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

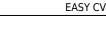
Each Channel = Filter need 8xCV-Outputs

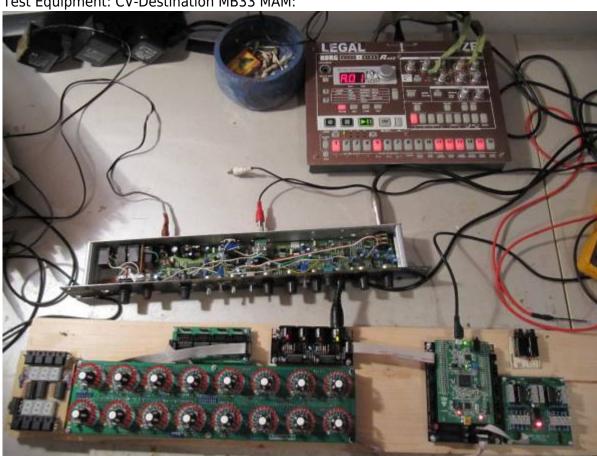
Copy Paste for LFOs and ENVelopes between the Voices

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.

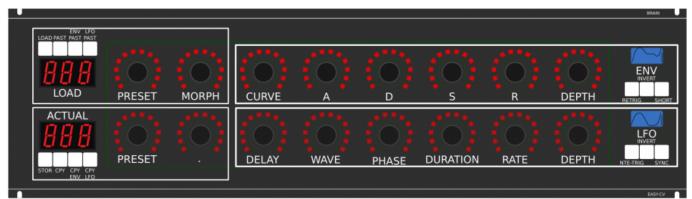
MORPH?:

-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

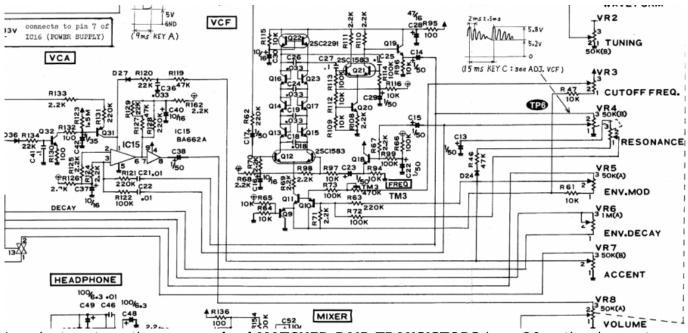
8.Send 2 EFX2

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

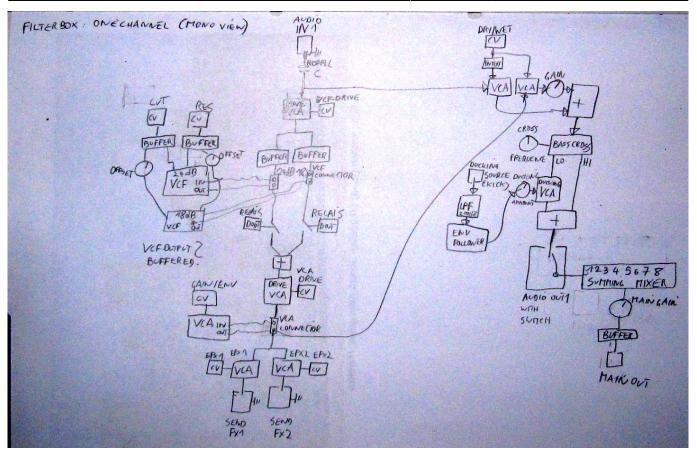
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| | | | | BRAIN U |
|--|---|---|---|--|
| LOAD MST MST PAST | | | O O I | |
| ACTUAL BBB STOR CPY CPY ENV IPO PRESET | DELAY WA | AVE PHASE DUP | RATION RATE | DEPTH NTE-TRIG SYNC |
| | | | | EASYCV |
| THE BRAIN - LEFT SIDE Preset-Management Save and Load the "SONO" or call It "BANK" The Song Is loaded by "SongareChange Oit With the LOAD-PRESET-Encoder BUT it with rate be heard you must first press ILAD or Morsh to it slowly with MORH-Encoder MOISHE Nou have the NEW-ENV+LEO (B LDAD Nou have the NEW-ENV+LEO (B LDAD Nou have the NEW-ENV+LEO (B LDAD | BREAKOUT ENV ENV LFO LFO | BREAKUUT ENV LFO LFO | BREARDUT BREARDUT ENV LFO LFO | BREAMOUT BREAMOUT ENV ENV LFO LFO |
| Paste, and Copy do their job it the full BANK ERV MSTE ERV-COPY do their job it the selected Envelope (selection is done by the breakout Modules) Misi-Channel Note NR or Number of Envelope is a real pagement job, with usb-tiploout fram computer | | DEPTH DEPTH MIXED ENV MIXED ENV | DEPTH DEPTH MIXED ENV MIXED ENV | DEPTH DEPTH MIXED ENV MIXED ENV |
| this is a individual device, and once set, it has to play and it just chould do LFOs and Envelopes. Rixed routed, to generic, special | | | | |
| in my case for a filterbank. | EASYCU EASYCU EASYCU | LASYCV CASYCV | EAST-CV EAST-CV | EASYCY EASYCY |
| MPLE-CV-Brain & UI-MAIN (Scopes + Digital-CV-Amount) and ricer the CV-Destination (e.g. a Filter). together softwareside Is saved in the patch, so the CV-Amount (b a Filter is saved in the Patch | L IN R CV LOUT R AMP CUT DRIVE EFX.SEND POSTVCA EFX -DRY | L IN R CV L OUT R AMP CUT DRIVE EFX-SEND POST-VCA EFX -DRY | L IN R CV L OUT R. AMP CUT DRIVE EFX-SEND POSTVCA EFX -DRY | L IN R CV L OUT R AMP CUT DRIVE EFX.SEND +DRV POSTVCA EFX -DRY |
| pividual destination w. and the code has to be adgited much or have to be made from scratch by filterbox (VCP=VCA), I am on with the proc and cons, so i call it Simple-C | DRIVE POST-VCF DRY/WET VOLUME | DRIVE POSTVCF DRIVMET VOLUME | POST-VCF | DRIVE DRVWET VOLUME |
| | | | | |

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

| Last update: 2016/08/15 00:24 | easy_cv http://midibox.org/dokuwiki/doku.php?id=easy_cv&rev=1471217070 | | | | |
|--|--|---|---------------------------------|-------------|--|
| MIDIOUT 2307 EITTEEBBOX | NB-CORE32 Connections | | UT-3 OUT-4 DUCK MAIN HALL DELAY | BACK-PANEL | |
| FILTERBOX | | | | | |
| -0+ SHORT VCF VCA 18 24dB OPEN | SHORT 18 24dB OPEN 18 24 | SHORT SHO 4dB OPEN 18 24dB | GAIN | FRONT-PANEL | |
| | 2 | 3 4 | | | |
| | | RES CUT | FILTER-OUT-1 MAIN | | |
| AMP-RELEASE CUT RES AMP-GAIN FILT-DISTORT | AMP-GAIN FILT-DISTORT AMP-GAIN | N FILT-DISTORT AMP-GAIN | FILT-DISTORT | | |
| -0+ CUT-ENV RES-ENV | CUT-ENV RES-ENV CUT-ENV | RES-ENV CUT-ENV | RES-ENV | | |
| VELO | AMP ENV REVERB AMP-ENV | REVERB AMP-ENV | | | |
| -0+ LFO/ENV-F LFO/ENV-R | LFO/ENV-F LFO/ENV-R LFO/ENV-F | F LFO/ENV-R LFO/ENV-F | Filter-OUT-3 DELAY | | |
| MOD | LFO/ENV-F LFO/ENV-K LFO/ENV-K | A DELAY LFO/ENV-A | | | |
| | | | FILTER-OUT-4 DUCKING | | |
| CUT-GAIN RES-GAIN VCA-DISTORT DRY/WET | CUT-GAIN RES-GAIN CUT-GAIN VCA-DISTORT DRY/WET VCA-DISTOR | RES-GAIN CUT-GAIN RT DRY/WET VCA-DISTORT | RES-GAIN A-LIN | | |
| PAST PAST ENV | | | RETRIG SHRT | | |
| LOAD MORPH | CURVE A D | S R | | | |
| CPY CPY | | | | | |
| STORE | DELAY WAVE PHASE | DURATION RATE | DEPTH | | |
| | | | | | |

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.

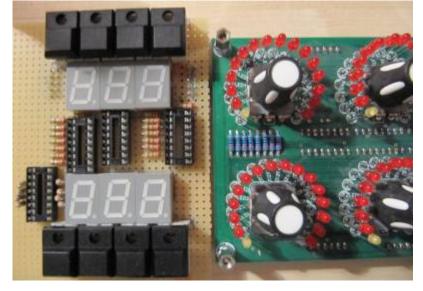
FrontPanel

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 |

본 Fill Table

Pots / Knobs

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

본 have to be done

4. Schematics in KiCAD

🗵 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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Last update: 2016/08/15 00:24



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