

Features

- Operating Voltage: 2.4V~5.0V
- Directly drive an external transistor
- Low stand-by current
- One percussion instrument
- One demo song
- End-pulse output
- 16 pin dual-in-line package

Applications

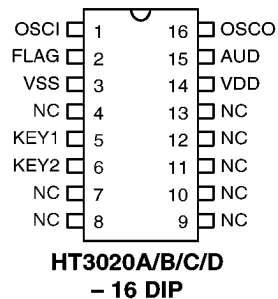
- Toys
- Sound effect generators

General Description

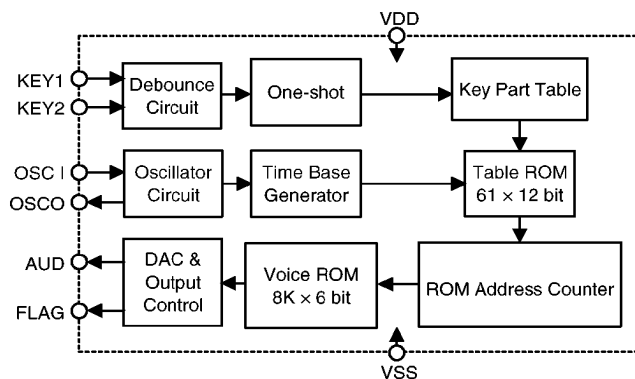
The HT3020A/B/C/D are all single-chip rhythm generator LSIs implemented in the CMOS technology. These ICs provide a percussion instrument sound and a demo-rhythm. Various types

of timbre and demo rhythm can be generated by coding the internal ROM. The IC is offered in either a dice form or 16 pin dual-in-line package.

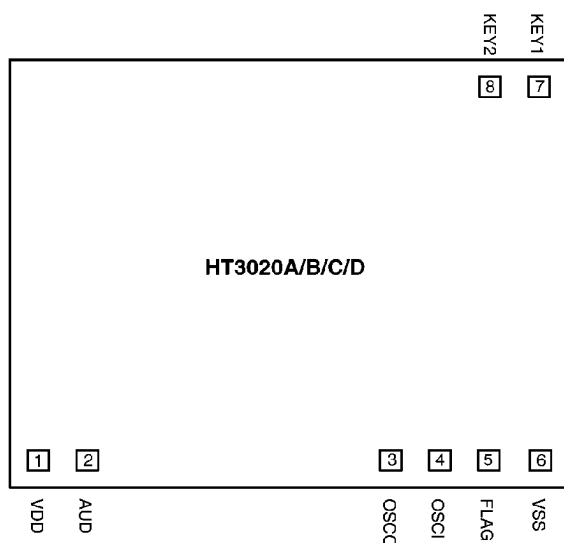
Pin Assignment



Block Diagram



Pad Coordinates

Unit: μm


Pad No.	X	Y
1	-949.75	-746.5
2	-764.75	-746.5
3	380.25	-746.5
4	565.25	-746.5
5	750.25	-746.5
6	944.25	-746.5
7	939.75	727
8	754.75	727

Chip size: $2160 \times 1860 (\mu\text{m})^2$

* The substrate should be connected to VSS in the PCB layout artwork.

Pin Description

Pin No.	Pin Name	I/O	Internal Connection	Description
1	OSCI	I	—	Oscillator input pin
2	FLAG	O	NMOS Open Drain	End pulse output, open drain, low active output
3	VSS	I	—	Negative power supply (GND)
4	NC	—	—	No connection.
5	KEY1	I	Pull-High	Trigger input for playing demo rhythm Low active, retriggerable
6	KEY2	I	Pull-High	Trigger input for playing percussion instrument Low active, retriggerable
7~13	NC	—	—	No connection
14	VDD	I	—	Positive power supply
15	AUD	O	PMOS Output	Voice output for driving an external transistor
16	OSCO	O	—	Oscillator output pin

Absolute Maximum Ratings

Supply Voltage -0.3V to 6.0V

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

Electric Characteristics

(Ta=25°C)

Symbol	Parameter	Test Condition		Min.	Typ.	Max.	Unit
		V _{DD}	Condition				
V _{DD}	Operating Voltage	—	—	2.4	—	5.0	V
I _{DD}	Operation Current	3V	No load	—	200	400	μA
I _{STB}	Stand-by Current	3V	—	—	1	5	μA
I _{AUD}	Max. AUD Output Current	3V	V _{OH} =0.6V	-1.5	-2	—	mA
I _{OL}	FLAG Sink Current	3V	V _{OL} =0.3V	1.5	3.0	—	mA
V _{IL}	“L” Input Voltage	—	—	—	—	0.2V _{DD}	V
V _{IH}	“H” Input Voltage	—	—	0.7V _{DD}	—	—	V
F _{OSC}	System Frequency	3V	R _{OSC} =320K	—	96	—	KHz

Functional Description

KEY2

When KEY2 is triggered, the built-in percussion instrument comes into play. KEY2 is an internal pull-high, low active, and retriggerable input.

KEY1

When KEY1 is triggered, a section of the demo-rhythm plays with the built-in percussion instrument. KEY1 is an internal pull-high, low active, and retriggerable input.

KEY priority

KEY1 > KEY2

KEY features

Pull-high resistance: 100kΩ

Key-in debounce time: 700 μs

FLAG

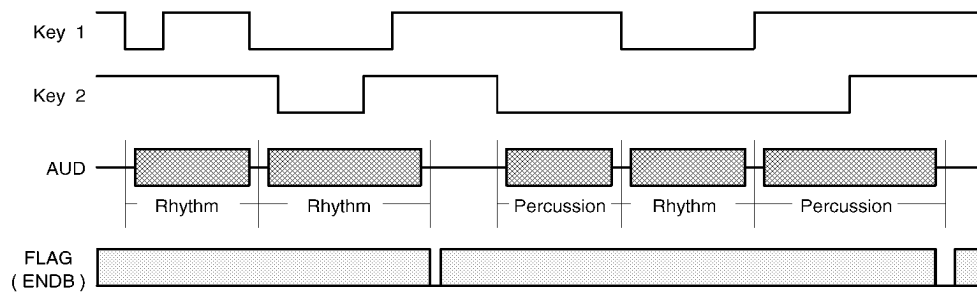
FLAG outputs an end pulse at the end of any playing. It is active low, and is an NMOS open drain output.

Selection table

Part No.	Percussion Instrument	Demo-Rhythm
HT3020A	Snare Drum	March
HT3020B	Conga	Latin
HT3020C	Cymbal	Big-Band
HT3020D	High-Hat	Dance

Timing Diagram

Retriggerable

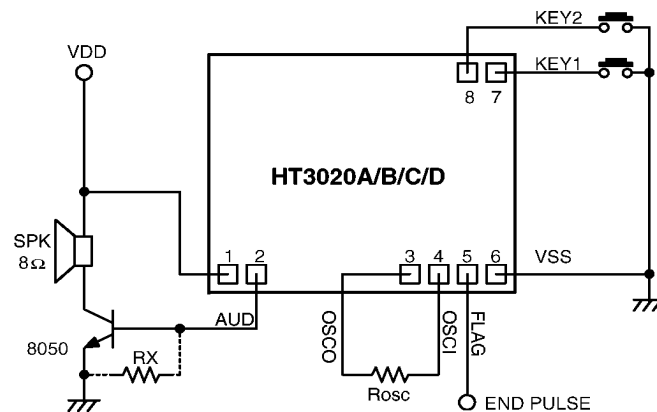


 : floating signal .

The key priority: Key 1 > Key 2

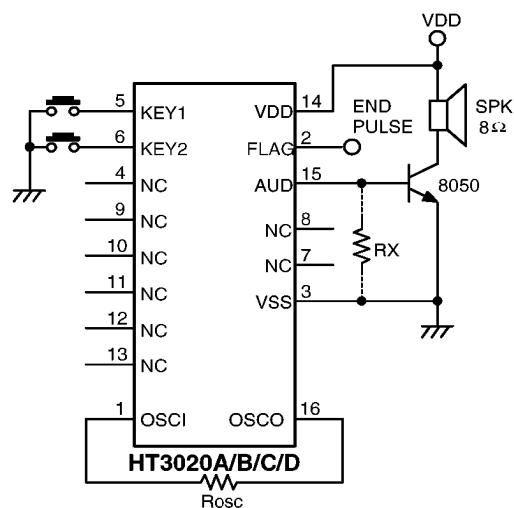
Application Circuit

Chip form



* The IC Substrate should be connected to VSS in the PCB layout artwork.

Package form



$RX \cong 1K\Omega$ for $VDD = 4V \sim 5V$

Rosc: HT3020A $\cong 240K\Omega$
 HT3020B $\cong 270K\Omega$
 HT3020C $\cong 120K\Omega$
 HT3020D $\cong 110K\Omega$

KEY1: HT3020A, March
 HT3020B, Latin
 HT3020C, Big-Band
 HT3020D, Dance

KEY2: HT3020A, Snare Drum
 HT3020B, Conga
 HT3020C, Cymbal
 HT3020D, High-Hat