



**"Let it rip in YOUR grip!"**

## Naughty Dogs Shocker SFT/NXT Board

### Features:

- The signature board of the Naughty Dogs team
- Runs the new Unleashed firmware customized for the Shocker SFT/Nerve
- Break Beam EYE support for the new NXT line of Shockers
- Uses a high performance 8MHz, 4K memory processor
- Extensive set of tournament and recreational firing modes with configurable mode modifiers for custom tournament and breakout modes
- Accurate peak ROF indicator reads out the maximum BPS achieved based on a moving average during a string
- Four eye modes for delayed shot, dropped shot with clearing shot, eye check bypass for full speed dry-fire testing, disabled for markers without eyes or damaged eyes
- Seven LED color palettes to choose from
- Advanced power saving logic dims indicator and eye LEDs to dramatically reduce power draw during idle periods
- Automatic shutdown timer
- Full adjustability of dwell, trigger debounce, paint delay, mechanical debounce, first shot drop-off, ROF, ROF fine adjust, bypass ROF, ramp start point, ramp level, burst count, shot modifiers, auto shutdown timer, and seven color palettes
- Power up battery level indicator with automatic low level indication
- On demand selection of bypass, ROF indicator and battery condition
- Full LED status indication of breech, trigger, battery level and ROF readings
- Automatic blocked eye detection with configurable ROF reduction and recovery
- Automatic bolt delay setting on a per shot basis

### Installation:

**First insure that the air is off**, and then refer to your markers instruction manual to put the marker in a safe, non firing condition. When removing or installing the board, user must be careful not to damage the harness wiring and/or board. If you are not comfortable with this installation, please see your nearest gun technician as NoX is not responsible for improper installation.

1. Remove the grip screws on the left side (barrel pointing Left) of the marker and unfold the grip panel out underneath the trigger frame
2. Carefully remove the battery without pulling on the battery clip wires

3. Remove pins holding (SFT)/Screws (NXT) down the board and carefully lift the board up.
4. Remove old board
5. Install the NOX board (follow your shocker manual instructions).
6. Install Battery.
  - a. Insure you are on the left side of the marker
  - b. Carefully install the battery by keep the battery as flat as possible.
  - c. When installing the battery it's a tight fit (to insure the battery doesn't move around).
  - d. Make sure you don't FORCE the battery in by Over flexing the NOX board.
  - e. Please refer to [www.buynox.com](http://www.buynox.com) for detailed battery installation

### Power Switch Functions

1. **Power up marker:** Briefly press power push button (instant on, ready to fire)
2. **Power down marker:** Press and hold power push button until LED dims and then turns off (about two seconds)
3. **Read peak ROF:** With tourney lock **disabled**, the peak ROF of the last string may be read out in blinks by briefly pressing the power push button.
4. **Check battery status:** With the tourney lock **enabled**, the current battery status may be read out by briefly pressing the power push button.
5. **Bypass paint check (dry firing):** To bypass the breech paint checking for dry firing, press and hold the power push button until the LED dims (about 1 second) and then release. The power LED and the grip LED will change their blink pattern to indicate the paint check has been bypassed. Repeat procedure to re enable breech paint checking. Even when bypassed, the eyes remain active and will read the bolt return and detect continuously blocked eyes.

### Push Button LED Indicator

Empty Breech:	Blinking
Ball in Breech:	Steady
Eye Check Bypassed:	Steady/Flashing
Eyes Faulted:	Steady/Rapid flashing

### Grip LED Status Indicator (default palette)

Empty Breech:	Blinking Blue
Ball in Breech:	Solid Blue
Eye Check Bypassed:	Alternating Blue/White
Eyes Faulted:	Alternating Blue/Yellow
Eyes Disabled:	Alternating Blue/Red
Trigger Pulled:	Solid Green
ROF Count:	Blinking Green
Good Battery:	Pulsing Green
Fair Battery:	Pulsing Yellow
Poor Battery:	Pulsing Red

## Power Management

The chip continuously monitors the idle time and automatically dims both status LEDs to 1/4 power and pulses the eye LED after three seconds of idle time and further dims the status LEDs to 1/16 power after ten seconds of idle time. Pulling the trigger instantly restores all LEDs to full brightness and resets the timer. After the configured shutdown idle time has passed, the board will automatically power down.

## Battery Monitor

The battery condition may be read out at power up, on demand by pressing the power push button with the tourney lock enabled, or if a low battery condition is detected during operation. The status LED will blink rapidly in Green for a good battery, Yellow for a low battery and Red for an exhausted battery. If the battery becomes exhausted, the status LED will automatically blink Red on a ten second interval and the battery must be replaced as soon as possible to insure correct electrical operation of the marker.

## Bolt Delay Monitor

The Bolt Delay is automatically calculated on a per shot basis and adapts to the actual bolt cycle speed to insure the delay is correct for all marker and lubrication conditions. The bolt delay is used to mask the false bolt return seen when the bolt pushes the ball past the eyes.

## Eye Fault Detection

The board monitors the bolt return on a per shot basis and if the bolt return is not seen within a reasonable period of time, the eye status will automatically change to faulted and the ROF will be adjusted to the configured Bypass ROF. This is used to reduce further chopping when the eyes have become paint blocked from a breech chop. Should the eyes clear from continued firing or being swabbed, the eye status will automatically return to good and the ROF setting will return to normal. It should be noted that when dry-firing without air, the breech needs to be clear of paint and the bolt retracted to run the solenoid at full speed.

## ROF Monitor

The peak ROF attained for a string of six or more shots is continuously calculated based on a moving average. To read out the peak ROF for the last string, briefly press the power push button with the tourney lock disabled. The ROF count will blink out on the grip status LED.

## Tournament Lock

The tournament lock is toggled by pressing the small, side mounted push button on the top of board. The grip LED will indicate green for unlocked (default), red for locked. When unlocked, the board can be programmed without opening the grips.

## Enter Programming Mode

1. Make sure tournament lock is off
2. Make sure marker is powered off
3. Hold trigger in and turn on marker by sliding the power switch on until LED goes on and then off again after two seconds, then release trigger
4. LED will turn red indicating the top level menu selection for Firing Mode

## Restore Factory Default Settings

1. Make sure tournament lock is off
2. Make sure marker is powered off
3. Hold trigger in and turn on marker by sliding the power switch on until LED goes on and then off again, continue to hold the trigger in until LED indicates white after ten seconds, then release trigger.
4. LED will turn Red indicating the top level menu selection for Firing Mode.  
All settings will be at their factory default values.

## Menu Navigation

To navigate the top level menu after entering programming mode, use short pulls to advance to the next selection. The color will change and the status LED will blink out the menu selection number. The menu will start over after the last selection. It is not necessary to wait for the blinking in order to advance to the next selection or to view/change a selection.

1. Firing Mode (red)
2. Eye Mode (white)
3. Dwell (blue)
4. Adaptive Trigger Debounce (yellow)
5. Loader Debounce (purple)
6. Mechanical Debounce (green)
7. Drop-off Adjustment (red)
8. ROF (white)
9. ROF Fine Adjust (blue)
10. Bypass ROF (yellow)
11. Ramp Point (purple)
12. Ramp Level (green)
13. Burst Count (red)
14. Mode Modifier (white)
15. Shutdown Timer (blue)
16. Color Palette (yellow)
17. Eye Mode (Purple)

## Viewing a Menu Selection

When in programming mode, advance to the desired menu item and hold in the trigger until the status LED changes to teal and then release the trigger. The LED will blink out the current setting and return to the top level menu color for the current selection.

## Changing a Menu Selection

When in programming mode, advance to the desired menu item and hold in the trigger until status LED changes to teal and then turns off after two seconds, now release the trigger. The LED will blink out the minimum setting in red and then turn off. You now have two seconds to begin adding counts to the minimum setting using short pulls until the desired count is reached. The LED will blink red each time the trigger is pulled. Two seconds after the last pull is registered, the LED will blink out the new setting in teal and return to the top level menu color for the current selection. The new setting has now been stored into the processor and will be remembered the next time the marker is powered up.

## Exiting Programming Mode

To exit programming mode, turn off the marker by sliding the power switch to off. The next time the marker is powered up, the new settings will be read in and take effect.

## Programming Example 1

For this example, you will change the Dwell setting to 12 ms.

1. Enter programming mode
2. Pull the trigger two times to advance to the Dwell menu (blue, three blinks)
3. Hold trigger until LED turns teal and then goes off, then release trigger
4. LED will blink four times in red to indicate the minimum setting of 4 ms
5. Pull the trigger eight times to add to the minimum setting and wait for the LED to blink out the new setting of 12 ms in teal and then return to the Dwell menu in blue
6. The Dwell setting has been changed and you may now change other settings or exit programming mode

## Programming Example 2

For this example, you will change the Mechanical Debounce setting to zero.

1. Enter programming mode
2. Pull the trigger five times to advance to the Mechanical Debounce menu (green, six blinks)
3. Hold trigger until LED turns teal and then goes off, then release trigger
4. The LED will not blink in red at all to indicate a minimum setting of zero
5. Do not pull trigger to stay at zero and wait for the return to the Mechanical Debounce menu in green after about two seconds
6. The Mechanical Debounce setting has been changed and you may now change other settings or exit programming mode

## Programming Example 3

For this example, you will design a custom firing mode based on the Auto Response firing mode with a breakout feature, a three shot semi requirement and a maximum ROF of 14.75 bps. After power up, this mode will provide the first three shots in semi, the fourth shot in full auto and then enter Auto Response mode. After one second of idle time, the three shots in semi will repeat but the full auto shot will not be repeated.

1. Enter programming mode
2. Program Firing Mode to Auto Response (mode 8)
3. Program ROF to (14)
4. Program ROF Fine to (3)
5. Program Mode Modifier to Three-Shot-Auto (mode 4)
6. Exit programming mode

## Programming Example 4

This example is just for fun and will show how to max out the solenoid. Do not run in this mode for more than a few seconds total. NoX is not responsible for abuse of this mode and any resulting damage to your solenoid.

1. Enter programming mode
2. Program Firing Mode to NXL (mode 3)
3. Program Dwell to 4 ms (minimum setting)
4. Program Loader Debounce to 0 ms (minimum setting)
5. Program ROF to (26, unlimited)

6. Exit programming mode

7. Power up marker and bypass Paint Check with trigger
8. Count blinks on ROF Indicator

## Firing Mode Options

1. Tournament Semi Automatic Unlimited  
This mode delivers one ball per pull with no ROF cap. Mode Modifiers and ROF settings are not applied.
2. Tournament Capped Semi Automatic  
This mode delivers one ball per pull capped at the ROF setting. Mode Modifiers are not applied.
3. Tournament PSP 3 Ball Burst  
This mode delivers the first three balls in Capped Semi Automatic mode, then on the fourth pull delivers three balls per pull capped at the ROF setting. After one second of idle time, the pattern repeats. Mode Modifiers are not applied.
4. Tournament NXL Full Auto  
This mode delivers the first three balls in Capped Semi Automatic mode, then on the fourth pull enters Full Automatic Mode. After one second of idle time, the pattern repeats. Mode Modifiers are not applied.
5. Tournament Millennium  
This mode delivers the first three balls in Capped Semi Automatic mode, then as soon as the pull rate reaches the Ramp Point setting, the ROF ramps straight to the full ROF setting. Any time the pull rate drops below the Ramp Point Setting, the ramp is turned off. After one second of idle time, the pattern repeats. Mode Modifiers are not applied.
6. Semi Automatic  
This mode delivers one ball per pull with no ROF cap. Mode Modifiers are applied.
7. Capped Semi Automatic  
This mode delivers one ball per pull capped at the ROF setting. Mode Modifiers are applied.
8. Auto Response  
This mode delivers one ball on the pull and one ball on the release capped at the ROF setting. Mode Modifiers are applied.
9. Burst  
This mode delivers the number of balls in the Burst setting on each pull capped at the ROF setting. Mode Modifiers are applied.
10. Full Auto  
This mode delivers a continuous stream of balls as long as the trigger is held down capped at the ROF setting. Mode Modifiers are applied.
11. Step Ramp  
As soon as the pull rate reaches the Ramp Point setting, the ROF ramps straight to the full ROF setting. Any time the pull rate drops below the Ramp Point Setting, the ramp is turned off. Mode Modifiers are applied.
12. Linear Ramp  
This mode offers the greatest level of adjustability and performance and uses three settings to control its behavior. As soon as the pull rate reaches the Ramp Point setting, the ROF is scaled by the Ramp Level Setting until the ROF setting is met. Any time the pull rate drops below the Ramp Point Setting, the ramp is turned off. Mode Modifiers are applied.
13. Training

This mode allows three uncapped semi shots to be fired and then pauses until one second of idle time has passed and repeats the pattern. This mode is intended to be used in team practice to teach good shooting skills and conserve paint.

## Eye Mode Options

1. Delayed Shot  
This mode will wait up to 1/2 second for a ball to drop into the breech before proceeding with a shot.
2. Dropped Shot  
This mode will wait up to 1/2 second for a ball to drop into the breech before dropping a shot with an empty breech. If the trigger is held during this wait time, the shot will proceed as if in Delayed Shot mode.
3. Eye Check Bypassed  
This mode bypasses the ball in breech check and allows the shot to take place immediately for dry-firing. The eyes are still active in this mode and the bolt return is used the same way it is with a normal shot sequence. The eyes will still fault if the breech is blocked during the shot. This mode closely simulates a normal shot sequence and can be used to tune the marker.
4. Eyes Disabled  
This mode completely ignores the eyes and fires the shot immediately. The ROF is limited to a maximum setting of 20 BPS in this mode.

## Dwell Options

The dwell setting determines the amount of time the solenoid is energized during a shot. The value can be set between 4-25 milliseconds.

## Adaptive Trigger Debounce

This setting removes the electrical noise from the micro-switch and prevents bounce from registering as intended shots. The algorithm used adapts to the actual amount of switch noise on a per pull basis and allows for shorter debounce times than a typical timer based approach. This results in a much more responsive trigger. The value can be set between 1-15 and is not in milliseconds.

## Loader Debounce

This setting is the amount of delay time used after a ball is detected in the breech until the shot may proceed. This allows the ball to settle in place and helps prevent chops. The setting is dependant on both the loader type and the eye type.

Force Fed/Reflective eye	8-10ms
Force Fed/Break beam eye	3-5ms
Gravity Fed/Reflective eye	15-18ms
Gravity Fed/Break beam eye	13-16ms

## Mechanical Debounce

This setting helps remove unwanted trigger pulls caused by the mechanical movement of the marker against the trigger during the bolt cycle. This setting will reduce trigger responsiveness and should be set as low as possible. The best approach to mechanical debounce issues is to use a heavier switch or trigger pull and a deeper activation point. The value can be set between 0-10 and is not in milliseconds.

## Drop-off Adjustment

This setting is the amount of additional dwell time applied to a shot when the marker has been idle for 20 or more seconds. This is used to help reduce first shot drop-off. This setting can result in high velocity shots and should be set as low as possible. The value can be set between 0-15 milliseconds.

## ROF (rate of fire)

This setting is used to cap the maximum rate of fire. The value can be set between 14-25 balls per second, with a setting of 26 reserved for an unlimited rate of fire. The maximum rate achieved is dependant on the cycle speed of the gun and the feed rate of the hopper.

## ROF Fine Adjust

This setting is used to fine tune the rate of fire and is added to the ROF setting. The value can be set between 0 – 0.75 balls per second (0 = 0, 1 = 0.25, 2 = 0.5, 3 = 0.75)

## Bypass ROF

This setting is used to cap the rate of fire to a low value when the eyes are faulted due to a breech chop. The value can be set between 8-14 balls per second.

## Ramp Point

This setting determines the minimum pull rate need to activate ramping when using the Step Ramp or Linear Ramp modes. The value can be set between 4-12 pulls per second.

## Ramp Level

This setting determines the amount of ramp scaling used for the Linear Ramp firing mode. The value may be set between 1.1-3.0 times the actual pull rate in 0.1X increments. This allows for anything between a very gradual up to a very aggressive ramp setting.

## Burst Count

This setting determines the number of balls fired per pull when using the Burst firing mode. The value can be set between 2-4 balls.

## Mode Modifier

Mode modifiers are used to modify the base firing modes (6-12). They allow for a wide variety of custom firing modes that can be tournament legal or recreational depending on regulations.

1. None
2. Three-Shot: First three shots in Semi Automatic, reset after one second of idle time

3. AUTO: First shot in Semi Automatic, second shot in Full Automatic
4. Three-Shot-Auto: First three shots in Semi Automatic, fourth shot in Full Auto, resets to three shots Semi Automatic after one second of idle time

## Auto Shutdown Timer

This setting determines the amount of idle time that passes before the board enters a low power sleep state to conserve the battery in case the marker was left on unintentionally.

1. Five Minutes
2. Ten Minutes
3. Fifteen Minutes
4. Twenty Minutes
5. T2irty Minutes
6. One Hour
7. Never

## EYE Mode Toggle

This mode enables you to use this board with the standard SFT shockers with reflective eyes or the NEW NXT shocker with break Beam eyes (Like the Naughty Dog edition)

1. Reflective
2. Break Beam

## Color Palettes

The default colors displayed by the LED can be customized to match the anodized color of the marker or to suit individual preferences.

1	
Ball in Breech	Red
Empty Breech	Red/Black
Paint Check Bypass	Red/White
Eye Fault	Red/Yellow
Eye Disable	Red/Purple
Trigger Pull	Green

  

2	
Ball in Breech	Yellow
Empty Breech	Yellow/Black
Paint Check Bypass	Yellow/White
Eye Fault	Yellow/Purple
Eye Disable	Yellow/Red
Trigger Pull	Green

  

3	
Ball in Breech	Green
Empty Breech	Green/Black
Paint Check Bypass	Green/White
Eye Fault	Green/Yellow
Eye Disable	Green/Red

Trigger Pull	Purple
4	
Ball in Breech	Teal
Empty Breech	Teal/Black
Paint Check Bypass	Teal/White
Eye Fault	Teal/Yellow
Eye Disable	Teal/Red
Trigger Pull	Green
5	
Ball in Breech	Blue
Empty Breech	Blue/Black
Paint Check Bypass	Blue/White
Eye Fault	Blue/Yellow
Eye Disable	Blue/Red
Trigger Pull	Green
6	
Ball in Breech	Purple
Empty Breech	Purple/Black
Paint Check Bypass	Purple/White
Eye Fault	Purple/Yellow
Eye Disable	Purple/Red
Trigger Pull	Green
7	
Ball in Breech	White
Empty Breech	White/Black
Paint Check Bypass	White/Purple
Eye Fault	White/Yellow
Eye Disable	White/Red
Trigger Pull	Green