

Features

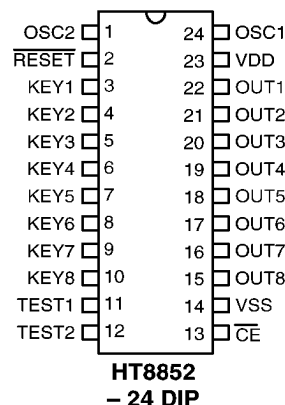
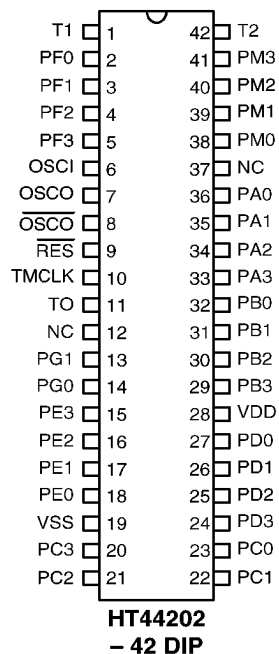
- Operating voltage: 2.4V~5.25V
- Two operation mode options:
 - Manual mode: 8 instrument sounds
 - Demo mode: 30 demo rhythms
- Two digit tempo display (1~60)
- Two digit rhythm display (1~30)
- 24 pin dual-in-line package for HT8852
- 42 pin dual-in-line package for HT44202

Generator Description

The HT44202/HT8852 are both LSI CMOS chips designed for use in rhythm generator applications. Of the two chips, the HT8852 can generate 8 different simultaneous instrument sounds including Cow Bell, Cymbal, Tom Tom, Conga, High Hat Close, Rim Shot, Snare Drum, and Bass Drum. The HT44202, on the other hand, is a single-chip 4-bit microcomputer capa-

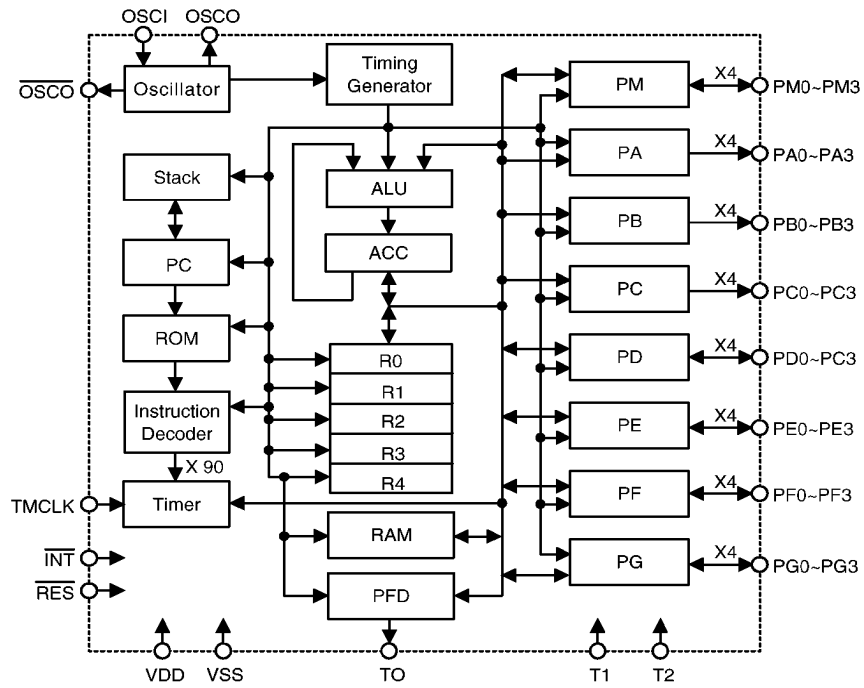
ble of internally creating timing signals to control the HT8852. The combination of these two chips are used to generate 8 individual instrument sounds and to play 30 kinds of demo rhythm. The supplied instrument sounds and demo songs can be modified to meet the customer's specification by altering one mask during ASIC manufacture.

Pin Assignments



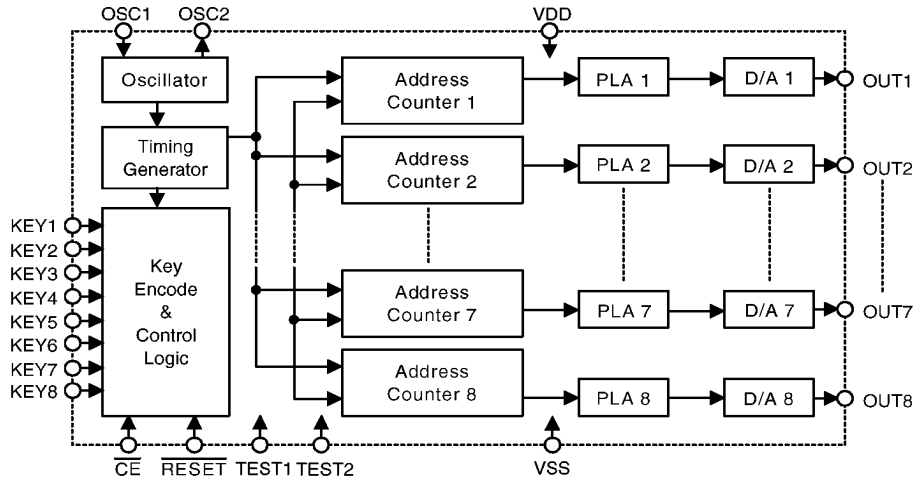
Block Diagrams

HT44202



Note ACC: Accumulator
 R0~R4: Working Registers
 PM, PD, PE, PG: I/O ports
 PA, PB, PC: Output ports
 PFD: Programmable Frequency Divider

HT8852



Pin Descriptions

HT44202

Pin No.	Pin Name	I/O	Internal Connection	Description
1	T1	I	CMOS	For IC test only
2~5	PF0~PF3	I/O	CMOS IN NMOS OUT	Keyboard scan pin
6	OSCI	I	—	Oscillator input pin
7	OSCO	O	—	Oscillator output pin
8	$\overline{\text{OSCO}}$	O	—	Oscillator output pin
9	$\overline{\text{RES}}$	I	CMOS Pull-High	Chip reset Reset is activated on a logical low level.
10	TMCLK	I	CMOS Pull-High	Timer clock input
11	TO	O	CMOS	PFD output
12	NC		—	No connection
13, 14	PG1, PG0	I/O	CMOS IN NMOS OUT	Keyboard scan pin
15	PE3	O	NMOS	Output to drive KEY5 of HT8852
16	PE2	O	NMOS	Output to drive KEY1 of HT8852
17	PE1	O	NMOS	Output to drive KEY2 of HT8852

Pin No.	Pin Name	I/O	Internal Connection	Description
18	PE0	O	NMOS	Output to drive KEY4 of HT8852
19	VSS	I	—	Negative power supply (GND)
20	PC3	O	CMOS	Rhythm decimal display driver
21	PC2	O	CMOS	Rhythm unit display driver
22	PC1	O	CMOS	Tempo decimal display driver
23	PC0	O	CMOS	Tempo unit display driver
24	PD3	O	NMOS	Output to drive KEY7 of HT8852
25	PD2	O	NMOS	Output to drive KEY3 of HT8852
26	PD1	O	NMOS	Output to drive KEY8 of HT8852
27	PD0	O	NMOS	Output to drive KEY6 of HT8852
28	VDD	I	—	Positive power supply
29	PB3	O	PMOS	Dot point display driver
30~36	PB2~PB0 PA3~PA0	O	PMOS	LED segment display drivers
37	NC	—	—	No connection
38~40	PM0~PM2	I/O	CMOS IN NMOS OUT	Keyboard scan pins
41	PM3	I/O	CMOS IN NMOS OUT	For IC test only
42	T2	I	CMOS	For IC test only

HT8852

Pin No.	Pin Name	I/O	Internal Connection	Description
1	OSC2	O	CMOS	Oscillator output pin
2	$\overline{\text{RESET}}$	I	CMOS Pull-High	Power-on reset or system reset pin
3~10	KEY1~KEY8	I	CMOS Pull-High	Instrument key directly input pins
11~12	TEST1, TEST2	I/O	CMOS	For IC test only
13	$\overline{\text{CE}}$	I	CMOS	Chip enable pin, low active
14	VSS	I	—	Negative power supply (GND)
15~22	OUT8~OUT1	O	—	PCM sound D/A output pins
23	VDD	I	—	Positive power supply
24	OSC1	I	CMOS	Oscillator input pin

Absolute Maximum Ratings

Supply Voltage -0.3V to 5.5V 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

Electrical Characteristics
HT44202

(Ta=25°C)

Symbol	Parameter	Test condition		Min.	Typ.	Max.	Unit
		V _{DD}	condition				
V _{DD}	Operating Voltage	—	—	2.4	—	5	V
I _{DD}	Operating Current	3V	No load, F _{OSC} =2MHz	—	700	1000	μA
		5V		—	1300	1800	μA
V _{IL}	“L” Input Voltage	—	—	—	—	0.2V _{DD}	V
V _{IH}	“H” Input Voltage	—	—	0.7V _{DD}	—	—	V
F _{OSC}	Oscillator Frequency	5V	R _{OSC} =2.7V C _{OSC} =180P	—	820	—	KHz

HT8852

(Ta=25°C)

Symbol	Parameter	Test Condition		Min.	Typ.	Max.	Unit
		V _{DD}	Condition				
V _{DD}	Operating Voltage	—	—	2.4	3	5	V
I _{STB}	Stand-by Current	4.5V	—	—	100	500	μA
I _{DD}	Operating Current	4.5V	No load	—	2	5	mA
I _{OH}	OUT1~OUT8 Current	4.5V	V _{OH} =2V	-0.5	-1	—	mA
V _{IL}	“L” Input Voltage	—	—	—	—	0.2V _{DD}	V
V _{IH}	“H” Input Voltage	—	—	0.7V _{DD}	—	—	V
F _{OSC}	Oscillator Frequency	5V	R=270K	—	128	—	KHz
		3V	R=330K				

Functional Description

When power-on

- Tempo displays the default value 30.
- Rhythm displays the default value 01.
- Decimal points of the display do not flash.
- No audio output in the stand-by condition

Start/Stop key

- Pushing the start/stop key in the stand-by condition will drive the rhythm generator to generate the demo rhythm according to the values shown on the tempo and rhythm displays. The cycle of the demo rhythm will repeat itself. The four decimal points of the 7 segment displays, at the same time, will flash sequentially accompanied with the tempo. The generator is then in the active condition.
- Pushing the start/stop key in the active condition will cause the rhythm generator to return to the stand-by condition with no audio output (the start/stop key has a toggle function).

Tempo Fast/Slow key

- The tempo speed can be altered by pressing the fast and slow keys.
- The tempo speed increases or decreases one step by pressing the fast or slow key once (less than 1/4 secs). If the fast or slow key is pressed over 1/4 secs, the tempo speed will be changed by 8 steps per second.
- The tempo speed is divided into 60 steps and is shown by the tempo display. The default tempo value is 30 of the power-on. By simultaneously pressing the fast and slow keys, the tempo will return to the default value 30.

Rhythm Up/Down key

The rhythm can be chosen by pressing the up and down keys. Pressing the up or down key once (less than 1/4 secs) alters one step up or down of the rhythm. If the time for pressing the up or down key exceeds 1/4 secs, the rhythm is altered by 8 steps per second. There are totally 30 kinds of rhythm in the rhythm generator.

Rhythm definition

(HT8852) 8 Instrument Sounds:

- Cow Bell (CW)
- Cymbal (CB)
- Tom Tom (TT)
- Conga (CA)
- High Hat Close (HH)
- Rim Shot (RS)
- Snare Drum (SD)
- Bass Drum (BD)

(HT44202) 30 Kinds of Rhythm:

- | | |
|---------------|-----------------|
| • 8 Beat | • March 2 |
| • Disco | • Country |
| • 16 Beat | • Calypso Rock |
| • Rock & Roll | • Calypso R & B |
| • Twist | • Swing 1 |
| • Mambo | • Swing 2 |
| • Rhumba | • Big Band |
| • Beguine | • Shuffle |
| • Cha Cha | • Boogie Woogie |
| • Tango 1 | • China Lion |
| • Tango 2 | • Slow Rock |
| • Merengue | • Rock-A-Ballad |
| • Bossa Nova | • Waltz |
| • Reggae | • Rock Waltz |
| • March 1 | • 16 Beat Waltz |

