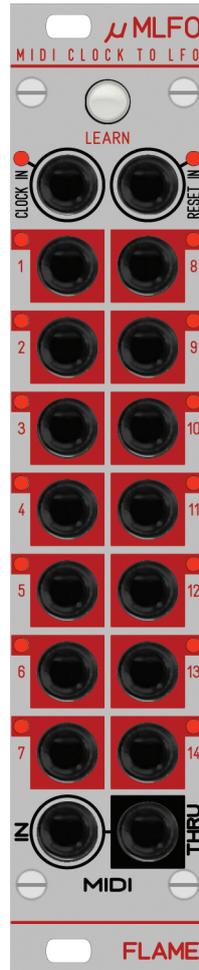


# FLAME

## μMLFO



# MANUAL

Version 1.00

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# 1. Short description

The "µMLFO" module provides 14 synchronizable (or free-running) LFOs with bipolar voltage output (+-5V). It can be operated via MIDI or analog clock. The tempo of the LFOs is determined by the speed of the corresponding clock and the divider settings (rate).

After receiving a MIDI Start command, the LFOs will run to MIDI clock and will then sync their rate accordingly. One of 24 patches can be selected via MIDI. The receive MIDI channel is set with the LEARN button. Up to 12 of your own patches can be loaded per SYSEX dump. These are individual settings for the 14 LFOs. This includes the waveform, rate, sync and phase (shifting the start point of the waveform).

When stopped (i.e. after receiving a MIDI stop command or after switching on), the module can be operated with 16th analog clock.

# 2. Hardware / Connection

## 2.1 Connection to the euro rack modular system (Doepfer bus)

The module is delivered with a connected ribbon cable for the Doepfer bus. The red lead marks -12 volt. Connecting the module please note the right polarity!

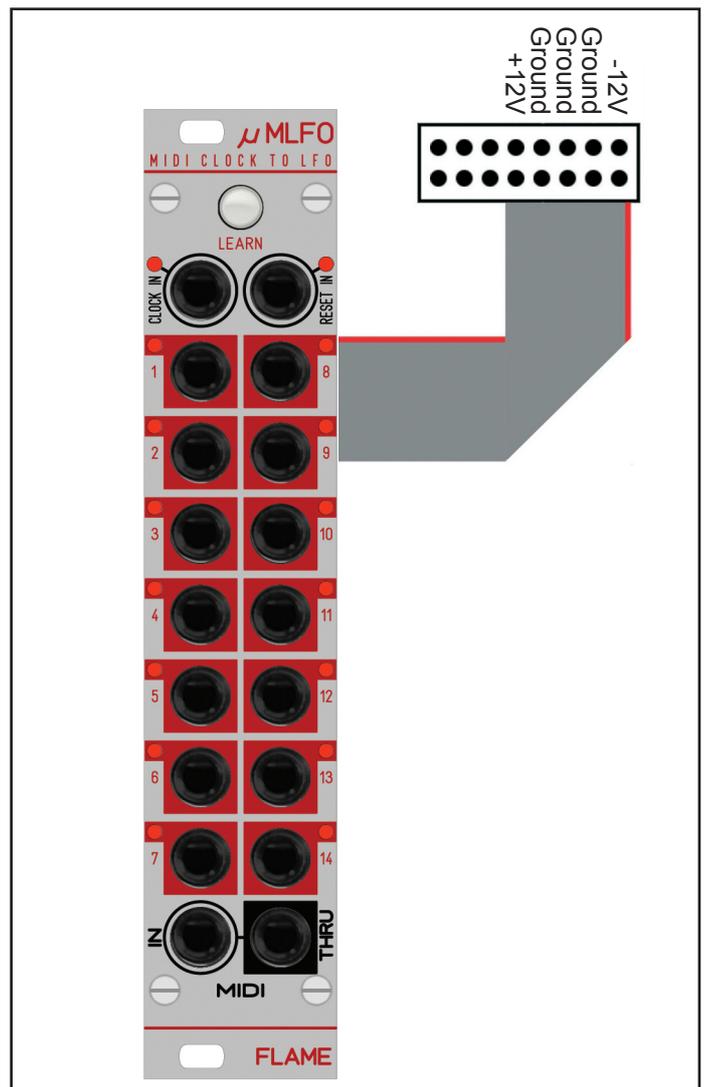
If the module is poled accidentally wrong safety diodes avoid the immediate destruction of the module but further damages cannot be expected.

**So please pay attention:** Check the connection various times before switching on!

The current consumption of the module is on average 50mA, but can reach peaks up to a maximum of +80mA!

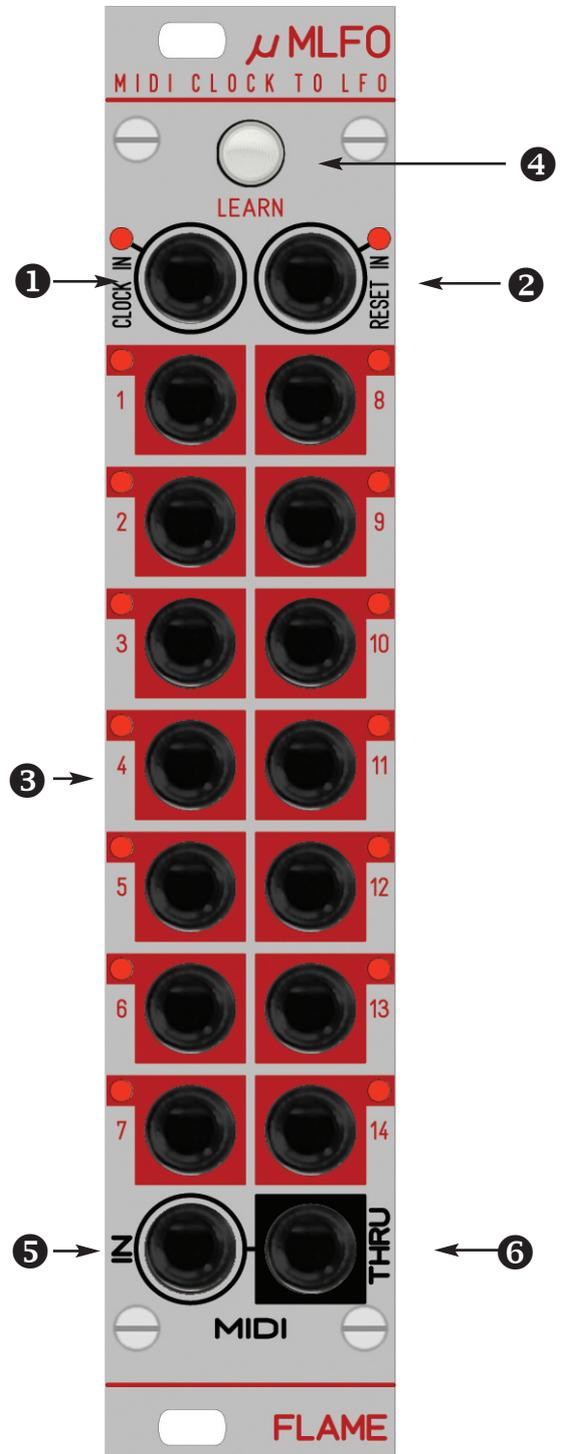
### CAUTION!

Do not accidentally connect the MIDI THRU output to high CV voltages! This can possibly damage the hardware!



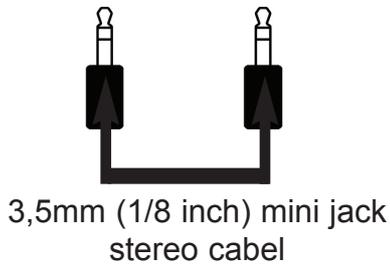
## 2.2 Modul overview

- ❶ Analog 16th clock Gate/Trigger input (0/+5v)
- ❷ Analog Reset Gate/Trigger input (0/+5v)
- ❸ 14 LFO outputs bipolar (-5v..+5v)
- ❹ LEARN key
- ❺ MIDI input (MIDI TRS-B standard)
- ❻ MIDI THRU output (MIDI TRS-B standard)

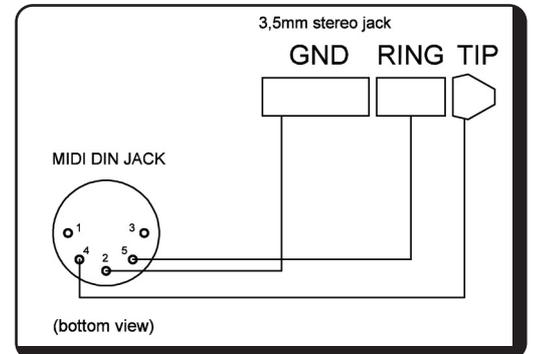


## 2.3 MIDI connections

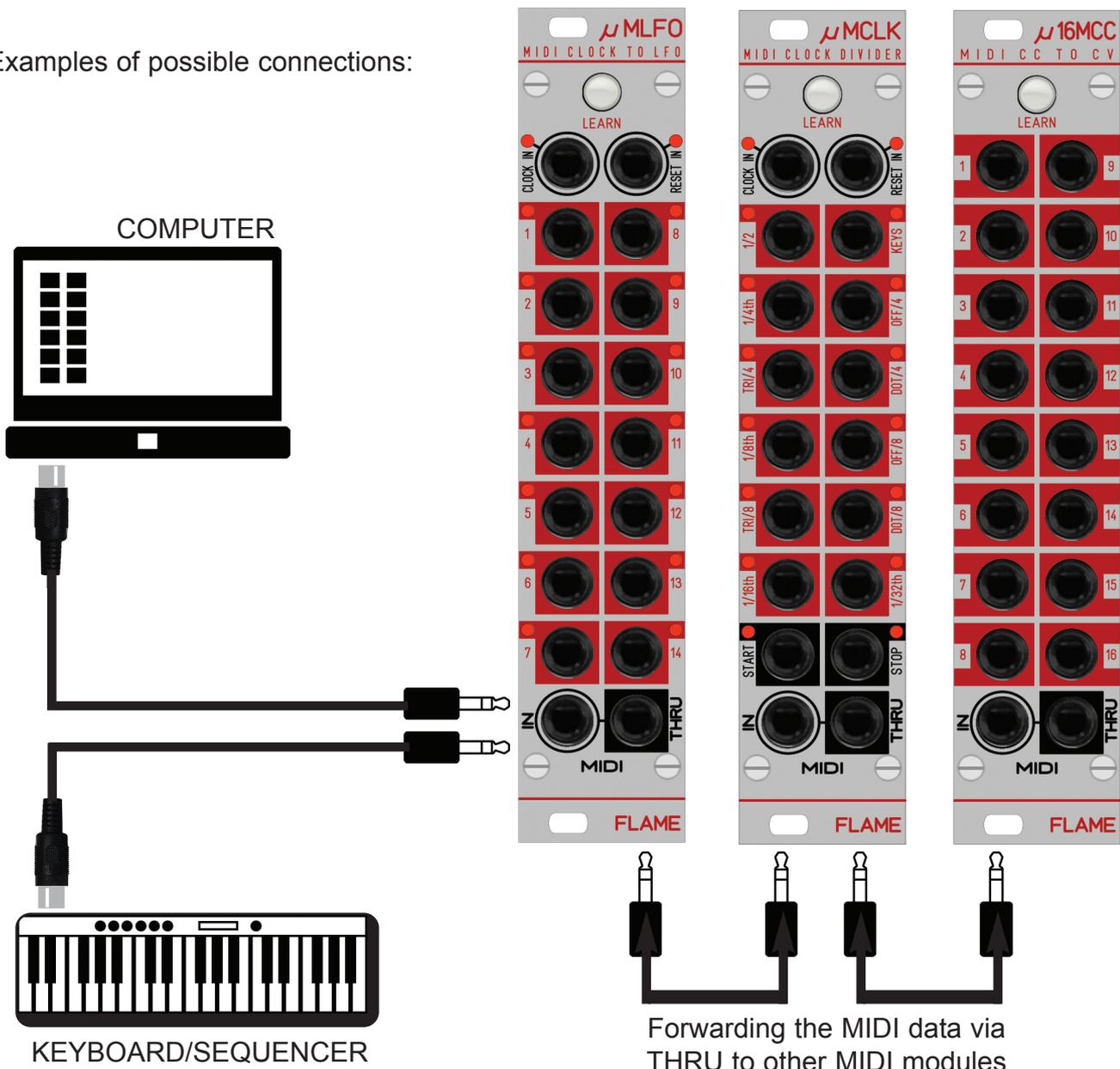
The module has two MIDI sockets (TRS-B standard mini jacks) INPUT and THRU. Connect the MIDI input to the MIDI output of your keyboard / sequencer or computer. The data received at MIDI-IN is forwarded via MIDI-THRU. A corresponding commercially available adapter (MIDI-DIN to Mini TRS-B) or a 3.5mm (1/8 inch) stereo jack cable is used for the MIDI connection.



**Adaptor schemata**  
MIDI DIN jack to 3,5mm (1/8 inch) mini jack MIDI TRS-B standard



Examples of possible connections:



# 3. Handling

## 3.1 RATE - CLOCK MODI

### RATE (LFO Speed)

The LFO speed results from the tempo of the external analog or MIDI clock and from the RATE dividers specified in the patch (see list of patches and SYSEX values). Values between 32nd notes and 128 bars can be set. The speed does not reach into the higher audio range!

### MIDI CLOCK

Connect the module's MIDI input to the MIDI output of a device that can send MIDI start/stop and MIDI clock commands. After starting the MIDI clock, the module needs one beat to sync to the tempo. With this second beat, all LFOs are reset (i.e. restarted with the set phase). After that, only those LFOs that are activated in the active patch are reset. The reset time is defined globally in the patch. This can be between one and 12 bars.

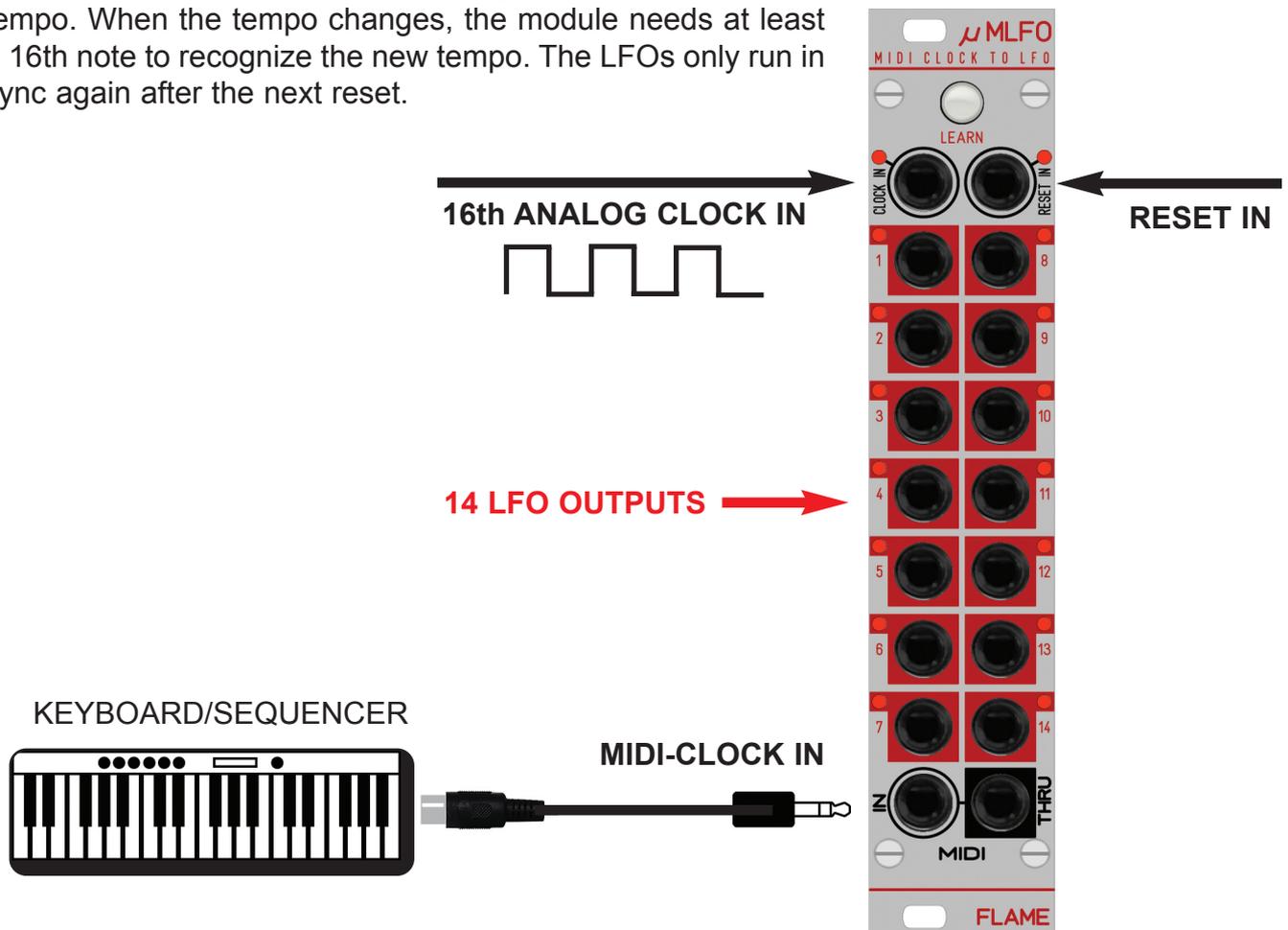
When the MIDI clock is stopped, the LFOs continue to spin at the same speed, free and unsynced. The MIDI tempo should be in the range of 40-200 bpm.

### ANALOG CLOCK

Send 16th pulse trains to the analog clock input of the module (with the MIDI clock stopped). The LFOs synchronize after one bar (16 clock pulses). With the reset input you reset the LFOs (common starting point of the set phases).

### ADVICE:

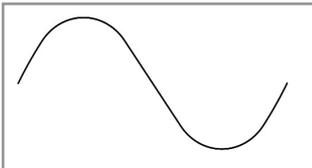
Note that the clock (MIDI or analog) must have an even tempo. When the tempo changes, the module needs at least a 16th note to recognize the new tempo. The LFOs only run in sync again after the next reset.



## 3.2 LFO - WAVE (Waveform)

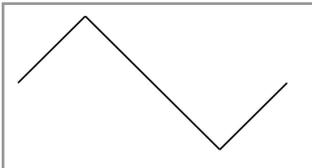
The module has 17 different waveforms (numbers 0-16). These are or can be placed on any output. The assignments of the outputs are defined in 12 unchangeable preset patches, but another 12 patches can be loaded via SYSEX file.

The waveforms are generated digitally according to the DDS principle (Digital Direct Synthesis). They are in tables and have a resolution of 10bit with 16bit values. They are output via 12-bit DA converters, which are smoothed with passive RC filters.



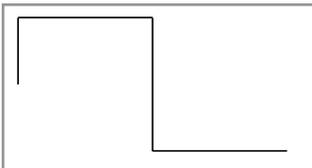
### 0. **Sine**

Classic sine waveform. This waveform can be used to create floating or evenly rising and falling effects.



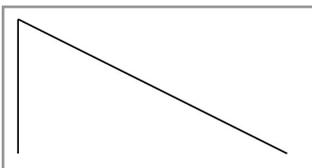
### 1. **Triangle**

Classic triangle waveform. With the help of this waveform, you can create floating effects or effects that rise and fall evenly and linearly.



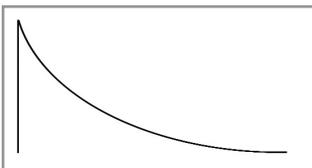
### 2. **Square** (square puls)

Square waveform with 50% duty cycle.



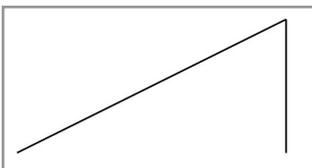
### 3. **Down-lin** (Down 1 - falling sawtooth)

Linear falling sawtooth.



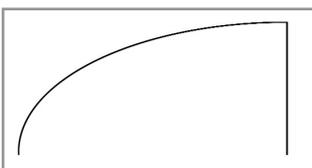
### 4. **Down-exp** (Down 2 - decay waveform)

Exponentially fast decay wave (slowing down).



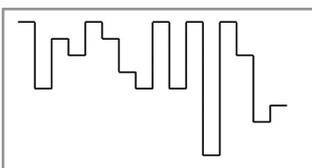
### 5. **UP-Lin** (rising sawtooth)

Linear increasing waveform.



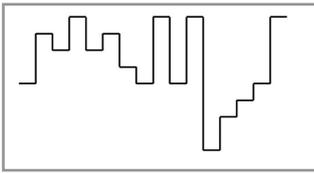
### 6. **UP-Log** (rising waveform)

Logarithmic fast rising waveform (slowing down).

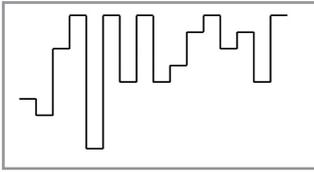


### 7. **SH1** (Sample & Hold 1 - sequence)

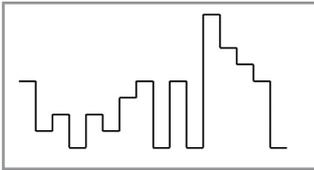
16 step square sequence.



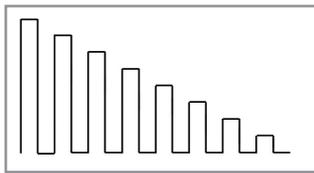
8. **SH2** (Sample & Hold 2 - sequence)  
16 step square sequence.



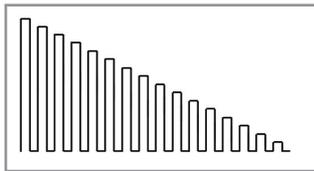
9. **SH3** (Sample & Hold 3 - sequence)  
16 step square sequence.



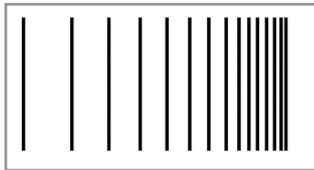
10. **SH4** (Sample & Hold 4 - sequence)  
16 step square sequence.



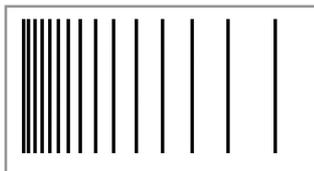
11. **ECHO1** (pulse echo)  
Linearly decreasing 8 step pulse sequence.



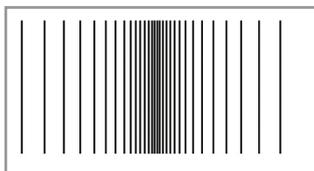
12. **ECHO2** (Pulse Echo)  
Linearly decreasing 16 step pulse sequence.



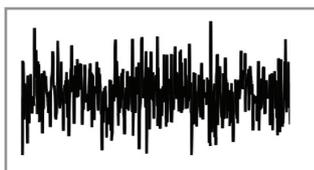
13. **Jump1** (bouncing ball)  
Pulse sequence (getting faster)



14. **Jump2** (bouncing ball)  
Pulse sequence (slowing down)



15. **Jump3** (bouncing ball - PingPong)  
Pulse sequence (faster and slower again)



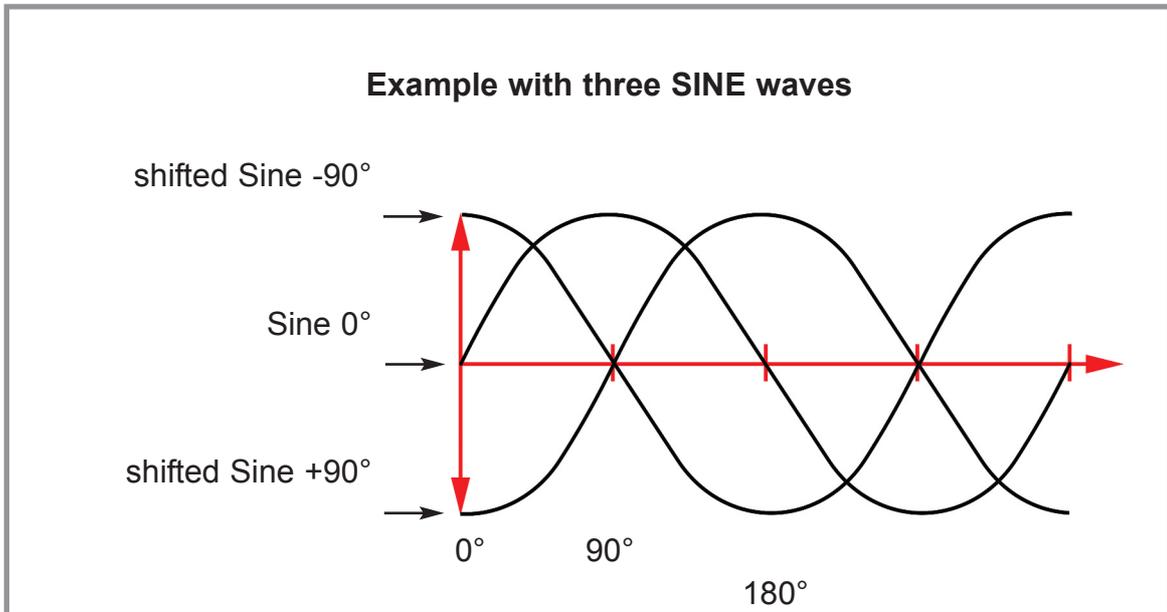
16. **RANDOM** (Random sequence of 1024 values)  
Determined noise waveform (digital noise).  
**Note:** The waveform contains 1024 specified random values that repeat on each iteration.

### 3.3 LFO - PHASE (Phase shift)

The starting point of the waveform can be set in 22.5° increments. This allows, for example, offbeat waveforms to be realized at the same rate (180° shift).

In the 12 preset patches you will find some preset phase shifts (see list).

You can change the phases of the LFOs in the 12 user patches via SYSEX (see appendix SYSEX).



#### ADVICE:

The LFOs are set back to the set phase during a reset. If the LFO Sync is switched on, the LFO is automatically reset to the clock according to the rate. Free-running LFOs are only reset at MIDI start and when changing a patch.

The phase change only becomes effective after a successful reset. A rate change in sync occurs at the next 16th note and the LFO is re-synced at the next (set) beat.

### 3.4 SYNC and RESET

After starting the MIDI clock, the module needs one beat to sync to the tempo of the clock. At the start and at the second bar, all LFOs are reset (i.e. restarted with the set phase). After that, those LFOs that are activated in the active patch are automatically reset. The reset time is defined globally in the patch. This can be between one and 12 bars. The analog RESET input is ineffective for SYNC with MIDI clock.

With an analog clock, all 14 LFOs can be reset using the RESET input. Then, as with MIDI Clock, it is automatically reset (with the appropriate settings of the patch). The RESET input behaves like START with MIDI Clock: After another bar it is automatically reset and then automatically at the point in time that is specified in the patch (between 1 and 12 bars).

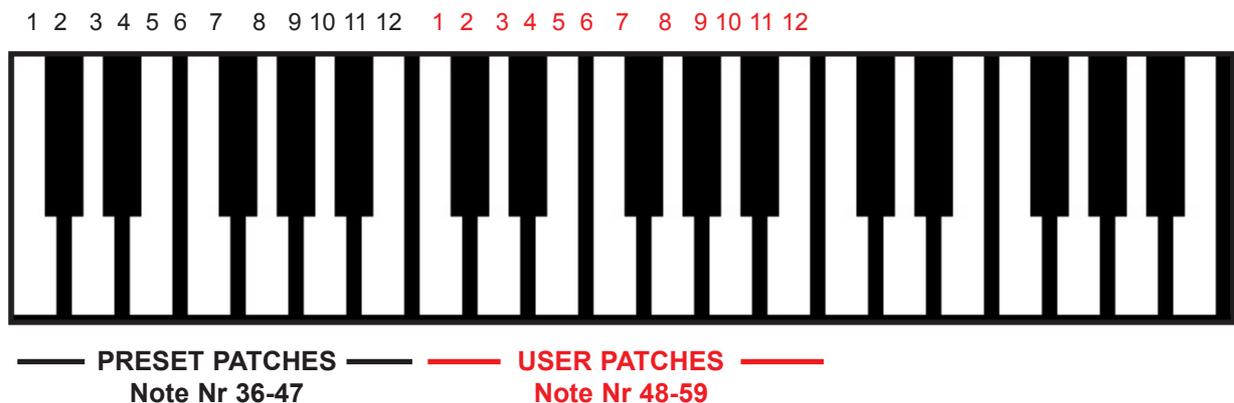
### 3.5 PATCH SELECT - LEARN FUNCTION

The module has 24 patches with LFO settings. The first 12 patches are included preset patches (see lists below). There are 12 user patches on another 12 patches, which can be overwritten via SYSEX dump (see SYSEX below).

The SYSEX file of type "GLOBAL SETUP" can be used to determine which patch is loaded when the module is switched on (as well as the MIDI receive channel for changing the patch). The default is MIDI channel 1 and preset patch 1.

To change the patch, send MIDI notes on the set receive channel. The patches are over 2 octaves starting at note number 36 (see graphic).

On the Flame website in the download area you will find some ready-made SYSEX files for USER presets and GLOBAL SETUPS.



#### LEARN (MIDI channel and PATCH Load number)

With the LEARN function you can specify the MIDI receive channel and the PATCH, which is automatically loaded when switching on:

To do this, press the LEARN button until it flashes. Then send any note from your connected MIDI keyboard on the desired MIDI channel. The new MIDI channel is automatically saved permanently.

If the received MIDI note is in the range from 36 to 59, the PATCH assigned to the note (see graphic above) is loaded. In addition, this number is saved and now this PATCH is automatically loaded when switching on.

The LEARN mode is automatically terminated after receiving the note (button LED off).

#### ADVICE:

If you only want to change the MIDI channel with LEARN, then select a note outside the PATCH note range.

#### INIT: Factory reset

To reset to the default, press and hold the LEARN button while powering on the module until it is lit. Release the button. Now the original 12 user patches are restored and starting with MIDI channel 1 and preset patch 1 is set. The init procedure takes about 45 seconds.

## 4. PATCH OVERVIEW

### 4.1 LIST OF PRESET PATCHES 1-4

PATCH 1 "Dotted Mix"				
LFO	WAVE	RATE	PHASE	RESET
1	Square	16th	0°	on
2	Down_Exp	8th	0°	on
3	Down-Exp	4th	0°	on
4	Up-Lin	1/2	0°	on
5	SH2	1Bar	0°	on
6	Jump3	2Bars	0°	on
7	Sine	8Bars	0°	off
8	Down-Exp	16th-Dot	0°	on
9	Down-Exp	8th-Dot	0°	on
10	Down-Lin	4th-Dot	0°	on
11	Up-Lin	1/2-Dot	0°	on
12	Up-Lin	1,5Bars	0°	on
13	Triangle	3Bars	0°	on
14	Sine	32Bars	0°	off

Patch Reset: 8 Bars  
MIDI Note Number: 36

PATCH 2 "Classic Waves"				
LFO	WAVE	RATE	PHASE	RESET
1	Sine	8th	0°	on
2	Sine	4th	0°	on
3	Up-lin	1/2	0°	on
4	Up-lin	1Bar	0°	on
5	Square	16th	0°	on
6	Square	4th	0°	on
7	Random	4Bars	0°	off
8	Triangle	8th	0°	on
9	Triangle	4th	0°	on
10	Down-lin	1/2	0°	on
11	Down-lin	1Bar	0°	on
12	Square	8th	0°	on
13	Square	1/2	0°	on
14	Random	64Bars	0°	off

Patch Reset: 2 Bars  
MIDI Note Number: 37

PATCH 3 "Sine Variations 1"				
LFO	WAVE	RATE	PHASE	RESET
1	Sine	8th	0°	on
2	Sine	4th	0°	on
3	Sine	1/2	0°	on
4	Sine	1Bar	0°	on
5	Sine	2Bars	0°	on
6	Sine	4Bars	0°	on
7	Sine	8Bars	0°	on
8	Sine	8th	180°	on
9	Sine	4th	180°	on
10	Sine	1/2	180°	on
11	Sine	1Bar	180°	on
12	Sine	2Bars	180°	on
13	Sine	4Bars	180°	on
14	Sine	8Bars	180°	on

Patch Reset: 3 Bars  
MIDI Note Number: 38

PATCH 4 "Sine Variations 2"				
LFO	WAVE	RATE	PHASE	RESET
1	Sine	4th	0°	on
2	Sine	4th	90°	on
3	Sine	4th	180°	on
4	Sine	4th	270°	on
5	Sine	1Bar	0°	on
6	Sine	1Bar	90°	on
7	Sine	1Bar	180°	on
8	Sine	16th	0°	on
9	Sine	8th	0°	on
10	Sine	4th-Tri	0°	on
11	Sine	1/2-Tri	0°	on
12	Sine	1-Tri	0°	on
13	Sine	1/2	0°	on
14	Sine	2Bars	0°	on

Patch Reset: 1 Bar  
MIDI Note Number: 39

## 4.2 LIST OF PRESET PATCHES 5-8

PATCH 5 "Beats 1"				
LFO	WAVE	RATE	PHASE	RESET
1	SH1	1Bar	0°	on
2	SH2	1Bar	0°	on
3	SH3	2Bars	0°	on
4	SH4	2Bars	0°	on
5	DownExp	8th	0°	on
6	DownExp	4th	0°	on
7	DownExp	1/2	0°	on
8	Echo1	2Bar	0°	on
9	Echo2	2Bar	0°	on
10	Jump1	1Bar	0°	on
11	Jump2	2Bar	0°	on
12	Jump3	2Bars	0°	on
13	DownLin	4th-Tri	0°	on
14	DownLin	1/2-Tri	0°	on

Patch Reset: 2 Bars  
MIDI Note Number: 40

PATCH 6 "Beats 2"				
LFO	WAVE	RATE	PHASE	RESET
1	DownExp	16th	0°	on
2	DownExp	8th	0°	on
3	DownExp	4th	0°	on
4	DownExp	1/2	0°	on
5	DownExp	1Bar	0°	on
6	Up-Lin	1Bar	0°	on
7	SH2	1Bar	0°	on
8	DownExp	8th-Dot	0°	on
9	DownExp	4th-Dot	0°	on
10	DownExp	1/2-Dot	0°	on
11	DownLin	1Bar	0°	on
12	Echo2	1Bar	0°	on
13	Sine	9Bars	0°	off
14	Sine	16Bars	0°	off

Patch Reset: 3 Bars  
MIDI Note Number: 41

PATCH 7 "Fast to very slow "				
LFO	WAVE	RATE	PHASE	RESET
1	Down-Exp	32th	0°	on
2	Down-Exp	8th	0°	on
3	Down-lin	1Bar	0°	on
4	Up-lin	4Bars	0°	off
5	Sine	16Bars	90°	off
6	Sine	48Bars	180°	off
7	Sine	96Bars	0°	off
8	Down-Exp	16th	0°	on
9	Down-Exp	4th	0°	on
10	Down-lin	1/2	0°	on
11	Triangle	2Bar	0°	on
12	Sine	32Bars	0°	off
13	Sine	64Bars	0°	off
14	Sine	128Bars	0°	off

Patch Reset: 2 Bar  
MIDI Note Number: 42

PATCH 8 "Sync & Free "				
LFO	WAVE	RATE	PHASE	RESET
1	Square	32th	0°	on
2	Down-Exp	16th	0°	on
3	Down-Exp	8th	0°	on
4	Sine	4th	0°	on
5	Sine	1/2	0°	on
6	Sine	1Bar	0°	on
7	Sine	3Bars	0°	on
8	Down-Lin	8th-Dot	0°	on
9	Down-Lin	4th-Dot	0°	on
10	Down-Lin	1/2-Dot	0°	on
11	Up-Exp	1Bar	0°	on
12	Up-Lin	3Bars	90°	on
13	Sine	17Bars	180°	off
14	Sine	41Bars	180°	off

Patch Reset: 3 Bars  
MIDI Note Number: 43

### 4.3 LIST OF PRESET PATCHES 9-12

PATCH 9 "Triplets"				
LFO	WAVE	RATE	PHASE	RESET
1	Square	16th	0°	on
2	Down-Exp	8th-Tri	0°	on
3	Down-Exp	1/2-Tri	0°	on
4	Triangle	1/2-Tri	0°	on
5	Sine	1Bar	0°	on
6	Sine	2Bars	0°	on
7	Sine	8Bars	0°	off
8	Square	4th	0°	on
9	Down-Exp	4th-Tri	0°	on
10	Down-Exp	1-Tri	0°	on
11	Triangle	1-Tri	0°	on
12	Sine	1Bar	180°	on
13	Sine	2Bars	180°	on
14	Sine	8Bars	180°	off

Patch Reset: 2 Bars  
MIDI Note Number: 44

PATCH 10 "Mixed"				
LFO	WAVE	RATE	PHASE	RESET
1	Down-Exp	16th	0°	on
2	Down-Exp	8th-Tri	0°	on
3	Down-Exp	8th	0°	on
4	Down-Exp	4th-Tri	0°	on
5	Down-Exp	8th-Dot	0°	on
6	Down-Exp	4th	0°	on
7	Down-Exp	1/2-Tri	0°	on
8	SH2	1Bar	0°	on
9	Sine	1,5Bars	0°	on
10	Sine	3Bars	0°	on
11	Jump1	1Bar	0°	on
12	Jump2	1Bar	0°	on
13	Tri	3Bars	0°	on
14	Sine	5Bars	0°	off

Patch Reset: 3 Bars  
MIDI Note Number: 45

PATCH 11 "Square"				
LFO	WAVE	RATE	PHASE	RESET
1	Square	32th	0°	on
2	Square	8th	0°	on
3	Square	1/2	0°	on
4	Sine	2Bars	0°	on
5	SH1	1Bar	0°	on
6	SH2	1Bar	0°	on
7	SH3	1Bar	0°	on
8	Square	16th	0°	on
9	Square	4th	0°	on
10	Echo1	2Bars	0°	on
11	Echo2	2Bars	0°	on
12	Jump3	2Bars	0°	on
13	Jump3	4Bars	0°	off
14	Jump3	6Bars	0°	off

Patch Reset: 2 Bar  
MIDI Note Number: 46

PATCH 12 "Noise"				
LFO	WAVE	RATE	PHASE	RESET
1	SH1	1Bar	0°	on
2	SH2	1Bar	0°	on
3	SH3	1Bar	0°	on
4	SH4	1Bar	0°	on
5	Jump1	2Bars	0°	on
6	Jump2	2Bars	0°	on
7	Jump3	4Bars	0°	on
8	Random	1/2	0°	off
9	Random	1,5Bars	180°	off
10	Random	2Bars	180°	off
11	Random	7Bars	180°	off
12	Random	13Bars	180°	off
13	Random	32Bars	180°	off
14	Random	64Bars	180°	off

Patch Reset: 4 Bars  
MIDI Note Number: 47

## 4.4 SYSEX Data format

The module can be reprogrammed using MIDI SYSEX files. For example, use a program like MIDI-OX, which can be used to create and transfer sysex files.

The module understands two different types of SYSEX files:

With the first type “**GLOBAL SETUP DATA**” only 2 global parameters are transmitted: the receive MIDI channel and the number of the patch, which is automatically loaded at power-up. This data can also be changed with the LEARN function (see chapter LEARN).

With the second type “**USER PATCH DATA**” all settings of the LFOs are changed for one patch at a time (User Patches 13-24). There are 12 memory locations (patches 13-24) into which you can load your own setups of the LFO parameters.

The following values can be changed for each LFO per patch: Wave (waveform), rate (clock divider), phase (reset offset), reset on/off. In addition, there is a value that determines the reset time (in whole bars) for all LFOs (except those LFOs that have reset set to OFF).

### ADVICE:

If the LFO data is not within the permitted value range, the transfer of the SYSEX file is aborted and an error message appears (flashing twice).

If the SYSEX file was transferred successfully, the LEARN LED only flashes once.

Examples of SYSEX files for the LFO Module can be downloaded from the download area on [www.flame-instruments.com](http://www.flame-instruments.com)

### 1. GLOBAL SETUP DATA

SYX file changing global parameters:

- the MIDI receive channel for selecting a patch: value range 0-15
- Number of the patch, which is automatically loaded when switching on: value range 0-23

<b>11110000</b>	<b>F0</b>	Exclusive Status
<b>01111101</b>	<b>7D</b>	Header Flame module
<b>00001011</b>	<b>0E</b>	Flame module “µMLFO”
<b>00000001</b>	<b>01</b>	version 1
<b>00000110</b>	<b>06</b>	data type (global setup)
<b>0000xxxx</b>	<b>ch</b>	receive MIDI channel (00-0F hex)
<b>000xxxxx</b>	<b>pt</b>	load Patch NR (00-17 hex)
<b>11110111</b>	<b>F7</b>	End of Exclusive

(total 8 bytes)

## 2. USER PATCH DATA

SYX file with the values of a USER patch with the data of the 14 LFOs:

- 1 byte patch number (storage location 1-12 of the sysex file = patch number 13-24)
- 1 byte global reset value of the patch (in bars 1-12, 0=off)
- 70 bytes of data from the 14 LFOs, each with values for phase, rate, wave, reset on/off

<b>11110000</b>	<b>F0</b>	<b>Exclusive Status</b>	
<b>01111101</b>	<b>7D</b>	<b>Header Flame module</b>	
<b>00001011</b>	<b>0E</b>	<b>Flame module "μMLFO"</b>	
<b>00000001</b>	<b>01</b>	<b>version 1</b>	
<b>00000110</b>	<b>07</b>	<b>data type (User Patch Data)</b>	
<b>0000xxxx</b>	<b>pt</b>	<b>Patch NR (00-0B hex) &gt;&gt; 0-11 = Patches 12-24</b>	} <b>USER DATA</b>
<b>0000xxxx</b>	<b>rs</b>	<b>Reset Patch (00-0C hex) &gt;&gt; 0-12 = off, 1-12 Bars</b>	
<b>0xxxxxxx</b>	<b>data</b>	<b>Data 14 LFOs total 70bytes</b>	
		--	
<b>0xxxxxxx</b>	<b>data</b>	--	
<b>11110111</b>	<b>F7</b>	<b>End of Exclusive</b>	

(total 78 bytes)

### DESCRIPTION OF USER DATA:

Successively, 72 bytes in this order result in the user patch data:

#### 1 byte with the patch number (where the file is loaded)

1 byte (value range = 0..11) corresponds to patch numbers 13-24 (user patches)

#### 1 byte with the reset value of the patch (whether and when it is automatically reset)

1 byte (value range = 0..12 bars) 0=OFF, 1-12 in bars

#### consecutively 14 x 5 bytes per LFO (total 70 bytes):

##### 1 byte for phase shift in 22.5° steps (value range = 0..15)

Example1: 0 = LFO has no phase shift ( $0 \times 22.5^\circ = 0^\circ$ )

Example2: 8 = LFO has a phase shift of  $8 \times 22.5^\circ = 180^\circ$

##### 2 bytes for the rate (speed) (value range 32nd .. 128 clocks)

1st byte = number of bars (0..127), 2nd byte = ticks (0..96)

Lowest value = 0 bars + 3 ticks  $\Rightarrow$  32nd, Highest value = 127 bars + 96 ticks  $\Rightarrow$  128 bars

Example 1: Byte 1=1, byte 2=24, gives a rate of one bar+24ticks= 1bar+1/4th note

Example 2: byte 1=0, byte 2=12, gives a rate of zero bars+12ticks= 1/8th note

Example3: byte 1=4, byte 2=0, gives a rate of 4 ticks+0 ticks= 4 ticks

##### 1 byte for the wave number (value range = 0..16)

Example1: 0 = SINE

Example2: 13 = Jump1

##### 1 byte with reset on/off (value range = 0..1)

Example1: 1 = LFO reset follows the RESET PATCH value (see above).

Example2: 0 = LFO is not reset (runs freely).

## 4. Appendix

### 4.1. Technical details

#### Connections:

Ribbon cable adapter for Doepfer bus +/-12Volt  
Inputs: 2x Clock/Gate, Reset (0/+5..10V), 3,5mm mono jacks  
1x MIDI (TRS-B Standard) 3,5mm stereo jack  
Outputs: 1x MIDI (TRS-B Standard) 3,5mm stereo jack  
14x LFO CV outputs (bipolar+-5V), 3,5mm mono jacks

#### Control elements:

1 push button with LED (LEARN key)  
16 LED's

**Current consumption:** max. +70..80mA / - 50 mA

**Size:** Euro rack format 3U / 6HP 30x128,5x40 mm

### 4.2 Warranty

Beginning from the date of purchase a 2-year warranty is guaranteed for this device in case of any manufacturing errors or other functional deficiencies during runtime. The warranty does not apply in case of:

- damage caused by misuse
- mechanical damage arising from careless treatment (dropping, vigorous shaking, mishandling, etc)
- damage caused by liquids penetrating the device
- heat damage caused by overexposure to sunlight or heating
- electric damage caused by improper connecting  
(wrong power supply/ jacks/ MIDI connections/ voltage problems).

If you have any complaints please contact your dealer or send an e-mail to:

**service@flame-instruments.de**

### 4.3 Terms of production

conformity: CE, RoHS, UL

### 4.4 Disposal

The device is produced with RoHS-conformity (subject to the regulations of the European Union) and is free of hazardous substances (like mercury, plumb, cadmium and hexavalent chrome). But electronical scrap is hazardous waste. Please don't add this to consumer waste. For an environment friendly disposal of waste please contact your distributor or specialist dealer.

### 4.3 Support

Updated and additional informations, updates, downloads and more see:  
[www.flame-instruments.de](http://www.flame-instruments.de)

### 4.4 Acknowledgment

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