

M3481 Series

UM3481 Multi-Instrument Melody Generator

Features

- Powered by a 1.5V battery
- Low standby current
- 512-note memory, up to 16 songs
- 8 playing modes by user setting
- One built-in RC oscillator
- 8 beats selectable
- 3 timbres - piano, organ, and mandolin
- 5 tempos available through mask setting
- 14 tones selectable
- On-chip envelope modulator and pre-amplifier

General Description

The M3481 series is a mask-ROM-programmed multi-instrument melody generator, implemented by CMOS technology. It is designed to play the melody according to the previously programmed information

and is capable of generating 16 songs with 3 instrument effects: piano, organ and mandolin. The device

also includes a pre-amplifier which provides a simple interface to the driver circuit. The M3481 series is

intended for applications such as toys, door bells, music box, melody clock/timers and telephones.

Absolute Maximum Ratings

DC Supply Voltage -0.3V to +5.0V
 Input Voltage Range Vss-0.3V to Vdd+0.3V
 Operating Ambient Temperature 0°C to +70°C
 Storage Temperature -10°C to +125°C

Electrical Characteristics

(Vss=0V, Vdd=1.5V, Ta=25°C, unless otherwise specified.)

Parameter	Symbol	Min.	Typ.	Max.	Conditions
Operating Voltage	Vdd	1.3V	1.5V	5V	
Stand-by Current	I _{sb}	-	-	12μA	No load
Input Voltage High	V _{ih}	Vdd-0.3V	-	Vdd	
Input Voltage Low	V _{il}	Vss	-	Vss+0.3V	
Input Current High	I _{ih}	1.5μA	3μA	6μA	V _{ih} =Vdd
Input Current Low	I _{il}	-	-	0.1μA	V _{il} =Vss
ENV Pin Drive Current	I _{env}	500μA	-	-	V _{env} =0.8V
Output Current (OP1)	I _{ol}	200μA	-	1200μA	V _{ol} =0.8V
Output Current (OP2)	I _{oh}	200μA	-	1200μA	V _{oh} =0.7V

Playing modes

Mode	CE	SL	LP	AS	Program
0	0	X	X	X	Standby
1	1	0	0	0	First melody→...→Last melody→Stop
2	↑	0	0	1	First melody→...→Last melody→Repeat from first melody
3	↑	0	1	0	Start from the present melody→Stop
4	1	0	1	1	Repeat the present melody
5	1	↑	0	0	Change to the next melody→...→Last melody→Stop
6	1	↑	0	1	Next melody→...→Last melody→Repeat from first melody
7	1	↑	1	0	Change to the next melody→Stop

8	1	↑	1	1	Change to the next melody→Repeat the same melody
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(↑ means a low to high voltage level transaction)

Song Series List (Fewer songs version provides longer duration for each song)

M3481 (8 songs)

- Jingle Bells
- Santa Claus Is Coming To Town
- Silent Night, Holy Night
- Joy To The World
- Rudolph, The Red-nosed Reindeer
- We Wish You A Merry Christmas
- O Come, All Ye Faithful
- Hark, The Herald Angels Sing

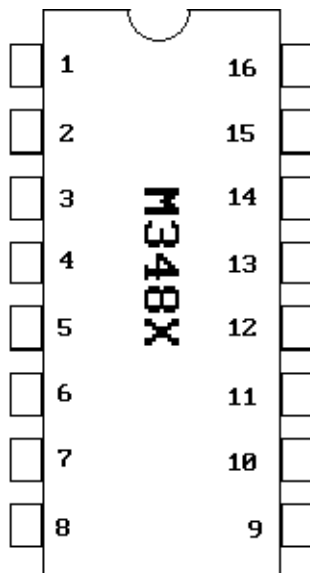
M3482 (12 songs)

- American Patrol
- Rabbits
- Oh My Darling, Clementine
- Butterfly
- London Bridge Is Falling Down
- Row, Row, Row Your Boat
- Are You Sleeping
- Happy Birthday
- Joy Symphony
- Home Sweet Home
- Weigenlied
- Melody On Purple Bamboo

M3485 (5 songs)

- The Hawaiian Wedding Song
- Try To Remember
- Aloha OE
- Love Story
- Yesterday

Pin Configuration

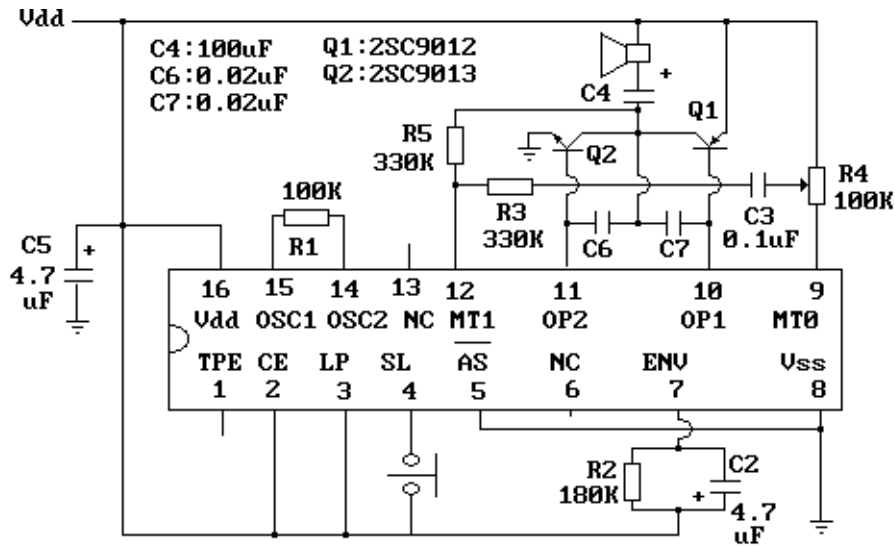


Pin no.	Symbol	Description
1	TSP	Output flag signal of melody auto stop : In normal operation, this should be open.
2	CE	Chip is enabled if connected to Vdd. Chip is disabled if connected to Vss.
3	LP	Only one song plays if connected to Vdd. All songs play if connected to Vss.
4	SL	A positive going edge will change to play the next song.
5	AS	The melody will repeat if connected to Vdd and will stop automatically if to Vss.
6	NC	No connection
7	ENV	Envelope circuit terminal
8	Vss	Negative power supply
9	MTO	Modulated tone signal output
10	OP1	Pre-amplifier output 1
11	OP2	Pre-amplifier output 2
12	MT1	Modulated tone signal input to the pre-amplifier.
13	NC	No connection
14	OSC2	External oscillator terminal 1

15	OSC1	External oscillator terminal 2
16	Vdd	Positive power supply

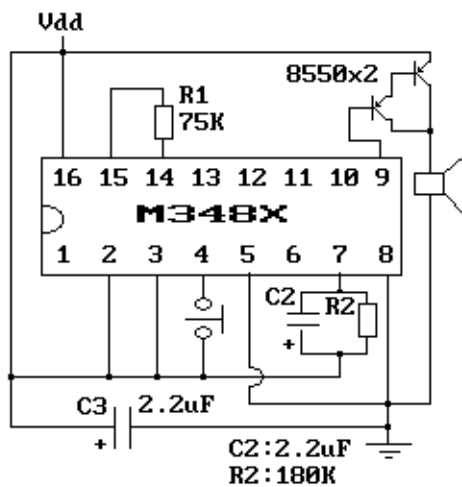
Typical Application Circuit

A. MELODY DOOR BELL

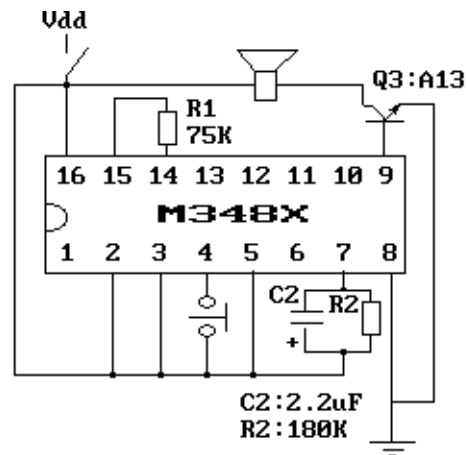


B. LOW COST APPLICATIONS USING SPEAKER

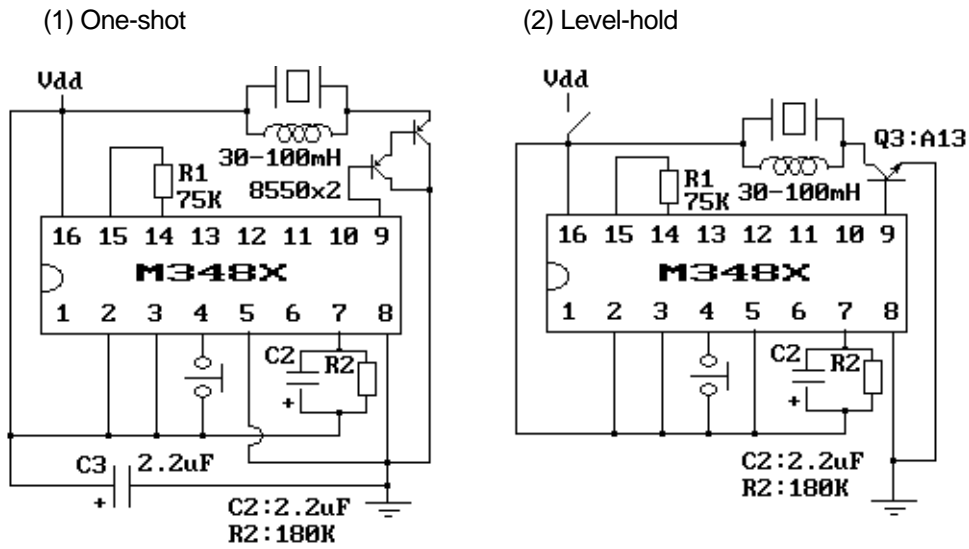
(1) One-shot



(2) Level-hold



C. LOW COST APPLICATIONS USING PIEZO BUZZER



The inductor in parallel can be replaced by a 100kΩ resistor but the sound level will be lower.

REV.4-98 (4 pages)