

**HOLTEK**



**HT82K628A**

## Windows 2000 PS/2 Keyboard Encoder

### Features

- Design for Windows 95/98/NT/2000/XP
- Supports Windows™ keys
- Supports PC/AT and PS/2 code set 1, 2, 3
- Supports Japanese, Korean, Brazilian and European
- RC oscillator
- Phantom key detection
- Low power consumption
- 101/102/104/105/107/109 keys or other special application keyboard encoder
- 8 external hot keys
- Supports Mini-keyboard and Internet/Multimedia keyboard
- WINDOWS is a registered trademark of Microsoft corporation
- 40-pin DIP package

### General Description

The HT82K628A is a keyboard encoder designed for IBM PC/AT, IBM PS/2 and all compatible machines.

The HT82K628A accepts keyboard inputs and provides a 16-character first-in-first-out buffer in which data is stored.

An inexpensive RC oscillator can be used for the system clock. Simple implementation of this device is an advantage for high performance and low cost keyboard applications.

### Pin Assignment

|           |    |    |                  |
|-----------|----|----|------------------|
| R5        | 1  | 40 | R6               |
| R4        | 2  | 39 | R7               |
| C3        | 3  | 38 | C4               |
| C2        | 4  | 37 | C5               |
| C1        | 5  | 36 | C6               |
| C0        | 6  | 35 | C7               |
| R3        | 7  | 34 | NC               |
| R2        | 8  | 33 | OSC1             |
| R1        | 9  | 32 | VDD              |
| R0        | 10 | 31 | RESET            |
| R19       | 11 | 30 | CAPS             |
| R18       | 12 | 29 | R8               |
| R17       | 13 | 28 | R9               |
| R16       | 14 | 27 | R10              |
| VSS       | 15 | 26 | R11              |
| SCROLL    | 16 | 25 | R12              |
| NUM       | 17 | 24 | R13              |
| DATA      | 18 | 23 | R14              |
| CLOCK     | 19 | 22 | R15              |
| Fn Select | 20 | 21 | Macro Key select |

**HT82K628A**  
**- 40 DIP-A**

**Pin Description**

| Pin No.                              | Pin Name         | I/O | Description                                                                                                                              |
|--------------------------------------|------------------|-----|------------------------------------------------------------------------------------------------------------------------------------------|
| 10~7, 2~1,<br>40~39, 29~22,<br>14~11 | R0~R19           | O   | Keyboard matrix scanning output pins                                                                                                     |
| 6~3, 38~35                           | C0~C7            | I   | Keyboard matrix scanning input pins                                                                                                      |
| 15                                   | VSS              | —   | Negative power supply, ground                                                                                                            |
| 16                                   | SCROLL           | O   | Scroll Lock indicator                                                                                                                    |
| 17                                   | NUM              | O   | Num Lock indicator                                                                                                                       |
| 18                                   | DATA             | I/O | Bidirectional data transmission line                                                                                                     |
| 19                                   | CLOCK            | I/O | Synchronous clock signal. Used to clock the transmission data.                                                                           |
| 20                                   | Fn Select        | I   | Mini-keyboard select, enables the function if connected to VSS.                                                                          |
| 21                                   | Macro Key Select | I   | Macro Key select, disables the function if connected to VSS.                                                                             |
| 30                                   | CAPS             | O   | Caps Lock indicator                                                                                                                      |
| 31                                   | RESET            | I   | Chip reset input. Active low. Built-in power-on reset circuit to reset the entire chip. Chip can also be externally reset via RESET pin. |
| 32                                   | VDD              | —   | 5.0V positive power supply                                                                                                               |
| 33                                   | OSC1             | I   | System clock input; 58.3kΩ resistor connected for RC OSC                                                                                 |
| 34                                   | NC               | —   | No connection                                                                                                                            |

**Absolute Maximum Ratings**

|                      |                                |                             |                                  |
|----------------------|--------------------------------|-----------------------------|----------------------------------|
| Supply Voltage ..... | $V_{SS}-0.3V$ to $V_{SS}+5.5V$ | Storage Temperature .....   | $-50^{\circ}C$ to $125^{\circ}C$ |
| Input Voltage .....  | $V_{SS}-0.3V$ to $V_{DD}+0.3V$ | Operating Temperature ..... | $-25^{\circ}C$ to $70^{\circ}C$  |

Note: These are stress ratings only. Stresses exceeding the range specified under "Absolute Maximum Ratings" may cause substantial damage to the device. Functional operation of this device at other conditions beyond those listed in the specification is not implied and prolonged exposure to extreme conditions may affect device reliability.

**Electrical Characteristics**
 $T_a=25^{\circ}C$ 

| Symbol    | Parameter                                     | Test Conditions |                         | Min. | Typ. | Max. | Unit |
|-----------|-----------------------------------------------|-----------------|-------------------------|------|------|------|------|
|           |                                               | $V_{DD}$        | Conditions              |      |      |      |      |
| $V_{DD}$  | Operating Voltage                             | —               | —                       | 3    | 5    | 5.25 | V    |
| $I_{DD}$  | Operating Current (RC OSC)                    | 5V              | No load, $f_{SYS}=4MHz$ | —    | 2.5  | 5    | mA   |
| $V_{IL}$  | Input Low Voltage                             | 5V              | —                       | 0    | —    | 1.5  | V    |
| $V_{IH}$  | Input High Voltage                            | 5V              | —                       | 3.5  | —    | 5    | V    |
| $I_{OL}$  | Sink Current (C0~C7, R0~R19, DATA, CLOCK)     | 5V              | $V_{OL}=0.5V$           | 16   | 25   | —    | mA   |
| $I_{OH1}$ | Source Current (C0~C7, R0~R19)                | 5V              | $V_{OH}=4.5V$           | -8   | -16  | —    | mA   |
| $I_{OH2}$ | Source Current (Scroll, Num, Caps)            | 5V              | $V_{OH}=4.5V$           | -2.5 | -4   | —    | mA   |
| $I_{LED}$ | LED Sink Current (Scroll, Num, Caps)          | 5V              | $V_{OL}=3.4V$           | 10   | 18   | 24   | mA   |
| $R_{ph}$  | Internal Pull-high Resistance (C0~C7, R0~R19) | 5V              | —                       | 5    | 12   | 20   | kΩ   |
| $R_{ph1}$ | Internal Pull-high Resistance (DATA, CLOCK)   | 5V              | —                       | 2    | 4.7  | 8    | kΩ   |
| $R_{ph2}$ | Internal Pull-high Resistance (RESET)         | 5V              | —                       | 25   | 50   | 75   | kΩ   |
| $f_{SYS}$ | System Clock (RC OSC)                         | 5V              | —                       | —    | 4    | —    | MHz  |

## Functional Description

### Command from the Host

The following table shows the commands that the host may send and their hexadecimal values.

| Command                             | Hex Value |
|-------------------------------------|-----------|
| Set/Reset Status Indicators         | ED        |
| Echo                                | EE        |
| Invalid Command                     | EF        |
| Select Alternate Scan Codes         | F0        |
| Invalid Command                     | F1        |
| Read ID                             | F2        |
| Set Typematic Rate/Delay            | F3        |
| Enable                              | F4        |
| Default Disable                     | F5        |
| Set Default                         | F6        |
| Set All Keys - Typematic            | F7        |
| Set All Keys - Make/Break           | F8        |
| Set All Keys - Make                 | F9        |
| Set All Keys - Typematic/Make/Break | FA        |
| Set Key Type - Typematic            | FB        |
| Set Key Type - Make/Break           | FC        |
| Set Key Type - Make                 | FD        |
| Resend                              | FE        |
| Reset                               | FF        |

The commands may be sent to the HT82K628A at any time and the HT82K628A will respond within 25ms except when performing the internal diagnostics or executing a Reset command.

### EDH – Set/Reset Status Indicators

Three status indicators on the keyboard-Num Lock, Caps Lock, and Scroll Lock-are accessible by the host. The HT82K628A activates or deactivates these indicators when it receives a valid command-code sequence from the system. The command sequence begins with the command byte (hex ED). The HT82K628A responds to the command byte with ACK, discontinues scanning, assignments for this option byte are as follow:

| Bit | Indicator             |
|-----|-----------------------|
| 0   | Scroll Lock Indicator |
| 1   | Num Lock Indicator    |
| 2   | Caps Lock Indicator   |
| 3~7 | Reserved (Must be 0)  |

If a bit for an indicator is set to 1, the indicator is turned on. If a bit is set to 0, the indicator is turned off.

The HT82K628A responds to the option byte with ACK, sets the indicators and if the HT82K628A was previously enabled, continues scanning. The status of the indicators will reflect the bits in the option byte and can be activated or deactivated in any combination. If another command is received in place of the option byte, execution of the Set/Reset Mode Indicators command is stopped, with no change to the indicator status, and the new command is processed.

Immediately after power-on, the lights default to the off state. If the Set Default and Default Disable commands are received, the lamps remain in the state they were in before the command was received.

### EEH – Echo

Echo is a diagnostic aid. When the HT82K628A receives this command, it issues a hex EE response and if the HT82K628A was previously enabled, continues scanning.

### EFH and F1H – Invalid Command

EFh and F1h are invalid commands and are not supported. If HT82K628A receives one of these and sends it, the HT82K628A will not acknowledge the command, but returns a Resend command and continues in its previous scanning state.

### F0H – Select Alternate Scan Codes

This command instructs the HT82K628A to select one of the three sets of scan codes. The HT82K628A acknowledges receipt of this command with ACK, clears both the output buffer and the typematic key. The host then sends the option byte and the keyboard responds with another ACK. An option byte value of hex 01 selects scan code set 1, hex 02 selects set 2 and hex 03 selects code set3.

An option byte value of hex 00 causes the HT82K628A to acknowledge with ACK and sends a byte telling the host which scan code set is currently in use.

After establishing the new scan code set, the HT82K628A returns to the scanning state it was in before receiving the Select Alternate Scan Codes command.

### F2H – Read ID

This command requests identification information from the HT82K628A. The HT82K628A responds with ACK, discontinues scanning and sends the two keyboard ID bytes hex 83h and Abh. After the output of the second ID byte, the HT82K628A resumes scanning.

**F3H – Set Typematic Rate/Delay**

The host issues the Set Typematic Rate/Delay command to change the typematic rate and delay. The HT82K628A responds to the command with ACK, stops scanning and waits for the system to issue the rate/delay value byte. The HT82K628A responds to the value byte with another ACK, sets the rate and delay to the value indicated, and continues scanning (if it was previously enabled). Bit6 and 5 indicate the delay, and bits 4, 3, 2, 1 and 0 indicate the rate. Bit7 is always 0. The delay is equal to 1 plus the binary value bit 6 and 5, multiplied by 250ms±20%.

The period (interval from one typematic output to the next) is determined by the following equation:

$$\text{Period} = (8+A) \cdot (2^B) \cdot 0.00417 \text{ seconds.}$$

Where:

A = binary value of bits 2, 1, and 0.

B = binary value of bits 4, and 3.

The typematic rate is 1 for each period and are listed as follows:

| Bit   | Typematic Rate ± 20% | Bit   | Typematic Rate ± 20% |
|-------|----------------------|-------|----------------------|
| 00000 | 30.0                 | 10000 | 7.5                  |
| 00001 | 26.7                 | 10001 | 6.7                  |
| 00010 | 24.0                 | 10010 | 6.0                  |
| 00011 | 21.8                 | 10011 | 5.5                  |
| 00100 | 20.0                 | 10100 | 5.0                  |
| 00101 | 18.5                 | 10101 | 4.6                  |
| 00110 | 17.1                 | 10110 | 4.3                  |
| 00111 | 16.0                 | 10111 | 4.0                  |
| 01000 | 15.0                 | 11000 | 3.7                  |
| 01001 | 13.3                 | 11001 | 3.3                  |
| 01010 | 12.0                 | 11010 | 3.0                  |
| 01011 | 10.9                 | 11011 | 2.7                  |
| 01100 | 10.0                 | 11100 | 2.5                  |
| 01101 | 9.2                  | 11101 | 2.3                  |
| 01110 | 8.0                  | 11110 | 2.1                  |
| 01111 | 8.0                  | 11111 | 2.0                  |

The default values for the HT82K628A are as follows:

Typematic rate= 10.9 characters per second ± 20%

Delay = 500ms±20%

The execution of this command stops without change to the existing rate if another command is received instead of the rate/delay value byte.

**F4H – Enable**

Upon receipt of this command, the HT82K628A will respond with ACK, clears its output buffer, clears the last typematic key, and starts scanning.

**F5H – Default Disable**

The Default Disable command resets all conditions to the power on default states. The HT82K628A will respond with ACK, clears its output buffer, sets the default key types (scan code set 3 operation only) and typematic rate/delay, and clears the last typematic key. The HT82K628A then stops scanning and awaits further command.

**F6H – Set Default**

The Set Default command resets all conditions to the power on default states. The HT82K628A will respond with ACK, clears its output buffer, sets the default key types (scan code set 3 operation only) and typematic rate/delay, and clears the last typematic key then continues scanning.

**F7H, F8H, F9H, FAH – Set All Keys**

These commands instruct the HT82K628A to set all keys to the type listed below:

| Hex Value | Command                           |
|-----------|-----------------------------------|
| F7        | Set All Keys-Typematic            |
| F8        | Set All Keys-Make/Break           |
| F9        | Set All Keys-Make                 |
| FA        | Set All Keys-Typematic/Make/Break |

The HT82K628A will respond with ACK, clears its output buffer, sets all keys to the type indicated by this command, and continues scanning (if it was previously enabled). Although these commands can be sent using any code set, they affect only scan code set 3 operation.

**FBH, FCH, FDH – Set Key Type**

These commands instruct the HT82K628A to set individual keys to the type listed below:

| Hex Value | Command                 |
|-----------|-------------------------|
| FB        | Set Key Type-Typematic  |
| FC        | Set Key Type-Make/Break |
| FD        | Set Key Type-Make       |

The HT82K628A will respond with ACK, clears its output buffer and prepares to receive key identification. Key identification is accomplished by the host identifying each key by its scan code value as defined in scan code set 3. Only scan code set 3 values are valid for key identification. The type of each identified key is set to the value indicated by the command. Although these commands can be sent using any code set, they affect only scan code set 3 operation.

**FEH – Resend**

The host sends this command when it detects an error in any transmission from the HT82K628A. It is sent only after a data transmission and before the host allows the next data output. When a Resend is received, the HT82K628A sends the previous output again (unless the previous output was Resend, in which case the HT82K628A sends the last byte before the Resend command).

**Commands to the Host**

The following table shows the commands that the HT82K628A may send to the host, and their hexadecimal values.

| Command                     | Hex Value             |
|-----------------------------|-----------------------|
| Key Detection Error/Overrun | 00 (Code Set 2 and 3) |
| Keyboard ID                 | 83AB                  |
| Bat Completion Code         | AA                    |
| Bat Failure Core            | FC                    |
| Echo                        | EE                    |
| Acknowledge                 | FA                    |
| Resend                      | FE                    |
| Key Detection Error/Overrun | FF (Code Set 1)       |

**00H or FFH – Key Detection Error**

The HT82K628A sends a key detection error character if conditions in the keyboard make it impossible to identify a switch closure. If the HT82K628A is using scan code set 1, the code is FFH. For sets 2 and 3, the code is 00H.

**00H or FFH – Overrun**

An overrun character is placed in the HT82K628A buffer and replaces the last code when the buffer capacity has been exceeded. The code is sent to the host when it reaches the top of the buffer queue. If the HT82K628A is using scan code set 1, the code is FFH. For sets 2 and 3, the code is 00H.

**83AbH – Keyboard ID**

The keyboard ID consists of 2 bytes, Hex 83AbH. The HT82K628A responds to the Read ID with ACK, discontinues scanning and sends 2 ID bytes. The low byte is sent first followed by the high byte. Following the output of Keyboard ID, the HT82K628A begins scanning.

**EEH – Echo**

The HT82K628A sends this code in response to an Echo command.

**AAH – BAT Completion Code**

Following satisfactory completion of the BAT, the HT82K628A sends AAH. Any other code indicates keyboard failure.

**FCH – BAT Failure Code**

If a BAT failure occurs, the HT82K628A sends this code, discontinues scanning and waits for a host response or reset.

**FEH – Resend**

The HT82K628A issues a Resend command following receipt of an invalid input or any input with incorrect parity. If the host sends nothing to the HT82K628A, no response is required.

**Data Communications**

- Data output
  - ♦ If CLK=0, no transmission (keyboard is inhibited).
  - ♦ If CLK=1, DATA=0, no transmission (system request to send).
  - ♦ If CLK=1, DATA=1, transmission permitted.
  - ♦ Data will be valid before the trailing edge and beyond the leading edge of the clock.
  - ♦ The KB checks the clock line for an active level of at least every 60ms.
  - ♦ If line contention occurs (system brings the clock low before the tenth clock), set clock=data=high.
- Data input
  - ♦ The system overrides the clock line for at least 60ms.
  - ♦ The keyboard checks the clock line state at intervals of 10ms
  - ♦ If a system request-to-send is detected, the keyboard counts 11 data bits.
  - ♦ Data will be valid before the rising edge and beyond the falling edge
  - ♦ After the 10th bit, the keyboard checks for an active level on the "data" line. If the line is active it is forced to be inactive, and counts one more bit.

**Note:** This action signals the system that the keyboard has received its data. Upon reception of this signal, the system returns to the ready state, in which it can accept keyboard outputs or goes to the inhibit state until it is ready.

If the keyboard "data" line is found to be at an inactive level following the 10th bit, a frame error has occurred, and the keyboard continues to count until the "data" line becomes active. The keyboard then makes the "data" line inactive and sends a Resend.

**Data Stream**

| Mode 1,2,3 |                         |
|------------|-------------------------|
| B1:        | start bit<br>always 0   |
| B2:        | data bit 0              |
| b3:        | data bit 1              |
| b4:        | data bit 2              |
| b5:        | data bit 3              |
| B6:        | data bit 4              |
| b7:        | data bit 5              |
| b8:        | data bit 6              |
| b9:        | data bit 7              |
| b10:       | parity bit<br>(odd par) |
| b11:       | stop bit<br>always 1    |

Note: The parity bit is either 1 or 0, and the 8 data bits, plus the parity bit, always have an odd number of 1μs.

**Key Code Set 1**

| Key Number and Symbol |            |   | Make/Break Code | Key Number and Symbol |           |      | Make/Break Code |
|-----------------------|------------|---|-----------------|-----------------------|-----------|------|-----------------|
| 1                     | ~          | ' | 29/A9           | 47                    | X         |      | 2D/AD           |
| 2                     | !          | 1 | 02/82           | 48                    | C         |      | 2E/AE           |
| 3                     | @          | 2 | 03/83           | 49                    | V         |      | 2F/AF           |
| 4                     | #          | 3 | 04/84           | 50                    | B         |      | 30/B0           |
| 5                     | \$         | 4 | 05/85           | 51                    | N         |      | 31/B1           |
| 6                     | %          | 5 | 06/86           | 52                    | M         |      | 32/B2           |
| 7                     | ^          | 6 | 07/87           | 53                    | <         | ,    | 33/B3           |
| 8                     | &          | 7 | 08/88           | 54                    | >         | .    | 34/B4           |
| 9                     | *          | 8 | 09/89           | 55                    | ?         | /    | 35/B5           |
| 10                    | (          | 9 | 0A/8A           | 57                    | Shift (R) |      | 36/B6           |
| 11                    | )          | 0 | 0B/8B           | 58                    | Ctrl (L)  |      | 1D/9D           |
| 12                    | _          | - | 0C/8C           | 60                    | Alt (L)   |      | 38/B8           |
| 13                    | +          | = | 0D/8D           | 61                    | Space     |      | 39/B9           |
| 14                    |            |   | 56 7D/D6 FD     | 62                    | Alt (R)   |      | E0 38/E0 B8     |
| 15                    | Back Space |   | 0E/8E           | 64                    | Ctrl (R)  |      | E0 1D/E0 9D     |
| 16                    | Tab        |   | 0F/8F           | 90                    | Num Lock  |      | 45/C5           |
| 17                    | Q          |   | 10/90           | 91                    | 7         | Home | 47/C7           |
| 18                    | W          |   | 11/91           | 92                    | 4         | ←    | 4B/CB           |
| 19                    | E          |   | 12/92           | 93                    | 1         | End  | 4F/CF           |
| 20                    | R          |   | 13/93           | 96                    | 8         | ↑    | 48/C8           |
| 21                    | T          |   | 14/94           | 97                    | 5         |      | 4C/CC           |
| 22                    | Y          |   | 15/95           | 98                    | 2         | ↓    | 50/D0           |
| 23                    | U          |   | 16/96           | 99                    | 0         | Ins  | 52/D2           |
| 24                    | I          |   | 17/97           | 100                   | *         |      | 37/B7           |
| 25                    | O          |   | 18/98           | 101                   | 9         | PgUp | 49/C9           |
| 26                    | P          |   | 19/99           | 102                   | 6         | →    | 4D/CD           |
| 27                    | {          | [ | 1A/9A           | 103                   | 3         | PgDn | 51/D1           |
| 28                    | }          | ] | 1B/9B           | 104                   | .         | Del  | 53/D3           |
| *29                   |            | \ | 2B/AB           | 105                   | -         |      | 4A/CA           |

| Key Number and Symbol   |           | Make/Break Code | Key Number and Symbol |             | Make/Break Code |
|-------------------------|-----------|-----------------|-----------------------|-------------|-----------------|
| 30                      | Caps Lock | 3A/BA           | 106                   | +           | 4E/CE           |
| 31                      | A         | 1E/9E           | 107                   |             | 7E/FE           |
| 32                      | S         | 1F/9F           | 108                   | Enter       | E0 1C/E0 9C     |
| 33                      | D         | 20/A0           | 110                   | ESC         | 01/81           |
| 34                      | F         | 21/A1           | 112                   | F1          | 3B/BB           |
| 35                      | G         | 22/A2           | 113                   | F2          | 3C/BC           |
| 36                      | H         | 23/A3           | 114                   | F3          | 3D/BD           |
| 37                      | J         | 24/A4           | 115                   | F4          | 3E/BE           |
| 38                      | K         | 25/A5           | 116                   | F5          | 3F/BF           |
| 39                      | L         | 26/A6           | 117                   | F6          | 40/C0           |
| 40                      | :         | 27/A7           | 118                   | F7          | 41/C1           |
| 41                      | □         | 28/A8           | 119                   | F8          | 42/C2           |
| **42                    |           | 2B/AB           | 120                   | F9          | 43/C3           |
| 43                      | Enter     | 1C/9C           | 121                   | F10         | 44/C4           |
| 44                      | Shift (L) | 2A/AA           | 122                   | F11         | 57/D7           |
| **45                    | Macro     | 56/D6           | 123                   | F12         | 58/D8           |
| 46                      | Z         | 2C/AC           | 125                   | Scroll Lock | 46/C6           |
| *101-Key Keyboard Only  |           |                 |                       |             |                 |
| **102-Key Keyboard Only |           |                 |                       |             |                 |

| Key Number and Symbol                                |        | Base Case Shift+Num | Left-Shift                                        | Right-Shift  | Num Lock     |
|------------------------------------------------------|--------|---------------------|---------------------------------------------------|--------------|--------------|
| 75                                                   | Insert | E0 52               | E0 AA E0 52                                       | E0 B6 E0 52  | E0 2A E0 52  |
| 76                                                   | Delete | /E0 D2              | /E0 D2 E0 2A                                      | /E0 D2 E0 36 | /E0 D2 E0 AA |
|                                                      |        | E0 53               | E0 AA E0 53                                       | E0 B6 E0 53  | E0 2A E0 53  |
|                                                      |        | /E0 D3              | /E0 D3 E0 2A                                      | /E0 D3 E0 36 | /E0 D3 E0 AA |
| 79                                                   | ←      | E0 4B               | E0 AA E0 4B                                       | E0 B6 E0 4B  | E0 2A E0 4B  |
|                                                      |        | /E0 CB              | /E0 CB E0 2A                                      | /E0 CB E0 36 | /E0 CB E0 AA |
| 80                                                   | Home   | E0 47               | E0 AA E0 47                                       | E0 B6 E0 47  | E0 2A E0 47  |
|                                                      |        | /E0 C7              | /E0 C7 E0 2A                                      | /E0 C7 E0 36 | /E0 C7 E0 AA |
| 81                                                   | End    | E0 4F               | E0 AA E0 4F                                       | E0 B6 E0 4F  | E0 2A E0 4F  |
|                                                      |        | /E0 CF              | /E0 CF E0 2A                                      | /E0 CF E0 36 | E0 CF E0 AA  |
| 83                                                   | ↑      | E0 48               | E0 AA E0 48                                       | E0 B6 E0 48  | E0 2A E0 48  |
|                                                      |        | /E0 C8              | /E0 C8 E0 2A                                      | /E0 C8 E0 36 | E0 C8 E0 AA  |
| 84                                                   | ↓      | E0 50               | E0 AA E0 50                                       | E0 B6 E0 50  | E0 2A E0 50  |
|                                                      |        | /E0 D0              | /E0 D0 E0 2A                                      | /E0 D0 E0 36 | /E0 D0 E0 AA |
| 85                                                   | PgUp   | E0 49               | E0 AA E0 49                                       | E0 B6 E0 49  | E0 2A E0 49  |
|                                                      |        | /E0 C9              | /E0 C9 E0 2A                                      | /E0 C9 E0 36 | /E0 C9 E0 AA |
| 86                                                   | PgDn   | E0 51               | E0 AA E0 51                                       | E0 B6 E0 51  | E0 2A E0 51  |
|                                                      |        | /E0 D1              | /E0 D1 E0 2A                                      | /E0 D1 E0 36 | E0 D1 E0 AA  |
| 89                                                   | →      | E0 4D               | E0 AA E0 4D                                       | E0 B6 E0 4D  | E0 2A E0 4D  |
|                                                      |        | /E0 CD              | /E0 CD E0 2A                                      | /E0 CD E0 36 | E0 CD E0 AA  |
| L Win                                                |        | E0 5B               | E0 AA E0 5B                                       | E0 B6 E0 5B  | E0 2A E0 5B  |
|                                                      |        | /E0 DB              | /E0 DB E0 2A                                      | /E0 DB E0 36 | /E0 DB E0 AA |
| R Win                                                |        | E0 5C               | E0 AA E0 5C                                       | E0 B6 E0 5C  | E0 2A E0 5C  |
|                                                      |        | /E0 DC              | /E0 DC E0 2A                                      | /E0 DC E0 36 | /E0 DC E0 AA |
| APP                                                  |        | E0 5D               | E0 AA E0 5D                                       | E0 B6 E0 5D  | E0 2A E0 5D  |
|                                                      |        | /E0 DD              | /E0 DD E0 2A                                      | /E0 DD E0 36 | /E0 DD E0 AA |
| When both shift keys are held down:<br>key number 75 |        |                     | Both Shift<br>E0 AA E0 B6 E0 52/E0 D2 E0 2A E0 36 |              |              |

| Key Number and Symbol                             |   | Base        | Left-Shift                                        | Right-Shift             |
|---------------------------------------------------|---|-------------|---------------------------------------------------|-------------------------|
| 95                                                | / | E0 35/E0 B5 | E0 AA E0 35/E0 B5 E0 2A                           | E0 B6 E0 35/E0 B5 E0 36 |
| When both shift keys are held down: key number 95 |   |             | Both Shift<br>E0 AA E0 B6 E0 35/E0 B5 E0 2A E0 36 |                         |

| Key Number and Symbol | Base                    | Shift/Ctrl  | Alt   |
|-----------------------|-------------------------|-------------|-------|
| 124 Print Screen      | E0 2A E0 37/E0 B7 E0 AA | E0 37/E0 B7 | 54/D4 |

| Key Number and Symbol                                                        | Base              | Ctrl        |
|------------------------------------------------------------------------------|-------------------|-------------|
| 126 Pause                                                                    | E1 1D 45 E1 9D C5 | E0 46 E0 C6 |
| This key is not typematic, all associated scan codes occur on the make code. |                   |             |

| Key Number and Function | Make/Break code | Default    |
|-------------------------|-----------------|------------|
| ACPI Power              | E0 5E/E0 DE     | Make/Break |
| ACPI Sleep              | E0 5F/E0 DF     | Make/Break |
| ACPI Wake-up            | E0 63/E0 E3     | Make/Break |

| Key Number and Function | Make/Break code | Default   |
|-------------------------|-----------------|-----------|
| 56 Brazil BA0           | 73/F3           | Typematic |
| 131 Japanese J131       | 7B/FB           | Make      |
| 132 Japanese J132       | 79/F9           | Make      |
| 133 Japanese J133       | 70/F0           | Make      |
| 150 Korea KC-L          | F1/–            | Make      |
| 151 Korea KC-R          | F0/–            | Make      |

| Multimedia Key Function | Make/Break code |
|-------------------------|-----------------|
| E-Mail                  | E0 6C/E0 EC     |
| WWW Home                | E0 32/E0 B2     |
| WWW Favorites           | E0 66/E0 E6     |
| WWW Search              | E065/E0 E5      |
| WWW Refresh             | E0 67/E0 E7     |
| WWW Stop                | E0 68/E0 E8     |
| WWW Forward             | E0 69/E0 E9     |
| WWW Back                | E0 6A/E0 EA     |
| Media                   | E0 6D/E0 ED     |
| Play/Pause              | E0 22/E0 A2     |
| Stop                    | E0 24/E0 A4     |
| Prev Track              | E0 10/E0 90     |
| Next Track              | E0 19/E0 99     |
| Volume+                 | E0 30/E0 B0     |
| Volume–                 | E0 2E/E0 AE     |
| Mute                    | E0 20/E0 A0     |
| My Computer             | E0 6B/E0 EB     |
| Calculator              | E0 21/E0 A1     |
| Screen save             | E0 26/E0 A6     |
| Rec                     | E0 1E/E0 9E     |
| Rew                     | E0 17/E0 97     |
| Minimize                | E0 2D/E0 AD     |
| Eject                   | E0 11/E0 91     |

**Key Code Set 2**

| Key Number and Symbol |            |   | Make/Break Code | Key Number and Symbol |           |      | Make/Break Code   |
|-----------------------|------------|---|-----------------|-----------------------|-----------|------|-------------------|
| 1                     | ~          | ' | 0E/F0 0E        | 47                    | X         |      | 22/F0 22          |
| 2                     | !          | 1 | 16/F0 16        | 48                    | C         |      | 21/F0 21          |
| 3                     | @          | 2 | 1E/F0 1E        | 49                    | V         |      | 2A/F0 2A          |
| 4                     | #          | 3 | 26/F0 26        | 50                    | B         |      | 32/F0 32          |
| 5                     | \$         | 4 | 25/F0 25        | 51                    | N         |      | 31/F0 31          |
| 6                     | %          | 5 | 2E/F0 2E        | 52                    | M         |      | 3A/F0 3A          |
| 7                     | ^          | 6 | 36/F0 36        | 53                    | <         | ,    | 41/F0 41          |
| 8                     | &          | 7 | 3D/F0 3D        | 54                    | >         | .    | 49/F0 49          |
| 9                     | *          | 8 | 3E/F0 3E        | 55                    | ?         | /    | 4A/F0 4A          |
| 10                    | (          | 9 | 46/F0 46        | 57                    | Shift (R) |      | 59/F0 59          |
| 11                    | )          | 0 | 45/F0 45        | 58                    | Ctrl (L)  |      | 14/F0 14          |
| 12                    | _          | - | 4E/F0 4E        | 60                    | Alt (L)   |      | 11/F0 11          |
| 13                    | +          | = | 55/F0 55        | 61                    | Space     |      | 29/F0 29          |
| 14                    |            |   | 6A/F0 6A        | 62                    | Alt (R)   |      | E0 11/E0 F0 11    |
| 15                    | Back Space |   | 66/F0 66        | 64                    | Ctrl (R)  |      | E0 14/E0 E0 F0 14 |
| 16                    | Tab        |   | 0D/F0 0D        | 90                    | Num Lock  |      | 77/F0 77          |
| 17                    | Q          |   | 15/F0 15        | 91                    | 7         | Home | 6C/F0 6C          |
| 18                    | W          |   | 1D/F0 1D        | 92                    | 4         | ←    | 6B/F0 6B          |
| 19                    | E          |   | 24/F0 24        | 93                    | 1         | End  | 69/F0 69          |
| 20                    | R          |   | 2D/F0 2D        | 96                    | 8         | ↑    | 75/F0 75          |
| 21                    | T          |   | 2C/F0 2C        | 97                    | 5         |      | 73/F0 73          |
| 22                    | Y          |   | 35/F0 35        | 98                    | 2         | ↓    | 72/F0 72          |
| 23                    | U          |   | 3C/F0 3C        | 99                    | 0         | Ins  | 70/F0 70          |
| 24                    | I          |   | 43/F0 43        | 100                   | *         |      | 7C/F0 7C          |
| 25                    | O          |   | 44/F0 44        | 101                   | 9         | PgUp | 7D/F0 7D          |
| 26                    | P          |   | 4D/F0 4D        | 102                   | 6         | →    | 74/F0 74          |
| 27                    | {          | [ | 54/F0 54        | 103                   | 3         | PgDn | 7A/F0 7A          |
| 28                    | }          | ] | 5B/F0 5B        | 104                   | .         | Del  | 71/F0 71          |
| *29                   |            | \ | 5D/F0 5D        | 105                   | -         |      | 7B/F0 7B          |
| 30                    | Caps Lock  |   | 58/F0 58        | 106                   | +         |      | 79/F0 79          |
| 31                    | A          |   | 1C/F0 1C        | 107                   |           |      | 6D/F0 6D          |
| 32                    | S          |   | 1B/F0 1B        | 108                   | Enter     |      | E0 5A/E0 F0 5A    |
| 33                    | D          |   | 23/F0 23        | 110                   | ESC       |      | 76/F0 76          |
| 34                    | F          |   | 2B/F0 2B        | 112                   | F1        |      | 05/F0 05          |
| 35                    | G          |   | 34/F0 34        | 113                   | F2        |      | 06/F0 06          |
| 36                    | H          |   | 33/F0 33        | 114                   | F3        |      | 04/F0 04          |
| 37                    | J          |   | 3B/F0 3B        | 115                   | F4        |      | 0C/F0 0C          |
| 38                    | K          |   | 42/F0 42        | 116                   | F5        |      | 03/F0 03          |
| 39                    | L          |   | 4B/F0 4B        | 117                   | F6        |      | 0B F0 0B          |

| Key Number and Symbol   |           |   | Make/Break Code | Key Number and Symbol |             | Make/Break Code |
|-------------------------|-----------|---|-----------------|-----------------------|-------------|-----------------|
| 40                      | :         | ; | 4C/F0 4C        | 118                   | F7          | 83/F0 83        |
| 41                      | □         | □ | 52/F0 52        | 119                   | F8          | 0A/F0 0A        |
| **42                    |           | \ | 5D/F0 5D        | 120                   | F9          | 01/F0 01        |
| 43                      | Enter     |   | 5A/F0 5A        | 121                   | F10         | 09/F0 09        |
| 44                      | Shift (L) |   | 12/F0 12        | 122                   | F11         | 78/F0 78        |
| **45                    | Macro     |   | 61/F0 61        | 123                   | F12         | 07/F0 07        |
| 46                      | Z         |   | 1A/F0 1A        | 125                   | Scroll Lock | 7E/F0 7E        |
| *101-Key Keyboard Only  |           |   |                 |                       |             |                 |
| **102-Key Keyboard Only |           |   |                 |                       |             |                 |

| Key Number and Symbol                                |        | Base Case Shift+Num | Left-Shift                                        | Right-Shift     | Num Lock           |
|------------------------------------------------------|--------|---------------------|---------------------------------------------------|-----------------|--------------------|
| 75                                                   | Insert | E0 70               | E0 F0 12 E0 70                                    | E0 F0 59 E0 70  | E0 12 E0 70        |
| 76                                                   | Delete | /E0 F0 70           | /E0 F0 70 E0 12                                   | /E0 F0 70 E0 59 | /E0 F0 70 E0 F0 12 |
|                                                      |        | E0 71               | E0 F0 12 E0 71                                    | E0 F0 59 E0 71  | E0 12 E0 71        |
| 79                                                   | ←      | /E0 F0 71           | /E0 F0 71 E0 12                                   | /E0 F0 71 E0 59 | /E0 F0 71 E0 F0 12 |
|                                                      |        | E0 6B               | E0 F0 12 E0 6B                                    | E0 F0 59 E0 6B  | E0 12 E0 6B        |
| 80                                                   | Home   | /E0 F0 6B           | /E0 F0 6B E0 12                                   | /E0 F0 6B E0 59 | /E0 F0 6B E0 F0 12 |
|                                                      |        | E0 6C               | E0 F0 12 E0 6C                                    | E0 F0 59 E0 6C  | E0 12 E0 6C        |
| 81                                                   | End    | /E0 F0 6C           | /E0 F0 6C E0 12                                   | /E0 F0 6C E0 59 | /E0 F0 6C E0 F0 12 |
|                                                      |        | E0 69               | E0 F0 12 E0 69                                    | E0 F0 59 E0 69  | E0 12 E0 69        |
| 83                                                   | ↑      | /E0 F0 69           | /E0 F0 69 E0 12                                   | /E0 F0 69 E0 59 | /E0 F0 69 E0 F0 12 |
|                                                      |        | E0 75               | E0 F0 12 E0 75                                    | E0 F0 59 E0 75  | E0 12 E0 75        |
| 84                                                   | ↓      | /E0 F0 75           | /E0 F0 75 E0 12                                   | /E0 F0 75 E0 59 | /E0 F0 75 E0 F0 12 |
|                                                      |        | E0 72               | E0 F0 12 E0 72                                    | E0 F0 59 E0 72  | E0 12 E0 72        |
| 85                                                   | PgUp   | /E0 F0 72           | /E0 F0 72 E0 12                                   | /E0 F0 72 E0 59 | /E0 F0 72 E0 F0 12 |
|                                                      |        | E0 7D               | E0 F0 12 E0 7D                                    | E0 F0 59 E0 7D  | E0 12 E0 7D        |
| 86                                                   | PgDn   | /E0 F0 7D           | /E0 F0 7D E0 12                                   | /E0 F0 7D E0 59 | /E0 F0 7D E0 F0 12 |
|                                                      |        | E0 7A               | E0 F0 12 E0 7A                                    | E0 F0 59 E0 7A  | E0 12 E0 7A        |
| 89                                                   | →      | /E0 F0 7A           | /E0 F0 7A E0 12                                   | /E0 F0 7A E0 59 | /E0 F0 7A E0 F0 12 |
|                                                      |        | E0 74               | E0 F0 12 E0 74                                    | E0 F0 59 E0 74  | E0 12 E0 74        |
|                                                      |        | /E0 F0 74           | /E0 F0 74 E0 12                                   | /E0 F0 74 E0 59 | /E0 F0 74 E0 F0 12 |
| L Win                                                |        | E0 1F               | E0 F0 12 E0 1F                                    | E0 F0 59 E0 1F  | E0 12 E0 1F        |
|                                                      |        | /E0 F0 1F           | /E0 F0 1F E0 12                                   | /E0 F0 1F E0 59 | /E0 F0 1F E0 F0 12 |
| R Win                                                |        | E0 27               | E0 F0 12 E0 27                                    | E0 F0 59 E0 27  | E0 12 E0 27        |
|                                                      |        | /E0 F0 27           | /E0 F0 27 E0 12                                   | /E0 F0 27 E0 59 | /E0 F0 27 E0 F0 12 |
| APP                                                  |        | E0 2F               | E0 F0 12 E0 2F                                    | E0 F0 59 E0 2F  | E0 12 E0 2F        |
|                                                      |        | /E0 F0 2F           | /E0 F0 2F E0 12                                   | /E0 F0 2F E0 59 | /E0 F0 2F E0 F0 12 |
| When both shift keys are held down:<br>key number 75 |        |                     | Both Shift<br>E0 AA E0 B6 E0 52/E0 D2 E0 2A E0 36 |                 |                    |

| Key Number and Symbol                                |   | Base           | Left-Shift                                                 | Right-Shift                   |
|------------------------------------------------------|---|----------------|------------------------------------------------------------|-------------------------------|
| 95                                                   | / | E0 4A/E0 F0 4A | E0 F0 12 E0 4A/E0 F0 4A E0 12                              | E0 F0 59 E0 4A/E0 F0 4A E0 59 |
| When both shift keys are held down:<br>key number 95 |   |                | Both Shift<br>E0 F0 12 E0 F0 59 E0 4A/E0 F0 4A E0 12 E0 59 |                               |

| Key Number and Symbol |              | Base                          | Shift/Ctrl     | Alt      |
|-----------------------|--------------|-------------------------------|----------------|----------|
| 124                   | Print Screen | E0 12 E0 7C/E0 F0 7C E0 F0 12 | E0 7C/E0 F0 7C | 84/F0 84 |

| Key Number and Symbol                                                        |       | Base                    | Ctrl           |
|------------------------------------------------------------------------------|-------|-------------------------|----------------|
| 126                                                                          | Pause | E1 14 77 E1 F0 14 F0 77 | E0 7E E0 F0 7E |
| This key is not typematic, all associated scan codes occur on the make code. |       |                         |                |

| Key Number and Function |         | Make/Break code | Default    |
|-------------------------|---------|-----------------|------------|
| ACPI                    | Power   | E0 37/E0 F0 37  | Make/Break |
| ACPI                    | Sleep   | E0 3F/E0 F0 3F  | Make/Break |
| ACPI                    | Wake-up | E0 5E/E0 F0 5E  | Make/Break |

| Key Number and Function |               | Make/Break code | Default   |
|-------------------------|---------------|-----------------|-----------|
| 56                      | Brazil BA0    | 51/F0 51        | Typematic |
| 131                     | Japanese J131 | 67/F0 67        | Make      |
| 132                     | Japanese J132 | 64/F0 64        | Make      |
| 133                     | Japanese J133 | 13/F0 13        | Make      |
| 150                     | Korea KC-L    | F1/–            | Make      |
| 151                     | Korea KC-R    | F2/–            | Make      |

| Multimedia Key Function | Make/Break code |
|-------------------------|-----------------|
| E-Mail                  | E0 48/E0 F0 48  |
| WWW Home                | E0 3A/E0 F0 3A  |
| WWW Favorites           | E0 18/E0 F0 18  |
| WWW Search              | E0 10/E0 F0 10  |
| WWW Refresh             | E0 20/E0 F0 20  |
| WWW Stop                | E0 28/E0 F0 28  |
| WWW Forward             | E0 30/E0 F0 30  |
| WWW Back                | E0 38/E0 F0 38  |
| Media                   | E0 50/E0 F0 50  |
| Play/Pause              | E0 34/E0 F0 34  |
| Stop                    | E0 3B/E0 F0 3B  |
| Prev Track              | E0 15/E0 F0 15  |
| Next Track              | E0 4D/E0 F0 4D  |
| Volume+                 | E0 32/E0 F0 32  |
| Volume–                 | E0 21/E0 F0 21  |
| Mute                    | E0 23/E0 F0 23  |
| My Computer             | E0 40/E0 F0 40  |
| Calculator              | E0 2B/E0 F0 2B  |
| Screen save             | E0 4B/E0 F0 4B  |
| Rec                     | E0 1C/E0 F0 1C  |
| Rew                     | E0 43/E0 F0 43  |
| Minimize                | E0 22/E0 F0 22  |
| Eject                   | E0 1D/E0 F0 1D  |

**Key Code Set 3**

| Key Number | Make /Break Code | Default Key State | Key Number | Make /Break Code | Default Key State |
|------------|------------------|-------------------|------------|------------------|-------------------|
| 1          | 0E/F0 0E         | Typematic         | 55         | 4A/F0 4A         | Typematic         |
| 2          | 16/F0 16         | Typematic         | 57         | 59/F0 59         | Make/Break        |
| 3          | 1E/F0 1E         | Typematic         | 58         | 11/F0 11         | Make/Break        |
| 4          | 26/F0 26         | Typematic         | 59         | 8B/F0 8B         | Make/Break        |
| 5          | 25/F0 25         | Typematic         | 60         | 19/F0 19         | Make/Break        |
| 6          | 2E/F0 2E         | Typematic         | 61         | 29/F0 29         | Typematic         |
| 7          | 36/F0 36         | Typematic         | 62         | 39/F0 39         | Make Only         |
| 8          | 3D/F0 3D         | Typematic         | 63         | 8C/F0 8C         | Make/Break        |
| 9          | 3E/F0 3E         | Typematic         | 64         | 58/F0 58         | Make Only         |
| 10         | 46/F0 46         | Typematic         | 75         | 67/F0 67         | Make Only         |
| 11         | 45/F0 45         | Typematic         | 76         | 64/F0 64         | Typematic         |
| 12         | 4E/F0 4E         | Typematic         | 79         | 61/F0 61         | Typematic         |
| 13         | 55/F0 55         | Typematic         | 80         | 6E/F0 6E         | Make Only         |
| 14         | 5D/F0 5D         | Typematic         | 81         | 65/F0 65         | Make Only         |
| 15         | 66/F0 66         | Typematic         | 83         | 63/F0 63         | Typematic         |
| 16         | 0D /F0 0D        | Typematic         | 84         | 60/F0 60         | Typematic         |
| 17         | 15/F0 15         | Typematic         | 85         | 6F/F0 6F         | Make Only         |
| 18         | 1D/F0 1D         | Typematic         | 86         | 6D/F0 6D         | Make Only         |
| 19         | 24/F0 24         | Typematic         | 89         | 6A/F0 6A         | Typematic         |
| 20         | 2D/F0 2D         | Typematic         | 90         | 76/F0 76         | Make Only         |
| 21         | 2C/F0 2C         | Typematic         | 91         | 6C/F0 6C         | Make Only         |
| 22         | 35/F0 35         | Typematic         | 92         | 6B/F0 6B         | Make Only         |
| 23         | 3C/F0 3C         | Typematic         | 93         | 69/F0 69         | Make Only         |
| 24         | 43/F0 43         | Typematic         | 95         | 77/F0 77         | Make Only         |
| 25         | 44/F0 44         | Typematic         | 96         | 75/F0 75         | Make Only         |
| 26         | 4D/F0 4D         | Typematic         | 97         | 73/F0 73         | Make Only         |
| 27         | 54/F0 54         | Typematic         | 98         | 72/F0 72         | Make Only         |
| 28         | 5B/F0 5B         | Typematic         | 99         | 70/F0 70         | Make Only         |
| *29        | 5C/F0 5C         | Typematic         | 100        | 7E/F0 7E         | Make Only         |
| 30         | 14/F0 14         | Make/Break        | 101        | 7D/F0 7D         | Make Only         |
| 31         | 1C/F0 1C         | Typematic         | 102        | 74/F0 74         | Make Only         |
| 32         | 1B/F0 1B         | Typematic         | 103        | 7A/F0 7A         | Make Only         |
| 33         | 23/F0 23         | Typematic         | 104        | 71/F0 71         | Make Only         |
| 34         | 2B/F0 2B         | Typematic         | 105        | 84/F0 84         | Make Only         |
| 35         | 34/F0 34         | Typematic         | 106        | 7C/F0 7C         | Typematic         |
| 36         | 33/F0 33         | Typematic         | 107        | 7B/F0 7B         | Make Only         |
| 37         | 3B/F0 3B         | Typematic         | 108        | 79/F0 79         | Make Only         |
| 38         | 42/F0 42         | Typematic         | 110        | 08/F0 08         | Make Only         |
| 39         | 4B/F0 4B         | Typematic         | 112        | 07/F0 07         | Make Only         |
| 40         | 4C/F0 4C         | Typematic         | 113        | 0F/F0 0F         | Make Only         |
| 41         | 52/F0 52         | Typematic         | 114        | 17/F0 17         | Make Only         |
| **42       | 53/F0 53         | Typematic         | 115        | 1F/F0 1F         | Make Only         |
| 43         | 5A/F0 5A         | Typematic         | 116        | 27/F0 27         | Make Only         |
| 44         | 12/F0 12         | Make/Break        | 117        | 2F/F0 2F         | Make Only         |
| **45       | 13/F0 13         | Typematic         | 118        | 37/F0 37         | Make Only         |
| 46         | 1A/F0 1A         | Typematic         | 119        | 3F/F0 3F         | Make Only         |
| 47         | 22/F0 22         | Typematic         | 120        | 47/F0 47         | Make Only         |
| 48         | 21/F0 21         | Typematic         | 121        | 4F/F0 4F         | Make Only         |
| 49         | 2A/F0 2A         | Typematic         | 122        | 56/F0 56         | Make Only         |
| 50         | 32/F0 32         | Typematic         | 123        | 5E/F0 5E         | Make Only         |
| 51         | 31/F0 31         | Typematic         | 124        | 57/F0 57         | Make Only         |
| 52         | 3A/F0 3A         | Typematic         | 125        | 5F/F0 5F         | Make Only         |
| 53         | 41/F0 41         | Typematic         | 126        | 62/F0 62         | Make Only         |
| 54         | 49/F0 49         | Typematic         | 127        | 8D/F0 8D         | Typematic         |

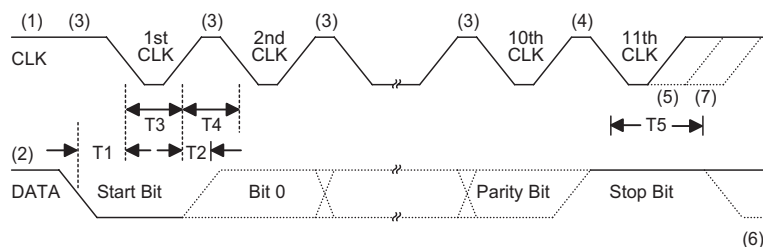
\*101-Key Keyboard Only

\*\*102-Key Keyboard Only

| Key Number | Key Number and Function | Make/Break code | Default   |
|------------|-------------------------|-----------------|-----------|
| 56         | Brazil BA0              | 51/F0 51        | Typematic |
| 131        | Japanese J131           | 67/F0 67        | Make      |
| 132        | Japanese J132           | 64/F0 64        | Make      |
| 133        | Japanese J133           | 13/F0 13        | Make      |
| 150        | Korea KC-L              | F1/-            | Make      |
| 151        | Korea KC-R              | F2/-            | Make      |

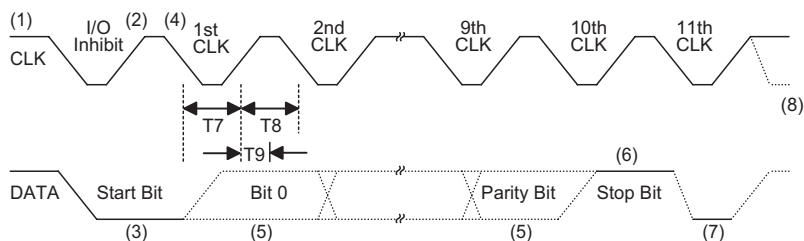
## Timing Diagrams

### Data Output



| Timing Parameter                                                                                                      | Min/Max          |
|-----------------------------------------------------------------------------------------------------------------------|------------------|
| T1 DATA transition to the falling edge of CLK                                                                         | 5/25 $\mu$ sec   |
| T2 Rising edge of CLK to DATA transition                                                                              | 5/T4-5 $\mu$ sec |
| T3 Duration of CLK inactive                                                                                           | 30/50 $\mu$ sec  |
| T4 Duration of CLK active                                                                                             | 30/50 $\mu$ sec  |
| T5 Time to auxiliary device inhibit after clock 11 to ensure the auxiliary device does not start another transmission | >0/50 $\mu$ sec  |

### Keyboard Data Input



| Timing Parameter                                                                                    | Min/Max         |
|-----------------------------------------------------------------------------------------------------|-----------------|
| T7 Duration of CLK inactive                                                                         | 30/50 $\mu$ sec |
| T8 Duration of CLK active                                                                           | 30/50 $\mu$ sec |
| T9 Time from inactive to active CLK transition, used to time when the auxiliary device samples DATA | 5/25 $\mu$ sec  |

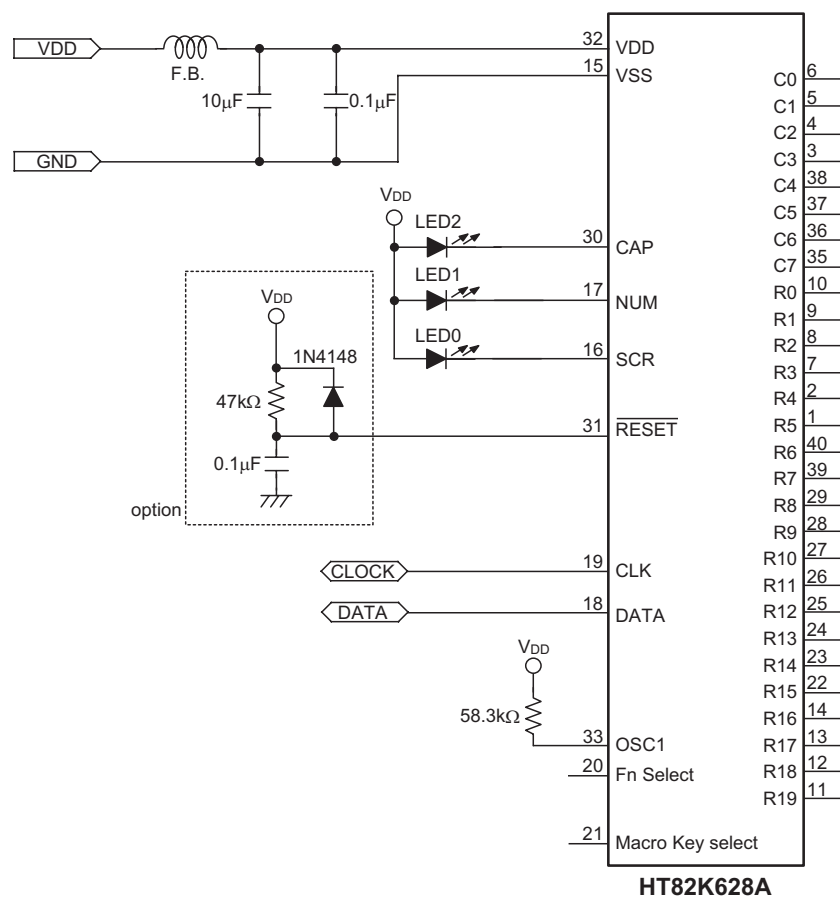
• Fn key usage

| Key Location    | Status    |          |           |          |          |          |           |          |
|-----------------|-----------|----------|-----------|----------|----------|----------|-----------|----------|
|                 | Fn        | Num Lock | Fn        | Num Lock | Fn       | Num Lock | Fn        | Num Lock |
|                 | OFF       | OFF      | ON        | OFF      | OFF      | ON       | ON        | ON       |
| 7               | &7        |          | Home      |          | 7        |          | 7         |          |
| 8               | *8        |          | ↑         |          | 8        |          | 8         |          |
| 9               | (9        |          | PgUp      |          | 9        |          | 9         |          |
| 0               | )0        |          | *         |          | *        |          | 0         |          |
| U               | U         |          | ←         |          | 4        |          | U         |          |
| I               | I         |          |           |          | 5        |          | I         |          |
| O               | O         |          | →         |          | 6        |          | O         |          |
| P               | P         |          | -         |          | -        |          | P         |          |
| J               | J         |          | End       |          | 1        |          | J         |          |
| K               | K         |          | ↓         |          | 2        |          | K         |          |
| L               | L         |          | PgDn      |          | 3        |          | L         |          |
| ::              | ::        |          | +         |          | +        |          | ::        |          |
| M               | M         |          | Ins       |          | 0        |          | M         |          |
| >.              | >.        |          | Del       |          | .        |          | >.        |          |
| ?/              | ?/        |          | /         |          | /        |          | ?/        |          |
| Enter           | Enter (L) |          | Enter(R)  |          | Enter(R) |          | Enter(L)  |          |
| F1/F11          | F1        |          | F11       |          | F1       |          | F11       |          |
| F2/F12          | F2        |          | F12       |          | F2       |          | F12       |          |
| F10/<br>ScrLock | F10       |          | ScrLock   |          | F10      |          | ScrLock   |          |
| ↑/PgUp          | ↑         |          | Page Up   |          | ↑        |          | Page Up   |          |
| ↓/PgDn          | ↓         |          | Page Down |          | ↓        |          | Page Down |          |
| ←/Home          | ←         |          | Home      |          | ←        |          | Home      |          |
| →/End           | →         |          | End       |          | →        |          | End       |          |

**Key Matrix**

|            | C0                 | C1              | C2             | C3              | C4             | C5           | C6           | C7             |
|------------|--------------------|-----------------|----------------|-----------------|----------------|--------------|--------------|----------------|
| <b>R0</b>  | PAUSE<br>126       | Pre Track       | Stop           | Play/Pause      | CTRL-R<br>64   | Next Track   | CTRL-L<br>58 | F5<br>116      |
| <b>R1</b>  | Q<br>17            | TAB<br>16       | A<br>31        | ESC<br>110      | Z<br>46        | N-CHG<br>131 | '(~)<br>1    | 1(!)<br>2      |
| <b>R2</b>  | W<br>18            | CAPS LOCK<br>30 | S<br>32        | (\)<br>45       | X<br>47        | CHG<br>132   | F1<br>112    | 2(@)<br>3      |
| <b>R3</b>  | E<br>19            | F3<br>114       | D<br>33        | F4<br>115       | C<br>48        | ROMA<br>133  | F2<br>113    | 3(#)<br>4      |
| <b>R4</b>  | R<br>20            | T<br>21         | F<br>34        | G<br>35         | V<br>49        | B<br>50      | 5(%)<br>6    | 4(\$)<br>5     |
| <b>R5</b>  | U<br>23            | Y<br>22         | J<br>37        | H<br>36         | M<br>52        | N<br>51      | 6(^)<br>7    | 7(&)<br>8      |
| <b>R6</b>  | I<br>24            | ]({)<br>28      | K<br>38        | F6<br>117       | ,(<)<br>53     | \(-)<br>56   | =(+)<br>13   | 8(*)<br>9      |
| <b>R7</b>  | O<br>25            | F7<br>118       | L<br>39        |                 | .(>)<br>54     | APP<br>119   | F8<br>119    | 9('')<br>10    |
| <b>R8</b>  | P<br>26            | [({)<br>27      | ;(.)<br>40     | '(")<br>41      | (\)<br>42      | /(?)<br>55   | _(-)<br>12   | 0('')<br>11    |
| <b>R9</b>  | SCROLL LOCK<br>125 |                 | Vol-<br>60     | ALT-L<br>60     | Vol+<br>62     | ALT-R<br>62  | Mute         | PRINT SCREEN   |
| <b>R10</b> | (\)<br>14          | BACK<br>15      | \( )<br>29     | F11<br>122      | ENTER-L<br>43  | F12<br>123   | F9<br>120    | F10<br>121     |
| <b>R11</b> | 7(Home)<br>91      | 4(←)<br>92      | 1(End)<br>93   | SPACE<br>61     | NUM LOCK<br>90 | ↓<br>84      | DEL<br>76    | POWER          |
| <b>R12</b> | 8(↑)<br>96         | 5<br>97         | 2(↓)<br>98     | 0(Ins)<br>99    | /<br>95        | →<br>89      | INS<br>75    | SLEEP          |
| <b>R13</b> | 9(PgUp)<br>101     | 6(→)<br>102     | 3(PgDn)<br>103 | .(Del)<br>104   | *<br>100       | -<br>105     | PgUp<br>85   | PgDn<br>86     |
| <b>R14</b> | +<br>106           | .<br>107        | ENTER-R<br>108 | ↑<br>83         |                | ←<br>79      | HOME<br>80   | END<br>81      |
| <b>R15</b> | Wake-up            | SHIFT-L<br>44   | SHIFT-R<br>57  | WWW Search      |                |              | F1/F11       | FN             |
| <b>R16</b> | Screen Save        | WIN-L           |                | Rec             | Rew            | Min          | Eject        | F10/<br>Scroll |
| <b>R17</b> | KC-L<br>150        |                 | WIN-R          | 00              | 000            |              | F2/F12       | KC-R<br>151    |
| <b>R18</b> | Media              | E-mail          | WWW Home       | WWW Back        | WWW Forward    | WWW Stop     | WWW Refresh  | WWW Bkmk       |
| <b>R19</b> | My Computer        | Calculator      | ↑/<br>Page Up  | ↓/<br>Page Down | ←/<br>Home     | →/<br>END    |              |                |

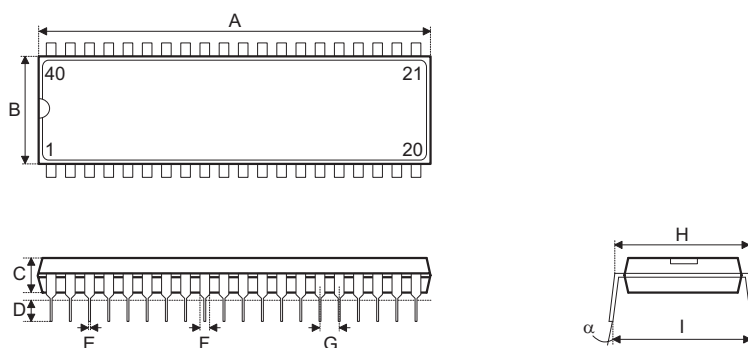
# Application Circuits



Note: Fn Select → GND: Enable the Mini Keyboard  
Macro Key Select → GND: Disable the Macro Key

**Package Information**

**40-pin DIP (600mil) Outline Dimensions**



| Symbol   | Dimensions in mil |      |      |
|----------|-------------------|------|------|
|          | Min.              | Nom. | Max. |
| A        | 2045              | —    | 2065 |
| B        | 535               | —    | 555  |
| C        | 145               | —    | 155  |
| D        | 125               | —    | 145  |
| E        | 16                | —    | 20   |
| F        | 50                | —    | 70   |
| G        | —                 | 100  | —    |
| H        | 595               | —    | 615  |
| I        | 635               | —    | 670  |
| $\alpha$ | 0°                | —    | 15°  |

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