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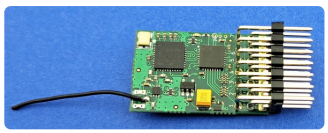
# Micron MR001d 2.4GHz DSM2/DSMX Receiver (from v1.9)

This document is regularly updated and the most recent version may be found online at http://micronrc.uk/mr001d-info where you will be able to view larger versions of the images.

The MR001d receiver is well suited for use in large scale live-steam or large scale battery powered locos. It operates on 2.4GHz using the Spektrum DSM2 or DSMX protocols; thus it operates just like any other DSM2/DSMX receiver but includes some useful features for model railway control. The MR001d is small (30x18x11mm) and space for it is easily found in most locos.


MR001d

The MR001d free-air range, when used with a Micron low-power transmitter, is 50m-60m and approximately 200m when used with a full-power (100mW) transmitter. This range will be reduced indoors due to absorption by furniture / fittings and reflections from metal surfaces. Range is also reduced if the receiver aerial is in a metal enclosure. Ideally, the aerial should be placed outside the vehicle body and clear of any metal. The active tip of the extended aerial needs to 'see' the transmitter so should be placed through a hole in the vehicle body - e.g. into the cab space. The receiver aerial should not be cut short or made longer as this will affect operation of the receiver. It is important to perform a range check after installation to ensure you have full control of your loco/vehicle at all positions around the layout.

## Features

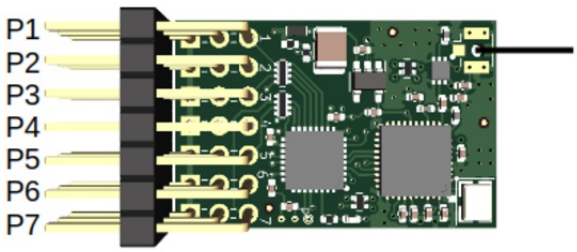
- Compatible with all DSM2 and DSMX transmitters with up to 10 R/C channels, both Micron model rail and aero model stick type transmitters.
- 3.45V to 8.5V working voltage range.
- 11 outputs which can be configured for servo/ESC or 0V/3.3V low-current switched ports; 7 ports are at the front with 'standard' 0.1" pitch connector pins, ports 8 to 11 are on an optional JST-SH connector at the rear.
- Supports the Selecta feature for compatibility with multi-loco transmitters, the receiver must be re-bound to change Selecta switch position.
- The default configuration provides auto-switched front and rear LED lights on P6 and P7 controlled by the throttle channel.
- Receiver on-board LED can be repeated to any non-servo output (this is called the LED2 function).
- All functionality may be configured by programming using a a suitable transmitter (most Micron tx or a stick type model aircraft tx).

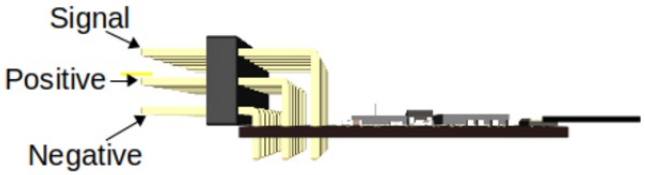
## Connections and Indicators

MR001d has 7 set of JR style 0.1" pitch output pins, labeled P1 to P7 on the diagram below. Ports P8 to P11 are on the optional JST-SH connectors at the aerial end of the receiver. Although the JST-SH socket has 3.3V power, this is insufficient for powering a servo which must use an external regulator or by power directly from the battery.

MR001d can be powered from a battery of 3.45V up to 8V; use of a 4 or 5 cell NiMH rechargeable battery or the 5V regulated output from a speed controller is typical.

MR001d contains 4 configurations which can be selected using a Power-On Configuration Changes or by programming the receiver. The default configuration has servo outputs on P1 to P5, front/rear lighting on P6 and P7, and switched outputs on P8 to P11 - see the Configurations table at the end of this document. Other output configurations are available on request.



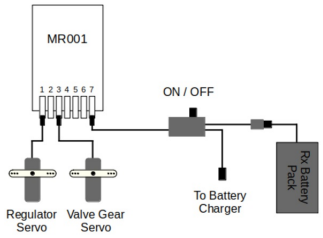




MR001d has a LED indicator on the top side to show receiver status:

- immediately after switch on, flashes slowly while waiting for a good transmitter signal
- if no transmitter signal found after 5 seconds, the LED flashes rapidly to indicate bind mode
- lights continously when good R/C data is being decoded
- flashes twice, pause and repeat when the receiver is deselected (see Selecta)
- used for feedback when programming; feedback flash patterns comprise a repeated number of flashes followed by a 1 second pause - this is called a N-flash where N is the number of flashes, e.g. 3-flash is 3 short flashes, 1 second pause and repeat

## Live Steam

For live-steam use, MR001d outputs can be connected to standard R/C servos to operate the regulator, reverser, blower, gas valve and whistle. MR001d will work with any servo that uses a standard (1ms - 2ms) pulse width control signal and operates off the selected battery voltage - e.g. Emax ES08MDII.



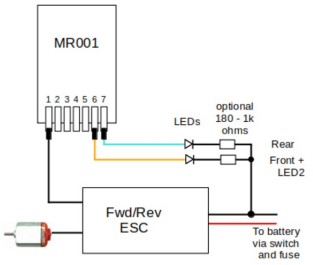
Servo Connection

The throttle mode should be set to low-off for separate regulator and direction controls and to ensure that Emergency Stop (if configured) will close the regulator.

When used with a Micron model rail transmitter, throttle is on P1/ch1 controlled using the large speed knob and direction is on P3/ch3 controlled using the toggle switch (or direction control knob on Tx24 variants). The Micron transmitter should ideally be configured for low-off throttle with no centre detent and a non-biased direction toggle switch. When used with an aeromodel type stick transmitter, throttle is controlled using the throttle stick and direction is controlled by the elevator stick. Servos, plugged into MR001d P1 and P3, are linked to the regulator and reverser. The battery can be connected, via an on/off switch, into any of the unused pins.

## Battery Powered Loco

An Electronic Speed Controller (ESC) that supports forward and reverse should be connected to P1/ch1 as shown in the diagram. The MR001d is powered from the ESC 5V output.



ESC Connection

The throttle mode should be set to centre-off or low-to-centre - the latter allows use of a centre-off ESC while providing separate transmitter speed and direction controls.

A resettable fuse is essential to protect the battery in the event of a ESC or wiring fault. The switch must be capable of carrying the maximum motor current; if a suitable mechanical switch cannot be found, an electronic switch should be used instead (contact Micron for details).

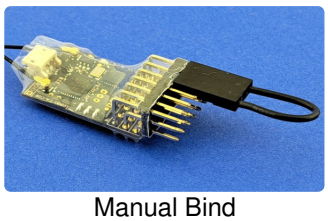
Any of the Micron model rail transmitters can be used or a Spektrum compatible stick type transmitter. Tx21v2, Tx22v2 and Tx24v2 transmitters have an inertia control which gives a more realistic acceleration and deceleration by slowing down the rate at which the throttle channel is changed.

## Binding

MR001d must be bound to a transmitter before use. Once bound, the receiver remembers the transmitter identity and searches for this when it is switched on.

To bind a receiver, it is switched on with no transmitter active (for normal operation, the transmitter should be switched on before the receiver).

MR001d enters autobind approximately 5 seconds after switching on if it fails to find a previously bound transmitter signal. Binding may also be initiated manually by connecting the large jumper plug across P5 and P7 signal pins (top) row.


Manual Bind

Bind mode is indicated by a rapid flashing of the receiver LED and the following steps should be followed to bind with your transmitter:

1. transmitter switched off
2. if Selecta is enabled, move the transmitter loco selection switch to the required position
3. switch on the receiver in bind mode (manual or auto)
4. only when the LED is flashing rapidly, hold down the transmitter bind button and switch on
5. wait for the transmitter to indicate that it is in bind mode and then release its bind button (the power LED on Micron model rail transmitters will flash when binding)
6. after a short delay, the LED should return to a slow flash and 2-5 seconds later will light and stay on
7. the receiver is now bound to the transmitter

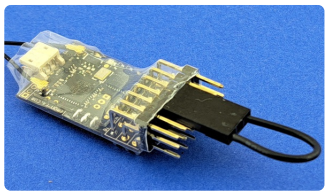
If the LED does not come on solid (no flash) within 10-15 seconds, the bind process has failed. This can happen for several reasons and does not normally indicate a fault. During binding, the receiver searches for the transmitter's

signal and this can be distorted by holding the transmitter and receiver too close. So, if you get a bind fail, try again after moving them slightly further apart or changing the relative orientation of the aerials. Binding is most reliable when no other 2.4GHz transmitters are turned on.

## Throttle Mode

The MR001d throttle mode determines how transmitter controls affect receiver outputs, the behaviour of Directional Lights and what happens if Emergency Stop is triggered or Cruise Control is disabled and signal is lost.

The throttle mode can be set using a Power-On Change using the large jumper plug on pins P3 and P5 or by programming. The modes are:


Set Throttle Mode

centre-off (1-flash)
: Forward and reverse on one transmitter control with stop in the centre. Best used with an external forward/reverse speed controller. This is the default mode and receivers will be supplied centre-off unless otherwise requested.

low-off (2-flash)
: Separate transmitter controls for speed and direction which are output on separate MR001d ports. This is the mode used for most live steam locos.

low-to-centre (3-flash)
: Separate speed and direction transmitter controls are combined into one forward/reverse output. This mode is intended for battery electric locos where the user prefers separate controls or who wants to use a transmitter for both live steam and battery locos.

  This mode requires the maximum low and high throttle control positions to be calibrated. Calibration is forced the first time a receiver is switched on in this mode. The LED will emit a repeated flash pattern comprising one long flash followed by 1 or 2 short flashes:

  1-flash
  : move the throttle to the minimum position (stop) and then move toward full throttle; as the control passes through the centre position, the flash pattern changes to ...

  2-flash
  : move the throttle to the max position (full throttle) and then move back toward the centre; as the control passes through the centre position, the LED will light continously to show that calibration is complete.

  The throttle can be re-calibrated at any time by re-selecting low-to-centre mode using the large jumper plug or by programming.

In all modes, the throttle output (P1) will not change until the transmitter control has been set to minimum throttle. This is to prevent the loco moving immediately the receiver is switched on.

## Loco Selection - Selecta

Many Micron model rail transmitters have a 12 way switch to allow control of up to 12 locos - Deltang originated this feature and called it 'Selecta'. Using the switch, locos are brought under control one at a time. When not selected, receiver outputs hold their current setting (e.g. a loco which is moving when deselected keeps moving) and the LED shows a 2-flash pattern. The default 'keep going' behaviour can be changed to stop when deselected by programming the receiver.

The Micron implementation of Loco Selection / Selecta is fully compatible with the Deltang Selecta feature and uses R/C channel 2 by default. When Selecta is enabled, the controlling R/C channel (e.g. 2) may still be mapped to a receiver output but, of course, this will not change as the transmitter switch is rotated.

The receiver has a 800ms delay before enabling when the transmitter Selecta value is changed. This is to avoid obeying the transmitter while the Selecta switch is being moved - e.g. a receiver on Selecta #4 should not change any outputs while the transmitter Selecta switch is moved from #3 to #5.

Selecta may be enabled by default (see the receiver configuration information) and may be enabled or disabled by using a power-on configuration change (see Power-On Configuration Changes) or by programming.

If Selecta is enabled, the transmitter's Selecta switch value will be saved when the transmitter and receiver are bound. A new Selecta value (i.e. switch position) can be stored either by rebinding or by using the power-on changes to disable and then re-enable Selecta.

**Note:** when the Selecta switch is changed to control a different loco, the newly selected loco responds to the transmitter control settings. The current range of Selecta enabled transmitters have no model memory so cannot have different throttle settings, etc. for each loco. Thus, although Selecta may be used to manage many moving locos, this **must be used with care** and is not recommended. Micron intends to introduce a transmitter with model memory but the release date is not known.

## Directional Lighting

The default configuration has pins P6 and P7 setup to drive front and rear LED lights; P6 powers a forward LED and P7 a backward facing LED. The directional lighting pins can be changed by programming the receiver.

MR001d has an on-board 3.3V regulator and 220 ohm resistors in series with the signal pins so limits the LED current to approximately 15mA. The LED should be connected between the signal and negative pins (top and bottom rows).

The default setting is for the LEDs to follow the throttle channel with 'centre-off' and is appropriate for a battery loco with ESC. For live-steam use, the LED behaviour can be reprogrammed for 'low-off' and this uses full-range throttle on ch1 and directional control on ch3.

To change the way that directional LEDs respond to throttle movement, set the appropriate throttle mode using a Power-On Change or by programming.

## Cruise Control

Cruise Control keeps a loco running if a receiver loses the signal from the transmitter, for example when going through a tunnel or behind a garden building or some dense bushes. All receiver outputs hold their current setting until the transmitter signal is reaquired. Outputs also hold when a Selecta-enabled receiver (see Selecta) is de-selected.

Cruise Control allows you to switch off the transmitter if, for example, you are running the loco round a continuous circuit.

The default MR001d setup is Cruise Control enabled. It can be disabled using a Power-On Change or by programming. If disabled, servos on pins designated as throttle/regulator will be moved to the stop position when signal is lost. Failsafe positions for all R/C channels may optionally be enabled; in this case, the values of all R/C channels are saved after a successful bind and restored when signal is lost. The time delay between loosing signal and initiating throttle close and failsafe is configurable between 1s and 4s - 3s is set when cruise control is disable using the Power-On Change.

## Emergency Stop

Any of the transmitter controls can be used as an 'Emergency Stop' function to bring the loco/vehicle to a stop. Emergency Stop is not enabled by default and must be configured by programming the receiver.

To enable Emergency Stop, you need to choose:

- the R/C channel
- whether a low or high signal is used to trigger
- the delay before stopping - i.e. the number of seconds that the R/C channel must be in the trigger state before Emergency Stop is actioned

For example, the Tx22X transmitter button S2 (in-between the 2 toggle switches) could be used: this controls R/C channel 4 and the signal is low when the button is pressed.

## Power-On Configuration Changes

A few configuration changes can be made without programming. A link across the output pins using one or both of the jumper plugs is used to action the change. It is best practice to do this with no other connections to the receiver pins. A change is made by connecting the appropriate P pins with the receiver off, switching the receiver on and observing the LED flash pattern, removing the connection which is confirmed by a rapid LED flash and then switching the receiver off. The exception are the P1/P3 options:

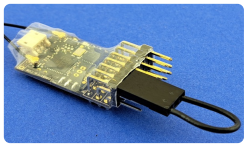
- 5-flash to enter programming mode; after removing the connection, MR001d goes into receive mode with programming enabled
- the toggle options show a flash count to indicate if the option is enabled (2-flash) or disabled (1-flash) and then the rapid flash is shown

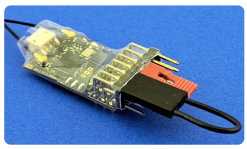
Servo end point adjustment and reversing may also be performed using the small jumper plug to select a servo and then using the large jumper plug to adjust - see Servo Throw Adjustment.

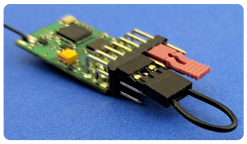
The changes all cycle though the flash counts while the jumper is installed. Each flash count is repeated once (i.e. shown twice) and then increments to the next, cycling back to 1 when the maximum is reached. When the desired flash count has been shown, removing the large jumper acknowledges the selection by showing a rapid flash. There will be a short delay between removing the jumper and the rapid flash due to the time taken to write the changes to permanent memory. The receiver should be powered off when the rapid flash starts. **If you switch off before removing the jumper connection, the configuration is not changed. If you switch off after removing the jumper and before the rapid LED flash, the receiver data is likely to be corrupted and you should perform a reset.**

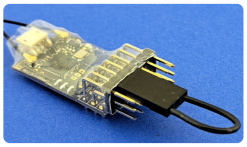
This is a summary of the configuration changes that can be made, performed using the large and small jumper plugs.
A '-' in the Small Jumper column indicates that the small jumper is not used.

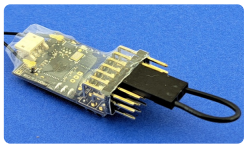
| Change | Large Jumper | Small Jumper | LED indication |
|---|---|---|---|
| Reset, Backup, Programming, Menu | P1/P3 | - | n-flash where 'n' is:<br>1: do nothing<br>2: reset<br>3: backup<br>4: toggle ch2/ch4 to enter programming<br>5: enter programming mode<br>6: toggle Menu mode on R/C ch7<br>7: toggle power e-switch function |
| Configuration Select | P1/P3 | P4/P5 | n-flash where 'n' is the configuration number |
| Throttle Arm Mode | P1/P3 | P5/P6 | This controls the way that the throttle output (normally P1) behaves after switch on:<br>1-flash = arm disabled (output follows Tx throttle immediately)<br>2-flash = arm enabled (output disabled until Tx throttle at stop) |
| LED2 | P2/P4 | - | 1-flash = LED2 disabled<br>2-flash = LED2 normal, not Select and not Cruise<br>3-flash = LED2 for Selecta & Cruise<br>4-flash= LED2 always |
| Throttle Mode | P3/P5 | - | 1-flash = centre-off (thr=ch1)<br>2-flash = low-off (thr=ch1, dir=ch3)<br>3-flash = low-to-centre (thr=ch1, dir=ch3) |
| Selecta | P4/P6 | - | 1-flash = Selecta disabled<br>2-flash = Selecta enabled on R/C ch2 |
| Cruise Control / Failsafe | P4/P6 | P1/P2 | 1-flash = Cruise enabled, continue running while no signal<br>2-flash = Cruise disabled, stop in 3s after signal loss<br>3-flash = Cruise disabled, stop in 3s and set all channels to failsafe positions |
| Bind | P5/P7 | - | rapid flash indicates bind mode |

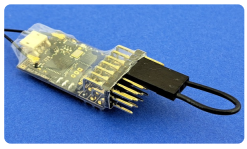

P1/P3 - Reset & Backup

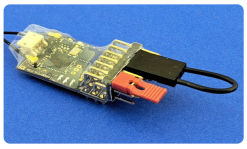

P1/P3 + P4/P5 - Config Select

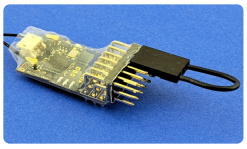

P1/P3 + P5/P6 - Throttle Arm Mode


P2/P4 - LED2


P3/P5 - Throttle Mode


P4/P6 - Selecta


P4/P6 + P1/P2 - Cruise


P5/P7 - Bind

## Receiver Programming

The behaviour for each MR001d pin can be changed using a bound transmitter. MR001d must first be put into programming mode and then the direction toggle switch (knob on Tx24 type transmitters), or elevator on a stick type transmitter, is used to enter a program sequence one digit at a time. The LED (and LED2 if enabled) flashes to indicate the value of the current step in the programming sequence. For example, if the current value is 4, the LED flashes 4 times, pauses and repeats - this is called a 4-flash.

The programming table is large and presented in a separate document (see micronrc.co.uk/mr001-progtable) which lists all of the functions that may be changed by programming. The table is split into 5 blocks of related functions each with the same value in the first column.

The programming table columns contain the values which must be entered to change a particular function. For example, to change the throttle behaviour from centre-off (forward and reverse on one control) to low-off (separate throttle/regulator and direction/reverser controls) the program sequence **1, 1, 2, 1, 3** is entered. Each digit of this program sequence is taken from the columns, left to right:

1 = Throttle Configuration
1 = Throttle Number (there is only 1 on MR001d)
2 = Low Off Throttle

1 = Throttle on R/C channel 1
3 = Direction Control on R/C channel 3

One function can be changed at a time. The general method is:

- set receiver into programming mode
- enter a program sequence
- repeat until all programming changes have been made

**Enter Programming Mode**
There are 2 methods of getting the receiver into programming mode:

ch2/ch4 method
: Hold the transmitter channel 2 and channel 4 controls at high or low extremes and then switch the receiver on; these are the F1 and F2 buttons on a Tx20v2 and the Selecta switch and S2 button on a Tx22X; the receiver LED will flash rapidly shortly after switch on, centre one or both channel 2 & 4 controls (e.g. release the buttons on Tx20v2 or the S2 button on Tx22X).

SOS method
: Switch the transmitter and receiver on (they must be bound), wait 5 seconds without touching any controls and then tap out morse SOS (... --- ...) on the transmitter bind button (or toggle the gear switch high to low for a stick transmitter);

  - dots (…) will be a quick press of the button and must be less than 1 second in duration
  - dashes (---) must be greater than 1 second and shorter than 5 seconds – 2 seconds is a reliable time
  - the time between each dot or dash must be less than 5 seconds

When programming mode has been successfully entered, the receiver LED will show a 1-flash - this is the **1** from the first column of the programming table. If you do not get the 1-flash, repeat the procedure to enter programming mode. It can take a couple of attempts to get the SOS method correct if you have never done it before.

**Enter a Program Sequence**
One programming change requires up to five choices to be made. These are called 'levels' and each has several options. They are documented in the programming table. Completion of a programming change exits programming mode and requires the receiver to be placed into programming mode again for the next change.

It is a good idea to write the programming sequence on a piece of scrap paper and cross off each digit as it is entered so that you don't lose track of where you are in the sequence. You always start at the top of the first column and 1-flash is displayed on entering programming mode.

- The flash count for a level is incremented by setting the R/C channel 3 control low and back to mid.
- The flash count for a level may be decremented by holding the R/C channel 4 control low while operating the R/C channel 3 control; R/C channel 4 is available on some Micron transmitters - e.g. F2 on Tx20v2 and S2 on Tx22X and Tx24v2
- The level value is accepted and the flash count for the next level is displayed by setting the R/C channel 3 control high and back to mid.

Most Micron transmitters have a toggle switch on R/C channel 3 which is marked A/B, or forward/reverse for a low-off transmitter:

- pushing the switch down (or toward 'reverse' for a low-off transmitter) sets the R/C channel to a low value and increments the flash count,
- pushing the switch up (or toward 'forward') sets the R/C channel to a high value, accepts the flash count and moves the program sequence on to next level or exit programming mode if the current level is the last in the sequence

Always return the toggle switch to centre after pushing down or up. Refer to the transmitter user manual for specific information on the R/C channel 3 control - Tx24v2 has a rotary reverser control.

The receiver LED will flash rapidly while R/C channel 3 is high or low and then return to a slower repeated flash when the control is back to the middle.

After accepting the flash count for a level, the LED displays a flash count for the current value of the next level. This could be higher than 1-flash if the function is set in the receiver configuration or has been previously programmed. For example:

- the default Selecta R/C channel is 2, so a 2-flash will be displayed after entering 4, 8, 2
- P6 is configured as a front light, so a 4-flash will be displayed after entering 3, 6

When the last level for a sequence has been accepted, the LED will light continously and the receiver is back in normal operating mode. There may be a short delay between accepting the last sequence value and the LED lighting continuously - this is is due to the time taken to write the changes to permanent memory. The maximum number of levels is 5, but not all sequences use all 5; if level 5 in the table is blank, the LED will light continously after level 4 is accepted.

Programming changes are accepted **only** when the LED lights solid at the end of the sequence. If a mistake is made mid way

through a sequence, switch the receiver off to abort.

**Programming Example**
These examples assume MR001d is in as-received configuration and a Micron transmitter with toggle switch on R/C channel 3. Tx24v2 transmitters have a variable control on R/C channel 3 - the Reverser; the equivalent actions are:

| Action | Tx with toggle switch | Tx24v2 type transmitter |
|---|---|---|
| Increment flash count: | toggle down | Reverser fully CCW (reverse) and back to centre |
| Accept flash count: | toggle up | Reverser fully CW (forward) and back to centre |

1. **Set P2 as normal speed servo on R/C channel 7**
   program sequence: 2, 2, 1, 7, 1
   - enter programming mode
   - LED shows 1-flash (level 1, 1=core)
   - toggle down and release once, LED shows 2-flash (level 1, 2=servo)
   - toggle up and release, LED shows 1-flash (level 2, 1=P1)
   - toggle down and release 6 times, LED shows 7-flash (level 2, 7=P7)
   - toggle up and release, LED shows 1-flash (level 3, 1=servo)
   - toggle up and release, LED shows 2-flash (level 4, 2=R/C chan 2 - P2 was prevously a servo on R/C chan 2)
   - toggle down and release 5 times, LED shows 7-flash (level 4, 7=R/C chan 7)
   - toggle up and release, LED shows 1-flash (level 5, 1=normal speed)
   - toggle up and release, LED lights continously and servo on P2 responds to R/C channel 7
2. **Reverse servo on P3**
   program sequence: 2, 2, 7, 1
   - enter programming mode
   - LED shows 1-flash (level 1, 1=core)
   - toggle down and release once, LED shows 2-flash (level 1, 2=servo)
   - toggle up and release, LED shows 1-flash (level 2, 1=P1)
   - toggle down and release 2 times, LED shows 3-flash (level 2, 3=P3)
   - toggle up and release, LED shows 1-flash (level 3, 1=normal servo)
   - toggle down and release 6 times LED shows 7-flash (level 3, 7=adjust servo)
   - toggle up and release, LED shows 1-flash (level 4, 1=reverse servo direction)
   - toggle up and release, LED lights continously and servo on P3 rotates in the opposite direction
3. **Set P5 as momentary switched output, on when R/C channel 5 is low**
   program sequence: 3, 5, 1, 5, 1
   - enter programming mode
   - LED shows 1-flash (level 1, 1=core)
   - toggle down and release 2 times, LED shows 3-flash (level 1, 3=on/off output)
   - toggle up and release, LED shows 1-flash (level 2, 1=P1)
   - toggle down and release 4 times, LED shows 5-flash (level 2, 5=P5)
   - toggle up and release, LED shows 1-flash (level 3, 1=momentary)
   - toggle up and release, LED shows 1-flash (level 4, 1=R/C chan 1)
   - toggle down and release 4 times, LED shows 5-flash (level 4, 5=R/C chan 5)
   - toggle up and release, LED shows 1-flash (level 5, 1=on when chan low)
   - toggle up and release, LED lights continously and a LED on P5 lights when the Tx bind button is pressed

The programming table for MR001d can be found at micronrc.co.uk/mr001-progtable.

## Servo Throw Adjustment

Servo throws (low and high end points) and reversing can be configured in 2 ways:

- using the small and large jumpers
- by using a transmitter

The servo centre position does not change, it will always be at the mid-point of normal servo rotation.

## Method 1: adjust servo using jumpers on the receiver pins

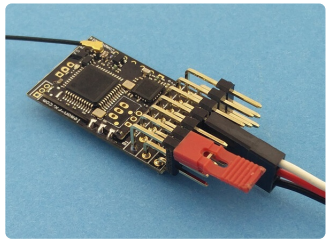
**WARNING:** never place the small jumper across the positive (middle row) and negative (bottom row) pins. This will short the battery.

The method comprises 2 steps:
1. select the servo output to be adjusted using the small jumper
2. reverse the servo using the small jumper, or increase or decrease the servo throw using the large jumper

Only one servo output can be changed at a time, the method must be repeated for each servo that requires adjustment.`

**WARNING:** never place the small jumper across the positive (middle row) and negative (bottom row) pins. This will short the battery.

**Step 1 - select servo output to adjust**


Select P1 to adjust

Servo outputs are on P1 to P5. The small jumper plug is used to select one of these outputs for adjustment, it is placed across the wanted signal pin (top row) and the adjacent signal pin. For example, to select P1 (throttle), place the small jumper plug across signal pins 1 and 2 as shown in the image (the black connector in the image is the battery plugged into P4).

Steps:

1. receiver must be bound to transmitter
2. receiver power off
3. transmitter on
4. place small jumper on
    - P1/P2 to adjust servo output P1
    - P2/P3 to adjust servo output P2
    - P3/P4 to adjust servo output P3
    - P4/P5 to adjust servo output P4
    - P5/P6 to adjust servo output P5
    - P6/P7 to adjust servo output P6
    - P1/P1 and P5/P7 to adjust servo output P7
5. plug the battery into a free pin set, **but not P6 or P7**
6. the LED will flash a sequence twice to indicate the selected pin set and then flash rapidly - e.g. flash pause flash pause rapid for P1, flash flash pause flash flash pause rapid for P2, and so on
   **Note:** if the selected pin is not currently configured as a servo the LED will not flash the pin number sequence and go immediately to rapid flashing; the receiver will not respond until it is switched off and back on again
7. remove the small jumper plug when the LED is flashing rapidly, the LED will flash slowly (1 per second). **Do not remove the battery**
8. connect a servo, this will respond to the transmitter control
    - no other output pin is active

The servo output is now selected. Jumper plugs are used on P6 and P7 to reverse the servo or adjust the travel end points. Reversing or end point adjustment can be repeated as often as desired while the servo is selected. To stop the process, remove power from the receiver.

**Step 2 - adjust selected servo output**

The selected servo may now have its direction reversed or have the travel end points adjusted:

**Reverse servo direction**

The small jumper plug is placed across signal pins (top row) for P6 and P7 to reverse the servo direction. The image shows a servo plugged into P1, a battery plugged into P3 and the small jumper across P6/P7.

Steps:

1. select servo output to adjust (see above) and plug servo in
2. place the small jumper across signal pins P6 and P7
3. the LED will flash rapidly
4. remove the jumper
    - the LED will stop flashing
    - the servo will respond to transmitter controls in the opposite direction to previous

The servo direction will reverse each time the procedure is executed.

**Adjust servo travel**

The servo travel end points can be increased or decreased using the large jumper plug on P6 (decrease) or P7 (increase). The adjustment is done in small steps every ½ second and the LED flashes for each step.

To make an adjustment:

1. move the servo to the low or high end using the transmitter control
2. use the large jumper to make changes:
    - on P6 to decrease the throw
    - on P7 to increase the throw
3. either remove the jumper or move the servo away from the end to stop the adjustment

The LED will stop flashing and the servo will stop moving when the adjustment limit is reached.

- The limit for decrement is the mid point of travel so, if an end point is decreased to the maximum amount, there will be no servo travel in that direction when the transmitter control is moved.
- The limit for increment is the maximum signal value. **Take care:** not all servos will respond to the maximum range of

servo signal values; stop decrementing when the servo stops moving even though the LED is still flashing.
- If the servo travel is still not enough after the increment LED has stopped flashing consider selecting an extended range of travel by programming - see programmming table row 2,x,8.

When the increment or decrement jumper is removed, the LED will flash rapidly for 2 seconds while the servo offset is being saved. You may continue adjusting after the flashing has stopped.

When complete, remove power from the receiver to stop, all changes are stored to the memory. The next time power is applied, the receiver will operate normally.

Only one servo output can be changed at a time, the method must be repeated for each servo that requires adjustment.`

**WARNING:** never place the small jumper across the positive (middle row) and negative (bottom row) pins. This will short the battery.

## Method 2: adjust servo using the transmitter

To adjust a servo, the servo output is selected first and then the travel adjusted using either the throttle control or direction toggle if the throttle servo is being adjusted.

The steps below assume a Micron transmitter is being used. If the transmitter is an aeroplane type stick transmitter then the elevator stick corresponds to the direction toggle.

- put the receiver into programming mode (see above)
- enter the program sequence **2, P, 7, 2**, where P is the output port number (e.g. 3 for P3)
- within 5 seconds, move the control for the output being adjusted to the end that needs adjustment:
- use the direction toggle or throttle control to increase or decrease the servo travel:
    - use the throttle control if the direction (R/C channel 3) servo is being adjusted, or
        - hold throttle knob fully CCW to decrease travel
        - hold throttle knob fully CW to increase travel
    - use the direction toggle for all other servos
        - hold toggle down to decrease travel
        - hold toggle up to increase travel

  the receiver LED will flash twice per second as the servo travel is being adjusted and stop flashing when the limit is reached.
- centre both controls to finish the adjustment, the receiver will return to normal operating mode after the control corresponding to the P port being adjusted has been centred for 5 seconds.

Only one servo output can be changed at a time. Go through the above steps to adjust a different output pin.

## Configurations

The pre-loaded configurations are shown below. Unless otherwise specified when the receiver was ordered, config 1 is enabled by default. The other loaded configurations can be selected using a power-on configuration change or by programming.

P1..P7 are the JR style pins at the front of the receiver, P8..P11 is the optional JST-SH connector at the rear of the receiver.

# Configurations

This configuration table is for firmware version 1.1. For other versions, refer to mrxxx_version.

The pre-loaded configurations are shown below. Unless otherwise specified when the receiver was ordered, config 1 is enabled by default. The other loaded configurations can be selected using a power-on configuration change or by programming.

| Port | 1: Centre-off throttle, no Selecta | 2: MyLocoSound triggers on P3-P5 (Tx22) | 3: MyLocoSound triggers on P3-P5 (Tx20) |
|---|---|---|---|
| H1 | Centre-Off ch1 | Centre-Off ch1 | Centre-Off ch1 |
| P1 | Throttle servo or ESC on H1 | Throttle servo or ESC on H1 | Throttle servo or ESC on H1 |
| P2 | Servo on ch2 | Servo on ch7 | Servo on ch2 |
| P3 | Servo on ch3 | Momentary on ch3, low 0V | Momentary on ch2, low 0V |
| P4 | Servo on ch4 | Momentary on ch3, high 0V | Momentary on ch4, low 0V |
| P5 | Servo on ch5 | Momentary on ch5, low 0V | Momentary on ch5, low 0V |
| P6 | Forward Light on H1 (LED2) | Forward Light on H1 (LED2) | Forward Light on H1 (LED2) |
| P7 | Reverse Light on H1 | Reverse Light on H1 | Reverse Light on H1 |
| P8 | Momentary on ch3, low 3.3V | Momentary on ch3, low 3.3V | Momentary on ch3, low 3.3V |
| P9 | Momentary on ch3, high 3.3V | Momentary on ch3, high 3.3V | Momentary on ch3, high 3.3V |
| P10 | Latch on ch3, start 0V, toggle low | Latch on ch3, start 0V, toggle low | Latch on ch3, start 0V, toggle low |
| P11 | Latch on ch3, start 0V, toggle high | Latch on ch3, start 0V, toggle high | Latch on ch3, start 0V, toggle high |
| LED2 | P6 | P6 | P6 |
| a class="mrc-product-link" href="mrxxx_features.html#cfg-selecta">Selecta | Disabled | Enabled | Disabled |
| a class="mrc-product-link" href="mrxxx_features.html#cfg-lvc">LVC | Enabled | Enabled | Enabled |
| Sleep time | 1 hour | 1 hour | 1 hour |
| Cruise | Enabled | Enabled | Enabled |

Other configurations are available to special order or you can configure yourself by programming.