micron radio control

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Tx22Xcs User Information

Tx22Xcs is a hand-held wireless transmitter designed to be usable for both live-steam and battery electric locomotives. It has a rotary control for throttle / regulator and a 12-way loco selection switch plus a direction toggle switch. It has a slider control which is switchable between inertia and an auxiliary function plus 2 push buttons also for auxiliaries. Powered by a 9V PP3 which is in a separate battery compartment with a removable cover. Case dimensions: 140 x 66 x 28mm.

Tx22Xcs can be used for Micron and Deltang receiver programming using the direction switch to step through programming levels. Programming details for each receiver may be accessed from the web page for the receiver.

Technology

Tx22Xcs 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.

Tx22Xcs is compatible with all DSM2 receivers.

Any number of receivers can be bound to your Tx22Xcs but only up to twelve, bound to different Selecta positions, should normally be switched on at a time to operate them independently.

Tx22Xcs is a low-power transmitter. The range is suitable for indoors and small outdoor sites; the outdoor free-air range is at least 50m. Range indoors is affected by building construction materials, furniture, people and receiver installation.

Control knob movement and push button actions are transmitted as separate R/C channels which must match the receiver configuration:

Regulator:	channel 1
Selecta:	channel 2
Reverser (S1):	channel 3
Push Button (S2):	channel 4
Bind Button:	channel 5
Whistle/Aux:	channel 7

The slider control is switchable between Inertia and R/C channel 7 (labelled 'Whistle'). When enabled, the Inertia control is implemented in the transmitter software and does not control a R/C channel; when the switch is toward 'Whistle', Inertia is off.

Battery

Tx22Xcs 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 on/off button is off (up) before) adding or removing a battery.
- Remove the lid at the bottom rear of the case by sliding it downwards. When Tx22Xcs 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

Tx22Xcs 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 Tx22Xcs is in bind mode (see below). It is best to switch the transmitter on before the receiver. If a receiver is switched on with Tx22Xcs 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 Tx22Xcs on followed by the receiver.

Selecta

Selecta is a 12-way rotary switch with positions matching those of a clock; it controls R/C channel 2. Selecta allows 12 locos to brought in and out of service without touching them (requires Selecta enabled receivers - e.g. MR001).

Regulator Control

The regulator is a 300° rotary control and uses R/C channel 1.

Inertia/Momentum Control

The slider controls Inertia when the adjacent switch is toward 'Inertia', otherwise the Inertia function is set to off. Inertia 'dampens' or slows down changes to Regulator (R/C channel 1). When Inertia is on, the Regulator sets a 'target' and Inertia changes the transmitted value slowly until it reachs that target. The Tx22Xcs LED flickers while a change is in progress.

To stop quickly Regulator and Inertia must be in the 'off' position.

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. Consult your receiver documentation for how to put it 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.

Push Buttons

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

The controls affect the following R/C channels:

S2 button: chan 4 up = mid, pressed = low

Bind button: chan 5 up = high, pressed = low

where low, mid and high are used in receiver programming instructions and are equivalent to servo pulse widths of 1ms, 1.5ms and 2ms.

Slider Control

The slider control is switchable between Inertia and R/C channel 7. The most common use for the slider is to control a servo for a resonator type steam whistle as the operating point of these varies with steam pressure. When the slider is switched to Inertia, channel 7 is set to the mid point.

Receiver Programming

Tx22Xcs 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. Please contact Micron if a receiver programming table looks daunting and we will send you specific programming instructions for the function you want to change.

A receiver must have been bound to Tx22Xcs to program it.

All of these receivers have a common method of entering programming mode and modifying the program data. There are 2 methods of getting a receiver into programming mode:

1. place the controls for R/C channels 2 and 4 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 works only for Micron MR001a and Deltang Rx6 types.

Method 1 (chan 2 and 4)

1. switch the transmitter on
2. place the Direction switch (S1) in the centre position
3. rotate Selecta to position 12
4. push and hold down the S2 button
5. switch on a receiver which has been bound to this transmitter; the receiver LED should flash fast within a few seconds.
6. release S2 and rotate Selecta to position 6
7. 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)

1. switch the Tx22Xcs on and then the receiver, receiver LED must be lit
2. centre the Direction switch (S1)
3. wait at least 5 seconds without touching any transmitter control
4. 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
5. if the SOS is accepted, the receiver LED will flash once, pause and repeat
6. if the SOS was not accepted go back to step 3

To enter a receiver program sequence

The Tx22Xcs Direction switch is used to enter the value for each level of the program sequence and the receiver LED flashes to show the digit value. For example, the sequence to set the Deltang Rx60 output P3 to on/off latching and operated by the bind button is 3 3 2 5 1. Decoding this sequence gives:

Level	Value	Explanation
1	3	Programming table menu 3
2	3	Rx60 output P3
3	2	on/off latching mode
4	5	R/C channel 5 = Bind button
5	1	start at 0V, toggle between 0V and 3.3V each time the Bind button is pressed (R/C channel 5 goes low)

As each programming level is entered, the receiver flashes to show the value, pauses and then repeats the flash count. The initial 1-flash after entering programming mode is for menu 1, level 1 - the left most column of the top row of the programming table.

- move the Direction switch to reverse (R) and return to centre to increment the number of receiver LED flashes for the current program level
    - each level has a maximum value, the flash count wraps to 1
    - if the current flash count is 4 and you need 2, you have to increment to the max, increment again to get to 1 and then again to get to 2
- move the Direction switch forward (F) and return to centre to accept the current flash count and move on to the next level in the programming sequence
    - when all programming levels have been entered, the receiver LED will light solid and the receiver

will exit programming mode

The receiver LED will show rapid flashing while the Direction switch is away from the centre and returns to slow flashing (or light continuously if at the end of a sequence) when the Direction switch is returned to the centre.

The new program sequence is stored only when the end of the sequence is reached. If you lose your position in the program sequence, turn the receiver off and start again.

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

For example, to set the Deltang Rx65 ESC output to respond to full range throttle on channel 1 and direction control on channel 3, the program sequence is 1,1,2,1,3. ('REV' means move the Direction switch left to R and back to centre; 'FWD' means move the Direction switch right to F and back to centre)

- 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 Regulator 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 throttle control behaves strangely.

To perform calibration:

- centre the Regulator knob (white mark pointing to the blue dot on the panel label)
- rotate Selecta to position 6
- centre the Direction switch
- slider selection switch to Whistle
- switch the Tx on
- within 60 seconds, press and hold down the Bind button
- after 20 seconds, the Tx LED will:
    - go off for 2 seconds
    - come on for 3 seconds
    - go off 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.