Lemon DSMP Transmitter Module – Plug & Go Version

Basic Instructions

This unit fits into a transmitter having a JR-type module bay and provides compatibility with receivers using Spektrum DSM2™ or DSMX™ protocol. In most cases the transmitter will be using OpenTX or ErSkyTX firmware.

Installing the Module

Only insert (or remove) the module with the Transmitter turned OFF.

The P&G module should plug directly into a JR-type bay on the transmitter. It will show some resistance in the corner where the pins are located but should insert with steady pressure. Hard resistance indicates that the pins are not aligned correctly with the socket. Wobbling it around will normally fix this but you may have to bend all five pins very slightly with your finger.

Removing the antenna may make insertion and alignment easier.

Attach the antenna before powering on. Operating without the antenna may damage the module.

Module Voltage

The module requires 4.8 to 12V from the transmitter (e.g., 8-cell, 6-cell or 4-cell NiMH pack or 2S LiIon or 2S LiPo battery).

Setting the Transmitter Protocol (PPM)

The basic setup using PPM is virtually identical for OpenTX and ErSkyTX.

Go to Model Setup and select Protocol. Set Internal RF to OFF, External RF to PPM. Select the appropriate number of channels for the receiver (12 maximum). Set the frame rate (PPM frame or FrLen) to 22.0mS, if available; if not, the default 22.5mS is OK.

With ErSkyTX, there are advantages to using the 9XR-DSM protocol rather than PPM. See *Supplementary Notes.*

The module can also be used with some transmitters designed for a MHz frequency band. See *Supplementary Notes*.

Using Correct Channel Order

The Lemon module transmits in the channel order set by the transmitter; this should normally be the standard Spektrum™ TAER. This is particularly important for Spektrum and other receivers with fixed channel assignments, as well as for UMX "bricks". If necessary, the transmitter default order can be changed (Radio Settings, Channel Order), but the new setting only applies to models created after the change. Channel order for an existing model can be adjusted in the Mixer page by using Move.

Spektrum™ standard assignment of the first six channels is:

> Channel 1 = Throttle (the only channel with failsafe on many Spektrum™ receivers)
> Channel 2 = Aileron (Right Aileron for two separate aileron channels)
> Channel 3 = Elevator
> Channel 4 = Rudder
> Channel 5 = Gear (dedicated to Stabilization Mode control for some stabilizers)
> Channel 6 = Aux1 (Left Aileron for two separate aileron channels)

Mixing and Wing Type

V-Tail or Elevon mixing, single or dual aileron wing type, etc. are set up in the transmitter, **except** for certain stabilized receivers, where mixing MUST be set in the receiver. See the receiver instructions.

Scaling and Direction of Output

The Lemon module automatically scales output pulse widths to the Spektrum™ standard.[1] Thus models created in OpenTX/ErSkyTX do not need any further scaling.

Note that aileron and rudder travel directions in OpenTX/ErSkyTX are opposite to Spektrum and thus may require reversal.

Channel 5 Resolution

The resolution of channel 5 (Gear) is lower than that of the other channels. This does not affect its use for switched functions, such as SAFE™ mode or landing gear retract, and is quite acceptable for many analog functions. However, this channel may not be suitable for fine control of primary flight controls in fast models.

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[1] Pulse width outputs at +/-100% in OpenTX/ErSkyTX range from 988 to 2012uS, while in Spektrum™ transmitters, +/-100% output ranges from 1100 to 1900uS (with neutral at 1500uS in both cases). Thus, to match the Spektrum™ standard, the pulse width outputs of the Lemon module are scaled to approximately 78% of the transmitter input.

To achieve more than 100% travel it is necessary to use Extended Limits in the transmitter.

Protocols and Telemetry

The DSMP protocol used by the Lemon module is fully compatible with the DSM2™ and DSMX™ protocols. The module will interrogate the receiver during the bind process and select the correct protocol.

Telemetry requires a suitable receiver and is only available in ErSkyTX at present. See the *Supplementary Notes* document.

Lights on the Module

The two LEDs visible inside the module, one red, one green, indicate the following:

> **Solid Red** = Module is looking for a valid PPM signal.
> **Flashing Green** = Module has found a PPM signal and is in the bind process.
> **Solid Green** = Module is in operation using a valid PPM signal.
> **Flashing Red** = Bind failed (or module not receiving PPM).

A successful bind will be indicated by a solid red or orange light on the receiver. See Bind Procedure below.

Certification

The module has been formally certified for use in the USA and Canada; the FCC and IC certification numbers are on the label. Many other jurisdictions accept FCC certification.

Note that the initial version of this unit can transmit in DSM2 mode and thus does not fully meet EU requirements. Lemon may offer an EU version without DSM2 capability if demand justifies this.

Using the Module

Bind Procedure

Start with transmitter and receiver powered down. The transmitter should be about 1-2m away from the receiver.

1. **Put the receiver into bind mode.** Insert a bind plug before the receiver is powered up, OR, for receivers with a bind switch, refer to the manual. UMX models enter bind mode automatically after a delay at power-up. For all types, bind mode is signalled by a **rapidly flashing LED**. If this is absent, the receiver is not in bind mode. Fix the problem before proceeding.

2. **Hold down the bind button on the module and power on the transmitter**. Cancel or comply with any OpenTX/ErSkyTX transmitter warnings while still holding the button.

3. **The transmitter is now in bind mode.** Wait until the bind process starts before releasing the bind button. Binding under way is indicated by a flashing green light inside the module and changes in the flashing of the receiver light.

4. **Bind is complete** when the red or orange receiver light is **solidly ON**. The module light will be solid green. Check servo operation at this point.

5. **Don't forget to remove the bind plug** (where relevant).

For binding with ErSkyTX using 9XR-DSM protocol, see *Supplementary Notes*.

Range Check

Hold down the Bind/Range Check push button to enter reduced power Range Check mode. Test the controls at a distance of at least 30m to ensure that they work without any jerkiness or interruption.

The module remains in Range Check mode until the button is released (there is no visible or audible indication that the module is in this mode). Advice on using Range Check mode is provided in the *Supplementary Notes* document.

Swapping Models

In PPM mode, the module retains a memory of the last receiver to which it was bound. It will normally connect to another receiver of the same class without rebinding but will require rebinding for a receiver of different class. Thus, models can only be freely swapped without rebinding if they use receivers of the same class.

"Class" refers to such characteristics as DSMX vs. DSM2 and speed (11mS vs. 22mS). See *Supplementary Notes* for details.[2]

The Lemon module in PPM mode does NOT support ModelMatch™. It is thus up to the user to select the right model!

Additional Information

The *Supplementary Notes* document *[in preparation]* contains detailed information on these and other topics. It applies to both the Plug & Go module (discussed here) and the DIY module (discussed in a separate Instructions document).

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[2] ErSkyTX when using 9XR-DSM protocol stores receiver information in the transmitter model memory and therefore does not require rebinding when swapping models, even with receivers in different classes. See *Supplementary Notes* for details.