# VIRTUE
## ION™ BOARD
## MANUAL

**www.virtuepaintball.com**

*Upgrade the Engine*

*Virtue Paintball*

*Virtue Paintball*

#### What the pros say about their Virtue boards...

*"My gun has never shot so fast and consistent. I love Virtue."*
**- Ollie Lang, Ironmen**

*"If you're serious about improving your game you gotta get some Virtue in your gun."*
**- Nicky Vegas, XSV**

*"Virtue is always one step above the competition."*
**- Pete "Mr. U" Utschig, Ironmen**

shown w/ optional Virtue Laser Eye Board (pg 13.)

1. **Smoother Shooting:** Virtue will shoot the most consistent, smoothest streams of paint with ease.

2. **Easy Trigger Programming:** Change modes and settings through the trigger without opening the grip.

3. **Enhanced Trigger Sensitivity:** Virtue Logic scans the trigger thousands of times every second, ensuring each pull is registered so you can shoot faster than ever.

4. **Advanced Eye Logic:** Virtue Logic upgrades the firing system in your paintball gun to ensure your marker never chops paint again.

5. **Fully Adjustable Ramping:** Virtue's Ramp mode is limitless.You control exactly when your gun starts ramping once you pull the trigger at a specified rate (5bps – 15bps), and exactly how much it will ramp by (10-200% or Unlimited).

6. **More Modes:** Virtue has 7 base modes of fire, but don't let the number 7 fool you. Unlike other boards that give you a fixed number of preset modes to choose from, each of Virtue's modes can be customized to your settings. There are literally thousands of modes to choose from.

7. **Complete Control:** All the settings on Virtue are fully adjustable, giving you complete control over your gun: Adjustable Debounce, Mechanical Bounce, Dwell, Eye Delay, Anti Bolt Stick (First Shot Drop off), Ramp Activation Speed, Ramp Percentage, and Max Rate of Fire.

8. **Quality Control:** Virtue hand tests each and every board before it leaves the factory, ensuring you'll have a reliable, working board.

9. **Superior Customer Support:** Virtue doesn't hide from its customers. You can contact Virtue's office by phone or email 6 days a week. Never be forced to wait several days just to get a quick question answered!

10. **Lifetime Warranty & Lifetime Upgrades:** Virtue is the only upgrade board guaranteed for life.

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The Virtue Ion board is the most advanced upgrade in paintball that easily installs in minutes. Virtue will dramatically increase the performance of your gun.

Barrels, bolts, triggers...the same old upgrades, using the same old technology. Virtue is the only upgrade that actually replaces your gun's engine, improving **performance at every level**. Virtue upgrades the engine of your paintball gun.

Virtue's advanced trigger and eye logic ensure your marker will be the fastest on the field, while never breaking a ball, even in straight semi-auto. Virtue's fully adjustable modes, place virtually an infinite number of firing capabilities at your finger tips.

- Simple trigger programming with ultra bright multi-color LED; never open the grips again!
- Instant on. "Bam, it's on!" Just tap the on/off button and your Ion turns on right away.
- Thousands of ramp & other fully adjustable modes
- Advanced Virtue eye & trigger Logic.
- Adjustable debounce & mechanical bounce (AMB).
- Adjustable dwell, eye sensitivity, anti-bolt stick.
- Adjustable ramp percentage & activation speed.
- Low battery indicator and power efficient software.
- Fully adjustable, unlimited, Max Rate of Fire.
- 100% legal (NPPL, PSP, NXL, CFOA, Millennium)
- 15 BPS ready
- Forced shot feature - hold in the trigger for 1 second to "force" the gun to fire with no ball in the breach and the eyes on.
- Installs in minutes. No soldering required.
- Brighter multicolor LED
- Power saving 10 minute idle auto shutoff
- Membrane switch ready. Easily install a Dye or Virtue membrane power and eye button on the back of the grip frame.
- Future upgradeable
- Lifetime FREE software upgrades
- LIFETIME WARRANTY
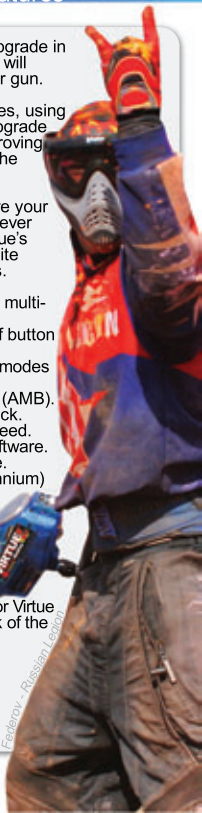
**Please see VirtuePaintball.com for a detailed installation video.**

## Stock Board Removal

1. Unscrew the left Ion grip (the side w/ the power button), and remove the battery.
2. Remove the 2 grip frame screws (1/8" Allen key), and the body flat cap screw (located above the regulator, underneath the barrel), and separate the Ion body from the Ion grip frame.
3. Unscrew the front banjo fitting (just above the regulator/fore grip), from the grip frame and carefully slide the Ion body with board and fittings attached out from the Ion frame.
4. Unplug the Vision Eye cable from the stock Ion board.
5. Unplug the small microline hose from the banjo fitting mounted to the Ion body, next to the Vision Eye, by pushing the grey part of the fitting, and pulling on the hose.
6. Remove the U shaped metal collar from the back of the Ion solenoid. No tools required; you may need to wiggle it for it to come off.
7. Remove the stock solenoid from the T-shaped solenoid head fitting, which will completely disconnect your stock board and solenoid from the Ion.
8. Set aside the stock piston/armature, which was located inside the stock solenoid.

## Virtue Board Installation

1. Plug the microline hose that is connected to the small nipple on your Virtue board into the banjo fitting mounted on the Ion body, just behind the Vision Eye.
2. Take the piston/armature, which you removed from the stock solenoid, and place it inside your Virtue board's solenoid, with the small black dot facing up.
3. Plug the Virtue board's solenoid into the T-shaped solenoid head fitting.
4. Reinstall the stock U shaped solenoid bracket onto your Virtue board's solenoid with the curved portion facing away from the Ion body.
5. Plug the Vision Eye cable into the Virtue Ion board.
6. Carefully slide the Ion body and Virtue board assembly into the grip frame (There are notches in the frame to slide the board through). Be careful not to damage the power or tournament lock buttons.
7. Screw the front banjo fitting back into the front of the Ion grip frame.
8. Screw the grip frame back to the body.
9. Connect the battery, and re-install the grips.

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## Tournament Lock

Toggle the tournament lock on and off by pressing the bottom button on the Virtue Ion Board. The tournament lock status will toggle from unlocked (LED flashes green ) to locked (LED flashes red). **If you use a membrane adapter (pg 12), you must disconnect the membrane plug cable from the board before toggling the tournament lock on and off.**

## Programming Mode

To program the Virtue Ion Board, hold down the trigger and turn the marker on. As the multicolor LED begins to cycle through a rainbow of colors, release the trigger. The LED will stop on purple, indicating you are now in the first programming setting; Firing mode.

Tapping the trigger will then toggle through the different programming settings:

| Program Settings | Color |
|---|---|
| Firing Mode (pg 7)................................Purple |
| Debounce (pg 8).....................................Green |
| Ramp Activation Speed (pg 8)...................Blue |
| Ramp Percentage (pg 9)..........................White |
| Dwell (pg 9)..............................................Red |
| Eye Delay (pg 10)......................................Teal |
| **Anti-Mechanical Bounce** (pg 10)............Yellow |
| Anti-Bolt Stick (pg 11)..............Flickering Green |
| Max Rate of Fire (pg 11).............Flickering Red |

*Ollie Lang - Ironmen*

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## LED Indicator

To the right of the Ion Power button there is a multicolor LED which tells you the status of your marker.

Solid Blue.................Eye Enabled / Ball in Breech
Solid Red............Eye Enabled / No Ball in Breech
Flashing Red................................Eyes Disabled
Flashing Blue.............................Eye Malfunction
Yellow – During startup......................Low Battery

## Power Operation

The Virtue Ion Board uses **Instant On** technology. Simply tap the power button, and the marker instantly turns on and is ready to fire. When the marker is turned on, the eyes are automatically enabled. To turn the marker off at any time, press the power button for 2 seconds.

## Eye Operation

When the marker is turned on the eye system is automatically enabled. The eyes can be turned off by pressing the power button for 1 second. When the eyes are disabled, the LED will begin flashing red.

## Eye Malfunction

The eye logic differentiates between a ball being fired, and something continually blocking the eye (like your finger). If the eye becomes blocked (by paint or other residue), the LED will flash blue, indicating an eye malfunction, and the rate of fire will be reduced to prevent chopping. When the object blocking the eyes is removed the eye will automatically return to normal mode.

*Nicky Vegas - XSV*

## Firing Mode: Purple - Values 1-7 (Default 1)

If you want to change firing modes first determine the number of the firing mode you want to change to:

**1. Semi Auto:** 1 trigger pull equals 1 shot.

**2. PSP Ramping:** First 3 shots are Semi Auto. The 4th shot shoots 3 shots per pull at your "Max Rate of Fire". Let go of the trigger for 1 second and the 3 shot Semi Auto count restarts.

**3. NXL Style Full Auto:** First 3 shots are Semi Auto. The 4th shot you hold down the trigger and the marker shoots full auto at your "Max Rate of Fire". Let go of the trigger for 1 second and the 3 shot Semi Auto count restarts.

**4. Ramp Mode:** When you reach the "Ramp Activation Speed" the marker will ramp the rate of fire by your "Ramp Percentage" setting, up to your "Max Rate of Fire". The default is when your trigger speed reaches 5bps, the marker will ramp up to the maximum speed your loader can feed.

**5. Auto Response:** Two shots per pull. One shot on the pull, and one shot on the release of the trigger.

**6. Full Auto:** Hold down the trigger and fire at your "Max Rate of Fire".

**7. Breakout Mode:** Turn the gun on and the first shot shoots full auto as long as you hold the trigger. Release the trigger and the gun goes in "Ramp Mode". Restart your marker when in this mode to repeat the Breakout function.

Then, remembering the number of the firing mode you want to change to (semi is 1, psp is 2, nxl is 3, etc) do the following steps:

1. With the marker off, and tournament lock off, hold the trigger and turn the marker on. Release the trigger once the marker turns on.
2. The LED will cycle through a rainbow of colors and stop on purple.
3. Pull and hold the trigger until the LED flashes (default is semi auto, so the LED will flash once).
4. When the LED stops flashing, tap the trigger the number of times of the desired mode (semi is 1 tap, psp is 2 taps, nxl is 3 taps, etc).
5. The LED will flash the number of taps you entered, then flash the rainbow of colors, and stop on purple, indicating the new value has been set and you are now in the new firing mode.
6. To exit programming mode, shut the marker off.

## Debounce: Green - Values 1-30 (Default 5)

Debounce is the amount of time the trigger has to be released before the next trigger pull is registered. Virtue's advanced debounce algorithm, ensures every pull is registered giving the highest possible rate of fire. Values range from 1-30 (milliseconds) with the default set to 5.

1. With the marker off, and tournament lock off, hold the trigger and turn the marker on. Release the trigger once the marker turns on.
2. The LED will cycle through a rainbow of colors and stop on purple.
3. Tap the trigger once until it stops on green for Debounce.
4. Pull and hold the trigger until the LED flashes the number of times the current Debounce is set to.
5. When the LED stops flashing, tap the trigger the number of times of the desired debounce (1-30).
6. The LED will flash the number of taps you entered, then flash the rainbow of colors, and stop on green. The new value has been set.
7. To exit programming mode, shut the marker off.

## Ramp Activation Speed: Blue - Values 5-15 (Default 5)

The Ramp Activation Speed only affects Firing Modes 4 and 7 (Ramp and Breakout Mode). The default setting is 5. So pulling the trigger @ 5bps, activates ramping, and adds the percentage set in the "Ramp Percentage" setting (pg 9). Values are equivalent to balls per second. For example, 5 = 5bps; 10 = 10bps, etc.

1. With the marker off, and tournament lock off, hold the trigger and turn the marker on. Release the trigger once the marker turns on.
2. The LED will cycle through a rainbow of colors and stop on purple.
3. Tap the trigger until it stops on blue for Ramp Activation Speed.
4. Pull and hold the trigger until the LED flashes the number of times the current Ramp Activation Speed is set to.
5. When the LED stops flashing, tap the trigger the number of times of the desired Ramp Activation Speed in balls per second (5-15).
6. The LED will flash the number of taps you entered, then flash the rainbow of colors, and stop on blue. The new value has been set.
7. To exit programming mode, shut the marker off.

*"Virtue is the best upgrade you can do to your gun. So easy to program, and the rate of fire and eye logic are the best"*
**- Alex Lundqvist, Russian Legion**

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## Ramp Percentage: White - Values 1-21 (Default 1)

Ramp Percentage only affects Firing Modes 4 and 7 (Ramp and Breakout Mode). The default is 1, which shoots as fast as your loader can feed once you reach the Ramp Activation Speed (pg 8).

| Value | Percentage | Value | Percentage | Value | Percentage |
|-------|-----------|-------|-----------|-------|-----------|
| 1 | Max Loader | 8 | 40% | 15 | 75% |
| 2 | 10% | 9 | 45% | 16 | 80% |
| 3 | 15% | 10 | 50% | 17 | 85% |
| 4 | 20% | 11 | 55% | 18 | 90% |
| 5 | 25% | 12 | 60% | 19 | 95% |
| 6 | 30% | 13 | 65% | 20 | 100% |
| 7 | 35% | 14 | 70% | 21 | 200% |

1. With the marker off, and tournament lock off, hold the trigger and turn the marker on. Release the trigger once the marker turns on.
2. The LED will cycle through a rainbow of colors and stop on purple.
3. Tap the trigger until it stops on white for Ramp Percentage.
4. Pull and hold the trigger until the LED flashes the number of times the current Ramp Percentage is set to.
5. When the LED stops flashing, tap the trigger the number of times of the desired Ramp Percentage (1-21, see table above).
6. The LED will flash the number of taps you entered, then flash the rainbow of colors, and stop on white. The new value has been set.
7. To exit programming mode, shut the marker off.

## Dwell: Red - Values 5-50 (Default 30)

Dwell is the time the solenoid will be activated. Values range from 5 – 50 milliseconds. Too low of a dwell will lead to inconsistent velocities and drop off. Too high of a dwell will result in poor air efficiency. If using a Quick Exhaust Valve (QEV), lower your dwell to 12 – 16 ms to get better efficiency and a higher rate of fire.

1. With the marker off, and tournament lock off, hold the trigger and turn the marker on. Release the trigger once the marker turns on.
2. The LED will cycle through a rainbow of colors and stop on purple.
3. Tap the trigger until it stops on red for Dwell.
4. Pull and hold the trigger until the LED flashes the number of times the current Dwell is set to.
5. When the LED stops flashing, tap the trigger the number of times of the desired Dwell (5-50, default 30)
6. The LED will flash the number of taps you entered, then flash the rainbow of colors, and stop on red. The new value has been set.
7. To exit programming mode, shut the marker off.

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## Eye Delay: Teal - Values 1-50 (Default 5)

The Eye Delay setting adds a small delay after the eye has seen a ball before it allows the marker to shoot. Players using non-force fed loaders may need to raise this setting to prevent chopping. The default setting is 5, with 1 being the fastest (No delay).

1. With the marker off, and tournament lock off, hold the trigger and turn the marker on. Release the trigger once the marker turns on.
2. The LED will cycle through a rainbow of colors and stop on purple.
3. Tap the trigger until it stops on teal for Eye Delay.
4. Pull and hold the trigger until the LED flashes the number of times the current Eye Delay is set to.
5. When the LED stops flashing, tap the trigger the number of times of the desired eye delay (1-50, default 5ms).
6. The LED will flash the number of taps you entered, then flash the rainbow of colors, and stop on teal. The new value has been set.
7. To exit programming mode, shut the marker off.

## Anti Mechanical Bounce: Yellow - Values 1-10 (Default 3)

Anti-Mechanical Bounce (AMB) allows you to adjust for mechanical bounce, which happens when "kick" from shooting causes the marker to fire extra shots. The default setting is 3, which is a low AMB. Settings range from 1-10 with 1 being AMB off (fastest) and 10 being slowest.

1. With the marker off, and tournament lock off, hold the trigger and turn the marker on. Release the trigger once the marker turns on.
2. The LED will cycle through a rainbow of colors and stop on purple.
3. Tap the trigger until it stops on yellow for AMB.
4. Pull and hold the trigger until the LED flashes the number of times the current AMB is set to.
5. When the LED stops flashing, tap the trigger the number of times of the desired AMB (1-10, default 3).
6. The LED will flash the number of taps you entered, then flash the rainbow of colors, and stop on yellow. The new value has been set.
7. To exit programming mode, shut the marker off.

*"Virtue takes the best products and makes them even better."*
**- Pete "Mr. U" Utschig, Ironmen**

## Anti Bolt Stick: Flickering Green - Values 1-20 (Default 6)

Anti-Bolt Stick (ABS) is the dwell time added to overcome first shot drop off. Provides for an extra 1 – 20 milliseconds of dwell.

1. With the marker off, and tournament lock off, hold the trigger and turn the marker on. Release the trigger once the marker turns on.
2. The LED will cycle through a rainbow of colors and stop on purple.
3. Tap the trigger until it stops on flickering green for ABS.
4. **Pull and hold the trigger until the LED flashes the number of times** the ABS currently is set to.
5. When the LED stops flashing, tap the trigger the number of times of the desired ABS (1-20, default 6).
6. The LED will flash the number of taps you entered, then flash the rainbow of colors, and stop on flashing green. The new value is set.
7. To exit programming mode, shut the marker off.

## Max Rate of Fire: Flickering Red - Values 1-22 (Default 15)

The max rate of fire applies to all modes of fire and is adjustable from 10.5bps to unlimited. The default setting is 15, which is 17bps.

| Value | BPS | Value | BPS | Value | BPS |
|-------|-----------|-------|-------|-------|-------|
| 1 | Unlimited | 8 | 13.50 | 15 | 17.00 |
| 2 | 10.5 | 9 | 14.00 | 16 | 17.50 |
| 3 | 11.00 | 10 | 14.50 | 17 | 18.00 |
| 4 | 11.50 | 11 | 15.00 | 18 | 18.50 |
| 5 | 12.00 | 12 | 15.50 | 19 | 19.00 |
| 6 | 12.50 | 13 | 16.00 | 20 | 20.00 |
| 7 | 13.00 | 14 | 16.50 | 21 | 21.00 |
| | | | | 22 | 22.00 |

1. With the marker off, and tournament lock off, hold the trigger and turn the marker on. Release the trigger once the marker turns on.
2. The LED will cycle through a rainbow of colors and stop on purple.
3. Tap the trigger until it stops on flickering red for Max Rate of Fire.
4. Pull and hold the trigger until the LED flashes the number of times the Max Rate of Fire is currently set to.
5. When the LED stops flashing, tap the trigger the number of times of the desired Max Rate of Fire (1-20, default 6).
6. The LED will flash the number of taps you entered, then flash the rainbow of colors, and stop on flickering red. The new value is set.
7. To exit programming mode, shut the marker off.

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## Reset to Factory Default:

1. With the marker off, and tournament lock off, hold the trigger and turn the marker on. Release the trigger once the marker turns on.
2. The LED will cycle through a rainbow of colors and stop on purple.
3. Hold down the trigger for 10 seconds until the LED turns white and cycles through the rainbow of colors indicating all settings have been reset.
4. To exit programming mode, shut the marker off.

## Optional Membrane Switch

A Virtue membrane switch offers better control of the Ions power and eyes on the back of your grip frame just like a DM5 or Intimidator.

The membrane plugs into the Virtue Ion board with the **Membrane** Adapter Wire (sold separately). No soldering required.

We recommend wrapping a piece of black electric tape over the membrane wire strip so it cannot be seen. Simply fit the membrane strip in between your grip. No cutting required.

Your Virtue Ion board now detects the membrane is installed, and will turn your Ion on and off with the power button, and turn the eyes on and off with the eye button on the membrane.

The side mounted power button will now work quicker, and will no longer control the eyes. **You must disconnect the membrane adapter wire from the board to toggle the tournament lock on and off.**

## Virtue Laser Eye Board

- Dual spectrum technology
- Infrared and visible light spectrum
- Glowing red laser eyes instantly confirm eye operation.

## Ion Quick Exhaust Valve (QEV)

- Shoot 20+ balls per second!
- Includes QEV, fitting & hose.
- Get more shots per tank fill.

## Virtue Ion EzOn Buttons

- Easy to use! Clear click felt when pushing the button.
- Replaces the stock on/off button
- Easy installation! No wiring required.
- Available in Blue, Army, Pink, Yellow, Clear/White

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## Troubleshooting tips

The Virtue Ion Board is backed by a lifetime warranty and guaranteed to be free of any defects for life. If you encounter any problems with your Ion please consult your Ion user manual first, as the problem may not be related to the Virtue Ion board.

**Tip #1 When in doubt, replace the battery! Your board and marker will behave erratically if your battery is low.**

**Won't turn on:**
Check to make sure battery connected securely.
<div align="center">OR</div>
Replace the battery.
<div align="center">OR</div>
**Check the power button is functional. Remove the** Virtue board from the Ion, install a fresh battery, and examine the power button. The power button at the top of the board needs to look and feel just like the tournament lock button at the bottom of the board.

**Won't go into programming mode:**
Make sure tournament lock is unlocked [green] (pg 6)

**Rate of fire is slow:**
Make sure you are using a fast hopper such as a HALO or VLocity with fresh batteries.
<div align="center">OR</div>
Reset your boards settings to factory default (pg 12). If using a QEV, remember to lower your dwell to 12-16ms after the reset.
<div align="center">OR</div>
**Eyes may be dirty**, damaged or blocked. Turn off eyes (pg 5) and dry fire with no paint. If marker shoots fast, your eyes are dirty or damaged, or the eye wiring harness is needs to be replaced.

**Gun will not fire (solenoid may or may not click):**
Make sure you are using a new 9 volt battery.
<div align="center">OR</div>
Reset your boards settings to factory default (pg 12). If using a QEV, remember to lower your dwell to 12-16ms after the reset.
<div align="center">OR</div>
Increase the Dwell (pg 9).

**Poor air efficiency:**
Decrease the Dwell (pg 9).

**Eyes are not working:**
Make sure eyes are on (LED should be solid blue or red).
                              OR
Disassemble the Ion and check the eye wire harness for broken or
pinched wires. You may have to replace the eye wire harness to be
absolutely certain this is not the problem.
.
**Breaking too much paint:**
Note: Is it cold out? Paint gets brittle and breaks easily in the cold.
                              OR
If **not** using a forcefeed hopper, increase the Eye Delay (pg 10).
                              OR
             Verify that the eyes are turned on (pg 5).

**Drop off:**
Replace the battery.
                              OR
Increase the Anti Bolt Stick (pg 11).
                              OR
Increase Dwell (pg  9).

**Bolt sticks forward:**
Solenoid hoses are loose, damaged or not fully connected.  Replace
damaged hoses or secure hoses properly.

**Air leaking out bottom of solenoid:**
Solenoid armature is damaged or overpressurized.  Replace arma-
ture and/or turn down the operating pressure to less then 200 psi.

**Only one side of your Virtue Laser Eye lights up:**
Only one side of the Virtue Laser eye board is supposed to light up.
One LED is the "sending" eye, and the other LED is the "receiving"
eye.


*Virtue Ion Board specifications subject to change without notice*