



**AR6210 User Guide**

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**AR6210 Bedienungsanleitung**

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**Guide de l'utilisateur - AR6210**

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**AR6210 Guida dell'utente**

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**NOTICE:** All instructions, warranties and other collateral documents are subject to change at the sole discretion of Horizon Hobby, Inc. For up-to-date product literature, visit <http://www.horizonhobby.com> and click on the support 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:

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

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

**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.



**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 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. Do not attempt disassembly, use with incompatible components or augment product in any way without the approval of Horizon Hobby, Inc. 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.



#### **WARNING AGAINST COUNTERFEIT PRODUCTS**

Thank you for purchasing a genuine Spektrum product. Always purchase from a Horizon Hobby, Inc. authorized dealer to ensure authentic high-quality Spektrum product. Horizon Hobby, Inc. disclaims all support and warranty with regards, but not limited to, compatibility and performance of counterfeit products or products claiming compatibility with DSM2 or Spektrum.

## **AR6210 User Guide**

The AR6210 full range 6-channel receiver features DSM technology and is compatible with all Spektrum™ and JR® aircraft radios that support DSM2 and DSMX technology including: JR12X, JR11X, JRX9503, JRX9303, Spektrum DX8, Spektrum DX7, Spektrum DX6i, Spektrum DX5e, Spektrum Module Systems.

**Note:** The AR6210 receiver is not compatible with the Spektrum DX6 parkflyer transmitter.

#### **Features:**

- **6-Channel Full Range Receiver**
- **Patented MultiLink™ receiver technology**
- **Includes one internal and one remote receiver**
- **SmartSafe™ failsafe system**
- **QuickConnect™**
- **2048 resolution**
- **Flight Log compatible**
- **Telemetry compatible**

#### **Applications**

##### **Full Range Up to 6 channel aircraft Including:**

All types and sizes of glow, gas and electric powered airplanes

All types and sizes of no-powered gliders

All types and sizes of glow, gas and electric powered helicopters

**Note:** Not for use in airplanes that have full carbon fuselages.

## Specifications:

- **Type:** DSM Full Range Receiver
- **Channels:** 6
- **Modulation:** DSM2, DSMX
- **Dimension (WxLxH):** .85 x 1.19 x .48 in (26.6 x 30.1 x 12.3mm)
- **Weight:** 26 oz (7.5 Grams main receiver)
- **Input Voltage Range:** 3.5–9.6V
- **Resolution:** 2048
- **Compatibility:** All DSM2 and DSMX Aircraft Transmitters and Module Systems
- **Single receiver capable (can be used with or without the included Remote Receiver, note that the AR6210 is limited to park flyer aircraft only when not using the remote receiver).**
- **Flight Log compatible**
- **Telemetry compatible**

## Receiver Installation

The AR6210 incorporates dual receivers, offering the security of dual path RF redundancy. An internal receiver is located on the main PC board, while a second external receiver is attached to the main board with a 6-inch extension. By locating these receivers in slightly different locations in the aircraft, each receiver is exposed to its own RF environment, greatly improving path diversity (the ability for the receiver to see the signal in all conditions).

## Antenna Polarization

For optimum RF link performance it's important that the antennas be mounted in an orientation that allows for the best possible signal reception when the aircraft is in all possible attitudes and positions. This is known as antenna polarization. The antennas should be oriented perpendicular to each other; typically vertical and horizontal and at different angles (see Receiver Installation below). The remote receiver antenna should be mounted in a position perpendicular at least 2 inches away from the main receiver's antenna using double-sided foam tape.

## Receiver Installation in Aircraft

In gas and glow aircraft install the main receiver using the same method you would use to install a conventional receiver in your aircraft. Typically, wrap the main receiver in protective foam and fasten it in place using rubber bands or hook and loop straps. Alternately, in electric airplanes or helicopters, it's acceptable to use thick double-sided foam tape to fasten the main receiver in place. Mounting this remote receiver in a slightly different location, even just inches away from the primary receivers, gives tremendous improvements in path diversity. Essentially, each receiver sees a different RF environment and this is key to maintaining a solid RF link, even in aircraft that have substantial conductive materials (e.g. larger gas engines, carbon fiber, pipes, etc.), which can weaken the signal. Using servo tape, mount the remote receiver keeping the remote antennas at least 2 inches away from the primary antennas. Ideally, the antennas will be oriented perpendicularly to each other. In airplanes, we've found it best to mount the primary receiver in the center of the fuselage on the servo tray and to mount the remote receiver to the side of the fuselage or in the turtle deck.



In helicopters, there is generally enough room on the servo tray to achieve the necessary separation. If necessary a mount can be fashioned using clear plastic to mount the external receiver.



### Important: Y-Harnesses and Servo Extensions

When using a Y-harness or servo extensions in your installation, it's important to use standard non-amplified Y-harnesses and servo extensions as this can/will cause the servos to operate erratically or not function at all. Amplified Y-harnesses were developed several years ago to boost the signal for some older PCM systems and should not be used with Spektrum equipment. Note that when converting an existing model to Spektrum be certain that all amplified Y-harnesses and/or servo extensions are replaced with conventional non-amplified versions.

### Binding

The AR6210 receiver must be bound to the transmitter before it will operate. Binding is the process of teaching the receiver the specific code of the transmitter so it will only connect to that specific transmitter.

1. To bind an AR6210 to a DSM2 or DSMX transmitter, insert the bind plug in the BIND/DATA port on the receiver.



**Note:** To bind an aircraft with an electronic speed controller that powers the receiver through the throttle channel (ESC/BEC), insert the bind plug into the BIND/DATA port in the receiver and the throttle lead into the throttle (THRO) port. Proceed to Step #2.

2. Power the receiver. Note that the LED on the receiver should be flashing, indicating that the receiver is in bind mode and ready to be bound to the transmitter.



Shown using a separate receiver pack.  
(Battery can be plugged into any open port.)



Shown using an ESC/BEC and a flight pack.

3. Move the sticks and switches on the transmitter to the desired failsafe positions (low throttle and neutral control positions).



4. Follow the procedures of your specific transmitter to enter Bind Mode, the system will connect within a few seconds. Once connected, the LED on the receiver will go solid indicating the system is connected.
5. Remove the bind plug from the BIND/DATA port on the receiver before you power off the transmitter and store it in a convenient place.
6. After you've set up your model, it's important to rebind the system so the true low throttle and neutral control surface positions are set.

**NOTICE:** Remove the bind plug to prevent the system from entering bind mode the next time the power is turned on.

### SmartSafe Failsafe

The AR6210 features SmartSafe failsafe. SmartSafe is ideal for most types of aircraft. With SmartSafe, when signal is lost the throttle channel only is driven to its preset failsafe position (normally low throttle) while all other channels hold last command.

- Prevents unintentional electric motor response on startup.
- 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.

### Receiver Power Only

- When the receiver only is turned on (no transmitter signal is present), the throttle channel has no output, to avoid operating or arming the electronic speed control.
- All other channels are driven to their preset failsafe positions set during binding.

**Note:** Some analog servos may coast slightly even though no signal is present. This is normal.

### 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.

### Plugging in the Leads

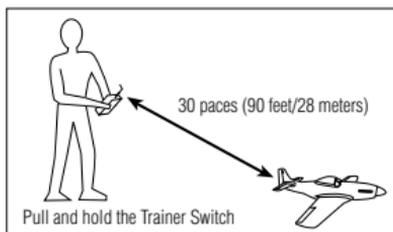
Plug the servo leads into the appropriate servo ports in the receiver noting the polarity of the servo connector.

### Red LED Hold Indicator

The AR6210 features a red LED that indicates the number of holds that have occurred since the receiver was last powered on. The LED will flash the number of holds then pause (e.g., flash, flash, flash, pause, flash, flash, flash, pause indicates three holds occurred since the receiver was last turned on). Note that holds are reset to zero when the receiver is turned off. During the first flights of a new airplane, it's recommended to check the red LED hold indicator. If it's flashing, **it's important** to optimize the installation (move or reposition antennas) until no hold occurs. On later flights, the LED Hold Indicator can be used to confirm RF link performance.

## Range Testing

Before each flying session and especially with a new model, it is important to perform a range check. All Spektrum aircraft transmitters incorporate a range testing system which, when activated, reduces the output power, allowing a range check.



1. With the model restrained on the ground, stand 30 paces (approx. 90 feet/28 meters) away from the model.
2. Face the model with the transmitter in your normal flying position and place your transmitter into range check mode.
3. You should have total control of the model with the button depressed at 30 paces (90 feet/28 meters).
4. If control issues exist, call the appropriate product support department.

## Receiver Power System Requirements

Inadequate power systems that are unable to provide the necessary minimum voltage to the receiver during flight have become the number one cause of in-flight failures. Some of the power system components that affect the ability to properly deliver adequate power include:

- Receiver battery pack (number of cells, capacity, cell type, state of charge)
- The ESC's capability to deliver current to the receiver in electric aircraft
- The switch harness, battery leads, servo leads, regulators etc.

The AR6210 has a minimum operational voltage of 3.5 volts; it is highly recommended the power system be tested per the guidelines below.

## Recommended Power System Test Guidelines

If a questionable power system is being used (e.g. small or old battery, ESC that may not have a BEC that will support high current draw, etc.), it is recommended that a voltmeter be used to perform the following tests.

**Note:** The Hangar 9 Digital Servo & Rx Current Meter (HAN172) or the Spektrum Flight Log (SPM9540) is the perfect tool to perform the test below.

Plug the voltmeter into an open channel port in the receiver and with the system on, load the control surfaces (apply pressure with your hand) while monitoring the voltage at the receiver. The voltage should remain above 4.8 volts even when all servos are heavily loaded.

**Caution:** The latest generations of Nickel-Metal Hydride batteries incorporate a new chemistry mandated to be more environmentally friendly. These batteries when charged with peak detection fast chargers have tendencies to false peak (not fully charge) repeatedly. These include all brands of NiMH batteries. If using NiMH packs, be especially cautious when charging, making absolutely sure that the battery is fully charged. It is recommended to use a charger that can display total charge capacity. Note the number of mAh put into a discharged pack to verify it has been charged to full capacity.

## QuickConnect™ With Brownout Detection (Brownout Detection not available with DSMX)

Your AR6210 features QuickConnect with Brownout Detection.  
(Brownout Detection not available with DSMX)

- Should an interruption of power occur (brownout), the system will reconnect immediately when power is restored (QuickConnect).
- The LED on the receiver will flash slowly indicating a power interruption (brownout) has occurred. (DSM2 Only)
- Brownouts can be caused by an inadequate power supply (weak battery or regulator), a loose connector, a bad switch, an inadequate BEC when using an electronic speed controller, etc.
- Brownouts occur when the receiver voltage drops below 3.5 volts thus interrupting control as the servos and receiver require a minimum of 3.5 volts to operate.

## How QuickConnect™ Works

- When the receiver voltage drops below 3.5 volts the system drops out (ceases to operate).
- When power is restored the receiver immediately attempts to reconnect.
- If the transmitter was left on, the system reconnects typically in about 4/100 of a second.

QuickConnect is designed to allow you to fly safely through most short duration power interruptions, however, the root cause of these interruptions must be corrected before the next flight to prevent a crash.

**Note:** If a brownout occurs in flight it is vital that the cause of the brownout be determined and corrected.

## Flight Log (SPM9540 Optional)

The Flight Log is compatible with the AR6210. 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 BIND/DATA port on the AR6210. The screen will automatically display voltage e.g. 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 the internal antenna
- B - Antenna fades on the external antenna
- L - Not used
- R - Not used
- 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 evaluate 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 be plugged in more conveniently. On some models, the Flight Log can be plugged in, attached and left on the model using double-sided tape. Mounting the Flight Log conveniently to the side frame is common with helicopters.

## Tips on Using Spektrum 2.4GHz

### ModelMatch™

Some Spektrum and JR transmitters offer a patent pending feature called ModelMatch. ModelMatch prevents the possibility of operating a model using the wrong model memory, potentially preventing a crash. With ModelMatch each model memory has its own unique code (GUID) and during the binding process the code is programmed into the receiver. Later, when the system is turned on, the receiver will only connect to the transmitter if the corresponding model memory is programmed on screen.

**Note:** If at any time you turn on the system and it fails to connect, check to be sure the correct model memory is selected in the transmitter. Please note that the DX5e and Aircraft Modules do not have ModelMatch.

While your DSM equipped 2.4GHz system is intuitive to operate, functioning nearly identically to 72MHz systems, following are a few common questions from customers.

### 1. Q: Which do I turn on first, the transmitter or the receiver?

*A: If the receiver is turned on first*—all servos except for the throttle will be driven to their preset failsafe positions set during binding. At this time the throttle channel doesn't output a pulse