eKM8065

USB and PS/2 Mouse Controller

Product Specification

DOC. VERSION 1.1

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Contents

Specification Revision History

Doc. Version	Revision Description	Date
1.0	Initial released version	2007/04/13
1.1	Set PD as output always while controlling the sensor.	2009/02/12

1 General Description

The eKM8065 is a Mouse Controller designed to control both USB and PS/2 Mouse device with 2-wire SPI (SCK and SDIO) interface sensor.

This Mouse Controller can auto detect whether in USB or PS/2 mode, and supports 3D 3K with enhanced wheel (horizontal scrolling) mouse.

2 Features

- Operating voltage: 4.4V ~ 5.2V

- Compatible with Universal Serial Bus Specification, version 1.1

- Compatible with USB HID Specification, version 1.11

- Compatible with Microsoft 3D PS/2 mouse

- Auto-detecting PS/2 port or USB port

- External 6 MHz ceramic resonator for system clock

- Supports mechanical Z/2 Z-axis input

- Supports OM10 and ADNS-2051 optical sensor

- Support USB 16-bit XY data for high speed motion

- DPI switch type:
  - Button switch
  - Slide switch

- Dynamic DPI switch:
  - USB supports 800,1600 DPI
  - PS/2 supports 400, 800 DPI

- Applications:
  - 3D, 3 Buttons USB and PS/2 Combo Mouse
  - 3D, 3 Buttons with enhanced wheel USB and PS/2 Combo Mouse

- Enhanced wheel function:
  - USB horizontal scrolling enabled by default in Windows Vista operating system.
  - USB and PS/2 horizontal scrolling enabled by ELAN enhanced wheel mouse S/W in Windows XP and Windows 2000 operating system.

- 20-pin package (eKM8065C) has additional DPI LED display

- Package:
  - 18-pin PDIP (300 mil) eKM8065BP
  - 18-pin SOP (300 mil) eKM8065BM
  - 20-pin PDIP (300 mil) eKM8065CP
  - 20-pin SOP (300 mil) eKM8065CM

3   Pin Assignment

■   **eKM8065B (18-Pin)**

CPI	1	18	Z1
L KEY	2	17	Z2
R KEY	3	16	ZX_L
M KEY	4	15	PD / M_SEL
SCLK	5	14	SDIO
ZX_R/BTN_SWT	6	13	D+ / CLK
VSS	7	12	D- / DATA
V3.3	8	11	VDD
OSCI	9	10	OSCO
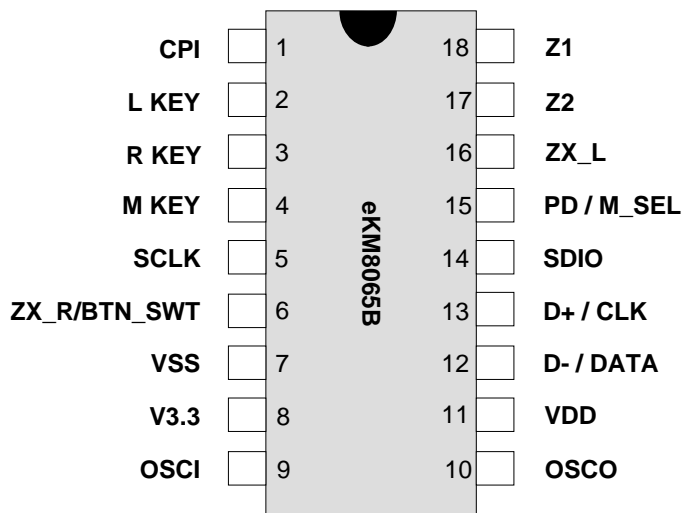
eKM8065B

Figure 3-1 eKM8065B (18-Pin) Pin Assignment

■   **eKM8065C (20-Pin)**

CPI	1	20	Z1
L KEY	2	19	Z2
R KEY	3	18	ZX_L
M KEY	4	17	PD / M_SEL
SCLK	5	16	SDIO
ZX_R / BTN_SWT	6	15	LED
VSS	7	14	D+ / CLK
VSS	8	13	D- / DATA
V3.3	9	12	VDD
OSCI	10	11	OSCO
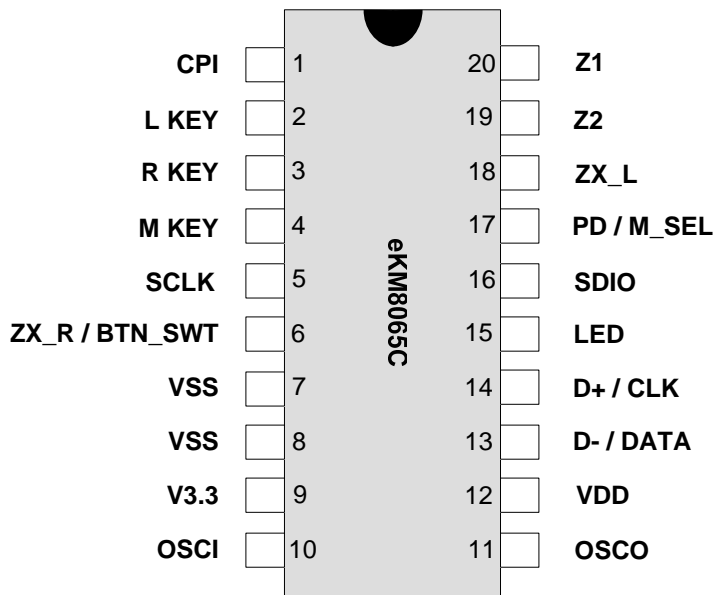
eKM8065C

Figure 3-2 eKM8065C (20-Pin) Pin Assignment

4   Pin Description

■   **eKM8065B (18-Pin)**

Pin	Symbol	I/O	Function

1	CPI	I	DPI select pin. Input port with internal 200 KΩ pulled high to V3.3V.
			
			To select BTN DPI switch type, press this button to change the DPI.
			
			To select Slide DPI switch type
			    USB : detect low for 800 DPI, detect high for 1600 DPI.
			    PS/2 : detect low for 400 DPI, detect high for 800 DPI.

2	L	I	Left Key Input. Input port with internal 200 KΩ puledl high to V3.3V.
3	R	I	Right Key Input. Input port with internal 200 KΩ pulled high to V3.3V.
4	M	I	Middle Key Input. Input port with internal 200 KΩ pulled high to V3.3V.
5	SCLK	I/O	Serial port clock output, while eKM8065 transmits data to OM10. Serial port clock internal 200K resistor pulled high to V3.3V, while eKM8065 is idle.
6	ZX_R / BTN_SWT	I	Input port with internal 200 KΩ pulled high to V3.3V. To select 3D 3-Key with enhanced wheel mode, the DPI switch type is fixed on BTN DPI switch type. 3D 3-Key with enhanced wheel mode : horizontal scrolling right Key Input To select 3D 3-Key mode, this pin is also use for DPI switch type selection. While in power on, this pin detects DPI switch type. This pin is connected to VSS for BTN DPI switch type. This pin is open or connected to V3.3V for Slide DPI switch type.
7	VSS	-	GND
8	V3.3V	O	3.3V DC voltage output from internal regulator. This pin has to be tied to a 4.7 µF capacitor.
9	OSCI	I	6 MHz ceramic resonator input.
10	OSCO	I/O	Return path for 6 MHz ceramic resonator.

Pin	Symbol	I/O	Function
11	VDD	–	5V Power supply
12	D- / DATA	I/O	USB D- or PS/2 Data
13	D+ / CLK	I/O	USB D+ or PS/2 CLK
14	SDIO	I/O	Serial port data I/O
15	PD / M_SEL	I/O	This pin is an internal 200 KΩ pulled high to V3.3V. It is used for mouse mode selection. This pin connects an external 100 KΩ to V3.3V for 3D 3-Key mode. This pin connects an external 1 MΩ to VSS for 3D 3-Key with enhanced wheel mode. Set output high to power down the sensor or output low to activate the sensor.
16	ZX_L	I	Input port with internal 200 KΩ pulled high to V3.3V. Key function : 3D 3-Key mode : this pin connects to V3.3V 3D 3-Key with enhanced wheel mode : horizontal scrolling left Key Input
17	Z2	I	Z axis Input 2. Input port with internal 200 KΩ pulled high to V3.3V.
18	Z1	I	Z axis Input 1. Input port with internal 200 KΩ pulled high to V3.3V.

■ **eKM8065C (20-Pin)**

Pin	Symbol	I/O	Function
1	CPI	I	DPI select pin. Input port with internal 200 KΩ pulled high to V3.3V. To select BTN DPI switch type, press this button to change the DPI. To select Slide DPI switch type 　USB : detect low for 800 DPI, detect high for 1600 DPI. 　PS/2 : detect low for 400 DPI, detect high for 800 DPI.
2	L	I	Left Key Input. Input port with internal 200 KΩ puledl high to V3.3V.
3	R	I	Right Key Input. Input port with internal 200 KΩ pulled high to V3.3V.
4	M	I	Middle Key Input. Input port with internal 200 KΩ pulled high to V3.3V.
5	SCLK	I/O	Serial port clock output, while eKM8065 transmits data to OM10. Serial port clock internal 200K resistor pulled high to V3.3V, while eKM8065 is idle.
6	ZX_R / BTN_SWT	I	Input port with internal 200 KΩ pulled high to V3.3V. To select 3D 3-Key with enhanced wheel mode, the DPI switch type is fixed on BTN DPI switch type. 3D 3Key with enhanced wheel mode : horizontal scrolling right Key Input To select 3D 3-Key mode, this pin is also use for DPI switch type selection. While in power on, this pin detects DPI switch type. This pin is connected to VSS for BTN DPI switch type. This pin is open or connected to V3.3V for Slide DPI switch type.
7	VSS	-	GND
8	VSS	-	GND
9	V3.3V	O	3.3V DC voltage output from internal regulator. This pin has to be tied to a 4.7 µF capacitor.
10	OSCI	I	6 MHz ceramic resonator input.
11	OSCO	I/O	Return path for 6 MHz ceramic resonator.

Pin	Symbol	I/O	Function
12	VDD	–	5V Power supply
13	D- / DATA	I/O	USB D- or PS/2 Data
14	D+ / CLK	I/O	USB D+ or PS/2 CLK
15	LED	O	DPI LED display pin. USB : LED off : 800 DPI (power-on default) LED on : 1600 DPI (double by F/W) PS/2 : LED off : 400 DPI (power-on default) LED on : 800 DPI (double by F/W)
16	SDIO	I/O	Serial port data I/O
17	PD/M_SEL	I/O	This pin is an internal 200 KΩ pulled high to V3.3V. It is used for mouse mode selection. This pin connects an external 100 KΩ to V3.3V for 3D 3-Key mode. This pin connects an external 1 MΩ to VSS for 3D 3-Key with enhanced wheel mode. Set output high to power down the sensor or output low to activate the sensor.
18	ZX_L	I	Input port with internal 200 KΩ pulled high to V3.3V. Key function : 3D 3-Key mode : this pin connects to V3.3V 3D 3-Key with enhanced wheel mode : horizontal scrolling left Key Input
19	Z2	I	Z axis Input 2. Input port with internal 200 KΩ pulled high to V3.3V.
20	Z1	I	Z axis Input 1. Input port with internal 200 KΩ pulled high to V3.3V.

5 Functional Description
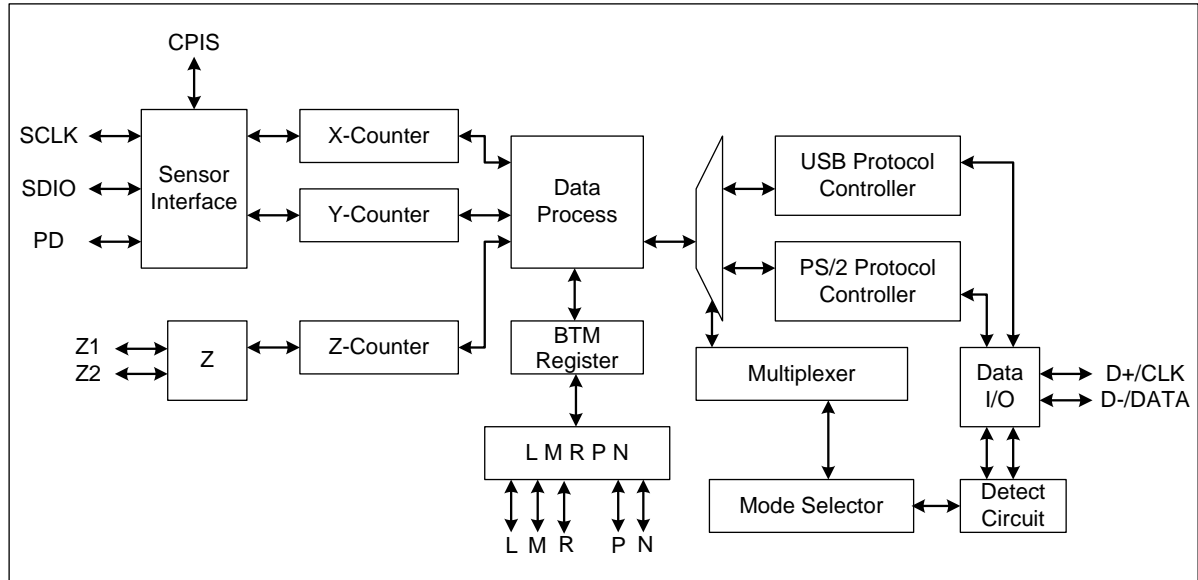
Figure 5-1 eKM8065 Functional Block Diagram
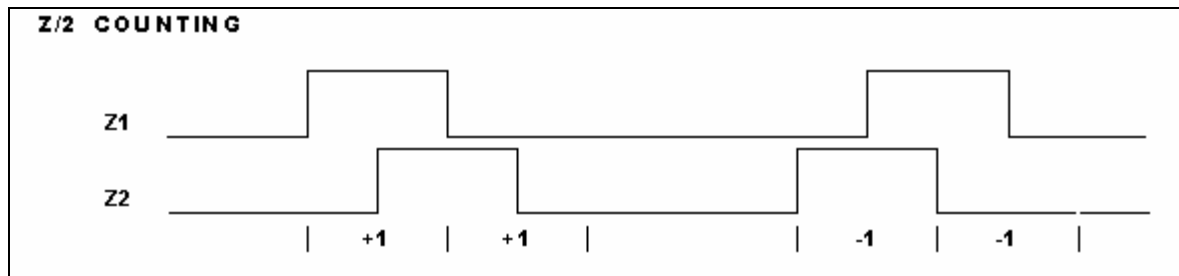
Figure 5-2 Quadrature Signal Timing Diagram

■ **PS/2 Functional Description**

● PS/2 Mouse Command Description

Hex Code	Command	eKM8065 Echo Code
FF	Reset	FA,AA,00
FE	Resend	XX,(XX,XX)
F6	Set Default	FA
F5	Disable	FA
F4	Enable	FA
F3,XX	Set Sampling Rate	FA,FA
F2	Read Device Type	FA,00
F0	Set Remote Mode	FA
EE	Set Wrap Mode	FA
EC	Reset Wrap Mode	FA
EB	Read Data	FA,XX,XX,XX
EA	Set Stream Mode	FA
E9	Status Request	FA,XX,XX,XX
E8, XX	Set Resolution	FA,FA
E7	Set Autospeed	FA
E6	Reset Autospeed	FA

● Microsoft 3D 3-Key PS/2 scrolling mouse

(A) Entering procedure: Except in WRAP mode, while the eKM8065 received the following consecutive commands.

i. F3 C8 ---- set sampling rate at 200/sec

ii. F3 64 ---- set sampling rate at 100/sec

iii. F3 50 ---- set sampling rate at 80/sec

(B) Operating in PS/2 3D 3-Key scrolling mode:

a. All of the commands in legacy mode are still valid.

b. The ID code of the read device type command (F2) will change from "00" to "03".

c. Data report will be four bytes format.

[3D 3 Buttons Data Format]

Byte	Bit	Description
1	0	Left button status; 1 = pressed
	1	Right button status; 1 = pressed
	2	Middle button status; 1 = pressed
	3	Reserve to 1
	4	X data sign; 1 = negative
	5	Y data sign; 1 = negative
	6	X data overflow; 1 = overflow
	7	Y data overflow; 1 = overflow
2	0-7	X data (D0-D7)
3	0-7	Y data (D0-D7)
4	0-7	Z data (D0-D7)

- Microsoft 3D 3-Key PS/2 with enhanced wheel scrolling mouse

  (A) Entering procedure: after eKM8065 enter scrolling mouse mode (Mouse ID = 03), while eKM8065 received the following consecutive commands. The eKM8065 will enter enhanced wheel mode, Mouse ID: 03).

  i. F3 C8 ------- set sampling rate at 200/sec

  ii. F3 50 ------- set sampling rate at 80/sec

  iii. F3 28 ------- set sampling rate at 40/sec

  iv. F3 C8 -------set sampling rate at 200/sec

  v. F3 C8 -------set sampling rate at 200/sec

  vi. F3 3C -------set sampling rate at 60/sec

  vii. F3 64 ------ set sampling rate at 100/sec

(B) Operating PS/2 3D 3-Key enhanced wheel scrolling mode:

a. All of the commands in legacy mode are still valid.

b. The ID code of the read device type command (F2) will change from "00" to "03".

c. Data report will be four bytes format:

[3D 3 Buttons Enhanced Wheel Data Format]

Byte	Bit	Description
1	0	Left button status; 1 = pressed
	1	Right button status; 1 = pressed
	2	Middle button status; 1 = pressed
	3	Reserve to 1
	4	X data sign; 1 = negative
	5	Y data sign; 1 = negative
	6	X data overflow; 1 = overflow
	7	Y data overflow; 1 = overflow
2	0-7	X data (D0-D7)
3	0-7	Y data (D0-D7)
4	0-7	Z data (D0-D7) Or 0x41 when horizontal scrolling right key press Or 0x7F when horizontal scrolling left key press

(C) Exiting Microsoft scrolling mode:

There are two ways to exit:

a. Power off

b. Reset command (FF)

- Z-axis Input Function

  (A) The Z0-Z7 limit value is 7

  (B) Z-axis counter accumulates the Z1, Z2 phase changed by movement. This mode includes noise immunity.

  (C) Z/2: 2 dots per count. The wheel should remain at Z1=0, Z2=0 or Z1=1, Z2=1 Phase

6 USB Functional Description

6.1 Device Descriptor

Offset	Field	Size	Description	Value
0	bLength	1	The size of this descriptor is 18 bytes	0x12
1	bDescriptorType	1	DEVICE Descriptor Type	0x01
2	bcdUSB	2	Device complies with USB Specification Version 1.10	0x0110
4	bDeviceCalss	1	Each interface specifies its own class information	0x00
5	bDeviceSubClass	1	Each interface specifies its own sub class information	0x00
6	bDeviceProtocol	1	No protocol on the device basis	0x00
7	bMaxPacketSize0	1	Maximum packet size for endpoint zero is 8	0x08
8	idVendor	2	The Vendor ID is 0x04F3	0x04F3
10	idProduct	2	The Product ID is 0x0217(3D3K)/0x0222(3D3K with enhanced wheel)	0x0217 / 0x0222
12	bcdDevice	2	The device release number is 0x6510	0x6510
14	iManufacturer	1	The device does not have the string descriptor describing the manufacturer	0x00
15	iProduct	1	The index of the string[1] descriptor describing the product is "2"	0x02
16	iSerialNumber	1	The device does not have the string descriptor that describes the serial number	0x00
17	bNumConfigurations	1	The device uses "1" as possible configuration	0x01

[1] *Product String: "USB Mouse"*

6.2 Configuration Descriptor

Offset	Field	Size	Description	Value
0	bLength	1	The size of this descriptor is 9 bytes	0x09
1	bDescritorType	1	CONFIGURATION Descriptor Type	0x02
2	wTotalLength	2	The total length of data for this configuration is 34 bytes. This includes the combined length of all the descriptors returned.	0x0022
4	bNumInterfaces	1	This configuration supports "1" interface	0x01
5	bConfigurationValue	1	The value "1" should be used to select this configuration.	0x01
6	iConfiguration	1	The device does not have the string descriptor describing this configuration.	0x00
7	bmAttributes	1	Configuration characteristics**:** • Bit 7**:** Reserved (set to one) **1** • Bit 6**:** Self-powered **0** • Bit 5**:** Remote Wake-up **1**	0xA0
8	MaxPower	1	Maximum power consumption of the device under this configuration is 100 mA	0x32

6.3 Interface Descriptor

Offset	Field	Size	Description	Value
0	bLength	1	The size of this descriptor is 9 bytes	0x09
1	bDescriptorType	1	INTERFACE Descriptor Type	0x04
2	bInterfaceNumber	1	The number of this interface is "0"	0x00
3	bAlternateSetting	1	The value used to select an alternate setting for this interface is "0"	0x00
4	bNumEndpoints	1	The number of endpoints used by this interface is "1" (excluding endpoint zero)	0x01
5	bInterfaceClass	1	The interface implements HID class	0x03
6	bInterfaceSubClass	1	The subclass code is 0x01	0x01
7	bInterfaceProtocol	1	The protocol code is 0x02	0x02
8	iInterface	1	The device does not have the string descriptor describing this interface	0x00

6.4 Human Interface Device (HID) Descriptor

Offset	Field	Size	Description	Value
0	bLength	1	The size of this descriptor is 9 bytes	0x09
1	bDescriptorType	1	HID Descriptor Type	0x21
2	bcdHID	2	Device compliant to the HID specification version 1.11	0x0111
4	bCountryCode	1	The country code is 0x00	0x00
5	bNumDescriptors	1	The number of class descriptor is "1"	0x01
6	bDescriptorType	1	The class descriptor is Report descriptor	0x22
7	wDescriptorlength	2	The total size of the class descriptor is 64 bytes (3D 3K) / 71 bytes (3D 3K with enhanced wheel)	0x0040 / 0x0047

6.5 Endpoint Descriptor

Offset	Field	Size	Description	Value
0	bLength	1	The size of this descriptor is 7 bytes	0x07
1	bDescriptorType	1	ENDPOINT Descriptor Type	0x05
2	bEndpointAddress	1	This is an IN endpoint with address (endpoint number) 1	0x81
3	bmAttributes	1	Types of attributes**:** • Transfer **:** Interrupt • Sync **:** No Sync • Usage **:** Data EP	0x03
4	wMaxPackerSize	2	Maximum packet size value for this endpoint is 6 bytes (3D3K) / 7 bytes (3D3K with enhanced wheel) (Bits 12-11**:** Addtl. Transactions/frame)	0x0006/ 0x0007
6	bInterval	1	bInterval**:**10. The polling interval value is bInterval or 2**(bInterval-1)	0x0A

6.6 Report Descriptor

■ **For 3D 3K Mouse**

0x05	0x01	Usage Page (Generic Desktop Control)
0x09	0x02	Usage (Mouse)
0xA1	0x01	Collection (Application)
0x09	0x01	Usage (Pointer)
0Xa1	0x00	Collection (Physical)
0x05	0x09	Usage Page (Button)
0x19	0x01	Usage Minimum (1)
0x29	0x03	Usage Maximum (3)
0x15	0x00	Logical Minimum (0)
0x25	0x01	Logical Maximum (1)
0x95	0x03	Report Count (3)
0x75	0x01	Report Size (1)
0x81	0x02	Input (DATA, VARIABLE, ABSOLUTE)
0x95	0x05	Report Count (5)
0x75	0x01	Report Size (1)
0x81	0x03	Input (CONSTANT)
0x05	0x01	Usage Page (Generic Desktop Control)
0x09	0x30	Usage (X)
0x09	0x31	Usage (Y)
0x16	0x8000	Logical Minimum (-32767)
0x26	0x7FFF	Logical Minimum (+32767)
0x75	0x10	Report Size (16)
0x95	0x02	Report Count (2)
0x81	0x06	Input (Data, Variable, Relative)
0x09	0x38	USAGE (WHEEL)
0x15	0x81	LOGICAL MINIMUM (-127)
0x25	0x7F	LOGICAL MAXIMUM (+127)
0x75	0x08	REPORT SIZE (8)
0x95	0x01	REPORT COUNT (1)
0x81	0x06	INPUT (DATA, VARIABLE, RELATIVE)
0xC0		End Collection
0xC0		End Collection

■   **For 3D 3K with Enhanced Wheel Mouse**

0x05	0x01	Usage Page (Generic Desktop Control)
0x09	0x02	Usage (Mouse)
0xA1	0x01	Collection (Application)
0x09	0x01	Usage (Pointer)
0Xa1	0x00	Collection (Physical)
0x05	0x09	Usage Page (Button)
0x19	0x01	Usage Minimum (1)
0x29	0x03	Usage Maximum (3)
0x15	0x00	Logical Minimum (0)
0x25	0x01	Logical Maximum (1)
0x95	0x03	Report Count (3)
0x75	0x01	Report Size (1)
0x81	0x02	Input (DATA, VARIABLE, ABSOLUTE)
0x95	0x05	Report Count (5)
0x75	0x01	Report Size (1)
0x81	0x03	Input (CONSTANT)
0x05	0x01	Usage Page (Generic Desktop Control)
0x09	0x30	Usage (X)
0x09	0x31	Usage (Y)
0x16	0x8000	Logical Minimum (-32767)
0x26	0x7FFF	Logical Minimum (+32767)
0x75	0x10	Report Size (16)
0x95	0x02	Report Count (2)
0x81	0x06	Input (Data, Variable, Relative)
0x09	0x38	USAGE (WHEEL)
0x15	0x81	LOGICAL MINIMUM (-127)
0x25	0x7F	LOGICAL MAXIMUM (+127)
0x75	0x08	REPORT SIZE (8)
0x95	0x01	REPORT COUNT (1)
0x81	0x06	INPUT (DATA, VARIABLE, RELATIVE)
0x05	0x0C	USAGE PAGE (CONSUMER)
0x0A	0x0238	USAGE (AC PAN)
0x81	0x06	INPUT (DATA, VARIABLE, RELATIVE)
0xC0		End Collection
0xC0		End Collection

6.7 USB Mouse Report Data Type

■   **BOOT Mode**

Byte 1	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	0	0	0	0	0	M	R	L
Byte 2	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	X-Movement Data							
Byte 3	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	Y-Movement Data							

■   **3D 3K**

Byte 1	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	0	0	0	0	0	M	R	L
Byte 2	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	X-Movement Data Low Byte							
Byte 3	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	X-Movement Data High Byte							
Byte 4	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	Y-Movement Data Low Byte							
Byte 5	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	Y-Movement Data High Byte							
Byte 6	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	Z-Movement Data							

■ **3D 3K with Enhanced Wheel**

Byte 1	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	0	0	0	0	0	M	R	L
Byte 2	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	X-Movement Data Low Byte							
Byte 3	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	X-Movement Data High Byte							
Byte 4	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	Y-Movement Data Low Byte							
Byte 5	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	Y-Movement Data High Byte							
Byte 6	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	Z-Movement Data							
Byte 7	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	AC_PAN							

7 Absolute Maximum Rating

Symbol	Min.	Max.	Unit
Temperature under bias	0	70	ºC
Storage temperature	−65	150	ºC
Input voltage	−0.5	6.0	V
Output voltage	−0.5	6.0	V

8   Electrical Characteristics

Test Condition: T = 25°C, VDD=5.0V, VSS=0V

| Parameters	Sym.	Min.	Typ.	Max.	Unit	Remarks
Operating voltage	VDD	4.5	5.0	5.5	V	-
Operating Current (Normal operation)	IOP	-	-	10	mA	-
Operating Current (Suspend)	Isuspend	-	-	200	µA	-
Operating Current (Sleep mode)	Isleep	-	-	100	µA	-
Output voltage of 3.3V regulator	Vreg	3.0	3.3	3.6	V	-
L, M, R, P, N input high voltage	VIH	2.0	-	-	V	-
L, M, R, P,N input low voltage	VIL	-	-	0.8	V	-
L, M, R, internal pull high resistor	Rmi	−30%	170	+30%	KΩ	-
L, M, R, debounce time	Tb	17	-	-	ms	See Figure 8-1a below
Z-axis debounce time	Tz	1	-	-	ms	See Figure 8-1b below
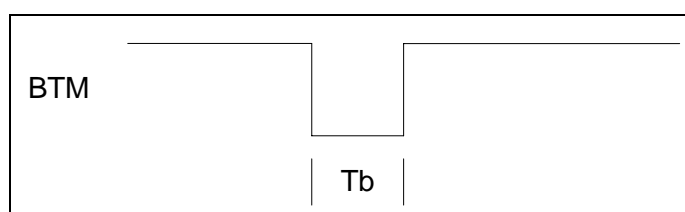
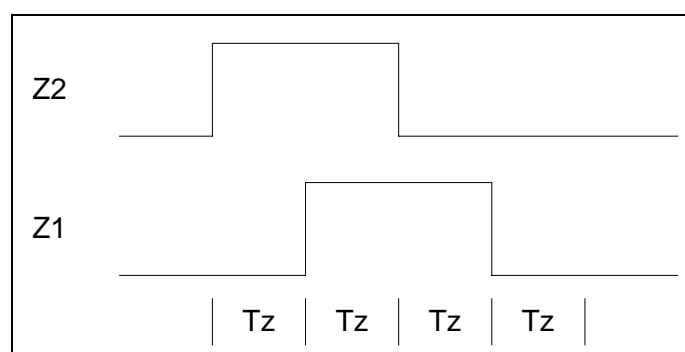*Figure 7-1a L, M, R, Debounce Time Timing Diagram*

Figure 7-1b Z-Axis Debounce Time Timing Diagram
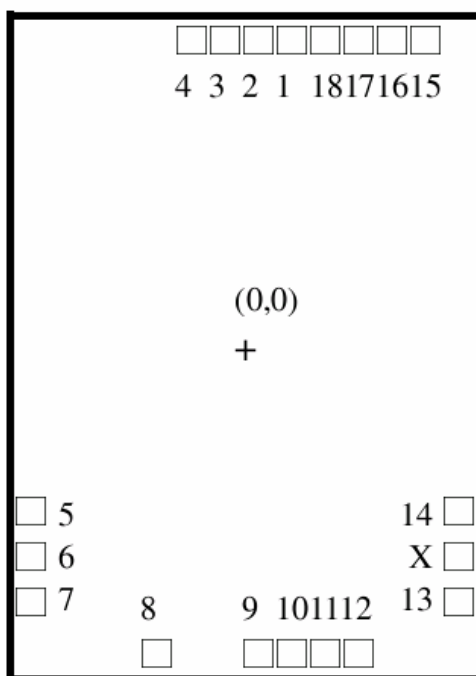
9   Pad List Information

9.1 eKM8065B Pad Diagram

Figure 8-1 eKM8065B Pad Diagram

9.1.1 eKM8065B Pad Coordinates

Chip Size : 1520 × 2580 μM		
Pad Number	**Pad Name**	**Pad Coordinate (X, Y)**
1	CPI	196.5, 1176.7
2	L	91.5, 1176.7
3	R	-13.5, 1176.7
4	M	-118.5, 1176.7
5	SCLK	-652.7, -785
6	ZX_R	-652.7, -890
7	VSS	-652.7, -997.5
8	V3.3	-304.45, -1182.6
9	OSCI	44.3, -1182.6
10	OSCO	149.3, -1182.6
11	VDD	256.9, -1182.6
12	D_MNS	364.4, -1182.6
13	D_PLUS	647.3, -1015.8
	NC	647.3, -901.6
14	SDIO	647.3, -796.6
15	PD	616.5, 1176.7
16	ZX_L	511.5, 1176.7
17	Z2	406.5, 1176.7
18	Z1	301.5, 1176.7

9.2 eKM8065C Pad Diagram
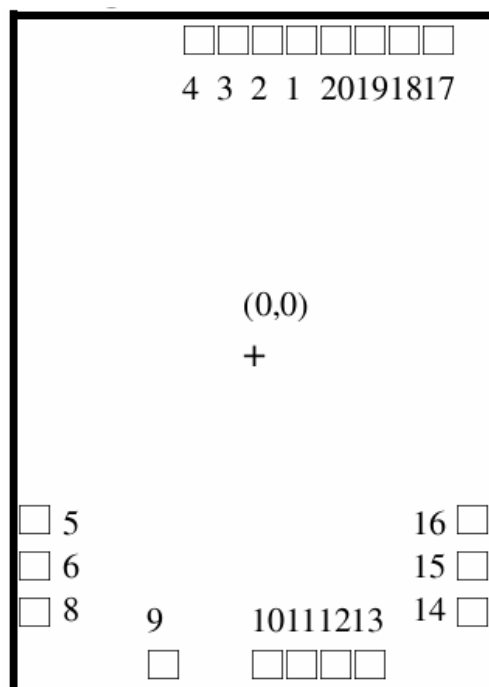
Figure 8-2 eKM8065C Pad Diagram

9.2.1 eKM8065C Pad Coordinates

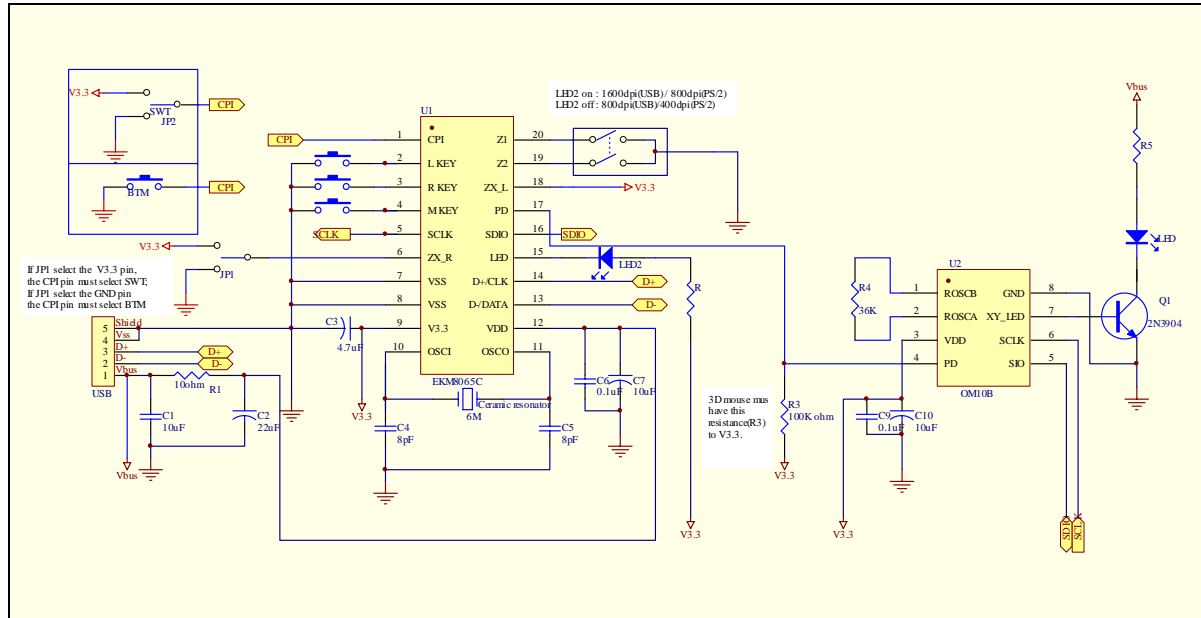| Chip Size : 1520*2580 UM		
Pad Number	**Pad Name**	**Pad Coordinate (X, Y)**
1	CPI	196.5, 1176.7
2	L	91.5, 1176.7
3	R	-13.5, 1176.7
4	M	-118.5, 1176.7
5	SCLK	-652.7, -785
6	ZX_R	-652.7, -890
7		
8	VSS	-652.7, -997.5
9	V3.3	-304.45, -1182.6
10	OSCI	44.3, -1182.6
11	OSCO	149.3, -1182.6
12	VDD	256.9, -1182.6
13	D_MNS	364.4, -1182.6
14	D_PLUS	647.3, -1015.8
15	LED	647.3, -901.6
16	SDIO	647.3, -796.6
17	PD	616.5, 1176.7
18	ZX_L	511.5, 1176.7
19	Z2	406.5, 1176.7
20	Z1	301.5, 1176.7

10 Application Circuits

■ **eKM8065B Mechanical Z/2 3D 3-Key Application**
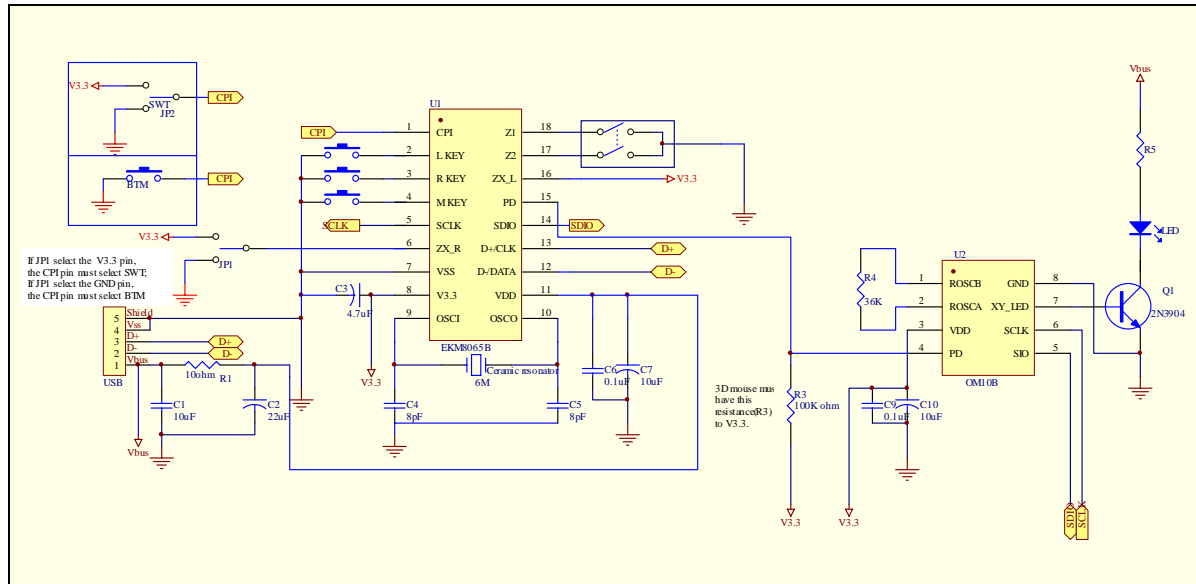
■ **eKM8065B Mechanical Z/2 3D 3-Key with Enhanced Wheel**
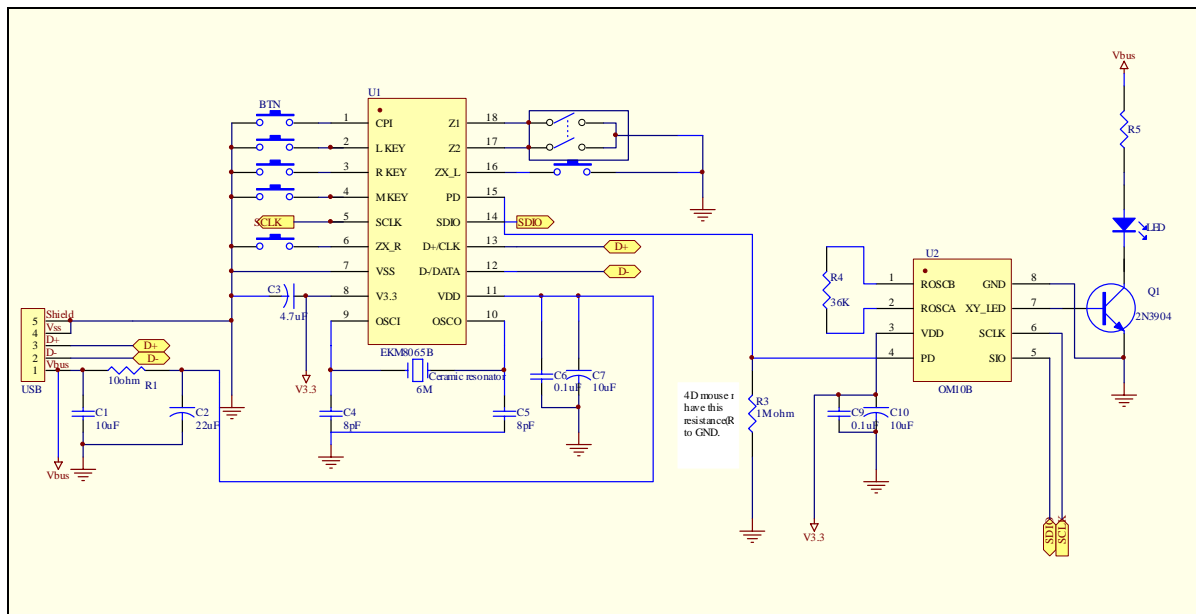
■ **eKM8065C Mechanical Z/2 3D 3-Key Application**

■ **eKM8065C Mechanical Z/2 3D 3-Key with Enhanced Wheel**