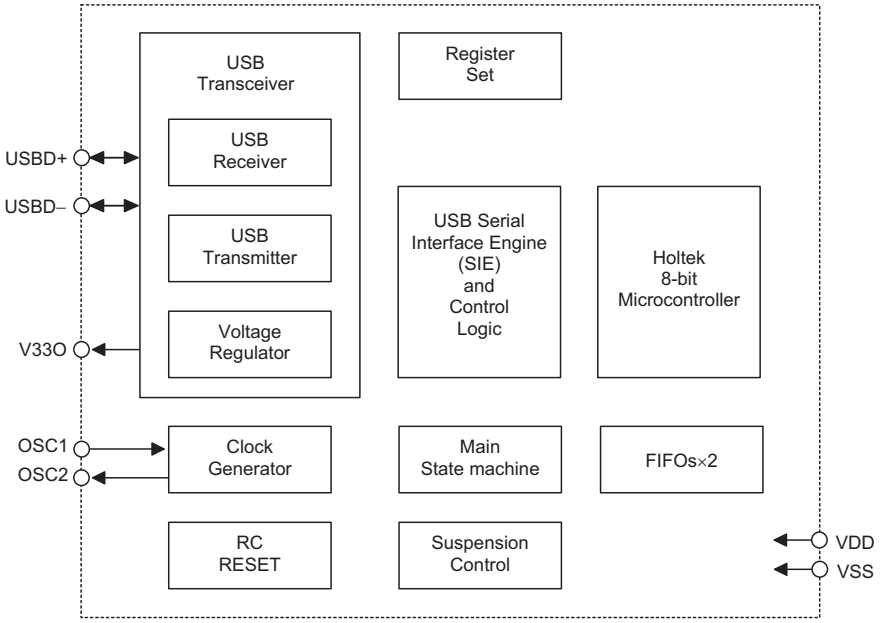
Features

- Operating voltage: 4.4V~5.25V
- 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 three buttons (R, M, L) 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
- 18-pin DIP package

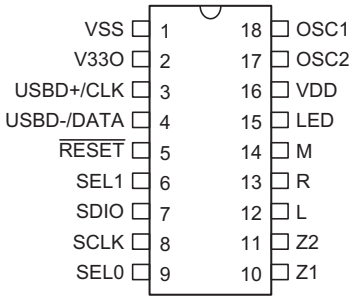
General Description

HT82M21A is a 3D mouse controller especially designed for USB and PS/2 applications. The HT82M21A 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; optomechanical and mechanical. It requires minimal external components to implement 3D USB plus PS/2 optical mouse. It can be briefly described as a 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



HT82M21A
−18 DIP-A

Pin Description

Pin No.	Pin Name	I/O	Description
1	VSS	—	Negative power supply, ground
2	V33O	O	3.3V voltage output
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
5	$\overline{\text{RESET}}$	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 SEL1=1, SEL0=1: Z-axis is divided by 1
7	SDIO	I/O	Serial data for Agilent sensor IC SDIO
8	SCLK	I	Serial data for Agilent sensor IC SCLK
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, Middle.
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 ..... V_{SS}–0.3V to V_{SS}+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_{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 MCU 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

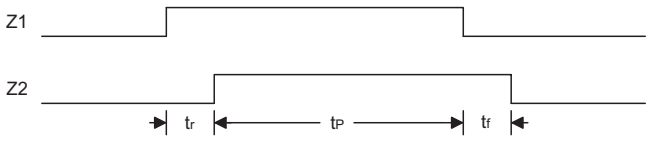
Ta=25°C

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{DD}	Conditions				
f_{SYS}	System Clock (Crystal OSC)	5V	—	0	6000	—	kHz
t_{OST}	Oscillation Start-up Timer Period	—	Power-up or wake-up form HALT	—	1024	—	t_{SYS}

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

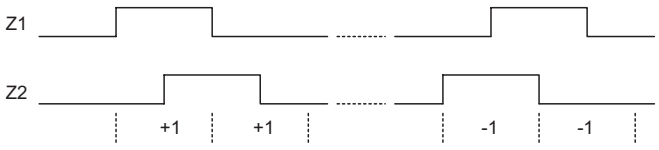
Timing Diagram

Z-axis Photo-Coupler Crossed Width



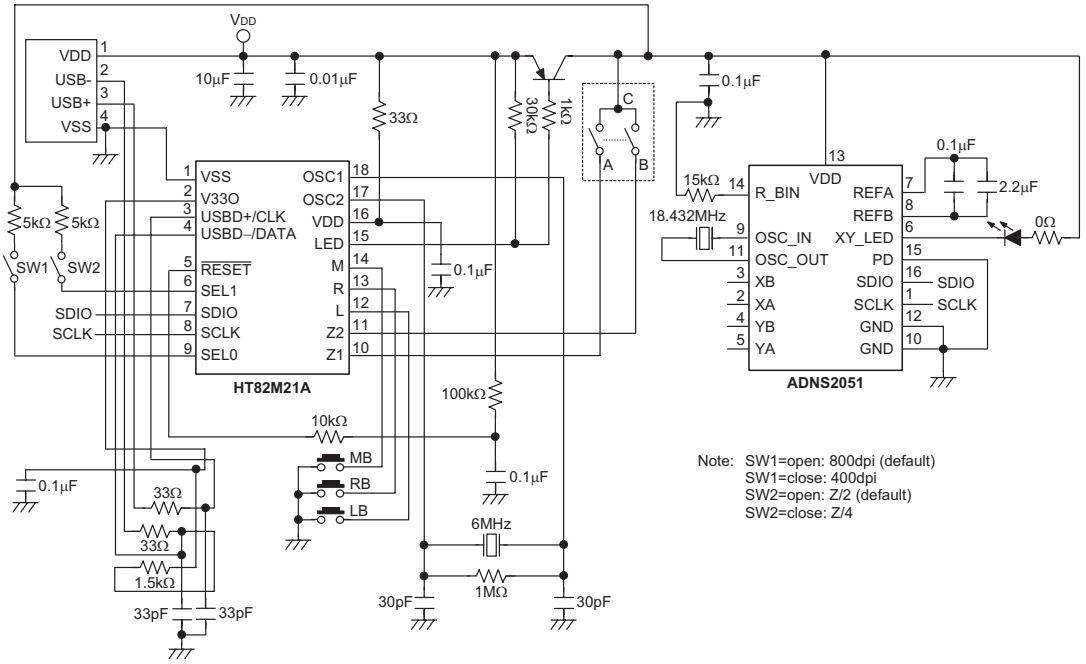
Note: For Z-axis t_r, t_P, t_f > 1ms

Z-axis Counting

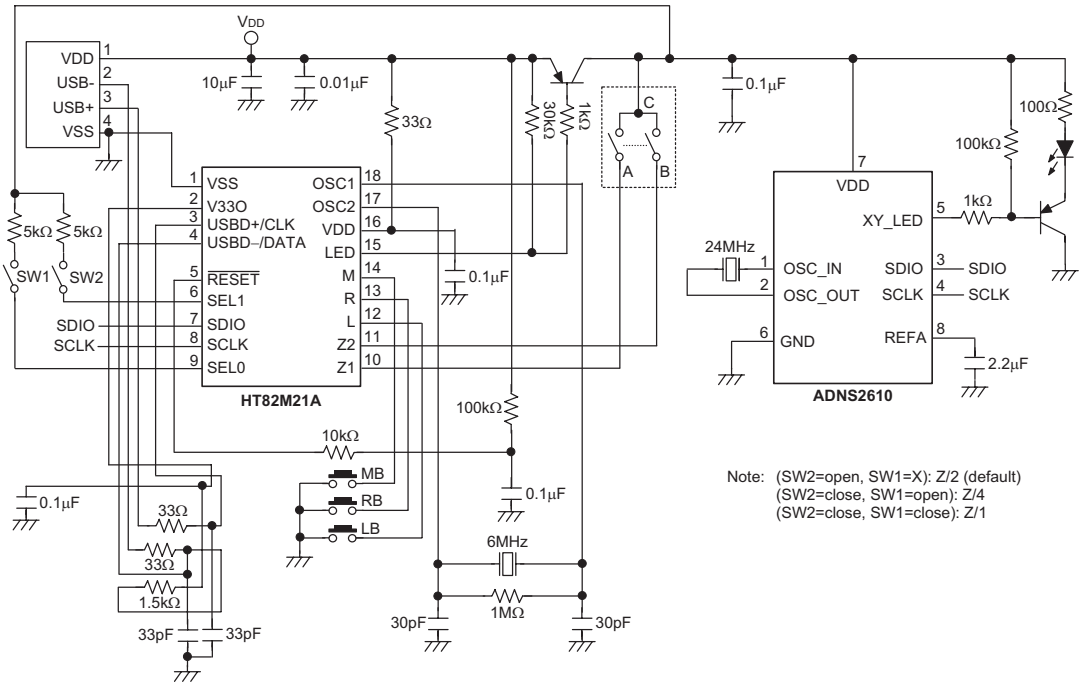


Application Circuits

This Application Circuit is for Reference Only



Note: SW1=open: 800dpi (default)
SW1=close: 400dpi
SW2=open: Z/2 (default)
SW2=close: Z/4

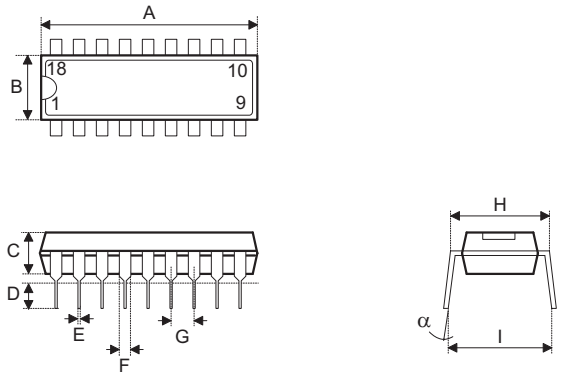


Note: (SW2=open, SW1=X): Z/2 (default)
(SW2=close, SW1=open): Z/4
(SW2=close, SW1=close): Z/1

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

Package Information

18-pin DIP (300mil) Outline Dimensions



Symbol	Dimensions in mil		
	Min.	Nom.	Max.
A	895	—	915
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°

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