Application Note: Setting the Trip Point

SUMMARY

This application note describes the procedure for calibrating the trip point of the circuit.

REQUIRED

- freETarget V2.1 or higher
- Firmware V3.0 or higher
- Small Screw Driver
- Header Jumper

INTRODUCTION

freETarget uses the sound of the projectile passing the sensors to trip a circuit and measure the time difference between the various sensor. Using the time difference the software computes the location and displays the results.

Ideally the hardware wants to detect the pellet at the moment the signal starts to appear. In practice setting the trip point close to zero would make it susceptible to false triggering from other targets. Setting the trip point too high would prevent the circuit from detecting some shots. freeETarget has a variable control that lets you adjust the trip point based on your range and shooting preferences.

There are two methods for adjusting the trip point

- Stand Alone – Circuit and screwdriver
- PC Based – Using the freETarget program and display

The stand-alone method would be used in the field and you wanted to make a quick adjustment to test a new condition.

The PC based method is easier, but requires that you have somebody to adjust the potentiometer and somebody to watch the screen.

STAND ALONE METHOD

PREPARATION

The circuit is put into calibration mode by following these steps:

1. Power down the circuit, and;
2. Insert the CAL jumper as shown in Figure 1, or;
3. If you do not have a CAL jumper turn the potentiometer clockwise until it stops.
4. Apply power

The trip ranges are selected by adding an additional jumper to the A or B header. The ranges are shown in Table 1.

Table 1: Jumper Settings

Low	Normal	High
Jumper A	None	Jumper B

Start by setting the calibration to the NORMAL mode. Use the HIGH setting for outdoor ranges with high calibre weapons. The low setting is provided for reference only.

ADJUSTMENT

The trip point is adjustable in three ranges and 15 levels as shown in Table 2. Using the small screwdriver adjust the trim pot (Figure 2) and observe the LED indicators (Figure 3). The circuit is delivered calibrated to a trip point of roughly 600mV. Adjust upwards if you are getting false trips. Adjust downwards to improve the detection threshold.

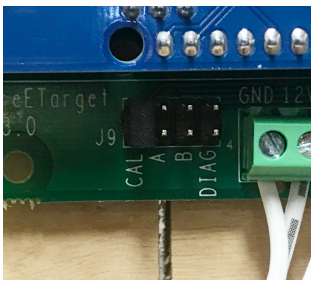

Figure 1: Calibration Jumper

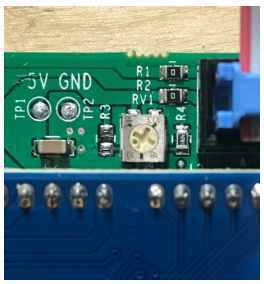

Figure 2: Adjusting Potentiometer

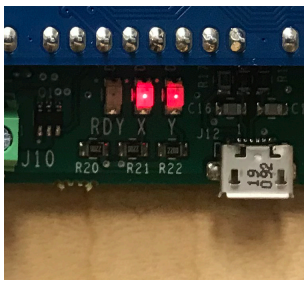

Figure 3: Indicator LEDs

Table 2: Trip Point Adjustment

	Low (mV)	Normal (mV)	High (mV)	RDY	X	Y
Do Not Use	233	350	525			
	267	400	600			
	300	450	675			BLINK
	333	500	750			
	367	550	825		BLINK	
Factory Setting	400	600	900			
	433	650	975		BLINK	BLINK
	467	700	1050			
	500	750	1125	BLINK		
	533	800	1200			
	600	900	1350	BLINK		BLINK
	667	1000	1500			
	733	1100	1650	BLINK	BLINK	
	800	1200	1800			
	867	1300	1950	BLINK	BLINK	BLINK
DO NOT USE	100	1400+	2000	TOGGLE	TOGGLE	TOGGLE

IMPORTANT

No LEDs or all blinking indicates under or over range and should not be used.

PC Method

The PC method is easier since you can observe the trip point value directly. It does however require that you use two people, or locate the PC close to the target stand

PREPARATION

Connect to the target using the CONNECT button as shown in Figure 4.

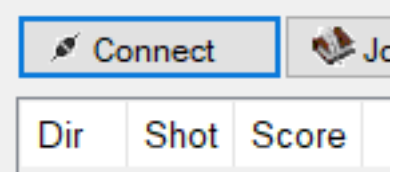

Figure 4: Connect Button

Select the Arduino button as shown in Figure 5

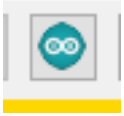

Figure 5: Arduino Button

Select CAL as shown in Figure 6 to begin the calibration

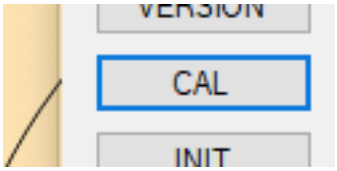

Figure 6: CAL Button

ADJUSTMENT

The program will begin to scroll the current V_Ref as shown in Figure 7. Using the screw driver, slowly adjust the potentiometer to reach the desired value.

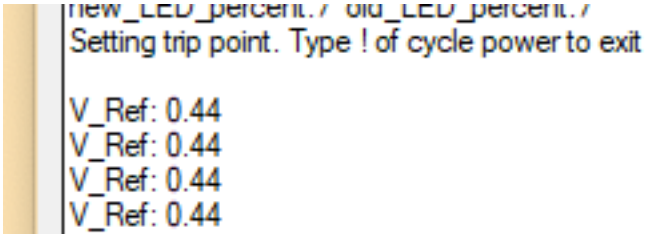

Figure 7: V_Ref Setting

Press STOP CAL as shown in Figure 8 to exit and return to normal operation.

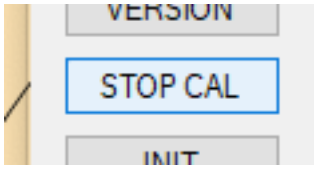

Figure 8: Ending the Calibration

FINISHING UP

- Record the LED settings and date

Date	S	X	Y	Reason for Change

- Remove the calibration and other jumpers
- Cycle power to the freETarget
- Verify that the LEDs return to the conventional RDY-OFF-OFF setting