

Tx24v2 User Information

Tx24v2 is a hand-held wireless transmitter intended to control live-steam locomotives or battery electric locomotives with the speed controller set to low-off throttle operation. It has rotary controls for low-off regulator, centre-off reverser, inertia plus a 12-way loco selection switch and a centre-biased toggle switch plus 2 push buttons for functions such as steam whistle, lighting or couplers. The inertia control and one push button are on the top panel.

Tx24v2 can be used for Micron and Deltang receiver programming using the reverser control to step through programming levels. Programming details for each receiver may be accessed from the web page for the receiver.

Technology

- Tx24v2 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.
- Tx24v2 is compatible with all DSM2 receivers; this includes Micron and Deltang receivers.
- Any number of receivers can be bound to your Tx24v2 but only up to twelve, bound to different Selecta positions, 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 model rail receiver is at least 50m. Range indoors is affected by building construction materials, furniture, people and receiver installation.
- Control knob, switch and push button actions are transmitted as separate R/C 'channels' which must match the receiver configuration:

Throttle:	channel 1
Selecta:	channel 2
Reverser:	channel 3 (CW/forward = channel high, CCW/reverse= channel low)
Inertia:	internal use for inertia or may be reconfigured to control channel 4 or channel 5
S2 button:	channel 4 or none if Inertia configured as channel 4) (up = channel mid, down = channel low)
Bind button:	channel 5 none if inertia configured as channel 5) (up = channel high, down = channel low)
Toggle switch (S1):	channel 7 (up = channel high, centre = channel mid, down = channel low)

Battery

Tx24v2 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 Tx24v2 is new this will require a bit of effort to slide it past the retaning '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 Toggle Switch

Tx24v2 has a latching toggle switch for power with a separate indicator LED. Power is on when the toggle is down. The LED lights continuously when the transmitter is on and flashes when Tx24v2 is in bind mode (see below). It is best to switch the transmitter on before the receiver. If a receiver is switched on with Tx24v2 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 Tx24v2 on followed by the receiver.

Selecta

This is a 12-way rotary switch with positions matching those of a clock. It allows 12 locos to be brought in and out of service without touching them and requires a Selecta enabled receiver. Selecta uses R/C channel 2; a receiver stores the value of channel 2 when it is bound. During normal operation, the received channel 2 value is compared with the stored value. If they match (plus/minus a small delta), the receiver responds to the transmitter controls; if they don't match the receiver does not respond and, usually, the receiver LED will show a double flash to indicate that it is not selected.

Bind Button

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 Micron or Deltang 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 operation, the bind button can be used as an auxiliary control - e.g. horn or whistle sound trigger. **TAKE CARE** to avoid holding the bind button down for 20 seconds or more as this will cause the transmitter to enter calibration mode or reconfigure some of the controls.

S1 Toggle Switch

The toggle switch is a centre-biased control operating R/C channel 7 with min/low value when the toggle is down, mid value at the centre CCW and max/high value with toggle up.

S2 and Bind Push Buttons

The top panel S2 button and the Bind button may be used to control auxiliary functions such as a steam whistle, lighting or servo actuated couplers.

Receiver Programming

Tx24v2 can be used to program Micron and Deltang receivers. The receivers have a rich set of functionality which is not possible to describe here, refer to the receiver's programming instructions for details of the available functions and the programming sequence to modify the functions.

The receiver must first be put into programming mode and then the Tx24v2 reverser control is used to enter a programming sequence. There are 2 methods of getting a receiver into programming mode:

1. place the controls for R/C channels 2 (Selecta) and 4 (S2 button) at the extreme positions and then switch receiver on, or
2. switch receiver on and enter the morse code SOS using the bind button (R/C channel 5)

Method 1 works for all receivers, method 2 is not supported by Deltang Rx4x receivers.

Method 1 (chan 2 and 4)

1. switch Tx24v2 on, receiver off
2. place the Reverser control in the centre position
3. rotate Selecta to position 12
4. push and hold down the top panel S2 button
5. switch the receiver on.
6. the receiver LED will flash rapidly
7. release S2 and centre the Selecta knob

- the receiver LED will flash once, pause and repeat - this is called a '1-flash' and corresponds to the 1st level of the first row in the receiver programming table

Method 2 (SOS)

- switch Tx24v2 on and then the receiver, receiver LED must be lit
- centre the Reverser control
- wait at least 5 seconds without touching any transmitter control
- tap out the morse SOS (... --- ...) on the bind button where:
 - a dot is a short press of less than 0.7 second
 - a dash is a long press of about 2 seconds
 - pauses between dots or dashes is about 1 second
- if the SOS is accepted, the receiver LED will flash once, pause and repeat
- if the SOS was not accepted go back to step 3

To enter a receiver program sequence

A program sequence comprises 5 values, one for each column from the programming table. The Tx24v2 Reverser control is used to enter the value for each level of the sequence, the receiver LED flashes to show the digit value. Program data is modified by rotating Reverser CCW (reverse) then back to centre and stored by rotating Reverser CW (forward) and back to centre.

Modify programme sequence value:	Reverser CCW (reverse) and back to centre = REV 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:	Reverser CW (forward) and back to centre = FWD The Rx LED will briefly show rapid flashing and then show the currently programmed flash pattern for the next in the sequence. If this is the last value in the program sequence, there is a brief pause with the LED off while the changes are written to safe storage and then the LED comes on solid.

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

For example, to set a Micron receiver 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, FWD to accept
- Rx LED displays 1-flash, FWD to accept
- If Rx LED does not display 2-flash, REV until it does, then FWD
- If Rx LED does not display 1-flash, REV until it does, then FWD
- If Rx LED does not display 3-flash, REV until it does, then FWD
- Rx LED lights solid

Calibration

All ready-to-use transmitters are calibrated as the final manufacturing step. This sets the control centre position and normally only needs to be done once. If you suspect that the Regulator control is not operating correctly or you have replaced any of the internal components (e.g. Regulator 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 Regulator control behaves strangely.

To perform calibration:

- Centre the Regulator knob (white mark pointing to top of case)
- Inertia to off
- Rotate the Selecta switch to position 6 (pointer on knob is pointing vertically down)
- Centre the Reverser knob
- Ensure the S1 toggle switch is centred
- 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; go out for 2 seconds; come on for 3 seconds; go off and stay off
- Release the Bind button, the Tx LED will stay on

The transmitter controls are now calibrated.

Change Inertia Control Function

If the Bind button is pressed for more than 20s, it alters how the Inertia knob is used:

- if the Bind button is pressed for 20s or more within the first 60s of switching on, it will perform calibration of the throttle knob centre position
- if the Bind button is pressed for 20s or more after the first 60s of switching on, it will toggle what the Inertia knob is used for – Inertia or control of channel 4 or channel 5.

The default behaviour of the Inertia knob is to control acceleration and deceleration as described above. To toggle the Inertia knob function:

1. switch the Tx on and wait 90s without touching the Bind button
2. press and hold the Bind button
3. after 20s the power LED will go off for 2s and then come on for 3s; release the Bind button in this 3s to toggle the Inertia knob between controlling Inertia or controlling channel 4.
4. after a total of 25s (i.e. after the 3s of LED on) the power LED will go off and stay off until you release the Bind button; this causes the Inertia knob to control channel 5
5. repeat steps 1 to 3 to revert to the Inertia knob controlling throttle inertia.

If the Inertia knob is being used for Inertia or channel 4, the Bind button controls channel 5 if pressed for less than 20s. If the Inertia knob is being used for channel 5, the Bind button has no effect on channel 5 but is still used for binding and controlling what the Inertia control is used for.