



SENSORED BRUSHLESS ESC

INTRODUCTION

The VIPER VTX Series sensored Electronic Speed Controller is the ultimate in engineering design from Viper R/C Solutions, Inc. Our commitment to quality and exhaustive track testing ensure that VTX Series sensored Electronic Speed Controllers give you the smoothest power band and reliable performance—even in the most demanding R/C conditions.

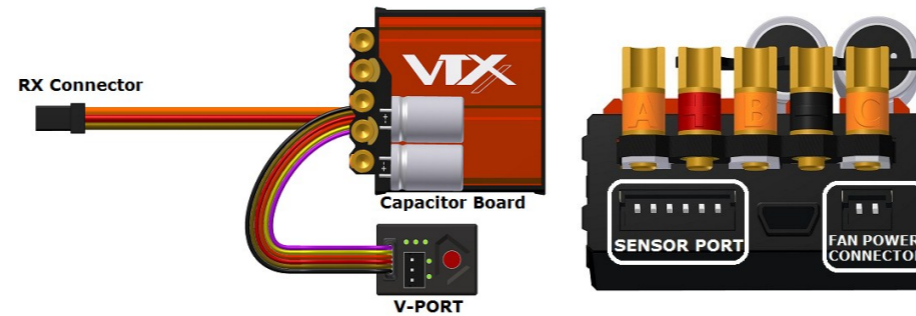
Please read the following instructions carefully before installing your new VTX system.

PRECAUTIONS

- VTX series ESCs are high end racing products that offer a lot of tuning parameters. If you are not certain about the set up, should always try corresponding factory default profiles. If not sure about the detailed setting, you should contact Viper directly for assistance.
- Viper RC has no control over the complicated boost timing set up in both gear and ESC, any ESC damage by boost function will not be covered under warranty (acceleration timing and top speed timing on Viper's ESC). This method of tuning the ESC should be done with EXTREME caution and Good knowledge of boost profiles.
- Should never free rev and brake the system with no loading. it will cause extreme spikes to damage both motor and ESC, moreover to void factory warranty.
- Do not run "reverse power" on lower turn motors (5.5T and below). Lower turn motors have extremely high RPM and using the reverse function will easily damage the ESC. You MUST use race mode without reverse power when running 5.5T and below motors.
- Do not connect reversed voltage. This will damage the ESC and battery.
- Pay attention to the motor and ESC timing. More timing will generate more heat on both the ESC and the motor.
- Do not leave batteries plugged into the ESC when not in use to prevent short circuits and over discharging the battery.
- Always monitor both the ESC and motor temperature after running them. Temperature should never exceed 160 degrees Fahrenheit.
- VTX Series ESC adapts high performance switching BEC. It requires high quality radio system. **2.4G** and **high quality FM radio systems** are the most suitable to work with VTX system. AM radio system will cause noise that results poor performance and operation failure of the VTX System.
- 3S Li-Po application always needs extra attention. Only VTX10 and VTX10R support up to 3S Li-Po. Black Edition only supports 2S Li-Po. Never drop in a 3S Li-Po without changing to the right pinion gear. 3S Li-Po is only suitable for SPEC class motors from 10.5T to 25.5T. Any ESC damage by 3S with improper gear and motor set up will not be covered by warranty.

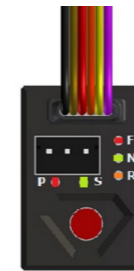
VTX10/10R/1 PHYSICAL DIAGRAM

- Capacitor board should be soldered properly as indicated below
- Each solder post has it's label to indicate motor signals (A/B/C) and power connectors (+/-). Do not apply high heat on the solder posts for more than 10 seconds to avoid damage on the VTX ESC.



V-PORT LED INDICATORS

- P** = Power On (Red LED)
- S** = Race Blinking Mode
(Green LED will be blinking when in Race Blinking Mode)
- F** = Forward (Red LED)
- N** = Neutral (Green LED)
- R** = Reverse/Brake (Orange LED)



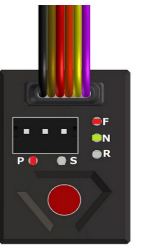
POWER ON/OFF VTX ESC

- Power On** = Press the red button on the **V-PORT** for one second.
- Power Off** = Press and hold the red button on the **V-PORT** for three seconds. All LED's will light up and turn off individually.

RADIO CALIBRATION

Every VIPER VTX ESC needs to run radio calibration process when it is brand new out of the package, switching radio system, or after firmware update. Process is as easy as the following steps after all wires and battery connector are properly soldered.

1. Connect a proper/charged battery pack to the ESC.
2. Turn on the transmitter with the throttle endpoint adjustments at 100% and all throttle trims centered.
3. Press and hold the red power button on the V-PORT for **three seconds**. (Followed by beep tone, F/N LED on the V-PORT will be indicated as the image at right)
4. Pull full throttle and hold, while holding press the red power button once. (Followed by beep tone, N/R LED will be indicated as the image shown at right.)
5. Push full brake and hold, while holding press the red power button once. (Followed by beep tone, all LED's will cycle.)
6. Calibration completed!



SETTING UP VTX ESC ON ProGauge

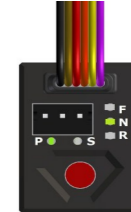
1. Power on VTX ESC. (Transmitter could be on or off.)
2. Press the red power button on the **V-PORT** for one second.
3. F/R LED will light up to indicate that the VTX is in **PROGRAMMING MODE**. (LED indicator shown as image below)
4. Connect the ProGauge to the **V-PORT** by plugging it in, and then scroll down to "Link Device" on the ProGauge. Use the **ESC/Up/Down/OK** keys on the ProGauge to **Change/Load/Save** settings. Please refer to Table.1 for setting option and parameters.
5. Any setting on ProGauge needs to be saved in order to store in the VTX system memory for properly future use.
6. After saving the settings, unplug the **V-PORT** connector and press the red power button for one second to go back to **RUNNING MODE**.



PROGRAMMING MODE.



RACE BLINKING MODE.



RACE OPEN MODE.

VTX10/10R/1 SPECIFICATIONS

	VTX10	VTX10R	VTX1	VTX10 BLACK EDITION	VTX10R BLACK EDITION
ON RESISTANCE	0.00045Ω * 2	0.000225Ω * 2	0.00045Ω * 2	0.00045Ω * 2	0.000225Ω * 2
SUPPORT LI-PO CELL	2S~3S	2S~3S	1S~2S	2S	2S
MAX BEC VOLTAGE/AMP	7V/5A	7V/5A	5.5V/3A	7V/5A	7V/5A
MOTOR LIMIT	2-pole 540/6.5T@2S	2-pole 540/2.5T@2S 2-pole 550/4.5T@2S	2-pole 540/3.5T@1S 2-pole 540/6.5T@2S	2-pole 540/6.5T@2S	2-pole 540/2.5T@2S 2-pole 550/4.5T@2S
3S LI-PO LIMIT	10.5T~25.5T ONLY WITH PROPER GEARING		No Support		
DIMENSIONS	30x32.5x16mm	30x32.5x21mm	30x32.5x16mm	30x32.5x16mm	30x32.5x21mm
WEIGHT (without wires)	47g	66g	43g	56g	75g
WATERPROOF	YES	YES	NO	NO	NO

PROGRAMMING OPTION: BRAKE

Brake Strength:

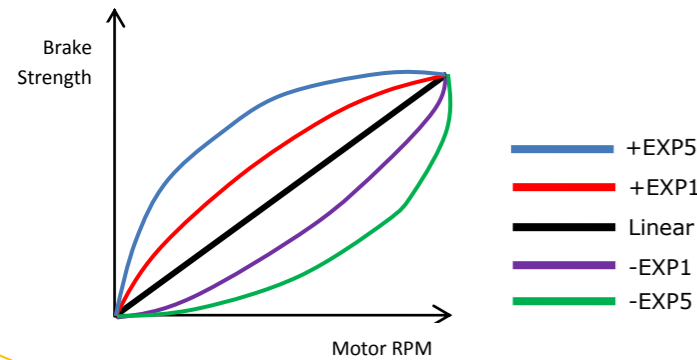
Parameters from 0% (Disabled) to 100%, 1% Incremental. A lower Brake Strength percentage will have less push brakes, while a higher percentage will have stronger push brakes.

Brake PWM Frequency:

Parameters are 600Hz/800Hz/1000Hz/1300Hz/1600Hz/2000Hz/2500Hz/3200Hz/4000Hz/5000Hz/6400Hz/8000Hz/9600Hz/12000Hz/16000Hz PWM stands for Pulse Width Modulation and is rated in Hertz, meaning cycles per second. A lower frequency will have a more aggressive braking feel. A higher frequency results in smoother braking, is more precise, and increases the ESC temperature.

Brake Curve:

Parameters are +EXP1 to +EXP5 / Linear / -EXP1 to -EXP5. A negative EXP Brake Curve will have a softer brake feel at the beginning of the brakes being engaged and get more aggressive as the brake are fully engaged. A linear Brake Curve will be uniform throughout the whole brake range. A positive EXP Brake Curve has strong brakes initially and then becomes softer.



PROGRAMMING OPTION: THROTTLE

Throttle PWM Frequency:

Parameters are 2000Hz/2500Hz/3200Hz/4000Hz/5000Hz/6400Hz/8000Hz/9600Hz/12000Hz/16000Hz PWM stands for Pulse Width Modulation and is rated in Hertz, meaning cycles per second. A lower frequency will have a more aggressive throttle feel and have less motor RPM. A higher frequency results in smoother throttle, is more precise, produces more motor RPM, and increases the ESC temperature.

Throttle Punch:

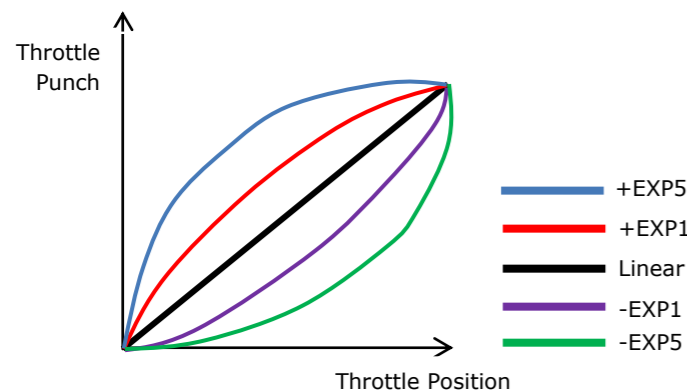
Parameters from 1% to 100%, 1% Incremental. A lower Throttle Punch percentage will have a slower throttle response and feel softer initially. A higher Throttle Punch percentage will have a faster throttle response.

Throttle Curve:

Parameters are Extreme Low Band/Power Low Band/Linear/Power High Band/Extreme High Band. A lower Throttle Curve will have a softer throttle feel at the beginning of the throttle being engaged and get more aggressive as it is fully engaged. A linear Throttle Curve will be uniform throughout the whole throttle range. A higher Throttle Curve has strong throttle initially and then becomes softer.

Dead Band:

Parameters are Off/Narrow/Middle/Wide. This is the amount of "play" when the throttle is engaged. Off make the throttle engage more instantaneously, while Wide would have a lag.



PROGRAMMING OPTION: SMART BRAKE SYSTEM

Smart Brake System was consisted by 2 sections, the Dynamic Brake and the traditional drag brake. These 2 sections could be working alone (by disable the other) or together. It will provide super precise braking performance at high speed racing circumstances.

Dynamic Brake

When throttle is at neutral point, and RPM is over the trigger RPM, the Smart Brake System will kick in with Max Brake Strength and automatically brake to the Trigger RPM (User Set). After that point it curves down to regular drag brake percentage for the remainder of the brake response.

Trigger RPM:

Parameters from 500RPM to 60000RPM, Incremental by 500RPM. The motor RPM that engages the Max Brake Strength. Dynamic Brake allows driver to set a trigger RPM. This parameter should be track and motor dependent.

Max Brake Strength:

Parameters from 0% (Disabled) to 100%, 1% Incremental. It is to set the initial drag brake force that will be applied when the throttle position was at neutral point and the motor RPM was over the trigger RPM. You can look at this as the upper part of the drag brake before the RPM (User Sets) is hit.

Dynamic Curve:

Parameters are +EXP1 to +EXP5 / Linear / -EXP1 to -EXP5. This is engaged after the Neutral Brake percentage is reached. A negative EXP Dynamic Brake Curve will have a softer brake feel at the beginning of the brakes being engaged and get more aggressive as they are fully engaged. A linear Dynamic Brake Curve will be uniform throughout the whole brake range. A positive EXP Dynamic Brake Curve has strong brakes initially and then becomes softer.

Drag Brake

Parameters from 0 (disable) to 100%, 1% Incremental. This is the traditional drag brake that we commonly see on most ESCs. It will provide a drag force when the throttle was released to the neutral point. When Dynamic Brake is disable, it is working like normal drag brake.

A Smart Brake System set up example:

We set Trigger RPM at 15000 with Max Brake Strength at 15% and Drag Brake at 5%. When the throttle is released, the system detects the motor is at 25000 RPM. The Smart Brake System will kick in with drag brake strength 15%. When the RPM drops to 15000, the Smart Brake System will start decreasing motor RPM progressively with drag brake force from 15 (Max Brake Strength) down to 5% (Drag Brake) and this is based on the Dynamic Curve parameter setting. The key parameter is the trigger RPM. It is motor RPM and track layout dependent. A good set Smart Brake System set up will assist you to have more precise cornering and moreover to reduce lap time.

PROTECTION & ERROR INDICATORS

Battery Cut Off:

Parameters from 5.0V to 10.5V (VTX10/10R), 3.6V to 7.0V (VTX10/10R Black Edition) and 2.7V to 7.0V (VTX1), 0.1V Incremental. Allows user to set the cut-off for the appropriate voltage per type of battery used.

Motor Temperature Cut Off:

Parameters from 160 Degrees to 270 Degrees (10 degrees incremental).

Motor temperature cut activation is indicated by blinking "F" and "R" LEDs.

ESC Temperature Cut Off:

Parameters from 160 Degrees to 270 Degrees (10 degrees incremental).

ESC temperature cut activation is indicated by blinking "F" and "R" LEDs with solid "N" LED.

PROGRAMMING OPTION: MOTOR POWER

VIPER VTX series ESC offers advanced timing system for extreme racing competitions. The MOTOR POWER has 2 sections (acceleration boost and top speed timing) with 5 parameters. It allows you to set up and to enhance acceleration and top speed performance.

Tips: Always start testing the MOTOR TIMING with minimum advanced timing. Most sensored brushless motors have 30 degrees physical advanced timing with adjustable end bell for more or less timing. The total advanced timing (acceleration boost + top speed timing) should not be over 60 degrees for the optimized performance and efficiency.

Warning: MOTOR TIMING option generates a lot of power and will easily overheat and moreover to damage both ESC and motor. VIPER R/C SOLUTIONS will not be responsible for any equipment damage caused by MOTOR POWER settings.

ACCELERATION BOOST

Start RPM:

Parameters from 500 to 30000 RPM (500 RPM incremental). This sets the start RPM that acceleration timing engages. This parameter should be based on the motor KV and the track condition. To calculate Start RPM:

Start RPM = Motor KV x 6.4 x 0.3

For example, if the motor KV is 2000, it will be $2000 \times 6.4 \times 0.3 = 3840$. Then you set the START RPM = 3500 to 4000

Finish RPM:

Parameters from 500 to 50000 RPM (500 RPM incremental). This sets the start RPM that acceleration timing finishes. To calculate the Finish RPM:

FINISH RPM = Motor KV x 6.4

For example, if the motor KV is 2000, it will be $2000 \times 6.4 = 12800$. Then you set the finish RPM = 12000 to 13000

Note: motor KV rating should be provided by the motor manufacture.

Max Advanced Timing:

Parameters from 0 (Disable) to 60 degrees (1 degree incremental). This sets the maximum advanced timing at the time the motor reaches the set up Finish RPM.

TOP SPEED TIMING

Slew Rate:

Parameters from Level 1 to 10 (1 level incremental). This sets how fast the ESC reaches the maximum advanced top speed timing. The larger number will have more aggressive top speed acceleration while the smaller number will have smoother feeling.

Max Advanced Timing:

Parameters from 0 (Disable) to 40 degrees (1 degree incremental). This sets the maximum advanced timing at the time the motor reaches the set up Finish RPM.

MISC CONTROL

Run Mode:

Parameters are Practice/Race Blinking/Race Open. Practice allows all settings to be adjusted on the ESC. Also, it allows reverse. Race Blinking locks out reverse and does not allow any Motor Power Parameters to be adjusted. Race Open locks out reverse while maintaining Motor Power adjustability.

SBEC Voltage:

Parameters from 5.0V to 7.0V (VTX10/10R) and 4.5V to 5.5V (VTX1), 0.1V Incremental. A higher voltage will make servos react faster at the expense of a shorter life span. However, do not set SBEC Voltage above the servo manufacturer's recommended voltage.

Forward Power:

Parameters from 50% to 100%(1% Incremental). This setting allows you to limit the forward power.

Reverse Power:

Parameters from 25% to 100%(1% Incremental). This setting allows you to limit the reverse power.

Auto Power Off:

Parameters from 1 to 10 Minutes(1 Minute Incremental). This allows the user to set the ESC to power off if it remains in neutral for the amount of minutes set.

UTILIZE FACTORY PRE-LOAD PROFILES

VIPER VTX series ESC was designed with 8 profiles space for storing settings for different tracks/ applications, and for easy /quick changes. We have spent countless track hours to test VTX series ESC and designed 8 factory pre-load profiles for drivers who need easier and quicker start of using VIPER VTX ESC without a ProGauge. For drivers who use VIPER VTX-LITE version without a ProGauge, this will allow a quick way to switch to a most suitable profile to start using VTX ESC in just a few minutes.

CHANGE PROFILE WITHOUT A ProGauge

1. Connect a proper/charged battery pack to the ESC.
2. Power on transmitter.
3. Press and hold the red power button on the **V-PORT** for three seconds.
(Followed by beep tone, F/N LEDs on the **V-PORT** will be indicated as the image shown at right)
4. Press the corresponding number of time of the desired profile (refer to TABLE.1 below) on the red power button on the **V-PORT**. For example, press 5 times if you wish to load profile 5. The F/R LEDs will be indicated on every button press.
5. Release the power button for 3 seconds. The VTX ESC will save the profile number and F/R LEDs will be flashing the number of time of the corresponding profile that it was saved.
6. The VTX ESC will then run an auto system reset. The F/R LEDs will be flashing the corresponding profile number every time after beeping of system initialization.



TABLE.1 VIPER VTX10/10R/1 FACTORY PRE-LOAD PROFILES

Profile #	Application	Good to run with	Smart Brake System						Throttle		Motor Power		MISC Control		Protection	
			Brake		Dynamic Brake			Drag Brake	Punch	Curve	Acceleration Boost	Top Speed Timing	SBEC Voltage (VTX1)	Reserve Power	Battery Cutoff (VTX1)	ESC Temp Cut
			Strength	Curve	Trigger RPM	Max Brake Strength	Curve									
1	SPEC off road no-boost	10.5T to 21.5T	80%	Linear	12000RPM	0%	Linear	Disable	100%	Linear	Disable	Disable	6.0V (5.0V)	Disable	6.4V (3.2V)	220 ° F
2	MOD off road no-boost	4.5T to 9.5T	75%	Linear	15000RPM	0%	Linear	Disable	60%	Linear	Disable	Disable	6.0V (5.0V)	Disable	6.4V (3.2V)	220 ° F
3	SPEC off road 13.5T boost	13.5T	80%	Linear	12000RPM	0%	Linear	Disable	100%	Linear	35 °	15°	6.0V (5.0V)	Disable	6.4V (3.2V)	220 ° F
4	SPEC off road 17.5T boost	17.5T	80%	Linear	10000RPM	0%	Linear	Disable	100%	Linear	35 °	15°	6.0V (5.0V)	Disable	6.4V (3.2V)	220 ° F
5	SPEC on road no-boost	10.5T to 21.5T	80%	Linear	12000RPM	10%	Linear	Disable	100%	Linear	Disable	Disable	6.0V (5.0V)	Disable	6.4V (3.2V)	220 ° F
6	MOD on road no-boost	4.5T to 9.5T	80%	Linear	18000RPM	10%	Linear	Disable	60%	Linear	Disable	Disable	6.0V (5.0V)	Disable	6.4V (3.2V)	220 ° F
7	SPEC on road boost	10.5T to 21.5T	80%	Linear	12000RPM	10%	Linear	Disable	100%	Linear	35 °	20 °	6.0V (5.0V)	Disable	6.4V (3.2V)	220 ° F
8	PRACTICE no-boost	All Turns	80%	Linear	Disable	Disable	Disable	Disable	60%	Linear	Disable	Disable	6.0V (5.0V)	50%	6.4V (3.2V)	220 ° F

TABLE.2 VIPER VTX10/10R/1 PROGRAMMING PARAMETERS

Root Manu	Menu/Options	Menu	Menu/Optional Values	Optional Values	
Change Setting	Brake	Brake Strength	0% (disable) to 100% (1% incremental)		
		Brake PWM Frequency	600Hz/800Hz/1000Hz/1300Hz/1600Hz/2000Hz/2500Hz/3200Hz/4000Hz/5000Hz/6400Hz/8000Hz/9600Hz/12000Hz/16000Hz		
		Brake Curve	EXP1 to EXP5 / Linear / -EXP1 to -EXP5		
	Smart Brake System	Dynamic Brake	Max Brake Strength	0% (disable) to 100% (1% incremental)	
			Dynamic Curve	EXP1 to EXP5 / Linear / -EXP1 to -EXP5	
			Trigger RPM	Disable, 500RPM to 60000RPM, 500RPM incremental	
	Drag Brake	0% (disable) to 100% (1% incremental)			
	Throttle	Throttle PWM Frequency	2000Hz/2500Hz/3200Hz/4000Hz/5000Hz/6400Hz/8000Hz/9600Hz/12000Hz/16000Hz		
		Throttle Punch	1% to 100% (1% incremental)		
		Throttle Curve	EXP1 to EXP5 / Linear / -EXP1 to -EXP5		
		Dead Band	off/Narrow/Middle/Wide		
	Motor Power	Acceleration Boost	Start RPM	500 to 30000 RPM (500 RPM incremental)	
			Finish RPM	500 to 50000 RPM (500 RPM incremental)	
		Top Speed Timing	Max Advanced Timing	0 to 60 Degrees (1 degree incremental)	
			Slew Rate	Level 1 to 10	
	Misc Control	Run Mode	Practice/Race Blinking/Race Open		
		SBEC Voltage	5.0V to 7.0V (VTX10/10R), and 4.5V to 5.5V (VTX1), 0.1V incremental.		
		Forward Power	50% to 100% (1% incremental)		
		Reserve Power	25% to 100% (1% incremental)		
		Auto Power Off	Disable, 1 to 10 Minutes (1 minute incremental)		
Protection	Battery Cut Off	5.0V to 10.5V (VTX10.10R),3.6V to 7.0V (VTX10/10R Black Edition) and 2.7V to 7.0V (VTX1) , 0.1V incremental			
	Motor Temperature Cut	Disable, 160 degrees F to 270 degrees F (10 degrees incremental)			
	ESC Temperature Cut	Disable, 160 degrees F to 270 degrees F (10 degrees incremental)			
Load Setting	Profile 1 to 8				
Save Setting	Profile 1 to 8				

PRODUCT WARRANTY

Your VIPER VTX series sensed ESC is guaranteed to be free from defects in materials and workmanship for a period of 365 days. Your original receipt showing the item and the date and place of purchase is required with your warranty service application. An ESC that is found to have been mishandled, abused or used incorrectly, including use in an application other than that for which the ESC is intended, will not be covered under the warranty. Viper R/C Solutions, Inc. has no control over the use of the ESC application with other electronic devices such as motors and batteries. Viper R/C Solutions, Inc. is not liable for any loss or damage, whether direct or indirect, incidental, or consequential, or any situation from the use, misuse or abuse of the product. Your VTX series sensed ESC is not a toy. This product is not intended for use by a child under age of 14 without adult supervision. The VTX ESC generates a lot of power that could result physical injuries. By setting up, connecting or operating the product, the user accepts all related liabilities.

SERVICE & SUPPORT

1. All requests for warranty service require the original proof of purchase showing the item, date, price, and dealer info.
3. For service, please visit www.viper-rc.com and follow the service instructions for the quickest turnaround time. Or call us at 1-866-206-8558.
4. For all technical questions, please visit www.viper-rc.com for the corresponding FAQ, or e-mail your question to

