

5-Key 3D USB+PS/2 Optical Mouse Controller

Features

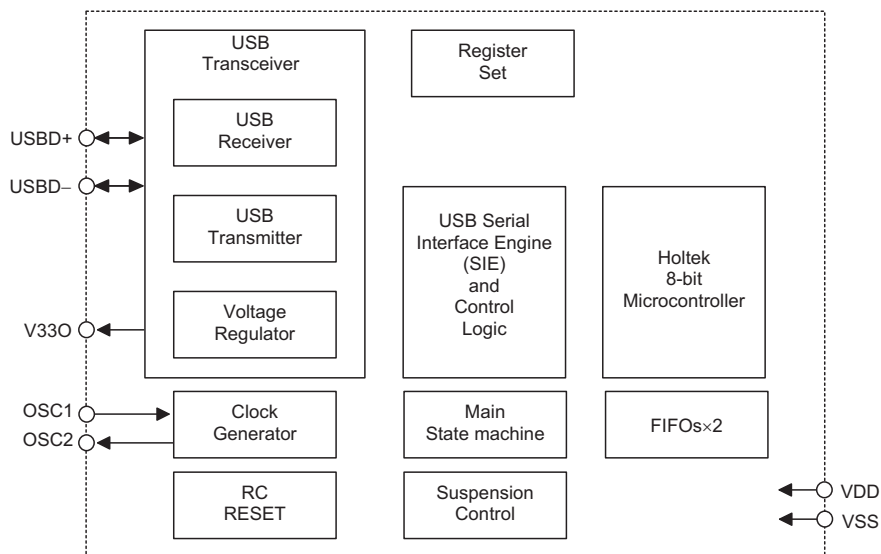
- Operating voltage: 4.4V~5.25V
- Compatible with Microsoft Windows 2000 and 5-button Wheel Mouse
- Complete Universal Serial Bus specs V1.1 compatibility
- Serial Bus Interface Engine (SIE)
- USB transceiver
- Microsoft 3D Intelli mouse and IBM PS/2 mouse compatible
- Supports five buttons and Z-axis input
- Z-axis can support two kinds of scroller input (optomechanical and mechanical)
- Single chip solution especially for USB mouse function
- HALT function and wake-up feature reduce power consumption
- Plug and Play functions
- Minimal external components
- 6MHz crystal oscillator for system clock
- Interface compliant with ADNS-2051, ADNS-2610 and ADNS-2620
- Pass WHQL, USB-IF and EMC testing
- 20-pin DIP package

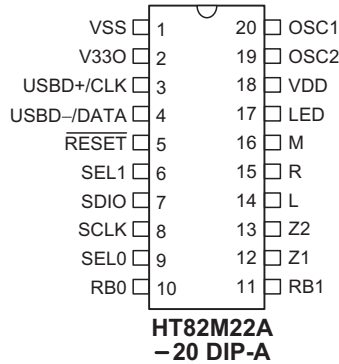
General Description

HT82M22A is a Plug and Play Windows 2000 and 5-button 3D USB+PS/2 Mouse controller. The HT82M22A can support the USB Standard Request as well as HID Class Request version 1.1. It is compatible with Microsoft Intelli 3D PS/2 mouse. The Z-axis can support two kinds of scroller input, namely; mechanical

and optomechanical. It requires minimal external components to implement 3D USB plus PS/2 mouse. All its features combined and make up this versatile Holtek 8-bit MCU with an on-chip USB interface logic. The USB is specified by the *Universal Serial Bus Specification V1.1*.

Block Diagram



Pin Assignment

Pin Description

| Pin No. | Pin Name | I/O | Description |
|----------------------|---------------------|-----|--|
| 1 | VSS | — | Negative power supply, ground |
| 2 | V330 | O | 3.3V voltage output |
| 3 | USB+/CLK | I/O | USB data plus or PS2 Clock, F/W auto-detect USB+ for USB, CLK for PS2 |
| 4 | USB-/DATA | I/O | USB data minus or PS2 Data, F/W auto-detect USB- for USB, DATA for PS2 |
| 5 | RESET | I | Chip reset input, low active |
| 6, 9 | SEL1 SEL0 | I | Configuration selections For ANDS 2051: SEL0=0: 800DPI (default) SEL0=1: 400DPI SEL1=0: Z-axis is divided by 2 (default) SEL1=1: Z-axis is divided by 4 For ANDS 2610/2620: SEL1=0, SEL0=don't care: Z-axis is divided by 2 (default) SEL1=1, SEL0=0: Z-axis is divided by 4 |
| 7 | SDIO | I/O | Serial data for Agilent sensor IC SDIO |
| 8 | SCLK(PA5) | I | Serial data for Agilent sensor IC SCLK |
| 10, 11 14, 15, 16 | RB0, RB1 L, R, M | I | Click button detection. Input ports with 30kΩ pull-high resistor. Input ports with pull-high resistor. These pads can function as Left, Right, Middle, B4 and B5 button input lines. |
| 12, 13 | Z1, Z2 | I | Z-axis input supports two kinds of scroller input; optomechanical and mechanical. |
| 17 | LED | I/O | Drives LED output |
| 18 | VDD | — | 5V positive power supply |
| 19 | OSC2 | O | 6MHz OSC output |
| 20 | OSC1 | I | 6MHz OSC input |

Absolute Maximum Ratings

| | | | |
|-------------------------|---------------------------------|-----------------------------|----------------------------------|
| Supply Voltage | $V_{SS}-0.3V$ to $V_{SS}+6V$ | Storage Temperature | $-50^{\circ}C$ to $125^{\circ}C$ |
| MCU Input Voltage | $V_{SS}-0.3V$ to $V_{DD}+0.3V$ | Operating Temperature | $-25^{\circ}C$ to $70^{\circ}C$ |
| USB Input Voltage | $V_{SS}-0.3V$ to $V_{330}+0.3V$ | | |

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.

D.C. Characteristics

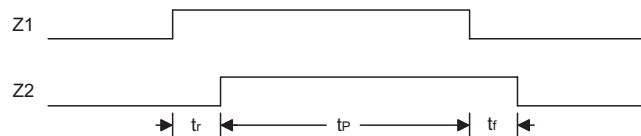
Ta=25°C

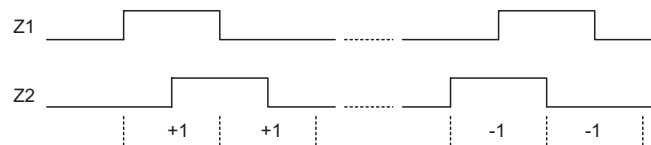
| Symbol | Parameter | Test Conditions | | Min. | Typ. | Max. | Unit | |
|------------------|---|-----------------|---------------------------------|-----------|------|------|------|----|
| | | V _{DD} | Conditions | | | | | |
| V _{DD} | Operating Voltage | — | — | 4.4 | — | 5.25 | V | |
| I _{DD} | Operating Current (Crystal OSC) | 5V | No load, f _{sys} =6MHz | USB mode | — | 10 | — | mA |
| | | | | PS/2 mode | — | 3 | — | mA |
| I _{SUS} | USB Suspend Mode | 5V | No load, system HALT | — | — | 250 | μA | |
| V _{IL1} | Input Low Voltage (Z1, Z2, L, M, R) | 5V | — | 0 | — | 1.0 | V | |
| V _{IH1} | Input High Voltage (Z1, Z2, L, M, R) | 5V | — | 3.5 | — | 5 | V | |
| V _{IL2} | Input Low Voltage ($\overline{\text{RESET}}$) | 5V | — | 0 | — | 1.5 | V | |
| V _{IH2} | Input High Voltage ($\overline{\text{RESET}}$) | 5V | — | 3.5 | — | 5 | V | |
| V _{POR} | Built-in Power on Reset V _{DD} Detection Voltage | 5V | — | — | 3.7 | — | V | |
| I _{OL} | Sink Current (LED) | 5V | V _{OL} =0.8V | — | 50 | — | mA | |

A.C. Characteristics

Ta=25°C

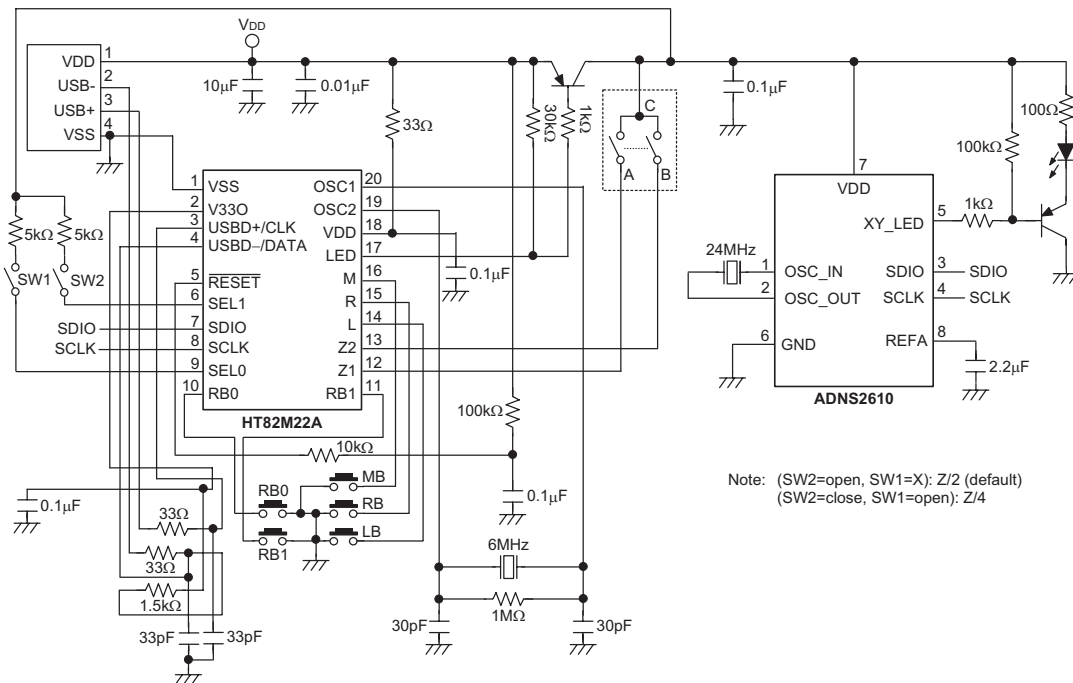
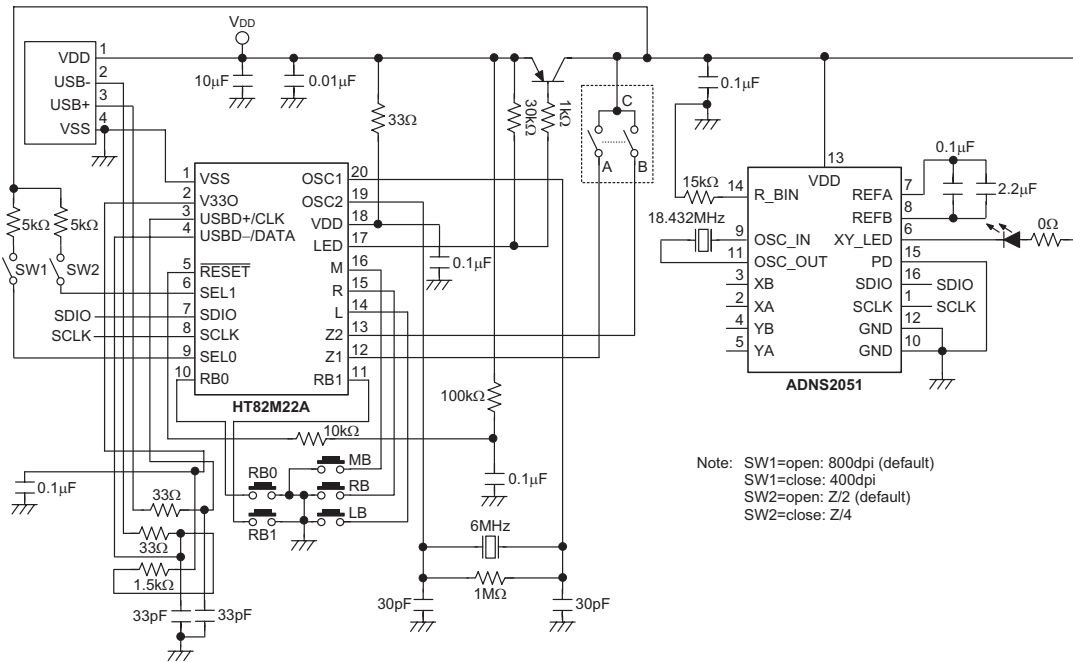
| Symbol | Parameter | Test Conditions | | Min. | Typ. | Max. | Unit |
|------------------|----------------------------|-----------------|------------|------|------|------|------|
| | | V _{DD} | Conditions | | | | |
| f _{sys} | System Clock (Crystal OSC) | 5V | — | 0 | 6000 | — | kHz |

 Note: t_{sys}=1/f_{sys}
Timing Diagram
Z-axis Photo-Coupler Crossed Width

 Note: For Z-axis t_r, t_p, t_f > 1ms

Z-axis Counting


Application Circuits

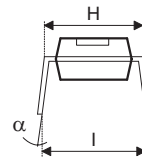
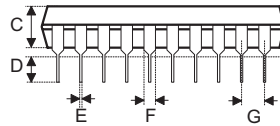
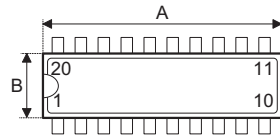
This Application Circuit is for Reference Only



Note: Layout 0.1µF capacitor, 33Ω resistor and 0.01µF capacitor as close to VDD pin as possible.

Package Information

20-pin DIP (300mil) Outline Dimensions



| Symbol | Dimensions in mil | | |
|----------|-------------------|------|------|
| | Min. | Nom. | Max. |
| A | 1020 | — | 1045 |
| B | 240 | — | 260 |
| C | 125 | — | 135 |
| D | 125 | — | 145 |
| E | 16 | — | 20 |
| F | 50 | — | 70 |
| G | — | 100 | — |
| H | 295 | — | 315 |
| I | 335 | — | 375 |
| α | 0° | — | 15° |

Holtek Semiconductor Inc. (Headquarters)

No.3, Creation Rd. II, Science Park, Hsinchu, Taiwan
Tel: 886-3-563-1999
Fax: 886-3-563-1189
<http://www.holtek.com.tw>

Holtek Semiconductor Inc. (Taipei Sales Office)

4F-2, No. 3-2, YuanQu St., Nankang Software Park, Taipei 115, Taiwan
Tel: 886-2-2655-7070
Fax: 886-2-2655-7373
Fax: 886-2-2655-7383 (International sales hotline)

Holtek Semiconductor Inc. (Shanghai Sales Office)

7th Floor, Building 2, No.889, Yi Shan Rd., Shanghai, China 200233
Tel: 021-6485-5560
Fax: 021-6485-0313
<http://www.holtek.com.cn>

Holtek Semiconductor Inc. (Shenzhen Sales Office)

43F, SEG Plaza, Shen Nan Zhong Road, Shenzhen, China 518031
Tel: 0755-8346-5589
Fax: 0755-8346-5590
ISDN: 0755-8346-5591

Holtek Semiconductor Inc. (Beijing Sales Office)

Suite 1721, Jinyu Tower, A129 West Xuan Wu Men Street, Xicheng District, Beijing, China 100031
Tel: 010-6641-0030, 6641-7751, 6641-7752
Fax: 010-6641-0125

Holmate Semiconductor, Inc. (North America Sales Office)

46712 Fremont Blvd., Fremont, CA 94538
Tel: 510-252-9880
Fax: 510-252-9885
<http://www.holmate.com>

Copyright © 2004 by HOLTEK SEMICONDUCTOR INC.

The information appearing in this Data Sheet is believed to be accurate at the time of publication. However, Holtek assumes no responsibility arising from the use of the specifications described. The applications mentioned herein are used solely for the purpose of illustration and Holtek makes no warranty or representation that such applications will be suitable without further modification, nor recommends the use of its products for application that may present a risk to human life due to malfunction or otherwise. Holtek's products are not authorized for use as critical components in life support devices or systems. Holtek reserves the right to alter its products without prior notification. For the most up-to-date information, please visit our web site at <http://www.holtek.com.tw>.