SPEKTRUM

AR12200 User Guide

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 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 a 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. 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 DSM or Spektrum.

WARRANTY REGISTRATION
Visit www.spektrumrc.com/registration today to register your product.

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

Spektrum launched the 2.4GHz RC revolution with DSM2™ technology. Since then, millions of hobbyists the world over have come to embrace 2.4 GHz as the way to fly. Spektrum leads the way yet again with DSMX® technology; the world's first wideband, frequency-agile 2.4GHz signal protocol.

How Does DSMX Work?
DSMX combines the superior data capacity and interference resistance of a wideband signal (like that used in DSM2) with the agility of frequency shifts.

Compared to the wideband signal of DSMX, the narrow band signal of other frequency hopping 2.4 GHz transmitters are more likely to suffer data loss in the event of on-channel interference. Think of it as a river vs. a stream. It takes more interference to dam a river than it does a stream.

As more and more 2.4 GHz transmitters vie for the same number of available channels, there is more interference and more of a risk for data loss. By adding the agility of frequency shifts to the superior interference resistance of a wideband signal, DSMX technology is far less likely to suffer significant data loss from on-channel interference. The result is quicker connection times and superior response in even the most crowded 2.4GHz environment.

DSMX Operational Differences
DSMX transmitters and receivers function nearly identically to Spektrum™ DSM2 systems. Binding, setting the failsafe, recording flight log data, as well as general use of the system is no different than using any current Spektrum system.

Brownout Detection—Not Available on DSMX Receivers
DSM2 receivers feature Brownout Detection that causes the receiver's LED to flash if a power interruption occurs. While DSMX receivers have QuickConnect™ and recover instantly from a power interruption, the architecture of DSMX prevents Brownout Detection when operating in DSMX mode.

Flight Log Recording—Fades Higher than DSM2
DSMX uses frequency shifts through the band while DSM2 finds two quiet channels and remains on those channels. Consequently, because DSMX operates on quiet and noisy channels, it's common to have more Antenna Fades than when using DSM2 in busy 2.4GHz environments. When taking flight log data readings, the Frames and Hold Data are important and should be used as a reference, while Fades are insignificant due to the nature of frequency agile systems. A 10-minute flight will typically result in less than 50 Frame Losses and no Holds.

Just How Good is DSMX?
In multiple tests, 100 DSMX systems were operated simultaneously for extended periods of time. During these tests, each of the 100 systems was monitored in flight and on the ground. In every test, not a single case of RF link loss, latency increase or control degradation was experienced or recorded.

Is DSMX Compatible with DSM2?
Yes. DSMX is fully compatible with all DSM2 hardware. In fact, many pilots may find the DSM2 equipment they have now is all they will ever need. Even if a new DSMX transmitter eventually comes along, all the DSM2 receivers they have now will work with it.

It is important to note, however, that while DSMX is compatible with DSM2, the only way to experience the full benefits of DSMX in a busy 2.4 GHz environment is by pairing a DSMX transmitter with a DSMX receiver.

Are DSM2 Transmitters Eligible for a DSMX Add-on?
Yes. DX8 owners can simply download Spektrum AirWare™ v2.0 software from spektrumrc.com and update the firmware using their SD card. All DSM2 transmitters, except the DX5e, are eligible for the add-on for $75 by sending them to the Horizon Hobby service center. DSM2 receivers and transmitter modules are not eligible for the DSMX add-on.

Does DSMX have ModelMatch™ and ServoSync™ Technology?
Yes. DSMX will provide you with these and other exclusive Spektrum advantages that you already enjoy with DSM2.

Want to know more about DSMX? Visit spektrumrc.com for complete details on this as well as the many other reasons Spektrum is the leader in 2.4 GHz.

NOTICE: While DSMX allows you to use more than 40 transmitters simultaneously, when using DSM2 receivers, DSMX receivers in DSM2 mode or transmitters in DSM2 mode, do not use more than 40 transmitters simultaneously.

Spektrum AR12200

The Spektrum AR12200 Cockpit is an advanced, 12-channel receiver system that offers the ultimate solution for powering high-current draw radio systems. It features a freely programmable gear and door sequencer for up to 6 servos with up to 12 programmable tasks for retracting the gear and another 12 tasks per servo for extending the gear.

The Cockpit features an integrated servo matching system for up to 4 different dual channels, perfect for giant-scale aircraft using ganged servos on a surface. The Spektrum Cockpit eliminates the need for external voltage regulators, gear door sequencers, and servo matchers.

In aircraft with multiple high-current draw servos (e.g. giant-scale aircraft, jets, etc.), the Cockpit can provide constant current of up to 20 amps. Each battery input is regulated independently to 5.9 or 7.4 volts and each regulator is capable of handling 10 amps (2 x 10 A). This offers true dual battery redundancy and a fail-on SensorSwitch for the ultimate in reliability. By locating four remote receivers throughout the aircraft, the RF link can be optimized in even the most demanding aircraft installations that have significant conductive materials like carbon, stainless steel bypass tubes, tuned exhausts, etc.

The Spektrum Cockpit main unit is not a receiver. The Spektrum Cockpit's main unit is a power distribution center that provides up to 20 amps of current to power your integrated gear and door sequencer and servo matching system. Through extensive testing, our engineers discovered that mounting the unit in the typical location in a sophisticated aircraft (an aircraft with many high-current draw servos and/or conductive materials) at the end of the servo and battery leads is not the optimum location to provide the clearest RF signal. The Spektrum Cockpit uses four remotely mounted receivers that can be optimally placed in your aircraft to provide the best possible RF link.

Specifications
Cockpit Main unit
    Voltage input: 6.0 to 9.0 volts
    Minimum operational voltage: 3.5 volts
    Peak current: 20 amps
        • Each battery input is regulated to 5.9 or 7.4V, and are each capable of 10 amps output (20 amps combined)
    Resolution: 2048
    Main unit Dimensions LxWxH: 4.35 x 2.88 x .78 in (110.5 x 73.1 x 19.9mm)
        • Includes mounting lugs and base plate
    Main unit Weight: 4.0 oz (113.4 grams)
    Connector type: MPX (MPX to EC3™ connector and MPX to Deans Ultra connector adapters are available separately (SPM6828 and SPM6829)).
    Regulator: Dual isolated 10-amp, 5.9 or 7.4V regulators
Remote Receiver
    Remote Receiver Dimensions LxWxH: 1.02 x .80 x .27 in (25.8 x 20.2 x 6.8mm)
    Remote Receiver Weight: 0.2 oz (3 g)
SensorSwitch
    SensorSwitch Dimensions LxWxH: 2.55 x .91 x .71 (65 x 23 x 18.1mm) Includes mounting base.
    SensorSwitch Weight: 0.7 oz (19.8 g)

Items Included
• Spektrum Cockpit Main Unit—SPMAR12200
• Four Remote Receivers—SPM9645
• SensorSwitch—PBS9050
• One 36" Remote Receiver Extension—SPM9014
• One 24" Remote Receiver Extension—SPM9013
• One 12" Remote Receiver Extension—SPM9012
• One 9" Remote Receiver Extension—SPM9011
• Instruction Manual

Optional Items
• 2150mAh 6.0V NiMH Receiver Pack—SPMB2150NM
• 2700mAh 6.0V NiMH Receiver Pack—SPMB2700NM
• 4500mAh 6.0V NiMH Receiver Pack—SPMB4500NM
• 1350mAh—SPMB1350LP LiPo Receiver pack
• 2000mAh—SPMB2000LP LiPo Receiver Pack
• 4000mAh—SPMB4000LP LiPo Receiver Pack
• 6000mAh—SPMB6000LP LiPo Receiver Pack
• 6" Remote Receiver Extension—SPM9010
• 9" Remote Receiver Extension—SPM9011
• 12" Remote Receiver Extension—SPM9012
• 24" Remote Receiver Extension—SPM9013
• 36" Remote Receiver Extension—SPM9014
• 12" EC3 Extension—SPMEXEC312
• 24" EC3 Extension—SPMEXEC324
• EC3 Battery Connector, Female (2)—EFLAEC302
• MPX to EC3 adapters—SPM6828
• MPX to WS Deans Ultra Adapter—SPM6829

Battery Requirements

Using One Battery
The Spektrum Cockpit allows the option of using one or two battery packs.
When using one battery, simply connect the battery into either of the two battery connectors (BATT 1 or BATT2).

Using Two Batteries
The Spektrum Cockpit offers a true redundant dual battery system with built-in dual voltage regulation. When using two battery packs, each pack functions independently and is isolated from the other so that if one pack should fail (open circuit, short circuit or become discharged), the other battery will provide power to operate the system.

When using dual batteries, it's important that both batteries be of the same capacity, number of cells and ideally of the same age and condition. Keep in mind, however, that it's normal for one battery to discharge slightly more than the other. This is the nature of an isolated battery system. The battery that has the higher voltage or lower internal resistance will discharge at a faster rate. Generally, the difference is negligible (less than 10%).

When using two batteries, the total available capacity equals the sum total of both batteries, for example, BATT1 (2000mAh) + BATT2 (2000mAh) = a total capacity of 4000mAh.

Battery Capacity
It's important to select a batteries that have more than adequate capacity to provide the necessary flight time. Current draw varies depending on your servos, installation and flying style.

40–45% aerobatic aircraft with 9–12 high-current servos:	4000–8000mAh
33–35% aerobatic aircraft with 7–10 high-current servos:	3000–6000mAh
25% quarter scale aerobatic aircraft with 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

Recommended Guidelines for Battery Capacity
Scale aircraft—The varieties of scale aircraft and the accessories they use vary tremendously, making it difficult to give capacity recommendations for these types of aircraft. Using the previously mentioned aerobatic guidelines, relative to the size and number of servos used, will provide a conservative capacity for your scale aircraft. As always, check the battery charge condition before each flight.

Battery Voltage
CAUTION: D0 NOT use a 4-cell, 4.8-volt battery to power the Spektrum Cockpit. Four-cell, 4.8-volt batteries do not provide enough voltage headroom (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 Spektrum Cockpit is capable of handling voltages from 6.0 to 9.0 volts. The voltage limitations are generally the servos. The output voltage of the servos are regulated to 5.9 or 7.4V. Each voltage regulator is capable of handling 10 amps for a total of 20-amp continuous current capability.

CAUTION: NiMH batteries have a tendency to false peak when being fast charged. Always make sure NiMH batteries are fully charged and have not false peaked during charging.

Many pilots use 2-cell LiPo batteries to power their aircraft. LiPo batteries offer greater capacity for their size and weight and are easier to manage when charging.

⚠ **CAUTION:** When not in use, always disconnect the battery from the Spektrum Cockpit to prevent over-discharge. Batteries discharged below recommended voltage may become damaged, resulting in loss of performance and potential fire when batteries are charged.

⚠ **CAUTION:** When charging any brand of NiMH battery pack, make sure the battery is fully charged. Due to the nature of peak charges and variations in charging rates, heat development and cell types, the capacity reading of a battery charged on a fast peak charger may only reach 80% of its nominal value. Use a charger that displays total charge capacity. Note the number of mAh put into a discharged pack to verify the charge is at full capacity.

Installation
The Spektrum Cockpit requires a minimum of three remote receivers to be plugged in for the system to operate. Each receiver functions independently and offers a more secure RF link in difficult environments. The added security of redundancy, should a failure occur, outweighs the additional weight and cost penalties.

Installing the Spektrum Cockpit Main Unit and SensorSwitch
1. Using the 4 included screws, drill 4, 1/16" pilot holes into a plywood or hardwood mount. Secure the main Cockpit unit in the position desired.

2. Mount the switch on the side of your aircraft and insert the switch plug in the SensorSwitch port in the Cockpit unit. Make sure to install the connector with the ribbon cable facing up. In models with severe vibration, secure the ribbon lead by at least one additional point to prevent the connector from coming loose. If the connector falls out in flight, you will need to connect the SensorSwitch again to power off the Cockpit.

NOTICE: The Spektrum Cockpit uses a specifically designed switch. Conventionally wired switches are not compatible with the Spektrum Cockpit.

3. To power on the Spektrum Cockpit with the SensorSwitch, press and hold the SET button on the SensorSwitch until the central LED glows red. Press buttons I and II separately to turn each battery on. If you have only 1 battery installed, you only need to press the button for that battery.

4. To power off the Spektrum Cockpit with the SensorSwitch, repeat the procedure for turning the unit on in reverse order. Intermittent contacts or interruptions in the battery power cannot power off the Spektrum Cockpit.

Installing the Batteries
Using the guidelines mentioned earlier, select the battery system that best fits your application and install the battery(s)/regulator(s) in your aircraft. Connect the battery to the Spektrum Cockpit. Spektrum PowerSafe™ batteries are pre-wired with an EC3 connector and require an EC3 to MPX adapter to connect to the Spektrum Cockpit. It is essential to maintain the correct polarity as connecting a battery with reversed polarity will instantly damage the Spektrum Cockpit's internal regulators and will prevent the Spektrum Cockpit from working. The default battery type setting is for Lithium Polymer (LiPo) 2-cell packs. If you wish to use other battery types, the specific battery type must be set using the Power Manager feature described later.

Patented MultiLink™ Receiver Technology
The AR12200 supports four receivers, offering the security of multiple path RF redundancy. External receivers attach to the main unit using extensions. Installing these receivers in different places in the aircraft exposes each receiver 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, mount the remote antennas in an orientation that allows for the best possible signal reception when the aircraft is at all possible attitudes and positions. This is known as antenna polarization. Mount one antenna vertically, one horizontally in-line with the fuselage and one horizontally perpendicular to the fuselage. Installing antennas in this pattern offers optimum cross-section visibility.

Receiver Installation
While Spektrum 2.4 GHz systems are far more resistant to interference caused from internal RF generating sources, the remote receivers should be mounted as far away as practical (typically 4" or greater, if possible) from the following:

• Ignition systems
• Ignition batteries
• Ignition switches
• Engines
• ECUS pumps
• Electric motors
• Receiver batteries
• Fuel tanks
• Metal bypass tubes
• High-temperature components like exhaust systems
• Any significant metallic conductive components
• High-vibration areas

Mount the remote receivers a minimum of at least 2" apart from each other as greater antenna separation gives improved path diversity (RF link performance) in critical environments. In large aircraft where space is not an issue, mount the antennas throughout the aircraft as illustrated below. Spektrum offers remote receiver extensions ranging from 6" to 36" to ensure the receivers can be mounted in the most optimum locations throughout the aircraft.

Using double-sided foam tape and tie wraps, mount a minimum of 3 remote receivers in your aircraft and connect the receivers to the receiver ports of the Spektrum Cockpit. The following illustrations show typically recommended installations. Note the remote receiver orientation.
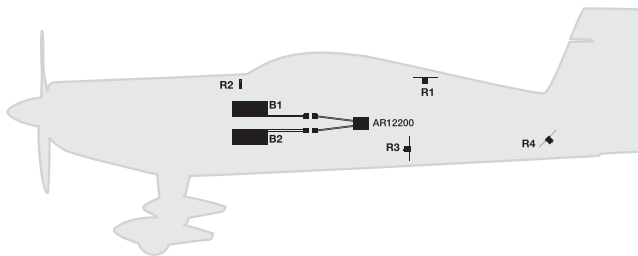
Mounting the Remote Receivers

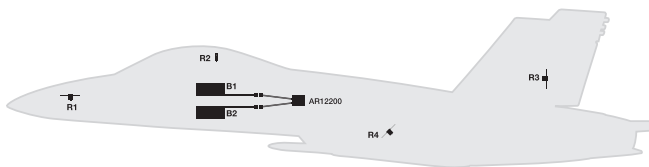• 35% aerobatic plane with single NiMH battery and three remote receivers

R2   R1   B1   AR12200   R3
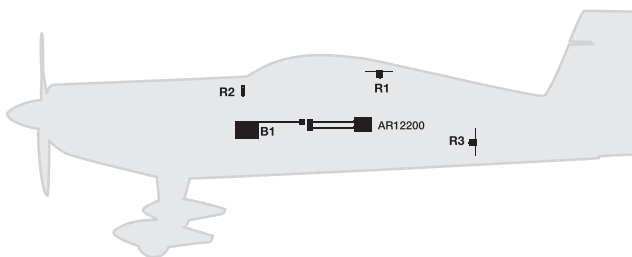
• 35% aerobatic plane with dual NiMH batteries and three remote receivers

R2   R1   B1   B2   AR12200   R3
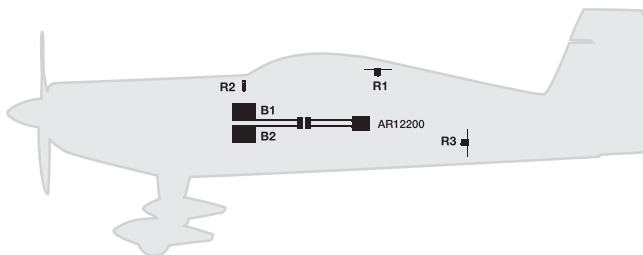
• 40% aerobatic plane with dual LiPo batteries and four remote receivers

R2   R1   B1   B2   AR12200   R3   R4

• Jet with dual LiPo batteries and four remote receivers

R2   R1   B1   B2   AR12200   R3   R4

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Installing Servos

Connect the servo leads to the appropriate ports in the Spektrum Cockpit and prepare to bind the system to your transmitter.

The Spektrum Cockpit has 4 dual-matched channels available to operate 2 separate ailerons, rudders, aux 1, flap or any other available channel servos. Use the built-in servo matching feature to adjust each of the 4 dual-channel servo ports to match each other. These ports can be matched at the servo center points as well as each endpoint.

NOTICE: Failure to match ganged servos throughout the range of motion on a control surface will result in high amperage drawn by the servos, which can lead to servo failure. Use an inline current meter (such as the HAN172) to adjust for decreased current draw in the system.

NOTICE: Only use standard, non-amplified Y-harnesses and servo extensions with Spektrum equipment. Use of amplified Y-harnesses or servo extensions will cause the servos to operate erratically or not function with Spektrum equipment. Amplified Y-harnesses were developed to boost the signal for some older PCM systems and should not be used with Spektrum equipment. When converting existing models to use Spektrum equipment, make sure all amplified Y-harnesses and/or servo extensions are replaced with conventional, non-amplified versions.

The JR® PCM Y-Harness with Amplifier (JRPA133) is not compatible with the AR12200 and should not be used.

Binding

Always connect three or more remote receivers to the Spektrum Cockpit for correct linking and binding to a transmitter. Connecting fewer than three remote receivers will cause the Cockpit to operate incorrectly.

Bind the Cockpit to your transmitter, so:
The Cockpit recognizes your transmitter, ignoring signals from other sources

Transmitter control and servo failsafe positions are set and saved in the Cockpit during binding.

After charging the batteries
Reset the Cockpit so reliable values for energy consumption and operating times are displayed.

To reset the Cockpit battery:
With the system powered on, press and hold buttons I and II on the SensorSwitch together until the following screen appears:

After this screen appears, release buttons I and II and the capacity available is reset to the value you have stored for the battery capacity.

Information on Main Screen
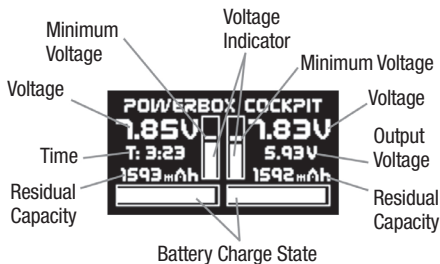
When the Cockpit is powered on, the following main screen will appear with the following information:

Graphic voltage indicator
  The graphic voltage indicator provides the batteries' state of charges. This display is only correct for the current type of battery selected. If the connected battery is fully charged, the charge bar will extend to the top of the voltage indicator box. If the bar only fills the bottom third of the box, the corresponding battery is almost discharged. This indicator is supplemented by the residual capacity display.

Graphic display of the minimum voltage value
  This displays the minimum voltage for the battery type selected. If the voltage is below this mark, the batteries must be charged.

Operating Time
  This displays the elapsed time since the last RESET of the battery capacity as described above. It is important to perform a RESET each time the batteries are charged.

Graphic Indicator of the battery charge state
  This displays the battery charge remaining. Assuming the battery is of good quality, if the bar reaches the halfway point, then the battery is halfway depleted.

Digital voltage display
  This displays the voltage of the battery in a numerical format.

Output voltage
  This displays the Cockpit's output voltage to the servos.

Residual battery capacity
Assuming that you have previously set the battery type correctly and have performed a RESET of the capacity of the battery after charging , this displays the momentary capacity value of the battery. Keep in mind, however, that aging effects and defective batteries may falsify this value. Residual capacities shown on the screen may appear different during battery discharge. This may be due to small and unavoidable differences in discharge rates between voltage regulators matched at the factory. In practice, if the remaining capacity appears to be high but the voltage is low, immediately check the battery for problems.

Sequencer

The Cockpit unit supports door sequencer (DS) programming. Doors can be set to open and close and gear to extend and retract as needed. Look at the unit to see the six ports marked DS, 1 through 6, available for sequencing and timing. Plan how you want to sequence and time what you connect using the information below. .

• Servo Position I: (Starting servo position, 700 micro seconds to 2300 micro seconds)
• Servo Position II: (Ending servo position, 700 micro seconds to 2300 micro seconds)
• Start Time (This can be set to a delay for the movement to occur, 0–9.9sec)
• Stop Time (This is used to slow the movement from the start position to the end position 0–9.9sec)

Example
Values for the retraction/extension positions will vary according to linkages and must be set up individually to suit your model. Ensure that the wheel and door positions do not mechanically stall or block the servos and that the timing suits the requirements of your model.

Sequence for retracting the gear

Task 1 is used to open the main wheel door when the transmitter switch is moved from position A to position B. The selected stop time (three seconds) causes the door to open slowly.

Task 2 controls the secondary wheel door. The servo for this function is installed in the reverse orientation, as can be seen from the position values.

Task 3 is responsible for operating the nose wheel door. After a period of 3.5 seconds (set in Task 4), the gear is extended, and, after a brief pause, the wheel door closes again.

Task 4 controls an electronic pneumatic valve for the retractable undercarriage. The valve will open after a delay of half a second once the wheel doors have reached their position; at this moment, it feeds compressed air into the air cylinders. The switching points are programmed on the valve itself after the door sequencer has been programmed.

Task 5 closes the wheel door that opened in Task 1 1.5 seconds after the gear is extended. In this example, it closes even more slowly than when opened.

Task 6 closes the secondary wheel door of the main gear.


```
ACTION: A→B      TEST
○TASK: 1      SERVO: 1
 SRV-POS I  : 1241µs
 SRV-POS II : 1803µs
 STARTTIME: 0.0s
 STOPTIME : 3.0s   OK
```

```
ACTION: A→B      TEST
○TASK: 2      SERVO: 2
 SRV-POS I  : 1801µs
 SRV-POS II : 1303µs
 STARTTIME: 0.0s
 STOPTIME : 3.0s   OK
```

```
ACTION: A→B      TEST
○TASK: 3      SERVO: 3
 SRV-POS I  : 1101µs
 SRV-POS II : 1953µs
 STARTTIME: 5.5s
 STOPTIME : 9.0s   OK
```

```
ACTION: A→B      TEST
○TASK: 4      SERVO: 4
 SRV-POS I  : 1200µs
 SRV-POS II : 1800µs
 STARTTIME: 3.5s
 STOPTIME : 3.5s   OK
```

```
ACTION: A→B      TEST
○TASK: 5      SERVO: 1
 SRV-POS I  : 1803µs
 SRV-POS II : 1241µs
 STARTTIME: 5.0s
 STOPTIME : 9.0s   OK
```

```
ACTION: A→B      TEST
○TASK: 6      SERVO: 2
 SRV-POS I  : 1303µs
 SRV-POS II : 1801µs
 STARTTIME: 5.0s
 STOPTIME : 9.0s   OK
```

Sequence for extending the gear

Task 1 opens the wheel door at the same times that were selected for retracting the gear. The only change that needs to be made is the direction B->A must be selected at the Action point. The software automatically copies the values for positions I and II as soon as you select Servo 1.

Task 2 opens the main gear door immediately when the retract switch is moved from position B to A.

Task 3 immediately starts to open the nose wheel door when the transmitter switch is operated, but slowly.

Task 4 operates the electronic valve again and the gear is extended.

Task 5 closes the main wheel doors slowly.

Task 6 closes the secondary main wheel door after the gear is extended with a delay of 1.5 seconds.

```
ACTION:B→A    TEST
○TASK:  1   SERVO:1
SRV-POS I : 124 1µs
SRV-POS II: 1803µs
STARTTIME:0.0s
STOPTIME :3.0s  OK
```

```
ACTION:B→A    TEST
○TASK:  2   SERVO:2
SRV-POS I : 180 1µs
SRV-POS II: 1303µs
STARTTIME:0.0s
STOPTIME :3.0s  OK
```

```
ACTION:B→A    TEST
○TASK:  3   SERVO:3
SRV-POS I : 1953µs
SRV-POS II: 110 1µs
STARTTIME:0.0s
STOPTIME :3.0s  OK
```

```
ACTION:B→A    TEST
○TASK:  4   SERVO:4
SRV-POS I : 1800µs
SRV-POS II: 1200µs
STARTTIME:3.5s
STOPTIME :3.5s  OK
```

```
ACTION:B→A    TEST
○TASK:  5   SERVO:1
SRV-POS I : 1803µs
SRV-POS II: 124 1µs
STARTTIME:5.5s
STOPTIME :9.5s  OK
```

```
ACTION:B→A    TEST
○TASK:  6   SERVO:2
SRV-POS I : 1303µs
SRV-POS II: 180 1µs
STARTTIME:5.5s
STOPTIME :9.5s  OK
```

This example shows how a complex function is put together. It is also possible to insert additional movements or intermediate stops at any time when opening or closing the doors by using tasks 7 to 12.

Servo Matching

The Cockpit unit supports servo matching (ganging) in a menu item, when using four pairs of ports marked A through D. For example, two servos attached to a single aileron can be connected to port A, decreasing current draw and fighting between these two servos.

Start by initializing the match channels you will use by setting the Initial Servo Center Position described later in these instructions. Set up the maximum travel and expo functions completely before matching the servos.

```
○KANAL:A    SERVO: 1
 START            OK

 SRV-OFF L :+     0
→SRV-OFF M:+     0
 SRV-OFF R :+     0
```

To match servos using the Servo Matching function, perform the following steps:

1. Disconnect the control surface linkages from the servos to avoid high forces acting upon the currently unmatched servos.

2. Select the output port to adjust, A–D. The channel for the output ports of the Cockpit are determined in the Servo Mapping function.
3. Select the Servo to adjust, 1–2. Either of the 2 channels can be adjusted, allowing greater flexibility in servo matching.
4. Move the stick, switch or other controlling device of the transmitter to the desired position and hold. Note that when the output channel is moved, the arrow will move on the screen, indicating which parameter is ready to adjust.
5. Select Start with the SET button on the SensorSwitch.
6. Once Start has been selected, you can release the transmitter stick. The position will be held until the SET button on the SensorSwitch is pressed again. Also check that the disconnected ball link lines up correctly with the linkage point.
7. Press the SET button on the SensorSwitch to conclude the set-up process. Do not re-connect the linkage until you have adjusted the center position and both end points correctly.
8. To make further adjustments, move the transmitter stick in the desired position and press SET again with the cursor at Start, then repeat the set up process.
9. If you wish to reverse the direction of rotation of a servo, move the control surface to one end point and select the menu point Start with the SET button on the SensorSwitch. Now press and hold button I or II until the control surface moves in the opposite direction. Repeat the procedure for the other endpoint of travel.
10. Typically, full throw on a servo will be within a range of 900 to 2100 micro seconds with the servo's center position at 1500 micro seconds.

⚠ **CAUTION:** Do NOT go beyond the servo's maximum travel or damage to the servo could result. Maximum throw varies from servo to servo.

11. Once the servos are matched, use a current meter to minimize the current draw of each servo to prevent any fighting of the servos. Adjust the servos as necessary with the linkages and the servo matching function to achieve the lowest current draw possible at the center and endpoints.

RX/TX Settings
Several functions are in the RX/TX Settings menu, including: selecting DSM2 or DSMX operation, binding the Cockpit, teaching fail safe positions, selecting the frame rate, channel output mapping for the output ports and setting the transmitter center stick positions.
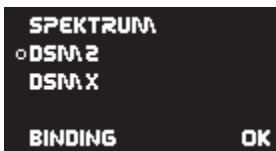
TX System
In the TX System sub menu, DSM2 or DSMX operation can be selected as well as the option for binding the Cockpit to the transmitter.

To select DSM2 or DSMX operation, press the I or II buttons on the SensorSwitch to select the desired type, then press the SET button to confirm your selection.

Binding—This function is used to bind the Cockpit to your transmitter. It is necessary to bind the Cockpit so that it will only recognize a specific transmitter, ignoring signals from any other sources. If the Cockpit is not bound to a transmitter, the system will not operate.
To bind the Cockpit to your transmitter, follow these steps:

```
SPEKTRUM
○DSM 2
 DSM X

BINDING          OK
```

1. Attach all remote receivers to the ports labeled RX1 through RX4.
2. Select the Binding Menu option with the I or II buttons on the SensorSwitch and press the SET button to place the receiver into Bind mode.
3. Follow your transmitter's instructions to enter bind mode on the transmitter.

4. The system will connect within a few seconds. Verify that all remote receivers' LEDs are glowing solid, indicating the system has been bound and is ready to use.

Teach Failsafe

In the Teach Failsafe sub menu, the failsafe positions are stored. In the event of a signal loss, all servos will be driven to the position set.

TX-SYSTEM
○TEACH FAILSAFE
FRAMERATE: 18ms
OUTPUT MAPPING
INIT CENTERPOS   OK

Preset Failsafe allows you to set the specific control positions for all channels to return to should a signal loss in flight occur or at any other time a successful connection has been made.

The Preset Failsafe is typically used to prevent "fly aways" in high-performance models by deploying spoilers in sailplanes or putting gas- and glow-powered models into a slight turn at reduced throttle.

To program the failsafe channel positions, follow these steps:

1. Move all transmitter sticks, switches and pots to the desired failsafe positions, typically to low throttle and centered controls. Set the positions as desired for your model.
2. Press the SET button with the cursor next to Teach Failsafe.
3. All positions will automatically be stored and ready to use.

Frame Rate

Frame rate indicates the time interval at which the servo signal is refreshed. Many analog servos are not compatible with higher frame rates. For many analog servos, it will be necessary to select the 21ms setting.

TX-SYSTEM
TEACH FAILSAFE
○FRAMERATE: 18ms
OUTPUT MAPPING
INIT CENTERPOS   OK

NOTICE: Set this rate to your servo's operating rate or damage to your servos can result. For operating rates, refer to your servo manufacturer's documentation.

A faster refresh rate causes the servos to respond faster and will offer greater effective torque because they are better able to counteract the forces acting on them. The frame rate setting should only be changed if you know that your servos are suitable for the frame rate you wish to use.

The frame rate adjustment is only available for the four dual-matched channels and the sequencer output channels. All other channels operate at the same frame rate as the cockpit.

To select the Frame Rate, complete the following steps:

1. After entering the Frame Rate function with the SET button on the SensorSwitch, press the I or II buttons on the SensorSwitch to select the desired frame rate.
2. The frame rate is available for the following values:
   12, 15, 18 and 21ms
3. After making the desired selection, press the SET button on the SensorSwitch to confirm the selection.
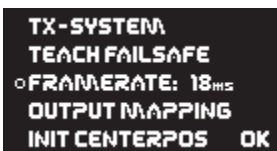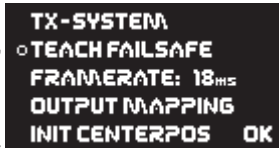
Output Mapping

The Output Mapping function allows the output ports of the Cockpit to be assigned to any of the 12 channels available. This allows for customization of the advanced features of the Cockpit. For instance, any of the 4 dual ports can be assigned to any channel for servo matching and the 6 sequencer channels can be assigned to any channel desired.

●A: AILE	G: AUX7
B: ELEV	H: AUX6
C: RUDD	I: AUX5
D: AUX1	J: AUX4
E: AUX2	K: THRO
F: AUX3	L: GEAR OK

To select the Output Mapping channels, complete the following steps:

1. After entering the Output Mapping function, move up and down through the mapping function by pressing the I or II buttons on the SensorSwitch.
2. The A through L letters in the Output Mapping function correspond to the output ports of the Cockpit. The channels in the Output Mapping correspond to the channels of the transmitter.
3. To change an output port selection, press the SET button on the SensorSwitch to select the output port desired.
4. Press the I or II buttons on the SensorSwitch to select the channel desired.
5. Press the SET button on the SensorSwitch to confirm the channel selected.

INIT Center Pos

The Initialize Center Position function is used to set the center positions of each channel of the transmitter. This is used for servo matching as well as sequencing.

Complete the INIT Center Pos function before setting up the servo matching and sequencer for best results.

TX-SYSTEM
TEACH FAILSAFE
FRAMERATE: 18ms
OUTPUT MAPPING
○INIT CENTERPOS   OK

To select the Output Mapping channels, complete the following steps:

1. Move all transmitter sticks, pots, sliders and switches (where possible) to the center positions.
2. With the cursor next to INIT Center Pos, press the SET button on the SensorSwitch.
3. The center position of each channel is automatically set.

Power Manager

The Power Manager function is used to select the chemistry type of the battery used, the capacity of the battery pack, and the output voltage to the servos.

Set the battery chemistry type, capacity of the battery and the output voltage before setting the rest of the functions on the Cockpit.

CHEMISTRY: LiPo
○CAPACITY: 2800mAh
OUTPUT-
VOLTAGE: 5.9V
                    OK

⚠ **CAUTION**: Ensure you select the correct battery type that you are using. Do not use the NiMH battery setting while using a LiPo battery or the LiPo battery setting while using a NIMH battery.

The default battery chemistry type is LiPo/Li-Ion. If this is the battery chemistry that will be used, this step can be skipped.

Three chemistry types are available:

1. 2-Cell LiPo or Li-Ion
2. 5-Cell NiMh or NiCd
3. 2-Cell LiFe

The Output Voltage function is used to select the output voltage to the servos, either 5.9V or 7.4V. For most servos, this selection should be set to 5.9V. For HV or High Voltage servos that can accept 2-Cell LiPo voltage, this can be set to 7.4V to take advantage of the servos' capabilities. Note, however, that in order to use the 7.4V setting, all servos connected must be capable of handling this voltage.

⚠ **CAUTION:** 7.4V must only be selected on servos that are compatible with this voltage, if 7.4V is selected on non-HV type servos, failure of the servos can occur, resulting in a loss in control of the model.

Reset

The Reset function is used to reset the parameters of the Cockpit to the default settings. The Sequencer, Servo Matching, and Output Map functions can be reset individually without affecting other functions.

```
○RESET SEQUENCER
 RESET MATCHING
 RESET OUTPUT MAP

              OK
```

```
  CAUTION RESET
      SURE?

   NO  ○YES
```
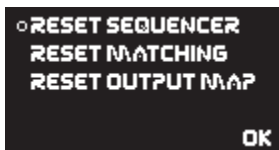
To Reset the Sequencer, Servo Matching or Output Mapping, perform the following steps:

1. Select the desired reset option by using the SET button.
2. A pop-up message stating "Caution Reset Sure? No or Yes" will be displayed.
3. Press the I or II to select No or Yes as desired.
4. Press the SET button on the SensorSwitch to confirm the selection.

NOTICE: Once you have confirmed your choice by answering Yes, the values are reset and the previous settings are lost permanently.

Standard Range Testing

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

Range Testing

1. With the model resting 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 put your transmitter into range test mode. This causes reduced power output from the transmitter.
3. You should have total control of the model in range test mode at 30 paces (90 feet/28 meters).
4. If control issues exist, call Horizon Product Support for further assistance.

Advanced Range Testing Using Flight Log Data

The Standard Range Testing procedure is recommended for most sport aircraft. For sophisticated aircraft that contain significant amounts of conductive materials (e.g. turbine powered jets, some types of scale aircraft, aircraft with carbon fuselages, etc.), the

```
RF-FLIGHTRECORDER
ANT. FADES    LOST
RX 1:  12    FRAMES:
RX2:   44        3
RX3:    0
RX4:    9    HOLDS: 0
```

following advanced range check will confirm that all 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. To view the flight log data on the screen, press and release the I and II buttons together while at the main screen and the flight log data will appear.
2. Have a helper hold your aircraft while observing the Flight Log data.
3. Standing 30 paces from the model, face the model with the transmitter in your normal flying position and put your transmitter into range test mode. This causes reduced power output from the transmitter.
4. Have your helper position the model in various orientations (nose up, nose down, nose toward the transmitter, nose away from the transmitter, etc.) while your helper watches the Flight Log, noting any correlation between the aircraft's 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 while recording the data. Next, place the airplane on its wheels and do a second test, rotating the aircraft in all directions for one minute.
5. After one minute, a successful range check will have less than ten recorded frame losses. Scrolling the Flight Log through the antenna fades (RX1, RX2, RX3, and RX4) 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.
6. A successful advanced test will yield the following:

   H: 0 holds

   F: less than 10 frame losses

   RX1, RX2, RX3, RX4: Frame losses will typically be less than 100. It's important to compare the relative frame losses. If a particular receiver has a significantly higher frame loss value (2 to 3X) then the test should be redone. If the same results occur, move the offending receiver to a different location.

   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. The antenna fades that caused the frame loss are recorded and will be added to the total antenna fades.

   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 re-evaluate the system, moving the antennas to different locations and/or checking to be sure the transmitter and receivers are all working correctly. The frame losses that led to the hold are not added to the total frame losses.

NOTICE: The Flight Log data is reset to 0 when you exit this screen display. It is not possible to read out previous data again.

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

The Cockpit features QuickConnect with Brownout Detection (Brownout Detection not available with DSMX). Should a power interruption occur (brownout), the system reconnects immediately when power is restored and the LEDs on each receiver flash, indicating a brownout (power interruption) 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 voltage to the Cockpit drops below 3.2 volts, interrupting control as the servos and this unit require a minimum of 3.2 volts to operate.

How QuickConnect Works

When the voltage drops below 3.2 volts, the system drops out (ceases to operate).

When power is restored, the Cockpit immediately attempts to reconnect. If the transmitter was left powered on, the system reconnects, typically in about 4ms. The receivers then blink, indicating a brownout has occurred (DSM2 Only). If at any time the receiver is powered off then back on and the transmitter is not powered off, the receivers will blink as a power interruption was induced by powering off the Cockpit (DSM2 Only).

⚠ **CAUTON:** If a brownout occurs in-flight, it is vital that you determine the cause of the brownout and correct it. QuickConnect and Brownout Detection allow you to safely fly through most short duration power interruptions, however, the root cause of these interruptions must be corrected before the next flight to prevent catastrophic safety issues.

Tips for Getting the Most from your Cockpit System

Flight Log

The Flight Log can be used to test the battery system using the built-in voltmeter and applying a load to the servos/control surfaces. The voltage should never drop below the rated voltage (5.9 volts) even under a heavy load.

When the system is first installed, an advanced range check should be performed. If any receiver is performing less than optimal (higher than normal fades), that receiver should be repositioned and the advanced range test repeated until low fades are recorded.

During first flights with sophisticated airplanes (significant conductive materials onboard, many high-current draw servos, carbon construction, etc.), it's good practice to keep your first flight in close, then confirm the RF link performance using the Flight Log to determine the performance of each attached receiver. Extend the distance on subsequent flights and record the Flight Log data, confirming that all systems are performing properly.

Storing Your System

If the system will be stored for more than two weeks, it's important that the battery be disconnected from the Spektrum Cockpit.

⚠ **CAUTION:** When a battery is connected to the Spektrum Cockpit, a low current drain of less than 1mA occurs even when powered off using the SensorSwitch. If the system is going to be stored for any length of time, always disconnect the battery from the Spektrum Cockpit to prevent over discharge and damage to the LiPo battery.

2.4GHz TROUBLESHOOTING GUIDE

Problem	Possible Cause	Solution
The system will not connect	Transmitter and receiver are too near each other	Move transmitter 8 to 12 feet (2.4 to 3.6m) from receiver
	Receiver is close to a large metal object	Move away from large metal objects (vehicles, etc.)
	Selected model is not bound in transmitter	Make sure correct model is selected and that transmitter is bound to the model
	Transmitter accidentally put in bind mode so bind is lost	Rebind transmitter and receiver system
The system goes into failsafe mode a short distance away from the transmitter	Check the receiver antennas to be sure they are not cut or damaged	Replace or contact Horizon Product Support
	Receivers are too near each other	Install receivers at least 2 inches (51mm) apart and perpendicular to each other
Receiver system quits responding during operation	Low battery voltage	Completely recharge flight battery
	Loose or damaged wires or connectors between battery and receiver system	Do a check of the wires and connection between battery and receiver. Repair or replace wires and/or connectors.
Receiver loses its bind	Transmitter stand or tray could be pressing the bind button	If stand is pressing bind button, remove from stand and rebind
	Bind button pressed before transmitter powered on	Rebind by following binding instructions
Receiver blinking at landing	Brownout occurred	Check battery voltage
	System was powered on and connected, then receiver powered off without powering off transmitter	Power off transmitter when receiver system is powered off
System taking longer than usual to link with transmitter	System is operating on DSM2	DSM2 receivers can take longer to link with transmitter

1-YEAR LIMITED WARRANTY

What this Warranty Covers
Horizon Hobby, Inc., (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 years 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, or (v) Products not purchased from an authorized Horizon dealer.

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 direct your email to productsupport@horizonhobby.com, or call 877.504.0233 toll free to speak to a Product Support representative. You may also find information on our website at www.horizonhobby.com.

Inspection or Services
If this Product needs to be inspected or serviced, please use the Horizon Online Service Request submission process found on our website or call Horizon to obtain

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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 under the Support tab. 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 cashiers 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/Service/Request/.

Warranty and Service Contact Information

Country of Purchase	Horizon Hobby	Address	Phone Number/ Email Address
United States of America	Horizon Service Center (Electronics and engines)	4105 Fieldstone Rd Champaign, Illinois, 61822 USA	877-504-0233 Online Repair Request: visit www.horizonhobby.com/service
	Horizon Product Support (All other products)	4105 Fieldstone Rd Champaign, Illinois, 61822 USA	877-504-0233 productsupport@horizonhobby.com
United Kingdom	Horizon Hobby Limited	Units 1-4 Ployters Rd Staple Tye Harlow, Essex, CM18 7NS, UK	+44 (0) 1279 641 097 sales@horizonhobby.co.uk
Germany	Horizon Technischer Service	Christian-Junge-Straße 1, 25337 Elmshorn, Germany	+49 4121 46199 66 service@horizonhobby.de
France	Horizon Hobby SAS	14 Rue Gustave Eiffel Zone d'Activité du Réveil Matin 91230 Montgeron	+33 (0) 1 60 47 44 70 infofrance@horizonhobby.com

Customer Service Information

Country of Purchase	Horizon Hobby	Address	Phone Number/ Email Address
United States of America	Sales	4105 Fieldstone Rd Champaign, Illinois, 61822 USA	(800) 338-4639 sales@horizonhobby.com
United Kingdom	Horizon Hobby Limited	Units 1-4 Ployters Rd Staple Tye Harlow, Essex, CM18 7NS, UK	+44 (0) 1279 641 097 sales@horizonhobby. co.uk
Germany	Horizon Hobby GmbH	Christian-Junge-Straße 1, 25337 Elmshorn, Germany	+49 4121 46199 60 service@horizonhobby.de
France	Horizon Hobby SAS	14 Rue Gustave Eiffel Zone d'Activité du Réveil Matin 91230 Montgeron	+33 (0) 1 60 47 44 70 infofrance@horizonhobby. com

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.

Compliance Information for the European Union
Declaration of Conformity
(in accordance with ISO/IEC 17050-1)
No. HH2011093003
Product(s): SPM AR12200 12 Channel DSMX Cockpit Receiver
Item Number(s): SPMAR12200
Equipment Class: 1

$C\mathcal{E}$

The object of declaration described above is in conformity with the requirements of the specifications listed below, following the provisions of the European R&TTE directive 1999/5/EC:

EN 301 489-1 V1.7.1: 2006
EN 301 489-17 V1.3.2: 2008

Signed for and on behalf of:
Horizon Hobby, Inc.
Champaign, IL USA
Sep 30, 2011

Steven A. Hall
Vice President
International Operations and Risk
Management
Horizon Hobby, Inc.

Instructions for Disposal of WEEE by Users in the European Union

This product must not be disposed of with other waste. Instead, it is the user's responsibility to dispose of their waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or where you purchased the product.

SPEKTRUM