PixArt Imaging Inc.

PAW3512DK SERIES USB OPTICAL MOUSE SINGLE CHIP

General Description

The PAW3512DK is an ultra low cost CMOS process optical mouse sensor single chip with USB interface that serves as a non-mechanical motion estimation engine for implementing a computer mouse. The PAW3512DK also embedded internal RC function to replace external resonator for BOM cost reduction and supported flexibility function change by programmer for easy and fast production.

Features

- ❑ **USB interface**
- ❑ **Single power supply**
- ❑ **Optical motion estimation technology**
- ❑ **Complete 2-D motion sensor**
- ❑ **Accurate motion estimation over a wide range of surfaces**
- ❑ **High speed motion detection up to 28 inches/sec**
- ❑ **Power saving mode during times of no movement**
- ❑ **Supports three buttons (R, M, L) and three axes (X, Y, Z) output**
- ❑ **Z-axis support mechanical input**
- ❑ **Internal RC oscillation without external resonator**
- ❑ **USB spec.**
  - ➢ **Complete Universal Serial Bus specs V1.1 compatibility**
  - ➢ **Complete USB HID specs V1.11 compatibility**
  - ➢ **Integrated USB transceiver and 1.5Mbps USB serial interface engine**
- ❑ **Flexibility function change**

Key Specification

Power Supply	**Wide operating supply range 4.25V ~ 5.5V**
Interface	**USB**
Optical Lens	**1:1**
System Clock	**24.000 MHz**
Speed	**28 inches/sec**
Acceleration	**8g**
Resolution	**1000 CPI**
Frame Rate	**3000 frames/sec**
Operating Current	**10mA @Mouse moving (Normal) 5mA @Mouse not moving (Sleep) 480uA @USB suspend (Suspend)**
Package	**Shrunk DIP12**

Ordering Information

Part Number	Sensor Rotate	CPI	Interface
PAW3512DK-TJZA	0˚	1000	U+P
PAW3512DK-TJYA	0˚	1000	U

V1.0 Oct. 2010

1. Pin Configuration

1.1 Pin Description

Pin #	Name	Type	Definition
1	BL	IN	Button left key input, normal pull-high, press connect to low
2	LED	I/O	LED control
3	VDDQ	BYPASS	I/O voltage reference
4	VSS	GND	Chip ground
5	VDD5V	PWR	Chip power VDD, 5.0V
6	VDDA	BYPASS	Analog voltage reference
7	D+/CLK	I/O	USB D+ or PS/2 mouse clock line
8	D-/DATA	I/O	USB D- or PS/2 mouse data line
9	BR	IN	Button right key input, normal pull-high, press connect to low
10	BM	IN	Button middle key input, normal pull-high, press connect to low
11	Z2	IN	Z axis, support mechanical scroller input
12	Z1	IN	Z axis, support mechanical scroller input

1.2 Pin Assignment for Sensor Rotate $0^\bullet$, $+90^\bullet$, $-90^\bullet$, $180^\bullet$
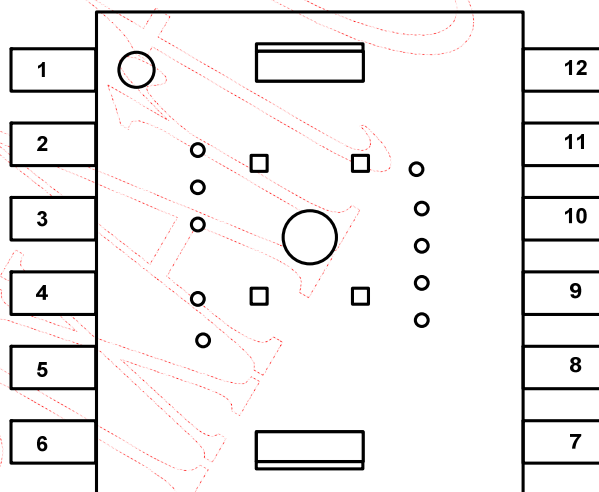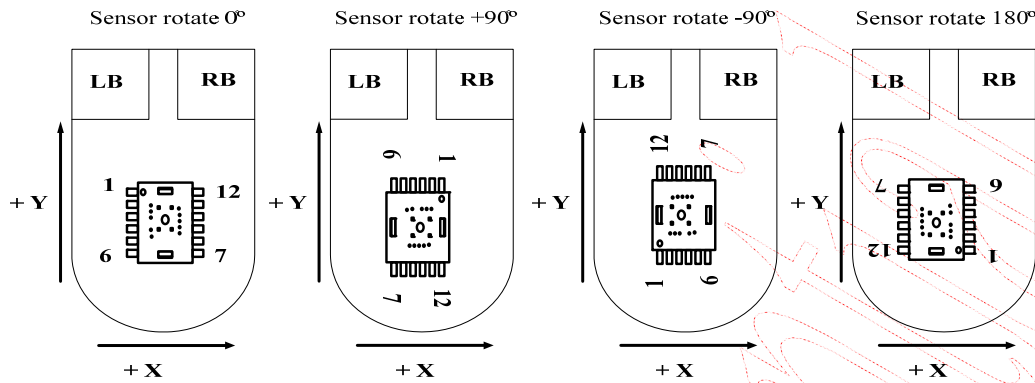

Figure 1. Top View Pinout

Figure 2. Top View of Mouse
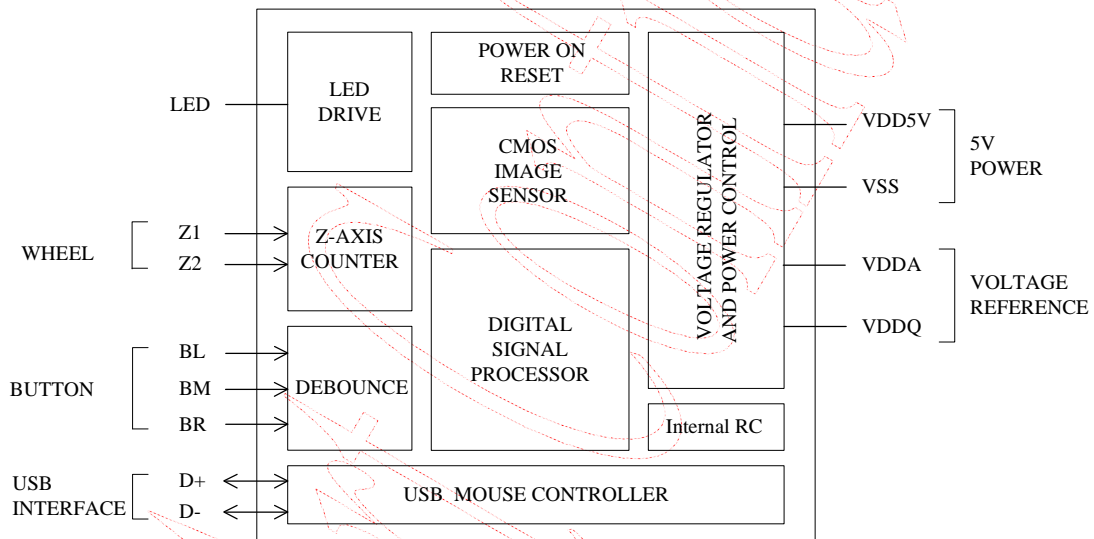
2. Block Diagram and Operation

Figure 3. Block Diagram

The PAW3512DK supports X, Y, Z three axes, and L, R, M three buttons under USB mode. It is a CMOS process optical mouse sensor single chip with USB interface that serves as a non-mechanical motion estimation engine for implementing a computer mouse.

The PAW3512DK is in a 12-pin optical package and comes with the resolution of 1000 counts per inch (CPI) and the rate of motion up to 28 inches per second. It includes USB interface so that no mouse controller is needed to interface through USB. The PAW3512DK can receive command and echo status or data format, both complete Universal Serial Bus® spec V1.1 and USB HID spec V1.11 compatibility. It is also a cost effective solution to support USB Mouse.

3. Referencing Application Circuit

3.1 3D3B Application Circuit
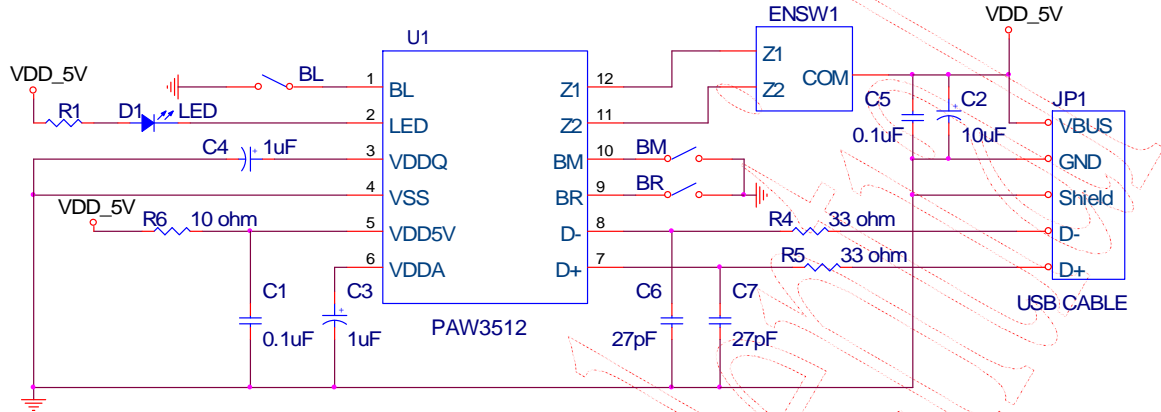
Note:
1. R4,R5,C6,C7 are for EMC immunity
2. USB cable connector JP1 is suggested to has the pin sequence like this:
   VBUS, GND, Shield, D-, D+

Figure 4. Application Circuit for PAW3512DK

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