Lucky Ace Chip Instructions Version 1.0
Board Version 1.0

Power

To turn the marker on, press and release the Power button. The LED should turn on right away.

To turn the marker off, hold the Power button until the LED turns off.

Eyes and LED display

The LED will display Green if there is a ball in the breach, ready to fire. It will display Red if there is no ball in the breach. Press and hold the Eye button for one second to disable the eye. The LED will display Blue when the eyes are disabled.

Eye modes:

Normal mode – Eyes On:
When the marker is turned on the eyes are automatically enabled. The marker will not fire unless there is a ball fully seated in the chamber of the marker.

Eyes Off mode:
To switch from normal mode into Eyes Off mode, press and hold the Eye button for one second and the LED will turn bright. When the button is released, the LED will turn Blue. The marker will now fire at the Eye Off Rate of Fire (ROF). The Eye button will also change the marker back to Eyes On mode.

Eyes Off mode allows you to disable the eyes if they are malfunctioning during a game. If you want to see how fast you can dry fire your marker, use Demonstration Mode.

Forced Shot:
To fire a single shot while there is no ball in the breach, and keep the eyes turned on, hold the trigger in for $1/3^{rd}$ of a second. The marker will fire once and then the eyes will automatically turn back on. This is useful for clearing a ball that has rolled past the eyes or triggering a sound activated hopper.

Training Mode
Training Mode – When the marker is Off, hold the Eye Button in and press and release the Power button. The LED will light up Purple. Release the trigger. This mode allows the user to practice firing the marker without it fully cycling. It is designed to be used with air, but it won't be as loud as a normal shot because the dwell is automatically cut in half. The trigger will behave like normal using the Eye On ROF cap allowing the marker to be shot indoors to practice walking the trigger. The marker will not fire in Training Mode if there is a ball in the breach.

Demonstration Mode
Demonstration Mode – in Training Mode, press and release the Eye button like turning the eyes off. The LED will light up Teal. It is designed to be used with air but it will fully cycle the marker using the Eye On ROF. The marker will not fire in Demonstration mode if there is a ball in the breach, but since it is shooting at full velocity, treat it as though it is loaded. Demonstration Mode is like Training Mode, but the marker will fully cycle. To switch back to Training Mode, press the Eye button.

Eye Error
If there a problem develops with the marker's eyes, the rate of fire will default to 8 bps (this is adjustable, see Dip switch 2 settings below) and the LED will display Yellow. As soon as the eyes start functioning normally this will be detected and the rate of fire limit will be removed. The LED will blink Yellow even if the eye error has been cleared to later indicate there was a problem during the game. Turning the marker off will reset it so it no longer flashes Yellow. At anytime, the eyes can be turned off and the marker will default to the MROF Eyes Off setting.

Dip switch settings:

Dip switch 1 – Inactive, doesn't affect marker.

Dip switch 2 – Eye Fault Default
In the OFF position this switch caps the marker at 8 BPS when the eye detects a problem reading the paint and bolt movement.

When set to ON, the marker will default to the Eye Off Rate of Fire when the eye is no longer correctly reading the paint and bolt movement.

Dip switch 3 – Inactive

Dip switch 4 – Program Mode
To allow access to Program Mode set dip switch 4 to ON. To play in Tournament Lock mode, set dip switch 4 to Off.

Program Mode

To enter Program Mode set Dip switch 4 to ON. Then turn the marker on while holding the trigger. Continue to hold the trigger until the LED starts to flash different colors. Release the trigger, the LED should display solid Purple.

To cycle through the programming options, pull and release the trigger. The LED will change colors to correspond to the different setting options. To indicate which option you are changing, the LED will display a solid color or a strobe color which will blink rapidly.

Display Color	Option	Range	Default
Solid Purple	Quickstart Modes	1 to 8	NA
Solid Teal	Eye Sensitivity	1 to 20	6
Solid Red	Dwell	1 to 40	12
Solid Blue	Anti FSDO	1 to 19	2
Solid Green	Debounce	1 to 20	4
Green Strobe	Anti-MBounce	1 to 20	14
Red Strobe	Max ROF Eye On	1 to 30	1

To change a setting:
Select an option and pull and hold the trigger. Wait for the LED to briefly turn off and then blink a number of times to indicate the current setting. To keep the setting, release the trigger and wait a few seconds.

To input a new setting, wait for the LED to stop blinking, release the trigger and pull the trigger the number of times corresponding to the desired setting. The LED will blink green each time the trigger is pulled. The LED will blink Red if a setting outside the adjustable range is selected.

If the new setting was accepted, the LED will blink the new setting number then flash multiple colors to show it has been accepted. If the value you have entered is invalid, the option will not be accepted and the LED will not flash different colors. Enter a valid setting within the adjustable range. Turn the marker off or cycle through the options to change more settings.

To exit setup mode and turn off the marker, hold the power button until the LED turns off.

Programming Options

		Range	
Solid Purple	Quickstart Modes	1 to 7	Default = not set

1 – NPPL	Semi (uncapped)	
2 – CFOA	Semi (capped at 15 bps)	
3 – PSP	Ramp (capped at 15 bps)	
4 – Millennium	Ramping (capped at 15 bps slow start)	
5 – NXL	Full Auto (capped at 15bps)	
6 – Response	Response with one Safety Shot – cap 20bps	
7 – Full Auto	Full Auto with one Safety Shot – cap 20bps	
8 – PSP Uncapped	Ramp with no ROF cap	

Warning: Changing these settings will change several settings at once on the marker. To see what each of the Quickstart settings will adjust, see the Quickstart Chart on the next page.

Problems, Complaints or Questions:
Email tech@lucky-paintball.com

Solid Teal   Eye Sensitivity   1 to 20   Default = 6
This setting adjusts the marker to the hopper. The faster the hopper, the lower the Eye Sensitivity can be set. This compensates for the different positions various manufacturers use for the eyes. For example, Angels and Egos use a higher position and often need a slightly higher Eye Sensitivity setting. This is not a delay, merely a better fusion of advanced electronic control and physical eye layout.

Solid Red   Dwell   1 to 40 milliseconds   Default = 12
The dwell setting controls the duration in milliseconds of the signal sent to the solenoid. Higher dwell can lead to high or even unsafe velocity. Always use a chronograph after adjusting dwell.

Solid Blue   First Shot Drop Off (FSDO) 1 to 19   Default = 2
This setting determines the amount of time (in ms) that is added on to the dwell after one minute. 1 = 1 ms. 2 = 2 ms. . . 19 = Off. Higher dwell can lead to high or even unsafe velocity. Always use a chronograph after adjusting this option.

Solid Green   Debounce   1 to 20   Default = 4
This setting controls how aggressively the chip filters for electronic switch bounce. A higher value makes it less likely that multiple shots are fired for a single trigger pull.
Note: Do not test for bounce with the eye off. It will not give an accurate reading. Use paint and a hopper at proper velocity to correctly test for bounce.

Green Strobe   Anti-Mechanical Bounce   1 to 20   Default = 14
This setting controls how much the system filters mechanical bounce. A higher value makes it less likely to shoot more than one shot or "bounce" especially when firing slowly. Also called MBounce.

Red Strobe   MROF Eyes On   1 to 30   Default = 1
Controls the maximum rate of fire cap while the eyes are on.

Setting	Value	Setting	Value
1	Uncapped	9	9 bps
2	15 bps	10	10 bps
3	15.1 bps	11	11 bps
4	15.2 bps	12	12 bps
5	15.3 bps	13	13 bps
6	15.4 bps	14	14 bps
7	15.5 bps	15 – 29	15 – 29 bps
8	15.6 bps	30	30 bps

Reset to Factory Defaults
Set dip switch 4 to ON for Program Mode.

Hold the trigger and turn the marker ON like entering Program Mode.

Continue holding the trigger and it will start cycling through the led colors (if the trigger is released now it would enter Program Mode). Keep holding the trigger and the LED will go off after 15 seconds. Now release the trigger. From the time the trigger is released, the trigger must be pulled again in less than 2 seconds to restore defaults. If the trigger is not pulled, the current settings will be kept and the marker will simply turn off.

Quickstart Chart
Quickstart Modes changes each of these settings to these values on the board automatically. All Quickstarts will automatically raise the Mbounce to 14 and the Debounce to 4 if either is set lower. All other settings and values will remain set where they were. Some settings can be adjusted afterwards like normal so any of these Quickstarts can be tweaked slightly after they are set.

NPPL Quickstart Adjusts:
Fire Mode		semi
Maximum Rate of Fire Eyes On	1	uncapped
Maximum Rate of Fire Eyes Off		14bps

CFOA Quickstart Adjusts:
Fire Mode		semi
Maximum Rate of Fire Eyes On	2	15bps
Maximum Rate of Fire Eyes Off		14bps

PSP Quickstart Adjusts:
Fire Mode		ramp
Maximum Rate of Fire Eyes On	2	15bps
Maximum Rate of Fire Eyes Off		15bps
Ramp Activation		5 trigger pulls second
Safety Shots		3 shots
Ramp Time Out		1 second

Millennium Quickstart Adjusts:
Fire Mode		ramp
Maximum Rate of Fire Eyes On	2	15bps
Maximum Rate of Fire Eyes Off		15bps
Ramp Activation		7.5 trigger pulls a sec
Safety Shots		1 shot
Ramp Time Out		disabled

NXL Quickstart Adjusts:
Fire Mode		Full Auto ramp
Maximum Rate of Fire Eyes On	2	15bps
Maximum Rate of Fire Eyes Off	2	15bps
Ramp Activation		5 trigger pulls second
Safety Shots		3 shots
Ramp Time Out		1 second

Preset Response Mode
Fire Mode		response
Maximum Rate of Fire Eyes On	20	20bps
Maximum Rate of Fire Eyes Off		12bps
Ramp Activation		2 trigger pulls second
Safety Shots		1 shot
Ramp Time Out		disabled

Preset Full Auto Mode
Fire Mode		Full Auto
MROFON	20	20bps
MROFOFF		12bps
Ramp Activation		5 trigger pulls second
Safety Shots		1 shot
Ramp Time Out		3 seconds

PSP Uncapped Quickstart Adjusts:
Fire Mode		ramp
Maximum Rate of Fire Eyes On	1	uncapped
Maximum Rate of Fire Eyes Off		15bps
Ramp Activation		5 trigger pulls second
Safety Shots		3 shots
Ramp Time Out		1 second

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Examples of how to change settings:

To set PSP Mode:
1. Set Dip switch 4 to ON.
2. Turn the marker on while holding the trigger. Continue to hold the trigger until the LED starts to flash different colors.
3. Release the trigger, the LED should be solid Purple. This is the Quickstart Fire Mode. This will change multiple settings at once.
5. Pull and hold the trigger. The number of flashes is irrelevant.
6. Pull the trigger 3 times. This will set all of the settings listed below at once so they are PSP legal.
7. The LED will blink green each time the trigger is pulled. If the new setting was accepted, the LED will blink the new setting number then flash multiple colors. Turn the marker off or change more options.
This will set:
Fire Mode - ramp
Maximum Rate of Fire Eyes On - 15bps (setting 2)
Maximum Rate of Fire Eyes Off - 15bps
Ramp Activation - 5 trigger pulls per second or tpps
Safety Shots - 3
Ramp Time Out - 1 second
8. To exit setup mode and turn off the marker, hold the power button until the LED turns off.

To set Dwell to 20:
1. Set Dip switch 4 to ON.
2. Turn the marker on while holding the trigger. Continue to hold the trigger until the LED starts to flash different colors.
3. Release the trigger, the LED should be solid Purple. This is the Quickstart Fire Mode.
4. Pull and release the trigger two times quickly to get to Dwell mode (Solid Red).
5. Pull and hold the trigger. The number of Red flashes is the current Dwell. If it flashed 20 times, Dwell is already set to 20. Turn marker off.
6. If the Dwell flashes any other number, wait for it to finish flashing and then pull the trigger 20 times.
7. The LED will blink green each time the trigger is pulled. If the new setting was accepted, the LED will blink the new setting number then flash multiple colors. Turn the marker off or change more options.
8. To exit setup mode and turn off the marker, hold the power button until the LED turns off.

To set Debounce to 3:
1. Set Dip switch 4 to ON.
2. Turn the marker on while holding the trigger. Continue to hold the trigger until the LED starts to flash different colors.
3. Release the trigger, the LED should be solid Purple. This is the Quickstart Fire Mode.
4. Pull and release the trigger four times quickly to get to Debounce mode (Solid Green).
5. Pull and hold the trigger. The number of Green flashes is the current Dwell. If it flashed 3 times, Debounce is already set to 3. Turn the marker off.
6. If the Debounce flashes any other number, wait for it to finish flashing and then pull the trigger 3 times.
7. The LED will blink green each time the trigger is pulled. If the new setting was accepted, the LED will blink the new setting number then flash multiple colors. Turn the marker off or change more options.
8. To exit setup mode and turn off the marker, hold the power button until the LED turns off.

Being the helpful guys we are, we made a quick cheat sheet in the next column. Print it out and keep it in your gear bag for the next time you want to change settings at the field.

Display Color

Green	Ball in breach
Red	No ball in breach
Blue	Eyes Disabled
Purple	Training Mode
Teal	Demonstration Mode
Yellow	Eye Error
Blinking Yellow	Corrected Eye Error

Program Color

Program Color	Option	Range	Default
Solid Purple	Quickstart Modes	1 to 8	NA
Solid Teal	Eye Sensitivity	1 to 20	6
Solid Red	Dwell	1 to 40	12
Solid Blue	Anti FSDO	1 to 19	2
Solid Green	Debounce	1 to 20	4
Green Strobe	Anti-MBounce	1 to 20	14
Red Strobe	Max ROF Eye On	1 to 30	1

QuickStart Modes

Program Color	Option	Range	Default
Solid Purple	Quickstart Modes	1 to 7	NA
1 – NPPL	Semi (uncapped)		
2 – CFOA	Semi (capped at 15 bps)		
3 – PSP	Ramp (capped at 15 bps)		
4 – Millennium	Ramping (capped at 15 bps slow start)		
5 – NXL	Full Auto (capped at 15bps)		
6 – Response	Response with one Safety Shot – cap 20 bps		
7 – Full Auto	Full Auto with one Safety Shot – cap 20bps		
8 – PSP Uncapped	Ramp (uncapped)		

ROF Chart

Program Color	Option	Range	Default
Red Strobe	Max ROF Eye On	1 to 30	1

Setting	Value	Setting	Value
1	Uncapped	9	9 bps
2	15 bps	10	10 bps
3	15.1 bps	11	11bps
4	15.2 bps	12	12bps
5	15.3 bps	13	13bps
6	15.4 bps	14	14bps
7	15.5 bps	15 – 29	15 – 29 bps
8	15.6 bps	30	30 bps

Dip switches
4 – On = Program Mode
3 – Inactive
2 – Off = Eye Error 8bps
1 – Inactive

Glossary:

Fire Mode Definitions:

Semi – Semi-Automatic – Shoots one ball per trigger pull. Debounce, MBounce and DML settings may cause occasional double fires if set too low.

Ramp – Assisted mode which shoots multiple balls per trigger pull. Safety Shots, Ramp Activation and Ramp Time Out settings are used to fully configure how many shots must be shot before burst kicks in, how many trigger pulls per second must be fired to activate then sustain the burst and how long the marker can pause between strings before the safety shots must be shot again. DML and Debounce are turned off in Ramp Modes.

Response – Fires on the trigger pull and release. Safety Shots, Ramp Activation and Ramp Time Out settings apply. DML and Debounce are turned off in Response Mode.

Full Auto – Holding down the trigger will continuously shoot the marker. Safety Shots, Ramp Activation and Ramp Time Out settings apply.

Complete Glossary of Terms

ABS – Anti-Bolt Stick – See FSDO.

BIP – see Eye Sensitivity.

BPS – Balls per second. Many tournament leagues put a maximum rate of fire cap on markers. That cap is measured in balls per second. BPS is also used as a unit of measure to set the maximum rate of fire with the eyes off.

CFOA – Carolina Field Owner's Association – Tournament League that limits rate of fire to 15bps and the marker to semi-auto only.

Debounce – How the gun filters the unwanted additional electronic signals coming from the microswitch when the gun is firing fast.

Demonstration Mode – Mode of fire that does not shoot paintballs. It is designed to simulate shooting paint so it is perfect for in store demonstration or test firing the marker in the staging area. It uses the marker's current settings for more accurate demonstration.

Dip switch – Small switches located on the board itself.

Dwell – Duration of the pulse sent to the solenoid. Controls how long the solenoid stays open. Longer dwell means potentially higher velocity. Too low a dwell will not cycle the marker properly.

Eye Sensitivity – This setting adjusts the marker to the hopper. The faster the hopper, the lower the Eye Sensitivity can be set. If the marker seems to pause at times between strings, it means the automatic Eye Sensitivity is kicking in because the hopper is not fast enough to keep up.

Eyes Off Mode – In this mode the marker will fire without checking to see if there is a ball in the breach. This mode should only be used if there is a problem with the eyes. Also called dry firing.

Eyes On Mode – Normal Mode – Default mode when marker is turned on. Checks to make sure a ball is in the breach before firing. Will not fire when no ball is present.

Forced Shot – Allows a single shot to be fired without a ball in the chamber with the eyes on by simply holding the trigger in. Useful for clearing a ball that has rolled off the eye.

FSDO – First Shot Drop Off – A low velocity first shot or series of shots. Sometimes these are so low the shot does not even leave the barrel.

LED – Light-emitting diode – This is the light on the marker that lights up when the marker is on. The LED acts as a feedback display for the marker.

MBounce – Anti Mechanical Bounce and Mechanical bounce are used interchangeably. This setting adjusts the amount of bounce caused by the gun moving while shooting slow. A higher value prevents doubles shots when pulling the trigger slow.

Millennium – European tournament series with a capped rate of fire and specific ramping rules that change often. Check current rules before playing. There's a good chance they changed some of them the night before.

NPPL – National Paintball Player's League – National tournament series that allows uncapped rate of fire but only in semi mode. The NPPL hosts both Amateur and invitation only Professional teams at the same venue with the same rules.

NXL – National X-Ball League – These tournaments are only open to professional teams by invitation and are played at the same time and at the same venue as the PSP tournaments, but with slightly different rules. Longer games and fully automatic markers are two of the changes.

Program Mode – Non-firing mode that allows the user to adjust all settings. Opening the grip panel and flipping the dip switch 4 to ON allows access to Program Mode.

PSP – Paintball Sports Promotions – Tournament series that runs X-Ball and 5-Man tournaments around the country. They play with a cap of 15 bps with 3 Safety shots and a Ramp Time Out of 1 second.

Ramp – Mode of fire that shoots several ball per trigger pull.

Ramp Time Out – Adjustable length of inactivity time that begins immediately after the last trigger pull

Response – One ball is shot on the pull and one on the release of the trigger.

ROF – Rate of Fire. The speed the marker can shoot measured in balls per second (bps).

Safety Shots – These are the shots needed before the Fire Mode kicks in. This way if the marker is dropped or the trigger is accidentally pulled, it will just shoot once.

Semi – Semi-Auto – One ball is shot per trigger pull.

Strobe - Fast blinking light used to denote certain settings in program mode.

Tournament Lock – Locks the marker out of Program Mode by flipping dip switch 4 to OFF so settings can not be changed through the trigger. Opening the grip panel and flipping dip switch 4 to ON allows access to Program Mode again.

TPPS – Trigger Pulls Per Second – Generally the number of trigger pulls per second needed to activate a mode.

Training Mode – Mode of fire that does not shoot paintballs because it does not fully the cycle the marker as it is being shot. It is perfect for sitting on the couch and practicing pulling the trigger without all the loud noise. It uses marker's current settings for more accurate practice.

Uncapped – Unlimited maximum rate of fire governed by how fast your hopper can feed and how fast the marker can load a ball.