DIY Kit 116. ALARM SIREN DRIVER

INTRODUCTION

This kit is based around the ZSD100 siren driver chip from Zetex. It is designed to drive an 8 ohm horn speaker which is commonly available.The addition of a few external components is all that is required to produce an ear piercing 120dB alarm driver. The device operates from supplies of 4V up to 18V and is ideal for security systems in battery powered applications, burglar alarms and car anti-theft systems.

The kit is constructed on single-sided printed circuit board. Protel Autotrax & Schematic were used in the design.

CONSTRUCTION

Start with the lowest height components first. Keep one of the resistor leg offcuts to use as the link. Take extra care when inserting the transistors and electrolytic capacitors that they are the right way round.

CIRCUIT DESCRIPTION

The ZSD100 contains two internal oscillators - an audio frequency generator that produces the basic tone modulated by a second low frequency oscillator to generate the characteristic siren "whoop" and wail. The audio signal oscillator is swept over a fixed 2:1 range by the low frequency sweep generator. The frequency of both oscillators are controlled by capacitors C1 and C2.

C1 sets the sweep rate of the low frequency oscillator and can be any value from 4.7uF to 100uF. C2 sets the base frequency or "pitch" of the signal generator and can be any value from 10nF to 100nF. Different siren effects can be obtained by combining the two capacitor values.

An internal timing resistor (61.5K) is available at pin 1. Grounding pin 1 enables the chip. Improved frequency control can be achieved by connecting an external resistor (up to 1M) between pin 1 and ground.

The modulation frequency is calculated as follows:

$$F_{MOD} = \frac{2850}{C_1(61.5 + R_T(EXT)} Hz$$

where C_1 in uF, R_T(EXT) in kΩ.

The base output frequency is given by:

$$F_{OUT} = \frac{1710}{C_2(61.5 + R_T(EXT)} kHz$$

where C_2 in uF, R_T(EXT) in kΩ.

Pin 2 is a "sawtooth" selection pin. Leaving this pin open creates the rising and falling modulated tone of a classic siren. Linkng pin 2 to pin 3 creates a rising ramp sound (sawtooth). Jumper J1 is provided for this function.

Pins 6 and 7 are complimentary outputs directly driving a H-bridge output circuit. When pin 6 is high, Q1 switches on and drives Q3 and Q6. When pin 7 is high, Q2 switches on and drives Q4 and Q5. Only one pair of transistors in the output bridge are switched on at any one time and this directly drives the speaker.

It is recommended that an 8Ω speaker be used. Lower value speakers can be substituted but in this case the H-bridge transistors would need to be uprated.

The ZSD100 operating current is a low 10mA. In standby mode it is only 1uA, making it ideal for battery powered systems.

WHAT IF IT DOES NOT WORK

Poor soldering ("dry joints") is the most common reason that the circuit does not work. Check all soldered joints carefully under a good light. Re-solder any that look suspicious. Check that all components are in their correct position on the PCB. Are the transistors and electrolytic capacitors the right way round?

PARTS LIST - KIT 116		
Resistors (0.25W carbon)		
100K	R1	1
330R	R2,3	2
Capacitors		
0.1uF MKT boxpoly	C2	1
100uF 25V electrolytic	C1,3	2
Semiconductors		
MPS222A	Q1,2	2
ZTX790A	Q3,5	2
ZTX690B	Q4,6	2
ZSD100	IC1	1
Zetex Siren Driver		
Miscellaneous		
2 way jumper pins and link	J1	1
Pushbutton switch		1
PCB, K116		1

Web Address & Email

You can email us at sales@kitsrus.com if you have any problems or requests. See our Web page at:

http://kitsrus.com

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