SUNSTAR

22C040/840N
一次性编程语音IC

40秒可编程语音电路

特点:

*语音长度在6K采样率时,可达40秒;
多种回放方式;
*八个触发键,TG1到TG8组合可触发32组语音;
*SBT引脚用于顺序触发所有语音;
*电平保持与非保持触发选择;
*15ms的触发延时可支持CDS;
*IRP引脚在播放时用于中断播放功能;
*STP/BUSY 输出引脚可定义为结束脉冲信号或忙信号,BUSY信号可用于同CPU接口;
*内置振荡器及采样变换器;
*单个外部电阻改变回放频率;
*内置D/A转换器及EPROM;
*采用高音质的ADPCM数据压缩方式;
*具有噪音消除功能;
*Cout引脚可用单个三极管驱动喇叭;
*Vout1及Vout2可直接驱动蜂鸣器;
*具有自动电源关闭功能;
*2.4V—6V单电源供电;
*低静耗电流(3V时小于5uA);
*提供开发应用工具.

功能:

*API840N是一个高质量语音合成器,在6K采样率时可以存贮40秒语音内容.
*API840N在保持高质量的语音音质下,不需复杂的电路便可回放各种声音,例如:人声,动物声,音乐,声效等人工合成语音.本IC可采用多片连接,加长语音.也可用两个芯片混音加入背景音乐或其它.
*API840N提供宽范围电压2.4V—6V.提供一对PWM输出脚,Vout1及Vout2可直接驱动蜂鸣器.一个电流输出Cout,外接一个NPN三极管,低成本即可驱动喇叭,不需增加复杂或滤波电路,渐进渐出功能可消除语音开始及结束时的"叭"声.
*LED1,LED2输出交互闪烁3HZ,STOP输出15ms的脉冲,BUSY信号可用于同CPU接口作同步信号.

编程选项:

API840N可采用不同的触发方式组合出功能:
*电平保持或不保持;
* SBT顺序或连续触发;
*BUSY/STOP输出选择;
*渐进渐出功能选择;

为客户提供专用软件.

样率与振荡电阻对照表:

采样率(KHz) Sampling Rate	振荡电阻(Mohm) Rosc	采样率(KHz) Sampling Rate	振荡电阻(Mohm) Rosc
5.6	3.0	9.0	1.8
6.0	2.8	10.5	1.6
6.6	2.6	12	1.4
6.8	2.4	14	1.2
7.5	2.2	16	1.0
8.0	2.0		

*上表参数作为参考值,具体以实际应用为准

Programmable Options

The API840N provides different control functions for user specified applications.The in-cude:

Non-sequential or Sequential Play-all
Unholdable or Holdable trigger
STOP or BUSY signal selection

Automatic ramp-up/ramp-down or on ramp-up/ramp-down.

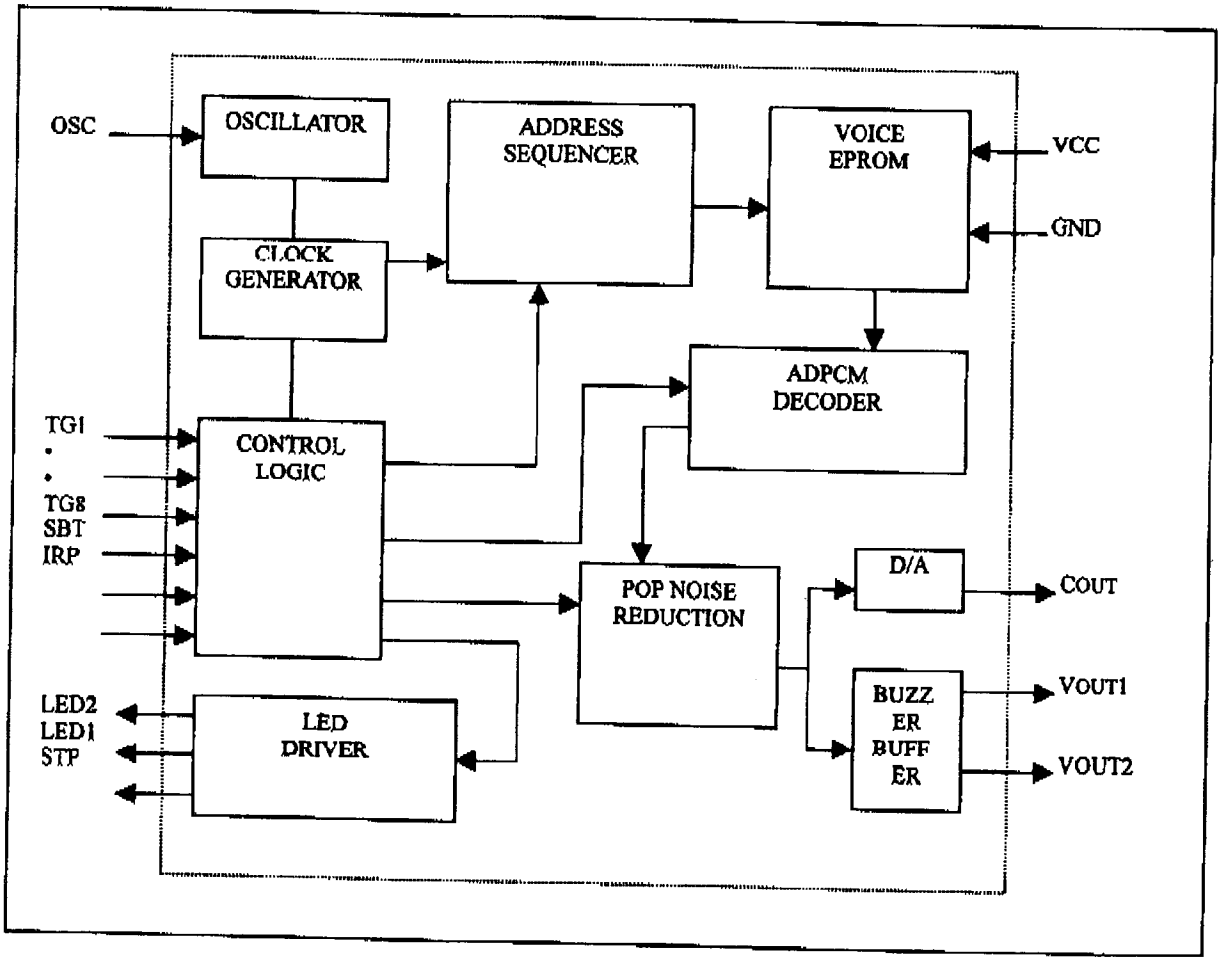
Silence Compression

If a particular sound sequence includes periods of silence, the API840N will automatically compress the silence to save memory space. This compression will not affect playback of the sound sequence.

Absolute Maximum Rating

Symbol	Raing	Unit
Vcc to GND	0.5 to 7.0	V
VIN	GND -0.3 to Vcc +0.3	V
VOUT	GND to Vcc	V
T(OPERATING)	-10 to 60	C
T(STORAGE)	-55 to 125	C

BLOCK DIAGRAM



FEATURES

Voice length at
6KHz sampling is 40 seconds
Silence compression to save memory
Available in two pin types:
20-pin package API840N for additional Sections

Eight trigger pins,TG1 to TG8
8 sections with a 16-pin package
32 sections with a 20-pin,package
SBT pin play-all or sequential play-all
15 ms debounce time suitable for CDS
IRP interrupt pin stops playback at once
STP stop pulse generated at of plaayback
BUSY signal for CPU control
Two LEDs flash at 3 Hz interaval
2.4V to 6V sigte power supply operation
Low standby current (<5 uA at 3V)
Auto-power down
Blilt-in oscillator , D/Aconverter,EPROM
ADPMC data compression
Optional pop noise speader with a transistor
Development tools support
Vout1 and Vout2 drives buzzer directly
Sampling rate determineb by external resistor
Development tools support
Vout1 and Vout2 drives buzzer directly
Sampling rate determineb by external resistor
Holdable and unholdable triggering option

GENERAL DESCRIPTION

API840N is a high-quality voice synthe-sizer with a caplcity of 32 to 40 seconds. A propri-etary ADPCM algorithm is used. The audio message is stored in a 1024K bit on-chip EPROM.

The API840N eliminates the need lf com-plicated circuitry in voice playback (Figure 1) but stillachieves high voice quality.Sounds such as human speech,animal sounds, musical soundsmand even special sound effects can be synthesized. Devices can be cascaded to achieve longer voice duration(Figure 2). Two devices can be configured in parallel (Figure 3) in order to achieve signal mixing without an external mixer allowing speeches to be mixed with background music synthesis from two different chips.

The instant programming nature of the API840N allows a very short production turn around tine. There are no NRE charges that are usually required with conventional voice ROMs.Users now can apply a voice synthesis function as an additional feature to their products even when production volume is relatively small. It is also ideal for trial or engineering prototyping. As a result, the initial investment is minimal and the risk in the product development phase is reduced.

The API840N provides a wide voltage operating range from 2.4V to 6.0V. A pair of PWM output pins, Vout1 and Vout 2 provide direct drive to a buzzer(Figure 1b). Oice quality from a buzzer is comparable to speaker output and power consumption is much lower.

A current output pin, Cout, enables the device to drive to drive a speaker with a low cost NPN transistor. No complex filtering or amplifier circuit is needed. An automatic ramp up/ down function eliminates the undesired noise at the end of playback.

Up to 32 sections are accessible through TG1 to TG8. The SBT trigger pin can be programmeb to playbacd all 32 sections or sequentially from section 1 to 32. An interrupt pin(IRP) and stop pulse(STP) or BUSY signals provide handshaking with microprocessors or other API840N devices. All trigger pins give 15 ms debounce time and is ideal for CDS applications as in Figure 5. Two LED drivers are available,flashing on and off at approximately 3Hz intervals (Figure 4). The internal voltage compensation oscillator requires only one external resistor. Different sampling frequencies are determined by the external oscillator resistor value.

SECTION TRIGGERING

TG1	TG2	TG3	TG4	TG5	TG6	TG7	TG8	Section
HIGH	NC	NC	NC	NC	NC	NC	NC	1
NC	HIGH	NC	NC	NC	NC	NC	NC	2
NC	NC	HIGH	NC	NC	NC	NC	NC	3
NC	NC	NC	HIGH	NC	NC	NC	NC	4
NC	NC	NC	NC	HIGH	NC	NC	NC	5
NC	NC	NC	NC	NC	HIGH	NC	NC	6
NC	NC	NC	NC	NC	NC	HIGH	NC	7
NC	NC	NC	NC	NC	NC	NC	HIGH	8
HIGH	HIGH	NC	NC	NC	NC	NC	NC	9
NC	HIGH	HIGH	NC	NC	NC	NC	NC	10
NC	NC	HIGH	HIGH	NC	NC	NC	NC	11
NC	NC	NC	HIGH	HIGH	NC	NC	NC	12
NC	NC	NC	NC	HIGH	HIGH	NC	NC	13
NC	NC	NC	NC	NC	HIGH	HIGH	NC	14
NC	NC	NC	NC	NC	NC	HIGH	HIGH	15
HIGH	NC	NC	NC	NC	NC	NC	HIGH	16
HIGH	HIGH	HIGH	NC	NC	NC	NC	NC	17
NC	HIGH	HIGH	HIGH	NC	NC	NC	NC	18
NC	NC	HIGH	HIGH	HIGH	NC	NC	NC	19
NC	NC	NC	HIGH	HIGH	HIGH	NC	NC	20
NC	NC	NC	NC	HIGH	HIGH	HIGH	NC	21
NC	NC	NC	NC	NC	HIGH	HIGH	HIGH	22
HIGH	NC	NC	NC	NC	NC	HIGH	HIGH	23
HIGH	HIGH	NC	NC	NC	NC	NC	HIGH	24
HIGH	HIGH	HIGH	HIGH	NC	NC	NC	NC	25
NC	HIGH	HIGH	HIGH	HIGH	NC	NC	NC	26
NC	NC	HIGH	HIGH	HIGH	HIGH	NC	NC	27
NC	NC	NC	HIGH	HIGH	HIGH	HIGH	NC	28
NC	NC	NC	NC	HIGH	HIGH	HIGH	HIGH	29
HIGH	NC	NC	NC	NC	HIGH	HIGH	HIGH	30
HIGH	HIGH	NC	NC	NC	NC	HIGH	HIGH	31
HIGH	HIGH	HIGH	NC	NC	NC	NC	HIGH	32

PIN DESCRIPTIONS

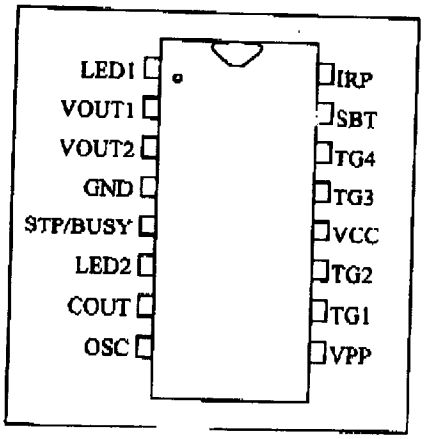
Name	I/O	Function
TG1	I	Trigger Switch 8, Internal Pull LOW, Active HIGH
LED1	O	Drives First LED Flash at 3 Hz, Active LOW
VOUT1	O	PWM Audio Signal Output for Buzzer
VOUT2	O	Compliment PWM Audio Signal Output for Buzzer
GND		Ower Ground
STP/BUSY	O	Generate 30 ms Pulse or Busy Signal After Voice Playback
LED2	O	Drives Second LED Flash at 3Hz, Active LOW
COUT	O	Current Output from Intemal DAC For Speaker Playback
OSC	I	Oscillator Resistor Pin to Control Sampling Frequency
TG5	I	Trigger Switch 5, Internal Pull LOW, Active HIGH
TG6	I	Trigger Switch 6, Internal Pull LOW, Active HIGH
VPP		Rogram Power Supply, No Connect When Voice Playback
TG1	I	Trigger Switch 1, Internal Pull LOW, Active HIGH
TG2	I	Trigger Switch 2, Internal Pull LOW, Active HIGH
VCC		Ositive Power Supply
TG3	I	Trigger Switch 3, Internal Pull LOW, Active HIGH
TG4	I	Trigger Switch 4, Internal Pull LOW, Active HIGH
SBT	I	One Key or Sequential Trigger, Intemal Pull LOW, Active HIGH
IRP	I	Interrupt to Stop Playback, Internal Pull LOW, Active HIGH
TG7	I	Trigger Switch 7, Internal Pull LOW, Active HIGH

Notes:

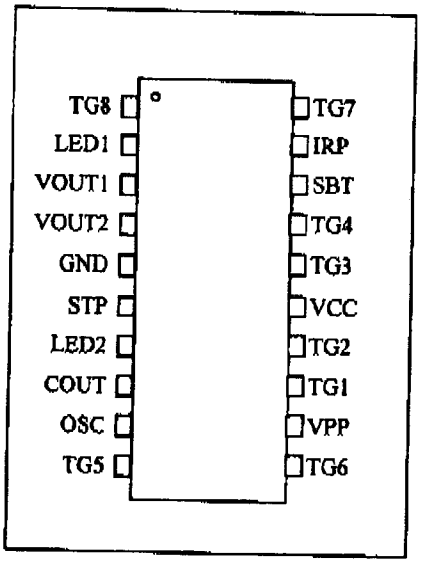
1. The following pins are used to program data into the memory when a 20-pin package is used:pins 5,6,7,9,12,15,18,19.
2. Pins 1,10,11&20 will not be bonded out when a 16-pin package is used.
3. All pins will be bonded out when a 20-pin package is used.

PIN CONFIGURATIONS

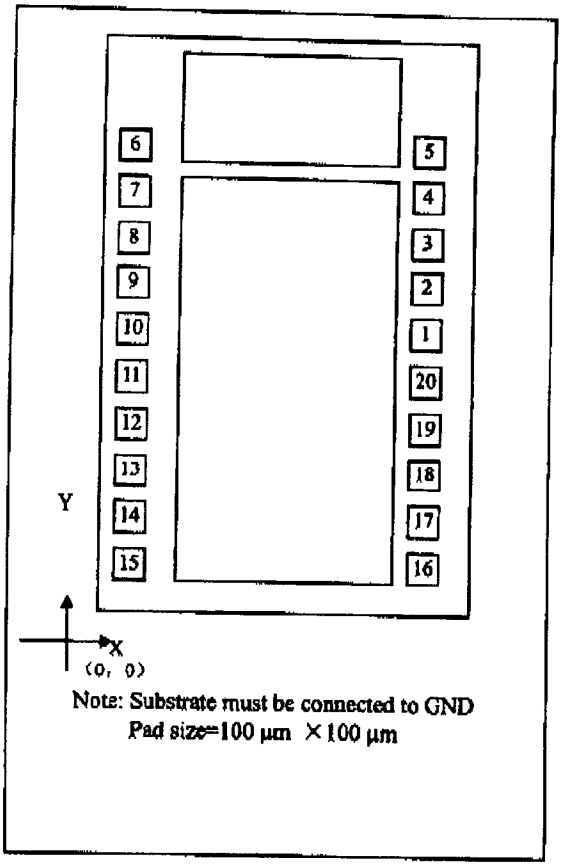
16-Pin 300-mil PDIP



20-Pin 300-mil PDIP



Bonding Diagram



Note: Substrate must be connected to GND
Pad size=100 μm ×100 μm

Bonding Parameters

Pin	Name	x	y
1	TG8	3451.9	1599.7
2	LED1	3451.9	1861
3	VOUT1	3451.9	2147.6
4	VOUT2	3451.9	2444.5
5	GND	3368.1	2803.35
6	STP	137.18	2795.93
7	LED2	100.4	2486.3
8	COUT	100.4	2245
9	OSC	100.4	1790
10	TG5	100.4	1469.5
11	TG6	100.4	1230
12	VPP	100.4	989.6
13	TG1	100.4	662.3
14	TG2	100.4	422.7
15	VCC	187.05	113.78
16	TG3	3451.9	157.9
17	TG4	3451.9	581.5
18	SBT	3451.9	836
19	IRP	3451.9	1090.6
20	TG7	3451.94	1345.13

DC CHARACTERISTICS

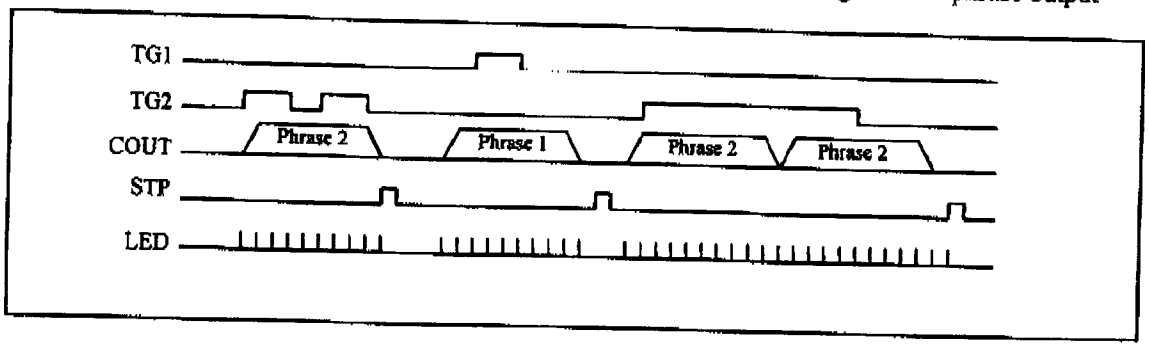
Symbol	Parameter Description	Condition	Min.	Typ.	Max	Unit
Vcc	Operating Voltage		2.4	3	6	V
ISB	Standby Current	Vcc=3.0V,I/O Open			5	μA
IOP	Operating Curret	Vcc=3.0V,I/O Open			100	μA
VIH	Input HIGH Voitage	Vcc=3.0V	2.5	3	3.5	V
VIL	Input LOW Voitage	Vcc=2.0V	0.3	0	0.3	V
IOH	Input LOW O/P Current	Vcc=3.0V,VOUT=0V		12		A
IOL	Input HIGH O/P Current	Vcc=3.0V,VOUT=3.0V		2		A
ICO	COUT O/P Current	Vcc=3.0v,VCOUT=0.7V		2		A
ISTPH	STP LOW O/P Current	Vcc=3.0V,VSTP=0V		5		A
TSTPL	STP HIGH O/P Current	Vcc=3.0V,VSTP=3.0V				A
ILED	Output current LED	Vcc=2.2V 6.0V	6	8	10	mA
F/F	Frequency Stability	Fosc(3V) Fosc(3.5V) fosc(3V)			5	%

TIMING DIAGRAM

PULSE TRIGGERED

a, Trigger is shorter than a phrase output

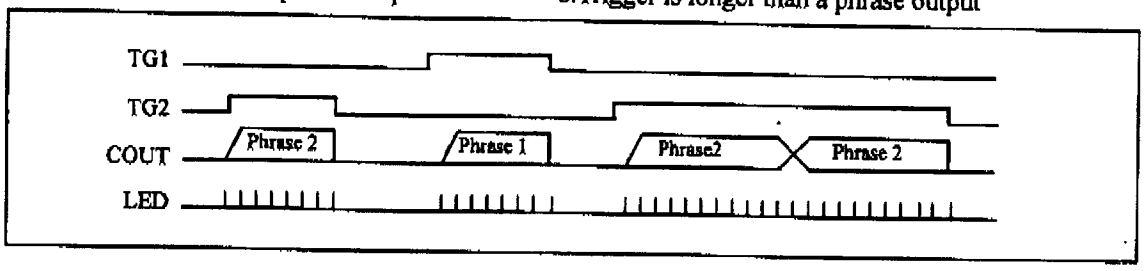
b. Trigger is longer than a phrase output



LEVEL TRIGGERED

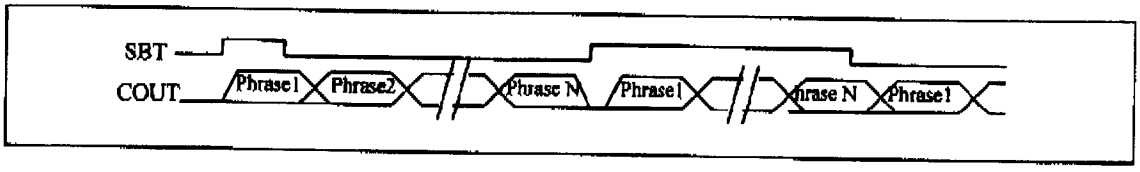
a.Trigger is shorter than a phrase output

b.Trigger is longer than a phrase output

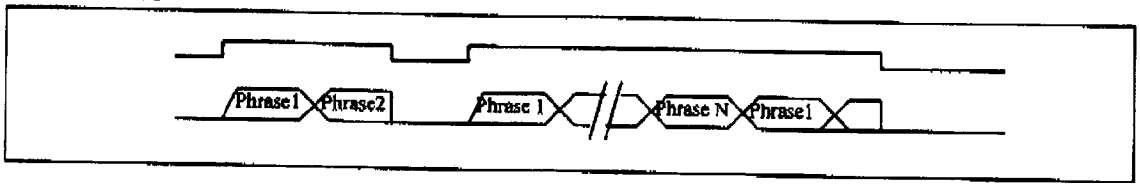


SINGLE BUTTON TRIGGER, NON-SEQUENTIAL PLAY-ALL(SBT)

a. Pulse Triggered



b. Level Triggered



SUNSTAR

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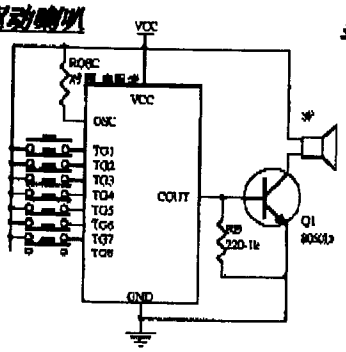
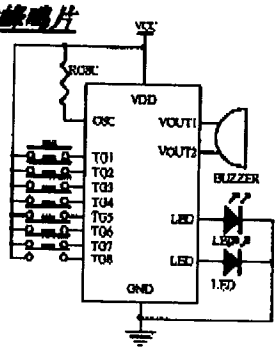
一次性编程语音IC

应用线路

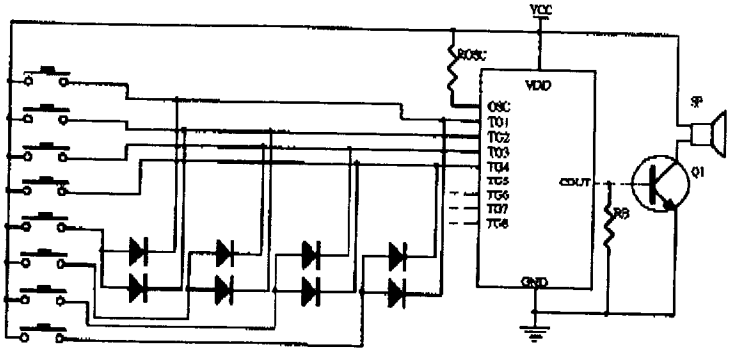
八段驱动喇叭



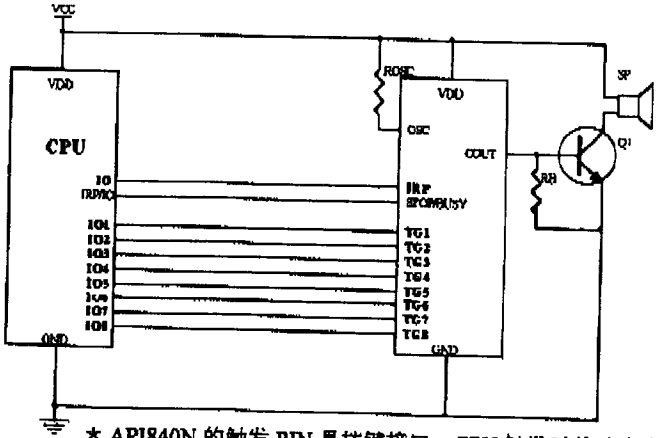
驱动蜂鸣片



八段以上触发控制



同CPU 接口



★ API840N 的触发 PIN 是按键接口，CPU 触发时脉冲宽度 10～30ms

★ STOP 输出脉冲宽度在 10～30ms

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