

No. X 2120B

LC7462M

Infrared Remote Control Transmitter IC

Preliminary

Functions

- 32 ⊕ 3 function keys
- 8-bit custom codes
- Operating supply voltage range V_{DD} = 1.8 to 3.6 V
- * Supply current at the standby mode $I_{\mbox{\scriptsize DD}}=1~\mu\mbox{\scriptsize A}$ or less
- Double-pressable operation keys (no priority given)
- Oscillator built in (ceramic resonator: connected externally)

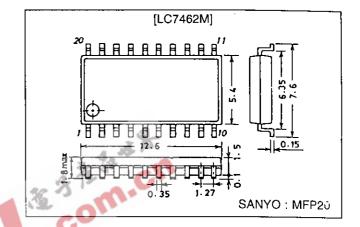
Features

- Two selections of custom code (8 bits) (SEL pin-selectable ... option)
- Since the custom code is set internally, no external diode is required.
- Since double-press operation provides no priority, the number of external parts can be reduced.

Package Dimensions

unit: mm

3036B-MFP20



Specifications

Absolute Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit	
Maximum supply voltage	V _{DD} max	V _{DD}	V _{SS} -0.3 to +5.5	٧	
Input voltage	V _{IN}	Each input pin	V _{SS} -0.3 to V _{DD} +0.3	V	
Output voltage	Vout	Each output pin	V _{SS} -0.3 to V _{DD} +0.3	V	
Output current	lout .	OUT	-35	mA	
Allowable power dissipation	Pd max	Ta ≦ 85°C	150	mW	
Operating temperature	Topr		40 to +85	°C	
Storage temperature	Tstg		-50 to +125	°C	

Allowable Operating Conditions at $Ta = 25^{\circ}C$

Parameter	Symbol	Conditions	min	typ	max	Unit
Supply voltage	V_{DD}	$V_{DD} = f_{OSC} = 455 \text{ kHz}$	1.8	3.0	3.6	V
Input high-level voltage	V_{IH}	K _I 0 to K _I 3, SEL	0.7V _{DD}		V _{DD}	V
Input low-level voltage	V _{IL}	K _I 0 to K _I 3, SEL	V_{SS}		0.3V _{DD}	V
Oscillation frequency	f _{osc}		400	455	500	kHz

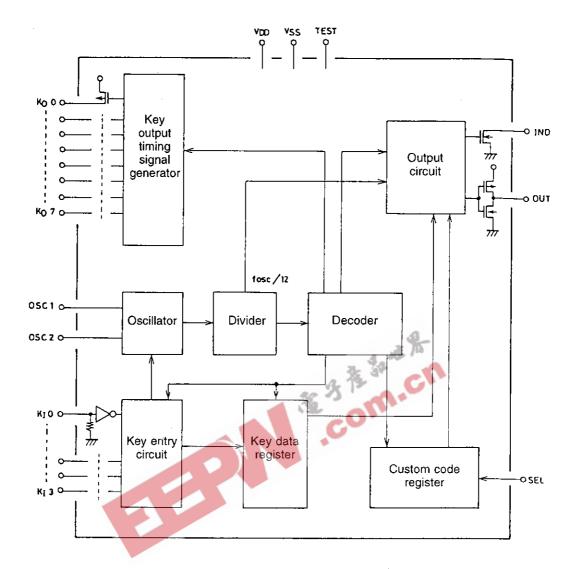
Electrical Characteristics at Ta = 25 $^{\circ}$ C, V_{DD} = 3.0 V

Parameter	Symbol	Conditions	min	typ	max	Unit
Operating supply current	I _{DD}	V _{DD} = Key ON, output: no load			1	mA
Quiescent supply current	I _{DS}	V _{DD} = All keys OFF, OSC stop			1	μA
Output high lovel gurrent	l _{OH} 1	OUT = V _{DD} = 1.8 V, V _{OH} = 1.0 V		-8		mΑ
Output high-level current	I _{OH} 2	OUT = V _{DD} = 3.0 V, V _{OH} = 1.0 V		-25		mΑ
Dioplay output ourrant	1 _{0L} 1	IND = V _{DD} = 1.8 V, V _{OH} = 1.0 V		2		mΑ
Display output current	I _{OL} 2	$IND = V_{DD} = 3.0 \text{ V}, V_{OH} = 1.0 \text{ V}$		5		mΑ
Output high-level voltage	V _{OH}	$K_{O}0$ to $K_{O}7 = I_{OH} = -0.1 \text{ mA}$			0.3	V
Output low-level voltage	V _{OL}	OUT = I _{OL} = 0.1 mA			0.3	V
Output OFF-state leakage current	loff	K _O 0 to K _O 7, IND			1	μA
Input high-level current	I _{IH}	SEL = V _{IN} = V _{DD}			1	μA
Input low-level current	. կլ	SEL = V _{IN} = V _{SS}	-1			μA
Input floating voltage	V _{IF}	K _I 0 to K _I 3			0.1V _{DD}	V
Input pull-down resistance	R _{IN}	K _I 0 to K _I 3	75	100	125	kΩ

Pin Assignment



Block Diagram



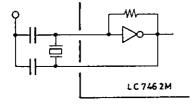
Pin Description

Pin Name	Pin No.	Input/Output	Equivalent Circuit	Pin Function
V_{DD}, V_{SS}	6, 10			Power supply pins: V _{SS} = GND
K _i 0 to K _i 3	1 to 4	Input		Key return signal entry pins
ООТ	5	Output	**************************************	Output pin for transmit LED drive
TEST	7	Input		LSI test pin Normally set to high-level or brought to open state
0SC1 0SC2	8 9	Input/output	OSC1 OSC2	Input/output pins for ceramic resonator-used oscillation VDD Oscillator configuration
IND	11	Output	777	Output pin for transmit indicator LED drive
K _O 0 to K _O 7	12 to 19	Output	o vod	Key scan timing signal output pins
SEL	20	Input	Option 1 SW 2 0	Either of the two shown below may be selected by option. (1) SW position 1 ON Two selections of custom code by SEL "H" or "L" (2) SW position 2 ON SEL pin: NC (No Connection)

General Description of Function

1. Oscillator

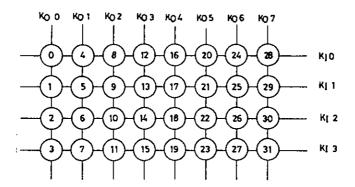
Since a self-bias type amplifier of CMOS inverter is contained, an oscillator can be formed by connecting a ceramic resonator.



To minimize power dissipation, the oscillator stops oscillating except when key operation is performed.

Key entry

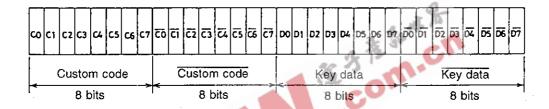
Key entry pins K_10 to K_13 and timing signal output pins K_00 to K_07 provide a key matrix of $4 \times 8 = 32$.



Multi-press of key No. 20 and one of key Nos. 21, 22, 23 may be done, with no priority given in key entry. When the two keys are kept pressed, a series of pulses will be output according to each key entry. If multi-press of keys which are not allowed multi-press is done, no output will be delivered.

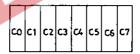
3. Data organization

Data consists of 32 bits in all: 8 bits of custom code, 8 bits of key data, and their inverted codes.



(a) Custom code

The custom code, which consists of 8 bits (C_0 to C_7) in all, is used to distinguish between receiving sets.



 C_0 to C_7 are fixed by the internal mask ROM (impossible to fix externally). Two selections of custom code may be made externally by option (SEL pin-selectable).

Custom code option

	Option 1	Option 2
Custom code to be set internally	2 kinds	1 kind
Function of SEL pin	Two selections of custom code by SEL "H" or "L"	NC (No Connection)

(b) Key data

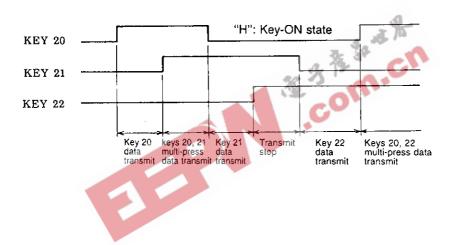
KEY No.	D ₀	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	d ₇
0	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0
2	0	1	0	0	0	0	0	0
3	1	1	0	0	0	0	0	0
4	0	0	1	0	0	0	0	0
5	1	0	1	0	0	0	0	0
;	:	:	:	:	•		•	
28	0	0	1	1	1	0	0	0
29	1	0	1	1	1	0	0	0
30	0	1	1	1	1	0	0	0
31	1	1	1	1	1	0	0	0

Multi-press

KEY No.	D _{.0}	D ₁	D ₂	Dз	D ₄	D ₅	D ₆	D ₇
20, 21	1	0	1	0	1	1	0	0
20, 22	0	1	1	0	1	1	0	0
20, 23	1	1	1	0	1	1	0 -	0

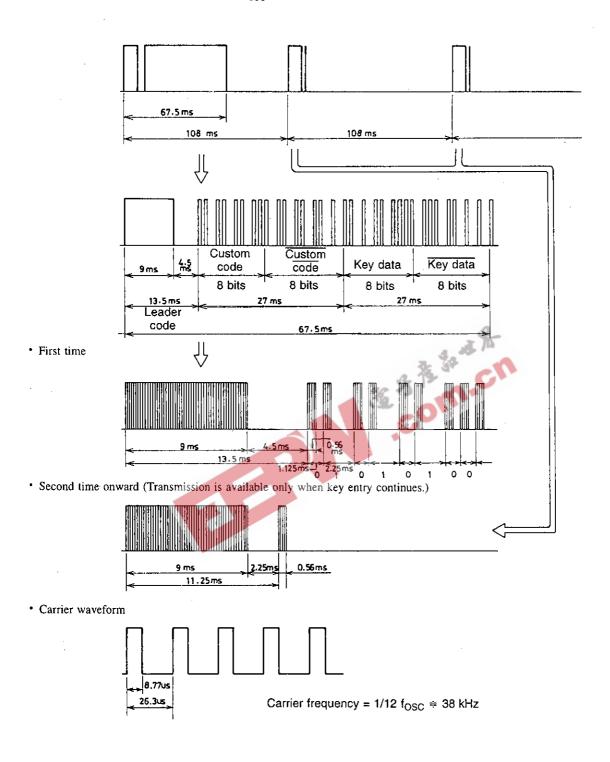
[•] D_6 , D_7 may be preset to "0", "1" beforehand (mask option).

When multi-press of key No. 20 and one of key Nos. 21, 22, 23 is done, multi-bit D_5 will be set to "1", with no priority given in key entry.

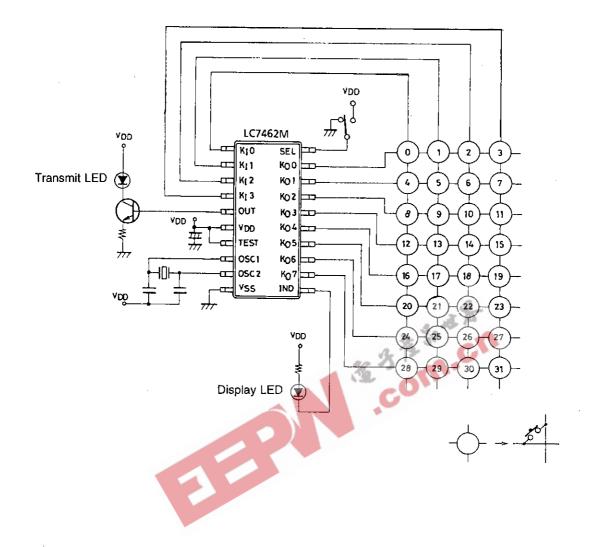


4. Transmit waveforms

The period of time shown below is for f_{OSC} = 455 kHz.



Sample Application Circuit



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