
8. Remove the read/write head cable from the brackets on the right diskette guide.
9. Remove the retaining bushings.
10. Slide the blade of a screw driver between the frame and the rear of the right guide, carefully pry the right guide from the frame.

Right Diskette Guide Replacement  5160

1. Align the pins on the right guide with the mounting holes on the top of the right side frame, then lower the guide onto the frame.
2. Place the read/write head cable through the brackets on the right guide.
3. Replace the front panel (5140).
4. Replace the diskette drive printed circuit board (5120).
5. Replace the system unit’s cover (5900).
6. Reconnect all cables.

Type 1  5-41
Servo Board Removal

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Set all external Power switches off (printer, TV, etc.).
3. Unplug the system unit’s (and expansion unit’s) power cord(s) from the wall outlet.
4. Disconnect all cables from the rear of the system unit.
5. Remove the system unit’s cover (5900).
6. Remove the diskette drive (5110) or (5115).
7. Disconnect connectors 20 and 21 from the servo board.
8. Remove the servo board’s retaining screws and lift the servo board from the diskette drive. Do not lose the spacers between the servo board and the frame when removing the board.

Servo Board Replacement

1. Place the servo board in position at the rear of the diskette drive.
2. Insert the retaining screws while holding the spacers in place between the servo board and the frame.
3. Connect connectors 20 and 21 to the servo board.
4. Replace the diskette drive (5110) or (5115).
5. Replace the system unit’s cover (5900).
6. Reconnect all cables.

Type 1 5-42
Spindle assemblies are installed two ways in the diskette drives. The assembly installed with hex-headed screws and retainer can be replaced. The assembly installed by bonding cannot be replaced.

Look through the latch opening of the diskette drive and find the spindle hub. If you have the hex-headed screws under the spindle hub, continue with the removal/replacement procedure. If you do not have the hex-headed screws under the spindle hub replace the diskette drive assembly.

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Set all external Power switches off (printer, TV, etc.).
3. Unplug the system unit's (and expansion unit's) power cord(s) from the wall outlet.
4. Disconnect all cables from the rear of the system unit.
5. Remove the system unit's cover (5900).
6. Remove the diskette drive (5110) or (5115).
7. Remove the diskette drive printed circuit board (5120).
8. Remove the cone lever arm (5105).
9. Remove the drive belt (5125).
10. Remove the drive pulley screw and washers.

Type 1 5-43
11. Remove the drive pulley by holding the spindle and twisting the pulley back and forth while pulling the pulley off.
12. Loosen the two hex-headed screws under the spindle.
13. Turn the spindle retainer counterclockwise until the retainer openings clear the hex-headed screws (see figure).
14. Remove the spindle assembly by pulling on the spindle and pushing on the spindle's shaft from the opposite side.
1. Insert the spindle assembly carefully into the mounting hole.
2. Turn the retainer clockwise until the retainer openings engage the hex-headed screws (see figure).
3. Tighten the two hex-headed screws.
4. Place the pulley on the spindle's shaft.
5. Place the pulley's screw and the washers in position and tighten the screw while holding the spindle.
6. Replace the drive belt.
7. Replace the cone arm lever assembly (5105).

8. Replace the diskette drive printed circuit board (5120).
9. Replace the diskette drive assembly (5110) or (5115).
10. Replace the system unit's cover (5900).
11. Reconnect all cables.

Type 1 5-46
Write Protect Switch
Assembly Removal

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Set all external Power switches off (printer, TV, etc.).
3. Unplug the system unit’s (and expansion unit’s) power cord(s) from the wall outlet.
4. Disconnect all cables from the rear of the system unit.
5. Remove the system unit’s cover (5900).
6. Remove the diskette drive printed circuit board (5120).
7. Remove the mounting screw for the write protect switch (left side, at the front of the diskette drive).
8. Remove the wire ties, as necessary, along the left side of the frame and the right side of the motor.
9. Remove the write protect switch assembly.

(Front View)
1. Place the write protect switch assembly in position on the left side, at the front of the diskette drive.
2. Replace the mounting screw for the switch assembly.

3. Place the cable along the left side of the frame and the right side of the motor.
4. Replace the wire ties.
5. Adjust the switch position so that when a diskette is inserted in the guides, the switch transfers without binding the diskette and the write protect assembly.
6. Install the diskette drive printed circuit board (5120).
7. Install the system unit's cover (5900).
8. Reconnect all cables.

Type 1 5-48
1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Set all external power switches off (printer, TV, etc.).
3. Unplug the system unit’s (and expansion unit’s) power cord(s) from the wall outlet.
4. Disconnect all cables from the rear of the system unit.
5. Remove the system unit’s cover (5900).
6. Remove the diskette drive printed circuit board (5185).
7. Remove the cone lever arm (5182).
8. Compress the cone assembly to relieve spring tension and remove the retaining clip from the top of the shaft.
9. Release the spring tension and allow the cone assembly to separate from the cone lever arm.
1. Arrange the cone assembly parts as shown in the figure, with the shaft through the cone lever arm and the spring compressed.
2. Replace the retaining clip on the shaft.
3. Replace the cone lever arm (5182).
4. Replace the diskette drive printed circuit board (5185).
5. Replace the system unit’s cover (5900).
6. Reconnect all cables.
Cone Lever Arm Removal

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Set all external Power switches off (printer, TV, etc.).
3. Unplug the system unit’s (and expansion unit’s) power cord(s) from the wall outlet.
4. Disconnect all cables from the rear of the system unit.
5. Remove the system unit’s cover (5900).
6. Remove the diskette drive printed circuit board (5185).
7. Remove the read/write head cable from the bracket, and the wire tie on the right diskette guide.
8. Remove the wire tie attaching the index cable to the cone lever assembly.
9. Remove the index assembly.
10. Remove the two mounting screws for the cone lever arm.
11. Slide the head carriage to the front of the diskette drive.
12. Release the upper arm by sliding the cone lever arm to the rear of the diskette drive.
13. Lift the cone lever arm out of the diskette drive.
1. Insert the latch assembly in its tracks; move the latch to the front of the diskette drive.
2. Carefully lower the cone lever arm and lift the upper arm over the cone lever arm.
3. Install the mounting screws (the shortest, silver colored screws, with the three dots on top); do not tighten.
4. Install the index assembly, mounting screw, and the washer (gold-colored with fine threads).
5. Tie the index assembly wire to the cone lever arm.
6. Route the head cables through the cone lever arm and along the right-hand diskette guide into the wire-holding bracket.
7. Tie the head cable wires to the diskette guide.
8. Close the latch assembly to engage the cone and hub.
9. Place the cone lever arm so that cone assembly is centered over the drive hub; tighten the screws.
10. Replace the diskette drive printed circuit board (5185).
11. Replace the system unit’s cover (5900).
12. Reconnect all cables.
1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Set all external Power switches off (printer, TV, etc.).
3. Unplug the system unit’s (and expansion unit’s) power cord(s) from the wall outlet.
4. Disconnect all cables from the rear of the system unit.
5. Remove the system unit’s cover (5900).
6. Disconnect the signal cable from the diskette drive printed circuit board (5185).
7. Remove the two mounting screws on the left side of diskette drive A.

   **Note:** Remove options adapters, as necessary, for access to the screws (5800).

8. Slide the diskette drive approximately two inches out of the system unit. Remove the power connector from the left-rear corner of the diskette drive printed circuit board (5185).

9. Remove the diskette drive from the system unit.
1. Slide diskette drive A in until the front panel is approximately two inches from the frame. Connect the power cable to the diskette drive printed circuit board (5185).
2. Slide diskette drive A in until the faceplate is even with the front panel.
3. Route the signal cable between the diskette drive and the power supply.
4. Connect the end of the signal cable to the diskette drive.
5. Replace the 2 mounting screws. Move the diskette drive in or out for a clearance of .040" between the rear of the front panel and the faceplate; tighten the screws.

(Side View)

6. Replace any option adapters you removed (5800).
7. Replace the system unit's cover (5900).
8. Reconnect all cables.
1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Set all external Power switches off (printer, TV, etc.).
3. Unplug the system unit's (and expansion unit's) power cord(s) from the wall outlet.
4. Disconnect all cables from the rear of the system unit.
5. Remove the system unit's cover (5900).
6. Disconnect the signal cable from the diskette drive printed circuit board (5185).

7. Remove the two mounting screws on the right side of diskette drive B.
8. Slide the diskette drive approximately two inches out of the system unit. Remove the power connector from the left-rear corner of the diskette drive printed circuit board (5185).

(Side View)

9. Remove the diskette drive from the system unit.
1. Slide the diskette drive B in until the front panel is approximately two inches from the frame. Connect the power cable to the diskette drive printed circuit board (5185).
2. Slide diskette drive B in until the faceplate is even with the front panel.
3. Route the signal cable between the diskette drive and the power supply.
4. Connect the end of the signal cable to the diskette drive.
5. Replace the two mounting screws. Move the diskette drive in or out for a clearance of .040" between the rear of the front panel and the faceplate; tighten the screws.

6. Remove the terminating resistor only on drive B (5185).
7. Replace the system’s unit cover (5900).
8. Reconnect all cables.
1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Set all external Power switches off (printer, TV, etc.).
3. Unplug the system unit's (and expansion unit's) power cord(s) from the wall outlet.
4. Disconnect all cables from the rear of the system unit.
5. Remove the system unit's cover (5900).
6. Disconnect all connectors from the rear, and the head cables from the right front of the diskette drive printed circuit board.
7. Remove the retaining screw.
8. Slide the diskette drive printed circuit board toward the rear until it clears the front guide brackets A.
9. Lift the right side of the diskette drive printed circuit board up and out to clear the brackets.
10. Disconnect the diskette drive's power connector from the left rear corner of the diskette drive printed circuit board.
11. Remove the shield plate.
1. Replace the shield plate with the metal side down.
2. Connect the diskette drive’s power connector under the left rear corner of the diskette drive printed circuit board.
3. Guide the left side of the printed circuit board into the left rear guide bracket A.
4. Slide the printed circuit board into the front guide brackets, align the hole in the printed circuit board with the threaded hole in the right diskette guide.
5. Insert the retaining screw.
6. Connect the connectors at the left rear of the diskette drive printed circuit board. The first connector on the left is a 4-pin connector for the drive motor, the second connector is a 6-pin connector, the third connector is a 10-pin connector, and the fourth connector is a 4-pin connector.
7. Connect the diskette drive’s signal cable at the right rear of the diskette drive printed circuit board.
8. Connect the head connectors, HD1 outside and HD0 inside, to the right front of the diskette drive printed circuit board.
9. Remove the terminating resistor only on drive B.
10. Replace the system unit’s cover (5900).
11. Reconnect all cables.
1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Set all external Power switches off (printer, TV, etc.).
3. Unplug the system unit’s (and expansion unit’s) power cord(s) from the wall outlet.
4. Disconnect all cables from the rear of the system unit.
5. Remove the system unit’s cover (5900).
6. Remove the diskette drive (5183) or (5184).
7. Carefully place the diskette drive on a work surface with the drive belt and pulleys facing up.
8. Lift the drive belt off the large pulley, then off the small pulley.

(Bottom View)

Drive Belt Replacement

1. Place the drive belt around the small pulley (dark, shiny side facing pulleys), then around the large pulley.
2. Replace the diskette drive (5183) or (5184).
3. Replace the system unit’s cover (5900).
4. Reconnect all cables.

Type 2 5-63
1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Set all external Power switches off (printer, TV, etc.).
3. Unplug the system unit’s (and expansion unit’s) power cord(s) from the wall outlet.
4. Remove the system unit’s cover (5900).
5. Remove the diskette drive (5183) or (5184).
6. Remove the diskette drive printed circuit board (5185).
7. Remove the drive belt (5186).
8. Remove the drive motor’s mounting screws.
9. Carefully lift the drive motor out of the diskette drive.
1. Insert the motor in the frame; align the threaded holes in the motor with the holes in the frame (motor wires should face the left rear corner of the drive).
2. Replace the mounting screws.
3. Replace the drive belt (5186).
4. Replace the diskette drive printed circuit board (5185).
5. Replace the diskette drive (5183) or (5184).
6. Replace the system unit's cover (5900).
7. Reconnect all cables.

Drive Motor

Mounting Screws

Type 2 5-65
1. Insert the Advanced Diagnostics diskette.
2. Set the Power switch on the expansion unit (if attached) and system unit to On.
3. Advance to diagnostic menu 8 (refer to “Diagnostic Menu Reference,” Section 2).
4. In menu 8, select option 4, SPEED TEST, for the diskette drive you are testing. The diskette drive’s speed and the adjustment specification appear on the screen.

**Note:** If you are unable to load the Advanced Diagnostics diskette, or if the speed test will not execute, refer to “Drive-Motor Preliminary Speed Adjustment” (5189).

```
SPEED IS 2000
ADJUST FOR 1980 TO 2020
PRESS ANY KEY TO EXIT

SPEED IS 1999
ADJUST FOR 1980 TO 2020
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5. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
6. Set all external Power switches off (printer, TV, etc.).
7. Unplug the system unit's (and expansion unit's) power cord(s) from the wall outlet.
8. Disconnect all cables from the rear of the system unit.
9. Remove the system unit's cover (5900).
10. Reconnect all cables.
11. Insert the Advanced Diagnostics diskette.
12. Set the Power switch on the expansion unit (if attached) and the system unit to On.
13. Advance to diagnostic menu 8 (refer to "Diagnostic Menu Reference," Section 2).
14. Select option 4, SPEED TEST, for the drive you are adjusting. The diskette drive's speed and the adjustment specification appear on the screen.

SPEED IS 2000

ADJUST FOR 1980 TO 2020
PRESS ANY KEY TO EXIT

SPEED IS 1999

ADJUST FOR 1980 TO 2020
15. The adjustment for the diskette drive's speed is a variable resistor on the diskette drive printed circuit board. To adjust the speed, carefully insert an insulated screwdriver into the screw on the top of the variable resistor.
16. Turn the screw until the speed shown on the screen is within the required specifications.

17. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
18. Set all external Power switches off (printer, TV, etc.).
19. Unplug the system unit’s (and expansion unit’s) power cord(s) from the wall outlet.
20. Disconnect all cables from the rear of the system unit.
21. Replace the system unit’s cover (5900).
22. Reconnect all cables.
1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Set all external Power switches off (printer, TV, etc.).
3. Unplug the system unit's (and expansion unit's) power cords from the wall outlet.
4. Disconnect all cables from the rear on the system unit.
5. Remove the system unit's cover (5900).
6. Remove the diskette drive (5183) or (5184).

7. Insert a scratch diskette into the diskette drive.
8. Place the diskette drive (left side up) on the system unit’s power supply.
9. Connect a jumper between J-1 pin 16 on the diskette drive logic printed circuit board and ground.
10. Plug power connector P-3 into the diskette drive printed circuit board.
11. Plug the system unit’s power cord into the system unit, then into the wall outlet.
12. Set the system unit’s Power switch to On.

Type 2 5-72
13. Observe in fluorescent light the black strobe marks on the outer ring of the drive pulley and adjust the variable resistor on the diskette drive printed circuit board until the strobe marks appear to stand still.

Note: The outer ring of strobe marks is for 60 hertz, and the inner ring is for 50 hertz.
14. Set the system unit’s Power switch to Off.
15. Disconnect the system unit’s power cord from the wall outlet.
16. Disconnect the system unit’s power cord from the rear of the system unit.
17. Replace the diskette drive (5183) or (5184).
18. Use “Drive-Motor Speed Adjustment” to verify that the speed is within specification. Adjust if necessary.
19. Replace the system unit’s cover (5900).
20. Reconnect all cables.
1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Set all external Power switches off (printer, TV, etc.).
3. Unplug the system unit’s (and expansion unit’s) power cords from the wall outlet.
4. Disconnect all cables from the rear of the system unit.
5. Remove the system unit’s cover (5900).
6. Remove the diskette drive (5183) or (5184).
7. Open the latch on the front of the diskette drive.
8. Remove the diskette drive printed circuit board (5185).
9. Remove the connector from the LED assembly.
10. Place the diskette drive on its right side and remove the two left front panel mounting screws.
11. Place the diskette drive on its left side and remove the two right front panel mounting screws.
12. Remove the front panel from the diskette drive.
1. Install the front panel by inserting the latch in its slots and positioning the panel in place.
2. Place the diskette drive on its right side and install two mounting screws.
3. Place the diskette drive on its left side and install two mounting screws.
4. Install the LED connector, making sure the white wire goes on the shouldered lead of the LED (see figure).
5. Replace the diskette drive printed circuit board (5185).
6. Replace the diskette drive (5183) or (5184).
7. Replace the system unit's cover (5900).
8. Reconnect all cables.
1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Set all external Power switches off (printer, TV, etc.).
3. Unplug the system unit’s (and expansion unit’s) power cord(s) from the wall outlet.
4. Remove the system unit’s cover (5900).
5. Remove the diskette drive printed circuit board (5185).
6. Close the latch and remove the mounting screw holding the pin clamp.
7. Remove the pin clamp.
8. Open the latch, push the cone arm down, and remove the latch by pulling toward the rear.
1. Push the cone arm down and slide the latch into its slots from the rear, then close the latch.
2. Replace the pin clamp.
3. Replace the mounting screw.
4. Replace the diskette drive printed circuit board (5185).
5. Replace the system unit’s cover (5900).
6. Reconnect all cables.
1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Set all external Power switches off (printer, TV, etc.).
3. Unplug the system unit’s (and expansion unit’s) power cord(s) from the wall outlet.
4. Remove the system unit’s cover (5900).
5. Remove the diskette drive (5183) or (5184).
6. Remove the diskette drive printed circuit board (5185).
7. Remove the front panel of the diskette drive (5190).
8. Remove the retaining collar that holds the LED to the front panel.
9. Remove the LED from the front panel by pushing on the LED from the front of the front panel.
1. Insert the LED into the front panel.
2. Insert the retaining collar over the back of the LED in the front panel.
3. Replace the front panel (5190).
4. Replace the diskette drive printed circuit board (5185).
5. Replace the diskette drive (5183) or (5184).
6. Replace the system unit’s cover (5900).
7. Reconnect all cables.
Left Diskette Guide Removal

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Set all external Power switches off (printer, TV, etc.).
3. Unplug the system unit’s (and expansion unit’s) power cord(s) from the wall outlet.
4. Disconnect all cables from the rear of the system unit.
5. Remove the system unit’s cover (5900).
6. Remove the diskette drive printed circuit board (5185).
7. Remove the wires to the write protect switch.
8. Remove the screws that hold the guide to the frame.
9. Slide the guide to the rear and lift it from the frame.

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Left Diskette Guide Replacement

1. Slide the guide to the front of the diskette drive, align the holes, and install the mounting screws.
2. Reroute the wires in the guide and connect the wires to the write-protect switch (5196).
3. Replace the diskette-drive printed circuit board (5185).
4. Replace the system unit’s cover (5900).
5. Reconnect all cables.
Right Diskette Guide Removal  5194

1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Set all external Power switches off (printer, TV, etc.).
3. Unplug the system unit’s (and expansion unit’s) power cord(s) from the wall outlet.
4. Disconnect all cables from the rear of the system unit.
5. Remove the system unit’s cover (5900).
6. Remove the diskette drive printed circuit board (5185).
7. Remove the head cables from the diskette guide.
8. Remove the screws that hold the guide to the frame.
9. Move the guide to the rear and lift it from the diskette drive.

Right Diskette Guide Replacement  5194

1. Move the guide to the front of the diskette drive, align the holes, and install the mounting screws.
2. Replace the diskette drive head wires in the guide.
3. Replace the diskette drive printed circuit board (5185).
4. Replace the system unit’s cover (5900).
5. Reconnect all cables.

Type 2  5-82
1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Set all external Power switches off (printer, TV, etc.).
3. Unplug the system unit’s (and expansion unit’s) power cord(s) from the wall outlet.
4. Disconnect all cables from the rear of the system unit.
5. Remove the system unit’s cover (5900).
6. Remove the diskette drive (5183) or (5184).
7. Remove the diskette drive printed circuit board (5185).
8. Remove the cone lever arm (5182).
9. Remove the drive belt (5186).
10. Remove the drive pulley screw and washer(s).
11. Remove the drive pulley by holding the spindle and twisting the drive pulley back and forth while pulling on the pulley.
12. Remove the spindle assembly by pulling on the spindle and pushing on the spindle’s shaft from the opposite side.
1. Carefully insert the spindle assembly into the mounting hole.
2. Replace the sleeve, bearing, and spring washer.
3. Replace the diskette drive’s pulley; hold the spindle and install the washers and the screw; turn the screw clockwise to tighten.
4. Replace the diskette drive belt (5186).
5. Replace the cone lever arm (5182).
6. Replace the diskette drive logic printed circuit board (5185).
7. Replace the diskette drive assembly (5183) or (5184).
8. Replace the system unit’s cover (5900).
9. Reconnect all cables.
1. Set the Power switch on the system unit (and expansion unit, if attached) to Off.
2. Set all external Power switches off (printer, TV, etc.).
3. Unplug the system unit’s (and expansion unit’s) power cord(s) from the wall outlet.
4. Remove the system unit’s cover (5900).
5. Remove the diskette drive (5183) or (5184).
6. Remove the diskette drive printed circuit board (5185).
7. Remove the connectors from the write protect switch.
8. Remove the mounting screws, washers, nut plate, and write protect switch.
Write Protect Switch Replacement 5196

1. Insert the write protect switch and nut plate in position.
2. Put the mounting screws and washers in position (do not tighten at this time).
3. Insert a diskette half way into the drive move the switch up then move it down until you hear it operate.
4. Tighten the mounting screws and check to see that the write protect switch operates when you first insert the diskette and again when the switch lever drops into the write protect notch on the diskette. Readjust if necessary.
5. Connect the connectors on the write protect switch (white wire on the center connector and the black wire on the rear connector).
6. Replace the diskette drive printed circuit board (5185).
7. Replace the diskette drive (5183) or (5184).
8. Replace the system unit's cover (5900).
9. Reconnect all cables.
Fixed Disk Drive

Drive C Removal

**WARNING:** Normal shipping and handling can result in permanent loss of all data and formatting of the fixed disk drive(s). It is recommended that all files be backed up onto diskettes.

1. Set the expansion unit Power switch to Off, then unplug the expansion unit power cord and remove all cables from the rear of the unit.
2. Place the keyboard, display, and all external options away from the work surface.
3. Remove the expansion unit cover (5900).

4. Tilt the unit up and remove the fixed disk drive mounting plate screw as shown below.

(Bottom View)
5. Remove the two mounting screws on the right side of the disk drive.

6. Unplug the power connector, control connector (J1), and data connector (J2). Then slide the drive completely out of the machine.
1. Slide the disk drive into slot C as shown below.
2. With the front of the drive still extending approximately two inches out of the front panel, plug in the power connector, control connector J1, and data connector J2.
3. Slide the disk drive in until there is .040" clearance between the front mounting panel and the drive face plate.
4. Replace the disk drive mounting screws.

**WARNING:** Be sure to use the same two mounting screws (long screws) that were removed from the side of the drive or damage to the drive will result.

5. Tilt the unit up and replace the fixed disk drive mounting plate screw as shown below.

**WARNING:** Be sure to use the same screw (short screw) that was removed from the mounting plate or damage to the drive will result.

6. Replace the expansion unit cover (5900).
7. Reconnect cables to the expansion unit.
**WARNING:** Normal shipping and handling can result in permanent loss of all data and formatting on the fixed disk drive(s). It is recommended that all files be backed up onto diskettes.

1. Set the expansion unit Power switch to Off, then unplug the expansion unit power cord and remove all cables from the rear of the unit.
2. Place all external options away from the work surface.
3. Remove the expansion unit cover (5900).
4. Tilt the unit up and remove the fixed disk mounting plate screw for drive D.

5. Remove all option adapters (5800).
6. Remove the mounting screws on the left side of disk drive D.
7. Slide the drive out two inches and unplug the control connector (J1), data connector (J3), and power connector.
8. Remove the disk drive from the unit.
1. Slide the disk drive into slot D as shown.
2. With the front of the drive still extending approximately two inches out of the front panel, plug in the power connector, control connector (J1), and data connector (J3).
3. Slide the drive in until there is .040" clearance between the drive face plate and the front mounting panel.
4. Replace the two mounting screws.

**WARNING:** Be sure to use the same two mounting screws (long screws) that were removed from the side of the drive or damage to the drive will result.

5. Tilt the unit up and replace the fixed disk drive mounting plate screw as shown below.

**WARNING:** Be sure to use the same screw (short screw) that was removed from the mounting plate or damage will result.

6. Replace all option adapters (5800).
7. Replace the expansion unit cover (5900).
8. Reconnect the cables.

5-98
Display

Monochrome Display Removal

1. Set the system unit's Power switch to Off, and remove the
display power cord from the rear of the system unit.
2. Disconnect the signal cable from the IBM Monochrome
Display and Printer Adapter.

Display Replacement

1. Connect the signal cable from your display to the IBM
Monochrome Display and Printer Adapter.
2. Connect the display power cord to the connector at the rear
of the system unit.
Color Display

Removal

1. Set the system unit’s Power switch (and expansion unit’s Power switch, if attached) and the display’s power control to Off.
2. Disconnect the display’s power cord from the wall outlet.
3. Disconnect the display’s signal cable from the Color/Graphics Monitor Adapter.
4. Disconnect the display’s power cord from the rear of the display.

Color Display Replacement

1. Connect the signal cable from the display to the Color/Graphics Monitor Adapter.
2. Connect the display’s power cord to the rear of the IBM Color Display.
3. Connect the display’s power cord to the wall outlet.

5-100
If your display works correctly, except for an incorrect color hue or the absence of color, adjust, in small increments, the trimmer capacitor next to the power connectors on the system board until the color appears. If the Color/Graphics Monitor Adapter is installed in the expansion unit, the trimmer capacitor on the expansion board, next to expansion slot 8 should be adjusted (use only a nonmetallic screwdriver or aligning tool). The hue and color controls on the color monitor must also be set correctly at this point.
Vertical Hold Adjustment

This adjustment is required only if your IBM Color Display has a vertical hold problem (screen rolling top-to-bottom or bottom-to-top).

1. Set the display's power control to on.
2. Set the expansion unit's Power switch to On, then set the system unit's Power switch to On.
3. Wait for POST to complete.
4. Turn the vertical hold control clockwise as far as it will go, then turn it counterclockwise until the screen stops rolling and is stable.
1. Set the system unit’s Power switch (and expansion unit’s Power switch, if attached) to Off.
2. Set the display’s Power control to on.
3. Turn the brightness and contrast controls fully clockwise.
4. Turn the vertical size control fully counterclockwise. A black area should appear across the top and bottom of the screen.
5. Turn the vertical size control clockwise until the black area at the top and bottom of the screen just disappears. If one of the black areas disappears before the other, continue to turn the control until the second black area is gone.
6. Adjust the brightness and contrast controls for eye comfort.
Explosion Unit

Expansion Board Removal

1. Set the system unit and the expansion unit Power switches to Off, unplug the expansion unit power cord and disconnect all cables from the rear of the expansion unit.
2. Remove expansion unit cover (5900).
3. Remove all option adapters, including the receiver card (5800).
4. Remove expansion board power connectors A.
5. Remove expansion board mounting screw B.
6. Slide expansion board away from the power supply (approximately 1/2") until stand-offs A can be lifted from mounting slots B.

7. Lift expansion board up and out of expansion unit.
1. Position the stand-offs A on the expansion board into the mounting slots B.

(Side View)
2. Slide expansion board toward power supply until holes for mounting screws are aligned.
3. Install expansion board mounting screw C.
4. Install expansion board power connectors D.
5. Install option adapters, including the receiver card (5800).
6. Install expansion unit cover (5900).
Keyboard Base Removal

1. Set system unit Power switch to Off, and disconnect keyboard cable from rear of system unit.
2. Position the keyboard with the bottom facing up and remove the two mounting screws.
3. Rotate the base up and out of the front retaining slots.

Keyboard Base Replacement

1. Place the tabs on front of base into retaining slots on cover and rotate base to closed position.
2. Replace mounting screws with ground wire A installed on screw post as shown.
3. Reconnect keyboard cable at rear of system unit.
1. Set system unit Power switch to Off, and disconnect keyboard cable from rear of system unit.
2. Remove keyboard base (5500).
3. Disconnect cable from keyboard assembly.
4. Lift rear of keyboard assembly up and then out of the cover.

Keyboard Assembly Replacement  5510

1. Place front of keyboard assembly into cover.
2. Lower rear of keyboard assembly into position in cover.
3. Replace keyboard base (5500).
4. Reconnect keyboard cable at rear of system unit.
Printer (IBM 80 CPS Matrix Printer)

Carriage Belt Adjustment

1. Set printer Power switch to OFF; unplug printer power cord from wall outlet and disconnect printer cable.
2. Remove forms.
3. Remove forms rack (5640).
4. Remove access cover (5630).
5. Remove ribbon cartridge.
6. Remove top cover (5630)
7. Loosen holddown screw A in carriage drive assembly.
8. Pivot carriage drive assembly B to the left to tighten belt.
9. Tighten holddown screw.
10. Loosen screws C in carriage motor mounts.
11. Position carriage motor so that motor and drive gears mesh.

13. Tighten motor mounts screws.
14. Move print head back and forth to check for smooth gear operation with no binding.
1. Set printer Power switch to OFF; unplug printer power cord from wall outlet and disconnect printer cable.
2. Remove forms.
3. Remove forms rack (5640).
4. Remove access cover (5630).
5. Remove ribbon cartridge.
6. Remove top cover (5630).
7. Remove left front and right rear screws from carriage motor mounts A.
8. Lift motor away from mounts to expose belt pulley B.
9. Pull belt from clip underneath print head carriage by pulling down on belt.

10. Loosen screw in slot in carriage drive assembly. Pivot carriage drive assembly to right.
12. Lift belt off pulley at each end.
1. Insert belt through opening in right side of frame of print mechanism assembly.
2. Guide belt along base toward carriage drive assembly.

3. Place belt onto pulleys at both ends.
4. Insert belt into retaining clip under the print head carriage.
5. Place carriage motor onto motor mounts A.
6. Install screws into motor base (do not tighten) B.

7. Perform carriage belt adjustment (5600).
8. Replace top cover (5630).
9. Replace ribbon cartridge.
10. Replace access cover (5630).
11. Replace forms rack (5640).
Carriage Drive Assembly Removal  5605

1. Set printer Power switch to OFF; unplug printer power cord from wall outlet and disconnect printer cable.
2. Remove forms.
3. Remove forms rack (5640).
4. Remove access cover (5630).
5. Remove ribbon cartridge.
6. Remove top cover (5630).
7. Move carriage to right side of frame.
8. Loosen nuts A on carriage shaft B and pivot left end of shaft to front.

9. Remove screw C and clamp D from left margin sensor.
10. Remove carriage drive assembly retaining screw E.
11. Pivot carriage drive assembly clockwise, lift belt off drive pulley, lift left margin sensor off post, and lift carriage drive assembly from machine.

Drive Assembly

Left Margin Sensor
1. Position carriage drive assembly by inserting post A through pivot hole.
2. Replace carriage drive assembly retaining screw B.
3. Replace left margin sensor, screw C, and clip D.
4. Place belt over drive pulley and perform carriage belt adjustment (5600).

5. Pivot carrier shaft E into the slots on frame. Tighten nuts F.
6. Check print head gap G. Adjust if necessary (5680).
7. Perform left margin sensor adjustment (5670).
8. Replace top cover (5630).
9. Replace ribbon cartridge.
10. Replace access cover (5630).
11. Replace forms rack (5640).
Before replacing the control circuit card, check the printer DIP switch settings. Be sure the problem is not caused by an improper DIP switch setting.

**Note:** Graphics printer Switch No. 1-7 must be set for local requirements. This switch selects Table 1 or 2 and is factory set to Off for U.S. English speaking countries.

### Functions and conditions of Dip Switch No. 1

<table>
<thead>
<tr>
<th>Switch No.</th>
<th>Function</th>
<th>Graphics Printer</th>
<th>Matrix Printer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1</td>
<td>Not Applicable</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>1-2</td>
<td>CR</td>
<td>Print Only</td>
<td>Print &amp; Line Feed</td>
</tr>
<tr>
<td>1-3</td>
<td>Buffer Full</td>
<td>Print Only</td>
<td>Print &amp; Line Feed</td>
</tr>
<tr>
<td>1-4</td>
<td>Cancel Code</td>
<td>Invalid</td>
<td>Off</td>
</tr>
<tr>
<td>1-5</td>
<td>Not Applicable</td>
<td>Off</td>
<td>On</td>
</tr>
<tr>
<td>1-6</td>
<td>Error Buzzer</td>
<td>Sound</td>
<td>Does Not Sound</td>
</tr>
<tr>
<td>1-7</td>
<td>Character Generator</td>
<td>Table 2</td>
<td>Table 1</td>
</tr>
<tr>
<td>1-8</td>
<td>Select In Signal</td>
<td>Fixed Internally</td>
<td>Not Fixed Internally</td>
</tr>
</tbody>
</table>

### Functions and Conditions of Dip Switch No. 2

<table>
<thead>
<tr>
<th>Switch No.</th>
<th>Function</th>
<th>Graphics Printer</th>
<th>Matrix Printer</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-1</td>
<td>Form Length</td>
<td>12&quot;</td>
<td>11&quot;</td>
</tr>
<tr>
<td>2-2</td>
<td>Line Spacing</td>
<td>1/8&quot;</td>
<td>1/8&quot;</td>
</tr>
<tr>
<td>2-3</td>
<td>Auto Feed XT Signal</td>
<td>Fixed Internally</td>
<td>Not Fixed Internally</td>
</tr>
<tr>
<td>2-4</td>
<td>1 in. Skip Over Perforation</td>
<td>Valid</td>
<td>Not Valid</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Switch No.</th>
<th>Function</th>
<th>Graphics Printer</th>
<th>Matrix Printer</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-1</td>
<td>Not Applicable</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>2-2</td>
<td>Not Applicable</td>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>2-3</td>
<td>Auto Feed XT Signal</td>
<td>Fixed Internally</td>
<td>Not Fixed Internally</td>
</tr>
<tr>
<td>2-4</td>
<td>Coding Table Select</td>
<td>N.A.</td>
<td>Standard</td>
</tr>
</tbody>
</table>

5-121
1. Set printer Power switch to OFF; unplug printer power cord from wall outlet and disconnect printer cable.
2. Remove forms.
3. Remove forms rack (5640).
4. Remove access cover (5630).
5. Remove top cover (5630).
6. Remove driver circuit card (5620).
7. Unplug connector CN2. A
8. Unplug connector CN6. B
9. Unplug ground wire. C
10. Remove three screws. D
11. Pull control panel cable from under retaining clips. E
13. Lift control circuit card to clear the six posts. Carefully pull control circuit card away from print mechanism assembly.
1. Guide control circuit card into open area behind print mechanism assembly.
2. Align six holes in control circuit card with six posts in base cover.
3. Lower control circuit card onto base cover and snap the three retaining tabs A into place.
4. Install 3 hold down screws B.
5. Guide control panel cable along right side of base cover and around to front.
6. Place control panel cable under two retaining clips C.
7. Connect ground wire.
8. Install connector CN2.

10. Replace driver circuit card (5620).
11. Replace top cover. (5630).
12. Replace access cover. (5630).
13. Replace forms rack. (5640).
1. Set printer Power switch to OFF; unplug printer power cord from wall outlet and disconnect printer cable.
2. Remove forms.
3. Remove forms rack (5640).
4. Remove access cover (5630).
5. Remove top cover (5630).
6. Unplug connector CN6. [A]
7. Remove two screws. [B]
8. Disconnect driver circuit card from control circuit card at CN4 and CN5. Lift at C, then at D.
1. Align two connectors CN4 and CN5 \(A\) on bottom of driver circuit card with connectors CN4 and CN5 on control circuit card.

**CAUTION:** CN4 and CN5 are not keyed. Verify proper alignment before powering on to prevent circuit card damage.

2. Connect driver circuit card to control circuit card by pressing down firmly on connectors. Be sure to guide connector CN6 cable into slot on left front edge of driver circuit.
3. Install two screws \(B\).
4. Install connector CN6 \(C\).

5. Replace top cover (5630).
6. Replace access cover (5630).
7. Replace forms rack (5640).
1. Set printer Power switch to OFF; unplug printer power cord from wall outlet and disconnect printer cable.
2. Remove forms.
3. Remove forms rack (5640).
4. Remove access cover (5630).
5. Remove top cover (5630).
6. Invert top cover.
7. Remove 2 screws A from underside of top cover.

8. Lift control panel from top cover.

Control Panel Replacement

1. Insert control panel into top cover.
2. Install two screws A.
3. Replace top cover (5630).
4. Replace access cover (5630).
5. Replace forms rack (5640).
1. Raise access cover.

2. Lift cover from base as shown.
Top Cover Removal

1. Set printer Power switch to OFF; unplug printer power cord from wall outlet.
2. Remove forms.
3. Remove forms rack (5640).
4. Remove access cover (5630).
5. Pull forms feed knob from shaft using a steady, firm pull.

6. Turn printer upside down and place on smooth surface.
7. Loosen completely (using a Phillips screwdriver) the four corner screws in the base.

8. Turn printer rightside up.

CAUTION: Be sure to grasp both printer and base cover.
9. Pull control panel cable connector from control panel in top cover.

10. Lift top cover away from base cover. Lift left side first. Then, slide top cover to right to clear forms feed shaft.
1. Position forms feed shaft through opening A in top cover and lower top cover onto base cover.

2. Connect control panel cable to control panel.
3. Turn printer upside down.
4. Install four screws.

5. Turn printer rightside up.
6. Replace forms feed knob (5635).
7. Replace access cover (5630).
8. Replace forms rack (5640).
Base Cover Removal

1. Set printer Power switch to OFF; unplug printer power cord from wall outlet and disconnect printer cable.
2. Remove forms.
3. Remove forms rack (5640).
4. Remove access cover (5630).
5. Remove top cover (5630).
6. Remove power transformer (5675).
7. Remove fuse-filter card/power cord (5655).
8. Remove driver circuit card (5620).
9. Remove control circuit card (5615).
10. Remove print mechanism assembly (5685).
11. Remove heat sink/power transistor assembly (5660).
12. Base cover is now completely detached from other FRUs.
1. Set base cover on work surface.
2. Replace heat sink/power transistor assembly (5660).
3. Replace print mechanism assembly (5685).
4. Replace control circuit card (5615).
5. Replace driver circuit card (5620).
6. Replace fuse-filter card/power cord (5655).
7. Replace power transformer (5675).
8. Replace top cover (5630).
9. Replace access cover (5630).
10. Replace forms rack (5640).
1. Pull forms feed knob from shaft using steady, firm pull.
1. Remove forms.
2. Compress rack on one side to unhook rack from printer frame.
3. Lift rack away from frame.
1. Set printer Power switch to OFF; unplug printer power cord from wall outlet and disconnect printer cable.
2. Remove forms.
3. Remove forms rack (5640).
4. Remove access cover (5630).
5. Remove top cover (5630).
6. Rotate lock levers A to forward (released) position.
7. Loosen nuts on ends of tractor support shaft B.
8. Remove retaining clip on left end of guide shaft C and slide bushings to outside of frame.
9. Lift guide shaft, support shaft and forms tractors from machine.
10. Slide forms tractors D off shafts.
1. Slide forms tractors A onto guide shaft B and support shaft C.
2. Place guide shaft and support shaft into slots on frame.
3. Slide bushings on guide shaft into frame and replace retaining clip on left end of shaft.
4. Tighten retaining nuts on ends of support shaft.
5. Replace top cover (5630).
6. Replace access cover (5630).
7. Replace forms rack (5640).
1. Set printer Power switch to OFF; unplug printer power cord from wall outlet and disconnect printer cable.
2. Remove forms.
3. Remove forms rack (5640).
4. Remove access cover (5630).
5. Remove top cover (5630).

**DANGER:** Static voltage may be present on the fuse-filter card. Use caution in this area.

6. Remove safety shield on fuse-filter card (5695).
7. Pull fuse A from holder.
1. Set printer Power switch to OFF; unplug printer power cord from wall outlet and disconnect printer cable.
2. Remove forms.
3. Remove forms rack (5640).
4. Remove access cover (5630).
5. Remove top cover (5630).

**DANGER:** Static voltage may be present on the fuse-filter card. Use caution in this area.

6. Remove safety shield from filter-fuse card assembly (5695).
7. Remove transformer primary connector \(A\) from fuse-filter card.
8. Remove screw \(B\) from center of fuse-filter card.
9. Remove screw \(C\) from ground terminal of printer power cord.
10. Lift strain relief \(D\) from slot in base cover.
11. Lift fuse-filter card from slot in base cover.
Fuse-Filter Card/Power Cord Replacement

1. Insert fuse-filter card into slot A in base cover.
2. Insert strain relief into slot B in base cover.
3. Install screw C into ground terminal of power cord.
4. Install screw D in center of fuse-filter card.
5. Connect transformer primary E to fuse-filter card.
6. Replace safety shield onto fuse-filter card (5695).
7. Replace top cover (5630).
8. Replace access cover (5630).
9. Replace forms rack (5640).
1. Set printer Power switch to OFF; unplug printer power cord from wall outlet and disconnect printer cable.
2. Remove forms.
3. Remove forms rack (5640).
4. Remove access cover (5630).
5. Remove top cover (5630).
6. Remove power transformer (5675).
7. Remove fuse-filter card/power cord (5655).
8. Remove driver circuit card (5620).
9. Remove control circuit card (5615).
10. Remove print mechanism assembly (5685).
11. Lift heat sink assembly A from base cover.
Heat Sink/Power Transistor Assembly Replacement

1. Position heat sink/power transistor assembly onto base cover.
2. Replace print mechanism assembly (5685).
3. Replace control circuit card (5615).
4. Replace driver circuit card (5620).
5. Replace fuse-filter card/power cord (5655).
6. Replace power transformer (5675).
7. Replace top cover (5630).
8. Replace access cover (5630).
9. Replace forms rack (5640).
1. Set printer Power switch to OFF; unplug printer power cord from wall outlet and disconnect printer cable.

2. Remove forms.

3. Remove forms rack (5640).

4. Remove access cover (5630).

5. Remove top cover (5630).

6. Remove two screws A from forms feed motor mounts.

7. Remove intermediate gear retaining clip B.

8. Slide intermediate gear C off shaft.
1. Slide intermediate gear A onto shaft.
2. Replace retaining clip B.
3. Place forms feed motor C onto mounts.
4. Install two screws D but do not tighten.
5. Position motor to mesh gears with minimum backlash E and no binding.
6. Tighten two screws.
7. Replace top cover (5630).
8. Replace access cover (5630).
9. Replace forms rack (5640).
1. Set printer Power switch to OFF; unplug printer power cord from wall outlet and disconnect printer cable.
2. Remove forms.
3. Remove forms rack (5640).
4. Remove access cover (5630).
5. Remove top cover (5630).
6. Remove ribbon cartridge.
7. Insert a sheet of paper into the printer. Position paper to the left frame.
8. Measure 1-3/4" from the left frame and mark the position on the paper.
9. Loosen the left margin sensor locking screw.

10. Plug in the printer power cord. Position the printer Power switch to ON.
11. Move the print head manually and align it with the 1-3/4" mark on the paper.
12. Set your multimeter to the 12 Vdc scale.
13. Place the negative \((-\)\) lead of the meter on the ground pin of the driver circuit card.
14. Place the positive \( (+\)\) lead of the meter on the yellow wire solder connection on the left margin sensor.
15. Move the left margin sensor to the left until the voltage reading on the meter is a down level (approximately 0 Vdc).

16. Move the left margin sensor to the right until the voltage on the meter is an up level (approximately 5 Vdc).

**Note:** If the voltage reading on the meter stays at a down level, move the print head one position to the left and repeat steps 15 and 16.

17. Tighten the left margin locking screw.
18. Place the positive (+) lead of the meter on the yellow wire solder connection on the printer timing sensor (PTS) board.

19. Loosen the printer timing sensor board locking screw.

20. Move the printer timing sensor board either way until the voltage reading is an up level (approximately 5 Vdc).

Adjustment of PTS Sensor Board

21a. Move the print head slightly to the left. The voltage reading should drop to a down level (approximately 0 Vdc). Do not allow the print head to step to the next detented position.

b. Move the print head slightly to the right. The voltage reading should drop to a down level (approximately 0 Vdc).

Note: It is very important that the amount of pressure exerted on the print head be equal in either direction when the meter reading drops to the down level, without causing the print head to jump to the next detented position.