

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.

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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.)

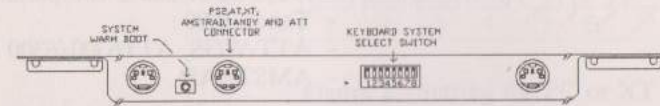


Figure 1. Rear view of OmniKey PLUS. Plug cable into the second connector from left.

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.

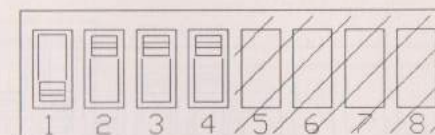


Figure 2. Setting for PC or XT mode. Switch 1 is down. Switches 2, 3, and 4 are up.

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

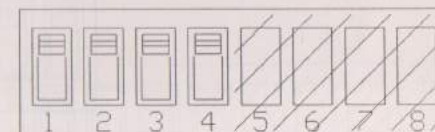


Figure 3. Setting for AT or PS/2 mode. Switches 1, 2, 3, and 4 are up.

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

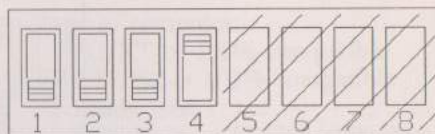


Figure 4. Setting for Tandy 1000. Switches 1, 2, and 3 are down. Switch 4 is up.

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

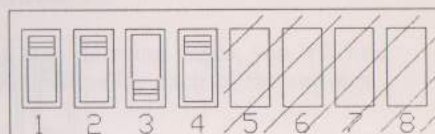


Figure 5. Setting for ATT-WGS. Switches 1, 2, and 4 are up. Switch 3 is down.

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

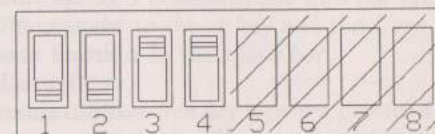


Figure 6. Setting for ATT6300. Switches 1 and 2 are down. Switches 3 and 4 are up.

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

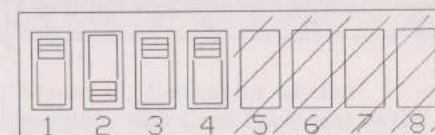


Figure 7. Setting for AMSTRAD. Switches 1, 3, and 4 are up. Switch 2 is down.

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.

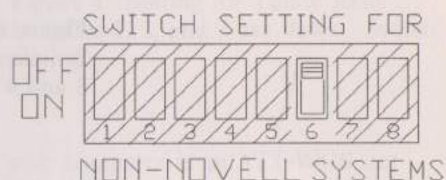


Figure 8. Set switch 6 up for normal operation.

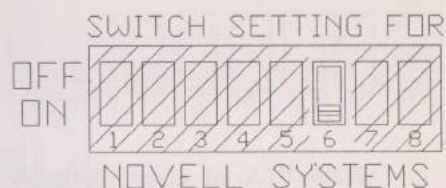


Figure 9. Set switch 6 down for Novell configuration.

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.

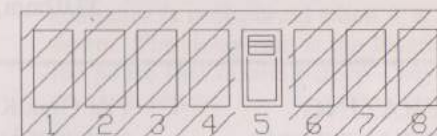


Figure 10. Setting for labeled positions with *Caps Lock* next to the *space bar*, and the left *Ctrl* key next to *A*. Switch 5 is up.

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.

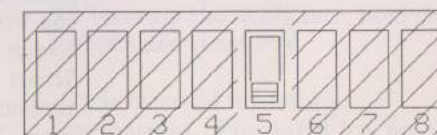


Figure 11. Setting for *Caps Lock* next to *A*, and left *Ctrl* next to *space bar*. Switch 5 is down.

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.)

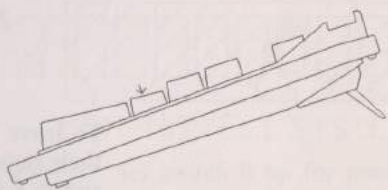


Figure 12. Home row height: feet up 33.02mm, feet down 36.82mm.

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

Hardware Compatibility

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:

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.

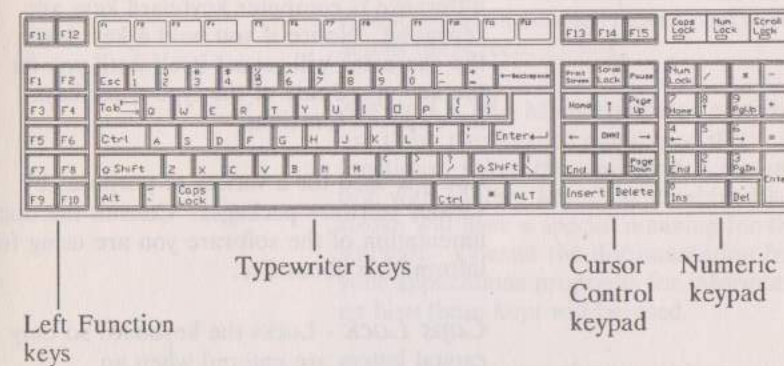
KEYBOARD LAYOUT

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 key-stroke 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

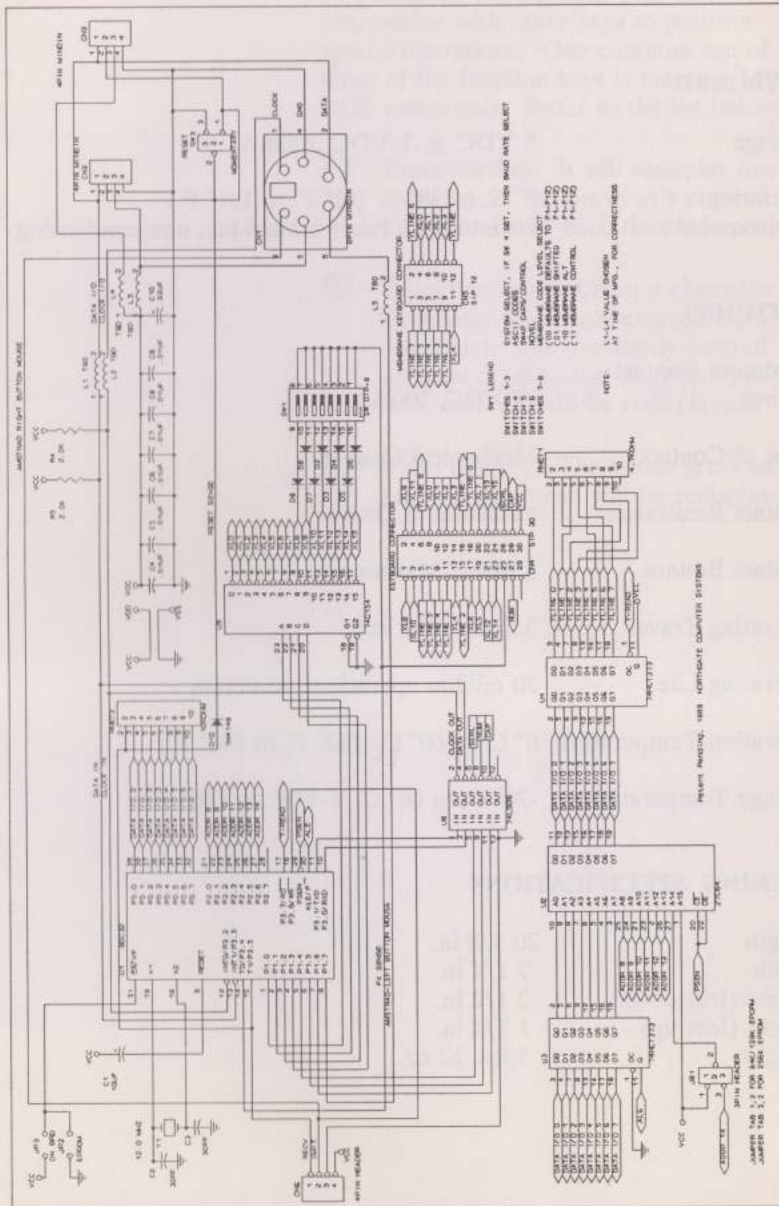
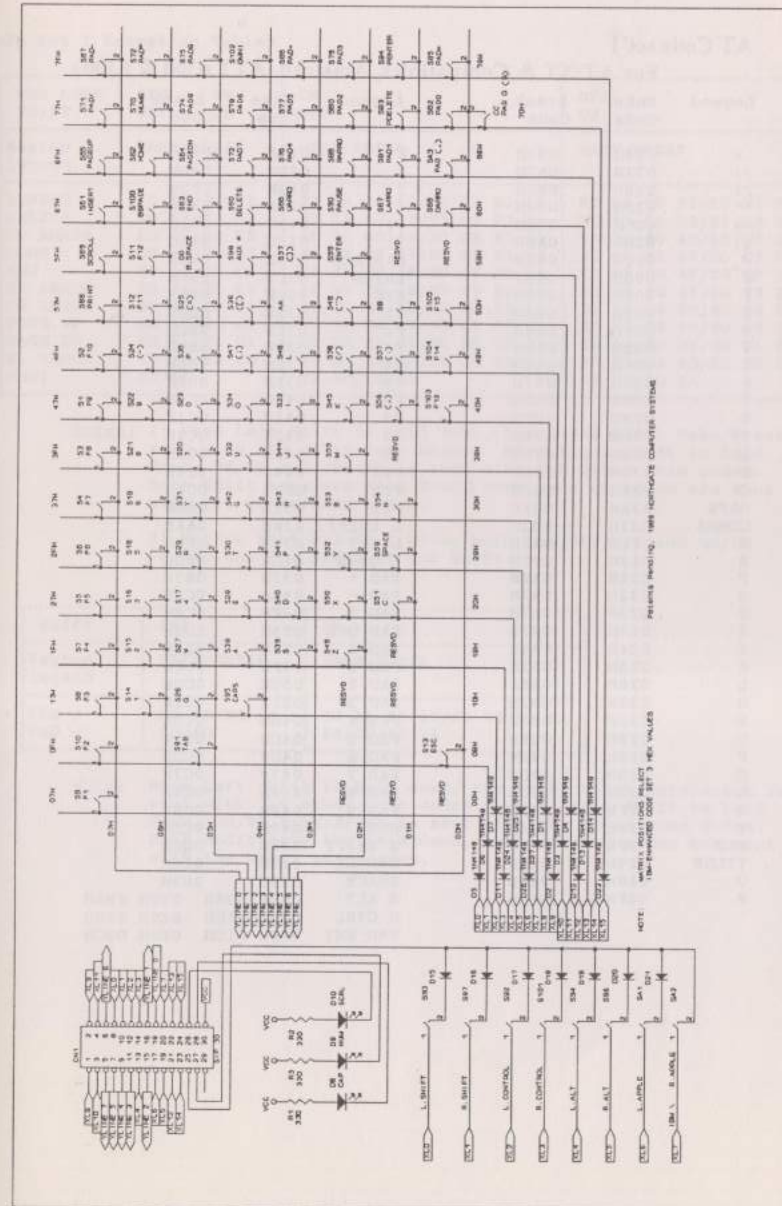


Figure 15. KEY MATRIX SCHEMATIC



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 |
| " | 026H | 0A6H | 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 | 0D8H |
| 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 |
| H | 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 | HAKE/BREAK | HAKE/BREAK | HAKE/BREAK | HAKE/BREAK |
| INSERT | E0 52/E0 D2 | E0 2A E0 52/E0 D2 E0 AA | E0 AA E0 52/E0 D2 E0 2A | |
| DELETE | E0 53/E0 D3 | E0 2A E0 53/E0 D3 E0 AA | E0 AA E0 53/E0 D3 E0 2A | |
| L. ARROW | E0 4B/E0 CB | E0 2A E0 4B/E0 CB E0 AA | E0 AA E0 4B/E0 CB E0 2A | |
| HOME | E0 47/E0 C7 | E0 2A E0 47/E0 C7 E0 AA | E0 AA E0 47/E0 C7 E0 2A | |
| END | E0 4F/E0 CF | E0 2A E0 4F/E0 CF E0 AA | E0 AA E0 4F/E0 CF E0 2A | |
| UP ARROW | E0 48/E0 C8 | E0 2A E0 48/E0 C8 E0 AA | E0 AA E0 48/E0 C8 E0 2A | |
| DN ARROW | E0 50/E0 D0 | E0 2A E0 50/E0 D0 E0 AA | E0 AA E0 50/E0 D0 E0 2A | |
| PAGE UP | E0 49/E0 C9 | E0 2A E0 49/E0 C9 E0 AA | E0 AA E0 49/E0 C9 E0 2A | |
| PAGE DN | E0 51/E0 D1 | E0 2A E0 51/E0 D1 E0 AA | E0 AA E0 51/E0 D1 E0 2A | |
| R. ARROW | E0 4D/E0 CD | E0 2A E0 4D/E0 CD E0 AA | E0 AA E0 4D/E0 CD E0 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 | HAKE/BREAK | HAKE/BREAK |
| PAD / | E0 35/E0 B5 | E0 AA E0 35/E0 B5 E0 2A |
| PAD - | 0D/8D | AA 0D/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 | 0F0H 049H | DELETE | 064H | 0F0H 064H |
| ; | 04CH | 0F0H 04CH | END | 065H | 0F0H 065H |
| / | 04AH | 0F0H 04AH | ENTER | 05AH | 0F0H 05AH |
| " | 052H | 0F0H 052H | ESC | 076H | 0F0H 076H |
| + | 055H | 0F0H 055H | F1 | 005H | 0F0H 005H |
| \ | 05DH | 0F0H 05DH | F2 | 006H | 0F0H 006H |
| - | 04EH | 0F0H 04EH | F3 | 004H | 0F0H 004H |
| 0 | 045H | 0F0H 045H | F4 | 00CH | 0F0H 00CH |
| 1 | 016H | 0F0H 016H | F5 | 003H | 0F0H 003H |
| 2 | 01EH | 0F0H 01EH | F6 | 00BH | 0F0H 00BH |
| 3 | 026H | 0F0H 026H | F7 | 083H | 0F0H 083H |
| 4 | 025H | 0F0H 025H | F8 | 00AH | 0F0H 00AH |
| 5 | 02EH | 0F0H 02EH | F9 | 001H | 0F0H 001H |
| 6 | 036H | 0F0H 036H | F10 | 009H | 0F0H 009H |
| 7 | 03DH | 0F0H 03DH | F11 | 078H | 0F0H 078H |
| 8 | 03EH | 0F0H 03EH | F12 | 007H | 0F0H 007H |
| 9 | 046H | 0F0H 046H | HOME | 00EH | 0F0H 00EH |
| A | 01CH | 0F0H 01CH | INSERT | 067H | 0F0H 067H |
| B | 032H | 0F0H 032H | L ALT | 011H | 0F0H 011H |
| C | 021H | 0F0H 021H | L CTRL | 014H | 0F0H 014H |
| CAPS | 058H | 0F0H 058H | L ARROW | 061H | 0F0H 061H |
| COMMA | 041H | 0F0H 041H | L SHIFT | 012H | 0F0H 012H |
| D | 023H | 0F0H 023H | NUMS | 077H | 0F0H 077H |
| E | 024H | 0F0H 024H | P SCREEN | 057H | 0F0H 057H |
| F | 02BH | 0F0H 02BH | PAD 0 | 070H | 0F0H 070H |
| G | 034H | 0F0H 034H | PAD 1 | 069H | 0F0H 069H |
| H | 033H | 0F0H 033H | PAD 2 | 072H | 0F0H 072H |
| I | 043H | 0F0H 043H | PAD 3 | 07AH | 0F0H 07AH |
| J | 03BH | 0F0H 03BH | PAD 4 | 06BH | 0F0H 06BH |
| K | 042H | 0F0H 042H | PAD 5 | 073H | 0F0H 073H |
| L | 04BH | 0F0H 04BH | PAD 6 | 074H | 0F0H 074H |
| M | 03AH | 0F0H 03AH | PAD 7 | 06CH | 0F0H 06CH |
| N | 031H | 0F0H 031H | PAD 8 | 075H | 0F0H 075H |
| O | 044H | 0F0H 044H | PAD 9 | 07DH | 0F0H 07DH |
| P | 04DH | 0F0H 04DH | PAD ENT | 05AH | 0F0H 05AH |
| Q | 015H | 0F0H 015H | PAD DEL | 071H | 0F0H 071H |
| R | 02DH | 0F0H 02DH | PAD / | 077H | 0F0H 077H |
| S | 01BH | 0F0H 01BH | PAD - | 07BH | 0F0H 07BH |
| T | 02CH | 0F0H 02CH | PAD * | 07CH | 0F0H 07CH |
| TAB | 00DH | 0F0H 00DH | PAD + | 079H | 0F0H 079H |
| TILDE | 00EH | 0F0H 00EH | PAD = | 04EH | 0F0H 04EH |
| U | 03CH | 0F0H 03CH | PAGE UP | 06FH | 0F0H 06FH |
| V | 02AH | 0F0H 02AH | PAGE DN | 06DH | 0F0H 06DH |
| W | 01DH | 0F0H 01DH | PAUSE | 062H | 0F0H 062H |
| X | 022H | 0F0H 022H | R SHIFT | 059H | 0F0H 059H |
| Y | 035H | 0F0H 035H | R ARROW | 06AH | 0F0H 06AH |
| Z | 01AH | 0F0H 01AH | R CTRL | 058H | 0F0H 058H |
| [| 054H | 0F0H 054H | R ALT | 039H | 0F0H 039H |
|] | 05BH | 0F0H 05BH | SCROLL | 07EH | 0F0H 07EH |
| BKSPACE | 066H | 0F0H 066H | SPACE | 029H | 0F0H 029H |
| D ARROW | 060H | 0F0H 060H | UP ARROW | 063H | 0F0H 063H |

Code Set 2 Exception Tables

| 1 | 2 | 3 | 4 |
|-------------------|------|----------------|---------------------|
| NUM LOCK SHIFT | | OFF OFF ON ON | OFF ON |
| 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 |

Notes: 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 | 0F0H 049H | D ARROW | 060H | 0F0H 060H |
| :: | 04CH | 0F0H 04CH | DELETE | 064H | 0F0H 064H |
| /? | 04AH | 0F0H 04AH | END | 065H | 0F0H 065H |
| " | 052H | 0F0H 052H | ENTER | 05AH | 0F0H 05AH |
| =+ | 055H | 0F0H 055H | ESC | 008H | 0F0H 008H |
| \ | 05CH | 0F0H 05CH | F1 | 007H | 0F0H 007H |
| - | 04EH | 0F0H 04EH | F2 | 00FH | 0F0H 00FH |
| 0 | 045H | 0F0H 045H | F3 | 017H | 0F0H 017H |
| 1 | 016H | 0F0H 016H | F4 | 01FH | 0F0H 01FH |
| 2 | 01EH | 0F0H 01EH | F5 | 027H | 0F0H 027H |
| 3 | 026H | 0F0H 026H | F6 | 02FH | 0F0H 02FH |
| 4 | 025H | 0F0H 025H | F7 | 037H | 0F0H 037H |
| 5 | 02EH | 0F0H 02EH | F8 | 03FH | 0F0H 03FH |
| 6 | 036H | 0F0H 036H | F9 | 047H | 0F0H 047H |
| 7 | 03DH | 0F0H 03DH | F10 | 04FH | 0F0H 04FH |
| 8 | 03EH | 0F0H 03EH | F11 | 056H | 0F0H 056H |
| 9 | 046H | 0F0H 046H | F12 | 05EH | 0F0H 05EH |
| A | 01CH | 0F0H 01CH | INSERT | 067H | 0F0H 067H |
| B | 032H | 0F0H 032H | L CTRL | 011H | 0F0H 011H |
| C | 021H | 0F0H 021H | L SHIFT | 012H | 0F0H 012H |
| CAPS | 014H | 0F0H 014H | L ARROW | 061H | 0F0H 061H |
| COMMA | 041H | 0F0H 041H | L ALT | 019H | 0F0H 019H |
| D | 023H | 0F0H 023H | NUMS | 076H | 0F0H 076H |
| E | 024H | 0F0H 024H | P SCREEN | 057H | 0F0H 057H |
| F | 02BH | 0F0H 02BH | PAD - | 04EH | 0F0H 04EH |
| G | 034H | 0F0H 034H | PAD / | 077H | 0F0H 077H |
| H | 033H | 0F0H 033H | PAD * | 07EH | 0F0H 07EH |
| HOME | 00EH | 0F0H 00EH | PAD - | 084H | 0F0H 084H |
| I | 043H | 0F0H 043H | PAD + | 07CH | 0F0H 07CH |
| J | 03BH | 0F0H 03BH | PAD 0 | 070H | 0F0H 070H |
| K | 042H | 0F0H 042H | PAD 1 | 069H | 0F0H 069H |
| L | 04BH | 0F0H 04BH | PAD 2 | 072H | 0F0H 072H |
| M | 03AH | 0F0H 03AH | PAD 3 | 07AH | 0F0H 07AH |
| N | 031H | 0F0H 031H | PAD 4 | 06BH | 0F0H 06BH |
| O | 044H | 0F0H 044H | PAD 5 | 073H | 0F0H 073H |
| P | 04DH | 0F0H 04DH | PAD 6 | 074H | 0F0H 074H |
| Q | 015H | 0F0H 015H | PAD 7 | 06CH | 0F0H 06CH |
| R | 02DH | 0F0H 02DH | PAD 8 | 075H | 0F0H 075H |
| S | 01BH | 0F0H 01BH | PAD 9 | 07DH | 0F0H 07DH |
| T | 02CH | 0F0H 02CH | PAD ENT | 079H | 0F0H 079H |
| TAB | 00DH | 0F0H 00DH | PAD DEL | 071H | 0F0H 071H |
| TILDE | 00EH | 0F0H 00EH | PAGE UP | 06FH | 0F0H 06FH |
| U | 03CH | 0F0H 03CH | PAGE DN | 06DH | 0F0H 06DH |
| V | 02AH | 0F0H 02AH | PAUSE | 062H | 0F0H 062H |
| W | 01DH | 0F0H 01DH | R SHIFT | 059H | 0F0H 059H |
| X | 022H | 0F0H 022H | R CTRL | 058H | 0F0H 058H |
| Y | 035H | 0F0H 035H | R ALT | 039H | 0F0H 039H |
| Z | 01AH | 0F0H 01AH | R ARROW | 06AH | 0F0H 06AH |
| [(| 054H | 0F0H 054H | SCROLL | 05FH | 0F0H 05FH |
|]) | 05BH | 0F0H 05BH | SPACE | 029H | 0F0H 029H |
| BKSPACE | 066H | 0F0H 066H | UP ARROW | 063H | 0F0H 063H |

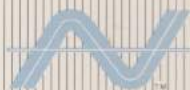
Warning: This equipment has been certified to comply with limits for a Class B computing device in accordance with the specifications in Subpart J, Part 15 of FCC Rules. Only computers and peripherals (computer input/output devices, terminals, printers, etc.) certified to comply with the Class B limits 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.



**NORTHGATE
COMPUTER
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