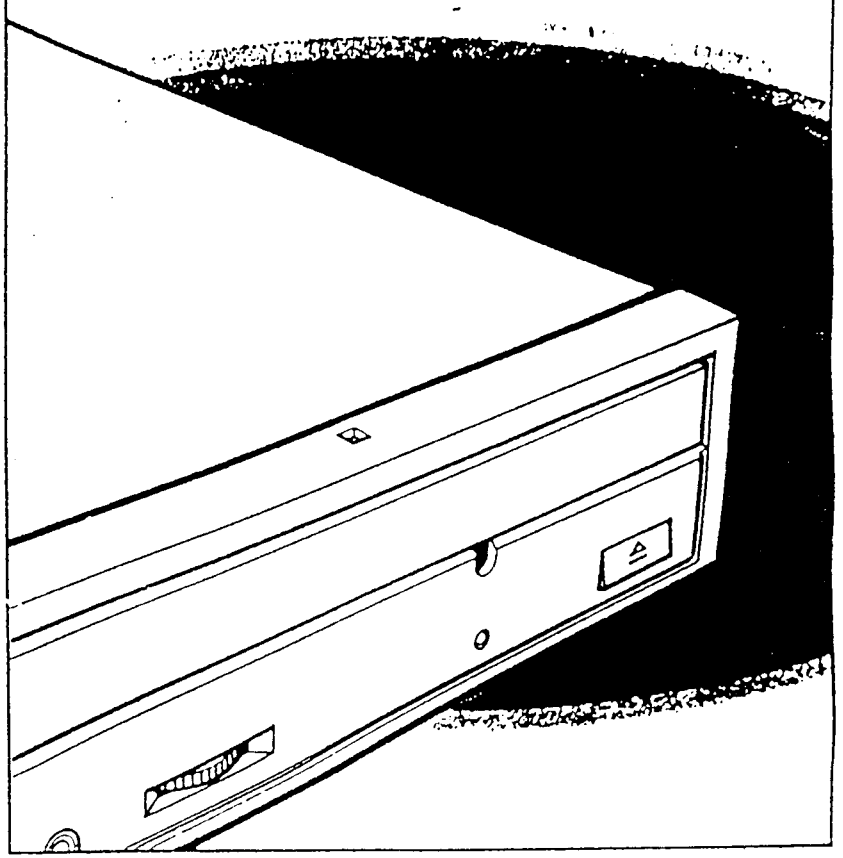
INTERNAL CD-ROM DRIVE

INSTALLATION MANUAL

Models FX001d & FX001



1993F

Printed in Japan

CONTENTS

INTRODUCTION

Thank you for purchasing our Internal CD-ROM drive.

Please read the instructions in this manual thoroughly before installing or using your new CD-ROM drive. We also recommend that you save this manual for later reference.

Be sure to follow all warnings and instructions marked on the product. Also, please be aware of and observe the following precautions.

- Unplug the computer power cables from the wall outlet before cleaning the CD-ROM unit. Clean only with a damp cloth. Use of a liquid or aerosol cleaner can damage the CD-ROM drive or CD-ROM disc.
- Do not use the CD-ROM drive near water or spill any liquid on it.
- Do not use the CD-ROM drive in areas that are exposed to a high level of dust.
- Never attempt to service the unit yourself. Opening or removing the cover can expose you to dangerous voltage levels, laser beams or other hazards. All service procedures should be performed by an authorized dealer or distributor.
- Note that the noise level of compact disc audio is much lower than that of an analog audio source, such as a standard LP record. Do not attempt to set the speaker sound level by listening to the noise level. Too high a setting can damage your speakers. Begin with the sound level set low then gradually increase the volume to the desired level.
- Moving the CD-ROM drive unit from a cold environment to a warm environment may cause condensation to form on the pickup lens. Condensation will interfere with the ability of the lens to properly read the disc. If this should occur, remove the disc. Leave the power to the unit turned on for about one hour then reinsert the disc. If problems persist, contact your dealer.

1 INSTALLATION, USAGE AND HANDLING PRECAUTIONS

CAUTION

The laser beam used by this CD-ROM drive unit can be harmful to the eyes. Do not attempt to open the unit. All service procedures should be performed by an authorized dealer or distributor.

WARNING

Never use any optical instrument in conjunction with this unit. To do so will greatly increase the hazard to your eyes.

INSTALLATION PRECAUTIONS

- Do not install the CD-ROM drive unit in a location where the temperature may exceed the specified maximum operating temperature.
- If the computer video display is unstable, increase the distance between the CD-ROM drive unit and the video monitor.
- Before moving the CD-ROM drive unit, make sure the disc has been removed and the disc tray is closed. Failure to do so can damage the unit and/or the disc.

DISC USAGE PRECAUTIONS

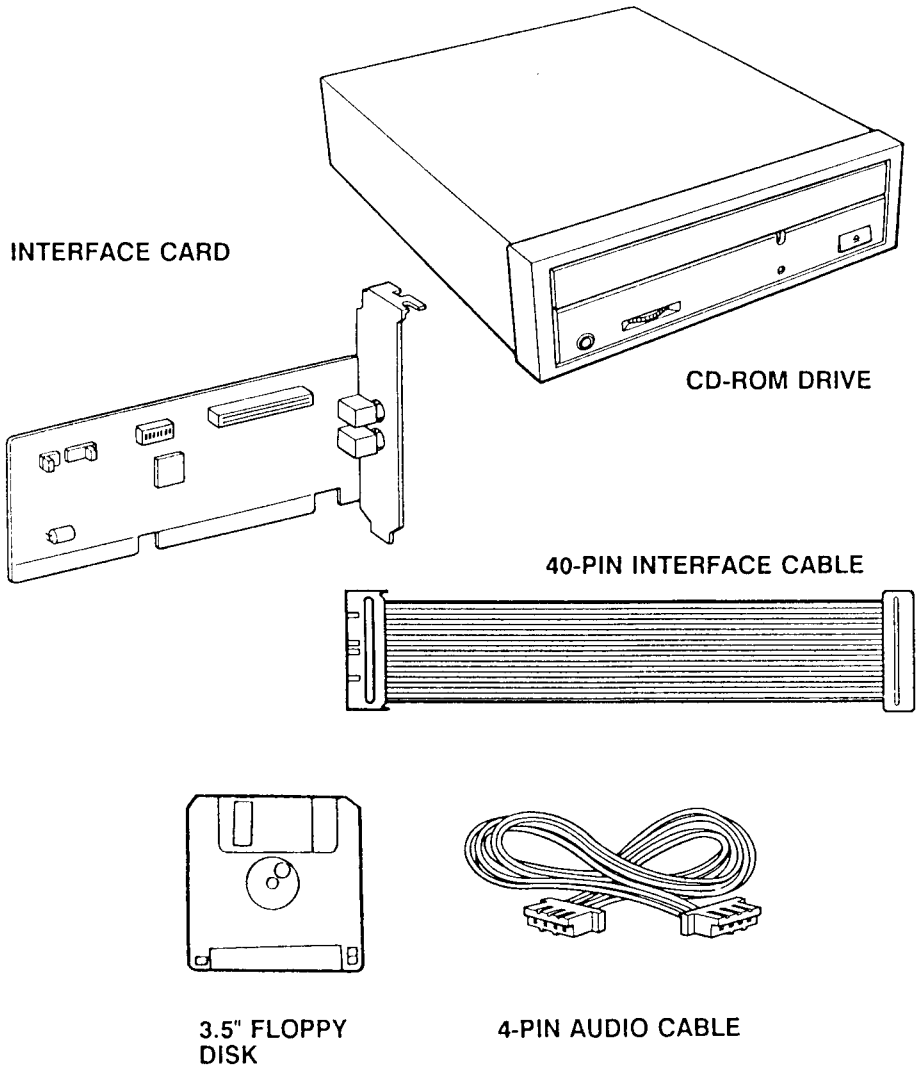
- Use only CD-ROM discs that bear the following mark:

- During operation, a sudden impact to the CD-ROM drive unit or excessive vibration may cause the drive to stop operating.
- Do not open the disc tray except to insert or remove a disc.
- Never place any item on top of the disc tray and do not attempt to push down on the opened disc tray.

DISC HANDLING PRECAUTIONS

- Avoid touching the surface of the disc. Always handle discs by their edges.
- Never write on a disc with a hard object, such as a ball-point pen or pencil and never affix any label directly on a disc.
- Never bend a disc.
- Do not expose discs to direct sunlight and avoid storing them in areas subject to high temperatures or humidity.
- Always store a disc in its case to avoid dust contamination, scratches, bending or other damage.
- For best results, periodically wipe each disc with a soft, dry cloth, gently rubbing outward from the center. Never use fluids such as Benzene, record cleaning or anti-static fluid. Use of such fluids can damage the disc.

- Before you start the installation procedure, make sure that you have all of the items shown in the following illustration:



FCC INFORMATION

This unit generates and uses radio frequency energy and if it is not installed and used properly in strict accordance with the manufacturer's instructions, it may cause interference with radio and television reception. This unit has been type tested and found to comply with the limits for a class B computing device, in accordance with the specifications in Part 15 of FCC Rules which are designed to provide reasonable protection against such interference in a residential installation.

We cannot guarantee, however, that interference will not occur in a particular installation. If this unit does cause interference to radio or television reception, which can be determined by turning the unit off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna.
- Relocate the unit with respect to the receiver.
- Move the unit away from the receiver.
- Plug the unit into a different outlet so that the unit and the receiver are on different branch circuits.

If necessary, consult the dealer or an experienced radio/television engineer for additional suggestions. The following booklet, "How to Identify and Resolve Radio-TV Interference Problems", Stock No. 004-000-00345-4, may be helpful. This booklet was prepared by the Federal Communications Commission and is available from the U.S. Government Printing Office, Washington, DC 20402.

Information to user.

Changes or modifications not expressly approved by the manufacturer for compliance could void the user's authority to operate the equipment.

2 CD-ROM DRIVE PARTS AND FUNCTIONS

FRONT PANEL

Figure 1 shows the front panel of the CD-ROM drive. The parts shown in this figure are:

1. DISC TRAY - Opens and closes for disc loading/removal.
2. BUSY LAMP - On during data access or audio replay.
3. HEADPHONE JACK - For attaching a headphone.
4. HEADPHONE VOLUME CONTROL - Adjusts headphone sound level.

Note: Low impedance headphones or self-amplified speakers are recommended.

5. OPEN/CLOSE BUTTON - Use to open or close the disc tray.
6. EMERGENCY EJECT HOLE - Use to open the disc tray when no power.

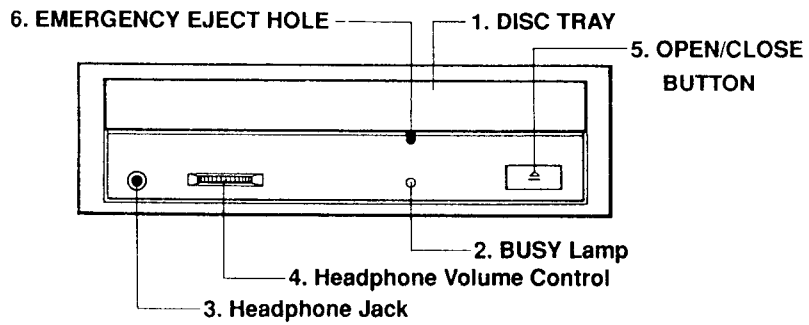


Figure 1. CD-ROM Drive Front Panel

REAR PANEL

Figure 2 shows the rear panel of the CD-ROM drive. The parts shown in this figure are:

7. POWER SUPPLY CONNECTOR - Supplies power to the CD-ROM drive from a standard PC AT power supply.
8. INTERFACE CONNECTOR - Connection for 40-pin ribbon interface cable.
9. LINE OUT CONNECTOR - Two channels, left and right audio output.

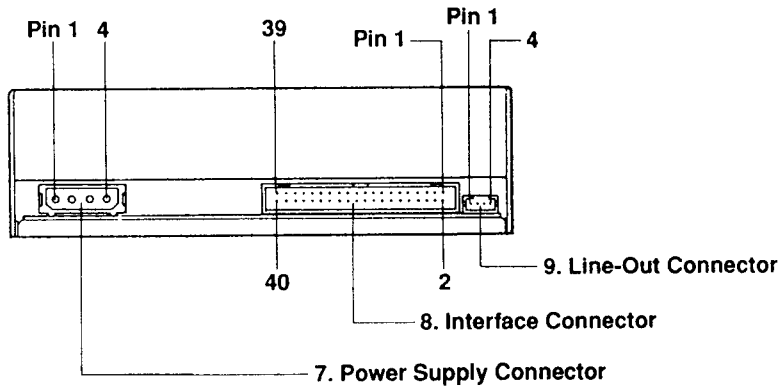


Figure 2. CD-ROM Drive Rear Panel

POWER SUPPLY CONNECTOR

The table below shows the pin assignments of the CD-ROM power supply connector.

PIN NO.	SIGNAL NAME	PIN NO.	SIGNAL NAME
1	DC +12V	3	GND
2	GND	4	DC +5V

INTERFACE CONNECTOR

The table below shows the pin assignments of the CD-ROM interface connector. If you should ever need to use a cable other than that supplied, make sure that all connections are correct.

PIN NO.	SIGNAL NAME	PIN NO.	SIGNAL NAME
1	HA0	21	-IOW
2	GND	22	GND
3	HA1	23	-ENABLE
4	GND	24	GND
5	NC	25	HD0
6	GND	26	GND
7	NC	27	HD1
8	GND	28	GND
9	NC	29	HD2
10	GND	30	GND
11	NC	31	HD3
12	GND	32	GND
13	IRQ	33	HD4
14	GND	34	GND
15	DRQ	35	HD5
16	GND	36	GND
17	-DACK	37	HD6
18	GND	38	GND
19	-IOR	39	HD7
20	GND	40	GND

LINE OUT CONNECTOR

The table below shows the pin assignment of audio line out connector.

PIN NO.	SIGNAL NAME	PIN NO.	SIGNAL NAME
1	R CHANNEL	3	L CHANNEL
2	GND	4	GND

INTERFACE CARD

- Before installing the interface card in your computer, be sure to set all jumpers and the DIP switch to the proper settings shown on the following pages.
- Make sure that the values for the IRQ, DMA and Base I/O Port Address parameters do not conflict with any values used for these parameters by any other interface cards you might have in your computer. If the values for these parameters are the same then you will probably have a hardware conflict and the CD-ROM drive will not operate properly. You will then need to either reconfigure the other interface cards or reconfigure the CD-ROM drive interface card.

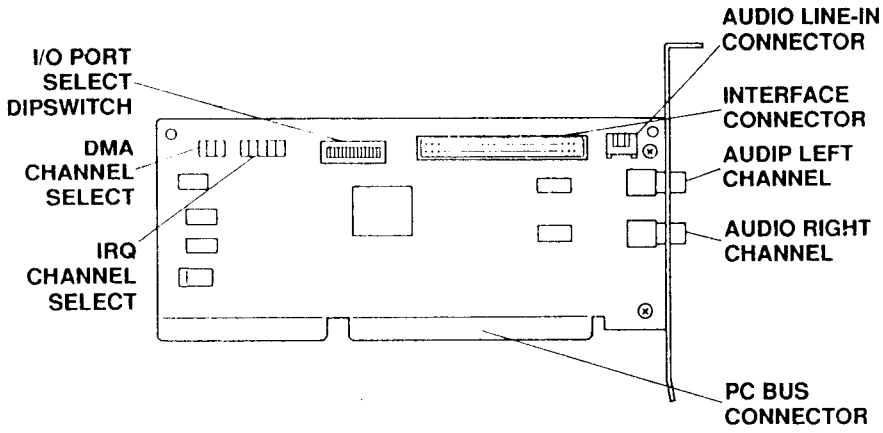


Figure 3. Physical Layout of Interface Card

3 HARDWARE INSTALLATION

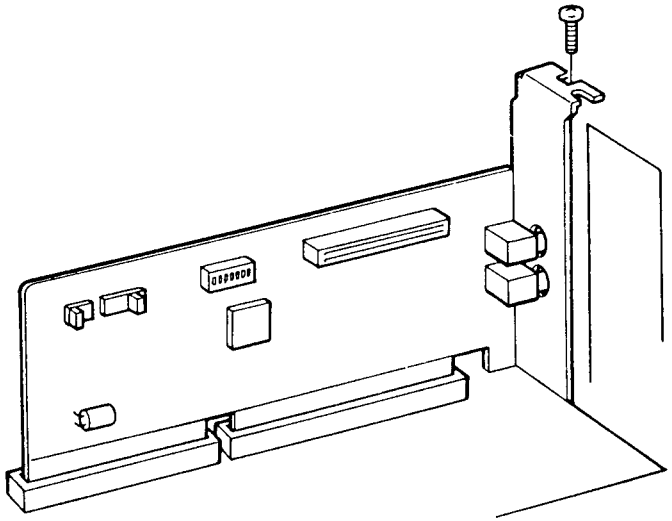
WARNING

Before starting the following procedure, make sure that the computer is turned OFF and the power cord has been disconnected from the wall outlet.

INTERFACE CARD INSTALLATION

First, install the CD-ROM interface card in the host computer.

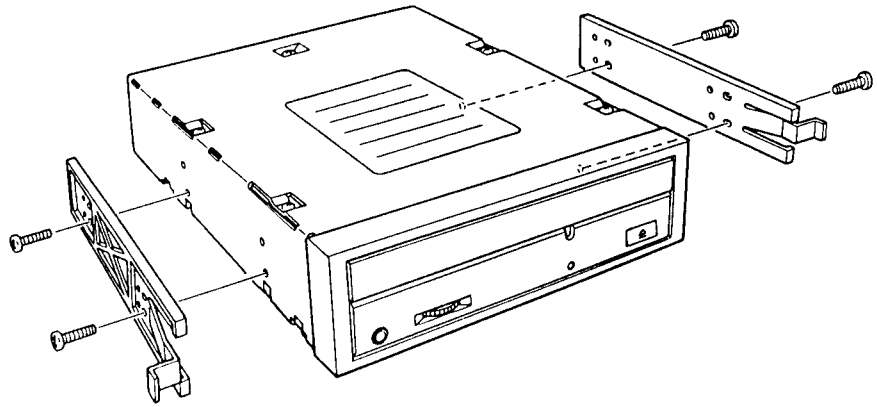
1. Remove the cover from your computer.
2. Locate an unused bus slot on the computer.
3. Insert the CD-ROM interface card into the slot. Make sure that it is seated properly.
4. Secure the interface card with a retaining screw.



CD-ROM DRIVE INSTALLATION

1. If necessary attach the slide rails to the CD-ROM drive as shown below. Slide rails are necessary for some computers with large AT style cases.

   Note: Please contact to computer makers or local dealers to get slide rails if necessary. This CD-ROM drive kit does not include slide rails.



2. Uncover an unused 5.25" half-height drive bay on the computer, and remove the screws and brackets from both sides of the drive bay.

3. Slide the CD-ROM drive into the half-height slot, and secure the drive in place with either screws and brackets for your computer or the mounting screws provided with the drive. Make certain that the mounting screws are no longer than 3/16 of an inch in length.

DIP SWITCH - I/O PORT ADDRESS

DIP switch 1 (SW1) of the interface card assigns the input/output (I/O) port address for the CD-ROM drive. The default I/O port address is 300h through 303h. Table 1 lists the settings of DIP switch SW1 and the corresponding I/O port selections.

SW1 Default Setting

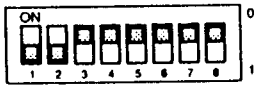


Table 1

POSITION 1 2 3 4 5 6 7 8		PORT ADDRESS	POSITION 1 2 3 4 5 6 7 8		PORT ADDRESS
1 1 0 0 0 0 0 0	300h	301h, 302h & 303h	1 1 1 0 0 0 0 0	380h	381h, 382h & 383h
1 1 0 0 0 0 0 1	304h	305h, 306h & 307h	1 1 1 0 0 0 0 1	384h	385h, 386h & 387h
1 1 0 0 0 0 1 0	308h	309h, 30Ah & 30Bh	1 1 1 0 0 0 1 0	388h	389h, 38Ah & 38Bh
1 1 0 0 0 0 1 1	30Ch	30Dh, 30Eh & 30Fh	1 1 1 0 0 0 1 1	38Ch	38Dh, 38Eh & 38Fh
1 1 0 0 0 1 0 0	310h	311h, 312h & 313h	1 1 1 0 0 1 0 0	390h	391h, 392h & 393h
1 1 0 0 0 1 0 1	314h	315h, 316h & 317h	1 1 1 0 0 1 0 1	394h	395h, 396h & 397h
1 1 0 0 0 1 1 0	318h	319h, 31Ah & 31Bh	1 1 1 0 0 1 1 0	398h	399h, 39Ah & 39Bh
1 1 0 0 0 1 1 1	31Ch	31Dh, 31Eh & 31Fh	1 1 1 0 0 1 1 1	39Ch	39Dh, 39Eh & 39Fh
1 1 0 0 1 0 0 0	320h	321h, 322h & 323h	1 1 1 0 1 0 0 0	3A0h	3A1h, 3A2h & 3A3h
1 1 0 0 1 0 0 1	324h	325h, 326h & 327h	1 1 1 0 1 0 0 1	3A4h	3A5h, 3A6h & 3A7h
1 1 0 0 1 0 1 0	328h	329h, 32Ah & 32Bh	1 1 1 0 1 0 1 0	3A8h	3A9h, 3AAh & 3ABh
1 1 0 0 1 0 1 1	32Ch	32Dh, 32Eh & 32Fh	1 1 1 0 1 0 1 1	3ACh	3ADh, 3AEh & 3AFh
1 1 0 0 1 1 0 0	330h	331h, 332h & 333h	1 1 1 0 1 1 0 0	3B0h	3B1h, 3B2h & 3B3h
1 1 0 0 1 1 0 1	334h	335h, 336h & 337h	1 1 1 0 1 1 0 1	3B4h	3B5h, 3B6h & 3B7h
1 1 0 0 1 1 1 0	338h	339h, 33Ah & 33Bh	1 1 1 0 1 1 1 0	3B8h	3B9h, 3BAh & 3BBh
1 1 0 0 1 1 1 1	33Ch	33Dh, 33Eh & 33Fh	1 1 1 0 1 1 1 1	3BCh	3BDh, 3BEh & 3BFh
1 1 0 1 0 0 0 0	340h	341h, 342h & 343h	1 1 1 1 0 0 0 0	3C0h	3C1h, 3C2h & 3C3h
1 1 0 1 0 0 0 1	344h	345h, 346h & 347h	1 1 1 1 0 0 0 1	3C4h	3C5h, 3C6h & 3C7h
1 1 0 1 0 0 1 0	348h	349h, 34Ah & 34Bh	1 1 1 1 0 0 1 0	3C8h	3C9h, 3CAh & 3CBh
1 1 0 1 0 0 1 1	34Ch	34Dh, 34Eh & 34Fh	1 1 1 1 0 0 1 1	3CCh	3CDh, 3CEh & 3CFh
1 1 0 1 0 1 0 0	350h	351h, 352h & 353h	1 1 1 1 0 1 0 0	3D0h	3D1h, 3D2h & 3D3h
1 1 0 1 0 1 0 1	354h	355h, 356h & 357h	1 1 1 1 0 1 0 1	3D4h	3D5h, 3D6h & 3D7h
1 1 0 1 0 1 1 0	358h	359h, 35Ah & 35Bh	1 1 1 1 0 1 1 0	3D8h	3D9h, 3DAh & 3DBh
1 1 0 1 0 1 1 1	35Ch	35Dh, 35Eh & 35Fh	1 1 1 1 0 1 1 1	3DCh	3DDh, 3DEh & 3DFh
1 1 0 1 1 0 0 0	360h	361h, 362h & 363h	1 1 1 1 1 0 0 0	3E0h	3E1h, 3E2h & 3E3h
1 1 0 1 1 0 0 1	364h	365h, 366h & 367h	1 1 1 1 1 0 0 1	3E4h	3E5h, 3E6h & 3E7h
1 1 0 1 1 0 1 0	368h	369h, 36Ah & 36Bh	1 1 1 1 1 0 1 0	3E8h	3E9h, 3EAh & 3EBh
1 1 0 1 1 0 1 1	36Ch	36Dh, 36Eh & 36Fh	1 1 1 1 1 0 1 1	3ECh	3EDh, 3EEh & 3EFh
1 1 0 1 1 1 0 0	370h	371h, 372h & 373h	1 1 1 1 1 1 0 0	3F0h	3F1h, 3F2h & 3F3h
1 1 0 1 1 1 0 1	374h	375h, 376h & 377h	1 1 1 1 1 1 0 1	3F4h	3F5h, 3F6h & 3F7h
1 1 0 1 1 1 1 0	378h	379h, 37Ah & 37Bh	1 1 1 1 1 1 1 0	3F8h	3F9h, 3FAh & 3FBh
1 1 0 1 1 1 1 1	37Ch	37Dh, 37Eh & 37Fh	1 1 1 1 1 1 1 1	3FCh	3FDh, 3FEh & 3FFh

1: SW OFF
0: SW ON

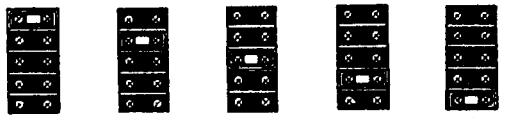
BASE ADDRESS

1: SW OFF
0: SW ON

BASE ADDRESS

IRQ Channel

If you wish to use either the 16 bits DMA transfer or the Software Interrupt transfer option, you must assign an IRQ (interrupt request) channel to the CD-ROM drive interface card that is not being used by any other interface cards on your computer. The IRQ channel you assign to the CD-ROM interface card must be the same as the interrupt channel you select during software installation (when running the SETUP program). The IRQ channel settings available on the CD-ROM interface and the jumper setting for these settings are shown below:



IRQ9 (IRQ2) | IRQ3 | IRQ5 | IRQ10 (default) | IRQ11

DMA (DRQ) Channel

If you wish to use DMA transfer, you must assign an unused DMA channel for the CD-ROM interface card. The specified DMA channel must be the same as the DMA channel selected during software installation (when running the SETUP program).
The jumper setting for each DMA channel is shown below.

DMA Channel 5 (default) | DMA Channel 6 | DMA Channel 7

We recommend choosing either the 16 bit DMA transfer or the software Interrupt transfer options from device driver MTMCDAE.SYS. These options provide better performance for your CD-ROM drive. The 16 bit DMA transfer needs an unused DMA channel and an unused IRQ channel, however, Software Interrupt transfer does not need any DMA channel, it needs an unused IRQ channel. In case the DMA channel required for 16 bit DMA transfer is in conflict with the existing DMA channel setting on your computer, Software Interrupt transfer is recommended.

It either IRQ10 or DMA5 (default channel) is not available on your computer, then you must select alternative settings for these parameters. Be sure to configure the interface card to match the alternative settings chosen.

If there are no unused DMA channels or no unused IRQ channels available on your computer, then you can choose the software polling transfer device driver MTMCDAS.SYS.

CD-ROM DRIVE CONNECTION

There are three cables which need to be connected to the CD-ROM drive.

1. INTERFACE CABLE: 40 conductor ribbon cable

   From: CD-ROM drive 40 pin connector
   To : Interface card connector CN1

   Note: The low profile, flush mount connector should connect to the interface card.

2. AUDIO CABLE: A miniature coaxial cable

   From: CD-ROM drive 4 pin white low profile connector
   To: Interface card connector CN3

3. POWER SUPPLY CABLE: 4 conductor cable

   From: PC power supply
   To: CD-ROM drive 4 pin white connector

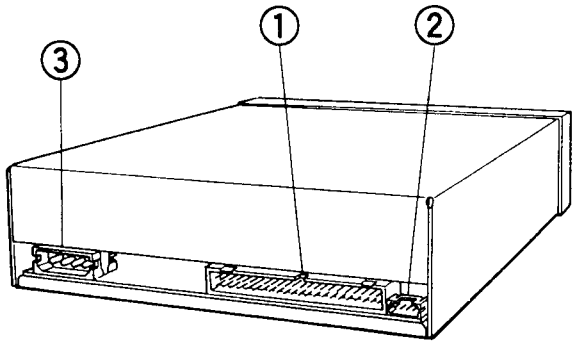
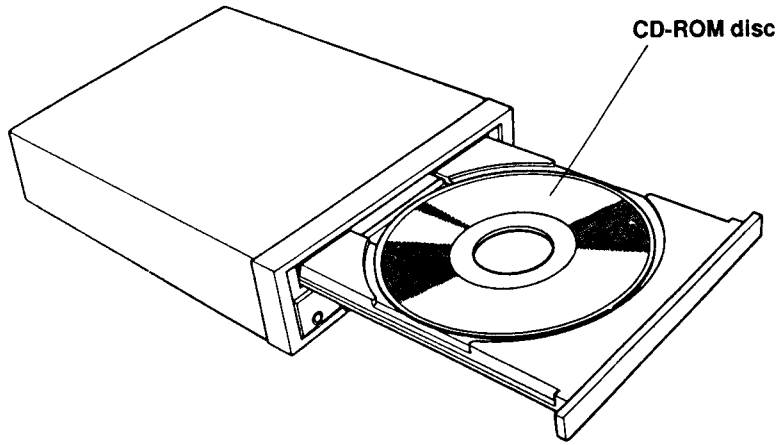


Figure 4. Connectors on Rear of CD-ROM Drive

OPERATING YOUR DRIVE

- Open the disc tray by pressing the OPEN/CLOSE button.
- Place the CD-ROM disc in the center of the platter.



- Close the disc tray by pressing the OPEN/CLOSE button or pushing the tray panel.
- The drive should now be in its normal operating position.

4 SOFTWARE INSTALLATION PROCEDURES

The procedure used to install the CD-ROM software on your computer depends on whether your system has a hard disk or dual floppy disk drives. Be sure to follow the instructions appropriate for your system.

To install your CD-ROM drive for use with MS-DOS, you need:

* An IBM personal computer or compatible with a minimum of 640K of conventional memory. (2M bytes RAM is recommended.)
* A CD-ROM drive and an interface card (included).
* CD-ROM SETUP diskette (included).
* MS-DOS version 3.1 or later.
* To choose device driver MTMCDAE.SYS and use the 16 bit DMA transfer option, an unused DMA (DRQ) channel (DMA CH5, CH6 or CH7) and an unused IRQ channel (IRQ CH3, CH5, CH9, CH10 or CH11) are required.
* To choose device driver MTMCDAE.SYS and use the Software Interrupt transfer option, an unused IRQ channel (IRQ CH3, CH5, CH9, CH10 or CH11) is required.
* To choose device driver MTMCDAS.SYS and use the Software polling transfer option, no DMA channel or IRQ channel is required.

NOTE: We recommend choosing either the 16 bit DMA transfer or the software Interrupt transfer options from device driver MTMCDAE.SYS. These options provide better performance for your CD-ROM drive. The 16 bit DMA transfer needs an unused DMA channel and an unused IRQ channel, however, Software Interrupt transfer does not need any DMA channel, it needs an unused IRQ channel. In case the DMA channel required for 16 bit DMA transfer is in conflict with the existing DMA channel setting on your computer, Software Interrupt transfer is recommended.

If either IRQ10 or DMA5 (default channels) is not available on your computer, then you must select alternative settings for these parameters. Be sure to configure the interface card to match the alternative settings choosen.

If there are no unused DMA (DRQ) channels or no unused IRQ channels available on your computer, then you can choose the software polling transfer device driver MTMCDAS.SYS.

PRINTING CONVENTIONS

The following conventions are used in the installation instructions for the CD-ROM software.

- **CAPS BOLD** indicates a key that you should press.
- A **lowercase bold word** indicates a string that you must enter from the keyboard.
- *Lowercase italics* represents file names.
- Brackets [ ] enclose optional parameters. Use an optional parameter only if you need the function.
- Messages or words that are displayed on the computer monitor are indicated by a different `typeface`.
- MS-DOS is uppercase insensitive; you may use lowercase or UPPERCASE.

WHAT'S ON THE INSTALLATION DISKETTE?

The installation diskette contains all the software needed to install and operate the CD-ROM. A list of the files and a brief description of each follows:

MSCDEX.EXE	Microsoft MS-DOS CD-ROM Extension software, which enables the computer to access the CD-ROM drive.
MTMCDAE.SYS	CD-ROM device driver for DMA transfer or software interrupt transfer.
MTMCDAS.SYS	CD-ROM device driver for software polling transfer.
SETUP.EXE	CD-ROM installation program which tells the CD-ROM driver how you want it organized.
PLAYCD.EXE	The program that allows you to play audio CD.

PREPARING FOR DUAL DISKETTE DRIVE INSTALLATION

To use the CD-ROM drive with a Dual diskette drive system, you will have to first prepare a bootable floppy diskette. To create a bootable floppy diskette:

1. Insert an MS-DOS diskette containing the program *format.exe (format.com)* in drive B. Place a blank diskette into drive A. Type **b:** and press **ENTER** to select drive B.

2. Format the blank diskette using the /s switch to place the DOS system files on the diskette. (That is, type **format a: /s** and press **ENTER**). If you are not familiar with the formatting process, consult your MS-DOS manual for more information.

3. Remove the MS-DOS diskette from drive B.

4. Insert the supplied installation diskette into drive B.

5. Make sure that the DOS prompt is B> (if not, type **b:** and press **ENTER**), then proceed to "CD-ROM DEVICE DRIVER INSTALLATION".

PREPARING FOR HARD DISK DRIVE INSTALLATION

To install the CD-ROM drive software on a system with a hard disk:

1. Select the hard disk's primary partition as the default drive. (For example, if the primary partition is C, type **c:** and press **ENTER**.)

2. Type **cd** and press **ENTER** to ensure that the root directory of drive C has been selected.

3. Insert the supplied installation diskette into drive A.

4. Type **a:** and press **ENTER** to select drive A as the default.

CD-ROM DEVICE DRIVER INSTALLATION

Certain software programs must be loaded in order to access a CD-ROM disc in your CD-ROM drive as if it were a MS-DOS formatted disk. The CD-ROM software files must be properly installed on your computer before the CD-ROM drive can read a CD-ROM disc.

After you have completed the preparation steps described above, perform the following steps:

1. At the DOS prompt:

   Type **setup** and press **ENTER**.

2. The following prompt will appear:

   ```
   Do you want to install MTMCDAE.SYS?
   [Y or N]
   ```

   Note: We recommend choosing either the 16 bit DMA transfer or the software Interrupt transfer options from device driver MTMCDAE.SYS. These options provide better performance for your CD-ROM drive. The 16 bit DMA transfer needs an unused DMA channel and an unused IRQ channel, however, Software Interrupt transfer does not need any DMA channel, it needs an unused IRQ channel. In case the DMA channel required for 16 bit DMA transfer is in conflict with the existing DMA channel setting on your computer, Software Interrupt transfer is recommended. If either IRQ10 or DMA5 (the default settings) is not available on your computer, then you must select an alternative setting. Be sure to configure the interface card to match the alternative settings you choose. If there are no unused DMA (DRQ) channels and no unused IRQ channels available on your computer, then you can use the software polling transfer device driver MTMCDAS.SYS.

   Type **y** to select the DMA transfer driver MTMCDAE.SYS.
   Type **n** to select the software transfer driver MTMCDAS.SYS.

3. If you select software transfer driver, the following prompt will appear:

   ```
   Do you want to install MTMCDAS.SYS?
   [Y or N]
   ```

   Type **y** and press **ENTER**, an informational message appears. Read the message and then press **ENTER** again.

4. A directory prompt will appear:

```
In which directory would you like the
CD-ROM device driver files installed?

(Press ENTER for default)

C:\DEV    [default]
```

To install the file in the default directory, press **ENTER**. To install the file in another directory, type the drive designation and complete path of the desired directory, then press **ENTER**. If the designated directory does not exist, the SETUP program will create it.

5. If you selected **y** in step 2, the following message and prompt will appear:

```
Installing file MTMCDAE.SYS
Copying file MTMCDAE.SYS to
C:\dev\MTMCDAE.SYS . . . . . . . Done

Press ENTER when ready to proceed.
```

If you answered **n** in step 2 (software transfer), the following message and prompt will appear:

```
Installing file MTMCDAS.SYS
Copying file MTMCDAS.SYS to
C:\dev\MTMCDAS.SYS . . . . . . . Done

Press ENTER when ready to proceed.
```

6. Press **ENTER**. The following prompt will appear:

```
In which directory would you like
MSCDEX.EXE installed?

(Press ENTER for default)

C:\BIN     (default)
```


7. To install the file in the default directory, press **ENTER**. To install the file in another directory, type the drive designation and complete path of the desired directory, then press **ENTER**. If the designated directory does not exist, the setup program will create it.

8. The following prompt will appear:

```
Installing file MSCDEX.EXE
Copying file MSCDEX.EXE to
C:\BIN\MSCDEX.EXE . . . . . . . Done

Press ENTER when ready to proceed.
```

9. Press **ENTER**, then follow the instructions on the screen:

```
Would you like to continue
the setup procedure?  [Y or N]
```

When the following prompt is displayed, decide whether you want to manually modify your *config.sys* and *autoexec.bat* files. To make changes manually, skip to step 10; to continue with the automatic installation, proceed to step 11.

10. If you wish to make the changes manually, answer **n**.

Type **n** and press **ENTER**. The following message appears, indicating that the setup procedure is finished. You can skip the remaining steps in this section.

```
The setup program did not modify your
config.sys or autoexec.bat files
```

Make the changes manually and then reboot your computer. Refer to the sections "DEVICE DRIVER PARAMETERS" and "MICROSOFT CD-ROM EXTENSIONS PARAMETERS", found later in this chapter, for information about modifying your *config.sys* and *autoexec.bat* files.

11. To continue with the automatic installation procedure from step 9, type **y** and press **ENTER**. The program will make changes to a file called *config.new*. The following prompt will appear:

```
Select I/O address of the adapter
interface? (300h=1, 310h=2, 340h=3,
360h=4, 390h=5) (Press ENTER for
default)
/p:300 [default]
Input No. (1 to 5)=
```

12. To select the default value (300h), press **ENTER**. Otherwise, input the appropriate number (2 to 5), then press **ENTER**.

13. The following prompt appears:

```
Select audio play mode? (0: MSCDEX
standard, 1: monaural play)
Press ENTER for default
/A:0 [default]
/A:
```

    Press **ENTER** to select the default (0: MSCDEX standard), or input **1** (1: monaural play) and press **ENTER** to select monaural.

14. If you selected MTMCDAS.SYS for installation in step 2, skip to step 17. If you selected MTMCDAE.SYS for installation, proceed to step 15.

15. The following prompt appears:

```
Select memory buffer size?
(MIN=2, MAX=64)
(Press ENTER for default)
/M:20 [default]
/M:
```

    Note: The greater this value, the better the CD-ROM drive will perform. However, each buffer uses about 2KB of memory, and specifying too many buffers may interfere with programs which have large memory requirements. It is **strongly recommended** to use as large a memory buffer size (/M parameter) as possible, after considering how much memory is available.

    To select the default value (20), press **ENTER**. Otherwise, input the appropriate value (2 to 64), then press **ENTER**.

16. The following prompt appears:

```
To choose device driver MTMCDAE.SYS and
use the 16 bit DMA Transfer option, you
need to specify a DMA (DRQ) channel
(5,6,7) and an IRQ channel (3,5,9,10,11)
for the CD-ROM interface card.

To choose device driver MTMCDAE.SYS and
use the Software Interrupt Transfer option,
you need to assign the DRQ channel to
'S' and specify an IRQ channel
(3,5,9,10,11) for the CD-ROM interface
card.

Which DMA (DRQ) channel (5,6,7 or S) do
you want specified?
(Press ENTER for default)
/T:5 [default]
/T:
```

    To enter the default value (5), press **ENTER**. Otherwise, input 6, 7 or S then press **ENTER**. Skip to step 18.

    NOTE: DRQ here refers to the interface card DMA channel setting. For more information, see "DMA Channel" in chapter 2.

17. If you selected *mtmcdas.sys* installation in step 2, the following prompt appears:

```
Adding the following entries to
c:config.sys
DEVICE=\DEV\MTMCDAS.SYS  /D:MSCD001
/P:300  /A:1

Press ENTER when ready to proceed.
```

Press **ENTER**. Skip to step 21.

18. The following prompt appears:

```
Which IRQ channel (3,5,9,10,11) do you
want IRQ specified?
(Press ENTER for default)
/I:10 [default]
/I:
```

To enter the default value (10), press **ENTER**. Otherwise, input 3, 5, 9 or 11 then press **ENTER**.

19. The following prompt appears:

```
Select extended memory feature?
( X: to use extended memory,
ENTER: not to use extended memory)
Press ENTER for default
```

Note: You must load an extended memory driver before using this option.

20. The following prompt appears:

```
Adding the following entries to
C:\config.sys:
DEVICE=\DEV\MTMCDAE.SYS  /D:MSCD001
/P:300  /A:1  /M:20  /T:5  /I:10
Press ENTER when ready to proceed.
```

Press **ENTER**.

21. The program then asks:

```
Do you want setup to make the changes
to config.sys?
[Y or N]
```

At this point, decide whether to retain your original *config.sys* file (step 22) or overwrite it with the new information (step 23).

22. To maintain your original *config.sys* file without any changes and confine the changes to the *config.new* file, type **n** and press **ENTER**. The following prompt will appear:

```
OK, setup will leave the changes in
config.new.  Press ENTER when ready to
proceed.
```

Skip to step 24.

23. To overwrite the existing *config.sys* file with the new information, type **y** and press **ENTER**. The following messages and prompt will appear:

```
Copying C:\CONFIG.SYS to C:\CONFIG.BAK
Copying C:\CONFIG.NEW to C:\CONFIG.SYS

Done . . .

Press ENTER when ready to proceed.
```

The setup program has copied the original *config.sys* file to a backup file (*config.bak*), then copied setup changes from the *config.new* file to the *config.sys* file. Proceed to step 24.

24. Press **ENTER**. The following prompt appears:

```
Adding the following entry
to c:\autoexec.bat:
\BIN\MSCDEX.EXE  /D:MSCD001  /M:10
Press ENTER when ready to proceed.
```

25. Press **ENTER**. The following prompt appears:

```
Do you want setup to make the changes
to autoexec.bat?   [Y or N]
```

At this point, decide whether to retain your original *autoexec.bat* file (step 26) or overwrite it with the new information (step 27).

26. To maintain your original *autoexec.bat* file without changes and confine the changes to the *autoexec.new* file, type **n** and press **ENTER**.

Make any necessary changes manually and then reboot the computer. Refer to the section ";MICROSOFT CD-ROM EXTENSION PARAMETERS" later in this chapter for information about modifying your *autoexec.bat* file.

27. To overwrite the existing *autoexec.bat* file with the new information, type **y** and press **ENTER**. The following messages and prompt will appear:

```
Copying C:\AUTOEXEC.BAT
to C:\AUTOEXEC.BAK
Copying C:\AUTOEXEC.NEW
to C:\AUTOEXEC.BAT

Done . . .

Press ENTER when ready to proceed.
```

The setup program has copied the original *autoexec.bat* file to a backup file (*autoexec.bak*), and then overwritten the *autoexec.bat* file with the *autoexec.new* file.

If your bootable disk (hard drive or diskette) does not have a *config.sys* or *autoexec.bat* file the setup program will create one automatically. Remove the CD-ROM installation disk from drive A and store it in a safe place.

This completes the CD-ROM software installation procedure. You must reboot your computer before the changes will take effect.

Note: If you allowed the setup program to make changes to your *autoexec.bat* and *config.sys* files for you, the files called *autoexec.new* and *config.new* will be duplicates of your current *autoexec.bat* and *config.sys* files. You can use these as backups and refer to them in the future if necessary. We also recommend that you make backup copies of the new *config.sys* and *autoexec.bat* files on a diskette for safekeeping.

DEVICE DRIVER PARAMETERS

The *mtmcdae.sys* and *mtmcdas.sys* files are device drivers that can be installed in the directory of your choice. The *config.sys* file specifies one of these files, thereby allowing your computer to identify and operate the CD-ROM drive.

Most computers will function adequately with most of the default settings for these files. However, there are some parameters that can be changed, if necessary. It is **strongly recommended** to change the /M parameter as described below. This section explains the function of each parameter. Use a word processor or text editor, such as MS-DOS "EDLIN", or "EDIT" to modify the appropriate line in your *config.sys* file.

For the *mtmcdae.sys* device driver, the line in *config.sys* is in the following format.

```
device     =     [drive:][path]mtmcdae.sys
/D:device name
[/M:nn][/I:n] [/P:nnn] [/T:n] [/A:n][/X]
```

For the *mtmcdas.sys* device driver, the line in *config.sys* is in the following format.

```
device     =     [drive:][path]mtmcdas.sys
/D:device name
[/P:nnn] [/A:n]
```

Note: The actual device driver entry is not truncated and should be placed entirely on one line in the *config.sys* file.

`[drive:][path]filename`
Specifies the location (drive and directory) and name of the device driver file. The default setting is the dev directory of the current drive.

`/D:device name`
Specifies the device name of the CD-ROM drive. This must be identical to the device name specified in the mscdex.exe parameters. For example:

```
DEVICE=C:\dev\mtmcdae.sys  /d:mscd001
```


`[/M:nn]`
Specifies the number of stock buffers for temporary storage of the most recent disc data. The default value is 2.
The value of/M should be 2 to 64.
When choosing software polling transfer (*mtmcdas.sys*), the M parameter is not used.
Note: The greater this value, the better the CD-ROM drive will perform. However, each buffer uses about 2KB of memory, and specifying too many buffers may interfere with programs which have large memory requirements. It is **strongly recommended** to use as large a memory bufffer size (/M parameter) as possible, after considering how much memory is available.

`[/I:n]`
Specifies the interrupt request (IRQ) channel number for both 16 bit DMA transfer and the software interrupt transfer option. This must match the value specified by the jumper setting on the interface card (3, 5, 9 10 or 11). The default value is 10. When choosing software polling transfer (*mtmcdas.sys*), the I parameter is not used.

`[/P:nnn]`
Specifies the base address for the interface card. This must be the same number as specified by DIP switch 1 (SW1). The default value is 300.

`[/T:n]`
Specifies DMA channel number. This must match the value specified by the jumper setting on the interface card. When use software interrupt transfer option, specify /T:S. When choosing software polling transfer (*mtmcdas.sys*), the T parameter is not used.

`[/A:n]`
Specifies the audio play mode. For a stereo CD, /A:0 or /A:1 is acceptable. For a monaural CD (left or right channel only), /A:1 will play the monaural audio signal from both the right and the left channels.

`[/X]`
Instructs the computer to use extended memory, if available. Note that you must first load an extended memory driver before using this option. If no extended memory driver is loaded, the following error message appears, and sector buffer specified by /M option should be located in conventional memory.

```
Extended Memory Manager not present.
CD-ROM driver can not use Extended memory.
```

When choosing software polling transfer (*mtmcdas.sys*), the M parameter is not used.

MICROSOFT CD-ROM EXTENSIONS PARAMETERS

Microsoft CD-ROM Extensions (*mscdex.exe*) is an executable program for MS-DOS (version 3.1 or higher) that works in conjunction with the device driver (*mtmcdae.sys* or *mtmcdas.sys*) to allow your computer to access CD-ROM discs in the CD-ROM drive as if they were MS-DOS formatted disks. This program is written by Microsoft and is specifically designed to work with the Microsoft designed operating system commonly called MS-DOS. Computers with MS-DOS "compatible" operating systems may experience unpredictable results unless the operating system manufacturer provides an alternative to the MSCDEX program.

The setup program automatically modifies the *autoexec.bat* file so that your computer can access the CD-ROM drive. However, there are some parameters that can be changed if you wish. This section explains the function of each parameter. Use a text editor, such as MS-DOS "EDLIN" or "EDIT", to modify the appropriate line in your *autoexec. bat* file.

The syntax of the *mscdex.exe* entry in *autoexec. bat* is:

```
[drive:][path]mscdex.exe/D:device name

[/M:n] [/E] [/V] [/L:drive letter]
```

Note: The actual *mscdex.exe* command line in the *autoexec.bat* file is not truncated and should be placed entirely on one line.

`[drive:] [path] mscdex.exe`
Specifies the location (drive and directory) of the *mscdex.exe* file. The default setting is the bin directory of the boot drive.

`/D:device name`
Specifies the name of the CD-ROM drive (8 characters maximum). This must be identical to the device name specified in the device driver in the *config.sys* file. For example:

```
c:\bin\mscdex.exe /d:mscd001
```


`[/M:n]`
Specifies the number of sector buffers for temporary storage of the most recent disc data. For example to specify four sector buffers you would use:

```
c:\bin\mscdex.exe /d:mscd001 /M:4
```

The installation program will set this value to 10.

The default value is 4.

Note: The greater this value, the better the CD-ROM drive will perform. However, each buffer uses about 2k of memory and specifying too many buffers may slow down computer operation or interfere with other programs which have large memory usage requirements. Using expanded memory (see the /E option in this section) or loading *mscdex.exe* into high memory (refer to your MS-DOS Users Manual or Memory Manager Users Manual) may allow you to specify a larger number of buffers to enhance CD-ROM performance and operate programs with large memory usage requirements simultaneously.

`[/E]`
Instructs the computer to use expanded memory, if available. For example:

```
c:\bin\mscdex.exe /d:mscd001 /e
```

Note that you must first load an expanded memory driver before using this option. If no expanded memory driver is loaded, the following error message appears:

```
Expanded memory not present or not
usable
```

[/V]
Instructs the computer to display a summary of RAM allocation and expanded memory usage at booting. For example, specifying

```
c:\bin\mscdex  /d:mscd001  /v
```

will cause the computer to display memory information in the following format:

```
5556864          bytes free memory
0                bytes expanded memory
12752            bytes CODE
1712             bytes static DATA
12618            bytes dynamic DATA
27344            bytes used
```

[/L:drive letter]
Specifies the drive letter to be assigned to the first CD-ROM drive. Do not assign a letter already used by an existing drive or the computer will be unable to access the CD-ROM drive. For example, you might use:

```
c:\bin\mscdex.exe /d:mscd001 /l:f
```

Normally, the CD-ROM drive is assigned the next available drive letter on the computer after the floppy drives, hard drives, RAM drives, etc. Therefore you only need to use this option if it is necessary to assign a drive letter beyond the last letter in use.

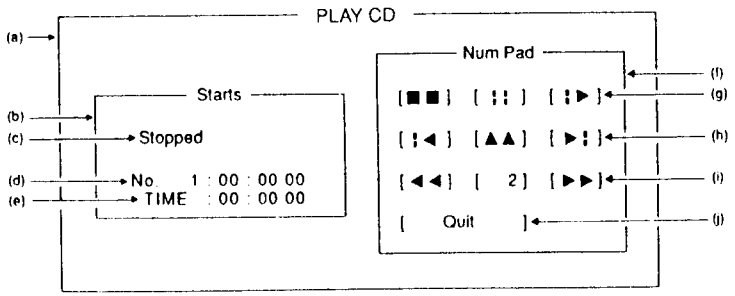
5 PLAYING AN AUDIO COMPACT DISC

There are two methods that control the Audio Play Program: control from the control panel or the command line.

OPERATION FROM THE CONTROL PANEL

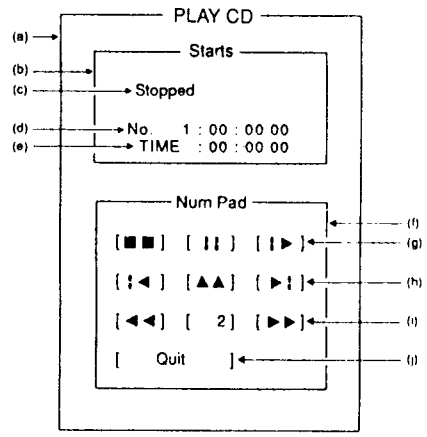
1. Copy the PLAYCD program from the installation diskette you received with your CD-ROM drive to the hard drive on your computer. We recommend you copy the program to a directory in your computers PATH, as this will allow you to load the program at any time you want. To learn more about your computer's PATH, please refer to your MS-DOS manual.
2. Boot up the computer, change to the directory that contains the file PLAYCD.EXE. Type **playcd** and press the **ENTER** key.
   Note: If you have a monochrome monitor, type **playcd M** instead of **playcd** and press the **ENTER** key. You do not need to change to the directory that contains the file *playcd.exe* if it is in your computer's PATH.
3. A control panel will be displayed on the screen. Note that the prompt does not appear until the program is finished.
4. The control panel can be operated with a mouse by clicking on the appropriate keys on the number pad.
   NOTE: The control panel can be positioned with a mouse by clicking and dragging the upper left-hand corner of the control panel.

5. You can operate the control panel on the screen using a mouse or the ten numeric keys with the NumLock key enabled:
   (a) Main window
   (b) Status window
   (c) Status message
   (d) Current track and elapsed time counter
   (e) Absolute time
   (f) Operating window (an image of the ten numeric keys)
   (g) Each numeric key, of the top row from left to right, corresponds to the following:
   [7]([■■]):STOP key
   [8]([⁞⁞]):PAUSE key. Effective only while playing.
   [9]([⁞▶]):PLAY key
   (h) Each numeric key, of the 2nd row from left to right, corresponds to the following:
   [4]([⁞◀]):Play the previous track
   [5]([▲▲]):Play the track being played starting from the beginning
   [6]([▶⁞]):Play the next track
   (i) Each numeric key, of the 3rd row from left to right, corresponds to the following:
   [1]([◀◀]):Jump to a point about 15 seconds earlier. Effective only while playing.
   [2]([ ]):Nothing occurs
   [3]([▶▶]):Jump to a point about 15 seconds later. Effective only while playing.
   (j) End
   [0] [Quit] :Stops the program



6. Control Panel Display Options:

PLAYCD [h[m[n]]] or
PLAYCD [v[m[n]]]



[h] or [v]
Orients the control panel horizontally [h] or vertically [v].
Use either, but not both.

[m] and [n]
Positions the control panel at line number [m] and column number [n].
Use both [m] and [n] with either [h] or [v].

FOR EXAMPLE:

PLAYCD h 1 1 (ENTER)
Orients the control panel horizontally with the upper left-hand corner positioned at the top left corner of the screen.

PLAYCD V 1 1 (ENTER)
Orients the control panel vertically with the upper left-hand corner positioned at the top left corner of the screen.

OPERATION FROM A COMMAND LINE

This section describes how to operate the **playcd** program from the MS-DOS command prompt. The following is the general syntax for the **playcd** command line:

PLAYCD [+[n]-[n] S P #[n] ? M]

Only the option specified first out of those listed below is effective. The prompt returns after ending each operation:

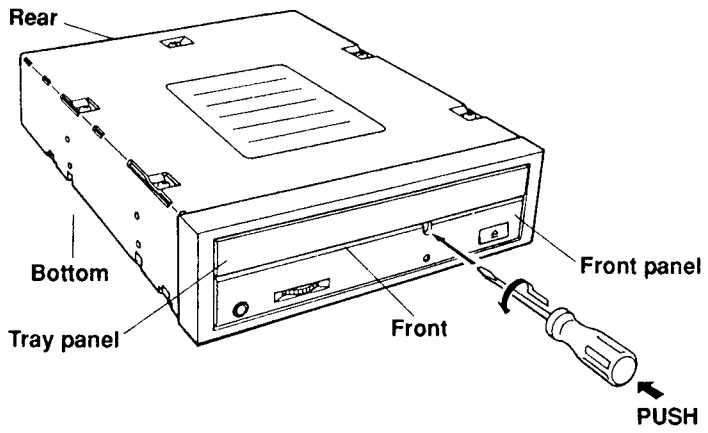
+[n]	Starts play at the nth track, or the nth track after the track being played. Omitting n plays the next track.
-[n]	Starts play at the nth track before the track being played. Omitting n plays the first track before the track being played.
S	Start/Stop
P	Pause
#[n]	Starts playing the nth track. If n is omitted, play is started at the first track.
?	Displays a help message.
M	Starts the control panel in monochrome mode.

6 TROUBLESHOOTING

The CD-ROM drive is designed to provide countless hours of trouble-free operation. If problems do occur, however, make sure the software has been properly installed and is functioning as it should. If problems persist, check the following items:

If the disc tray does not open:

- Is the power cord connected?
  Is the power switch turned to ON?
  The disc tray does not move without supplying power.
- When the disc tray does not move even when the power is supplied, turn the power switch to OFF and turn the emergency knob counterclockwise while pressing with a small (−) screw driver.
  Then disc tray will open slightly, carefully pull the disc tray manually, remove the disc from the disc tray and close the disc tray carefully again.
- After closing the disc tray, turn the power switch to ON and check the disc tray operates correctly.



Common Problems You Can Fix Yourself

If the CD-ROM drive does not operate properly:

1. Are both ends of the interface cable, power cable and audio cable securely attached? Are any of the cables frayed or damaged?

2. Is the disc inserted correctly? The label must be facing up.

3. Does the *config.sys* file address setting match the interface card DIP switch setting? These must be set to the same address.

4. Do the DMA channel, the IRQ channel and the Base I/O Port Address specified by the device driver (in the *config.sys* file) match the DMA jumper setting on the interface card? These channel settings must be identical.

5. Was the CD-ROM drive unit recently moved from a cold environment to a warm environment? If so, moisture may have condensed on the lens. Remove the disc and leave the CD-ROM drive turned on for about one hour before using it.

6. If any other hardware interfaces (bus, mice, scanners, sound boards, tape backups, etc.) are installed in the computer, are they using the same parameters as the CD-ROM drive? If so, there may be a hardware conflict which you can resolve by configuring the CD-ROM drive interface to use one of the alternative values for that parameter.

7. If you use an EMS driver like *emm386.exe* and load the driver. *mtmcdae.sys.* into Upper Memory Block (UMB), it is recommended that you add the parameter D=32 (or greater) to the EMS driver as follows. DEVICE=EMM386.EXE D=32

8. **If the motion or sound in an application seems slow or jerky, you should:**
   1. Increase the size of the buffer memory (/M parameter) in your *config.sys* file.

9. **If "Memory Not Enough" appears on the display screen or an application will not run, you may not have enough main memory for the CD-ROM buffer (/M parameter) and the application software:**
   1. Reduce the number of buffers and files specified in the *config.sys* file.
   2. Specify a smaller number for the /M:n parameter in the *mscdex.exe* file (in the auto exec.bat file) and device driver (in the *config.sys* file).

10. **if no sound comes from the speakers:**
    1. Have the connections between the LINE OUT jacks and the input terminals of the amplifier and/or speakers been properly made? Is the line frayed or damaged?
    2. Is power to the amplifier and/or speakers turned on?

11. **If no sound comes from the headphones:**
    1. Are the headphones properly connected to the headphone jack? Is the headphone cord frayed or damaged?
    2. Is the volume adjustment (on the front panel) set properly?

12. **If no sound comes from the speakers or the headphones:**
    1. Has the disc been properly inserted into the drive?
    2. Make sure the disc is not defective.

13. **If the error message "Incorrect DOS Version" appears on the display:**
    1. This message may appear if you have DOS version 6.0 or later. Use a text editor to add the following line to the *config.sys* file.

DEVICE=C:\DOS\SETVER.EXE