



HITEC SPECTRA 2.4J AFHSS Module Instruction

version 1.3

• Risk of explosion if battery is replaced by an incorrect type.
Dispose of used battery according to the instructions.

European CE notice to users and product statements.
This product is CE marked according to the provisions of the R&TTE Directive(99/5/EC).
Hereby, HITEC RCD Inc. declares that this product is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.
For further information, please contact <http://www.hitecrd.com>

FCC notice to users and product statements:
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.

• FRANCE Frequency Range : 2.4056GHz~ 2.4482GHz



CE0678

2.4GHz-2.4835GHz Band for use in :
AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES,
FI, GB, GR, HU, IE, IT, LT, LU, LV, MT, NL,
PL, PT, RO, SE, SI, SK
2.4GHz-2.45GHz Band for use in : FR

Made in the Philippines

Introduction

Thank you for your purchase of the Hitec Adaptive Frequency Hopping Spread Spectrum or AFHSS, 2.4GHz module and receiver system. This manual contains the complete directions on how to use the Optima series receivers and Spectra 2.4GHz module. We encourage you to review the entire manual before using these products.

Service & Support

Hitec Customer Service

Help is available from Hitec customer service through phone support and e-mail inquiries.
Our US office is open Monday thru Friday, 8:00AM to 4:30PM PST. These hours and days may vary by season. We make every attempt to answer all incoming service calls; should you reach our voicemail, please leave your name and number and a staff member will promptly return your call.

Hitec Website

We invite you to regularly visit our website at www.hitecrd.com for specification information and descriptions of our entire product line. Our FAQ pages provide valuable information as well as program updates on the Spectra 2.4GHz module and Optima series of receivers.

The On-Line Community

One of the benefits of the extensive RC on-line community is the vast wealth of archived information available. Hitec sponsors forums on most of the popular RC websites where a Hitec staff member or representative answers product-related questions. Bringing together strangers with common interests is proving to be one of the greatest gifts of the internet. If past history is any guide to the future, we are certain forums will be started about the Hitec 2.4GHz system creating valuable archived information for future access.

Warranty and Non-Warranty Service

All Hitec products carry a two-year warranty against manufacturing defects from date-of-purchase. Our trained, professional service representative will determine if the item will be repaired or replaced. Please complete and include the repair form at www.hitecrd.com when you return your item so that we may administer your repair promptly.

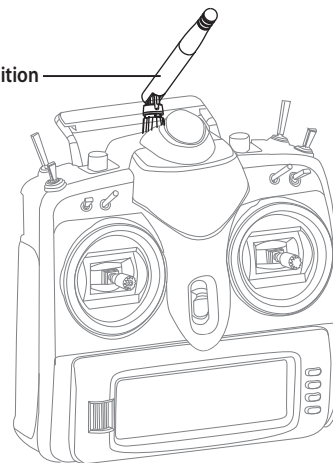
Hitec Service
12115 Paine St. Poway CA 92064
1-858-748-6948
E-mail: service@hitecrd.com



Warning!

1. For maximum performance, we recommend positioning the antenna at a 90 degree angle as shown below.

Recommended Position



- The receiver antenna should not be placed near the engine, metal parts or high current batteries.
- When using a large number of high-power digital servos, we recommend using the SPC feature to insure the receiver gets the power it needs in high-load conditions.
- Depending on flying conditions, you may possibly experience a time delay in receiving telemetry data from the HTS-SS (Sensor Station).

* Above image is different than the actual transmitter used. JR* transmitter is required to work this module properly.
*JR is a registered trademark of Japan Remote Control Corporation of Japan

Spectra 2.4 Module Features

AFHSS 2.4GHz Telemetric Module Stock # 28315

1. Dual Blue and Red Status Indicator LEDs

- Indicates the set-up process codes and current status of the module.

2. Function Button

- Used for linking the module to a receiver, entering the "power down" mode for range checks and switching system to the Scan / Normal Mode set-up.

3. Sensor Data Output and System Update Connector Port

- A three-pin servo connector port is featured on the Spectra 2.4GHz module allowing you to upgrade the device software as well as download any information recorded when using Hitec's AFHSS 2.4GHz optional on-board sensors. This port also interfaces with our new Telemetry System Sensor Station, allowing real-time data display on the ground when flying with the Aurora 9 transmitter.

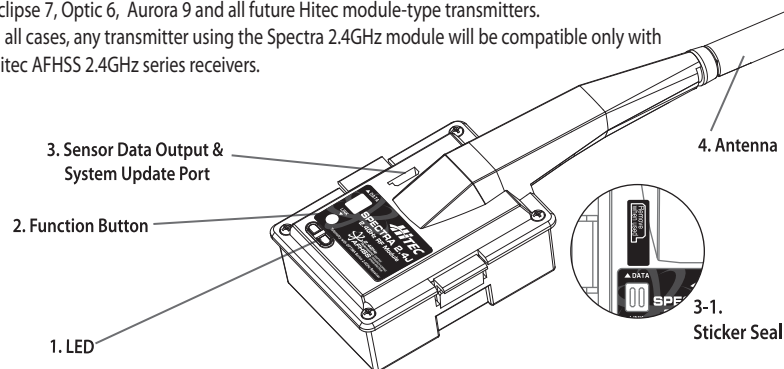
4. Adjustable Omnidirectional Antenna

- The Spectra 2.4GHz antenna is an omnidirectional antenna which can transmit and receive the transmitter and receiver data.

For the best reception, refer to the set-up example picture in the above Warning box.

5. Compatible Transmitters

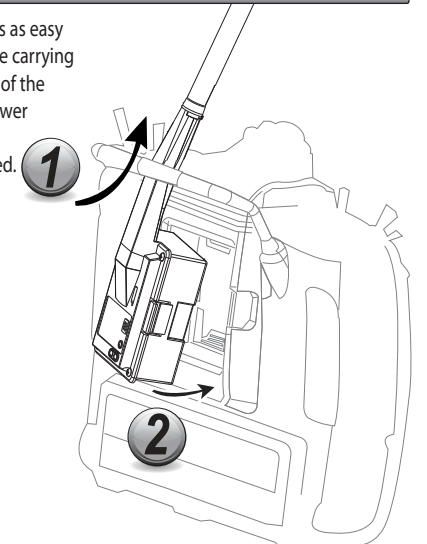
- The Spectra 2.4GHz module and antenna can be used with the following Hitec transmitters: Eclipse 7, Optic 6, Aurora 9 and all future Hitec module-type transmitters.
- In all cases, any transmitter using the Spectra 2.4GHz module will be compatible only with Hitec AFHSS 2.4GHz series receivers.



With the exception of the Aurora 9 and future Hitec 2.4GHz models, all other transmitter modules should be set up as PPM.

Spectra 2.4J Module Installation

- Installing Spectra 2.4J module to your JR* transmitter is as easy as one, two, three. simply slide the module through the carrying handle bar and slide-in the module to the module slot of the transmitter, until you hear the 'click' sound. Turn the power on of the transmitter and the receiver, wait until the Spectra 2.4J module and Optima receiver get connected.



Now you are ready to fly, and you can experience Hitec's AFHSS 2.4GHz telemetry system, which will teach you the whole new way of enjoy your R/C.

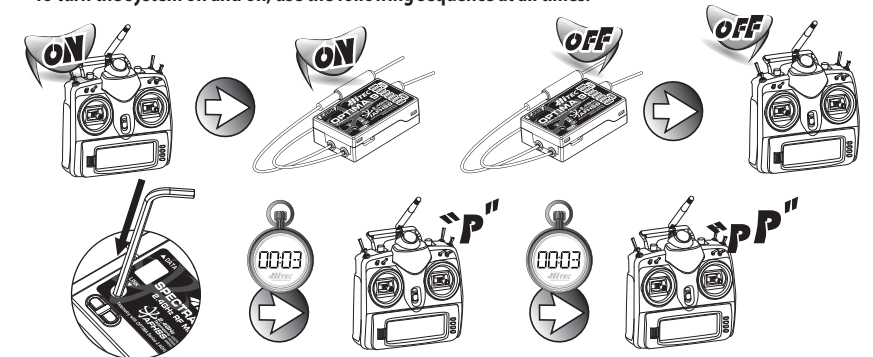
General Use Guidelines



* When the Spectra 2.4J module is used for JR* radios, the PPM mode is required to be activated for proper work.

General Use Guidelines

To turn the system on and off, use the following sequence at all times.



Press & Hold Button

Range Check Mode

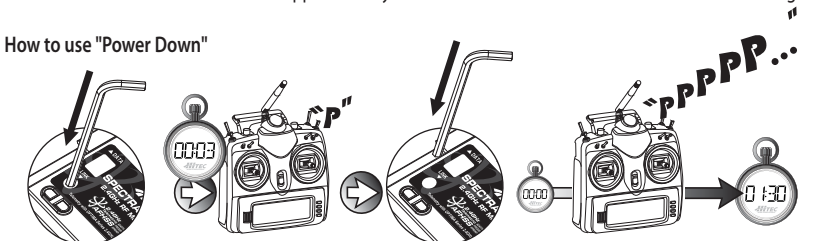
Scan/Normal Mode

Range Check Function

Before each flight, it is critical that you perform a range check to confirm the signal between the receiver and transmitter is appropriate. Unlike the FM/PPM or PCM signal radios, 2.4GHz systems use a fixed, shorter transmitter antenna commonly called a "rubber duck" antenna. Therefore, the traditional method of range check, lowering the transmitter antenna, is not applicable.

The Hitec 2.4GHz system uses a "power down" mode to reduce the transmitter signal strength. Once the "power down" mode is activated, it runs for about 90 seconds effectively shortening the range to 30 meters or 100 feet. During this "power down" mode, you should walk away from the secured aircraft carrying the transmitter to a minimum distance of approximately 30 meters or 100 feet in order to test the effective range.

How to use "Power Down"



**Warning**

- Before each flying session to confirm the radio system is working properly.
- Before the engine or motor is started, turn on the system as explained above.
- Then make sure all the servos and control surfaces are working properly.
- If any control surface is not moving properly, do not fly the aircraft until the problem is solved.
- If you are unable to accomplish a successful range check of 30 meters (100 feet), DO NOT ATTEMPT TO FLY.

Link (ID-Setting)

Your Hitec AFHSS 2.4GHz system uses a communication protocol that links and binds the Optima receiver to your transmitter. Once the receiver and module are "bound," no other transmitter can interfere with your receiver during its operation. In the case of multiple model memory transmitters, you can bind as many Optima receivers to your transmitter as necessary, one per model memory.

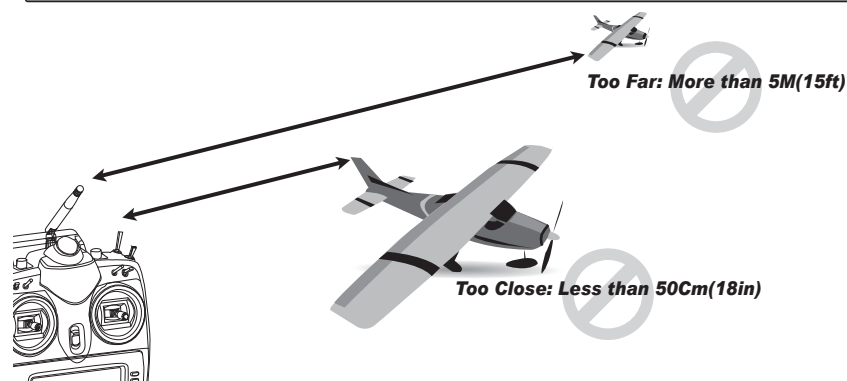
Each module and receiver set is paired at the factory in Normal Mode for your convenience. To change the transmitter to Scan Mode see page 2 (Scan and Normal Mode Information).

**Note**

- When both red and blue LEDs are "on" and both module and receiver are powered up and bound together, the Scan Mode is active. Two beeps will be heard when the system is turned on.
- When the red LED is "on" and both module and receiver are powered up and bound together, the Normal Mode is active. Four quick beeps will be heard when the system is on.

How to Link (ID-Setup or Bind in Normal Mode)

Module	Receiver
<p>1 Press and hold the button on the module and turn on the transmitter.</p>	<p>4 Press and hold the button on Optima 6, and turn on the power.</p>
<p>2 Release the button.</p>	<p>5 Release the button.</p>
<p>3 Red LED will blink to indicate it's searching for a receiver.</p>	<p>6 When the link is completed, the red LED glows solid and the blue LED flashes on the module.</p>
<p>8 Turn the power on for both the transmitter and receiver. When you hear four continuous beep sounds with LED status as indicated in the drawing below, the system is in Normal Mode.</p>	<p>7 To save the setting, turn the power off for both the receiver and transmitter.</p>

Link Guidelines**Note**

- Link must be established within 15 feet of the transmitter and receiver.
- Transmitter and receiver need to be at least 18 inches from each other to link properly.
- In the Scan Mode, if the transmitter or receiver has been shut off or disconnected for more than one second, both module and receiver need to be rebooted (turn the power off and back on).

Scan and Normal Mode Information

Hitec's Spectra AFHSS 2.4GHz systems can be operated with two different modes: Normal Mode or Scan Mode. Each mode selection can be controlled only from the Spectra 2.4GHz module; however, you can view the current system status from the receivers.

Normal Mode

- The single LED will light up to indicate the system is in Normal Mode.

Scan Mode

- Both LEDs will light up to indicate the system is in Scan Mode.

Telemetry System

The Hitec Spectra 2.4GHz module and Optima series receivers feature full telemetry capabilities (except for the Optima 6) and include a Low Receiver Battery Warning as a basic function.

I. Basic Function: Low On-board Battery Warning - for All Optima Receivers

- When the Optima series receiver is powered up, it will automatically detect the battery voltage level and recognize between 4-cell or 5-cell NiMH and NiCd batteries (4-cell < 5.8V < 5-cell).
- If a 2-cell LiPo battery is being used, you can customize the battery warning level by using our HPP-22 program.
- When battery level is safe (4-cell > 4.5V, 5-cell > 5.6V), no changes will appear to the LED lights.
- When battery level is low (4-cell < 4.5V, 5-cell < 5.6V), the blue LED glows constantly and the red LED blinks fast. Three continuous beeps from the module serve as a low receiver battery warning. Upon hearing the alarm, we advise you to land at once.

II. Optional Functions: GPS, FUEL, TEMP, O-RPM, M-RPM Sensors - Applicable for Optima 7 & 9 Only

- More devices will be available in the future. Check the Hitec website at www.hitecrd.com for more up-to-date information

**Warning**

- Low Battery Warning function is only for reference. The actual battery level may differ.
- Be aware that lazy battery effect or battery memory effects could impact the Low Battery Warning function from operating properly.
- When 2.4GHz system and HV servos are used together, we strongly recommend using a large capacity battery pack in a fully charged condition. You must constantly monitor the battery status.

II. Optional Functions: GPS, FUEL, TEMP, O-RPM, M-RPM Sensors - Applicable for Optima 7 & 9 Only

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HTS-GPS (GPS Sensor)

Hitec's GPS sensor is specially designed for R/C application, unlike conventional single dimension GPS sensor, such as car navigation, the five dimension cube Antenna has been implemented to cover dynamic movement of R/C aircraft. As a result, it could receive stable GPS information, even during 3D flight.

- When the system boots up for the first time, the position recognition time is usually slower, depending on the area you are in. Once it connects, it memorizes its last location for about 4 hours. When the system reboots at the same location within that four hour time period, the position recognition time will be significantly shortened.
- During extreme 3D flight, the signal can be lost, if this happens try to stabilize the aircraft until the connection is reestablished.

HTS-MRPM (RPM Sensor)

M-RPM sensor has been developed for indoor aircraft and for applications where the O-RPM sensor is too big to be installed. Furthermore, it will give you a much more accurate reading. For optimum performance, make sure the distance between the magnet and the sensor is less than 1mm.

HTS-ORPM (RPM Sensor)

The Optical RPM sensor was made to be used with larger, outdoor, use helicopters. Installation is simple, attach it to the boom and connect it to the sensor station. It can read from 0 to 50,000 RPM.

- The readout can be inaccurate and influenced by the weather condition
- For a more accurate reading, install the sensor as far away from the fly bar paddles as possible.

HTS-FUEL (Fuel Level Sensor)

This fuel level sensor indicates five steps of fuel level (Full, 3/4, 1/2, 1/4, Empty) to the flyer. Installation is easy, simply stick the sensor outside of the fuel tank and fly. It can even read the values during inverted flight.

Power-up the system prior to fueling.

- During extreme 3D flight, the reading can be inaccurate, if this happens try to hover (for Heli), and flatten out (for Acro) for a few seconds to re-establish an accurate reading.

The fuel sensor is only made to be used with glow fuel.

HTS-TEMP (Temperature Sensor)

HTS-SS can measure up to four different temperature locations, using the HTS-TEMPs, the temperature sensors. These specially designed temperature sensors are wrapped with high temp resistant shrink tubing and can read temperatures from -40°C to 200°C (-40°F to 392°F). These sensors can be used almost anywhere.

