# EASY CV

## Introduction

Digital created LFO+ENV with CV-Output. No Displays, No Menues, Minimal buttons, much Scopes, much Led-Ring-Rotarys (Planed for LRE-8x2CS), one big UI with complete functions for one LFO+ENV Voice... switching between the UI-Voices is done from the BREAKOUTMODULES...to this later

LFO+ENV are mixed together softwareside, to use only one CV-Output
8xCV-Outputs (VOICES) are supported > if u are on a VCF+VCA-Setup = 4 Voices on the Analog-Side (4xFilterbank)
Copy Paste for LFOs and ENVelopes between the Voices
Copy Paste for a Songa aka Preset aka Bank aka Program(change)
Jam Style Pattern load (next Preset Display) + Preset Morph between Current-Preset and Next-Preset

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...

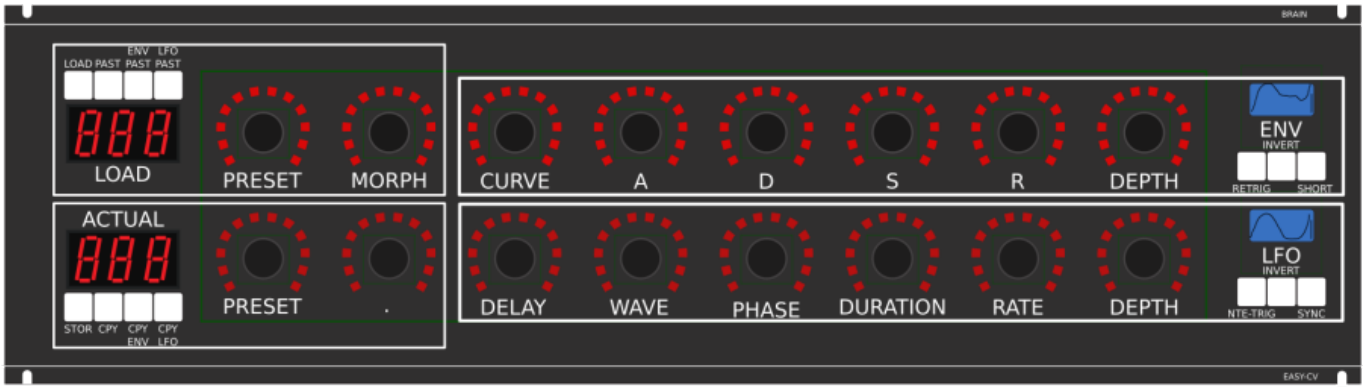
Whole thing will not be compatible on MB-CV concepts... i will copy code snippets and so on, but i have to understand it from scratch... anyhow this is not generic

## FrontPanel

### Brain

THE **LEFT** SIDE of the BRAIN > Preset-Management: **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

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



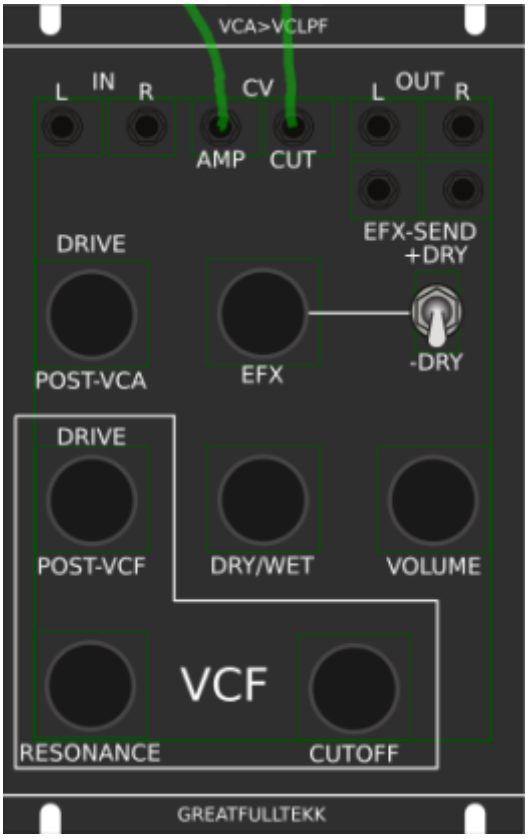

**Envelope Scope:** show the ENV-Waveform
or the Mixed-CV-Output-Waveform (when Switch is in LFO Mode)
and show the Envelope-Amount with a BAR or as integer Value?
**MIXED CV Plug:** CV-Output > Mixed Waveform ENV+LFO
**Switch @ ENV:**

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...

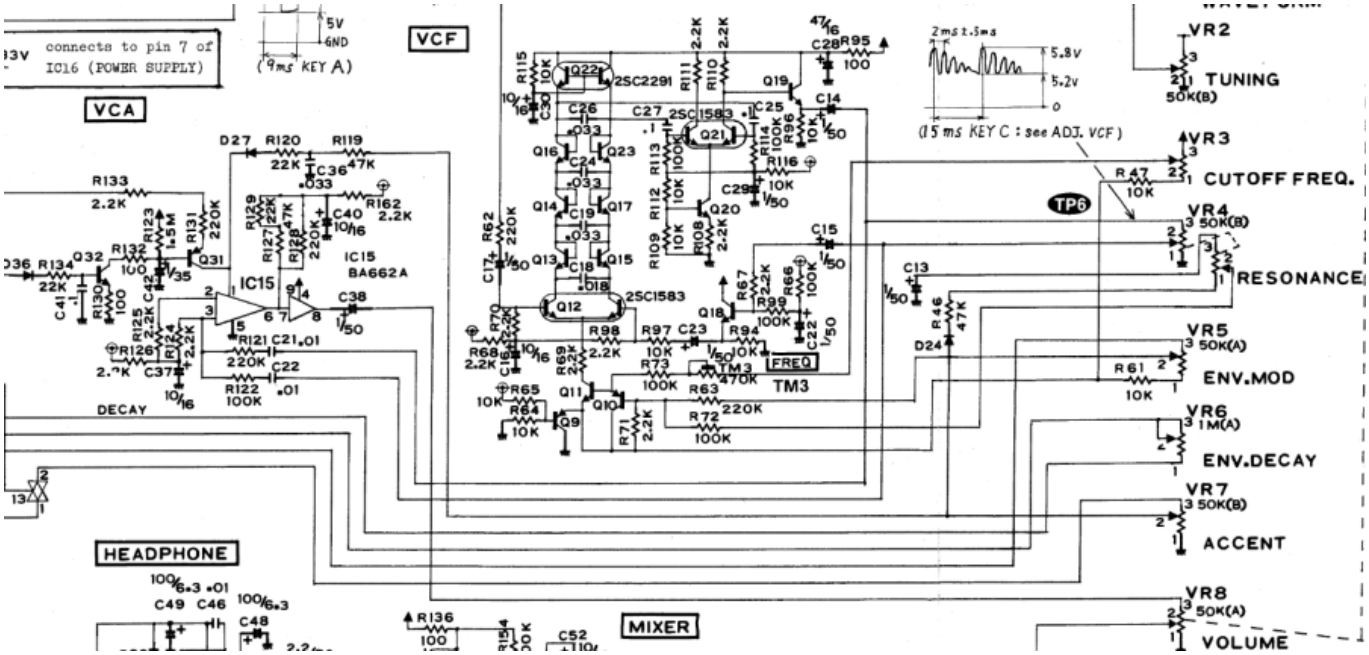
## VCA-VCF

THE VCA and the VCF are controlled with each one CV - each CV has a LFO and a ENVELOPE digitaly mixed... fixed in routing.




basicly a simple VCA (MS20Like) that drives the input of a Audio transformator 1:3 which is a Neutrik NTE10-3 (9€)
this “Tesla” Hi Gain - goes now thru the Post-VCA-Gain-Potentiometer - which then overdrives the 303 Filter (my prototype was a Freebase 383)
sound now goes to the Post-VCF-Gain-Potentiometer
now sound goes into a OP-Amp - to have the change for a light overdrive
From this point a EFX-Send Potentiometer send the Processed Signal to a extra Output (EFX-Send)
With the +DRY-Switch, we switch the orginal Signal additional to this EFX-Send-Potentiometer (or not)
Parallel to the EFX-Send Potentiometer is the DRY/WET Potentiometer it Pan between Orginal and Filtered Sound.
after DRY/WET come the Volume-knob and the Audio outs…

**Original Schematics 303 - VCA-VCF**

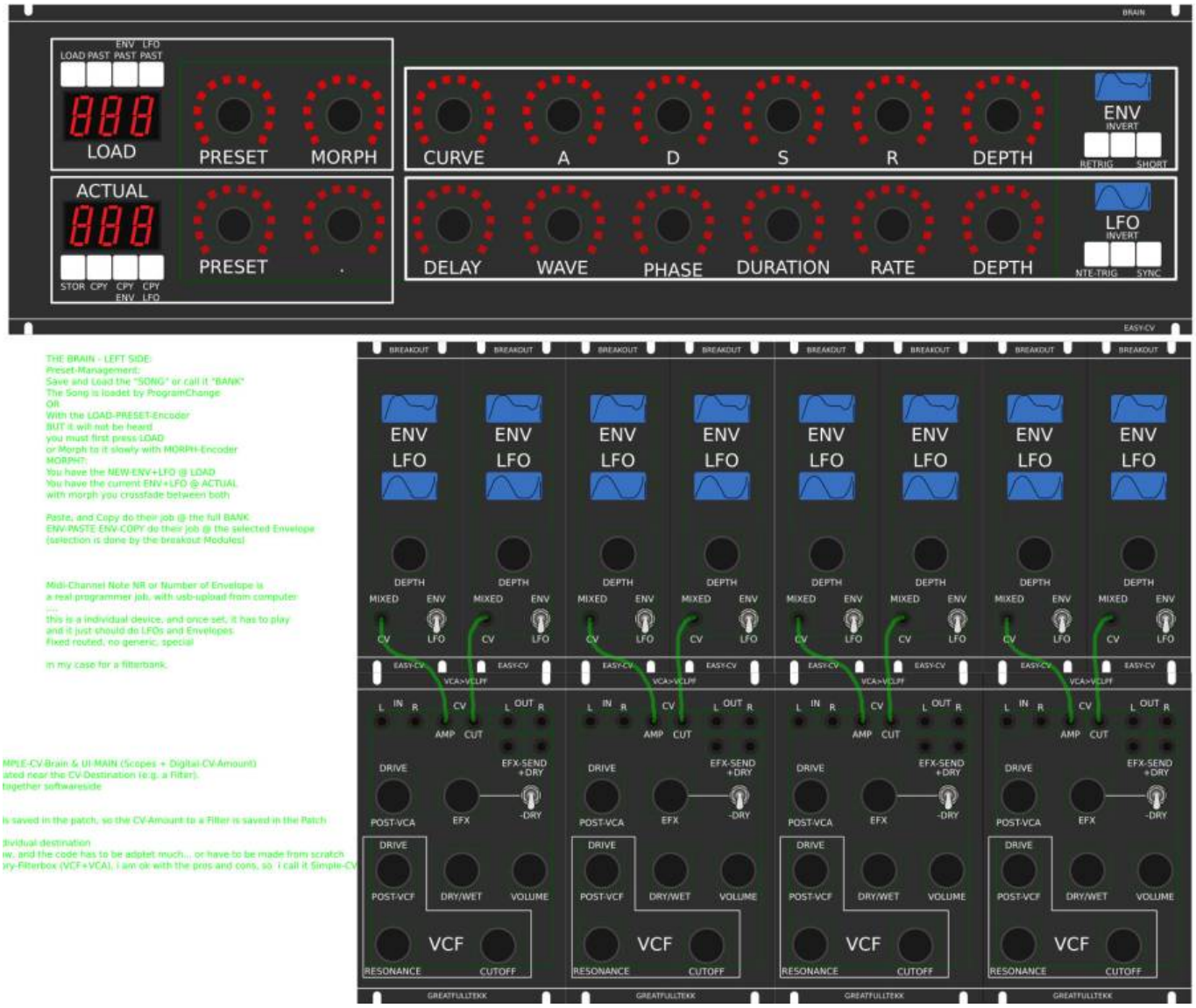



### Mod Sources

Fix Me! Fill with 303 mods take orginal VCA (have a bunch of this ICS) or make MB33 Style with standart components...

## Example for a Filterbank

Here are 8Envelopeś 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.




**I will use it to filter:**
2xGuitar-Loopstations
1xGuitar
1xPercussion-Master

# General Design

The panel size is 3U, Eurorack compliant

### FrontPanel

### PCBs

The Analog Circuits (VCF+VCA) get sandwitch as normal (not90° angeled)

### 3D View of Sandwitches

Fix Me! make concept

## 1. UI Parts Listing

### BRAIN + BREAKOUT

- Jacks 3.5mm @ Thonk
- SPDT Switch ON-OFF-ON @ Rs-components

| Value | Type | Qty |
|---|---|---|
| 3.5mm Jack | Vertical PCB-Mount | 13 |
| 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! need special 4gang 50KB potentiometers for a STEREO Resonance (stereo filter, one UI)
- Fix Me! need special 4gang xxKB (50?) potis for a Stereo DRY/WET Mix
- Fix Me! need special 2gang xxKB (50?) potis for EFX Send Mix Stereo
- Fix Me! need special 2gang 50KA potis for CUT-OFF Stereo
- Fix Me! need special 2gang Post Transformator Potentiometer (Value have to look in my prototype which is used)

| Value | Type | Qty |
|---|---|---|
| 5K | Linear | x |
| 10K | Linear | x |
| 50K | Linear | x |
| 50K | Logarithmic | x |
| 100K | Linear | x |
| 1M | Linear | x |
| 2M? | Linear | x |
| Knobs | Soft/Plastic/Alu | x |

## 2. Analog Parts Listing

### VCA-VCF-Board

Fix Me! Fill Table

## 3.Footprint Making in KiCAD

- ALPS Pots
- Alpha Pots
- 3,5mm Jack
- Switch
- Momentary Switch
- 7 Segment LED Display
- OLED DIsplay
- Rotary Encoder

Fix Me! have to be done

## 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
- LRE8x2CS - is a generic PCB which i already have (fairlightiiś)
- BREAKOUT PCBs (maybe have to sandwitch because of shiftregisters and less space)
- FILTER PCBs (have to sandwitch)

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