PixArt Imaging Inc.

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PMW3310DH-AWQT
Low Power LED Gaming Mouse Sensor

Description

PMW3310DH-AWQT low power gaming sensor is a new addition to PixArt Imaging's gaming sensor family. The tracking system comprises of navigation IC, HSDL-4261 IR LED and lens. It provides enhanced features such as variable frame rate, programmable resolution, angle tunability, X-Y axis independent resolution, programmable angle snap plus configurable sleep and wake up time to suit various gamers' preferences.

This gaming sensor is in a 20-pin staggered dual in- line package (DIP). It is designed to be used with ADNS-2120-001 trim lens to achieve optimum performance featured in this document.

Theory of Operation

The sensor measures changes in position by optically acquiring sequential surface images (frames) and mathematically determining the direction and magnitude of movement. It contains an Image Acquisition System (IAS), a Digital Signal Processor (DSP), and a four wire serial port. The IAS acquires microscopic surface images via the lens and illumination system. These images are processed by the DSP to determine the direction and distance of motion. The DSP calculates the Δx and Δy relative displacement values. An external microcontroller reads the Δx and Δy information from the sensor serial port. The microcontroller then translates the data into PS2, USB, or RF signals before sending them to the host PC or game console.

Features

- 20-pin DIP package
- Operating Voltage: 2.7V – 3.3V
- VDDIO range: 1.65V – 3.3V
- 16-bits motion data registers
- High speed motion detection of 130ips and acceleration up to 30g
- Variable Frame Rate for optimum power performance
- Motion detect pin output
- Internal oscillator – no external clock input needed
- Enhanced Programmability
  - Frame rate up to 6,500fps
  - Resolution up to 5000cpi with step of ~50cpi
  - X and Y axis independent resolution setting
  - Programmable Rest Modes
  - Programmable Angle Snap
  - Angle Tunabilty

Applications

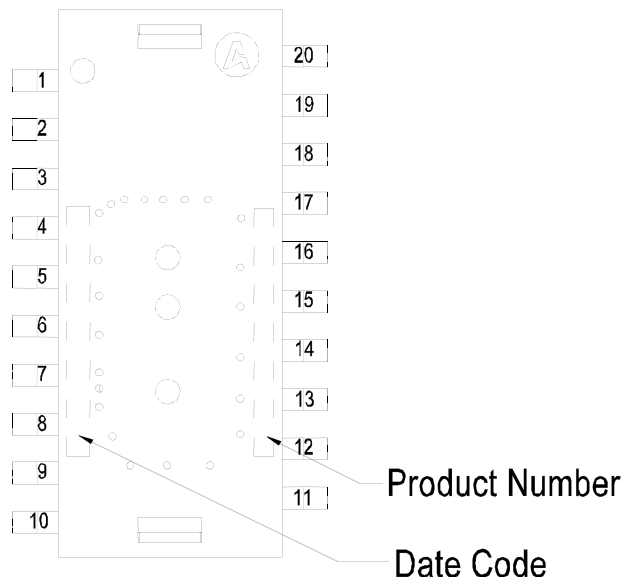- Corded and cordless gaming mice
- Motion input devices

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Device Pinout

Figure 1. Device Pinout of PMW3310DH-AWQT

Product Number: PMW3310DH-AWQT
Date Code: $CYW_kW_kW_fW_fR$ (C = CM Code, Y = Year Code, W_kW_k = Week Code, W_fW_f = Wafer Code, R = Remark (mark E for engineering lot))

Pin No	Pin Name	Input / Output/ Power	Description
1 – 2	NC	-	-
3	NCS	IN	Chip Select (Active Low Input)
4	SCLK	IN	Serial Clock Input
5	MOSI	IN	Serial Data Input (Master Out/Slave In)
6	MOTION	OUT	Motion Detect (Active Low Output)
7	VDDIO	PWR	IO Voltage
8	XYLED	OUT	LED Illumination Control
9	GND	PWR	Ground
10 – 11	VDD	PWR	3V Supply
12	NC	-	-
13	REF	PWR	Internal regulator output pin (To connect to external bypass cap)
14	GND	PWR	Ground
15	NC	-	-
16	MISO	OUT	Serial Data Output (Master In/Slave Out)
17 – 18	NC	-	-
19	GND	PWR	Ground
20	NC	-	-

LED

Clip

Sensor

Customer supplied PCB

Lens

Customer supplied base plate with recommended alignment features per IGES drawing

Figure 2. Exploded View of Assembly

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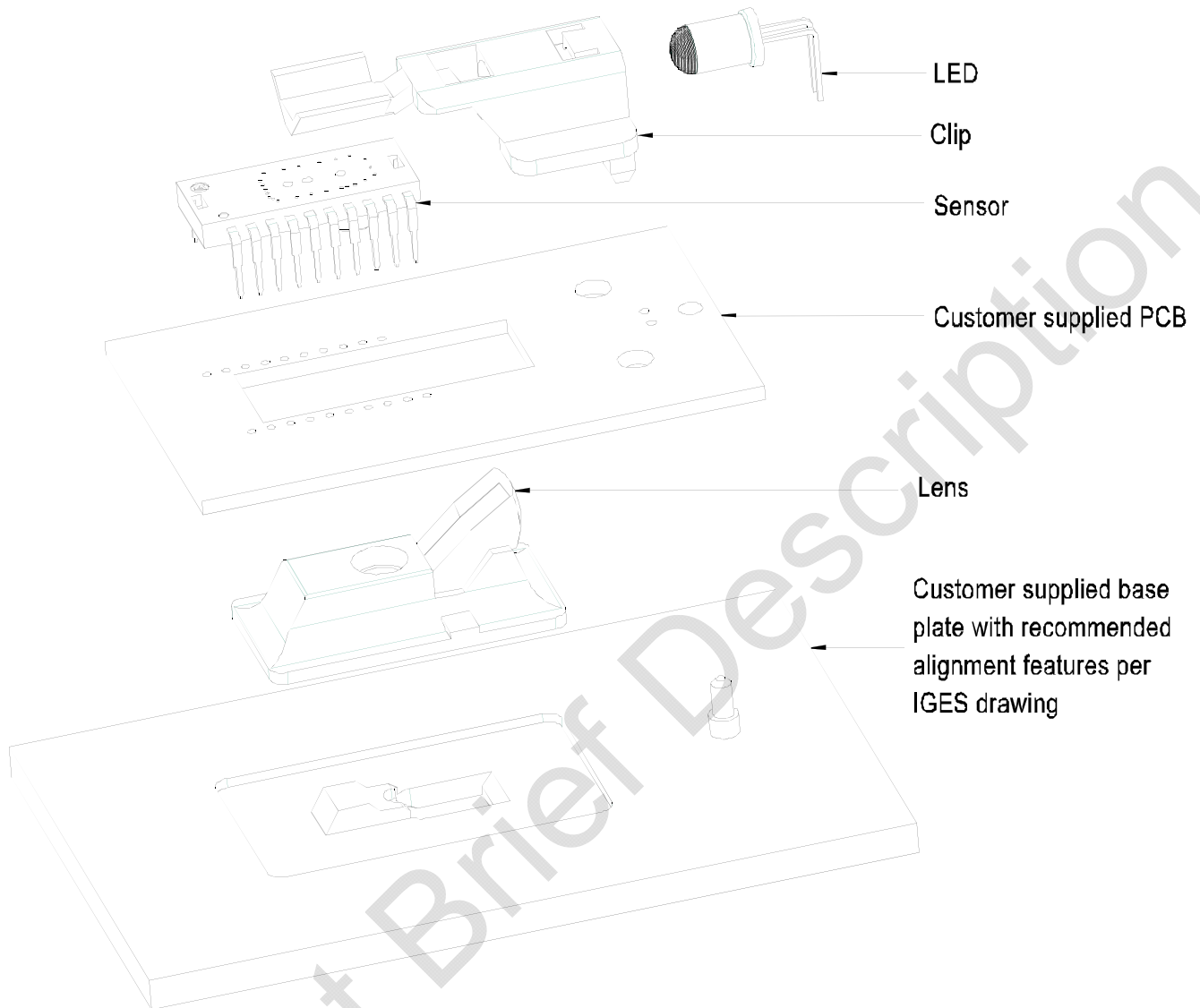
Registers

PMW3310DH-AWQT registers are accessible via the serial port. The registers are used to read motion data and status as well as to set the device configuration.

Address	Register	Read/Write	Default Value
0x00	Product_ID	R	0x3f
0x01	Revision_ID	R	0x01
0x02	Motion	R	0x20
0x03	Delta_X_L	R	0x00
0x04	Delta_X_H	R	0x00
0x05	Delta_Y_L	R	0x00
0x06	Delta_Y_H	R	0x00
0x07	SQUAL	R	0x00
0x08	Pixel_Sum	R	0x00
0x09	Maximum_Pixel	R	0x00
0x0a	Minimum_Pixel	R	0x00
0x0b	Shutter_Lower	R	0x7a
0x0c	Shutter_Upper	R	0x31
0x0d-0x0e	Reserved		
0x0f	Configuration_A	R/W	0x24
0x10	Configuration_B	R/W	0x00
0x11	Configuration_C	R/W	0x00
0x12	Frame_Capture	R/W	0x00
0x13	SROM_Enable	W	0x00
0x14	Run_Downshift	R/W	0x32
0x15	Rest1_Rate	R/W	0x01
0x16	Rest1_Downshift	R/W	0x1f
0x17	Rest2_Rate	R/W	0x09
0x18	Rest2_Downshift	R/W	0xbc
0x19	Rest3_Rate	R/W	0x31
0x1a	FrameDuration_MaxLimit_Lower	R/W	0x60
0x1b	FrameDuration_MaxLimit_Upper	R/W	0x6d
0x1c	FrameDuration_MinLimit_Lower	R/W	0x0c
0x1d	FrameDuration_MinLimit_Upper	R/W	0x1e
0x1e	Shutter_MaxLimit_Lower	R	0xb8
0x1f	Shutter_MaxLimit_Upper	R	0x0b
0x24	Observation	R/W	0x00
0x25	Data_Out_Lower	R	Undefined
0x26	Data_Out_Upper	R	Undefined
0x27-0x28	Reserved		
0x29	Pixel_Grab	R/W	0x00
0x2a	SROM_ID	R	0x00
0x2b-0x2e	Reserved		
0x2f	Configuration_D	R/W	0x00
0x30-0x38	Reserved		
0x39	Configuration_E	R/W	0x00
0x3a	Power_Up_Reset	W	NA

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Address	Register	Read/Write	Default Value
0x3b	Shutdown	W	NA
0x3c-0x3e	Reserved		
0x3f	Inverse_Product_ID	R	0xc0
0x40-0x41	Reserved		
0x42	Snap_Angle	R/W	0x06
0x43-0x46	Reserved		
0x47	Sensor_Mode	R/W	0x01
0x48-0x4f	Reserved		
0x50	Motion_Burst	R/W	0x00
0x51-0x61	Reserved		
0x62	SROM_Load_Burst	W	NA
0x63	Reserved		
0x64	Pixel_Burst	R	0x00