Simple Gun Circuit Design

This document is intended to give you all the information you need to build a basic laser tag gun circuit. It doesnt do any of the more fancy things that we have come to expect nowdays like ammo and clip counting, digital displaying, 3 round burst etc etc, BUT it does hit a Laser tag sensor.

The components for the circuit are available from Digikey amongst other places.

Circuit Overveiw

A lasertag circuit to hit a sensor must produce and combine 2 seperate frequencies, a 31khz carrier and a 244Hz signal. The ideal for LC is 38 khz and 250 hz for hitting but the frequencies produced are close enough to work correctly. The circuit has several chips on board, I will now list the function of each.

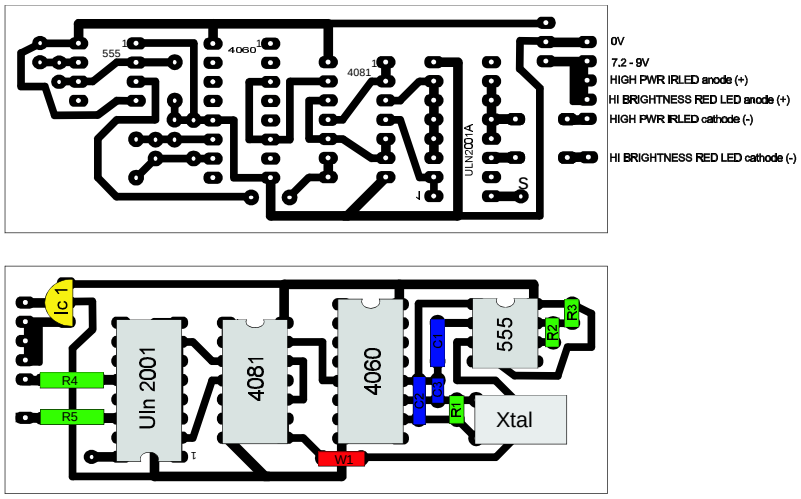
555 - the 555 chip is set up to pulse, it controls the rate of fire for the gun circuit, everytime it pulses the circuit will fire a 'shot'.

4060 - the 4060 in conjuction with the crystal actually produces the 2 required frequencies, it does this by dividing the frequency of the crystal several times and outputting it to several of its pins.

4081 - the 4081 combines the 2 frequencies together and also acts as a switch controlled by the 555, letting the frequencies through when it pulses.

ULN2001 - this chip is the output transistors that actually powers the LED's. You can replace this with another type of hi power hi gain transistor if you wish.

The circuit diagram below is from the track side, the component placement diagram is from the component side of course.



Component List		Capacitors	
		C1 2.2 mF	x1
I.C.'s		C2 33 pF	x1
555	x1	C3 22pF	x1
4060	x1		
4081	x1	Resistors	
ULN2001A	x1	R1 10 M	x1
IC1 78L05	x1	R2 100K	x1
4 Mhz Xtal	x1	R3 22K	x1
		R4 4.7	x1
W1 Wire link	x1	R5 22	x1

When power is applied to the circuit the 555 oscillates and allows the 4081 chip to switch the frequencies produced by the 4060. The frequencies are wired to the ULN2001, this is a darlington driver transistor chip which drives the led's. There are outputs for an infrared (sfh484-2 or similar) and a visible led, although you could add more. Point 'S' on the circuit board goes low in time with the 555 and can be used to trigger an external sound board.

IF you have any question regarding this circuit then please email tech@spartandesign.co.uk