

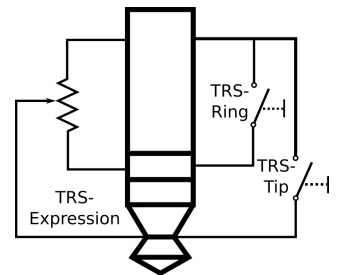
## Garbage Collector User Guide 2.1.0

The *Oscillator Devices Garbage Collector* is a MIDI controllable expression pedal and footswitch in one device. Effects devices with expression pedal inputs or inputs for external foot switches (e.g. tap tempo on guitar pedals) can be controlled automatically by the *Garbage Collector* via MIDI. It can emulate either a foot switch with *tip* and *ring* or an expression pedal on both outputs. The *Garbage Collector* can be synced to MIDI clock, allowing time-based effects to sync to either tap tempo or LFO waveforms. The MIDI channel is adjustable and complex switching functions can be combined in presets.



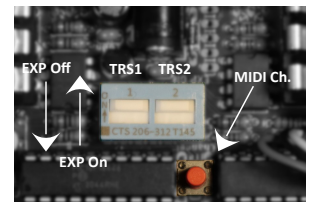
Dimensions:  
100 x 50 x 31 mm

- **TRS1/2:** Two 1/4 " stereo jack sockets. As switches, the *tip* and *ring* are open and close individually to the *sleeve*. As an expression out, the wiper is on the *tip* and connected to the *sleeve* and *ring* via the potentiometer. If the expression function is activated via MIDI command, the switch is automatically deactivated. If the switch is used, the expression function is automatically deactivated.
- **LED1/2:** Associated LEDs. With the switch function, the LEDs light up whenever the contact is closed. If the LED lights up green, the *tip* is connected to the *sleeve*, if it lights up red, the *ring* is connected to the *sleeve*. When using the expression function, the LED on the *heel* position lights up green, becomes darker towards the middle position and begins to light up red towards the *toe* position.
- **+V:** Power supply 9-18V. 2.1mm barrel connector, center negative. This corresponds to the standard "Boss-Style" power supply. Current consumption maximum 100mA.
- **MIDI In/Out:** The MIDI sockets are 1/8" stereo jack sockets and are assigned according to **MIDI TRS-Type A**. The MIDI Out functions as low latency MIDI Thru.

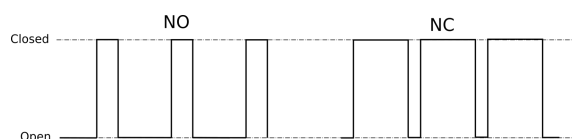


Signal	Funktion	MIDI TRS Type A	5-Pin DIN
MIDI Ref	Current Source	Ring	Pin 4
MIDI Sig	Current Sink	Tip	Pin 5
GND	Shield	Sleeve	Pin 2

**Caution:** In the delivery state, **under no circumstances should more than +5V and less than 0V be applied** to the TRS sockets. Otherwise the digital potentiometer would be destroyed. In order to switch higher voltages or AC voltages up to +60V, the blue dip switch for the corresponding TRS inside must be switched to the off position. This isolates the digital potentiometer from the circuit. In addition, the *sleeve* of the socket is separated from GND. In this way, the *Garbage Collector* can be used as an amp switcher, for example.



Most effects expect a switch that is open when idle and activated by a connection to the *sleeve*. But there are also manufacturers who, conversely, expect a closed switch for the idle state (e.g. Boss). In the case of commands that generate pulses, each command is therefore designed twice: **NO** (Normally Open) and **NC** (Normally Closed).



- **NO:** The impulse always ends openly. If the switch is closed at the beginning, it is only opened
- **NC:** The impulse always ends closed. If the switch is open at the beginning, it only closes.

# Function as Switch

CC 00 to CC 02 are commands that act on multiple switches at the same time. CC 00 act on all switches, CC 01 only on TRS1, CC 02 only on TRS2.

CC	#	TRS1-Tip	TRS1-Ring	TRS2-Tip	TRS2-Ring
00	00	Open	Open	Open	Open
00	01	Closed	Open	Open	Open
00	02	Open	Closed	Open	Open
00	03	Closed	Closed	Open	Open
00	04	Open	Open	Closed	Open
00	05	Closed	Open	Closed	Open
00	06	Open	Closed	Closed	Open
00	07	Closed	Closed	Closed	Open
00	08	Open	Open	Open	Closed
00	09	Closed	Open	Open	Closed
00	10	Open	Closed	Open	Closed
00	11	Closed	Closed	Open	Closed
00	12	Open	Open	Closed	Closed
00	13	Closed	Open	Closed	Closed
00	14	Open	Closed	Closed	Closed
00	15	Closed	Closed	Closed	Closed

CC	#	TRS1-Tip	TRS1-Ring
01	00	Open	Open
01	01	Closed	Open
01	02	Open	Closed
01	03	Closed	Closed
01	04	Pulse NO	Pulse NO
01	05	Pulse NC	Pulse NC

CC	#	TRS2-Tip	TRS2-Ring
02	00	Open	Open
02	01	Closed	Open
02	02	Open	Closed
02	03	Closed	Closed
02	04	Pulse NO	Pulse NO
02	05	Pulse NC	Pulse NC

CC 10 (TRS1-Tip), CC 20 (TRS1-Ring), CC30 (TRS2-Tip), CC 40 (TRS2-Ring) only act on one switch at a time.

CC					Function				
TRS1-Tip	TRS1-Ring	TRS2-Tip	TRS2-Ring	#	Basic functions and NO	#	NC	#	Toggle
10	20	30	40	00	Set „Open“				
				01	Set „Closed“				
				02	Single Pulse NO				
				03	Single Pulse NC				
				4	Toggle (Open → Close/Close → Open)				
				10	Pulse NO MIDI clock 1/4	30	Pulse NC MIDI clock 1/4	50	Toggle MIDI clock 1/4
				11	Pulse NO MIDI clock 1/8	31	Pulse NC MIDI clock 1/8	51	Toggle MIDI clock 1/8
				12	Pulse NO MIDI clock triplets	32	Pulse NC MIDI clock triplets	52	Toggle MIDI clock triplets
				13	Pulse NO MIDI clock 1/16	33	Pulse NC MIDI clock 1/16	53	Toggle MIDI clock 1/16
				14	Pulse NO MIDI clock dotted 1/8	34	Pulse NC MIDI clock dotted 1/8	54	Toggle MIDI clock dotted 1/8
				15	Pulse NO MIDI clock 1/32	35	Pulse NC MIDI clock 1/32	55	Toggle MIDI clock 1/32
				16	Pulse NO MIDI clock 1/2	36	Pulse NC MIDI clock 1/2	56	Toggle MIDI clock 1/2
				17	Pulse NO MIDI clk every whole note	37	Pulse NC MIDI clk every whole note	57	Toggle MIDI clock every whole note
				18	Pulse NO MIDI clk every 2nd whole note	38	Pulse NC MIDI clk every 2nd whole note	58	Toggle MIDI clock every 2nd note
				19	Pulse NO MIDI clk every 3rd whole note	39	Pulse NC MIDI clk every 3rd whole note	59	Toggle MIDI clock every 3rd note
				20	Pulse NO MIDI clk every 4th whole note	40	Pulse NC MIDI clk every 4th whole note	60	Toggle MIDI clock every 4th note
				21	Pulse NO MIDI clk every 5th whole note	41	Pulse NC MIDI clk every 5th whole note	61	Toggle MIDI clock every 5th note
				22	Pulse NO MIDI clk every 6th whole note	42	Pulse NC MIDI clk every 6th whole note	62	Toggle MIDI clock every 6th note
				23	Pulse NO MIDI clk every 7th whole note	43	Pulse NC MIDI clk every 7th whole note	63	Toggle MIDI clock every 7th note
				24	Pulse NO MIDI clk every 8th whole note	44	Pulse NC MIDI clk every 8th whole note	64	Toggle MIDI clock every 8th note

## Pulses

It is also possible to send a certain number of pulses, e.g. to select a preset. This is also possible as *NO* and *NC*.

CC					Function
TRS1-Tip	TRS1-Ring	TRS2-Tip	TRS2-Ring	#	
11	21	31	41	0	1 Pulse NO
				1	2 Pulses NO
				2	3 Pulses NO
				n	n+1 Pulses NO
				126	127 Pulses NO
				127	128 Pulses NO

CC					Function
TRS1-Tip	TRS1-Ring	TRS2-Tip	TRS2-Ring	#	
12	22	32	42	0	1 Pulse NC
				1	2 Pulses NC
				2	3 Pulses NC
				n	n+1 Pulses NC
				126	127 Pulses NC
				127	128 Pulses NC

## MIDI clock pulse

Some effects with Tap Tempo are sensitive to the Tap Tempo Pulse being sent continuously. Therefore there is the possibility to send the clock only for a limited number of pulses until the effect has recognized the clock. This is also possible as *NO* and *NC*.

CC					Function
TRS1-Tip	TRS1-Ring	TRS2-Tip	TRS2-Ring	#	
13	23	33	43	0-19	1-20 pulses NO MIDI clock 1/4
				20-39	1-20 pulses NO MIDI clock 1/8
				40-59	1-20 pulse NO MIDI clock triplets
				60-79	1-20 pulses NO MIDI clock 1/16
				80-99	1-20 pulses NO MIDI clock dot. 1/8
				100-119	1-20 pulses NO MIDI clock 1/32

CC					Function
TRS1-Tip	TRS1-Ring	TRS2-Tip	TRS2-Ring	#	
14	24	34	44	0-19	1-20 pulses NC MIDI clock 1/4
				20-39	1-20 pulses NC MIDI clock 1/8
				40-59	1-20 pulses NC MIDI clock triplets
				60-79	1-20 pulses NC MIDI clock 1/16
				80-99	1-20 pulses NC MIDI clock dot. 1/8
				100-119	1-20 pulses NC MIDI clock 1/32

## Pulse length

The standard length of a pulse is approx. 80 ms. This can be too short for some devices, or too long for fast switching applications. Therefore the pulse length can be set in 10ms steps.

CC					Function
TRS1-Tip	TRS1-Ring	TRS2-Tip	TRS2-Ring	#	
15	25	35	45	n	Pulse length in 10ms steps

# Function as Expression

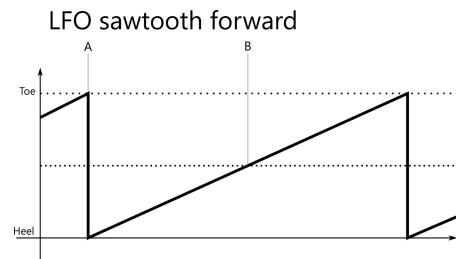
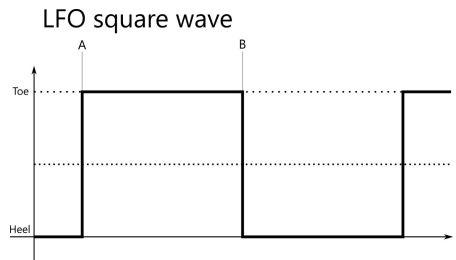
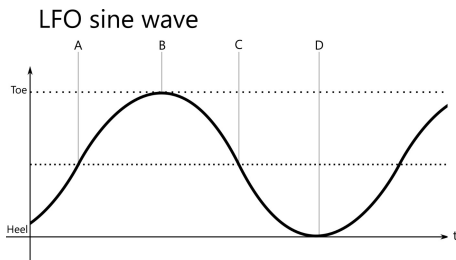
The following commands apply to the use of TRS1/2 as expression out. The change from switch to expression and back is done automatically. The expression out has 256 steps. Command 16/17 or 36/37 distributes the entire area over 128 steps. The high-resolution commands 18/38 and 19/39 can be used to set an precise value.

CC			Function
TRS1 (EXP1)	TRS2 (EXP2)	#	
16	36	0-127	Expression out from heel (0) to toe (127)
17	37	0-127	Expression out from toe (0) to heel (127)
18	38	0-127	Expression out from heel (0) to middle position (127)
19	39	0-127	Expression out from middle position (0) to toe (127)

# LFO Waveforms

The *Garbage Collector* has an internal, MIDI clock synchronous, LFO engine with 3 waveforms to drive the Expression.

CC			Function	#	Function
TRS1 (EXP1)	TRS2 (EXP2)	#			
26	46	0	Stop LFO	50	LFO square wave with starting point A
		1	Restart LFO	60	LFO square wave with starting point B
		10	LFO sine wave with starting point A	90	LFO sawtooth forward with starting point A
		20	LFO sine wave with starting point B	100	LFO sawtooth forward with starting point B
		30	LFO sine wave with starting point C	110	LFO sawtooth backward with starting point C
		40	LFO sine wave with starting point D	120	LFO sawtooth backward with starting point D



The LFO starts immediately at the specified starting point. Resending the commands will reset the engine to start over from the starting point.

## LFO Speed

The speed of the LFO relative to MIDI clock can be increased or decreased. The commands above perform one pass of the waveform per 1/4 note. The commands to change the speed are determined by adding to the basic command (CC 60 10, CC 60 20 etc.).

- Basic Command: Normal speed
- Basic Command+1: Half speed
- Basic Command+2: Double speed
- Basic Command+3: Quarter speed
- Basic Command+4: Quadruple speed

For example:

CC			Function
TRS1 (EXP1)	TRS2 (EXP2)	#	
26	46	10	LFO sine wave with starting point A, speed normal (1/4 Note)
		11	LFO sine wave with starting point A, half speed (1/2 Note)
		12	LFO sine wave with starting point A, double speed (1/8 Note)
		13	LFO sine wave with starting point A, quarter speed (Ganze Note)
		14	LFO sine wave with starting point A, quadruple speed (1/16 Note)

This procedure can be applied to all waveforms and starting points. E.g. rectangle with starting point B in 1/8 notes: CC 26 62 or CC 46 62

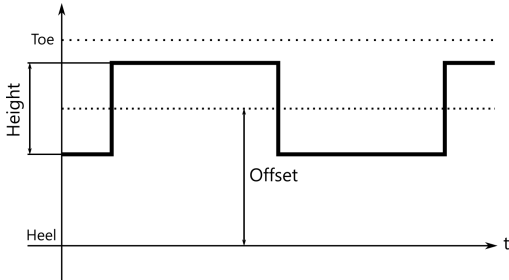
## LFO Parameter

The waveforms set this way always run through the entire range, from heel to toe. The range can be reduced and the center point moved.

The waveforms are shifted in 13 steps, with step 6 being the the waveform in the middle. This corresponds to the *Offset* in the graphic.

CC			Function
TRS1 (EXP1)	TRS2 (EXP2)	#	
27	47	00	Offset 0. The middle of the waveform is at Heel
		60	Offset middle: The middle of the waveform is right between the heel and toe (default)
		120	Offset Max: The middle of the waveform is at Toe

All values in increments of 10 are valid.



In addition to the shift, the height of the waveforms can also be restricted. This corresponds to *Height* in the graphic. As with command CC 26/46, this parameter is calculated by addition to the basic command.

- Basic Command: Normal Height
- Base Command+1: Half Height
- Base Command+2: Quarter Height
- Base Command+7: Height 1/128

For example:

CC			Function
TRS1 (EXP1)	TRS1 (EXP1)	#	
27	47	60	No constraint on height, waveform sweeps full range (default)
		61	Waveform height halved
		62	Waveform height 1/4
		63	Waveform height 1/8
		...	
		67	Waveform height 1/128

The *Offset* and *Height* settings are global, so they persist across a new waveform. Reset with CC 27 60 or CC 47 60.

## Presets

It is possible to save 16 configurations and call them up with Program Change (PC) commands. The last command that was called is saved for each channel. The exception is the pulse length, which is also always saved. With the command CC 03, TRS1 and TRS2 are saved together; with the commands 04 and 05, TRS1 and TRS2 can be saved separately. The TRS that has not been saved in each case remains unchanged when the preset is called up. A preset can be deleted with CC 06.

CC		Function
03	0-15	Save the last command from TRS1 and TRS2 to memory location 0-15
04	0-15	Save the last command from TRS1 to memory location 0-15
05	0-15	Save the last command from TRS2 to memory location 0-15
06	0-15	Deleting the preset on memory location 0-15

To recall the saved presets, the corresponding number is sent as a Program Change (PC).

**ATTENTION:** Preset 0 is the startup state that is called when the device is switched on.

# MIDI Channel

The **Garbage Collector** ships in omni mode (i.e. it responds to every channel).

The **Garbage Collector's** MIDI channel can be set in two ways. With a MIDI command or a switch inside the housing (see picture on side 1).

To change the MIDI channel via MIDI, the following commands are sent directly one after the other.

CC		Function
127	0-16	Set MIDI channel 1-16, 0 for Omni
127	127	Saving the MIDI channel. The Device restarts.

To change the MIDI channel using the built-in switch, follow the steps below

1. Disconnect the device from the power supply
2. Remove the bottom plate. To do this, remove the 4 screws.
3. There is a button inside. Carefully press this button and restore the power supply while it is pressed. Be careful not to touch the electronics.
4. After the boot process is complete, the device starts to flash (LED1 green). Press the button according to the number of the desired channel (e.g. twice for channel 2). The **Garbage Collector** acknowledges this by emitting short flashing pulses corresponding to the number of the channel.
5. Once the desired channel is set, press the button and hold it down until the **Garbage Collector** switches off entirely.
6. Disconnect the supply voltage and mount the bottom plate. The next time it is started, the **Garbage Collector** reacts to the selected MIDI channel.

To put the **Garbage Collector** in omni mode skip step 4.

## Applications

**DigiTech FS 3X:** To emulate a DigiTech FS 3X switch, the following commands are sent (for TRS1)

Function FS 3X	Function TRS	CC commands	Description
Mode	Tip to GND	CC 10 02	A single pulse on the tip emulates a non-latching button press on Mode
Down	Ring to GND	CC 20 02	A single pulse on the ring emulates a non-latching button press on Down
Up	Tip and ring to GND	CC 10 02 + CC 20 02	Individual pulses at the tip and ring emulate non-latching button presses on Up

**DOD Rubberneck:** The foot switch input of the Rubberneck is matched to the above FS 3X switch. The following options

Function	Function FS 3X	CC commands	Description
Modulation on/off	Press button down	CC 20 02	A single pulse on the ring toggles the modulation
Rubbernecking	Press and Hold button up	CC 10 01 activate, CC 10 00 deactivate	Closed state activates rubbernecking, Open state deactivates
Tap tempo	Tap button up	CC 10 02 + CC 20 02 or CC 01 04	Single pulse activates Tap Tempo
Tap tempo with MIDI clock	Tap button up	CC 10 10 + CC 20 10	A pulse on tip and ring is triggered every ¼ note MIDI clock

**Strymon El Capistan:** The EXP socket can either be used to call up the favorite setting or to set the tempo. (Requires different configuration of the El Capistan)

Function El Capistan	Function TRS	CC commands	Description
Call up favorite	Tip closed	CC 10 01	A closed line on the tip calls up the favorites setting
Call up live mode	Tip open	CC 10 00	An open line at the tip changes back to live mode
Control tempo	Expression out	CC 16 00...CC 16 127	Expression out controls the tempo. The El Capistan must be configured for this

**Walrus Monument Tremolo:** Depending on the jumper setting of the Monument, tap tempo manually, via MIDI clock, or expression out

Funktion Monument	Funktion TRS	CC Kommandos	Beschreibung
Tap tempo	Pulse NO at tip	CC 10 02	Repeating pulses on the tip synchronize with the tap tempo
Tap tempo with MIDI clock	Pulse NO at tip with MIDI Clock 1/4	CC 10 10	Repeating pulses in time with MIDI Clock ¼ synchronize to the tap tempo
Tremolo speed	Expression out	CC 16 00 ... CC 16 127	Tremolo speed starting at slowest (CC 16 00) ending with fastest (CC 16 127)