

**SANYO**

No. ※ 2120B

**LC7462M****Infrared Remote Control Transmitter IC****Preliminary****Functions**

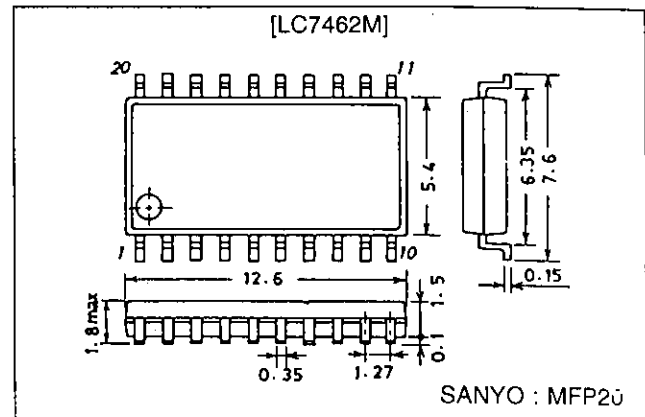
- 32 ⊕ 3 function keys
- 8-bit custom codes
- Operating supply voltage range  $V_{DD} = 1.8$  to  $3.6$  V
- Supply current at the standby mode  $I_{DD} = 1$   $\mu$ A or less
- Double-pressable operation keys (no priority given)
- Oscillator built in (ceramic resonator: connected externally)

**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  $T_a = 25^\circ\text{C}$** 

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{DD \text{ max}}$	$V_{DD}$	$V_{SS}-0.3$ to $+5.5$	V
Input voltage	$V_{IN}$	Each input pin	$V_{SS}-0.3$ to $V_{DD}+0.3$	V
Output voltage	$V_{OUT}$	Each output pin	$V_{SS}-0.3$ to $V_{DD}+0.3$	V
Output current	$I_{OUT}$	OUT	-35	mA
Allowable power dissipation	$P_d \text{ max}$	$T_a \leq 85^\circ\text{C}$	150	mW
Operating temperature	$T_{opr}$		-40 to +85	$^\circ\text{C}$
Storage temperature	$T_{stg}$		-50 to +125	$^\circ\text{C}$

**Allowable Operating Conditions at  $T_a = 25^\circ\text{C}$** 

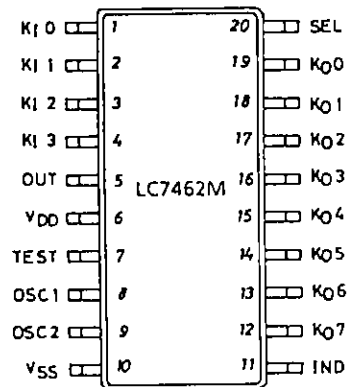
Parameter	Symbol	Conditions	min	typ	max	Unit
Supply voltage	$V_{DD}$	$V_{DD} = f_{osc} = 455$ kHz	1.8	3.0	3.6	V
Input high-level voltage	$V_{IH}$	$K_10$ to $K_13$ , SEL	$0.7V_{DD}$		$V_{DD}$	V
Input low-level voltage	$V_{IL}$	$K_10$ to $K_13$ , SEL	$V_{SS}$		$0.3V_{DD}$	V
Oscillation frequency	$f_{osc}$		400	455	500	kHz

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

Parameter	Symbol	Conditions	min	typ	max	Unit
Operating supply current	$I_{DD}$	$V_{DD} = \text{Key ON}$ , output: no load			1	mA
Quiescent supply current	$I_{DS}$	$V_{DD} = \text{All keys OFF}$ , OSC stop			1	$\mu\text{A}$
Output high-level current	$I_{OH1}$	$\text{OUT} = V_{DD} = 1.8\text{ V}$ , $V_{OH} = 1.0\text{ V}$		-8		mA
	$I_{OH2}$	$\text{OUT} = V_{DD} = 3.0\text{ V}$ , $V_{OH} = 1.0\text{ V}$		-25		mA
Display output current	$I_{OL1}$	$\text{IND} = V_{DD} = 1.8\text{ V}$ , $V_{OH} = 1.0\text{ V}$		2		mA
	$I_{OL2}$	$\text{IND} = V_{DD} = 3.0\text{ V}$ , $V_{OH} = 1.0\text{ V}$		5		mA
Output high-level voltage	$V_{OH}$	$K_0$ to $K_7 = I_{OH} = -0.1\text{ mA}$			0.3	V
Output low-level voltage	$V_{OL}$	$\text{OUT} = I_{OL} = 0.1\text{ mA}$			0.3	V
Output OFF-state leakage current	$I_{OFF}$	$K_0$ to $K_7$ , IND			1	$\mu\text{A}$
Input high-level current	$I_{IH}$	$\text{SEL} = V_{IN} = V_{DD}$			1	$\mu\text{A}$
Input low-level current	$I_{IL}$	$\text{SEL} = V_{IN} = V_{SS}$	-1			$\mu\text{A}$
Input floating voltage	$V_{IF}$	$K_0$ to $K_3$			$0.1V_{DD}$	V
Input pull-down resistance	$R_{IN}$	$K_0$ to $K_3$	75	100	125	$\text{k}\Omega$

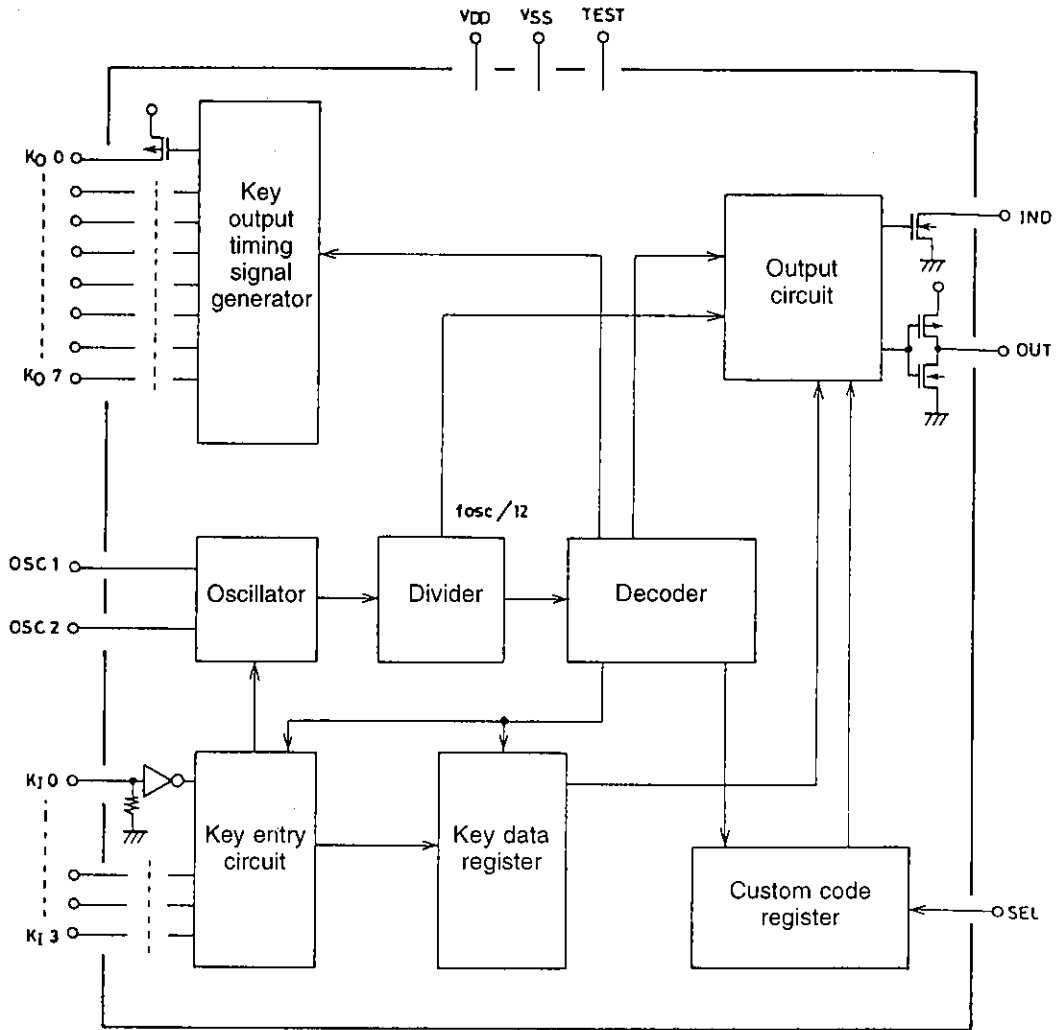
### Pin Assignment



Top view

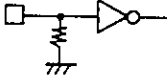
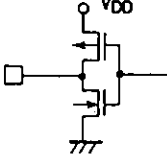
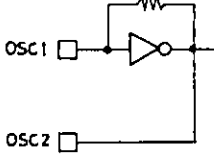
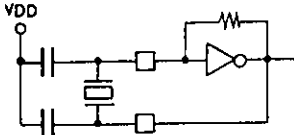
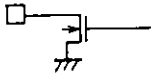
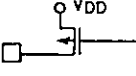
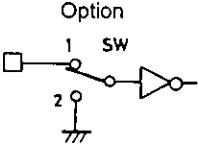
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## Block Diagram



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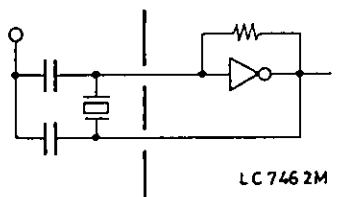
## Pin Description

Pin Name	Pin No.	Input/Output	Equivalent Circuit	Pin Function
V <sub>DD</sub> , V <sub>SS</sub>	6, 10			Power supply pins: V <sub>SS</sub> = GND
K <sub>i</sub> 0 to K <sub>i</sub> 3	1 to 4	Input		Key return signal entry pins
OUT	5	Output		Output pin for transmit LED drive
TEST	7	Input		LSI test pin Normally set to high-level or brought to open state
OSC1 OSC2	8 9	Input/output	  Oscillator configuration	Input/output pins for ceramic resonator-used oscillation
IND	11	Output		Output pin for transmit indicator LED drive
K <sub>O</sub> 0 to K <sub>O</sub> 7	12 to 19	Output		Key scan timing signal output pins
SEL	20	Input		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.

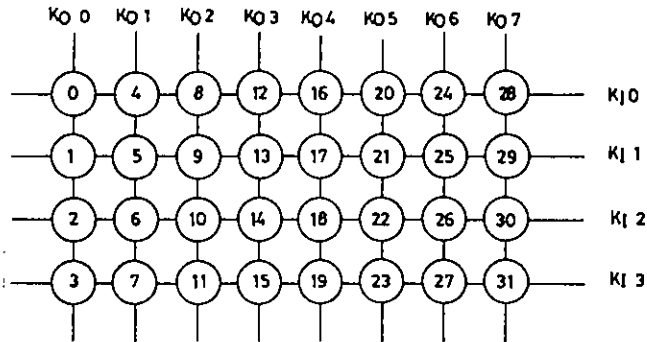


To minimize power dissipation, the oscillator stops oscillating except when key operation is performed.

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### 2. Key entry

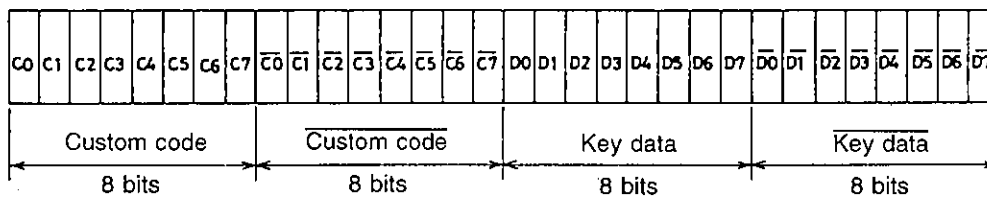
Key entry pins  $K_{I0}$  to  $K_{I3}$  and timing signal output pins  $K_{O0}$  to  $K_{O7}$  provide a key matrix of  $4 \times 8 = 32$ .



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.

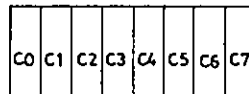
### 3. Data organization

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)

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(b) Key data

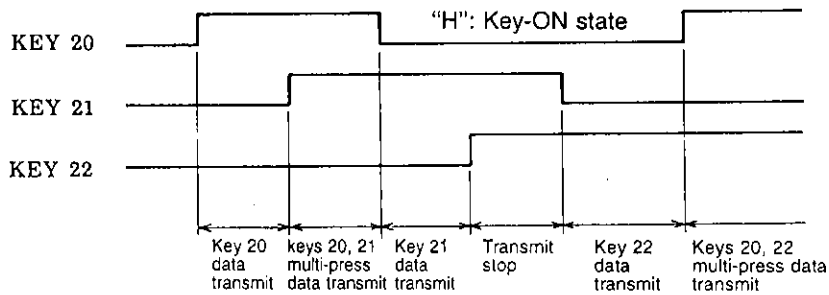
KEY No.	D <sub>0</sub>	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	D <sub>5</sub>	D <sub>6</sub>	d <sub>7</sub>
0	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0
2	0	1	0	0	0	0	0	0
3	1	1	0	0	0	0	0	0
4	0	0	1	0	0	0	0	0
5	1	0	1	0	0	0	0	0
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
28	0	0	1	1	1	0	0	0
29	1	0	1	1	1	0	0	0
30	0	1	1	1	1	0	0	0
31	1	1	1	1	1	0	0	0

Multi-press

KEY No.	D <sub>0</sub>	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	D <sub>5</sub>	D <sub>6</sub>	D <sub>7</sub>
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<sub>6</sub>, D<sub>7</sub> may be preset to "0", "1" beforehand (mask option).

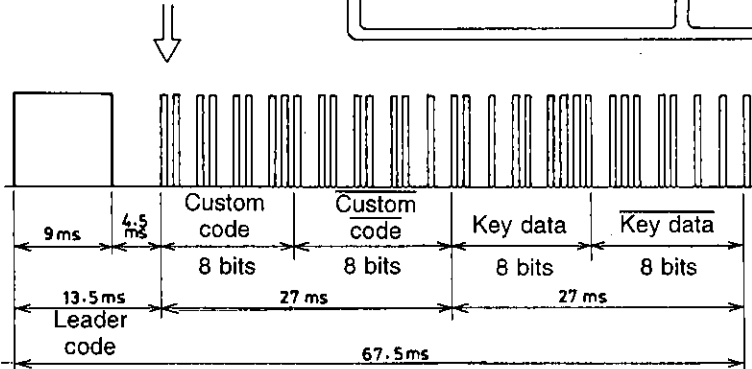
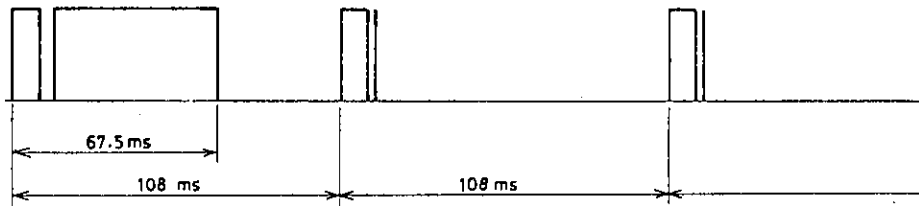
When multi-press of key No. 20 and one of key Nos. 21, 22, 23 is done, multi-bit D<sub>5</sub> will be set to "1", with no priority given in key entry.



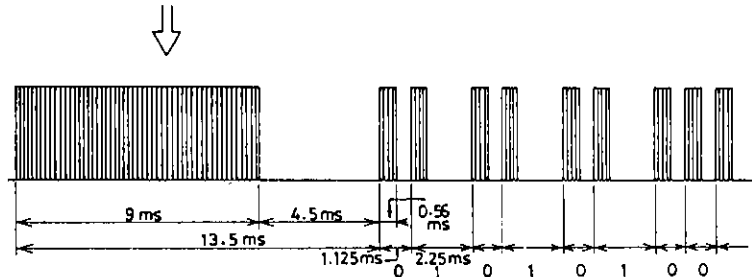
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## 4. Transmit waveforms

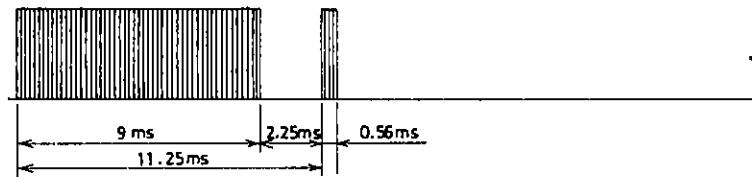
The period of time shown below is for  $f_{OSC} = 455 \text{ kHz}$ .



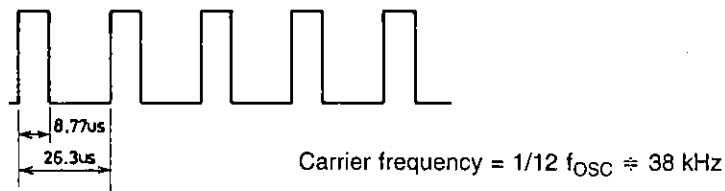
• First time



• Second time onward (Transmission is available only when key entry continues.)

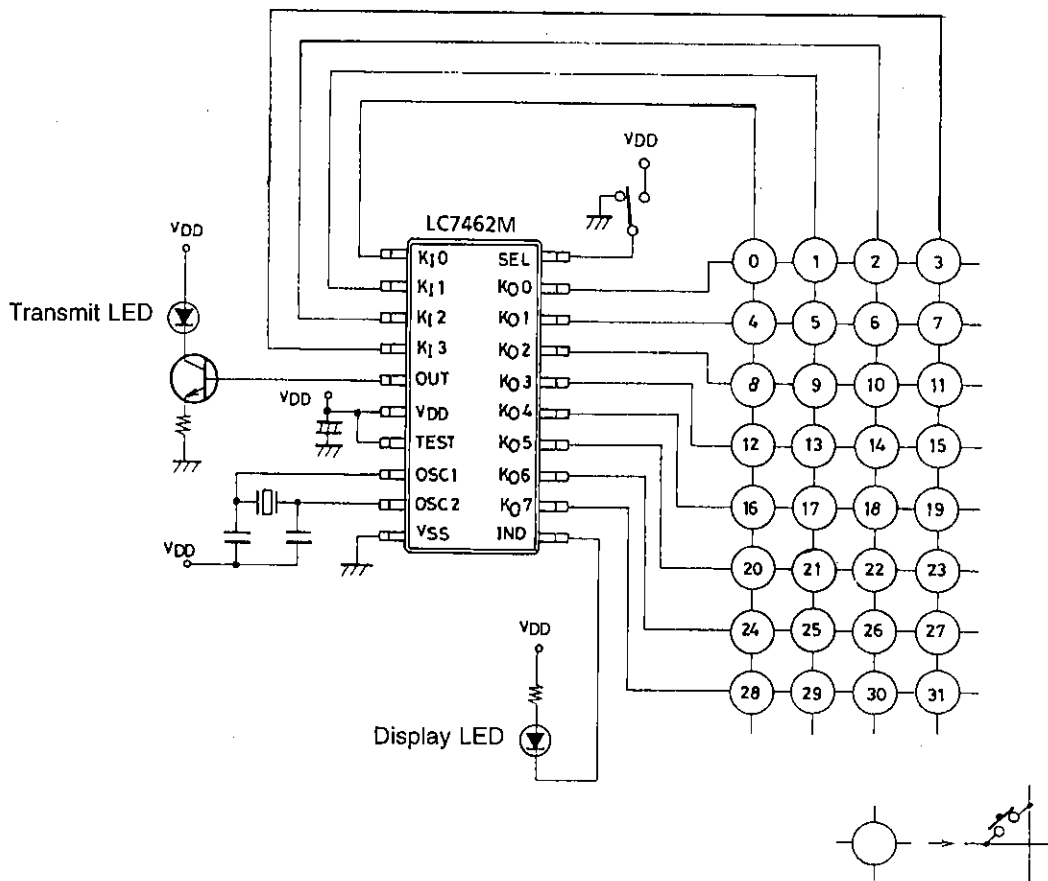


• Carrier waveform



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## Sample Application Circuit



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