

USER MANUAL - v1  
MODOR DIGITAL DRUM SYNTHESIZER



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## Getting Started . . .

### 1.1 Overview

Thanks for buying a Modor DR-2!

The DR-2 is a digital 6 instrument drum machine with a 128 32nd note step sequencer. Soundwise, the DR-2's digital drum models offer a lot of sound sculpting flexibility. It is not based on samples or analog circuits, the DR-2 is actually a real digital DSP drum synthesizer. It has the sound editing knobs like on a synthesizer, but with digital synthesis algorithms that are aimed towards drum synthesis.

The DR-2 also has extensive sequencing possibilities. It has a 32nd-note resolution and there is the possibility to program accents, flams (double hits) and tuplets (multiple hits), silences (breaks) and reversing (backwards running) drum sounds.

### 1.2 Patterns, songs and drumsets

The Modor DR-2 has an internal sequencer, that plays PATTERN or SONG structures, controlling the internal drum synthesizer. The synthesizer creates drum sounds using the sound parameters stored in DRUMSETS. These are the 3 different kinds of 'data structures' you'll meet working with the DR-2.

- A PATTERN is the collection of (up to) 128 steps of sequencer data of the six instruments, including accents, flams, breaks and reverse notes.
- A SONG is a string or loop of up to 112 patterns.
- A DRUMSET is a set of sound synthesis parameters for the six drum instruments A-F.

So, the DR-2 consists of two main components: the drum *synthesizer*, and the drum *sequencer*. The internal drum synthesizer and its drumsets, are not related to the internal sequencer and its patterns and songs. So you can play any pattern or song using any drumset. But also, this means after restarting your DR-2 you'll have to load both the pattern/song and the drumset separately to restart where you left before. If you save a pattern or song after editing, the drumset is *not* saved along. You have to save it separately if you want to store it!

By pressing the PATTERN, SONG or DRUMSET buttons, you go into pattern, song or drumset mode. This is important in the menu for loading, saving, initialising and renaming items.

## 1.3 Connections

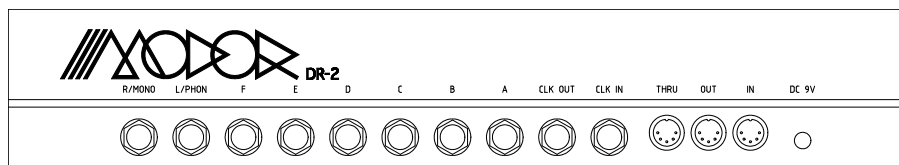
Before you can start playing the Modor DR-2 a few connections have to be made. This chapter is written to help you make the first connections so that you can immediately start playing your instrument. By following these instructions, you will have your Modor drum machine up and running in a few minutes time.

**Main Audio Connections** The main stereo output of the Modor DR-2 is found on the L/PHON and R/MONO connectors on the backside of the instrument. Connect the DR-2 to an external amplifier or mixing device with two mono 6mm jack cables. The external amplifier or mixing device should be switched off before making this connection, and only be switched on after the connection has been made to prevent damage to the equipment.

You can also connect headphones to the L/PHON audio connector with a 6mm TRS-connector. The signal is strong enough to drive a pair of headphones, although it may be not loud enough to be used in noisy environments.

**Channel Audio Connections** The Modor DR-2 has six drum channels that can be sent to the main L/R mix, but can also be sent out using the A-F connectors on the backside. If you insert a mono 6mm jack connector into one of these connectors, this channel is taken out of the main stereo mix on the L/R connectors and can be treated separately on an external mixing desk.

However, these connectors can also be used as so-called 'insert' points. Using a 6mm TRS connector you can send a channel out for external treatment, some effect for example, and have it returned back into the DR-2. It then passes the stereo panning and is mixed into the main L/R output.



**Clock Synchronisation** The DR-2 has CLK IN and CLK OUT connectors for 24PPQN clock signals. You can use the DR-2 as a clock master or clock slave to synchronise with other systems.

**MIDI Connection** The DR-2 has an internal drum sequencer, but it can also be controlled by an external keyboard or (computer) sequencer via a MIDI connection. Chapter 6 indicates which notes (note numbers) to send. Connect the MIDI output of this external midi source to the MIDI IN connector on the backside of the Modor DR-2.

The patterns generated by the internal sequencer, can also be sent out via the MIDI OUT connector as MIDI note messages, along with the knob movements of the sound parameters as MIDI control messages.

**Power Connection** Finally, the Modor DR-2 has to receive power via the power connector. Connect the adaptor, and turn the volume knob (POW/VOL) on the upper left corner of the front panel clockwise to get the instrument running. Theoretically, any 9V DC-adaptor with 9W power (1000mA) will be sufficient, but there are many DC-adaptors around providing unstable or even plain wrong electrical tensions. Only use the DC-adaptor delivered with the Modor DR-2 or refer to a specialised electronics dealer. Damage to the instrument caused by using a wrong adaptor is excluded from any warranty regulation.

## 1.4 Pattern programming

Programming basic patterns on the DR-2 is quite simple. Push the A-F buttons to select an instrument and hit the 1-16 buttons to toggle drum hits. Then press play to hear the pattern you programmed. That's the basic pattern programming as can be found on many classic drum machines. You can also live record patterns by pushing REC and PLAY, and then playing the A-F buttons along. However, there is more about pattern programming on the DR-2:



**Accents** can be programmed by keeping the ACC button pressed while programming drum hits with the 1-16 buttons.

**Accents** can also be programmed in a separate accent track for all instruments simultaneously. Just press the ACC button to access the accent track.



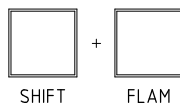
**Reverses** can be programmed by keeping the REV button pressed and hitting 1-16.



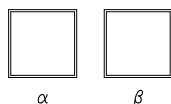
**Breaks** or instrument silences can be programmed by keeping the BREAK button pressed and hitting 1-16.



**Flams** or double hits can be programmed by keeping the FLAM button pressed and hitting 1-16. .



**Tuplets** or multiple hits can be programmed by keeping the SHIFT+FLAM buttons pressed and hitting 1-16.



**β-variations** Every instrument has two separate tracks to program  $\alpha$  and  $\beta$  drum hits. The  $\alpha$  and  $\beta$  drum sounds are identical, except for one sound parameter.

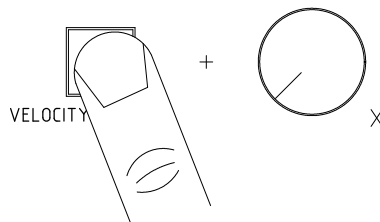
- Set the reverse delay with REV+(SWING/)VALUE
- Set the flam speed with FLAM+(SWING/)VALUE

- Set the tuplet balance, number and speed with SHIFT+FLAM+Y/Z/T

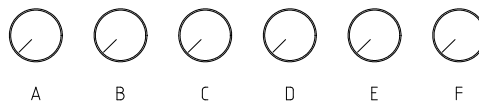
## 1.5 Modulations

You can bring a lot more 'life' in your drum riffs by using modulations that avoid every drum to sound exactly identical. There are 4 different ways of modulation:

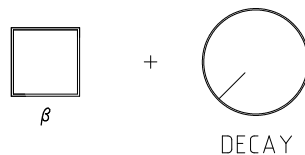
- Velocity or accents: keep the VELOCITY button pressed and turn one of a drum's parameter knobs. Now this parameter is connected to velocity modulation. When playing notes with different velocity or accent you'll hear a difference in sound. Velocity can be connected to the volume parameter and one extra parameter per drum. Double click VELOCITY to remove this extra modulation.



- Random: press the RANDOM button and turn one of a drum's parameter knobs. Now you'll hear a random variation of this parameter with every drum hit. Random can be connected to one parameter per drum. Double click RANDOM to remove this modulation.
- Definable: press the DEF button and turn one of a drum's parameter knobs. Now the DEF-knob above the instrument's slider can be used to vary this parameter. Definable knobs can be connected to one parameter per drum. Double click DEF to remove this modulation.



- Alpha/Beta: press the  $\beta$ -button and turn one of a drum's parameter knobs. Now you have a  $\beta$ -variation of this instrument.  $\beta$ -variations can be connected to one parameter per drum. The sequencer has separate tracks for the  $\alpha$  and  $\beta$  variations, press  $\alpha$  or  $\beta$  to program  $\alpha/\beta$  drum hits.



## 1.6 Menu navigation

The menu of the Modor DR-2 consists of 7 menu items. When the MENU/YES button is hit you enter the menu, and the first menu item is shown on the upper display line.



## 1.7. LOADING PATTERNS, SONGS AND DRUMSETS. GETTING STARTED ...

A black dot starts running from right to left over the display. By pressing MENU/YES again before the dot reaches the left side of the screen, the next menu item is selected. If you stop hitting MENU/YES, after about 1 sec the black dot reaches the left side of the display, and you enter the indicated menu. Following menus can be entered:

1. LOAD: Load a pattern, drumset or song from internal memory
2. SAVE: Save a pattern, drumset or song into the internal memory
3. NAME: Give your pattern, drumset or song a name
4. COPY: An easy way to copy data between different parts of a pattern, or different instruments in a drumset.
5. INIT: Initialize a pattern, drumset or song
6. SONG EDIT: Edit the order of patterns in a song.
7. SYSTEM SETTINGS: To set some global system parameters
8. MIDI DUMP: Dump the memory contents of the DR-2 using Midi Sysex messages

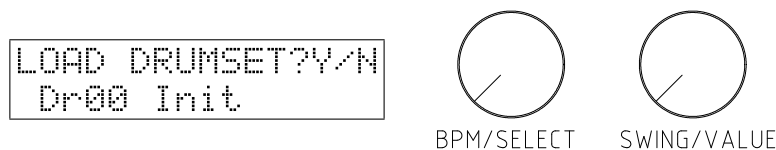
Next, after entering a certain menu, data can be selected and altered using the SELECT(BPM) encoder and VALUE(/SWING) control. Sometimes you need to validate your choice by pressing the MENU/YES button again, or you might need to cancel your choice by using EXIT/NO. While in the menu, on any moment you can press EXIT/NO to cancel and leave the menu. A full item-by-item reference of the complete menu can be found in chapter 5.

Note: the SONG EDIT menu can only be entered when you are in Song mode, it is skipped otherwise. Press the SONG button to get into song mode. You can also doubleclick the SONG button as a shortcut to the SONG EDIT menu.

## 1.7 Loading patterns, songs and drumsets

### 1.7.1 ... from the menu

Press PATTERN, SONG or DRUMSET, hit the MENU/YES button 1 time and wait 2 seconds to enter the LOAD menu. You should see the following screen: On the first line you see "LOAD" to indicate you are in the LOAD menu and PATTERN, SONG or DRUMSET to indicate in which mode you are. On the second line you see the active pattern, song or drumset number and name.



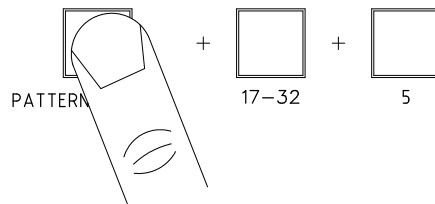
You can now scan through all the available patterns, songs or drumsets in the Modor's memory using the SELECT and VALUE controls. Confirm your choice with SRC/YES.

If you are loading drumsets, the selected drumset can be heard when playing the DR-2. This way you can listen to the drumsets in the memory without losing your actual work, and compare your active drumset to any drumset in the Modor DR-2's memory.

You can push DEST/NO at any time to cancel the load operation and return to the situation where you left before.

### 1.7.2 ... from the frontpanel

However, there is a much easier and more straightforward way to load patterns, songs and drumsets. Keep the PATTERN, SONG or DRUMSET button pressed, while you hit one of the 1-16, 17-32, 33-48, 49-64 buttons and then one of the 1-16 step buttons. For example [PATTERN] + 17-32 + 5 loads pattern Pt21 (16+5). [DRUMSET] + 33-48 + 13 loads drumset Dr45 (32+13). That's a lot quicker to switch between drumsets, patterns or songs. The downside of this for drumsets is that your actual drumset gets immediately overwritten, you can't use it to compare your actual drumset to a stored drumset in memory.



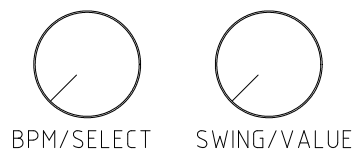
## 1.8 Saving patterns, songs and drumsets

Saving goes more or less identically to menu loading: now press the MENU button twice within one second to enter the SAVE menu. Select a slot in the memory using the SELECT and/or VALUE controls. This slot will be overwritten with the actual pattern, song or drumset if you now hit SRC/YES to confirm.

When you play the DR-2 during the save operation for drumsets, you can hear the drumset in the Modor DR-2's memory that's about to be overwritten. This way you can check which memory position can be overwritten before actually doing it.

Hitting DEST/NO at any time cancels the save operation and exits the menu of the Modor DR-2.

```
SAVE PATTERN?Y/N
A00 Init
```



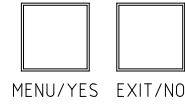
## 1.9 Initialisation

How to reinitialise the actual drumset or pattern? If you want to start building up a new drumset completely from scratch, this might be helpful. Select Pattern/Drumset/Song with the respective button, and quickly hit the MENU/YES button four times to select the INIT-menu and wait one second to select it (the black dot reaches the left side of the screen). Confirm with SRC/YES (or cancel with DEST/NO).

```

DRUMSET INIT
Initialise? Y/N

```



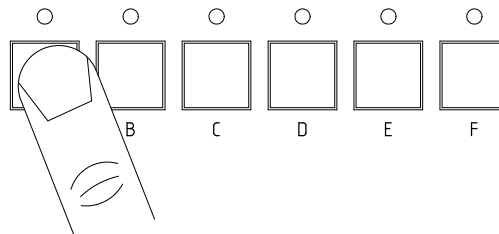
When you initialise a drumset, you get a simple straightforward techno orientated drumset with a bassdrum, claps, hihat, snaredrum, rimshot and cymbal. Upon initialisation of a pattern, you get a very simple four-on-the-floor pattern in steps 1-16. An initialised song will contain nothing but a list of patterns all set to pattern Pt00.

## 1.10 Fingerdrumming...

The DR-2 is about programming drum sequences, it's not really built for 'live' electronic finger drumming, the buttons aren't built for that. However, you can check the sounds in a drumset by pressing the A..F buttons.

The A..F buttons are not velocity sensitive however. But you can check what it sounds like when accented, by holding ACC down while playing A..F. The same goes for flams, triplets, breaks and reverses. Hold down the appropriate buttons while playing A..F.

Fingerdrumming works when the sequencer is not playing, or when it's recording. When playing, there are two playing 'modes', that can be toggled with the PLAY button. If you can't hear the sounds when hitting the A..F buttons, press PLAY once more.



## 1.11 Key combinations

The DR-2 has a number of key and knob combinations to make things faster and easier. Try the combinations in the table below, to get accustomed to what all these different keys and knobs can do.

PATTERN (+ 1-16/.../49-64) + 1...16	Load Pattern
DRUMSET (+ 1-16/.../49-64) + 1...16	Load Drumset
SONG (+ 1-16/.../49-64) + 1...16	Load Song
REV (+16/32) + 1...16	Toggle Note Reverse
BREAK (+16/32) + 1...16	Toggle Note Break
FLAM (+16/32) + 1...16	Toggle Flam
SHIFT+FLAM (+16/32) + 1...16	Toggle Triplet

16/32 + 1...16	Toggle 32nd Notes
SHIFT + 1...16	Set Number of Pattern Parts
SHIFT + 1-16/.../49-64	Set Pattern Length
SHIFT + A...F	Mute/Unmute Instrument
VELOCITY + Knob	Set Velocity/Accent Parameter and Amount
RANDOM + Knob	Set Random Parameter and Amount
DEF + Knob	Set Definable Parameter and Amount
BETA + Knob	Set Beta Parameter
SHIFT + Knob	Inspect Parameter without changing it
16/32 + SWING/VALUE	Set 32nd Note Swing
FLAM + SWING/VALUE	Set Flam Time
REV + SWING/VALUE	Set Reverse Delay
SHIFT + FLAM + Y	Set Triplet Velocity Balance
SHIFT + FLAM + Z	Set Triplet Retrig Number
SHIFT + FLAM + T	Set Triplet Retrig Time
Double Click VELOCITY	Remove Velocity Parameter and Amount
Double Click DEF	Remove Definable Parameter and Amount
Double Click RANDOM	Remove Random Parameter and Amount
Double Click SONG	Shortcut to Song Edit
DEF + A...F	Delete an instrument's pattern track
RANDOM + A...F	Randomise an instrument's pattern track

## 2.1 Structure of the DR-2

The Modor DR-2 has 2 main components: a drum sequencer and a drum synthesizer, working more or less independently from each other. The sequencer is a classic step sequencer able of playing 64 16th notes, or 128 32nd notes per pattern for each of the 6 drum instruments (A..F) of the drum synthesizer. The drum synthesizer can also be played using external gear connected to MIDI IN.

Each of the 6 (A..F) drum instruments or drum channels from the drum synthesizer has a separate output or insert connector at the backside of the DR-2. This can be used to send each channel separately to external mixing gear, or to treat it with external effect gear and return it into the DR-2. After that, there's a panning, a mixer and output amp.

For each of the 6 instruments or channels of the DR-2 a drum synthesis algorithm can be chosen. There are algorithms for bassdrums, snaredrums, cymbals, claps, ... These algorithms can be chosen independently. If you want a drumset with 6 different snaredrums, just do it. It's up to you to decide which instruments you want in your DR-2 drumset.

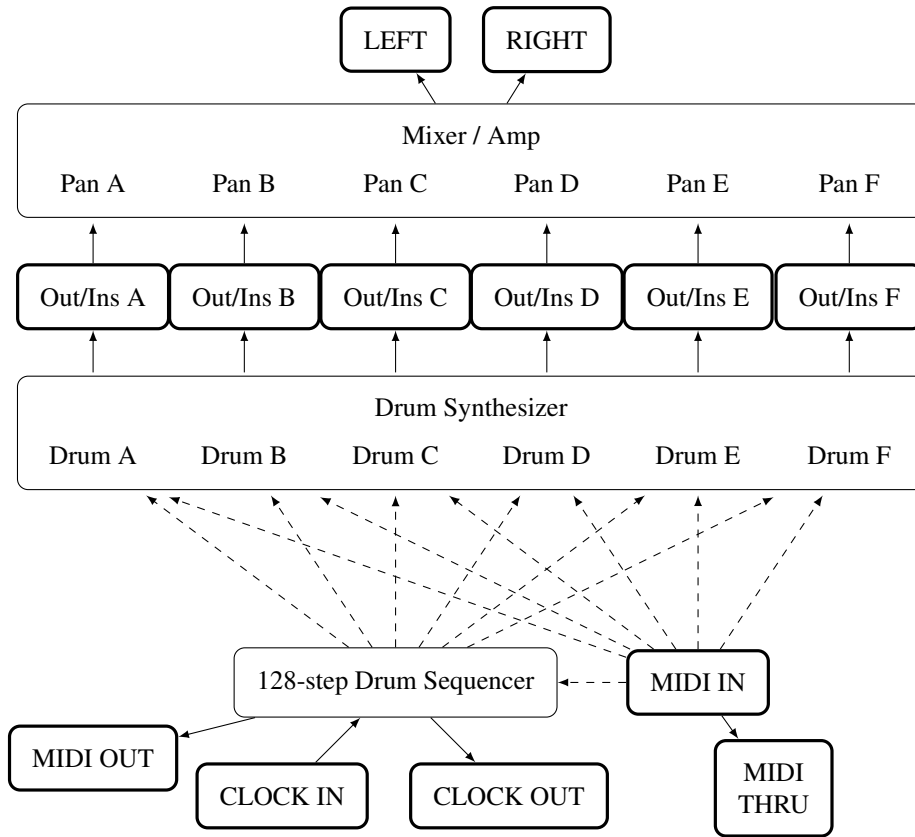
Each instrument of the DR-2 drum synthesizer can have up to 12 drum parameters:

- Pitch, with a pitch envelope decay, amount and curve
- Volume, with an amp envelope decay and curve.
- Pan
- X, Y, Z and T parameters, different for each drum algorithm.

Each of these 12 parameters has it's own control knob on the DR-2's frontpanel. Select one of the 6 drum instruments with the A..F buttons below the sliders, and turn the knobs to alter it's sound.

## 2.2 Patterns, songs and drumsets

Pattern, song and drumset modes can be selected using the respective PATTERN, SONG and DRUMSET buttons. These modes mainly affect the menu. Outside of



the menu, the influence of the active mode is limited. Select Pattern, Song or Drumset mode to load, save, rename or initialise patterns, songs or drumsets.

However, selecting Song mode has a different influence. When in Song mode, the sequencer doesn't repeat the same pattern over and over again. It plays a list of patterns in a single movement or in a loop. When at the end of one pattern, the sequencer jumps to the next pattern in the list. The main difference now, is that eventual changes to the playing pattern made with the 1..16 STEP buttons are discarded when moving on to the next pattern. First, carefully design your song's patterns, before combining them into a song. Or, when changing things in a song's pattern, save it first in pattern mode, before moving on.

Every pattern has its own BPM, Swing, Swing32 and Flam and Reverse timings. When playing in Song mode however, these pattern parameters are overridden by the Song BPM, Swing and timing settings. So you can share patterns between different songs, each song will play the pattern in its own way.

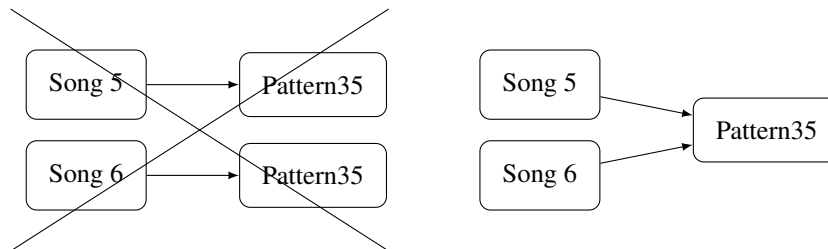
The same thing happens in Pattern mode, when switching between patterns without stopping the sequencer. If you load a new pattern while the sequencer is playing, it switches to the new pattern after the actual pattern has ended. The pattern's own BPM, swing and timing settings are overridden with the actual playing settings.

## 2.3 Flash memory

The DR-2's internal flash memory has space for:

- 64 Drumsets (0..64) of 6 instruments
- 96 Patterns (0..96) of up to 128 32nd note steps
- 32 songs (0..32) of up to 112 pattern numbers.

Caution: A pattern and a song are 2 different things, that are stored separately in the DR-2's memory. A song does not 'contain' it's patterns, it only refers to pattern numbers. For example, imagine song Sn05 and song Sn06 both contain pattern number Pt35. If you change and store pattern Pt35 (in pattern mode), then both songs Sn05 and Sn06 (in song mode) will have changed.

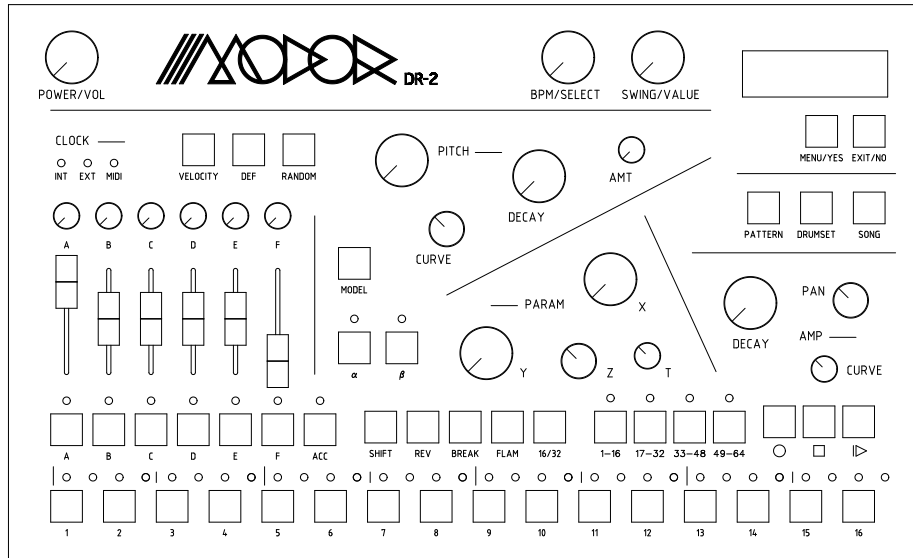


## 2.4 Frontpanel overview

You can find 18 rotary knobs, 6 slider knobs and 46 pushbuttons on the frontpanel of the Modor DR-2.

In a short overview, following controls are found:

- MENU/YES and EXIT/NO menu buttons.
- PATTERN button to select pattern mode.
- DRUMSET button to select drumset mode.
- SONG button to select song mode.
- Drum synthesizer, chapter 3
  - 6 volume sliders A..F [0, 127]
  - 6 definable knobs A..F [0, 127] to control 1 user selectable sound parameter per instrument.
  - MODEL button to select the drum synthesis model (or algorithm)
  - PITCH control [0,127]. The precise effect is depending on the active drum model
  - pitch env DECAY control [0, 127]
  - pitch env AMOUNT control [0, 127]
  - pitch env CURVE control [0, 127]
  - X control [0, 127]
  - Y control [0, 127]
  - Z control [0, 127]
  - T control [0, 127]
  - amp env DECAY [0,127]



- amp env CURVE [0,127]
- PAN [-64, +63]
- $\beta$  button to set 1  $\beta$  modulation per instrument
- VELOCITY button to set velocity (or accent) modulations
- DEF button to set 1 definable parameter per instrument to be controlled by the definable knobs A..F
- RANDOM button to set 1 random parameter modulation per instrument
- Drum sequencer, chapter 4
  - 6 channel or instrument selection buttons A..F
  - 1 accent channel selection button
  - RECORD, PLAY and STOP buttons
  - $\alpha$  and  $\beta$  buttons to program  $\alpha$  and  $\beta$  sequencer lines
  - REV button to program envelope reverses
  - BREAK button to program immediate note mutes
  - FLAM button to program double hits
  - SHIFT button to access extra functions
  - 16/32 button to program 32nd notes and events
  - 1-16, 17-32, 33-48, and 49-64 pattern part selection buttons.
  - 16 step buttons
  - BPM encoder (doubling up as SELECT control in the menu)
  - SWING control (doubling up as VALUE control in the menu)



## Drum synthesizer

### 3.1 Drum models or algorithms

The DR-2 uses drum 'models' or drum synthesis algorithms that create a drum sound when a trigger from the DR-2's step sequencer or MIDI receiver comes in. At this moment, the available drum models are:

- DIST BD: a sinewave bassdrum that has a parallel filtered distortion path
- NOISE BD: a overdriven triangle bassdrum with a filtered noise burst attack
- SQUARE BD: a square wave oscillator bassdrum with lowpass and notch filters
- SNARE: a snare drum algorithm using 6 sinewave FM oscillators and a 'snappy' noise burst
- MARCHING SNARE: a much 'tighter' marching band type of snare drum
- ANALOG SNARE: an 'electronic' sounding snare algorithm with 2 overdriven triangle waves and a 'snappy' noise burst
- CLAPS: a heavily filtered white noise burst with multiple triggering
- HIHAT: short to medium long hits of 'cymbal noise' and white noise
- RIDE CYMBAL: a set of bandpass and hipass filters working on cymbal noise
- CRASH CYMBAL: a series of 6 parallel bandpass filters filtering white noise and cymbal noise
- TOM: a set of 3 overdriven triangle wave oscillators with a filtered init noise burst
- TENORDRUM: a series of 32 sine oscillators with different tuning and length settings, and a filtered attack noise burst
- RIMSHOT: 3 sine waves that get overdriven and highpass filtered
- RATTLE: a short clicky sound with 2 base frequencies, with retriggering possibility to make 'rattle' sounds.
- COWBELL: a series of 18 cowbell tuned sine oscillators with different tunings, with a lowpass filter and a noisy init click

Future firmware upgrades will include new drum models.

**Selecting an algorithm:** Push the MODEL button to cycle through the different available drum synthesis algorithms, SHIFT+MODEL cycles the other way round.

## 3.2 Envelope generator

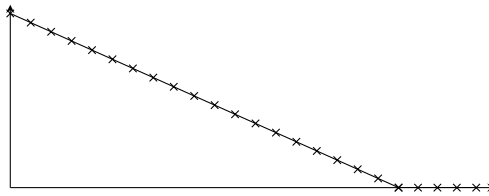
The DR-2 runs a special envelope generator, serving all the different drum models. The possible DECAy range is mostly adapted to the specific drum algorithm, but apart from that the envelopes are identical for all drum models.

Envelopes used in drum synthesis aren't very complex. In synthesizers you most often see ADSR envelopes, or even more complex envelopes such as the Modor NF-1's 4-stage envelopes. In drum synthesis you need decay-only envelopes, a control value starting at high level (1) and dropping to low level (0). A drum sound starts loud, and drops to silence. It's pitch starts high, and drops to a low pitch. So, you don't need attack, sustain or release settings. Only a DECAy setting.

However, there's another very important property of envelopes used in drum sound synthesis: its curvature. Does the envelope drop to zero in a uniform, linear way? Or does it drop fast in the beginning, slowing down towards the end? The envelopes in the DR-2 have next to the DECAy rate, also a CURVE parameter. Behind the CURVE parameter of the DR-2's envelope generators there are 5 different curvature types:

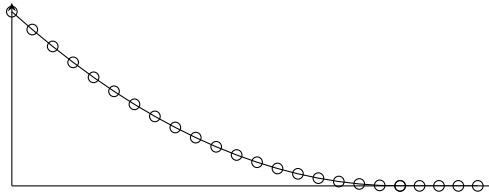
**Linear** full left, 8 'o clock setting of the CURVE knob:

The linear envelope drops uniformly from 1 to 0. For the math freaks, it follows a  $y = (1 - ax)$  curve,  $a$  being a decay speed parameter.



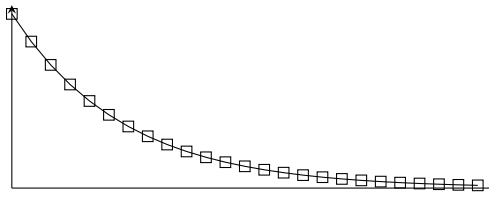
**Squared linear** at 10 'o clock setting of the CURVE knob:

In between the linear and exponential curve is the squared linear curve:  $y = (1 - ax)^2$



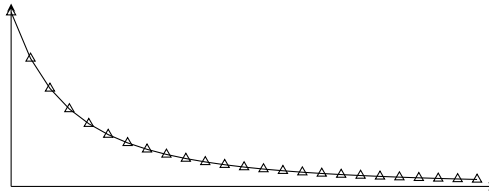
**Exponential** central, 12 'o clock setting:

This is the most extensively used curve in drum synthesis, as it matches to many natural decay processes. It drops fast in the beginning, and slows down while dropping, theoretically never coming to an end. It follows a  $y = e^{-ax}$  curve.



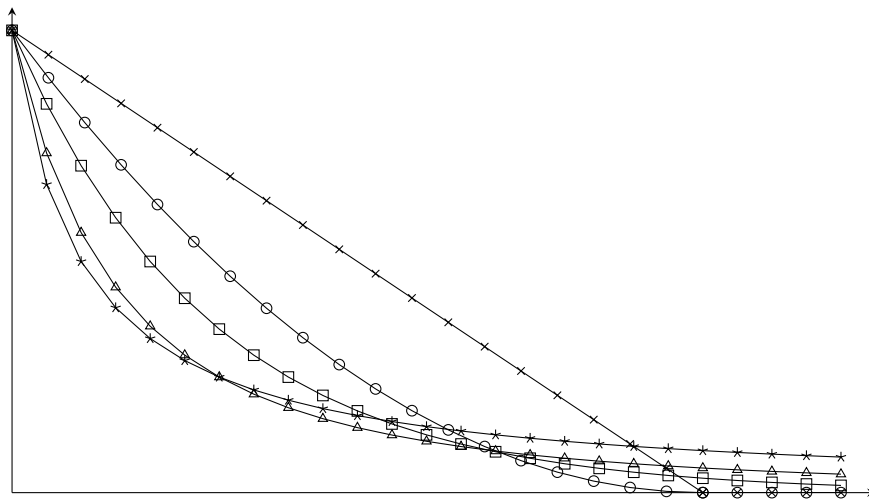
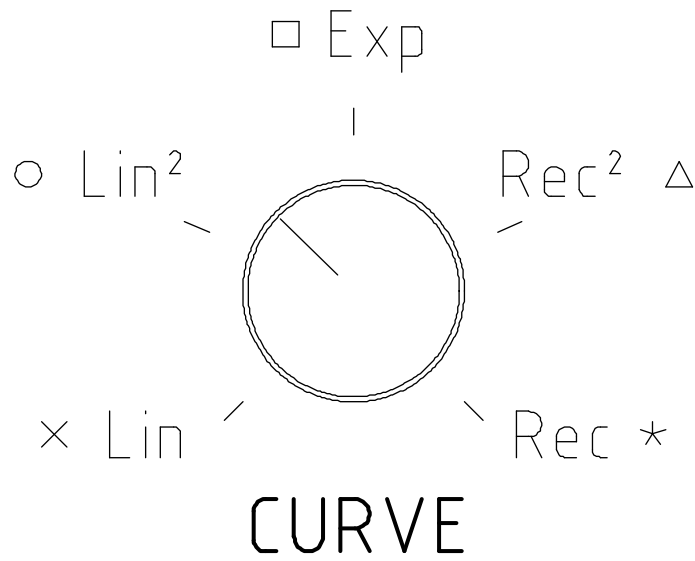
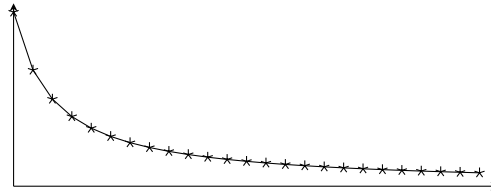
**Squared reciprocal** 2 'o clock setting:

In between the exponential and reciprocal curve is the squared reciprocal,  $y = \left(\frac{a}{x+a}\right)^2$ .



**Reciprocal** Full right, 4 'o clock setting:

The reciprocal curve also drops fast at the beginning, even faster than an exponential curve, but it slows down a lot earlier, resulting in a different curvature with a longer tail that never really seems to stop decaying. It follows a  $y = \frac{a}{x+a}$  curve.



### 3.3 Bass drums

#### 3.3.1 Drive BD

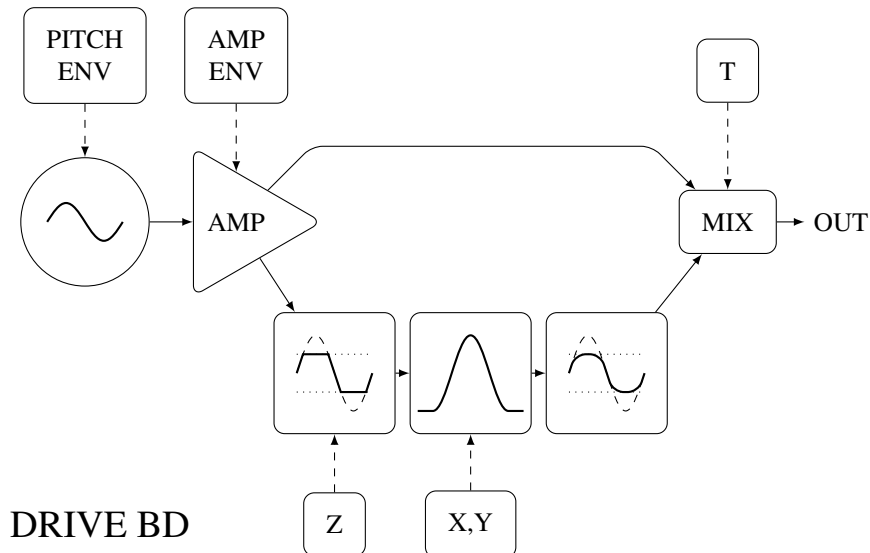
The first bass drum model is the Drive BD. This model uses a very basic sine wave bassdrum, that has a parallel drive&filter path that can be mixed with the dry sine bassdrum to get harmonic overtones in a certain frequency range.

The sine wave oscillator creates a basic bassdrum sound using the pitch, pitch envelope and amp envelope settings. Then, the signal is split and routed directly to the output, and to the drive and filter part.

MODEL: DRIVE BD

In this part, the basic sine wave is overdriven and clipped using a quite hard saturation curve. This creates a broad range of overtones on top of the basic sine wave frequency. This clipped sound is then filtered using a resonant 12dB/oct bandpass filter, and finally overdriven and clipped again with a softer saturation curve to get some overtones of the filter and/or resonance frequency. The result of this can be dry/wet mixed with the original unaltered sine wave bassdrum.

- X controls the bandpass filter cutoff
- Y controls the bandpass filter resonance, upto self oscillation
- Z controls the overdrive gain
- T controls the dry/wet mix



### 3.3.2 Noise BD

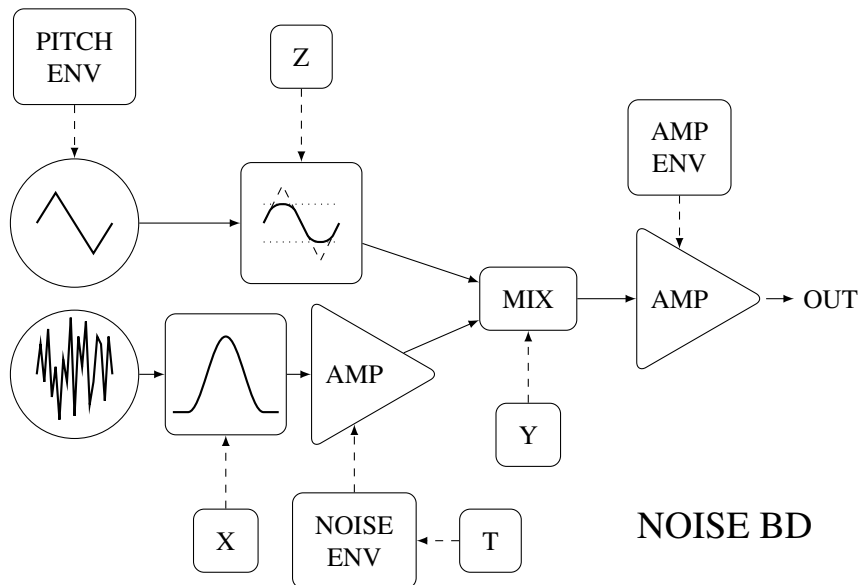
A second bassdrum model is the Noise BD. In this bassdrum model a triangle oscillator creates a basic bassdrum, using the pitch and pitch envelope. It is then clipped using a soft saturation curve that 'rounds the corners', such that the result approaches a sinewave, but still contains a small amount of the lower harmonics. This technique is often used in classic analog machines to make 'sinewaves'.

Next to this, there is a noise oscillator that gets filtered by a bandpass filter and gets its volume set by a noise envelope. The wave and noise parts finally get mixed and send to the output.

MODEL: NOISE BD

The noisy part can be used for example to create very short init clicks or to make longer, low filtered attack noises that make it sound more like a physical bassdrum. Or, the noise part can be disabled by turning down the noise-wave balance (Y) if you just want the overdriven triangle oscillator alone, to get a classic electronic-style bassdrum sound.

- X controls the noise filter frequency
- Y controls noise/wave mix
- Z controls the wave clipping overdrive gain
- T controls the noise envelope decay rate



### 3.3.3 Square BD

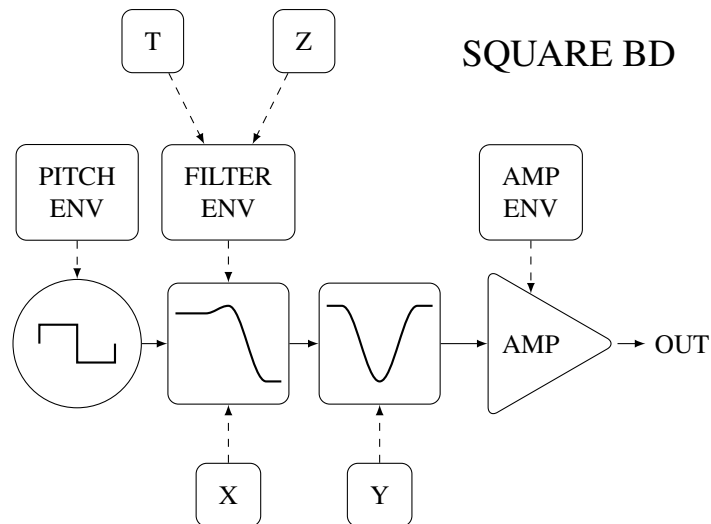
A third bassdrum model is the Square BD. This model is based on a square waveform oscillator, that produces a large number of harmonics. The result is filtered by two filters in series: a lowpass filter with an envelope controlling the cutoff frequency, and a notch filter.

MODEL: SQUAR BD

The lowpass filter controls the amount of higher harmonics. The envelope on the cutoff frequency makes it possible to give it a bright 'attack phase' with more harmonics.

Sometimes you clearly want some of the higher harmonics of the square oscillator, while you want to cut the disturbing frequencies somewhere in the middle range. In that case, a lowpass filter alone is not sufficient. Therefore, there's an extra notch filter. It has a broad frequency range from low to high frequencies, but you'll often find yourself putting it somewhere over the middle frequency range.

- X controls the lowpass filter cutoff frequency
- Y controls the notch filter frequency
- Z controls the lowpass envelope amount
- T controls the lowpass envelope decay rate



## 3.4 Snare drums

### 3.4.1 Basic SN

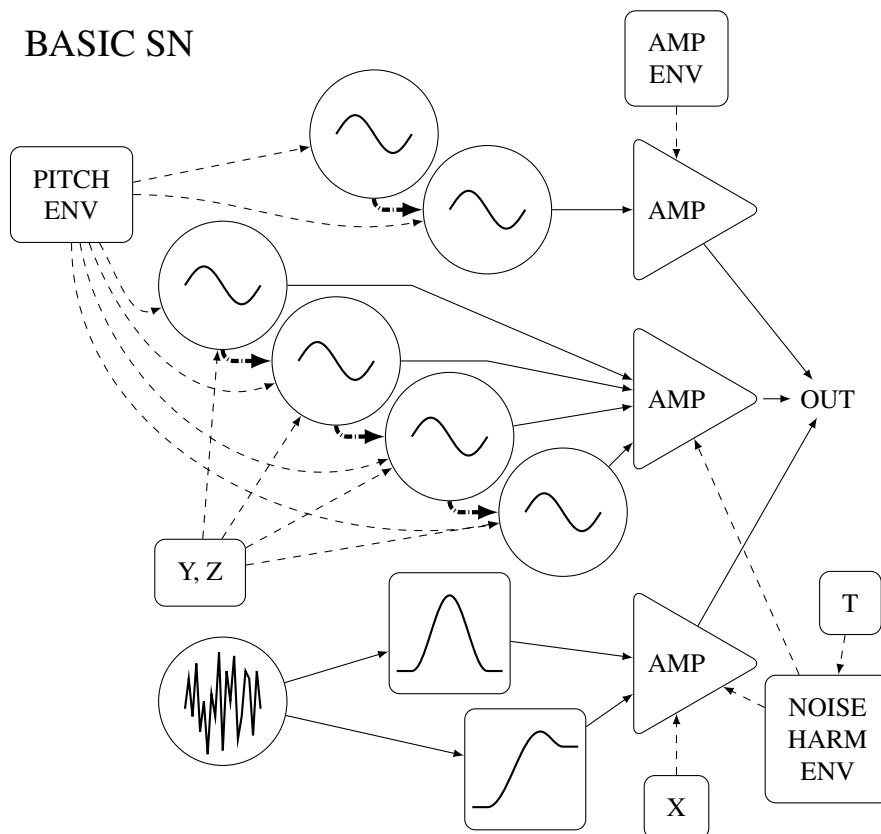
This snare model uses FM synthesis and filtered noises to create a snare drum sound that sounds the most 'realistic' (at certain settings) from the DR-2's snare drums.

This model uses a 2-operator FM path to create the 'fundamental' tonal element, and a 4-operator part to create overtone harmonics. Next to that there is a noise path, that is split up in a middle and a high frequency filtering path.

MODEL: BASIC SN

The amp envelope controls the volume of the fundamental, while the snare noise and the overtone harmonics are controlled by a separate harmonics and noise envelope.

- X controls the amount of snare noise
- Y controls the FM intensity
- Z controls the FM harmonics pitch separation
- T controls the harmonic and noise envelope decay



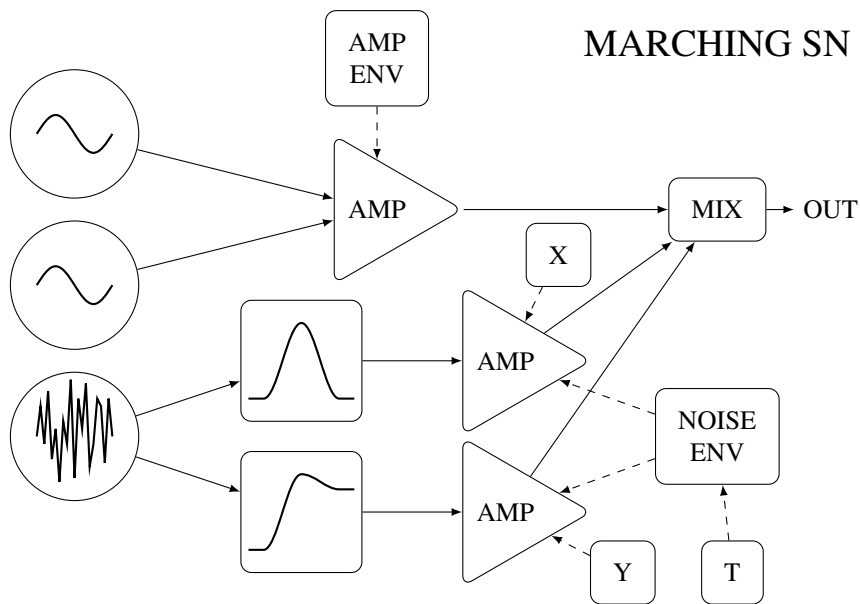
### 3.4.2 Marching SN

This snare drum is modelled after the tighter and more intense sound of snare drums as they are used in marching bands and bagpipe bands. It has a very short sounding

'tonal' attack part that uses 2 sinewave oscillators, and a 'snarenoise' part that creates separately controllable middle and high frequency noise.

MODEL: MARCH SN

- X controls the middle frequency noise volume
- Y controls the high frequency noise volume
- T controls the noise envelope decay rate



### 3.4.3 Analog SN

This snare model comes closer to what snare drums on analog drum machines sound like. It has 2 separate overdriven triangle oscillators and a 'snappy' snare noise oscillator. Each of these elements has a separate amp envelope.

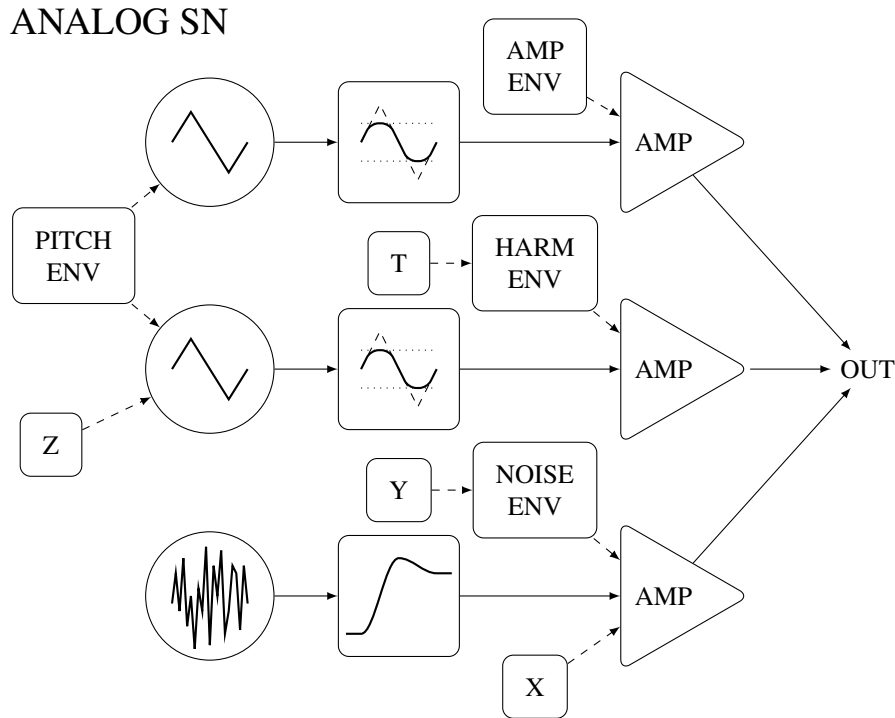
MODEL: ANALG SN

The overdriven triangle oscillator was a classic analog trick to make 'sinewave' oscillators. The output of a triangle oscillator is sent into a soft overdrive stage that rounds the corners of the triangle wave. This doesn't produce perfect sinewaves but waves that still contain some harmonic overtones, which were however found to be more pleasing to the ear than pure sinewaves. So, in this Analog SN model we used this same approach to give the snaredrum a more 'analog' sounding result.



**Tip:** Add some pitch envelope to get a more 'realistic' analog snare sound.

- X controls the 'snappy' snare noise volume
- Y controls the snare noise envelope decay length
- Z controls the oscillators pitch separation
- T controls the second oscillators envelope decay length



## 3.5 Cymbals

Cymbals are made out of filtered 'cymbal noise'. Cymbal noise is different from white noise, it actually has very little to do with noise. It is created by mixing 8 quite low and completely inharmonically tuned square oscillators. Filtering out the low frequencies of this mix give it a basic cymbal sound. So, cymbal noise is just a quite large number of harmonically unrelated frequencies in the mid to high frequency range.

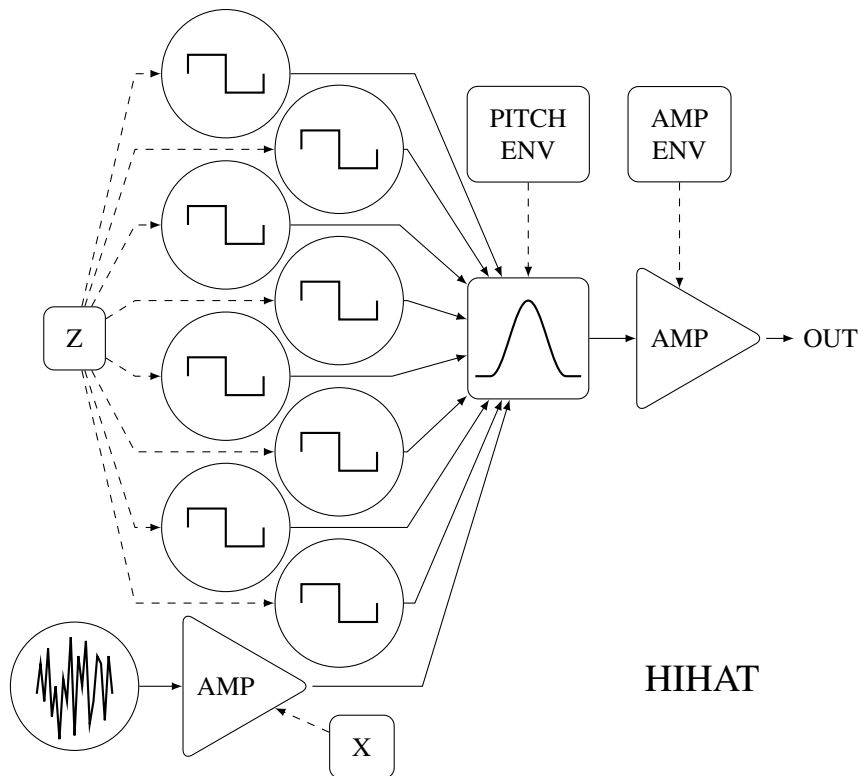
### 3.5.1 Hihats

The hihats are short to moderately long 'bursts' of bandpass filtered cymbal noise. You can control the spectral content with the Z-parameter, and you can add, if you want, a slight amount of white noise. The pitch and pitch envelope control the bandpass filter frequency.



- X controls the amount of added white noise
- Z controls the spectral content of the cymbal noise

**Tip:** It is possible to make closed and open hihats on a single instrument by using the  $\alpha$  and  $\beta$  variations, see §3.9.



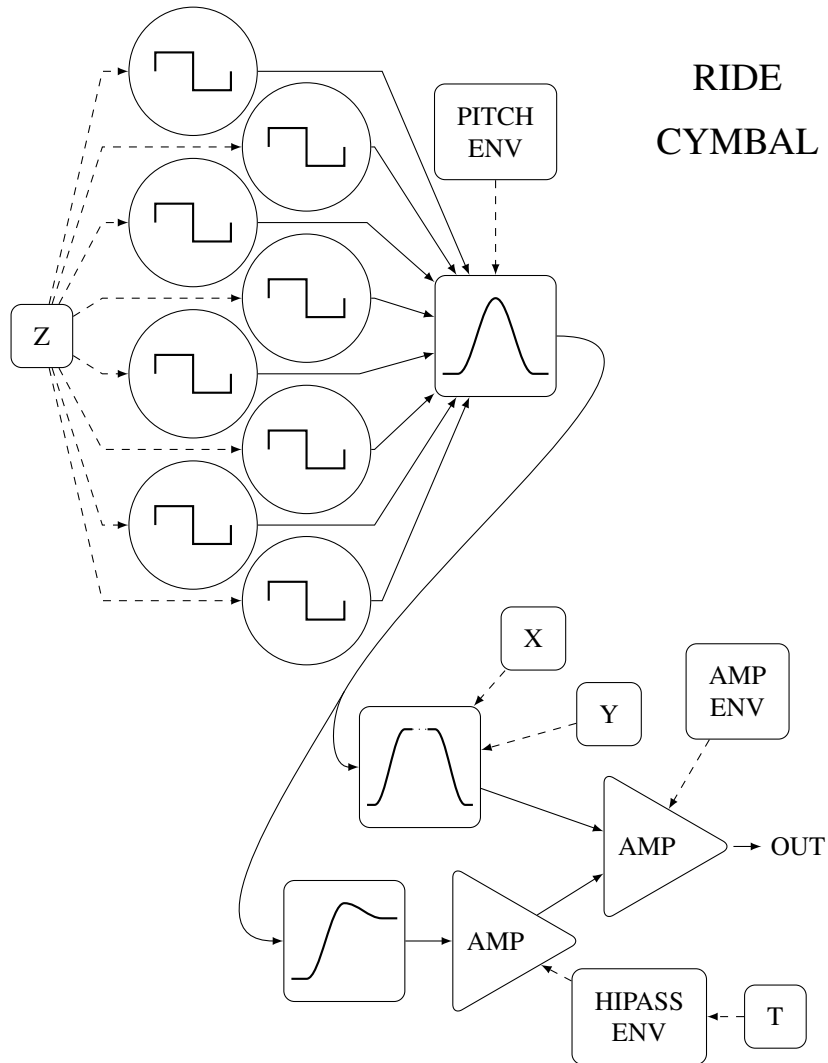
### 3.5.2 Ride cymbal

The ride cymbal model moves on where the hihat ends. First the 8-oscillator cymbal noise is filtered by a 12dB/oct bandpass filter, controlled by the pitch (+pitch env) setting to create a basic filtered cymbal noise. Then, the ride cymbal has two parallel filters that enhance a range of frequencies from this basic cymbal noise.

The main filter is a bandpass filter with frequency and bandwidth setting, and it has some non-linearities in its design that thicken up the amount of different frequencies that are produced in the cymbal noise. A second parallel 24dB/oct highpass filter can produce a shorter bright 'ting' sound in the attack phase of the ride cymbal.

MODEL: RIDE CYM

- X controls the frequency of the main filter
- Y controls the bandwidth of the main filter
- Z controls the spectral content of the cymbal noise
- T controls the decay rate of the hipass filter's envelope



This way the ride cymbal algorithms is capable of producing a wide range of cymbal sounds, not limited to ride cymbals alone. The extra filters and the non-linearities in the main filter make it sound thicker and noisier than the hihat algorithm. The settings however allow you to produce much more non-realistic sounding cymbal-like sounds.

### 3.5.3 Crash cymbal

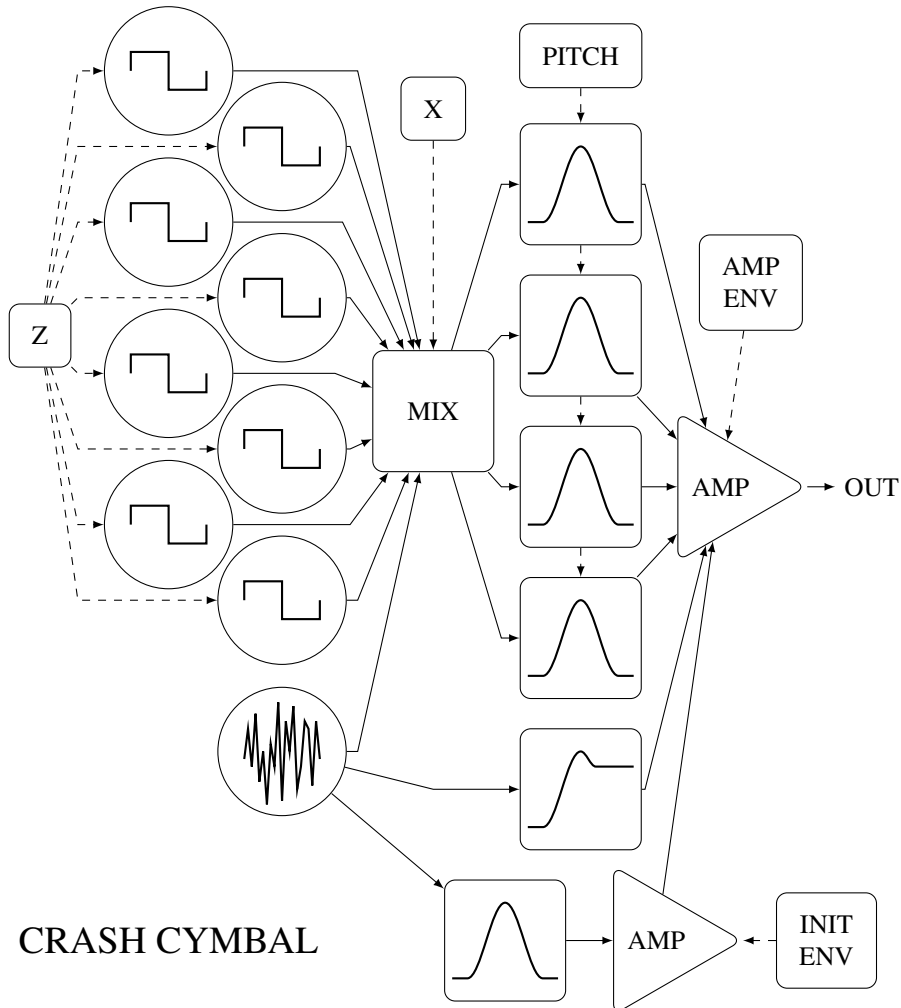
The crash cymbal is a set of 6 parallel filters working on white noise or a mix of white noise and 8-oscillator cymbal noise.

A first bandpass filter works with white noise on a rather low frequency with a short amp envelope to create the first 'hit' of the cymbal.

MODEL: CRASH CY

Secondly there is a group of 4 bandpass filters with different middle to high frequencies working on a mix of white noise and cymbal noise.

Finally, there is a highpass filter working on white noise to create the upper 'zing' of the cymbal sound.



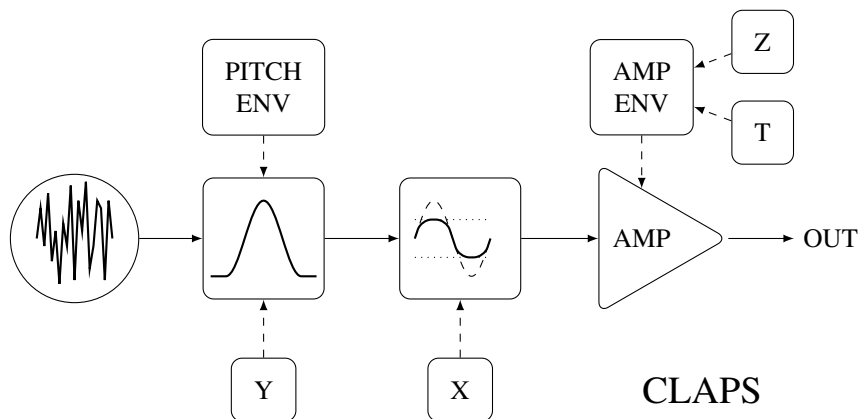
- X controls the mix of white vs cymbal noise for the 4 middle bandpass filters
- Z controls the spectral content of the cymbal noise

## 3.6 Claps

Although you could say it's technically not really a 'drum' sound, it's obvious that handclaps made their way into the electronic music, and can't be missing on an electronic drum machine. The claps sound is made out of white noise, that is filtered by a resonant bandpass filter, sent through a drive stage, and attenuated by an amp envelope. The amp envelope can be set to trigger multiple times, to simulate the effect of multiple simultaneous handclaps. In this model, the pitch (and pitch envelope) determines the filter cutoff frequency.

MODEL: CLAPS

- X controls the drive's gain factor
- Y controls the bandpas filter's resonance parameter
- Z controls the number of amp envelope retriggers
- T controls the time between the amp envelope retriggers



## 3.7 Toms

### 3.7.1 Analog Tom

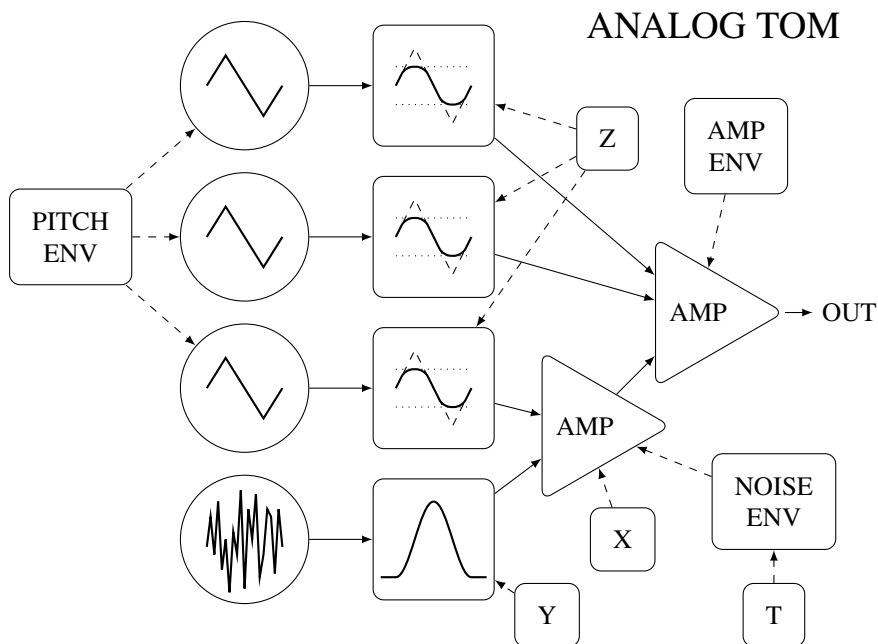
The toms are made using three oscillators with frequency ratios 1:1,5:2,7. The oscillators are the same kind of overdriven triangle waves such as in Analog SN and the Noise BD that contain a small amount of extra harmonics of each of the three oscillator frequencies.

The Analog Tom model also has a noise path that adds a noisy attack phase to the tom sound. The noise is filtered by a bandpass filter in the low to middle range.

**Tip:** Add a little pitch envelope to get a more 'realistic' tom sound.

MODEL: ANLG TOM

- X controls the noise volume
- Y controls the noise filter frequency
- Z controls the triangle oscillators drive gain
- T controls the decay rate of the third oscillator and noise



### 3.7.2 Tenordrum

The tenordrum is produced by 32 sinewave oscillators that produce a number of inharmonic frequencies to form the basic tenordrum sound. The oscillators are divided in 3 groups that have different amp envelopes, to create a certain spectral variation during the 'ringing' of the drum hit. These groups of sine oscillators can be pitched and their frequency separation can be controlled with the Z parameter. There is also a notch filter that can be used to further control the spectral content, controlled with the Y parameter.

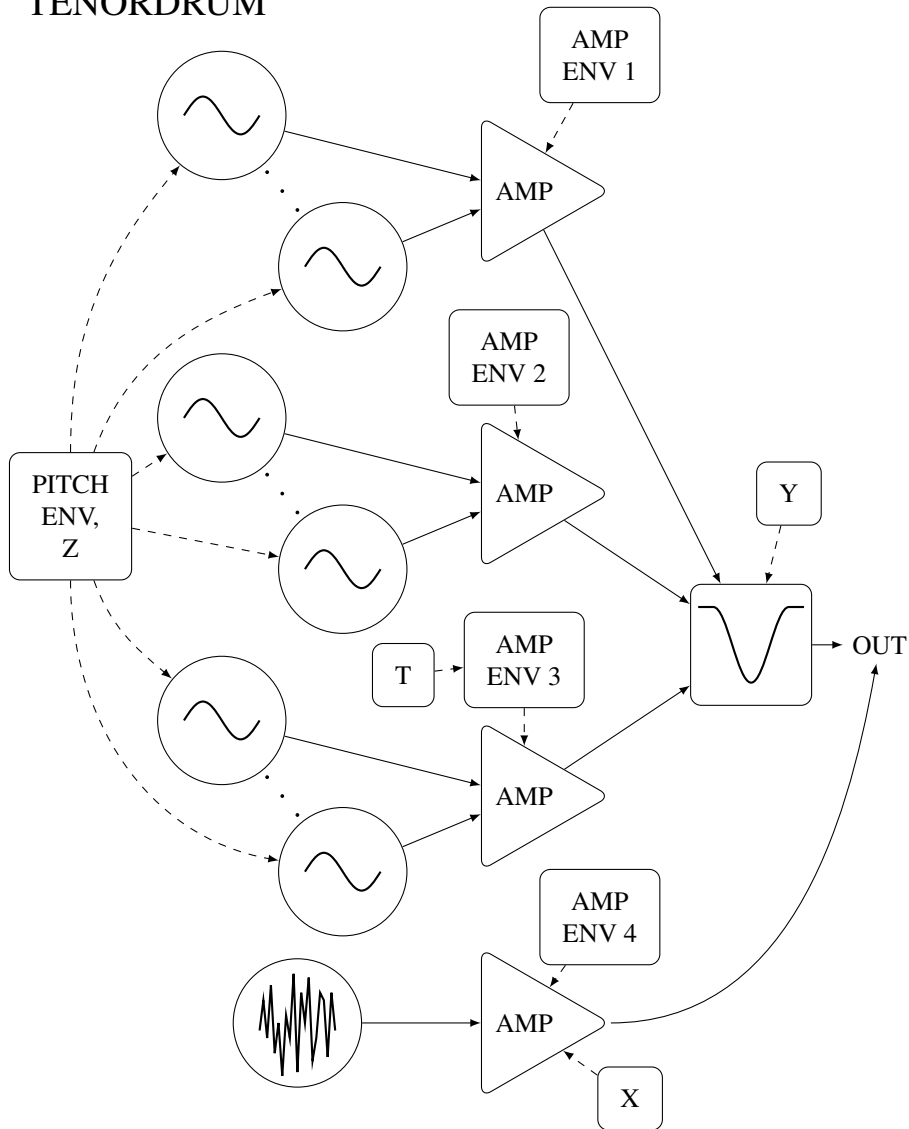
Next to these groups of oscillators, a filtered noise hit that mimics the drum stick impact can be added.

MODEL: TENOR DR

If you don't know where to start with the pitch and Z parameters, put them both at the center (+64), and turn down the pitch envelope to get a more or less regular sounding tenordrum.

- X controls the noise hit volume
- Y controls the notch filter frequency
- Z controls the spectral content of the tenordrum sound
- T controls the longer harmonics decay rate

### TENORDRUM



## 3.8 Miscellaneous

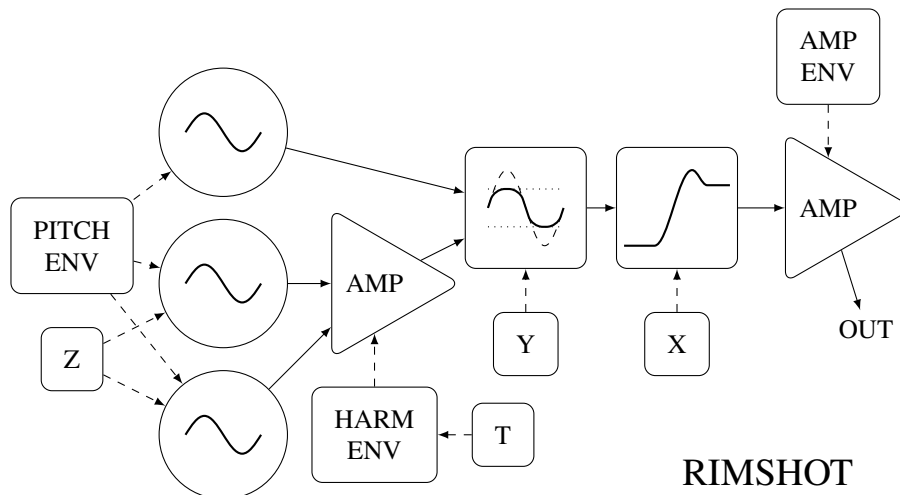
### 3.8.1 Rimshot

The rimshot is created out of 3 sinewave oscillators, that pass through a drive and a highpass filter. The lowest oscillator, the 'fundamental' goes directly into the drive, the upper two 'harmonic' oscillators are attenuated by a harmonic envelope first, and then go into the drive.

MODEL: RIMSHOT

With the right settings, this model can sound very much like a rimshot on a classic analog drum machine, but this model is quite flexible and is able to create a lot more sounds. Put the pitch, pitch separation (Z) and filter cutoff (X) knobs in a central position, turn down pitch envelope amount and play a little with the amp and harmonic envelope decays to get a classic rimshot.

- X controls the highpass filter cutoff frequency
- Y controls the drive's gain factor
- Z controls the harmonic oscillators pitch separation
- T controls the harmonic envelope decay rate



### 3.8.2 Rattle

The rattle may be a bit of a weird instrument... It is made by short clicks that are sent into 2 parallel highly resonant filters, who are transforming the clicks into short sinewave pulses. The resonant frequencies of these two filters can be set separately.

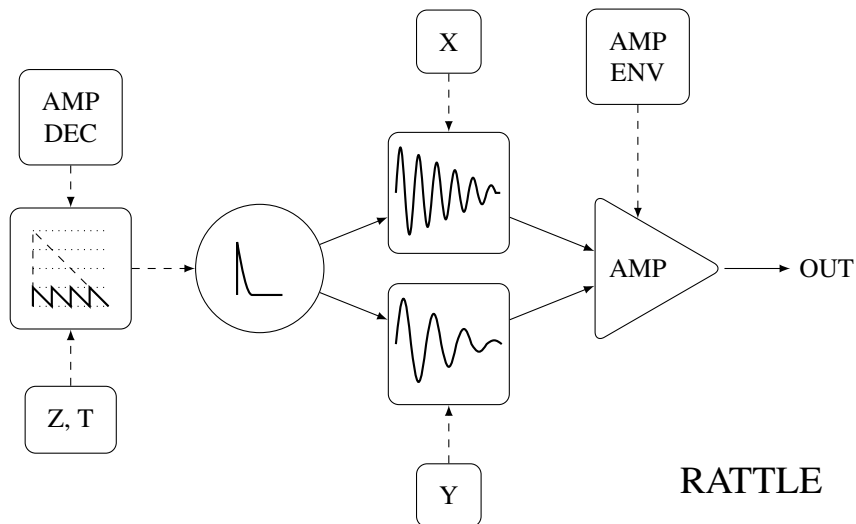


## MODEL: RATTLE

But there is a second aspect to this instrument: one of its envelope is multiplied by an adjustable factor (T) and then undergoes a so-called modulo division by 1. This results in a retriggering envelope that clicks multiple times for a single drum hit.

The rattle envelope has the same decay rate as the amp decay (set by the amp DECAY knob), but has a separate envelope curve setting (Z). So you can set the rattling amount, length and character by experimenting with the amp DECAY, Z and T knobs.

- X controls the first filter's cutoff
- Y controls the second filter's cutoff
- Z controls the rattle envelope's curvature
- T controls the retriggering multiplication factor



## 3.8.3 Cowbell

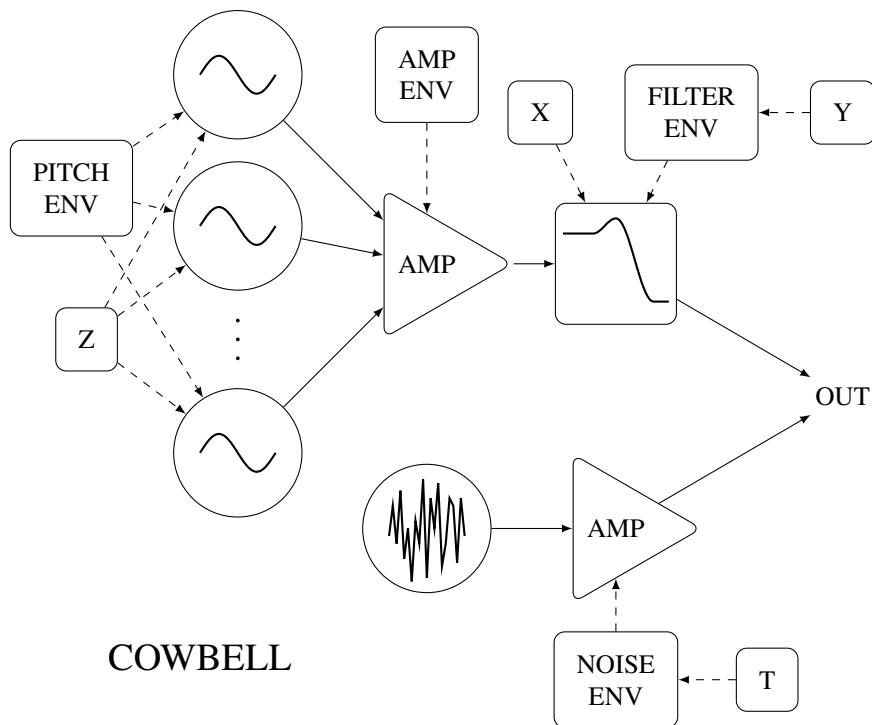
The cowbell sound is produced by 18 sinewave oscillators that produce a number of inharmonic frequencies to form the basic cowbell sound. This group of sine oscillators can be pitched and their frequency separation can be controlled with the Z parameter. The result can be lowpass filtered, and a short envelope can be applied to this filter to get the initial sound clearer, getting more filtered towards the end.

Next to this filtered group of oscillators, a very short white noise click can be added.

## MODEL: COWBELL

If you don't know where to start with the pitch and Z parameters, put them both at the center (+64), and turn down the pitch envelope to get a more or less regular sounding cowbell.

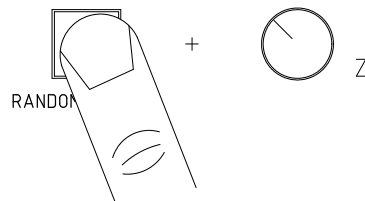
- X controls the filter's cutoff
- Y controls the filter's envelope amount
- Z controls the spectral content of sound
- T controls the initial noise click



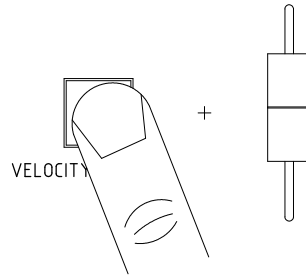
### 3.9 Modulations

You can bring a lot more 'life' in your drum riffs by using modulations that avoid every drum to sound exactly identical. Modulations alter the parameter value of one the drum model's parameters. There are 4 different ways of modulation:

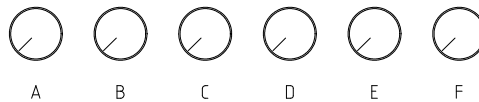
- Random: press the RANDOM button and turn one of a drum's parameter knobs. Now you'll hear a random variation of this parameter with every drum hit. Random can be connected to one parameter per drum. Double click RANDOM to remove the modulation.



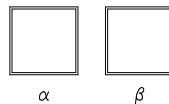
- Velocity or accents: keep the VELOCITY button pressed and turn one of a drum's parameter knobs. Now this parameter is modulated by velocity. When playing notes with different velocity or accent you'll hear a difference in sound. Velocity modulation can be applied on the volume parameter (VELOCITY+slider) and one extra parameter (VELOCITY+knob) per drum. Double click VELOCITY to remove the 2nd parameter modulation.



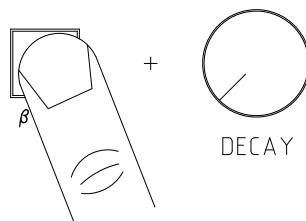
- Definable: press the DEF button and turn one of a drum's parameter knobs. Now the DEF-knob above the instrument's slider can be used to vary this parameter. Definable knobs can be connected to one parameter per drum. Double click DEF to remove this modulation.



- Alpha/Beta: press the  $\beta$ -button and turn one of a drum's parameter knobs. Now you have a  $\beta$ -variation of this instrument.  $\beta$ -variations can be connected to one parameter per drum. The sequencer has separate tracks for the  $\alpha$  and  $\beta$  variations, press  $\alpha$  or  $\beta$  to program  $\alpha/\beta$  drum hits.



**Closed and open hihats** A very typical use for  $\alpha$ - $\beta$  variations is the closed and open hihat. Set all parameters for a closed hihat, then set the amp decay length for the open ( $\beta$ ) hihat using  $\beta + \text{AMP DECAY}$ . Now you can use the  $\alpha$  and  $\beta$  sequencer lines to program closed and open hihats.

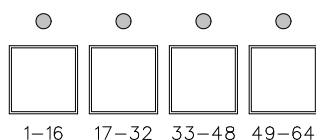


## Drum sequencer

### 4.1 16 step, 64 step or 128 step sequencer?

The Modor DR-2's sequencer has the typical 16 step buttons as can be found on many classic drum machines, typically playing the 16th notes of a 4 beat bar. Select an instrument by pushing one of the buttons A-F, and then program rhythms on the buttons 1 to 16. Press PLAY to hear the resulting drum riff. That's a classic 16 step drum sequencer.

The DR-2 patterns can have up to 4 of these bars of 16 steps, so a pattern can have a length of up to 64 16th notes. That's for example 4 bars of 4 beats of a classic four-on-the-floor pattern. Use SHIFT + 1..16/17..32/33..48/49..64 to set the pattern length to 1, 2, 3 or 4 bars.



But the DR-2's sequencer can also do the steps 'in between' the steps. Just above the row of 16 step buttons, you can see there are 32 leds. The DR-2's sequencer has actually up to 128 32nd note steps, 4 bars of 32 32nd notes. To program a note at the 32nd note in between, keep the 16/32 button pushed while hitting one of the 16 step buttons.

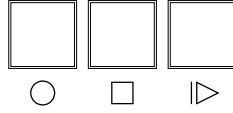


### 4.2 Rec, Play, Rec Pause and Stop

The sequencer can be playing or not playing, and can be recording or not recording. The actual playing/recording status is indicated on the LCD screen.

- Hitting STOP stops both playing and recording.

- Hitting PLAY puts the sequencer in 'playing' status, ie. in Play or Record.
- Hitting REC puts the sequencer in 'recording' status, ie. in Rec Pause or Record.



If you hit PLAY while the sequencer was stopped, it starts playing. There are two playing 'modes' that can be toggled with the PLAY button. In the first playing mode, hitting the A..F buttons only selects an instruments track, it doesn't trigger any sound. If you press PLAY once more, you can manually trigger drums along with the playing pattern. The play symbols on the LCD screen are a bit different.



If you hit REC when the sequencer was stopped, it goes into 'Rec Pause'. The sequencer doesn't run, but is ready to start recording. Hitting the A..F buttons you can hear the different instruments A..F get triggered, but nothing is recording yet.



If you hit REC and then PLAY, the sequencer starts recording. Hitting the A..F buttons now triggers the instrument, and programs a new hit at the actual playing step.

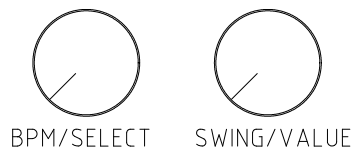


After hitting STOP the sequencer isn't playing or recording. You can trigger the drum sounds with the A..F buttons.

### 4.3 BPM and Swing

The tempo in Beats Per Minute (BPM) can be set using the BPM/SELECT knob at the top. In a menu, this knob doubles up as a data or menu select encoder. So, go out of the menu (hit EXIT/NO) to set the BPM.

Swing can be set using the SWING/VALUE knob at the top. With Swing at 50%, all notes have identical note lengths. With Swing going above 50%, the first note in a pair of 16th notes gets longer, the second note gets shorter. This creates a certain 'shuffle' feeling in your drum pattern. In the menu, this knob doubles up as a VALUE knob, so it can't be used for swing setting.



The DR2 also has a 'Swing32' setting. This does the same as the Swing setting, but with 32nd note pairs. It can go both above and below 50%. This way you can change

the timing of the 32nd notes 'in between' to be right in the middle, or just a little before or after the 16th notes. Keep the 16/32-button down while turning SWING/VALUE to set Swing32.

Every Pattern and Song has its own BPM and Swing settings. But, when loading a new pattern while the sequencer is playing, the new pattern's BPM and Swing are not adopted. The DR-2 keeps playing in the pace of the last pattern. When playing a song in song mode, the Song BPM and swing settings are active.

## 4.4 Pattern mode

In pattern mode patterns can be programmed and stored. When the sequencer is playing in pattern mode, the same pattern is played over and over again (while in Song Mode, a list of consecutive patterns is played).

A pattern is a set of sequencing data used by the drum sequencer. The sequencer uses these data to tell the synthesizer what the different drums should play: which notes should be played where, which ones should have accents or flams, etc... A Pattern contains all the drum sequences for the 6 instruments, including the  $\alpha/\beta$ -variations, flams, tuplets, breaks, accents and reverses.

**Pattern properties** Apart from the drum sequences, a pattern also contains some other data, the pattern properties. These are :

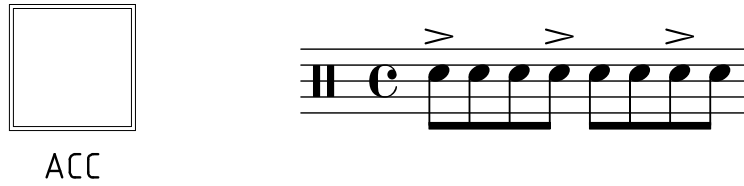
- Pattern name
- Pattern BPM
- Pattern length (number of steps)
- Pattern Swing and Swing 32
- Pattern Reverse Time
- Pattern Flam Time
- Pattern Tuplet Number, Time and Balance

**Pattern switching** If a new pattern is loaded while the sequencer is playing, the sequencer first finishes the actual pattern and then switches to the new pattern. Thereby, the actual playing pattern properties such as BPM and swing settings are kept. The sequencer does *not* switch to the new pattern's BPM.

When loading a new pattern while the sequencer is not playing, the newly loaded pattern's BPM and all other pattern properties are adopted.

Only exception to this are the tuplet settings: tuplet number, time and balance. These are always adopted from the newly loaded pattern, whether the sequencer is playing or not.

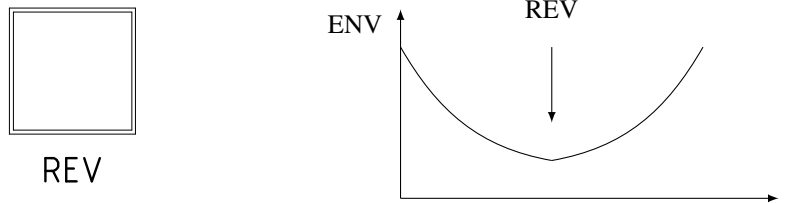
**Accents** By applying accents, you can make certain steps more intense than other. The drum synthesizer can be set to vary loudness and one extra parameter with accents, by applying velocity modulations, see also §3.9.



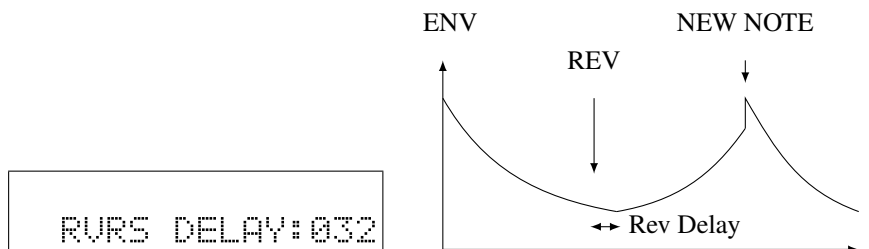
There are two accent 'levels' or velocity values in the DR-2's sequencer: a separate accent line per instrument, and a general accent line for all instruments at once.

- Keep the ACC(ent) button down and select the steps you want to accentuate to use the per-instrument accent line,
- or just shortly hit ACC(ent) to access the general accent line for all instruments together.

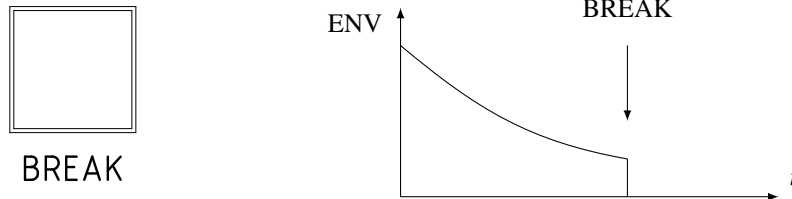
**Reverse events** By using the REV-button you can program reverse events. When meeting a reverse event, the drum synthesizer's envelopes will start running backwards, resulting in a reversed drum sound. Keep the REV button pressed and select the steps where you want the drum sound to start running backwards. So, the selected step is not the place where the reversed drum note will end, it's where it will start running backwards. Keep REV and 16/32 pressed if you want to program a reverse on a 32nd note step.



If you turn the (SWING)/VALUE knob while holding REV down, you can set a slight delay between the reverse event on the sequencer and the actual turnaround of the envelopes. Often, when using a reversed drum sound to run up to new drum hit, without such delay the new drum hit would lose it's impact. This can be avoided using the reverse delay. With a certain reverse delay, the instrument is not yet entirely back 'up' when a new drum hit arrives, so the new drum hit keeps it's impact.



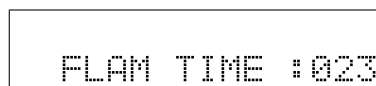
**Breaks** When meeting a break, all envelopes are immediately set to zero, so the playing note is immediately silenced. Keep the BREAK button pressed and select the steps where you want the drum sound to stop. Keep BREAK and 16/32 pressed if you want to program a drum break on a 32nd note step.



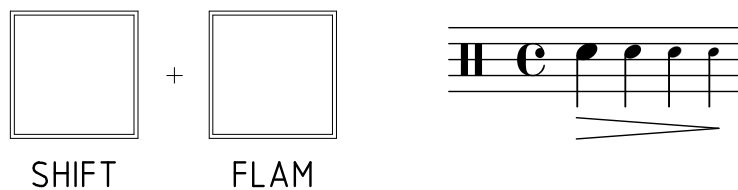
**Flam** A 'flam' is a double hit of a drum, like a drummer that lets his drumstick bounce twice or plays a drum hit with both hands almost simultaneously. Keep FLAM button pressed and select the steps where you want to program a double hit. Keep FLAM and 16/32 pressed to program a flam on a 32nd note step.



If you turn the (SWING/)/VALUE knob while keeping the FLAM button pressed you can set the FLAM time, the time between the two almost simultaneous hits.



**Tuplet** A 'tuplet' is a series of multiple consecutive drum hits. It can for example be used to program triplets, or just for notes that go 'off the grid'. Keep SHIFT+FLAM button pressed and select the steps where you want to program a tuplet. Keep SHIFT + FLAM + 16/32 pressed to program a tuplet on a 32nd note step.





Tuplets have a balance setting. This is the velocity 'evolution' of the consecutive drum hits. If it is set neutral, all tuplet drum hits are played equal in volume. If it's set positive, the drum hits decrease in velocity, sounding a bit like an echo. If the balance is negative, the tuplet's drum hits increase in velocity, like an upcoming drum roll. Don't forget to set a volume velocity sensitivity to get the full effect (VELOCITY + slider, see §3.9).

If you turn the Y, Z or T knob while keeping the SHIFT+FLAM button pressed you can set the tuplet balance, number and time:

- SHIFT+FLAM+Y: tuplet balance, can be set to diminutive (positive) or growing (negative)
- SHIFT+FLAM+Z: tuplet number, the number of tuplet drum hits
- SHIFT+FLAM+T: tuplet time, or the time between tuplet drum hits

The tuplet balance, number and time parameters are parameters that belong to the pattern. You can save and recall them with the pattern.

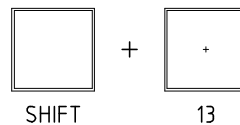
**Pattern length** Pattern lengths can be set using the SHIFT+button:

- SHIFT + 1-16/./49-64 sets how many bars you want in your pattern: 1, 2, 3 or 4.
- SHIFT + number button sets the number of steps in a bar.

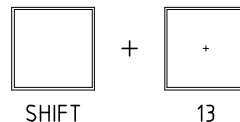
If you want to play a piece in 6/8 time signature for example, press SHIFT+13. You'll have a bar length of 6 8th-notes now. When the sequencer arrives at step 13, it restarts from zero. The display shows 'Patt Length:1x24' (or 2, 3 or 4 x24). Why 24? Because it's a 32nd note sequencer. 6 8th notes equals 12 16th notes or 24 32nd notes...

You can also combine this with the 16/32 button to create very special time signatures... 27/32, anyone?

PATT LENGTH: 1x24




PATT LENGTH: 1x24



---

PATT LENGTH: 1x28




SHIFT

+

15

---

PATT LENGTH: 1x21



SHIFT

+


16/32

+

11

---

PATT LENGTH: 1x32



SHIFT

+

1

## 4.5 Song mode

In song mode songs can be programmed and stored. A song is a list of patterns that can be played sequentially or in a loop. When the sequencer is playing in song mode, every time a pattern comes to an end, it switches to the next pattern in the list.

**Song edit** You can double click the SONG button, or go via the menu (5x MENU-button) to get into the SONG EDIT menu. Here you can alter the song's pattern list. Use the SELECT encoder to move back and forth in the song pattern list, and use VALUE or SHIFT+SELECT to alter the pattern numbers.

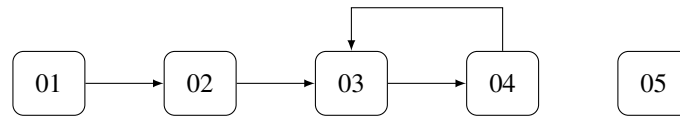
SONG EDIT  
 01 02\_03\_04 05

**Song loop** Songs can also be used to make loops of a number of patterns, if the 64/128 steps of a pattern are insufficient. Hold the SONG button down while turning the SELECT encoder in Song edit to set the loop markers.

```

SONG EDIT
01 02>03_04<05

```



**Song end** You can set a pattern number in the song pattern list to 'none', turn it past pattern 96 (VALUE full right). If the sequencer meets this, it will stop playing.

**Song properties** Just like a pattern, a song has a speed setting (BPM), swing and swing32 settings, a flam and a reverse timing. When playing in song mode, these pattern data are overridden by the song's data.

So, a pattern can sound somewhat different in different songs. If the BPM differs between two songs that have the same pattern number in their list, the pattern will play faster in one song and slower in the other.

The tuplet settings however (tuplet number, time and balance) are always adopted from the playing pattern.

**Song switching** If a new song is loaded while the sequencer is playing, the sequencer first finishes the actual pattern, and then switches to the first pattern of the newly loaded song.

At that moment, the song properties such as the BPM speed setting and Swing settings of the new song are adopted. So it's possible this results in an abrupt tempo switch.

## 4.6 Synchronisation

The DR-2 can be played in synchronisation with a lot of other gear. There are 2 synchronisation methods, the DR-2 can use them both as a master or as a slave. Both systems use 24 clock ticks per quarter note :

- MIDI Clock on MIDI IN and OUT connectors
- 24 PPQN clock on CLOCK IN and OUT connectors

The DR-2 starts working as a slave when it receives MIDI clock signals or clock pulses on the CLOCK IN input. In this case the BPM setting of the sequencer is overridden by the external clock's tempo. If there is no external clock coming in, the DR-2 works as a master and sends clock ticks on both the CLOCK OUT connector and sends a midi clock on it's MIDI OUT.

The MIDI clock output however can be disabled or enabled in the SYSTEM SETTINGS menu. If you don't succeed synchronising external MIDI gear to the DR-2, check the Clock Output setting.

```
SYSTEM SETTINGS
MidiClkOut: ON
```

The leds on the upper left corner of the frontpanel indicate which clock is in control of the DR-2.

CLOCK ———

●   ●   ●

INT   EXT   MIDI

## Menu Reference

The menu of the Modor DR-2 has 7 main menu items. When the menu button is hit you enter the menu, and the first menu item appears on the upper display line, while a black dot moves from right to left over the screen. By pressing again before it reaches the left side, the next menu item is selected. If you stop hitting "Menu", the black dot reaches the left side. You now entered this submenu. Following menus can be entered:

1. LOAD: Load a pattern, song or drumset from internal memory
2. SAVE: Save a pattern, song or drumset to the internal memory
3. NAME: Give the actual pattern, song or drumset a name
4. INIT: Initialise the actual pattern, song or drumset
5. COPY: An easy way to copy data between pattern parts or drumset instruments
6. SYSTEM SETTINGS: To set some global system parameters
7. MIDI DUMP: Dump patterns, songs or drumsets, or the complete memory using Midi Sysex messages

Next, after entering a certain menu, data can be selected and altered using the SELECT-encoder and VALUE-knob. Sometimes you need to approve or cancel your choice by using MENU/YES or EXIT/NO. While in the menu, on any moment you can press EXIT/NO to cancel and leave the menu.

### 5.1 Load

After entering the Load-menu, you can select a pattern, song or drumset in the synth's memory using the SELECT- and/or VALUE-control. When loading drumsets, the selected drumset is temporarily loaded into the memory, and can be heard when playing the DR-2. This way you can browse through the available drumsets in memory, while the drumset you were working on does not yet get lost. Next:

```
LOAD PATTERN?Y/N
Pt04 Pattern4
```

- Pressing the EXIT/NO-button cancels the load-operation, exits the menu and restores the active drumset you were working with before entering the menu.

- Pressing the MENU/YES-button finishes the load operation and exits the menu. The active pattern, song or drumset gets replaced by the selected item from flash memory.

## 5.2 Save

After entering the Save-menu, you can use the SELECT- and VALUE-controls to select a spot in the DR-2's memory to store your pattern, song or drumset, the same way as in the load menu. When saving a drumset, the drumset you select is temporarily loaded in the synth's memory such that you can listen to the drumset that's going to be overwritten, to make sure you don't overwrite the wrong one.

```
SAVE SONG   ?Y/N
Sn01 InitSong
```

- Pressing the EXIT/NO-button cancels the save operation, and exits the menu.
- Pressing the MENU/YES-button writes the actual pattern, song or drumset into the synth's memory on the selected spot and exits the menu. This memory spot is now permanently overwritten.

## 5.3 Name

In this menu, you can change the name of the actual pattern, song or drumset with the Select and Value buttons. Use the VALUE-control to select a character position. With the SELECT-encoder you choose a character.

```
NAME DRUMSET?Y/N
Dr17 909 Set
```

- Pressing the NO/DEST-button cancels the naming operation and exits the menu.
- Pressing the YES/SRC-button confirms the new patch name and exits the menu.
- Pressing the  $\alpha$  and  $\beta$ -buttons switches between latin characters and numbers, and cyrillic characters.

## 5.4 Init

In the INIT-menu you can reset or clear the active pattern, song or drumset to start building up new work completely from scratch:

- Drumset: restart with classic electronic-style drumset with a bassdrum, claps, hihat, snaredrum and cymbal.
- Pattern: restart with a simple 1-bar 4-on-the-floor pattern
- Song: restart with an empty song pattern list

```
INIT DRUMSET?Y/N
```

Quickly hit the MENU button four times to select the INIT-menu and wait one second to enter it (the black dot reaches the left side of the screen). Press the YES/SRC-button to confirm the initialisation and exit the menu, press the NO/DEST-button to cancel.

## 5.5 Copy

The copy menu offers you three possibilities of copying data between instruments and pattern parts:

- Pattern bars
- Instrument patterns
- Instruments

**Pattern bar** To copy a pattern bar (sequencer steps 1-16/17-32/33-48/49-64) to another bar:

- enter the COPY menu (5x MENU)
- select the source bar (hit 1-16, 17-32, 33-48 or 49-64 button)
- select the destination bar
- hit MENU/YES to confirm (or EXIT/NO to cancel).

Now, all pattern data are copied from the source bar steps to the destination bar steps. Hit EXIT/NO to exit the menu, or continue with a second copy.

```
COPY FROM 01-16
TO 33-48 ? Y/N
```

**Instrument pattern** To copy an instrument pattern A-F (all 64 sequencer steps for a single instrument) to another instrument pattern A-F:

- enter the COPY menu (5x MENU)
- select the source instrument's pattern by holding down PATTERN and selecting A-F
- select the destination instrument's pattern PATTERN + A-F
- hit MENU/YES to confirm (or EXIT/NO to cancel).

Now, the complete pattern line that belongs to the source instrument A-F is copied to the destination instrument, including accents, flams, triplets, breaks and reverses. Hit EXIT/NO to exit the menu, or continue with a second copy.

```
COPY FROM PATT A
TO PATT B? Y/N
```

**Drumset instruments** To copy a drumset's instrument A-F (one of the six drum sounds) to another instrument A-F:

- enter the COPY menu (5x MENU)
- select the source instrument by selecting A-F
- select the destination instrument A-F
- hit MENU/YES to confirm (or EXIT/NO to cancel)

Now, the source instrument's sound parameters are copied from the source to the destination instrument. Hit EXIT/NO to exit the menu, or continue with a second copy.

```
COPY FROM DRUM C
TO DRUM E?  Y/N
```

Note: if you want to copy a complete pattern or drumset to another location in memory, just load it and save it on the new location. There's no menu option for it in the COPY menu.

## 5.6 System Settings

In this menu a few global settings can be edited. These parameters act globally and do not depend on the selected pattern, song or drumset. Select the parameter to edit using the SELECT encoder, and change it using VALUE. Leave the menu using the MENU or NO/DEST switch.

```
SYSTEM SETTINGS
MIDI Channel:11
```

- **Midi Channel:** The MIDI channel upon which the midi data are received and transmitted [1,16]
- **ProgChangeRx:** choose if the Modor DR-2 responds to incoming MIDI Program Change messages or not [ON,OFF]
- **CtrlChangeRx:** choose if the Modor DR-2 responds to incoming MIDI Control Change messages or not [ON,OFF]
- **SysexRx:** choose if the Modor DR-2 receives or ignores incoming MIDI sysex messages [ON,OFF]
- **NoteOffRx:** choose if the Modor DR-2 receives or ignores incoming MIDI note-off messages [ON,OFF]
- **CtrlChangeTx:** choose if the Modor DR-2 sends MIDI Control Change messages when turning a control on the front panel [ON,OFF]
- **MidiClockTx:** choose if the Modor DR-2 transmits MIDI Clock and Start/Stop messages [ON,OFF]
- **MidiNotesTx:** choose if the Modor DR-2 transmits the sequencer patterns as MIDI note messages [ON,OFF]
- **ShowCtrlInpt:** choose whether incoming MIDI controller messages are displayed on screen or not [ON,OFF]



- **Load Preview:** With Load Preview ON, you immediately hear the selected patch when scrolling in the LOAD-menu. With Load Preview OFF, you need to confirm (Y/N) before you're able to hear the loaded patch. [ON, OFF]
- **OS Version:** check the version number of the currently installed operating system.

## 5.7 Sysex Dump

A Sysex or "System Exclusive" message is commonly used to send the contents of a synth's memory to an external device for backup or external editing, a so-called "sysex dump". The contents of the memory are put into a long string of data bytes and send out over MIDI, where an external computer or sequencer can capture and store them. On a later moment, the sysex data can be sent back to restore the DR-2's memory to the situation at the moment of the sysex dump. A way to make backups of the DR-2's memory, or to exchange patches between two Modor DR-2s.

Another use of sysex-messages is to perform firmware updates of a midi device's operating system. Instructions on how to install firmware (OS) updates on the DR-2 are distributed together with the OS-updates.

In the SYSEX DUMP menu you can choose between "Drumset dump", "Pattern dump", "Song dump", and "Memory dump" turning the SELECT-control.

**Drumset, Pattern or Song dump** With Drumset, Pattern or Song Dump you send out a sysex message containing the actual drumset, pattern or song data. Press the MENU-button once, and confirm with MENU/YES (or cancel with EXIT/NO).

```
SYSEX DUMP  ?Y/N
Song Dump
```

**Memory dump** A Memory Dump creates a very long sysex message containing all of the drumsets, patterns or songs in memory. This way you can create a backup of the complete memory of the Modor DR-2. Select the SYSEX DUMP menu by pressing MENU 9x, turn the SELECT-control to select Memory Dump, press MENU again, and hit MENU/YES to confirm (or cancel with EXIT/NO).

```
SYSEX DUMP  ?Y/N
Memory Dump
```

Note that if the Modor DR-2 receives a Drumset, Pattern or Song dump, this is not yet stored permanently in it's memory. If you want to store the data you received, you still have to store them. This is of course different for a full memory dump, where a very large number of patches is sent through midi in a large bulk package. They have to be stored permanently immediatly upon reception of the data.

Note that the Modor DR-2 cannot receive midi bulk memory dumps at any speed. The received data need to be written into flash memory while receiving new data in the mean time. This means that at very high data speeds, some data might get lost.

The sysex messages contain a checksum to detect bad reception, such that you will be informed when something went wrong. Reduce the speed of your sysex program or sequencer if you experience problems with the reception of large sysex dumps.

## 5.8 Menu overview

LOAD Drumset Pattern Song	SYSTEM SETTINGS Midi Channel ProgChangeRx CtrlChangeRx SysexRx NoteOffRx CtrlChangeTx MidiClockTx MidiNotesTx ShowCtrlInpt Load Preview OS Version
SAVE Drumset Pattern Song	
NAME Drumset Pattern Song	
PATCH INIT Drumset Pattern Song	SYSEX DUMP Drumset Dump Pattern Dump Song Dump Memory Dump
COPY 01-16 .. 49-64 PATT A..PATT F DRUM A..DRUM F	

# 6

## MIDI Implementation

### 6.1 Midi channel

To have your DR-2 working together with other MIDI gear, first set the right MIDI channel in the SYSTEM SETTINGS menu, it's the first item in this menu. Press 6x MENU/YES to enter SYSTEM SETTINGS, use VALUE to set the MIDI channel (1-16).

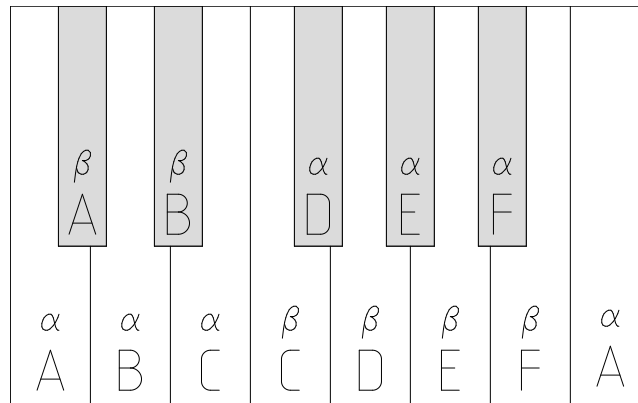
```
SYSTEM SETTINGS  
Midi Channel:01
```

### 6.2 MIDI note mapping

**Drum triggers** Next to the internal sequencer, the DR-2 can also be played by external keyboards, sequencers, DAWs, ... using MIDI note messages. You can also trigger reversing notes and note breaks using note messages.

To trigger the different instruments A-F in their  $\alpha$  and  $\beta$  variations, use the notes in the third octave, note numbers 48 to 59:

- Drum A is on C-3 ( $\alpha$ ) and C#-3 ( $\beta$ )
- Drum B is on D-3 ( $\alpha$ ) and D#-3 ( $\beta$ )
- Drum C is on E-3 ( $\alpha$ ) and F-3 ( $\beta$ )
- Drum D is on F#-3 ( $\alpha$ ) and G-3 ( $\beta$ )
- Drum E is on G#-3 ( $\alpha$ ) and A-3 ( $\beta$ )
- Drum F is on A#-3 ( $\alpha$ ) and B-3 ( $\beta$ )



**Reverse notes** To trigger a note reverse, use the same notes, but in the fourth octave, note numbers 60 to 71:

- Reverse drum A using C-4 or C#-4
- Reverse drum B using D-4 or D#-4
- Reverse drum C using E-4 or F-4
- Reverse drum D using F#-4 or G-4
- Reverse drum E using G#-4 or A-4
- Reverse drum F using A#-4 or B-4

**Breaks** Triggering a note break can be done using the same notes, but in the fifth octave, note numbers 72 to 83:

- Reverse drum A using C-5 or C#-5
- Reverse drum B using D-5 or D#-5
- Reverse drum C using E-5 or F-5
- Reverse drum D using F#-5 or G-5
- Reverse drum E using G#-5 or A-5
- Reverse drum F using A#-5 or B-5

**Note Off recognition** You can turn MIDI Note Off Recognition ON/OFF in the system settings menu (default:OFF). When enabled, the DR-2 recognises Note Off messages and interprets them as breaks and immediately ends the note corresponding to the Note Off note number. However, this can be very annoying when programming a rhythm on a sequencer or DAW, so it's default is OFF. But if you want to, you can enable it.

```
SYSTEM SETTINGS
NoteOffRx      : OFF
```

**Flams and tuplets** Flams and tuplets don't have their own note triggers, they are simply produced by sending the same note several times.

**Note transmission** You can turn MIDI note transmission ON/OFF in the system settings menu (DEFAULT:ON). When enabled, the DR-2 transmits MIDI note messages that can be recorded in external sequencers or DAWs. This way it is easy to use the DR-2's intuitive internal sequencer to do the basic design of your rhythms, and export them later on to a DAW or sequencer for further external treatment.

### 6.3 MIDI control changes

In the controller list below you can see the mapping of the instrument parameters to MIDI control changes. Both reception (CtrlChangeRx) and transmission (CtrlChangeTx) can be enabled and disabled in the System settings menu. With CtrlChangeTx ON control changes are sent when you turn a knob on the frontpanel. With CtrlChangeRx ON the DR-2 responds to incoming control change messages according to the controller numbers in the controller list below.

```
SYSTEM SETTINGS
CtrlChangeRx: ON
```

### 6.4 MIDI program changes

Program changes can be used to load patterns and drumsets via MIDI, in combination with Bank Select (Control Change CC#0). Bank Select 0, Program Change 0-63 loads Drumsets 1-64. Bank Select 1, Program Change 0-95 loads Patterns 1-96. Reception of MIDI Program Changes can be disabled in the System Settings menu (ProgChangeRx: ON/OFF). Also the reception of a bank select message CC#0 is enabled/disabled with ProgChangeRx, although is technically a control change.

```
SYSTEM SETTINGS
ProgChangeRx: ON
```

## 6.5 MIDI implementation chart

MIDI Implementation Chart v. 2.0			
Manufacturer: Modor Music Model: DR-2 Version: 1			
Date: August 2020			
	Transmit	Recognize	Remarks
<b>1. Basic Information</b>			
MIDI channels	[1-16]	[1-16]	
Note numbers	[48-83]	[48-83]	
Program change	-	[0-96]	
Bank Select response?	-	Yes	
Modes supported			
Mode 1: Omni-On, Poly	-	No	
Mode 2: Omni-On, Mono	-	No	
Mode 3: Omni-Off, Poly	-	Yes	
Mode 4: Omni-Off, Mono	-	Yes	
Multi Mode	-	No	
Note-On Velocity	-	Yes	
Note-Off Velocity	-	No	
Channel Aftertouch	-	No	
Poly (Key) Aftertouch	-	No	
Pitch Bend	-	No	
Active Sensing	No	No	
System Reset	No	No	
Tune Request	No	No	
Universal System Exclusive:			
Sample Dump Standard	No	No	
Device Inquiry	No	No	
File Dump	No	No	
MIDI Tuning	No	No	
Master Volume	No	No	
Master Balance	No	No	
Notation Information	No	No	
Turn GM1 System On	No	No	
Turn GM2 System On	No	No	
Turn GM System Off	No	No	
DLS-1	No	No	
File Reference	No	No	
Controller Destination	No	No	
Key-based Instrument Ctrl	No	No	
Master Fine/Coarse Tune	No	No	
Other Universal System Exclusive	No	No	
Manufacturer System Exclusive	Yes	Yes	
NRPNS	No	No	
RPN 00 (Pitch Bend Sensitivity)	No	No	
RPN 01 (Channel Fine Tune)	No	No	
RPN 02 (Channel Coarse Tune)	No	No	
RPN 03 (Tuning Program Select)	No	No	

6.5. MIDI IMPLEMENTATION CHART CHAPTER 6. MIDI IMPLEMENTATION

RPN 04 (Tuning Bank Select)	No	No	
RPN 05 (Modulation Depth Range)	No	No	
<b>2. MIDI Timing and Synchronization</b>			
MIDI Clock	Yes	Yes	
Song Position Pointer	No	No	
Song Select	No	No	
Start	Yes	Yes	
Continue	No	Yes	
Stop	Yes	Yes	
MIDI Time Code	No	No	
MIDI Machine Control	No	No	
MIDI Show Control	No	No	
<b>3. Extensions Compatibility</b>			
General MIDI compatible?	No	No	
Is GM default power-up mode?	No	No	
DLS compatible?	No	No	
Standard MIDI Files	No	No	
XMF Files	No	No	
SP-MIDI compatible?	No	No	

## 6.6 MIDI controller list

Control	Function	Transmitted	Received	Remarks
0	Bank Select <sup>1</sup>	No	Yes	
1		No	No	
2		No	No	
3		No	No	
4		No	No	
5		No	No	
6		No	No	
7		No	No	
8		No	No	
9		No	No	
10		No	No	
11		No	No	
12		No	No	
13		No	No	
14	Drum A Pitch	Yes	Yes	
15	Drum A Pitch Env Decay	Yes	Yes	
16	Drum A Pitch Env Curve	Yes	Yes	
17	Drum A Pitch Env Amount	Yes	Yes	
18	Drum A Volume	Yes	Yes	
19	Drum A Amp Decay	Yes	Yes	
20	Drum A Amp Curve	Yes	Yes	
21	Drum A Pan	Yes	Yes	
22	Drum A X	Yes	Yes	
23	Drum A Y	Yes	Yes	
24	Drum A Z	Yes	Yes	
25	Drum A T	No	No	
26	Drum B Pitch	Yes	Yes	
27	Drum B Pitch Env Decay	Yes	Yes	
28	Drum B Pitch Env Curve	Yes	Yes	
29	Drum B Pitch Env Amount	Yes	Yes	
30	Drum B Volume	Yes	Yes	
31	Drum B Amp Decay	Yes	Yes	
32		No	No	
33		No	No	
34		No	No	
35		No	No	
36		No	No	
37		No	No	
38		No	No	
39		No	No	
40		No	No	
41		No	No	

<sup>1</sup>CC#0, Bank Select 0: Program Change selects Drumsets, Bank Select 1: Program Change selects Patterns. Reception is disabled/enabled by the ProgChangeRx setting, instead of CtrlChangeRx.



Control	Function	Transmitted	Received	Remarks
42		No	No	
43		No	No	
44		No	No	
45		No	No	
46	Drum B Amp Curve	Yes	Yes	
47	Drum B Pan	Yes	Yes	
48	Drum B X	Yes	Yes	
49	Drum B Y	Yes	Yes	
50	Drum B Z	Yes	Yes	
51	Drum B T	Yes	Yes	
52	Drum C Pitch	Yes	Yes	
53	Drum C Pitch Env Decay	Yes	Yes	
54	Drum C Pitch Env Curve	Yes	Yes	
55	Drum C Pitch Env Amount	Yes	Yes	
56	Drum C Volume	Yes	Yes	
57	Drum C Amp Decay	Yes	Yes	
58	Drum C Amp Curve	Yes	Yes	
59	Drum C Pan	Yes	Yes	
60	Drum C X	Yes	Yes	
61	Drum C Y	Yes	Yes	
62	Drum C Z	Yes	Yes	
63	Drum C T	Yes	Yes	
64		No	No	
65		No	No	
66		No	No	
67		No	No	
68		No	No	
69		No	No	
70	Drum D Pitch	Yes	Yes	
71	Drum D Pitch Env Decay	Yes	Yes	
72	Drum D Pitch Env Curve	Yes	Yes	
73	Drum D Pitch Env Amount	Yes	Yes	
74	Drum D Volume	Yes	Yes	
75	Drum D Amp Decay	Yes	Yes	
76	Drum D Amp Curve	Yes	Yes	
77	Drum D Pan	Yes	Yes	
78	Drum D X	Yes	Yes	
79	Drum D Y	Yes	Yes	
80	Drum D Z	Yes	Yes	
81	Drum D T	Yes	Yes	
82	Drum E Pitch	Yes	Yes	
83	Drum E Pitch Env Decay	Yes	Yes	
84	Drum E Pitch Env Curve	Yes	Yes	
85	Drum E Pitch Env Amount	Yes	Yes	
86	Drum E Volume	Yes	Yes	
87	Drum E Amp Decay	Yes	Yes	
88		No	No	

Control	Function	Transmitted	Received	Remarks
89		No	No	
90		No	No	
91		No	No	
92		No	No	
93		No	No	
94		No	No	
95		No	No	
96		No	No	
97		No	No	
98		No	No	
99		No	No	
100		No	No	
101		No	No	
102	Drum E Amp Curve	Yes	Yes	
103	Drum E Pan	Yes	Yes	
104	Drum E X	Yes	Yes	
105	Drum E Y	Yes	Yes	
106	Drum E Z	Yes	Yes	
107	Drum E T	Yes	Yes	
108	Drum F Pitch	Yes	Yes	
109	Drum F Pitch Env Decay	Yes	Yes	
110	Drum F Pitch Env Curve	Yes	Yes	
111	Drum F Pitch Env Amount	Yes	Yes	
112	Drum F Volume	Yes	Yes	
113	Drum F Amp Decay	Yes	Yes	
114	Drum F Amp Curve	Yes	Yes	
115	Drum F Pan	Yes	Yes	
116	Drum F X	Yes	Yes	
117	Drum F Y	Yes	Yes	
118	Drum F Z	Yes	Yes	
119	Drum F T	Yes	Yes	
120		No	No	
121		No	No	
122		No	No	
123		No	No	
124		No	No	
125		No	No	
126		No	No	
127		No	No	



