file NO.14585
BEST-NO.173630

≒ HT 88

HT-2880 8 SOUND GENERATOR	
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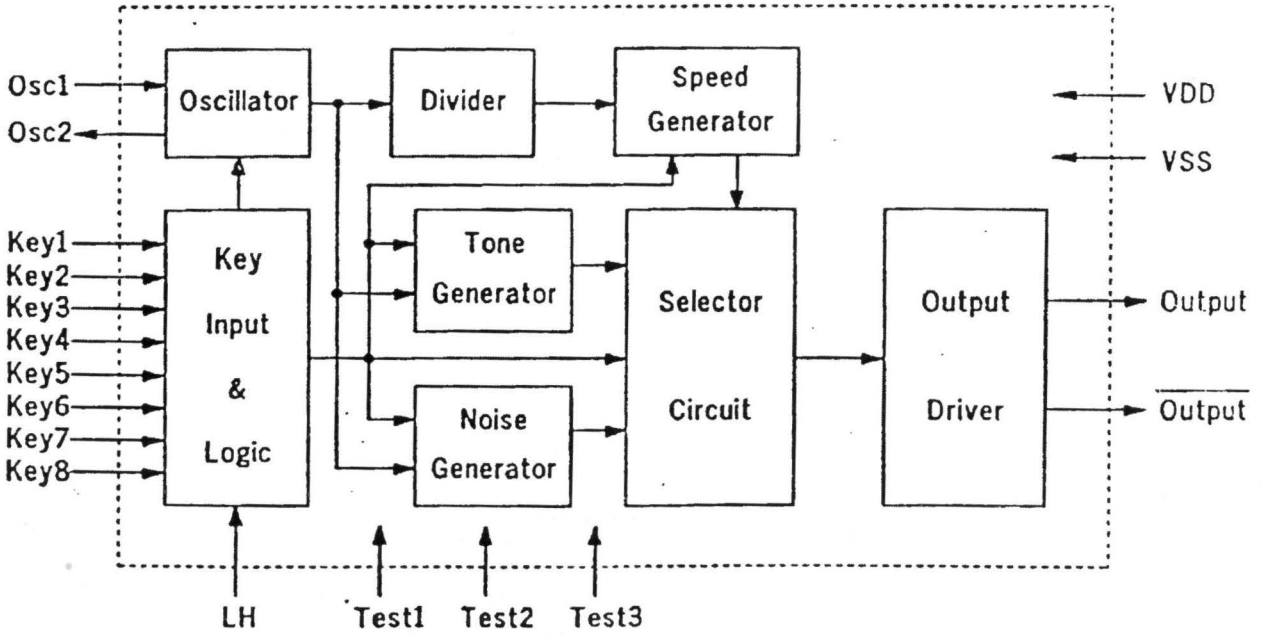
A. General Description —

The HT-2880 is a C-MOS LSI chip specially designed for the sound effect application. It contains eight sections which include tone circuit , noise circuit and other control logic to generate many kinds of sound , such as Rifle Gun, Machine Gun, Booming Sound, Door Bell, Alarm and ect.... Customer sound type can be analyzed and programmed into internal ROM by changing one mask layer during device fabrication. It is well suited for the various toy applications.

B. Features —

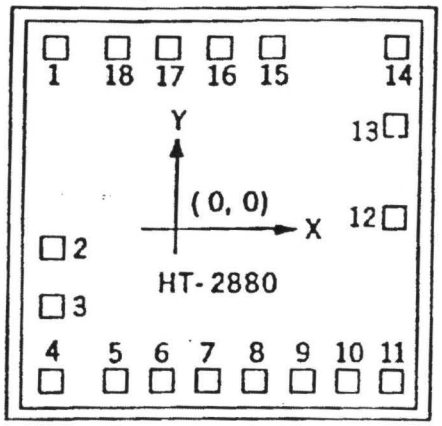
- Single power supply 2.4V～3.3V.
- Low stand—by current : 1μA typically at VDD=3V
- Auto power—off function.
- Eight different sound sections.
- Level hold or one shot play selectable.
- Speaker or directly buzzer application.
- Minimum external components.

C. Block Diagram —



D. Pad Assignment & Position —

Chip Size : 95 × 81 (Mil)²



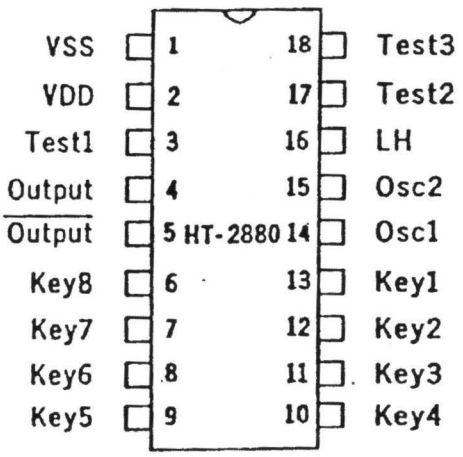
PAD 1 :	Test1	PAD 10 :	Key2
PAD 2 :	Output	PAD 11 :	Key1
PAD 3 :	$\overline{\text{Output}}$	PAD 12 :	Osc1
PAD 4 :	Key8	PAD 13 :	Osc2
PAD 5 :	Key7	PAD 14 :	LH
PAD 6 :	Key6	PAD 15 :	Test2
PAD 7 :	Key5	PAD 16 :	Test3
PAD 8 :	Key4	PAD 17 :	VSS
PAD 9 :	Key3	PAD 18 :	VDD

	X	Y		X	Y
PAD 1 :	− 41.00	34.12	PAD 10 :	32.62	− 34.19
PAD 2 :	− 41.00	− 14.30	PAD 11 :	41.08	− 34.19
PAD 3 :	− 41.00	− 22.76	PAD 12 :	41.08	− 0.62
PAD 4 :	− 41.00	− 34.19	PAD 13 :	41.08	23.59
PAD 5 :	− 20.03	− 34.19	PAD 14 :	41.08	34.12
PAD 6 :	− 8.50	− 34.19	PAD 15 :	3.82	34.12
PAD 7 :	1.03	− 34.19	PAD 16 :	− 6.71	34.12
PAD 8 :	11.56	− 34.19	PAD 17 :	− 15.17	34.12
PAD 9 :	22.09	− 34.19	PAD 18 :	− 23.63	34.12

Unit : (Mil)

* The IC substrate should be connected to VDD in PCB layout artwork.

E. Pin Assignment —



F. Pin Description —

Pad No	Pad Name	I/O	Description
1	VSS		Negative power supply, ⏚
2	VDD		Positive power supply.
3	Test1	I/O	For IC test only.
4	Output	O	Sound output pin.
5	$\overline{\text{Output}}$	O	Sound output pin, out of phase to pin 4.
6	Key8	I	Key8 input pin, low active.
7	Key7	I	Key7 input pin, low active.
8	Key6	I	Key6 input pin, low active.
9	Key5	I	Key5 input pin, low active.
10	Key4	I	Key4 input pin, low active.
11	Key3	I	Key3 input pin, low active.
12	Key2	I	Key2 input pin, low active.
13	Key1	I	Key1 input pin, low active.
14	Osc1	I	Oscillator input pin.
15	Osc2	O	Oscillator output pin.
16	LH	I	Level hold control pin.
17	Test2	I/O	For IC test only.
18	Test3	I/O	For IC test only.

G. Electric Characteristics —

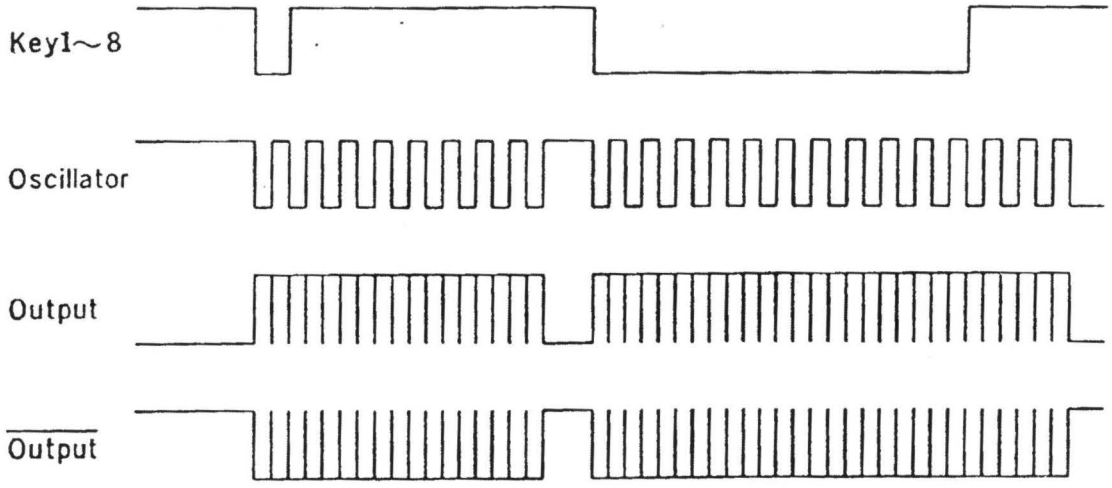
Parameter	Symbol	Test condition	Minimum	Typical	Maximum	Unit
Operating voltage	VDD	—	2.4	3	3.3	V
Stand— by current	IDD	VDD=3V	—	1	5	μA
Operating current	Iop	VDD=3V, No load	—	300	600	μA
Output source current	IOH	VDD=3V, VOH=2.5V	−1	−2	—	mA
Output sink current	IOL	VDD=3V, VOL=0.5V	1	2	—	mA
Oscillator frequency	Fosc	R=150KΩ	—	128	—	KHz
'H' input voltage	VIH	VDD=3V	2.1	—	—	V
'L' input voltage	VIL	VDD=3V	—	—	0.9	V

H. Absolute Maximum Ratings —

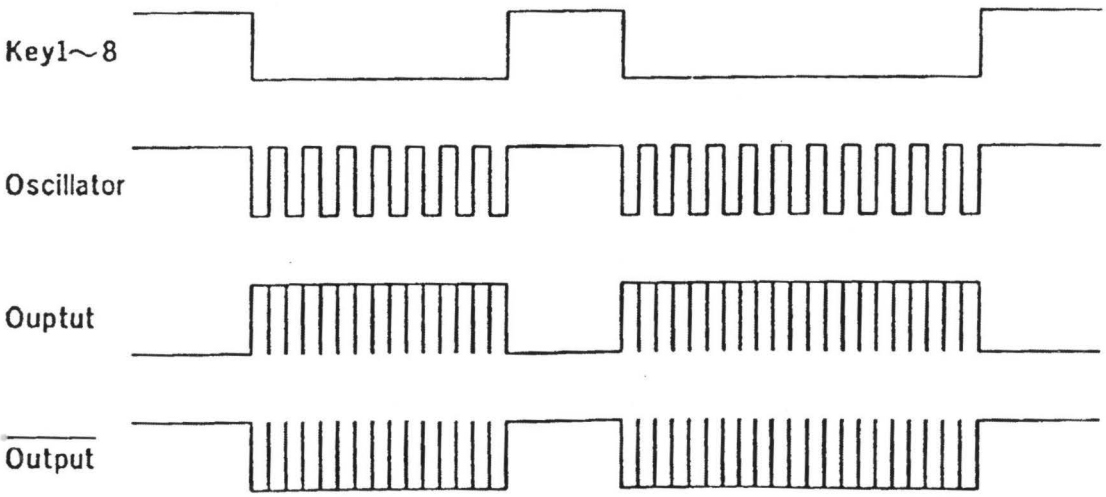
Parameter	Symbol	Minimum	Maximum	Unit
Supply voltage	VDD	− 0.3	5	V
Input/output voltage	Vi , Vo	VSS − 0.3	VDD +0.3	V
Storage temperature	Tstg	− 50	125	℃
Operating temperature	Top	0	70	℃

I. Timing Diagram —

(a) One shout mode : (LH=Open)



(b) Level hold mode : (LH=VSS)



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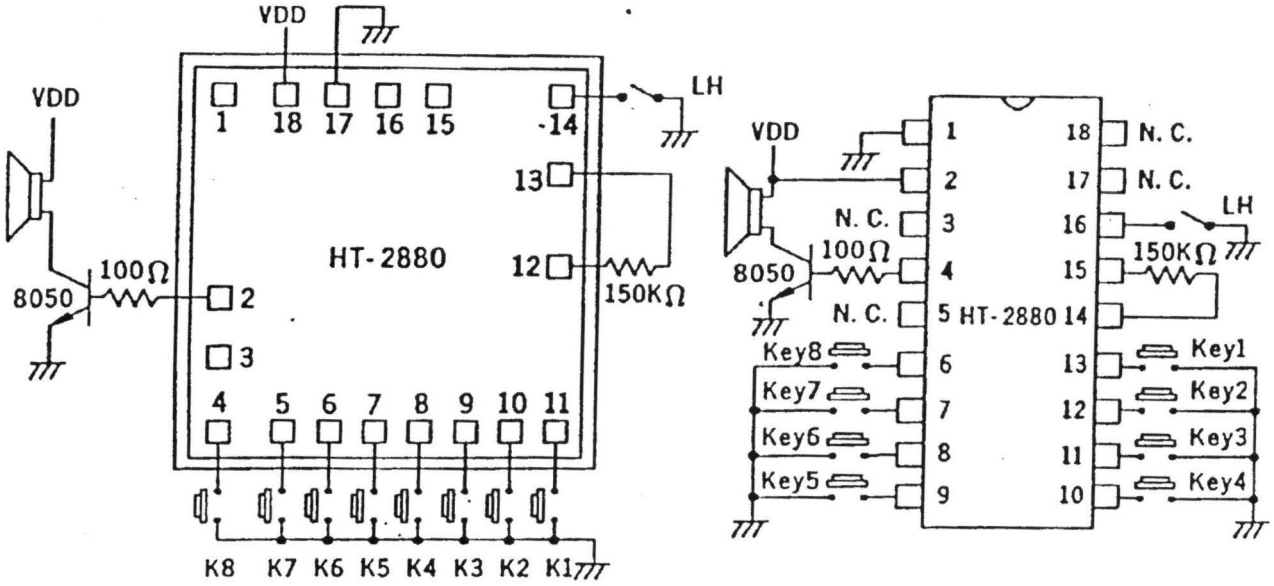
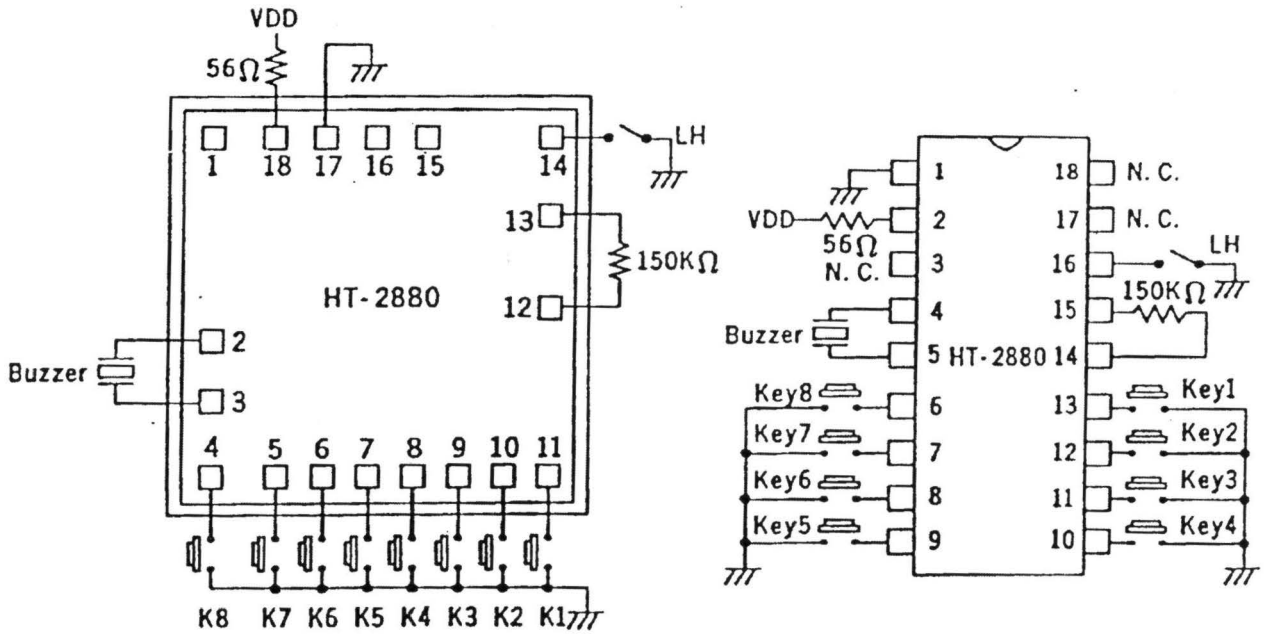
J. Application Diagram —

(a) Speaker Application



(b) Buzzer Application :



Key1 : Rifle Gun

Key2 : Animal Sound

Key3 : TV Game

Key4 : Dual Tone

Key5 : Bombing 2

Key6 : Bombing 1

Key7 : Machine Gun 2

Key8 : Machine Gun 1

- The IC substrate should be connected to VDD in PCB layout artwork.

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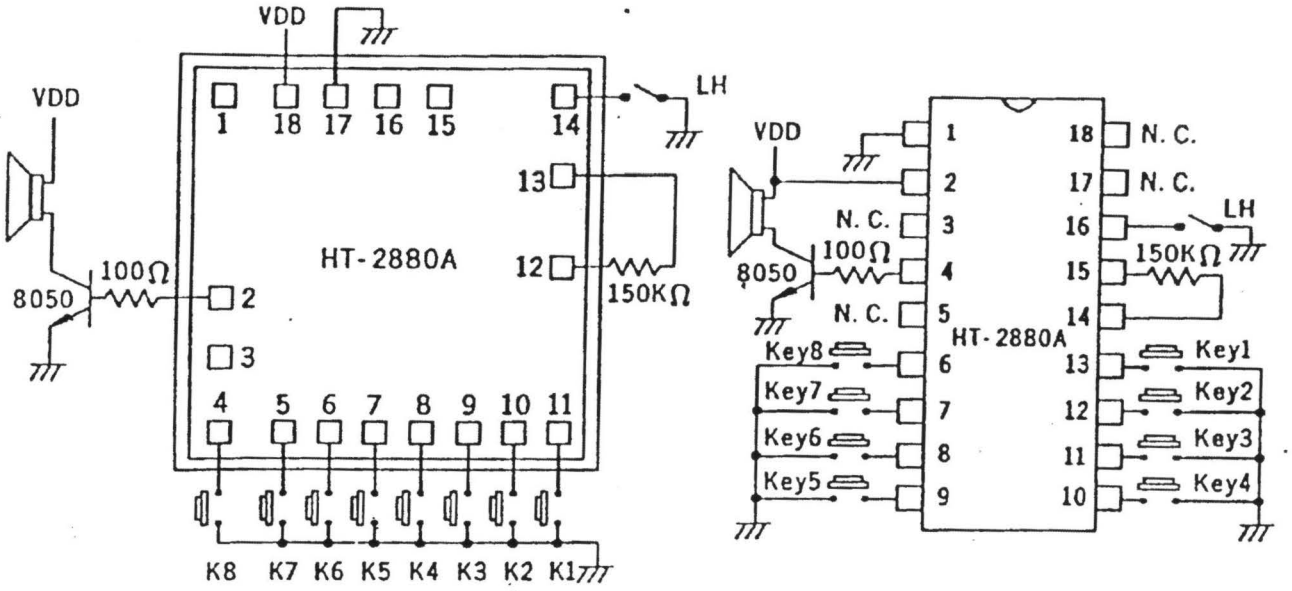
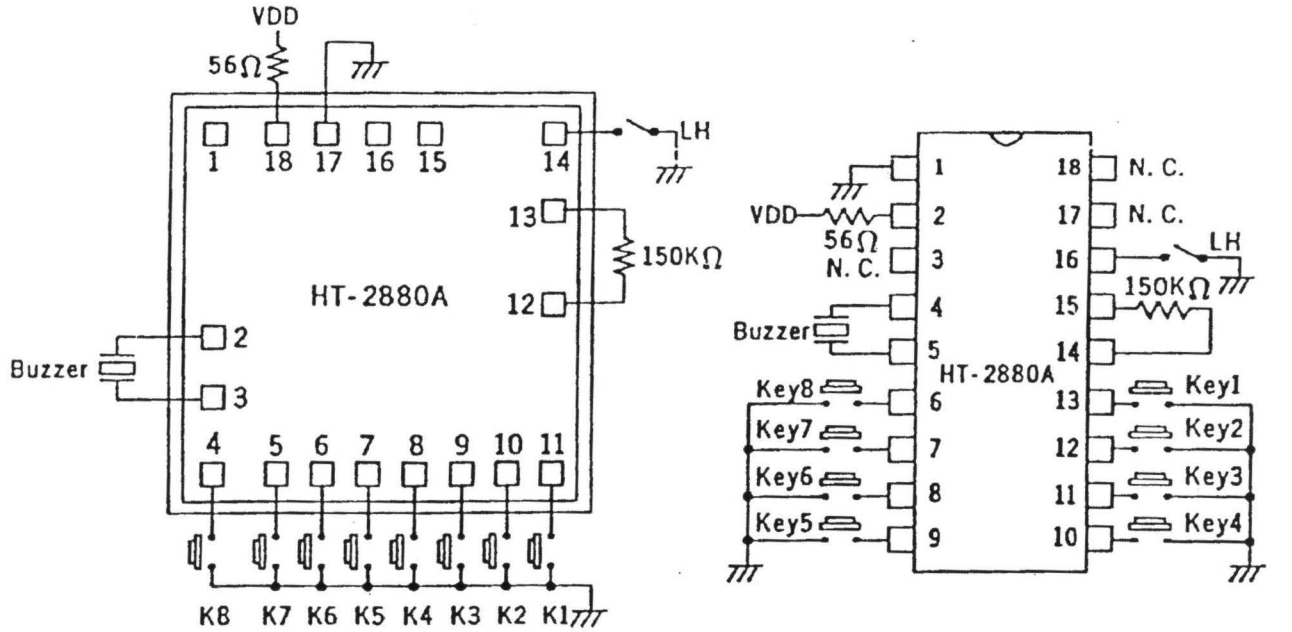
K. Application Diagram —

(a) Speaker Application



(b) Buzzer Application :



Key1 : Rifle Gun
Key2 : Machine Gun 3
Key3 : TV Game
Key4 : Dual Tone
Key5 : Bombing 2
Key6 : Bombing 1
Key7 : Machine Gun 2
Key8 : Machine Gun 1

* The IC substrate should be connected to VDD in PCB layout artwork.

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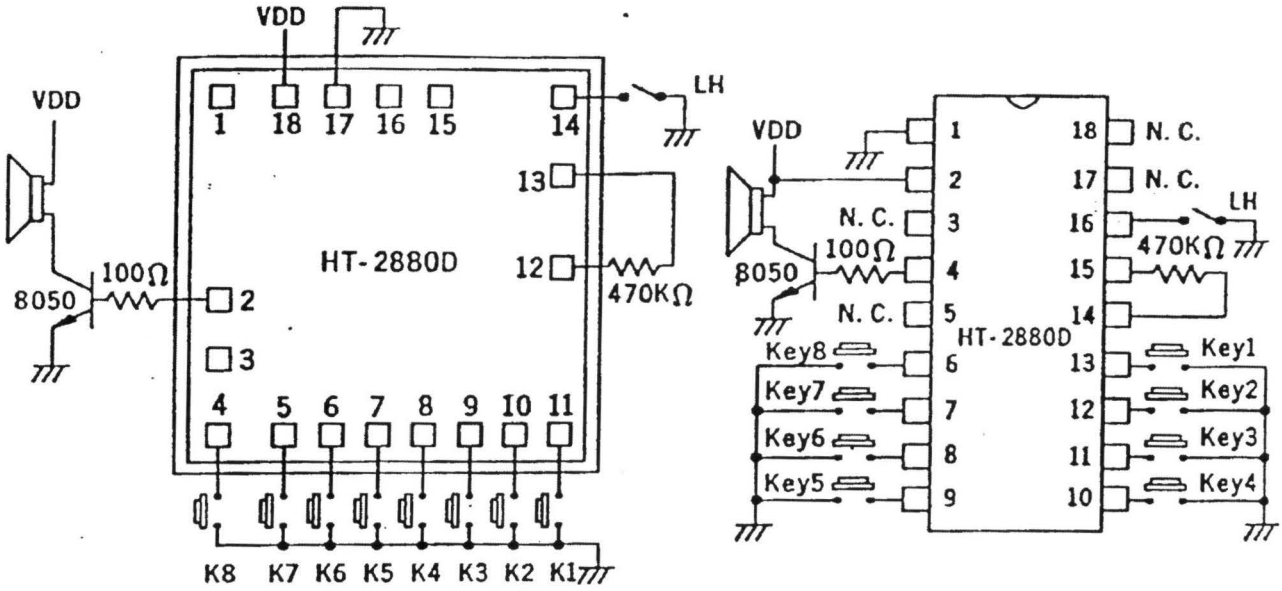
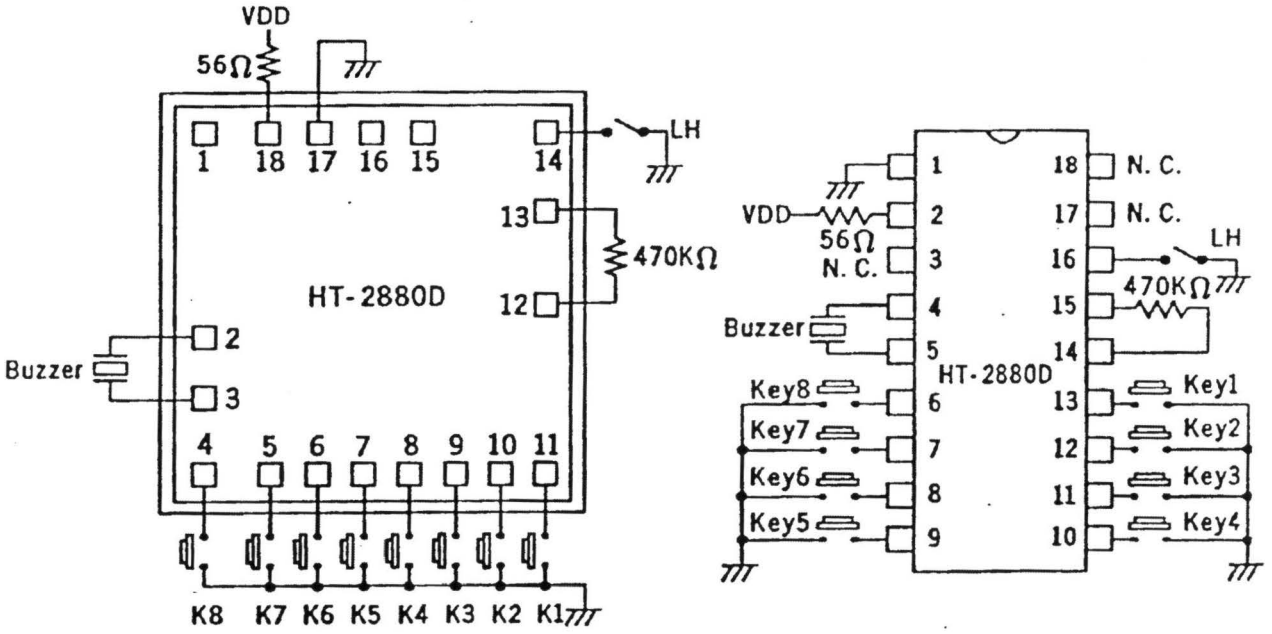
L. Application Diagram —

(a) Speaker Application



(b) Buzzer Application :



Key1 : Siren

Key2 : Melody (1)

Key3 : Explosion

Key4 : Mountain Musician

Key5 : Bombing

Key6 : Melody (2)

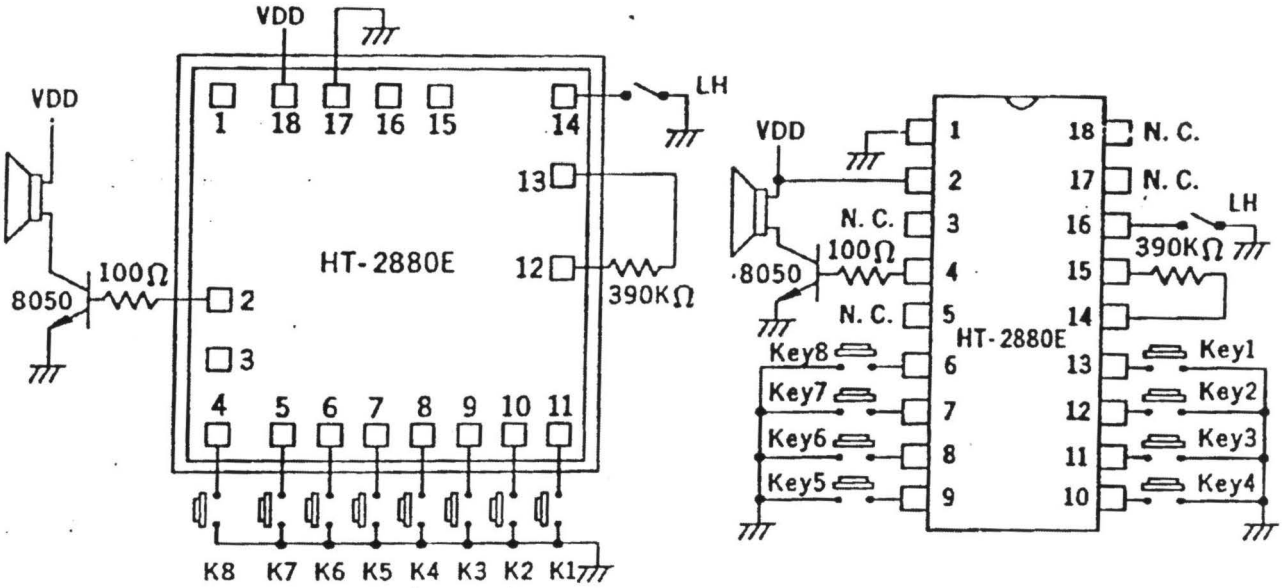
Key7 : Rifle Gun

Key8 : London Bridge

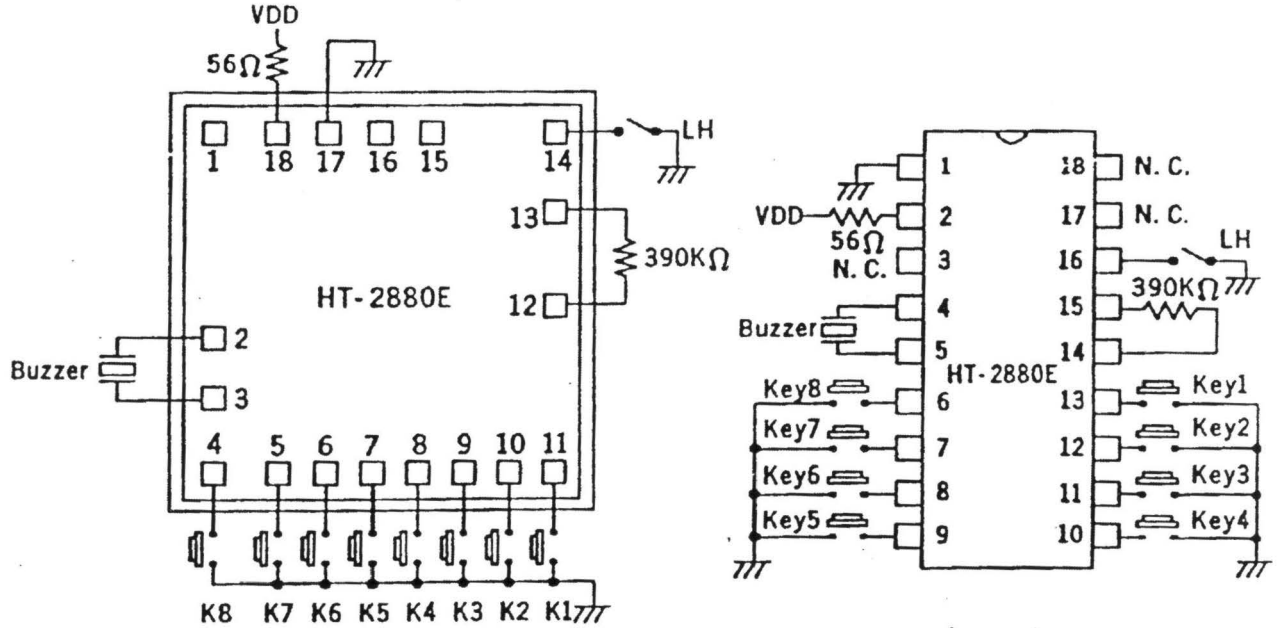
* The IC substrate should be connected to VDD in PCB layout artwork.

M. Application Diagram —

(a) Speaker Application



(b) Buzzer Application :



Key1 : Jingle Bells (1)

Key2 : Siren

Key3 : Jingle Bells (2)

Key4 : Alarm

Key5 : Happy Birthday

Key6 : Phone Bell

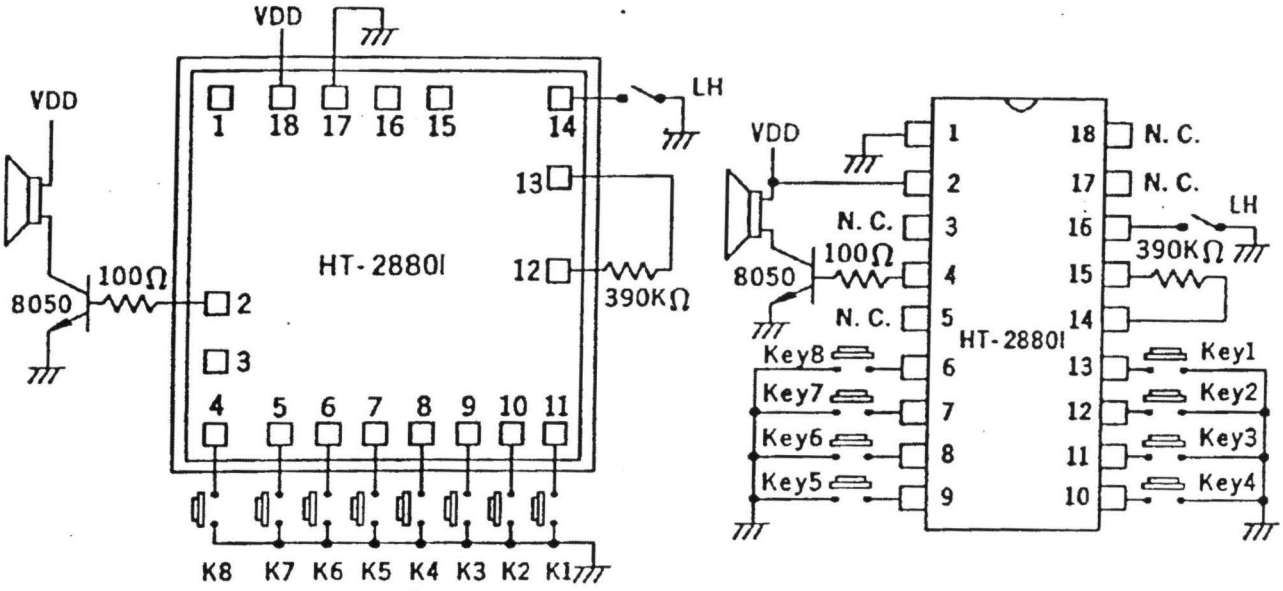
Key7 : Wedding March

Key8 : Explosion

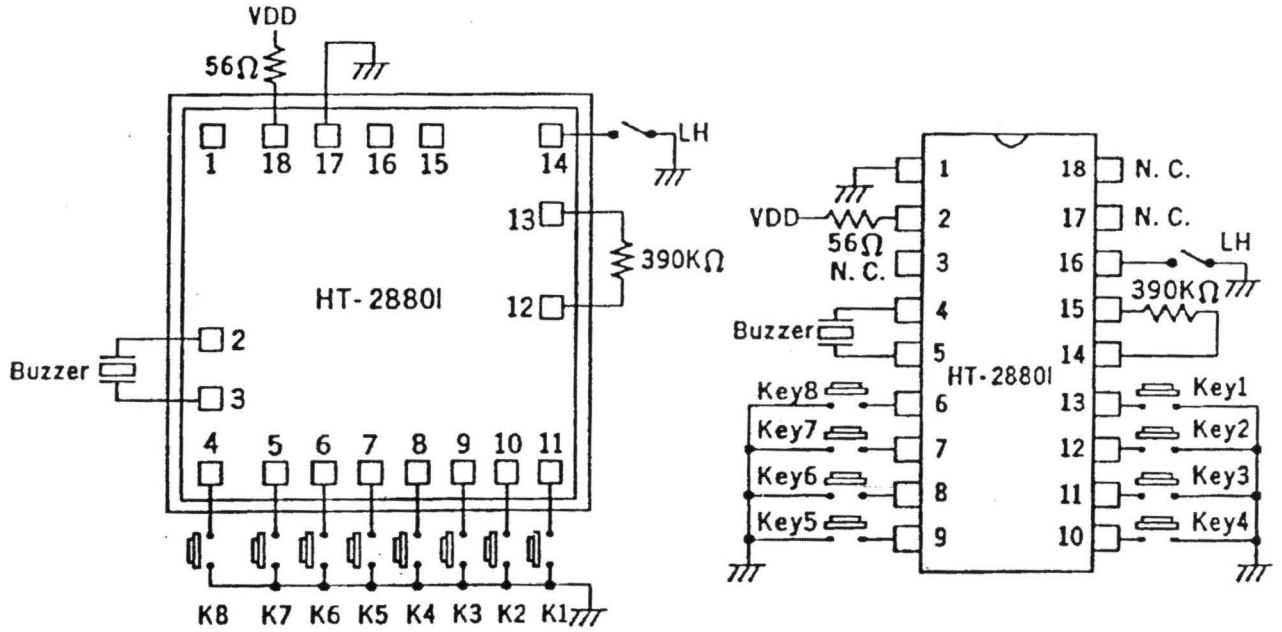
* The IC substrate should be connected to VDD in PCB layout artwork.

N. Application Diagram —

(a) Speaker Application



(b) Buzzer Application :



Key1 : London Bridge

Key2 : Siren

Key3 : Happy Birthday

Key4 : Alarm

Key5 : OH, My Darling!

Key6 : Phone Bell

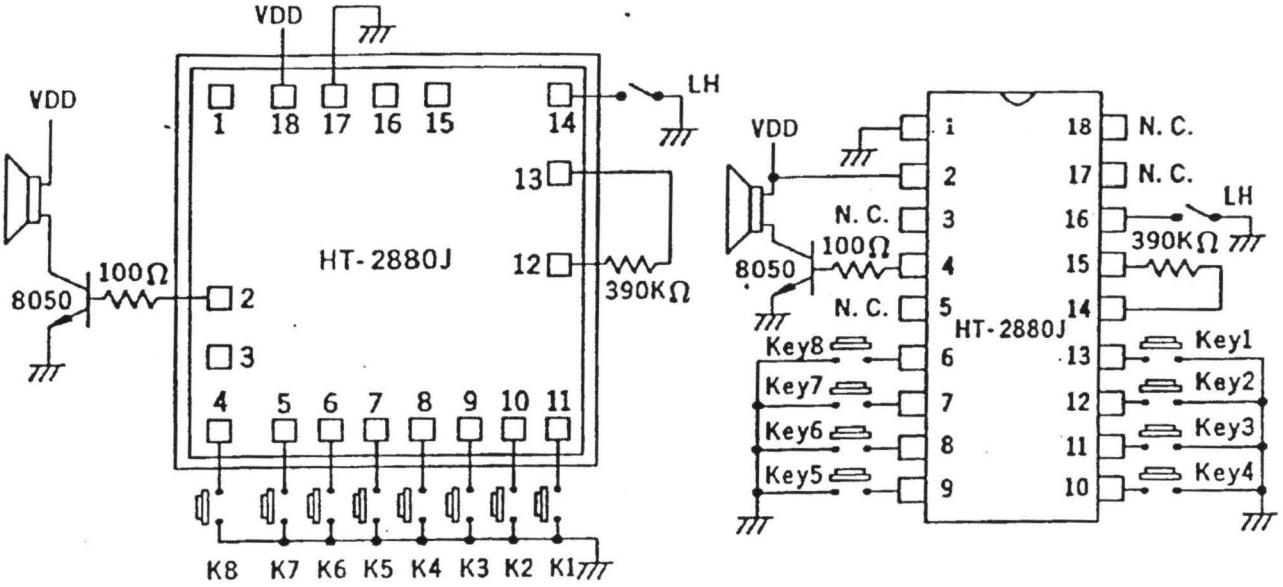
Key7 : Are You Sleeping?

Key8 : Explosion

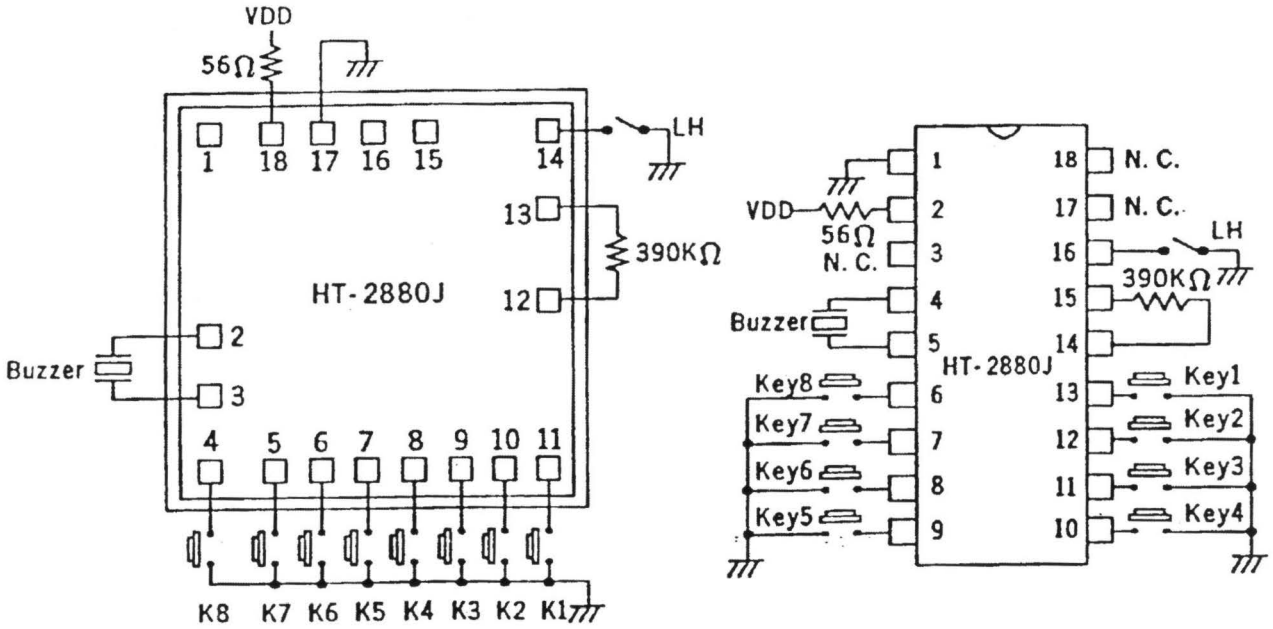
* The IC substrate should be connected to VDD in PCB layout artwork.

O. Application Diagram —

(a) Speaker Application



(b) Buzzer Application :



Key1 : London Bridge

Key2 : Happy Birthday

Key3 : Oh, My Darling!

Key4 : Are You Sleeping?

Key5 : Wedding March

Key6 : Little Bees

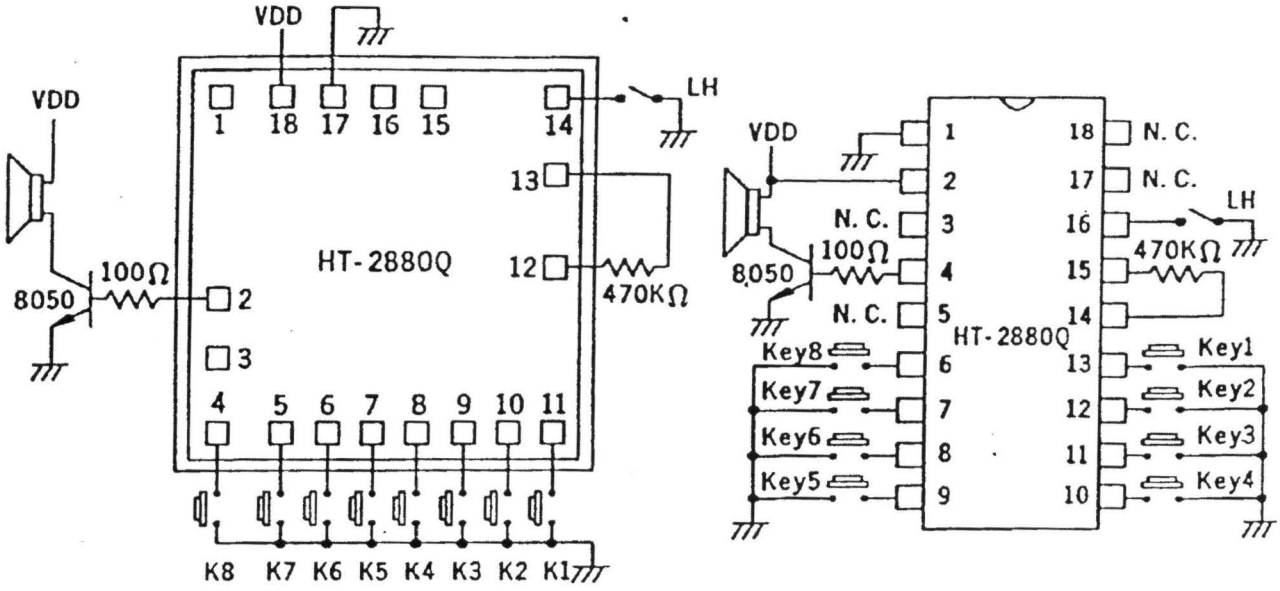
Key7 : Row Your Boat

Key8 : Mary Had A Little Lamb

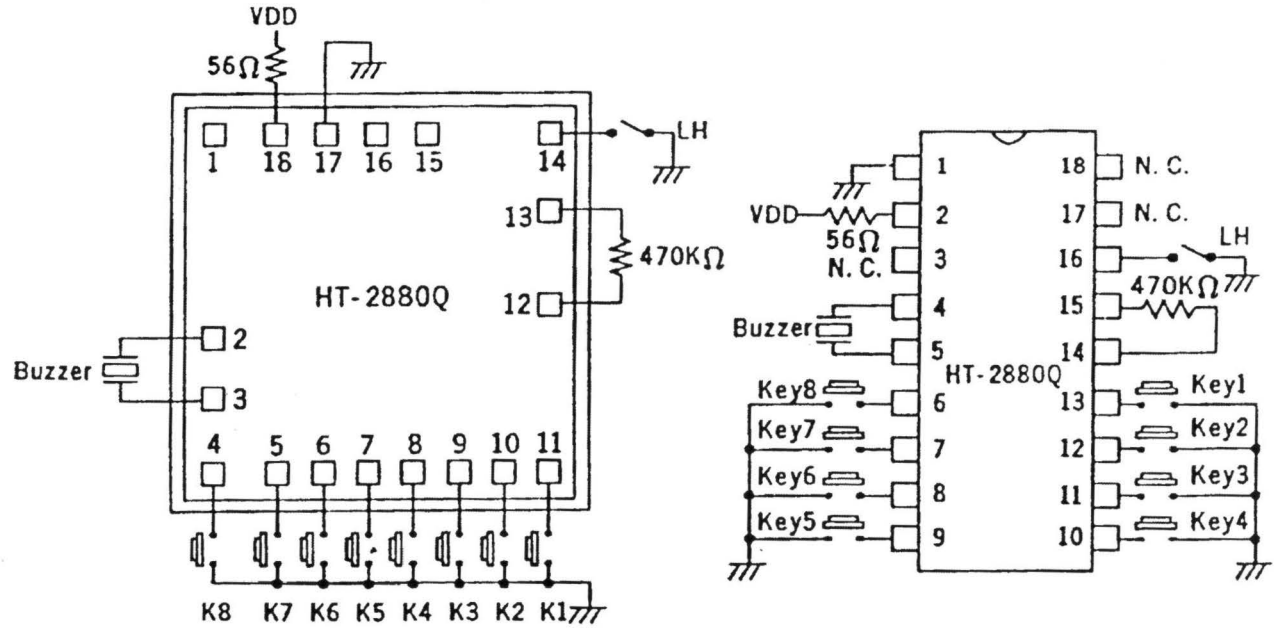
* The IC substrate should be connected to VDD in PCB layout artwork.

P. Application Diagram —

(a) Speaker Application



(b) Buzzer Application :



Key1 : Mary had a Little Lamb
Key2 : Row Your Boat
Key3 : Little Bees
Key4 : Wedding March
Key5 : Lambada (1)
Key6 : Lambada (2)
Key7 : Lambada (3)
Key8 : Lambada (4)

* The IC substrate should be connected to VDD in PCB layout artwork.