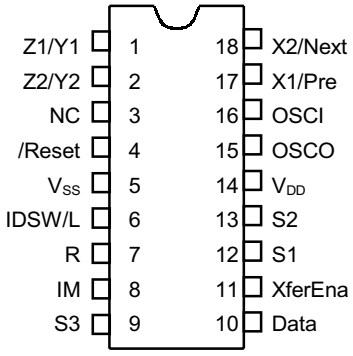
1. General Description

EM84100E is designed as a Cordless Mouse Controller which supports 3D, 5 buttons. It requires an external Radio Frequency Module to transmit signal and must be applied with EM84110E which is an Cordless Mouse decoder.

EM84100E / EM84100EB



DIP / SOP

2. Feature

- Low Operation frequency. (2MHz)
- Supports 3D, 5 buttons. (Compatible with Microsoft IntelliMouse)
- Effective encoding algorithm for Radio Frequency Transmission.
- Supports up 255 deciding Device Identification Number to avoid the interference from other Radio Frequency devices.
- Auto-entering Sleep Mode for saving power
- Least pins and least area requiring.
- Two kinds of Z-axis input:

  EM84100E: Mechanical input (1/2)

  EM84100EB : Photo-couples input (1/2)

3. Application

- Up to 3D Cordless Mouse
- Up to 5 buttons Cordless Mouse
- Up to 255s Cordless Mouse

4. Pin Assignment

Symbol	I/O	Pin	Description
VDD	-	14	5.5V~2.3V Voltage supply.
VSS	-	5	Ground
X1, X2, Y1, Y2	I	17,18,1,2	X axis and Y axis optical transistors signals input.
L, R, M	I	6,7,8	L, R, M three buttons input.
Pre, Next	I	17,18	PreviousPage, NextPage buttons input.
Z1,Z2	I	1,2	Z axis input.
IDSW	I	6	Change Device ID push button input.
OSCI	I	16	External crystal input .
OSCO	O	15	Output for crystal oscillator clock.
/Reset	I	4	Reset Pin with Schmitt trigger, It should be pull up by an 180k Ω resistor under normal operation..
Data	O	10	Transmission data output.

XferEna	O	11	Transmission enable signal. When there is data need to transmitted, this pin will output “H”. It can be used as an Enable signal for RF transmitting module.
S1	O	12	“ True ” signal for the five buttons.
S2	O	13	Sink path for the serial Infrared radiations of X-axis and Y-axis.
S3	O	9	Sink path for a pumping circuit.

5. Function Description

1. The protocol of Transmission Data

The output data of EM84100E is a serial signal for cordless transmission. Therefore, noise immunity logic and error detecting logic is applied to the protocol of transmission data.

There is the definition of the protocol below.

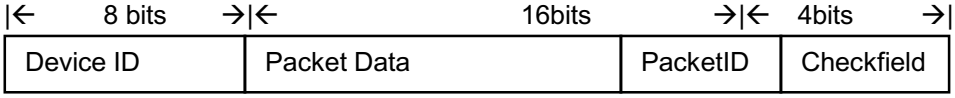
(I). Signal definition:

A fixed length of “L” signal followed with a fixed length “H” signal represents a nibble data. The table below showed the different combinations from 0x0 to 0xF. The unit of time is uS.

Data	Signal Components (us)		Data	Signal Components	
	L	H		L	H
0x0	600	400	0x8	600	1000
0x1	600	600	0x9	800	800
0x2	800	400	0xA	1000	400
0x3	800	600	0xB	1000	600
0x4	600	800	0xC	400	1000
0x5	1000	800	0xD	400	800
0x6	800	1000	0xE	400	600
0x7	1000	1000	0xF	400	400

(II).Packet Format:

A packet data is divided into three parts which are PacketID, PacketData and Checkfield.



Device ID

Supports up 255 deciding Device Identification Number to avoid the interference from other Radio Frequency devices. ID 0x00 is reserved for changing Device ID.

Packet Data

The packet data is 16-bit long. The first byte may be the value of Y-axis counter or Z-axis counter while the least byte may be the value of X-axis or the state of five buttons. As the

different Packet is transmitting, the contents will be different.

Checkfield

It is used to detect the data of if this packet is destroyed or not.

Packet ID

There are 4-bit long in this field. There are three kind of Packet data. One contains the value of X-axis counter and Y-axis counter, another contains the state of five buttons and the value of Z-axis counter. The last one contains the new Device ID.

(III).Begin and End Strob

After a period of idle, the data should be transmited by following a preamble signal. Besides, there is a start signal in the front of packet and one stop signal in the end of packet. These three kind of signal is defined as below.

2. The Operation of Device ID

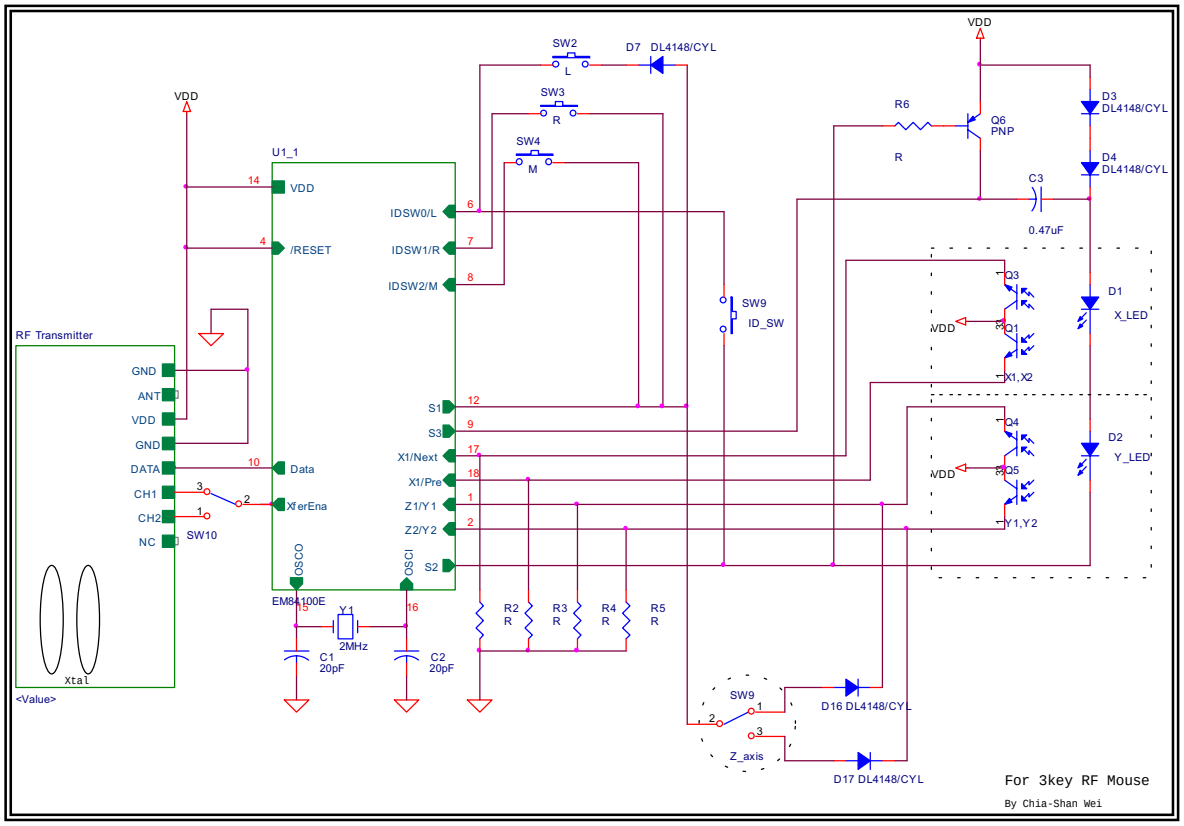
When there is not only one RF device used in a same room, these RF devices may interact. Therefor, the device ID can provide the protection from the interfrence of other device.

When the ID switch is pressed. The encoder will change a new ID for itself, and continuously send ID packet out at last 3ms.

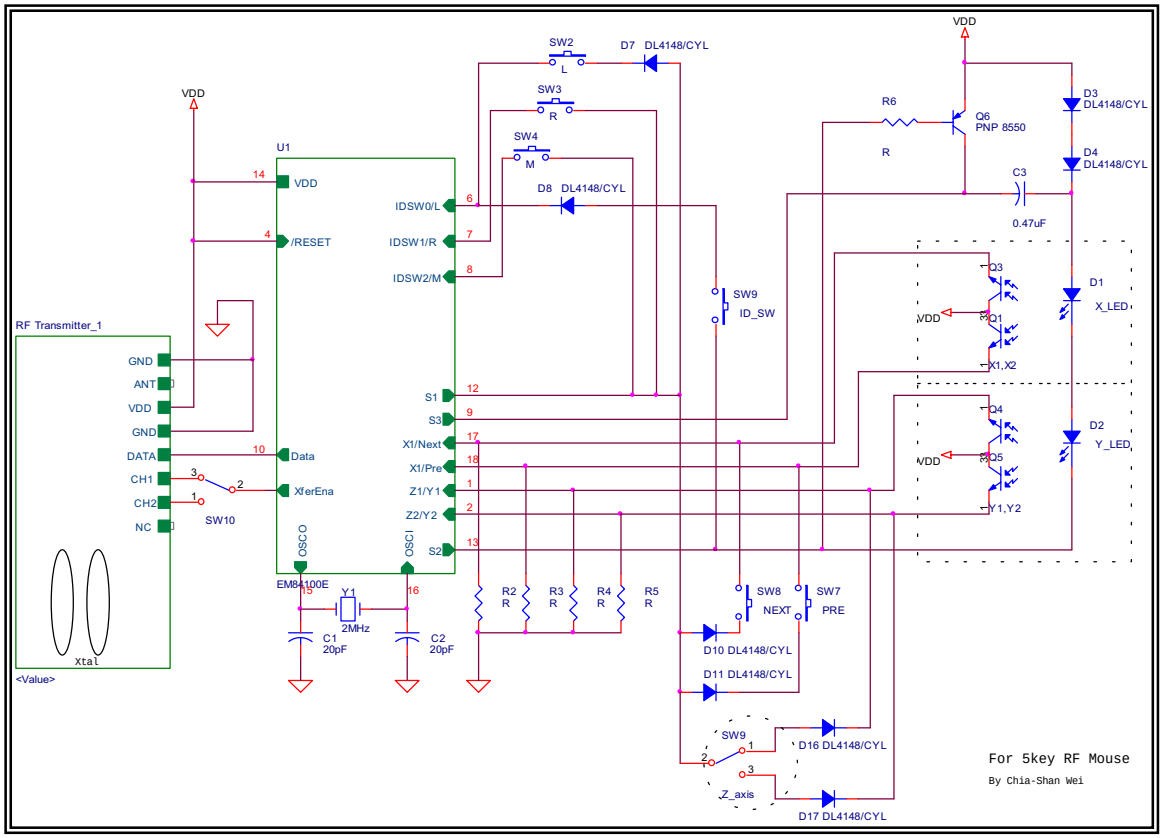
Please refer to “Application Note of EMC cordless mouse control IC series.”

6. Application circuit

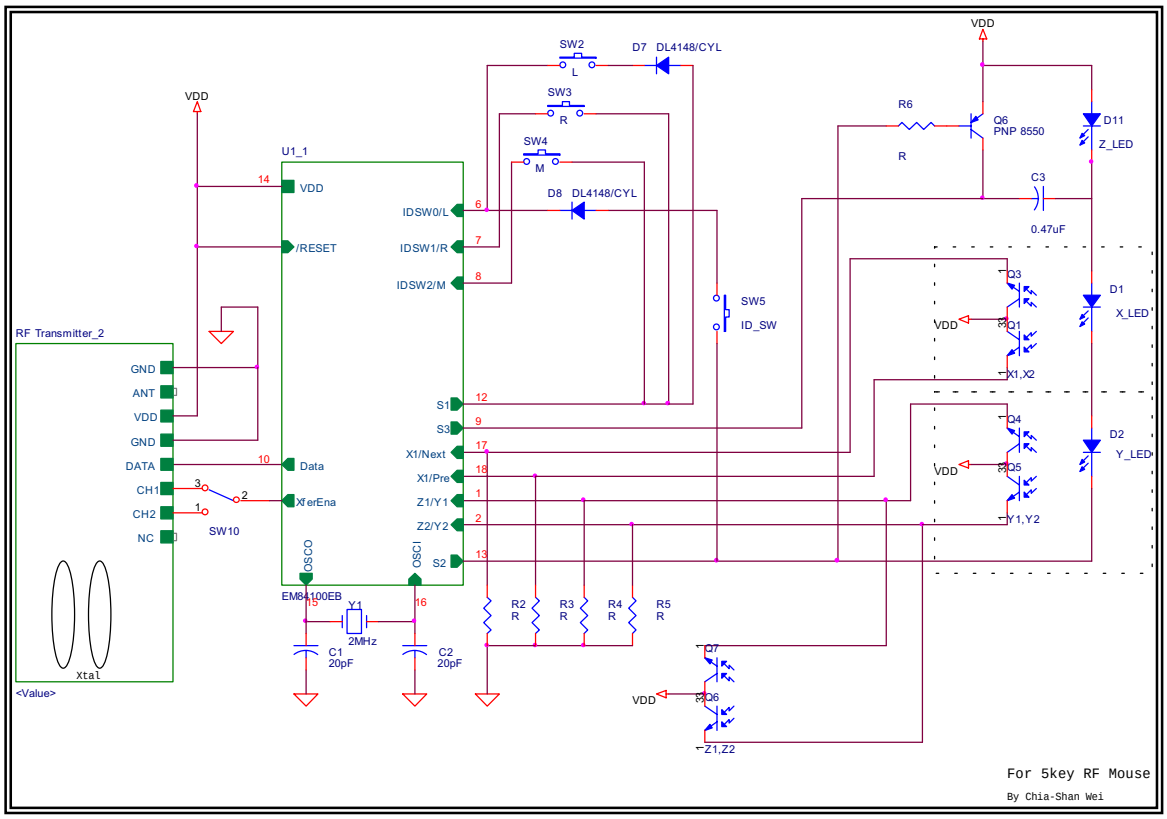
1. EM84100E three buttons Cordless Mouse



2. EM84100E 5buttons Cordless Mouse



3. EM84100EB, 3 bottons cordless Mouse



4. EM84100EB, 5 bottons cordless Mouse

