FLAME

QUAD CV RECORDER

MANUAL

Version 1.01

Index

1. Short description

OVERVIEW

The QUAD CV RECORDER is a four-track cv recorder/looper that lets you record and play back voltage changes from various sources in 16-bit resolution allowing for smooth progressions even at very slow playback speed. The recording time can extend to an hour depending on your synchronization and it's easily possible to do punch in/out recordings during performance. You can sync the module via clock or MIDI.

IN DETAIL

The QUAD CV RECORDER features 4 independent tracks for recording and playing back control voltages i.e. analog sequences, envelopes or controller movements from external sources and/or movements of the rotary knobs (pots) on the front panel. Control voltages can be recorded in either range -5V/+5V or 0/+9V, individually adjustable per track. All recordings and settings are automatically saved and will be readily available the next time you turn on your modular system.

ZOOM is a two stage fine adjust function of the control ruler. When recording movements of a pot you can use the ZOOM function during playback to 'zoom' into the current position of the knob (in this case the position in the recording time). A smaller segment of the recording will then be mapped to the rotation range of the knob, giving you a finer control over this portion of the recording.

The start and end positions of a recording can be changed at any time as well as the playback speed. Smoothing algorithms eliminate the so-called 'stair-step effect' and ensure smooth playback even at very slow speeds.

You can play back each track either by hand, pressing the respective PLAY button or using Gate or MIDI start/stop. Playback modes are LOOP, SINGLE, GATE (while Gate is on) and SCAN which lets you move freely through the recording, forwards or backwards (controlled by an external LFO for instance) or jump to random points in recording time.

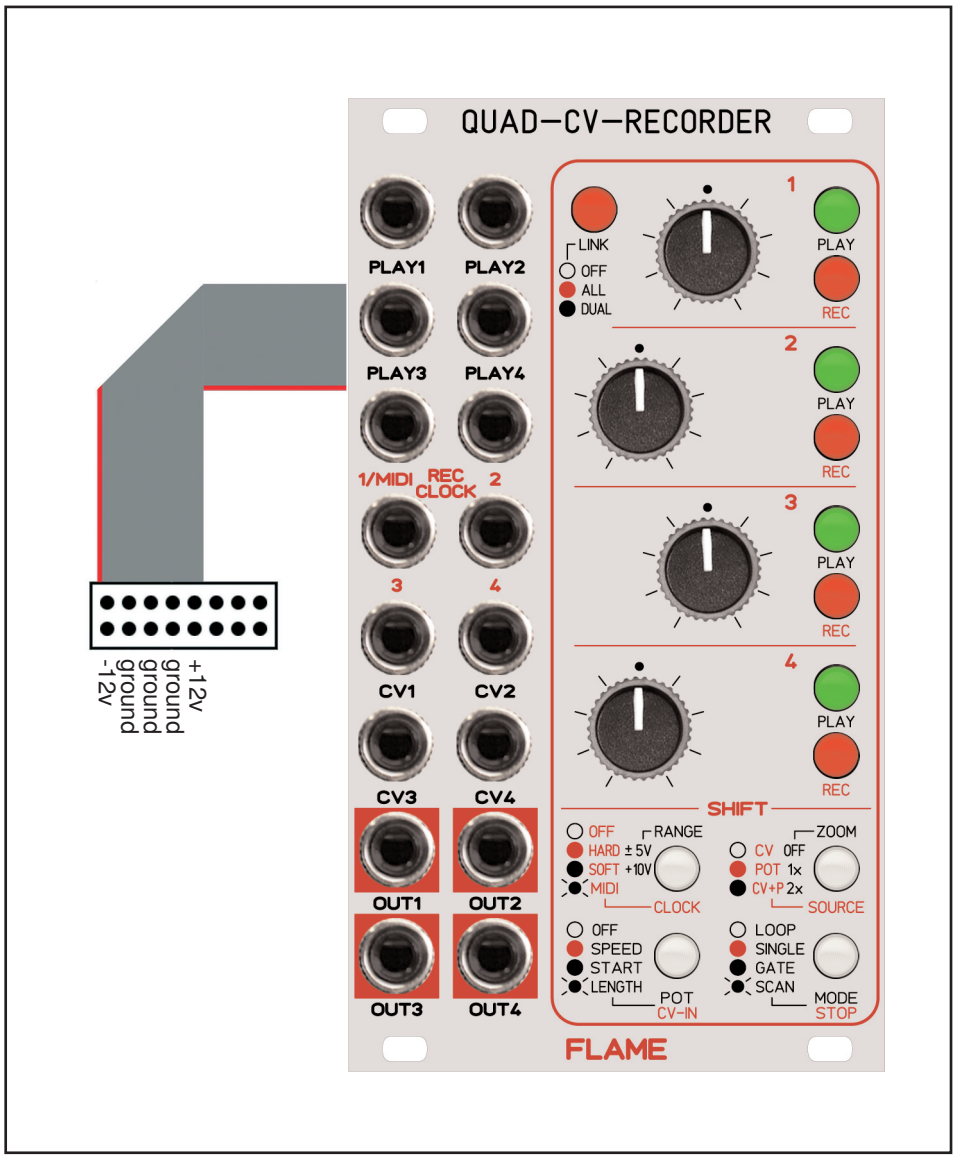
Each track can be synced separately by clock trigger or MIDI clock. The QUAD CV RECORDER recognizes the clock (ticks per bar) automatically. It is possible to make a one hour long recording on each track with a MIDI clock of 96 ticks per bar. The settings HARD/SOFT provide different degrees of smoothing of synchronization.

The LINK button allows for simplified multitrack recording: ALL combines all 4 tracks controlled through track 1, DUAL combines the track pairs 1+2 and 3+4 which might be handy for use with controllers that generate voltage pairs, like joysticks etc.

Future software updates can be easily performed via MIDI sysex dump. A MIDI adapter is provided with the unit.

2. Hardware / Connections

Connection to the modular system (Doepfer bus)

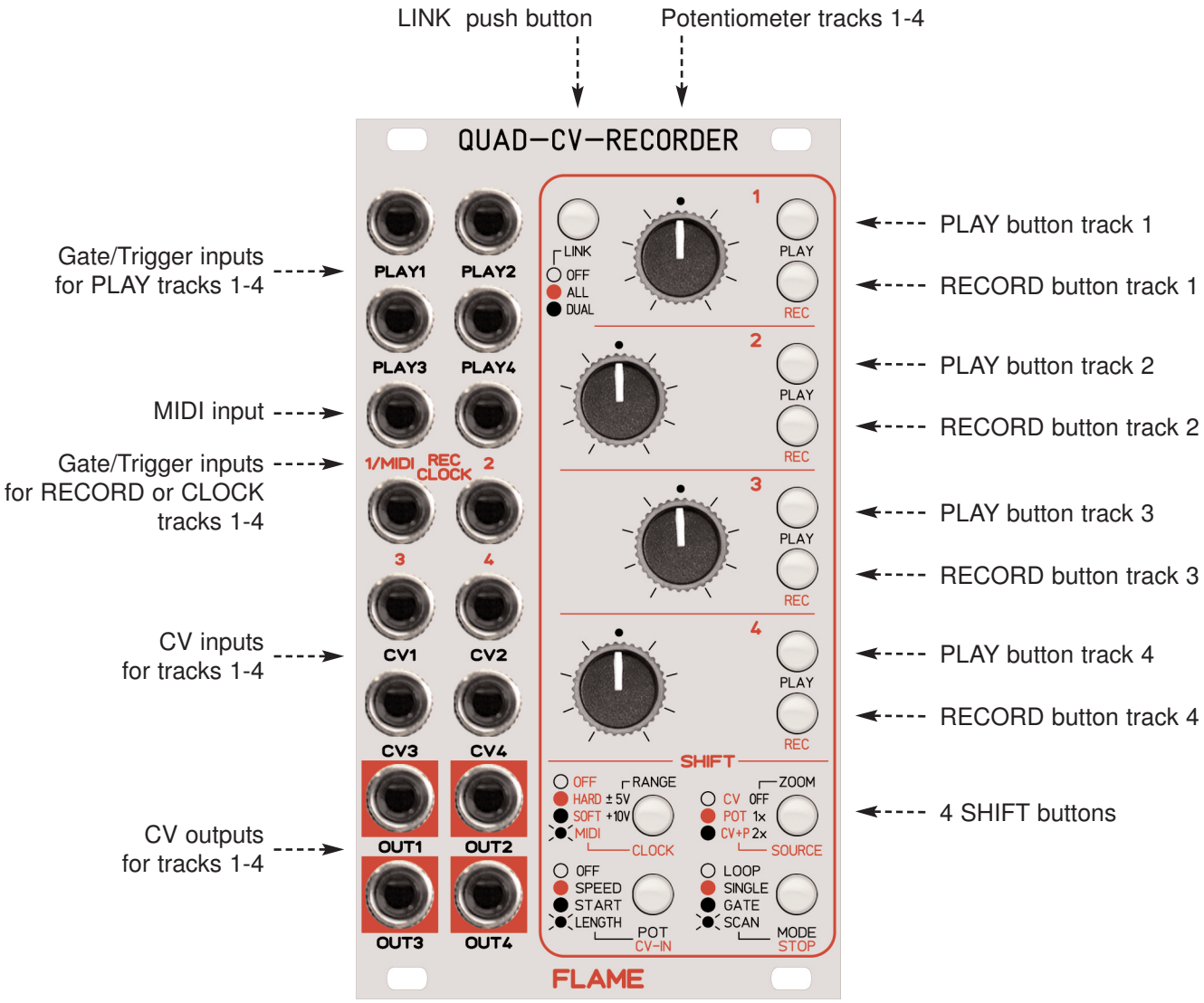


The module is delivered with a connected ribbon cable for the Doepfer bus. The red lead marks -12 volt. Connecting the module please note the right polarity!
If the module is poled accidentally wrong safety diodes avoid the immediate destruction of the module but further damages cannot be excepted. So please pay attention: Check the connection various times before switching on!

Advice: Please check the correct connection several times before switching-on the module!

Attention! Please avoid doing electrostatic voltages (don't touch the pins of the chips or the electronic). Please touch the modul frontpanel only for installation in your rack.

Module frontpanel overview



POTENTIOMETER 1-4 Individual programable potentiometer tracks 1-4 either
as CV source during recording or
as controller pot during play back

INPUTS CV 1-4 Individual programable CV inputs tracks 1-4 with selected range: **-5..+5v, 0..+9v**
as CV source during recording or
as CV during play back

INPUTS PLAY 1-4 Gate/Trigger inputs PLAY (playback start/stop) tracks 1-4 : **0/+5v**

INPUTS REC 1-4 Trigger inputs RECORD / CLOCK tracks 1-4 : **0/+5v**
Additional option: Input REC-1 = MIDI-INPUT (via MIDI adapter)

OUTPUTS CV 1-4 CV outputs tracks 1-4 with selected range: **-5..+5v, 0..+9v**

SHIFT BUTTONS Shift buttons (functions) in combination with Play/Record buttons
SHIFT+PLAY --> black printed functions
SHIFT+RECORD --> red printed functions

LINK BUTTON Selector switch for LINK modes

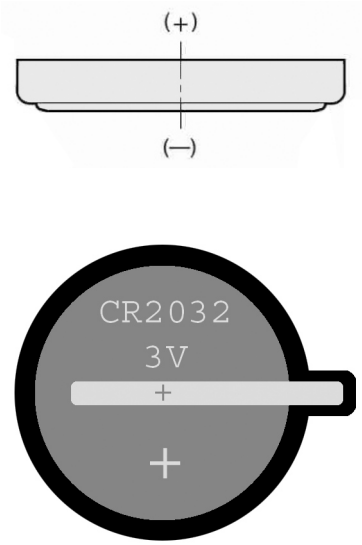
3. QUICK START

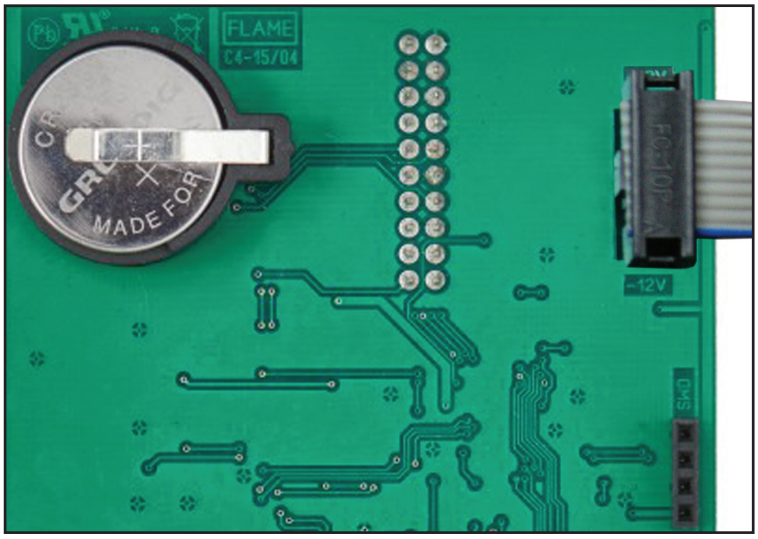
FIRST STEPS

1. Insert the backup battery before connecting the unit to your modular rack

The QUAD CV RECORDER uses a standard 3v lithium backup battery, type CR2032. Insert the provided battery or a comparable battery into the battery compartment as shown below. The battery is needed to keep recordings and settings stored when the Eurorack case is turned off.

Make sure the anode (+) points outwards.





Turn the Eurorack case off an unplug its powerchord before attaching the module.
Do not touch any electrical parts of the module.

After the first power-on the module starts automatically with the basic settings.

FIRST STEPS

POT RECORDER

After the first startup you can use the module easily like a pot-recorder. You can record and play back the movements of the ruler separately of each track.

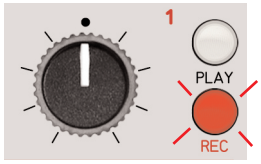
Example Pot Recorder track 1 for control filter frequency:

1. Connect the output **CV-1** with the CV input (filter frequency) of your external filter module.

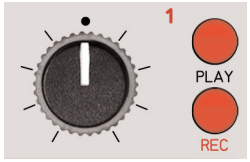
2. Set SOURCE of track1 to POT: While hold down the button SHIFT SOURCE press the button **REC-1** (as the case may be several times) until the **REC-1** LED is red.

3. Turn the ruler 1 in order to hear the filter.

4. Push the button **REC-1** for setting the track in record standby mode (blinking **REC-1** LED red).

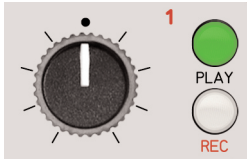


5. Push the button **PLAY-1** for starting the recording (**PLAY-1** and **REC-1** are constant red).



6. Turn the ruler over a period of time.

7. Push again the button **PLAY-1** for stop the recording.
Now the playback begins automatically (**PLAY-1** is constant green).



8. Stop the play back with buttons **SHIFT STOP** + **REC-1.**
The output holds on the last sample voltage. If you turn the pot, then the output voltage switches to the voltage of the pot.

4. OPERATION

How you can change and display the settings:

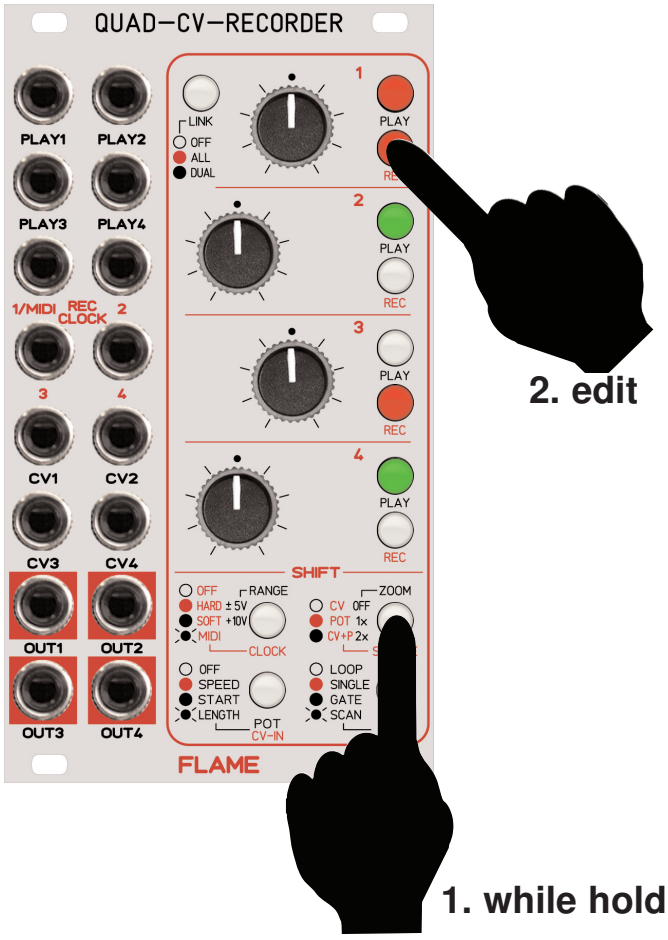
Make settings by means of a combination of buttons **SHIFT** + **PLAY** or **REC**.
While you push down a button **SHIFT** the LEDs of buttons **PLAY** and **REC** display the settings via the LED colors.

You find the color codes of the functions besides the SHIFT buttons.

LED aus
LED rot
LED grün
LED grün blinkend

Change the **black** functions with buttons **SHIFT + PLAY**.
Change the **red** functions with buttons **SHIFT + REC**.
You can change the LINK modes directly with the button **LINK**.

Example:
Set the SOURCE of track 1 to **POT** :
While you hold down the button SHIFT "SOURCE/ZOOM" push the button REC-1 (as the case may be several times) until the LED of button REC-1 is red.



ADVICE:
The memory is non-volatile, as such, the recordings and settings remain unchanged when the modular system is powered down (only with included backup battery.

5. FUNCTIONS

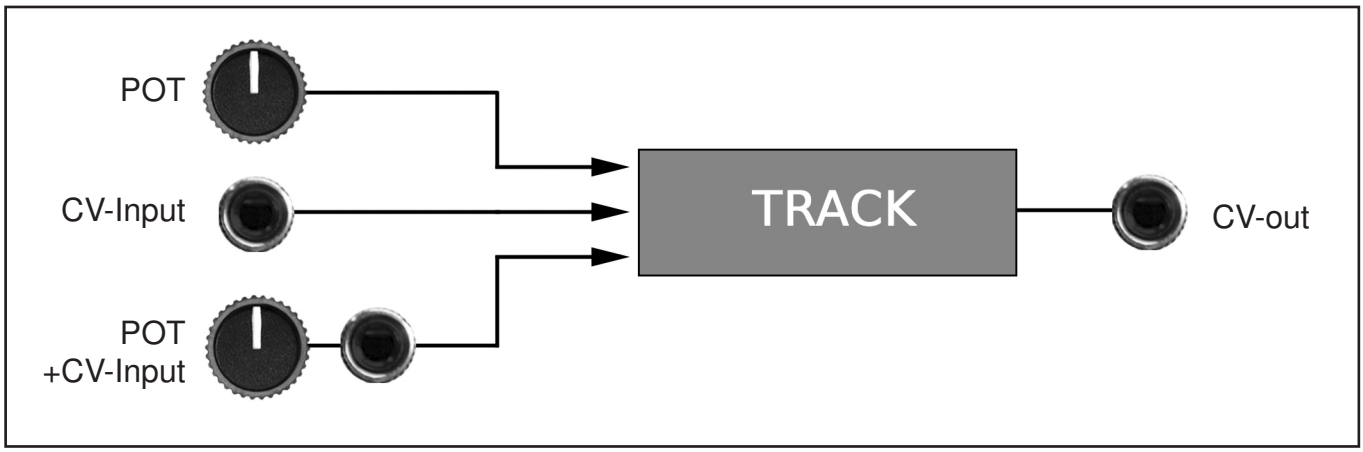
SOURCE

SOURCE is the CV source of the track for the recordings. This can be the CV input, the potentiometer or both.

If the track is stopped, then the output holds on the last sample voltage. If you move the pot, then the output voltage switches to the voltage of the pot/input (SOURCE).

The CV output has the voltage of SOURCE if the track is in record standby (**REC** is blinking red) and during the recording (**PLAY+REC** are constant red).

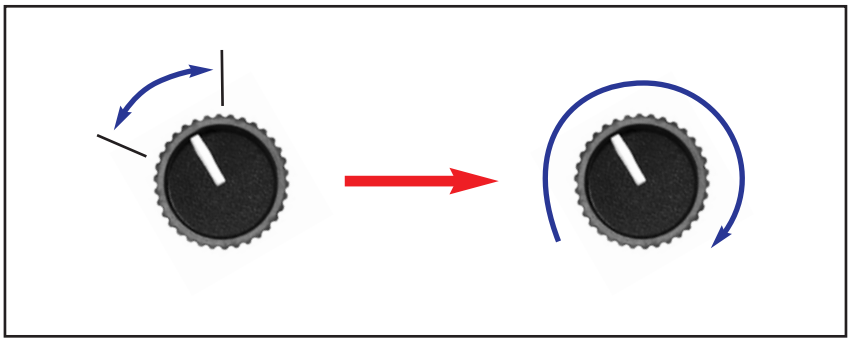
SOURCE can be set seperatly for each track and each LINK mode.



ZOOM

ZOOM is a two stage fine adjust function of the control ruler. A small range around the current pot position is stretched over the complete pot range.

ZOOM is available only if the pot is used as CV source.



RANGE (OFFSET)

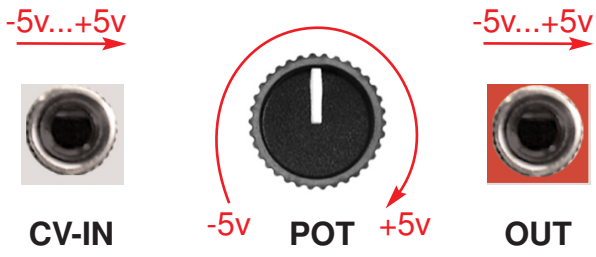
You can set the voltage range of each track to bipolar or unipolar:

RANGE can be:

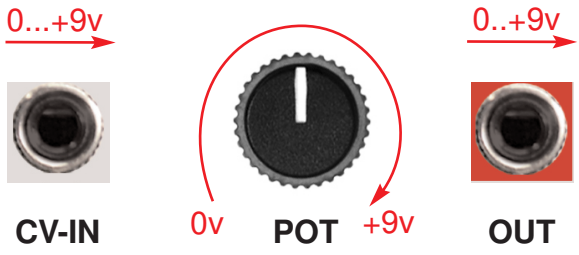
bipolar: -5v ... +5v (calibrated)
unipolar: 0,1v ... +9v (calibrated)

Input and output of the track have the same RANGE setting.
It's possible to reset the Range setting after recording.
Input voltages outside of the range are ignored.

RANGE +/-5v
(bipolar -5v..+5v)



RANGE +10v
(unipolar 0,1v..+9v)



RECORD (externe CLOCK=OFF)

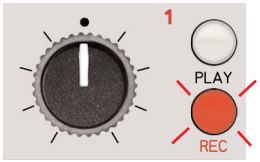
Before recording you have to stop the track and then you have to set the track in record standby mode. You can make it manually with the button REC or external via REC-input trigger.
If the track is in record standby mode the button REC is blinking red. If you wish to disable the record standby mode, push the button REC again.

You start the recording either manually with the button PLAY or external via the PLAY-input trigger. Both buttons REC and PLAY are constant red.

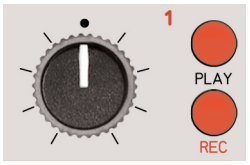
You stop the recording either with pushing again the button PLAY or via the next PLAY-input trigger. The maximal recording time is 66 seconds (mode Clock=OFF). After the maximal time the recording is stoped automatically and the play back begins.

EXAMPLE
Manually record an external CV with internal Clock (mode external CLOCK=OFF):

1. Before you begin set the track parameters CLOCK=OFF and SOURCE=CV.
   (Use the button combinations CLOCK+REC and SOURCE+REC)

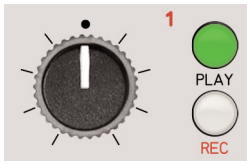


2. Push the button **REC** for setting the track in record standby mode
   (blinking **REC** LED red).



3. Push the button **PLAY** to start the recording
   (**PLAY** and **REC** are constant red).

4. Now the recording is on the run.



5. Push again the button **PLAY** to stop the recording.
   Now the playback begins automatically (**PLAY** is constant green)

PUNCH IN/OUT RECORDING

While the track is played you can manually overwrite parts of the track. The old parts of the track are modified with the new recorded parts.

Please note: the punch-in/out procedure is irreversible.

You can use the punch in/out recording only manually via REC buttons!

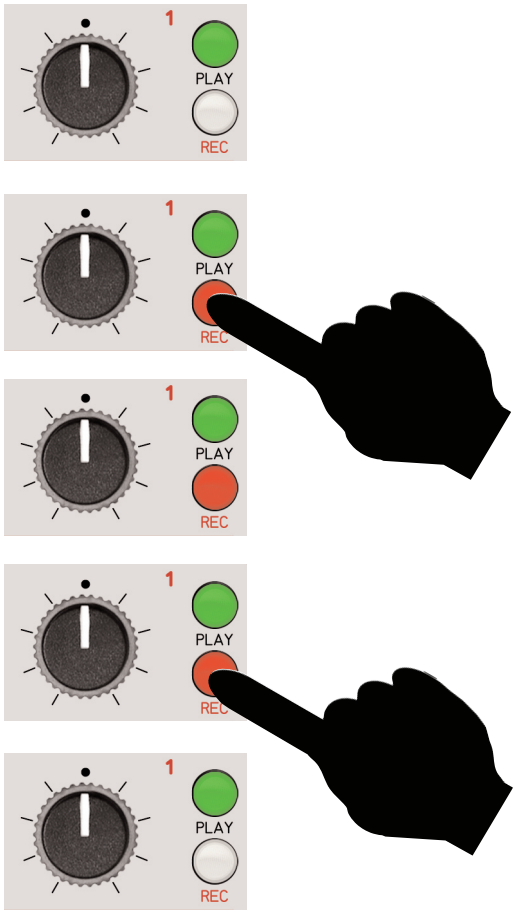
PLAY
(play back of the original track)

PUNCH IN
push REC once only
(new record begins)

RECORD
(overwriting runs - old record area is changed)

PUNCH OUT
push REC once again
(punch record is finished)

PLAY
(play back of the modified track)



Also you can use PUNCH IN/OUT recording with slower or faster SPEED.

PLAY MODE

You have four different play back modes of the track:

LOOP

The play back runs endless (auto reset).

START: Button PLAY, Trigger PLAY-Input or MIDI-START-command
STOP: Button STOP+REC or MIDI-STOP-command

SINGLE

The play back runs once only and is stoped by end of the track.

START: Button PLAY, Trigger PLAY-Input or MIDI-START-command
STOP: End of sample, Button STOP+REC or MIDI-STOP-command
RESET: Button PLAY, Trigger PLAY-Input

GATE

While hold down button PLAY or the GATE-input is high the play back runs endless.

START: Pressed key PLAY or PLAY-Input=high oder MIDI-START-command
STOP: Unpressed key PLAY or PLAY-Input=off or MIDI-STOP-command

SCAN

Manually scan of the recorded sample with CV or movement of the pot. Internal or external clock are disabled.
Voltage=zero (or the pot position min) are equivalent to the first value of the sample.
Voltage=max (or the pot position max) are equivalent to the last value of the sample.

It's necessary to set the function of POT or CV-IN to SPEED !

The shorter the sample, the better the resolution of the play back.

PLAY FUNCTIONS

While the track is played you can control the parameters SPEED, START, LENGHT with pot or external CV input. You can set the functions separately for each track.
Please note: it's not possible to set the same function to pot **and** CV input.

While you hold down the button SHIFT **POT/CV** push the button **PLAY** or **REC** (of the channel).

For setup the pot use the keys SHIFT+PLAY
For setup the pot use the keys SHIFT+REC

example track 1

OFF
Pot`s and/or CV inputs have no play functions

SPEED
.. is the speed of the play back.
The speed is not carried out with sample rate modifications, but interpolation of the samples. Therefore the output is a smoothed voltage without audible increments especially if the speed is slow.

if CLOCK=OFF (internal clock):
continuous control of the speed

if CLOCK=ON (HARD, SOFT, MIDI):
quantized control of the speed
(incremental duplets and triplets - for example half time oder double time)

if MODE=SCAN:
Not an automatically speed per clock. Using the SCAN mode, the recorded sample can be scanned via CV input or the pot of the channel

START
start position of the sample track

LENGHT
end position of the sample track

LINK

All four channels can be used individually or in groups of two or four tracks at any one time (for multitrack or joystick recording).
Stepping the mode directly with the key LINK.

Please note: You can change the mode only in stop mode.

The settings of functions SOURCE, CV-IN/POT and CLOCK can be independent for all three LINK modes OFF, ALL, DUAL.

OFF LINK LED off -->

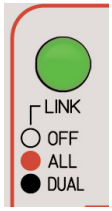
LINK mode is off.
All four tracks work independently.

ALL LINK LED red -->

All four tracks are linked. Each PLAY/REC keys control all tracks similarly.
For external control you have to use the PLAY/REC inputs of channel 2
(The Inputs of channels 1,3 and 4 are inactive.)

This mode is used as multitrack recorder because you can record/play simultaneously all four tracks. The functions SPEED, START and LENGHT control simultaneously all four tracks.

DUAL LINK LED green -->



The tracks 1+2 are linked **and** the tracks 3+4 are linked.

The PLAY/REC keys of track 1 or 2 control manually the tracks 1+2 similar.
But for external control you have to use only the PLAY/REC inputs of channel 2
(The Inputs of channel 1 are inactive.)

The PLAY/REC keys of track 3 or 4 control manually the tracks 3+4 similar.
But for external control you have to use only the PLAY/REC inputs of channel 4
(The Inputs of channel 3 are inactive.)

You can use the DUAL mode for joystick recordings (linked recording of x- and y- axis).
It's possible to apply two joysticks independently.

The functions SPEED, START and LENGHT control simultaneously the linked tracks.

CLOCK (external synchronization)

1. ANALOG CLOCK HARD/SOFT

Synchronization via analog clock (per REC/CLOCK inputs) or MIDI clock is possible.
One value is sampled per clock. The more clocks the merrier the resolution of the sample.

If you set the clock to “SOFT” then the output is a smoothed voltage without audible increments. Sometimes it is usefull to set the output without smoothing (example for notes). In this case choose the clock setting “HARD”.

While you hold down the button SHIFT **CLOCK** push the button **REC** (of the channel) to set the CLOCK (Sync modes).

HARD for direct voltage output (REC=rot)
SOFT for smoothed voltage output (REC=grün)

RECORD / PLAY with ANALOG CLOCK

Connect the clock out of the external analog sequencer with the **REC/CIOCK** input of the channel. Connect the start/stop gate/trigger output of the sequencer with the PLAY input of the channel.

1. Push the button **REC** for setting the track in record standby mode (alternate blinking **REC** LED red-green, if analog clock is detected).

2. Start the external analog sequencer (sequencer send PLAY trigger and the clocks) . Now the recording begins. (Keys **REC+PLAY** of the track are red).

3. Stop the external analog sequencer. The recording is finished. (**REC+PLAY** LED’s are off)

4. Start again the external analog sequencer to play back the track. (**PLAY** LED is green)

5. Stop the external analog sequencer to stop the play back. (**PLAY** LED is off)

2. MIDI CLOCK HARD/SOFT

Synchronization via analog clock (per REC/CLOCK inputs) or MIDI clock are possible.
One value is sampled per one MIDI tick (96 values per measure).

If you set the clock to “SOFT” then the output is a smoothed voltage without audible increments. Sometimes if desired to set the output without smoothing (example for notes). In this case choose the clock setting “HARD”.

While you hold down the button SHIFT **CLOCK**
push the button **REC** (of the channel) to set the
CLOCK (Sync modes).

MIDI (SOFT) for direct voltage output (REC is blinking green)
MIDI (HARD) for smoothed voltage output (REC is blinking red)

ADVICE: There are printed only ONE “blinking MIDI” symbol on the front panel.
But its possible to configure booth MIDI-Sync-Modes “HARD” and “SOFT” !

RECORD / PLAY with external MIDI CLOCK

Connect the **MIDI OUT** of you external sequencer with the **MIDI IN** of the module (CLOCK input of channel 1). Therefore you have to use the provided MIDI adapter accessory.

1. Push the button **REC** for setting the track in record standby mode (blinking **REC** LED red).

2. Start the external MIDI sequencer.
   (The sequencer sends MIDI start command and MIDI clocks) .
   Now the recording begins. (Keys **REC+PLAY** of the track are red).

3. Stop the external MIDI sequencer.
   Now the recording is finished. (Keys **REC+PLAY** of the track are off)

4. Start again the external MIDI sequencer.
   (The sequencer sends MIDI start command and MIDI clocks) .
   Now the play back begins. (Key **PLAY** of the track is green).

5. Stop the external MIDI sequencer to stop the play back.
   (**PLAY** LED is off)

FIRMWARE UPDATE

You can easily update the firmware with a MIDI sysex dump. To do so, use a MIDI-sysex-dump-loader for example the freeware MIDI-OX or Electron C6 (win or mac).

1. Load the firmware sysex file to your computer.

2. Connect the MIDI interface of the computer with the MIDI input of the modul (jack REC-1/MIDI). Therefore you have to use the provided MIDI adapter accessory.

3. Hold down both keys LINK and STOP while you power on the module. The key LINK is blinking red.

4. Now send the Sysex firmware file to the module. While the update runs you can see the progress indicator (green PLAY LED's and red REC LED's bar). The upload during time is for instance 1,5 minutes.

5. If no error message is displayed the update is succesfull finished. The module reboots automatically

ERROR CODES

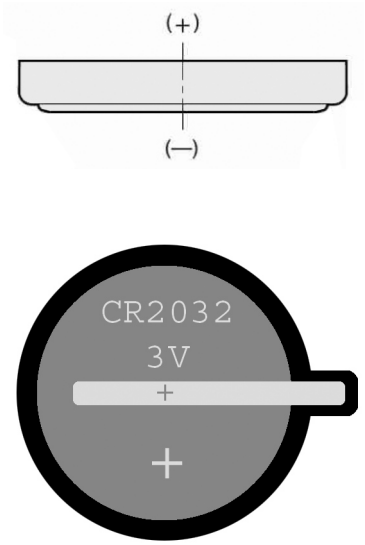
PLAY 1 LED blinking green	Wrong SysexID
PLAY 1 LED blinking red	Packet Checksum Error
PLAY 2 LED blinking green	Firmware Checksum Error
PLAY 2 LED blinking red	Flash Error
PLAY 3 LED blinking green	Timeout
PLAY 3 LED blinking red	Interface Check Failed

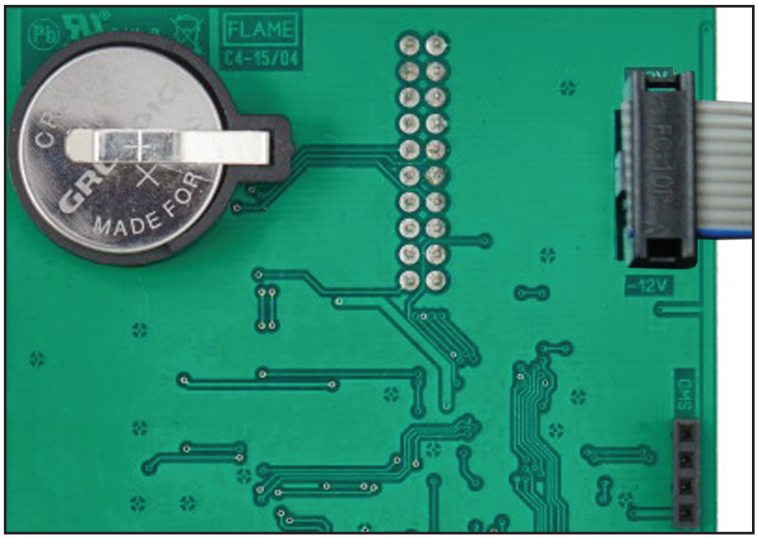
ADVICE:
Sometimes it's necessary to set the parameter "Delay" or "Timeout" to higher values (such as 80ms) from your used dumploader software.

EXCHANGE BACKUP BATTERY

Please use a standard 3v lithium backup battery (type CR2032).

Please note the correct polarity: Positive pole outwards!





ADVICE:
You can conserve your data if the old battery is not complete empty. In this case exchange the battery while the module is power on.

Otherwise the module starts automatically with the basic settings and clear the memory.

LIST OF BASIC SETTINGS

Function	Track 1	Track 2	Track 3	Track 4
ZOOM SOURCE	OFF POT	OFF POT	OFF POT	OFF POT
RANGE CLOCK	+/-5v OFF	+/-5v OFF	+/-5v OFF	+/-5v OFF
POT CV-IN	OFF OFF	OFF OFF	OFF OFF	OFF OFF
MODE	LOOP	LOOP	LOOP	LOOP
LINK	OFF			

You can set the parameters individually for all modes LINK= ALL, DUAL, OFF.

5. Appendix

Technical details

Current consumption: ca. +160mA / -50mA
Size: Euro format 3U / 14HP 70,5 x 128,5 x 42mm

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.fortschritt-musik.de

Terms of production

conformity: CE, RoHS, UL

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.

Support

Updated and additional informations, updates, downloads and more see:
http://flame.fortschritt-musik.de

Acknowledgment

For help and assistance big thanks to: Alex4 Berlin, Shawn Cleary (Analogue haven), Robert Junge, Anne-Kathrin Metzler, Lena Bünger, Baron, Ebotronix and FX Gueule Cassée.

Hardware + Concept: Per Salzwedel, Sebastian Preller
Software: Sebastian Preller