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U.S. Patent Nos. 5,228,427; 5,755,213; 5,957,119; 6,260,821; 6,349,711; 6,494,195; 6,644,295; 6,644,296; 6,823,857;
6,694,963; 6,810,871; 7,017,497; 7,044,119.

CLONE[®] GT
Owners Manual



Clone GT Model Owners Manual

V1.00

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CAUTION!

This is not a toy. Misuse may cause serious injury or death. Eye protection designed specifically for paintball must be worn by user and persons within range. Recommend 18 years or older to purchase. Persons under 18 must have adult supervision.

READ OWNER'S MANUAL BEFORE USING.

MacDev 2 Year Warranty

Your marker is covered by the MacDev 2 year warranty against manufacturing defects. Your marker is guaranteed free of manufacturing defects for a period of two (2) consecutive years beginning from the product purchase date for the original owner. The warranty is not transferable in the event of 2nd hand sale. This warranty does not cover damage due to theft, misadventure or operator error/abuse. Your warranty also does not cover the replacement of consumable items including, but not limited to; o-rings, tools, detents, sensor eyes, barrel blockers, screws, solenoids or batteries (at our discretion).

If a manufacturing defect is detected, the owner must lodge a claim with MacDev, or an authorised MacDev tech centre in their region before the warranty has expired. The owner must supply proof of purchase, and surrender their marker for evaluation. MacDev, or their authorised representative, will evaluate the product to determine the validity of the warranty claim. In the event of a successful warranty claim, the defective part will be either repaired or replaced at no cost to the owner.

To ensure that you are covered for warranty, please keep your original proof of purchase in your records. The owner is solely responsible for producing this proof in the event of claiming warranty.

To claim warranty, please visit the support section of the macdev website (www.macdev.net) to find the tech centre in your region.

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KNOW YOUR CLONE®



Your Clone marker represents the pinnacle of premium grade paintball markers available today.

Please take the time to learn the parts of your Clone, it will help you when reading this manual.

Numbered basic parts as shown in the figure on the left:

1. Shift® 3 piece barrel
2. Feed clamp lever (used to affix your loader)
3. Drivetrain, pull up and back to remove (note: marker must be degassed first)
4. Eye covers and screws
5. Gladiator GT Inline (High Pressure Regulator)
6. Velocity adjustment screw (anti clockwise to increase velocity)
7. Trigger with screw adjustments
8. OLED display used to view gun status/settings
9. Membrane pad with power and programming buttons
10. Venting ASA, screw your air system in here
11. Venting ASA on/off knob (used to turn the air on or off)

QUICK SETUP

Switching your marker on and off

The on/off button is located on a membrane pad on the rear of the frame. Push the button with the power symbol (🔌), when done correctly, your OLED will display the MacDev logo and the marker will be set with the beam sensor system on and ready to fire. Turn your marker off by holding the power button down until the OLED system goes blank.

Firing your marker

If a paintball is loaded in your marker, and the power is switched on, you may fire the marker by pulling the trigger. If a paintball is not loaded, then you need to either load one, or read the section below on disabling the beam sensor.

Understanding the beam sensor

Your Clone is equipped with a visible light sensor to determine if a paintball is correctly loaded. This system is used to prevent accidental ball breakage due to misloaded paintballs. The OLED indicator on the side of your grip will show you the status of the beam sensor:



Ball loaded



Sensor disabled



No ball loaded



Sensor fault

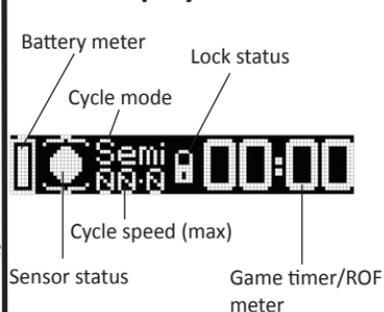
Disabling the beam sensor

To disable the sensor (for dry firing), hold the scroll button on the membrane pad (⏮) until the beam sensor disabled icon appears on the OLED display. You can re-enable the beam sensor the same way.

Membrane Pad



OLED Display



Installing a preset air system

Your Clone comes equipped with a high quality venting ASA (Air System Adaptor) that is designed for use with commercially available air/nitrogen systems.

The venting ASA included with your Clone uses a knob to turn the air from your preset system on or off. Before installing your preset air system, you must unscrew the ASA knob by approximately 3 turns.

Once this is done, carefully screw your air system into the ASA until it stops.

WHEN SCREWING YOUR AIR SYSTEM INTO THE ASA, THE THREADS SHOULD BE LOOSE. IF AT ANY POINT THEY BECOME TIGHT, DO NOT FORCE THE THREADS, THIS MAY CAUSE DAMAGE TO YOUR AIR SYSTEM OR YOUR MARKER!

Turning the air on and off

To pressurise your marker, screw the ASA knob down until it stops. This will depress the pin on the end of your air system and pressurise the marker (provided you have sufficient air in your air system).

To depressurise your Clone, unscrew the ASA knob until you hear the air being vented from the cap. Your air system is now turned off and safe to remove.

NOTE: WHEN YOU UNSCREW THE ASA KNOB, YOUR MARKER MAY STORE ONE SHOT. POINT THE MARKER IN A SAFE DIRECTION AND FIRE OFF THAT SHOT BEFORE ENTERING A SAFE AREA.



Installing an air system



Turning the air on

Using a loader with your Clone

Your Clone marker can operate using any commercially available loader. The software and beam sensor will compensate for the speed of the hopper, ensuring that the marker fires as quickly as the loader allows.

Installing a loader onto your Clone

Open the cam lever as shown. This should allow your loader neck to fit into the feed tube as shown. If your loader does not fit into the feed tube, then you may have to loosen cam lever - this is done by rotating the cam lever (anti-clockwise). Once your loader is pushed all the way down into the feed tube, close the cam lever. If your loader is loose, you may need to open the cam lever, and tighten it (by turning clockwise) to adjust the cam system to hold your hopper tightly. Only ever adjust your cam lever by one turn at a time to prevent overtightening.

DO NOT OVER TIGHTEN YOUR FEED CLAMP! OVERTIGHTENING MAY RESULT IN DAMAGE TO YOUR LOADER OR CLAMP.

Removing your loader

Open the clamp by swinging the lever on its hinge. This will loosen the loader and allow you to remove it easily. If it does not remove easily, then it means that you have the cam lever overtightened.



USING YOUR CLONE

To get the most out of your marker, make sure that you follow the instructions in this section to ensure that the marker is adjusted correctly.

Adjusting the velocity

The velocity of the Clone is adjusted via an adjustment screw on the bottom your inline regulator. To increase velocity, use a 1/8" allen key to turn the adjustment screw anti clockwise. Always adjust your velocity in small increments and use a chronograph.

DO NOT ADJUST YOUR VELOCITY ABOVE 300FPS, AND ALWAYS OBEY LOCAL LAWS AND REQUIREMENTS.

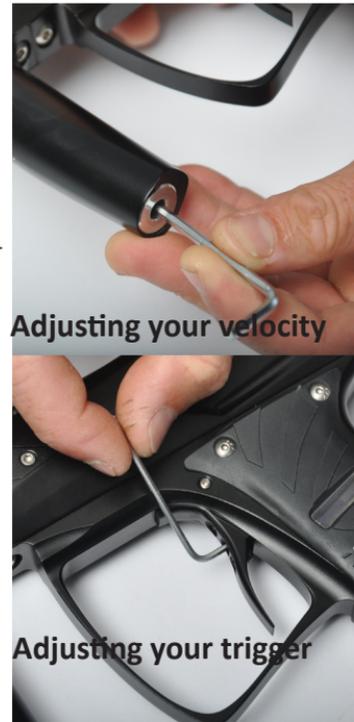
Adjusting the trigger

Your trigger has three adjustment screws, they are located in the front face of the trigger in the following order from top to bottom:

- Pull tension
- Switch actuation point
- Pull length

CAUTION! WHEN ADJUSTING THE SWITCH ACTUATION SCREW, MAKE CERTAIN THAT YOU DO NOT ADJUST THE SCREW IN TOO FAR, AS THIS MAY RESULT IN DAMAGE TO YOUR MICROSWITCH.

You can easily adjust these three screws to personalise the feel of your trigger.



Adjusting your velocity

Adjusting your trigger

Replacing the battery

Remove the three screws holding the wrap around grip onto the left hand side of your grip frame. Gently lever the battery out of the frame from the bottom. Take care that the terminals are not caught on the battery.

Place the replacement battery into the marker, NOTE: make sure you put the bottom of the battery in first then push it onto the terminals. Only use high quality alkaline 9V batteries (type 6LR61).

ADVANCED SETUP

About the tourney lock

The Clone board is equipped with a tourney lock system. When the tourney lock system is activated, the gun cannot be reprogrammed on the field - making it tournament legal.

Your marker has a tourney lock status indicator:



unlocked



locked

When in unlocked mode, settings on the board may be changed, when in the locked mode settings cannot be changed.

The lock status can be changed by opening the right hand side of the marker wrap around grip to gain access to the back of your circuit board. The tournament lock is a black button. Hold the button until you see the tournament lock status change.



Programming the Clone software

To program the board, first ensure that the tournament lock is off, then turn the marker off. Hold down the trigger whilst turning the marker on. When done correctly, you will see a message on your display screen indicating that programming mode is loading.

When in the programming mode, settings will be displayed ready to be adjusted. If you would like to adjust the setting displayed, hold the trigger until the word "Set" appears before the setting value. Press the scroll button (⏮) to increase the set value, and the power button (⏻) if you would like to decrease the set value. When you are satisfied with the new setting, hold the trigger until the word "Set" is removed.

If you would like to advance to the next setting, press the scroll button. If you would like to go backwards, press the power button.

When you are finished with the program mode, hold the power button until the display goes blank (marker is powered down).

Each setting is described in detail below:

Debounce

The debounce setting of your marker is used to control the amount of "bounce" in your trigger. A very low debounce setting will result in a lot of bounce. In some tournaments or fields, it will be necessary to reduce the amount of bounce by increasing the debounce setting. Always increase the debounce slowly, because settings higher than 15 may result in your marker feeling unresponsive.

Tourney lock button



Cycle mode

Your Clone is equipped with 10 different cycle modes. These cycle modes will allow you to use your Clone in many different situations - tournament play, recreational and scenario. Always follow the rules and local regulations when selecting your cycle mode.

Semi-auto unlimited - one pull, one shot as fast as your loader can feed.

Semi-auto adj - one pull, one shot as fast as the cycle speed setting.

PSP ramping - ramping mode legal in the PSP league limited by the cycle speed setting.

PSP burst - more aggressive ramping mode legal in the PSP league limited by the cycle speed setting.

NXL full auto - full auto mode legal in the NXL league limited by the cycle speed setting.

Millennium - ramping mode legal in the Millennium league limited by the cycle speed setting.

Ramping - standard ramping mode limited by the cycle speed setting.

Response - fires both when the trigger is pulled and released limited by the cycle speed setting.

Burst - a burst is fired for each individual trigger pull, limited by the cycle speed setting.

Full auto - marker is cycled continuously when trigger is held, limited by the cycle speed setting.

Cycle speed

This setting is measured in Balls Per Second (BPS). If you are using a cycle mode that is limited by the cycle speed setting, then your marker will not cycle faster than this setting (plus the fine adjustment in the next setting).

Cycle speed fine

The fine adjustment allows the addition of 0.1bps increments for the very precise adjustment of your cycle speed.

Ramp start

In ramping modes, the software requires you to achieve a given cycle speed before ramping shots are added. This

NOTE: SOME VERSIONS MAY HAVE SOME MODES REMOVED TO COMPLY WITH LOCAL LAWS. FOR EXAMPLE, ALL MARKERS SOLD IN AUSTRALIA OFFER ONLY SEMI AUTO MODES.

may be adjusted in this ramp start setting. This parameter is measured in trigger pulls per second (PPS). A low PPS setting will begin ramping more easily than a high PPS setting.

Ramp degree

Once ramping is achieved (by exceeding the PPS setting above), the software will add shots. The ramp degree setting allows you to set the amount of shots added and is specified as a multiple of the actual trigger pulls. For example a setting of 2.0 will add double the actual trigger pulls - if the trigger pulls are 5 pulls per second, it will add $2 \times 5 = 10$, giving you a total speed of $5 + 10 = 15$ bps.

Mechanical debounce

Most difficulties experienced with bounce in your marker can be rectified by increasing the debounce setting at the start of your settings list. However, the mechanical debounce system is an alternative method for electronically removing bounce, and its setting can be increased to help remove bounce if the standard debounce setting is ineffective.

Anti bolt stick (ABS)

When your marker is idle for long periods, friction and settling effects can cause your bolt or other moving parts to be sticky. The ABS system is used to overcome this on the first shot by temporarily increasing the dwell setting. The ABS is adjustable in increments of 1ms.

Cycle filter

Your software allows the buffering of a single shot in case you pull the trigger during a cycle. This filter can be used to reduce the time allowed to buffer this shot. Adjustable from off (0%)-100%. Higher settings will reduce the amount of mechanical bounce in the marker, whilst low settings will make the marker feel aggressive and responsive.

Ball settle delay

Most paintball loaders will bounce the paintball in the breech. The ball settle delay allows some time (measured in milliseconds) for the ball to settle in place before firing. If you experience excessive paint chopping, you should try increasing your ball settle delay.

Solenoid on time (dwell)

When your marker is cycled, the solenoid valve is held open for the solenoid on time. If this setting is too low, the marker cannot cycle. If this setting is too high, the marker will use too much air. The correct setting for a Clone is 12ms.

Eye function

Your Clone can utilise the beam sensor (eye) in different ways. This setting can be used to select which way you would like to have the sensor used. The system can use a delayed mode, where if a ball is not detected in the breech, a shot will be fired after a half second delay. This mode is useful if you are using a sound activated loader, or if you would like your gun to indicate to you when you are out of paintballs. Another option is the forced mode. In this mode, the marker will only fire if a ball is detected. However, the user can force a shot to be fired by holding the trigger until the marker fires.

Auto power off

Your display system and other software uses power when switched on. To conserve power, the system can power off after a given period of time, this may be adjusted here.

Game timer

Your display system can display either a rate of fire indicator or a game timer. If the game timer is switched off, the rate of fire indicator will be displayed. The game timer will be started when the user presses and releases (not hold) the power button .

Brightness

Your OLED display system has an adjustable brightness setting. Lower brightness settings conserve battery power.

User profiles

Users who make changes to the default settings can save these settings as profiles so that they can be reloaded at a later time. There are three different profile slots available.

To save a profile, enter the save profile setting by holding the trigger. Once inside the setting, you can use the scroll button to select the profile slot number you would like to save to. Once the desired slot is displayed, hold the trigger again, and the software will ask you to confirm (with the power button) or cancel (with the scroll button).

To load a profile, follow the same steps after entering the load profile setting. Please note that when loading a profile, the current settings will be replaced by the loaded profile.

Reset to default

The default settings on your software are preset by the factory to give good all round performance from your Clone. If you have made changes to your software, and would like to return your software to factory default settings, you can use this reset feature.

To reset your software, enter the reset setting by holding the trigger. Once inside the setting, you can use the scroll button to select the word “yes”, hold the trigger again, and the software will ask you to confirm (with the power button) or cancel (with the scroll button).

Using an RF transmitter

Your stock board has provision for an RF transmitter attachment. To use the RF transmitter function, you must plug a compatible RF transmitter module into the RF transmitter plug (directly under the eye plugs on your board), and it will be activated automatically.

Using the USB connector

Your stock board has a mini USB connector on the bottom of the board to the right of the 9V battery. The USB connectivity may be used to update your software via a standard USB/mini USB cable.

Never operate the USB connection while the board is powered on. Never update your board with software unless it has been downloaded directly from the MacDev website (www.macdev.net), the use of non genuine software on your stock board will immediately void your entire marker warranty.

MAINTENANCE

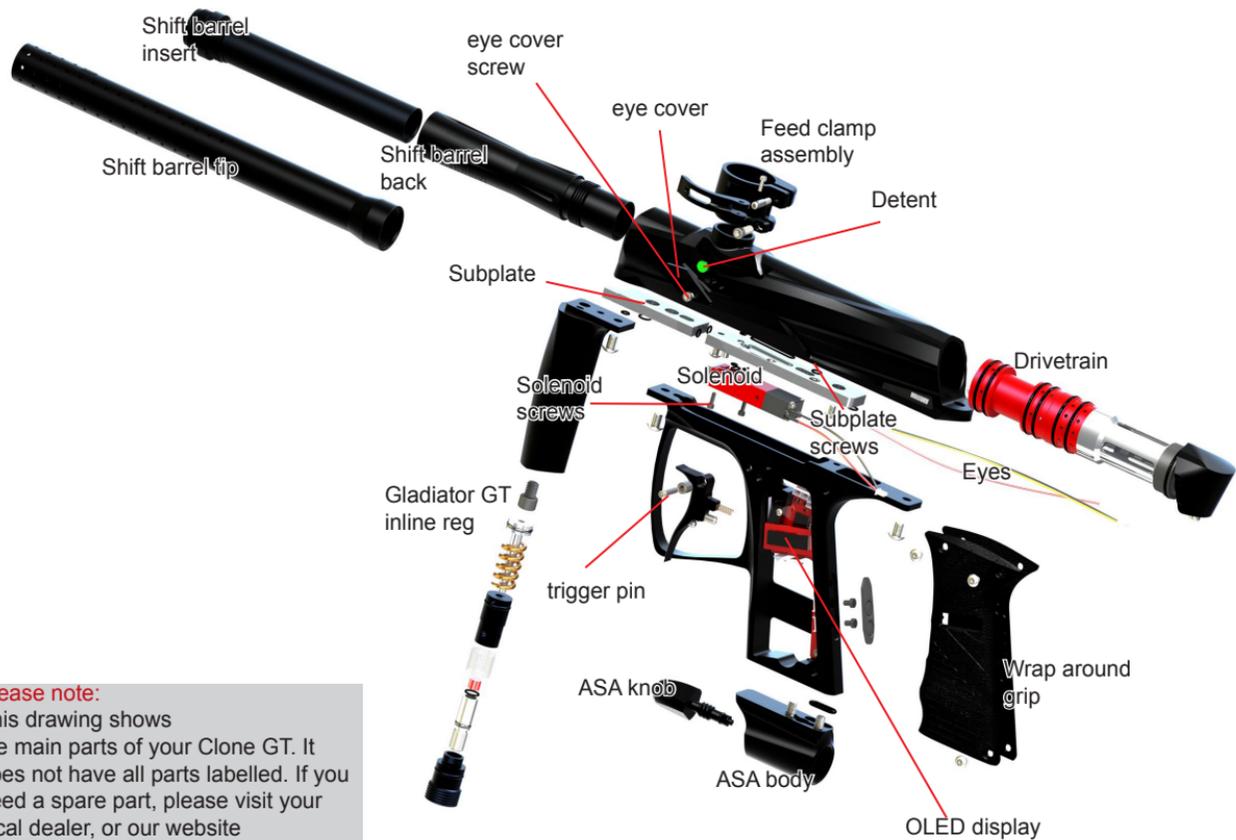
If you take 10 minutes after every day of play to maintain your marker, you will be rewarded with consistent reliable performance.

You should perform basic cleaning after every day of play, and you should perform drivetrain maintenance every 10 cases. You should perform inline regulator maintenance every 25 cases. You can clean and maintain your Clone more often, it is up to you.

When maintaining your Clone, use only MacDev accessories. Your Clone is packaged with an allen key set and a small tub of MacDev Militia Lube, only use Militia Lube to lubricate your Clone.

Basic cleaning

After using your Clone, always clean old paint from the outside. Always clean your barrel using a barrel swab to remove traces of dirt and paint. Use your barrel swab to clean the breech and feed tube in a similar way. Your Clone internal parts are quite well protected and sealed. However, when not in use, dirt can get into the marker and cause problems - so storage of your marker is just as important as cleaning. When storing your marker, ensure that it is stored in the Clone bag that is free of dirt, otherwise dirt may get into the venting ASA or breech.



Please note:
 This drawing shows the main parts of your Clone GT. It does not have all parts labelled. If you need a spare part, please visit your local dealer, or our website www.macdev.net to see a full spares drawing.

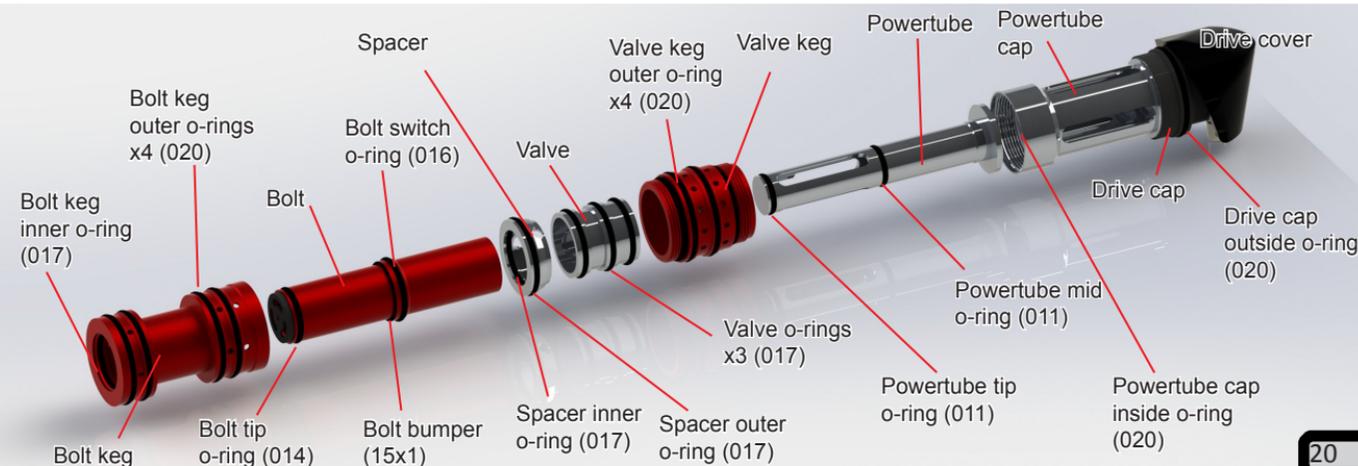
Maintaining the drivetrain

Your drivetrain should be maintained after every 20,000 shots (10 cases). You may maintain your drivetrain more frequently if you wish.

Before working on your drivetrain, ensure that your marker is degassed, dry fire the gun with safety to ensure that there is no air remaining. Once that is done, pull the drive cover upwards firmly until it clicks, and pull the drivetrain backwards out of your marker. Set aside your marker so that you can focus on the drivetrain.

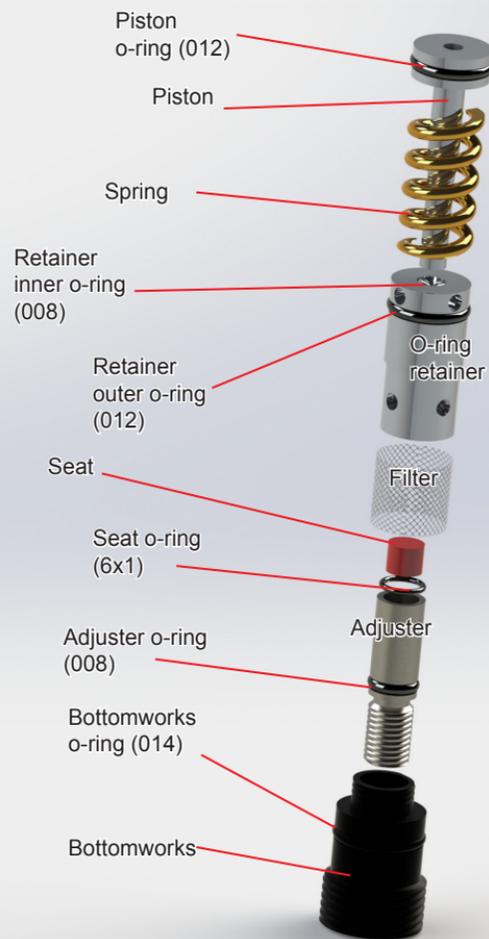
The disassembled drivetrain is shown below. To maintain your drivetrain, clean and re lubricate the following o-rings; bolt switch, bolt keg inner, valve, spacer inner, powertube tip and mid. Also clean and relubricate the bolt keg bore, valve keg bore, as well as the bolt and valve themselves.

After working on your drivetrain, reassemble it, then slide it back into your marker. Take care to align the pin correctly before pushing your drive cover down.



Simple Maintenance:

Yes, its that easy. The right hand picture shows all the parts, but you don't need to open your regulator further, unless you need to trouble-shoot it.



Maintaining the inline regulator

We recommend that you maintain your inline regulator every 50,000 shots (25 cases).

Before working on your inline regulator, make certain that the air supply is turned off (via the venting ASA), and safely fire any gas out of the gun to ensure it does not have any residual pressure.

Use a 1/4" allen key to unscrew and remove the inline regulator bottomworks and o-ring retainer - these should come out together. Then tip the spring out and put it aside.

To remove the piston, use the 1/8" allen key from your set, and push it gently into the hole in the end of the piston (still inside your inline regulator body). Push the key slightly to one side and use it to pull the piston out of your inline regulator body.

CAUTION: take care not to damage the end of the piston. Do not use pliers, sharp tools or excessive force to extract the piston - a damaged piston will require replacement, it cannot be repaired. If you are unsure of the piston removal, ask a technician to do it for you.

Clean dirt and old grease from your piston. Relubricate the piston o-ring and piston shaft with Militia Lube, before putting the spring onto the piston, and fitting the piston and spring back onto the regulator bottomworks. Finally, screw the assembly back into your inline regulator body, and tighten lightly into place using your 1/4" allen key.

A picture of the parts inside your Gladiator reg are shown on the adjacent page. Please note that to complete this simple maintenance, you do not need to completely disassemble the regulator as shown, all the parts are shown to help you if you need it for troubleshooting.

TROUBLESHOOTING

If you are experiencing difficulties with your marker, please check this table first to see if there is an easy solution listed. If at any time you are unsure about how to work on your marker, please contact a certified MacDev technician or service centre.

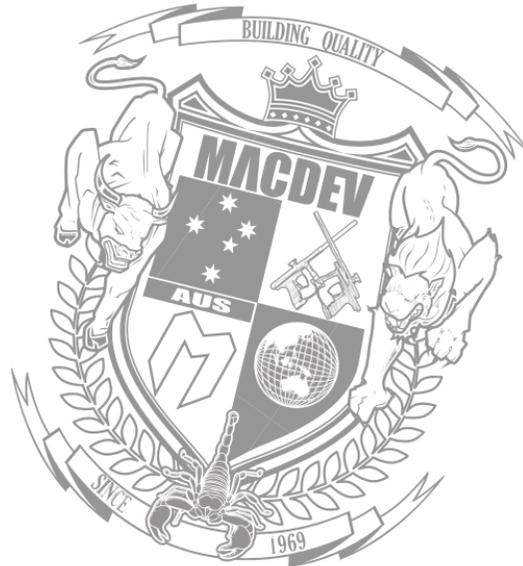
Symptom	Possible Cause	Solution
Although a fresh battery has been fitted, your Clone will not turn on	The battery has not been fitted correctly	Ensure that the battery is firmly connected to both terminals. Ensure that the positive (+) terminal is connected to the positive terminal on your battery.
Your Clone leaks from the solenoid	Leaking bolt switch o-ring	Clean and relubricate the drivetrain with particular attention to the bolt switch o-ring. Replace if necessary.
	Leaking manifold o-rings	Check that the 3 manifold o-rings are in place between the solenoid and subplate. If they are damaged or missing, then replace them.
Your Clone uses excessive air	Valve is leaking	Check that the valve o-rings are clean and well lubricated, replace if worn.
	General leak	Make certain that there are no leaks from your gun or air system wasting your air supply.

Symptom	Possible Cause	Solution
Your Clone is chopping paintballs	Beam sensor is turned off	Always play with the beam sensor enabled.
	Beam sensor is dirty or blocked	Clean the breach, bolt and sensor.
	Loader is set on a force setting too high for your paintballs	Some force fed loaders can apply enough force to break a fragile paintball. If this is the case, consult your loader manual to reduce the force setting.
	Detents are missing or incorrectly installed	Replace or re-install your detents.
Your Clone will not fire	Ball settle delay too low	Increase the ball settle delay (pg 15)
	The trigger is set up incorrectly	Ensure that the trigger actuates the micro-switch by adjusting the actuator screw.
	The beam sensor is on, and there are no paintballs loaded	Load some paintballs.
Your Clone fires high on the first shot or inconsistently.	The solenoid is not plugged in	Plug the solenoid into the board.
	Creeping inline regulator	Clean and lubricate the inline regulator, ensure that the seat and piston are in good condition.
Your Clone fires low on the first shot	Sticking drivetrain	Clean and relubricate the drivetrain. If you continue to have problems: -increase the dwell by 1-2 ms. -increase the ABS parameter on your board.

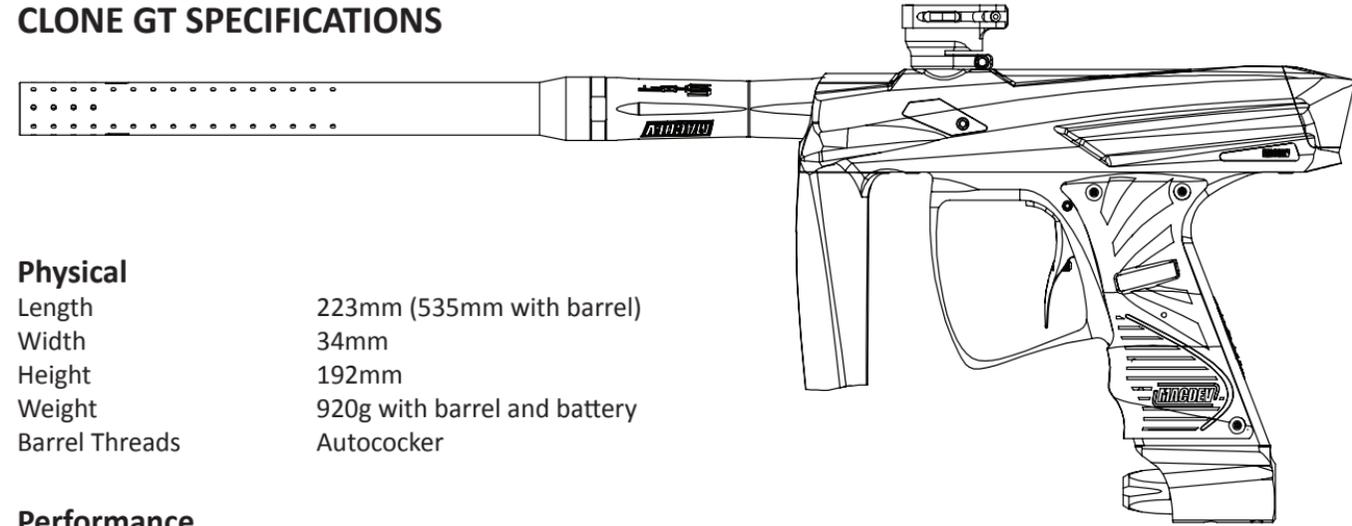
Symptom	Possible Cause	Solution
The beam sensor is not reading correctly	Eyes are connected incorrectly	Red/white wire eye is the left hand plug Yellow/black wire eye is the centre plug.
	Eyes are faulty	Replace the eye pair.

MACDEV TECHNICAL ASSISTANCE

If you require technical assistance, please contact your local MacDev service centre. You can also find assistance on the MacDev support website www.macdev.net.



CLONE GT SPECIFICATIONS



Physical

Length	223mm (535mm with barrel)
Width	34mm
Height	192mm
Weight	920g with barrel and battery
Barrel Threads	Autococker

Performance

Operating pressure	100psi
Maximum Rate of Fire	30 BPS

Electronics

Software	Militia Soft Version 2.0
Hardware	Militia Version 2.0 (Lead Free)
Display	OLED high visibility low power usage 96x16px
Power	9V standard battery 6LR61
Fire modes	Semi, NXL, PSP, Response, Burst, Full Auto
Connectivity	Mini USB
Solenoid	5V 1W