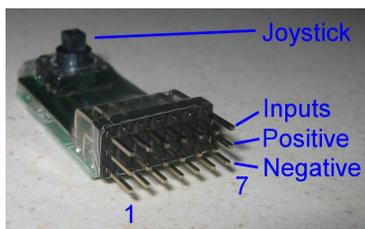


DT 2.4GHz DSM2 TX1 TRANSMITTER INSTRUCTIONS



DESCRIPTION:

Tx1 is an AR6100 type receiver reprogrammed to be a DSM2 short range transmitter. It can either be used as a 7 channel 'module' with a conventional transmitter or as a miniature thumb-controlled 2-channel transmitter. Users should comply with local regulations relating to transmitters.

BINDING:

Select the appropriate model number (1-4) and switch Tx1 off.
Switch the target Rx on in bind mode.
If the joystick is being pressed IN when power is applied (or bind plug on Pin1), Tx1 will enter Bind mode.
The LED flashes twice a second for ~5s while binding.
Bind is complete when the Rx LED comes on solid.

NORMAL OPERATION:

The LED will flash the model number on startup (1-4 flashes). The model number is not flashed during binding or when changing settings on startup.
If no PPM signal is present it will be in 'joystick' mode and the LED will come on but flicker. If a PPM signal is present on Pin7, the Tx1 LED will come on solid.

2 CHANNEL JOYSTICK FEATURES:

Tx1 defaults to this mode if no PPM signal is present.
To operate in this mode it needs joystick inputs on signal pins 1-5.
The joystick is a 5-way switch like used in mobile/cell phones.
Tx1 always transmits 7 channels but in this mode channels 3-7 are at neutral.
A 130mA 1S lipo it should last several hours but charge regularly to avoid damage.

CHANNEL 1:

UP and DOWN opens and closes the Throttle and IN cuts the Throttle immediately. Throttle starts low/off but stays where you leave it when you change it during use. A brief press makes a small change; a continuous press of 2s covers the full range.

CHANNEL 2:

LEFT and RIGHT controls the Rudder.
Rudder is deflected only while the joystick is pressed.
The time taken to reach full throw can be set to four speeds.
The rudder centers automatically at double the chosen speed (faster).

Partial throws are achieved by short presses and pulsing the joystick.
Servo throws can be set to 64%, 100% or 136%.
The direction of travel can be reversed.

CHANGING SETTINGS:

Settings are changed by holding the Joystick in the direction described below as power is applied. A bind plug on the indicated Pin can be used instead.
Settings are specific to model numbers so select the correct model before changes.
The LED will flash the current setting twice (eg: 3-flash for option 3).
If the Joystick continues to be held (or the bind plug remains in place) after the two sets of flashes, the option number will increment or wrap (eg: 2 becomes 3).
Whatever option is flashing at the time the Joystick is released (or bind plug removed) will be saved.

MODEL NUMBER:

If the joystick is being pressed UP when power is applied (or bind plug on Pin4), the model number can be changed.
1 to 4 flashes = model number.

RUDDER REVERSE:

If the joystick is being pressed LEFT when power is applied (or bind plug on Pin3), the Rudder can be reversed.
1-flash = normal direction (default)
2-flash = reversed.

RUDDER THROWS:

If the joystick is being pressed RIGHT when power is applied (or bind plug on Pin5), the Rudder throw can be changed.
1-flash = 64%
2-flash = 100% (default)
3-flash = 136%.

SPEED / RATE OF CHANGE:

If the joystick is being pressed DOWN when power is applied (or bind plug on Pin2), the time taken for Rudder to move from center to full throw can be changed.
1-flash = 1s
2-flash = 0.75s
3-flash = 0.5s (default)
4-flash = 0.25s

PPM MODULE FEATURES:

To operate in this mode it needs a PPM input on Pin 7.
The host transmitter can have any number of channels (>2).
Two channel orders are supported (JR & Futaba).
The input can idle high or low.

PPM CHANNEL ORDER / IDLE STATE:

If there is a bind plug on Pin6 when power is applied, the expected channel order and idle state (high/low) can be changed.

1-flash = TAER idle High (JR - default)

2-flash = AETR idle High (Futaba)

3-flash = TAER idle Low (JR)

4-flash = AETR idle Low (Futaba)

TAER= Throttle, Aileron, Elevator, Rudder, Gear, Aux1, Aux2

AETR=Aileron, Elevator, Throttle, Rudder, Gear, Aux1, Aux2.

TECHNICAL DETAILS:

VOLTAGES:

Tx1 can be powered by 3.2-10v although a 3.3-6v supply is recommended.

The PPM input to the signal pin should be 3.0-3.3v and must not exceed 3.6v. Input low threshold is 0.8v and input high is 2.1v. This would normally be achieved with an external resistor divider, 3.0-3.3v zener diode/1k series resistor or transistor.

PIN CONNECTIONS:

The top row are inputs/outputs configured as follows:

Pins 1-5 are digital inputs with pull-ups enabled.

Pin 6 is digital output normally held low ('psuedo ground' for joystick switches)

Pin 7 is digital input with pull-up enabled.

All digital inputs therefore idle high and trigger when low.

Sensing on Pin 7 is hardware interrupt-triggered.

Any external normally open switches can be used to achieve the same results as the joystick.

Any circuit that can produce a PPM stream can be used to feed channel position data to Tx1 (eg: this could be used to feed analogue (pot) stick positions).

PIN FUNCTIONS:

<u>Pin number</u>	<u>Normal usage</u>	<u>Setting changes on startup</u>
Pin1	IN	Bind
Pin2	DOWN	Joystick rudder speed
Pin3	LEFT	Joystick rudder reverse
Pin4	UP	Model number
Pin5	RIGHT	Joystick rudder throws
Pin6	Switch low	PPM pulse order/idle state
Pin7	PPM	Not used

PROGRAM SEQUENCE:

All pins are checked on startup to decide whether to enter bind mode or to make any setting changes. These are saved.

Once past this the Pin7 interrupt is enabled and has priority. Tx1 defaults to Joystick mode but if a PPM signal appears on Pin7 at any time it will latch into PPM/Module mode and all other inputs (Pins 1-6) will be ignored until the device is restarted.

Pin 7 requires >2 and can accept but does not use >7 PPM pulses. There has to be a 'gap' between pulse sequences of >2.5ms. Trigger pulses can be any length and are considered part of the pulse duration.

Once in PPM/Module mode, Tx1 will only transmit if a valid PPM stream is present. Eg: if PPM stops and restarts, transmissions will stop and restart automatically.