



*Personal Computer
Hardware Reference
Library*

Guide to Operations

Enhanced Memory

Expansion Adapter

**STATEMENT OF LIMITED WARRANTY FOR THE ENHANCED
MEMORY ADAPTER (PRODUCT)**

International Business Machines Corporation (IBM) gives you the following limited warranty for this Product only if it was originally purchased for use, not resale, from IBM, an IBM Authorized Dealer or any other IBM approved reseller for this Product (original purchase).

The Type of Warranty Service for this Product is **Customer Carry-In Exchange**. The Warranty Period is **1 Year** which starts on the date of original purchase (Date of Purchase) as shown on the receipt which establishes the proof of original purchase.

IBM warrants that on the Date of Purchase this Product will meet IBM's official published specifications which are available from IBM upon request. If, during the Warranty Period, this Product is found by IBM or an IBM Authorized Dealer to be 1) defective in material or workmanship or 2) otherwise not in good working order, IBM or such Dealer will remedy the problem by providing the Type of Warranty Service indicated above at no additional charge. Warranty service does not include repair or exchange when the problem results from accident, disaster, misuse, abuse, another machine, non-IBM modification, or service of the Product by other than IBM or an IBM Authorized Dealer for this Product.

To obtain warranty service, you must, during the Warranty Period, present this Product and the proof of original purchase to 1) an IBM Authorized Dealer for the Product or 2) IBM at an IBM Service/Exchange Center. Any transfer of the Product to another user during the Warranty Period should therefore include the proof of original purchase. You may ship the Product to an IBM Service/Exchange Center to obtain warranty service. If you do so, you must insure it or bear the risk of loss or damage in transit. In addition, you must prepay shipping charges and use the original shipping container or equivalent. Return shipping charges within the United States and Puerto Rico will be paid by IBM.

Note: If the Type of Warranty Service is **Customer Carry-In Repair**, it includes the return of the original Product to you. It may include the exchange of some parts or components.

If the Type of Warranty Service is **Customer Carry-In Exchange**, it includes the exchange of ownership of the Product between you and IBM or the IBM Authorized Dealer. Therefore, you must remove all non-IBM parts and all alterations and attachments, and you must also ensure that it is free from any outstanding liens.

Before presenting this Product for warranty service, you must remove all programs, data and removable storage media. Products and parts provided as a result of warranty service may be other than new but will be in good working order and become your property at the time of exchange. At the same time, the exchanged Products or parts become the property of IBM or the IBM Authorized Dealer.



*Personal Computer
Hardware Reference
Library*

Guide to Operations

Enhanced Memory

Expansion Adapter

Third Edition (July 1987)

The following paragraph does not apply to the United Kingdom or any country where such provisions are inconsistent with local law: INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This publication could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time.

It is possible that this publication may contain reference to, or information about, IBM products (machines and programs), programming, or services that are not announced in your country. Such references or information must not be construed to mean that IBM intends to announce such IBM products, programming, or services in your country.

Requests for copies of this publication and for technical information about IBM products should be made to your IBM Authorized Dealer or your IBM Marketing Representative.

©Copyright International Business Machines Corporation 1987. All rights reserved.

Federal Communications Commission (FCC)

The Enhanced Memory Expansion Adapter (hereafter called ADAPTER) is a FCC Class B device designed for installation in the IBM Personal Computer AT¹ or the IBM Personal Computer XT² Model 286.

Warning: The IBM Personal Computer AT or XT Model 286 with the ADAPTER installed in it (hereafter called the equipment) generates, uses and can radiate radio frequency energy, and if not installed in accordance with the instruction manuals, may cause interference to radio communications. If peripherals are used with the equipment, it is suggested to use shielded grounded cables with in-line filters if necessary.

The equipment has been tested and found to comply with the limits for a Class B computing device pursuant to Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference, when operated in a residential environment. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television, which can be determined by turning the equipment 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 computer with respect to the receiver,
- move the computer away from the receiver,
- plug the computer into a different outlet so that computer and receiver are on different branch circuits.

¹ "Personal Computer AT" is a Registered Trademark of the IBM Corp.

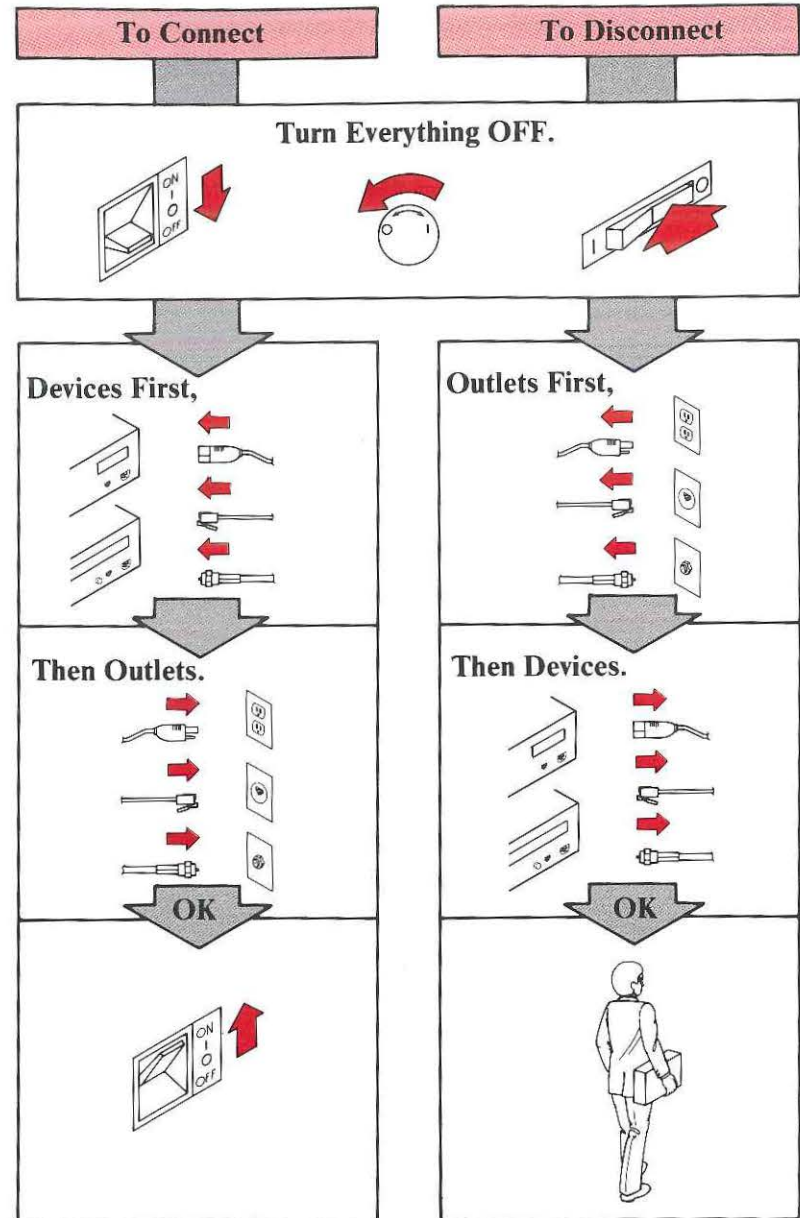
² "Personal Computer XT" is a Registered Trademark of the IBM Corp.

If necessary, the user should consult the dealer or an experience radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commissions helpful: *How to Identify & Resolve Radio-TV Interference Problems*. This booklet is available from the US Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4.0.

This equipment has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of FCC Rules. Only peripherals (computer input/output devices, terminals, printers, etc.) certified to comply with the Class B limits may be attached to this computer. Operation with non-certified peripherals is likely to result in interference to radio and TV reception.

Electrical Safety

Electrical current from power, telephone, and communications cables is hazardous. Connect and disconnect cables as shown when installing, moving, or opening the covers of personal computers or attached devices.



Notes:

Preface

This publication is an introduction to the Enhanced Memory Expansion Adapter. Included are instructions for configuration, installation, and setup of the adapter as well as problem diagnosis.

This guide is intended for anyone who will be using the adapter to add memory to an IBM Personal Computer AT or XT Model 286.

The first two chapters in the guide provide some useful background information. The remaining chapters describe the procedures needed to configure and install the adapter.

- **Chapter 1. “Introduction,”** describes the product and gives a list of related reading.
- **Chapter 2. “Overview,”** gives a more in-depth look at the features and capabilities of the adapter.
- **Chapter 3. “Preparing for Installation,”** describes how to unpack and check out the adapter and options you have purchased.

- **Chapter 4. "Installing Memory Kits,"** explains how memory modules can be added to the adapter.
- **Chapter 5. "Configuration,"** gives instructions on setting the switches and jumpers on the adapter.
- **Chapter 6. "Installing the Adapter,"** contains instructions for installing the adapter in the IBM Personal Computer AT or XT Model 286.
- **Chapter 7. "The Setup and Diagnostics Program,"** describes the procedure for running the Setup and Diagnostics program after the adapter has been installed.

The chapters in this publication are intended to be read in sequence. However, if a particular procedure is not required by the user, the corresponding chapter can be skipped.

For example, if no memory modules are to be added to the adapter, Chapter 4 can be skipped, and the reader can continue with Chapter 5.

Contents

Chapter 1. Introduction	1-1
Introduction	1-3
Inventory Check List	1-4
Related Reading	1-5
Chapter 2. Overview	2-1
Physical Layout of the Adapter	2-3
Memory Addressing Capability	2-5
Chapter 3. Preparing for Installation	3-1
Unpacking the Adapter	3-3
Factory Configuration	3-3
Available Options	3-5
Chapter 4. Installing Memory Kits	4-1
Memory Modules	4-3
Installation Instructions	4-4
Chapter 5. Configuration	5-1
Checking Memory Size	5-3
Setting the Switches	5-3
Base Memory Addressing	5-5
Expansion Memory Addressing	5-6
Enabling/Disabling the I/O Ports	5-9
Switch Definition Summary	5-9
Configuring the I/O Ports	5-9
Configuring Multiple Adapters	5-12
Chapter 6. Installing the Adapter	6-1
Chapter 7. The Setup and Diagnostics Program .	7-1

Notes:

Chapter 1. Introduction

Contents

Introduction	1-3
Inventory Check List	1-4
Related Reading	1-5

Notes:

Introduction

The IBM Enhanced Memory Expansion Adapter is a powerful, versatile multifunction card for the IBM Personal Computer AT or XT Model 286. It consists of a single board with the following features:

- Up to 12MB of memory
- A parallel printer port
- An asynchronous serial communications port.

The adapter comes with 0KB of memory. Memory can be added to the adapter in increments of 512KB, 1024KB, or 2048KB.

The reliability and storage capacity of the adapter is achieved through a technology called single in-line packaging (SIP).

Inventory Check List

When you receive the IBM Enhanced Memory Expansion Adapter Kit (part number 74X8635), verify that it includes the following items:

Item	Part Number
Enhanced Memory Expansion Adapter with 0K of memory	55X3543
This <i>Guide to Operations</i> manual	74X7715
Above Disc® EMS Emulation software	

If any item is missing or damaged, contact your place of purchase.

® Registered Trademark of Tele-Ware West.

Related Reading

For more in-depth information about the Enhanced Memory Expansion Adapter, the following manuals are available.

- *Technical Reference Manual Enhanced Memory Expansion Adapter*
- *Hardware Maintenance and Service Enhanced Memory Expansion Adapter.*

For more information about the IBM Personal Computer Disk Operating System (DOS), the IBM Personal Computer AT and XT Model 286 hardware, these manuals are suggested:

- *Guide to Operations Personal Computer AT*
- *Technical Reference Manual Personal Computer AT*
- *Hardware Maintenance Service*
- *Hardware Maintenance Reference Personal Computer Systems*
- *Disk Operating System (Version 3.00 or higher).*
- *Guide to Operations Personal Computer XT Model 286.*
- *Technical Reference Manual Personal Computer XT Model 286.*

Notes:

Chapter 2. Overview

Contents

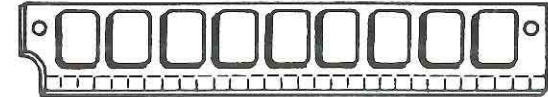
Physical Layout of the Adapter	2-3
Memory Addressing Capability	2-5
Split Memory Addressing	2-5
Contiguous Memory Addressing	2-6

Notes:

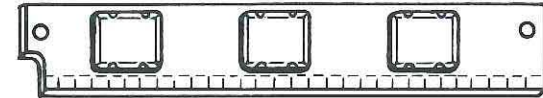
Physical Layout of the Adapter

The Adapter has several features with which you should be familiar. An adapter can have four types of memory modules installed. Two types of 256KB memory modules can be interchanged on an adapter. The third type is a 512KB memory module. The fourth type is a 1024KB memory module.

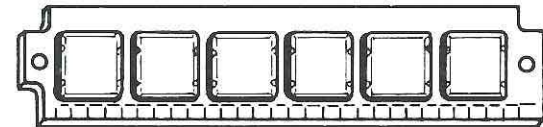
256KB Memory Module



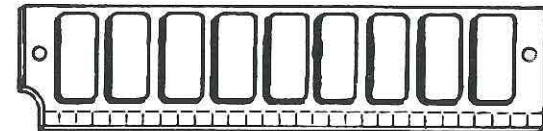
256KB Memory Module



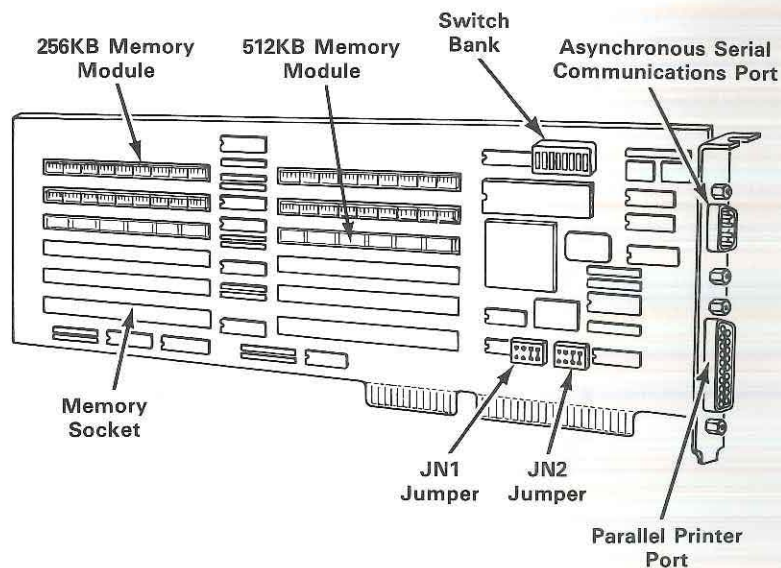
512KB Memory Module



1024KB Memory Module



An adapter contains 12 memory sockets into which memory modules can be inserted. The adapter in the following figure has four 256KB memory modules and two 512KB memory modules installed. This adapter has 2MB of memory.



In the top right part of the card is a bank of 8 switches. These switches determine:

- The starting address of memory on the card
- Whether the I/O ports on the card are enabled or disabled.

In the bottom right part of the card are two jumpers. The leftmost jumper, labeled JN1, determines the address of the asynchronous serial communications port.

The jumper on the right, labeled JN2, determines the address of the parallel printer port.

The I/O ports themselves are attached to the bracket on the right side of the card. The asynchronous serial communications port at the top of the bracket is a 9-pin RS-232C connector. This port interfaces to a modem, a serial printer, remote display terminal, or other serial devices via a 9-to-25 pin serial adapter cable.

The parallel printer port is a 25-pin connector that is used to connect a parallel printer to the IBM Personal Computer AT or XT Model 286.

Memory Addressing Capability

One of the powerful features of the adapter is that it permits memory to be added to both the base memory area and the expansion memory area of the IBM Personal Computer AT or XT Model 286.

The base memory area has an address range from 0 to 640KB. The expansion memory area has an address range from 1024KB to 16256KB.

The memory addresses from 640KB to 1024KB and 16256KB to 16348KB are reserved for system functions.

Split Memory Addressing

The adapter can be used to fill base memory up to its 640KB limit. The additional memory above 640KB automatically becomes part of the expansion memory area.

The capability to split memory between the base memory area and the expansion memory area is called split memory addressing.

Contiguous Memory Addressing

The Adapter can also be used to increase the amount of expansion memory. Suppose, for example, that a computer has 1MB of expansion memory, and an adapter with 2MB of memory is added to the computer.

The memory on the adapter must be added at a starting address directly after the expansion memory. This means the memory on the adapter will have a starting address of 2MB. The total expansion memory will be 3MB.

There cannot be any gap between newly added memory and existing memory in the expansion memory area. This is called contiguous memory addressing.

Chapter 3. Preparing for Installation

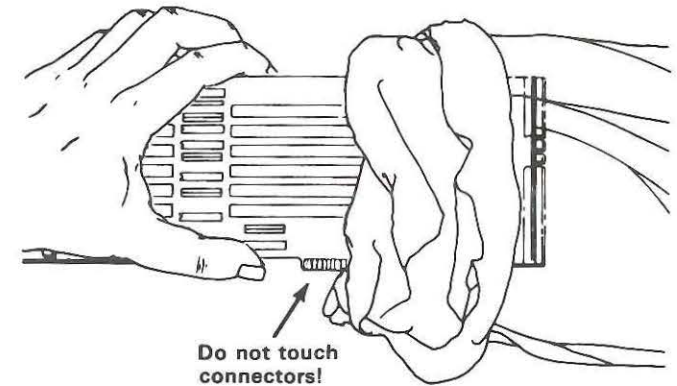
Contents

Unpacking the Adapter	3-3
Factory Configuration.....	3-3
Available Options	3-5

Notes:

Unpacking the Adapter

To check out the adapter shipped from the factory, carefully remove the adapter from its anti-static bag. Be sure to hold the adapter by the edges only. Avoid touching the components or connections.



Factory Configuration

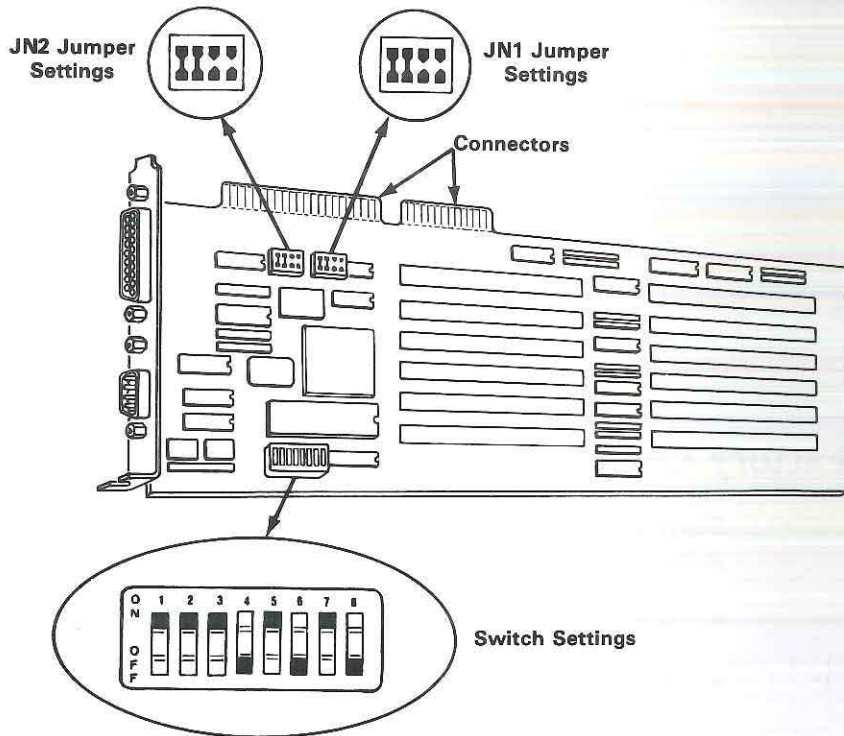
There are several things you should know about the Adapter as it is shipped from the factory:

- It comes with 0KB of memory.
- It is configured to be installed in a computer with 512KB of base memory and no expansion memory.
- The I/O ports on the adapter are disabled.
- The address of the parallel port is set to LPT1.
- The address of the serial port is set to COM1.

You will need to change the standard configuration if your computer has 256KB or 640KB of base memory, if it has expansion memory, or if you want to modify the I/O port settings. Chapter 5 describes how to change the adapter configuration.

To verify the standard factory configuration, compare your adapter with the one in the illustration. The settings of the switches and jumpers should be identical to those in the figure.

The adapter is shown upside down so the numbers above the switches can be read easily.



Note: The dark square indicates the end of the switch that is depressed.



For example, this switch is set to the ON position.

Available Options

Three different Memory Kits can be purchased to upgrade the Enhanced Memory Expansion Adapter to the desired memory level.

Note: The warranty coverage applies only to the configuration of the board as originally shipped from IBM and to upgrade kits (memory modules) purchased from IBM.

The 0.5 MegaByte Memory Kit (part number 55X3547) contains two memory modules (part number 65X6263 or 6480428). Each kit or pair of memory modules adds 0.5 MB of memory to the adapter.

The 1 MegaByte Memory Kit (part number 55X3681) contains two memory modules (part number 65X6273). Each kit or pair of memory modules adds 1MB of memory to the adapter.

The 2 MegaByte Memory Kit (part number 74X7833) contains two memory modules (part number 68X5721). Each kit or pair of memory modules adds 2MB of memory to the adapter.

Note: This kit can not be used in combination with either of the above kits.

You are now ready to begin the next step, adding memory to the adapter. If you do not wish to add memory, then go to Chapter 5, for configuration of the adapter.

Notes:

Chapter 4. Installing Memory Kits

Contents

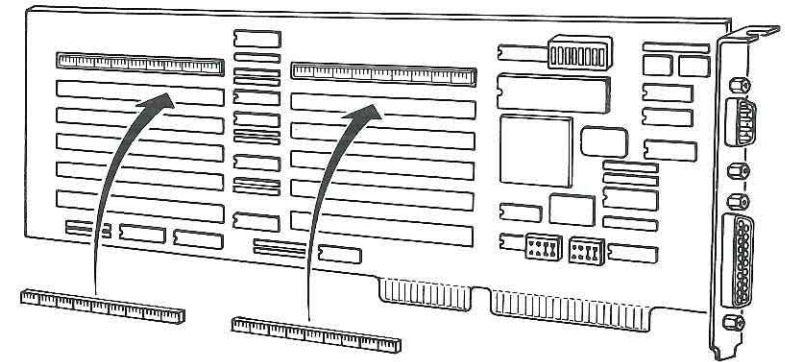
Memory Modules	4-3
Installation Instructions	4-4

Notes:

Memory Modules

Memory can be added to the Adapter by installing 256KB, 512KB, or 1024KB memory modules. Each module is either a 256K X 9, 512K X 9, or 1024K X 9, dynamic RAM assembly.

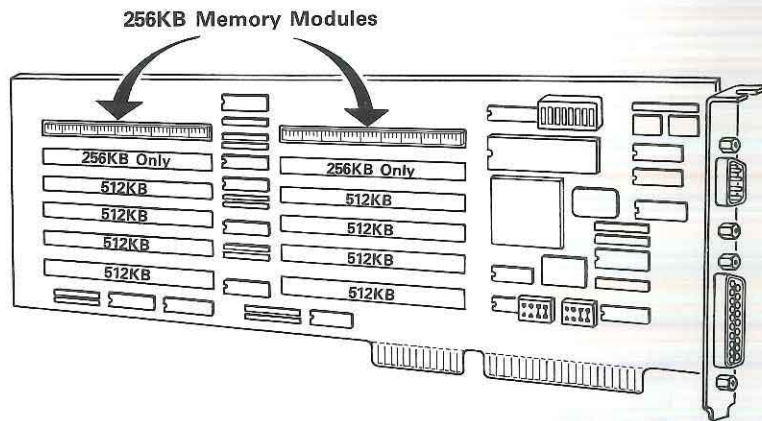
To install a memory module, the module must be inserted into a memory module socket on the adapter. To add memory to the adapter, place two memory modules in the next available pair of memory sockets. These sockets must be beside each other on the adapter. This procedure applies to 256KB, 512KB, and 1024KB memory modules.



**Install two memory modules
in the next available memory sockets.**

An adapter can be configured with only 256KB modules, with only 512KB modules, with a combination of 256KB and 512KB modules, or with only 1024KB modules.

If 256KB and 512KB memory modules are combined on the same adapter, then 256KB memory modules must be installed in the first two pairs of memory sockets. 512KB memory modules can be installed in the sockets that follow.

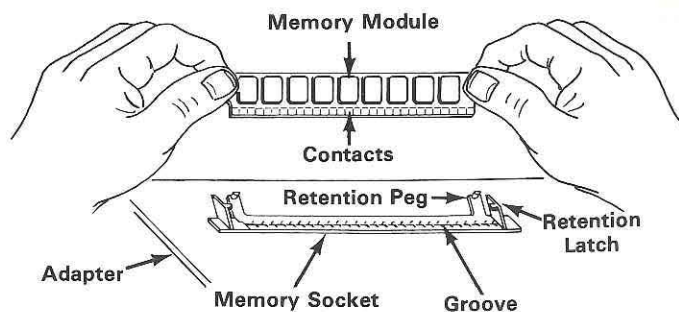


The 1024KB memory modules can **not** be installed in combination with any other memory modules.

Installation Instructions

A closer view of a memory socket is shown below. The groove in the middle of the socket is for inserting a memory module.

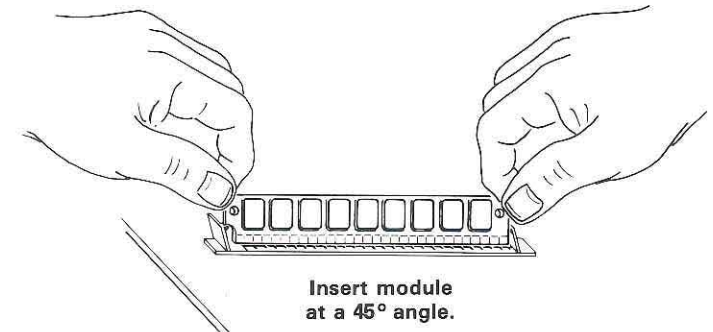
Retention pegs and retention latches hold the memory module in place in the memory socket.



To install a memory module, follow this two-step procedure:

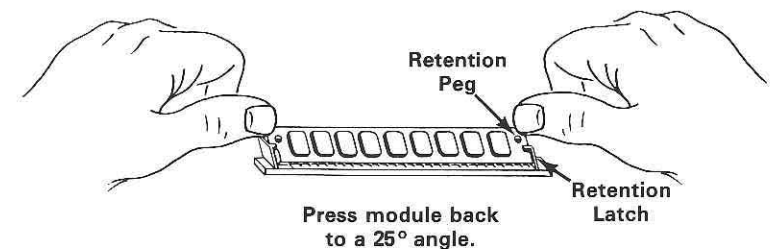
- 1 Position the module as shown below.

Insert the module with downward pressure until the contacts almost disappear. Apply even pressure firmly across the top edge of the memory module.



- 2 Pivot the module downward from the top until a click is heard. The module latches at a 25 degree angle to the socket.

To ensure that the memory module has been properly installed, verify that the retention pegs have snapped into the holes at each end of the module.



Notes:

Chapter 5. Configuration

Contents

Checking Memory Size	5-3
Setting the Switches	5-4
Base Memory Addressing	5-5
Expansion Memory Addressing	5-6
Enabling/Disabling the I/O Ports	5-9
Switch Definition Summary	5-9
Configuring the I/O Ports	5-9
Configuring Multiple Adapters	5-12

Notes:

Checking Memory Size

Before setting the switches on the adapter, run the Setup program on the Diagnostics diskette provided with your system's *Guide to Operations* manual. Record the amount of base memory and expansion memory installed in your system.

Base Memory _____

Expansion Memory _____

To run the Setup program, follow steps 1-7 and step 10 in Chapter 7. Do not change any values in the Setup program at this time!

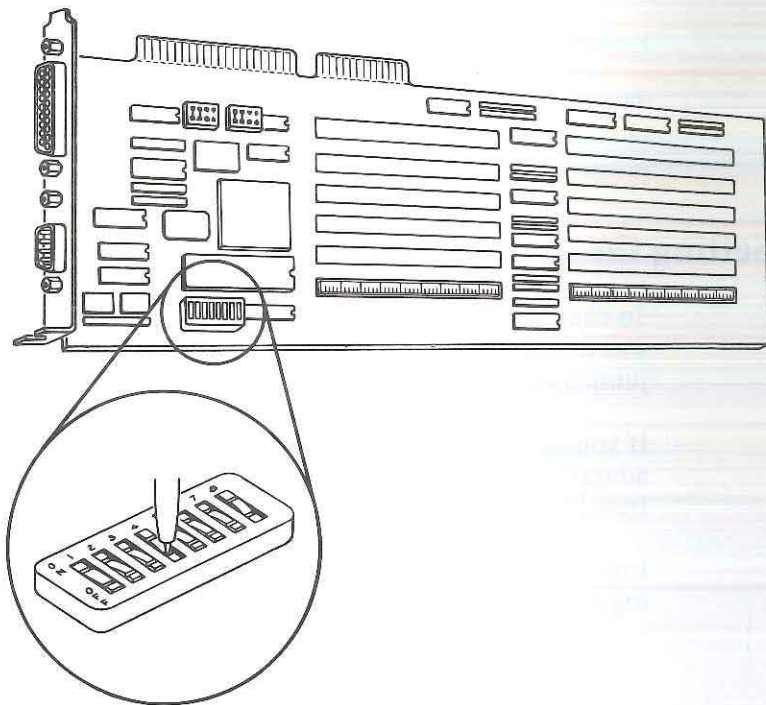
Setting the Switches

To change the configuration of the Adapter from the way it is set at the factory, reset the switches and/or jumpers.

If you do not wish to change the configuration of the adapter, skip this chapter and go on to Chapter 6, *Installing the Adapter*.

Eight rocker switches, numbered 1-8, are located together in a block on the adapter.

Each switch can be set with a ballpoint pen or a similar object. If a pen is used, make sure it does not leak. Use the pen to depress one end of the switch. To set a switch to the ON position, depress the end of the switch across from the word 'ON.' To set a switch to the OFF position, depress the end of the switch across from the word 'OFF.' In the following figure, switch number 4 is set to the OFF position.

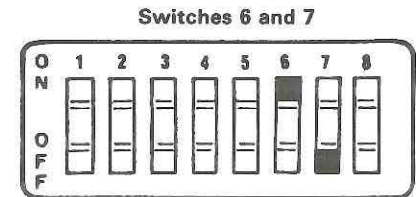


Base Memory Addressing

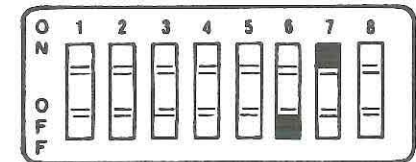
Switches 6 and 7 determine the starting address of memory that is added to the base memory area. If you have 256KB or 512KB of base memory currently installed in your computer, set switches 6 and 7 as shown below.

Amount of Base Memory
Installed Prior to
Installation of Adapter

256KB



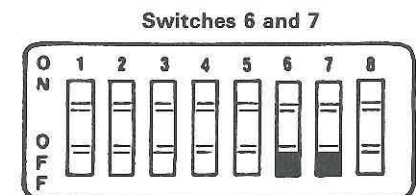
512KB



If you have 640KB of base memory, the switch settings depend on the amount of expansion memory you have installed. If you have no expansion memory or your expansion memory is a multiple of 512KB or you are installing the adapter in a IBM Personal Computer XT Model 286, set switches 6 and 7 as shown below.

Amount of Base Memory
Installed Prior to
Installation of Adapter

640KB



If the amount of expansion memory installed is **not** a multiple of 512KB, refer to "Configuring Multiple Adapters" in Chapter 5 for the correct switch settings.

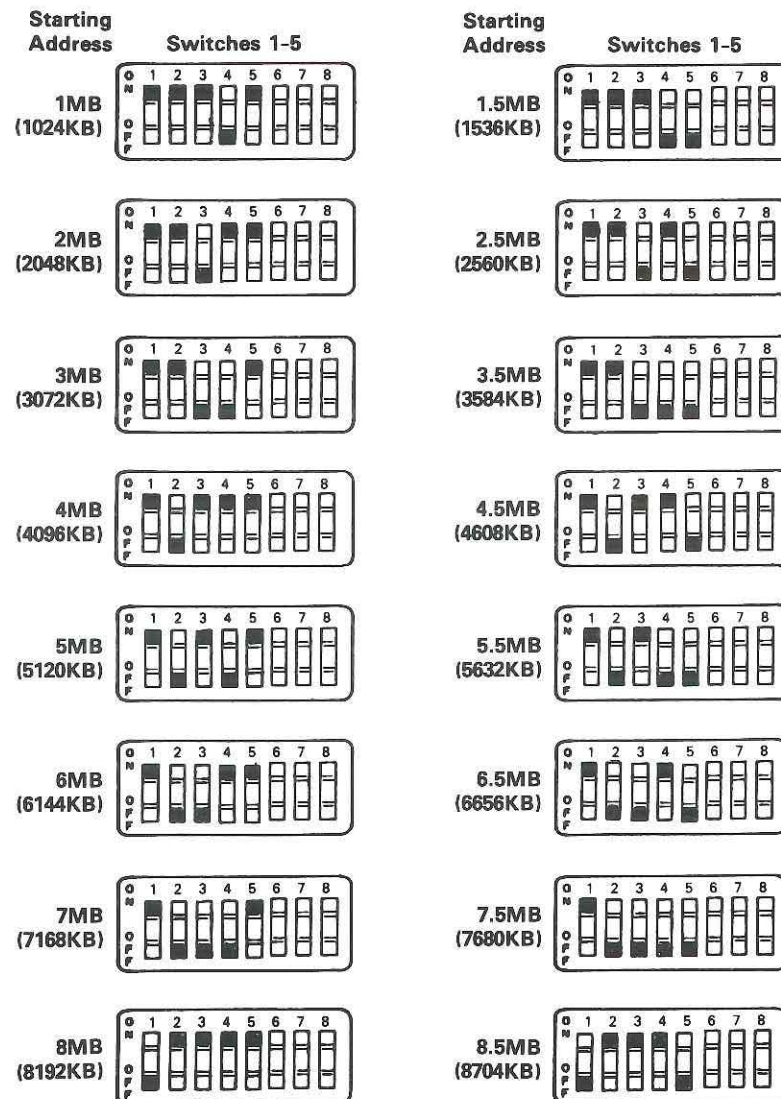
Expansion Memory Addressing

Switches 1-5 determine the starting address of expansion memory. Memory added to this area can have a starting address from 1MB up to 15.5MB.

Remember two things when setting switches 1-5:

- If you are adding base memory (switch 6 or 7 is ON), switches 1-5 should specify a starting address of 1MB. This will give the memory on the adapter that exceeds the 640KB boundary of the base area a starting address of 1MB in expansion memory.
- If there is already expansion memory, the starting address of the memory being added must immediately follow the last address of the existing memory.

For example, a computer contains 640KB of memory in its base memory area and 512KB of expansion memory. Since the expansion memory has a starting address of 1MB, the next available memory address is 1.5MB. An Adapter added to this computer would require a starting address of 1.5MB. The switch settings (SW1-SW5) for this starting address can be found in the following figure.



Enabling/Disabling the I/O Ports

Switch 8 enables or disables the I/O ports on the adapter. In the ON position the switch enables the ports. In the OFF position the switch disables the ports.

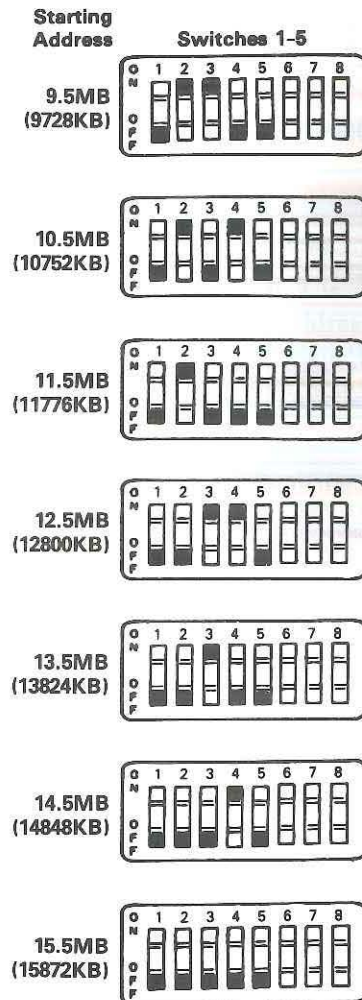
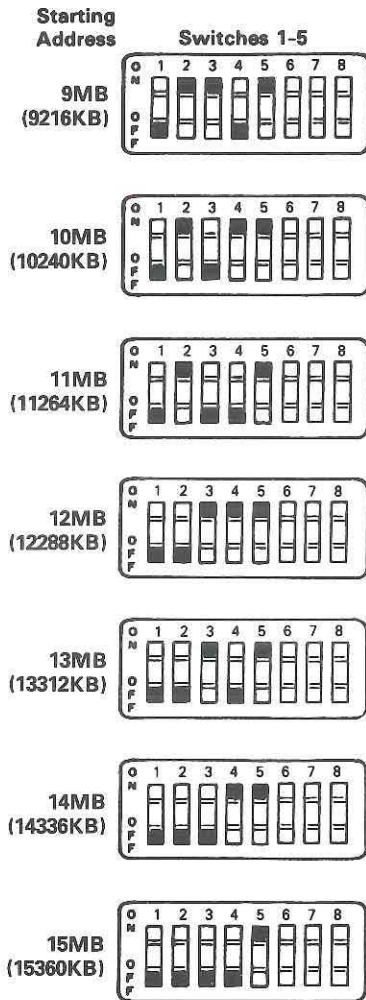
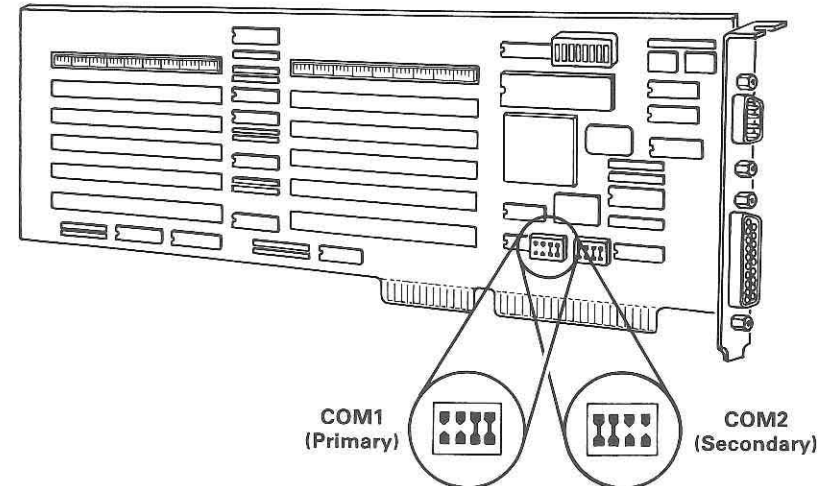
Switch Definition Summary

The following table summarizes the meaning of each of the 8 switches:

Switch #	Definition
1-5	Starting Address in the Expansion Memory Area
6-7	Starting Address in the Base Memory Area
8	I/O Ports Enable/Disable

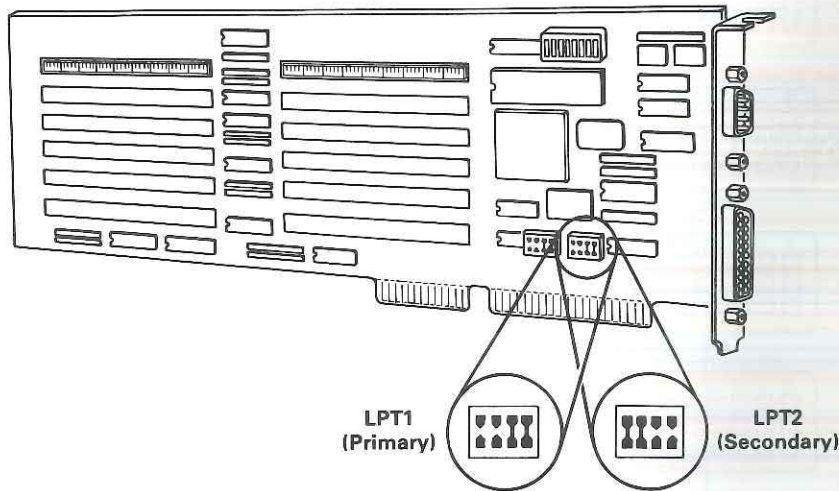
Configuring the I/O Ports

The address of each I/O port on the adapter is determined by a jumper. Configure the jumper for the serial port to COM1 or COM2.

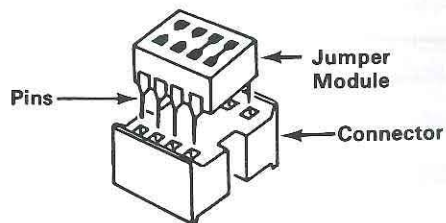


Note: It is not necessary to reset the starting address on the adapter when memory modules are added to it. The starting address of memory on the adapter will stay the same. The adapter will automatically adjust for the increase in memory size.

Configure the jumper for the parallel port to LPT1 or LPT2.

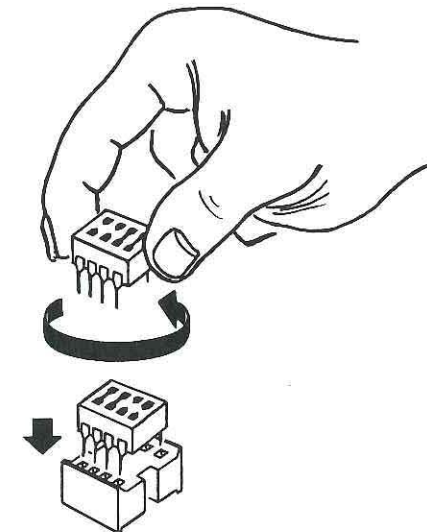
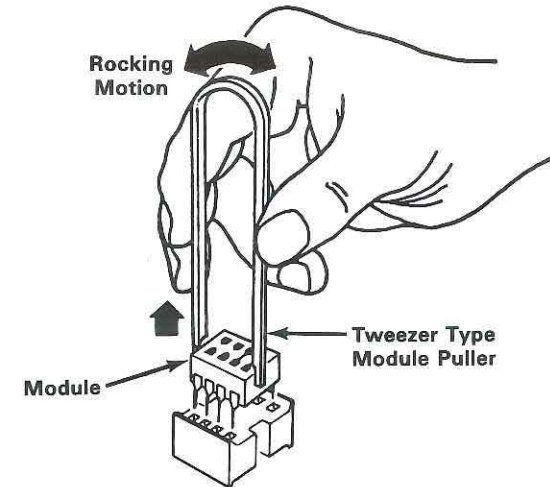


Each jumper is a 4-pin module. The jumper modules are installed in connectors at the bottom right of the adapter. To change the address of a port, rotate the appropriate jumper module 180 degrees.



To rotate a jumper module, first remove the module from its connector. Use a module puller, which can be purchased locally. Once the module has been removed, turn it 180 degrees and reinsert it into its connector. To reinsert the module, align its pins with the holes in the connector and press the module firmly into place.

Warning: The pins on the module bend easily. They must be carefully aligned with the connector before the module is pressed into place.



Configuring Multiple Adapters

You may install up to five Adapters in an IBM Personal Computer AT or up to 4 Adapters in an IBM Personal Computer XT Model 286. The IBM Personal Computer AT or XT Model 286 can use 15.5 MB (15,872KB) of memory.

The switch settings on each adapter will vary depending on the number of adapters and the amount of memory currently installed in the computer.

If the currently installed adapters have both switches 6 and 7 set to OFF, go to the beginning of Chapter 5 to set the switches on your new adapter.

If switch 6 on any of the currently installed adapters is set to ON, set switch 6 ON on your new adapter. Then set switch 6 to OFF on the currently installed adapter. Add 1408KB to the expansion memory size recorded in "Checking Memory Size" in Chapter 5. Use this number as your starting address in expansion memory. Refer to "Expansion Memory Addressing" for setting switches 1 to 5 on the new adapter.

If switch 7 on any of the currently installed adapters is set to ON, set switch 7 to ON on your new adapter. Then set switch 7 OFF on the currently installed adapter. Add 1152KB to the expansion memory size recorded in "Checking Memory Size" in Chapter 5. Use this number as your starting address in expansion memory. Refer to "Expansion Memory Addressing" for setting switches 1 to 5 on the new adapter.

Switch number 8 on each adapter is used to enable or disable the I/O ports on that adapter. To enable the I/O ports, switch number 8 should be set ON. To disable the I/O ports, switch number 8 should be set OFF. The IBM Personal Computer AT or XT Model 286 can have up to two serial and two parallel ports enabled. Refer to "Configuring the I/O Ports" in this chapter to set the address of the I/O ports.

Note: Three parallel ports can be enabled if one is the parallel port on the monochrome monitor parallel printer adapter.

Chapter 6. Installing the Adapter

Contents

Installation Instructions	6-3
---------------------------------	-----

Notes:

Installation Instructions

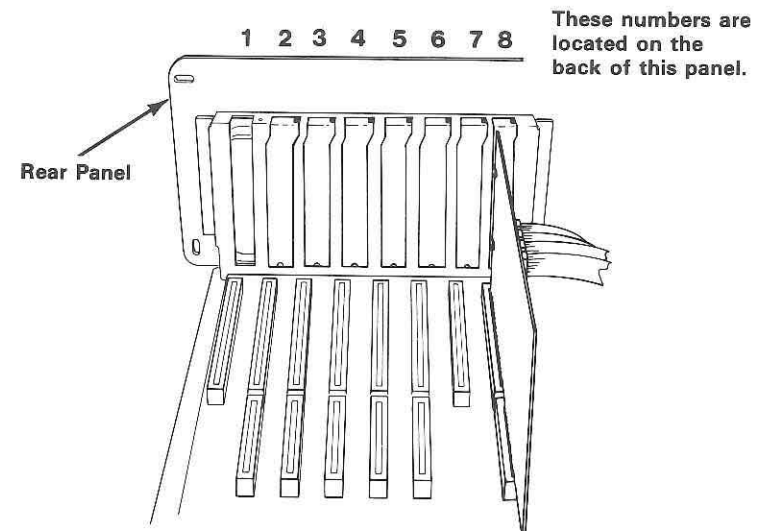
Now that you have completed the configuration of the adapter, it is ready to be installed.

Note: If your system unit has not been installed, do so now. Then return to this manual.

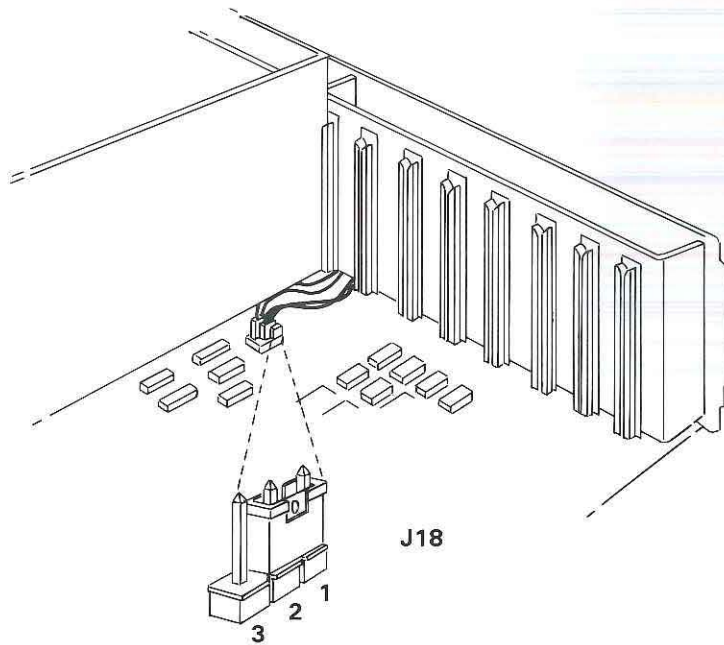
- 1 Remove the system unit cover.

Refer to "Cover Removal" in the *Guide to Operations* or *Installation and Setup* manual for your system unit.

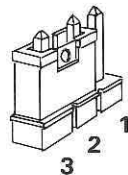
- 2 The Adapter may be installed in expansion slots 2 through 6 in the IBM Personal Computer AT or 2 through 5 in the IBM Personal Computer XT Model 286.



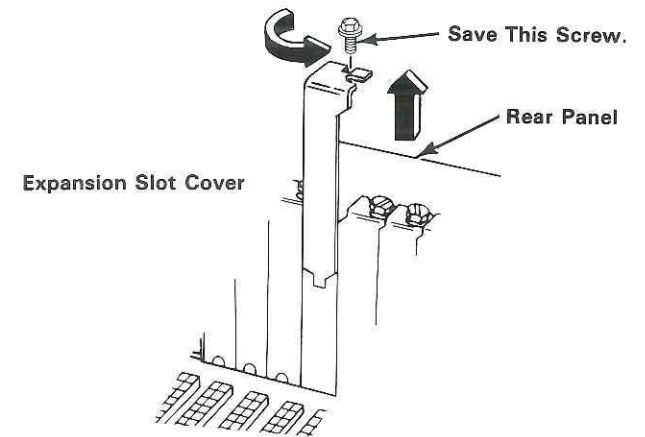
- 3** If switch 6 (see “Base Memory Addressing” in Chapter 5) is set to on in any adapter then Jumper Block J18 must have the jumper installed in positions 2 and 3. Otherwise the jumper block should be installed in positions 1 and 2. J18 is located toward the front of the system next to the Fixed Disk and Diskette Adapter, located in Slot 8. You may need to remove the Fixed Disk and Diskette adapter card in order to reach the jumper.



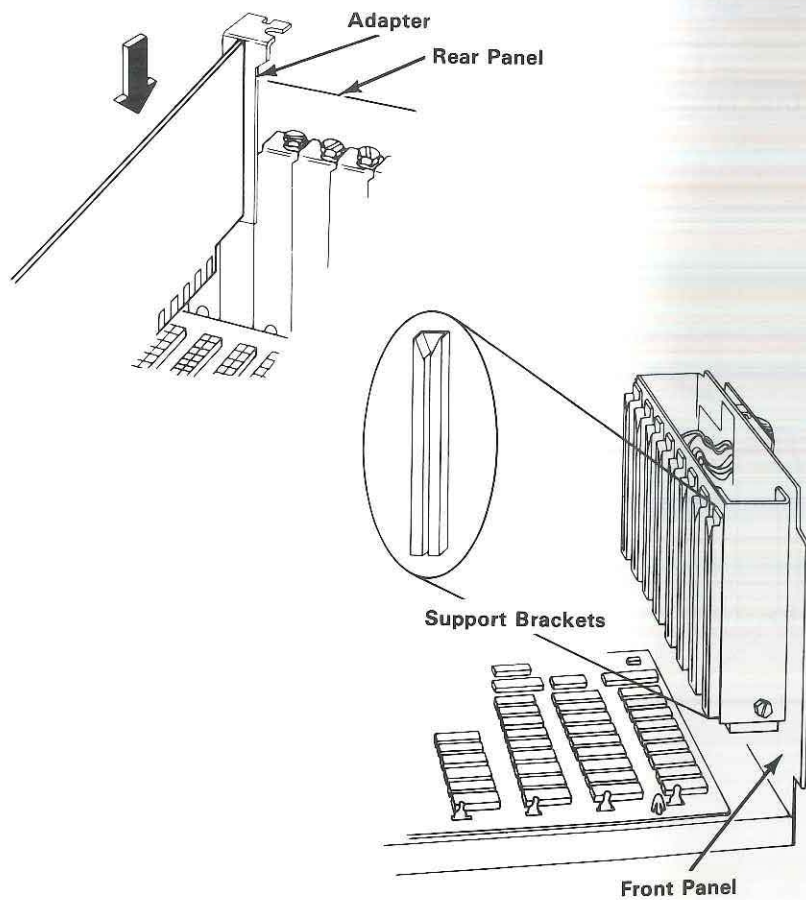
The jumper will look like the one shown above when installed in positions 1 and 2 and like the one below when installed in positions 2 and 3.



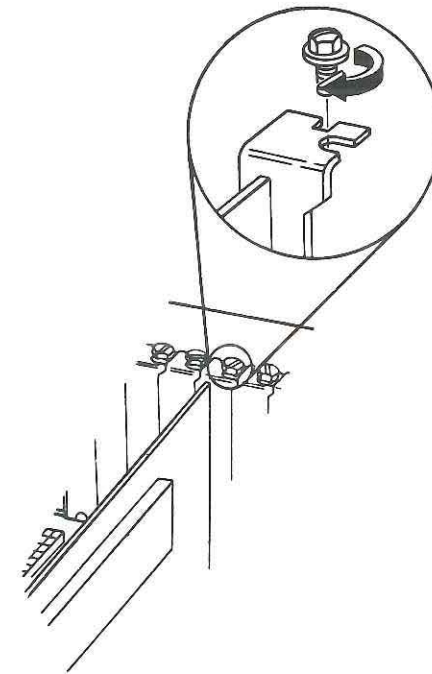
- 4** Remove the screw that holds the expansion slot cover in place. Save the screw for the installation of the adapter.



- 5** Hold the adapter by the top and firmly press it into the expansion slot making certain the adapter is in the support bracket. Use the adapter installed in expansion slot 8 as a reference.



- 6** Install the screw you removed in step 4.



- 7** Do you have additional memory adapters to install?
- YES** - Go to "Running the Setup and Diagnostics Program" in Chapter 7.
- NO** - Go to the next step.
- 8** If you have other internal options to install, install them now. If not, continue with the next step.
- 9** Install the system unit cover.
- Refer to "Cover Installation" in the *Guide to Operations or Installation and Setup* manual for your system unit.
- 10** Your system is now ready to be cabled. Refer to "System Checklist" in the manual for your system unit if you need assistance.
- 11** Warning! You will receive error messages if you do not reconfigure your system to indicate the change in the amount of base and/or expansion memory installed. To reconfigure your system run the Setup Program as instructed in Chapter 7.

Chapter 7. The Setup and Diagnostics Program

Contents

Running the Setup and Diagnostics Program 7-3

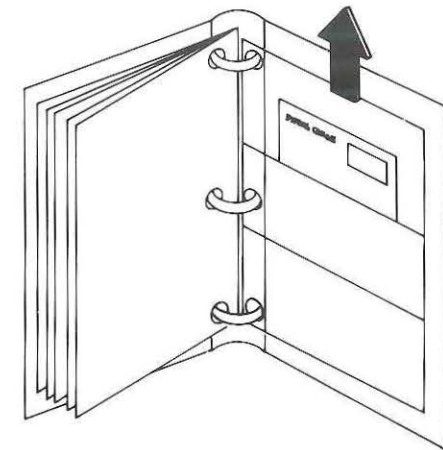
Notes:

Running the Setup and Diagnostics Program

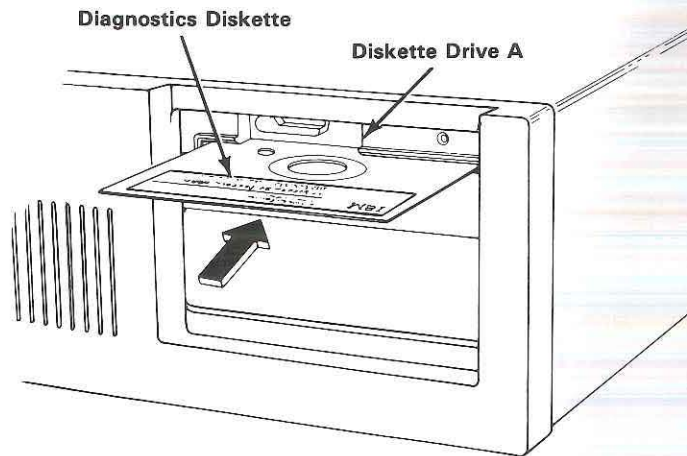
This is the final step in adding the Adapter to your system. Whenever there is any change to the configuration of the IBM Personal Computer AT or XT Model 286, the Setup and Diagnostics program should be run. This program will let the system know that the adapter has been installed. It will also determine whether there are any problems associated with the installation of the adapter.

To run the Setup and Diagnostics program, follow these steps:

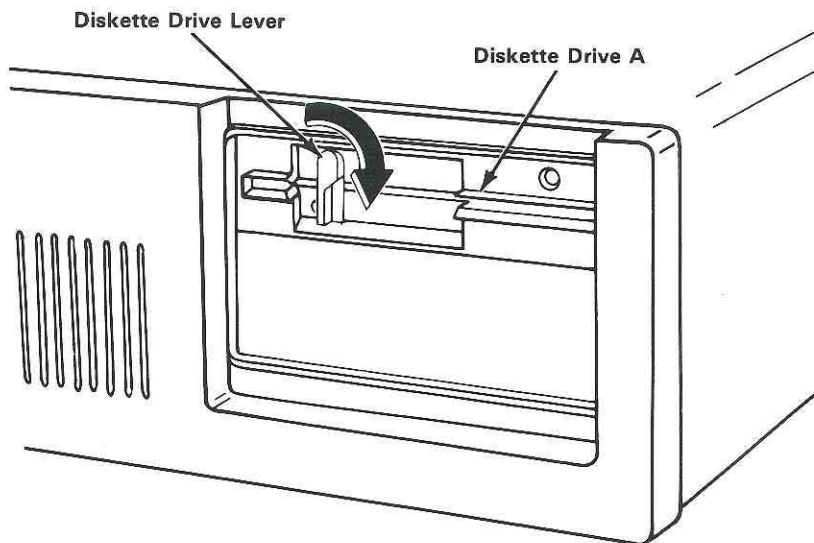
- 1 Get the Diagnostics diskette located in the back of your system's *Guide to Operations* manual.



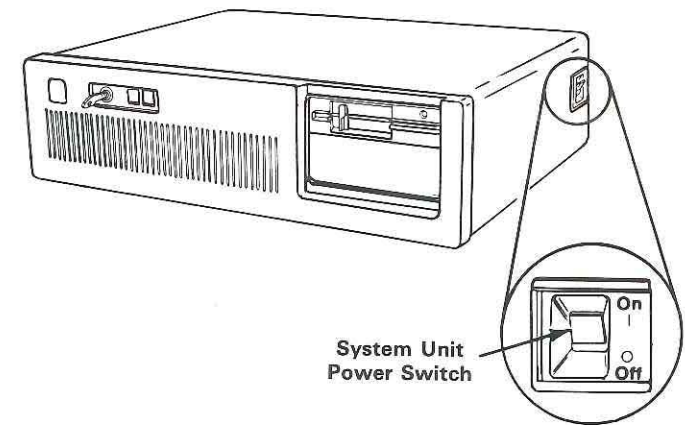
- 2** Insert the Diagnostics diskette into diskette drive A. Push the diskette in until you hear it click into place.



- 3** Rotate the diskette drive lever clockwise.



- 4** Turn your display's Brightness and Contrast controls fully clockwise. Turn your display power on (if it has a Power switch).
- 5** Power on all externally attached devices (printer, TV, and others).
- 6** Turn on your system unit.



7 Adjust your display's Brightness and Contrast controls for eye comfort.

8 Your screen looks similar to the one below when you add or remove an option.

Note: If you received a "302-System Unit Key Lock is Locked" message, unlock the lock on the front of the system unit before continuing.

XXXXX KB OK

164 - Memory Size Error-(Run SETUP)
(RESUME="F1"KEY)

IS YOUR SCREEN THE SAME AS THE SCREEN SHOWN ABOVE (XXXXX can be any number)?

YES - Go to step 10 "Running the Setup Program."

NO - Go to step 9.

9 If you received a screen other than the one shown in step 8, make sure that:

- The switch settings on the adapters are correct
- The adapters are seated properly in their slots
- The memory modules on the adapters are secured properly
- The cabling is correct.

After making the necessary adjustments, go to step 10.

10 Running the Setup Program: Before your system unit can be used for the first time, it must be told what options are installed. Many of the options are sensed by the system unit when you turn the power on; however, it still must be told the date, time, and the type of fixed disk drive. Then it must verify the diskette drive types and memory size.

The answers to the questions this program asks are listed on the "Setup Information" foldout, which is in the back of the *Guide to Operations* or *Installation and Setup* manual for your system unit. Now press F1 to start the Setup program; then follow the instructions on your screen. Record the total amount of base memory and expansion memory now installed in your system in the "Setup Information" foldout.

Enter 640K bytes as the new amount of base memory. You can get the amount of expansion memory from the following procedure.

If your base memory size recorded in "Checking Memory Size" in Chapter 5 was 640KB, add the value for expansion memory size recorded there to the value found in the "Enter Expansion Memory" column in Table 1. Enter this amount as the new expansion memory size.

Memory on the Adapter	Enter Expansion Memory
0.5M bytes	512K bytes
1.0M bytes	1024K bytes
1.5M bytes	1536K bytes
2.0M bytes	2048K bytes
2.5M bytes	2560K bytes
3.0M bytes	3072K bytes
4.0M bytes	4096K bytes
5.0M bytes	5120K bytes
6.0M bytes	6144K bytes
8.0M bytes	8192K bytes
10.0M bytes	10240K bytes
12.0M bytes	12288K bytes

Table 1

If your base memory size recorded in "Checking Memory Size" in Chapter 5 was 512KB, add the value for expansion memory recorded there to the value found in the "Enter Expansion Memory" column in Table 2. Enter this amount as the new expansion memory size.

Memory on the Adapter	Enter Expansion Memory
0.5M bytes	384K bytes
1.0M bytes	896K bytes
1.5M bytes	1408K bytes
2.0M bytes	1920K bytes
2.5M bytes	2432K bytes
3.0M bytes	2944K bytes
4.0M bytes	3968K bytes
5.0M bytes	4992K bytes
6.0M bytes	6016K bytes
8.0M bytes	8064K bytes
10.0M bytes	10112K bytes
12.0M bytes	12160K bytes

Table 2

If your base memory size recorded in "Checking Memory Size" in Chapter 5 was 256KB, add the value for expansion memory size recorded there to the value found in the "Enter Expansion Memory" column in Table 3. Enter this amount as the new expansion memory size.

Memory on the Adapter	Enter Expansion Memory
0.5M bytes	128K bytes
1.0M bytes	640K bytes
1.5M bytes	1152K bytes
2.0M bytes	1664K bytes
2.5M bytes	2176K bytes
3.0M bytes	2688K bytes
4.0M bytes	3712K bytes
5.0M bytes	4736K bytes
6.0M bytes	5760K bytes
8.0M bytes	7808K bytes
10.0M bytes	9856K bytes
12.0M bytes	11904K bytes

Table 3

Note: The maximum expansion memory size you can use is 15232KB.

11 If you received an error when running the Setup program, check for the proper starting address in the expansion memory area (SW1 to SW5) and for the proper base memory address (SW6 and SW7). After checking the switch settings, go to step 10.

If you cannot correct the error, have your system unit serviced. Be sure your Key Lock key is with your system unit.

12 Do you have another memory adapter to install?

YES - To configure the next adapter, return to "Setting the Switches" in Chapter 5. Use the base memory size and expansion memory size you just entered in the Setup program.

NO - Go to the next step.

13 To ensure that the adapters are installed properly, run the memory tests on the Diagnostics diskette for your system unit.

Glossary

address: A value that identifies a particular part of memory or storage.

asynchronous: In communications, a type of data transmission where signals are sent at arbitrary time intervals.

communications: A synonym for data communications. The transmission and reception of data.

configuration: The arrangement of a computer system or some part of a computer system as defined by the nature, number, and chief characteristics of its components.

connector: A part that connects or joins one component of a computer to another component.

Diagnostics diskette: A diskette used by computer users and service personnel to diagnose hardware problems.

diskette: A storage device consisting of a flexible magnetic disk inside a protective plastic jacket.

diskette drive: A mechanism that stores and retrieves data from diskettes.

fixed disk: A disk made of rigid material with a magnetic coating, used for mass storage and retrieval of data.

I/O ports: Physical locations on the computer where data enters or exits when data is transmitted between the computer and external devices.

jumper: A connection between pins on a card or board.

K: When referring to storage capacity, two to the tenth power; 1024 in decimal notation.

KB: Kilobyte; 1024 bytes.

MB: Megabyte; 1,048,576 bytes or 1024KB.

modem: (Modulator-demodulator). A device that enables digital data from a computer to be transmitted over analog transmission facilities.

module: A packaged functional hardware unit designed for use with other components.

parallel: In data communications, the simultaneous transmission of bits over a data circuit.

port: See *I/O ports*.

Power-On Self Test: A series of diagnostic tests that are run each time the computer's power is turned on.

program: A set of instructions that can be interpreted and executed by the computer.

rocker switch: A type of switch where one end of the switch or the other must be depressed to turn it on or off.

serial: In data communications, the sequential transmission of bits over a data circuit.

Index

A

anti-static bag 3-3
asynchronous serial
communications port 1-3, 2-4

B

base memory 1-4, 2-5, 3-3,
5-5, 5-6, 5-9, 6-4, 7-7, 7-8, 7-9,
7-10, 7-11

C

connector 2-5, 5-11
contiguous memory 2-6
cover 6-3, 6-5, 6-8

D

Diagnostics 7-1, 7-3, 7-4, 7-11
diskette 7-3, 7-4, 7-7, 7-11

E

expansion slot 6-3, 6-5, 6-6
expansion memory 2-5, 2-6,
5-3, 5-5, 5-6, 5-9, 5-12, 7-7,
7-8, 7-9, 7-10, 7-11

I

IBM Personal Computer AT
1-3, 1-5, 2-5, 5-12, 6-3, 7-3
IBM Personal Computer XT
Model 286
1-3, 1-5, 2-5, 5-12, 6-3, 7-3
I/O Port 2-4, 2-5, 3-3, 5-1, 5-9,
5-12

J

jumper 2-4, 3-4, 5-3, 5-9, 5-10
5-11, 6-4

M

memory socket 2-4, 4-3, 4-4

P

parallel port 1-3, 2-5, 3-3,
5-10, 5-12
printer 1-3, 2-4, 2-5, 7-5

R

retention latch 4-4, 4-5
retention peg 4-4, 4-5
RS-232C 2-5

S

serial 1-3, 2-4, 2-5, 3-3, 5-9,
5-12
SIP 1-3
split memory 2-5
starting address 2-4, 2-6, 5-5,
5-6, 5-7, 5-8, 5-9, 5-12
switches 2-4, 3-4, 5-3, 5-4, 5-5,
5-6, 5-7, 5-8, 5-9, 5-12
system unit 6-3, 6-4, 6-8, 7-5, 7-6,
7-7, 7-11
system unit cover 6-3, 6-8

Notes:

Notes:



The Personal Computer
Hardware Library

Reader Comment Form

G570-2237-03

Guide to Operations Enhanced
Memory Expansion Adapter

74X7715

Your comments assist us in improving our products. IBM may use and distribute any of the information you supply in anyway it believes appropriate without incurring any obligation whatever. You may, of course, continue to use the information you supply.

Comments:

If you wish a reply, provide your name and address in this space.

Name _____

Address _____

City _____ State _____

Zip Code _____

Phone _____

Tape

Please do not staple

Tape



The Personal Computer
Hardware Library

Reader Comment Form

G570-2237-03

**Guide to Operations Enhanced
Memory Expansion Adapter**

74X7715

Your comments assist us in improving our products. IBM may use and distribute any of the information you supply in anyway it believes appropriate without incurring any obligation whatever. You may, of course, continue to use the information you supply.

Comments:

Fold here

ATTENTION: IBM PERSONAL COMPUTER SUPPORT PRODUCTS

IBM PERSONAL COMPUTER
IBM DIRECT
ONE CULVER RD.
DAYTON N.J. 08810

POSTAGE WILL BE PAID BY ADDRESSEE

FIRST CLASS PERMIT NO. 40 ARMONK, NEW YORK 10504

BUSINESS REPLY MAIL



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



If you wish a reply, provide your name and address in this space.

Name _____

Address _____

City _____ State _____

Zip Code _____

Phone _____

Fold here

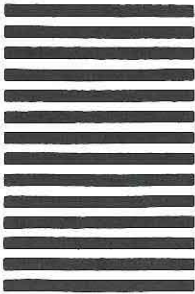
ATTENTION: IBM PERSONAL COMPUTER SUPPORT PRODUCTS

IBM PERSONAL COMPUTER
IBM DIRECT
ONE CULVER RD.
DAYTON N.J. 08810

POSTAGE WILL BE PAID BY ADDRESSEE

FIRST CLASS PERMIT NO. 40 ARMONK, NEW YORK 10504

BUSINESS REPLY MAIL



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



If this Product is an optional feature, this limited warranty applied only when the feature is used in a machine for which it was designed, and, to obtain warranty service, you may be required to present the feature with an IBM machine for which it was designed.

If you have any questions about your warranty, contact your IBM Authorized Dealer for this Product or call IBM at 1-800-428-2569.

If you purchased this Product directly from IBM under an Agreement for Purchase of IBM Machines, the Date of Installation is considered to be the Date of Purchase for warranty purposes, and, to obtain warranty service from IBM, you need not present proof of original purchase. To obtain warranty service from an IBM Authorized Dealer for the Product, contact IBM for proof of the original purchase from IBM.

This limited warranty will apply only to a Product purchased and located in the United States or Puerto Rico.

ALL EXPRESS AND IMPLIED WARRANTIES FOR THIS PRODUCT, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO THE WARRANTY PERIOD, AND NO WARRANTIES, WHETHER EXPRESS OR IMPLIED, WILL APPLY AFTER THIS PERIOD.

Some states do not allow limitations on how long an implied warranty lasts, so the above limitations may not apply to you.

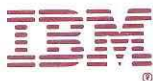
This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

LIMITATION OF REMEDIES: Your sole remedy under this Statement of Limited Warranty shall be IBM's or an IBM Authorized Dealer's performance of warranty service. For any claim concerning performance or nonperformance by IBM or an IBM Authorized Dealer under this Statement of Limited Warranty, or for any other claim directly related to this Product, you shall be entitled to recover actual damages up to the limits set forth in the following paragraph.

IBM's liability for damages to you for any cause whatsoever, arising out of this Statement of Limited Warranty, or for any other claim directly related to this Product, shall be limited to the greater of \$5000 or the amount paid for this Product at the time of original purchase. This limitation of liability will not apply to claims for personal injury or damage to real property or tangible personal property caused by IBM's negligence. In no event will IBM be liable to you for any damages caused by your failure to perform your responsibilities under this statement, or for any lost profits, lost savings or other incidental or consequential damages, even if IBM, an IBM Authorized Dealer or an IBM approved reseller for this Product has been advised of the possibility of such damages, or for any claim by you based on any third party claim.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

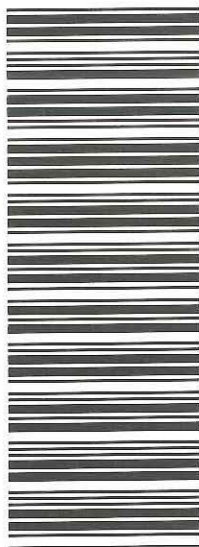
Limited Warranty page 2 of 2



International Business Machines

One Culver Road
Dayton N.J. 08810

74X7715



74X7715

Printed in the United States of America

G570-2237-3

