Manual for Hyperion Receivers

1. Binding

Binding is the process of "locking" the receiver to its own transmitter (and, where relevant, to a particular model memory within the transmitter) so that it ignores any others. Binding is the first step in setting up any receiver. Ensure the transmitter and receiver are separated by 3-6ft/1-2m or the transmitter may "swamp" the receiver. Occasionally, it may be necessary to have as much as 10ft/3m separation to achieve binding. Generally you should only need to bind once and, after binding, normal link-up should not require more than a couple of feet of separation.

Step 1. Power up the receiver in bind mode

For most receivers: put the bind plug on to the bind pins. For 6-channel Ultra Light and Micro Light receivers, press and hold in the bind button.
Connect a suitable power source to the receiver throttle servo pins. This can be:
– A receiver pack battery (generally 3.45 – 7.2v)[1]; or
– A stand-alone BEC; or
– The throttle connection from your speed controller (ESC) with inbuilt BEC (if the ESC is in a model, disconnect the motor or remove the propeller).
The red LED on the receiver will flash rapidly to indicate bind mode. If it doesn't, you have a problem (such as reversed power connector). Make absolutely sure the LED is flashing rapidly before going any further.

Step 2. Turn on transmitter in bind mode

On some transmitters bind mode is activated by holding the Trainer button/ switch or bind button while powering up. Others require going into a menu to enable bind mode. If in doubt, read the manual.
Where appropriate, continue to hold the switch/button until the receiver LED stops its rapid flashing. Release it at that point and the bind process will complete. A solid light on the LED indicates successful bind.
Some transmitters will display on screen or announce the type of bind (DSM2 or DSMX) and the frame rate (normally 22mS).

Step 3. Power down and test

Remove power from the receiver, **remove the bind plug** (very important!) and switch the transmitter off.
Turn the transmitter back on, then apply power to the receiver to check that the receiver operates properly and servos respond to the transmitter controls.

NOTES:

1. If your receiver uses a satellite then binding MUST be done with the satellite connected. Both receiver and satellite LEDs should flash rapidly at the beginning of the bind process, then become solid.
2. Binding can be done with or without servos. Servos plugged in the wrong way round may prevent binding, so check this if you have difficulty.
3. Always perform a range check after binding, using the range check function on your transmitter. This attenuates transmitter power so that range is reduced by a factor of about 30. Please make sure to use “range-check” mode at 30 yds./25m indicates ample range for normal visual flying. It is good practice to perform a range check at the beginning of every day’s flying to ensure everything is working properly.

2. What does the LEDs Mean?

All Hyperion receivers and satellites have a red LED.
1. A **rapidly flashing red LED** indicates the receiver is in Bind mode
2. A **solid red LED** indicates normal radio link between receiver and transmitter.
3. **No red LED** means there is no radio link.
this “brownout warning”.
4. On receivers equipped with a failsafe button, a **solid green LED** indicates that user-defined (preset) failsafe has been set. No green LED on these receivers indicates that failsafe is in the default mode, in which loss of signal triggers removal of all pulses from the output.

3. Antennas and Satellites

All Hyperion receivers are “full range”. However the range of any receiver is affected by the number of antennas (aerials) and their orientation, as well as by the installation in the model, making comparisons difficult. Some Hyperion receivers and satellites have one short active antenna wire, while others also have a second identical “reflector” wire. Some come with longer twin diversity antennas or have them as an option. For the strongest and most reliable reception there are a number of good practices to follow.

For receivers and satellites with short wire antennas:

1. The wire(s) should stick reasonably straight out from the receiver/ satellite; where there are two, they should be in an approximately straight line. Antennas that are bent along the receiver/satellite board may have range reduced by 10-15%.
2. If a satellite is connected, it should be located as far as possible from the main receiver, not right next to it.
3. If a satellite is connected, most reliable reception is obtained when the satellite antenna and main receiver antenna are at right angles.

The larger non-diversity receivers (e.g., 7, 8- and 10-channel) do not have a second short antenna wire, as the circuit board serves the reflector function.
A small receiver with only a single antenna wire (including satellite-enabled receivers when operated without a satellite) will generally have less range by about 10-15% than an equivalent twin short antenna wire version. This is still ample range for normal flying.

For receivers and satellites with diversity antennas:

Receivers and satellites with diversity have two antennas made of coaxial cable with the last 32mm of outer insulation and conductive sheath removed to create a white or silver active portion (the antenna proper).
The antenna cables are connected to an electronic switch that selects the one currently with the stronger available signal. The receiver will switch antennas very quickly if the signal from the one it is using starts to drop in strength below the signal from the other antenna. The switching occurs within 300mS and no signal is lost during the switching period. This antenna-switching strategy is commonly called “diversity” in the RC world.

A satellite does not significantly increase the maximum possible range. Rather, as a separate stand-alone receiver it increases the probability that a reliable signal will be obtained at all times no matter the orientation of the model. The main receiver selects the stronger of its own best signal or that of the satellite. Note that if both the receiver and the satellite have diversity antennas this gives up to four separate signal sources for the receiver/satellite combination.
The antennas we use for radio control radiate (and receive) in all directions, but the signal is much weaker off the ends of the antenna (the active portion of the cable) than "broadside" to it.

To achieve the most reliable possible link to the model , what we want to avoid are situations in which the transmitter and receiver antennas are end-on to each other. For the transmitter, the advice to the pilot is simple. A single receiver antenna will inevitably be pointed at the transmitter some of the time and thus in a relatively weak orientation for reception. This is where diversity comes in. If the receiver has two active antennas positioned at right angles to each other, they can never both be pointed at the transmitter simultaneously. The receiver just has to select the antenna that is giving the better signal right now.

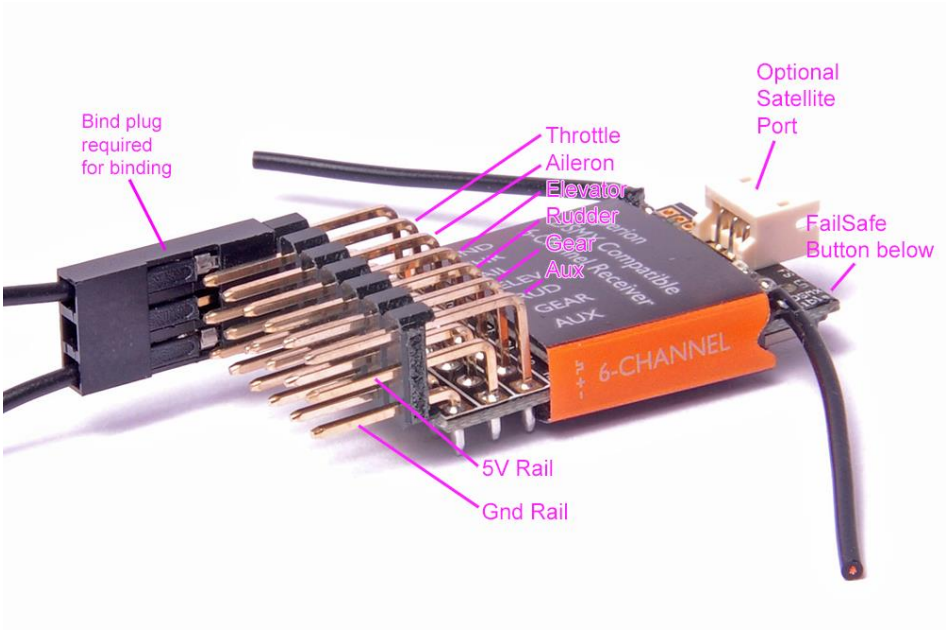
Diversity improves the reliability of the RF link in other ways. If the two receiver antennas are well separated, at least one should have a clear view of the transmitter, minimizing the risk of signal blanking by conductive materials on board the model. As well, with antennas at right angles, one of them should be somewhere near parallel to the transmitter antenna, thus roughly aligning polarization for a stronger signal. Conductive materials such as foil coverings, batteries, metal components and carbon fiber can absorb and shield the incoming radio signal. Radio systems on 2.4GHz have a very short wave length and are susceptible to this. Receiver antennas need to be placed so that this effect is minimized.

In summary

What all this means for the installation of a receiver is simple.
If the receiver has dual diversity antennas, make sure the active tip portions are separated as far as practical from each other and from conductive stuff like battery, wiring and carbon fiber. 3 Align these portions so they are at right angles to each other and reasonably straight. The coax cable portion of the antennas can be curved to achieve this but must not be sharply bent.
If a satellite is connected, it should be well away from the main receiver, not right next to it. Align it so the satellite antenna(s) and at least one main receiver antenna are roughly at right angles.
Take all this seriously but don't get paranoid. The installation doesn't have to be perfect to support an adequately strong RF link. Our modern receivers do a remarkable job of picking up the signal, even with just a simple single antenna. Diversity is not essential in most cases but can be thought of as extra security for when the going gets tough.
And, as always, **range testing is essential**. It should be done very thoroughly before the first flight of a new installation, with reception tested from all directions by walking around the model. If control becomes erratic from any direction at 25m range it’s time to review and improve the installation. Once the setup is proven, a quick range check at 30 paces before the first flight of the day is all that’s needed to check that things are working as they should.

Connections and Switches on the Receiver

Hyperion receivers have connections, plug orientation and switch function identified on the PC board or case. The positive pins for all channels (and the bind slot) are connected together, as are all the ground pins; power can be applied to any set of pins and if necessary a Y-cable can be used.



Only use a DSMX-compatible satellite with this receiver. It is also available in a diversity antenna version.

Input voltage: 3.45 ~ 10.2v

6. Failsafe

The primary purpose of failsafe is to minimize the risk of injury and damage should the receiver lose signal while the model is powered up, whether flying or on the ground. The key safety requirement is that the motor be shut down on loss of signal.

Two types of failsafe are used by the various Hyperion receivers:

1. No Pulse

Modern speed controls (ESCs) go automatically to OFF if no control pulses are available. This important safety feature can be used to achieve failsafe behavior if on loss of signal the receiver cuts off pulses to the ESC and other channels. This results in the motor shutting down and the servos not moving.

An advantage of this approach is that it does not rely on the operator to ensure that the throttle stick is at low position when binding. However, it is not suitable for use with a model powered by an internal combustion engine (glow or gasoline), or with an ESC that lacks auto off.

This type of failsafe is used by the Hyperion 7-channel stabilizer.

No Pulse Failsafe is the **default** for the 6-channel DSMX-compatible, 7-channel Telemetry enabled DSMX-compatible PPM receiver, 8 and 10 channel DSM2-compatible and DSMX-compatible receivers, and 8-channel PPM receivers (both the current DSMX-compatible version and the earlier DSM2-compatible unit).

2. User-Defined Failsafe

This type of failsafe allows the operator, after binding the receiver, to set the desired failsafe positions of all channels. This allows for such special failsafe requirements as having a glider go into a spiral with spoilers deployed in order to prevent a flyaway. Likewise, multicopters may have a failsafe command to return home using GPS.

User-Defined Failsafe, also known as Pre-set Failsafe, is a user set **option** on the 6 channel DSMX compatible, 7-channel Telemetry enabled DSMX compatible PPM receiver, and 8 and10 channel receivers, including the PPM units.

As explained above, the **default** for these receivers is No Pulse Failsafe.

Setting User-Defined Failsafe. Where user-defined failsafe is available, the receiver can be set to use it as follows:

1. Power up the transmitter and receiver (which should already be bound). Do NOT have the transmitter in bind mode.
2. Apply the bind plug to the receiver bind pins (with power on).
3. Set the transmitter controls to the desired failsafe positions.
4. Press in the failsafe switch on the receiver briefly.
5. The Green LED on the receiver will turn on to indicate that failsafe positions have been stored. Henceforth, whenever the receiver is powered up, the green LED will indicate “user-defined failsafe”. If signal is lost, the receiver will output the pre-set positions after approximately 3 seconds and maintain them until a valid signal is again received. Test the failsafe settings by turning off the transmitter, after taking all necessary precautions, such as removing propellers or restraining the model.

To return to the default no-pulse failsafe with these receivers, simply rebind the receiver normally.

How to bind DSMX compatible Satellite to Flight Controller without main Rx:

1.Make sure that satellite has been connected correctly.
2.Connect Naze32 to USB
3.Open baseflight/cleanflight and connect to Naze32 (baseflight/cleanflight app in Chrome)
4. From Configuration tab make sure that you have selected "Enable Serial-based receiver" and select. SPEKTRM2048 for DSMX.
5. From CLI tab type: "set spektrum_sat_bind = 9" for DSMX
6. Type "save" and after Naze32 reboot remove USB cable (Fully Power off the Flight Controller)
7. Wait a few seconds and reconnect the USB cable. After cold start satellite led should start blinking and transmitter should be turned on while pressing the bind button.
8. After binding satellite led should be solid. Connect cleanflight/baseflight and use receiver tab to test that satellite is working correctly.
9.Final step is to go to CLI tab and type "set spektrum_sat_bind = 0" and then type "save". This must be done so that satellite doesn't go back to binding mode when Naze32 is repowered again.

NOTICE

- For more information on the Hyperion receivers, see www.Hyperion-World.com website for more product details.
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