EASY CV

#### Test Equipment: CV-Destination MB33 MAM:

# Introduction

All Parameters are saved as a preset as a song (programchange...) Digital created LFO+ENV with CV-Output. No Displays, No Menues, Minimal buttons, much Scopes, much Led-Ring-Rotarys (LRE-8x2CS) one big UI with complete functions for one LFO+ENV Voice + 4xChannelstrip Controlls...

LFO+ENV are mixed together softwareside, to use only one CV-Output

Each Channel = Filter need 8xCV-Outputs

Copy Paste for LFOs and ENVelopes between the Voices

Copy Paste for a Song aka Preset aka Bank aka Program(change)

Jam Style Pattern load (next Preset Display) + Preset Morph between Current-Preset and Next-Preset

The Early Design was a EuroRack-Module: A Breakoutmodule for each CV-Output, with Depth-rotary, Focusswitch (Pushrotary), 2x Scopes (LFO+ENV) and LFO/ENV-Switch to show on one Display the Mixed Waveform & to switch the Rotary to "ENV" or "LFO" Mode (there is only space for one Encoder maybe just make PAN Style, instead of 2 individual level -maybe more live feel?, how ever when using an 3Stage switch, i could disable MIX-View, or display it on ENV or LFO...maybe a good choise ;) ) The Depth-rotary has no Ledring, want to display it as a bar or as Value in the scope...



# FrontPanel

# Brain

<u>THE LEFT SIDE of the BRAIN > Preset-Management:</u> Save & Load the PROGRAM, can be done by Midi-ProgramChange -or With the LOAD-PRESET-Encoder

then press LOAD -or Morph to the next Program slowly with the MORPH-Encoder

-Another option is to take a **PUSH-ENCODER** for **LOAD** & **STORE** > and load and store it by pushing it... would free 2 buttons for other functions.

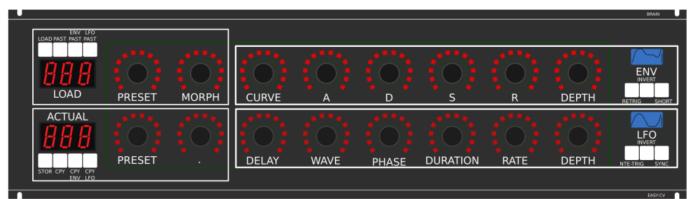
MORPH?:

-The Upper 7 Segment LED- Display: is the **LOAD Display** indicate the new Program with ENV+LFO -The downer7 Segment LED- Dsipaly: is the **STORE Display** it indicates also the current Program with ENV+LFO

-with morph you crossfade between both Presets (be carefull, first Store the current Preset **Paste** & **Copy** do their job @ the whole PROGRAM Memory

**ENV-PASTE** & **ENV-COPY** do their job @ the selected Envelope > (ENV-Voice selection is done by the breakout Modules) ... LFO..same

Midi-Channel Note NR or Number of Envelope is a real programmer job (C), with usb-upload from computer .... this is a individual device, and once set, it has to play > and it just should do LFOs and Envelopes Fixed routed, no generic, special > in my case for a filterbank.



THE **RIGHT** SIDE of the BRAIN > LFO + ENV Settings (one Voice): ADSR with:

**CURVE** Paremter which give exponentially to it (no straight lines While Fall and Rise) **Short:** just shorten the Maximal lenght of a Envelope, haveing more Feeling on Encoders should change Scope Display also...

LFO: get synced with Midi, and there is a retrigger by Notes...

**Phase:** offsets the start-Phase

**Delay:** simple delay (nte-Trig)

Rate: clear from 8 wholes to 128th or so

Wave: access to the Waveforms

**Duration:** interpret Midisync in trippled, whole notes or whatever...

**DEPTH:** is the maximal Value of FALL and RISE and SUSTAIN, i know i loose resolution with this...but i have to have a memory filterbank,...doing depth instead with Potentiometers on Filtermodules... would give no memory...

# this will not be supportet > since i dont want a Euro-Module Setup > i want one big filterbox.

1. Discharged UserInterface for the Brain in "Island mode" (Scopes + Digital-CV-Amount)

2. CV-Breakout EuroModule to be located near the CV-Destination (example: a Filter).

2 Waveforms (ENV+LFO) are mixed together softwareside

that bring 2 advanteges:

1.save one CV-Output

2. the Amplitude of each Waveform is saved in the patch, so the CV-Amount to a Filter is saved in the Patch

That bring 2 disadvanteges:

1.LFO or ENV cant get patched to individual destination

2.the Resulution gets lower 2 very low, and the code has to be adptet much... or have to be made from scratch Because I use the device for a Memory-Filterbox (VCF+VCA), i am ok with the pros and cons, so i call it EASY-CV



Envelope Scope: show the ENV-Waveform

or the Mixed-CV-Output-Waveform (when Switch is in LFO Mode) and show the Envelope-Amount with a BAR or as numeric Value? **MIXED CV Plug:** CV-Output > Mixed Waveform ENV+LFO **Switch @ ENV:** 

- 1. Depth-Encoder change ENV Amount of the CV-MIX
- 2. ENV Scope will show ENV Wave
- 3. LFO Scope will Show CV-Mix

Switch @ LFO: visa versa ENV Press the Encoders built in ENCODER-BUTTON: will switch the BRAIN-A-D-S-R and L-F-O ENCODER to the Page for THIS Module... workflow, see what you have with a Scope, over a filter, and edit exact this selected CV on the brain in full detail...

# VCA-VCF

#### CVś(AOUT):

1.VCF-CUT 2.VCF-RES 3.FILTER DRIVE

4.VCA-ENV 5.VCA-DRIVE

6.DRY-WET (Orginal vs Filtered Mixer)
7.Send 2 EFX1
8.Send 2 EFX2
So 1x 8AOUT-Module for each "Channelstrip", makes a total of 4x8AOUT-Modules.
The Module of Choise is a 16Bit, since i control with the the same AOUT-Channel ENV+CUT-OFF...
so there is no analog potentiometer for Cutoff or resonance... it is all saved in the Preset.

the VCA is basicly a simple VCA (MS20Like) or something the VCF are a 303 18dB for the 24db Filter it will be a SSM2044, where bords are available.

In order to not use those **overprized MATCHED-PAIR-TRANSISTORS** (over 2€ on the cheapest place) i have to use standart Transistors and make a **VBE-MATCH** on my own, i have already a PCB from here - to measure the transistors with a Multimeter: https://midisizer.com/other/vbe-matching/

### Example for a Filterbank

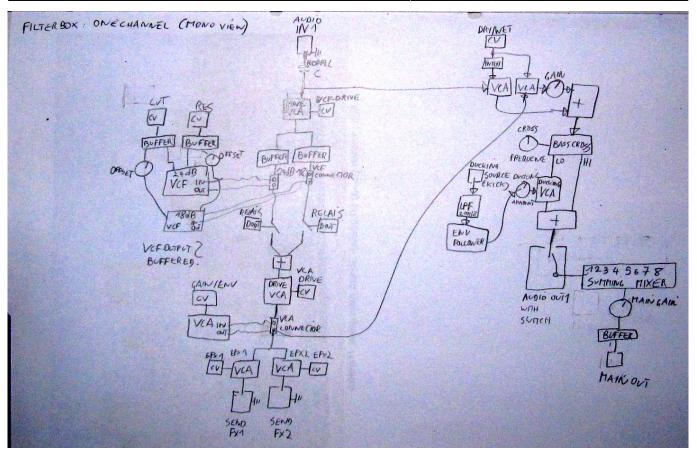
EUROMODULE-BASED »> It is not planed to do it that way (just for you to get some input)

				ORAIN.
ENV LEO LOAD PAST PAST	]			
nnn :*** :**	2 2 2 2			
				INVERT
LOAD PRESET MORPH	CURVE	A D	S R [	DEPTH RETRIG SHORT
				LFO INVERT
PRESET .	DELAY WA	VE PHASE DUP	ATION RATE [	
STOR CPY CPY ENV LFO				A AND AND AND AND A
				EASY/CV
THE BRAIN - LEFT SIDE: Preset-Management:	BREAKOUT	BREAKOUT	BREAKOUT	BREAKOUT
Save and Load the "SONG" or call it "BANK" The Song is loadet by ProgramChange OR With the LOAD-PRESET-Encoder				
With the bookd-mission-rencoder BUT is will mit be heard you must first press-LOAD or Morph to it sowily with MORPH-Encoder	ENV ENV	ENV ENV	ENV ENV	ENV ENV
MCROPHT four have the NEW-ENV+LFO (# LDAD four have the current ENV 4LFO (# ACTUAL	LFO LFO	LFO LFO	LFO LFO	LFO LFO
with morph you crussfade between both Paste, and Copy do their job () the full BANK				
ENVIPASTE ENVICOPY do their job (a the selected Envirope (astection is done by the brankout Modules)				0 0
Midi-Channel Note NR or Number of Envelope is a rext programmer job, with usb-upload from computer	DEPTH DEPTH MIXED ENV MIXED ENV			
This is a individual device, and once set, it has to play and it just chould de LFOs and Envelopes. Fixed routed, no generic, special			L Po Co Do	
in my case for a filterbank.	EASY-CV BASKCV	RASYCY VCA-VCD/F	EAST-CV UCA-VED/F	
		L IN R CV L OUT R	L IN R CV L OUT R	L IN R CV LOUT R
MPLE-CV Brain & UI-MAIN (Scopes + Digital CV-Amount) ated near the CV-Destination (e.g. a Filtin).	DRIVE EFX-SEND +DRY	DRIVE EFX-SEND + DRY	DRIVE EFX-SEND +DRY	DRIVE EFX-SEND + DRY
together softwareside				
dividual destination	POST-VCA EFX -URY DRIVE	POST-VCA EFX -DRY	POST-VCA EFX -UKY	POST-VCA EFX -UNY
w. and the code has to be adopted much, or have to be made from scratch any Piterbox (VCF+VCA), i am or with the prosiand cons, so i call it Simple-CV		POST-VCF DRY/WET VOLUME		POST-VCF DRY/WET VOLUME

A not EUROMODULE-BASED Version of something like this is the FILTERBOX: (this is the Design I prefer @ the moment)

Last update: 2016/08/22 02:03	easy_cv http://www.midibox.org/dokuwiki/doku.php?id=easy_		
	MB-CORE32 Connections		DUCKING CROSS-FREQUENCY
FILTERBOX			
-0+ VCFVCA 18 24dB OPEN	SHORT 18 24dB OPEN 18 24d	SHORT SHO IB OPEN 18 24dB	PROMT-RAMEL
FILT-RELEASE	2	3 4	GAIN
			filter-out-1 MAIN
AMP-RELEASE AMP_GAIN FILT-DISTORT	CUT RES CUT AMP.GAIN FILT.DISTORT AMP.GAIN	RES CUT FILT-DISTORT AMP-GAIN	
-0+ CUT-ENV VELO	CUT-ENV RES-ENV AMP-ENV REVERB AMP-ENV	RES-ENV REVERB AMP-ENV	RES-ENV RESYERE
			FILTER-OUT-3 DELAY
LFO/ENV-F LFO/ENV-R LFO/ENV-A DELAY MOD	LFO/ENV-F LFO/ENV-R LFO/ENV-F LFO/ENV-A DELAY	LFO/ENV-R DELAY LFO/ENV-A	LFO/ENV-R DPLAY
VELO MOD VELO MOD CUT-GAIN RES-GAIN VCA-DISTORT DRY/WET	CUT-GAIN RES-GAIN CUT-GAIN VCA-DISTORT DRY/WET VCA-DISTOR	RES-GAIN CUT-GAIN T DRY/WET VCA-DISTORT	RES-GAIN DRY/WET
			RETRIG
LOAD MORPH	CURVE A D	<u>S</u> R	
CPY CPY			
STORE	DELAY WAVE PHASE	DURATION RATE	ОЕРТН

Filterbox OneChannel > first idea of Block-shematic:



# **General Design**

The Panel is made of transparent but shadet (black transparent) Plexiglass.

The Panel is directly mounted into a Flightcase.

The 3x LRE8x2 (LEDRING) are mounted with the Encoder Nuts, the rest of the PCBs are mounted with normal thruhole screws.

#### **FrontPanel**

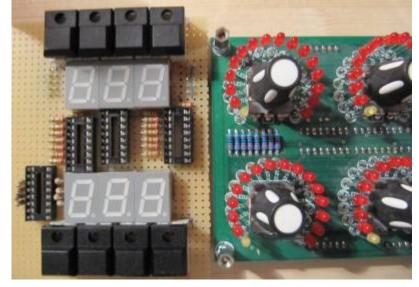
#### PCBs

#### The Analog-IO Board on the Backpanel, holds:

-the ENV-VCAs -the DryWet-VCAs, Filter-Releay-Switch -SEND-EFX-VCAs -the Summing Mixer -the Ducking-Cross-AMP-Follower+Ducking-VCAs -VCF+ENV-VCA-Distortion-Driver-VCAs -the Connectors to connect the Filter, AOUT, Poti-Boards

Left-Part of the Brain on Breathboard: OLED-Display Button: ShadowSE/ITT ENCODER: with built in Pushswitch

#### a early state with 7Segment Displays to indicate the Patches



#### **1. UI Parts Listing**

#### **BRAIN + BREAKOUT**

- 6,3 Neutrik Connector
- FLASH-Switch @ Rs-components

Value	Туре	Qty
Switch	SPDT Vertical PCB-Mount ON-OFF-ON	1

Fix Me! Fill Table

#### Pots / Knobs

- Alps RK11K Series
- Alpha Pots @ Thonk
- Knobs Suppliers

🕆 Fix Me!

which Values for the Audio-Mixer?

### **3.Footprint Making in KiCAD**

- ALPS Pots
- Alpha Pots
- 6,3mm Jack
- Switch
- Momentary Switch
- SSD-Displays
- OLED DIsplay
- Rotary Encoder



#### 4. Schematics in KiCAD

**Fix Me!** have to be done

#### **5.PCB Making In Kicad**

#### **PCB Making Order**

- BRAIN PCBs:

a.Left-Brain

b.Right-Brain

- 3x LRE8x2CS - is a generic PCB which i already have (fairlightiiś)

- Backpanel PCB

- FILTER PCBs

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