



**8-Sound Generator + 5 Flashing LEDs**

**Features**

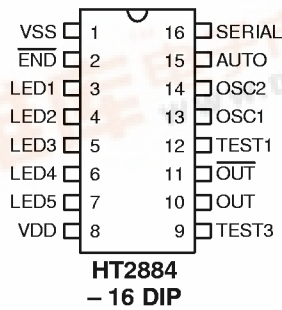
- Single power supply: 2.4V~3.3V
- Low standby current: 1μA (Typ.) at V<sub>DD</sub>=3V
- Auto power-off function
- Eight different sound sections
- Auto key and serial key control
- Five direct LED outputs for sequential flash
- END pulse trigger output
- Speaker or direct piezo application
- Minimum external components

**General Description**

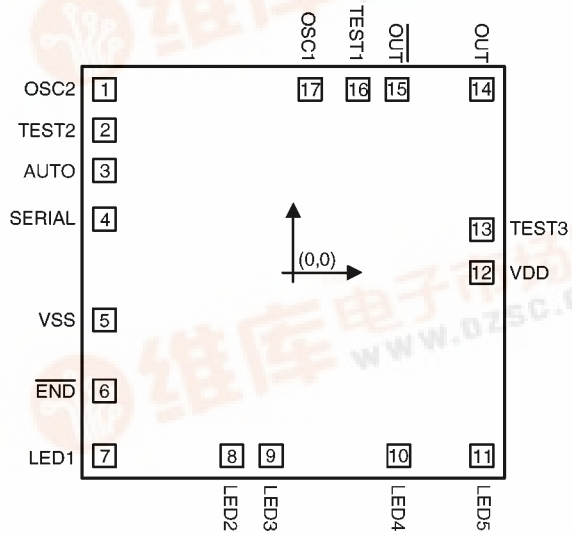
The HT2884 is a CMOS LSI chip designed for use in sound effect products. It is equipped with tone circuit, noise circuit, and other control logic to generate various sounds including rifle gun, machine gun, booming, door bell, alarm, and so

forth. The features of the customer's sound source can be analyzed and programmed into an internal ROM by changing a mask layer during device fabrication. The HT2884 is suitable for various toy applications.

**Pin Assignment**



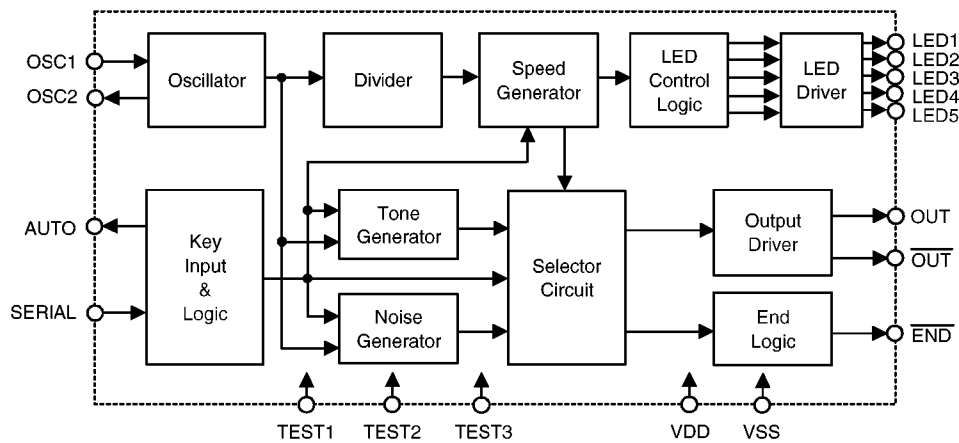
**Pad Assignment**



Chip size: 87 × 85 (mil)<sup>2</sup>

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



**Block Diagram**

**Pad Coordinates**

Unit: mil

Pad No.	X	Y	Pad No.	X	Y
1	-37.187	36.125	10	20.783	-36.125
2	-37.187	28.050	11	37.188	-36.125
3	-37.187	20.145	12	37.188	0.000
4	-37.187	10.540	13	37.188	8.500
5	-37.187	-9.350	14	37.188	36.125
6	-37.187	-23.375	15	20.485	36.125
7	-37.187	-36.125	16	12.835	36.125
8	-12.027	-36.125	17	3.400	36.125
9	-4.377	-36.125			

**Pin Description**

Pin No.	Pin Name	I/O	Description
1	VSS	O	Negative power supply, GND
2	$\overline{\text{END}}$		End trigger output
3	LED1		LED output, open drain P-MOS
4	LED2	O	LED output, open drain P-MOS
5	LED3	I	LED output, open drain P-MOS
6	LED4		LED output, open drain P-MOS
7	LED5		LED output, open drain P-MOS
8	VDD		Positive power supply

Pin No.	Pin Name	I/O	Description
9	TEST3	I	For IC test only
10	OUT	I	Sound output
11	$\overline{\text{OUT}}$	O	Sound output, out of phase to pin 10
12	TEST1	I	For IC test only
13	OSC1	I	Oscillator input
14	OSC2	O	Oscillator output
15	AUTO	I	(Refer to the timing diagram), low active
16	SERIAL	I	(Refer to the timing diagram), low active

### Absolute Maximum Ratings\*

Supply Voltage ..... -0.3V to 5V      Storage Temperature ..... -50°C to 125°C  
 Input Voltage .....  $V_{SS}-0.3V$  to  $V_{DD}+0.3V$       Operating Temperature ..... 0°C to 70°C

\*Note: Stresses above those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only. Functional operation of this device at these or any other conditions above those indicated in the operational sections of this specification is not implied and exposure to absolute maximum rating conditions for extended periods may affect device reliability.

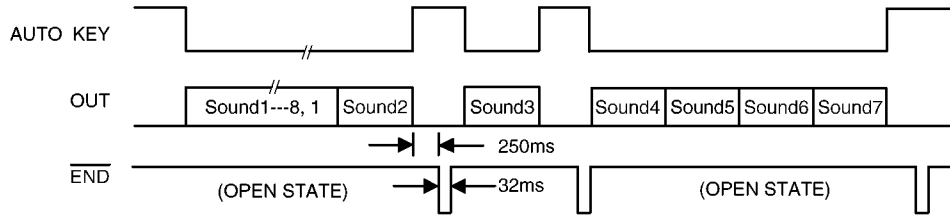
### Electrical Characteristics

(Ta=25°C)

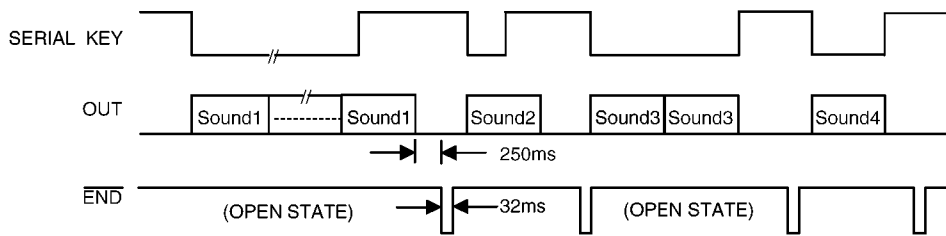
Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V <sub>DD</sub>	Conditions				
V <sub>DD</sub>	Operating Voltage	—	—	2.4	3	3.3	V
I <sub>STB</sub>	Standby Current	3V	—	—	1	5	μA
I <sub>DD</sub>	Operating Current	3V	No load	—	300	600	μA
I <sub>OH1</sub>	Output Source Current	3V	V <sub>OH</sub> =2.5V	-1	-2	—	mA
I <sub>OL1</sub>	Output Sink Current	3V	V <sub>OL</sub> =0.5	1	2	—	mA
I <sub>OH2</sub>	LED Source Current	3V	V <sub>OH</sub> =-2.5V	-4	—	—	mA
I <sub>OL2</sub>	$\overline{\text{END}}$ Sink Current	3V	V <sub>OL</sub> =0.5V	1	—	—	mA
F <sub>OSC</sub>	Oscillator Frequency	—	R=180kΩ	—	128	—	kHz
V <sub>IH</sub>	“H” Input Voltage	3V	—	2.4	—	—	V
V <sub>IL</sub>	“L” Input Voltage	3V	—	—	—	0.6	V

**Timing Diagram (When Fosc=128kHz)**

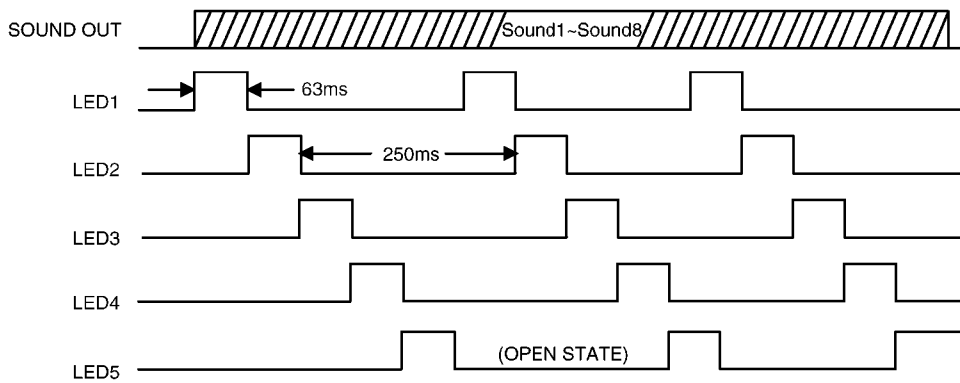
- Auto key control: (Level-hold)



- Serial key control: (One-shot)

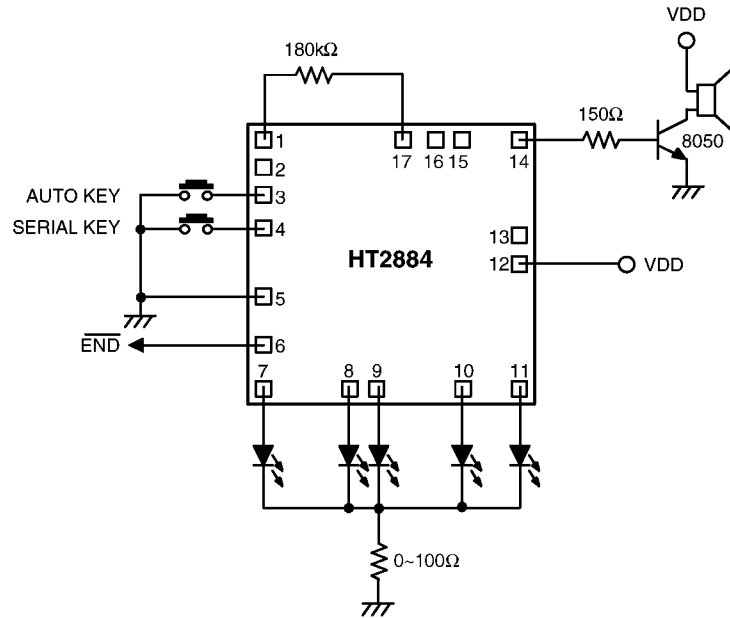


- LED flash output

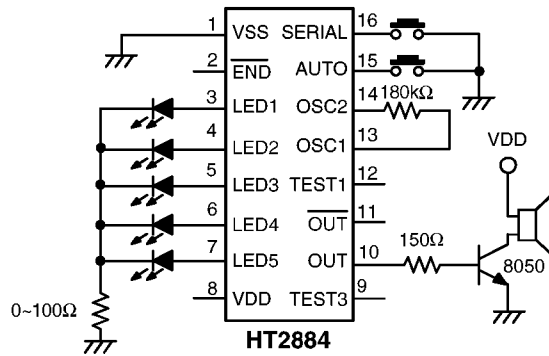


**Application Circuits (HT2884 — Eight Gun Sound IV)**

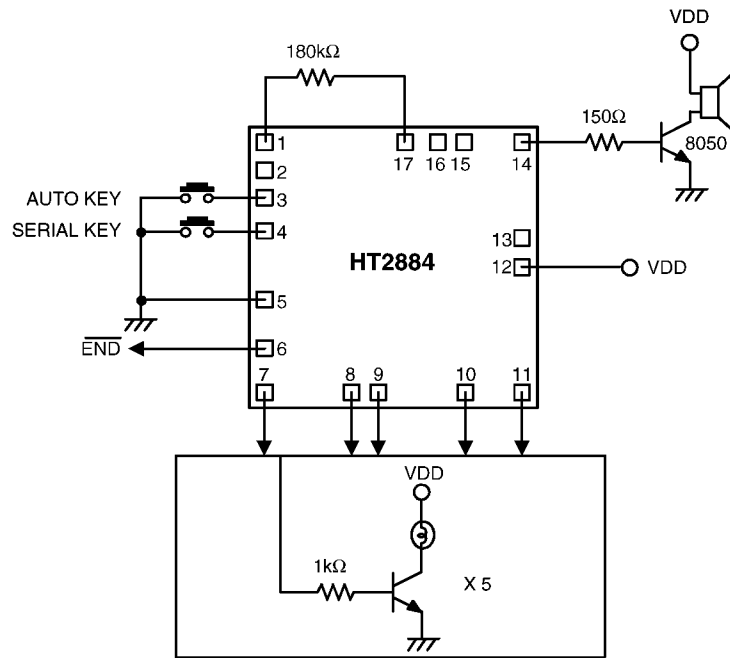
- Speaker mode with five LED flashes (Eight Gun Sounds)



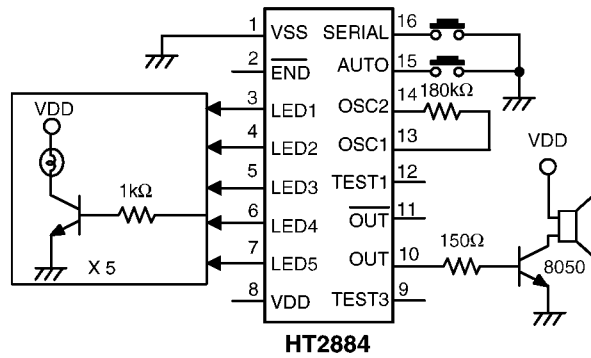
\* The IC substrate should be connected to VDD in the PCB layout artwork.



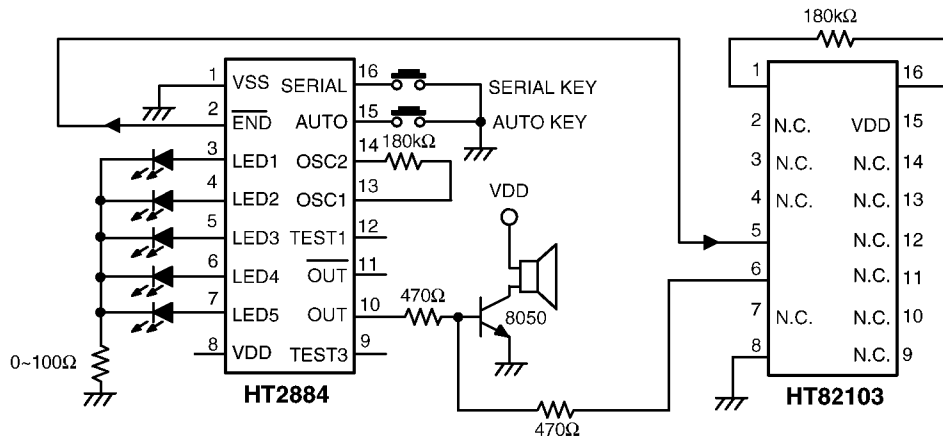
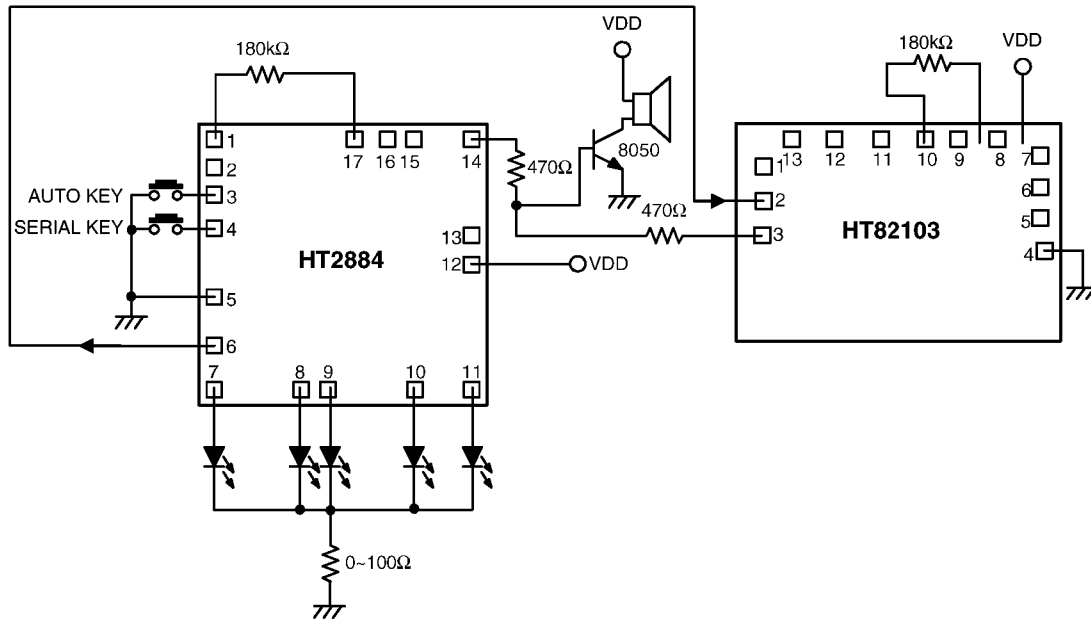
- Example 2: Speaker mode with five lamp flashes (Eight Gun Sounds)



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

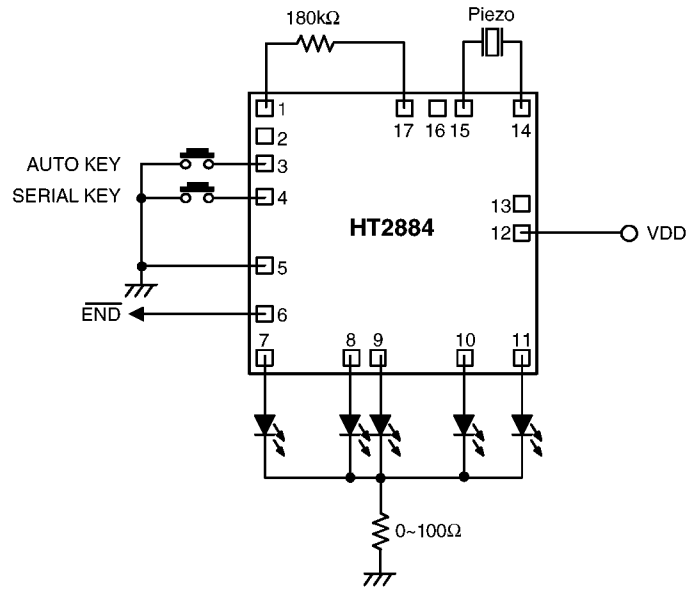


• Example 3: Eight gun sounds with a glass broken sound

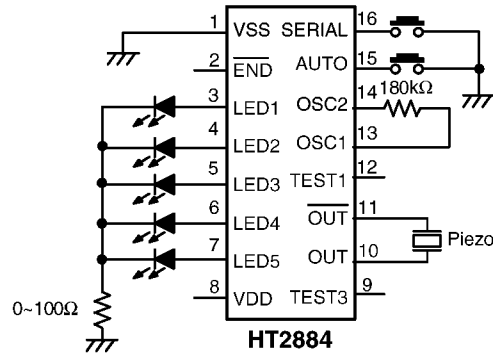


- \* The HT2884's  $\overline{\text{END}}$  pin can trigger all of HOLTEK's voice ICs.
- \*\* The IC substrate should be connected to VDD in the PCB layout artwork (HT2884).  
The IC substrate should be connected to VSS in the PCB layout artwork (HT82103).

- Example 4: Piezo mode with an LED flash (Eight Gun Sounds)



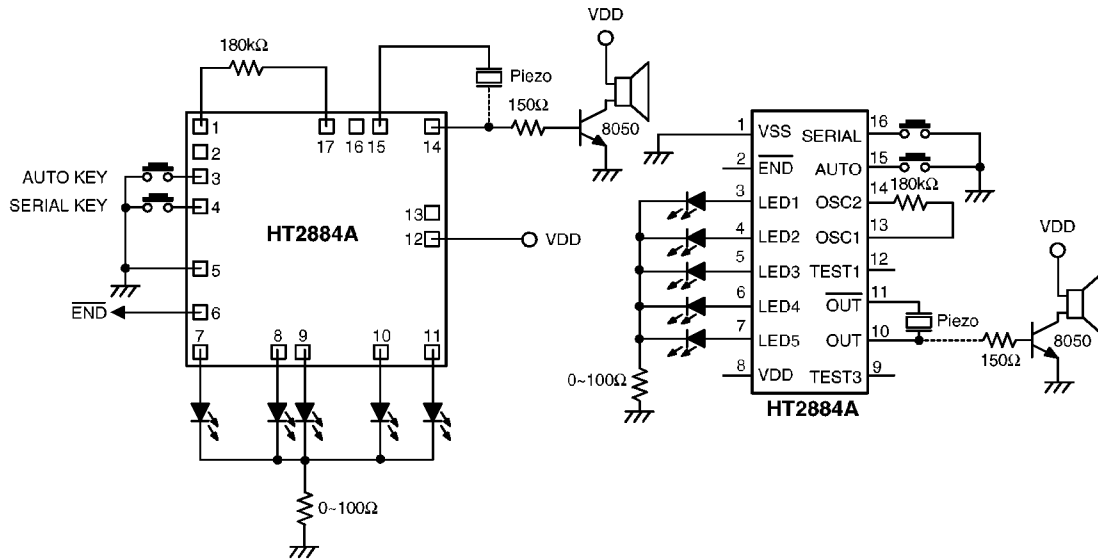
\* The IC substrate should be connected to VDD in the PCB layout artwork.



The contents of eight sounds:

- |                   |                   |
|-------------------|-------------------|
| (1) Machine Gun 3 | (5) Bombing 1     |
| (2) TV Game       | (6) Machine Gun 2 |
| (3) Dual Tone     | (7) Machine Gun 1 |
| (4) Bombing 2     | (8) Rifle Gun     |

Application Circuits (HT2884A — Eight Gun Sound IV)

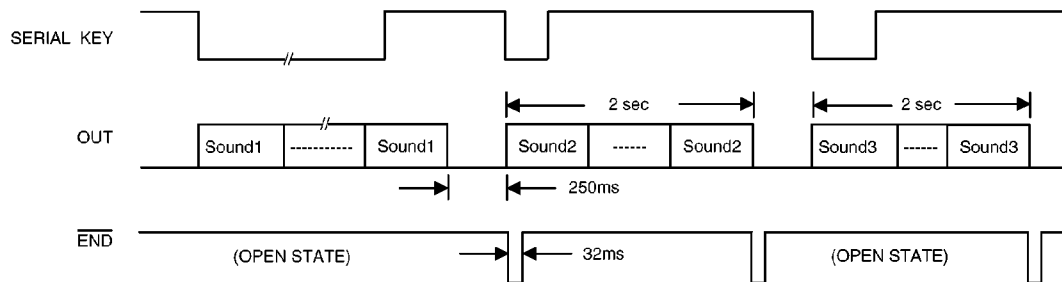


\* The IC substrate should be connected to VDD in the PCB layout artwork.

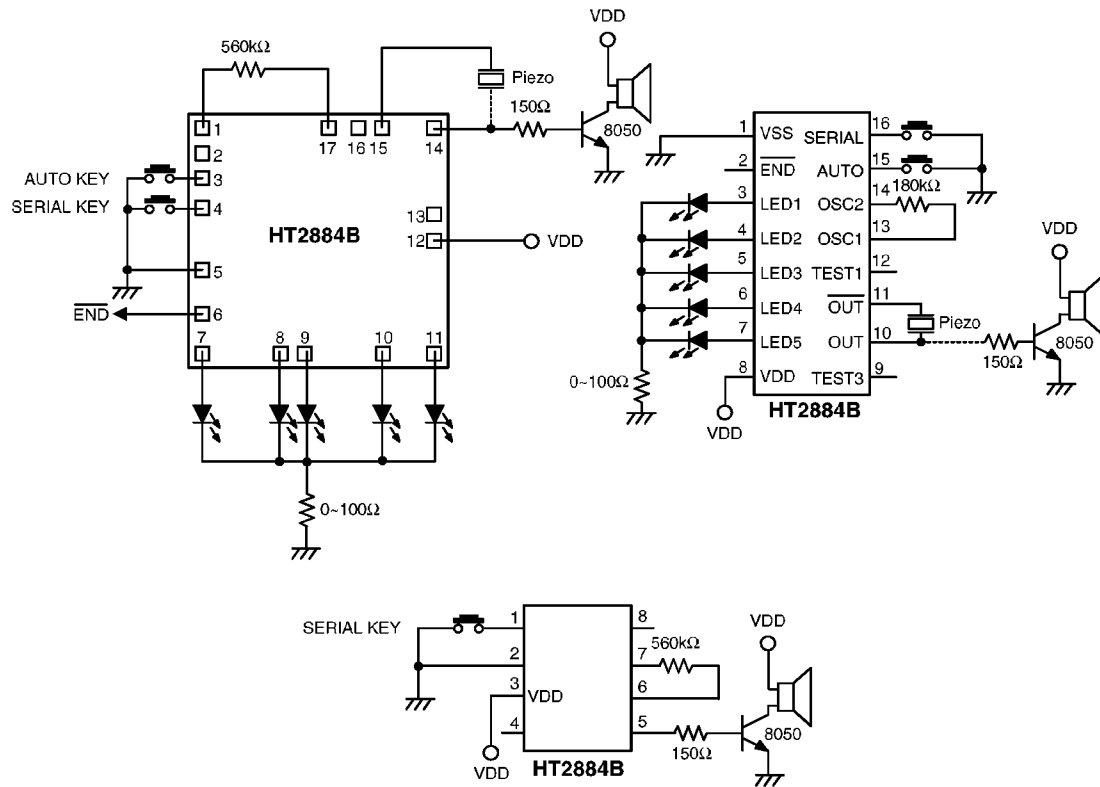
The contents of eight sounds:

- |                   |                   |
|-------------------|-------------------|
| (1) Machine Gun 3 | (5) Bombing 1     |
| (2) TV Game       | (6) Machine Gun 2 |
| (3) Dual Tone     | (7) Machine Gun 1 |
| (4) Bombing 2     | (8) Rifle Gun     |

Serial Key Control: Refer to HT2884's timing diagram



Application Circuits (HT2884B — Eight Melodies III)



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

The contents of eight melodies:

- KEY1: London bridge is falling down
- KEY2: It come upon a midnight clear
- KEY3: Clementine
- KEY4: Are you slepping?
- KEY5: The caissons go rolling along
- KEY6: Bee
- KEY7: Row, Row, Row your boat
- KEY8: Mary had a little lamb