# HT82M98A
# 3D USB+PS2 Mouse

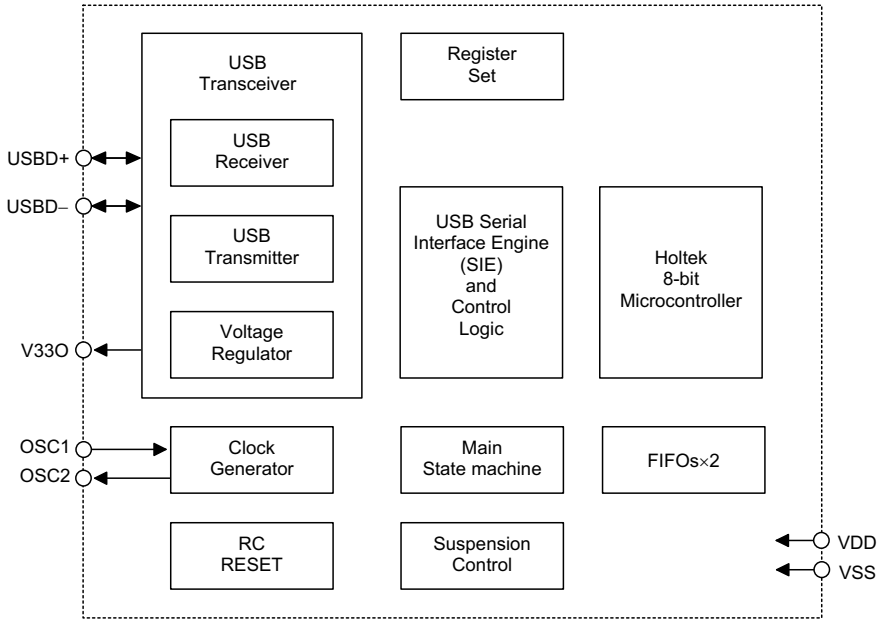
## Features

- Complete Universal Serial Bus specs V1.0 compatibility
- Serial Bus Interface Engine (SIE)
- USB transceiver
- Microsoft 3D Intelli mouse and IBM PS/2 mouse compatible
- Supports three buttons (R, M, L) and three axes (X, Y, Z) 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
- 18-pin DIP package

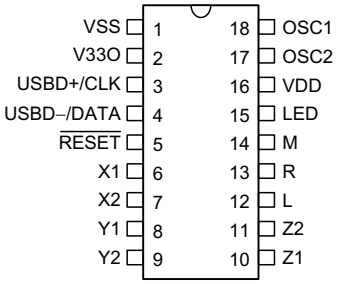
## General Description

HT82M98A is a 3D mouse controller especially designed for USB and PS/2 applications. The HT82M98A can support the USB Standard Request as well as HID Class Request version 1.0 draft 4. It is compatible with Microsoft Intelli 3D PS/2 mouse. The X/Y axis photo input with built-in Holtek's special dynamic photo-input resistor and Z axis can support two kinds of scroller input, namely; optomechanical and mechanical. It requires minimal external components to implement 3D USB plus PS/2 mouse. It can be briefly described as a Holtek 8-bit μC with an on-chip USB interface logic. The USB is specified by the *Universal Serial Bus Specification V1.0*.

## Block Diagram




## Pin Assignment




**HT82M98A**
**– 18 DIP**

## Pin Description

| Pin No. | Pin Name | I/O | Description |
|---|---|---|---|
| **USB Interface (2 pins)** | | | |
| 3 | USBD+/ CLK | I/O | USB data plus or PS2 Clock, F/W auto-detect USBD+ for USB, CLK for PS2 |
| 4 | USBD–/ DATA | I/O | USB data minus or PS2 Data, F/W auto-detect USB– for USB, DATA for PS2 |
| **General purpose I/O (9 pins)** | | | |
| 6, 7 | X1, X2 | I | X-axis photo input with built-in Holtek's special dynamic photo input resistor |
| 8, 9 | Y1, Y2 | I | Y-axis photo input with built-in Holtek's special dynamic photo input resistor |
| 10, 11 | Z1, Z2 | I | Z-axis input supports two kinds of scroller input; optomechanical and mechanical |
| 12, 13, 14 | L, R, M | I | Input ports with pull-high resistor. These pads can function as Left, Right and Middle button input lines. |
| **Miscellaneous (7 pins)** | | | |
| 1 | VSS | — | Negative power supply, ground. |
| 2 | V33O | O | 3.3V voltage output |
| 5 | $\overline{\text{RESET}}$ | I | Chip reset input, low active |
| 15 | LED | I/O | Drives LED output |
| 16 | VDD | — | 5V positive power supply |
| 17 | OSC2 | O | 6MHz OSC output |
| 18 | OSC1 | I | 6MHz OSC input |

## Absolute Maximum Ratings

Supply Voltage.....–0.3V to 6V
μC Input Voltage .....$V_{SS}$–0.3V to $V_{DD}$+0.3V
USB Input Voltage .....$V_{SS}$–0.3V to $V_{33O}$+0.3V
Storage Temperature.....–50°C to 125°C
Operating Temperature .....–25°C to 70°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.

## D.C. Characteristics

Ta=25°C

| Symbol | Parameter | Test Conditions | | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|---|
| | | $V_{DD}$ | Conditions | | | | | |
| $V_{DD}$ | Operating Voltage | — | — | | 4.5 | — | 5.5 | V |
| $I_{DD}$ | Operating Current (Crystal OSC) | 5V | No load, $f_{SYS}$=6MHz | USB mode | — | 10 | — | mA |
| | | | | PS/2 mode | — | 3 | — | mA |
| $I_{STB}$ | Standby Current | 5V | No load, system HALT | | — | — | 250 | μA |
| $V_{IL1}$ | Input Low Voltage for I/O Ports | 5V | — | | 0 | — | 1.0 | V |
| $V_{IH1}$ | Input High Voltage for μC I/O Ports | 5V | — | | 3.5 | — | 5 | V |
| $V_{IL2}$ | Input Low Voltage ($\overline{RESET}$) | 5V | — | | 0 | — | 1.5 | V |
| $V_{IH2}$ | Input High Voltage ($\overline{RESET}$) | 5V | — | | 3.5 | — | 5 | V |
| $V_{IH3}$ | Input High Voltage for USB I/O Ports | 3.3V | — | | 2.8 | — | 3.6 | V |
| $V_{POR}$ | Power on Reset $V_{DD}$ Detection Voltage | 5V | — | | 3.5 | — | 3.9 | V |
| $I_{OL1}$ | Output Port Sink Current | 5V | $V_{OL}$=0.5V | | — | 4 | — | mA |
| $I_{OH1}$ | Output Port Source Current | 5V | $V_{OL}$=4.5V | | — | –4 | — | mA |
| $I_{OL2}$ | Output Port Sink Current (LED) | 5V | $V_{OL}$=4.5V | | — | 50 | — | mA |

## A.C. Characteristics

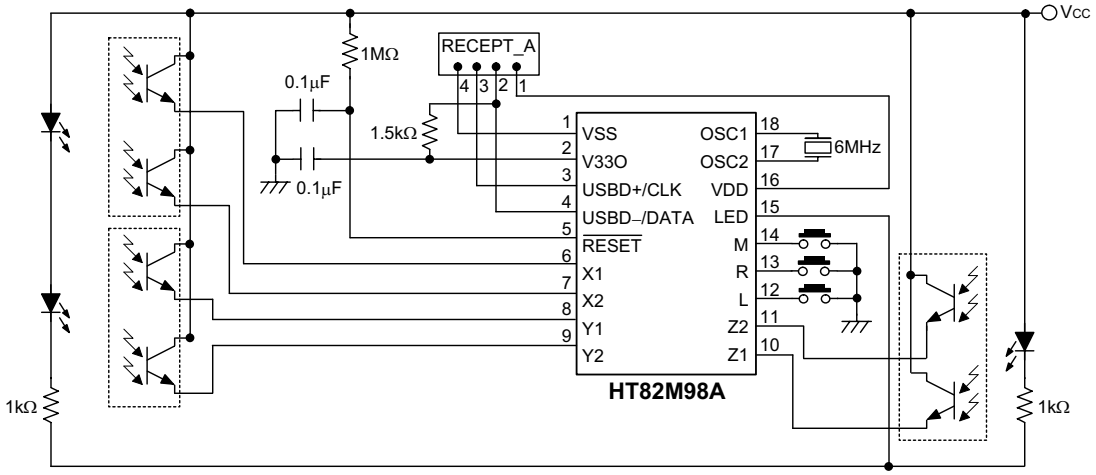
Ta=25°C

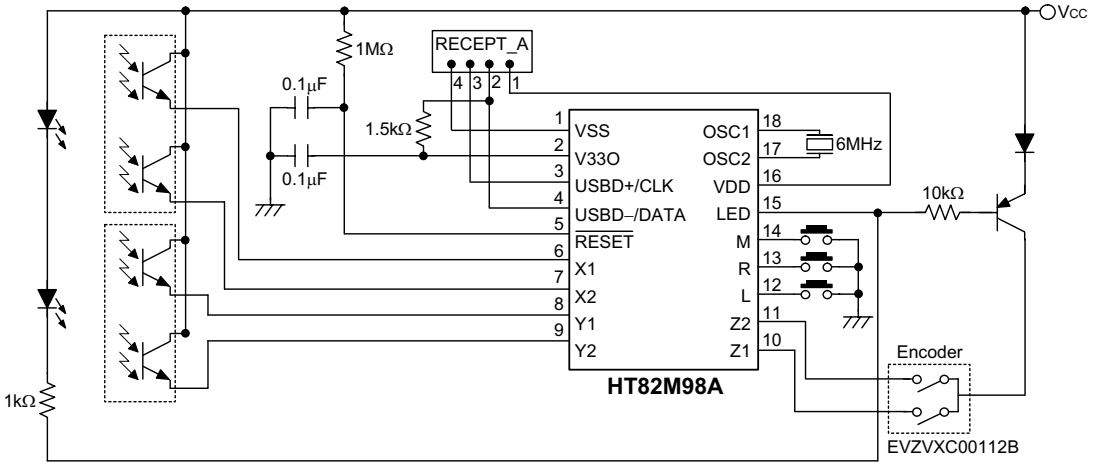
| Symbol | Parameter | Test Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| | | $V_{DD}$ | Conditions | | | | |
| $f_{SYS}$ | System Clock (Crystal OSC) | 5V | — | 0 | 6000 | — | kHz |
| $t_{WDTosc}$ | Watchdog Oscillator | — | — | 80 | 100 | 120 | μs |
| $t_{WDT}$ | Watchdog Time-out Period (RC OSC) | — | — | 768 | 1024 | 1280 | ms |
| $t_{PWRT}$ | Power-up Timer Period | — | — | — | 10 | — | ms |
| $t_{OST}$ | Oscillation Start-up Timer Period | — | Power-up or wake-up form HALT | — | 1024 | — | $t_{SYS}$ |

Note: $t_{SYS}=1/f_{SYS}$

## Application Circuits

**This application circuit is for reference only**



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