

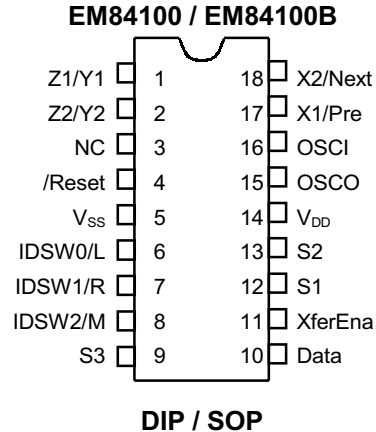


1. General Description

EM84100 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 EM84110 which is an Cordless Mouse decoder .

2. Feature

- Low Operation frequency. (2MHz)
- Supports 3D, 5 buttons. (Compatible with Microsoft IntelliMouse)
- Effective encoding algorithm for Radio Frequency Transmission.
- Supports up 8 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:
EM84100 : Mechanical input (1/2)
EM84100B : Photo-couples input (1/2)



3. Application

- Up to 3D Cordless Mouse
- Up to 5 buttons Cordless Mouse
- Up to 8 IDs 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.
IDSW0~IDSW2	I	6,7,8	Device Identification Number Switches 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 EM84100 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.

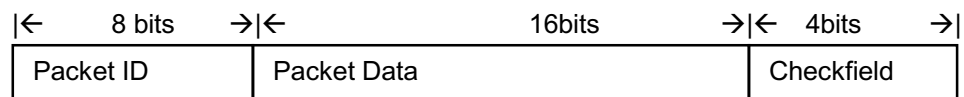
(I). Signal definition:

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.



Packet ID

There are 8bits in this field. The first four bits represents the ID of the device and the least four bits represents which kind of Packet data that follows Packet ID field.

There are two 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.

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.

(III).Begin and End Strob

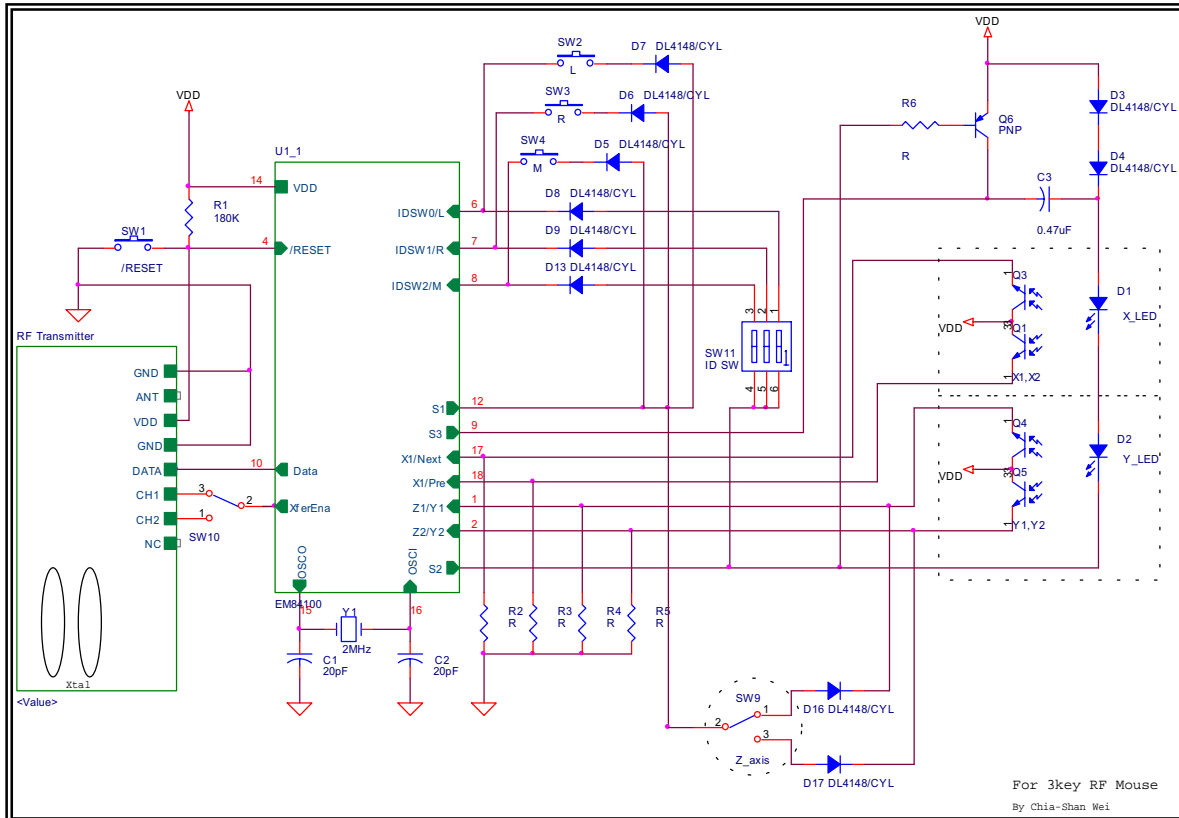
After a period of idle, the data should be transmitted by following a preamble signal. Besides, there is a start signal in the front of packet and one stop signal in the end of packet. These three kind of signal is defined as below.

2. The Operation of Device ID

There are three switches to decid the Device ID of each device. When there is not only one RF device used in a same room, these RF devices may interact. Therefore, the ID switches can provide the protection from the interfrnce of other device.

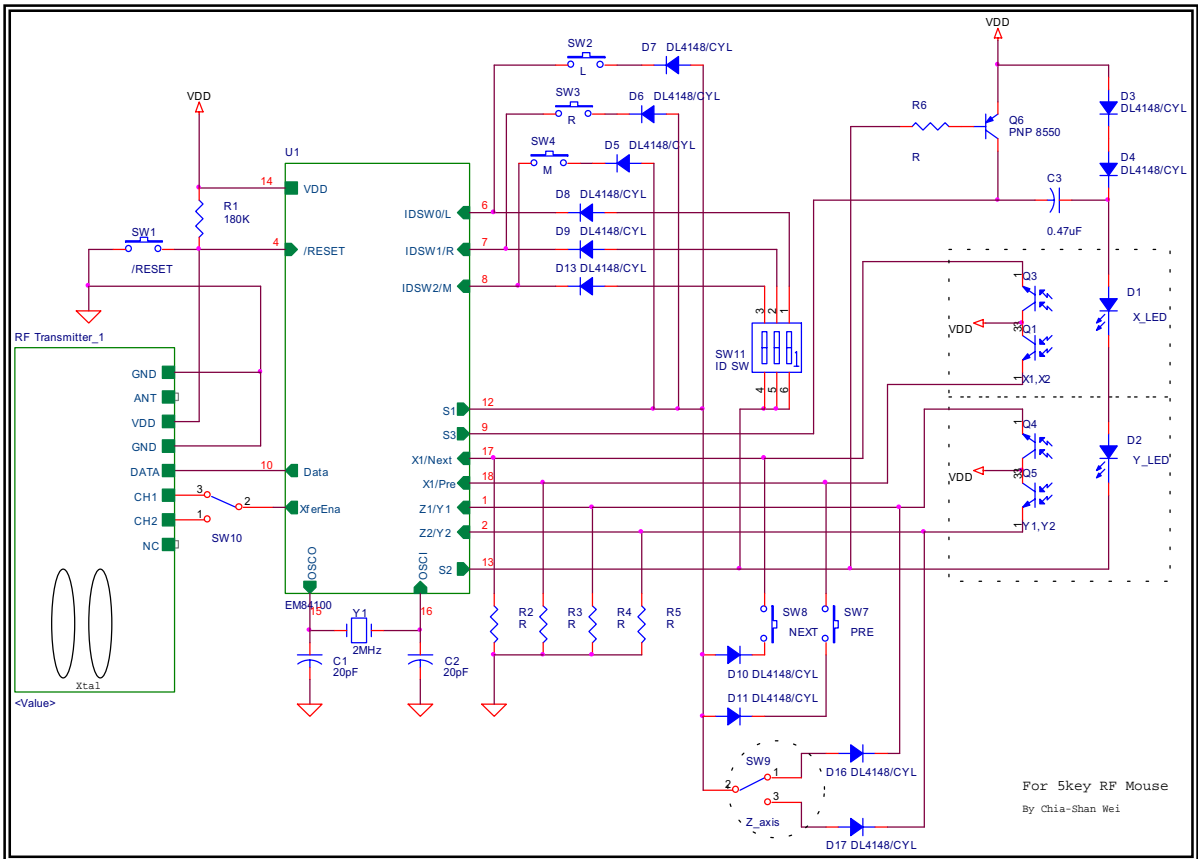
6. Application circuit

1. EM84100 three buttons Cordless Mouse

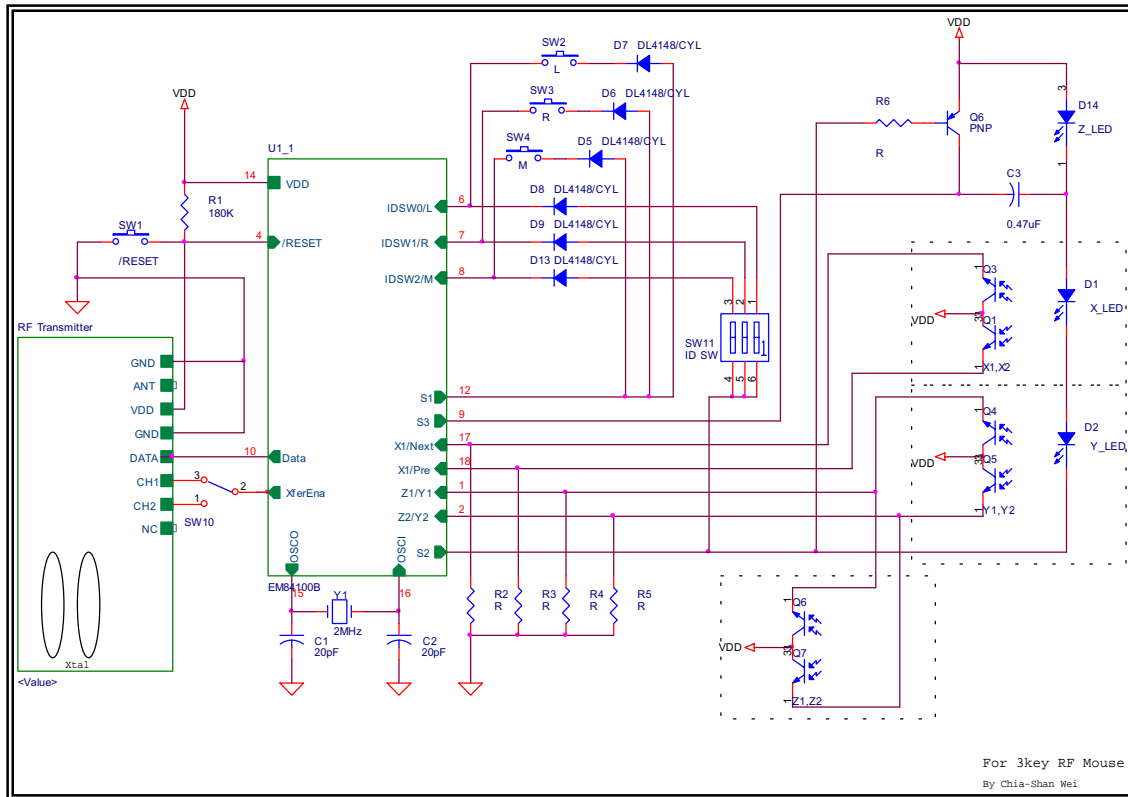


For 3key RF Mouse
By Chia-Shan Wei

2. EM84100 5buttons Cordless Mouse



3. EM84100B, 3 buttons cordless Mouse



4. EM84100B, 5 buttons cordless Mouse

