

SYNTH PANELS DESIGNER

USER MANUAL V. 1.0

27 June 2020

<https://synthpanels.design>

SYNTH PANELS DESIGNER (SPD) is a **FREE** and **OPEN SOURCE** software designed to assist in the design of synthesizers panels, electronic musical instruments, guitar pedals, labs instruments and for all those applications, hardware and software, that require the design of a UI.

SPD is an extension for the **INKSCAPE 1.0** open source vector graphics software for MacOS, Linux and Windows. You can download the latest version of Inkscape here https://bit.ly/dl_inkscape

SPD is brought to you by **FASELUNARE** (<https://bit.ly/faselunare>) a small Italian company who designs and builds electronic musical instruments, synthesizers, modular synthesizers and experimental designs.

FASELUNARE can help you to realize your idea, if you have a new instrument in mind but you don't know how to make it, write to info@faselunare.com, our team will be able to help you from the schematics to the market.

SPD is also sponsored by **SOUNDMIT - International Sound Summit** (https://bit.ly/visit_soundmit) the **Italian Synths and Pedals EXPO**. With over **10 years** of experience and succesful events, **SOUNDMIT** is the right place to promote your idea and business.

DOWNLOAD SPD

Download the latest version of **SPD** at this link https://bit.ly/dl_synthpanelsdesigner

INSTALL SPD

To install a new Inkscape extension, download and unpack the archive file. Copy the files into the directory listed at **Preferences > System: User extensions**. After a restart of Inkscape, the new extension will be available under the menu **EXTENSIONS -> RENDER -> Synth Panels Designer**.

MacOSX User must go to the Applications folder, right click on the Inkascape icon and choose 'Show content' then go to Contents -> Resource -> Share -> inkscape -> extensions and copy the files here.

After copying the files, you need to restart Inkscape.

NOTE: After copying the files, you must have this folder structure, otherwise it won't work.

EXTENSIONS (Inkscape's extensions folder)

- SynthPanelsDesigner.inx
- SynthPanelsDesigner (folder)
- Assets (folder)
- SynthPanelsDesigner.py

COLLABORATE

SPD is released under the AGPL3 Open Source license, you can also contribute to improve it. Connect to our Gitlab at this link https://bit.ly/spd_gitlab and help us improve!

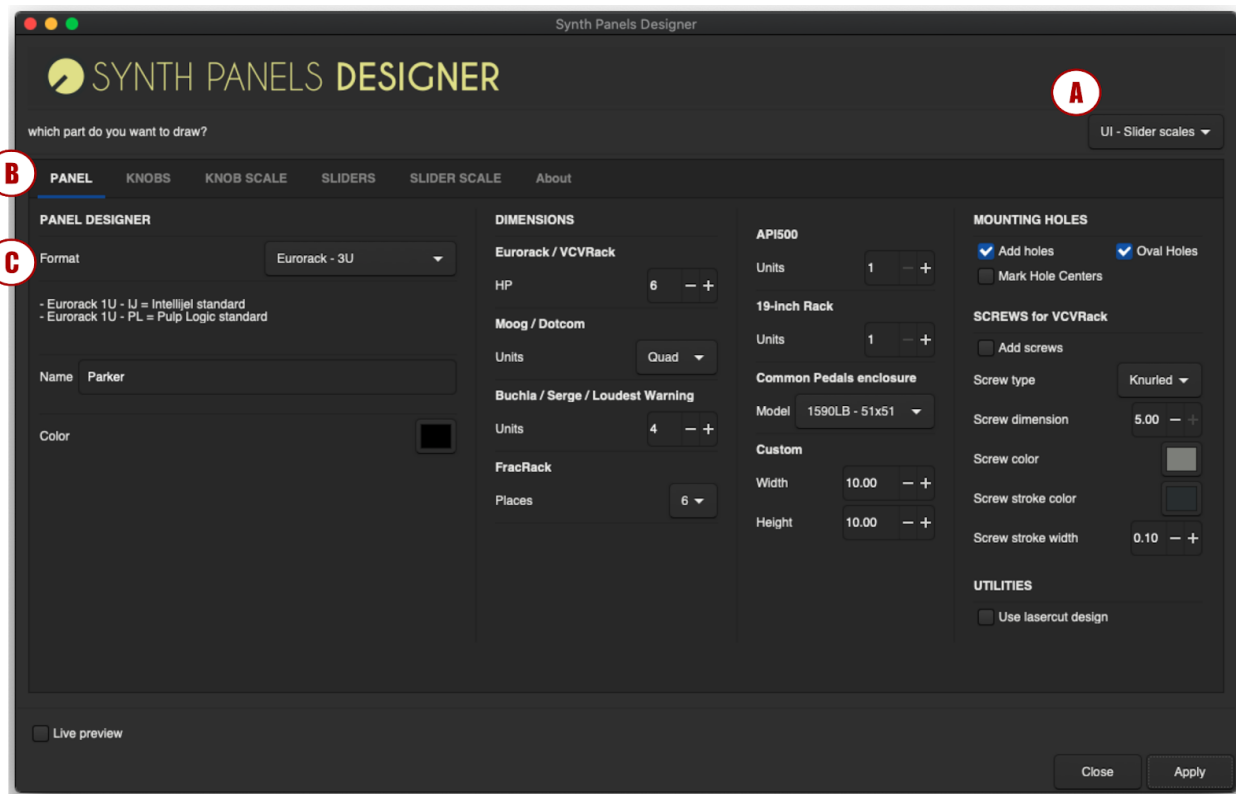
NOTE: If you find a bug in SPD or if you have a request for new functions, do not contact us through social channels or email but **OPEN AN ISSUE ON GITLAB**, this is the only way to reach our team about **Synth Panels Designer** issue and requests. Thank you!

NOTE: All products and brands are the property of their respective owners

INTERFACE

SPD is a single window application divided into thematic areas. Although the use is fairly intuitive, we will try to explain in this manual all the sections that make up the application and how to use it.

SPD is made up of **over 140 parameters** that we invite you to explore (especially in the sections dedicated to scales).



SECTION A

The '**SECTION A**' it's a drop-down menu from which you can (and must) choose what you want to draw with the extension, before anything else.

The options you have are

- **PANEL** (to draw a panel)
- **KNOB** (to draw a knob)
- **KNOB SCALES** (to draw the knob scale)
- **SLIDER** (to draw horizontal and vertical sliders)
- **SLIDER SCALES** (to draw the slider scale)

SECTION B

5 of these 6 tabs represent the objects that we can go to draw with **SPD** and reflect the items seen previously at **SECTION A**:

- **PANEL** (to draw a panel)
- **KNOB** (to draw a knob)
- **KNOB SCALES** (to draw the knob scale)
- **SLIDER** (to draw horizontal and vertical sliders)
- **SLIDER SCALES** (to draw the slider scale)

SECTION C

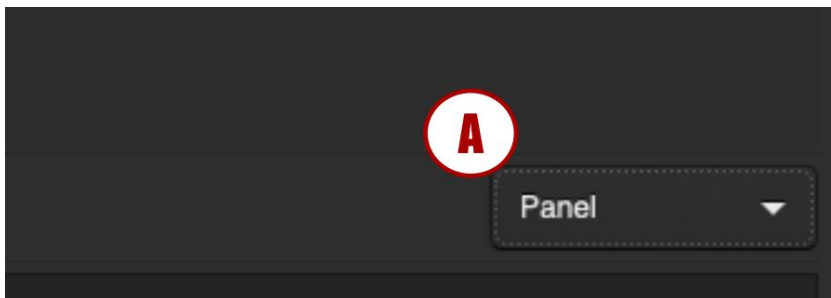
SECTION C contains all the parameters on which we are going to work to design our UI.
SECTION C is different and unrelated to the other TABS.

NOTE: DOUBLE CHECK YOUR FINAL DESGN BEFORE SENDING IT TO PRODUCTION. SPD WILL NOT BE RESPONSIBLE FOR DESIGN ERROR.

LET'S START TO DESIGN A PANEL

At the first start, what we will see is the content of the first TAB, **PANELS**. As we said before, **the first thing to do before drawing an element** is to select the corresponding item from the list in **SECTION A**.

Assuming we want to draw a panel, we will then choose **PANEL**



Panel are composed by 4 elements (each created on a dedicated layer):

- The **panel**
- The **holes**
- The **screws**
- The **center marks**

PANEL OPTIONS

The screenshot shows the 'PANEL DESIGNER' interface with the following sections:

- PANEL DESIGNER**
 - Format: Eurorack - 3U (dropdown)
 - Eurorack 1U - IJ = Intellijel standard
 - Eurorack 1U - PL = Pulp Logic standard
 - Name: Parker (text input)
 - Color: [Black color swatch]
- DIMENSIONS**
 - Eurorack / VCV Rack
 - HP: 6 (input with +/-)
 - Moog / Dotcom
 - Units: Quad (dropdown)
 - Buchla / Serge / Loudest Warning
 - Units: 4 (input with +/-)
 - FracRack
 - Places: 6 (input with +/-)
- API500**
 - Units: 1 (input with +/-)
- 19-inch Rack**
 - Units: 1 (input with +/-)
- Common Pedals enclosure**
 - Model: 1590LB - 51x51 (dropdown)
- Custom**
 - Width: 10.00 (input with +/-)
 - Height: 10.00 (input with +/-)

- MOUNTING HOLES**
- ☒ Add holes
- ☒ Oval Holes
- ☐ Mark Hole Centers
- SCREWS for VCV Rack**
- ☐ Add screws
- Screw type: Knurled (dropdown)
- Screw dimension: 5.00 (input with +/-)
- Screw color: [Grey color swatch]
- Screw stroke color: [Dark blue color swatch]
- Screw stroke width: 0.10 (input with +/-)
- UTILITIES**
- ☐ Use lasercut design

PREVIEW TIPS: In **Inkscape**, to see the effect produced by an extension, you have to check the **LIVE PREVIEW** checkbox on the bottom left of **SDP**. As long as you don't press **APPLY**, you can edit all the parameters and immediately see the result. After pressing **APPLY**, you can no longer edit the panel (but you can edit it using Inkscape tools)

The **PANEL** is one of the easiest parts to draw with **SPD** but you need to know some fundamental things to get a good result.

FORMATS and STANDARDS

SPD allows 'out of the box' to design different types of panels according to the most common standards.

These are the standards supported at the moment:

- EURORACK 3U
- EURORACK 1U - Intellijel
- EURORACK 1U - Pulp Logic
- VCV RACK
- MOOG
- SERGE
- LOUDEST WARNING
- FRACKRACK
- API500
- 19-INCH STANDARD

- DOTCOM
- BUCHLA

- HAMMOND ENCLOSURE
- CUSTOM FORMAT

PANEL NAME

The panel name will be used as the name for the dedicated **LAYER** (everything designed by **SPD** has a dedicated layer). Usually it is the name of the module.

PANEL COLOR



You can choose the color of your panel from here.

COLOR TIP: If you need to produce the panel for a real (non-software) instrument, make sure that the company that will produce your panel has this color available.

PANEL DIMENSIONS

Each standard has specific rules, **SPD** knows these rules and applies them for you!

The panels in **EURORACK** format, for example, have the width expressed in **HP (Horizontal Pitch)**, each single HP corresponds according to the **DOEPFER standards** (the first to formalize this type of format) to 5.08mm (**all dimensions in FPD are expressed in millimeters**)

Curious about the standards?

Eurorack 3U Doepfer standard

http://www.doepfer.de/a100_man/a100m_e.htm

#Eurorack 1U Intellijel standard

<https://intellijel.com/support/1u-technical-specifications>

#Eurorack 1U Pulplogic standard

http://pulplogic.com/1u_tiles

#API500 500 module series specification

https://www.barryrudolph.com/recall/manuals/api_vpr_%20500_spec.pdf

#MOOG UNIT 5U

<https://www.dsl-man.de/display/FRONTPANELS/5U+Format+specifications>

#Loudest Warning standard

<http://www.loudestwarning.co.uk/portfolio/4u-modular-specs>

#Fracrack standard

<https://www.paia.com/fracrak.asp>

MOUNTING HOLES

FACT: All panels must have mounting holes! (Add holes)

As with the dimensions, the mounting holes must also be in the right place and the right size and each standard has its own.

With **SPD** you can add **regular** and **hoval hole (Oval Holes)**, **some standards do not have the oval variant of the holes** while others, such as the EURORACK standard, can have a single hole or 2 holes based on the width (the Eurorack format has 2 pairs of holes from 11HP up).

If you are designing a panel to print it on paper and then apply it on the module, it will be convenient for you to know where to make the mounting holes with precision, '**Mark Hole Center**' checkbox automatically marks the center of the holes.

SCREWS FOR VCVRACK

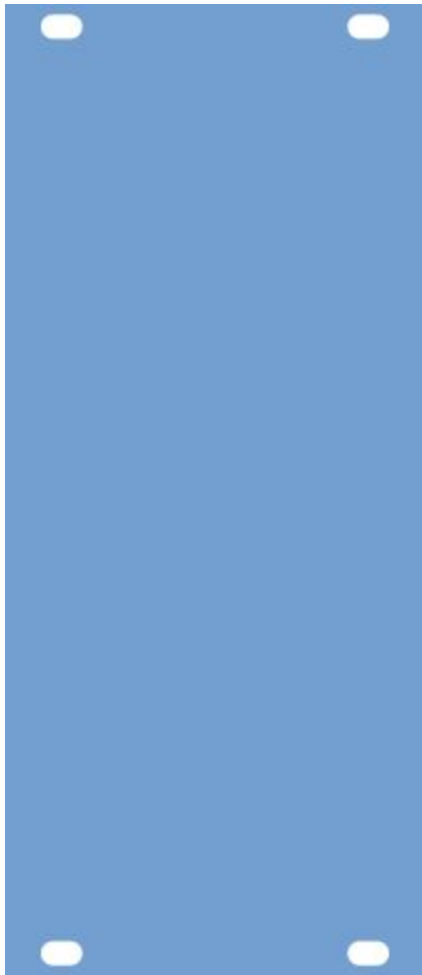
Useful if you are designing a panel for **VCVRACK** or if you are designing your synth and you need to see how the screws would look good, **Add Screws** checkbox, add the screws in the center of the panel holes. You can choose between different types of screws and you can customize their color, border color and size.

UTILITIES - LASERCUT

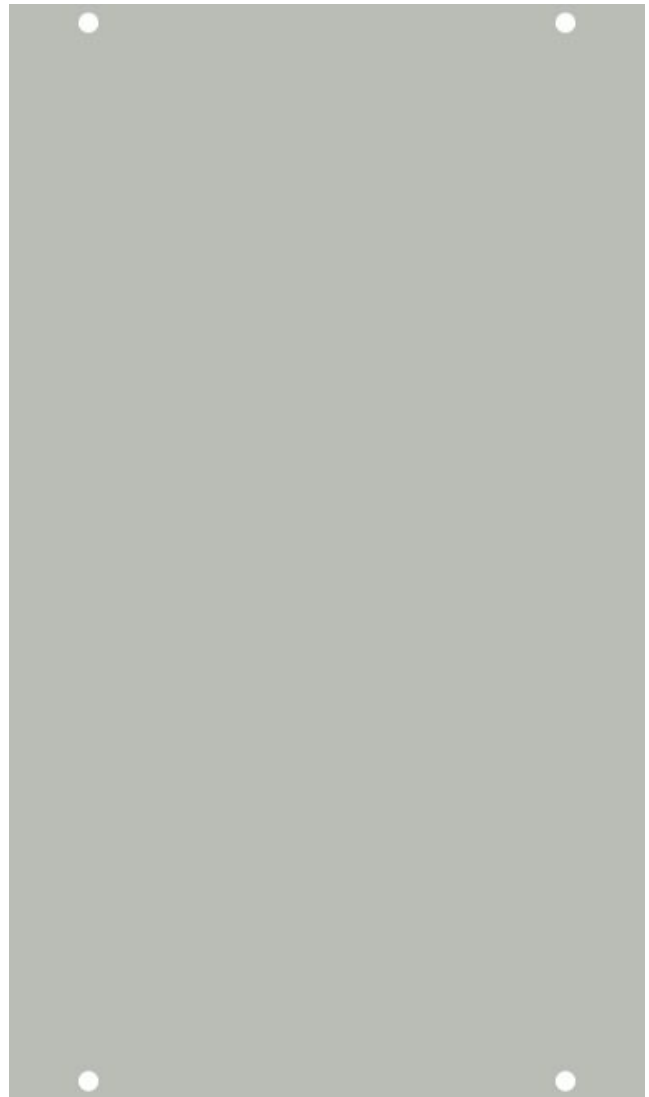
In the **UTILITIES** section we have the **Use Lasercut Design** checkbox, this eliminates all the colors and marks the edges of the panel, a useful function if your panel needs to be laser cut.

PANEL EXAMPLES

11HP EURORACK



4 PARTS BUCHLA



HAVEFUN, DESIGN KNOBS AND SLIDERS!

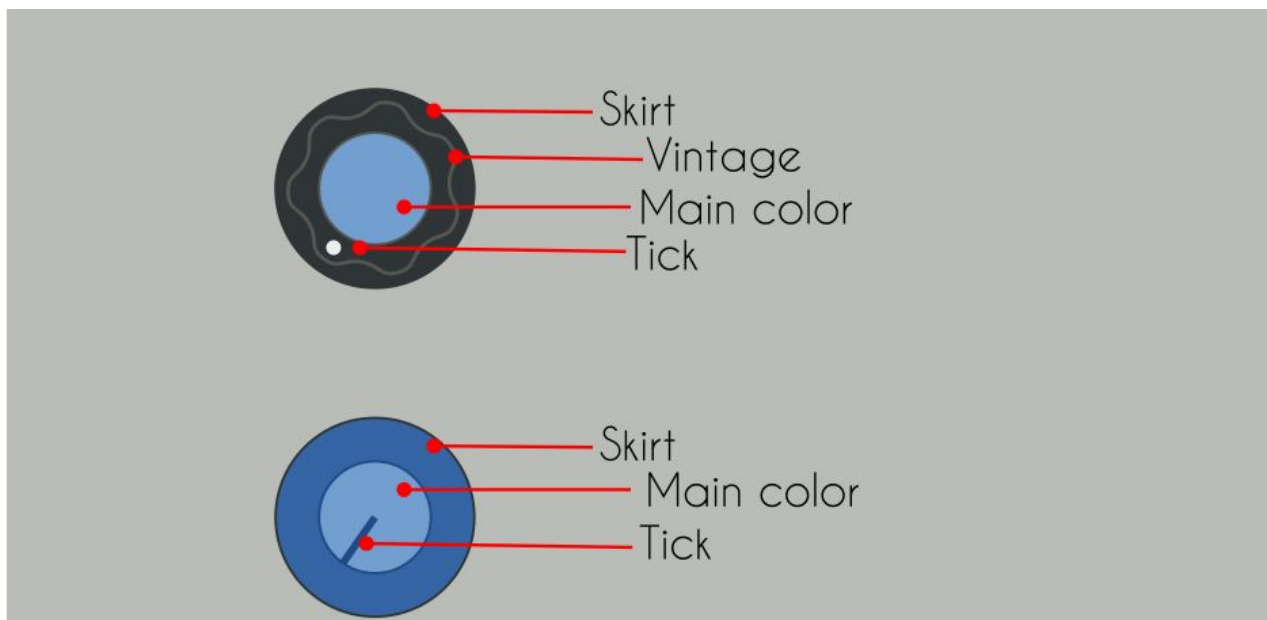
Remember: The first thing to do before drawing an element is: select the corresponding item from the list in **SECTION A**. To view the element, check the **Live Preview** checkbox on the bottom left.

KNOB PARTS

Knobs are fun to draw!

Each knob is made up of 4 parts:

- Main
- Vintage
- Skirt
- Tick (can be dot or line)



Each part is created in a dedicated layer.

KNOB NAME

The knob name will be used as the name for the dedicated **LAYER** (everything designed by **SPD** has a dedicated layer). Usually it is the name of the function (for example: Resonance, Cutoff, Volume).

Try to give each knob on the panel a unique name.

KNOB PARAMETERS

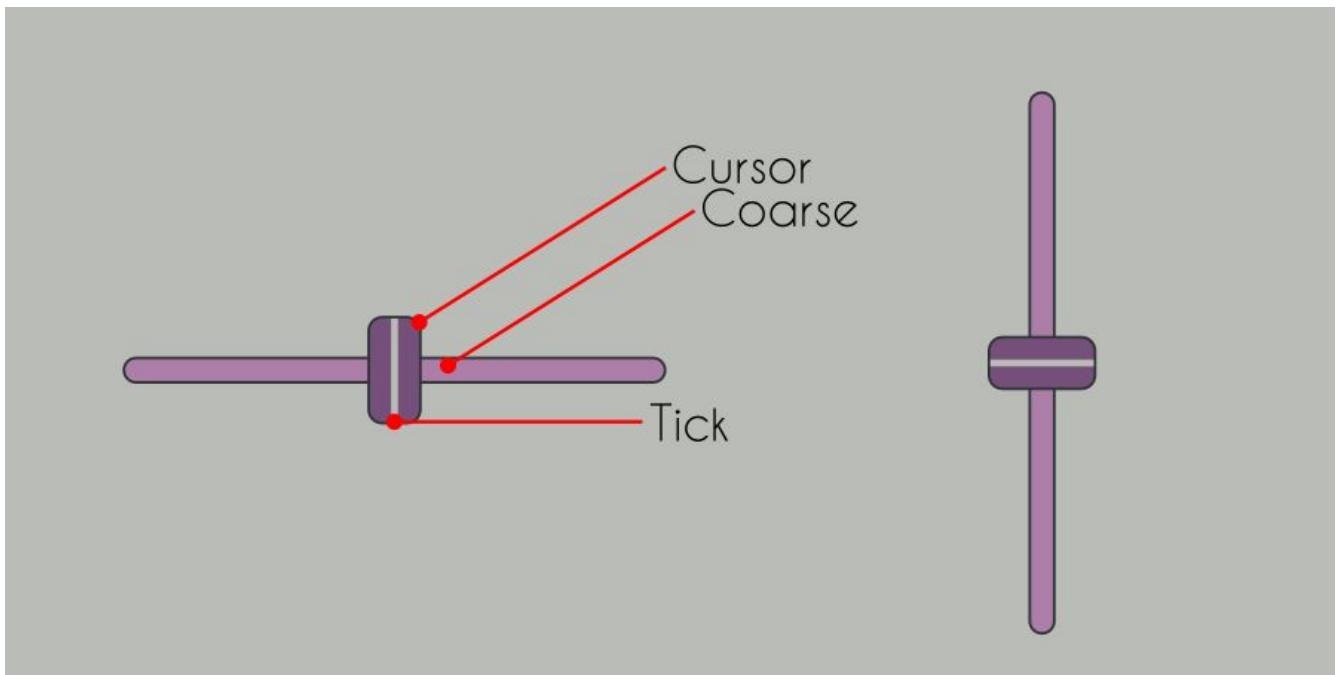
In this case the parameters are self explanatory, we advise you to do some experiments to understand the relationships between the various parts that make up the knob.

SLIDER PARTS

Sliders are fun to draw (but knob are more fun!!)

Each slider is made up of 3 parts:

- Coarse
- Cursor
- Tick



Each part is created in a dedicated layer.

SLIDER NAME

The slider name will be used as the name for the dedicated **LAYER** (everything designed by **SPD** has a dedicated layer). Usually it is the name of the function (for example: Resonance, Cutoff, Volume).

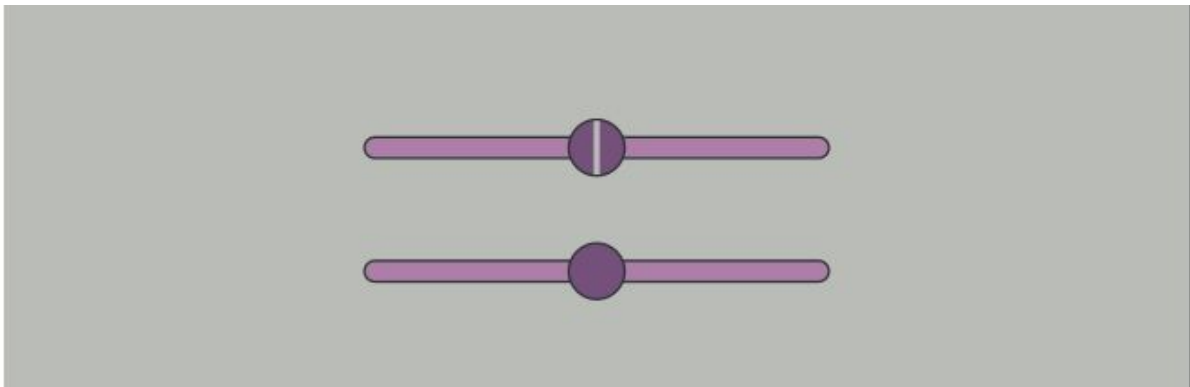
Try to give each knob on the panel a unique name.

SLIDER PARAMETERS

In this case the parameters are self explanatory, we advise you to do some experiments to understand the relationships between the various parts that make up the slider.

SLIDER DESIGN TIPS: Cursor can be **Rectangle** or **Dot**, the **Dot version does not have the tick**, but you can have a Dot cursor's tick with this little trick:

Set cursor to **Rectangle**, now set the **cursor width** and **cursor height** to the same dimension, let's say 5, now set the **Round the cursor edges** to the same dimension of height and width (5) and, voilà: now you have a dot cursor with thick!



UNLEASHING THE GENIUS IN YOU, DESIGN THE SCALES OF THE KNOB!

Remember: The first thing to do before drawing an element is: select the corresponding item from the list in **SECTION A**. To view the element, check the **Live Preview** checkbox on the bottom left.

Ok, this will seem complicated but in reality it is very simple even if there are many parameters involved.

First of all, **to draw a scale for the knob, you need to draw the knob first**. If you don't need the knob, you still have to draw at last one simple knob with **only the Main Color**, this is because **SPD** needs a reference point to draw the scale which is the center of our **Main Color**, otherwise all the pieces of our scale would end in cyberspace. **To draw the knob scale you have to select the Main Color before.**

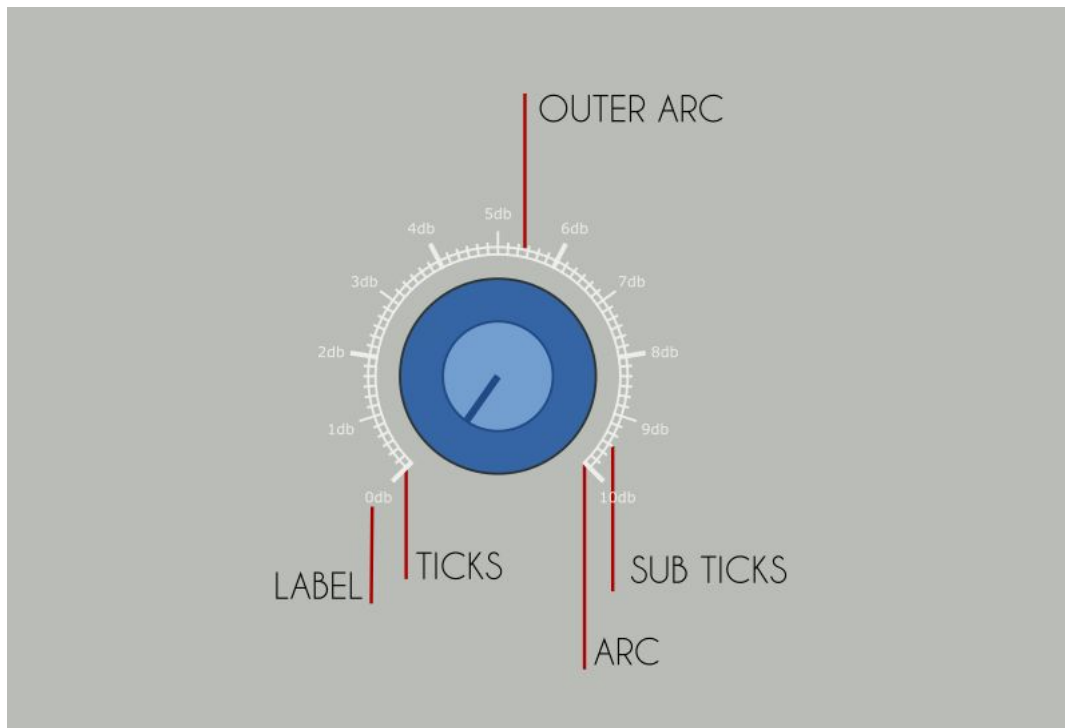


Select the knob Main Color

KNOB SCALE PARTS

A knob scale is composed by 5 parts (there are other parts that are **UTILITIES** but we will see them later), the color can be changed on each part

- The Arc
- The Outer Arc
- The Ticks
- The Sub Ticks
- The Labels



THE ARC and OUTER ARC

Arc is the main part of the scale, its size is determined by the **Scale Radius parameter** which is calculated from the center of the knob's **Main Color**. For example, if our Knob has an 8mm radius, the **Arc**, which must be larger, will have a 10mm **Scale Radius**. This means that the **Arc** is drawn at 2mm of distance from the knob.

The Outer Arc, as you can easily imagine, it is an additional arc designed outside the main arc. Its size is given by the **Arc Offset parameter** which sets the radius of the **Outer Arc** to **Scale Radius + Outer arc offset**. **Outer arc offset** can be a negative value. Negative value set the **Outer Arc** inside the main **Arc**.

Arc line width set the arcs tickness and is equal for Arc and Outer Arc.

Angle sets the angle of the scale while **Rotation** moves the starting point at which the first tick of the scale is drawn. 90% of the arcs that you can see on UI are sets to 270 degree with 0 rotation.

To better understand the concept of **Angle** and **Rotation**, try some parameters combinations, for examples: Angle 180 and Rotation 0, Angle 270 and Rotation 45, Angle 15 and Rotation 90.

Arc angle offset and **Outer arc angle offset** can change the scale Angle in relation to the **Angle**

parameter. This allows you to have arches with different angles, useful for creating unusual scales.

KNOB SCALE TICKS

Ticks are the main indicators that are distributed along the extension of the main **Arc**.

Inner ticks parameter, apply a **negative offset** to the ticks bringing them inside the **Arc**.

Ticks can be lines (**marks**) or **dots**.

The **number of ticks** defines the quantity of ticks. For example, if I have a scale that goes from 0 to 10, I will have to place 11 ticks on the **Arc**.

When ticks are **Marks** type, their length is defined by the **Tick Lengths/radius** parameter. When the ticks are **Dot** type, **Tick Lengths/radius** parameter define the dot's radius.

Ticks width parameter define the **Marks** tickness.

Accent every x ticks add the **Accent lenght** value to the **Tick lenght** parameters, this results in ticks of different lenghts.

To better understand the concept of **Accent**, try to set:

Number of ticks: 11, Ticks lenght: 1, Ticks width 0.2, Accent every 2 ticks, Accent lenght 0.3, Accent width to 0.4. Play with the last 3 parameters on this list and see what happen to the scale.

Tick offset parameter change the ticks starting point relative to the **Arc**.

KNOB SCALE SUB TICKS

Scale **Sub Ticks** are very similar to ticks, the main difference is the position of the Sub ticks, in fact the number of **Sub Ticks** represents **the quantity of Sub Ticks between one tick and another**.

Sub Ticks can also be Mark or Dot type.

KNOB SCALE LABELS

The Labels are the salt of the stairs.

The **Labels are always numerical value**, **Star value** and **End value** define the range of your scale.

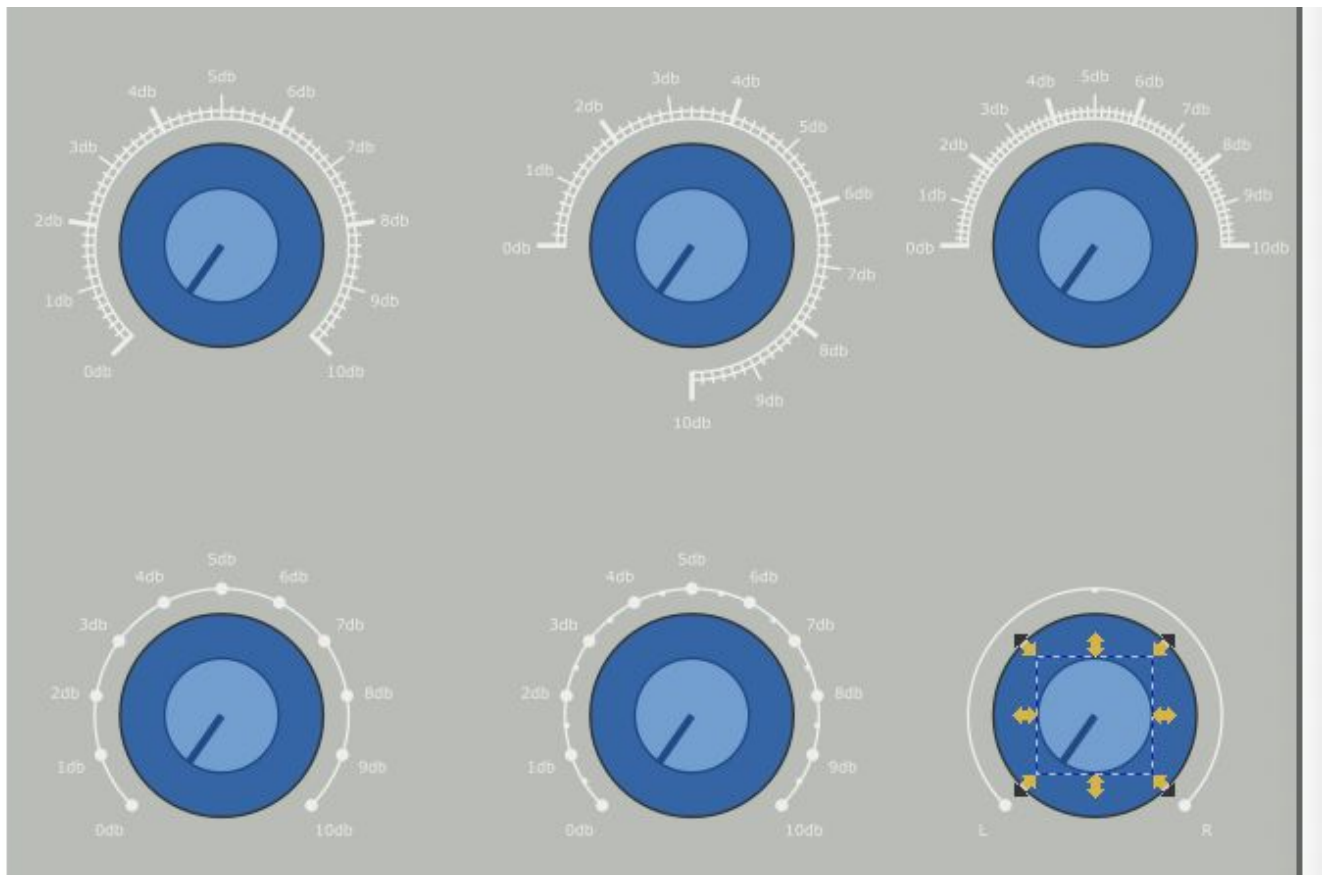
The values can be **integers** or **floats** and are automatically positioned according to the number of ticks. You can choose to reverse the order with the **Reverse Order parameter** or you can draw a special version of the scale with only the **Left** and **Right** words (useful in the mixers for Pan controls).

You can choose the color and size of the font and also the offset, i.e. how far they must go from the end of the relative tick.

Finally you can insert text after the number (e.g. db,%, Hz)

KNOB SCALE UTILITIES

With the utilities you can insert a sign in the center of the holes such as crosses, dots or contours (it depends on the type of processing you will have to perform after) also you can add a 'Centering Circle' very useful for positioning Scales with less than 360 degrees.



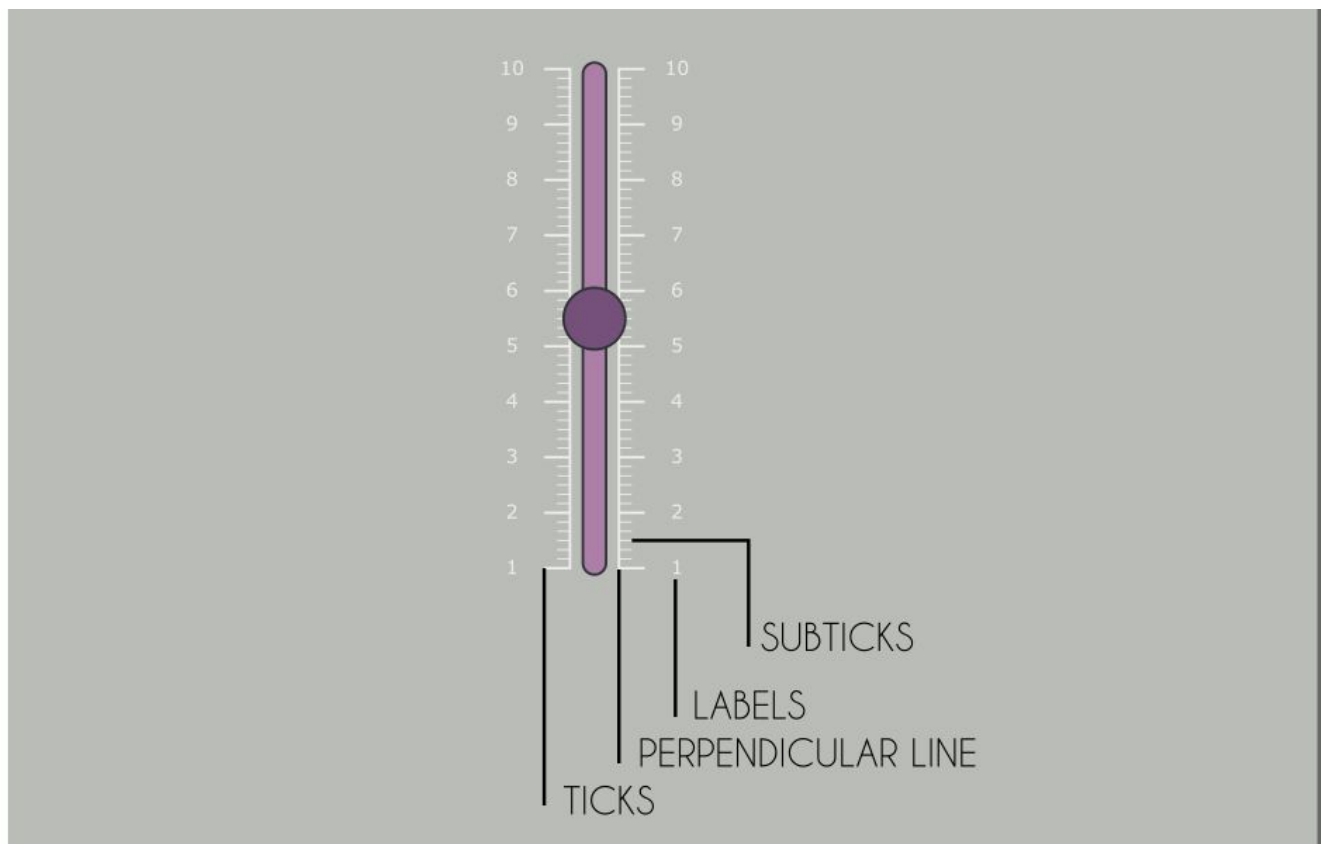
KNOB SCALES EXAMPLES

WE HAVE ALMOST FINISHED, WE PUT THE SCALES ON THE SLIDERS

First of all, **to draw a scale for the slider, you need to draw the slider first**. If you don't need the slider, you still have to draw and remove later, this is because **SPD** needs a reference point to draw the scale which is the **Coarse** of our slider, otherwise all the pieces of our scale would end in microcosmos. **To draw the slider scale you have to select the Coarse before.**

The scales of the sliders are very similar to those of the Knobs, they also have Ticks and Sub Ticks but they obviously have differences and we are going to talk about these differences now.

SLIDER SCALE PARTS



SLIDER SCALE POSITION

SPD is able to independently understand if you have selected a vertical or horizontal slider. In the case of a horizontal slider, the scale can be positioned above, below or on both sides. In the case of a vertical slider, to the right, to the left or both.

Depending on what you have chosen, you will need to adjust the **horizontal offsets and vertical offsets** that move the scale closer or further away from your slider.

SLIDER SCALE TICKS AND SUBTICKS

Ticks and Sub Ticks are concepts that we have already seen for the knobs, the difference here is that we can also set a **Ticks start lenght**, **Tick end lenght**, **Ticks start size** and **Ticks end sizes** in order to create shaded scales or narrow to wide scales.

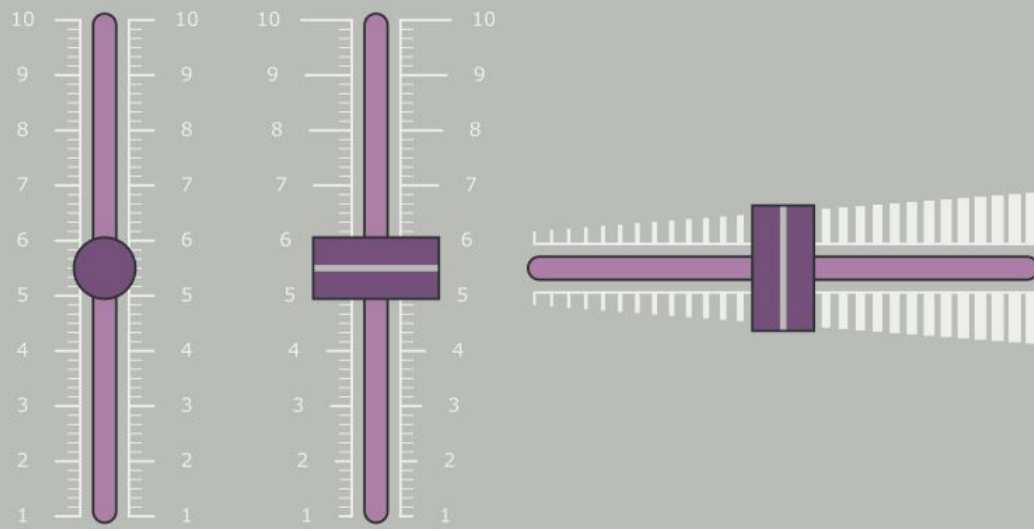
SLIDER SCALE LABELS

Labels are the same as knobs with additional **offset** and **fine positioning** which help in positioning the text relative to ticks if needed.

SLIDER SCALE UTILITES

Same as **KNOB SCALES UTILITIES**

Slider scale's layer are created on top of the Slider layer, you have to lower the scale's layer after confirming with Apply button.



SLIDER SCALES EXAMPLES