ARCHER

TECHNICAL DATA

AN EXCLUSIVE RADIO SHACK SERVICE TO THE EXPERIMENTER

UM3482A Melody Generator

General Discription

The UM3482A is a mask-ROM-programmed multi-instrument melody generator, implemented in the CMOS technology. It is designed to play melodies according to programmed information and is capable of generating 12 songs with 3 instrument sounds, the piano, the organ and the mandolin.

The device also includes a pre-amplifier which provides simple interface to the driver circuit. The UM3482A is intended for applications such as toys, door bells, music boxes melody clock/timers and telephones.

Features

- Powered by a 1.5V battery
- Low stand-by current
- 12 songs
- Play all the songs repeatedly or auto stop
- Play one song only, repeatedly or auto stop
- Every song starts from the first note
- On chip envelope modulator and pre-amplifier

Absolute Maximum Ratings*

DC supply voltage ..... −0.3V to 5.0V
Input/output voltage ..... V_{SS} −0.3V to V_{DD} +0.3V
Operating ambient temperature ..... −10°C to 60°C
Storage temperature ..... −55°C to 125°C

* Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

Electrical Characteristics

V_{DD} = 1.5V V_{SS} = OV Temperature = 25°C

Parameter	Symbol	Min.	Typ.	Max.	Conditions
Operating voltage	V_{DD}	1.35V	1.5V	5V	
Stand-by current	I_{STB}	0.1μA	—	12μA	OSC halting
Input voltage-high	V_{IH}	V_{DD} − 0.3V	—	V_{DD}	
Input voltage-low	V_{IL}	V_{SS}	—	V_{SS} + 0.3V	
Input current high	I_{IH}	1.5μA	3μA	6μA	V_{IH} = V_{DD}
Input current low	I_{IL}	—	—	0.1μA	V_{IL} = V_{SS}
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

Pin Assignments & Functions

PIN	Assignments	Descriptions
1	TSP	Output flag of melody auto stop In normal operating this pin should be open
2	CE	Chip enable if connected to V_{DD} Chip disable if connected to V_{SS}
3	LP	The melody plays only one song if this pin is connected to V_{DD} The melody plays all songs if this pin connected to V_{SS}
4	SL	A positive going edge applied to this pin the melody will change to the next song
5	$\overline{AS}$	The melody will be repeated if this pin connected to V_{DD} The melody will be auto stop if this pin connected to V_{SS}
6	NC	No connection.
7	ENV	Envelope circuit terminal.
8	V_{SS}	Negative supply power.
9	MTO	Modulated tone signal output.
10	OP1	Pre-amplifier output 1.
11	OP2	Pre-amplifier output 2.
12	MTI	Modulated tone signal input to the pre-amplifier.
13	OSC3	Pin 13-15 can be connected as an RC oscillator. External oscillating signal can be input to Pin 15.
14	OSC2	
15	OSC1	
16	V_{DD}	Positive power supply.

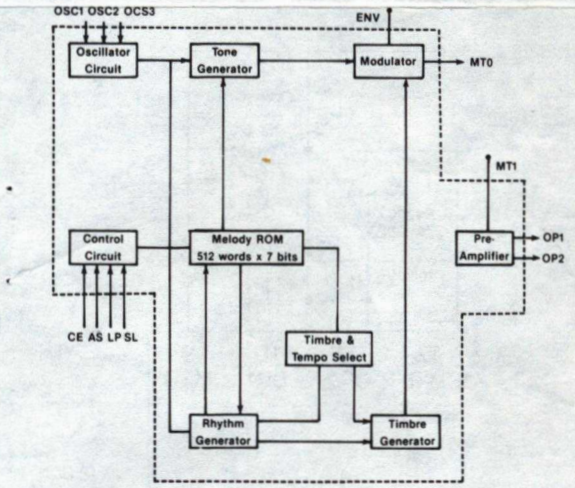
Program Truth Table

Items	CE	SL	LP	AS	Program
1	0	X	X	X	Stand-by
2	1	0	0	0	Start from first melody → last melody → stop
3	⎍	0	0	1	Start from first melody → last melody → repeat from first melody
4	⎍	0	1	0	Start from the preset melody → stop
5	1	0	1	1	Repeat the present melody
6	1	⎍	0	0	Change to the next melody → last melody → stop
7	1	⎍	0	1	Change to the next melody → last melody → repeat from first melody
8	1	⎍	1	0	Change to the next melody → stop
9	1	⎍	1	1	Change to the next melody → repeat the same melody

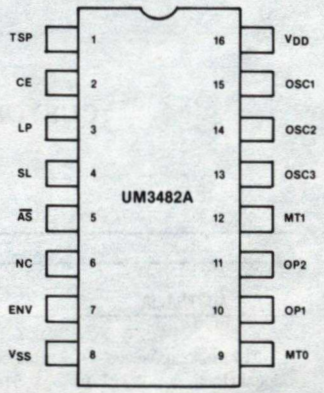
Selections:

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
WIEGENLIED
MELODY ON PURPLE BAMBOO

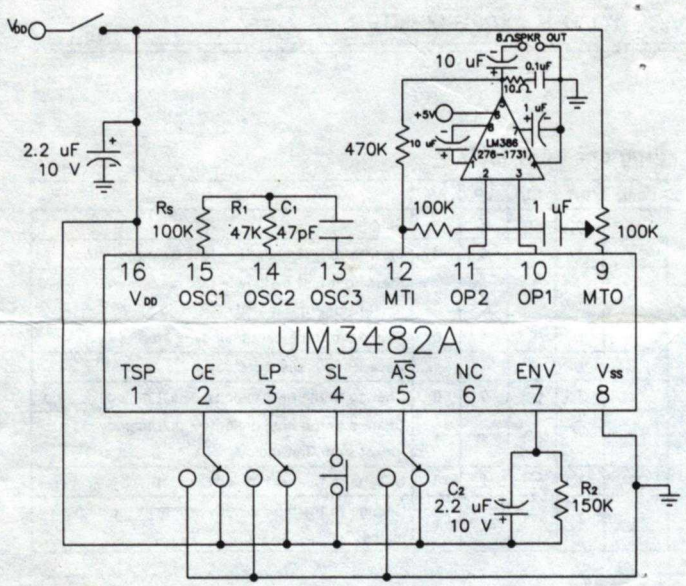
Block Diagram



Pin Assignment



General Application



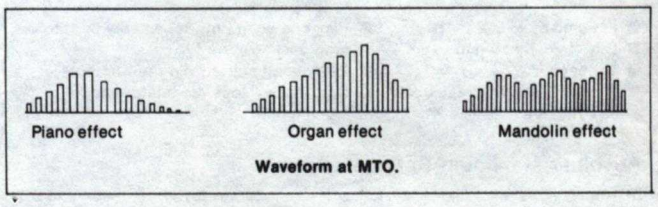
Chime Function Application

Oscillator & Control Circuit

The resistor R_1 & capacitor C_1 are connected externally to set the frequency at 100 KHz. Addition of R_S in series with input inverter makes the circuit less sensitive to variations of supply voltage. Under the standby condition (CE is Low) the operation of the OSC is inhibited. As soon as a high level signal is applied to the CE terminal the circuit starts oscillating. Since the OSC frequency is used as a time base of the tone, rhythm and tempo generators, its accuracy will affect the quality of the melody.

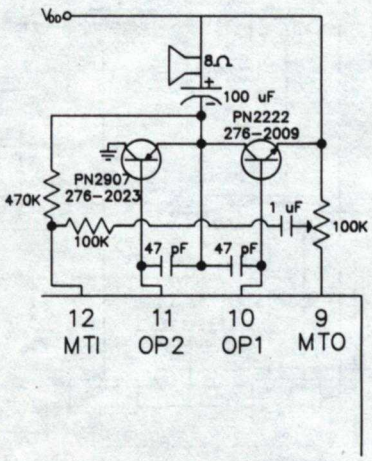
Modulator Circuit

The tone signal and the timbre signal are put through the modulator circuit. The output wave is shown below. Proper selection of C_2, R_2 can produce envelopes of desired charging and discharging time.

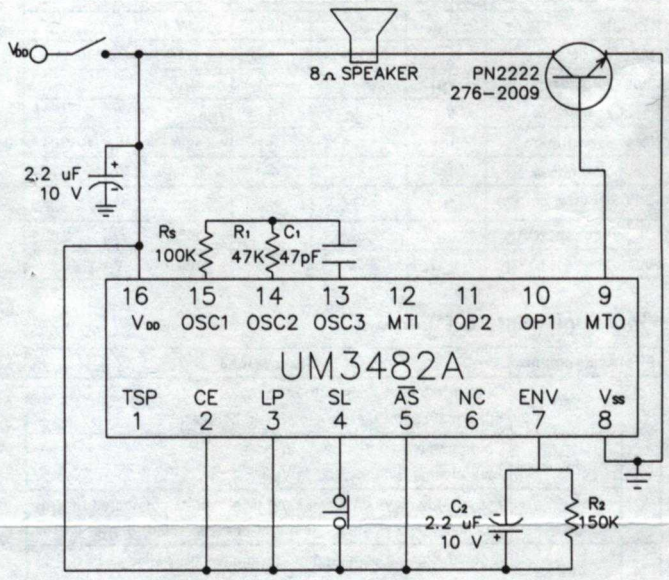


Waveform at MTO.

Alternative Amplifier Section



Low Cost Application



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