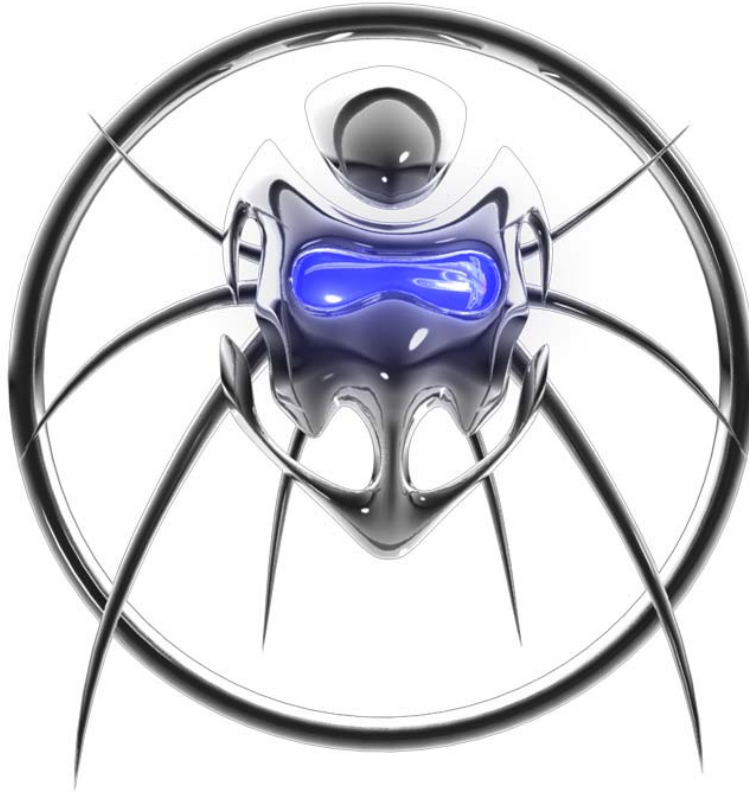


OPERATIONS MANUAL FOR THE

Diadem I.T.S.



Weight:	2 lbs.
Width:	1 inch
Length:	8.5 inches
Height:	9.5 inches
Efficiency:	2000 rounds from a 68cu/4500psi
Battery Life:	150,000 shots
Operation Pressure:	200-250psi
Caliber:	.68 paintballs
Max Rate of Fire:	25+ bps limited by hopper
Barrel Thread:	'Cocker ^(tm)



WARNING: *The paintball marker, which you have purchased, is not a toy.*

Misuse or carelessness may cause serious injury or death. Eye and ear protection designed specifically for paintball use must be worn to prevent injury. Read the Owners Manual before using.

Misuse of this paintball marker, including but not limited to vandalism, may result in criminal penalties.

Use only goggle systems that are designed for paintball use. Goggles that are not specifically designed for paintball use will not withstand the multiple impacts of paintballs fired from a semi-automatic paintball marker.

Never work on your marker without disconnecting the air supply.

Do not carry a paintball marker in public unless it is properly stored. Please check your local laws.



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SEE WARNING ON OPPOSITE PAGE



WARRANTY POLICY

WHAT IT COVERS

We take pride in making quality parts for all of our products. We have put a great emphasis on ensuring that the marker, which you have purchased, is made to high standards of quality. In some very rare cases, something may have gone wrong in the process of making and delivering your marker. We offer this warranty to you in order to ensure that you get what you paid for – a high quality, high performance paintball marker.

Action Markers warranties all mechanical components, excluding the electronic assembly, air valve, and any 3rd party components that may have been installed onto the marker to be free from defects for 90 days from the original retail purchase. Action Markers warranties all electronic components to be free from defects for 30 days. All 3rd party components are warranted per the original manufacturer's warranty. Action Markers does not give any warranty either express or implied on any parts or components made by 3rd parties, except where required by law.

The purpose of this warranty is to ensure that you get the high quality product that you paid for. The warranty covers parts, labor, manufacturing defects or malfunctions. We will also cover any aftermarket accessories that are manufactured by Action Markers and are designed for use on the Diadem. In other words, if there is something wrong with the marker, which was in any way our fault, we will fix the problem at our cost.

WHAT IT DOES NOT COVER

We at Action Markers are fans of paintball and play the sport as often as possible. We also know the frustration that sometimes accompanies the sport. We cannot afford to warranty any of the actions that may accompany this frustration. If you feel the absolute need to throw your paintball marker at the tree that didn't offer enough cover, you do so at your own expense. We also do not offer any warranty for accidents such as automobile accidents or a house fire. Any use of the marker other than that which it was intended, such as playing baseball with it, will also not be covered by the warranty. Any 3rd party modification or aftermarket accessory that causes a problem will not be covered. The presence of a 3rd party accessory does not void the warranty if the accessory was not the cause of the problem. Finally, we do not cover any cosmetic scratches, normal wear and tear, or any damages caused by attempted modification of the marker.

WHY?

In deciding the policies for this warranty we were faced with two somewhat conflicting desires. We want to be able to sell our marker for as low of a price as possible. We also want to be able to give the best service to our customers. We feel that the warranty policies that we have made give the best value to the most people

RETURN AUTHORIZATION

In order to process your repair work as fast as possible we require you to call us and get a return authorization (RA) number before you send your marker in. This number allows us to begin processing the order even before we receive your marker so

that we can fix it and return it to you quickly. We will not accept any packages that come in without an RA number on them. **Any package without an RA number written clearly on the outside of the package will be returned to the sender at his or her expense.**

TECHNICAL SUPPORT

We recommend that you look on our website for technical support. It is available twenty-four hours a day, seven days a week, and doesn't take off holidays. We will regularly post new information on the website and your question may already be answered there. If you are unable to find what you need at our website, Technical Support is available from 9:00 a.m. until 3:00 p.m. Eastern Time on Monday through Friday. If you need to call us have your serial number ready so that we can find your information on our computers quickly. It will also help if you have sent in your warranty card. Technical support is almost always faster through email or through the website than it is through calling. To avoid long periods of being put on hold, please try the website and email first.



THIS PAINTBALL MARKER IS NOT A TOY!! This paintball marker should be treated with respect. Never point the marker at a person who is not properly attired with a complete face mask. While paintball as a sport has a very low injury rate, if the marker is misused or not properly maintained, it can cause serious injury, including blindness, or even death. Please read and understand all safety instructions and directions contained in this manual before using this paintball marker.

Adult supervision is recommended at all times whenever a minor is handling this paintball marker.

Never point at or shoot any animal with this paintball marker. Never point at or shoot this paintball marker at any person, unless both you and your target are participating in paintball activities and are both wearing proper safety attire. Proper safety attire includes approved paintball goggles, mask, gloves, and pads.

Follow all maintenance instructions carefully. If you have any questions regarding maintenance procedures, contact your local dealer or if your dealer is unable to answer your question, call Action Markers directly.

Any time you have an air supply connected to your marker, it is assumed to be armed. **NEVER RELY ON SAFE-MODE ALONE AS A FAIL-SAFE DEVICE.** Before connecting your air supply, make sure your marker is turned off (you will not see a light through the clear panel). In addition to the safety on the marker, a barrel bag should be used any time you are not actively playing. Turn on your marker and remove the barrel bag **only** when you are on a playing field and the game has started. The marker is ready to fire when you can see a green light (like the traffic signal) through the clear plastic panel on your grip-frame.



A chronograph should be used to check your paintball's velocity before using your marker. Ensure that your marker is firing at velocities lower than 300 feet per second before playing. Never shoot this paintball marker if the chronograph reading is higher than 300 feet per second. Velocity adjustments should never be done on the playing field. All changes in velocity should take place between games and be checked with a chronograph.

Remove the air supply from the paintball marker and dry fire in a safe direction before disassembling the marker. Do not put your fingers in the breech area or down the ball feed tube while firing the paintball marker. Never shoot at any target closer than ten feet.

Only fire this marker where it is safe and legal to do so. Do not fire at any place of residence or at any building not specifically designated as part of a paintball field.

Never look down the barrel when it is connected to the marker. If you need to clean the barrel disconnect the air supply and field strip the marker before cleaning.

Never use a damaged marker. If your marker is damaged, take your marker into your nearest dealer or service center to be repaired.

FEATURES

At Action Markers, we all play paintball on a regular basis. We are paintballers. Combining our personal experiences with those of high-level paintball players, we were able to assemble a complete wish list of performance that we feel comfortable every player will agree with. Our engineers hated us, but the players are the bosses here, so after the screaming and crying died down, they got to work.

Using a design team comprising of engineers, designers, machinists, and above all paintball players Action Markers was able to create the revolution that has come to be known as the Diadem. With a features list a mile and a half long, the Diadem has been designed from the ground up to be the player's marker. We have milled both the upper and lower receiver out of solid aluminum to gain the strength to keep the marker in top shape. We use only state-of-the-art machines to make the Diadem. The ram is designed with particular attention to wear reducing details, like a polished stainless steel hammer. The Diadem is a high quality, precision marker that will easily withstand the high level of abuse that is standard to a paintball marker.

Of course the marker is only good while you can still shoot it. Using a uniquely designed valve chamber, a near magically created Ram system, adding on a Quick Evacuation Valve (QEV), and a light upper bolt, we have made the Diadem use a minimal amount of air to reach the desired velocity. The end result is amazingly high air

efficiency – Under field conditions we have been able to get over 2000 rounds from a full 68/4500 Nitro Tank. Under “testing” conditions we can get even more.

To complement the air efficiency, we have made the trigger pull as short as possible. Using special micro-switch and trigger hinge match, we are able to get a short, even trigger pull that is fully adjustable to less than ½ mm of travel. We have also made our trigger pads wider than most to be more comfortable on your fingers. A wider trigger pad means that the force of pulling the trigger back is spread across your entire finger, so walking the trigger is easier than ever before.

The trigger frame was designed to actually improve the performance of the player by allowing a more comfortable and ergonomically natural hand position. The result is less stress on your wrist and hand enabling you to move your fingers even fast. The average paintball player gets 2-3 balls per second faster shooting simply by using the Bubble Grip on the Diadem.

The extra speed of shooting is facilitated by the design of the pneumatic Ram, which is the center of the Diadems operations. Using a fully pneumatic system to power the ball and upper bolt movement we were able to get amazing reliability and speed out of the Diadem. By adding in a spring assist to the Ram we were able to transcend amazing and get right down to revolutionary. The Diadem is capable of running off of a single regulator powering both the Ram and the ball at the same pressure. It does this by using the slight tension of the spring to offset some of the pressure coming in from the regulator and the using the spring to assist the pneumatics of the Ram in its return to open. The result: A much lower force hitting the ball when firing which lowers the chances of the ball being broken and a much higher return speed allowing the next ball to feed into the breach faster. In summary, faster firing and less ball breaks.

The feed tube on the Diadem is our trademark Vari-Grip feed system. The Vari-Grip system allows the use of a large variety of hoppers without any adjustments (like a tightening screw or sanding the hopper’s neck down to fit). The Vari-Grip system also holds onto your hopper so tightly, you could carry your marker by it! (Carrying your marker by the hopper is, of course, not recommended, but you could if you were inclined to.)

The Vari-Grip feed tube has 3 internal o-rings that the hopper will compress to give a snug fit, ensuring that the hopper cannot come off during play. If the hopper seems to be too snug, add a drop or two of lubricant to each o-ring. If it is still too snug then remove one or two of the o-rings.

When attaching your hopper to the marker always turn the hopper in a clockwise motion, the same way that you turn the feed tube when putting it on. This will lock the Feed Tube in place. With the feed tube locked this way it will not be able to come loose easily. This is a good thing. The side effect of the locking is that you will most likely not be able to loosen the Feed Tube by Hand. If you do want to ever change your feed tube, you will need to use a non-abrasive tool to turn the feed tube loose. We recommend a



rubber strap wrench. Some players find they can also use their hopper to loosen the feed neck, but care must be taken to remove the feed neck from the hopper.

Paintball can be a messy sport. From paintballs exploding on the bunker next to you, to an emergency dive behind a tree that lands you in a mud-puddle, there are many ways for your marker to get dirty. Any sort of foreign object inside of your marker can damage it very quickly. A small amount of dirt inside the upper bolt can shred the O-rings. We have tried to eliminate the possibility of anything that doesn't belong in the marker, getting into the marker. Our first step to fight the dirt is to limit the amount that gets inside the marker. We have found that when landing on the ground or rolling away from an opponent, dirt can get into the marker through any openings on the side of the marker. We then took this knowledge, designed the upper bolt to cock from the rear, and used a connecting pin on the top of the marker to connect the upper and hammers. This design lowers the chance of a players contact with the ground allowing any foreign substances to get inside the marker.

Eventually, no matter what the design of the marker is, something will get inside the marker and you will be forced to clean it. The cleaning of a marker has been among the top of our personal frustrations with many markers. We have designed the Diadem to be able to be 'field stripped' in a matter of seconds. It is a process of pulling the connecting pin out and the pulling the upper bolt out. Cleaning the lower chamber is only a slightly longer of a process, involving removing of the Ram Cap and airline then unscrewing the ram. Most cleaning and maintenance can be accomplished without the use of tools.

QUICK START

This section is a quick overview of how to use the Diadem.

When you are ready to play, first attach the barrel to the body of the marker. Connect an air supply to the marker. The Diadem will perform well with Nitrogen or Compressed Air, but CO₂ is not recommended. After the barrel and air supply are attached, and a barrel bag has been placed over the barrel, turn the marker on by pressing the second button on the grip-frame.

You will also need to get a loader, also known as a hopper, to carry your supply of paintballs. Because most people will want a better loader, we have chosen to not include a "cheap" loader with the Diadem, as it will very easily out-shoot them. Attach the loader to the feed tube on the top of the marker and fill the loader with paintballs. Keep the marker turned off until ready to fire. When ready, press the button that is closest to the rear of the marker and hold it down until the LED turns green. You are now ready to fire.



To field strip the Diadem first remove any air supply from the marker and pull the trigger once or twice to remove any air which may still be in the marker. Pull up the connecting pin at the top of your marker and slide the upper bolt out of the marker. You now have access to the upper chamber and upper bolt for cleaning. If you need to clean the ram for any reason, turn your marker off, pull off the Ram Cover, remove the airline, and unscrew the ram and carefully slide the ram out. Take care to prevent scratching any of the parts. Even though the ram casing is treated to increase hardness, scratches can sometimes occur and affect performance.



To reassemble, place the ram into the lower chamber (again with care) and turn until completely inserted. The airline attachment should be pointing straight down. You may now reattach the airline and Ram Cap.



(Note: Failure to tighten the ram completely into the marker may result in permanent damage to your marker as well as injury or even death.) Now replace the upper bolt into the upper chamber. Push the upper bolt forward until lined up with the groove in the hammer. Push the connecting pin back down until it stops and is engaged with the hammer. (As opposed to being engaged *to* the hammer.)

(note – if you have changed the regulator on the Diadem from the Standard Centerflag Regulator, these instructions may be different for you.) Velocity adjustment is done through the primary regulator. See the diagram in the back of this manual for reference. To increase the velocity turn the screw counter-clockwise (increasing the output pressure of the regulator) and to decrease the velocity, turn the screw clockwise (decreasing the output pressure of the regulator). One full revolution of the screw will change the velocity significantly so be sure to re-check the velocity after any adjustments. Fire several shots before re-checking your velocity, as the pressure may not stabilize immediately. You will want to be sure that your paintball velocity is less than 300 feet per second. Most fields are strict with this rule and you may not be allowed to play if you are shooting too fast.



As a quick tip – many people have found it easiest to adjust the velocity by fully turning the velocity screw out of the regulator (this will cut off all airflow) and then adjusting it in until the velocity is up to speed.

Always use high quality paintballs. Lower quality paintballs will break more easily and will not fly as accurately as high quality paintballs.

The Default Electronic settings for the Diadem are as follows:

- Fire Mode = Single Shot
- BPS = 12 BPS
- Dwell = 14 ms
- Debounce = 5 ms
- Eye = On

To change the electronic settings of the Diadem see the following information:

MARKER OPERATION & MENU

HOW IT ALL WORKS:

The trigger pushes the micro switch (I bet you already knew that part), which sends a signal to the electronics and tells them to fire a number of times depending on the mode of fire.

On each fire the board sends a signal to a Custom designed electronic air valve that is in the grip handle.

The air valve opens its output valve and pushes air (at about 200 psi) through a hose to a pneumatic ram that is in the lower chamber of the upper receiver.

The ram flies forward (at near warp speeds) and opens the valve in the front of the marker.

The open valve allows air (at the same pressure) to travel through the marker.

The seals on the ram and the upper bolt direct the flow at the ball, which goes out the end of the barrel (I really hope that you knew that part already).

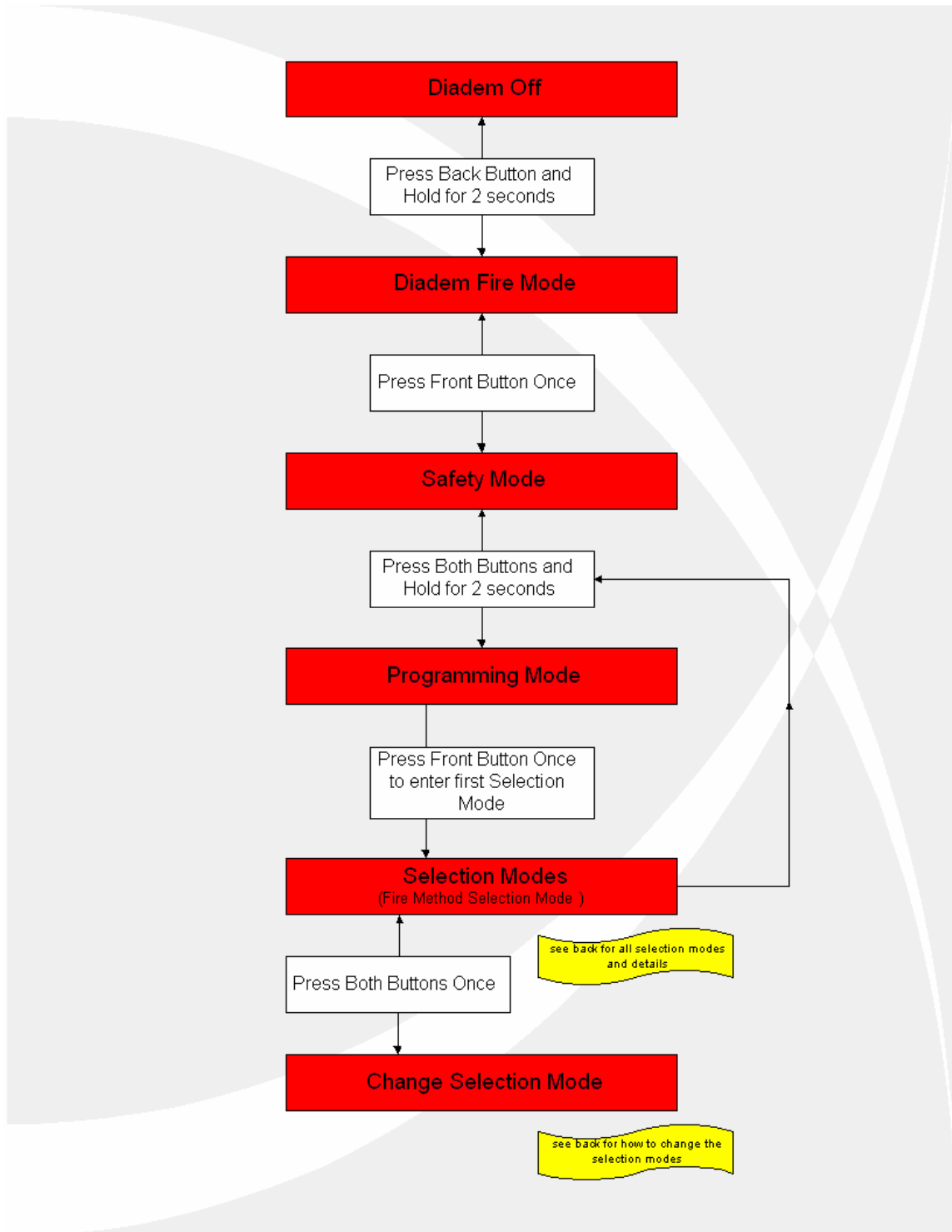
Additional air is used to return the ram to its resting state, aided by the spring inside the Ram.

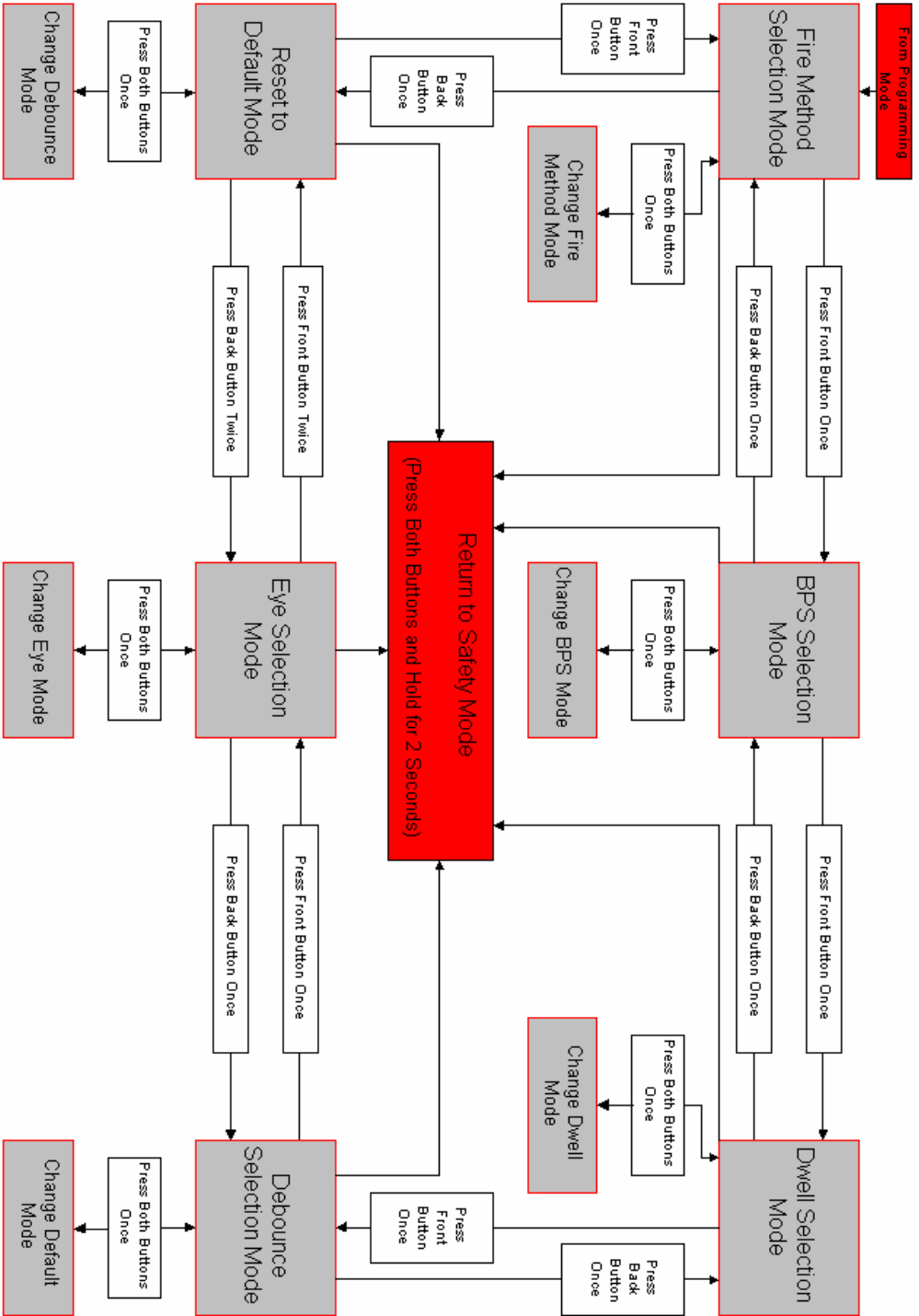
Repeat up to 25 times a second. (However the top rate of fire is programmable as well, so you might tell it to top out at 4 times a second. Can't imagine why you'd want to do that, though.)

PROGRAMMING:

All programming is done through the two buttons on the side of the marker with the circuit board showing through. . (It is best and safest to remove your air supply while programming your Diadem ITS)

The Following Chart on the next page shows the sequence of programming your Diadem. We will go over this in more detail.





Diadem Selection Modes
11/22/2004

To program the mode of fire:

1. Turn Your Diadem on.
2. Enter Safety Mode by holding the front (+) button for 2 seconds. – The LED will turn a solid Red.
3. Enter Programming Mode by pressing both buttons and holding them for 2 seconds, until the LED starts flashing Red.
4. Select Method 1 (Firing Method Selection) by pressing the forward (+) button once. The LED will now flash Red-Green-Red-Off and repeat that sequence.
5. Enter into Change Option Mode by pressing both buttons at the same time once and quickly releasing them. The LED will flash red one time and then turn off.
6. Select your fire mode by pressing the front (+) button one of the following numbers of times:
 - 1 = Single Shot (Tournament Lock uses this mode)
 - 2 = Reactive Trigger (One shot on trigger pull, one shot on trigger release)
 - 3 = Turbo (Begins adding shots in between trigger pulls after 3 pulls per second)
 - 4 = 3 shot Burst
 - 6 = 6 Shot Burst
 - 6 = Full Auto Mode
7. Exit Change Selection Mode by pressing both buttons and releasing them quickly. The LED will start flashing in the following sequence:
 - a. Red-Green-Red---Green-Off (if Single Shot option has been selected)
 - b. The Green-Off sequence will flash a number of times representing which option you picked, for example: If you had set the Diadem to fire in Turbo Fire Mode then the Green-Off Sequence would flash 3 times as follows: Green-Off- Green-Off- Green-Off The entire sequence would be: Red-Green-Red--- Green-Off- Green-Off- Green-Off- REPEAT
8. Exit Method Selection Mode by pressing and holding both buttons for 2 seconds until the LED turns red. You are now back in Safety Mode.
9. Exit Safety Mode by pressing the front (+) button once.

10. The Diadem is now ready to fire in your selected Firing Mode:

*(**Note: If you have the tournament lock on, the Diadem will always shoot in Single Fire Mode regardless of which mode you selected)*

TO PROGRAM THE BALLS PER SECOND:

1. Turn Your Diadem on.
2. Enter Safety Mode by pressing the forward (+) button once. – The LED will turn a solid Red.
3. Enter Programming Mode by pressing both buttons and holding them for 2 seconds, until the LED starts flashing Red.
4. Select Method 2 (BPS Selection) by pressing the forward (+) button twice. The LED will now flash Red-Green-Red-Green-Red-Off and repeat that sequence.
5. Enter into Change Option Mode by pressing both buttons once and quickly releasing them. The LED will flash red one time and then turn off.

6. Select your BPS setting by pressing the forward (+) button the number of times representing how many BPS you want to shoot (1-25):
7. Exit Change Selection Mode by pressing both buttons and releasing them quickly. The LED will start flashing in the following sequence:
 - a. Red-Green-Red-Green-Red----Green-Off
 - b. The Green-Off sequence will flash a number of times representing which option you picked, for example: If you had set the Diadem to fire 3 times per second then the Green-Off Sequence would flash 3 times as follows: Green-Off- Green-Off- Green-Off The entire sequence would be: Red-Green-Red-Green-Red---- Green-Off- Green-Off- Green-Off- REPEAT
8. Exit Option Selection Mode by pressing and holding both buttons for 2 seconds until the LED turns red.
9. Exit Safety Mode by pressing the forward (+) button once.
10. *The Diadem is now ready to fire in your selected Firing Mode:*

DWELL SETTING:

Note: only adjust the dwell setting on your Diadem ITS if you are an advanced user. You can experiment with different settings using these directions if you really want to, but it is highly recommended that you do so when you are not about to go into a game.

Note: The Dwell setting can only be set between 8 and 25 ms (milliseconds)

1. Turn Your Diadem on.
2. Enter Safety Mode by pressing the forward (+) button once. – The LED will turn a solid Red.
3. Enter Programming Mode by pressing both buttons and holding them for 2 seconds, until the LED starts flashing Red.
4. Select Option 3 (Dwell Selection) by pressing the forward (+) button 3 times. The LED will now flash Red-Green-Red-Green-Red-Green-Red-Off and repeat that sequence.
5. Enter into Change Selection Mode by pressing both buttons once and quickly releasing them. The LED will flash red one time and then turn off.
6. Select your dwell setting by pressing the forward (+) button the number of times representing the dwell that you would like to set your Diadem with (NOTE: pressing the button once will set it to 8 ms)
7. Exit Change Selection Mode by pressing both buttons and releasing them quickly. The LED will start flashing in the following sequence:
 - c. Red-Green-Red-Green-Red-Green-Red ----Green-Off
 - d. The Green-Off sequence will flash a number of times representing which option you picked, for example: If you had set the Diadem to fire with a dwell of 11 ms then the Green-Off Sequence would flash 11 times as follows: Green-Off- Green-Off- Green-Off- Green-Off- Green-Off- Green-Off- Green-Off- Green-Off- Green-Off- Green-Off- Green-Off The entire sequence would be: Red-Green-Red-Green-Red-green-red---- Green-Off- Green-Off- Green-Off- Green-Off- Green-Off- Green-Off- Green-Off- Green-Off- Green-Off- Green-Off- Green-Off - REPEAT

8. Exit Option Selection Mode by pressing and holding both buttons for 2 seconds until the LED turns red.
9. Exit Safety Mode by pressing the forward (+) button once.
10. *The Diadem is now ready to fire in your selected Firing Mode:*

SETTING THE DEBOUNCE:

Note: only adjust the debounce setting on your Diadem ITS if you are an advanced user. You can experiment with different settings using these directions if you really want to, but it is highly recommended that you do so when you are not about to go into a game.

Note: The Debounce setting can only be set between 0 and 50 ms (milliseconds)

1. Turn Your Diadem on.
2. Enter Safety Mode by pressing the forward (+) button once. – The LED will turn a solid Red.
3. Enter Programming Mode by pressing both buttons and holding them for 2 seconds, until the LED starts flashing Red.
4. Select Option 4 (Debounce Selection) by pressing the forward (+) button 4 times. The LED will now flash Red-Green-Red-Green-Red-Green-Red-Green-Red-Off and repeat that sequence.
5. Enter into Change Selection Mode by pressing both buttons once and quickly releasing them. The LED will flash red one time and then turn off.
6. Select your debounce setting by pressing the forward (+) button the number of times representing the debounce that you would like to set your Diadem with (NOTE: debounce is set in 5 ms increments 0, 5, 10, etc)
7. Exit Change Selection Mode by pressing both buttons and releasing them quickly. The LED will start flashing in the following sequence:
 - e. Red-Green-Red-Green-Red-Green-Red-green-Red ----Green-Off
 - f. The Green-Off sequence will flash a number of times representing which option you picked, for example: If you had set the Diadem to fire with a debounce of 15 ms then the Green-Off Sequence would flash 3 times as follows: Green-Off- Green-Off- Green-Off. The entire sequence would be: Red-Green-Red-Green-Red-green-red-green-red---- Green-Off- Green-Off- Green-Off- - REPEAT
8. Exit Option Selection Mode by pressing and holding both buttons for 2 seconds until the LED turns red.
9. Exit Safety Mode by pressing the forward (+) button once.
10. *The Diadem is now ready to fire in your selected Firing Mode:*

SETTING THE EYE:

Note: only adjust the eye setting on your Diadem ITS if you are an advanced user. You can experiment with different settings using these directions if you really want to, but it is highly recommended that you do so when you are not about to go into a game.



Note: The Eye setting can only be set to on or off.

1. Turn Your Diadem on.
2. Enter Safety Mode by pressing the forward (+) button once. – The LED will turn a solid Red.
3. Enter Programming Mode by pressing both buttons and holding them for 2 seconds, until the LED starts flashing Red.
4. Select Option 5 (Eye Selection) by pressing the forward (+) button 5 times. The LED will now flash Red-Green-Red-Green-Red-Green-Red-Green-Red-green-red-Off and repeat that sequence.
5. Enter into Change Selection Mode by pressing both buttons once and quickly releasing them. The LED will flash red one time and then turn off.
6. Select your eye setting by pressing the forward (+) button once to turn the eye on or twice to turn it off.
7. Exit Change Selection Mode by pressing both buttons and releasing them quickly. The LED will start flashing in the following sequence:
 - g. Red-Green-Red-Green-Red-Green-Red-green-Red-green-red ----Green-Off
 - h. The Green-Off sequence will flash a number of times representing which option you picked, for example: If you had set the Diadem to fire with eye on then the Green-Off Sequence would flash 1 time as follows: Green-Off. The entire sequence would be: Red-Green-Red-Green-Red-green-red-green-red-green-red---- Green-Off- REPEAT
8. Exit Option Selection Mode by pressing and holding both buttons for 2 seconds until the LED turns red.
9. Exit Safety Mode by pressing the forward (+) button once.
10. *The Diadem is now ready to fire in your selected Firing Mode:*

RESET TO DEFAULT:

Note: RESETTING YOUR DIADEM TO ITS DEFAULTS WILL ERASE ANY SETTING CHANGES THAT YOU HAVE MADE!!! MAKE SURE THAT THIS IS WHAT YOU WANT TO DO, BECAUSE THERE IS NO WAY TO REVERSE A RESET!

1. Turn Your Diadem on.
2. Enter Safety Mode by pressing the forward (+) button once. – The LED will turn a solid Red.
3. Enter Programming Mode by pressing both buttons and holding them for 2 seconds, until the LED starts flashing Red.
4. Select Option 7 (Reset to Default Selection) by pressing the forward (+) button 7 times. The LED will now flash Red-Green-Red-Green-Red-Green-Red-Green-Red-Green-Red-Green-Red-Off and repeat that sequence.
5. Enter into Change Selection Mode by pressing both buttons once and quickly releasing them. The LED will flash red one time and then turn off.
6. Select your RESET TO DEAFULT setting by pressing the forward (+) button once to keep your current settings on or twice to reset the Diadem to factory defaults.



7. Exit Change Selection Mode by pressing both buttons and releasing them quickly. The LED will start flashing in the following sequence:
 - i. Red-Green-Red-Green-Red-Green-Red-Green-Red-Green-Red-Green-Red-Green-Red- ----Green-Off
 - j. The Green-Off sequence will flash a number of times representing which option you picked, for example: If you had set the Diadem to keep your current settings then the Green-Off Sequence would flash 1 time as follows: Green-Off. The entire sequence would be: Red-Green-Red-Green-Red-Green-Red-Green-Red-Green-Red-Green-Red- ----Green-Off- REPEAT
8. Exit Programming Mode by pressing and holding both buttons for 2 seconds until the LED turns red.
9. Exit Safety Mode by pressing the forward (+) button once.
10. Turn your Diadem off by pressing the back button and holding it until the LED turns off (about 2 seconds)
11. Turn your Diadem on by pressing the back button and holding it until the LED turns Green. (about 2 seconds)
12. *The Diadem is now ready to fire in your selected Firing Mode:*

TOURNAMENT LOCK:

You will want to use the Tournament Lock Mode while playing in tournaments or league games.

Note: You cannot change any of the programmable settings when you are in tournament lock. Ensure that all the settings of the marker are how you want them to be before turning the tournament lock on

1. Turn your marker off and disconnect the air supply.
2. Remove the rubber grips



3. Remove the clear plastic cover-plate



4. Locate the Tournament Lock Switch



5. Push the Tournament Lock Switch into the Forward (to the left) position



6. Replace the plastic cover and rubber grip. Do not over tighten the screws.
7. When you turn your marker back on, it will be in Semi-Auto mode, and you will be unable to reprogram your marker while set in the Tournament Lock Mode.

TRIGGER ADJUSTMENTS

Adjusting the trigger is done through 2 set screws inside of the trigger housing. One of them is in the body of the marker, and the other is in the trigger itself. Both are accessible without taking the Diadem apart. The front screw, in the body of the marker, is used to adjust the over-travel, the amount distance that the trigger moves after the Diadem fires. The rear screw, in the trigger itself, is used to adjust the under-travel, or the distance that the trigger moves before the Diadem fires. The minimum amount of trigger movement required for the Diadem to fire is .5 mm.

NOTE: It is possible to render your Diadem unusable with improperly adjusted triggers. Be sure that you understand the concepts presented here before adjusting your marker. If your trigger won't move, or moves but never fires, you probably have made a mistake in the trigger adjustment. Loosen both set screws and try again!

To adjust the Over-Travel of the trigger (to its minimum distance):

1. Remove all air and paint from the Diadem.
2. Make sure that the eye is turned on, and the Diadem is in single fire mode. – see the programming guide (above) for instructions on how to do this.
3. Press and hold the trigger. The LED should turn and stay red
4. Turn the Over Travel set screw clockwise until the LED turns green.
5. Turn the Over Travel Set screw counter-clockwise until the LED turns Red.
6. This is the minimum over-travel the Diadem can have and still operate.
7. If this setting is not to your liking – adjust the over-travel to your desired placement, making sure that the LED turns red when the trigger is pushed.

To adjust the Under-Travel of the trigger (to its minimum distance):

1. Remove all air and paint from the Diadem.
2. Make sure that the eye is turned on, and the Diadem is in single fire mode. See the programming guide (above) for instructions on how to do this.
3. With the trigger loose, turn the under-travel screw clockwise, until the LED turns Red. (*NOTE: if you have already adjusted the over-travel, you may “pinch” the trigger between the two set screws and render it unable to move. If this happens you will need to loosen either the under travel or the over travel.*)
4. Turn the under-travel screw counter-clockwise, until the LED turns green
5. This is the minimum setting for the under travel
6. If this setting is not to your liking, loosen the under-travel to your desired setting. Making sure that the LED is green whenever it is not being pressed.



Through adjusting the under-travel and over-travel of the Diadem ITS, you are able to customize the trigger feel to your exact specifications. Not everyone likes the trigger in the exact same place, and you should not necessarily just set the trigger to the minimum pull possible. For instance, I have found that I shoot 1-2 BPS faster with a 1-1.5 mm trigger pull than I do with the minimum pull. Each person is different in their playing and shooting styles and should make sure that the trigger setting on the Diadem ITS suits them personally.

BATTERY REPLACEMENT

Although the Diadem ITS has low drain circuitry, and you can leave your marker turned on for weeks at a time before the battery finally wears out, eventually you will have to replace it. (The battery, not the marker.) The Diadem LED will flash Red anytime the battery is within 5 % of going dead. This is to allow you ample time to change the battery before it completely stops. However, some functions on the Diadem may not operate properly while the battery is low. *(Note: Due to testing the Diadems prior to shipping, we can not guarantee that the battery that comes installed in your Diadem is fully charged. If you have any problems with your Diadem, one of the first things to check is the battery. And always carry a spare battery with you to important games...)*

To replace the battery

1. Remove the two screws on the front side of the rubber grip to reveal the battery.
2. While holding the battery harness, remove the old battery from the diadem. Do not hold the battery harness by the wires, doing so can cause the wires to pull out of the harness and is not covered by warranty.
3. Place the new batter in the battery harness *NOTE: Do not connect the battery backwards, doing so may cause irreparable damage to your Diadem's circuit board, and is not covered by warranty*
4. Replace the grip screws.





HINTS AND TIPS

Paintballs are inherently inaccurate. A paintball is moving relatively slow, less than 300 feet per second, and has a relatively high surface area that wind can hit. The paintballs themselves, with a solid exterior and a liquid filled interior, are likely to develop a curve in the air. Learn to adjust to the playing conditions of the day. A good idea is to fire multiple shots and aim from where the first one hits.

Three round burst fire, firing three paintballs quickly and then pausing, is a good balance in conserving paintballs and air, and ensuring a hit. Though you might want to vary how many shots you fire when you lean out of your bunker, as your opponent will learn your rhythm and shoot you out as you begin to lean out.

Play Hard. Put everything you have into the game. Don't be afraid to get hit, even the best players will get shot on occasion. **Warning: Playing hard may cause you to become irresistible to members of the opposite gender. This condition may be aggravated when using the Diadem ITS. USE CAUTION.**

Teamwork is the key to most victories. Rambo won't win a lot of paintball games. Learn to work with your selected team of friends. When you have a good system down with your friends and you can communicate your intentions nearly telepathically, learn to play with a group of people that you have never met before. Accept different roles and don't expect to always be the team captain.

Tell all of your friends and co-workers about the sport of paintball. It is generally more fun to play with people that you know, and it's a good stress reliever to be able to shoot your co-workers too.

Try "Walking the Trigger!" All your friends are doing it! Walking the trigger is a technique where you use two fingers to pull the trigger, but you alternate between them. Imagine shooting 10 balls a second with your trigger finger. Now add another shot in between each shot with your second finger. You have just DOUBLED your firepower! Of course it takes a lot of practice to get this technique down, but it is well worth it to reach those high rates of fire!

PERFORMANCE

A technique called “snap shooting” will improve your chances to eliminate the other team while keeping you in the game. Learn to shoot AS SOON as you lean out of your bunker and lean back behind it AS SOON as you are done firing. Always vary how many shots you fire, what side you lean out from, how high you are from the ground, and how often you lean out. Practice this technique, and you will see more eliminations per game.

Do not “blind fire.” Blind firing is when you shoot around your bunker without leaning out. In tournament play, you can be ejected from a game, and in the woods, you just can’t see your opposition coming at you. It’s always good to practice looking where you’re shooting while presenting as small a target as possible.

Above all else, play fair. Don’t try to wipe the paintball off of your shirt before the ref sees you. Don’t adjust your velocity mid-game. Paintball has received some negative publicity because the markers look so much like real weapons. We need to work together to keep paintball a clean, safe, and fun sport. Please don’t ruin the experience for the other players.

The Diadem should get over 900 shots from a full 45ci/3000psi Nitro tank out of the box, from a 68 ci. / 4500 psi you should achieve up to 2000 rounds from a single full fill. Any modifications, such as changing the barrel, will change this number. Weather conditions may also affect the air usage. The paint itself plays a large factor in air efficiency – the better the paint matches the internal diameter of the barrel the better your air efficiency will be.

For extended life of your Diadem, please always use Nitrogen or Compressed Air as your air supply. Although the Diadem ITS will operate on CO₂, the nature of that gas may interfere with the electronics, and can cause your Diadem ITS to cease functioning. Damage to the electronics or the air valve by CO₂ is not warranted.

The barrel, which is included with the Diadem, is designed to accommodate most of the standard sizes of paintballs and should work fine with any of the major paintballs on the market. We recommend that you use higher quality paintballs to get the best performance. The Rx Barrel System features removable sleeves that re-size the bore of your barrel to more closely match the paint you are using, increasing your accuracy and air efficiency.

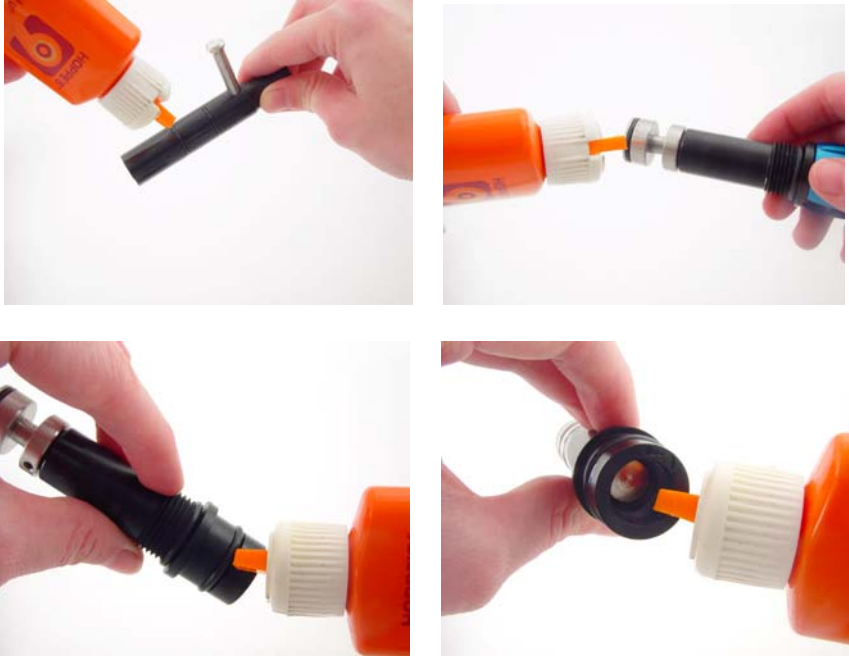
The trigger pull can also be adjusted. By removing the Under-travel and Over-Take on your trigger, you can increase the speed at which you can fire. This is desirable when using a feed system that will force paintballs into the breach faster than they can fall. The trigger is adjustable down to ½ mm total travel.

MAINTENANCE

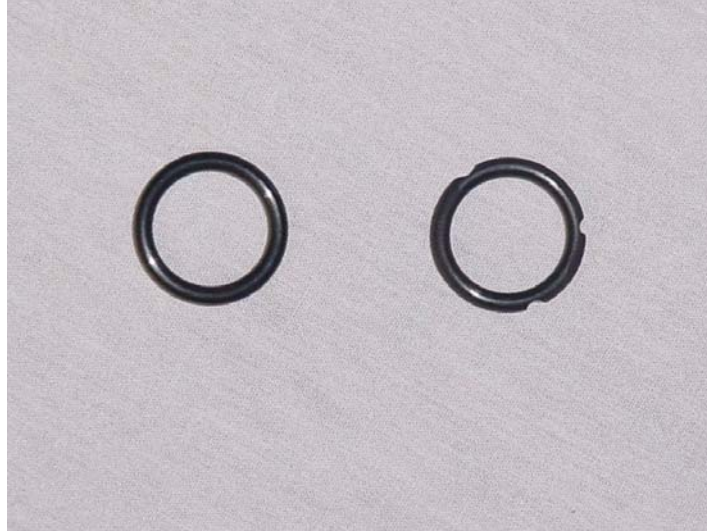
Many of the concepts listed here are talked about in other parts of the manual. Use this as a concise way of finding reference information.

LUBRICATION

Lubrication is a key element to proper maintenance. When you fire the Diadem the moving parts are slowly being worn down. Lubrication slows this process. To lubricate your Diadem properly first remove any air source from the marker. Remove the upper bolt and the hammer as outlined above. Now drop a couple of drops of oil onto the hammer o-ring. With the upper bolt out of the marker put a few drops onto each o-ring on the upper bolt. Always do visual inspections of each o-ring as you oil it. A damaged or missing o-ring may cause the Diadem to misfire. You should lubricate your Diadem before each day of playing.



Oil all O-rings by placing one drop of oil on and spreading it around with your finger.



Check all your O-rings

VELOCITY ADJUSTMENT

To adjust the velocity of your Diadem you must raise or lower the pressure of air released. This is done by turning the pressure adjustment screw located on the bottom of the regulator. Turning the screw clockwise increases the velocity. A turn counter-clockwise decreases the velocity. If you using a regulator that did not come from Action Markers on the marker, check the regulator's directions to make sure of your adjustments.



When changing the velocity of your Diadem ITS, be sure to fire several shots to make sure that the setting is locked in. We have found the best performance of the Diadem is reached when the marker is firing at around 295 feet per second.

AIR TANKS

The Diadem is designed to work great with all air tanks made for paintball use. We recommend using compressed air or Nitrogen for the most consistent velocity. CO2 has the possibility of damaging some of the internals of the Diadem. Damage caused by CO2 is not warranted.

FIELD STRIPPING

Field Stripping your Diadem is extremely easy. It is done by removing the air supply (or using the on/off valve on your Advanced Drop to shut off the air supply), pulling up the locking pin on the top of your marker, and then sliding the upper bolt out the rear of the marker. This allows you to clean the upper bolt and chamber



CLEANING

To keep your marker in top condition it should be cleaned anytime you have used it. To clean it properly, remove any air supply from the marker and pull the trigger once or twice to let any remaining air escape. Remove the barrel from the front of the marker and clean separately. Pull the connecting pin up. Slide the upper bolt out of the rear of the marker. Then run a squeegee through the top chamber (from back to front) to ensure that there is no paint in the chamber. Examine the upper bolt and remove any traces of paint there as well. Next remove the ram. To remove the ram assembly, simply remove the Ram Cap (Note the orientation of the Ram as it is in the marker, you will need to replace the ram in this position when re-assembling the marker), remove the airline, and turn the Ram Assembly counter-clockwise. Use care when pulling the Ram Assembly out so you do not scratch the Ram Housing. Look for any paint which may have leaked to the bottom and gotten on the hammer or in the lower chamber. Clean your marker with any standard paintball cleaning equipment.

RE-ASSEMBLING

First replace the Ram Assembly, carefully sliding it in up to the threads and then turning it clockwise. Now replace the upper bolt into the upper chamber. The easiest way we have found to line up the connecting pin with the hammer is to apply some pressure to the top of the pin as it enters the upper chamber and slide the bolt forward until it drops down.



TRANSPORTATION

Whenever transporting your marker, be sure to use a carrying case to prevent any wear and tear. We feel that all wear and tear should happen in the course of an actual paintball game. Dropping your paintball marker on the sidewalk shouldn't be a concern that you worry about. The box that your marker came in also doubles as a nice case already. **As a reminder, never transport your marker in the open in public. Not everybody can recognize it as a paintball marker.**



SUPPORT

The following is a list of the most common problems you may have with paintball markers, along with their most common solutions. The list is not intended to be comprehensive. If you are having a problem that is not listed, please refer to www.actionmarkers.com. We will be posting new and updated Support issues through our website. If your concern is not resolved through the website then call your dealer or call our technical support number listed under contact information.

Firing in unexpected mode:

Last programmed firing mode is still in memory - Reprogram the firing mode to your preference

Leaks at tank connection:

Bad tank o ring – Replace the O-Ring on the tank

Damaged tank adapter – Replace the Tank adapter

Poor accuracy:

Wet or oily barrel – Clean the barrel out with a dry squeegee. Ensure that the barrel is completely dry. Field strip your marker and ensure that the upper chamber is dry as well.

Bad or poor quality paintballs – This is the biggest cause of inaccuracy. Ensure that the Paintballs are not uneven or dimpled. Use a higher quality of paintball.

Velocity too high – Re-check your velocity at a chronograph and change as needed to get your velocity down under 300 feet per second.

Velocity too low – Re-check velocity using a chronograph and change as needed. Keep your velocity under 300 feet per second. Ensure that you are not running out of air in your air supply.

Bad or damaged barrel – Inspect your barrel for nicks or scratches on the inside of the barrel. If it is damaged in any way you may need to replace your barrel. Check with your local dealer or look at our website, www.actionmarkers.com, to order a new barrel.

Breaks paintballs:

Bad or poor quality paintballs – Use higher quality paintballs. Ensure that your paintballs are not overly fragile.

Bad or dirty barrel – Make sure that your barrel is clean and free from all debris. If there is any damage to your barrel you may need to get a new barrel.

Slow Feed Rate – One of the most common causes of ball breakage on the Diadem is out shooting your hopper. If you are consistently getting chopped paint you should consider getting a motorized ball hopper that would better keep up with the Diadem's Rate of Fire.

Rate of Fire set too high – Reprogram your maximum rate of fire to match your hopper

Inconsistent velocity:

Bad or oval shaped paintballs – Use higher quality paintballs. Ensure that your paintballs are completely spherical without becoming oblong.

Bad upper bolt O-ring – Replace worn out O-rings.

Regulator Problems – There are a number of possible problems with the regulator. Check with your regulator manufacturer to see if there are any problems with your regulator.

Extremely Low velocity:

Low Tank – Recharge or change your air supply

Will not fire/ Light will not turn on:

Battery is too low or dead – Replace the battery with a new one.

Trigger adjustment is set wrong – Refer to the Trigger adjustment section and check your trigger to make sure it is set right.

NEW PRODUCTS AND UPDATES

We are continually in the process of designing new products. A full line of accessories and upgrades to the Diadem is available. For information regarding new Products call your local dealer or Action Markers, Inc or visit us online at www.actionmarkers.com.





CONTACT INFORMATION

If you need to contact us for any reason check out our website at www.actionmarkers.com.

Action Markers, Inc.
3908 Fourier Dr.
Fort Wayne, Indiana 46818
Tel: (260) 426-4600
Fax: (260) 490-5300
Email: info@actionmarkers.com
Website: www.actionmarkers.com

(cut out and return Warranty cards to the above address with your receipt.)

Check out www.actionmarkers.com to see our new referral program – let your friends know how much you love the Diadem and we will pay for you to play paintball!

WARRANTY REGISTRATION CARD

Purchased From _____ Serial # _____

Date _____ City _____ State _____ Zip _____

Your Name (Please Print) _____

Street Address _____

City _____ State _____ Zip _____

Phone # _____ Email Address _____

Why did you choose the Sentinel? _____

What other markers do you own? _____

Who referred you to Action Markers? _____



Visit us at www.actionmarkers.com!!








Diadem Quick Reference Guide

Icon Reference Chart

LED Lights

-  Solid Green
-  Solid Red
-  Flashing Red
-  Solid Red for about 2 seconds
-  Solid/Off

Buttons

-  Button 1 (on left) (Safety) Press
-  Button 2 (on right) (Power) Press
-  Button 2 (on right) (Power) Hold
-  Buttons 1 & 2 Press
-  Buttons 1 & 2 Hold

How to set Modes

Turn Diadem on/off:   / 

Turn Safety on/off:   / 

Programming enter/exit:   / 
(must be in safety mode to enter, defaults back to safety when exiting) safety on

Firing Method Mode: 

Balls Per Second Mode:  

Dwell Mode:   

Debounce Mode:    

Eye Selection Mode:     

Reset Factory Settings:  X7

(must be in programming mode first)

How to set Options

Firing Method Mode:

3 Shot Burst:       









Auto Fire:        

Balls Per Second Mode:









6 BPS:        

15 BPS:     X15 






Dwell Mode (ms=milliseconds):

10 ms:        

Debounce Mode (ms=milliseconds):

10 ms:        

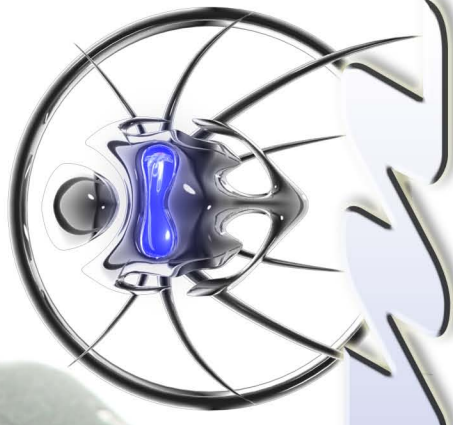
Turn Eye Off:       

Turn Factory Settings On:     



Programming Chart

Fire Method Mode: 2 1) Single Shot 2) Response Trigger 3) Turbo Fire 4) 3 Shot Burst 5) 6 Shot Burst 6) Full-Auto	Balls Per Second Mode: 2 1) 1 BPS 2) 2 BPS 3) 3 BPS 4) 4 BPS 5) 5 BPS 6) 6 BPS	Dwell Mode: 2 1) 8 milliseconds X8 (8 flashes) 2) 9 milliseconds X9 (9 flashes) 3) 10 milliseconds X10 (10 flashes) 4) 11 milliseconds X11 (11 flashes) 5) 12 milliseconds X12 (12 flashes) 6) 13 milliseconds X13 (13 flashes)	Debounce Mode: 2 1) 0 milliseconds 2) 5 milliseconds 3) 10 milliseconds 4) 15 milliseconds 5) 20 milliseconds 6) 25 milliseconds
Eye Selection Mode: 2 1) On 2) Off	Reset to Factory Default: 2 1) Off 2) On	Factory Settings are as follows: Fire Method Mode: Single Shot Balls Per Second Mode: 12 BPS Dwell Mode: 14 milliseconds Debounce Mode: 5 milliseconds Eye Selection Mode: On Factory Selection Mode: On	



DIAGNOSTIC

etc. up to 25 milliseconds

etc. up to 25 BPS

etc. up to 50 milliseconds in 5ms increments