



## Intimidator Board Instructions

### Features

- Fully functional in 2K2 or GZ style Intimidator frames
- Includes three fire modes: uncapped semi-auto, capped semi-auto, and PSP ramping
- Continuously monitors the trigger switch throughout the entire firing cycle
- AMB algorithms help to eliminate mechanical bounce
- Power efficient software lengthens battery life
- Programming mode allows changes to debounce, dwell, loader delay, AMB, eye mode, bolt delay, fire mode, and fire mode max rate of fire
- All settings are stored in non-volatile memory so they are not lost when battery is disconnected
- One-touch startup enables the marker to fire instantly
- Delayed and forced eye mode with force shot allows the marker to be fired when the eyes are enabled but no object is present in the breech
- Low battery indicator software

### Installation

The Tadao Intimidator Board is a drop-in upgrade. Installation consists of removing the old board and putting in the new one:

1. Remove the left half of the 2K2 Intimidator frame. The stock circuit board is exposed.
2. Unscrew the bottom mounting screw.
3. Gently lift up the stock board and unplug the LCD ribbon and two wiring harnesses.
4. Reconnect the wiring harnesses to the Tadao Intimidator Board. The top 12 pin connector may need to be reversed for the eye system to function correctly. If the eye system does not work then the 12 pin connector is installed backwards.
5. Place the Tadao Intimidator Board back into the grip frame on top of the solenoid, making sure all the wires are tucked underneath the board so they are not pinched when the frame is reassembled.
6. Put the bottom board mounting screw in and tighten.
7. Reattach the left side of the grip frame.
8. Readjust the trigger set screws as necessary.

### LED Indicator

The multi-color LED that shines out the grip frame shows which mode of operation the marker is currently in:

Rapid Blinking Red	At startup this indicates a low battery
Solid Green	Ball in breech, ready to fire
Solid Red	No ball in breech
Slow Blinking Green	Eye malfunction; clean eyes or make sure the gun is being fired with paint and air
Slow Blinking Red	Eyes disabled, rate of fire limited to 20 balls per second in mode 1; otherwise capped at fire mode max rate of fire for fire modes 2 and 3

### Power Operation

Sliding the power switch turns the marker on. If the battery is low, the LED will flicker red. If the battery is fine, it will show a green or red LED in the grip frame to indicate that the marker is ready to be fired. Every time the marker is turned on, the eyes are enabled. The marker can be turned off regardless of the state of the eyes. See "Battery Indicator" section for additional details.

Startup Sequence:

1. Slide power switch.
2. If battery is fine, skip this step. If low battery, LED rapidly pulses red.

3. LED lights solid red or green, depending on whether something is in the breech, ready to fire.

### Eye Operation and Logic

The eyes are enabled when the marker is first turned on. The eyes can be turned off by pushing the bolt forward and firing 5 times. If the marker is not aired up, you can also block the eyes for 5 shots in a row to turn off the eyes.

Note that the eye logic can tell the difference between paint being fired and an object constantly blocking the eyes. The eyes watch for the bolt to return every shot. If this does not happen, the LED will flash green to indicate an eye malfunction. Unblocking the eyes will cause it to revert to a solid red LED to show that the eyes are working again and the breech is empty. If the eyes are continually blocked for 5 shots in a row, the eye system will automatically disable. If you are firing the marker with paint and air, and the eye system is working, the eyes will not disable automatically since they will see the bolt returning every shot.

To determine if the eyes are working correctly, insert an object into the breech. Check to see if the LED changes from solid red to solid green and then back to solid red once the object is removed.

### Battery Indicator

The battery indicator software is standard on the Tadao Intimidator Board. When the marker is turned on, the LED may briefly flicker red to indicate a low battery, and it should be changed as soon as possible. Your battery may last for another case of paint, but it is close to failing. If the battery is fine, the software will go directly into the firing mode.

### Programming

The tournament lock must be disabled in order to change settings on the board. The tournament lock is toggled by making sure the marker is turned off, then shorting the top 2 pins on the programming connector and power cycling the maker (turning it on, then off):



To toggle the tournament lock:

1. Turn the marker off.
2. Touch the top two pins of the programming connector with a conductive object.
3. Turn on the marker while maintaining contact with the two pins.
4. The LED will blink twice either red (lock ON), or green (lock OFF).
5. Turn the marker off.

By default the tournament lock is disabled, allowing the user to change settings.

While the marker is turned off, press and hold the trigger and turn the marker on. This will initiate the programming mode, flashing through a rainbow sequence and then finally showing solid green.

Pulling and releasing the trigger quickly will toggle between the different programming modes:

Green	Debounce
Red	Dwell
Orange	Loader Delay
Flickering Green	AMB
Flickering Red	Bolt Delay
Flickering Orange	Eye Mode
Flickering Green/Orange	Fire Mode
Flickering Red/Orange	Fire Mode Max Rate of Fire

When the LED is lit for the desired setting, press and hold the trigger until the LED goes out. When you release the trigger, the LED will blink to show the current setting. For example, if the current setting for debounce is 5, the LED will blink green 5 times. Once the LED stops blinking, you have 2 seconds to begin entering the new setting.

To enter the new setting, pull the trigger the desired number of times. For example, to set the debounce to 2, you must pull the trigger 2 times. Every time you pull the trigger the LED will light. After all settings have been changed, turn the marker off, using the power button.

### Programming Example

If you want to set the dwell to 10, you should:

1. Make sure the marker is powered off and the tournament lock is disabled.
2. Push and hold the trigger and turn on the marker. The LED goes through a rainbow sequence then shows green. This is the debounce mode.
3. Quickly pull and release the trigger 1 time to switch to the dwell mode. The LED will show red.
4. Pull and HOLD the trigger until the LED turns off.
5. Release the trigger. The LED will blink out the current setting.
6. When the LED stops blinking, enter the new setting by pulling the trigger 10 times.
7. Wait until the LED turns back on, indicating programming has been completed.
8. Turn the marker off.

## Settings

**Debounce** – The Musashi software features a hybrid debounce scheme that uses microcontroller cycles to debounce the pull of the trigger and ½ ms time increments to debounce the release. This results in a very effective debounce algorithm that does not hinder the user at any setting. At low debounce settings, however, it may cause the marker to read switch bounce as additional pulls, falsely generating shots or near full automatic fire. The setting ranges from 1 to 50 and is defaulted at 10.

**Dwell** – The amount of time the solenoid is energized each time the marker is fired. The default is 10 ms. The range is from 4 to 20 ms. Too low of a dwell may lead to inconsistency or drop off. Too high of a dwell can cause bad air efficiency.

**Loader Delay** – Adds a slight delay after the eye has seen a ball and the bolt is cycled, causing the gun to fire. If not using force fed loaders, it may be necessary to increase this setting to prevent chopping. A setting of 1 means no loader delay, which is the fastest. The default is 2 and may be set from 1 to 50.

**AMB** – Allows the user to adjust the anti-mechanical bounce feature. Mechanical bounce occurs with the Alias Intimidator due to the kick generated during each shot and can cause the marker to “run away,” firing even after the trigger has been released. AMB helps stop markers from going full auto when the trigger is pulled very slowly. The default is 2 and may be set from 1 to 5 (1 being off). AMB is only used in fire modes 1 and 2 (semi-automatic unlimited and capped). In PSP mode AMB is disabled.

**Bolt Delay** – This setting determines how long the eyes are ignored after the dwell time ends. Some delay is necessary to allow the bolt to move far enough forward so the eye system does not mistake a small gap between a paintball and the bolt face for a bolt return. The default is 15 ms and may be set from 5 to 25 ms. Higher settings will reduce the maximum capable rate of fire, while lower settings may lead to skipped or blank shots because the bolt does not have enough time to block the eyes on its forward stroke.

**Eye Mode** – This setting selects the eye mode. The default is 1, which is delayed. In delayed mode the eyes will watch for a ball up to ½ second after the trigger is pulled. After ½ second the marker will fire whether or not a ball is in the breech. If set to 2, the eye mode is forced. In forced mode the marker will not fire unless a ball is present in the breech or a force shot is utilized. The user can fire a force shot by holding down the trigger for ½ second.

**Fire Mode** – Included are three different fire modes (default is 1):

1. Semi-automatic, unlimited rate of fire
2. Semi-automatic, adjustable rate of fire
3. PSP ramping, adjustable rate of fire

Setting 1 is normal semi-automatic with an unlimited rate of fire while the eyes are enabled. When the eyes are turned off, the max rate of fire is set to 20 balls per second.

Setting 2 is semi-automatic with a capped rate of fire. It limits the maximum balls per second that can be fired. The cap is set by the Max ROF setting.

Setting 3 is the PSP ramping fire mode that works as follows:

- The first 3 shots of a string are semi-automatic
- After the 4<sup>th</sup> shot the marker will add shots as long as the user continues to pull the trigger
- If the trigger is released, the marker will stop firing immediately
- If the trigger is not pulled after 1 second of release, the 3-shot semi-automatic count starts over

In normal operation, continually pulling the trigger faster than 5 to 6 pulls per second will effectively give the user full automatic at the max rate of fire. If the user stops shooting then resumes within 1 second, the marker will return to the max rate of fire. If the user stops shooting for more than 1 second, the next 3 shots will be semi-automatic. On the 4<sup>th</sup> shot it will resume a faster fire rate.

**Fire Mode Max ROF** – The maximum rate of fire setting only applies to the 2<sup>nd</sup> and 3<sup>rd</sup> fire modes. The max rate of fire is adjustable from 14 to 20 balls per second in ¼ balls per second increments. It has an unlimited setting. The default is 4, which is roughly 14.75 balls per second. Oscillator inconsistencies from chip to chip make it impossible to time perfectly, so the only true way to check rate of fire is to use a Pact Timer or ballistic chronograph. The red radar chronographs commonly found at fields are NOT reliable.

Setting	BPS	Setting	BPS	Setting	BPS
1	14.0	9	16.0	17	18.0
2	14.25	10	16.25	18	18.25
3	14.5	11	16.5	19	18.5
4	14.75	12	16.75	20	18.75
5	15.0	13	17.0	21	19.0
6	15.25	14	17.25	22	19.25
7	15.5	15	17.5	23	19.5
8	15.75	16	17.75	24	19.75
				25	20.0
				26	Unlimited w/eyes on

## Additional Features

**Force Shot (while in forced eye mode only)** – In the event the eyes are enabled, the breech is empty, and the user wants to fire a clearing shot, a force shot can be initiated by pulling and holding the trigger for ½ second. This is useful with force-fed loaders that sometimes push a ball slightly into the detents where the eyes are unable to see it. After force firing, the next ball will load, and operation will continue as normal.

**A tip for setting the debounce and AMB** – Although AMB is meant as a safety feature to stop run-away markers, it also has the unfortunate side effect of hiding bounce. To test your marker for bounce, shoot it as fast as possible with a single finger. If you have bounce, you’ll see and hear double shots for individual pulls. This means you need to turn up your debounce. The slow pull test in use by some judges is not realistic for finding guns that have the debounce set too low.

## Additional Information

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