

Tx20v2 User Information

Tx20v2 is a hand-held wireless transmitter intended to control one model railway locomotive engine. It has a large knob for forward/reverse throttle control plus three push buttons and one 3-way toggle switch for control of auxiliary circuits such as lighting, sound card triggers and couplers.

Tx20v2 can be used for Micron and Deltang receiver programming using the toggle switch to step through programming levels. Programming details for each receiver may be accessed from the web page for the receiver.



Technology

- Tx20v2 uses the 2.4GHz band which requires no frequency channel control and is very resilient against interference. All radio frequency components are contained on the internal Tx2 module. There are no user adjustable parts on this module and it should not be modified.
- Tx20v2 is compatible with all DSM2 receivers; this includes all Deltang receivers.
- Any number of receivers can be bound to your Tx20v2 but only one should normally be switched on at a time to operate them independently.
- Range is suitable for indoors and small outdoor sites; the outdoor free-air range to a Deltang receiver is at least 50m. Range indoors is affected by building construction materials, furniture, people and receiver installation.
- The throttle control knob and bind push button action are transmitted as separate R/C 'channels' which must match the receiver configuration:

throttle: channel 1
F1 push button: channel 2
toggle switch: channel 3
F2 push button: channel 4
F3 bind button: channel 5

Battery

Tx20v2 uses a PP3 9V battery, preferably Alkaline or NiMH / Lithium rechargeable. The maximum working voltage of the internal electronics module is 10V and there is a protection diode wired in series with the battery lead. This allows the battery voltage to be up to 10.7V. If the battery voltage is above this value, the internal regulator will shut down and the transmitter will not operate.



To replace the battery:

- Make sure that the power switch is off (up) before adding or removing a battery.
- Remove the lid at the bottom rear of the case by sliding it downwards. When Tx20v2 is new this will require a bit of effort to slide it past the retaining 'click'. The image at the right shows the case rear with the battery lid removed.
- Remove the battery from the compartment and pull the battery clip off the terminals. Replace the clip on the new battery which will only fit one way round. TAKE CARE, if force is needed, the connector is probably the wrong way round.
- Replace the battery cover by sliding it up from the bottom making sure that the retaining tab goes under the case rear. The battery is held in place with a piece of foam attached to the cover and you will feel some resistance as the cover is pushed down onto the battery.

On/Off Switch

Tx20v2 has a 2-way latching toggle switch for power and an adjacent LED indicator. The LED lights continuously when the transmitter is on and flashes when Tx20v2 is in bind mode (see below). It is best to switch the transmitter on before the receiver. If a receiver is switched on with Tx20v2 off, it is likely to enter bind mode with rapid flashing of the LED on the receiver board. If you did not intend to bind, switch the receiver off, then switch Tx20v2 on followed by the receiver.

Speed/Throttle Knob

Tx20v2 is available with a centre-off or low-off throttle control. The throttle type is actually implemented in the receiver, transmitter difference are the front-panel label and whether there is a centre-click on the throttle.

centre-off

Off/Stop is in the centre of rotation when the white dot is pointing toward the top of the transmitter; a 'click' will be felt as the knob is centred. Rotating the knob to the right (clockwise) will move your loco forwards. If it goes in reverse, you need to swap the two wires connected to the motor in your loco.

low-off

Off/Stop is at the fully counter-clockwise rotation of the knob and speed increases as the knob is rotated clockwise; the toggle switch is used to control direction. The receiver will change the motor direction only when the throttle knob is at zero.

Toggle Switch

The 3-way toggle switch is used to select forward/reverse with receivers that have 'low off', full-range motor control. It can be used to control lights instead of direction with receivers that have 'centre off' motor control. The switch controls R/C channel 3 and the transmitted values are:

toggle up: high

toggle centre: mid

toggle down: low

Bind Button

Note: holding the bind button for longer than 20 seconds will result in strange things happening (see [Calibration](#)).

If a receiver has not previously been bound, it has to be 'paired' with the transmitter. Binding is only required once per receiver.

1. Put your receiver into Bind mode (if a Deltang Rx4 or Rx6 receiver, switch it on and wait for the LED to flash fast).
2. Press and hold the Bind push-button on the transmitter.
3. Switch the transmitter on by pushing the Power button and then release the Bind button.
4. Binding is complete when the receiver LED stops flashing.

During normal transmitter operation, the bind button controls R/C channel 5. The transmitted value is high when the button is up and low when pressed.

Push Buttons

The two auxiliary function push buttons F1 and F2 may be used to control lighting, couplers, sound cards, etc. They control R/C channels 2 and 4. The transmitted value is mid when the button is up and low when pressed.

Receiver Programming

Tx20v2 can be used to program Micron and Deltang receivers. You need to refer to the receiver's programming instructions for details of the available functions and the programming sequence to modify the functions.

All of these receivers have a common method of entering programming mode and modifying the programme

data. Programming mode is entered by setting the transmitter channel 2 and channel 4 to maximum low or maximum high before applying power to the receiver and then setting both channels back to the middle. Program data is modified by pulsing channel 3 low and stored by pulsing channel 3 high. This corresponds to the following controls on Tx20v2.

Enter programming mode:	Turn on Tx20v2 and hold down F1 and F2. Apply power to the rx and the LED will start rapid flashing. Release F1 and F2. The Rx LED will now show a 1-flash – this is a repeated single short flash followed by a longer pause. This first flash pattern is called the 'Menu' in the programming instructions.
Modify programme sequence value:	Pulse the toggle switch down. The Rx LED will briefly show rapid flashing and then the next flash in the sequence – i.e. if it was showing 1-flash it will now show 2-flash. The flash sequence returns to 1-flash when advancing beyond the last value in a sequence. The number of the last value depends on the particular sequence being programmed.
Store programme sequence value:	Pulse the toggle switch up. The Rx LED will briefly show rapid flashing and then show the currently programmed flash pattern for the next in the sequence.

Repeat the above for each program function that you wish to alter.

For example, to set the ESC output (the first if the receiver has multiple ESC) to respond to full range throttle on channel 1 and direction control on channel 3, the programme sequence is 1,1,2,1,3:

- Enter programming mode
- Rx LED displays 1-flash, push tx toggle up to accept
- Rx LED displays 1-flash, push tx toggle up
- If Rx LED does not display 2-flash, push tx toggle down until it does, push tx toggle up
- If Rx LED does not display 1-flash, push tx toggle down until it does, push tx toggle up
- If Rx LED does not display 3-flash, push tx toggle down until it does, push tx toggle up
- Rx LED lights solid

Calibration

All ready-to-use transmitters are calibrated as the final manufacturing step. This sets the throttle control centre position and normally only needs to be done once. If you suspect that the throttle control is not operating correctly or you have replaced any of the internal components (e.g. throttle potentiometer), your transmitter may need calibration.

If the bind button has been inadvertently held down for longer than 20 seconds, the previously stored calibration data will have been overwritten and you could find that the throttle control behaves strangely.

To perform calibration:

- Centre the throttle knob
- Switch the Tx on
- Within 60 seconds, press and hold the bind button
- After 20 seconds, the Tx LED will:
 - go out for 2 seconds
 - come on for 3 seconds
- Release the bind button, the Tx LED will stay on

The throttle control centre position is now calibrated.