

**Kingston Technology
DataCard-16
Installation Guide**

Model: KTM-DC16/xxx

DataCard-16

**Fixed Disk + Memory Expansion
Micro Channel Adapter**

**For IBM PS/2 Models
50, 50z, 55SX, 56, 57, 60 and 65SX**

Installation Guide

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General Description

Congratulations on your purchase of the Kingston DataCard-16 Fixed Disk and Memory Expansion Adapter for IBM PS/2 Micro Channel machines. The DataCard-16 is designed for IBM PS/2 Models 50, 50z, 55SX, 56, 57, 60, and 65SX personal computers. There are several models of the DataCard-16: KTM-DC16/127, KTM-DC16/209, KTM-DC16/260 and KTM-DC16/340. All models come with a 2 1/2" high-speed Winchester Hard Drive in 127MB, 209MB, 260MB and 340MB disk capacities, respectively.

The DataCard-16 is also a 16-bit memory expansion adapter which supports up to 16 Megabytes of onboard memory. It uses standard IBM 72-pin SIMM modules. The DataCard-16 can be plugged into any 16-bit expansion slot, but should use the slot closest to the fixed disk controller so as not to interfere with any other expansion slot. Its onboard 2 1/2" 16ms fast access hard drive can replace the existing hard disk or be configured as a second hard drive for increased data storage capacity. The DataCard-16 can also be configured as the boot drive and may be partitioned into several logical drives to run more than one operating system. The DataCard-16 supports DOS 3.3 or higher, OS/2 2.0 or higher, and Windows NT 3.x.

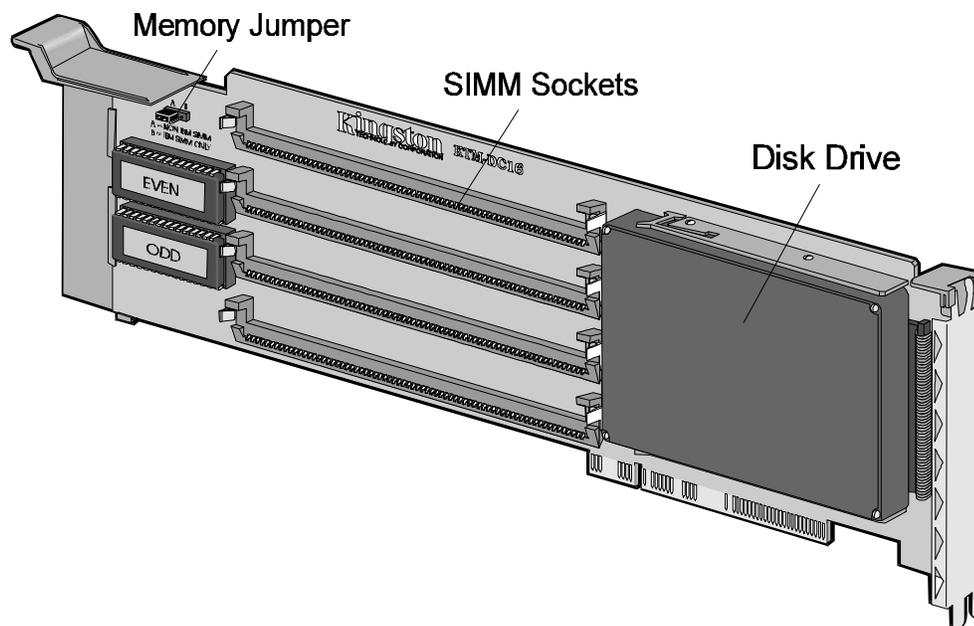
For the remainder of this manual, these fixed disk memory expansion adapters will be referred to collectively as the DataCard-16. When necessary for clarification, the three models will be differentiated as follows:

KTM-DC16/127	16-bit memory adapter with 127MB hard drive
KTM-DC16/209	16-bit memory adapter with 209MB hard drive
KTM-DC16/260	16-bit memory adapter with 260MB hard drive
KTM-DC16/340	16-bit memory adapter with 340MB hard drive

Special Features

Your DataCard-16 includes these important features:

- 16-Bit Fixed Disk and Memory Expansion Adapter
- Available in 127MB, 209MB, 260MB or 340MB disk drive capacity
- Small 2.5" Winchester hard drive
- Fast 16 millisecond disk access speed
- Can replace existing hard drive or add as secondary drive
- Uses standard IBM-Type, 72-pin SIMM modules
- Memory expansion from zero to 16 megabytes
- 100% factory tested to ensure reliability
- Supports the following operating systems:
 - DOS 3.3 or higher
 - OS/2 2.0 or higher
 - Windows NT 3.x



Package Contents

The DataCard-16 package should contain the following items:

- KTM-DC16 Fixed Disk and Memory Expansion Adapter
- User's Manual
- Kingston Option Diskette

If any of the items are missing or damaged, please contact your Kingston dealer for a replacement. Be sure the items you receive are genuine Kingston Technology products. The printed circuit board has the Kingston name silk screened on its surface. If the Kingston name is missing, it's not a genuine Kingston product.

Packaging Materials

The DataCard-16 is shipped in a special anti-static envelope which protects it from shock and static electricity that could cause severe damage. You should save this packaging material in case you need to reship the DataCard-16 in the future.

Before you remove any component from its packaging, be sure you discharge any static electricity by touching a properly grounded metal object.

Order Information

The DataCard-16 can be expanded up to 16MB and supports 2MB or 4MB IBM standard 72-pin SIMM modules. To add memory to your DataCard-16, order the following SIMM modules through your local Kingston dealer:

Kingston Part Number	Size
KTM2000/M70	2MB
KTM4000/M70	4MB
KTM0129	8MB

Software Installation

Updating Your Backup Copy of the Reference Diskette

It is recommended that you **never use your original IBM®** Reference diskette when installing hardware. If you have not already done so, follow the instructions below to make a backup copy of your IBM Reference Diskette:

1. Boot from your most current Reference diskette.
2. From the Main Menu, select "Backup the Reference Diskette."
3. Follow the instructions until the process has completed.

The DataCard-16 package is supplied with a Kingston Option Diskette. There is an installation program on the Kingston diskette. Use this program to copy the Kingston option files to your backup IBM Reference diskette. **Note:** for REPLY® motherboards, follow the special installation instructions located in "*Appendix F Troubleshooting*".

Running the INSTALL Program

The Kingston Option diskette includes an **INSTALL.EXE** program which **MUST** be run to correctly install the configuration files to your backup Reference diskette. If you run "Copy an option diskette" from the IBM Reference Menu, it will recognize the DataCard in its system configuration, but will not install the memory correctly.

You must run the INSTALL program from the Kingston Option diskette to copy the Kingston files to your backup Reference diskette or the configuration will not complete successfully. Do NOT use "Copy an option diskette" from the Reference Menu.

Before you start, it's a good idea to backup your existing hard drive and have both the Kingston Option diskette and your backup copy Reference diskette ready. This portion of the installation requires the use of DOS. If you are running OS/2, opening a DOS window will satisfy this requirement. If you use an operating system that cannot simulate DOS, boot your system from a DOS diskette.

The following steps show you how to install the option files from the Kingston diskette to your backup copy Reference diskette.

1. Turn on or reboot your computer (from hard disk or bootable DOS diskette) and get to the DOS prompt.
2. Remove the boot diskette from drive A, if present, and insert the Kingston Option diskette. At the prompt, type:

A: and press [Enter].

3. To start the INSTALL program, type:

INSTALL and press [Enter].

You will see the following display on your computer screen:

INSTALLATION Version 1.30 (C) Copyright 1990, 1992 KINGSTON TECHNOLOGY CORPORATION	
F1	Install Configuration Files onto Reference Diskette
F2	Install KEMM.SYS EMS Driver onto a Working Disk.
F3	Change Existing EMS Driver Parameters
F4	Exit and Back to DOS

4. Select [F1] to copy the Kingston Option files to your backup Reference Diskette

Note: Because the DataCard-16 does not have EMS hardware for Expanded Memory, the F2 and F3 menu functions do not apply. This INSTALL program is also used for other Kingston Memory boards which do contain EMS hardware.

Now that you have updated your backup Reference diskette with the Kingston option files, you are now ready to install the DataCard-16 into your machine.

For OS/2 2.0 Users

The DataCard-16 is designed to run OS/2 2.0 or later. If you are running OS/2 1.3 or earlier, you should first upgrade to version 2.0 before using the DataCard. Where OS/2 2.0 is already installed on your internal hard drive, add the following line to your CONFIG.SYS file before adding the DataCard-16:

1. Using your favorite text editor, edit the CONFIG.SYS file.
2. Look for a line that starts " **BASEDEV=** ".
3. At the end of this section, insert a blank line and add **BASEDEV=IBMINT13.I13**
4. Reboot your system.

Now OS/2 will see the DataCard-16 as a secondary hard drive. If the BASEDEV line is not added to your CONFIG.SYS file, OS/2 will report a COUNTRY.SYS error.

Note: When installing OS/2 onto the DataCard-16, after OS/2 has finished the installation phase and prompts you to reboot the system, in some instances the reboot does not fully reset the system and will cause a blank gray screen. To clear, simply cold boot the machine by turning power off and then on.

For OS/2 2.1 Users

If you are installing the DataCard-16 in an IBM PS/2 Model 56, you will need to remark out a "BASEDEV" line from the CONFIG.SYS file on the OS/2 diskette #1 PRIOR to OS/2 2.1 installation. Follow the steps below to modify the CONFIG.SYS file:

1. Insert the OS/2 2.1 Diskette #1 into Drive A, and type:
A: [Enter]
2. Using your favorite text editor, edit the CONFIG.SYS file.
3. Go to the **BASEDEV=IBM2M57.ADD** line and remark it out by inserting a REM statement as follows:
REM BASEDEV=IBM2M57.ADD
4. Save your changes and begin the OS/2 2.1 installation as instructed.

The Software Installation is now complete. You are now ready to install the DataCard-16 into your system. Continue with the next section, "*Hardware Installation.*"

Hardware Installation

The DataCard-16 uses IBM standard 72-pin SIMMs and, in some cases, the memory may already be installed. If you do not plan to add or remove any SIMMs, you can skip this section and go to "Installing the DataCard."

Installing SIMM Modules

The DataCard-16 has four sockets labeled P1, P2, P3, and P4 into which you can plug from one to four SIMM modules. The DataCard-16 uses 2MB and 4MB SIMMs. It does not support: 1MB memory modules; or memory modules that are slower than 85 nanoseconds. These modules are incompatible with the DataCard-16.

Note: Do NOT use 1MB SIMMs (Kingston P/N: KTM1000/M70)

To install a SIMM module, carefully push the SIMM into the socket until it is firmly seated. Then push the SIMM gently toward the memory board until the flanges shown in Figure 1-1 snap over either end of the module.

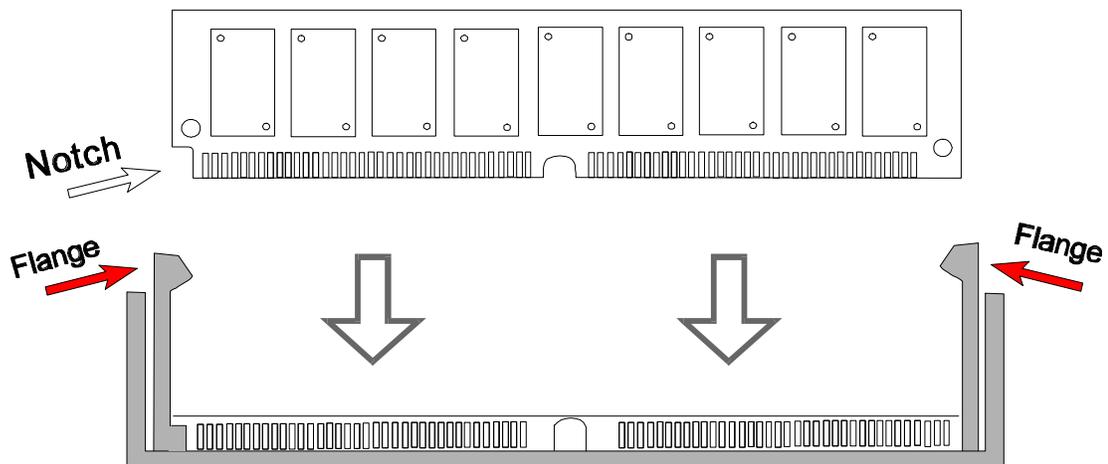


Figure 1-1 Inserting a SIMM module

Installing the DataCard

Now you are ready to install the DataCard-16 into your PS/2 computer. Keep in mind the precautions on static electricity and magnetized tools and be sure that you are grounded when touching any electrical components. The following steps will guide you through the physical installation of the DataCard-16.

STEP 1

- Turn power off from the computer.
- Disconnect any cables from the unit.

STEP 2

- Open the chassis.
- Locate one available **16-bit** expansion slot. **Remember:** the DataCard-16 can be plugged into any expansion slot, but should use the slot nearest the fixed disk adapter so as not to interfere with any other cards.
- Remove the expansion slot bracket.

STEP 3

- Place the DataCard-16 into the **16-bit** expansion slot.
- Make sure the DataCard-16 is inserted into the guide channels and properly seated into the expansion slot.
- Secure the adapter card to the expansion slot with the thumb screw.

STEP 4

- Replace the cover and reattach any cables that were disconnected.

The hardware portion of the installation procedure is now complete. You may want to leave the cover off during the remainder of the installation process in case it becomes necessary to move the DataCard-16 for troubleshooting purposes.

Configuring the System

At this point, the DataCard-16 is installed and needs to be configured before it can be recognized by the system. Follow the steps below to add the DataCard-16 to your system configuration. After rebooting, if you experience any conflicts with other adapter cards currently in your machine, you may need to change the DataCard-16 settings to correct any address conflicts. To manually configure or change the default settings of the DataCard-16, refer to "*Appendix A Manual Configuration*" in the Appendices section of this manual.

1. Insert your backup Reference diskette (onto which you've already copied the files from the Kingston Option diskette) into the floppy drive.
2. Turn on or reboot your computer.
3. The system will boot up automatically from the backup Reference diskette. When the IBM logo appears, press [ENTER] as prompted. After a few seconds, the system will prompt you: "Do you want to automatically configure the system? (Y/N)?" Press [N] for No.
4. From the main menu, select "Set Configuration."
5. Then select "Change Configuration."
6. If you have an internal IBM hard disk already installed and are adding the DataCard as a second drive, it is important to know the drive type number. Page down the Change Configuration menu to the last expansion slot. It should look something like this:

```
slot x - IBM Hard Disk Adapter
  Type of first drive.....[ 32]
  Type of second drive.....[ 0]
```

In this example, the IBM internal hard drive type is 32. **Write down your drive type number below for future reference.**

Your Internal IBM Fixed Disk Type: _____

7. You should see the DataCard in one of the expansion slots. Preferably in the slot closest to the IBM Hard Disk Adapter. There is no need to change the settings unless you see an asterisk denoting a conflict. Press [F10] followed by an [Enter] to save the configuration.
8. Press the exit key twice ([ESC] or [F3] depending on version) to exit. To restart the system, press [Enter].
9. At this point, the system will do a "cold boot" as if it had just been powered on. During the memory count, you should see any additional memory from the DataCard added to your system.

Your DataCard needs to be prepared before you can store data on it. Turn to the next section, *"Preparing Your Disk"* to complete the installation of your DataCard. The DataCard-16 can be configured for DOS, OS/2 2.0 or higher, and Windows NT. Refer to the section regarding your particular operating system.

Preparing the Disk

Now that the DataCard-16 is installed in your PS/2 machine, the hard drive needs to be partitioned and formatted before it can store data. This section will take you through a basic disk drive preparation for DOS, OS/2, and Windows NT 3.1 and 3.5 where your internal hard drive contains the operating system and you are adding the DataCard as the second hard drive. In the examples below, your internal hard drive remains the boot drive. To configure the DataCard-16 as the boot drive on your system, refer to "*Appendix B Configuring DataCard as the Boot Drive*".

For DOS

Running FDISK

FDISK is located in your DOS directory on either your existing hard drive or on a DOS diskette. This program creates partitions on the hard drive. The hard drive must be partitioned before it can be formatted using the *FORMAT* command. When running *FDISK*, the disk can be partitioned as one entire primary partition, one entire non-bootable extended partition, or divided into separate primary and extended logical drives.

If you are running DOS 4.0 or higher, it is best to configure the DataCard-16 as one entire primary partition to use all the disk space as one drive letter. If you are running DOS 3.3, there is a 32MB size limit for each partition. Be careful to note how drive letters are assigned depending on the number of physical drives and the number of primary partitions. Refer to *Appendix C How DOS Assigns Drive Letters* for more information.

In the example below, we will partition the DataCard-16 as one entire primary partition using DOS 5.0. As a primary partition, the DataCard-16 can use the Select Boot Feature to boot the system or be configured as the default boot drive in your system.

The DataCard-16 can also be partitioned as one entire non-bootable extended partition. If your internal hard drive is already partitioned into several drive letters, this type of

configuration would avoid reassigning drive letters based on the order of primary partitions. The DataCard-16 would use the next available drive letter.

To run FDISK, follow these steps:

1. From the DOS prompt, type:

FDISK [Enter]

You should see the following screen display:

```
MS-DOS Version 5.0
Fixed Disk Setup Program
(C)Copyright Microsoft Corp. 1983 - 1991

FDISK Options

Current fixed disk drive: 1

Choose one of the following:

1. Create DOS partition or Logical DOS Drive
2. Set active partition
3. Delete partition or Logical DOS Drive
4. Display partition information
5. Change current fixed disk drive

Enter choice:  [1]

Press Esc to exit FDISK
```

Note: Option 5 is present only when two hard drives are detected on the system.

2. You will see the "Current fixed disk drive: 1" message. If the DataCard is the only physical drive on your system, skip to Step 3 below. If the DataCard is the second physical drive, select Option 5 to change the current fixed disk drive to "2".

3. At the main menu, select Option 1 *Create DOS partition or Logical DOS Drive*.

You should see the following screen display:

```

                Create DOS Partition or Logical DOS Drive

Current fixed disk drive: 2

Choose one of the following:

1. Create Primary DOS Partition
2. Create Extended DOS Partition
3. Create Logical DOS Drive(s) in the Extended DOS Partition

Enter choice:  [1]

Press Esc to return to FDISK Options
```

4. Now select Option 1 *Create Primary DOS Partition*.

You should see the following screen display:

```

                Create Primary DOS Partition

Current fixed disk drive: 2

Do you wish to use the maximum available size for a Primary DOS
Partition and make the partition active Y/N) .....? [Y]

Press Esc to return to FDISK Options
```

5. To partition the DataCard-16 as one primary DOS partition, press [Enter] to accept. This type of partitioning will use the entire disk as one drive letter.

6. After DOS has completed the partition process, the following message appears on the screen:

```
                Create Primary DOS Partition

Current fixed disk drive: 2

Do you wish to use the maximum available size for a Primary DOS
Partition and make the partition active Y/N) .....? [Y]

Primary DOS Partition created, drive letters changed or added

Press Esc to return to FDISK Options
```

7. To exit, press the Escape key. If you wish to view the DataCard-16's partition information, select Option 4 *Display partition information*, otherwise press the Escape key again to exit *FDISK*. The system will reboot.

The DataCard-16 is now partitioned and ready to be formatted. Continue with "*Running FORMAT*" in the next section to complete the DOS installation.

Running FORMAT

FORMAT is located in your DOS directory on either your existing hard drive or on a DOS diskette. This program creates a root directory and file allocation table (FAT) to prepare the disk for storing data. For more detailed information on using the *FORMAT* command, refer to your DOS Manual.

To continue with our example, we have exited *FDISK* and rebooted the system from the internal hard drive, drive C:. The DataCard-16 is now recognized by your system as drive D: even if your internal hard drive was partitioned into several drives. This is because DOS assigns drive letters in order of primary partitions first, and then extended partitions.

For example, let's say your internal hard drive has two partitions: a primary partition and an extended partition (C: and D:). When the system boots from the internal hard drive, its primary partition becomes drive C:, the DataCard's primary partition becomes drive D:, and the extended partition on the internal hard drive will follow as drive E:. Remember, your path statement in the *AUTOEXEC.BAT* file and any other software pointers that used to point to drive D: on the internal hard drive's extended partition must be changed to reflect drive E: now.

In our example, we have partitioned the DataCard-16 as one primary partition under DOS 5.0. Follow the instructions below for formatting the primary partition. If you are using DOS version 3.x which has a size limitation of 32MB per logical, you must run *FORMAT* for each logical. After you have formatted the primary partition, continue with formatting the extended partitions until each partition on the DataCard-16 has been formatted.

Formatting the Primary Partition

FORMAT D:/S/V

where: /S copies the system files to make the drive bootable.
 /V to prompt for a volume label.

Note: The above example assumes your system is running DOS 5.0, and you have partitioned the DataCard as one primary

partition. Older versions like DOS 3.x had a size limit of 32MB per logical. If you have partitioned the DataCard into several logicals, use the next example for all consecutive extended partitions.

Formatting Extended Partitions

FORMAT x:/V

where: **x** is drive letter of DataCard extended drive(s).
/V to prompt for a volume label.

Note: If the DataCard has been partitioned into several logical drives, the *FORMAT* command must be run for each logical drive.

After *FORMAT* has completed successfully, it will then prompt you for a volume label. Your screen should look like the screen below. Letters in bold are commands you have typed. For volume label, use any name that describes the DataCard-16 to differentiate it from other hard drives in your system. For example, use the name "DATACARD".

```
C:\FORMAT D:/S/V

WARNING, ALL DATA ON NON-REMOVABLE DISK
DRIVE D: WILL BE LOST!
Proceed with Format (Y/N? Y)

Volume label (11 characters, ENTER for none)? DATACARD
```

Congratulations, you have finished installing and configuring your new DataCard-16 to work in a DOS environment. To make the DataCard-16 the boot drive for your system, refer to "*Appendix B Configuring DataCard as the Boot Drive*".

For OS/2

Running FDISK

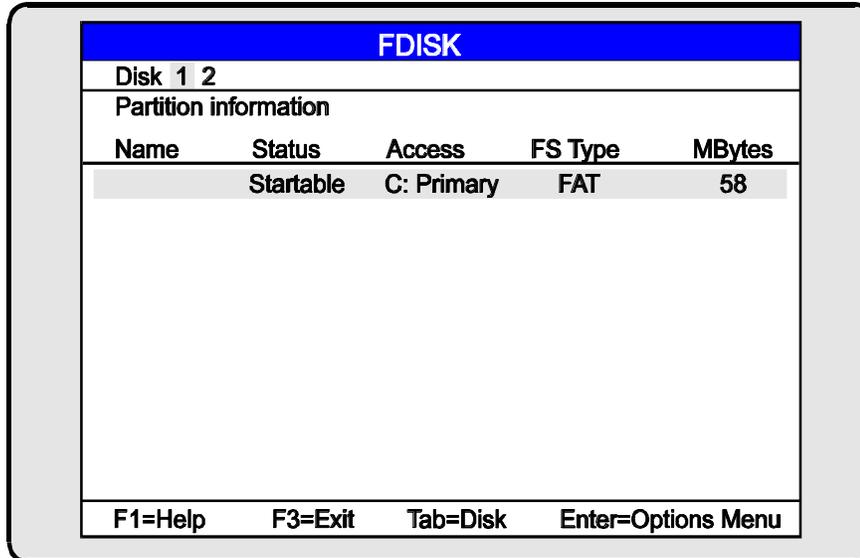
In most cases, your internal hard drive has OS/2 already installed and you are adding the DataCard-16 as a second hard drive. This section will show you how to configure the DataCard-16 for OS/2, where OS/2 is already installed on the internal hard drive. If you wish to install OS/2 onto the DataCard-16, you will need to make the DataCard-16 the boot drive first. Refer to "*Appendix B Configuring DataCard as the Boot Drive*". Then load OS/2 as a new installation. Refer to your OS/2 documentation for details on installing OS/2.

To configure the DataCard-16 where OS/2 is currently installed on your system, follow the steps below:

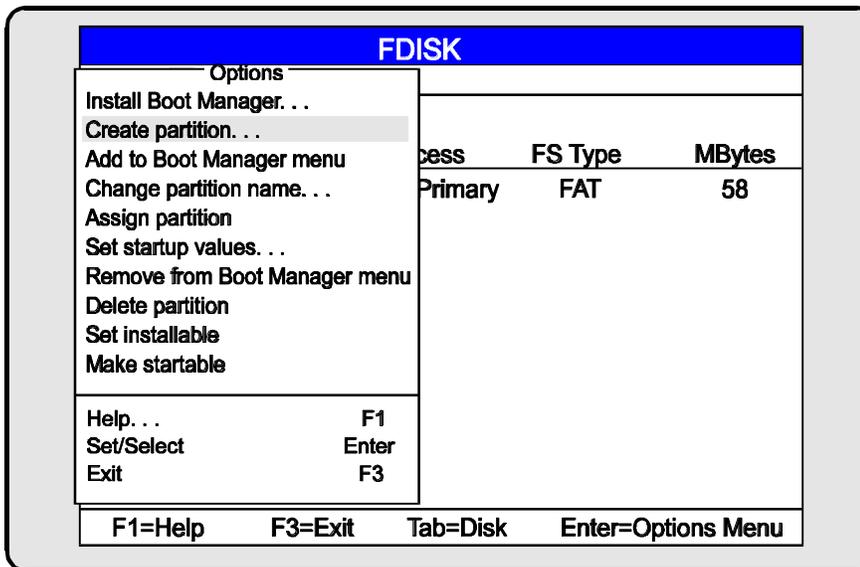
1. Boot into OS/2 from your internal hard drive.
2. Double-click on the *OS/2 System* icon.
3. Double-click on the *Command Prompts* icon.
4. Double-click on the *OS/2 Full Screen* icon.
5. From the OS/2 command prompt, type:

FDISK [Enter]

The FDISK screen will appear and display disk information regarding your internal hard drive. Your screen should look something like the display below:



6. Press the Tab key to highlight Disk, then Right Arrow over to Disk 2
7. Press the Tab key again to select.
8. Now press [Enter] to bring up the Options Menu.



9. From the list of choices, select *Create partition...*

10. The *Size of Partition* screen will prompt you to enter the size in megabytes. It will default to the maximum size of the disk. For this example, we will partition the DataCard-16 as one drive. Press [Enter] to select the default amount.
11. At the *Type of Partition* screen, select *Primary Partition*.
12. FDISK will create a primary partition. When it finishes, your screen should look like the one below. The size in megabytes may vary. Notice the FS Type is Unformatted until we run *FORMAT* on the disk.

FDISK				
Disk 1 2				
Partition information				
Name	Status	Access	FS Type	MBytes
	None	D: Primary	Unformatted	121

F1=Help F3=Exit Tab=Disk Enter=Options Menu

13. The DataCard-16 is now partitioned. Press F3 to exit. To save and exit, press F3 again. The screen will now prompt:

Drive Letter changed. Please press Ctrl+Alt+Del

14. Follow the prompt to reboot your system.

Running FORMAT

In our example, we have partitioned the DataCard-16 as one primary partition under OS/2. Follow the instructions below for formatting the primary partition.

1. From an OS/2 full screen prompt, type:
format d: [Enter]
2. After FORMAT has completed, it will prompt for a volume label. Enter a name that differentiates the DataCard-16 from other hard drives in your system. For example, use the name *DataCard* as follows:
Enter up to 11 characters for the volume label,
or press Enter for no volume label. **DataCard** [Enter]
3. Type EXIT to return to the OS/2 Desktop.

The following page shows the screen display after running FORMAT on the DataCard-16. If you have partitioned the DataCard-16 into several logical drives, FORMAT must be run on each drive.

```
OS/2      Ctrl+Esc = Window List      Type HELP = help

[C:\]format d:
The new type of file system is FAT

Warning! All data on hard disk D:
will be lost!
Proceed with FORMAT (Y/N? y

Formatting has been completed.
The Volume Serial Number is xxxxx-xxxxx

Enter up to 11 characters for the volume label,
or press Enter for no volume label. DataCard

    127541248 bytes total disk space
    127541248 bytes available on disk

        2048 bytes in each allocation unit.
        62276 available allocation units on disk.

[C:\] exit
```

Windows NT - New Installation

The Data Card-16 uses a device driver to properly configure in a Windows NT environment. Follow the steps below to install both the Data Card-16 and the Windows NT operating system onto your computer. If you are currently running Windows NT, skip to "*Windows NT - Adding Your Data Card-32.*"

1. Insert the Windows NT Setup disk for CD-ROM Installation into Drive A and power on or re-boot your computer.
2. When the Setup Screen appears, you will have a choice of Express Setup or Custom Setup. Because the DataCard needs to load its driver, choose **C** for CUSTOM Setup.
3. Setup will determine what type of SCSI Adapter your CD-ROM is using. Select **S** to "Configure Additional SCSI Adapters".
4. From the list of choices, select "Other (Requires disk provided by a hardware manufacturer)" and press [Enter].
5. You will be prompted for the Manufacturers Diskette. Insert the Kingston DataCard diskette into drive A and press [Enter].
6. For diskette version 2.1 or older, there should be two selections, choose one of the listings below. For diskette version 2.2 or higher, there is only one driver listed.

KINGSTON DataCard (Bootable) to use the DataCard as the boot drive.

KINGSTON DataCard (Non-Bootable) to use the DataCard as a second drive. System will boot from internal.

7. Now Setup will list detected SCSI Adapters including the DataCard. Press [Enter] to continue.

8. The next screen will show your system configuration. Verify the settings are correct, then press [Enter] to continue with no changes. Setup will continue with the installation of Windows NT onto the DataCard drive.

Windows NT Disk Partitioning

1. At this screen, press [Enter] to install Windows NT. Setup will prompt you to partition either as NTFS or FAT. Select either type of partition depending on your specific needs.
2. Now select "F" to format the DataCard.
3. Use the default directory, WINNT, to copy Windows NT system files.
4. When finished, Setup will prompt you to:
 1. Remove disk in drive A
 2. Press CTL+ALT+DEL to restart your computer
5. Follow the instructions above and reboot your computer.

When the system reboots, continue with Windows NT Setup as described in your Microsoft documentation.

Windows NT - Adding Your Data Card

If your system is currently running Windows NT, you can simply add the Data Card-16 from within the Windows environment. Follow the steps below to configure your new Data Card-16 adapter under Windows NT:

1. Under the *Main* group, select *Windows NT Setup*.
2. Choose *Options*.
3. Select *Add/Remove SCSI Adapters...*
4. Select *Add*.
5. A list of SCSI adapters will appear. Scroll down to the bottom of the list and choose "*Other (Requires a disk from a hardware manufacturer)*."
6. Insert the Kingston Data Card diskette version 2.2 or higher. Then click on *OK*.
7. Select "*Kingston Data Card*", and click on *OK*
8. Choose *Install* to complete the installation process.

The Data Card-16 can then be partitioned and formatted from within Windows NT using the *System Administrator* program utility. Consult your Microsoft documentation for help.

Appendices

Appendix A Manual Configuration

In most cases, the default settings of the DataCard-16 will not need to be changed. If a conflict occurs with another adapter card in your machine, the DataCard addresses can be changed to correct any conflicts. If for any reason you need to change the default settings on the DataCard-16, follow the steps below:

1. Boot from the backup Reference diskette.
2. At the IBM logo, press [Enter]
3. From the Main Menu, choose "Set Configuration"
4. Then select "Change Configuration"

You will see your system configuration on the screen. Look at the expansion slots to see what adapters are found. If any of the hardware addresses have an asterisk (*) by them, this denotes an address conflict. Highlight the option and press [F5] or [F6] to change the address. The following sections explain the DataCard's hardware addresses.

DataCard Settings

The DataCard has software selectable settings for I/O base address, BIOS PROM address, and interrupt level (IRQ).

Controller I/O Address

Default: **8020 - 803f**
Options: **8120 - 813f**
 8220 - 823f
 8320 - 833f

This is the base I/O address range for the DataCard. The Set Configuration program will display an asterisk next to this address if there is a conflict with another adapter card. Press [F6] until you see an address that does not conflict.

BIOS PROM Address

Default:	D4000h	Dos-OS/2 non-boot
	D6000h	Dos-OS/2 bootable
	C8000h	Dos-OS/2 bootable
	CA000h	Dos-OS/2 non-boot
	CC000h	Dos-OS/2 non-boot
	CE000h	Dos-OS/2 non-boot
	D0000h	Dos-NT bootable
	D2000h	Dos-NT non-boot

This selects the base address of the BIOS PROM. The default setting is D4000h for DOS or OS/2 non-bootable, but can be changed to another address if desired. For Windows NT, use D0000h bootable or D2000h non-bootable. If you have another hard drive currently on your system, it will remain the boot drive at any **non-boot** address setting and the DataCard will be the second physical drive on your system. If the DataCard is the only hard drive on your system, it will become the boot drive and boot the system from any address listed.

Select Boot feature: You can select the hard drive to boot from while the system is powering on by pressing Ctrl+Alt+F1 just after the Kingston logo appears (Press the keys **after** the Kingston logo appears or you may encounter a 301 keyboard error). As the system is booting up, you will see the following message:

```
Kingston Technology Corp. Copyright (c) 1993.  
BIOS version xxx
```

At this point quickly press Ctrl+Alt+F1. You have only a few seconds to do so. In the following example, the internal hard drive is the boot drive and you wish to boot from the DataCard-16. The screen will now display:

```
First drive is original.  
Press B to swap, or ENTER to bypass timer.
```

Pressing "B" on the keyboard will change the boot disk from the internal hard drive to the DataCard-16. If you change your mind, press [Enter] to bypass, or let the timer count down to zero and it will boot from the default disk. This procedure will not permanently change the boot drive default.

Interrupt Level

Default: **Interrupt 15**
Options: **Interrupt 14**
 Interrupt 11
 Interrupt 10

This selects the hardware interrupt level that the DataCard uses. There is no reason to select another level other than 15, unless this conflicts with another adapter already in your PS/2 system. If an asterisk appears, press [F6] until you see an Interrupt level that does not conflict.

Appendix B Configuring DataCard as the Boot Drive

The DataCard-16 can be configured as the boot device for your computer even if there are other hard drives currently on your system. Configuring the DataCard-16 as the boot drive involves two steps: (1) selecting a bootable address from the Reference diskette, and (2) running FDISK to set the active primary partition from the DataCard-16.

You will need the following items to complete this procedure:

DOS

- Your backup copy Reference diskette
- A bootable DOS diskette

OS/2

- Your backup copy Reference diskette
- Complete set of OS/2 diskettes

Windows NT

- Your backup copy Reference diskette
- DataCard Option diskette
- Microsoft Setup diskette for CD-ROM Installation

Note: the DataCard-16 must already be partitioned and formatted with a primary partition as discussed earlier in the "*Preparing the Disk*" section of this manual.

To configure the DataCard-16 as the boot drive, follow the steps below:

1. Insert your backup copy of the IBM Reference diskette into Drive A.
2. Turn on or reboot the computer.
3. From the main menu, select *Set Configuration*.
4. Now select *Change Configuration*.
5. The DataCard-16 should be listed in one of the expansion slots. Change the BIOS PROM Address to one of the following based on your particular operating system:

C8000h Dos-OS2 bootable for DOS or OS/2

D6000h Dos-OS2 bootable for DOS or OS/2

D0000h Dos-NT bootable. for DOS or Windows NT

6. Press [F10] to save changes. Press [Enter] to Continue when prompted. To exit press Esc or [F3] (depending on Reference diskette version) until you are prompted to restart the system. Reboot to make changes permanent.

The second phase of configuring the DataCard-16 as the boot drive depends on your operating system. Follow the applicable section: DOS, OS/2, or Windows NT.

DOS

Remove the backup Reference diskette and insert a bootable DOS diskette. The reason we are booting from a floppy disk is to set the active primary partition to the DataCard. If we boot from the internal hard drive, *FDISK* will not allow you to change the active partition. If you try booting the machine from the DataCard-16 without the primary partition active, the system will boot into ROM BASIC, instead of DOS.

Caution: It is important to boot from a floppy disk to run FDISK. Booting from the DataCard without the primary partition active will boot the system into ROM BASIC instead of DOS.

Follow the steps below to run *FDISK*:

1. From the A: drive, type FDISK.
2. FDISK will display the following message:

```
WARNING! No partitions are set active - disk 1 is not
startable unless a partition is set active.
```
3. Select Option 2 "Set active partition"
4. Enter the number of the primary partition as prompted.
5. Exit FDISK and restart your computer.

OS/2

When making the DataCard-16 the boot drive in OS/2, it is recommended that you install the OS/2 operating system on the DataCard. First, verify that the DataCard BIOS PROM Address is set to either **C8000h** or **D6000h** OS/2 bootable address. To install OS/2 onto the DataCard-16, insert the *Install* disk into Drive A and boot the machine. Follow the screen prompts to install OS/2. For more information on OS/2 installation, refer to your OS/2 documentation.

Windows NT

When making the DataCard-16 the boot drive with Microsoft Windows NT, there is a device driver which allows the DataCard to be recognized by the system. First, verify that the DataCard BIOS PROM Address is set to **D0000h** Windows NT bootable address. Then, follow the installation instructions as described previously in the "*Preparing the Disk*" section of this manual. For the latest updates and changes, refer to the README.DOC file on the Kingston diskette.

Installing Windows NT 3.5

Windows NT 3.5 uses an installation utility, WINNT.EXE, to install the operating system. This utility has several command line switches which may be used depending on your system requirements. If you are installing Windows NT 3.5 **after** the Data Card-16 is already installed, you **must** use the following command line switches when running the WINNT installation utility:

WINNT /x /b [Enter]

where /x = Do not create the Setup boot floppies.

/b = Floppyless operation.

Use the switches listed above to ensure proper Windows NT installation. Refer to your Microsoft documentation to properly install the Windows NT operating system.

Appendix C How DOS Assigns Drive Letters

This section describes how DOS assigns drive letters to the storage devices in your computer. The term "drive letter" refers to the letters used by the operating system to access the various storage devices in your computer such as floppy disk drives, and hard-disk drives. For example, drive C: is normally the hard-disk from which the computer boots and drive A: is a floppy disk.

Floppy Disk Drives

Drive letters A & B are always reserved for floppy drives.

Hard Disks - Overview

Before DOS can store data on a hard drive, it must be prepared by first partitioning and then formatting. The term "partitioning" means dividing the drive into sections called partitions. A partition can be any size from 1MB to the size of the drive. For example, a 200MB drive might be divided into 4 partitions of 50MB, 100MB, 20MB and 30MB. Or, it might be divided into 2 partitions of 125MB and 75MB. Also, a drive can be configured as a single partition, in this case, 200MB. Partitioning is done by running a program called FDISK.EXE.

Each partition must then be formatted before DOS can store files on the drive. Formatting writes a particular type of information in each partition. This information is called the "file system". The information contained in the file system is used by DOS to manage the storage and retrieval of files in a partition. Formatting is done by running a program called FORMAT.COM.

Types of Partitions

There are 2 types of partitions; primary and extended. A hard drive can have 1 primary partition and 1 extended partition. The extended partition can be further divided into logical-drives, which, for all intents and purposes, are more partitions. For instance, using the above example of a 200MB drive being divided into 4 partitions, 1 partition would be a primary partition, and the extended partition would be divided into 3 logical drives.

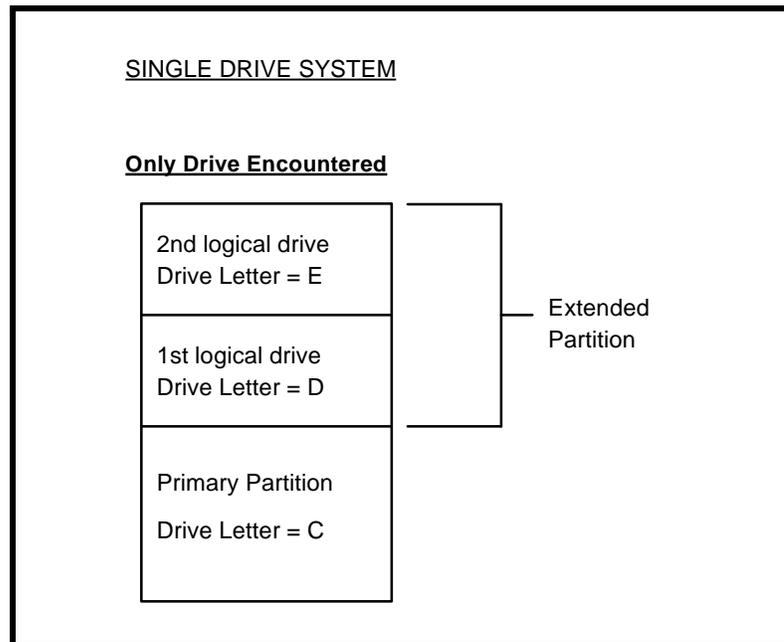
Drive Letter Assignments for Hard Drives

The assignment of drive letters is determined by the system's hardware and software configuration **at the time the system is booted.**

Each time the system is booted, DOS searches for hard drives and associated partitions. When a drive/partition is encountered, the next available drive letter is assigned to that drive/partition. For example, if DOS has already assigned the letter C to a drive/partition, the next drive/partition would be assigned the letter D.

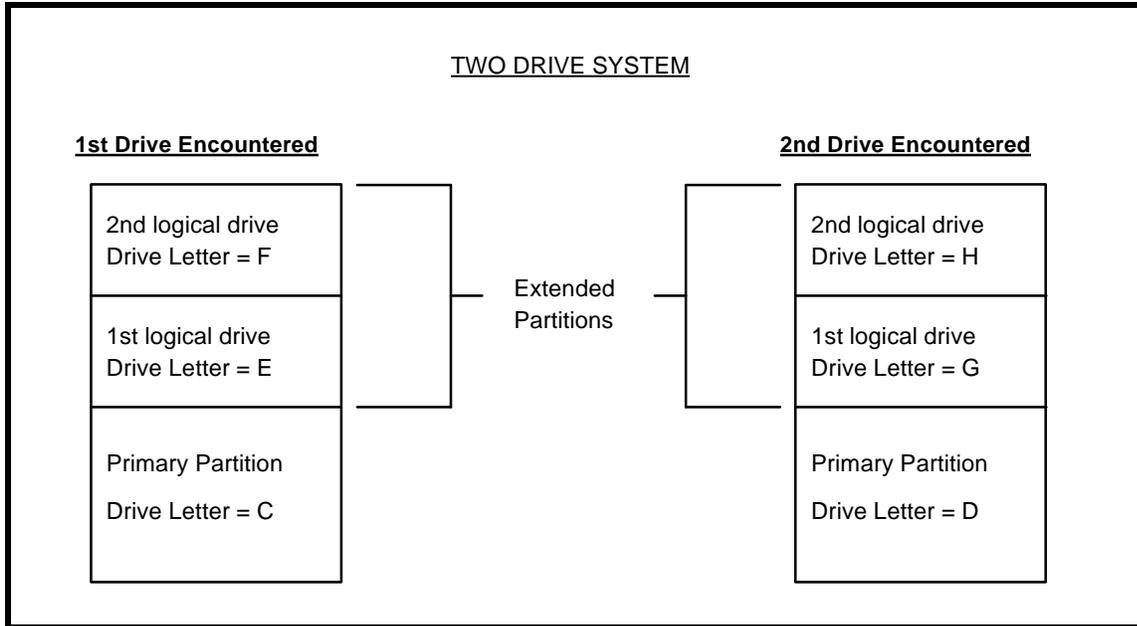
Single Drive System

In a system with only one hard drive, DOS assigns the letter C to the primary partition and subsequent letters to the logical-drives in the extended partitions.



Two Drive System

As with a single drive system, DOS assigns the letter C to the primary partition of the first hard drive encountered. However in a two drive system, drive letter D is assigned to the primary partition of the **second** hard drive. DOS then goes back to the first drive and assigns drive letters to each of the logical drives in its extended partitions. Then DOS switches back to the **second** hard drive and assigns letters to its extended partition logical drives.



Appendix D Special SCSI Adapters

If your system contains a SCSI Controller Card, for example, Future Domain SCSI Hard disk controller whose option ROM takes control of the system on bootup. It will cause the DataCard to not be seen by your system.

There are two procedures to resolve this problem. First, check to see if the DataCard's option ROM address comes before the SCSI option ROM address. Normally the DataCard defaults to D4000h behind other adapters. Change the DataCard's option ROM to an address before the Future Domain SCSI adapter. This should allow the DataCard to load before the SCSI adapter.

If this procedure does not resolve the conflict, disable the SCSI option ROM from the configuration menu of your IBM Reference diskette and load an IDD (installable device driver) for the SCSI adapter in your CONFIG.SYS file. This will allow the DataCard to initialize properly before the SCSI adapter takes control of the system bus. For more information on using an installable device driver, consult the owner's manual of your particular SCSI adapter.

Appendix E About Expanded Memory

If you have a 286 Micro Channel machine (PS/2 50, 50z, or 60) and need to use Expanded (EMS) memory for older software applications, such as Lotus 123 version 2.x, you will be unable to use the DataCard's onboard memory as Expanded (EMS) Memory. The DataCard-16 does not support Expanded memory. If you are running software outside of Windows which specifically needs EMS memory, you have a couple of options. You can use other third-party memory boards configured for Expanded memory, such as Kingston's KTM609/16 memory board which does support EMS memory.

You can also upgrade the processor to use 386-level memory management software. Kingston offers the SX/Now!, a 386SX 25Mhz or 33Mhz processor upgrade or the SLC/Now!, a 386SLC 20Mhz, 25Mhz, or 486SLC2 50Mhz version. You would then be able to run 386-level Expanded memory drivers, such as DOS 5.0's EMM386, Quarterdeck's QEMM386, Qualitas's BlueMAX, etc..

For 386SX machines (IBM PS/2 55SX, 65SX, 70, 80, etc.), use DOS 5.0's EMM386.EXE memory manager. This driver has the ability to take Extended memory and simulate Expanded memory if your software application requires it. Be sure to use the RAM switch instead of NOEMS when loading the device. The RAM switch allows EMM386 to load other devices high and work as an Expanded memory manager. Using the NOEMS switch allows devices to be loaded high, but will not act as an Expanded memory manager. Refer to your DOS Manual for instructions on how to use EMM386.

Using Quarterdeck's QEMM 50/60

If you are using a version of QEMM 50/60 earlier than the release of Kingston's DataCard-16, you will need to edit the **MCA.ADL** file in the QEMM directory. This file contains a list of adapters which use ROM addresses in upper memory. The board ID numbers are listed in numerical order. Find the appropriate place in the file and add the following line:

71D4 Kingston DataCard

Save your changes and cold boot the computer by turning the power off and on to reset the system. QEMM should now be able to recognize the DataCard-16.

Appendix F Troubleshooting

201 Memory Parity Error and 164 Memory Size Error

If you are installing the DataCard-16 with memory, it is important to run the **INSTALL** program from the Kingston diskette to copy the DataCard's option files to your backup Reference diskette. If you use "Copy an option diskette" from the IBM Reference diskette this will NOT configure the board correctly. Refer to *"Running the INSTALL program"* in the Software Installation section of this manual. If errors still occur, call Kingston Technical Support at (714) 435-2600.

301 Keyboard Error while booting into DOS

This error can occur by touching the keyboard during POST (Power-On-Self-Test). If you wish to use the Select Boot Feature to boot the system from a hard drive other than the default boot drive, hit Ctrl+Alt+F1 **after** the Kingston logo appears. If these keys are pressed before the Kingston logo appears, it will produce a 301 keyboard error.

COUNTRY.SYS error while booting into OS/2 2.x

OS/2 needs to load a device to handle Interrupt 13. Edit the CONFIG.SYS file. Search for " **BASDEV=** ". Insert a blank line at the end of this section to read, **BASDEV=IBMINT13.I13** . Save your changes and reboot the system.

Unable to set active primary partition in FDISK

When configuring the Datacard-16 as the boot drive, you must boot from a DOS diskette to run FDISK and set the active primary partition from the DataCard-16. Running FDISK from the internal hard drive will allow you to create primary and extended partitions, but you will not be able to set the active partition. This is because FDISK will only set the active partition from Disk 1. Whichever hard drive boots the machine will be assigned as Disk 1 in FDISK. To correct this, boot your machine from a floppy disk.

System Boots into ROM BASIC

Booting from the DataCard-16 without first setting the primary partition active will boot the system into ROM BASIC. Refer to "*Appendix B Configuring DataCard as the Boot Drive*" to set the primary partition active or change the DataCard's BIOS PROM address to a non-bootable setting.

Memory Errors Using IBM SIMMs

Jumper W2 in the upper left corner of the DataCard-16 is set to position A for compatibility with all IBM SIMM modules. Verify that jumper is in position A for IBM compatibility. For Kingston 2MB, 4MB, and 8MB SIMMs, either jumper position works fine. IBM and Kingston SIMM modules can be mixed.

Systems Using REPLY™ Motherboards

If your PS/2 computer has been upgraded with a REPLY system board, it will not recognize memory on the DataCard-16. The REPLY board is designed to address a full 16MB of RAM from its system board without searching micro channel expansion ports for additional memory. For this reason, memory should be installed directly onto the system board. Remove any memory from the DataCard-16 and install it on the REPLY motherboard.

To configure the DataCard-16 on a REPLY motherboard, use the following guidelines:

1. **DO NOT use the Kingston INSTALL program** to copy the option files to your REPLY Reference diskette. Only one file is required. Copy "**@71D4.ADF**" from the OPTIONS directory on the Kingston diskette to the REPLY Reference diskette.
2. Then continue with the installation of the DataCard-16 starting at "Configuring the System" on page 9 of this manual.

Revision History

Revision Level	Comment
A1	First Release.
A2	Added Drive Type Number to "Configuring System".
B1	Added separate DOS and OS/2 sections for "Preparing the Disk". Added "Appendix B DataCard as Boot Drive."
B2	Revised INSTALL main menu verbiage. Added Windows NT installation. Added new Data Card non-parity part #s. Removed incompatible IBM part #s.
B3	Removed any mention of non-parity part numbers.
B4	Added REPLY Motherboard to Appendix F Trblshootg
B5	Added KTM0129 8MB SIMM to Order Information.
B6	Changed drive capacities from 85, 127, & 209 to 127, 209, & 340.
C1	Added 260MB hard drive to the list.
C2	Updated COUNTRY.SYS error from OS/2 2.0 to 2.x. New Limited Warranty.
C3	Added Windows NT 3.5 instructions.