

JR[®]
DSM[®]

For additional information on JR radios and accessories, call or write:
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13152

JR
DSM

R1221
High Performance
Receiver

Applications

High performance, giant-scale aircraft
Jets with multiple high current draw servos
Scale aircraft with multiple high current draw servos
Accessories (i.e. lights, ESC's, etc.)
Scale helicopters
Racing

Features

The JR R1221 is a high performance, 12-channel DSM2 2.4GHz receiver intended for use in sophisticated jets, scale, aerobatic, racing and sailplane projects.

- Dual battery ports
 - Utilizes up to 3 remote receivers for the ultimate RF link in even the most demanding applications
 - Up to 35 amps continuous current handling capability, the limiting factor being the connectors
 - Two types of failsafe - Smartsafe (throttle only) and conventional failsafe (all servos)
 - Instant-on reconnect - if a power interruption (brown out) occurs the system reconnects in less than 1/2 second
- Flight Log compatible
 - Compatible with all Spektrum™ and JR® full range radio systems

Important

Employing Spektrum's patent-pending MultiLink™ DSM2™ technology, the R1221 uses one internal and three external receivers for path diversity —assuring your receiver always “sees” a strong signal and is unaffected by multi-path issues. What's more, DSM2 air receivers employ DualLink™ two-frequency technology, ensuring your aircraft always operates with an ultra-secure, robust Rf link.

Dual battery ports are provided with the R1221 for power redundancy. The receiver will handle well over 35 amps of continuous current, the limiting factor being the connectors. In the unlikely event your voltage should ever drop below 3.5 volts, control is established the instant voltage returns due to the QuickConnect™ instant voltage recovery system.

Specifications

PowerSafe Main unit

Voltage input - 6.0 to 10.0 volts *Note: Consult your servo manufacturer's specifications for maximum allowable voltage.*

Minimum operational voltage - 3.5 volts

Continuous current - 35 amps

Dimensions LxWxH - 1.48 x 2.1 x .628 in

Weight - .7 oz / 20 g

Remote Receiver

Dimensions LxWxH - 1.02 x .80 x .27 in

Weight - .2 oz / 3 g

Items Included

- Receiver main unit - JRPR1221
- Three remote receivers - JRPRR121
- One 24" remote receiver extension - JRPA184
- One 12" remote receiver extension - JRPA183
- One 9" remote receiver extension - JRPA182
- Instruction manual
- Male/Female bind plug

Optional Items

- Flight Log data recorder - JRPA145
- Replacement remote receiver - JRPRR121
- 6" Remote receiver extension - JRPA181
- 9" remote receiver extension - JRPA182
- 12" remote receiver extension - JRPA183
- 24" remote receiver extension - JRPA184
- 36" Remote receiver extension - JRPA185
- 12" Remote receiver extension w/disconnect - JRPA186
- 24" Remote receiver extension w/disconnect - JRPA187
- 36" Remote receiver extension w/disconnect - JRPA188

Battery Requirements

Using One Battery

The R1221 allows the option of using one or two battery packs. When using one battery, simply plug the battery into either one of the two battery connectors (BATT 1 or BATT2). When using dual batteries, it's recommended that both batteries be of the same capacity, voltage and ideally of the same age/ previous profile. When using two batteries the total available capacity equals the sum total of both batteries (i.e. BATT1- 2000mAh + BATT2- 2000mAh= a total capacity of 4000mAh).

Battery Capacity

It's important to select a battery(s) that has more than adequate capacity to provide the necessary flight time. Our staff has been recording in-flight data to determine typical current consumption of aircraft in flight. Following are two graphs that illustrate the in-flight current draw of the radio system.

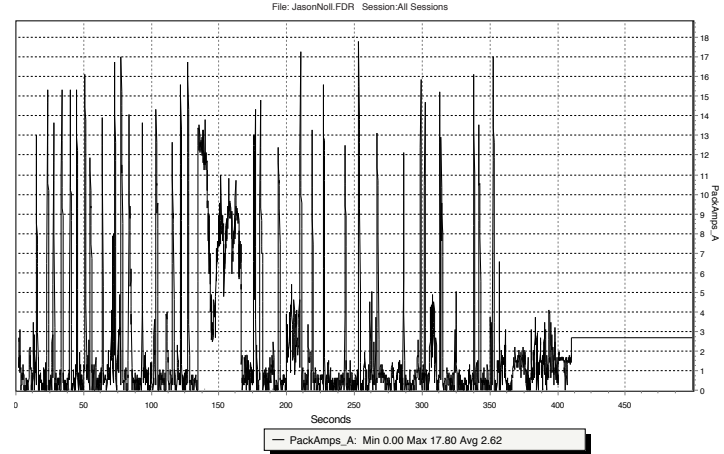
Note: Current draws may vary depending on your servos, installation, and flying style.

The following setup is shown as a worst case scenario indicative of some aerobatic pilot's setups. It is not recommended to use this setup without proper voltage regulation for your servos.

Airplane - 40% YAK
Servos - 9-JR8711's 1-8317 (throttle)
Batteries - Two 4000mAh 2-cell 7.4-volt LiPo's
Regulator - none

Note: JR8711's and 8317's are rated at a maximum of 6-volt 5-cell use. Using higher voltages will void the warranty.

Engine - DA150
Weight - 40 lb
Flight envelope - Hard 3D
Average current - 2.62 amps
Peak current - 17.8 amps
Milliamps used per 10 minute flight - 435mAh



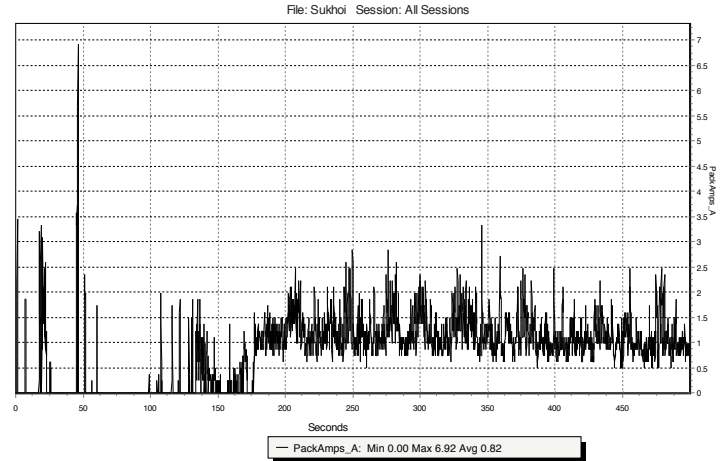
In the example above, the average current was 2.62 amps, which calculates to 435mAh per 10 minutes (typical flight length). It's recommended that only 60% of the available capacity be used to ensure plenty of reserve battery capacity. In this example, using two 4000mAh batteries (8000mAh total capacity) \times 60% = 4800mAh (available usable capacity) divided by the capacity used per 10 minute flight, 435mAh would allow up to 11 flights of 10 minutes each.

Battery Capacity (continued)

Airplane - 33% Sukhoi
Servos - 7-JR8611's 1-8317 (throttle)
Batteries - 1- 4000mAh 2-cell 7.4-volt LiPo's
Regulator - 6 volts
Engine - DA100
Weight - 26 lb
Flight envelope - Moderate 3D
Average current - .82 amps
Peak current - 6.92 amps
Milliamps used per 10 minute flight - 137mAh

Recommended Guidelines for Battery Capacity

40-45% Aerobatic aircraft w/ 9-12 high current servos:
4000-8000mAh
33-35% Aerobatic aircraft w/ 7-10 high current servos:
3000-6000mAh
25%/ Quarter Scale Aerobatic aircraft w/ 5-7 high current servos:
2000-4000mAh
Jets- BVM Super BANDIT, F86, Euro Sport, etc.:
3000-6000mAh
Giant-Scale Jets- BVM Ultra Bandit:
4000-8000mAh



Scale aircraft - The variety of scale aircraft and the accessories they use vary tremendously making it difficult to give capacity recommendations for these types of aircraft. Using the above aerobic guidelines relative to the size and number of servos used will provide a conservative capacity for your scale aircraft. As always, check battery charge condition before each flight.

Battery Voltage

IMPORTANT: DO not use a 4-cell 4.8-volt battery to power the receiver.

Four-cell 4.8-volt batteries do not provide enough voltage head room (additional margin needed) necessary to power the system when heavily loaded. Under load, the system voltage can drop below the voltage system's minimum operating voltage threshold (3.5 volts) and cause loss of control.

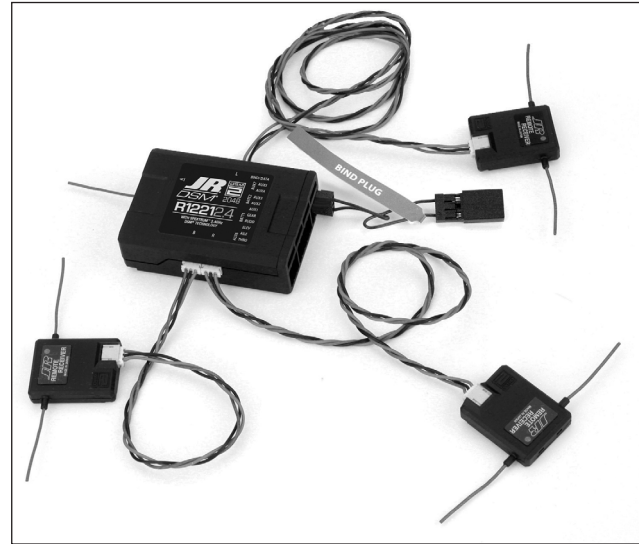
The R1221 is capable of handling voltages from 6.0 to 10.0 volts. The voltage limitations are generally the servos. Most servos are compatible with 5-cell 6-volt packs, however, and 5-cell 6-volt NiMH packs have become the standard for many giant-scale applications.

Be aware that NiMH batteries have tendencies to false peak when being fast charged. Be especially careful and sure when using NiMH batteries that they are fully charged and have not false peaked.

Many pilots are using 2-cell LiPo batteries to power their aircraft. LiPo's offer greater capacity for their size and weight, plus it is easier to manage the charging.

Installation

- Mount the R1221 unit in the position that you would normally mount the receiver.
- Using the above guidelines, select the battery system that best fits your application and install the batteries in your aircraft. Connect the battery to the R1221.
- Using double-sided foam tape and tie wraps, mount the 3 remote receivers in your aircraft and plug them into the receiver ports.
- Remoter receivers should be installed at least 2-3" apart.
- Remote extensions must not exceed 36".
- Plug the servo leads into the appropriate ports in the R1221.
- You are now ready to bind the system.
- Turn on the system. An amber light on the main unit and an amber light on the remote receivers should turn on, indicating the system is powered. Check servo operation.

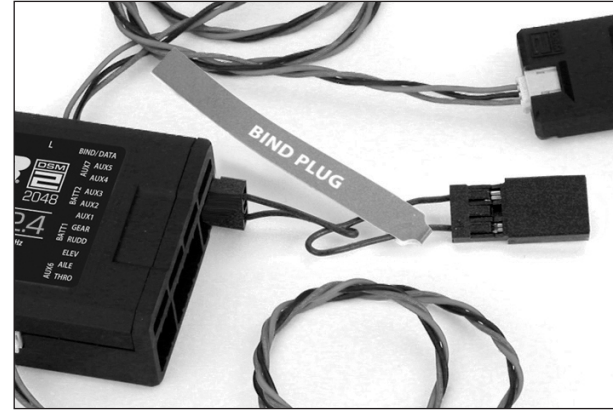


Binding

It's necessary to bind the receiver to the transmitter so that the receiver will only recognize that specific transmitter and ignore signals from other sources. If the R1221 is not bound to the transmitter, the system will not operate. During binding, the servo's failsafe positions are stored.

How To Bind the R1221

1. With the system hooked up and all remote receivers attached as described previously, insert the bind plug in the BIND/DATA port in the R1221.
2. Power the receiver. Note that the LED's on all receivers should be flashing, indicating that the receiver is ready to bind.
3. Establish the desired failsafe stick positions, normally low throttle and flight controls neutral.
4. Press and hold the bind button on the back of the transmitter while turning on the power switch. After confirming the bind light on the transmitter flashes, release the bind button. Within a few seconds the system should connect. The LED's on all receivers should go solid, indicating the system has connected.
5. Remove the bind plug and store it in a convenient place.
6. After you've programmed your model, it's important to rebind the system so the true low throttle and neutral control surface positions are programmed.



Failsafe Functions

The R1221 features two types of failsafe: SmartSafe™ and Preset Failsafe.

SmartSafe Failsafe

The R1221 features a SmartSafe failsafe option. SmartSafe is ideal for most types of electric aircraft and is also recommended for most types of gas- and glow-powered models. With SmartSafe, when the signal is lost only the throttle channel is driven to its preset failsafe position (normally low throttle) while all other channels hold their last command. Here's how SmartSafe works:

Receiver power only

When the receiver only is turned on (no transmitter is present), no pulses are output to the servos so the servos are not driven and remain in their “at rest” position. The receiver remains in standby mode with the amber battery LED(s) on indefinitely until the transmitter signal is present. When the transmitter is turned on, the receiver locates the signal (GUID), connects, and normal control resumes. When connected, the amber LEDs on the attached remote receivers will be on.

After connection

When the transmitter is turned on and after the receiver connects to the transmitter, normal control of all channels occurs. After the system makes a connection, if loss of signal occurs SmartSafe drives the throttle servo only to its preset failsafe position (low throttle) that was set during binding. All other channels hold their last commanded position. When the signal is regained, the system immediately (less than 4ms) regains control.

SmartSafe:

- Prevents unintentional electric motor response on start-up.
- Eliminates the possibility of over-driving servos on start-up by storing preset failsafe positions.
- Establishes low-throttle failsafe and maintains last-commanded control surface position if the RF signal is lost. Note: Failsafe positions are stored via the stick and switch positions on the transmitter during binding.

Preset Failsafe

Preset Failsafe is ideal for sailplanes and is preferred by some modelers for their glow- and gas-powered aircraft. With Preset Failsafe, if the signal is lost all channels are driven to their preset failsafe positions. Here's how Preset Failsafe works:

Receiver power only

When the receiver only is turned on (no transmitter is present), no pulses are output to the servos so the servos are not driven and remain in their “at rest” position. The

Failsafe Functions

receiver remains in standby mode with the amber battery LED(s) on indefinitely until the transmitter signal is present. When the transmitter is turned on, the receiver locates the signal (GUID), connects, and normal control resumes. When connected, the amber LEDs on the attached remote receivers will be on.

After connection

When the transmitter is turned on and after the receiver connects to the transmitter, normal control of all channels occurs. After the system makes a connection, if loss of signal occurs Preset Failsafe drives all servos to their preset failsafe positions that were set during binding. When the signal is regained, the system immediately (less than 4ms) regains control.

Preset Failsafe:

- Prevents unintentional electric motor response on start-up.
- Eliminates the possibility of over-driving servos on start-up by storing preset failsafe positions.
- Establishes preset failsafe servo positions for all channels if the signal is lost.

Note: Failsafe positions are stored via the stick and switch positions.

Programming SmartSafe

During the binding process the bind plug is left in throughout the process and is removed only after the receiver connects to the transmitter. After the connection is

made, confirmed by operating the servos, the bind plug can be removed. The receiver is now programmed for SmartSafe.

Programming Preset Fail-safe

During the binding process the bind plug is inserted in the bind port, then the receiver is powered up. The LED's in each receiver should blink, indicating that the receiver is in bind mode. Now before binding the receiver to the transmitter and with the receiver in bind mode, remove the bind plug. The LED's will continue to blink. With the control sticks and switches in the desired fail-safe positions, bind the transmitter to the receiver by pressing and holding the bind button on the back of the transmitter/module and turning on the transmitter. The system should connect in less than 15 seconds. The receiver is now programmed for preset fail-safe.

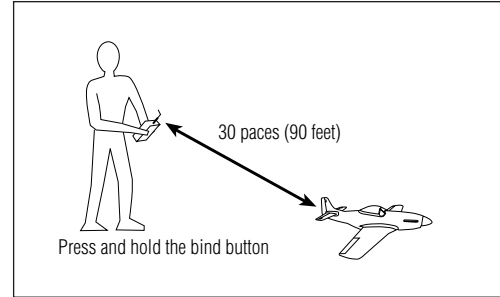
Note: Fail-safe positions are stored via the stick and switch positions on the transmitter during binding.

Standard Range Testing

Before each flying session, and especially with a new model, it's important to perform a range check. All JR/DSM aircraft transmitters incorporate a range testing system which, when the bind button on the transmitter is pressed and held, reduces the output power, allowing a range check.

Range Testing

1. With the model resting on the ground, stand 30 paces (approx. 90 feet) away from the model.
2. Face the model with the transmitter in your normal flying position and depress and hold the bind button on the back of the transmitter. This causes reduced power output from the transmitter.
3. You should have total control of the model with the button depressed at 30 paces (90 feet).
4. If control issues exist, call Horizon Support Team at 1-877-504-0233 or e-mail us at Productsupport@horizonhobby.com for further assistance.



Advanced Range Testing Using a Flight Log

While the above Standard Range Testing procedure is recommended for most sport aircraft, for sophisticated aircraft that contain significant amounts of conductive materials (i.e. turbine powered jets, some types of scale aircraft, aircraft with carbon fuselages, etc.), the following advanced range check will confirm that all internal and remote receivers are operating optimally and that the installation (position of the receivers) is optimized for the specific aircraft. This Advanced Range Check allows the RF performance of each remote receiver to be evaluated and to optimize the locations of each individual remote receiver.

Advanced Range Testing

1. Plug a Flight Log (optional) into the data port in the receiver and turn on the system (Tx and Rx).
2. Advance the Flight Log until frame losses are displayed by pressing the button on the Flight Log.
3. Have a helper hold your aircraft while he observes the Flight Log data.
4. Standing 30 paces away from the model, face the model with the transmitter in your normal flying position and depress and hold the bind button on the back of the transmitter. This causes reduced power output from the transmitter.
5. Have your helper position the model in various orientations (nose up, nose down, nose toward the Tx, nose away from the Tx, etc.) while your helper watches the Flight Log noting any correlation between the aircrafts orientation and frame losses. Do this for 1 minute. The timer on the transmitter can be used here. For giant-scale aircraft it's recommended that the airplane be tipped up on its nose and rotated 360 degrees for one minute then the data recorded. Next place the airplane on its wheels and do a second test rotating the aircraft in all directions for one minute.
6. After one minute release the bind button. A successful range check will have less than ten recorded frame losses. Scrolling the Flight Log through the antenna fades (A, B, L, R) allows you to evaluate the performance of each receiver. Antenna fades should be relatively uniform. If a specific antenna is experiencing a high degree of fades then that antenna should be moved to a different location.
7. A successful advanced test will yield the following:
 - H- 0 holds
 - F- less than 10 frame losses
 - A, B, R, L- Frame losses will typically be less than 100. It's important to compare the relative frame losses and if a particular receiver has a significantly higher frame loss value (2 to 3X) then the test should be redone and if the same results occur, move the offending receiver to a different location.

Flight Log

JR/DSM's Flight Log is compatible with the R1221. The Flight Log displays overall RF link performance as well as the individual internal and external receiver link data. Additionally it displays receiver voltage.



Using the Flight Log

After a flight and before turning off the receiver or transmitter, plug the Flight Log into the Data port on the R1221. The screen will automatically display voltage i.e. 6v2= 6.2 volts.

Note: When the voltage reaches 4.8 volts or less, the screen will flash indicating low voltage.

Press the button to display the following information:

A - Antenna fades on internal antenna A

B - Antenna fades on internal antenna B

L - Antenna fades on the left external antenna

R - Antenna fades on the right external antenna

F - Frame loss

H - Holds

Antenna fades—represents the loss of a bit of information on that specific antenna. Typically it's normal to have as many as 50 to 100 antenna fades during a flight. If any single antenna experiences over 500 fades in a single flight, the antenna should be repositioned in the aircraft to optimize the RF link.

Frame loss—represents simultaneous antenna fades on all attached receivers. If the RF link is performing optimally, frame losses per flight should be less than 20.

A Hold occurs when 45 consecutive frame losses occur. This takes about one second. If a hold occurs during a flight, it's important to reevaluate the system, moving the antennas to different locations and/or checking to be sure the transmitter and receivers are all working correctly.

Note: A servo extension can be used to allow the Flight Log to more conveniently be plugged in without having to remove the aircraft's hatch or canopy. On some models, the Flight Log can be plugged in, attached and left on the model using double-sided tape. This is common with helicopters, mounting the Flight Log conveniently to the side frame.

Warranty

Warranty Period

Exclusive Warranty- Horizon Hobby, Inc., (Horizon) warrants that the Products purchased (the "Product") will be free from defects in materials and workmanship for a period of 3 years from the date of purchase by the Purchaser.

Limited Warranty

- (a) This warranty is limited to the original Purchaser ("Purchaser") and is not transferable. REPAIR OR REPLACEMENT AS PROVIDED UNDER THIS WARRANTY IS THE EXCLUSIVE REMEDY OF THE PURCHASER. This warranty covers only those Products purchased from an authorized Horizon dealer. Third party transactions are not covered by this warranty. Proof of purchase is required for warranty claims. Further, Horizon reserves the right to change or modify this warranty without notice and disclaims all other warranties, express or implied.
- (b) Limitations- HORIZON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCT. THE PURCHASER ACKNOWLEDGES THAT THEY ALONE HAVE DETERMINED THAT THE PRODUCT WILL SUITABLY MEET THE REQUIREMENTS OF THE PURCHASER'S INTENDED USE.
- (c) Purchaser Remedy- Horizon's sole obligation hereunder shall be that Horizon will, at its option, (i) repair or (ii) replace, any Product determined by Horizon to be defective. In the event of a defect, these are the Purchaser's exclusive remedies. Horizon reserves the right to inspect any and all equipment involved in a warranty claim. Repair or replacement decisions are at the sole discretion of Horizon. This warranty does not cover cosmetic damage or damage due to acts of God, accident, misuse, abuse, negligence, commercial use, or modification of or to any part of the Product. This warranty does not cover damage due to improper installation, operation, maintenance, or attempted repair by anyone other than Horizon. Return of any goods by Purchaser must be approved in writing by Horizon before shipment.

Damage Limits

HORIZON SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCT, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY. 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 this Product, you are advised to return this 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).

Safety Precautions

This is a sophisticated hobby Product and not a toy. 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. The Product 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 injury.

Questions, Assistance, and Repairs

Your local hobby store and/or place of purchase cannot provide warranty support or repair. Once assembly, setup or use of the Product has been started, you must contact 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 direct your email to productsupport@horizonhobby.com, or call 877.504.0233 toll free to speak to a service technician.

Inspection or Repairs

If this Product needs to be inspected or repaired, please call for a Return Merchandise Authorization (RMA). 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. A Service Repair Request is available at www.horizonhobby.com on the "Support" tab. If you do not have internet access, please include a letter with your complete name, street address, email address and phone number where you can be reached during business days, your RMA number, a list of the included items, method of payment for any non-warranty expenses and a brief summary of the problem. Your original sales receipt must also be included for warranty consideration. Be sure your name, address, and RMA number are clearly written on the outside of the shipping carton.

Warranty Inspection and Repairs

To receive warranty service, you must include your original sales receipt verifying the proof-of-purchase date. Provided warranty conditions have been met, your Product will be repaired or replaced free of charge. Repair or replacement decisions are at the sole discretion of Horizon Hobby.

Non-Warranty Repairs

Should your repair not be covered by warranty the repair 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 repair you are agreeing to payment of the repair without notification. Repair estimates are available upon request. You must include this request with your repair. Non-warranty repair estimates will be billed a minimum of ½ hour of labor. In addition you will be billed for return freight. Please advise us of your preferred method of payment. Horizon accepts money orders and cashiers checks, as well as Visa, MasterCard, American Express, and Discover cards. If you choose to pay by credit card, please include your credit card number and expiration date. Any repair left unpaid or unclaimed after 90 days will be considered abandoned and will be disposed of accordingly. Please note: non-warranty repair is only available on electronics and model engines.

Electronics and engines requiring inspection or repair should be shipped to the following address:

Horizon Service Center
4105 Fieldstone Road
Champaign, Illinois 61822

All other products requiring warranty inspection or repair should be shipped to the following address:

Horizon Product Support
4105 Fieldstone Road
Champaign, Illinois 61822

Please call 877-504-0233 or e-mail us at Productsupport@horizonhobby.com with any questions or concerns regarding this product or warranty.

FCC Information

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.

This product contains a radio transmitter with wireless technology which has been tested and found to be compliant with the applicable regulations governing a radio transmitter in the 2.400GHz to 2.4835GHz frequency range.

The associated regulatory agencies of the following countries recognize the noted certifications for this product as authorized for sale and use:

