

Appendix Magic - I

Software Spec Sheet

- **Product** 4 bit 1 chip microcomputer
- **Type** Magic-I
- **Purpose** Infrared remote control encoder
- **Function** 8x4 key matrix scan
- **Features**
 - Program memory (On-chip ROM) : 1024 bytes
 - Data memory (On-chip RAM) : 32x4 bits
 - 43 types of instruction sets
 - 3 levels of subroutine nesting
 - 1 bit output port for a large current (Output signal)
 - Operating frequency : 300KHz to 1MHz
 - Instruction cycle : 13.1868 μ s ($f_{osc}=455KHz$)
 - CMOS process (Single 3V power supply)
 - Stand-by function (Through internal instruction)
 - Released stand-by mode by key input (Masked option)
 - Built in capacitor for ceramic oscillation circuit (Masked option)
 - Built in a watch dog timer (WDT)
 - 3 kind of double action key for uPD6121G
 - Provided with indicator for transmission

1. Function

1) Stand-by

Output of D0~D3 is "L"

Oscillation is stop.

Output of D4~D5 are held to "H"

2) Condition of stand-by mode

After reset

When scan strobe output is over, there is not any key input.

3) Release of stand-by mode

One of the key scan input (K0~K3, R0~R3) is change to "L" level

2. Key input

1) Key-data mapping table

Output pin	Input Pin							
	K0	K1	K2	K3	R0	R1	R2	R3
D0	1	2	3	4	5	6	7	8
D1	9	10	11	12	13	14	15	16
D2	17	18	19	20	21	22	23	24
D3	25	26	27	28	29	30	31	32

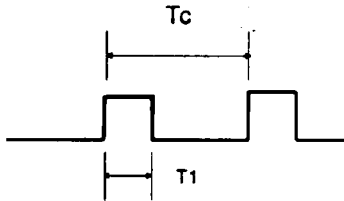
2) Double action key

Combl of Key	Key Data
K21 + K22	35h
K21 + K23	36h
K21 + K24	37h

3. Output

1) Output waveform for uPD6121G

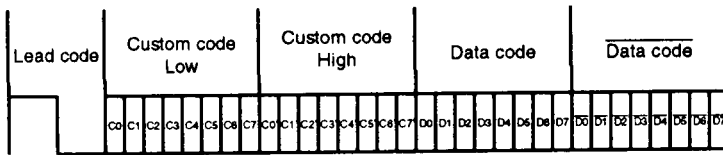
A single pulse, modulated with 37.917KHz signal at 455KHz



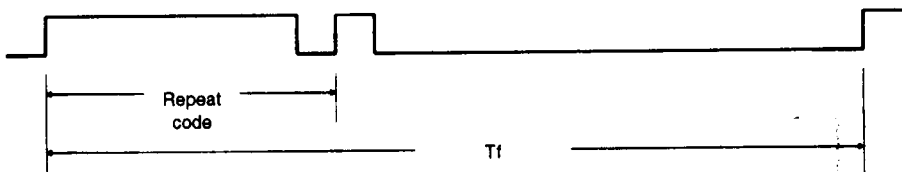
Carrier frequency
 $f_{CAR} = 1/T_c = f_{osc}/12$
 Duty ratio = $T_1/T_c = 1/3$

- Configuration of Flame

.1st flame

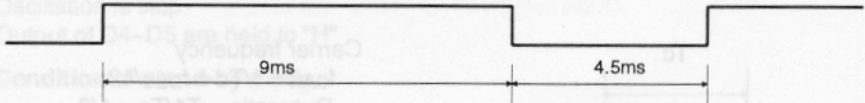


. Repeat flame

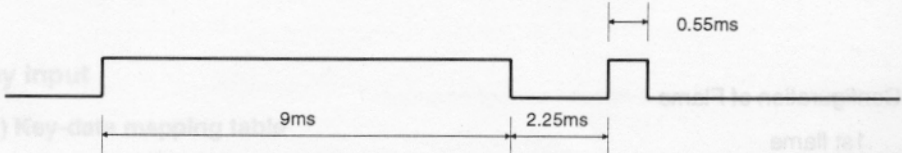


Appendix A Magic-I

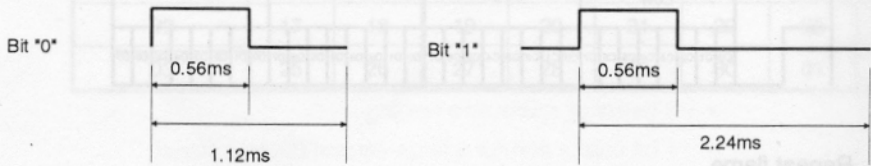
- Lead code



- Repeat code

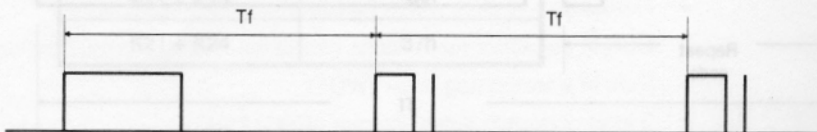


- Bit Description



- Flame Interval : T_f

The transmitted waveform as long as a key is depressed

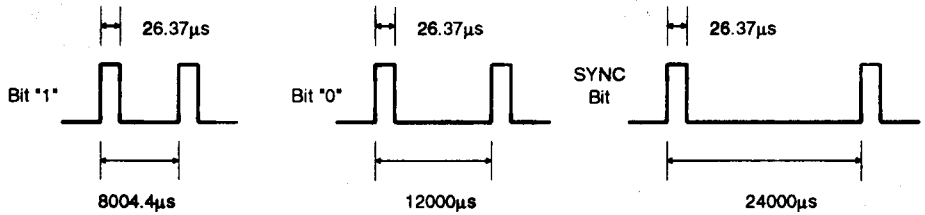


$T_f=108ms$ @455KHz

2) Output waveform for MV500

A single pulse at 455KHz

- Bit description

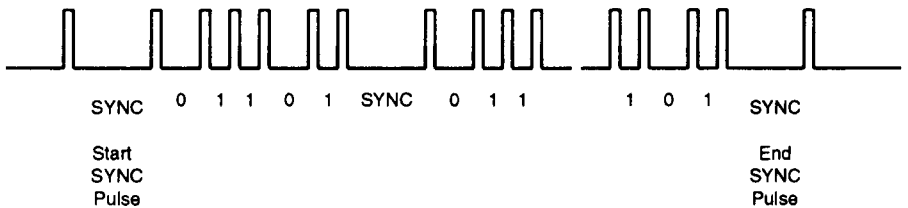


- Configuration of Flame



- Flame Interval : Tf

The transmitted waveform as long as a key is depressed.

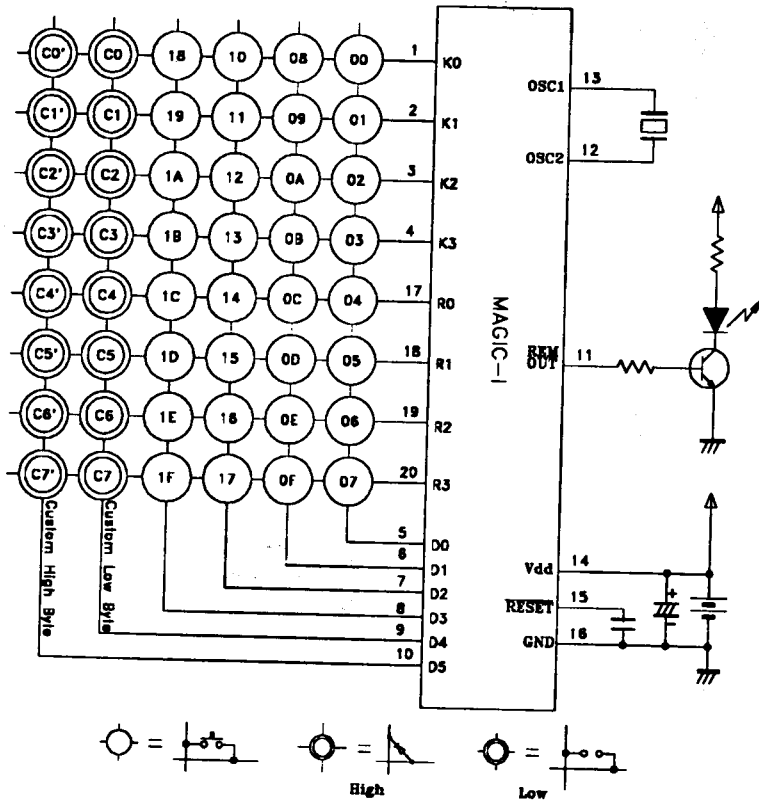


4. Pin Descriptions

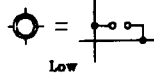
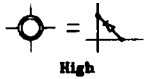
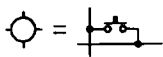
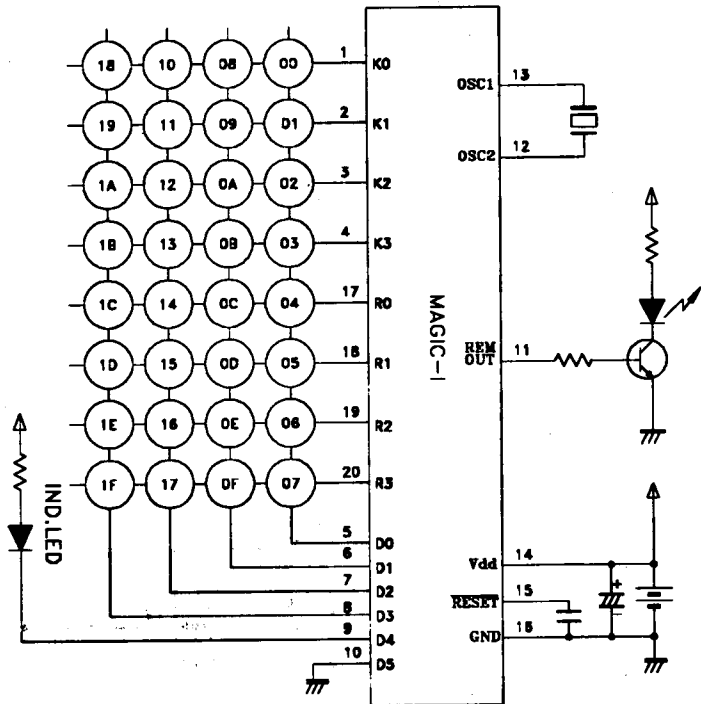
Pin No.	Pin	Function	Remark
1	K0	Key Input No. 0 pin	
2	K1	Key Input No. 1 pin	
3	K2	Key Input No. 2 pin	
4	K3	Key Input No. 3 pin	
5	D0	Key Scan Signal No. 0 pin	
6	D1	Key Scan Signal No. 1 pin	
7	D2	Key Scan Signal No. 2 pin	
8	D3	Key Scan Signal No. 3 pin	
9	D4	Custom code Low input pin	
10	D5	Custom code High input pin	
11	REMOUT	Out of Transmission pin	
12	OSC2	Connect Ceramic Resonator between OSC1 & OSC2	
13	OSC1	Connect Ceramic Resonator between OSC1 & OSC2	
14	V _{DD}	Connect 3V power source	
15	$\overline{\text{RESET}}$	Reset by input of "L"	
16	GND	Reference voltage for all inputs & outputs 0V	
17	R0	Key Input No. 4 pin	
18	R1	Key Input No. 5 pin	
19	R2	Key Input No. 6 pin	
20	R3	Key Input No. 7 pin	

5. Circuit Diagram & Key Data

1) NEC 16bit for uPD6121G



2)MV500



3) NEC 8bit for uPD6121G

