

*Preliminary*

## GENERAL DESCRIPTION

The EM83807 Mouse Controller is specially designed to control serial mouse device. This single chip can interface three key-switches and 4 X-Y photo-couples directly to RS-232C.

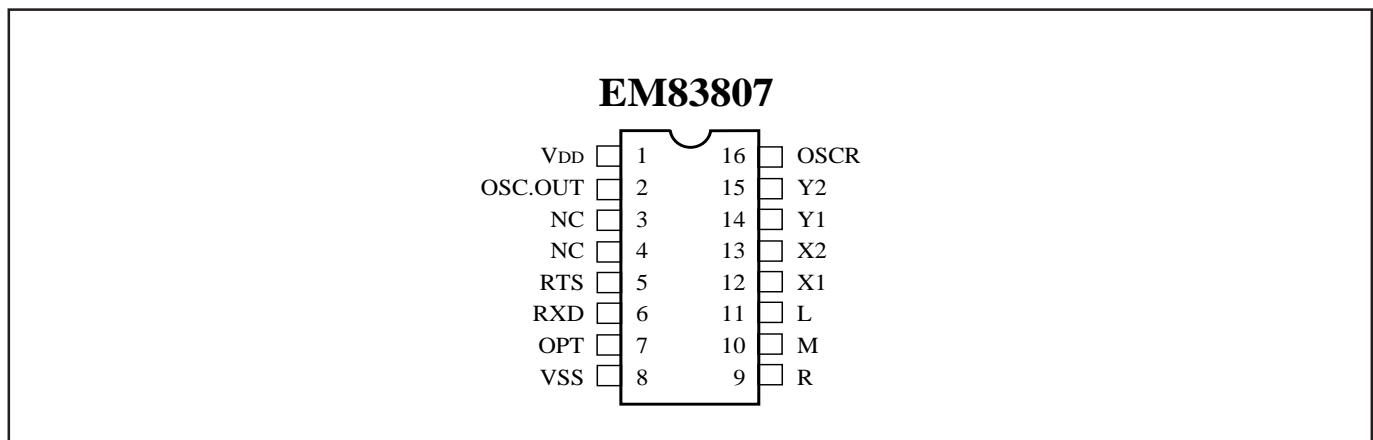
## FEATURES

- Include PnP software scrolling function
- Using  $50k\Omega \pm 1\%$  resistor for RC oscillation.
- Compatible with Microsoft serial mouse.
- 100 bytes PnP ID code could be filled by code layer.
- Built-in noise immunity circuit.
- The sampling rate of motion detector is up to 65KHz.
- Built-in three zener diodes : one in VDD to VSS, two in RTS to VDD.
- CMOS push-pull RXD output.
- Built-in current comparator for photo-couples input.
- Built-in three step dynamic input impedance.
- Three key-switches and four photo-couples inputs.
- RTS debouncing circuit included.
- Photo couple test mode included.
- Low power dissipation.

## APPLICATION

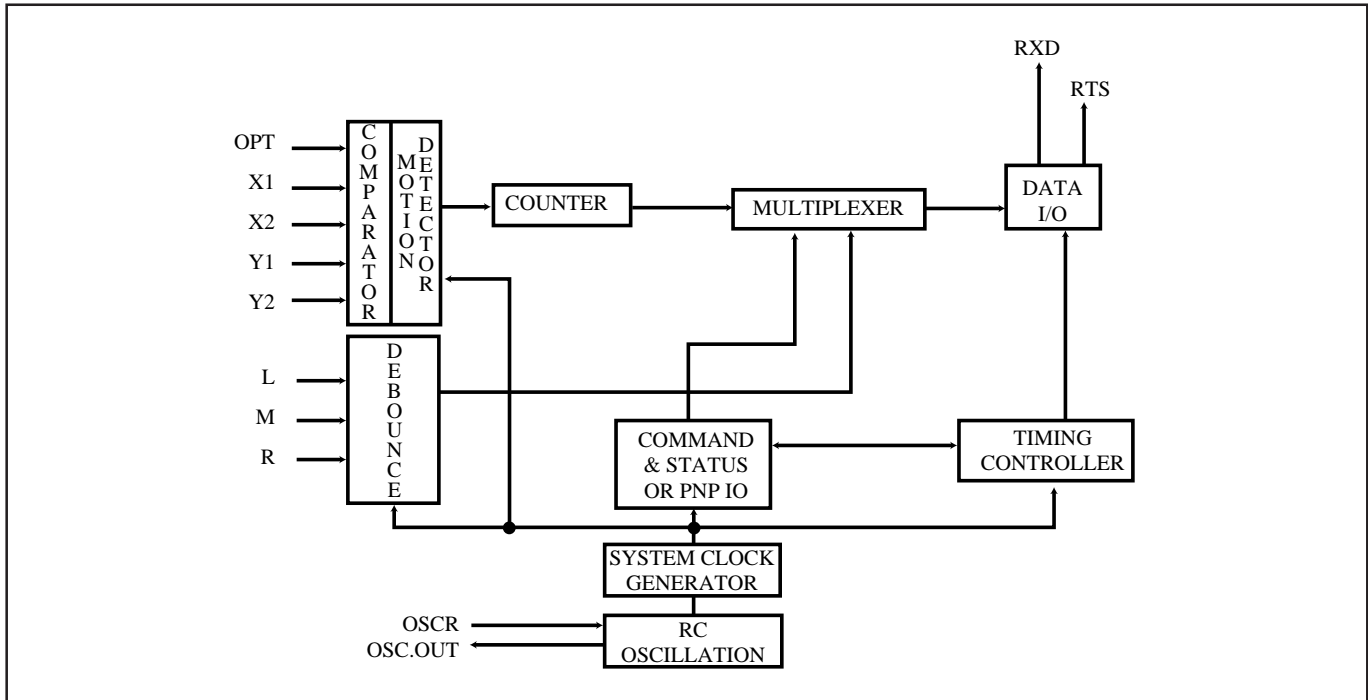
- Serial PnP mouse.

## PIN ASSIGNMENT



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## FUNCTIONAL BLOCK DIAGRAM



## PIN DESCRIPTIONS

Symbol	I/O	Function
OPT	I/O	INPUT: 200k $\Omega$ pull low to VSS. When OPT is connected to VDD, EM84530 will enter test mode. In test mode, L will be the output of X1, while M will be the output of X2. Toggling R key can change these output to be Y1, Y2 respectively.
OSC.OUT	O	The RC oscillation clock output. Or 3mA sink current output for X, Y photo emitters.
OSCR	I	Connect 50k $\Omega$ $\pm$ 1% precise resistor for oscillation.
RTS	I/O	$\pm$ 12V signal with 10mA driving. Used as PnP ID code output trigger signal from 100w (-12V) to high (+12V) while under normal operating. RTS will keep on $\pm$ 12V driving.
RXD	I/O	One report contains 4 data bytes, 7 data bits without parity in the data byte. The data byte is shifted out from LSB through MSB, started by start bit and ended by stop bit. The RXD signal swing between +6V and -6V.
R	I	Three key-switches inputs. 200k $\Omega$ resistor pull low.
M	I/O	
L	I/O	
X1	I	Three step dynamic input impedance. If OSC.OUT is not connected to LEDs, the dynamic input impedance will be off. Use current comparator to measure photo-couples "ON", or "OFF".
X2	I	
Y1	I	
Y2	I	
VSS		Negative power.
VDD		Power line.

*Preliminary***FUNCTION DESCRIPTIONS**

In Microsoft mode, the transmission cycle consists of four bytes in one report. Each byte contains one start bit, 7 data bits and two stop bits. The first byte contains "L", "R" key status and four bits of the two most significant bits in horizontal counter and vertical counter. The second byte represents the value accumulated by horizontal counter, the third byte is the data of the vertical counter. The last byte contains only "M" key status. The vertical data is transmitted in 2's complement.

Output byte arrange

Bit no.	.....	6	5	4	3	2	1	0
1st byte	.....	1	L	R	V7'	V6'	H7	H6
2nd byte	....	0	H5	H4	H3	H2	H1	H0
3rd byte	....	0	V5'	V4'	V3'	V2'	V1'	V0'
4th byte	....	0	0	M	0	0	0	0

Plug & Play ID code

When RTS input from low to high, EM83810 will send a string ID code. Customer can specify the contains of the code area and the total length below 100 bytes by changing the code layer.

Field Name	Length	Field Data	Description
Other ID	<17	4D, 5A, 40, 00, 00, 00	ID for legacy
Begin ID	1	08	Begin PnP ID
PnP Revision	2	01, 24	Version 1.00
EISA ID	3	25, 2D, 23	EMC
Product ID	4	10, 10, 10, 11	0001
Serial Number	9	3C	None provided
Class ID	<34	3C, 2D, 2F, 35, 33, 25	Mouse Class
Driver ID	<42	3C, 30, 2E, 30, 10 26, 10, 21	PnP0F0A
User Name	<42	3C, 25, 2D, 23, 00, 33, 23, 32, 2F, 2C, 2C, 29, 2E, 27, 00, 33, 25, 32, 29, 21, 2C, 00, 2D, 2F, 35, 33, 25	EMC SCROLLING SERIAL MOUSE
Checks um	2	21, 15	2 bytes checks um
End PnP	1	09	End PnP ID

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**ABSOLUTE MAXIMUM RATINGS**

Parameter	Ratings		Unit
	Min.	Max.	
Temperature under bias	0	70	°C
Storage temperature range	-65	150	°C
Supply voltage	-0.3	7.5	V
Power dissipation	-	500	mW

**DC ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C to 70°C, V<sub>ds</sub>=5.6V)**

Parameters	Sym.	Min.	Typ.	Max.	Unit
Operating voltage	Vdd	4.5	6	6.5	V
	Vrts	-	12	13	V
Operating current (Vdd=5.4V, RTS=Vdd)	Iop1	-	-	0.8	mA
Operating current (Vdd=6.2V, RTS=Vdd)	Iop2	3	-	-	mA
RTS operating current (Vdd=5.6V, RTS=11V)	Irts1	-	-	1.8	mA
RTS operating current (Vdd=5.4V, RTS=12.5V)	Irts2	4	-	-	mA
RXD high output voltage (Vrh=Vrts-2.6V)	Irh	2	-	-	mA
RXD low output voltage (Vrl=Vss+2.6V)	Irl	-	-	-2	mA
RTS high input voltage	Vrts+	9.6	-	-	V
RTS low input voltage	Vrts-	-	-	6.8	V
X1,X2,Y1,Y2 low input reference current	Ipl	70	-	-	μA
X1,X2,Y1,Y2 high input reference current	IPh	-	-	106	μA
X1,X2,Y1,Y2 input current (80μA)	Vpi1	0.8	-	1.2	V
X1,X2,Y1,Y2 input current (500μA)	Vpi2	1.5	-	2.1	V
L,M,R,OPT input low voltage	Vail	-	-	1.5	V
L,M,R,OPT input high voltage	Vaih	3.5	-	-	V
L,M,R input current (Vin=5.6V)	Rmi	18	-	56	μA
OPT input current	Ixi	-18	-	-56	μA
OPT high output current (Iopt=20mA)	Vopt	4.5	-	-	V
L,M,R,X1,X2,Y1,Y2 input leakage current (Vds=0V)	Iil	0	-	-1.0	μA
OPT input leakage current (Vin=5.6V)	Iih	0	-	1.0	μA



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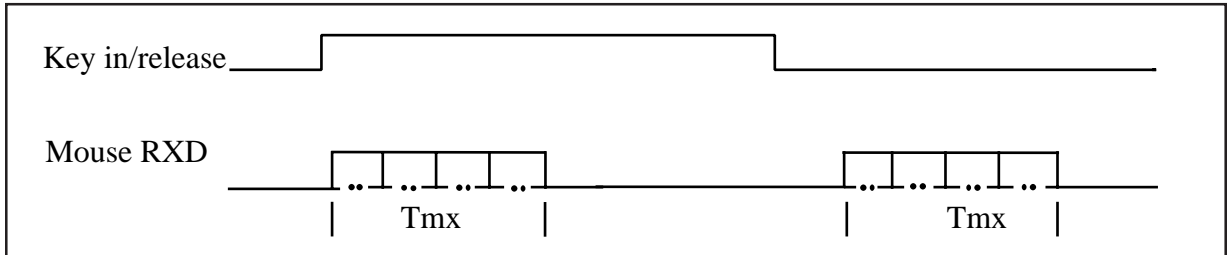
AC ELECTRICAL CHARACTERISTICS ( $T_A=0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ )

Parameters	Sym.	Min.	Typ.	Max.	Unit
Oscillating Frequency	Fosc	32.4-3%	32.4	32.4+3%	KHz
Key Debounce	Tkd	-	13	-	ms
Rising Edge Crossed Width	Tr	15.4	-	-	us
Falling Edge Crossed Width	Tf	15.4	-	-	us
Transmission Time	Tmx	-	33.33	-	ms
Start bit Time	Ts	-	833.3	-	us
Data bit time	Td	-	833.3	-	us
Stop bit Time	Tp	-	833.3	-	us
Mode code delay Time	Trd	11	-	14	ms

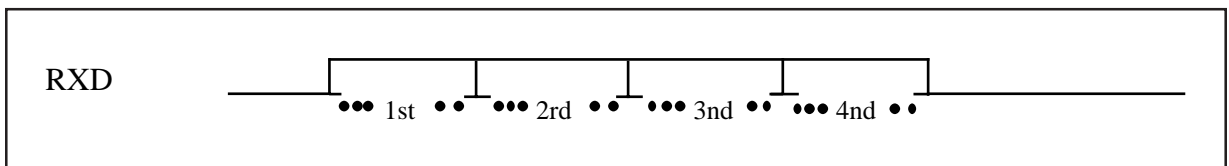
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**TIMING DIAGRAM**

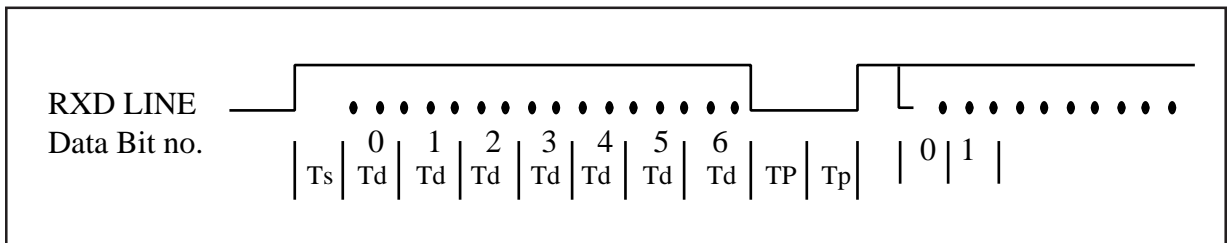
(A) RXD output :



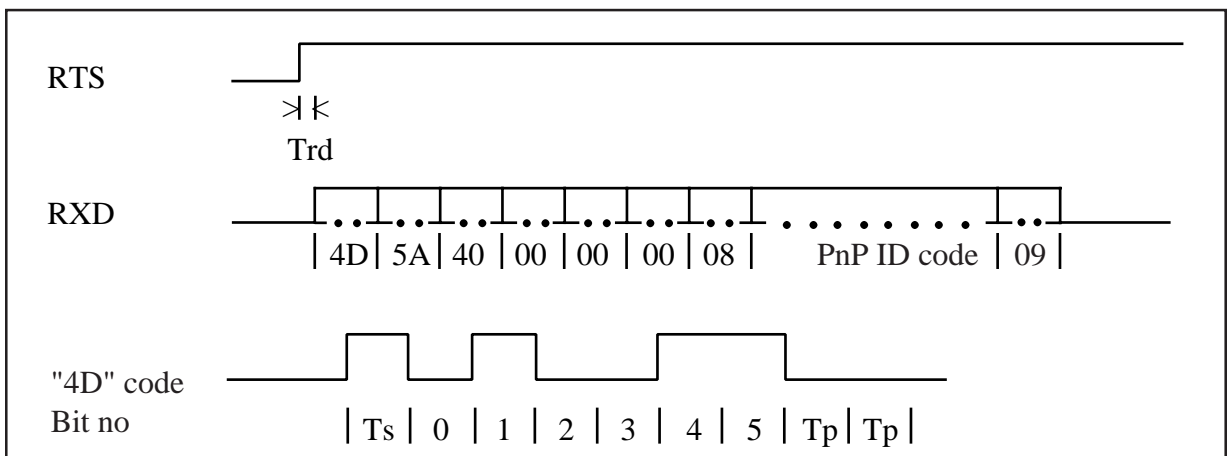
(B) Bytes structure :



(C) Bits structure :

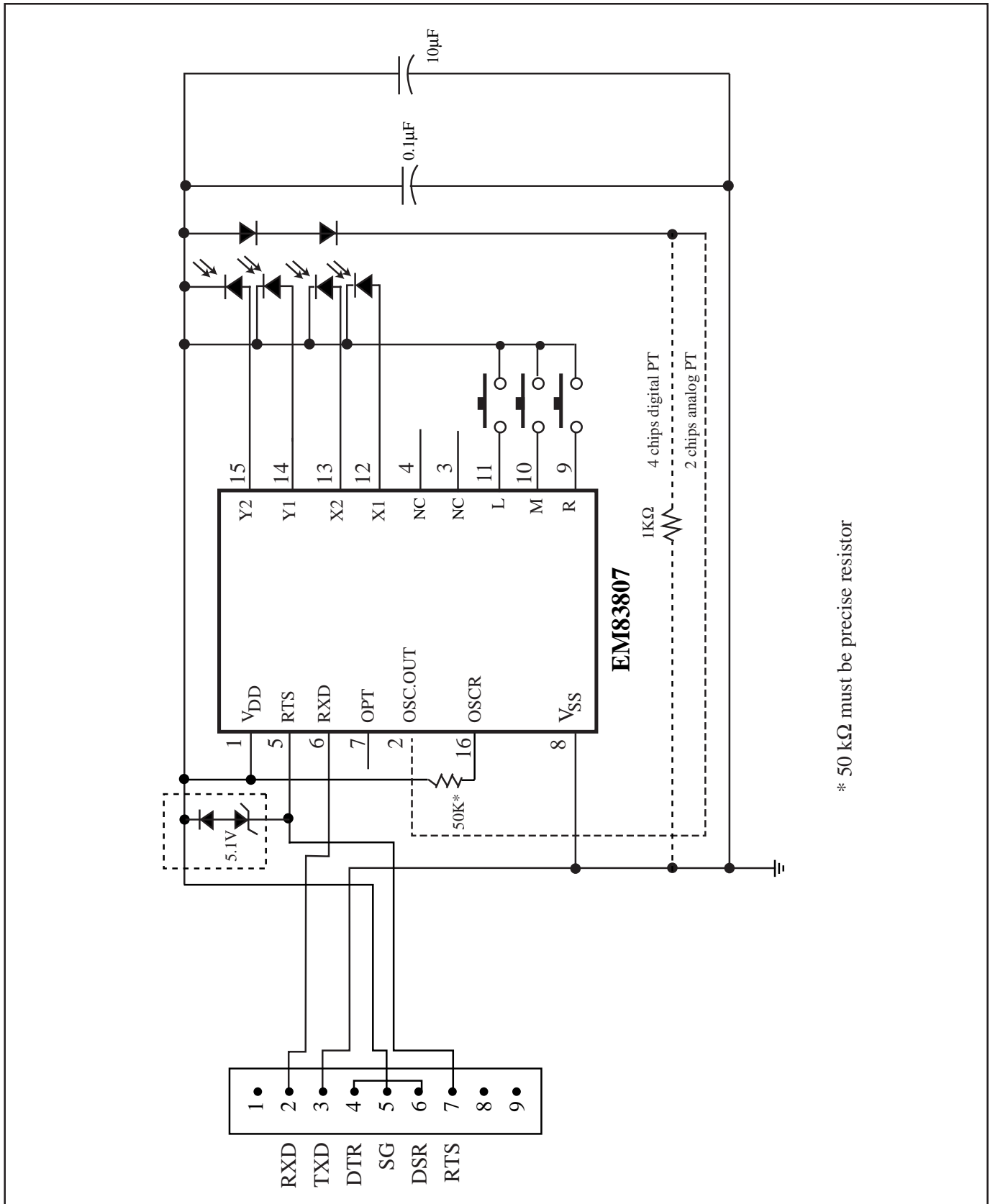


(D) PnP ID code echo timing :



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APPLICATION CIRCUIT



\* 50 kΩ must be precise resistor