VX Series

For the DM4™, DM5™ and DMC™ paintball markers

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Version 1.7

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Contents

1 Introduction

Thank you for the purchase of the VX series upgrade for DM4™, DM5™ and DMC™ paintball markers. You will find that this chip has the most innovative features of any chip currently on the market. Key features like Anti-mechanical Bounce (AMB), Instant On Functionality, and a variety of firing modes that will give you the ability to dominate the playing field. The VX series upgrade contains streamlined software to accelerate the performance of your DM4™, DM5™ and DMC™ paintball markers.

2 Features

- Capable of seven firing modes: Semi-Auto, PSP, NXL, Millenium Ramp, Threshold Ramping, Variable Ramping, and Demonstration.
- Actual BPS indication by a simple touch of the Power Button.
- Programming Mode allows modifications to Debounce™, Loader Delay, Dwell, AMB, Anti-Bolt Stick (ABS), Firing Mode, Ramp Threshold, Variable Ramp Multiplier, and Maximum Rate of Fire.
- ABS programming virtually eliminates First Shot Drop-Off (FSDO).
- Innovative debounce and AMB algorithms designed to suppresses mechanical bounce.
- Power efficient software that extends battery life.
- Instant On functionality allows the marker to fire instantly once powered on.
- Automatic ten minute power down saves battery life.
- Automatic Eye Disable (AED) system prevents unnecessary ball breaks due to dirty/malfunctioning eyes.
- Automatic Eye Enabling (AEE) system allows the marker to recover to full speed whenever possible.
- Streamlined software monitors loader feed rate to provide the absolute fastest cycling time.
- Low battery Indicator warns you of low battery levels at all times during marker operation.

3 Safety warning

Setup and operation of the VX series upgrade chip is not complicated. To prevent damage to your marker please read this manual completely before beginning the installation process. If after reading through this manual you believe you cannot perform the installation please seek someone who can assist you.

Figure 1: Taking off the grip panel.

The VX series upgrade chip is electro-statically sensitive. Care must be taken during handling and installation. Electrostatic Discharge (ESD) precautions must be taken to ensure that there will be no accidental damage to the VX series upgrade chip or your marker. Please use a grounding strap or similar device when working on anything subject to ESD.

Before disassembling any marker be sure the power to the marker is off, the barrel removed, and the air system off. **Do not remove or install any electronic components with the battery connected!**

4 Installation

4.1 Removing the Grip Panel

Before disassembling the marker, make sure power to the marker is off, the barrel removed, and the air system off. Using the proper sized allen wrench, remove the three screws that hold the right side rubber grip panel in place (see figure 1). Move the rubber grip panel behind the trigger guard so it is completely out of the way. Remove the 9-volt battery and set it aside. **Do not remove or install any electronic components with the battery connected!**

4.2 Removing the Stock Chip

Note the orientation of the stock chip. Using a chip puller or similar device, carefully lift the chip from the socket (see figure 2). The chip should now easily come out of the socket by pulling straight up on the chip. **Be carefully not to damage the pins of the chip when removing from the socket.**

4.3 Installing the Upgrade Chip

The chip has a notch at one end, which denotes the direction it should be inserted (see figure 3). Carefully insert the VX series upgrade chip into the socket, making sure that all pins are inserted into the matching socket holes and that the notch is oriented to the right (front of the marker). Orientation of the chip is the same as the stock chip. Press down on the chip to fully seat it in the socket. **Extreme**

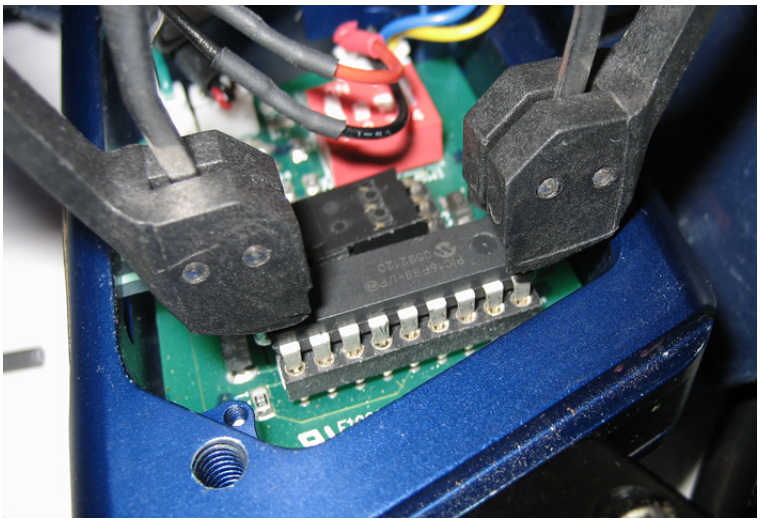

Figure 2: Removing stock chip with a chip puller.

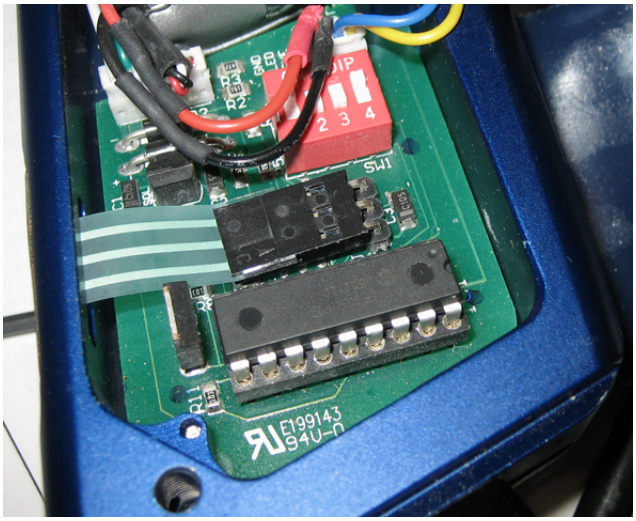

Figure 3: VX chip installed.

care must be taken so that no pins are bent during the installation process! Re-install 9-volt battery and reassemble the grip frame.

5 Operation

The VX series upgrade performs with the same concept as the stock chip; however advancements in design allow the VX series upgrade to operate at a higher level. The VX series upgrade is designed to work only with the Low Battery Indicator (LBI) board for the DM4™, DM5™ and DMC™ paintball markers. Under normal operating conditions (tournament lock enabled), all DIP switches should be in the ON position.

Power to the marker can be turned ON/OFF by pressing and releasing the Power Button located at the rear of the grip frame. To turn the marker on press the Power Button (Note: the LED will show different colors depending on the status of the marker). The marker will immediately be able to fire once the marker is turned on. Please use proper marker handling when turning on any marker. When first powered on the LED will rapidly flash green to indicate sufficient battery power for normal operation. If the battery is low the LED will rapidly flash orange. To turn off the marker, press and hold the Power Button for approximately one second until the LED turns off.

5.1 Tournament Lock

Tournament Lock is enabled by setting DIP switch 2 to the ON position. With Tournament Lock enabled you cannot enter Programming Mode. With Tournament Lock disabled (DIP switch 2 OFF) you can enter Programming Mode by turning on the marker while pulling the trigger.

5.2 Low Battery Indicator

The VX series upgrade chip continuously monitors the battery level and will flash the LED orange if the battery level is low. When you power on the marker the LED will blink three times. It will blink green if the battery level is good and orange if the battery is low. The marker will still be able to operate when the battery level is low, however the battery should be replaced as soon as possible.

5.3 The Anti-Chop Eye (ACE)

The Anti-Chop Eye (ACE) can be enabled/disabled by pressing the Eye Button located on the rear of the grip frame. When the marker is first powered on the ACE is enabled. The ACE status can be enabled/disabled when the marker is powered on. A blinking red LED indicates that the ACE is disabled. A solid red LED indicates that the ACE is enabled and that there is no ball in the breech. A solid green LED indicates that the ACE is enabled and that there is a ball in the breech.

The ACE will automatically disable if it is blocked for four consecutive shots. If the ACE is disabled, it will automatically enable when the ACE registers 5 consecutive shots fired. You can also enable the ACE manually by pushing the Eye Button.

LED Color	Rate of Fire
White	Greater then 20 bps
Purple	20 bps to 16 bps
Blue	15 bps to 13 bps
Teal	12 bps to 10 bps
Red	Less then 10 bps

Figure 4: BPS Indicator LED Display Color Range

5.4 Demonstration Mode

Demonstration Mode allows you to dry fire the marker. **This is for testing the marker with air only.** You should never use paint in this mode as the marker will ignore any input from the ACE. You can enter Demonstration Mode by setting DIP switch 3 to the OFF position. To disable Demonstration Mode, set DIP switch 3 to the ON position. Demonstration Mode functions in all firing modes.

5.5 BPS Indicator

Briefly pushing the power button, during any normal operation will display an indication of your rate of fire with the LED. Figure 4 explains the LED colors.

5.6 Debounce™

Debounce™ is an adjustable number of microcontroller cycles after each trigger pull and release where the state of the trigger switch must remain consistent before the software starts looking for additional trigger activity. Setting this too low may cause excessive trigger bounce, leading to falsely generated shots. The default is 5 and may be set from 1 to 50.

5.7 Loader Delay

Loader Delay is the amount of time delayed before a firing cycle to allow the paintball to fully seat in the breech. Depending on what type of loader (i.e. gravity feed or force feed), the Loader Delay can be adjusted to prevent chopping due to the speed of the loader. The default is 1 and may be set from 1 to 50.

5.8 Dwell

Dwell is the amount of time that the solenoid is energized during each firing cycle. If you experience drop off or your bolt will not cycle completely, increase the dwell. Greater efficiency and faster firing rates are achieved by lowering the dwell. The default is 18 milliseconds and may be set from 10 to 25 milliseconds.

Fire Mode	No.	Explanation
Semi-Auto	1	One valid trigger pull and release results in one shot.
NXL	2	First three shots are Semi-Auto and full auto as long as trigger is pulled, timeout is one second. Rate of fire capped at 15bps.
PSP	3	First three shots are Semi-Auto and three shot burst per pull afterward, timeout is one second. Rate of fire capped at 15bps.
Millenium Ramp	4	Any trigger activity below 8bps will behave similar to Semi-Auto. Trigger activity above 8bps will result in ramping with the rate of fire capped at 15bps.
Ramping	5	Full-Auto after trigger input is above Ramp Threshold.
Variable Ramp	6	Variable rate of fire after trigger input is above Ramp Threshold.

Figure 5: Fire Mode Settings

5.9 Anti Mechanical Bounce (AMB)

Mechanical bounce occurs when the marker fires due to the kick generated during the last shot and can cause the marker to ”run away,” firing after you let go of the trigger. AMB helps prevent markers from ”running away” when the trigger is pulled slowly. The default is 1 and may be set from 1 to 5.

5.10 Anti Bolt Stick (ABS)

The ABS setting is the additional amount of Dwell added to the current Dwell setting after 15 seconds of non-use has occurred. The default ABS setting is 10 milliseconds and may be set from 1 to 15 milliseconds. This feature decreases the likelihood of First Shot Drop-Off (FSDO).

5.11 Fire Mode

For NXL, PSP and Millenium Ramp firing modes the Debounce™ and AMB settings are deliberately set high to comply with the first three shots Semi-Automatic rule. Please consult the PSP Rulebook regarding details for either of these firing modes.

Ramping (mode 5) allows you to easily maximize your firing rate. If you pull the trigger faster then the Ramp Threshold, the marker will fire as fast as possible maximizing your loader feed rate.. When you pull the trigger slower then the Ramp Threshold, the marker will fire one shot per trigger pull and release (depending on the Debounce™ and AMB settings). You can set the Ramp Threshold anywhere between 5 and 20bps.

Variable Ramp (mode 6) reacts the same way as Ramping, except that the rate of fire varies randomly below the Maximum Rate of Fire. For example, if you have your Maximum Rate of Fire set at 15bps and you have Variable Ramp enabled, the marker can randomly fire anywhere between 15bps and 7bps. The amount that it varies can be set using the Variable Ramp Multiplier setting (see Figure 6.

Variable Ramp Multiplier Setting	Variable Rate of Fire
1	1 bps
2	3 bps
3	7 bps
4	15 bps

Figure 6: Variable Ramp Multiplier Settings

Setting	Maximum Rate of Fire (bps)	Setting	Maximum Rate of Fire (bps)
1	Uncapped	14	17.00
2	14.00	15	17.25
3	14.25	16	17.50
4	14.50	17	17.75
5	14.75	18	18.00
6	15.00	19	18.25
7	15.25	20	18.50
8	15.50	21	18.75
9	15.75	22	19.00
10	16.00	23	19.25
11	16.25	24	19.50
12	16.50	25	19.75
13	16.75	26	20.00

Figure 7: Rate of Fire Cap Settings

5.12 Ramping Threshold

The Ramping Threshold setting is used in both Ramping (mode 5) and Variable Ramping (mode 6) Fire Modes. It can be set anywhere between 5 and 20bps.

5.13 Variable Ramp Multiplier

The VRM setting is used only in Variable Ramping Mode (mode 6). See Figure 6 for possible settings.

5.14 Maximum Rate of Fire

The Maximum Rate of Fire setting is a global setting used in all Fire Modes. Due to manufacturing tolerances the values listed in Figure 7 should only be used as guidelines and should be independently verified by the user. The default setting is 1 or uncapped rate of fire.

6 Programming

ABS, AMB, Loader Delay, Dwell, Fire Mode (Semi-Auto, NXL, PSP, Millenium and Ramping), Ramping Threshold, Variable Ramp Multiplier, and Debounce™ functions are programmable by following these instructions. During programming make sure that your marker has a barrel condom in

Color	Feature	Default Setting	Allowable Settings
Green	Trigger Sensitivity	5	1-50
Teal	Loader Delay	1	1-50
Orange	Dwell	18ms	10-25ms
Purple	Anti Mechanical Bounce (AMB)	1	1-5
Red	Anti Bolt Stick (ABS)	10ms	1-15ms
Blue	Fire Mode	1	1-5
Flashing Blue	Ramping Threshold	10	5-20
Flashing Green	Variable Ramp Multiplier	1	1-4
White	Maximum Rate of Fire	1	1-26

Figure 8: Programming Mode Menu

place and the air supply is shut off. Although it is not possible to fire the marker while in Programming Mode it is always good to practice safe marker handling.

6.1 Entering Program Mode

To enter Programming Mode set DIP switch 2 to the OFF position (if it has not already been done). Turn off marker, pull and hold the trigger, and then turn the marker on. The LED will first blink blue then blink purple indicating you are in Programming Mode. These first blinks indicate the version of the software. For example, one blue and three purple indicates software version 1.3. **Note: no color display indicates a value of 0.**

6.2 Navigating Program Mode

The LED will initially light green indicating the Debounce™feature. Pulling and releasing the trigger will change the LED color, advancing to the next Programming Feature. This is also known as the Programming Menu. Figure 8 lists the LED colors, the settings they refer to, and the sequence of the Programming Menu. Once you have reached the last feature an additional trigger pull will restart the sequence of colors returning you to the top of the Programming Menu.

6.3 Viewing or Changing A Setting

Once you decide which Programming Feature you want to change, advance the Programming Menu to the appropriate color and hold the trigger until the LED turns off, then release the trigger. The LED will flash the number of times already programmed into memory for that feature. Once the flash pattern has completed the LED will turn off. At this stage, the user can program a new value for that specific feature. To program a new value, pull and release the trigger the same amount of times as the new value. The LED will flash every time the trigger is pulled confirming the trigger pull.

Programming Feature Change Example

This example will show you how to set your marker to PSP mode. It assumes all of the marker settings are the factory default settings.

1. Open the grips to expose the DIP switch block.
2. Set DIP switch 2 to the OFF position.
3. Turn the marker off if it is not already off.
4. Hold down the trigger and turn the marker on using the Power Button.
5. The LED will flash the software version indicating the marker is now in Programming Mode.
6. Pull and release the trigger five (5) times to switch to the Fire Mode Programming Feature. The LED should now be blue.
7. Pull and HOLD the trigger until the LED turns off. Release the trigger.
8. The LED will flash blue one (1) time indicating the factory default setting of one (1).
9. When the LED stops blinking enter the new setting by pulling the trigger three (3) times.
10. The LED will now show the color of the next programming feature (Flashing Blue, the Ramping Threshold Programming Feature) indicating that the new Fire Mode Programming Feature has been set correctly.
11. Turn marker off to exit Programming Mode.
12. (Optional) Flip DIP switch 2 to the ON position to engage Tournament Lock.
13. Turn the marker on. The marker is now ready to fire in PSP mode.

7 Free Upgrades

From time to time Inoviq, LLC makes new releases of the VX series upgrade software. You can have your chip upgraded for free, you must pay for shipping. Contact us for more information!

8 Limited Warranty

Inoviq, LLC warrants its products to be in good working order for one month from the date of purchase. If the chip proves to be defective and Inoviq, LLC is notified within the warranty period, Inoviq, LLC will, at its option, repair or replace the product at no charge. All repairs will be done at Inoviq, LLC. Damage to equipment resulting from negligence, misuse, tampering or acts of God are not covered by this warranty. Inoviq, LLC will make every effort to return your equipment to you as quickly as possible. Shipping costs for the return of equipment for repair by Inoviq, LLC shall be the responsibility of the purchaser.

Inoviq, LLC must be contacted to obtain a Return Merchandise Authorization (RMA) number prior to repair. Any product returned without an RMA will be shipped back. All defective equipment must be returned to Inoviq, LLC for repair in the original shipping container.

9 Contact Us

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