VAPORWORKS
Chaos Entropy Board

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Introduction

Thank you for purchasing an Entropy Board from Vaporworks! This marker will fit any pre-2k4 Intimidator as a direct replacement for the stock board. Assembly is fairly straightforward and easy. However we ask that if you are not familiar with disassembly of your marker, to please have it installed by a professional. We are not responsible for damage done by improper installation.

Liability

By using this product you hereby release Vaporworks, Paintball Trader Inc from any liability from use of this product.

Section 1 - Installation instructions

1. First, configure your entropy board's operating mode Jumpers. JP1is tourney lock jumper. With this jumper installed, mode will be locked in semi, debounce will be locked at max, and certain settings will be disabled.

2. Next, remove the four screws holding the left grip panel in place. Unscrew the single screw holding the stock circuit board in place, unplug the stock wiring harness, and remove the board. You may wish to keep this board in a safe place for later use.

3. Install the LCD cable by sliding it into the ZIF socket and clamping the socket

4. Install the 14- and 12-pin sockets

5. Place the board in the grip frame and install the screw. The Entropy was designed with traces kept far away from the installation area, so an isolating o-ring is not a necessity.

6. Reinstall the grip cover, and you are finished.

Section 2a: General Operation

Generally speaking, the Entropy board does essentially exactly what the stock board does – it controls all aspects of a marker to propel a paintball when you pull the trigger. For most basic operations and warnings, refer to your original owner's manual. These operational instructions assume you're already familiar with basic marker operations.

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Section 2b: Trigger Programming & description of settings

For markers not equipped with LCD display screens, the trigger programming option will allow you to change all relevant settings for your marker. To change settings with the Entropy board, remove the "Tourney Lock" jumper, and then follow the guidelines below. With the tourney lock in place, no settings will be changeable from the trigger, and the board will always use Semi Auto with the highest debounce settings.

To initiate trigger programming, turn the marker off, pull the trigger, hold it in, and turn the marker on again. The LED will blink once, pause, blink twice, pause, etc. Release the trigger as the LED is blinking the number of times that corresponds to the setting you wish to change. See section 3b for a quick reference to settings; following is a detailed listing with definitions.

1 – Presets – These are whole sets of settings, making initial configuration much easier.
2 – Mode – Firing mode; controls the way the marker responds to trigger pulls.
3 – ROF – Controls how fast the marker fires.
4 – Dwell – Controls how long the solenoid is kept 'on' – affects consistency and efficiency.
5 – Debounce – Controls the way the board filters out trigger 'noise'; can allow for extra pulls.
6 - After-ball delay – controls the length of time after a ball is visible before the marker is fired.
7 - eye timer mode – Controls whether the marker will fire or not after the eye's default timer runs out.
8 – SCOPE mode – Controls whether the marker re-tests the eye condition after a ball is loaded.

When you release the trigger, the LED will turn off, signifying that the marker will now let you change that setting. As soon as you are ready to change the setting, pull the trigger again. The trigger will blink in the same pattern. Simply release the trigger when the LED blinks correspond to the setting you want for that option. Tables for each option follow. The presets are the quickest and easiest way to get the board up and running. After you select a preset, you can go back and change specific settings from there. Example: Select preset 4, then you may go back and raise the ROF to unlimited and all other settings will remain the same.

Presets
1 - Conservative (Semi, 13bps, Dwell of 10ms, debounce 7, 6ms AE Delay, Drop shot after timer) – Most likely to work in most situations.
2 - Normal (Semi, 14bps, Dwell of 8ms, debounce 7, 5ms AE Delay, Drop shot after timer) – A bit faster, should usually work, though.
3 - Fast (Semi, 16bps, Dwell of 8ms, debounce 7, 4ms AE Delay, Drop shot after timer) – Expects a bit faster hopper.
4 - Extreme (Semi, 18bps, Dwell of 6ms, debounce 5, 4ms AE Delay, Drop shot after timer) – Expects a halo.

MODE
1 – Semi – One shot, one pull. The only mode allowed in most tourneys and on most fields for that matter.
2 – Turbo – Alternating one shot, two shot.
3 – Auto response – One shot per pull, and one shot per release.
4 - Full Auto – Will continue firing at the maximum rate of fire until trigger is released.

ROF
Rate of fire ranges from 9bps to Unlimited Rof. With unlimited the markers ROF will only be limited by how fast the eye detect paint. If your hopper feeds at 25 bps, your marker will fire that fast.

DWELL
Dwell is the for forward "on" time for the solenoid. This controls how long the valve will stay open and bolt will stay forward.

Debounce
When switches close, the contacts tend to bounce apart rapidly several times before coming to rest. Filtering out the bounces is called debouncing. The lower debounce setting you use the more "switch bounce" the board will pick up.

After-Eye Delay
This is how long the board will wait after the eyes detect paint before it allows the bolt to close. It's generally better to have a longer delay so you decrease the odds of chopping paint.

EYE TIMER MODE
 Drop shot after timer – Marker will not fire unless it detects paint. This is the mode most people will want to use.
 Fire after timer – The marker will slow it's ROF to 4bps when no paint is detected.

SCOPE MODE
1 – SCOPE mode A – The marker does not check eye status after a ball has loaded
2 - SCOPE mode B – The marker checks eye status after a ball has loaded. This is the most chop proof setting.

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Section 2c: Menu operating instructions

For LCD equipped markers, the menu is the preferred method of settings changes. To operate the menu, press buttons 1 and 2 simultaneously to initiate the menu session. Button 1 changes the selected option, and button 2 changes that option. When the exit screen is the selected option, pressing button 2 will save the selections made and exit the menu. Menu options exactly reflect trigger programming options, but with a few additions (listed below): When tourney lock is on, mode, ROF, dwell, and debounce selections are locked into their previous settings (except debounce, which is set to full, and mode, which is set to semi), and one exception: presets.

Timer Mode – Selects whether the timer counts up or down
Timer Initiation – Selects what events (button, fire, or poweron) start the timer
Timer Time – Selects the starting point for the timer, if counting down
Display Section1 – Selects what is displayed in the top left of the LCD
Display Sect 1-B – Selects what is displayed in the top left of the LCD
Display Section2 – Selects what is displayed in the top left of the LCD
Display Sect 2-B – Selects what is displayed in the top left of the LCD
Operation Mode – Selects between test (see 3d) and normal mode
Achieved ROF type – Selects how achieved rate of fire is displayed

Section 2d: Semi Only Board Changes

The Entropy Semi Only option functions exactly like the standard Entropy board, but with the following changes:

1) Primarily, absolutely no enhanced modes are present in the system.
Trigger programming and menu operations will simply skip mode related options – the 'blink' numbers will stay the same either way.

Section 3a: Recommended settings
Firing Mode - Semi is always recommended

Rate of Fire - With eye, recommend maximum; otherwise, recommend setting equal to hopper capacity (Halo, 20; Egg2, 16, Egg1, 14, rev, 12)

Solenoid Dwell - 12-18ms with green/black solenoids, 6-10 with black/black

Debounce Multipl- Max multiplier is always recommended; No one has yet been able to differentiate any lag as a result of this debounce.

After-Eye Delay - For most intimidators, this can be set to between 0-3, bushmasters, 4-8 (usually).

Eye Timing Mod - Drop shot after timer is usually preferred.

Operation Mode - Standard, unless testing CPS.

S.C.O.P.E. Mode – Scope B.

Achieved ROF Tp- Whatever you prefer.

Section 3b: Test Mode

The CPS test mode is set up to allow for the capacity of the marker used to be measured for tuning purposes. To test, set the marker to full auto, unlimited bps, eye enabled, 0ms after-eye delay, whatever is normal for your dwell, , with air, but with NO PAINT – the use of this mode with paint will be quite nasty! Set one of your display modes to be ROF achieved – I prefer maximum achieved – and rip, see what you get. Tune, test, tune, test, you get the picture.

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Section 3c: Trigger programming structure

1 - Presets
2 - Mode
3 - ROF
4 - Dwell
5 - Debounce
6 - After-eye delay (& forced eye bypass)
7 - eye timer mode

SETTINGS in each option:

1 Blink	2Blinks	3 Blinks	4 Blinks
Presets	**MODE**	**ROF**	**DWELL**
1 - Conservative (Semi, 13bps, Dwell of 10ms, debounce 7, 6ms AE Delay, Drop shot after timer)	1 - Semi	1 - 20/UL	1 - 6
	2 - Turbo	2 - 18	2 - 8
2 - Normal (Semi, 14bps, Dwell of 8ms, debounce 7, 5ms AE Delay, Drop shot after timer)	3 - Autoresponse	3 - 16	3 - 10
	4 - Full Auto	4 - 14	4 - 12
		5 - 13	5 - 14
3 - Fast (Semi, 16bps, Dwell of 8ms, debounce 7, 4ms AE Delay, Drop shot after timer)		6 - 12	6 - 16
		7 - 10	7 - 18
4 - Extreme (Semi, 18bps, Dwell of 6ms, debounce 5, 4ms AE Delay, Drop shot after timer)		8 - 9	8 - 20

5 Blinks	6 Blinks	7 Blinks	8 Blinks
Debounce	**After-Eye Delay**	**EYE TIMER MODE**	**SCOPE MODE**
1 - 1 (very fast debounce return, meaning likely bounce shots)	1 - eye bypassed	1 - Drop shot after timer	1 – SCOPE mode A – The marker does not check eye status after a ball has loaded
2 - 2	2 - 0	2 - Fire after timer	
3 - 3	3 - 1		
4 - 4	4 - 2		2 - SCOPE mode B – The marker checks eye status after a ball has loaded
5 - 5	5 - 3		
6 - 6	6 - 4		
7 - 7	7 – 5		
8 - 8 (extremely slow debounce return, should eliminate any bounce shots)	8 - 6		