

# **E.C.S.**

## **Enhanced Cricket Software**

### **Version 1.13**

**Please read through this entire manual before operating your cricket board with ECS.**

### **Introduction**

**ECS is a software upgrade for owners of the Smart Parts Impulse with non-vision “cricket” boards. This software enhances the stock “cricket” board by providing the following features:**

- **Muti -Mode Functionality or Semi-Auto Only**
  - **Semi-Automatic Mode**
  - **3 Round Burst Mode**
  - **6 Round Burst Mode**
  - **Full-Automatic Mode**
  - **Safe/Edit Mode**
- **Adjustable Rate of Fire**
  - **Ranges Between 1 and 30 Balls per Second**
  - **Affects All Firing Modes**
- **Expanded Dwell Range**
  - **Now Ranges Between 1 and 20 Milliseconds**
  - **Adjustable in 0.25 Millisecond Increments**
- **Adjustable Trigger Bounce Timer**
  - **Ranges Between 1 and 100 Milliseconds**
  - **Adjustable in .5 Millisecond Increments**
- **1 Shot Buffer**
  - **Stores a single trigger pull up to 1/2 second before it is discarded**
- **Faster Vision Eye Logic**
  - **Auto-calibration feature**
  - **Manually adjustable**

**Defaults for each adjustable value are as follows:**

**Rate of Fire: 14 Balls per Second**

**Dwell: 10 ms**

**Bounce Timer: 10 ms**

**These features may expand or change with future development.**

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## 1. Buttons



## 2. Mode Descriptions

### Note on LED strobe patterns:

- + -- LED on
- = -- LED off

A strobe pattern consists of 12 frames in which the LED is either on or off. Each frame is 1/8<sup>th</sup> of a second.

### Live Modes

Dwell may be adjusted while the marker is in any live mode, just like the original Smart Parts software. Dwell time can be modified using SW2 and SW3. Each press

increments or decrements the dwell time by .25 ms. This value can range between 1 and 20 ms.

#### **Semi-Automatic:**

In Semi-Automatic Mode, the marker will cycle 1 time for each trigger pull as long as each trigger pull is not faster than the set maximum rate of fire. Each time the board is turned on, it defaults to Semi-Automatic Mode.

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#### **3 Round Burst:**

In 3 Round Burst Mode, the marker will cycle 3 times for each trigger pull. If the trigger is pulled during a 3 round burst, the number of cycles pending is set to 3 and the gun continues cycling. The gun will fire at the maximum rate of fire, and trigger pulls will only be detected if they are at or less than the maximum rate of fire.

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#### **6 Round Burst:**

In 6 Round Burst Mode, the marker will cycle 6 times for each trigger pull. If the trigger is pulled during a 6 round burst, the number of cycles pending is set to 6 and the gun continues cycling. The gun will fire at the maximum rate of fire, and trigger pulls will only be detected if they are at or less than the maximum rate of fire.

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#### **Full-Automatic:**

In Full-Automatic Mode, the gun will cycle continuously at the maximum rate of fire as long as the trigger is held down.

**LED Strobe Pattern: ++++++++=====**

## **Safe/Edit Modes**

While in Safe/Edit modes, the gun will not fire if the trigger is pulled. Pressing SW1 while in Safe/Edit mode will cycle through each Safe/Edit mode.

#### **Safe/Edit Fire Mode:**

**Note:** This mode is omitted in the semi-only version of ECS.

In Safe/Edit Fire mode, buttons SW2 and SW3 switch between the 4 available fire modes. When the marker is toggled back to a Live Mode, the selected fire mode becomes the current mode of the marker. This is the initial mode of the board whenever switching from Live to Safe/Edit modes.

**LED strobe pattern: +=====**

#### **Safe/Edit Rate of Fire:**

The rate of fire affects all firing modes. When in Safe/Edit Rate of Fire Mode, SW2 and SW3 increase and decrease the current rate of fire limit. This value can range between 1 and 30 balls per second.

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#### **Safe/Edit Bounce Timer:**

The bounce timer eliminates any trigger events which aren't caused by a physical trigger pull. Having a setting too low is illegal and dangerous.

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**Safe/Edit Eye Sensitivity:**

**You can adjust the eye sensitivity in this mode. SW2 increases sensitivity and SW3 decreases sensitivity. The LED will turn on in this mode when it recognizes the paint. Pulling the trigger in this mode with paint loaded and in the chamber will auto-calibrate the sensitivity setting.**

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**Note: Please refer to the section describing Live Modes for information on dwell adjustment.**

### **3. General Operation**

**To turn the marker on:**

- **press and hold SW1 for 2 seconds**
- **the speaker will emit a 3 tone sequence**
- **the marker is now on and in semi-automatic mode**

**To turn the marker off:**

- **press and hold SW1 for 2 seconds**
- **the speaker will emit a 3 tone sequence**
- **the marker is now off**

**To switch from Live to Safe/Edit mode:**

- **press and hold SW1 for 1 second**
  - **the LED will turn off**
  - **the speaker will emit a 4 tone sequence**
  - **the marker is now in Safe/Edit Fire Mode**

**To switch from Safe/Edit to Live mode:**

- **press and hold SW1 for 1 second**
  - **the LED will turn off**
  - **the speaker will emit a 4 tone sequence**
  - **the marker is now in Live Mode**

**To cycle through Safe/Edit modes:**

- **enter Safe/Edit mode**
  - **while in Live mode, press and hold SW1 for 1 second**
- **press SW1 to cycle to next Safe/Edit mode**
  - **modes will cycle: Safe/Edit Fire Mode->Safe/Edit Rate of Fire->Safe/Edit Bounce Timer->Safe/Edit Fire Mode**

**To toggle eye on or off:**

- **enter any live mode**
- **press and hold SW1**
  - **the LED will turn on**
- **pull and release the trigger**
  - **the speaker will emit a high tone if the eye has been turned on or a low tone if it has been turned off**
- **release SW1**
- **this entire process must be completed within 1 second or you will switch between Safe and Live mode or turn off the gun**

**Remember that when editing settings, it is not necessary to return to live mode and then enter edit mode again in order to modify another setting. All changes go active immediately and are saved to EEPROM when the marker is turned off.**

## **4. Setting Dwell Time**

**Please refer to the manual that came with your Impulse to determine the correct dwell setting for your Impulse. This can be downloaded from the Smart Parts website at <http://www.smartparts.com>. Default dwell is 10 ms.**

**To set the dwell time:**

- **enter any Live mode**
  - **turn the marker on—it will be in Semi-Automatic mode**
- **press SW3 to decrease dwell by .25 ms**  
**or**
- **press SW2 to increase dwell by .25 ms**

**If the dwell is already at its minimum or maximum when decreased or increased, the speaker will emit a 2 tone notification. When the dwell is set to 10 ms, the speaker will, instead of emitting a single tone, emit a double tone.**

## **5. Switching Fire Modes**

**To change fire modes:**

- **enter Safe/Edit mode**
  - **while in Live mode, press and hold SW1 for 1 second**
- **board is now in Safe/Edit Fire Mode**
- **press SW3 to cycle back through modes**  
**or**
- **press SW2 to cycle forward through modes**
  - **modes will cycle: Semi-Automatic<->3 Round Burst<->6 Round Burst<->Full-Automatic**
- **return to Live Mode**
  - **hold SW1 for 1 second**

**If the fire mode is already at its minimum or maximum when decreased or increased, the speaker will emit a 2 tone notification.**

## **6. Setting Rate of Fire**

**To set your rate of fire, I recommend switching to full auto mode and putting the rate of fire at the value you think your hopper can sustain. Gas up your gun, fill up your hopper, and fire off a string. If the gun chops, decrease the rate of fire, clean the gun (with the gun de-gassed and off), and try again. If the gun doesn't chop, increase the rate of fire until it chops and then decrease it by one.**

**To change the rate of fire:**

- **enter Safe/Edit mode**
  - **while in Live mode, press and hold SW1 for 1 second**
- **change to Safe/Edit Rate of Fire**
  - **press SW1 once**
  - **make sure strobe pattern indicates the correct mode**
- **press SW3 to decrease the rate of fire by 1**  
**or**
- **press SW2 to increase the rate of fire by 1**
- **return to Live Mode**
  - **hold SW1 for 1 second**

**If the rate of fire is already at its minimum or maximum when decreased or increased, the speaker will emit a 2 tone notification.**

## **7. Setting Bounce Timer**

**Setting the bounce timer correctly is important when configuring your paintball gun, and it is also very simple. While in semi-automatic mode, fire your marker by slowly easing your trigger back. If the marker cycles more than once, you need to increase the bounce timer and then try again. You should repeat the process until it doesn't fire more than one time per trigger pull. On the other hand, if the marker does not fire more than once, you may want to decrease your bounce timer until it double fires, and then increase it by one increment. By doing this, your trigger will be as sensitive as possible while still being semi-automatic.**

**If you increase your rate of fire, you will have to increase your bounce timer setting because with a higher rate of fire setting, the gun will be more likely to double fire.**

**To change the bounce timer:**

- **enter Safe/Edit mode**
  - **while in Live mode, press and hold SW1 for 1 second**
- **change to Safe/Edit Bounce Timer**
  - **press SW1 twice**
  - **make sure strobe pattern indicates the correct mode**
- **press SW3 to decrease the bounce timer time by 2 milliseconds**  
**or**
- **press SW2 to increase the bounce timer by 2 milliseconds**
- **return to Live Mode**
  - **hold SW1 for 1 second**

## **8. Setting Eye Sensitivity**

**Correctly setting the eye sensitivity is very, very important. If it is set too low, the gun might fire slowly and at an inconsistent rate. If it is set too high, it may skip or chop. First, set the sensitivity using the auto-calibration feature. If this setting is not good, adjust it manually. When the sensitivity is set high enough for the board to detect paint, the LED will remain on. When manually adjusting the eye, decrease the eye sensitivity to fix problems with skipping or chopping. Increase the eye sensitivity if the gun shoots slower**

than it should or it stops shooting altogether.

Eye sensitivity will need to be set every time you switch paint.

To set eye sensitivity automatically:

- enter Safe/Edit mode
  - while in Live mode, press and hold SW1 for 1 second
- change to Safe/Edit Eye Sensitivity
  - press SW1 three times
  - make sure strobe pattern indicates the correct mode
- pull the trigger to automatically calibrate the eye sensitivity

To set eye sensitivity manually:

- enter Safe/Edit mode
  - while in Live mode, press and hold SW1 for 1 second
- change to Safe/Edit Eye Sensitivity
  - press SW1 three times
  - make sure strobe pattern indicates the correct mode
- press SW3 to decrease the eye sensitivity
  - or
- press SW2 to increase the eye sensitivity

## 9. Frequently Asked Questions

**Q: When I pull the trigger in Semi-Automatic mode, the gun shoots multiple times, but only when it's gassed up. Why does it do this?**

**A: It is because you are holding your trigger right at the trip point and the kick of the gun actually causes another trigger pull. To fix this, increase your bounce timer or decrease your rate of fire.**

**Q: My gun won't fire. What's wrong?**

**A: You are in Safe/Edit mode.**

**A: The dwell is set to a very low setting; increase the dwell time.**

**A: The eye sensitivity is set too low. This is the case if it will fire with the eye turned off.**

**Q: I don't like ECS. Can I get my board restored to its original software?**

**A: Yes. Send me an email and I'll tell you what to do.**

**Q: Does ECS void my warranty?**

**A: Yes.**

**Q: My gun is chopping. Is there anything I can do about it?**

**A: Decrease your rate of fire until it doesn't chop anymore.**

**A: This could be because your eye sensitivity is too high. Decrease the eye sensitivity.**

**Q: What is bounce?**

**A: When the trigger is pulled, it trips a micro switch. The computer on the board**

**monitors this switch and when it is pushed down, it knows the trigger is pulled. The problem with the switch is that when it's pulled, the switch does not instantly go on or off. It oscillates between the on and off position multiple times. This is because the switch physically bounces some and because the electricity jumps the very small gap in the switch. The bounce timer is used to determine which trigger events are actually pulls and which are just bounce. The adjustable parameter called the bounce timer is the amount of time it will take after an event before the computer will call another event a trigger pull and fire the marker.**

**The bounce timer can be tweaked to give your marker the feel you want. A lower bounce timer setting will make the trigger more sensitive to very fast trigger pulls. A higher bounce timer setting eliminates multiple firing due to kick. Trigger bounce is illegal, so this value should be high enough that there are no shots fired due to bounce.**

**Q: Does ECS work on vision boards?**

**A: Yes.**

**Q: How much does ECS cost?**

**A: ECS is an open source project, and it will be free to download.**

**Q: Is ECS tournament legal?**

**A: ECS is not legal in PSP or NPPL events. Semi only ECS should be legal in other tournaments.**

## **10. How to Contact Me**

**If you have any problems with your board, please contact me. Please report any bugs you find so I can fix them in a future release. If you have a suggestion for a feature you'd like included in the next release, let me know. If you are unsatisfied with your board, please contact me and I will restore the board to the factory software.**

**I can be reached via email at [enhancedcricket@hotmail.com](mailto:enhancedcricket@hotmail.com).**