

# M348x Series

## UM348x 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 <sub>sb</sub>	-	-	12µA	No load
Input Voltage High	V <sub>ih</sub>	Vdd-0.3V	-	Vdd	
Input Voltage Low	V <sub>il</sub>	Vss	-	Vss+0.3V	
Input Current High	I <sub>ih</sub>	1.5µA	3µA	6µA	V <sub>ih</sub> =Vdd
Input Current Low	I <sub>il</sub>	-	-	0.1µA	V <sub>il</sub> =Vss
ENV Pin Drive Current	I <sub>env</sub>	500µA	-	-	V <sub>env</sub> =0.8V
Output Current (OP1)	I <sub>ol</sub>	200µA	-	1200µA	V <sub>ol</sub> =0.8V
Output Current (OP2)	I <sub>oh</sub>	200µA	-	1200µA	V <sub>oh</sub> =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

( ↑ 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

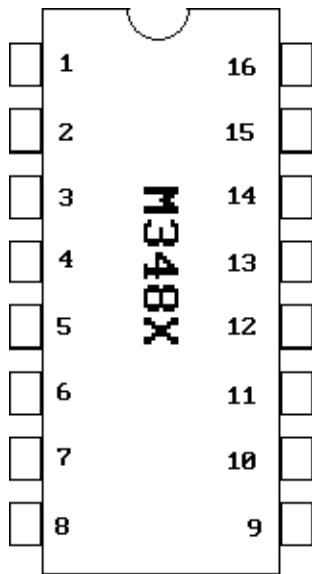
**M3482** (12 songs)

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

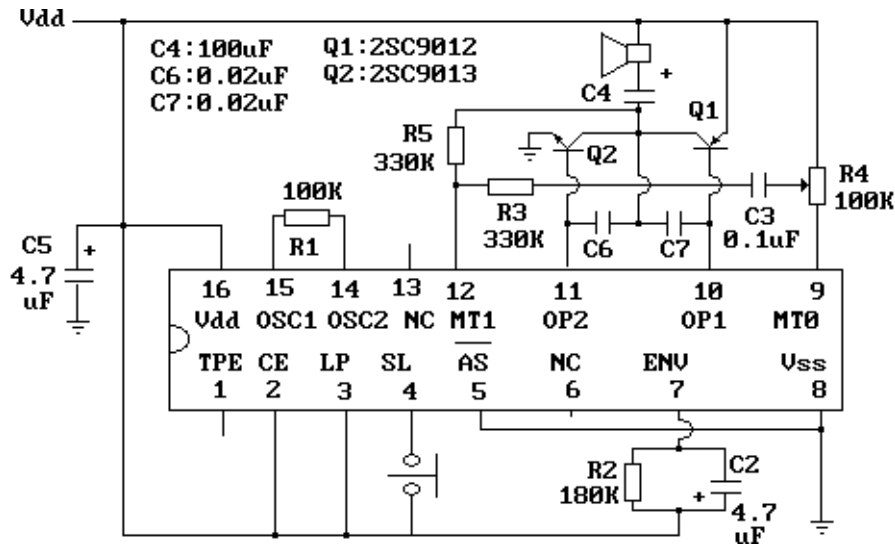
**Pin Configuration**



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

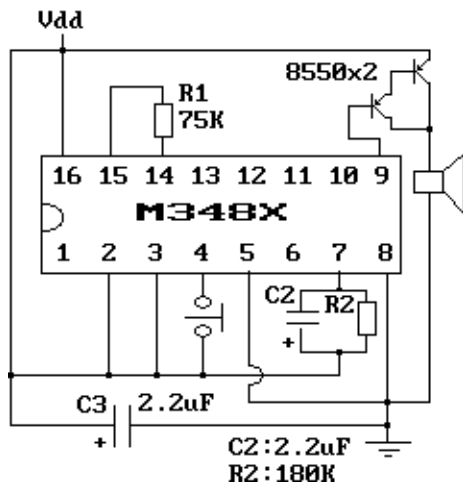
## Typical Application Circuit

### A. MELODY DOOR BELL

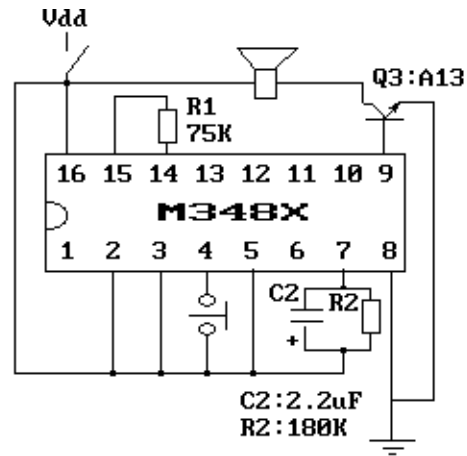


### B. LOW COST APPLICATIONS USING SPEAKER

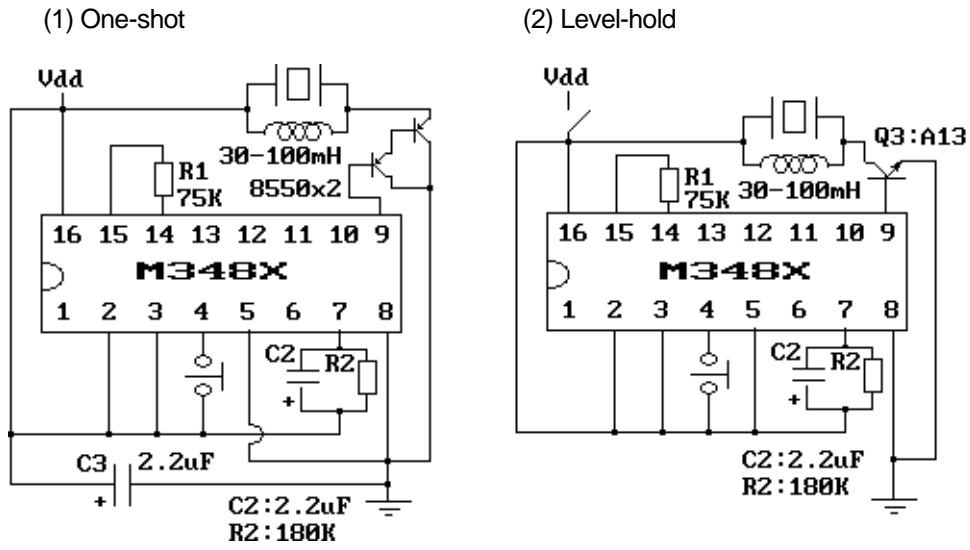
(1) One-shot



(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 )