

Appendix F Magic-IIIb

Software Spec Sheet

- **Product** 4 bit 1 chip microcomputer
- **Type** Magic-IIIb
- **Purpose** Infrared remote control encoder
- **Function** 8x8 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

1. Function

1) Stand-by

Oscillation is stop

Output of D0~D5,D8,D9 is "L", Output of D6~D7 is "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
D8	9	10	11	12	13	14	15	16
D9	17	18	19	20	21	22	23	24
D1	25	26	27	28	29	30	31	32
D2	33	34	35	36	37	38	39	40
D3	41	42	43	44	45	46	47	48
D4	49	50	51	52	53	54	55	56
D5	57	58	59	60	61	62	63	64

2) Double action key

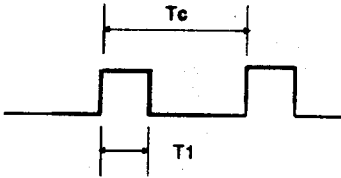
Combi of Key	Key Data
K21 + K22	35h
K21 + K23	36h
K21 + K24	37h

2. Output

Output waveform of uPD6122-001

- Output waveform

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



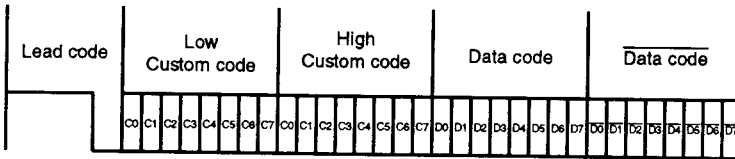
Carrier frequency

$$f_{CAR} = 1/T_c = f_{osc}/12$$

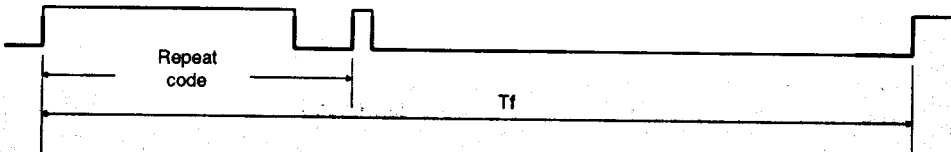
$$\text{Duty ratio} = T_1/T_c = 1/3$$

- Configuration of Flame

.1st flame

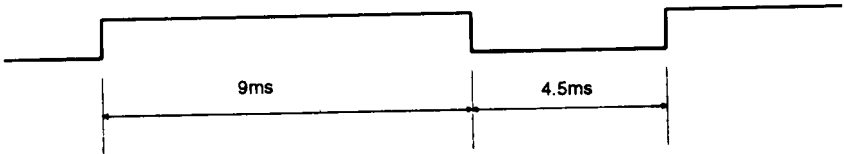


. Repeat flame

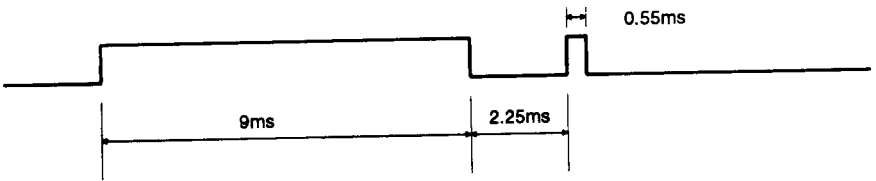


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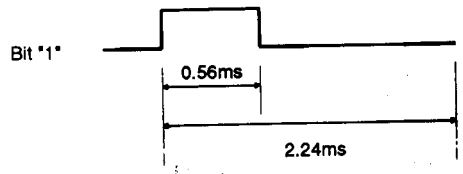
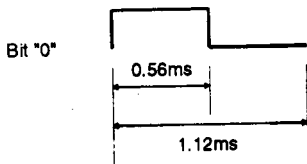
- Lead code



- Repeat code

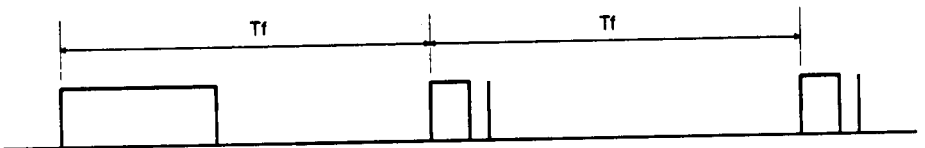


- Bit Description



- Flame Interval : T_f

The transmitted waveform as long as a key is depressed



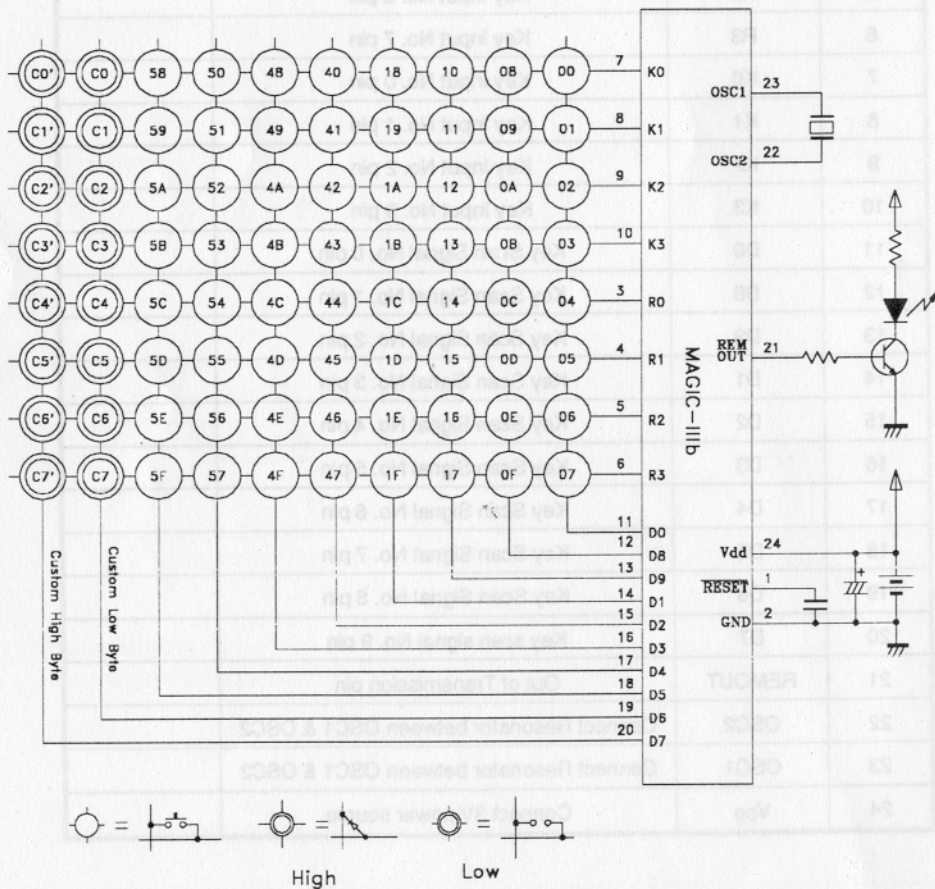
$T_f=108ms$ @ 455KHz

3. Pin Descriptions

Pin No.	Pin	Function	Remark
1	<u>RESET</u>	Reset by input of "L"	
2	GND	Reference voltage for all inputs & outputs 0V	
3	R0	Key Input No. 4 pin	
4	R1	Key Input No. 5 pin	
5	R2	Key Input No. 6 pin	
6	R3	Key Input No. 7 pin	
7	K0	Key Input No. 0 pin	
8	K1	Key Input No. 1 pin	
9	K2	Key Input No. 2 pin	
10	K3	Key Input No. 3 pin	
11	D0	Key Scan Signal No. 0 pin	
12	D8	Key Scan Signal No. 1 pin	
13	D9	Key Scan Signal No. 2 pin	
14	D1	Key Scan Signal No. 3 pin	
15	D2	Key Scan Signal No. 4 pin	
16	D3	Key Scan Signal No. 5 pin	
17	D4	Key Scan Signal No. 6 pin	
18	D5	Key Scan Signal No. 7 pin	
19	D6	Key Scan Signal No. 8 pin	
20	D7	Key scan signal No. 9 pin	
21	REMOUT	Out of Transmission pin	
22	OSC2	Connect Resonator between OSC1 & OSC2	
23	OSC1	Connect Resonator between OSC1 & OSC2	
24	V _{DD}	Connect 3V power source	

4. Circuit Diagram & Key data

1) NEC 16bit for uPD6122-001



2) NEC 8bit for uPD6122-001

