

SMART BRUSHED 70A ESC + 15T REBUILDABLE MOTOR

SPEKTRUM. Instruction Manual

NOTICE

All instructions, warranties and other collateral documents are subject to change at the sole discretion of Horizon Hobby, LLC. For up-to-date product literature, visit horizonhobby.com or towerhobbies.com and click on the support or resources tab for this product.

MEANING OF SPECIAL LANGUAGE

The following terms are used throughout the product literature to indicate various levels of potential harm when operating this product:

WARNING: Procedures, which if not properly followed, create the probability of property damage, collateral damage, and serious injury OR create a high probability of superficial injury.

CAUTION: Procedures, which if not properly followed, create the probability of physical property damage AND a possibility of serious injury.

NOTICE: Procedures, which if not properly followed, create a possibility of physical property damage AND a little or no possibility of injury.

WARNING: Read the ENTIRE instruction manual to become familiar with the features of the product before operating. Failure to operate the product correctly can result in damage to the product, personal property and cause serious injury.

This is a sophisticated hobby product. It must be operated with caution and common sense and requires some basic mechanical ability. Failure to operate this Product in a safe and responsible manner could result in injury or damage to the product or other property. This product is not intended for use by children without direct adult supervision. Do not attempt disassembly, use with incompatible components or augment product in any way without the approval of Horizon Hobby, LLC. This manual contains instructions for safety, operation and maintenance. It is essential to read and follow all the instructions and warnings in the manual, prior to assembly, setup or use, in order to operate correctly and avoid damage or serious injury.

Age Recommendation: Not for children under 14 years. This is not a toy.

NOTICE: This product is only intended for use with unmanned, hobby-grade, remote-controlled vehicles and aircraft. Horizon Hobby disclaims all liability outside of the intended purpose and will not provide warranty service related thereto.

Waterproof Component

Your new Spektrum™ 70A Brushed Waterproof ESC has been designed and built to allow you to operate the product in many "wet conditions," including puddles, creeks, wet grass, snow and even rain.

While waterproof, this component has not been designed to be immersed in water for long periods of time and should NOT be treated like a submarine. In addition, most metal parts, including any screws and nuts, as well as the contacts in the electrical cables, will be susceptible to corrosion if additional maintenance is not performed after running in wet conditions.

To maximize the long-term performance of your ESC and to keep the warranty intact, it should only be used as described in the "Usage Conditions" section of this manual. Additionally, the procedures described in the "Wet Conditions Maintenance" section must be performed regularly if you choose to run in wet conditions. If you are not willing to perform the additional care and maintenance required, then you should not operate your vehicle in those conditions.

CAUTION: Failure to exercise caution while using this product could result in product malfunction and/or void the warranty.

GENERAL PRECAUTIONS

- Read through the wet conditions maintenance procedures and make sure that you have all the tools you will need to properly maintain your ESC.
- Do not operate your ESC where it could come in contact with salt water (ocean water or water on salt-covered roads), contaminated or polluted water. Salt water is very conductive and highly corrosive, so use caution.

USAGE CONDITIONS

Your ESC will operate successfully in any of the following, individual-use scenarios:

- 2 hours continuous operation in damp grass or vegetation.
- 2 hours continuous operation in heavy fog (95% humidity, saturated air, condensing water).

NOTICE: Never use a pressure washer to clean your vehicle.

NOTICE: This ESC is waterproofed for use in wet conditions. Make sure the other components in your vehicle are waterproof or water-resistant before driving in wet conditions.

Included Components

15T 540 Size Rebuildable Brushed Motor	SPMXSM5153
Waterproof Brushed Crawler ESC	SPMXSE1070

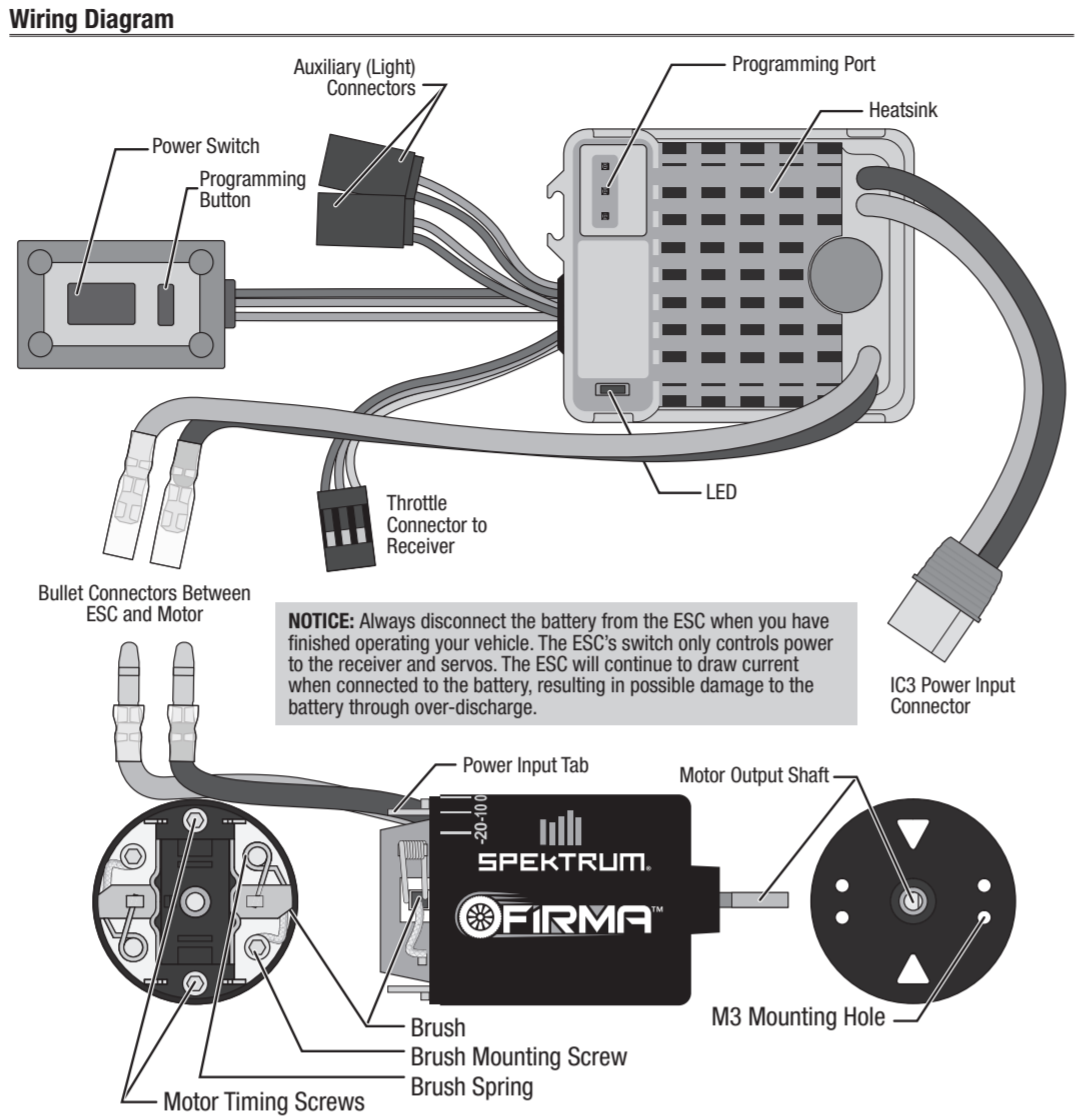
System Specifications

MOTOR SPECIFICATIONS

Motor Type	540 Sized Brushed, Open Endbell (Rebuildable)
Turns	15
Rotor	Precision Balanced 3 Slot
Vehicle Type	1/10 On-Road, Off-Road
Brushes	Replaceable
Bearings	Ball Bearings
Dimensions	2.1 in. Long x 1.4 in. Diameter (53 mm Long x 36 mm Diameter)
Weight	6 oz (169g)
Motor Shaft	1/8th in. (3.12mm) with Flat Spot for Pinion Gear Set Screw
Mounting threads	M3 @ 1 in. (25.4mm) Spacing Center to Center
Timing	Adjustable
Power Connector	4mm Female Motor Bullets
Cells	2S LiPo/ 6-7 cell NiMH

ESC SPECIFICATIONS

Type	Brushed
Constant/Peak	70A/200A
Function	Forward/Reverse; Forward/Brake/Reverse (Default); Forward/Brake (Can Be Programmed Via SPMXCA200 or Through the Push Button on the Switch)
Programming Port	Optional Programming Box
Auxiliary Power Outputs	(2) Standard Female Servo Connectors for Lights, etc @ 6V/7.4V (Power Supplied by BEC)
Vehicle Type	1/10 On-Road, Off-Road
Optional Features	Can Be Programmed Via SPMXCA200 or Through the Push Button on the Switch
Battery Type/Input Voltage	2-3 Cell Li-Po/Li-Fe; 5-9 Cell Ni-MH/Ni-Cd
Recommended Motor Type	540-/550-Size Motors
Compatible Motors (Based on Battery Voltage)	Below 8.4V; Down to 12T; Below 12.6V; Down to 35T
BEC Output	6V/7.4V - 4A (Shared Between Receiver and Auxiliary Light Outputs)
Dimensions	36mm x 30mm x 18.2mm (without tabs)
Weight	1.76 oz (50 g)
Battery Connector	IC3™ Connector (EC3™ compatible)
Motor Connector	4mm Female Motor Bullets



TIP: We recommend leaving motor timing at zero degrees for Forward/Reverse applications.

Quick Start

The quick start setup guide will get you running quickly using the ESC's default settings.

- Mount the ESC and motor in your car.
- Connect the ESC to the motor.
- Connect the ESC receiver lead to the throttle port on your receiver.
- Ensure the ESC switch is OFF.
- Connect a fully charged battery to the ESC. Power ON the ESC.
- Calibrate the ESC to the transmitter.

Gearing

Improper gearing will cause excessive heat buildup in the motor and speed control. Use your vehicle's kit manual in order to find the manufacturer's recommended pinion size. It is best to monitor the system's operating temperature when you are operating on new and different tracks or racing surfaces. Your system's operating temperature should never exceed 160° F (71° C). The best place to monitor the system's temperature is at the center of the end bell. If the temperature is higher than 200° F (93° C) after a 5 minute run, the gearing should be lowered (change to a smaller pinion gear).

CAUTION: Once the battery is connected to the system, stay clear of the rotating shaft and pinion gear. Failure to do so could result in personal injury.

Mounting the Motor

- Install the pinion gear for your vehicle (not included) on the motor shaft with blue thread locking compound. Verify the pinion is spaced correctly for your vehicle to fully mesh with the spur gear.
- Mount the motor with the 3mm motor mounting screws provided with your vehicle and set the gear mesh.
- Connect the red power connectors together and the black power connectors together between the ESC and the motor.
- If you need to reverse the motor direction, reverse the power connections.

NOTICE: Verify the mounting screws do not protrude more than 3mm into the motor or the motor may be permanently damaged.

Mounting the Speed Control

- Mount the ESC in the location specified by your vehicle's instruction manual, or in an area with adequate airflow and protection from damage.
- Use double-sided foam tape or mounting tabs with screws on the bottom of the case to secure the ESC in position.
- Secure all wiring and ensure heatsink has access to airflow.
- The switch can be mounted to the side of the ESC with the integrated slide mount, or mounted elsewhere with double-sided foam tape.

ESC and Transmitter Calibration

When using a new ESC it is important to calibrate it so the ESC matches the throttle range on your transmitter. If you install a new radio system, or make changes to the throttle/brake values in your transmitter, you must redo the ESC Calibration Process. Failure to calibrate the ESC to your radio system will result in the ESC not working correctly. Set the Fail Safe on your radio to a neutral position to ensure the motor stops in the event of a signal loss.

- Power ON the transmitter, and begin with throttle values at 100% for dual rates and travel and at neutral for trim and sub-trim.
- Verify there are no ABS braking functions activated before proceeding with calibration.
- For transmitters without an LCD, turn the D/R knob to the max setting, and center the throttle trim.
- Connect a battery to the ESC.
- Press and hold the programming button on the switch case, power on the ESC.
- The red LED on the ESC will flash, and the motor will beep.

Release the programming button.

The ESC will enter the programming mode if the programming button is not released within 3 seconds.

- With the throttle trigger and trim in the neutral position, press and release the programming button. The red LED will flash once, and the motor will emit 1 tone.
- Push the throttle trigger to full throttle. Press and release the programming button. The red LED will flash twice, and the motor will emit 2 tones.
- Push the throttle trigger to full reverse. Press and release the programming button. The red LED will flash 3 times, and the motor will emit 3 tones.
- Power OFF the system with the ON/OFF switch.
- Power ON the system with the ON/OFF switch. The system is ready for operation.

TIP: Beeps from the motor may be quiet and difficult to hear, use the LED status to help verify settings.

ESC Programming via Switch Push Button

- Power ON your transmitter. Connect a battery to the ESC and power it ON.
- Press and hold the programming button for 1 second.
- Release the programming button. The red LED will blink to indicate it has entered programming mode.
- The red LED blinks (and the motor beeps) to indicate the programming item. Press the programming button for 1 second in order to toggle through the programmable items.
 - 1 red LED blink for item one, 2 red LED blinks for item 2, etc.
 - Items 5 and above: 1 long LED blink for item 5, 1 long LED blink and 1 short LED blink for item 6, etc.
 - Items 10 and above: 2 long LED blinks for item 10, 2 long LED blinks and 1 short LED blink for item 11, etc.
- Press and hold the programming button for 3 seconds when you want to enter a programming item.
- The LED blinks to indicate the programming value within the item selection.
- Press and hold the programming button for 3 seconds when you want to select a programming value.
- Power off the ESC.
- Begin the process again to change any other programming values. One long LED blink and one long beep will indicate when the ESC is ready to run.

Programming the ESC via the SPMXCA200 Program Box

- Begin with no battery connected.
- Connect the cable for the programming box into the programming port as shown.
- Connect a battery and power ON the ESC.
- Press Select button on the program box once.
- Select the programming choices. Press SAVE after any changes are made.
- Power off the ESC.
- Disconnect the cable for the programming box.

OPTIONAL: The ESC settings can be reset to default by pressing "Reset" and then "OK" buttons.

Troubleshooting Guide

PROBLEM	POSSIBLE CAUSE	SOLUTION
ESC ON — No motor function, audible tone or LED	Battery/connection issue Damaged ESC/switch Damaged motor	Recharge/replace battery. Secure all connections Repair/replace ESC switch/ESC Repair/replace
Motor — Stops and LED blinks	Low voltage protection Overheat protection	When the ESC LED blinks, recharge/replace battery When the LED blinks, let motor/ESC cool, change set up or gearing to avoid overheating
Motor — Accelerates irregularly	Battery issue Worn or damaged motor	Repair damaged wiring/replace battery Repair/replace motor
Motor — Does not turn continuously in response to throttle	ESC/motor damaged	Repair/replace wiring or motor/ESC
Motor — Slows but will not stop	Incorrect transmitter/ESC calibration	Adjust throttle travel/other throttle settings on the transmitter/ESC. Repeat the ESC Calibration Procedure
Steering Servo — Operates; motor does not run	Damaged motor Incorrect transmitter/ESC calibration	Test the motor apart from the vehicle system, repair/replace motor as needed Adjust throttle travel/other throttle settings on the transmitter/ESC. Repeat the ESC Calibration Procedure
Steering/motor — Do not function	Low battery voltage Wrong model memory selected on transmitter	Recharge/replace Select correct model settings on your transmitter, refer to transmitter and/or receiver manual
Vehicle — Does not operate at full speed	Receiver not bound to transmitter Battery issue Incorrect transmitter/ESC calibration	Bind transmitter to receiver, refer to transmitter and/or receiver manual Recharge/replace Adjust throttle travel/other throttle settings on the transmitter/ESC. Repeat the ESC Calibration Procedure

LED Indicator and Motor Sounds

Upon powering on the ESC, the LED will blink and the motor will emit a series of beeps to indicate its status. First it will display the battery mode selection, second the drag brake setting, and then it will indicate it is ready to operate.

FEATURE	LED STATUS	MOTOR SOUND
Ni-MH/Ni-CD Battery	1 Blink	1 Short Beep
2S Li-Po Battery	2 Blinks	2 Short Beeps
Li-Po Battery	3 Blinks	3 Short Beeps
ESC Ready	1 Long Blink	1 Long Beep

DURING OPERATION	LED STATUS
Stop	OFF
Forward Partial Throttle	Blinks
Full Throttle	Solid
Reverse Partial Throttle	Blinks
Full Throttle	Solid
Partial Brake	Blinks
Full Brake	Solid
Battery Low Voltage	Blinks
Overheat	Blinks

Low Voltage Cutoff Protection

If the voltage of the battery drops below the threshold for 2 seconds, the ESC will enter the low voltage protection mode.

BATTERY TYPE SETTING	THRESHOLD	PROTECTION
2S-3S Li-Po	3.3V per cell	Power at 40%
	3.1V per cell	Power Off
5-7 Ni-MH	5V	Power at 40%
	4.5V	Power Off

Programmable Features – Optional Programming

To program the ESC, use the push button on the switch or use the Spektrum Smart ESC Programming Update Box (SPMXCA200).

■ = Default

PROGRAMMABLE FEATURE	1	2	3	4	5	6	7	8	9
1. Running Mode	Fwd/Brk	Fwd/Rev/Brk	Fwd/Rev						
2. Lipo Battery	On	Off							
3. Cutoff Voltage	Disabled	Auto (low)	Auto (Medium)	Auto (High)					
4. Initial Start Force	0%	2%	4%	6%	8%	10%	12%	14%	16%
5. Max Forward Force	25%	50%	75%	100%					
6. Max Reverse Force	25%	50%	75%	100%					
7. Max Brake Force	0%	12.5%	25%	37.5%	50%	62.5%	75%	87.5%	100%
8. Initial Brake Force	0%	6.25%	12.5%	18.75%	25%	31.25%	37.5%	43.75%	50%
9. Drag Brake	0%	5%	10%	50%	60%	70%	80%	90%	100%
10. Drag Brake Rate (Level)	1	2	3	4	5	6	7	8	9
11. Neutral Range	3%	4%	5%	6%	7%	8%	9%	10%	12%
12. Start Mode / Punch (Level)	1	2	3	4	5	6	7	8	9
13. PWM Frequency	1K	2K	4K	8K	16K				
14. BEC Voltage	6.0V	7.4V							

1-Year Limited Warranty

WHAT THIS WARRANTY COVERS — Horizon Hobby, LLC, (Horizon) warrants to the original purchaser that the product purchased (the "Product") will be free from defects in materials and workmanship for a period of 1 year from the date of purchase.

WHAT IS NOT COVERED — This warranty is not transferable and does not cover: (i) cosmetic damage, (ii) damage due to acts of God, accident, misuse, abuse, negligence, commercial use, or due to improper use, installation, operation or maintenance, (iii) modification of or to any part of the Product, (iv) attempted service by anyone other than a Horizon Hobby authorized service center, (v) Product not purchased from an authorized Horizon dealer, (vi) Product not compliant with applicable technical regulations, or (vii) use that violates any applicable laws, rules, or regulations.

OTHER THAN THE EXPRESS WARRANTY ABOVE, HORIZON MAKES NO OTHER WARRANTY OR REPRESENTATION, AND HEREBY DISCLAIMS ANY AND ALL IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE PURCHASER ACKNOWLEDGES THAT THEY ALONE HAVE DETERMINED THAT THE PRODUCT WILL SUITABLY MEET THE REQUIREMENTS OF THE PURCHASER'S INTENDED USE.

PURCHASER'S REMEDY — Horizon's sole obligation and purchaser's sole and exclusive remedy shall be that Horizon will, at its option, either (i) service, or (ii) replace, any Product determined by Horizon to be defective. Horizon reserves the right to inspect any and all Product(s) involved in a warranty claim. Service or replacement decisions are at the sole discretion of Horizon. Proof of purchase is required for all warranty claims. SERVICE OR REPLACEMENT AS PROVIDED UNDER THIS WARRANTY IS THE PURCHASER'S SOLE AND EXCLUSIVE REMEDY.

LIMITATION OF LIABILITY — HORIZON SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY, REGARDLESS OF WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, TORT, NEGLIGENCE, STRICT LIABILITY OR ANY OTHER THEORY OF LIABILITY, EVEN IF HORIZON HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. Further, in no event shall the liability of Horizon exceed the individual price of the Product on which liability is asserted. As Horizon has no control over use, setup, final assembly, modification or misuse, no liability shall be assumed nor accepted for any resulting damage or injury. By the act of use, setup or assembly, the user accepts all resulting liability. If you as the purchaser or user are not prepared to accept the liability associated with the use of the Product, purchaser is advised to return the Product immediately in new and unused condition to the place of purchase.

LAW — These terms are governed by Illinois law (without regard to conflict of law principals). This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Horizon reserves the right to change or modify this warranty at any time without notice.

WARRANTY SERVICES

QUESTIONS, ASSISTANCE, AND SERVICES — Your local hobby store and/or place of purchase cannot provide warranty support or service. Once assembly, setup or use of the Product has been started, you must contact your local distributor or Horizon directly. This will enable Horizon to better answer your questions and service you in the event that you may need any assistance. For

questions or assistance, please visit our website at www.horizon-hobby.com, submit a Product Support Inquiry, or call the toll free telephone number referenced in the Warranty and Service Contact Information section to speak with a Product Support representative.

INSCRIPTION OR SERVICES — If this Product needs to be inspected or serviced and is compliant in the country you live and use the Product in, please use the Horizon Online Service Request submission process found on our website or call Horizon to obtain a Return Merchandise Authorization (RMA) number. Pack the Product securely using a shipping carton. Please note that original boxes may be included, but are not designed to withstand the rigors of shipping without additional protection. Ship via a carrier that provides tracking and insurance for lost or damaged parcels, as Horizon is not responsible for merchandise until it arrives and is accepted at our facility. An Online Service Request is available at http://www.horizonhobby.com/content/service-center_render-service-center. If you do not have internet access, please contact Horizon Product Support to obtain a RMA number along with instructions for submitting your product for service. When calling Horizon, you will be asked to provide your complete name, street address, email address and phone number where you can be reached during business hours. When sending product into Horizon, please include your RMA number, a list of the included items, and a brief summary of the problem. A copy of your original sales receipt must be included for warranty consideration. Be sure your name, address, and RMA number are clearly written on the outside of the shipping carton.

NOTICE: Do not ship LiPo batteries to Horizon. If you have any issue with a LiPo battery, please contact the appropriate Horizon Product Support office.

WARRANTY REQUIREMENTS — For Warranty consideration, you must include your original sales receipt verifying the proof-of-purchase date. Provided warranty conditions have been met, your Product will be serviced or replaced free of charge. Service or replacement decisions are at the sole discretion of Horizon.

NON-WARRANTY SERVICE — Should your service not be covered by warranty, service will be completed and payment will be required without notification or estimate of the expense unless the expense exceeds 50% of the retail purchase cost. By submitting the item for service you are agreeing to payment of the service without notification. Service estimates are available upon request. You must include this request with your item submitted for service. Non-warranty service estimates will be billed a minimum of ½ hour of labor. In addition you will be billed for return freight. Horizon accepts money orders and cashier's checks, as well as Visa, MasterCard, American Express, and Discover cards. By submitting any item to Horizon for service, you are agreeing to Horizon's Terms and Conditions found on our website http://www.horizonhobby.com/content/service-center_render-service-center.

ATTENTION: Horizon service is limited to Product compliant in the country of use and ownership. If received, a non-compliant Product will not be serviced. Further, the sender will be responsible for arranging return shipment of the un-serviced Product, through a carrier of the sender's choice and at the sender's expense. Horizon will hold non-compliant Product for a period of 60 days from notification, after which it will be discarded.

Warranty and Service Contact Information

Country of Purchase	Horizon Hobby	Contact Information	Address
United States of America	Horizon Service Center (Repairs and Repair Requests)	servicecenter.horizonhobby.com/RequestForm/	2904 Research Rd. Champaign, Illinois 61822 USA
	Horizon Product Support (Product Technical Assistance)	productsupport@horizonhobby.com 877-504-0233	
	Sales	websales@horizonhobby.com 800-338-4639	

FCC Information

SUPPLIER'S DECLARATION OF CONFORMITY

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

CAUTION: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communica-

IC Information

CAN ICES-3 (B)/NMB-3(B)

This device contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science, and Economic Development Canada's license-exempt RSS(s). Operation is subject to the following 2 conditions:

Compliance Information for the European Union

CE EU Compliance Statement: Hereby, Horizon Hobby, LLC declares that the device is in compliance with the following: 2014/30/ EU EMC Directive; RoHS 2 Directive 2011/65/EU; RoHS 3 Directive - Amending 2011/65/EU Annex II 2015/863.

The full text of the EU declaration of conformity is available at the following internet address: <https://www.horizonhobby.com/content/support-render-compliance>.

EU Manufacturer of Record: Horizon Hobby, LLC
2904 Research Road
Champaign, IL 61822 USA

EU Importer of Record: Horizon Hobby, GmbH
Hanskamping 9
22885 Barsbüttel Germany

WEEE NOTICE: This appliance is labeled in accordance with European Directive 2012/19/EU concerning waste of electrical and electronic equipment (WEEE). This label indicates that this product should not be disposed of with household waste. It should be deposited at an appropriate facility to enable recovery and recycling.

RoHS 3 Directive - Amending 2011/65/EU Annex II 2015/863.

The full text of the EU declaration of conformity is available at the following internet address: <https://www.horizonhobby.com/content/support-render-compliance>.

1. This device may not cause interference.

2. This device must accept any interference, including interference that may cause undesired operation of the device.

RoHS 3 Directive - Amending 2011/65/EU Annex II 2015/863.

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E328



SPMXSEM310