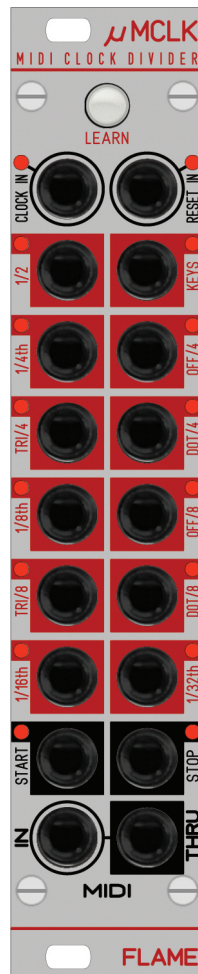


FLAME

MIDI / ANALOG - DIVIDER



MANUAL

Version 1.00

Contents

| | |
|---|--------------|
| 1. Short description..... | 3 |
| 2. Hardware / connections..... | 3 |
| 2.1 Connection to the modular system (Doepfer bus) | 3 |
| 2.2 Module overview | 4 |
| 2.3 MIDI connections | 5 |
| 3. Handling | 6 |
| 3.1 MODE: MIDI-Clock-Divider | 6 |
| 3.2 MIDI Divider outputs | 7 |
| 3.3 KEYS Trigger output / LEARN function | 8 |
| 3.4 MODE: Analog-Clock-Divider / RESET function | 9 |
| 3.5 Analog clock divider assignment | 10 |
| 3.6 Overview of divider assignment | 10-11 |
| 3.7 SYSEX data format | 12 |
| 4. Appendix and technical informations | 13 |
| 4.1 Technical details | |
| 4.2 Warrenty | |
| 4.3 Terms of production | |
| 4.4 Disposal | |
| 4.5 Support | |
| 4.6 Acknowledgment | |

1. Short description

The "µMCLK Divider" module can either work as a MIDI clock divider or as an analog clock divider. The divider outputs are assigned differently in both operating modes.

After receiving a MIDI start command, the module works as a MIDI clock divider. There are fixed dividers on 11 outputs. Via the divider output KEYS, triggers can be triggered and mixed via MIDI notes. The keyboard zone extends over three octaves. With the help of the LEARN key, the receive MIDI channel and the lowest note of this 3-octave range can be defined.

When stopped (i.e. after receiving a MIDI stop command or after switching on), the module works as an analog clock divider and divides the analog clock present at the CLOCK input. The 12 analog divider outputs can be reprogrammed via SYSEX. Ready-made SYSEX files are already available (e.g. for even / odd dividers, Fibonacci series, offbeats, etc.). The RESET input resets the analog counters or serves to deactivate the analog divider.

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!

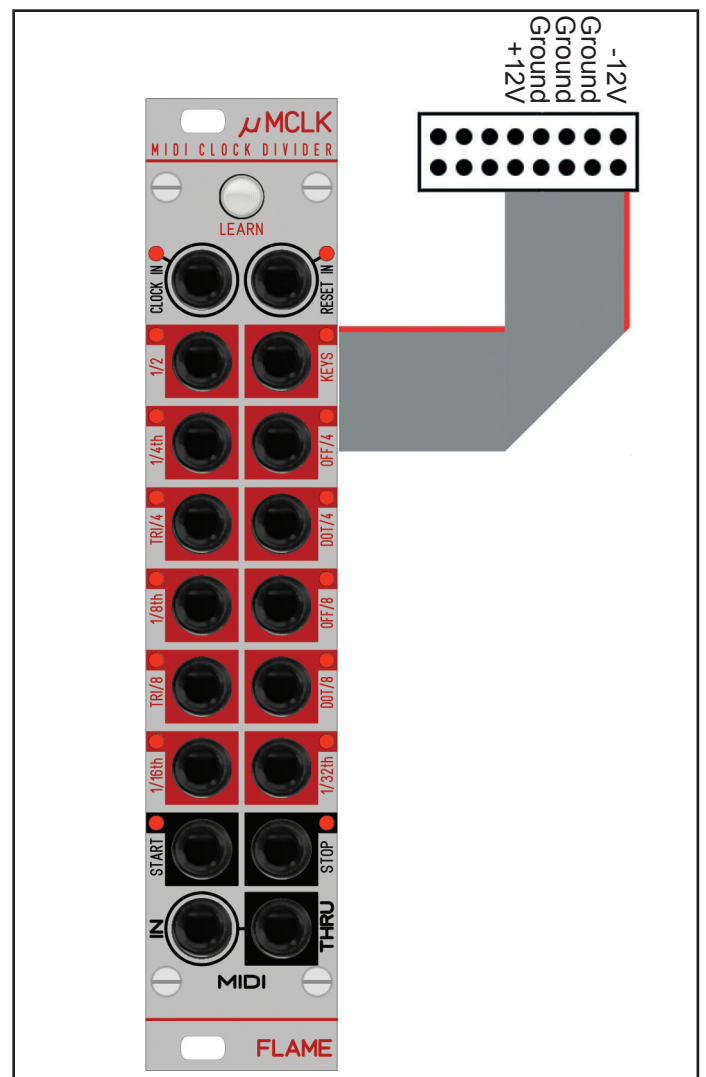
If the module is poled accidentally wrong safety diodes avoid the immediate destruction of the module but further damages cannot be expected.

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!

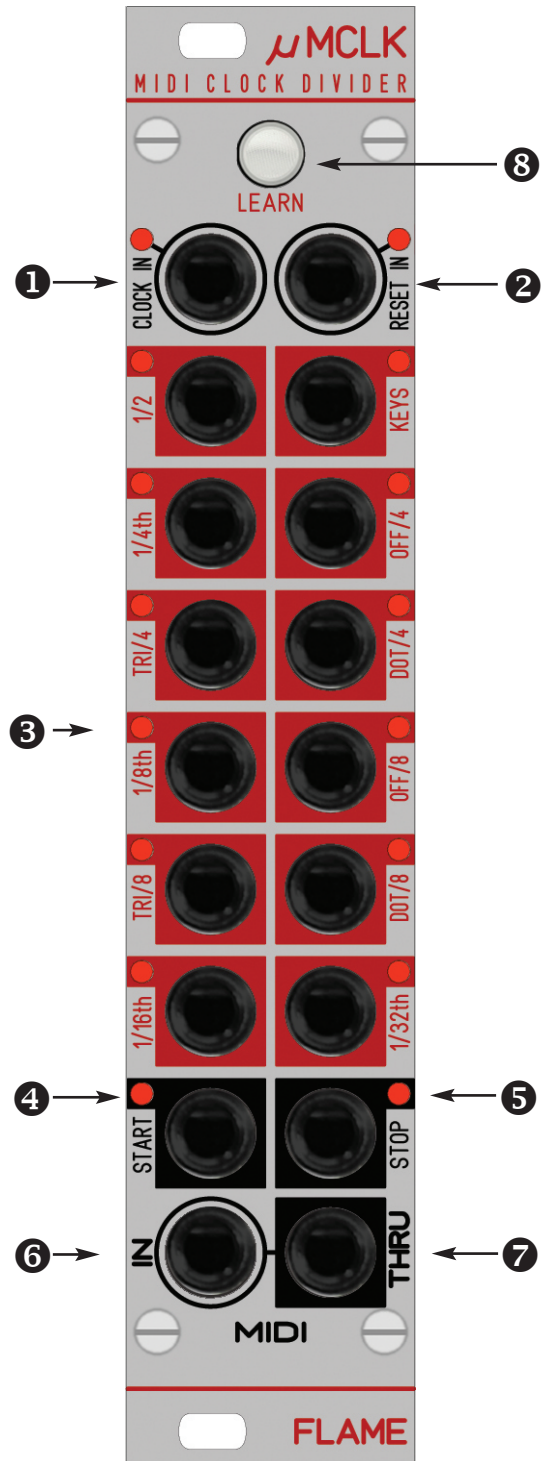
CAUTION!

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



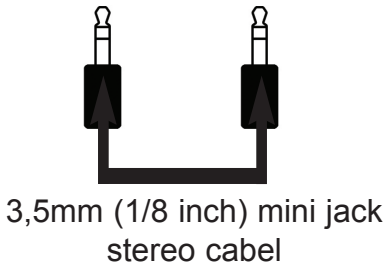
2.2 Module overview

- ❶ Analog Clock Gate/Trigger input
- ❷ Analog Reset Gate/Trigger input
- ❸ 12 Divider Gate/Trigger outputs (0..+5V)
- ❹ MIDI Start Trigger output (0..+5V)
- ❺ MIDI STOP Trigger output (0..+5V)
- ❻ MIDI Input (MIDI TRS-B Standard)
- ❼ MIDI THRU Output (MIDI TRS-B Standard)
- ❽ LEARN button (with red LED)

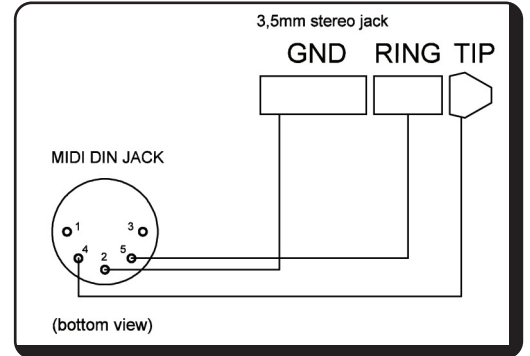


2.3 MIDI connections

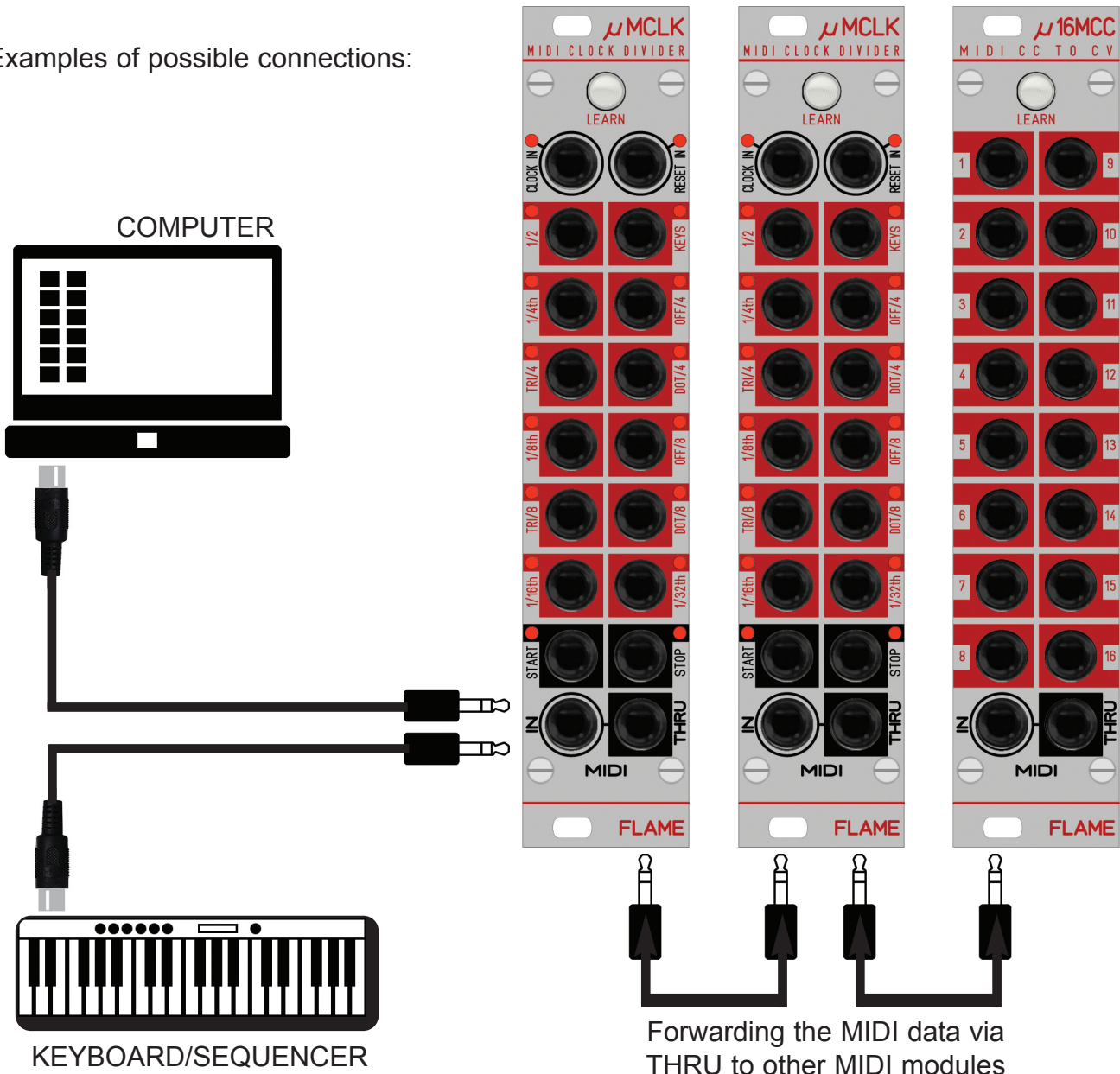
The module has two MIDI sockets (TRS-B standard mini jacks) INPUT and THRU. Connect the MIDI input to the MIDI output of your keyboard / sequencer or computer. The data received at MIDI-IN is forwarded via MIDI-THRU. A corresponding commercially available adapter (MIDI-DIN to Mini TRS-B) or a 3.5mm (1/8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

Connect the MIDI input of the module to the MIDI output of a device that can send MIDI start / stop and clock commands. The device must be able to send MIDI note commands for the trigger output **KEYS**.

NOTE!

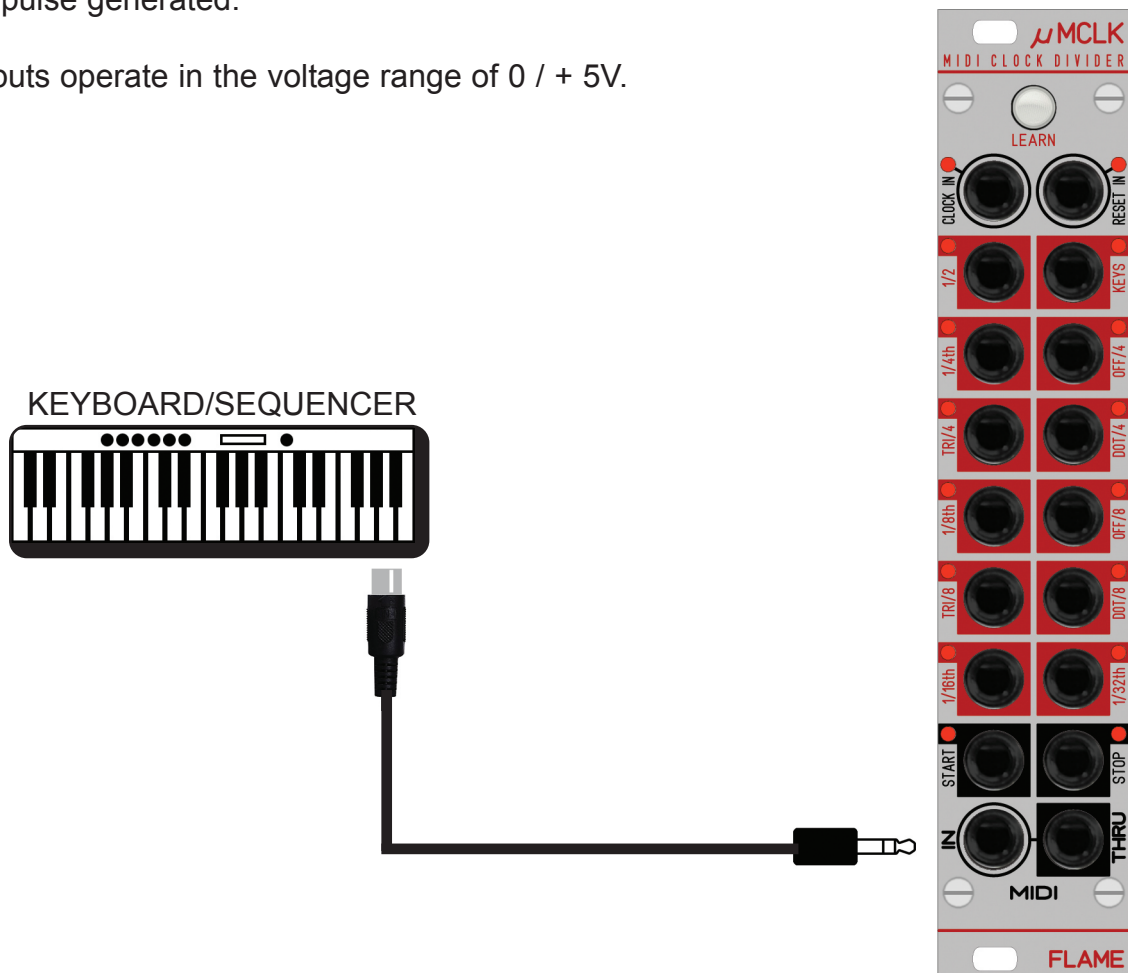
If you only want to use MIDI, do not plug a cable into the CLOCK input (analog divider) or make sure that no clock pulses arrive via this input. Otherwise the module runs as an analog divider at MIDI Stop (or after switching on)!

After switching on, the module is in STOP mode. All LEDs are off.

Start a MIDI sequence. When the MIDI start command is received, the module starts as a MIDI divider and the corresponding rhythms derived from the MIDI clock run at the divider outputs. A short trigger pulse is generated at the **START** output. Likewise, all outputs with the exception of OFFBEATS go on to MIDI start. All outputs with the exception of the **1/32th** output and the **KEYS** output generate a GATE signal with a 50% pulse width ratio. The **1/32th** and the **KEYS** output generate trigger pulses with a length of 1 tick. However, the **KEYS** output only generates running triggers as long as one (or more) corresponding keys (Note On) are pressed via MIDI. > **See chapter below!**

With MIDI stop the MIDI Divider is stopped and all outputs are set to zero. There is a short one at the STOP output trigger pulse generated.

All outputs operate in the voltage range of 0 / + 5V.



3.2 MIDI DIVIDER OUTPUTS

In MIDI mode, 11 divider outputs have clock dividers that are derived from the MIDI clock. These are printed on the front panel. Some rhythms have been shifted to create OFFBEATS. The LEDs signal the rhythms while the MIDI clock is running.

The number of clock pulses is specified in the MIDI standard. One bar corresponds to exactly 96 ticks. The corresponding note lengths (rhythms) are derived from this.

Here is an overview of the specified note lengths:

| Name | Note length | MIDI Ticks |
|---------------|--------------------|--------------------------------|
| 1/2 | 1/2 note | 48 Ticks |
| 1/4th | 1/4 note | 24 Ticks |
| 1/8th | 1/8 note | 12 Ticks |
| 1/16th | 1/16 note | 6 Ticks |
| 1/32th | 1/32 note | 3 Ticks |
| TRI/4 | 1/4 triplet | 32 Ticks |
| TRI/8 | 1/8 triplet | 16 Ticks |
| DOT/4 | 1/4 dotted note | 36 Ticks |
| DOT/8 | 1/8 dotted note | 18 Ticks |
| OFF/4 | 1/4 note offbeat | 24 Ticks (shifted by 12 Ticks) |
| OFF/8 | 1/8 note offbeat | 12 Ticks (shifted by 6 Ticks) |

The **1/32th** output and the **KEYS** output generate a trigger pulse with a note length of one tick. All other outputs generate a GATE pulse with 50% pulse width.

3.3 OUTPUT “KEYS” PLAYABLE VIA MIDI KEYBOARD

If the module works in MIDI divider mode, different clock triggers can be generated on the KEYS output with the help of transmitted MIDI notes within a 3 octave range. This is comparable to a DRUM sound expander, in which different drum instruments are assigned to the notes. Different divider beats are now assigned to the notes. As long as a key (Note ON command) remains pressed, the beat is output. The trigger beats can be mixed by pressing several buttons. In the graphic below you can see the preset assignment.

LEARN

You can change the MIDI channel and the lowest note (at which the 3 octave range begins) with the LEARN function: To do this, press the LEARN button until it flashes. Then send a note from your connected MIDI keyboard on the desired MIDI channel. This note is then the lowest note of the 3 octave range. The new MIDI channel and the new lowest note are automatically saved permanently. The LEARN mode is automatically ended again after receipt of the note (button LED off).

The default is a note number range from No. 41-76 on MIDI channel 1.

| | | | |
|----|---|--------------|----------|
| 76 | | 1/4 random | TRIPLETS |
| 75 | ■ | 1/8 random | |
| 74 | ■ | 1/32 | |
| 73 | ■ | 1/16 offbeat | |
| 72 | ■ | 1/16 | |
| 71 | ■ | 1/8 offbeat | |
| 70 | ■ | 1/8 | |
| 69 | ■ | 1/4 | |
| 68 | ■ | 1/4 offbeat | |
| 67 | ■ | 1/2 | |
| 66 | ■ | 1/2 offbeat | DOTTED |
| 65 | ■ | Whole note | |
| 64 | ■ | 1/16 random | |
| 63 | ■ | 1/8 random | |
| 62 | ■ | | |
| 61 | ■ | | |
| 60 | ■ | 1/16 | |
| 59 | ■ | 1/8 offbeat | |
| 58 | ■ | 1/8 | |
| 57 | ■ | 1/4 | |
| 56 | ■ | 1/4 offbeat | |
| 55 | ■ | 1/2 | DUPLETS |
| 54 | ■ | 1/2 offbeat | |
| 53 | ■ | Whole note | |
| 52 | ■ | 1/16 random | |
| 51 | ■ | 1/8 random | |
| 50 | ■ | 1/32 | |
| 49 | ■ | 1/16 offbeat | |
| 48 | ■ | 1/16 | |
| 47 | ■ | 1/8 offbeat | |
| 46 | ■ | 1/8 | |
| 45 | ■ | 1/4 | |
| 44 | ■ | 1/4 offbeat | |
| 43 | ■ | 1/2 | |
| 42 | ■ | 1/2 offbeat | |
| 41 | ■ | Whole note | |

The image shows a MIDI Clock Divider module with a grid of buttons. The buttons are labeled with various rhythmic values: 1/2, 1/4th, 1/4, 1/8th, 1/8, 1/16th, 1/16, 1/8th, 1/8, 1/16th, 1/16, START, and STOP. The module also has a LEARN button, CLOCK IN, RESET IN, MIDI IN, and MIDI THRU ports. A FLAME indicator is at the bottom. An arrow points from the KEYS button to the text 'Output KEYS = Beat trigger output'. Another arrow points from the MIDI IN/THRU area to the text 'MIDI Clock and Note On'.

3.4 MODE: ANALOG-CLOCK-DIVIDER

If the module is in stop mode (i.e. after switching on or when a MIDI stop command has been received), the module can work as an analog clock divider. The clock pulses arriving at the CLOCK input are divided and output at the 12 divider outputs. These dividers are different than in MIDI clock divider mode (printed dividers) and can also be reprogrammed using SYSEX.

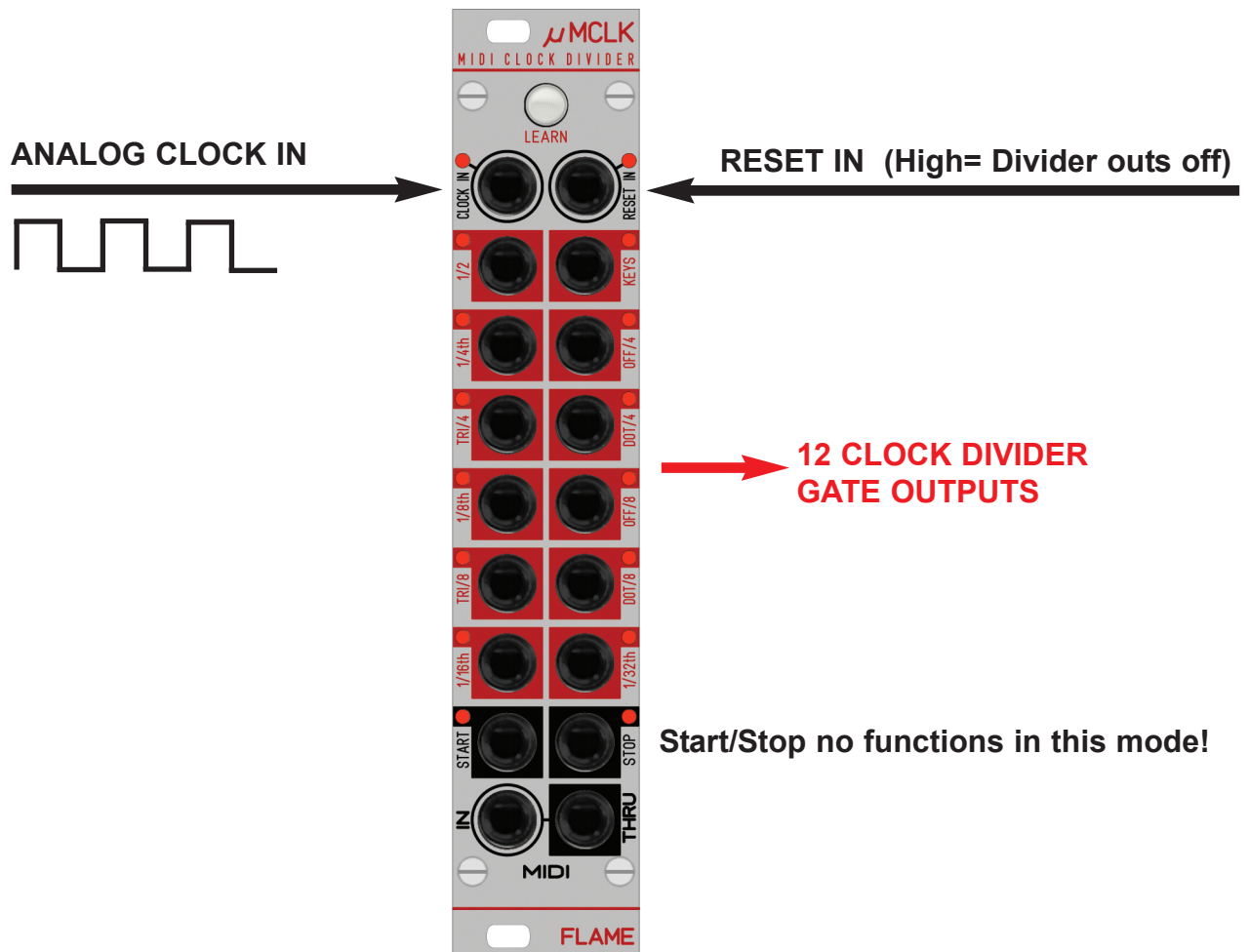
A special feature is that the divider outputs can also be set as an offbeat. The clock output is shifted by half.

NOTE:

The analog divider works with a rising and falling edge of the input clock. Normally you should therefore use rectangular pulses with a 50% pulse width, e.g. generated by LFOs. This is important for even dividers of odd dividers because they are triggered on the falling edge. But you can also experiment with different pulse widths and create interesting beats.

RESET INPUT

If the RESET input is high (LED lights up), the divider outputs are set to zero. As long as the RESET input remains high, the divider output is switched off (all outputs are LOW).



3.5 ANALOG-CLOCK-DIVIDER ASSIGNMENT

The dividers of the outputs in analog clock divider mode can also be reprogrammed using SYSEX. Some SYSEX files are available for this. These can be loaded with a MIDI SYSEX dump program (e.g. MIDI-OX or Elektron C6) from a computer via MIDI. After receiving the SYSEX file, the data is saved permanently.

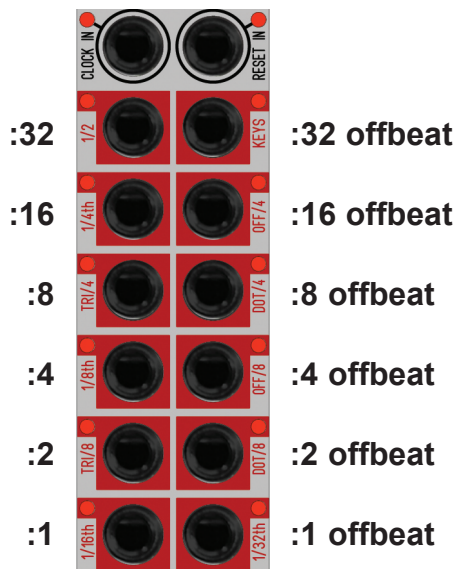
NOTE:

You can send the SYSEX files to the module while the analog divider is running. When receiving, the LEARN LED lights up permanently and goes out again when reception is successful. If the SYSEX reception was faulty, the LED flashes briefly several times, but the old data are retained.

3.6 OVERVIEW OF DIVIDER ASSIGNMENTS

1. Power of two + Offbeats

AD_2pot_offbeat.syx (preset)



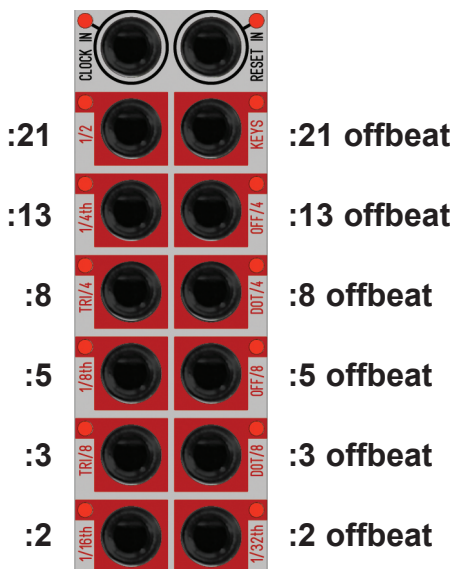
2. Odd / even + Offbeats

AD_oddeven_offbeat.syx



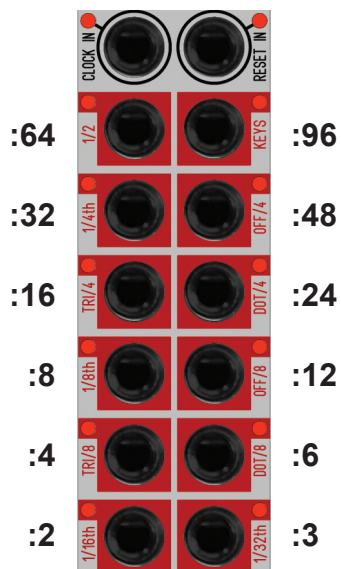
3. Fibonacci + Offbeats

AD_fibonacci_offbeat.syx

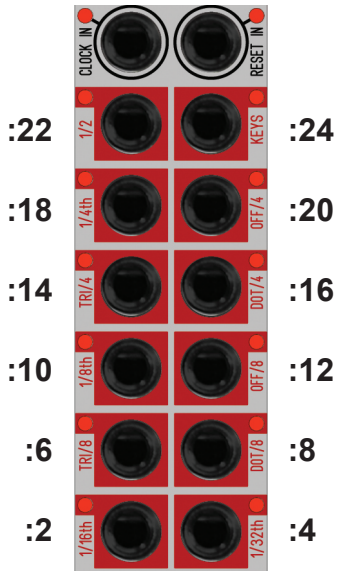


4. Duplets + Triplets

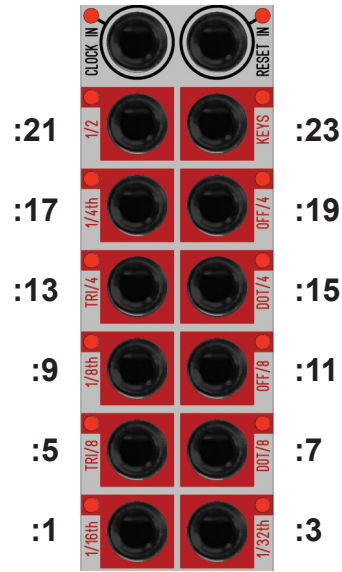
AD_duotri_01.syx



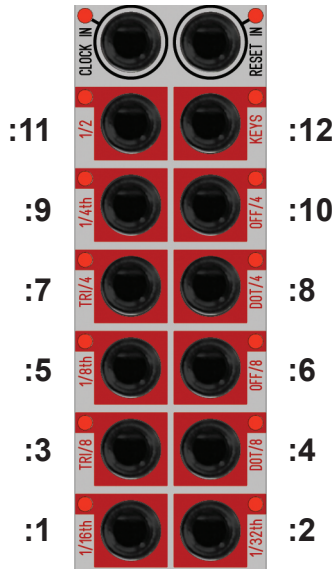
5. Even continual
AD_even_up.syx



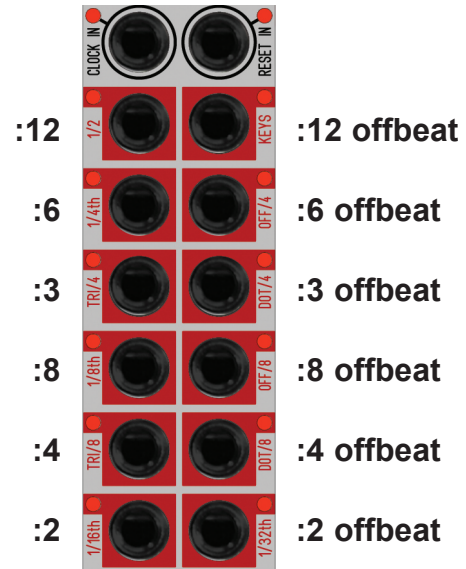
6. Odd continual
AD_odd_up.syx



7. Odd/even continual
AD_oddeven_up.syx



8. Duplets/Triplets + Offbeats
AD_duotri_offbeat.syx



3.7 SYSEX Data format

The dividers of the 12 outputs in analog clock divider mode can be reprogrammed using SYSEX.

| | | |
|-------------------------|------------|---|
| 11110000 | F0 | Exclusive Status |
| 01111101 | 7D | Header Flame module |
| 00001011 | 0A | Flame module “μMCLK” |
| 00000001 | 01 | version 1 |
| 00000110 | 07 | data type (analog divider) |
| 0xxxxxxx | o2 | offset byte out 6-12 |
| 0xxxxx00 | o1 | offset byte out 1-5 |
| 0xxxxxxx | d1 | 12 data bytes DIVIDER for outputs 1-12 |
| | | (range: 01 .. 7F = DIVIDER value) |
| 0xxxxxxx | d12 | |
| 11110111 | F7 | End of Exclusive |
| (total 20 bytes) | | |

Description OFFSET:

The two bytes **o2** and **o1** determine whether a divider output is output with offset (shifted by half). The outputs are assigned 7 or 5 bits each of the two bytes, i.e. a total of 12 bits. If the bit is set, the offset is switched on. The following applies:

Byte o2: **0xxxxxxx** 7 Bits from right to left = outputs 6-12
Byte o1: **0xxxxx00** 5 Bits from right to left = outputs 1-5

Example 1: 00000011 01111100 outputs 1-7 Offset on
 Example 2: 01000010 00000100 outputs 1, 7 and 12 Offset on
 Example 3: 00000000 00000000 all outputs Offset off
 Example 4: 01111111 01111100 all outputs Offset on

Description DIVIDER:

The 12 bytes **d1** to **d2** define the divider of the respective output. The following applies:

01 Division by 1
 02 Division by 2
 -
 -
 -
 7F Division by 127

4. Appendix

4.1. Technical details

Connections:

Ribbon cable adapter for Doepfer bus +/-12Volt

Inputs: 2x Clock/Gate,Reset (0/+5..10V), 1/8th inch mono jacks

1x MIDI (TRS-B standard) 1/8th inch stereo jack

Outputs: 1x MIDI (TRS-B standard) 1/8th inch stereo jack

14x Clock/Gate Divider, 1/8th inch mono jacks

Control elements:

1 push button with LED (LEARN key)

16 LED's

Current consumption: max. +70..80mA / - 0 mA

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

4.2 Warrenty

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

4.4 Acknowledgment

For help and assistance big thanks to: Alex4 and Schneiders Büro Berlin, Shawn Cleary (Analogue haven, Los Angeles), Thomas Wagner, Robert Junge, Anne-Kathrin Metzler, Lena Büniger and Alex Wolter.