

Transmitters with HRS modulation (Futaba 3PK HRS etc.)

Some transmitters (eg. transmitter sets) feature digital HRS (*High Response Speed*) modulation. This modulation ensures besides higher reliability also faster system response to changes in throttle stick position and overall control. On the receiver outputs are the same control pulses as in cases of different modulations (PPM etc.). The only difference on the outside is a higher repeating period of the control pulses which are on channel outputs of the receiver for controlling the servos, or controllers (ca 5 ms compared to usual 20 ms) – see measurements on the next page. Sometimes the repeating period is only 2ms. This brings on some issues that did not occur earlier.

For example: v <http://www.rsmodeļsport.cz/info/DSM---modul-Futaba-3PK-HRS-3418/> names the possibility of destroy of analogue servos in connection with this modulation. Citing from this source:

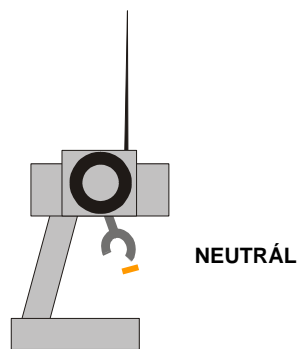
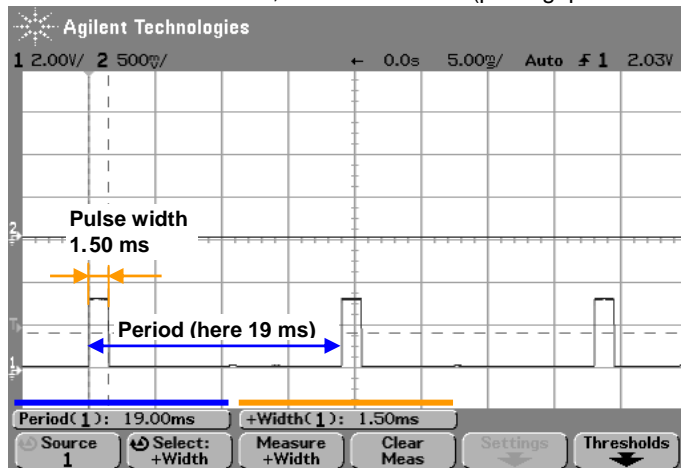
→ „It is only possible to connect digital servos to this receiver. The use of analogue servos will lead to their destroy!!!“

Similar warnings may be found on many other web pages.

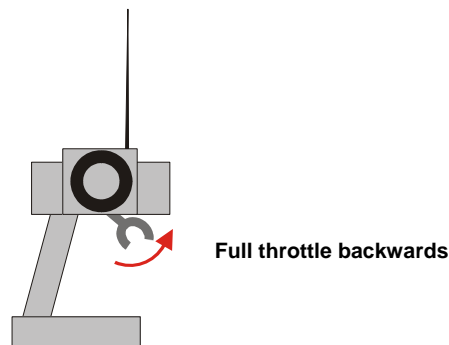
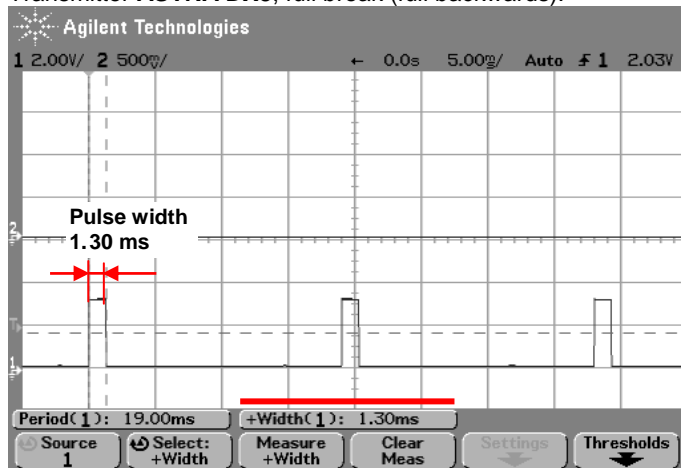
Another fact is that intelligent speed controllers which besides other things check also the repeating period, may evaluate this fast repeating period as incorrect and thus not work with it. Then it is necessary to switch to regular modulation such as PPM, PCM etc. **The newest versions of brushless TMM speed controllers work also with this fast period of control pulses.**

The following figures show, for comparison, the more usual modulation (PPM) with repeating period of 19ms and control with the "correct" direction of deflection. The outputs are measured on the throttle channel.

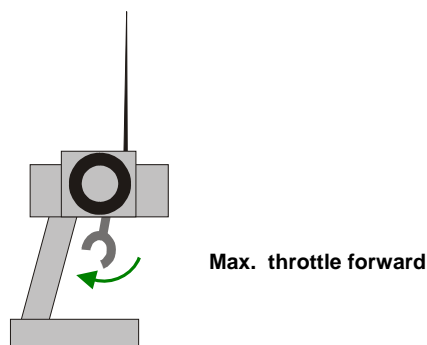
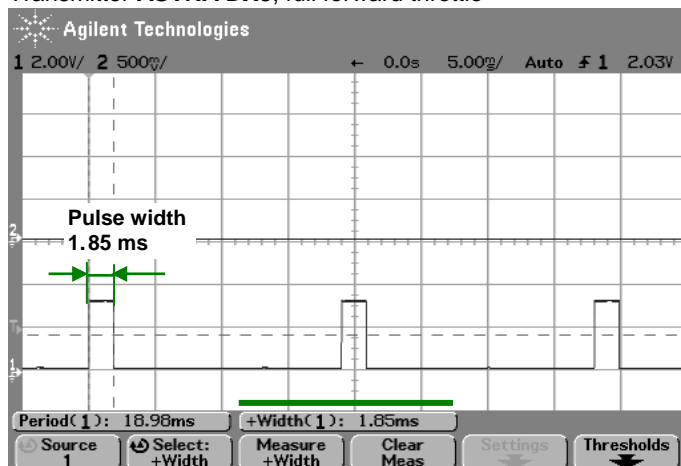
Transmitter **ASTRA DX3**, throttle in neutral (pistol grip transmitter), 2.4GHz, default settings, forward / backwards ratio is 70:30.



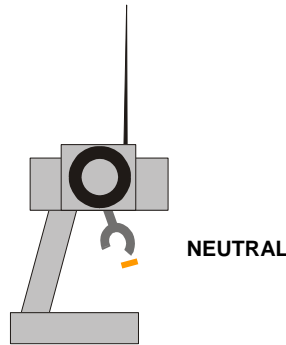
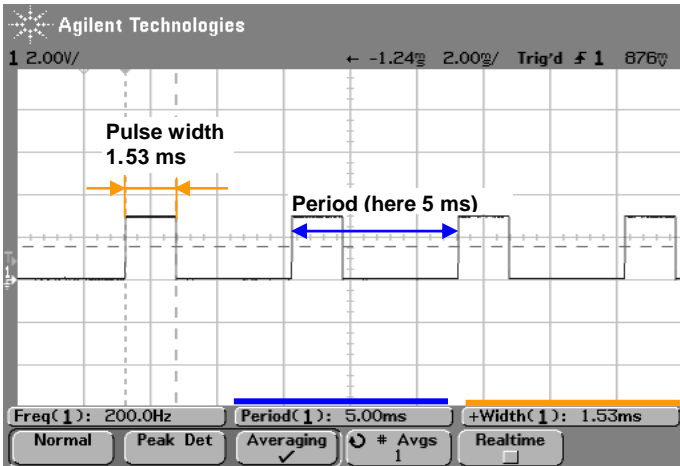
Transmitter **ASTRA DX3**, full break (full backwards):



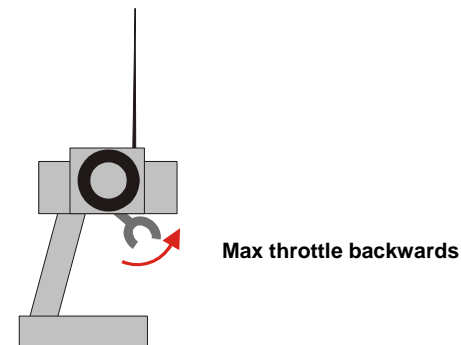
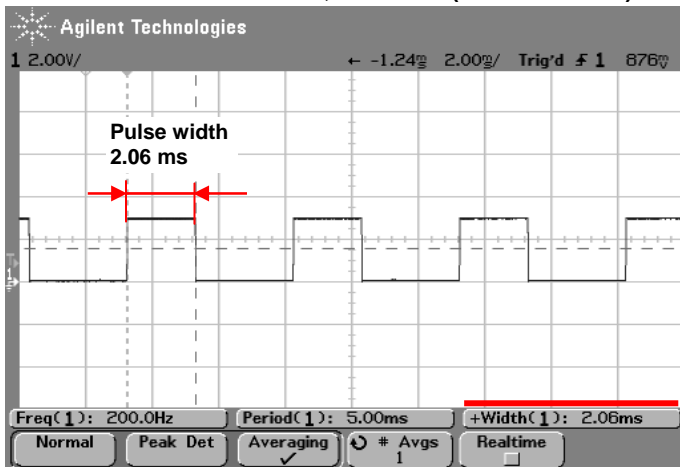
Transmitter **ASTRA DX3**, full forward throttle



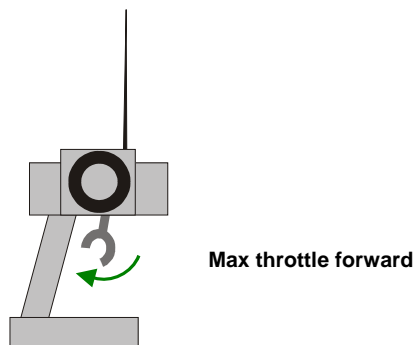
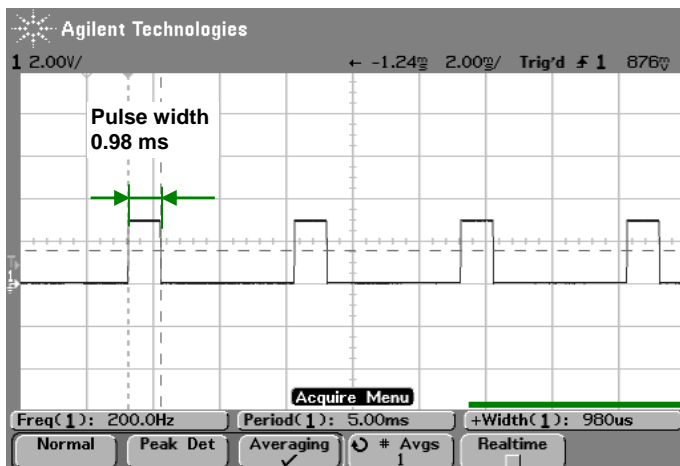
Transmitter **Futaba 3PK HRS**, 2.4 GHz, **HSR modulation** with period of 5ms, **throttle in neutral**. Notice that, the deflections are in the **opposite direction** (as it is typical for Futaba) compared to the more commonly used standard. (if you set the PPM modulation, the period is the standard 14 ms, everything else stays the same).



Transmitter **Futaba 3PK HRS**, full break (full backwards):



Transmitter **Futaba 3PK HRS**, full forward throttle:



If you have Futaba 3PK HRS transmitter, everything that was said about the opposite deflections of throttle of Futaba transmitters applies, see file „Transmitters with opposite direction of deflections“.