

## Micron MR001 Receiver Programming - v1.2

This document is available on-line at <http://micronrc.uk/mr001-1.2-progtable> where you will be able to use the links to access information about the functions that can be programmed.

This page contains programming information for firmware versions shown in the page title, information for other versions can be found via [/mr6xx version](#).

Micron receivers implement a rich set of [features](#) with a common programming interface that allows functionality to be changed using most Micron [model rail transmitters](#) or a joystick Tx. Each row in the table below describes a 5 number sequence (levels 1 to 5) which is used to modify a feature's behaviour - e.g. change the throttle from centre-off to low-off behaviour; set an auxiliary output as servo, on/off, or auto-direction light. Each row also contains a brief explanation of the function accessed by that row and a link to more detail in the features page.

The value for each level of a programming sequence will be indicated by a repeated flash pattern on a receiver's LED. For example, the value 3 is displayed as a sequence of 3 flashes followed by a pause (this is called a 3-flash in receiver and transmitter user manuals). Where appropriate, a value of zero is displayed as a very short flash followed by a pause.

Many table rows specify how a transmitter control is used to activate the receiver function; the row specifies (usually at level 4) a R/C channel. Transmitters encode each control (throttle, toggle switch, push button, etc.) as a number in the range 0..1024 and transmits them in the radio signal as separate R/C channels. The mapping between transmitter controls and R/C channels is described in the user manual for the transmitter. Throttle is usually channel 1, Selecta (if used) is channel 2, the bind button is channel 5, and so on.

Receiver outputs use the channel value directly to provide a proportional response to transmitter control changes. Switched outputs divide the R/C channel range into 2 or 3 positions: low, mid and high where low is a channel value less than 250, high is greater than 750 and mid is 511 +/- a small delta. The transmitter user manual describes the control positions corresponding to low, mid and high and the programming table shows how these low, mid and high values are used to control the receiver output.

For specific information on how to place a receiver into programming mode, see the receiver's user manual. See the transmitter's user manual or [Receiver Programming](#) for information on how to use a transmitter for entering a program sequence.

### Programming Table

[ESC Configuration](#) | [Servo Configuration](#) | [On/Off Configuration](#) | [General Configuration](#) | [Radio Configuration](#) | [Input](#)

Menu	Level 2	Level 3	Level 4	Level 5	Information
1 = ESC Configuration ( <a href="#">top</a> )	1 = ESC Num	1 = Centre off (1 ch: fwd/rev) <a href="#">esc-centre-off</a>	<b>Throttle</b> 1-10 = R/C Channel		Forward and reverse with one control, off at control centre (-100% .. 0 .. +100%) prog: 1,1,1,1 = Menu1, H1, centre-off, R/C chan 1
1	1 = ESC Num	2 = Low off (2 ch: speed & direction) <a href="#">esc-low-off</a>	Throttle R/C Channel 1-10 = R/C Channel	<b>Direction</b> 1-10 = R/C Channel	One control for throttle (0 .. 100%) Second control for direction (prog: 1,1,2,1,3 = Menu1, H1, low-off, R/C chan 1, R/C chan 3)
1	1 = ESC Num	3 = Low off to Fwd/Rev (2 ch: speed & direction) <a href="#">esc-low2ctr</a>	<b>Throttle</b> 1-10 = R/C Channel	<b>Direction</b> 1-10 = R/C Channel	One control for throttle (0 .. 100%) and another for direction. Both are combined into a single forward/reverse output, which must be type 'Throttle Servo'. (prog: 1,1,2,1,3 = Menu1, H1, low-off, R/C chan 1, R/C chan 3')
1	1 = ESC Num	4 = Not used			
1	1 = ESC Num	5 = Not used			
1	1 = ESC Num	6 = Motor reverse <a href="#">reverse</a>	1 = Normal 2 = Reversed		Reverse motor rotation
1	1 = ESC Num	7 = Not used			
1	1 = ESC Num	8 = Not used			

Menu	Level 2	Level 3	Level 4	Level 5	Information
1	1 = ESC Num	9 = Direction mode <a href="#">esc-low-off</a>	1 = latching (default) 2 = stop when neutral		Set the throttle behaviour for low-off and split when the direction control is centred. The default is latching so that the vehicle direction stays the same until the control is moved to the opposite. This function allows the neutral / centre point to disable the throttle - i.e. a neutral gear effect.
1	1 = ESC Num	10 = Auto light mode <a href="#">auto-lights</a>	1 = on when stopped (default) 2 = off when stopped		Set the auto light behaviour when the motor is stopped. The default is 'on when stopped' and should be changed to 'off when stopped' for road vehicles.
2 = Servo Configuration <a href="#">(top)</a>	1-11 = P1-P11	1 = Normal Servo <a href="#">servo</a>	1-10 = R/C Channel	1 = normal speed 2-6 = slow motion	Servo PPM signal on any 'P' pad. Default is full throw from full stick movement; servo travel and reversing can be adjusted using level3 = 7. Slow motion times are roughly equal to the number of seconds for end to end rotation (for an 'average' servo).
2	1-11 = P1-P11	2 = Offset Servo <a href="#">servo-offset</a>	1 = control low-mid 2 = control mid-high		Full range servo control using half of the transmitter control movement, either from low to mid or from mid to high. <b>Note:</b> the output must be first configured as a servo using level3=1; this allows specification of normal or slow speed. If the pin is not currently configured as a servo, the receiver will exit programming mode at level 3 with a rapid LED flash.
2	1-11 = P1-P11	3 = Servo Toggle <a href="#">servo-toggle</a>	1 = start low, toggle chan low 2 = start low, toggle chan high 3 = start high, toggle chan low 4 = start high, toggle chan high		Servo toggles between low and high end points each time the channel is low or high. Use the 'Adjust Servo' and/or 'Expand Servo Range' functions to set the end points' <b>Note:</b> the output must be first configured as a servo using level3=1; this allows specification of normal or slow speed. If the pin is not currently configured as a servo, the receiver will exit programming mode at level 3 with a rapid LED flash.
2	1-11 = P1-P11	4 = Differential Servos <a href="#">servo-differential</a>	<b>2nd Servo</b> 1-11 = P1-P11	<b>2nd servo direction</b> 1 = same direction 2 = opposite direction	Specify a second servo to be used as a differential servo mixed pair. Then, using the following programming row, specify a second R/C channel to be differentially mixed into the 2 servo outputs. <b>Note:</b> the first servo must be already configured as a servo using level3=1; this allows specification of normal or slow speed. If the pin is not currently configured as a servo, the receiver will exit programming mode at level 3 with a rapid LED flash.

Menu	Level 2	Level 3	Level 4	Level 5	Information
2	1-11 = P1-P11	5 - Differential Second R/C Chan <a href="#">servo-differential</a>	<b>2nd Channel</b> 1-10 = R/C Channel	<b>Mix direction</b> <u>normal</u> 1 = 25% mix 2 = 50% mix 3 = 75% mix 4 = 100% mix <u>reverse</u> 5 = 25% mix 6 = 50% mix 7 = 75% mix 8 = 100% mix	Specify a 2nd R/C channel plus ratio and direction for mixing into the 2 servo outputs defined in the previous programming row. <b>Note:</b> the previous program row must be entered before this one, otherwise programming mode will exit with a rapid LED flash. The level 2 P number must be the main servo - the value entered for level 2 in the previous program row.  Example: servos on P1 and P2, master R/C channel = 2, secondary R/C channel = 6 with a mix ratio of 50%: 1,1,1,2,2 (main servo=P1, main R/C=2, speed=1) 1,1,4,2,1 (main servo=P1, second servo=P2, same direction) 1,1,5,6,2 (main servo=P1, second R/C=6, ratio=50%)
2	1-11 = P1-P11	6 = Not used			Placeholder for external ESC
2	1-11 = P1-P11	7 = Adjust Servo <a href="#">servo-adjust</a>	1 = Toggle Servo Direction 2 = Adjust Servo Travel		Toggle servo direction or adjust travel using transmitter controls. If the pin is not currently configured as a servo, the receiver will exit programming mode at level 3 with a rapid LED flash.
2	1-11 = P1-P11	8 = Expand or Reduce Servo Range <a href="#">servo-range</a>	<u>expand</u> 1 = normal range (1.1ms..1.9ms) 2 = +25% (1.0ms..2.0ms) 3 = +50% (0.9ms..2.1ms) 4 = +75% (0.8ms..2.2ms) 5 = +100% (0.7ms..2.3ms) 6 = +125% (0.6ms..2.4ms) 7 = +150% (0.5ms..2.5ms) 8 = +200% (0.3ms..2.7ms) <u>reduce</u> 9 = -75% (1.4ms..1.6ms) 10 = -50% (1.3ms..1.7ms) 11 = -25% (1.2ms..1.8ms)		Expand or reduce the servo throw range from the default 1.1ms .. 1.9ms (aka 100%) servo pulse width. The actual pulse width range will depend on the range of your transmitter's control. These fixed scaled values can be fine tuned using servo travel adjustment. If the pin is not currently configured as a servo, the receiver will exit programming mode at level 3 with a rapid LED flash. <b>Beware:</b> make sure that your servo can handle an increased range before connecting it.
3 = On/Off Configuration <a href="#">(top)</a>	1-11 = P1-P11	1 = Momentary on/off <a href="#">momentary</a>	1-10 = R/C Channel	<u>Idle off</u> P=0V, F=open 1 = ch low on 2 = ch mid on 3 = ch high on <u>Idle on</u> P=3.3V, F=closed 4 = ch low off 5 = ch mid off 6 = ch high off	1 R/C channel can control up to 3 outputs, momentary = non-latching. eg: 3,4,1,5,1 = P4, On only when Ch5 is low eg: 3,6,1,5,3 = P6, On only when Ch5 is high

Menu	Level 2	Level 3	Level 4	Level 5	Information
3	1-11 = P1-P11	2 = Single Action Latching <a href="#">latch1</a>	1-10 = R/C Channel	<b>Start off</b> P=0V, F=open 1 = ch low toggle 2 = ch high toggle <b>Start on</b> P=3.3V, F=closed 3 = ch low toggle 4 = ch mid toggle	1 R/C channel can control 1 or 2 outputs, each control action toggles the output on/off. (eg: 3,4,2,5,1 = P4, Start off, toggle when Ch5 is low) (eg: 3,6,2,5,2 = P6, Start off, toggle when Ch5 is high)
3	1-11 = P1-P11	3 = Dual Action Latching <a href="#">latch2</a>	1-10 = R/C Channel	<b>Channel high</b> 1 = >2s toggle 2 = <1s toggle <b>Channel low</b> 3 = >2s toggle 4 = <1s toggle	1 R/C channel can control 1 to 4 outputs. Output selection is based on the time that the control is away from mid value (centre). All outputs start off (P=0V, F=open).
3	1-11 = P1-P11	4 = Flash or Latch <a href="#">latch3</a>	1-10 = R/C Channel	<b>Channel high</b> 1 = <1s 0.5s momentary on 2 = <1s 1.0s momentary on 3 = <1s 1.5s momentary on 4 = <1s 2.0s momentary on <b>Channel low</b> 5 = <1s 0.5s momentary on 6 = <1s 1.0s momentary on 7 = <1s 1.5s momentary on 8 = <1s 2.0s momentary on	1 R/C channel can control 1 or 2 outputs with either momentary with a selection of on times or latching action. Momentary or latching selection is based on the time that the control is away from mid value (centre): <1s gives a momentary on, >2s latches; if the output is latched on the momentary action is disabled. All outputs start off (P=0V, F=open).
3	1-11 = P1-P11	5 = Auto Lights <a href="#">auto-lights</a>	1 = Forward 2 = Reverse 3 = Brake		Link output ports to the speed controller status. See 7,7 for setting brake light on time and 3,x,10 for setting the behaviour of the forward and reverse lights when stopped (default is on when stopped and should be changed to off when stopped for road vehicles).
3	1-11 = P1-P11	6 = Left Indicator & Hazard Light <a href="#">indicator-lights</a>	<b>Activation</b> 1-10 = R/C Channel	<b>Steering</b> 1-10 = R/C Channel	Indicator and Hazard Lights (level 3 = 5 or 6). A < 1s operation of the activating channel (high/left=left, low/right=right) starts an indicator flashing, movement of the steering channel away from centre cancels the indicator. A > 2s high/left operation of the activating channel starts both indicators flashing together as hazard lights. There may be only one left and one right indicator pin.
3	1-11 = P1-P11	7 = Right Indicator & Hazard Light <a href="#">indicator-lights</a>			See previous. An attempt to set right indicator without first setting a left indicator will result in a rapid CPU LED flash error.
3	1-11 = P1-P11	8 = Output Grouping <a href="#">output-groups</a>	0-9 = Group ID (0-flash = no group)	1 = Exclusive	Group P or F logic outputs to co-ordinate behaviour. The default is no grouping.
4 = General Configuration <a href="#">(top)</a>	1 = LED2 <a href="#">LED2</a>	1 = LED2 Disabled			Any output can drive a LED to mirror the on-board LED.  2-flash: enabled but not after Rx is deselected (Selecta) or Tx is switched off (Cruise Control)  3-flash: enabled for Selecta and

Menu	Level 2	Level 3	Level 4	Level 5	Cruise Control Information
		2 = LED2 Enabled (not deselected or cruise) 3 = LED2 Enabled when deselected or cruise 4 = LED2 Always	1-11 = P1-P11		4-flash: over-rides any other function on this pin (e.g. auto lights).
4	2 = LVC <a href="#">LVC</a>	1 = LVC Disabled 2 = LVC Auto  3 = LVC Manual	Manual threshold (volts): 4-10 = 4-10V	Manual threshold (tenths): 0-9 = 0.1-0.9V	Enable or disabled low voltage cut-off. 2-flash = LVC enabled with auto threshold, 3-flash = LVC enabled with manually set threshold. Levels 4 & 5 only apply to manual threshold.
4	3 = Sleep <a href="#">Sleep</a>	Time before sleep: 1-6 = 1-6 hours 7 = never	LVC sleep: 1 = No 2 = Yes (5 minutes)		Inactivity timeout (1-6 hours) LVC sleep is triggered by Low Voltage Cut (if enabled)
4	4 = Failsafe / Cruise <a href="#">Failsafe</a>	Time to stop after signal loss: 1-4 = 1-4s 5 = sleep time			Time to kill outputs after signal loss. Use 'Sleep time' (level 3 option 5) for 'cruise control' with transmitter switched off.
4	5 = Emergency stop <a href="#">EStop</a>	1 = Disabled 2 = ch low to stop 3 = ch high to stop	1-10 = R/C Channel	Time to stop: 1-6 = 1-6s	Manual trigger stop over radio (eg: 7,5,2,3,6 enabled using Ch3 low with 6s delay - i.e. Ch3 must be low for at least 6s to trigger.)
4	6 = ESC Arming <a href="#">Arming</a>	1 = Disabled 2 = Enabled	1 = H1		Arm the ESC only when the throttle is in the off position. Enabled by default. THINK CAREFULLY before you disable this feature.
4	7 = Brake On Time <a href="#">auto-lights</a>	1-6 = 1-6s			The time that the brake light stays on after stopping. The default is 1s.
4	8 = Selecta <a href="#">Selecta</a>	1 = Disabled 2 = Enabled	1-10 = R/C Channel		Enable or disable the loco selection feature which is compatible with all transmitters that have a Select switch. All transmitters stocked by Micron use R/C channel 2 for Selecta.
4	9 = Deselect Action <a href="#">Selecta</a>	1 = stop 2 = continue			Action when deselected: 'continue' or 'stop': continue - ESC continues at the last throttle setting. stop - throttle smoothly closes the default is 'continue'.
4	10 = Auto-light control <a href="#">auto-lights</a>	1 = Disabled 2 = Enabled	1-10 = R/C Channel	<b>Start off</b> 1 = toggle when ch low 2 = toggle when ch high 3 = momentary on when ch high <b>Start on</b> 4 = toggle when ch low 5 = toggle when ch high 6 = momentary off when ch high	Enable/disable the auto-direction outputs using an R/C channel. When this control is enabled, the initial state of auto-lights is disabled (i.e. off). Any other function mapping of the R/C channel remains - e.g. output on/off switching.
4	11 = Reset <a href="#">Reset</a>				Restore backed-up configuration or, if no backup, the factory configuration

Menu	Level 2	Level 3	Level 4	Level 5	Information
4	12 = Backup Configuration <a href="#">Backup</a>				Create configuration backup to be restored with a reset. A backup should be saved whenever the Rx configuration is changed by programming or using a power on jumper.
4	13 = Select Configuration <a href="#">Select Config</a>	1-4 = stored configuration			Select one of the stored configurations, See the receiver documentation for details of each configuration
4	14 = Show Firmware Version <a href="#">Version</a>				Show the firmware version by flashing the LED (and LED2 if enabled). Firmware versions are 2 numbers: major and minor (e.g. 1.2). 0.5s of rapid flashing is shown first, followed by a flash count for the major number, a pause and then a flash count for the minor number. A zero is shown as a very brief flash, much shorter than the normal flash. The pattern is repeated until the receiver is switched off.
5 = Radio Configuration <a href="#">(top)</a>	1 = Binding <a href="#">Bind</a>	1 = DSM2/DSMX Protocol	1 = auto 2 = manual		Choose auto or manual bind. The pins/pads for manual bind are specified in the receiver manual.
6 = Input <a href="#">(top)</a>	1-11 = P1-P11	1 = Buffer Stop Trigger <a href="#">buffer-stop</a>	Time to stop: 1-6 = 1-6 seconds		One P pad can be used as a trigger to stop the vehicle automatically by slowing to a stop. The throttle must be closed to restart. The trigger is enabled after the reactivation delay.
6	1-11 = P1-P11	2 = Stop & Reverse Trigger <a href="#">stop-reverse</a>	Time to stop: 1-6 = 1-6 seconds	<u>fixed pause</u> 1-6 = 4,8,15,30,45,60s <u>random pause</u> 7 = 4-8s 8 = 8-15s 9 = 15-30s 10 = 30-45s 11 = 45-60s 12 = 60-120s (1-2m) 13 = 120-300s (2-5m) 14 = 300-600s (5-10m)	One P pad can be used to stop the vehicle automatically by slowing to a stop. The vehicle reverses at the same speed after the pause time. If the vehicle is manually restarted by closing and then opening the throttle during the pause time, the restart is cancelled.
6	1-11 = P1-P11	3 = Station Stop Trigger <a href="#">station-stop</a>	Time to stop: 1-6 = 1-6 seconds	<u>pause time</u> as above	One P pad can be used to stop the vehicle automatically by slowing to a stop. The vehicle continues at the same speed and in the same direction after the pause time. If the vehicle is manually restarted by closing and then opening the throttle during the pause time, the restart is cancelled.
6	1-11 = P1-P11	4 = Not used			Placeholder for limit switch

Menu	Level 2	Level 3	Level 4	Level 5	Information
6	1-11 = P1-P11	5 = Reactivation Delay <a href="#">automation</a>	1-15 = 5 second increments		Set the delay before an input trigger is reactivated after being actioned. The default when setting an input type is 10 seconds (level 5 = 2). This program allows the delay to be specified in 5 second increments: 1 = 5 seconds, 4 = 20 seconds, 9 = 45 seconds, 15 = 75 seconds. Resetting the input type (level 3 = 1..3) resets the activation delay to 10 seconds.
6	1-11 = P1-P11	6 = Input Enable/Disable <a href="#">automation</a>	1-10 = R/C Channel	0 = disable control <u>Start Enabled</u> 1 = disable when ch low 2 = disable when ch high 3 = toggle when ch low 4 = toggle when ch high <u>Start Disabled</u> 5 = enable when ch low 6 = enable when ch high 7 = toggle when ch low 8 = toggle when ch high	All automation features are enabled by default. This function allows a transmitter control to over-ride this by: - disabling on receiver start - disabling or enabling while running The input type (options 1..4) must be programmed before this function. If the P port is not configured as input, an attempt to enter this program option will result in a rapid flash on the receiver LED. The actuating R/C channel may also be used for other functions - e.g. to light an LED to show the enable/disable state of automation.
6	1-11 = P1-P11	7 = Input Enable Indicator <a href="#">automation</a>	0 = disable 1-11 = P1-P11		This function allows a Rx output (F or P) to be used to indicate when the input is manually activated - e.g. to illuminate a LED. The program sequence is available only when the 'Input Enable/Disable' control has been programmed. Set the pin value (level 4) to zero to disable the indicator.