



## Allen-Bradley Mass Storage Systems

(Cat. Nos. 1770-M10, -M11, Series B)

### Use This Document Update With

- Mass Storage Systems Assembly & Installation Manual  
(publication 1770-6.6.1)
- Peripheral Communication Module User's Manual  
(publication 1775-6.5.4.)
- Advisor2+ Color Graphic System User's Manual  
(publication 6171-6.5.3)

### What This Document Update Contains

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## New Information

This release of the publication contains new and revised information, which is indicated by revision bars as shown here:

For this new or revised information:	Refer to:
PLC-3 mass storage system	page 16
Converting from decimal to hexadecimal	page 24
Upgrading a PLC-3 mass storage system operating system to B/D	pages 25 - 26

## Terms and Conventions

In this update, we use the following convention:

- User prompts and screen displays are shown in a fixed-pitch type:

CURRENT TRACK REASSIGNMENTS

- Text that you enter literally is shown in bold fixed-pitch type:

**DESTROY DATA**

- A literal key stroke that cannot be represented by a single character is shown in bold fixed-pitch type inside a box:

**ENTER**

**ESC**

**F2**

- A key stroke combination looks like this:

**CTRL-C**

This means “while holding down **CTRL**, press **C**.”

- Items for which you enter a word or value of your choice are shown in an italic fixed-pitch type (not bold) such as:

**device = c:\directory\_path\ARCNET.SYS**

- “**Type**” means type in the information.
- “**Enter**” means type in the information and then press the **ENTER** key.



Tracks are referenced in two formats:

- physical - refers to the actual head and cylinder number of the track
- logical - refers to a numeric value formulated from the head and cylinder number

If you are missing the label, perform “Obtaining Unusable Track Data” in section 4, on page 23.

## **Section 2** **Advisor 2/2+** **Mass Storage System** **Procedures**

This section contains procedures on the following:

- parking heads of the M10 hard disk
- configuring the M10
- preparing the Advisor2/2+ Enclosure
- starting up the Advisor2/2+ Mass Storage System
- restoring GRAFIX2 files
- formatting the M10 hard disk drive
- understanding the Advisor2/2+ 8.1 Format Routine Disk

The 1770-M10 is factory-set for operation with the Advisor2/2+ Color Grafix System. The latest revision of the format routine has been performed on the hard disk prior to shipment.



**ATTENTION:** Handle any Mass Storage system with care. Be certain to park the heads before moving or transporting the unit. Failure to do this risks damage to the disk or destruction of data.

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### **Configuring the M10**

The M10 is factory-set for operation with an Advisor2/2+ system. To verify or reconfigure the 1770-M10 configuration for operation with an Advisor2/2+ system you need to park the heads of the M10 hard disk drive (refer to page 15), and then do the following:

1. Disconnect the 1770-M10 from any power sources.

2. Remove the top cover of the 1770-M10 and set the switches as shown in Table B. These settings are located on the Small Computer System Interface (SCSI) module:

**Table B**  
**Switch Settings**

Set switch number:	To:
1	ON
2	ON
3	ON
4	OFF
5	OFF
6	ON
7	OFF
8	ON

3. Remove jumper W12 near the center of the SCSI module.
4. Ensure that two single in-line pack (SIPs) terminating resistors are installed with pin 1 positioned nearest to the J3 baud connector. For more information, refer to Mass Storage Systems Assembly & Installation manual (publication no. 1770-6.6.1), Figure 3.10.
5. Replace the cover on the 1770-M10.

### Preparing the Advisor 2/2+ Enclosure

Before connecting the 1770-M10 to the Advisor2/2+ Enclosure do the following:

1. Make sure that the 1770-M10 and the Advisor2/2+ Enclosure power switches are in the OFF position.



**ATTENTION:** Never unplug the M10 from the Advisor2/2+ Enclosure or install or remove a board in the card-cage when the Enclosure power switch is ON. You must set the power switch to OFF, wait until the red back-lit RESET button is out, and then install or remove the boards. The RESET button may remain lit for up to 30 seconds after you set the power switch to OFF.

---

2. Remove the Advisor2/2+ Enclosure 6171-CPU2 Board.
3. Set switch 5 according to the series of the module (Table C).

**Table C**  
**Setting switch 5**

If your M10 is a configuration of series <sup>1</sup> :	Set switch 5 to:
A	OFF
B	ON

<sup>1</sup>The series configuration is listed on a label on the back of the M10.

4. Set switch 1 to the ON position to boot from the 3 1/2" disk drive with your current revision of the Advisor2/2+ distribution disk.
5. Set all other switches (2, 3, 4, 6, 7, 8) to the OFF position.
6. Re-install the Advisor2/2+ 6171-CPU2 Board.

**Important:** If you have an Advisor2 system and would like to configure your new Series-B M10 to it, you **MUST** have a Master System Firmware Board (6171-SFB2, SFB4, or SFB6) that has an MF1 chip revision of 6.0 or later. Install the 6171-SFB module, if necessary.

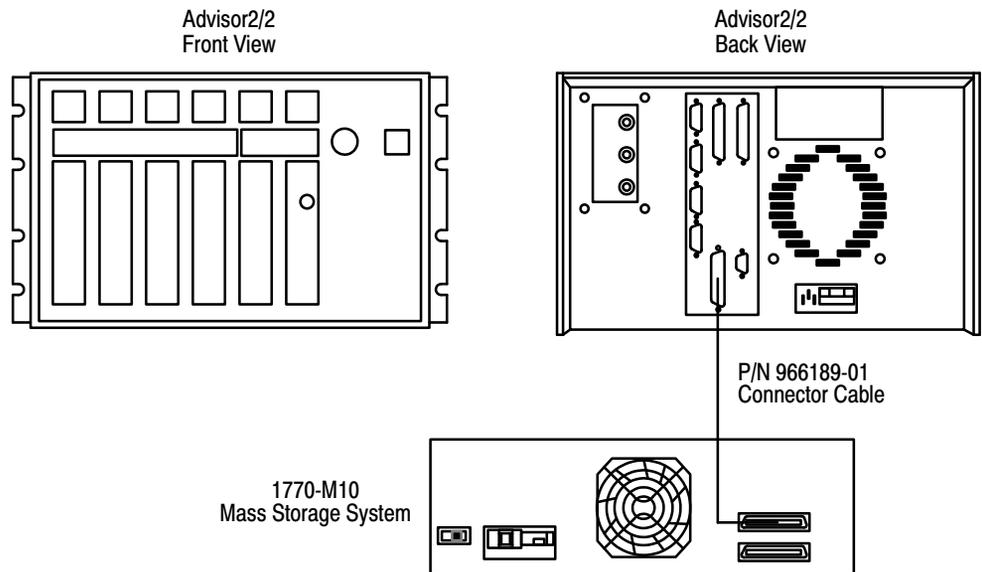
For more information on setting up the Advisor2/2+ System, refer to:

- Advisor2 Installation and Start-Up Guide (publication 6171-6.7.2)
- Advisor2+ Installation and Start-Up Guide (publication 6171-6.7.3)

## Connecting the M10 to the Advisor2/2+ Enclosure

Figure 2 shows you how to connect the 1770-M10 system to the Advisor2/2+ Enclosure. Use the cable (PN 966189-01) to connect each product.

**Figure 2**  
**How to connect the Advisor2/2+ Enclosure to a 1770-M10**



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To connect the 1770-M10 to the Advisor2/2+Enclosure, do the following:

1. Match the mass storage system voltage to the power outlet voltage.  
  
For example, if the power outlet is 220V ac, change the electrical card to 220V ac. For more information, refer to Mass Storage Systems Assembly & Installation Manual (publication 1770-6.61), chapter 4 . We ship each mass storage system set for 110V ac operation.
2. Connect and ground one end of the parallel cable (PN 966189-01) to the Advisor2/2+ Enclosure port labeled DISK DRIVE.
3. Connect and ground the other end of the parallel cable to the 1770-M10 port labeled PARALLEL CHANNEL IN J21.

4. Plug the 1770-M10 power cable into the power source and turn the power switch to the ON position.

Power MUST be applied to the 1770-M10 prior to turning on the Advisor2/2+ Enclosure. The system will not boot up if this procedure is not followed.

5. Place your current version of the Advisor2/2+ distribution disk into disk drive.
6. Turn Advisor2/2+ Enclosure key-switch to the ON position to apply power to the Advisor2/2+ unit.

### **Starting Up the Advisor2/2+ System**

After connecting your Mass Storage System, you are ready to copy your distribution disk revisions to the M10. Do the following:

1. Make sure that switch 1 on the CPU2 Board is in the ON position to boot from the 3-1/2" disk drive.
2. Insert your distribution disk into the M10 and press the RESET button on the front of the Advisor2/2+ Enclosure.

The system boots to the Offline Command List.

3. Type: `DU`

The system displays the Disk Utilities Menu.

4. Type: `2`

The system displays the File Utilities Menu.

5. Select the Copy File option by typing: `2`

The system prompts:

FILE NAME :

6. Type: **A:**

This specifies the 3-1/2" disk drive as the source for the copy when booting from the 3-1/2" disk drive.

The system again prompts:

FILE NAME :

7. Type: **B:**

This specifies the first section of the hard disk as the destination for the copy when booting from the 3-1/2" disk drive. The system displays:

PRESS <ENTER> TO COPY

8. Press:

This copies the distribution disk onto the hard disk.

When the copy has been completed, the system displays:

COPY\*\*COMPLETE\*\*

9. Remove the 3-1/2" distribution disk from the M10.
10. Turn Advisor2/2+ Enclosure key-switch to the OFF position and remove the CPU2 board.
11. Set switch 1 on the board to the OFF position and re-insert the CPU2 board.

This allows the Advisor2/2+ unit to boot and load from the hard disk at power-up.

For more information on using the 1770-M10 with an Advisor2/2+ after the system has been connected, refer to Advisor2/2+ User's Manual (publication 6171-6.5.3).

### Restoring GRAFIX2 Files

After performing start-up procedures, restore the custom GRAFIX2 Files to the M10. If current files reside in memory (EPROM or CMOS), the files should execute as they did before the new M10 installation. However, in order to edit any of them, they must be restored to the M10 first.

To restore the files to the M10, do the following:

1. With the system set to boot from the hard disk, turn Advisor 2/2+ Enclosure key-switch to the ON position.

2. Insert your disk with the GRAFIX2 files into the M10.

The system displays the Offline Command List.

3. Type: `DU`

The system displays the Disk Utilities Menu.

4. Type: `2`

The system displays the File Utilities Menu .

5. Type: `2`

The system prompts:

FILE NAME :

6. Type: `F:`

This specifies the 3-1/2" disk drive as the source of the copy when booting from the hard disk.

The system again prompts:

FILE NAME :

7. Type: `B:`

This specifies the second section of the hard disk as the destination of the copy when booting from the hard disk. The system displays:

PRESS <ENTER> TO COPY

8. Press:

When the copying has been completed, the system displays `**COPY**COMPLETE`. The standard procedure can now be used to modify any existing programs.

## Formatting the M10 Hard Disk Drive

After completing section 1, “Gathering the Unusable Track Data” on page 3, you can begin to format your hard disk. Your M10 has been formatted at the factory prior to shipment; however, during the life of the M10 you may need to reformat the hard disk.



**ATTENTION:** Reformatting your hard disk erases all data recorded on it. Back up all of your data before using the Format Utility to reassign unusable tracks. To do this you must:

- transfer the data to a floppy disk
- reformat the hard disk
- transfer the data back to the hard disk

---

To reformat your M10 hard disk, do the following:

1. Turn the Advisor2/2+ Enclosure key-switch to the OFF position.
2. Remove the CPU2 Board and set switch 1 to the ON position to boot from the 3-1/2" disk drive.
3. Verify switch 5 according to the series of the module (Table D on page 6).
4. Re-install the CPU2 Board.
5. Insert the appropriate disk:
  - If your distribution disk is a release before revision 8.1, insert the Advisor2/2+ 8.1 Format Routine disk (PN 99897501) into the M10.
  - If your distribution disk is a revision 8.1 or later, insert it into the M10.
6. Turn the Advisor2/2+ Enclosure key-switch to the ON position.

The system boots from the 3-1/2 disk drive and displays the Offline Command List.

7. Type: `CP`

The system prompts:

```
a>
```

8. Type: `M10FMT`

The system displays the Format Utilities Menu and prompts you to select which disk you want to format.

9. Type `2` to select the 20M-byte hard disk.

The system displays:

```
TYPE "DESTROY DATA" TO CONFIRM YOUR INTENTIONS:
```

Formatting divides the disk into sectors and destroys all data that may be on the disk. If you do not want to continue this procedure and DO NOT want to format your hard disk, press:

To continue the procedure to format your hard disk:

10. Type `DESTROY DATA`.

You cannot proceed if you type `DESTROY DATA` incorrectly. If you make an error, press:  — and correct the error.

If your entry is confirmed, the system displays this message:

```
CONFIRMED  
PRESS <ENTER> TO CONTINUE
```

11. Press  to begin formatting or  to return to the Format Utilities Menu.

The formatting takes several minutes, during which time the system displays several messages:

- First the system displays the type or equivalent type of hard disk detected and the number of heads and cylinders it has.
- Next the system indicates when the software is formatting, restoring, and verifying the tracks on your hard disk.
- Next the systems lists the track reassignments (if any) that the format utility has made on the results of its verification.

- Finally, the system displays:

ENTER ADDITIONAL TRACK REASSIGNMENTS

Compare the track reassignments obtained after completing section 1, “Gathering Unusable Track Data,” with the track reassignments listed on the screen. If there are additional unusable tracks that the format utility hasn’t already reassigned, enter the additional tracks. If no additional reassignments, go to step 13.

You can reassign a total of 32 of the M10’s tracks.

- Type one of the additional tracks you want reassigned in the format you are using and press: **ENTER**

If your are using this format:	Enter the following:
Physical <sup>1</sup>	<i>Ph.ccc</i> <i>h</i> = head number <i>ccc</i> = cylinder number
Logical	Lttt tttt=logical track number (54EF in hexadecimal notation)

<sup>1</sup>The physical location is listed on the Unusable Tracks label for the Advisor2/2+ Mass Storage System.

Be aware that reassignment is done one physical track at a time and that one physical track corresponds to nine logical sectors. The utility program won’t let you reassign the same track twice; if you attempt to do so, it displays this message:

? TRACK ALREADY HAS ALTERNATE

- Once ALL track reassignments are entered, press **ENTER** to perform the reassignments.

- When the procedure is completed, press **ENTER** to continue.

The system displays the Format Utilities Menu.

- Type **3** to boot from the hard disk.

This step MUST be performed in order to assure proper response to the 6171-CPU2’s 1 switch setting.

- Press **ENTER** to continue.

- Press: **EXIT**

- Turn the Advisor2/2+ Enclosure key-switch to OFF.

19. Remove the format disk from the M10.

### **Parking Heads of the Advisor2/2+ Mass Storage System**

Prior to moving or transporting your Mass Storage System, you must park the heads of the hard disk. The heads are automatically un-parked upon applying power and switching the Mass Storage System power switch to the ON position.

To park the heads of the hard disk, do the following:

1. Turn the Advisor2/2+ Enclosure key-switch to the OFF position.
2. Remove the CPU2 Board and set switch 1 to the ON position to boot from the 3-1/2" disk drive.
3. Re-install the CPU2 Board.
4. Insert the appropriate disk:
  - If your distribution disk is a release before revision 8.1, insert the Advisor2/2+ 8.1 Format Routine disk (PN 99897501) into the M10.
  - If your distribution disk is a revision 8.1 or later, insert it into the M10.
5. Turn the Advisor2/2+ Enclosure key-switch to the ON position.

The system boots from the 3-1/2 disk drive and displays the Offline Command List.

6. Type: `CP`

The system prompts:

a>

7. Type: `SHIPDISK`

The system displays:

HARD DRIVE HEAD LANDING ZONE

8. Turn the M10 power switch, located on the back of the M10 to OFF.

The M10 can now be opened or moved.

## Understanding the Advisor2/2+ 8.1 Format Routine Disk

The purpose of the Advisor2/2+ 8.1 Format Routine disk (PN 99897501) is to provide Advisor2/2+ users with these current Format Files:

- M10FMT.COM
- SHIPDISK.COM
- SD.MSG
- M10BOOT.COM
- M10STAT.COM
- MAP.COM
- X.COM

These files can be copied from the Advisor2/2+ 8.1 Format Routine disk (received with your new M10) onto your CURRENT version of the distributions disk residing on the first section of your hard disk.

These and only these files are compatible with ALL versions of the Advisor2/2+ distributions disk 5.0 through 8.1 versions.

**Important:** Do not use your format routine if it is a release before 8.1. If the format procedure is necessary, complete this procedure using the Advisor2/2+ 8.1 Format Routine disk provided and following the formatting instructions found in this section on page 12. Refer to Advisor 2/2+ User's Manual, chapter 6, for additional information.

Allen-Bradley encourages all users of the Advisor2/2+ system to upgrade their units to the latest version of hardware and software available for their particular product. The 6171-U2 Upgrade Kit for Advisor2/2+ users is still available and offers many enhancements to earlier revision systems.

### Section 3 PLC-3 Mass Storage System

The 1770-M11 series B revision D operating system (PN 99830304) contains a low speed driver-monitor that lets you:

- park the heads of the hard disk
- manually enter unusable hard disk tracks when formatting

The driver is accessible to you through the RS-232 port on the back of the M11. It is labeled TEST. If an ASCII terminal (configured for 9600 baud, no parity, and one stop bit) is connected to this test port, a > prompt appears after the unit is booted. Press **ENTER** to display the monitor.

**Important:** The 1775-GA format function does not provide a means of entering additional track reassignment data in the event there are any manufacturer suggested unusable tracks on the disk. It will also clear out any track reallocation history retained by this low speed driver format function. For this reason, we recommend that the 1775-GA format routine NOT be used.

Media affected – The M11 operating system resides on the hard drive in the M11 and on a 3-1/2" hard shell floppy that is provided with the unit.

#### Configuring the M10

The 1770-M10 is factory-set for operation with an Advisor2/2+ system. However, to use a 1770-M10 with the PLC-3 Mass Storage System, it must be configured for operation with a PLC-3, 1775-GA, and 1770-M11 system. To configure the M10, you must first park the heads of the M10 hard disk drive (refer to page 22).

To configure the 1770-M10, do the following:

1. Disconnect the 1770-M10 from any power sources.

2. Remove the top cover of the 1770-M10 and set the switches as shown in Table F. These settings are located on the Small Computer System Interface (SCSI) module:

**Table D**  
**Switch Settings**

Set switch:	To:
1	OFF <sup>1</sup>
2	ON <sup>1</sup>
3	ON1
4	OFF
5	ON
6	OFF
7	OFF
8	ON

<sup>1</sup> These switch settings are valid for the first 1770-M10 unit connected to the PLC-3, 1775-GA and 1770-M11 system. For configurations consisting of more than one 1770-M10 system, refer Table 3.A of Mass Storage Systems Assembly & Installation Manual (publication 1770-6.6.1).

3. Locate jumper W12 near the center of the SCSI module and short the two pins by placing a jumper over them.
4. Remove single in-line pack (SIPs) terminating resistor pairs for the M10/M11 configuration. For a complete description, refer to Mass Storage Systems Assembly & Installation manual (publication no. 1770-6.6.1), pages 3–10 and 3-11.
5. Ensure that two SIPs are in the last unit with pin 1, positioned near the J3 board connector.
6. Replace the cover of the 1770-M10 Mass Storage System.

The 1770-M10 is now configured for the PLC-3, 1775-GA and 1770-M11 System.

## Formatting the M10 and M11 Hard Disk Drive

After completing section 1, “Gathering Hard Disk Unusable Track Data” on page 3, you can begin to format your hard disk. When you format or reformat a disk, you are erasing all the data on that disk. If you wish to reformat a disk and save portions of its data you must:

- first transfer those portions to a floppy
- next reformat your disk
- finally, transfer the floppy data back to the hard disk

To format an M10 or M11 hard disk drive, and to reallocate unusable tracks when used with a PLC-3 1775-GA module, do the following:

1. Configure the T4 as an alphanumeric terminal for:
  - 9600 baud
  - no parity
  - one stop bit
2. Connect one end of the 1775-CAT cable to Channel B of the T4 Terminal.
3. Connect the other end of the 1775-CAT cable to the back of the M10 where the connector is marked TEST.
4. Press **ENTER** to display the main menu.



**ATTENTION:** Using commands other than the format command **z** or the head parking command **κ** must be avoided. Their improper use will corrupt disk files. Pressing **Ctrl-C** at any time will abort the command.

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5. Select **z** from the main menu. The system displays:

>Z FORMAT DRIVE:

6. Enter drive number and type of drive as shown in .

Table E

# Allen-Bradley Replacements

**Table E**  
**Number and Drive Type**

<b>If you have this type of disk:</b>	<b>Your drive number is:</b>
M11 hard disk	0
M11 floppy disk	1
M10 1 hard disk	4
M10 1 floppy disk	5
M10 #2 hard disk	8
M10 #2 floppy disk	9
M10 #3 hard disk	C
M10 #3 floppy disk	D
<b>If You Have This Type of Drive:</b>	<b>Your drive type is:</b>
Single sided floppy	F1
Double sided floppy	F2
10M-byte Winchester	W1
20M-byte Winchester	W2

For example: > Z FORMAT DRIVE: 0 W2

If you enter the wrong drive type or number, press **Ctrl-C** to abort the entry.

The system then displays any track reassignments found on the hard disk under the heading:

CURRENT TRACK REASSIGNMENTS

If no track reassignments are found, the system displays:

NO REASSIGNMENTS

and displays your options.

<b>If you want to:</b>	<b>Press this key and</b> <b>ENTER</b>
Add Reassignments	<b>A</b>
Clear the CURRENT TRACK REASSIGNMENT list	<b>C</b> <sup>1</sup>
Format the hard disk drive	<b>F</b> <sup>2</sup>
Quit without formatting	<b>Q</b>

<sup>1</sup> It is recommended not to clear the list in order to retain a history of bad tracks.

<sup>2</sup> Formatting will take about 20 minutes.

7. Compare the track reassignments obtained in section 1 with the track reassignments listed on the screen. If any additional unusable tracks haven't already been reassigned by the format utility, you must reassign these tracks using the following procedure:

- a. Type: **A**

The system displays:

```
SECTOR:
```

- b. Type in one of the unusable track reassignments obtained from the A-B Unusable Track's Label. For example:

```
SECTOR: A9CE
```

In this example, the system displays:

```
CURRENT TRACK REASSIGNMENTS  
A9CE
```

and displays your options.

If you try to enter a track already in the Current Track Reassignment list, the system displays:

```
? TRACK ALREADY REASSIGNED
```

If you strike a wrong number when entering track locations and you haven't entered all four digits, press  to abort the entry.

If you have entered all four digits, type **Q** to quit without formatting and start over.

You can enter 32 track reassignments in this manner. However, if the total number of track reassignments exceeds 32 during the format function, an error will occur and all past data is lost. If this error occurs, press RESTART on the M11 to start over. To begin formatting, type: **F**

8. Select the option you wish to perform.

## Parking Heads of the PLC-3 Mass Storage System

To park the hard disk heads of an M10 and M11 while the ASCII terminal is connected to test ports:

1. Press:

The system displays the main menu.

2. Select **K (PARK)**.

The system displays `> K PARK DRIVE:`

3. Type the drive number and type of drive as shown in . For example: `> K PARK DRIVE: 0 W2`

- If the entry is valid, the system displays the `>` prompt. This means the heads have been parked.
- If `???` is displayed, either an invalid entry was made or an error was made. Re-enter the drive number and type of drive.

4. Turn the M10 or M11 power switch to OFF.

The M10 and/or M11 can now be opened or moved.

## Section 4 Retrieving Hard Disk Unusable Track Data

This section allows you to gather the hard disk unusable track data if your Hard Disk Unusable Track label is missing and to convert the logical number (decimal value) to a hexadecimal value.

### Obtaining Hard Disk Unusable Track Data

To obtain track reassignment data from your hard disk, do the following:



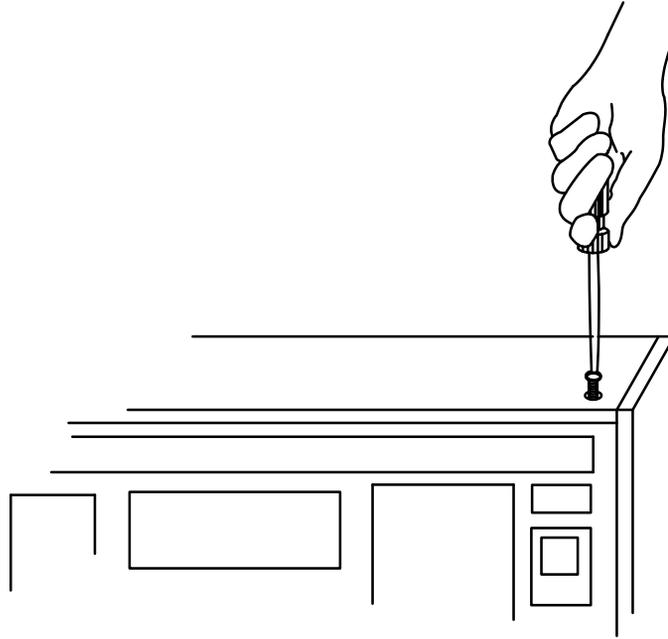
**ATTENTION:** Before moving or transporting your Mass Storage System, you must park the heads of the hard disk. Failure to do this risks damage to the hard drive and destruction of data. For the Advisor2/2+ System, refer to page 15, and for the PLC-3 System, refer to page 22).

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Table E

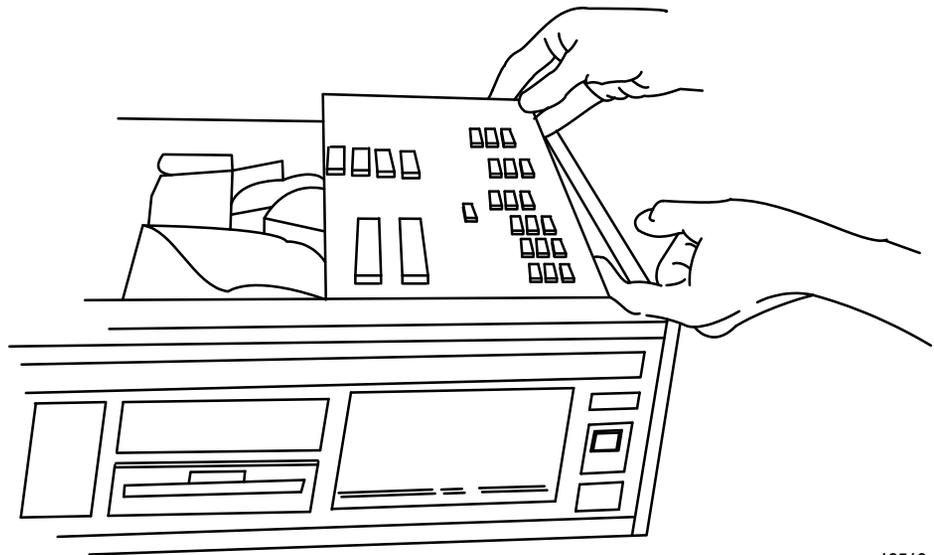
# Allen-Bradley Replacements

1. Remove the unit's cover (4 slot-head screws).



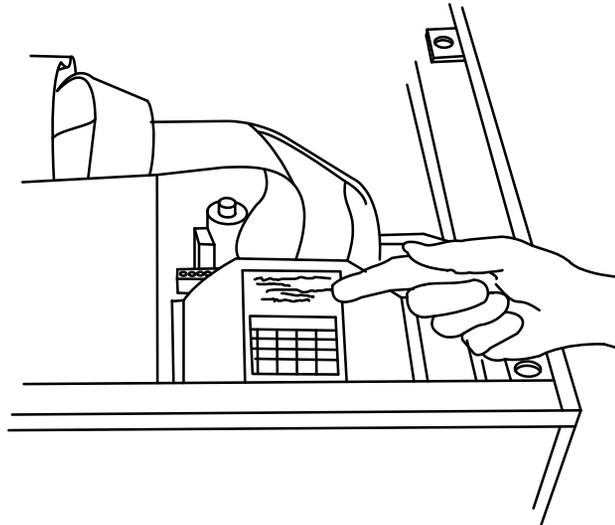
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2. If 1770-M11, remove the Disk Memory Interface Module (6 Phillips-head screws).



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3. Copy the defective-cylinder and -head information (unusable tracks) from the manufacturer's label on top of the disk drive.



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- If using the PLC-3 Mass Storage System:
    - convert the label data to a logical track number (decimal value) using the following formula:
 
$$(\text{Cylinder} \times 72) + (\text{Head} \times 18) = \text{logical track number (decimal value)}$$
    - convert the logical track number (decimal value) into a hexadecimal value (refer to "Converting from Decimal to Hexadecimal" in this section, on page 24).
  - If you are using the Advisor2/2+ Mass Storage System, record the data as is, in physical format.
4. For a 1770-M11, replace the Disk Memory Interface Module and cover.
  5. Tape a list of your track reassignments to the underside of your M10 or M11 and to begin operation:

<b>If you are using:</b>	<b>Refer to section:</b>	<b>On page:</b>
Advisor2/2+ Mass Storage System	2	4
PLC-3 Mass Storage System	3	16

### Converting from Decimal to Hexadecimal

To convert the logical track number from a decimal to a hexadecimal value:

1. Divide the decimal value by 16.

For example, if your logical track number = 1980 (decimal value)

$$\begin{array}{r}
 123 \\
 16 \overline{)1980} \\
 \underline{-16} \\
 38 \\
 \underline{-32} \\
 60 \\
 \underline{-48} \\
 12
 \end{array}
 \quad \leftarrow \text{The remainder is } 12_{10}$$

$$\frac{1980}{16} = 123 \cdot 12/16$$

2. Convert this decimal remainder value into its hexadecimal numeral.

Decimal Value	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Hexadecimal Numeral	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F

For example:

$$12_{10} = C_{16}$$

3. Repeat steps one, two, and three until the quotient equals zero.

$$1980/16 = 123 \cdot 12/16 \quad r = 12_{10} = C_{16}$$

$$123/16 = 7 \cdot 11/16 \quad r = 11_{10} = B_{16}$$

$$7/16 = 0 \cdot 7/16 \quad r = 7_{10} = 7_{16}$$

4. Write the first remainder computed as the least significant digit.

$$1980_{10} = 7BC_{16}$$

## Section 5 Upgrading a PLC-3 Mass Storage System Operating System to B/D

The Series B Revision D operating system for the 1770-M11 mass storage system fixes some potential disk corruption bugs that have shown up when used with a PLC-3 1775-GA module. Install this operating system into all Series B 1770-M11 mass storage systems. This operating-system revision is indicated on the 1770-M11 operating-system disk by release number B/D. This B/D disk is included with each Series B 1770-M11 mass storage system shipped from Allen-Bradley. The 1770-M11 has been formatted for the PLC-3 system.

This operating system includes a new format utility that is accessible through the RS-232-C port on the back of the M11. The format utility has the ability to retain a history of bad tracks. Do not clear the list of bad tracks unless it has a 0000 in the list. If the current reassignment list has a 0000 in the list prior to formatting, clear the list and re-enter the bad-track data to retain the existing history. (Refer to section 3.)

When you send us a Series A mass storage system for repair, and the problem is a failure of the hard drive, we automatically upgrade it to a Series B before returning it to you. When you receive the upgraded system, you have the task of installing the new operating system and re-building the file system with your backup files.

The following guidelines allow the backup files created prior to sending the unit in for service to be used to re-build the file system with the Series B Revision D operating system. If you copied each file individually to a floppy using the GA copy command, start at step 3. If you used the store command to back up the file system, start at step 1.



**ATTENTION:** If you used the store command to back up the file system and you do not start at step 1, you will **not** end up with the Series B Revision D operating system.

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1. Re-build the backup file system using the restore command.
- 



**ATTENTION:** The restore command re-builds all backup files including the stored version of the operating system. Perform steps 1 thru 4 without cycling power or re-starting the mass storage system to prevent any mix up of operating systems.

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2. Copy each file individually to a floppy using a GA copy command. **Do not copy the operating system file. Do not use store/restore or copy/device.**
3. Boot up the M11 with Series B Revision D operating-system floppy disk in place.

4. Using the back port of the M11 and following the format procedure in section 3, format and reassign any bad tracks.
5. Copy all files individually from the floppies back to the hard disk using the GA copy command to re-build the file system. **Do not copy the operating system file. Do not use store/restore or copy/device.** In order to facilitate copying of individual files from/to the hard disk and floppy in large number of files systems, you could write a GA procedure to do this more automatically. For a copy of an already written procedure that allows selective and “wildcard” copies, contact technical support in Highland Heights at 1-216-646-6800.

To incorporate Series B Revision D operating system into other Series B unit, perform steps 2 thru 5.

To upgrade the Series A file system to a Series B file system, perform steps 2 thru 5.

If the mass storage system has a 1770-M10 serially connected to the 1770-M11 with different series units connected, be aware of the following:

- When formatting a 1770-M10 system with a series version different from that of the 1770-M11 system to which it is serially connected, place the appropriate operating system series into the 1770-M11 floppy-disk drive, boot from floppy, and format accordingly.

With this M10 System	And this Operating System	Use this Format Method
Series A	Series A Rev. A	1775-GA format command
Series B	Series B Rev. D	1770-M11 test-port format

Refer to publication 1775-6.5.4 for more information on the 1775-GA format command.

- The copy/device command will not perform correctly between different series revisions.
- The store/restore device commands will not perform as intended because the operating system is usually part of the files stored.

## **Section 6** **Specification Changes**

Please note the following change in the specifications for the Mass Storage Systems (cat. nos. 1770-M10, -M11, -M12).

Operating Temperature:

- Series A: 10° C to 40° C (50° F to 104° F)
- Series B: 10° C to 35° C (50° F to 95° F)

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