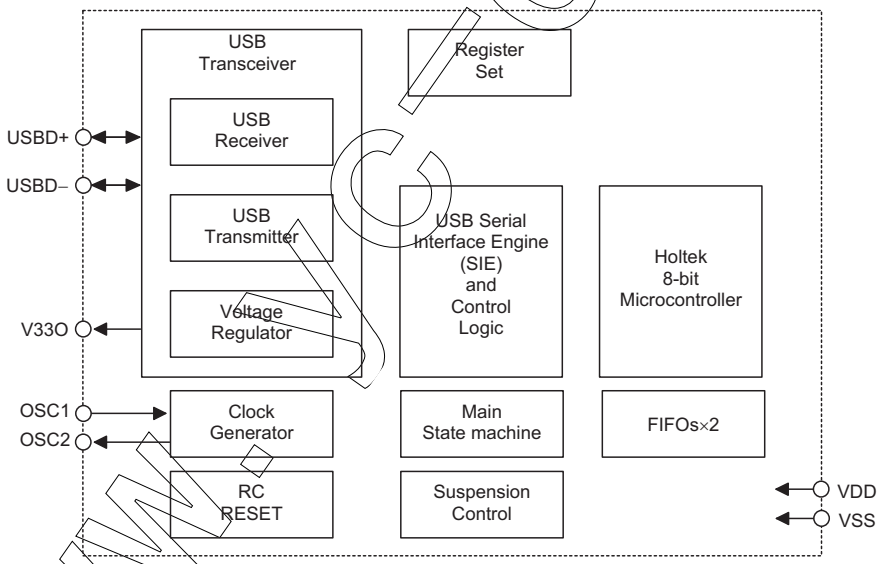
Features

- 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 three axes 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
- 20-pin DIP package

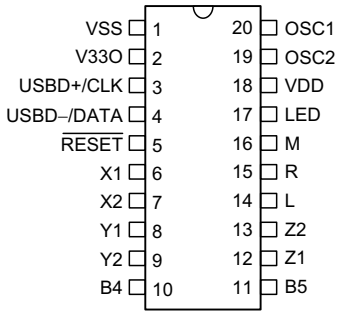
General Description

HT82M980A is a Plug and Play Windows 2000 and 5-button 3D USB+PS/2 Mouse controller. The HT82M980A 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 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; 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



HT82M980A
−20 DIP-A

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 (11 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
12, 13	Z1, Z2	I	Z-axis input supports two kinds of scroller input; optomechanical and mechanical
10, 11, 14 15, 16	L, R, M, B4, B5	I	Input ports with pull-high resistor. These pads can function as Left, Right, Middle, B4 and B5 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
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 .....–0.3V to 6V

MCU 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	—	—		4.4	—	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 (X1, X2, Y1, Y2, Z1, Z2, L, M, R, B4, B5)	5V	—		0	—	1.0	V
V_{IH1}	Input High Voltage (X1, X2, Y1, Y2, Z1, Z2, L, M, R, B4, B5)	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_{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

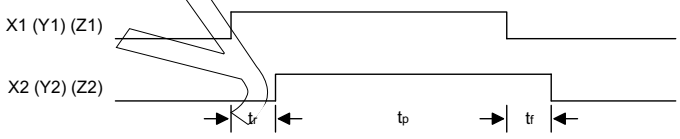
Ta=25°C

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{DD}	Conditions				
f_{SYS}	System Clock (Crystal OSC)	5V	—	0	6000	—	kHz

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

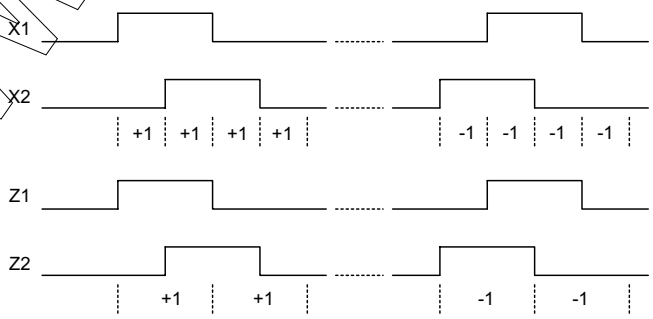
Timing Diagram

X, Y Axis Photo-Coupler Crossed Width



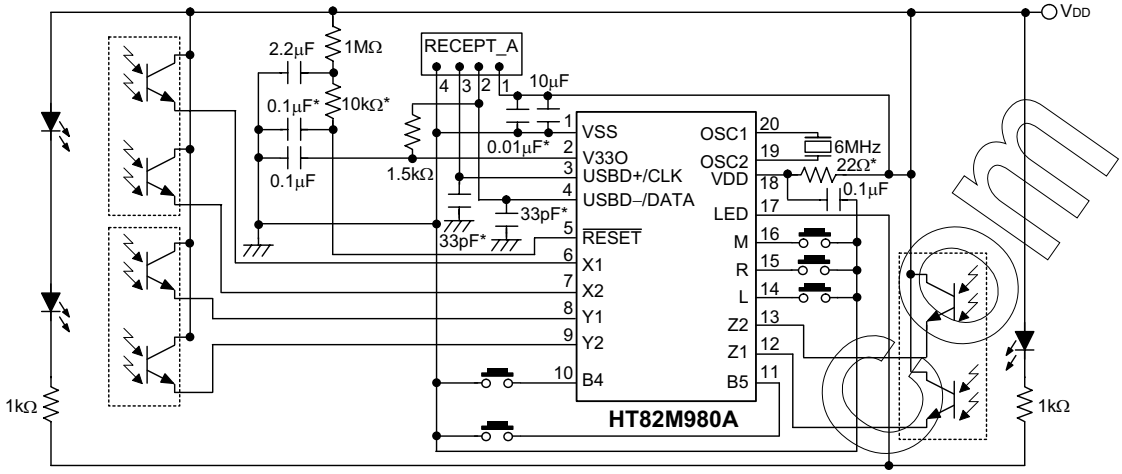
Note: For X, Y-axis t_r, t_p, t_f > 30μs
For Z-axis t_r, t_p, t_f > 1ms

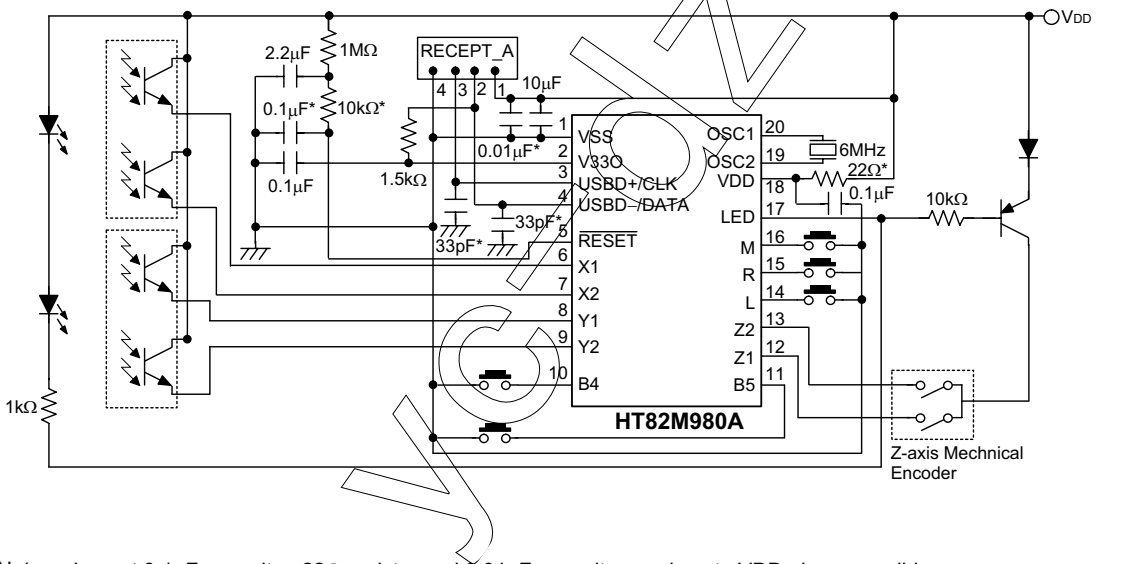
X, Y, Z Axis Counting



Application Circuits

This Application Circuit is for Reference Only





Note: Layout 0.1μF capacitor, 22Ω resistor and 0.01μF capacitor as close to VDD pin as possible.

Layout power plane and ground plane as large as possible.

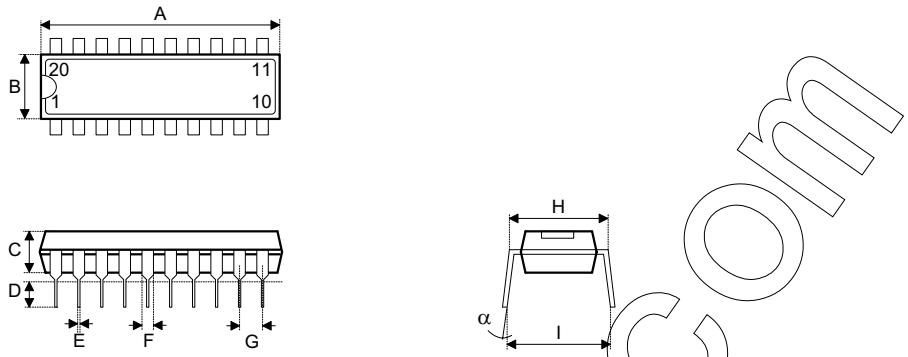
Place 0.1μF capacitor as close to $\overline{\text{RESET}}$ pin as possible.

Place 6MHz crystal as close to OSC1 and OSC2 pins as possible.

Components with * are used for EMC issue.

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

Holtek Semiconductor (Hong Kong) Ltd.
Block A, 3/F, Tin On Industrial Building, 777-779 Cheung Sha Wan Rd., Kowloon, Hong Kong
Tel: 852-2-745-8288
Fax: 852-2-742-8657

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