**Manuals+**

User Manuals Simplified.



# SYNTONIE Circuit Bent Delay CBV002 User Guide

**November 25, 2021 November 26, 2021**

SYNTONIE Circuit Bent Delay CBV002 User Guide



CBV002 is an eurorack adaptation of Discret11, which is based on an analog encryption system of the same name

used by pay TV in the 90s.

It works by delaying the signal by a few hundreds of nanoseconds, resulting in an horizontal displacement and hue shift.

**Contents** [ **hide** ]

## Specifications

- 16HP
- 120mA +12V
- 60mA -12V
- 0mA +5V
- 45mm deep

## Inputs / outputs
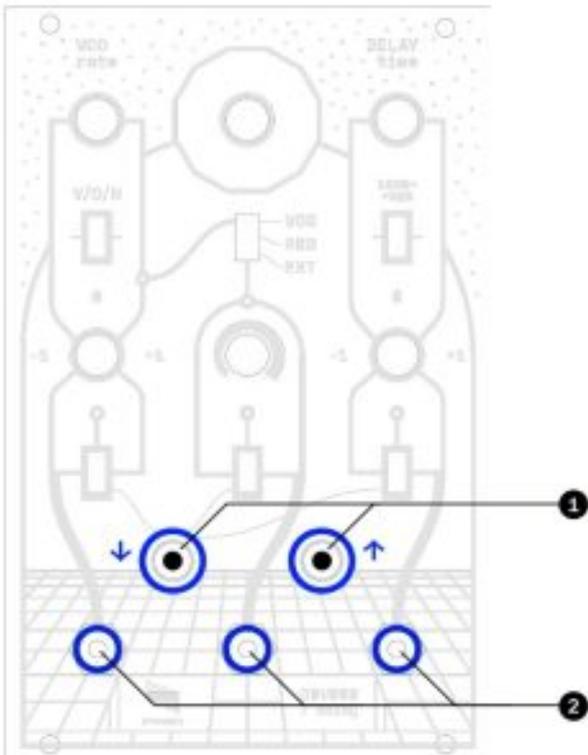
1. Composite Video IN (left) – OUT (right) / 1Vpp, 75ohm
2. CV Inputs / 0-1V, 100k ohm

CBV002 process composite video through the RCA input/out
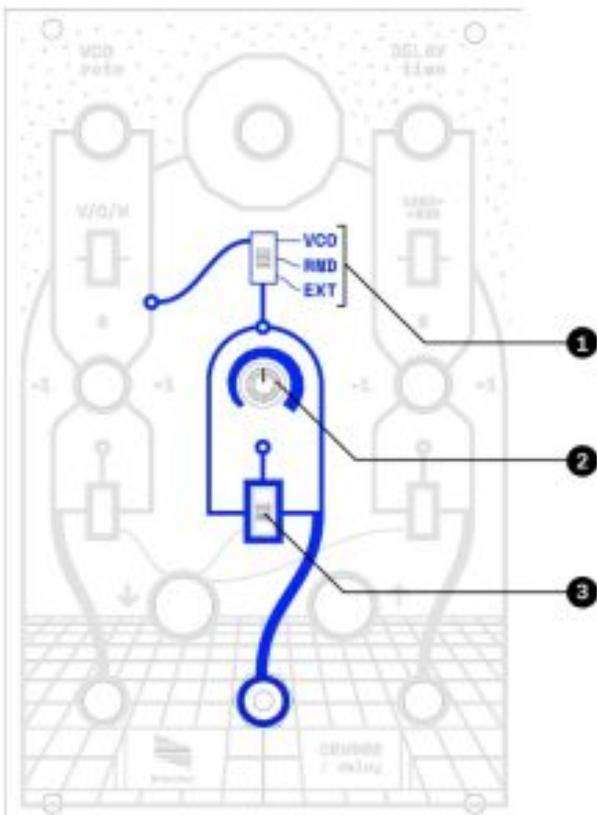
**CV (2) inputs allow for:**

- frequency modulation of the internal oscillator
- keying between original and delayed video
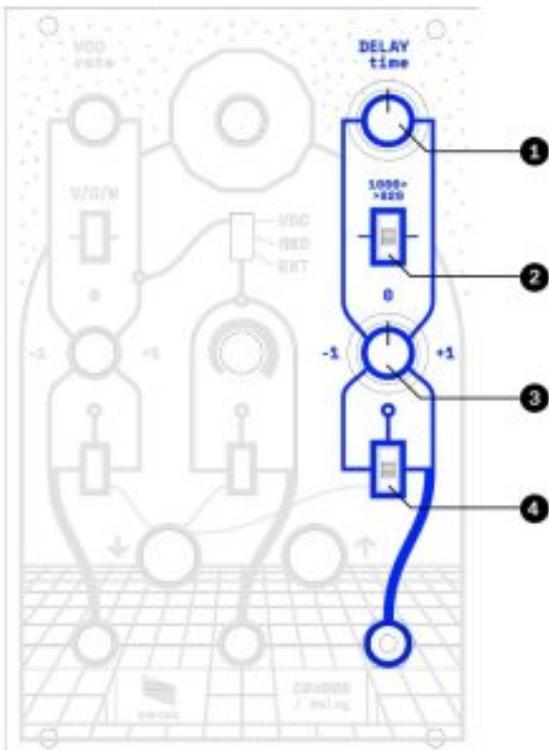- control over delay time

**Key**

This section switches between original and delayed video signal using a control voltage.
Source selection switch **(1)** allows to choose which signal will be used for keying :

- **VCO:** internal square VCO
- **RND:** internal VCO through random
- **EXT:** external signal through CV input

Knob **(2)** acts on the threshold of the CV input (only work in EXT) Input selection switch **(3)** allows to choose between :

- external CV input through 3.5mm jack when UP **(↑)**
- video input modulation when DOWN **(↓),** original/delayed video will now be keyed based on the input video signal

## Delay



This section acts on the delay time, which in result acts on horizontal displacement/hue shift.

- Delay time knob **(1)** allows for manual control over delay time.
- Delay preset switch **(2)** set the initial delay time (from around 820ns to 1000ns)
- Delay CV attenuverter **(3)** attenuates and/or invert the signal coming from the Delay CV input

**Input selection switch (4) allows to choose between :**

- external CV input through 3.5mm jack when UP **(↑)**
- video input modulation when DOWN **(↓),** original/delayed video will now be delayed based on the input video signal (can cause instability of the signal)

**Note:** that even if the delay CV input can go quite high in frequency, an internal filter attenuates it in order to minimize CV bleeding through the video signal at high frequencies

## VCO
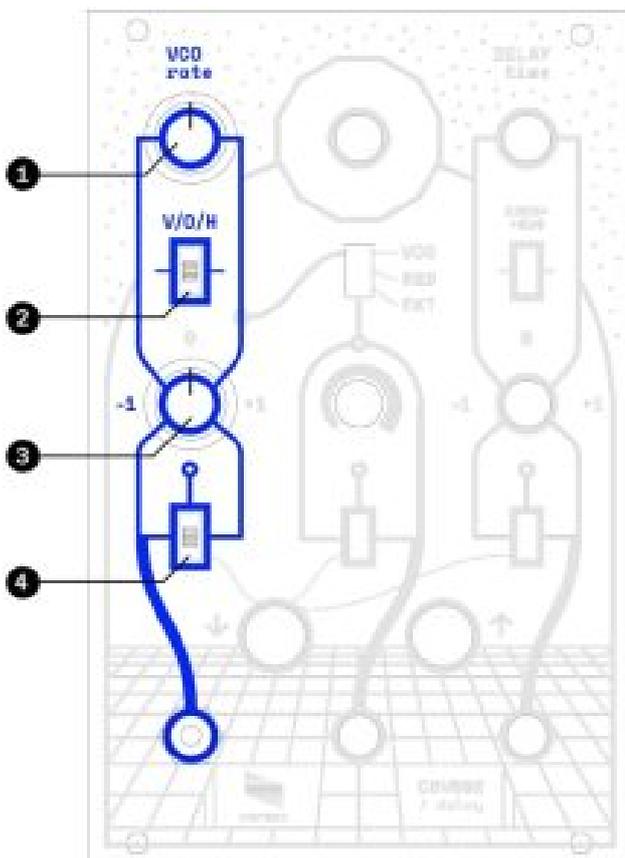
This section features a square VCO that can be used for keying, which result is quite close to the original Discret11 effect which works by delaying the signal at line rate.

VCO rate knob **(1)** allows for manual control over the frequency of the VCO
Frequency range switch **(2)** allows to switch between Vertical and Horizontal range, as long as unsynced oscillation when switch is centered.
FM attenuverter **(3)** attenuates and/or invert the signal coming from the FM input.
Input selection switch **(4)** allows to choose between :

- external CV input through 3.5mm jack when UP **(↑)**
- video input modulation when DOWN **(↓),** oscillator will now be frequency modulated based on the input video signal.

**Feedback**

The knob **(1)** feeds the video output signal back into the video input, resulting in edge feedback/ distorsion when fully clockwise **(→).**

## Build guide / mainboard



Use the interactive BOM to look for component placement / **Find the BOM here**

**Place and solder in this order :**

1. Resistors/resistor array
2. Diodes **(mind the orientation)**
3. Ferrites beads

4. Capacitors **(mind the orientation of electrolytic capacitors)**
5. Transistors/regulators **(mind the orientation)**
6. IC sockets/ICs **(mind the orientation)**
7. Trimmers
8. Connectors **(mind the orientation)**

## Build guide / mainboard Modifications
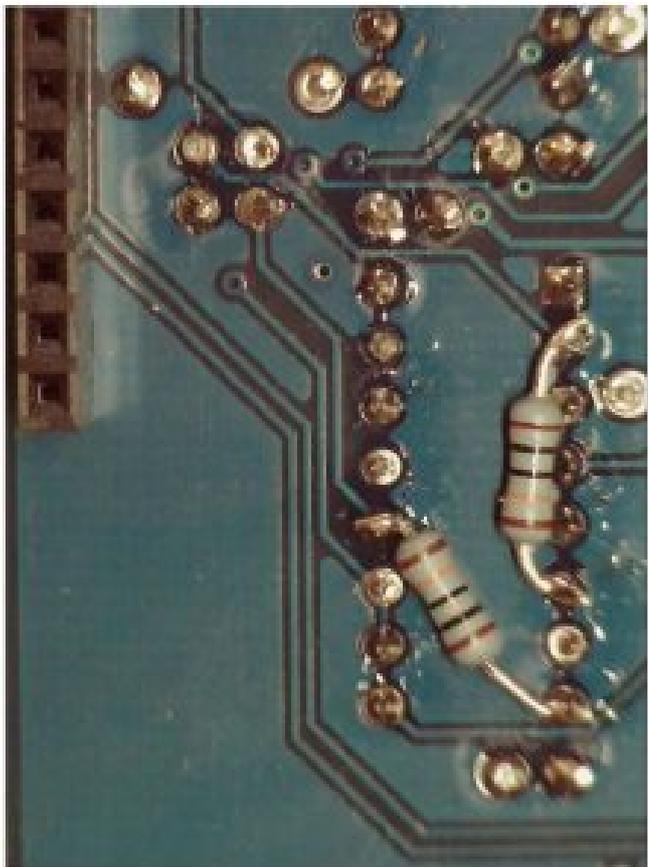


R72 and R73 are not present on the board (no footprint), so they need to be soldered underneath U4 on the mainboard like in the picture above (one resistor between pin 2 and pin 6, another one between pin 8 and pin 12).

**Make sure the resistors leads doesn't short anything.**

The circuit will work without this modification, however it will generate a DC voltage at the output when nothing is plugged at the RCA input of the module, and in the case the RCA output is connected to another input , the module will draw much more current that what is specified.
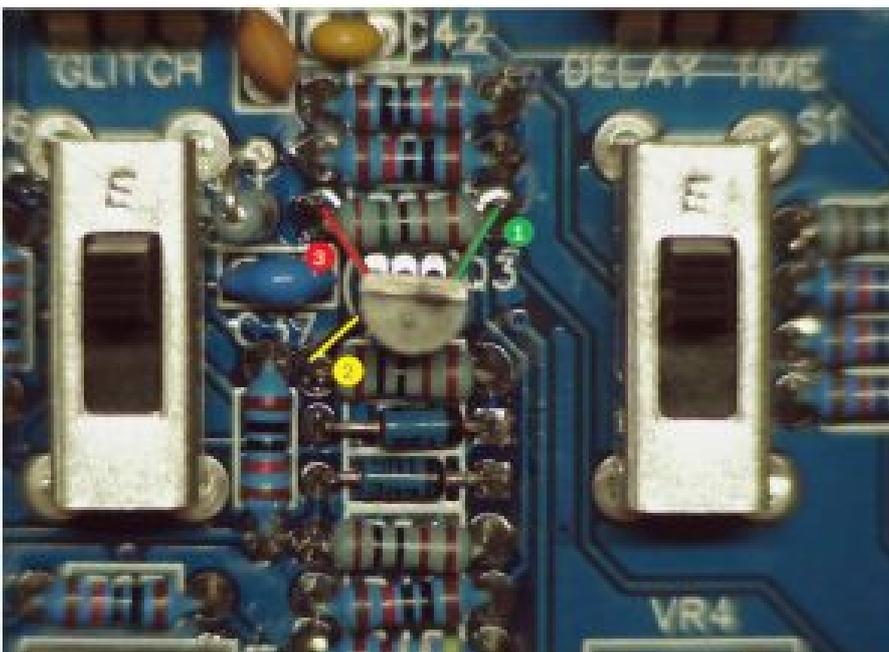
## Build guide / controlboard
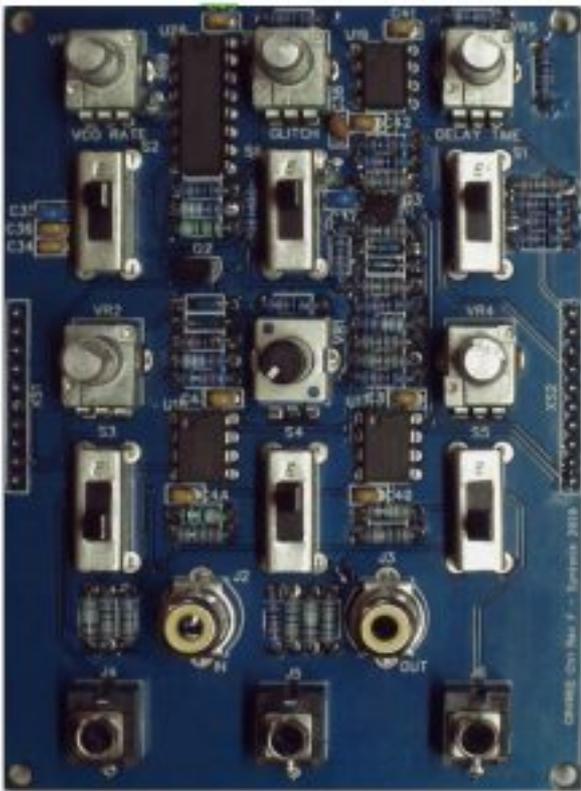
Use the interactive BOM to look for component placement / **Find the BOM here**

**Place and solder in this order :**

1. Resistors **(mind the two standing resistors)**
2. Capacitors
3. Transistors **(mind the orientation)**
4. IC sockets/ICs **(mind the orientation)**
5. Switches
6. Connectors
7. Potentiometers

**Build guide / controlboard Modifications (optional)**



Q3 footprint got the leads of the transistor quite close together, which can be hard to solder. If you don't feel confident soldering Q3 without shorts, you can solder it like in the image above (pin 1 and pin 3 across R57, pin 2 on

left side of R55).

Keep the transistor oriented as shown on the silkscreen (flat side on the top).
Cut the leads of the transistor at about the half and make sure that it doesn't sit too tall, as the front panel will come above.

## Power supply (optional
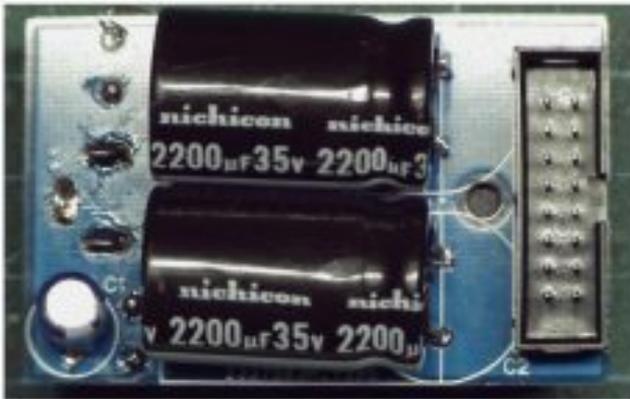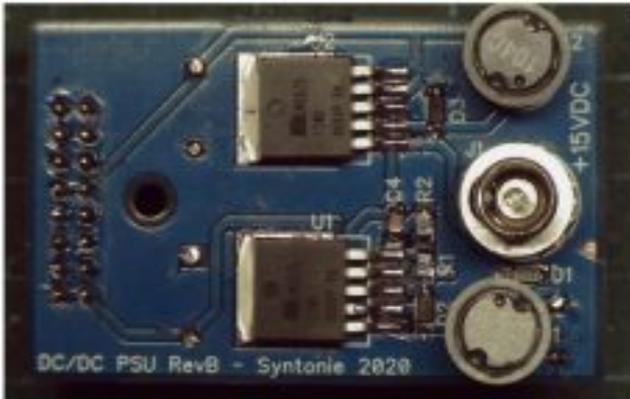


### Place and solder in this order :

1. Inductors
2. Connector (mind the orientation)
3. Capacitors (mind the orientation + the two 2200uF caps needs to be bent and soldered perpendicular to the board))

Apply 15VDC power supply and check for +12V/-12V on the 16pin connector.

## Calibration

Once the mainboard and controlboard are connected together, and power applied through the 10pin connector, the circuit should pass video through.

If that's not the case, check both boards for incorrect component orientation/placement, cold solder joint, etc…

### Blanking

Best way to set it visually is to switch the key source to VCO and VCO range to vertical, and use a test pattern for reference. The resulting image should display horizontal bars.

### Not calibrated properly

- Left and right part of the picture doesn't display the delayed (darker) part fully.
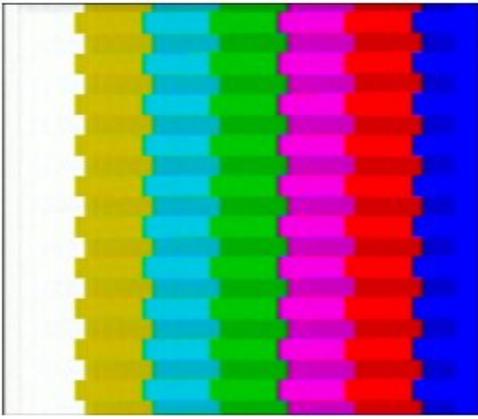
- After turning P1 clockwise, we can see that the delayed part is now displayed on the left, however the whole bars shifted to the left, so we're now missing a little bit more on the right.
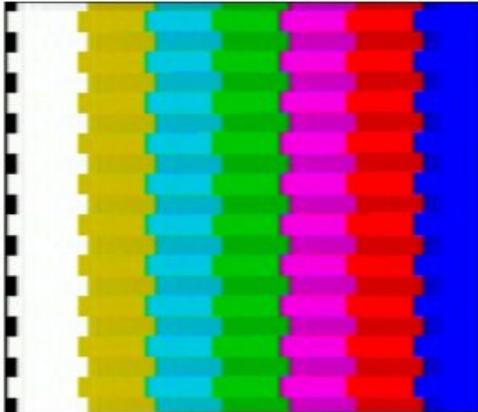


- After turning P2 counterclockwise, the horizontal bars should now be extended on the right, until it reaches the end of the picture.
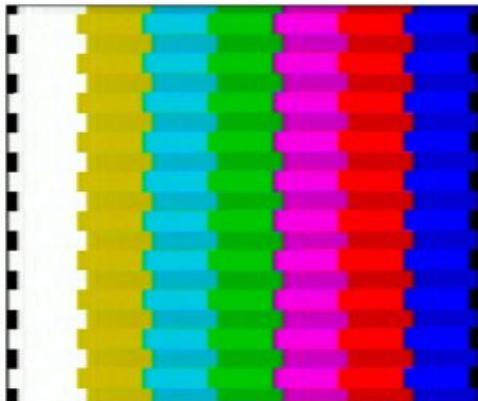


- If P2 is turned counterclockwise too much, it will display something like this. Turn it clockwise until you start seeing the bars diminishing to the right, and back until it reaches the previous example.
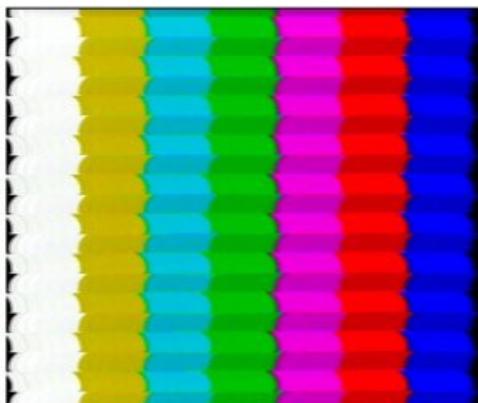


**Delayed signal make-up gain**

The delay chip attenuates the video signal a bit, so delayed signal needs to be amplified to match the input video signal. Note that the delayed signal also loose a bit of linearity, so it's not really possible to match the original signal

1:1.

We can keep the previous calibration settings, however this time we need to turn the delay time knob so the color in the delayed signal matches the original signal as much a possible, use the delay preset switch if the range of the delay time isn't enough to reach the right colors. Move the delay time until you reach the right colors at max saturation (saturation will increase/decrease as you get close to match the original video).

- When moving P3, the brightness of the delayed signal should change. Here it is darker, so P3 needs to be turned counterclockwise to increase delayed signal amplitude.
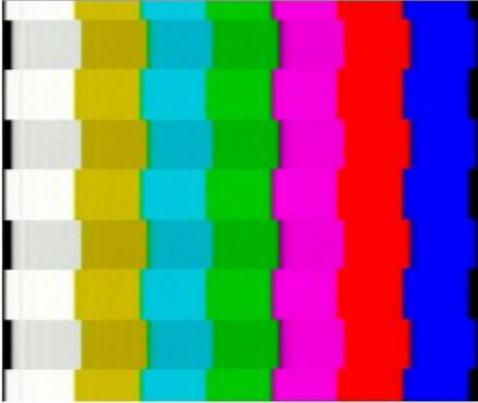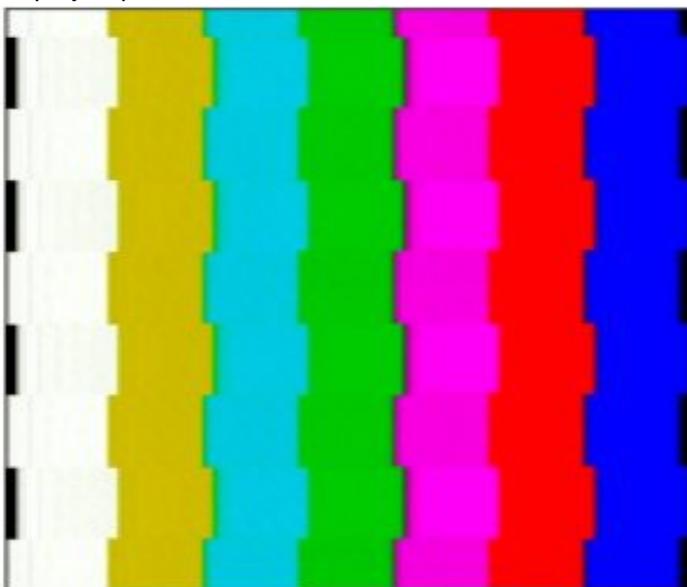


- Here it is too high, so P3 needs to be turned clockwise to decrease delayed signal amplitude.
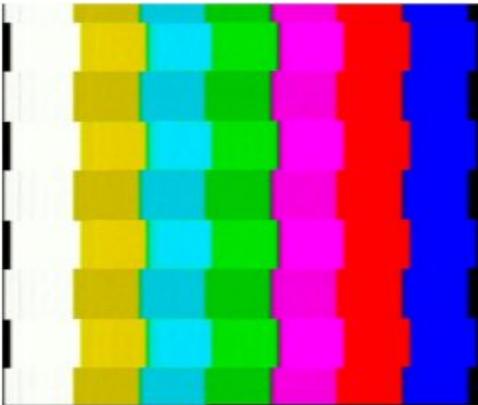


**P3 properly calibrated**

- Once again, it's not really possible to have it perfectly matched so aim for what looks good on your display/capture card.



**Enclosure assembly**

If you printed the enclosure yourself, you'll need to install M3 brass inserts in order to screw the assembly together as

long as fixing the front panel to the enclosure. The enclosure has holes to fit the inserts using a soldering iron. There is 4 on the rear part and 2 on the front part.
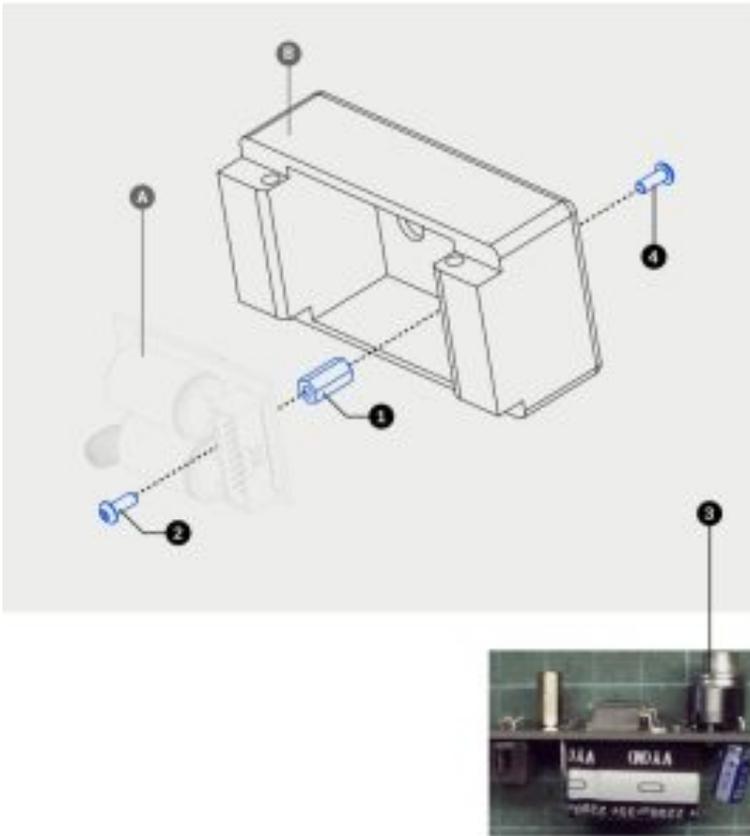


Start by fixing the power supply **(A)** to the rear part of the enclosure **(B).** First, fix the 11mm spacer **(1)** with a 6mm screw **(2)** to the power board, leave the washer on the DC connector **(3).**

Attach the 16pin to 10pin power cable to the power board before installing it into the rear part of the enclosure. Then secure it using a 6mm screw **(4)** and the nut for the DC connector.

Connect the 16pin to 10pin connector to the module **(C),** and slide the module **(C)** into the front part of the enclosure **(D).**
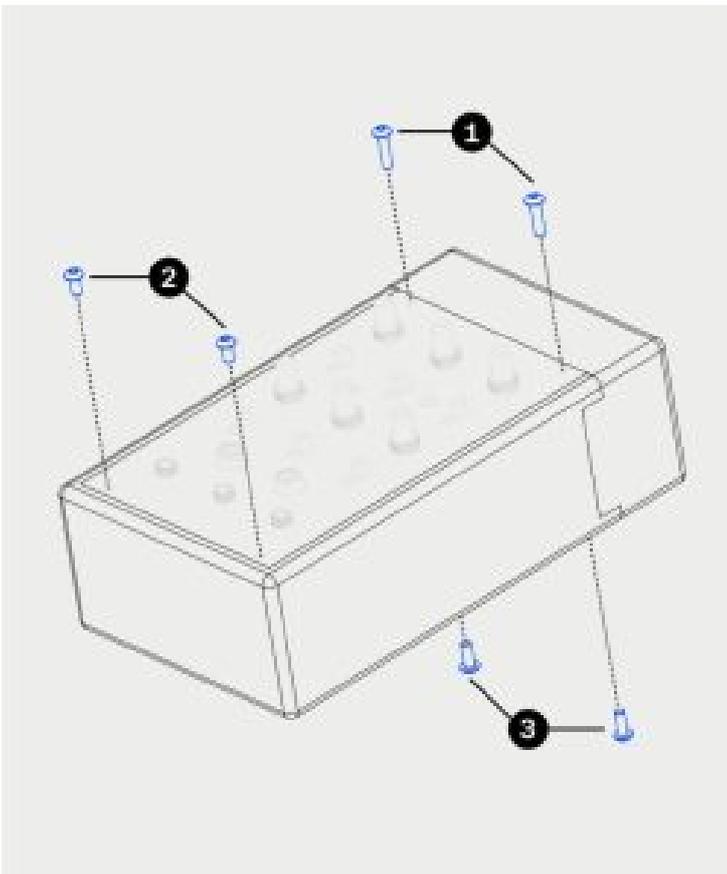
Finally, slide the rear part of the enclosure **(B)** into the front part of the enclosure **(D).**
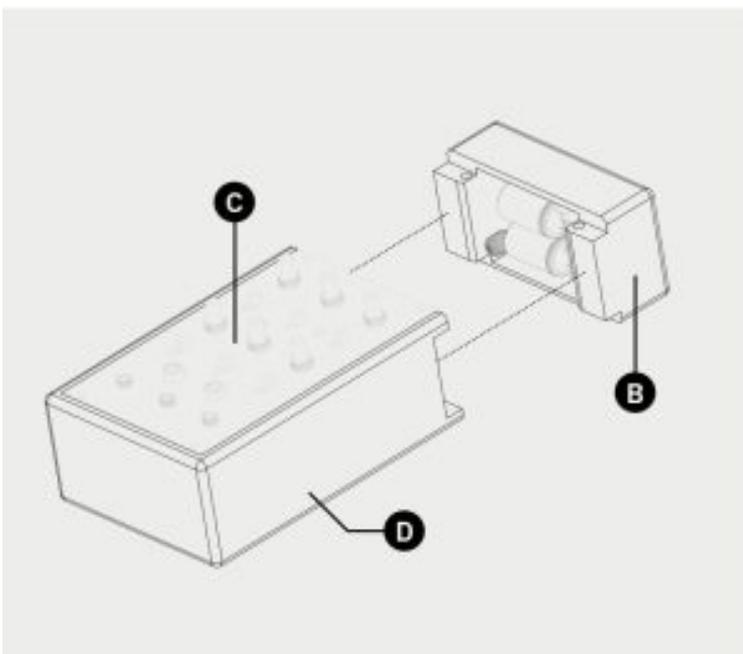
Now secure the front panel, rear and front part of the enclosure using 2x
12mm screws **(1),** then using 2x 6mm screws **(2),** fix the front panel to the front part.

Use 2x 12mm screws **(3)** to fix the rear part to the front part from the other side.



## Documents / Resources



**SYNTONIE Circuit Bent Delay CBV002** [pdf] User Guide
SYNTONIE, Circuit Bent Delay, CBV002

## Related Manuals / Resources

### IKEA TJUSIG Installation Guide

IKEA TJUSIG Installation As wall and door materials vary, screws for fixing to wall or door are not…

### IKEA KONSTRUERA Drawer Installation Guide

IKEA KONSTRUERA Drawer Installation Guide Required Tools 4x 4x 2x 12x 2x 1x WARNING Assembly Instructions

### HobbyEagle A3 Configurator Installation Guide

A3 Configurator A3 Configurator v1.0 a3-configurator-installer-1.0.0.msi Windows10 A3 Configurator Microsoft .NET Framework 4 dotNetFx40_Full_x86_x64.exe A3 Configurator WWW.HOBBYEAGLE.COM 1…

### Caddx Turtle V2 User Guide

Caddx Turtle V2 User Guide   Operation Diagram   Turtle V2 Quick operation guide   Parameter   Connection…

**Manuals+**,

- **home**
- **privacy**