ORANGERX DSMX/DSM2/DEVO COMPATIBLE 2.4GHZ AUTO TRANSMITTER MODULE (JR/TURNIGY COMPATIBLE) V1.2

USER MANUAL

FEATURES:
• Works with any JR/Turnigy/Taranis compatible module-based transmitter
• 4 modes (selected automatically during binding procedure): DSM2 1024/22ms, DSM2 2048/11ms, DSMX 22ms, DSMX 11ms
• Accepts PPM from 4 to 12 channels
• Outputs from 4 to 12 channels according to PPM provided
• Input Voltage: 6 - 18VDC
• Output power – 18dBm
• Easy to access bind button
• Range check mode (1mW)
• Current consumption: 100mA max

COMPATIBILITY:
Standard JR style 5 pin module-based transmitters (JR/Turnigy compatible)
Radio Type: Full range system

OUTPUT PROTOCOLS:
DSM2 –1024/22ms, 2048/11ms
DSMx – 22ms/11ms

TX MODULE INSTALLATION
The Tx module can be installed and used in following radio transmitters:
- All JR compatible radios with external Tx module compartment
- Turnigy 9XR and 9XR Pro
- Taranis X9D and compatible
  Please note: The module is NOT compatible with Turnigy 9X. If you still want to use it in Turnigy 9X radio you will have to modify 9X bay to make it compatible. Beware – **it will void your warranty** on your Turnigy 9X.

ANTENNA POLARIZATION AND ORIENTATION
For optimum RF link performance it's important that the antenna be oriented in the way that allows for the best possible signal reception when the aircraft is in all possible attitudes and positions.
Follow simple rules:
- Never point antenna to the aircraft. Pointing antenna to the aircraft will give you the worst reception.
- Don't block an antenna with metal objects (frames, trays, monitor and smartphone holders). This weakens the signal.
- In the most situations it is better to position antenna horizontally to get better performance and avoid pointing antenna to the aircraft.

ID CHANGE
To make sure that many models can be controlled at the same time and place without interference to each other a unique ID is assigned to each control communication. A transmitter module provides this ID to the receiver during binding procedure. There is totally more than 4 billion

combinations available. You may want to change ID before binding to another model to make sure that if you accidently turned previous model ON with settings for the new model, the previous one will not respond to your radio transmitter.

RANGE TESTING

Before each flying session and especially with a new model, it is important to perform a range check.

Make sure that your transmitter battery is fully charged. Be careful and make sure that all propellers on your aircraft are removed.

Turn your transmitter on and following turn on your receiver.

Make sure that the orange LED on your receiver/satellites is ON and solid. That indicates a good signal received.

Move the sticks and confirm that all servos/control surfaces are moving smooth and without stopping and delays. Ask your buddy to watch your aircraft.

Move 30 steps away (appr. 28 meters). Press and hold BIND button. Move sticks and check if all servos are moving smooth and without delays. Check if orange LED on the receiver is solid ON.

If orange LED is solid ON and all control surfaces move smooth and no delays then the range test is PASSED.

CONNECTORS:

Connector P1 Pin description:

> PIN1- PPM signal, TTL 5V, 6-12 channels
>
> PIN2- Not connected,
>
> PIN3- VCC In, 6-18VDC, 100mA
>
> PIN4- GND
>
> PIN5- for future use

Antenna connector:

> SMA connector to attach a standard rubber duck 2.4GHz 50Ohm antenna.

BUTTONS:

Button 1(ID)

> When pressed upon power on a new unique ID is assigned to Tx.
>
> There is totally 4 billion combinations available. When powered up with Button1 pressed the new ID will be generated. The procedure of new ID generation is initiated regardless if PPM signal present or not. After detection of Button 1 pressed module waits for 3 sec then generated a new ID and buzzer generates long beep (0.3 sec). After this the module waits until the button 1 is released. When button is released the module detects PPM signal from the radio. Following binding procedure is necessary.

Button 2(Bind)

> When the module is powered on while the button is pressed a binding procedure is initiated.
>
> When pressed during operation the output power is reduced to 1mW for a range check
>
> When pressed shortly 3 times with interval 0.2-0.5 sec between presses – working mode change.
>
> **Note:**   During binding procedure the output power is fixed at 0.006mW
>
>   During Range test procedure the output power is fixed at 1mW

LED FUNCTIONALITY:

During normal working operation LED indicates current working mode. You can see what current mode is active

> **Single blinks** - DSM2, 1024, 22ms
>
> **Double blinks** - DSMx, 2048, 22ms
>
> C**onstant ON. -** Auto mode

BUZZER:

Buzzer indicates the status and the mode of the Tx module. When it is powered ON in presence of PPM signal (normal operation) you should hear three short beeps. If you powered your radio and don't hear three short beeps that means your radio probably doesn't output the PPM signal. The reasons for the radio not outputting PPM signal can be:

- Your radio is not set up to output PPM signal;
- Sticks, and/or switches are not in their initial position – throttle might be high or switches for landing gear/flaps/throttle hold are not in proper position. Check your switches and sticks position.

> During binding procedure upon successful binding the module will also make three short beeps. With unsuccessful binding it will be a single long beep.

LED and Buzzer:

Button1 – ID change

Button2 – When pressed during operation for more than 3 sec the output power is reduced to 1mW for a range check.
When pressed during power on a binding procedure will be initiated
When pressed shortly 3 times during normal operation changes working modes

Buzzer – – beeps 3 times on power ON after detecting PPM signal on the PPM input

LED – **Single blinks** - DSM2, 1024, 22ms
            Double blinks - DSMx, 2048, 22ms
            Auto – constant ON.

Functionality:

Power ON:

When powered up the module is waiting for valid PPM signal to be detected.
As soon as PPM signal is detected the buzzer generates three short beeps (0.1s) indicating that the system is ready.
When module starts transmitting RF packets red LED is will blink **according to the working mode selected.**

Binding procedure:

After power ON with the Button2 detected pressed and valid PPM signal present the module generates three sort beeps and enters binding procedure.
The module sets output power at 0.006mW and starts binding procedure. Your receiver will be bound in the mode based on:

- Your receiver capability
- Number of channels provided by your radio via PPM signal
- Working mode selected in your Tx module

After that the module generates three short beeps. If the bind was unsuccessful it generates one long beep. After binding procedure is over the module enters the regular transmitting mode and stays in this mode until power turned off.
The settings for transmission will not be changed if the binding procedure was unsuccessful. If the binding procedure was successful the settings will be changed to the new ones.

Please note: it is recommended to have at least 2 meters between transmitter and receiver (depending on conditions such as WiFi signal presence) to have successful binding. If your binding was unsuccessful try different distance between transmitter and receiver.

ID change:

Every ORX 2.4GHz Transmitter module has one GUID (Globally Unique Identifier), no another ORX 2.4GHz Transmitter will share it. The ORX 2.4GHz Transmitter module still has a Change ID button as a safeguard.
This is provided for the near impossible case where another transmitter (not ORX) can control your model without binding. This near impossible case could happen as there are other DSM2/DSMX system manufacturers and they could use the same GUID.
When powered up with Button1 pressed the new ID will be generated. The procedure of new ID generation is initiated regardless if PPM signal present or not. After detection of Button 1 pressed module waits for 3 sec then generated a new ID and buzzer generates long beep(0.3 sec). After this the module waits until the button 1 is released. When button is released the module detects PPM signal from the radio. In Spektrum mode following binding procedure is necessary.

Channel assignments:

Your transmitter's channel assignments may not be the same as the JR/Spektrum receiver channel assignments. This means the channel assignments on your DSM2/DSMX receiver's case may not match the typical controls on your transmitter (e.g., the JR receiver throttle connection may actually correspond to Futaba transmitter aileron output or settings in your transmitter are AETR and your receiver or bind`n`fly model requires TAER option). You may need to connect your servos into receiver ports with different labels depending on the brand of transmitter you are using. Alternatively, you may be able to remap the transmitter's controls to the corresponding DSM2/DSMX receiver channels if your transmitter supports such a feature.

Fail Safe:

Fail Safe features are setup in your receiver. Please read your receivers manual carefully to setup this feature. It is very important that you pay attention to the channel assignments. As mentioned above, on the JR/Spektrum receivers the throttle is on the receiver's CH1 (labeled as 'THRO") while the throttle output from your transmitter may actually be on a different channel. You need to be certain that you have all of the controls hooked up to the proper receiver connector and that all your controls are functioning properly before setting up Fail Safe

DSM Protocols, their compatibility and relations to Tx module working modes
Table 1: protocols supported in each mode

Receiver modes	Auto mode	DSM2 mode		DSMx mode	
	Any number of channels	7 and less	8 and more	7 and less	8 and more
dsm2-1024-22ms-6ch	Ok	Ok	Not all Rx	-	-
dsm2-1024-22ms-8ch	Ok	Ok	Ok	-	-
dsm2-2048-22ms-6ch	Ok	Ok	Ok	-	-
dsm2-2048-22ms-8ch	Ok	Ok	Ok	-	-
dsm2-2048-11ms-6ch	Ok	Ok	Ok	-	-
dsm2-2048-11ms-8ch	Ok	Ok	Ok	-	-
dsmX-22ms-6ch	Ok	Ok	Ok	Ok	-
dsmX-22ms-8ch	Ok	Ok	Ok	Ok	Ok
dsmX-11ms-6ch	Ok	Ok	Ok	Ok	Ok
dsmX-11ms-8ch	Ok	Ok	Ok	Ok	Ok

Ok – compatible
Not All Rx - not all Rx was able to work in this mode.

Since Tx module supports multiple protocols it can be bound with your receiver in one of these modes. The mode selected during binding depends on:
- The working mode chosen (shown in LED blinks),
- Number of channels sent via PPM from your radio;
- Your receiver capability (number of channels, protocols available).

Working modes and list of protocols supported in each mode:
> **Single blinks** - DSM2, 1024, 22ms:
> During binding depending on your receiver it can be:
> DSM2, 1024, 22ms **7 and less channel mode**
> DSM2, 1024, 22ms **8 and more channel mode**
> **double blinks** - DSMx, 2048, 22ms:
> During binding depending on your receiver it can be:
> DSMx, 2048, 22ms **7 and less channel mode**
> DSMx, 2048, 22ms **8 and more channel mode**
> DSMx, 2048, 11ms **7 and less channel mode**
> DSMx, 2048, 11ms **8 and more channel mode**
> **Solid ON** - all protocols available for binding

Possibility of Tx module to work with multiple receivers without rebind.
This Tx module is capable to support multiple receivers without rebinding them every time.
This option highly depends on the protocol your receiver was set during binding procedure, its capabilities and number of channels your radio sends via PPM signal.
You will have to work around with your receivers to find the working mode for each of them to be compatible without rebinding. If you see that the receiver does not respond try to change mode on Tx module and it will probably work in another mode.
Also for some receivers 8 and more channels bound in DSMx mode it is important to provide 8 or more channels of PPM signal from your receiver. Set up 10channels PPM on your Taranis or 9XR and it will probably work with other receivers without rebinding.

As an example following combination was tested and worked together:
- R615x bound in "DSMx 7 and less CH mode"
- Old Orange R620 bound in "Auto mode";
- AR8000 bound in "8 and more DSMx mode"
- Old R615 DSM2 bound in "DSM2 7 and less mode"

All those receivers worked after without rebinding by changing working mode on Tx module and channel number in PPM output of the radio when needed.

Unfortunately due to big variety of receivers, modes their support and the fact that some receivers don`t implement the functionality of the mode completely or exchange incorrect information during binding it is impossible to guarantee the compatibility of all receivers working without rebind. You will have to experiment with your receivers to see which ones can work together.
A little hint:
- All new TM orange receivers (R620x-R1220x) act as 12 channel receivers so you will have to set number of channels PPM to 10 in Taranis or 9XR to make them working with others. They are all compatible to each other
- Receivers Orange R615x, R410x, R415x, R616xn, Spektrum AR6210, AR6210 , Orange DSMx 3D stabilizers are compatible to each other.