If you are reading this, most probably, you are about to build Erica Synths DIY MIDI-CV module. This module is 35mm deep, skiff friendly, has solid mechanical construction and doesn't require wiring. Erica Synths Black MIDI-CV is compact, highly accurate and easy to use duophonic MIDI interface. It emulates classical monophonic and duophonic synth behaviour, as well as can be configured for use in two independent MIDI channels. Bonus features – MIDI clock output and analogue glide circuit on both channels.

The DIY MIDI-CV kit comes in three versions:
1) 2PCBs + pre-programmed controller chip + connectors + glide potentiometer,
2) 2PCBs + pre-programmed controller chip + connectors + glide potentiometer + panel,
3) Full kit.

FEATURES:

- Two CV and Gate outputs
- MIDI clock output (4ppq – sequencer friendly)
- Configurable MOD output – modulation wheel or velocity
- Analogue glide on both MIDI channels
- One or two MIDI channel configuration
- One or two voice switch

SPECIFICATIONS:

- CV range   0-8V
- Max CV deviation   0.001V; 1cent
- Gate and Clock level   5V
- Glide time   0 – 2"
- Module width   6HP
- Module depth   35mm
- Power consumption   +40mA, -9mA

Setting MIDI channel	Connect MIDI keyboard to the module! Push and hold PROGRAMM button for 2". MIDI LED will start to blink slowly. While holding PROGRAMM button, select midi channel by pushing a key on the keyboard. C of any octave corresponds to MIDI channel 1, C# - channel 2, D – channel 3, etc. Channels 1-12 can be assigned to send midi messages to the module. For two MIDI channel configuration push two keys simultaneously. CV1/Gate1 will be assigned to the lowest midi channel, CV2/Gate2 – to highest. As you release PROGRAMM button, the module will advance to MOD output configuration.
MOD output configuration	In MOD output configuration mode MIDI LED starts to blink faster. If you wish to assign a modulation wheel to MOD output, simply rotate it on the midi controller. If you wish to assign key velocity to the MOD output, push any key on the keyboard. Push PROGRAMM button to confirm, and the module will exit configuration mode.
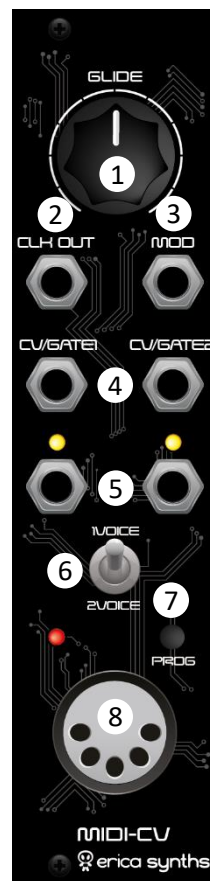
1 Use this knob to set the glide time on the output CV! It affects both channels simultaneously.

2 This is 4ppq Clock output – ready to control your sequencers. In two MIDI channel mode make sure, only one MIDI device has MIDI clock activated.

3 This is Modulation CV output. You can configure it for modulation wheel CV output or key velocity. Refer to the table below!

4 These are CV outputs.

5 These are Gate outputs, LEDs indicate active gates.

6 This is Voice switch. In one MIDI channel mode you can select between one voice mode (highest note priority) or two voice mode (highest and lowest note priority).

7 Push PROGRAMM button promptly to send MIDI panic message. Push and hold the button and you will enter configuration mode. Please, refer to the table on configuration settings.

8 This is MIDI input, obviously.

ASSEMBLY

Take precautions with regard to electrostatic discharge (ESD) safety. Handling components should be done in electrostatically safe environment. Use personal and workplace grounding. Any discharge (even a minor one) from body to a component may permanently damage it.

Our PCBs have silkscreened both component values and designators nevertheless we highly recommend you to print out files with component placement before you start assembly of the module. And, please, at least take a look on this manual!

Some components are marked as NU (not used) – leave those unpopulated! Some components are market as OPTION (those are for optional modifications) – leave those unpopulated for now.

1 Solder resistors and diodes on both PCBs (Controls board and Main board) and ferrite beads on the controls PCB! Pay attention on orientation of diodes! In order to save space and make the module more compact, resistors on main board are installed vertically **(you also may want to replace them with 0805 smt resistors).** See the close-up for correct installation! Pay attention on resistor placement – don't accidentally install them in the testpoint hole!

Controls board
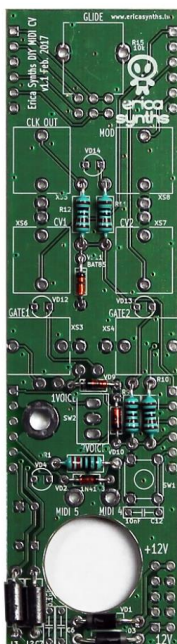
Main board
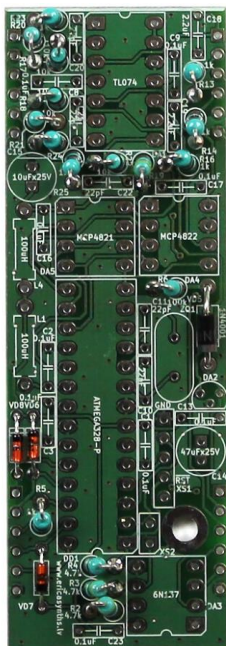
2 Solder IC sockets on the Main board, capacitors, jacks, potentiometer, switch and the pushbutton on the Control board!

3 Turn the Controls board around and solder two resistors, female connectors, PSU connector and electrolytic capacitors! **If you use 10mm high capacitors (most common ones, and ones included in the full kit), solder them horizontally!**
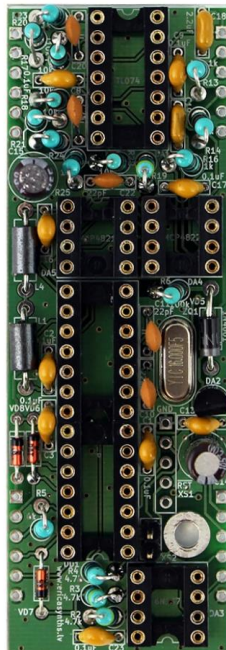

This is the negative lug of the electrolytic capacitor!

Solder these horizontally!

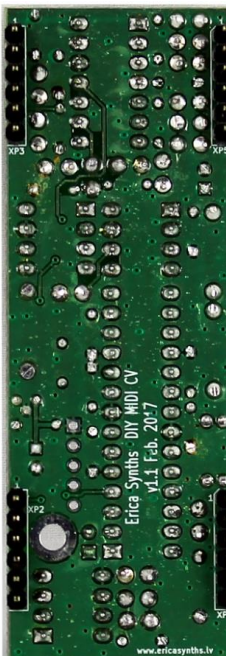**4** Solder ceramic capacitors, electrolytic capacitors, ferrite beads and 16MHz crystal on the Main board!

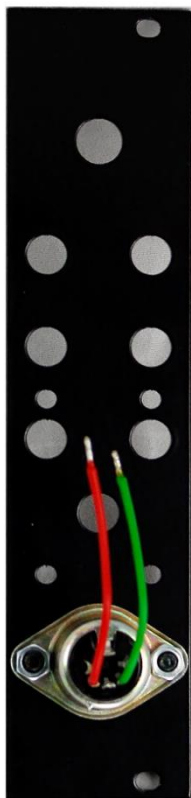
5 Use M3 screw to fix the 11mm spacer!

6 Turn the Main board around and solder male connectors and an electrolytic capacitor!

7 Use two black M3 screws and nuts to fix DIN5 midi connector! Midi connectors typically are installed upside down. Solder wires to lugs 4 and 5
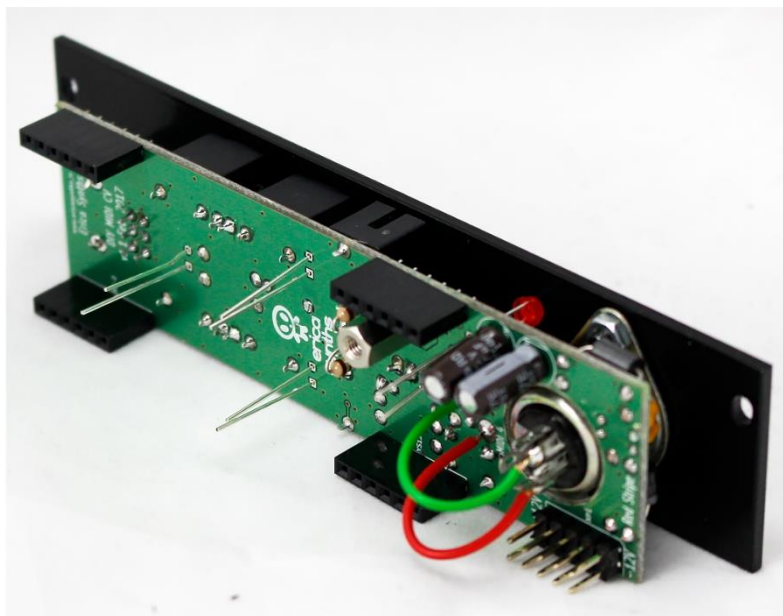
8 Place LEDs in the relevant places (mind the polarity), **but do not solder them yet!** Install the front panel, fix it with jack and potentiometer nuts! Push the LEDs in relevant holes on the front panel and solder them. Cut off their pins! Also solder MIDI connector wires in the relevant holes!

9 Insert ICs, connect both boards together and fix with M3 screw!

10 Congratulations! You have completed assembly of Erica Synths DIY MIDI-CV interface! Now it's time to do some calibration!

Install a jumper of wire link next to the controller IC! The module will not work properly without it.

CALIBRATION

With Erica Synths MIDI-CV interface you can achieve extremely accurate VCO tracking, therefore some calibration is required.
You will need a VCO with good 1V/oct tracking, midi keyboard and a chromatic tuner.

Connect midi keyboard to the module, set VOICE switch to 1 Voice mode and connect CV1 output to a calibrated VCO 1V/oct input and a chromatic tuner to the output of the VCO.
Disconnect MIDI-CV module from the PSU. Then push and hold PROGRAMM button and connect the module to PSU busboard! MIDI LED will start to blink, which means the module is in calibration mode.
Play C3 on the keyboard, and tune the VCO so that tuner reads C3!
Play C4 on the keyboard and check the reading on the tuner. If it reads something higher than C4, play B3 on the keyboard repeatedly until the tuner reads C4. If it reads something lower than C4, play C# repeatedly until the tuner reads C4.
Play C5 on the keyboard and check the tuner. If it reads something higher than C5, play repeatedly B4 until the tuner reads C5, etc.
Continue until you have perfect tuning along all octaves.
Push the PROGRAMM button to quit calibration mode.

NOW IT'S TIME TO USE THE MODULE FOR YOUR MODULAR MASTERPIECES! ENJOY!