

32 Key Piano with 4 Instrument & one Demo Song

Features

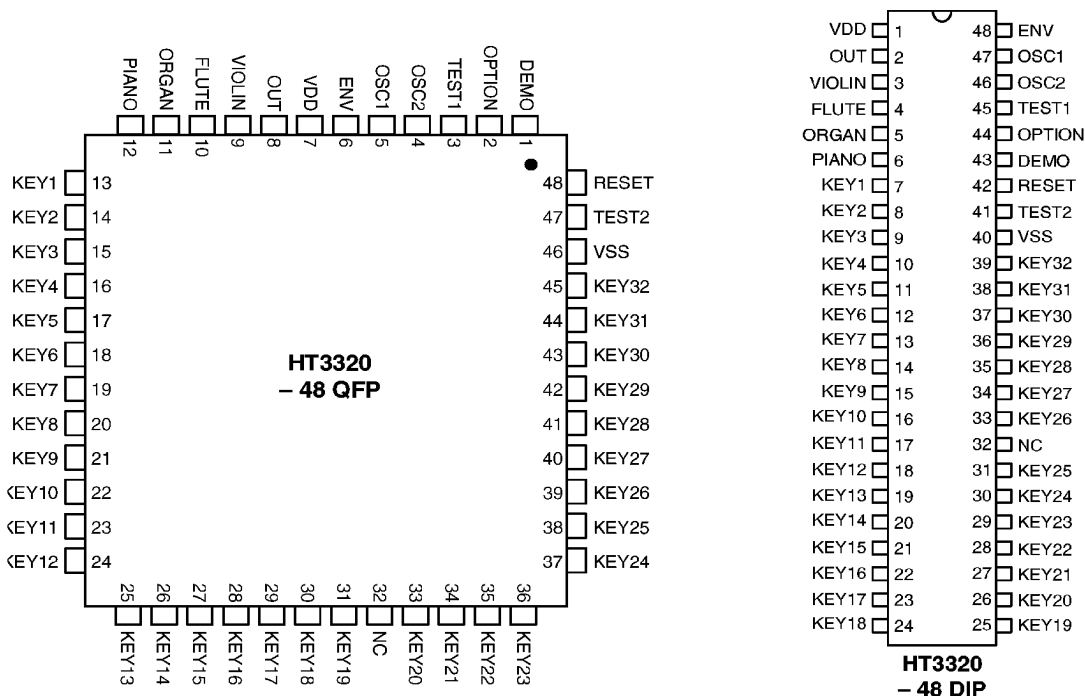
- CMOS Metal-Gate technology
- Operating voltage: 2.4V~5V
- Low stand-by current
- Auto power-off function
- 32 direct key inputs for easy PCB layout
- 4 instruments: Piano, Organ, Flute, and Violin
- A built-in demonstration melody of 64 notes
- A built-in oscillator with only one external resistor
- Built-in envelope circuit with a pair of external resistors and capacitors
- Minimal external components required
- 48-pin QFP or DIP package

General Description

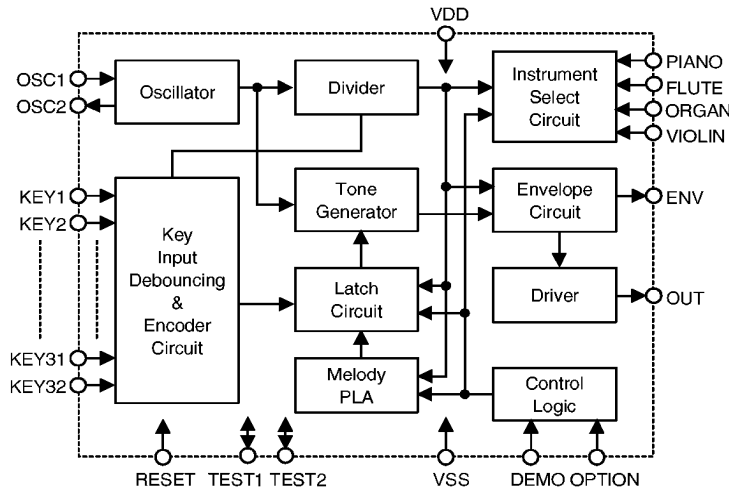
HT3320 is a 32 key piano LSI implemented in the CMOS technology. The chip contains a built-in melody for demonstration and 4 kinds of instrument sounds including Piano, Flute, Organ, and Violin. Both PCB layout and assembly

work of the HT3320 are simplified, requiring only few external components. The chip provides 32 direct key inputs. It is suited for simple and multiple key instrument applications.

Pin Assignment

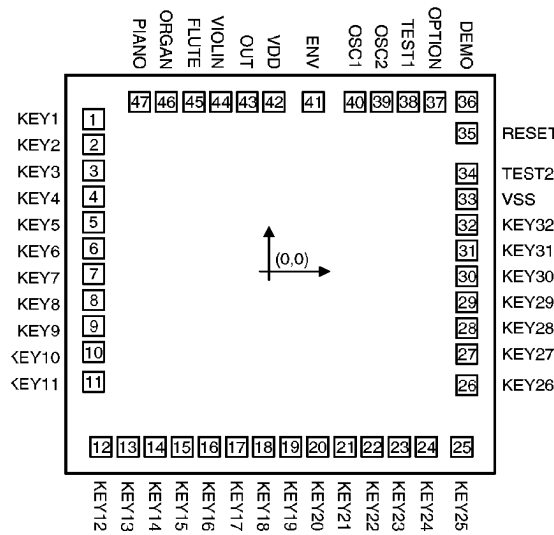


Block Diagram



Pad Coordinates

Unit: mil



Chip size: 119 × 116 (mil)²

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

Pad No.	X	Y	Pad No.	X	Y
1	-53.50	46.34	25	52.06	-52.04
2	-53.50	38.70	26	53.51	-33.56
3	-53.51	30.92	27	53.51	-24.20
4	-53.51	23.14	28	53.51	-16.43
5	-53.51	15.36	29	53.51	-8.65
6	-53.51	7.59	30	53.51	-0.87
7	-53.51	-0.19	31	53.51	6.91
8	-53.51	-7.97	32	53.51	14.68
9	-53.51	-15.75	33	53.51	22.33
10	-53.51	-23.52	34	53.51	29.98
11	-53.51	-32.45	35	53.51	42.10
12	-51.38	-52.04	36	53.51	51.53
13	-43.61	-52.04	37	44.41	51.53
14	-35.83	-52.04	38	36.76	51.53
15	-28.05	-52.04	39	29.11	51.53
16	-20.27	-52.04	40	21.46	51.53
17	-12.49	-52.04	41	9.56	51.53
18	-4.72	-52.04	42	-1.74	51.53
19	3.06	-52.04	43	-9.39	51.53
20	10.84	-52.04	44	-17.04	51.53
21	18.62	-52.04	45	-24.69	51.53
22	26.39	-52.04	46	-32.68	51.53
23	34.17	-52.04	47	-40.33	51.53
24	41.95	-52.04			

Pin Description (48 PIN DIP form)

Pin No.	Pin Name	I/O	Internal Connection	Description
1	VDD	I	—	Power supply (positive)
2	OUT	O	Transmission Gate Pull-High	Sound output pin
3	VIOLIN	I	CMOS Pull-High	Violin timbre selection input
4	FLUTE	I	CMOS Pull-High	Flute timbre selection input
5	ORGAN	I	CMOS Pull-High	Organ timbre selection input
6	PIANO	I	CMOS Pull-High	Piano timbre selection input
7~25	KEY1~KEY19	I	CMOS Pull-High	Direct keyboard input pins, with retrigger
32	NC	—	—	No connection
26~31 33~39	KEY20~KEY32	I	CMOS Pull-High	Direct keyboard input pins, with retrigger
40	VSS	I	—	Power supply (ground)
41	TEST2	I/O	CMOS	For IC test only
42	RESET	I	CMOS Pull-High	System power-on-reset pin
43	DEMO	I	CMOS Pull-High	Demo song selection input The demo song can be stopped by pressing one of the 32 keys (KEY1~KEY32).
44	OPTION	I	CMOS Pull-High	Selection of demo song playing at power on If OPTION connects to VDD, the demo song will play at power-on. But if OPTION connects to VSS, no demo song will play at power-on.
45	TEST1	I/O	CMOS	For IC test only
46	OSC2	O	—	Oscillator output
47	OSC1	I	—	Oscillator input
48	ENV	O	CMOS	Envelope effect 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

(Ta=25°C)

Symbol	Characteristic	Test Condition		Min.	Typ.	Max.	Unit
		V _{DD}	Condition				
V _{DD}	Operating Voltage	—	—	2.4	3	5	V
I _{STB}	Stand-by Current	3V	—	—	1	10	μA
I _{DD}	Operating Current	3V	No load	—	200	400	μA
I _{OH}	OUT Source Current	3V	V _{OH} =2.7V	-0.1	-0.3	—	mA
I _{OL}	ENV Sink Current	3V	V _{OL} =0.3V	1	5	—	mA
V _{IL}	“L” Input Voltage	—	—	—	—	0.2V _{DD}	V
V _{IH}	“H” Input Voltage	—	—	0.7V _{DD}	—	—	V
F _{OSC}	Oscillator Frequency	3V	R _{OSC} =60KΩ	—	263.71	—	KHz

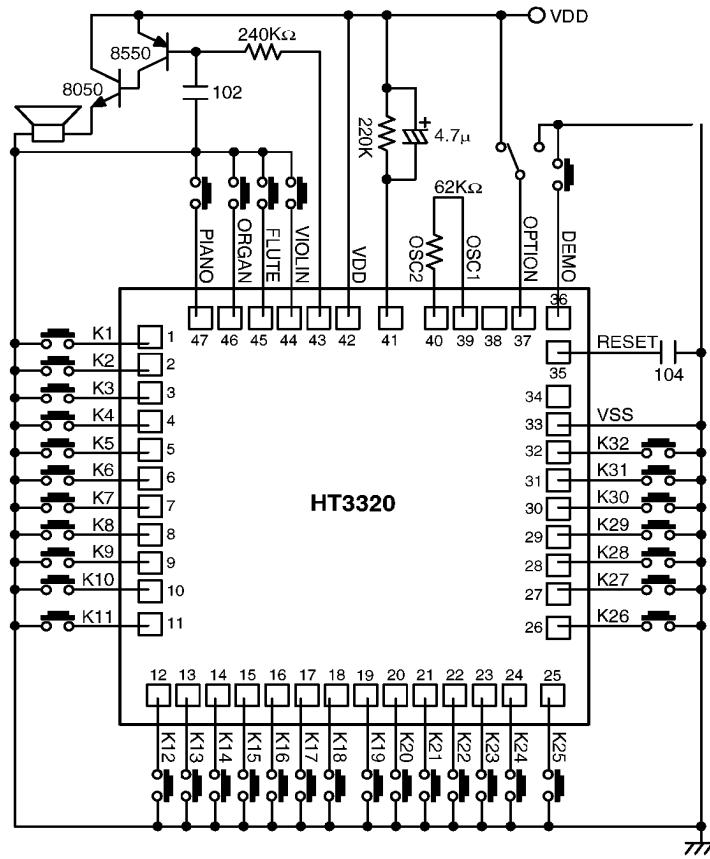
Compass (When Fosc=263.713KHz)

Key No.	Note	Output Cycle Frequency (Hz)	Standard Cycle Frequency (Hz)	Err (%)	Err Cent
KEY1	C6	1046.48	1046.48	0.000	0.00
KEY2	B5	984.00	987.75	0.379	6.31
KEY3	A#5	928.57	932.31	0.401	6.69
KEY4	A5	879.04	879.98	0.107	1.78
KEY5	G#5	834.53	830.59	0.475	7.91
KEY6	G5	784.86	783.97	0.113	1.88
KEY7	F#5	740.77	739.97	0.107	1.79
KEY8	F5	701.36	698.44	0.418	6.97
KEY9	E5	659.28	659.24	0.006	0.10
KEY10	D#5	621.96	622.24	0.044	0.74
KEY11	D5	588.65	587.32	0.226	3.77
KEY12	C#5	554.02	554.35	0.060	1.01
KEY13	C5	523.24	523.24	0.000	0.00
KEY14	B4	492.00	493.87	0.379	6.31

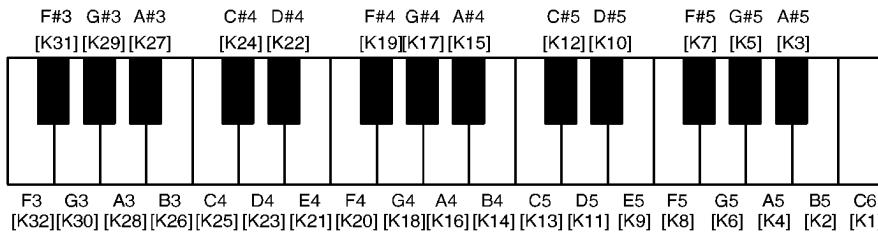
Key No.	Note	Output Cycle Frequency (Hz)	Standard Cycle Frequency (Hz)	Err (%)	Err Cent
KEY15	A#4	464.28	466.15	0.401	6.69
KEY16	A4	439.52	439.99	0.107	1.78
KEY17	G#4	417.27	415.30	0.475	7.91
KEY18	G4	392.43	391.99	0.113	1.88
KEY19	F#4	370.38	369.99	0.107	1.78
KEY20	F4	350.68	349.22	0.418	6.97
KEY21	E4	329.64	329.62	0.006	0.10
KEY22	D#4	310.98	311.12	0.044	0.74
KEY23	D4	294.32	293.66	0.226	3.77
KEY24	C#4	277.01	277.18	0.060	1.01
KEY25	C4	261.62	261.62	0.000	0.00
KEY26	B3	246.00	246.94	0.379	6.31
KEY27	A#3	232.14	233.08	0.401	6.69
KEY28	A3	219.76	220.00	0.107	1.78
KEY29	G#3	208.63	207.65	0.475	7.91
KEY30	G3	196.22	195.99	0.113	1.88
KEY31	F#3	185.19	184.99	0.107	1.79
KEY32	F3	175.34	174.61	0.418	6.97

Application Circuits

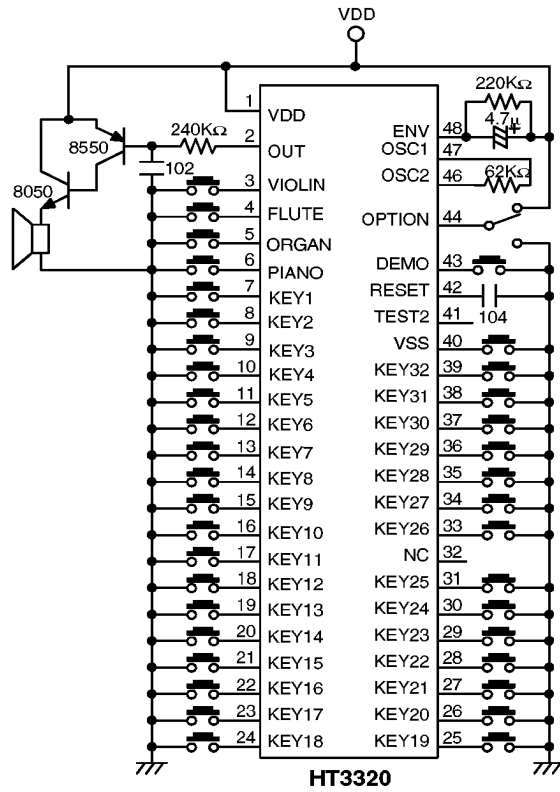
Chip form



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



DIP form



Note: Option pin: VDD → Demo song plays when power-on
 Option pin: VSS → Demo song does not play when power-on
 Demo song name: Oh! Susana

QFP form

