

NORTHGATE

OmniKey™
PLUS

**User's
Guide**



**NORTHGATE
COMPUTER
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LIMITED PRODUCT QUALITY WARRANTY

Your Northgate OmniKey/PLUS Keyboard is guaranteed to meet your requirements for a quality keyboard, and to be free from defects in workmanship and materials for three full years from the date of purchase. Please use the Return Merchandise Authorization (RMA) form if you return it because you are dissatisfied or it is defective.

Satisfaction Return Policy

If, for any reason, you wish to return your keyboard within 10 days after receipt, put it in the ORIGINAL PACKAGING with all the packing materials and the User's Manual intact. Ship prepaid to Northgate Computer Systems at the address shown on the RMA form. The keyboard must be in new condition with no alterations or modifications made. Call Northgate Keyboard Technical Support for an RMA number. This number must be marked on the outside of the shipping box. Credit will be issued only when the keyboard is received properly packaged in the original container and marked with an RMA number. Credit to your charge card or a refund check will be issued within a reasonable amount of time after we receive your keyboard. NORTHGATE will not issue dissatisfaction refunds for more than one keyboard per customer. Evaluate one unit before you place orders for multiple units. Packages not marked with RMA numbers will not be accepted by Northgate's Shipping/Receiving Department.

Three-Year Keyboard Repair/Replacement Policy

The obligation of Northgate under this warranty, beyond the 10-day evaluation period, is limited to repair or replacement of the defective keyboard for a full three years. In no event will Northgate Computer Systems be liable to you for any

damages, including any lost profits, lost savings or other incidental or consequential damages arising out of the use or inability of use of such keyboard.

Ship your keyboard as required above IN THE ORIGINAL SHIPPING CARTON and include a short explanation of the keyboard problem. A repaired or replacement keyboard will be shipped to you promptly by normal freight service. If you want the repaired or replaced keyboard shipped by a faster method, please indicate this on the return slip. Freight charges will be added to your credit card.

CONTENTS

INTRODUCTION	1
UNPACKING AND INSTALLATION	2
UNPACKING THE KEYBOARD	2
CONNECTING THE CABLE	2
SETTING THE DIP SWITCHES	4
Setup for type of computer	5
Setup for Novell or normal stand-alone configuration	8
Swapping the <i>Caps Lock</i> and the left <i>Ctrl</i> keys	9
USING THE OMNIKEY/PLUS	10
SETTING THE KEYBOARD ANGLE	10
OPERATING INSTRUCTIONS	10
TROUBLESHOOTING	12
TELEPHONE SUPPORT	12
HARDWARE AND SOFTWARE COMPATIBILITY NOTES	13
Hardware Compatibility	13
Software Compatibility	13
INTRODUCTION TO KEYBOARD INSTRUCTIONS	15
ABOUT THE OMNIKEY/PLUS	15
KEYBOARD LAYOUT	16
USING THE OMNIKEY/PLUS	17
Using the Typewriter Keys	18
Using the Cursor-Control Keys	19
Using the Numeric Keypad	22
Using the Function Keys	24
TECHNICAL SPECIFICATIONS	25
CONTROLLER SCHEMATIC	26
KEY MATRIX SCHEMATIC	27
KEY CODE CHARTS	28

INTRODUCTION

Congratulations on your purchase of the OmniKey/PLUS, which is designed for use with the following computer systems:

- PC/XT/AT/PS2 computer systems and 100% compatibles
- Tandy 1000
- ATT-WGS, ATT6300 and 6300-Plus
- Amstrad

The OmniKey/PLUS gives you unmatched performance and the following features:

- Standard typewriter keyboard layout.
- Full-stroke, audible-click key action.
- 12 function keys arranged to the left of the keyboard.
- Caps lock, number lock, and scroll lock LEDs.
- Separate cursor-control and numeric keypads.
- Switchable *Caps Lock* and *Left Control (Ctrl)* key functions.
- A reboot switch located on the back of the keyboard that performs a *Ctrl + Alt + Del* keystroke.

UNPACKING AND INSTALLATION

This process has five steps:

1. Unpack the keyboard.
2. Turn the computer off and plug the cable in the proper connectors.
3. Check and (if necessary) set the DIP switches.
4. Turn the computer on and start typing.
5. Adjust the keyboard so it is at a comfortable angle.

UNPACKING THE KEYBOARD

1. Carefully unpack your keyboard as you would any other piece of electronic equipment. (For example, don't drop it or cut the cables with a knife.)
2. Store the packing material in a safe place. It is **required** if you return the keyboard and it is very useful for repacking if you move.

CONNECTING THE CABLE

1. **Turn your computer off.** If you haven't already disconnected your old keyboard, do so now.
2. Refer to the illustration on the following page. Plug the new cable into the connector on the back of your keyboard. (The proper connector is the second from the left when you are facing the back of the keyboard.)

Note: Don't force the cable plug into a connector. The cable will only fit into the connector one way. If it doesn't fit easily, the cable plug is not properly oriented, or you are trying to plug it into the wrong connector.

3. Plug the other end of the cable into the computer. **Don't turn the computer on until you have checked and set the DIP switches.** (See next section.)

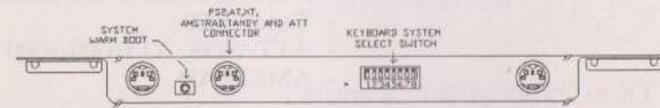


Figure 1. Rear view of OmniKey PLUS. Plug cable into the second connector from left.

SETTING THE DIP SWITCHES

The DIP switches are in a bank of numbered switches on the back edge of the keyboard. Use these switches to set the following options:

- Type of computer:
 - PC/XT or 100% compatible
 - AT/PS2 or 100% compatible
 - Tandy 1000
 - ATT-WGS, ATT6300/6300 Plus
 - AMSTRAD
- Normal stand-alone or Novell ELS configuration
- Swapping location of *Caps Lock* and left *Ctrl* key functions

Because these switches are small, it is easiest to use the tip of a ball point pen or some other thin object to change their positions.

On the following pages, you will find instructions for each of the settings.

1. Setup for type of computer:

If your computer is a PC, XT, or 100% compatible, set switch 1 down. Set switches 2, 3, and 4 up. See illustration below.

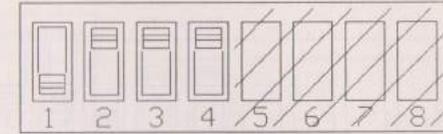


Figure 2. Setting for PC or XT mode. Switch 1 is down. Switches 2, 3, and 4 are up.

If your computer is an AT, PS/2 or 100% compatible, set switches 1, 2, 3, and 4 up. See illustration below.

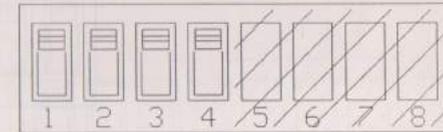


Figure 3. Setting for AT or PS/2 mode. Switches 1, 2, 3, and 4 are up.

If your computer is a Tandy 1000, set switches 1, 2, and 3 down. Set switch 4 up. See illustration below.

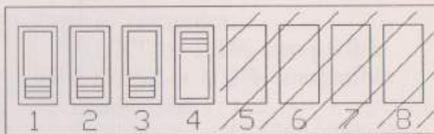


Figure 4. Setting for Tandy 1000. Switches 1, 2, and 3 are down. Switch 4 is up.

If your computer is an ATT-WGS, set switches 1, 2, and 4 up. Set switch 3 down. See illustration below.

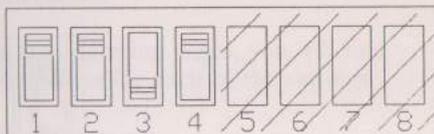


Figure 5. Setting for ATT-WGS. Switches 1, 2, and 4 are up. Switch 3 is down.

If your computer is an ATT6300/6300 Plus, set switches 1 and 2 down. Set switches 3 and 4 up. See illustration below.

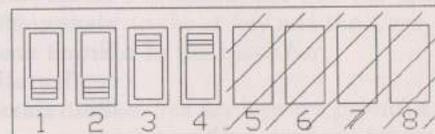


Figure 6. Setting for ATT6300. Switches 1 and 2 are down. Switches 3 and 4 are up.

If your computer is an AMSTRAD, set switches 1, 3, and 4 up. Set switch 2 down. See illustration below.

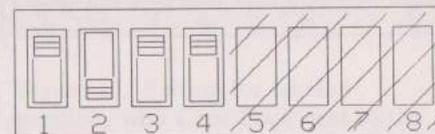


Figure 7. Setting for AMSTRAD. Switches 1, 3, and 4 are up. Switch 2 is down.

2. Setup for Novell or normal stand-alone configuration.

If you are using your computer as a terminal in a Novell LAN, you must set DIP switch 6.

To set your keyboard for a normal, stand-alone configuration, set switch 6 up. For Novell non-protected mode, or ELS configuration, set switch 6 down. See illustrations below.

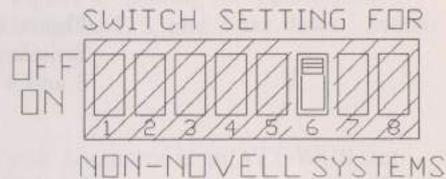


Figure 8. Set switch 6 up for normal operation.

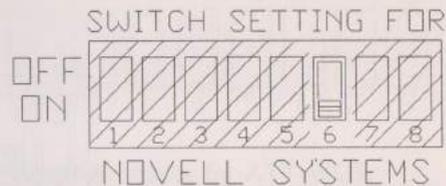


Figure 9. Set switch 6 down for Novell configuration.

3. Swapping the Caps Lock and the left Ctrl keys.

The OmniKey/PLUS keyboard allows you to swap the functions of the *Caps Lock* and the left *Ctrl* key. This option is provided for people prefer a keyboard layout with the *Caps Lock* key in the third row of keys. The keyboard is initially set with the left *Ctrl* key next to the *A* key and the *Caps Lock* key next to the *space bar*.

Notes: 1) Two free key tops are provided for swapping the functions of these keys.

2) Changing the location of the left *Ctrl* key will not alter the right *Ctrl* key in any way.

To leave the *Ctrl* and *Caps Lock* keys in their default labeled positions, make sure switch 5 is up. See illustration below.

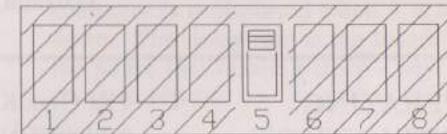


Figure 10. Setting for labeled positions with *Caps Lock* next to the *space bar*, and the left *Ctrl* key next to *A*. Switch 5 is up.

To switch the keyboard so that the left *Ctrl* key is next to the *space bar* and the *Caps Lock* is next to the *A* key, set switch 5 down. See illustration below.

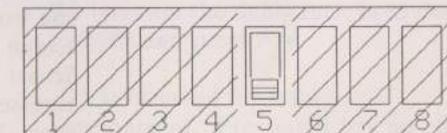


Figure 11. Setting for *Caps Lock* next to *A*, and left *Ctrl* next to *space bar*. Switch 5 is down.

USING THE OMNIKEY/PLUS

Once the DIP switches are properly set, turn your computer on and start typing. Enjoy the feel of your new keyboard! If you haven't used a computer keyboard before, refer to the *Keyboard Instructions* section of this manual.

SETTING THE KEYBOARD ANGLE

You can adjust the angle of the OmniKey/PLUS by pulling down the legs on the back of the keyboard. (See illustration below.)

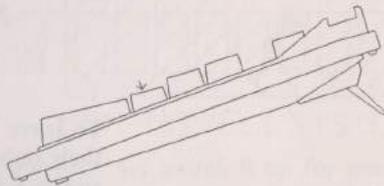


Figure 12. Home row height: feet up 33.02mm, feet down 36.82mm.

OPERATING INSTRUCTIONS

The OmniKey/PLUS works like any other computer keyboard. In addition, it has the following special functions:

- The key marked *Omni* in the middle of the cursor-control keypad sends the same keystroke sent by the 5 in the numeric keypad when *Num Lock* is off.
- The *Print Screen* key performs a normal Print Screen function when you press it **twice**. (This feature prevents you from accidentally triggering a screen print when you bump the *Print Screen* key.) All other functions accessed by this key are performed normally. For example, to access Sys Request functions, press *Alt* + *Print Screen*, or to perform a *Shift* + *Print Screen* function, press *Shift* + *Print Screen*.

- *F13* serves as a Comma/Period lock. When you press *F13*, the *Period - Greater Than* (. >) key will be locked so it always sends a period and the *Comma - Less Than* (, <) key will be locked so it always sends a comma, whether or not the *Shift* key is depressed. *F13* is a toggle; Press it a second time to return the . > and , < keys to normal operation.

The unique Comma/Period lock feature is useful if you rarely use the < or > symbols. By pressing *F13*, you eliminate typos that occur when you are holding down the *Shift* key and trying to type a period or comma.

- *F14* allows you change the *repeat* rate and the *delay* rate of the keyboard. The repeat rate is the speed at which a character is redisplayed when it is held down. The delay rate is the length of the pause that occurs before a key starts to repeat.

To **increase** the repeat rate, hold down *Right Shift* and press *F14*. For a small change in rate, press only once or twice. For a greater change in rate, press eight or nine times. To **decrease** the repeat rate, hold down *Left Shift* and press *F14*.

To **decrease** the delay rate (to shorten the period before a character repeats), hold down *Right Alt* and press *F14*. To **increase** the delay rate, hold down *Left Alt* and press *F14*.

- *F15* is reserved for future development. Pressing it has no effect.
- The small button on the back of the keyboard can be used to reboot your computer. Depressing this button performs a *Ctrl* + *Alt* + *Del* keystroke.

TROUBLESHOOTING The most common problems with the OmniKey/PLUS result from:

- Improperly plugged cable
- Incorrect DIP switch settings

If your keyboard is not functioning properly, complete the following steps:

1. Turn off the computer.
2. Check the cable connections to make sure both ends of the cable are securely plugged into the connectors.
3. Check the DIP switches to be sure the switches are set properly for your type of computer and for your particular application. (Refer to the section on setting DIP switches in this manual.)
4. Turn your computer on again and start typing.
5. If your keyboard will not make a < or > symbol, press *F13* once. This key is a Comma/Period lock. (Refer to Operating Instructions for more information.)

TELEPHONE SUPPORT

If you have checked the DIP switches and the cable connections, and your keyboard still doesn't work, call Northgate Keyboard Technical Support at 612-591-0053.

HARDWARE AND SOFTWARE COMPATIBILITY NOTES

The OmniKey/PLUS is compatible with the great majority of hardware and software available on the market today. For more information about compatibility issues, please read the following:

Hardware Compatibility

The OmniKey/PLUS is compatible with virtually all standard 8088, 80286, and 80386 systems. The keyboard is also compatible with a number of other less-standard computer types. (See list in Introduction.)

There is some potential for incompatibility: Some older PC systems, including the original 80286 systems were issued with an 84-key keyboard. The ROM BIOS in these early PC, 8088 and 80286 systems will not fully support the enhanced OmniKey/PLUS. The only way to fix this problem is to change the ROM BIOS of the system. **This is not a problem with the keyboard.**

With XT's and compatibles, it is possible for the *Num Lock* key to get out of sequence, so the Num Lock LED is lit, but the Num Lock function is not on, or vice versa. **(This is a problem with the XT architecture, not with the keyboard.)** If this occurs, hold down the *Shift* and the *Alt* keys and press *Num Lock*. This will return the Num Lock function to the proper synchronization.

Software Compatibility

Some software was not written for or upgraded to allow use of enhanced keyboards like the OmniKey/PLUS. Specifically, certain macro programs may not operate properly. These types of software may cause problems even when used with industry-standard enhanced keyboards. **This is not a problem with the keyboard.** We recommend that you contact the software supplier. Request an upgrade for the program that is causing the problem.

KEYBOARD INSTRUCTIONS

INTRODUCTION TO KEYBOARD INSTRUCTIONS

This section is written for people who are new to using a computer keyboard. It explains how to get the most out of your OmniKey/PLUS. If you are an experienced computer user, you will know most (if not all) of the information in this part of the manual. However, you may be interested in the section that explains how the function keys can be used to enter MS-DOS commands.

Before you start using your OmniKey/PLUS, make sure you have installed it properly. Refer to the sections on Connecting the Cable and Setting the DIP Switches.

ABOUT THE OMNIKEY/PLUS KEYBOARD

Your new OmniKey/PLUS keyboard represents state-of-the-art keyboard technology. It has been widely praised for its full-stroke range of motion and its tactile feedback caused by the audible click.

Press a few of the keys on the keyboard. Notice how the range of motion of the key is firm yet responsive. The slight click you hear when the key is pressed down is a mechanical sound, not an electronic beep.

The responsive OmniKey/PLUS keyboard will make it easy to master the new skill of using a computer keyboard.

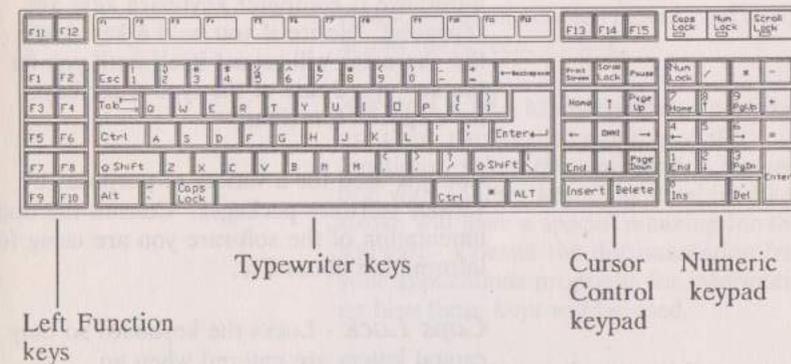
KEYBOARD LAYOUT

This section describes the physical layout of the OmniKey/PLUS. More detailed explanations of the functions of the keys are given later. The illustration on the following page shows the layout of the OmniKey/PLUS.

The keys are arranged in four major groups:

- The typewriter keys. Use these keys to type letters, numbers and special characters. Some special keys like *Tab*, *Esc*, and *Caps Lock* are also found here.
- The cursor-control keypad. Use these keys to move the cursor (the blinking block that indicates your location on the computer screen) from place to place on the screen. The *F13* key, used for Northgate's unique Comma/Period Lock feature, is located at the top of this keypad.
- The numeric keypad. You can use this section of the keyboard in two ways: 1) With *Num Lock on*, you can use these keys to enter numbers. (This is especially useful if you are used to entering numbers on a calculator keypad.) 2) With *Num Lock off*, you can use these keys to control the cursor.
- The left function keys. Use these keys to enter special information, access certain functions, and to control operations. These functions depend on the software you use.

Figure 13. OmniKey PLUS keyboard layout.



USING THE OMNIKEY/PLUS

Computer keyboards work in conjunction with computer software. The best way to learn about your OmniKey/PLUS is to use it with your software. However, many software packages lack good documentation; therefore, the following information can help you understand how to get the most out of your keyboard.

Using the Typewriter Keys

Using the typewriter keys is very similar to using a typewriter. One important difference is computer keyboard keys are repeating. Notice if you hold a key down, the character will repeat itself until you let the key up. Some of the typewriter keys have special functions:

Esc - is used for a variety of purposes by various software packages. Consult the documentation of the software you are using for information about *Esc*.

Caps Lock - Locks the keyboard so only capital letters are entered when an alphabetic key is pressed. When *Caps Lock* is on, the Caps Lock LED will light up. If you press the *Shift* key when *Caps Lock* is on, lower case letters will be entered.

Caps Lock is a toggle key. Press it to turn *Caps Lock* on; press it again to turn *Caps Lock* off. *Caps Lock* differs from the Shift Lock on a typewriter. It locks only the 26 letter keys in the capitals mode. Number keys, punctuation keys, and all other special keys are not affected by *Caps Lock*.

Shift - The *Shift* keys on either side of the keyboard work like the Shift keys on a typewriter. Use *Shift* to enter upper case letters or the upper symbols on the number and punctuation keys. When *Caps Lock* is on, *Shift* acts as an un-shift; lower case letters will be entered.

Backspace - The *Backspace* serves as a reverse delete. It works like the Backspace key on a typewriter, except it deletes the characters as the cursor moves backward across the screen.

Alt and Ctrl - Many computer programs use these two keys to enter special functions. Often they are used in conjunction with another key. The combined keystroke will have a special meaning for the software. Consult the documentation from your applications programs for information on how these keys will be used.

Tab - With many software packages, you will use the *Tab* key to perform a tab function similar to the tab on a standard typewriter.

Using the Cursor-Control Keys

The keys in the cursor-control keypad allow you to move the cursor from place to place on the computer screen. The functions of the cursor-control keys depend on the software you are using. In addition, the Comma/Period Lock key (*F13*) and the keyboard accelerator (*F14*) are located at the top of this keypad.

F13 - *F13* is a Comma/Period Lock. When you press *F13*, the , < key will be locked so it always enters a comma and the . > key will be locked so it always enters a period, **whether or not you are holding down the Shift key.**

The Comma/Period feature is especially useful if you rarely use the < or > symbols. By turning on the Comma/Period Lock, you eliminate typos like U>S>A> that occur when you forget to release the *Shift* key when you are typing abbreviations.

The Comma/Period Lock is a toggle switch. Press *F13* once to turn on the Comma/Period Lock. Press *F13* a second time to unlock the *Comma* and *Period* keys and

return them to normal operation.

F14 - This key allows you to change the repeat rate and the delay rate of the keyboard. The repeat rate is the speed at which a character is redisplayed when it is held down. The delay rate is the length of the pause that occurs before a key starts to repeat.

To **increase** the repeat rate, hold down *Right Shift* and press **F14**. For a small change in rate, press only once or twice. For a greater change in rate, press eight or nine times. To **decrease** the repeat rate, hold down *Left Shift* and press **F14**.

To **decrease** the delay rate (to shorten the period before a character repeats), hold down *Right Alt* and press **F14**. To **increase** the delay rate, hold down *Left Alt* and press **F14**.

Print Screen - With many software packages, the *Print Screen* function is used to print a screen image on the printer. With the OmniKey/PLUS, you must press *Print Screen* twice to produce a normal *Print Screen* function. If you press *Print Screen* while holding down the *Alt* key, you will send a System Request message to the computer. Notice the label on the *Alt* key and the *SysRq* label on the *Print Screen* key are printed in blue. This color coding is a special feature of the OmniKey/PLUS; it is easy to remember *SysRq* is made by pressing *Alt* + *Print Screen* because both are blue.

Scroll Lock - With many software packages, pressing this key will disable the cursor-control keys. *Scroll Lock* is a toggle switch. Press it once to turn on the *Scroll Lock* function; press it again to turn off *Scroll Lock*. When *Scroll Lock* is on, the *Scroll Lock* LED is lit.

Pause - With some software packages, pressing this key will stop the contents of the screen from scrolling until another key is pressed. If you press *Ctrl* + *Pause* you will send a Break message to the computer. This function is used in many software packages as a signal to stop processing. Notice the color coding for this function; both the *Ctrl* key and the *Break* label are red.

Cursor Keys (←, →, ↑, ↓) - Many software packages use these keys to move the cursor from place to place. Each time you press a *Cursor Key*, the cursor will move in the direction of the arrow.

Page Up & Page Down - Many software packages use these keys to move the cursor up or down an entire screen or to move to the top or bottom of a page.

Omni - Use this key to enter the same keystroke entered by pressing the 5 on the numeric keypad when *Num Lock* is off.

Home & End - Many software packages use the *Home* key to move the cursor to the beginning of a file and the *End* key to move the cursor to the end of the file.

Insert - Many word-processing and spreadsheet software packages use this key to switch between typeover and insert modes. In typeover, each keystroke you make will replace the character at the cursor location. In insert mode, the keystrokes you make will push the existing characters to the right.

Delete - Many software packages use this key to delete the character at the cursor location.

F15 - This key is reserved for future development. Pressing **F15** will have no effect.

Using the Numeric Keypad

The numeric keypad has two functions:

- If the *Num Lock* is **on**, the numeric keypad is used primarily to type numbers.
- If the *Num Lock* is **off**, the numeric keypad is used primarily to control cursor movement.

Num Lock - The *Num Lock* key is a toggle. Press it once to turn on the *Num Lock* function. Press it a second time to turn off the *Num Lock* function. When *Num Lock* is on, the Num Lock LED will be lit. Refer to the chart on the following page for information on how *Num Lock* affects the function of the keys in the numeric keypad.

Key	Num Lock On	Num Lock Off
7/Home	Enters 7 on the screen.	Performs a <i>Home</i> function. See Cursor-Control keys.
8/↑	Enters 8 on the screen.	Performs an <i>Up Cursor</i> function. See Cursor-Control keys.
9/PgUp	Enters 9 on the screen.	Performs a <i>Page Up</i> function. See Cursor-Control keys.
4/←	Enters 4 on the screen.	Performs a <i>Left Cursor</i> function. See Cursor-Control keys.
5	Enters 5 on the screen.	With most software, this key does not function.
6/→	Enters 6 on the screen.	Performs a <i>Right Cursor</i> function. See Cursor-Control keys.
1/End	Enters 1 on the screen.	Performs an <i>End</i> function. See Cursor-Control keys.
2/↓	Enters 2 on the screen.	Performs a <i>Down Cursor</i> function. See Cursor-Control keys.
3/PgDn	Enters 3 on the screen.	Performs a <i>Page Down</i> function. See Cursor-Control keys.
0/Ins	Enters 0 on the screen.	Performs an <i>Insert</i> function. See Cursor-Control keys.
./Del	Enters . on the screen.	Performs a <i>Delete</i> function. See Cursor-Control keys.

Note: The other keys on the numeric keypad (*Enter*, +, =, -, *, and /) are not affected by the *Num Lock* key. The *Enter* key will always perform an *Enter* function. In most software packages the other keys perform like their counterparts in the typewriter section of the keyboard.

Using the Function Keys

The function keys are located on the left of the keyboard in the function keypad. Many programs use the function keys in conjunction with other keys to perform special operations. One common use of three of the function keys is entering MS-DOS commands. Refer to the list below:

F1 - Press this key. It will redisplay one character of the previously entered DOS command each time it is pressed.

F2 - Press this key and then a character from your previously entered DOS command. The previously entered command, up to the character you have entered, will be redisplayed.

F3 - Press this key. The entire previously entered command will be redisplayed.

Technical Specifications

KEYBOARD

Voltage	5 VDC \pm .1 VDC, 200mA
Operating Environment	5° C. to 38° C. (41° F. to 101° F.) 20% to 80% relative humidity, non-condensing

SWITCHES

Maximum Contact Rating	12 VDC, 100mA
Type of Contact	Mechanical Contact
Contact Resistance	Maximum 5 Ohms
Contact Bounce	5 mSec. Maximum
Operating Travel	3.5mm (.137 in.)
Operating Life	20 million operations minimum
Operation Temperature	0° C. to 60° C. (32° F. to 140° F.)
Storage Temperature	-20° C. to 60° C. (-4° F. to 140° F.)

PACKING SPECIFICATIONS

Length	20 3/8 in.
Depth	7 1/4 in.
Height (feet down)	2 1/2 in.
Height (feet up)	1 3/4 in.
Weight	5 lbs. 12 oz.

Figure 14. CONTROLLER SCHEMATIC

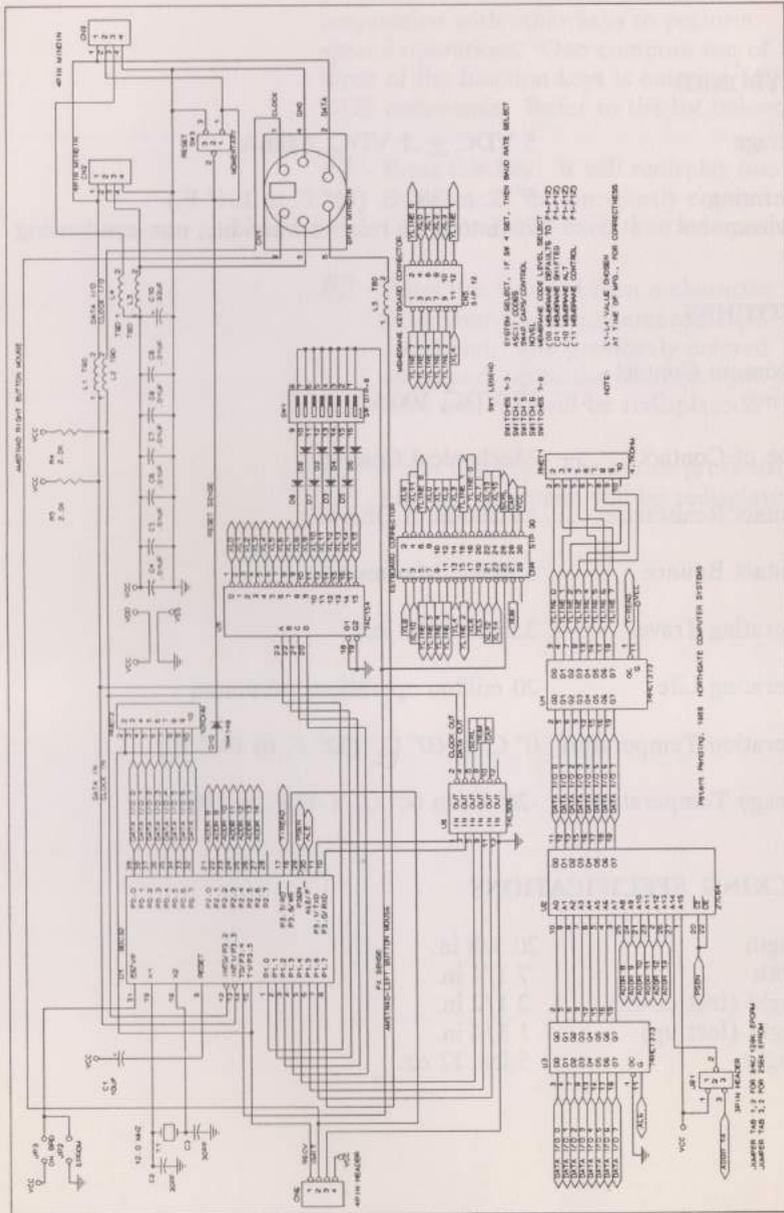
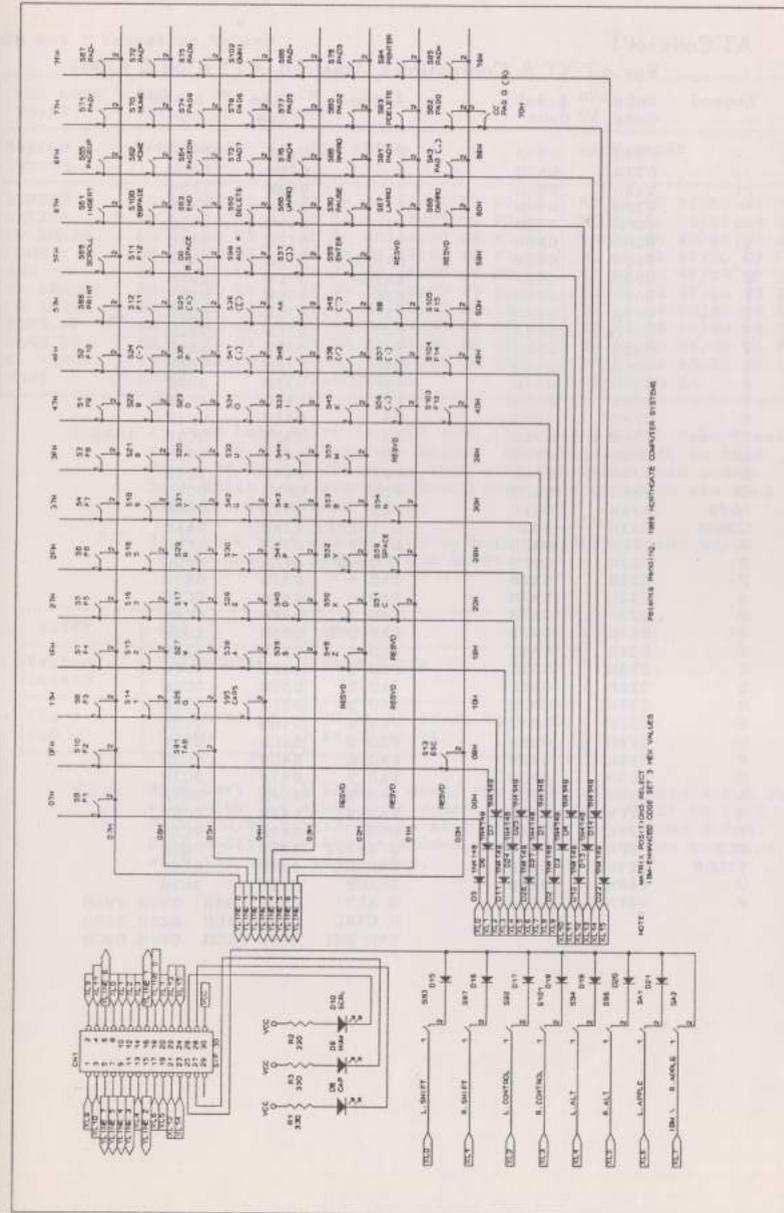


Figure 15. KEY MATRIX SCHEMATIC



Key Code Charts

AT Code set 1

For AT/XT & Compatibles, Amstrad, ATT 6300 & 6300+

Legend	Make Code	Break Code	Legend	Make Code	Break Code
.	034H	0B4H	W	011H	091H
;	027H	0A7H	X	02DH	0ADH
/	035H	0B5H	Y	015H	095H
''	028H	0A8H	Z	02CH	0ACH
++	00DH	08DH	{	01AH	0AAH
\	02BH	0ABH	}	01BH	09BH
-	00CH	08CH	BKSPACE	00EH	08EH
0	00BH	08BH	ENTER	01CH	09CH
1	002H	082H	ESC	001H	081H
2	003H	083H	F1	03BH	0BBH
3	004H	084H	F2	03CH	0BCH
4	005H	085H	F3	03DH	0BDH
5	006H	086H	F4	03EH	0BEH
6	007H	087H	F5	03FH	0BFH
7	008H	088H	F6	040H	0C0H
8	009H	089H	F7	041H	0C1H
9	00AH	08AH	F8	042H	0C2H
A	01EH	09EH	F9	043H	0C3H
B	030H	0B0H	F10	044H	0C4H
C	02EH	0AEH	F11	057H	0D7H
CAPS	03AH	0BAH	F12	058H	0DBH
COMMA	033H	0B3H	L SHIFT	02AH	0AAH
D	020H	0A0H	L ALT	038H	0B8H
E	012H	092H	L CTRL	01DH	09DH
F	021H	0A1H	PAD *	037H	0B7H
G	022H	0A2H	PAD -	04AH	0CFH
G	023H	0A3H	PAD +	04EH	0CEH
I	017H	097H	PAD DEL	053H	0D3H
J	024H	0A4H	PAD 0	052H	0D2H
K	025H	0A5H	PAD 1	04FH	0CFH
L	026H	0A6H	PAD 2	050H	0D0H
M	032H	0B2H	PAD 3	051H	0D1H
N	031H	0B1H	PAD 4	04BH	0CBH
O	018H	098H	PAD 5	04CH	0CCH
P	019H	099H	PAD 6	04DH	0CDH
Q	010H	090H	PAD 7	047H	0C7H
R	013H	093H	PAD 8	048H	0C8H
S	01FH	09FH	PAD 9	049H	0C9H
T	014H	094H	NUMS	045H	0C5H
TAB	00FH	08FH	R SHIFT	036H	0B6H
TILDE	029H	0A9H	SCROLL	046H	0C6H
U	016H	096H	SPACE	039H	0B9H
V	02FH	0AFH	R ALT	0E0H	038H
			R CTRL	0E0H	01DH
			PAD ENT	0E0H	01CH

Code Set 1 Exception Tables

NUM LOCK SHIFT	OFF OFF	ON ON	ON OFF	OFF ON
Keypop legend	MAKE/BREAK		MAKE/BREAK	MAKE/BREAK
INSERT	EO 52/EO D2	EO 2A EO 52/EO D2 EO AA	EO AA EO 52/EO D2 EO 2A	
DELETE	EO 53/EO D3	EO 2A EO 53/EO D3 EO AA	EO AA EO 53/EO D3 EO 2A	
L. ARROW	EO 4B/EO CB	EO 2A EO 4B/EO CB EO AA	EO AA EO 4B/EO CB EO 2A	
HOME	EO 47/EO C7	EO 2A EO 47/EO C7 EO AA	EO AA EO 47/EO C7 EO 2A	
END	EO 4F/EO CF	EO 2A EO 4F/EO CF EO AA	EO AA EO 4F/EO CF EO 2A	
UP ARROW	EO 48/EO C8	EO 2A EO 48/EO C8 EO AA	EO AA EO 48/EO C8 EO 2A	
DN ARROW	EO 50/EO D0	EO 2A EO 50/EO D0 EO AA	EO AA EO 50/EO D0 EO 2A	
PAGE UP	EO 49/EO C9	EO 2A EO 49/EO C9 EO AA	EO AA EO 49/EO C9 EO 2A	
PAGE DN	EO 51/EO D1	EO 2A EO 51/EO D1 EO AA	EO AA EO 51/EO D1 EO 2A	
R. ARROW	EO 4D/EO CD	EO 2A EO 4D/EO CD EO AA	EO AA EO 4D/EO CD EO 2A	
OMNI	4C/CC	2A 4C/CC AA	AA 4C/CC 2A	

Notes: 1) When Left Shift is held down, the 2A/AA Shift Make/Break is sent with the other scan codes. When Right Shift is held down, 36/B6 Make/Break is sent with the other scan codes. If both Shift keys are held down, both sets of codes are sent with the other scan codes.

2) Notice that column 2 gives both the OFF/OFF and ON/ON conditions for Num Lock and Shift.

SHIFT	OFF	ON
Keypop legend	MAKE/BREAK	MAKE/BREAK
PAD / PAD -	EO 35/EO B5 OD/8D	EO AA EO 35/EO B5 EO 2A AA OD/8D 2A

Notes: When Left Shift is held down, the 2A/AA Shift Make/Break is sent with the other scan codes. When Right Shift is held down, 36/B6 Make/Break is sent with the other scan codes. If both Shift keys are held down, both sets of codes are sent with the other scan codes.

Code Set 1 Exception Tables, Continued

CTRL	OFF	ON
Keytop legend	MAKE	MAKE
PAUSE	E1 1D 45 E1 9D C5	E0 46 E0 C6

Note: This key does not repeat. All codes occur on the Make stroke of the key.

	KEY ALONE (BASE CODE)	KEY + SHIFT OR CTRL	KEY + ALT
Keytop legend	MAKE/BREAK	MAKE/BREAK	MAKE/BREAK
PRINT SCREEN	E0 2A E0 37/E0 B7 E0 AA	E0 37/E0 B7	54/D4

AT Code set 2 (IBM)
For AT's & Compatibles

Legend	Make Code	Break Code	Legend	Make Code	Break Code
.	049H	OFOH 049H	DELETE	064H	OFOH 064H
;	04CH	OFOH 04CH	END	065H	OFOH 065H
/	04AH	OFOH 04AH	ENTER	05AH	OFOH 05AH
"	052H	OFOH 052H	ESC	076H	OFOH 076H
+	055H	OFOH 055H	F1	005H	OFOH 005H
\	05DH	OFOH 05DH	F2	006H	OFOH 006H
-	04EH	OFOH 04EH	F3	004H	OFOH 004H
0	045H	OFOH 045H	F4	00CH	OFOH 00CH
1	016H	OFOH 016H	F5	003H	OFOH 003H
2	01EH	OFOH 01EH	F6	00BH	OFOH 00BH
3	026H	OFOH 026H	F7	083H	OFOH 083H
4	025H	OFOH 025H	F8	00AH	OFOH 00AH
5	02EH	OFOH 02EH	F9	001H	OFOH 001H
6	036H	OFOH 036H	F10	009H	OFOH 009H
7	03DH	OFOH 03DH	F11	078H	OFOH 078H
8	03EH	OFOH 03EH	F12	007H	OFOH 007H
9	046H	OFOH 046H	HOME	00EH	OFOH 00EH
A	01CH	OFOH 01CH	INSERT	067H	OFOH 067H
B	032H	OFOH 032H	L ALT	011H	OFOH 011H
C	021H	OFOH 021H	L CTRL	014H	OFOH 014H
CAPS	058H	OFOH 058H	L ARROW	061H	OFOH 061H
COMMA	041H	OFOH 041H	L SHIFT	012H	OFOH 012H
D	023H	OFOH 023H	NUMS	077H	OFOH 077H
E	024H	OFOH 024H	P SCREEN	057H	OFOH 057H
F	02BH	OFOH 02BH	PAD 0	070H	OFOH 070H
G	034H	OFOH 034H	PAD 1	069H	OFOH 069H
H	033H	OFOH 033H	PAD 2	072H	OFOH 072H
I	043H	OFOH 043H	PAD 3	07AH	OFOH 07AH
J	03BH	OFOH 03BH	PAD 4	06BH	OFOH 06BH
K	042H	OFOH 042H	PAD 5	073H	OFOH 073H
L	04BH	OFOH 04BH	PAD 6	074H	OFOH 074H
M	03AH	OFOH 03AH	PAD 7	06CH	OFOH 06CH
N	031H	OFOH 031H	PAD 8	075H	OFOH 075H
O	044H	OFOH 044H	PAD 9	07DH	OFOH 07DH
P	04DH	OFOH 04DH	PAD ENT	05AH	OFOH 05AH
Q	015H	OFOH 015H	PAD DEL	071H	OFOH 071H
R	02DH	OFOH 02DH	PAD /	077H	OFOH 077H
S	01BH	OFOH 01BH	PAD -	07BH	OFOH 07BH
T	02CH	OFOH 02CH	PAD *	07CH	OFOH 07CH
TAB	00DH	OFOH 00DH	PAD +	079H	OFOH 079H
TILDE	00EH	OFOH 00EH	PAD =	04EH	OFOH 04EH
U	03CH	OFOH 03CH	PAGE UP	06FH	OFOH 06FH
V	02AH	OFOH 02AH	PAGE DN	06DH	OFOH 06DH
W	01DH	OFOH 01DH	PAUSE	062H	OFOH 062H
X	022H	OFOH 022H	R SHIFT	059H	OFOH 059H
Y	035H	OFOH 035H	R ARROW	06AH	OFOH 06AH
Z	01AH	OFOH 01AH	R CTRL	058H	OFOH 058H
{	054H	OFOH 054H	R ALT	039H	OFOH 039H
}	05BH	OFOH 05BH	SCROLL	07EH	OFOH 07EH
KBSPACE	066H	OFOH 066H	SPACE	029H	OFOH 029H
D ARROW	060H	OFOH 060H	UP ARROW	063H	OFOH 063H

Code Set 2 Exception Tables

1	2	3	4
NUM LOCK SHIFT		OFF OFF ON ON	ON OFF OFF
Keytop legend	DATA	MAKE/ BREAK	MAKE/ BREAK
INSERT	70	EO DATA/	EO 12 EO DATA/
DELETE	71	EO FO DATA	EO FO DATA EO FO 12
L. ARROW	6B		
HOME	6C		
END	69		
UP ARROW	75		
DN ARROW	72		
PAGE UP	7D		
PAGE DN	7A		
R. ARROW	74		
OMNI	73		

Notes: 1) When Left Shift is held down, the 12/FO 12 Shift Make/Break is sent with the other scan codes. When Right Shift is held down, 59/FO 59 Make/Break is sent with the other scan codes. If both Shift keys are held down, both sets of codes are sent with the other scan codes.

2) Notice that column 2 gives both the OFF/OFF and ON/ON conditions for Num Lock and Shift.

SHIFT	OFF	ON
Keytop legend	MAKE/BREAK	MAKE/BREAK
PAD /	EO 4A/EO FO 4A	EO FO 12 4A/EO 12 EO 4A
PAD -	78/FO 78	FO 12 78/FO 78 12

Note: When Left Shift is held down, the 12/FO 12 Shift Make/Break is sent with the other scan codes. When Right Shift is held down, 59/FO 59 Make/Break is sent with the other scan codes. If both Shift keys are held down, both sets of codes are sent with the other scan codes.

Code Set 2 Exception Tables, Continued

CTRL	OFF	ON
Keytop legend	MAKE	MAKE
PAUSE	E1 14 77 E1 FO 14 FO 77	EO 7E EO FO 7E

Note: This key does not repeat. All codes occur on the Make stroke of the key.

	KEY ALONE (BASE CODE)	KEY + SHIFT OR CTRL	KEY + ALT
Keytop legend	MAKE/BREAK	MAKE/BREAK	MAKE/BREAK
PRINT SCREEN	EO 12 EO 7C/ EO FO 7C EO FO 12	EO 7C/EO FO 7C	84/FO 84

FCC NOTICE

AT Code set 3 (IBM)

For AT's & Compatibles & ATT WGS

Legend	Make Code	Break Code	Legend	Make Code	Break Code
.	049H	OFOH 049H	D ARROW	060H	OFOH 060H
;	04CH	OFOH 04CH	DELETE	064H	OFOH 064H
/	04AH	OFOH 04AH	END	065H	OFOH 065H
"	052H	OFOH 052H	ENTER	05AH	OFOH 05AH
+	055H	OFOH 055H	ESC	008H	OFOH 008H
\	05CH	OFOH 05CH	F1	007H	OFOH 007H
-	04EH	OFOH 04EH	F2	00FH	OFOH 00FH
0	045H	OFOH 045H	F3	017H	OFOH 017H
1	016H	OFOH 016H	F4	01FH	OFOH 01FH
2	01EH	OFOH 01EH	F5	027H	OFOH 027H
3	026H	OFOH 026H	F6	02FH	OFOH 02FH
4	025H	OFOH 025H	F7	037H	OFOH 037H
5	02EH	OFOH 02EH	F8	03FH	OFOH 03FH
6	036H	OFOH 036H	F9	047H	OFOH 047H
7	03DH	OFOH 03DH	F10	04FH	OFOH 04FH
8	03EH	OFOH 03EH	F11	056H	OFOH 056H
9	046H	OFOH 046H	F12	05EH	OFOH 05EH
A	01CH	OFOH 01CH	INSERT	067H	OFOH 067H
B	032H	OFOH 032H	L CTRL	011H	OFOH 011H
C	021H	OFOH 021H	L SHIFT	012H	OFOH 012H
CAPS	014H	OFOH 014H	L ARROW	061H	OFOH 061H
COMMA	041H	OFOH 041H	L ALT	019H	OFOH 019H
D	023H	OFOH 023H	NUMS	076H	OFOH 076H
E	024H	OFOH 024H	P SCREEN	057H	OFOH 057H
F	02BH	OFOH 02BH	PAD -	04EH	OFOH 04EH
G	034H	OFOH 034H	PAD /	077H	OFOH 077H
H	033H	OFOH 033H	PAD *	07EH	OFOH 07EH
HOME	00EH	OFOH 00EH	PAD -	084H	OFOH 084H
I	043H	OFOH 043H	PAD +	07CH	OFOH 07CH
J	03BH	OFOH 03BH	PAD 0	070H	OFOH 070H
K	042H	OFOH 042H	PAD 1	069H	OFOH 069H
L	04BH	OFOH 04BH	PAD 2	072H	OFOH 072H
M	03AH	OFOH 03AH	PAD 3	07AH	OFOH 07AH
N	031H	OFOH 031H	PAD 4	06BH	OFOH 06BH
O	044H	OFOH 044H	PAD 5	073H	OFOH 073H
P	04DH	OFOH 04DH	PAD 6	074H	OFOH 074H
Q	015H	OFOH 015H	PAD 7	06CH	OFOH 06CH
R	02DH	OFOH 02DH	PAD 8	075H	OFOH 075H
S	01BH	OFOH 01BH	PAD 9	07DH	OFOH 07DH
T	02CH	OFOH 02CH	PAD ENT	079H	OFOH 079H
TAB	00DH	OFOH 00DH	PAD DEL	071H	OFOH 071H
TILDE	00EH	OFOH 00EH	PAGE UP	06FH	OFOH 06FH
U	03CH	OFOH 03CH	PAGE DN	06DH	OFOH 06DH
V	02AH	OFOH 02AH	PAUSE	062H	OFOH 062H
W	01DH	OFOH 01DH	R SHIFT	059H	OFOH 059H
X	022H	OFOH 022H	R CTRL	058H	OFOH 058H
Y	035H	OFOH 035H	R ALT	039H	OFOH 039H
Z	01AH	OFOH 01AH	R ARROW	06AH	OFOH 06AH
[054H	OFOH 054H	SCROLL	05FH	OFOH 05FH
]	05BH	OFOH 05BH	SPACE	029H	OFOH 029H
BKSPACE	066H	OFOH 066H	UP ARROW	063H	OFOH 063H

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

This equipment generates radio-frequency energy. If it is not installed and used properly it may cause interference with radio and television reception. It has been tested and found to comply with the limits for Class B computing devices in accordance with the specifications in Subpart J, Part 15, of FCC rules. These rules are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference, which can be determined by turning it off, you can try to correct the problem by one or more of the following measures:

- Turning the TV or radio antenna until the interference stops.
- Moving the computer further away from the TV or radio.
- Moving the computer from one side of the TV or radio to the other.
- Plugging the computer into an outlet on a different circuit breaker or fuse than the TV or radio.
- Installing a rooftop antenna connected to your TV and radio with coaxial cable.

If necessary, you should consult your computer dealer for additional suggestions. You may find the booklet *How to Identify and Resolve Radio-TV Interference Problems* prepared by the Federal Communications Commission helpful. This booklet is available from the U.S. Government Printing Office, Washington, DC 20402. Refer to Stock Number: 004-000-00345-4.

NOTICE: In order to insure continued compliance to the FCC emission limits for this keyboard, it is necessary to use computer and I/O cables which are shielded. The shield must be terminated to the metallic cabinet at both ends to guarantee adequate suppression of undesirable emissions.

NOTICE

This equipment has been certified to comply with the rules for a Class B amateur station in accordance with the provisions of Section 97.15 of FCC Part 97. This equipment may be used for transmitting and receiving on the amateur bands provided the operator is licensed in the appropriate class and is licensed in the appropriate band.

Receipt of this notice does not constitute a license to use the equipment for any purpose other than that for which it was designed and certified.

The equipment described in this notice is not to be used for any purpose other than that for which it was designed and certified. It is not to be used for any purpose other than that for which it was designed and certified. It is not to be used for any purpose other than that for which it was designed and certified.

More information is available in the following references:

Part 97 of the FCC Rules and Regulations, which contain the rules for the amateur service. The FCC Rules and Regulations are available on the FCC website.

Part 97.15 of the FCC Rules and Regulations, which contains the rules for the use of equipment in the amateur service.

Part 97.101 of the FCC Rules and Regulations, which contains the rules for the use of equipment in the amateur service.

Part 97.103 of the FCC Rules and Regulations, which contains the rules for the use of equipment in the amateur service.

Part 97.105 of the FCC Rules and Regulations, which contains the rules for the use of equipment in the amateur service.

Part 97.107 of the FCC Rules and Regulations, which contains the rules for the use of equipment in the amateur service.

Part 97.109 of the FCC Rules and Regulations, which contains the rules for the use of equipment in the amateur service.

Part 97.111 of the FCC Rules and Regulations, which contains the rules for the use of equipment in the amateur service.

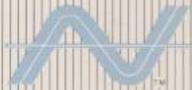
Part 97.113 of the FCC Rules and Regulations, which contains the rules for the use of equipment in the amateur service.

Part 97.115 of the FCC Rules and Regulations, which contains the rules for the use of equipment in the amateur service.

Part 97.117 of the FCC Rules and Regulations, which contains the rules for the use of equipment in the amateur service.

Part 97.119 of the FCC Rules and Regulations, which contains the rules for the use of equipment in the amateur service.

Part 97.121 of the FCC Rules and Regulations, which contains the rules for the use of equipment in the amateur service.



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