# 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...

# BreakOut

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.

### **Original Schematics 303 - VCA-VCF**



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

Here are 8Envelopes 4xfor VCF 4xfor VCA... in fact there could be used more then this for example

8xVCF and 8xVCA...since the BREAK-OUT-Modules are Modular, and they share the same "Main-UI"...the only limiting factor is the CODE...i am not a C-Guru, and maybe i will still have timing problems with 8x CV-Outs...we will see.

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	_			BRAIN U
LOAD MST MST PAST LOAD DAST MST PAST LOAD PRESET MORPH			<b>O</b> ) ( <b>O</b> ) S R	DEPTH
ACTUAL BBBB STOR CPY CPY ENV LED PRESET	DELAY WA	VE PHASE DUE	RATION RATE	
THE BRAIN - LEFT SIDE Preset-Management: Save and Good the "SORO" or call it "BANK" The Song Is loadet by ProgramChange OR With the GAB-PRESET-Encoder BUT it with rat be heard you must first press LOAD or Morph to it Solwith MORPH-Encoder MORPH? Nou have the KEW-ENV+LFO (# LOAD Nou have the Current ENV 4FPO (# ACTUAL, with morph you crossida between both	ENV ENV LFO LFO	ENV LFO LFO	BREAKDUT BREAKDUT ENV LFO LFO	EXSVEV BREAKOUT ENV LFO LFO LFO
Paste, and Copy do their job (j) the full BANC ERV MSTE (ERV-COPY do their job (j) the selected Envelope (delection is done by the breakout Modules) Midl-Channel Note NR or Number of Envelope is a real programmer job, with vab-upload from computer this is a individual device, and once set, it has to play and it with the SPC and Envelope.	DEPTH DEPTH IXED ENV MIXED ENV CV LTO CV LTO	DEPTH DEPTH MIXED ENV CV LFO CV LFO TASTCV	DEPTH DEPTH MIXED ENV MIXED ENV CV LFO CV LFO	DEPTH DEPTH MIXED ENV MIXED ENV CV LFO ENVYCV EASYCV
MMLE-CV-Brain & UI-MAIN (Scopes + Digital-CV-Amount) and near the CV-Destination (e.g. a Tritter), together softwareside is saved in the patch, so the CV-Amount to a Tilter is saved in the Patch	L IN R CV L OUT R AMP CUT DRIVE EFX.SEND OST.VCA EFX -DRY	L IN R CV L OUT R AMP CUT DRIVE EFX SEND POST-VCA EFX -DRY	L IN R CV LOUT R AMP CUT DRIVE EFX-SEND POSTACA EFX -DRY	L IN R CV L OUT R AMP CUT DRIVE EFX.SEND POSTACA EFX -DRY
Inv. and the code has to be addet much or have to be made from scratch by-Effection (VCE+VCA), I am or with the proc.and cons. so. I call it Simple-CV participation (VCE+VCA).				

#### I will use it to filter:

2xGuitar-Loopstations 1xGuitar 1xPercussion-Master

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

easy\_cv http://wiki.midibox.org/doku.php?id=easy\_cv&rev=1471134952

				2 Connections				DUG	JCK MAIN F	ALL DELAY	RACK-PANEL
FILTE	RBOX										
-0+	VCFVCA 1824	SHORT IdB OPEN	18 24di	SHORT 3 OPEN	18 24d	SHORT B OPEN	SH 18 24dB	ORT 1-4 OPEN 5-8	3		FRONT-PANEL
FILT-RELEASE									GA	IN	
MAIN-ADD	1	1	, i <b></b>	2		3	<b>4</b> ***	4			
-0+									FILTER-OUT-1	MAIN	
AMP-RELEASE	CUT AMP-GAIN	RES FILT-DISTORT	CUT AMP-GAIN	RES FILT-DISTORT	CUT AMP-GAIN	RES FILT-DISTORT	CUT AMP-GAIN	RES FILT-DISTORT			
-0+									FILTER-OUT-2	HALL	
	CUT-ENV	RES-ENV	CUT-ENV	RES-ENV	CUT-ENV	RES-ENV	CUT-ENV	RES-ENV			
VELO											
-0+									FILTER-OUT-3	DELAY	
	LFO/ENV-F LFO/ENV-A	LFO/ENV-R DELAY	LFO/ENV-F LFO/ENV-A	LFO/ENV-R DELAY	LFO/ENV-F LFO/ENV-A	LFO/ENV-R DELAY	LFO/ENV-F LFO/ENV-A	LFO/ENV-R DELAY			
MOD MORPH VELO MOD									FILTER-OUT-4	DUCKING	
	CUT-GAIN VCA-DISTORT	RES-GAIN DRY/WET	CUT-GAIN	RES-GAIN DRY/WET	CUT-GAIN	RES-GAIN DRY/WET	CUT-GAIN VCA-DISTORT	RES-GAIN DRY/WET		A-LIN	
									RE	TRIG SHRT	
PAST PAST ENV 333	LOAD	MORPH	CURVE	A	D	s	R	DEPTH	ENV	INV	
005 - ENV CPY CPY											
									LFO	Trig SYNC	
	STORE		DELAY	WAVE	PHASE	DURATION	RATE	DEPTH			

# **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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