LS Cadencer & LS Cadenculator

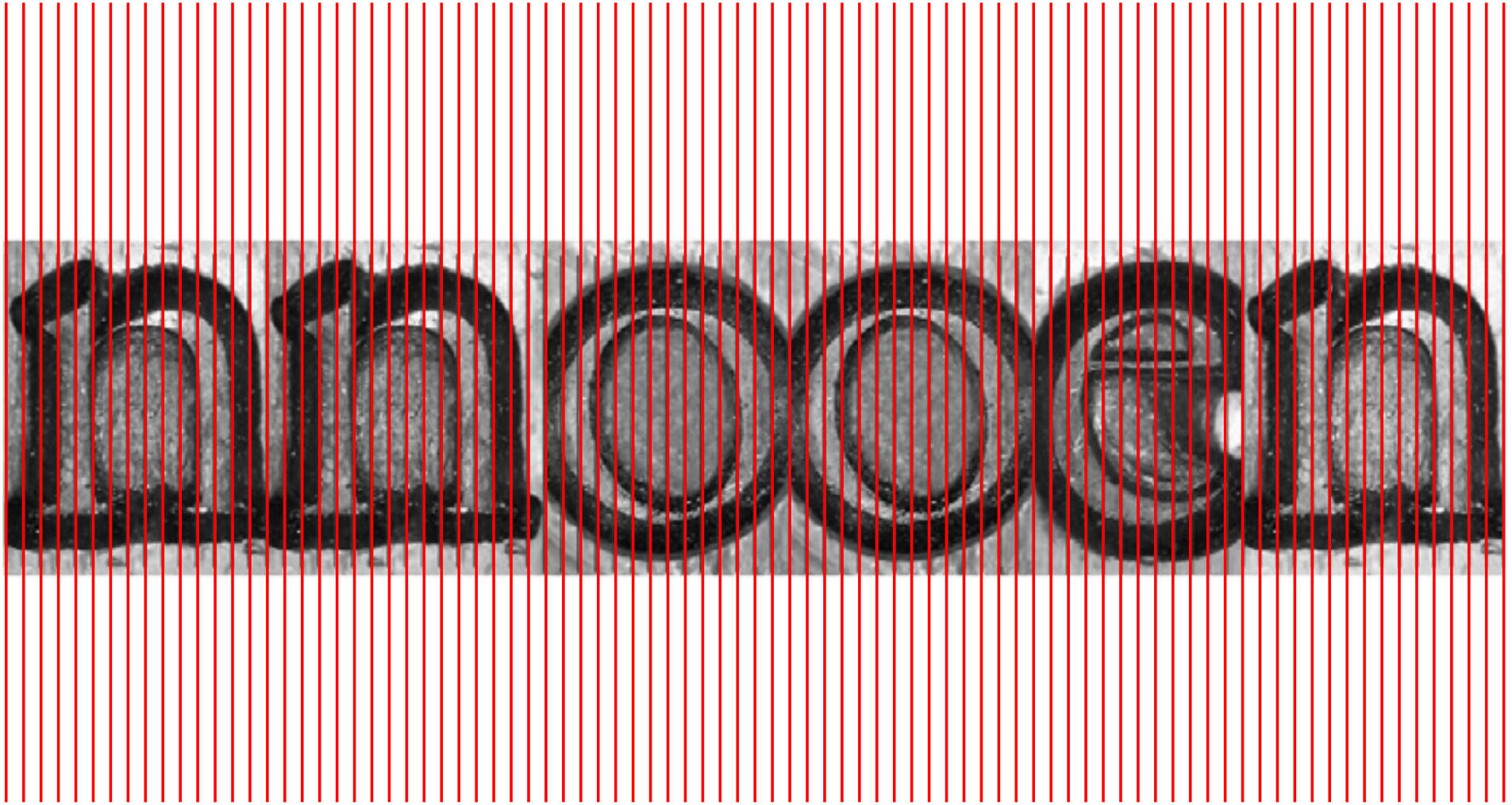
The LS Cadencer and LS Cadenculator are (batch) fitting/auto-spacing tools written in Python, which can be used as extensions in the RoboFont and Glyphs font editors. The tools are developed by **Lukas Schneider**. **www.revolvertypefoundry.com**

The underlying principle and algorithm find their origin in **Frank E. Blokland's** PHD research on the (effects of) systematization, standardization, and unitization in the Renaissance font production. **www.lettermodel.com**

LS Cadencer is basically meant for applying auto-spacing to fonts, while LS Cadenculator compares metrics of existing fonts and calculates values applicable to its underlying system and usable in LS Cadencer.

Documentation written by Lukas Schneider. Thanks to George Thomas for all the helpful comments and proofreading.

The Tools are based on Frank E. Blokland's PhD research at Leiden University, about the Renaissance standardization, systematization, and unitization of roman and italic type.



www.lettermodel.org

CONTENT

LS Cadencer & LS Cadenculator are Extensions/Plugins for RoboFont and Glyphs. www.robofont.com / www.glyphsapp.com

As a RoboFont user you will also need the DrawBot Extension for Robofont — download and double-click to install: www.github.com/typemytype/drawBotRoboFontExtension

LS Cadencer & LS Cadenculator can simply be installed by double-clicking the files.

In RoboFont De-installation works the same way (or in Preferences). In GlyphsApp you have to remove the files from the Plugins Folder.

After the installation the tools appear in the extensions menu of Robofont. **Important for Glyphs App Users**: LS Cadencer can be found in the VIEW menu -> LS Cadencer show. LS Cadenculator can be accessed by clicking the EDIT menu -> LS Cadenculator. Although there is an entry LS Cadencer in the EDIT menu LS Cadencer can only be accessed from the VIEW menu!

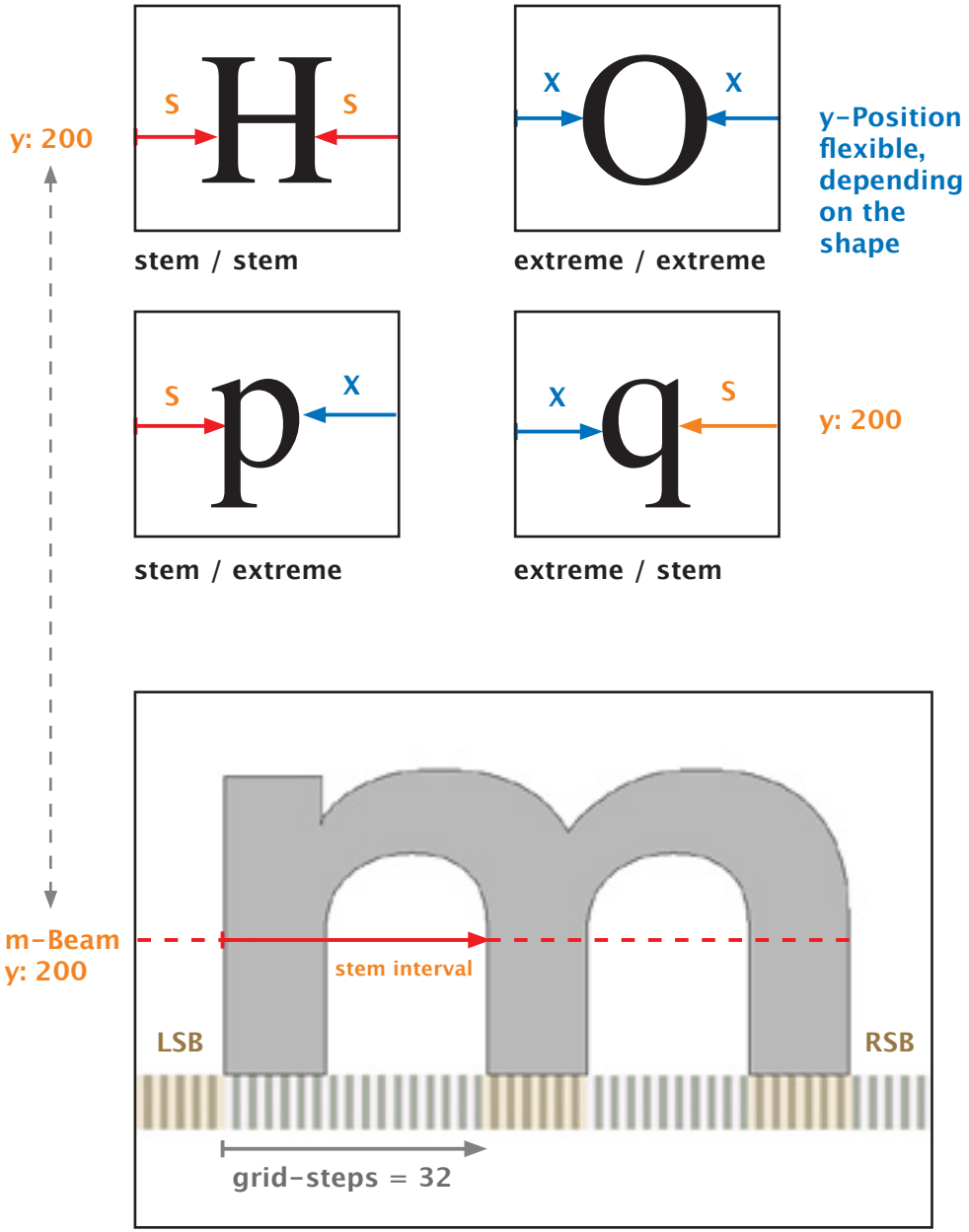
The tool(s) might look difficult at the beginning — like it is with most tools. The underlying principle may also look highly complicated, but it is really easy and simple to apply if you get used to it.

To do a QUICK START please follow instructions on page 10.

LS Cadencer

A tool for auto-spacing your fonts.

On the next two pages the basic principles will be explained. This might be too much information when you have never used the tool — so maybe try the tool first and use the **quick start** instruction to play around first and dive into details later.



The **LS Cadencer** is a tool for the (batch) fitting ('auto-spacing') of fonts using cadence units for positioning the sidebearings from either extremes on the x-axis or stems. Generally the capital letter X is used for indicating measurements of extremes or capital letter S for indicating stem measurements.

An extreme of a glyph is always the most extreme point on the horizontal x-axis of a shape, no matter where this point is on the vertical y-axis. In the case of a lowercase p the extreme point on the right side could be higher on the vertical y-axis than the left side extreme point of a lowercase q (see image on the left).

For calculating the sidebearings of a glyph, which uses a stem as a definition, the so-called **m/n-Beam** is taken into account. The m/n-Beam is used for positioning the vertical point of measurement which will be applied to other glyphs with stems as a definition as well. If the m/n-Beam is set to 200 for example, it will also measure the H at this position to calculate the sidebearings of H.

The m/n-Beam is also used for the calculation of the grid for Auto-Spacing, based on a user-defined resolution of the grid, i.e., the **Grid-Steps**. For this the stem interval, i.e., the distance between the stems of the lowercase m or n will be divided into 'cadence units'. These will be a factor for calculating the sidebearings of stems, defined in a spacing table (CUST).

Grid-Steps are set to 32 by default.
A universal value which works for a relatively wide range of typefaces with regular proportions, weights and widths.

For fine-tuning the Grid-Steps can be altered, i.e., the number of units can be increased or decreased. Because the position of the sidebearings is defined in units and the number is fixed in the CUST files, an increased amount of units in the Grid-Steps will result in a tighter fitting and a decreased amount in a wider one.

Decreasing the Grid-Steps could be used to auto-space bold weights, for example.

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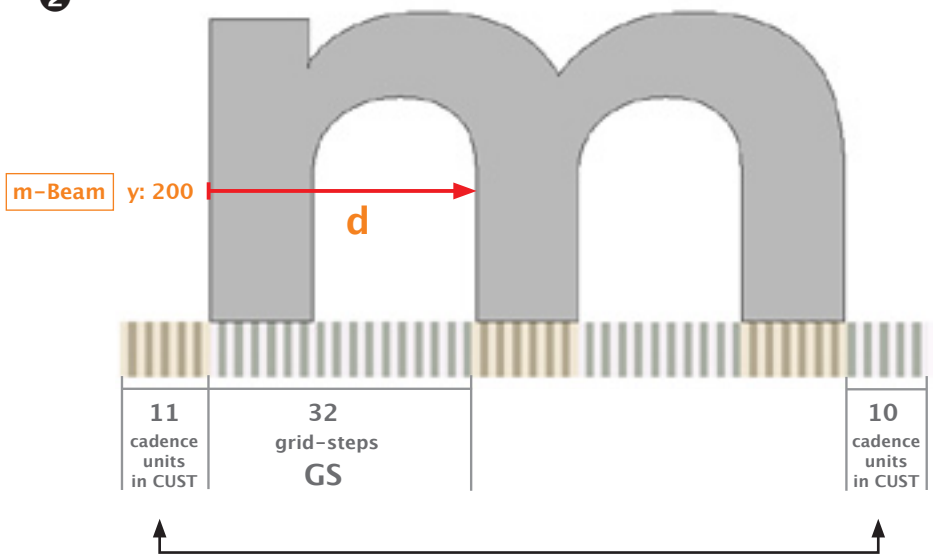

11 (left-side) and 10 (right-side) are defined by the USER in a CUST. These will be multiplied by the calculated Grid-Steps units.

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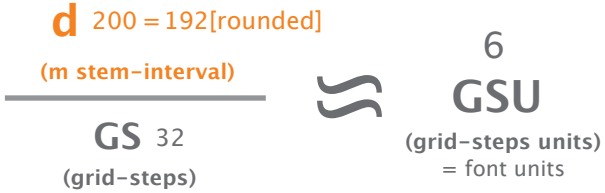


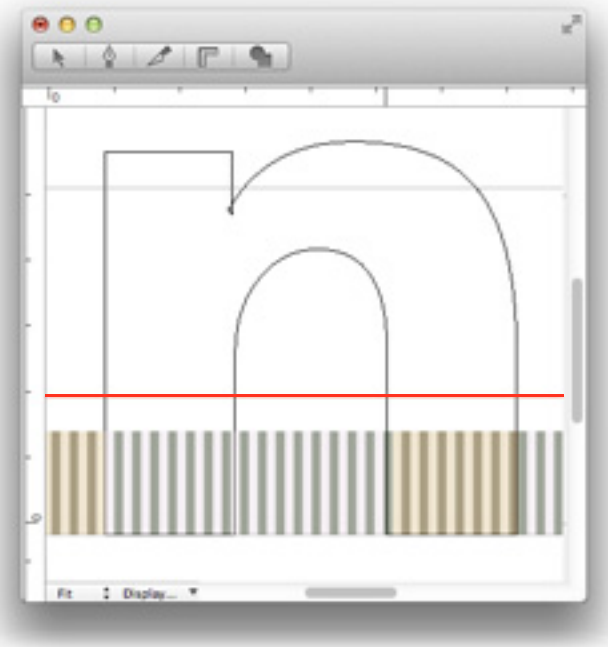
Basically the **stem interval** is the rythmic repetition of stems.

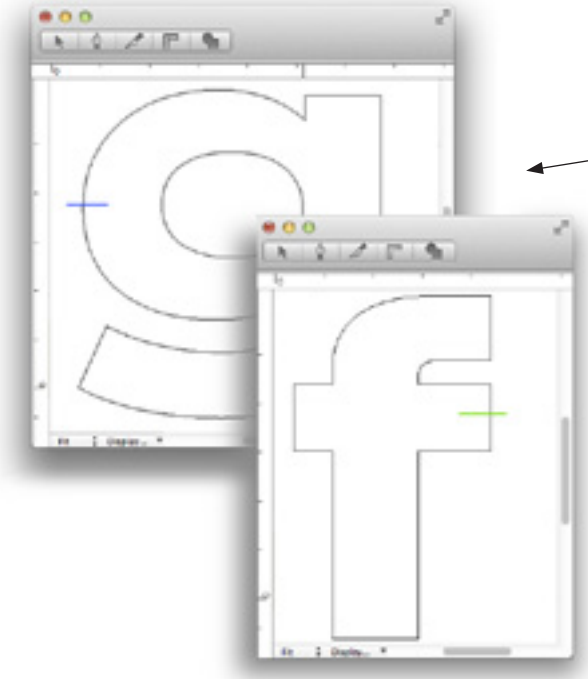
For measurements of the stem interval LS Cadencer Tools use the glyph m (or glyph n) as a basis. The user can select one of both options. As an example for the underlying principle, see image 2 on the left. The distance (d) of glyph m or n is measured at a vertical position (y) by the so-called m/n-Beam (a virtual line intersecting the shape). This distance (d) is called the stem interval (or m/n-stem interval). Grid-Steps is the factor which will be used for dividing the stem interval (d). The outcome are grid-steps units which will be displayed in font units.There will be some rounding of the m/n-stem-interval because the proportions do not exactly fit to the grid.

Grid-Steps/GS (input field in UI): by default set to 32 — a more or less universal value applicable to a relatively wide range of typefaces. Grid-Steps are basically the divisor for calculating the output, the grid-steps units. By increasing or decreasing the grid-steps, the outcome of **Grid-Steps units** will change and this will tighten or widen the spacing. You can use the Visual Grid in LS Cadencer to see how changes to the Grid-Steps influence the sidebearings.

Grid-Steps units (calculated outcome of stem-interval divided by Grid-Steps) is a value in font units — for example, 10. This is the width of one bar (1 step) of the grid shown on the left. So if you have 11 Cadence Units on the left and 10 Cadence Units on the right, these will be multiplied by 10 (Grid-Steps units) to get the sidebearings in font units.

CUST means Spacing Table (Cadence Units Spacing Table).
It stores glyphnames, glyph sidedefinitions, values for left and right sidebearings and the vertical position of the Beam, where glyph stems are measured. More details and explanations about the exact syntax of a CUST can be found in chapter about “Spacing tables”.





Open a font & start the tool, or the other way around.

Select a predefined spacing table (CUST) which fits to your design.

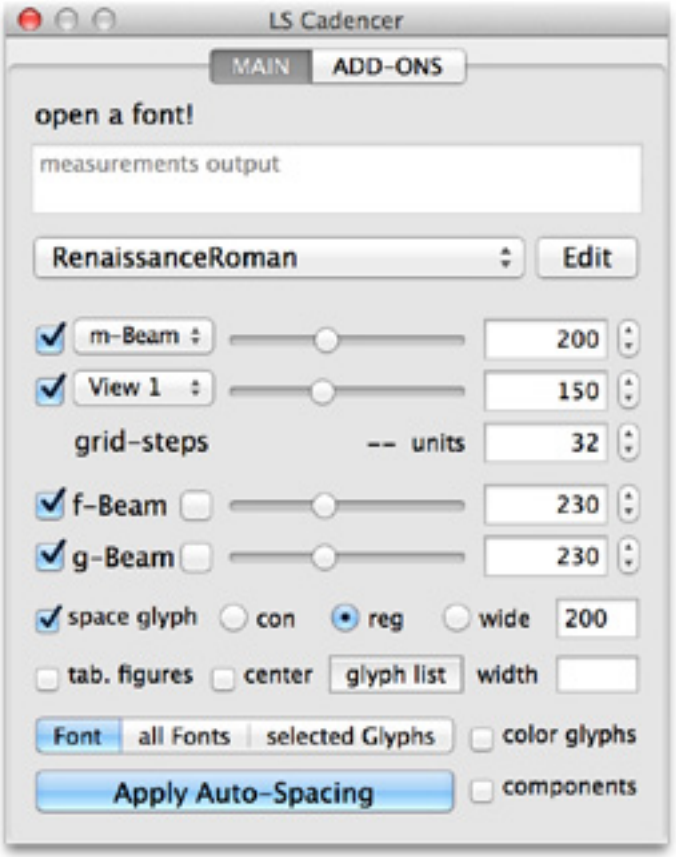
Use **n-Beam (or m-Beam) slider** to adjust vertical position of the red measurement line in the glyph window. m-Beam refers to the glyph m, n-Beam to glyph n like shown at left (the red line has to slice two stems for proper calculations!).

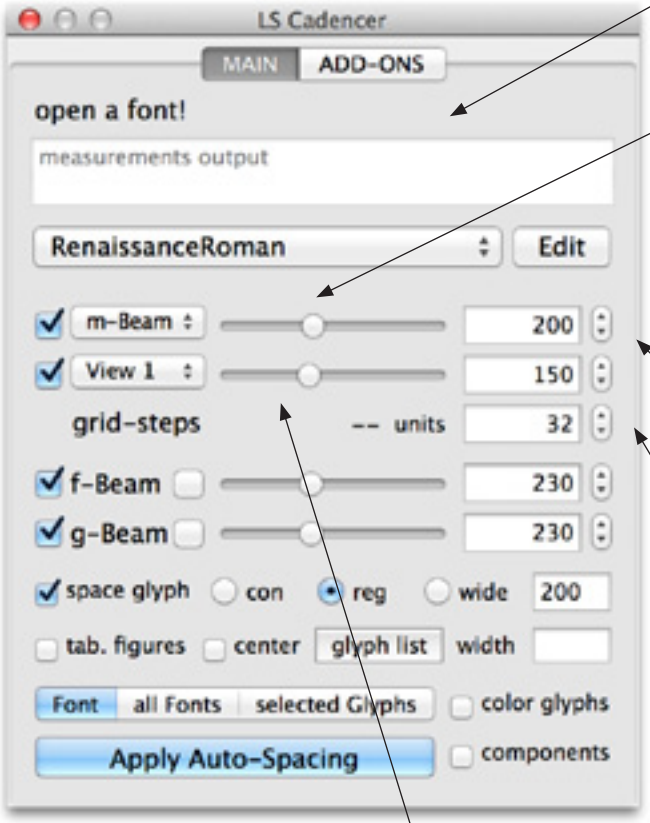
checkbox to show/hide the vertical bars (details follow)

f-Beam/g-Beam for refining f and g glyph side measurements (open the g-/f-glyph)

Apply Auto-Spacing (option. activate “color glyphs” to color glyph cells of spaced glyphs.) activate **components** to adjust those if the base glyph was changed by auto-spacing

Done! Open SpaceCenter / MetricsWindow & check it out!





First row displays the current font (active) Second row shows some calculations and additional info.

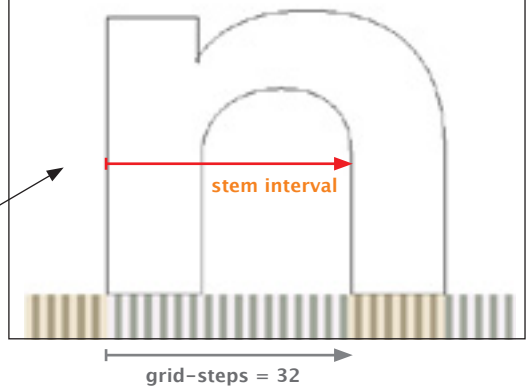
The position of the **m/n-Beam** (red line) is essential for applying Auto-Spacing. It should cut through both vertical stems (n) or 3 stems if m is selected. Important: This is the position where measurements are taken in glyphs with a stem (S) as a sidedefinition like for example glyph H or glyph N. (see Spacing Table / CUST for more info).

m/n-Beam slider to adjust vertical position (red line in glyph n)

show/hide the measurement line

grid steps input: for adjusting (expanding/decreasing) the overall width of the spacing. It is set to 32 by default, which is a predefined universal value for regular weights, widths and proportions.

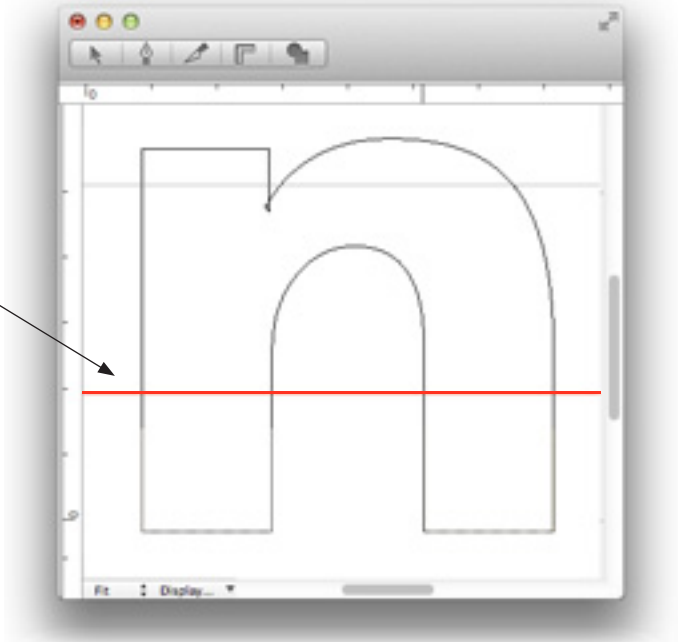
units outputs the calculated value in Cadence units. For more details about this calculation, see below.

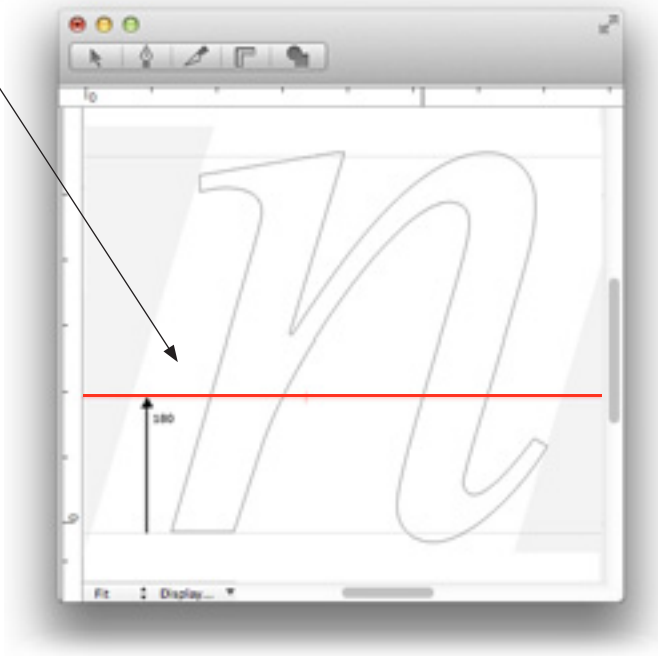


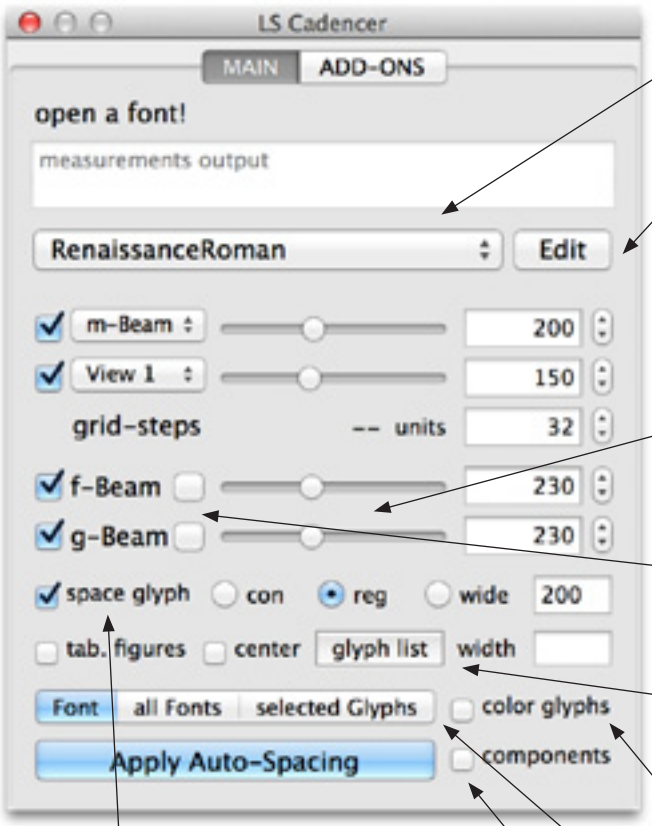
An additional slider to change the vertical size of the grid (the size of the vertical bars — only for visual output of the grid).

View 1/View 2 are two different kinds of previews of the grid. For details see next pages. **show/hide** the measurement line.

Important note: Find the highest possible position, because it influences measurements/ spacing of other letters as well! At the same time it has to intersect the vertical stems!





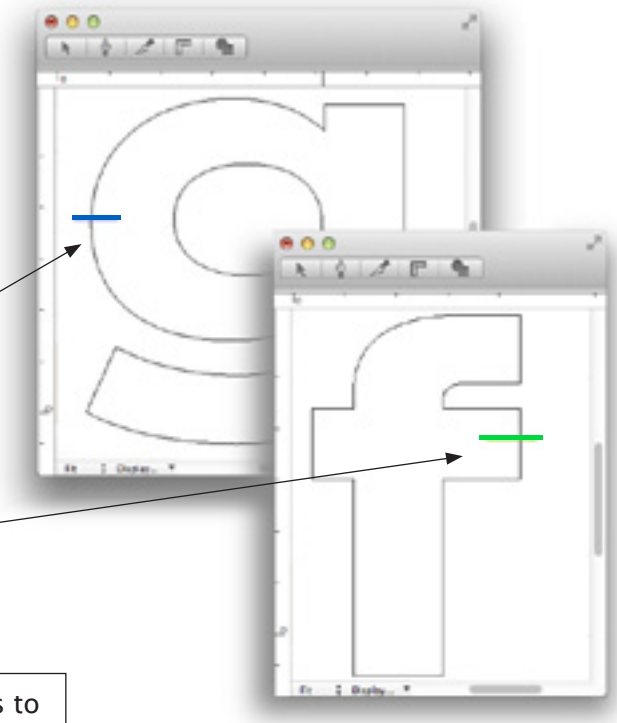


PopUp for selection of a Spacing Table (CUST) — displays predefined, a user-defined and imported ones.

CUST Editor shows content of a Spacing Table (more about this on later pages).

f-Beam right / g-Beam left. These are special measurement positions in glyph f (green line at the right side) and glyph g (blue line on the left side) in order to have better influence on where measurements for sidebearings are made. This can be also turned off by clicking the checkboxes — then the regular measurements of extremes or stems (defined in n-Beam) are used.

Buttons for automatically detecting vertical positions of g-Beam (left) and f-Beam (right)



tab. figures is an option for readjusting glyphs to a fixed width. This happens as a second step after auto-spacing from the spacing table was applied. The user has to provide glyphnames (glyph list button) and a value for the width. (more details about this on later pages).

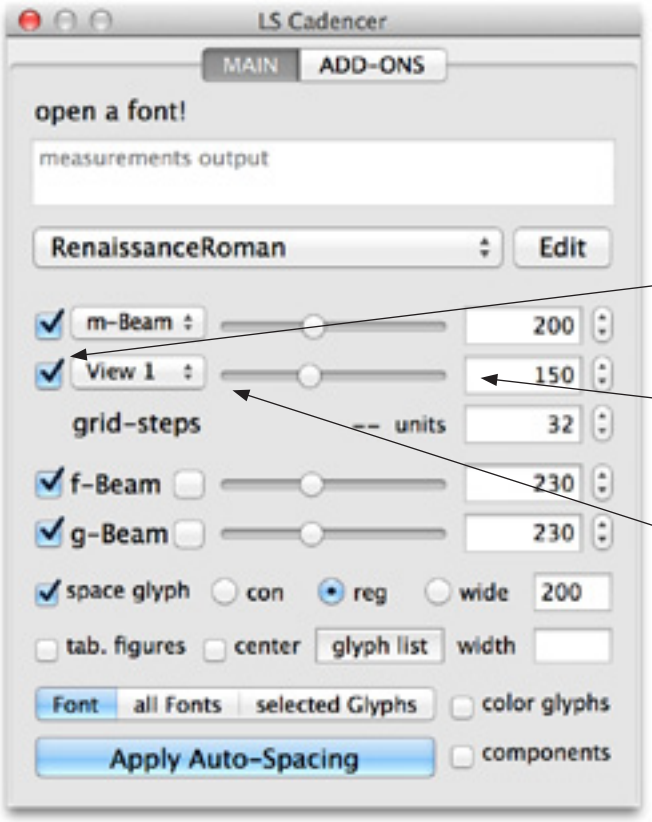
activate **color glyphs** to color auto-spaced glyphs.

change the selection **Font/ all Fonts / selected Glyphs** depending on the required application. It is also possible to batch auto-space several fonts stored in a folder: a dialog will ask for it when the user applies auot-spacing to **all fonts**.

activate **components** to adjust those if the base glyph was changed by auto-spacing. If not active/selected components are not changed if the base glyph was changed

SPACE GLYPH is meant for adjusting the width of the space glyph. Select one of the three options (condensed, regular or wide proportions) or use the input field to provide a value.

Side note: Generally the method behind Auto-Spacing with this tool is based on Spacing Tables (CUST). You can find a detailed description of how to access and edit a CUST in this manual as well.

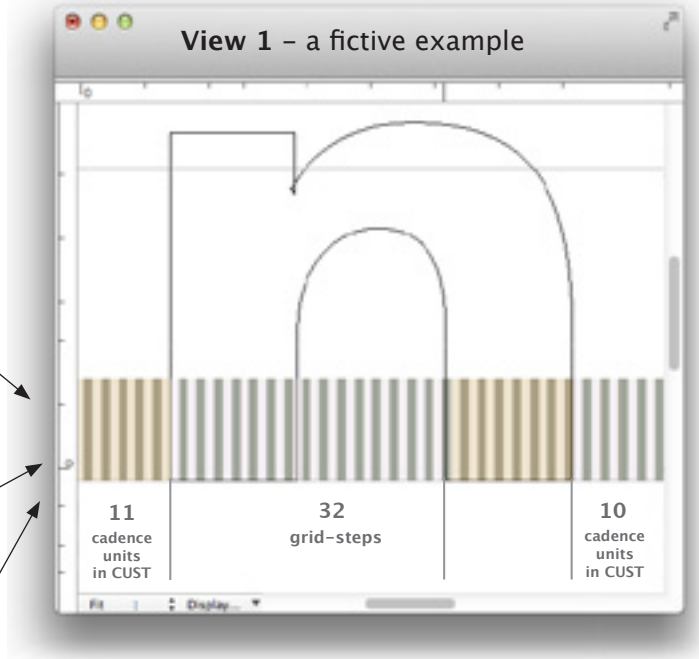


The **VISUAL GRID** section basically influences the visual output (the vertical bars) displayed in glyph window and Space Center. Settings made in this section have no direct influence on the Auto-Spacing function. It is a visual preview of calculations and content of current selected CUST. The grid will only show up in glyphs which are present in CUST. You can read the content of the CUST and the calculations that are made visually in a way.

Click the checkbox to show or hide the visual grid.

slider for setting vertical size of the display grid (vertical bars), which is overlaying the glyph preview

View 1 / **View 2** – PopUp menu is for choosing two different views. See details in the box on the right side or on the next page.



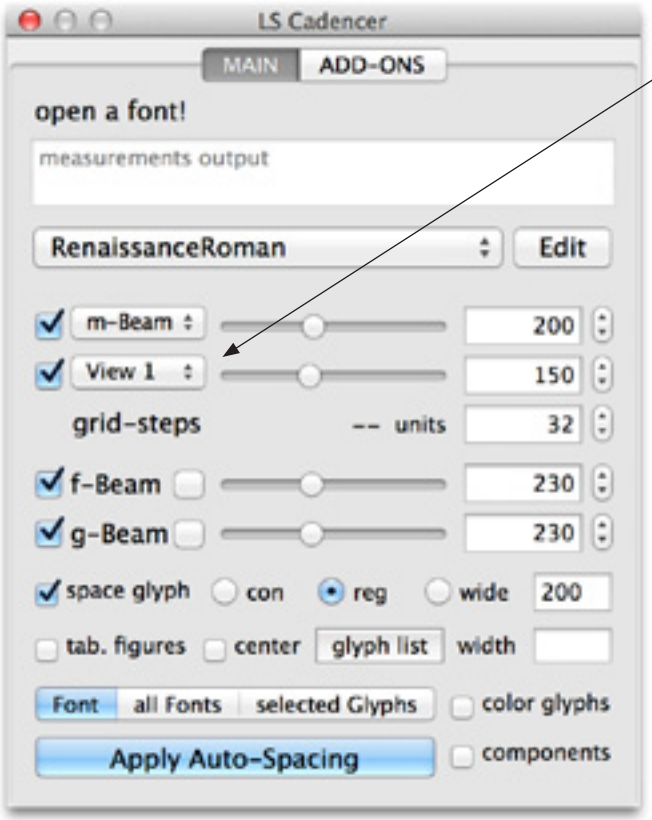
View 1 is basically a preview of the rounded n stem-interval and the values of the side-bearings defined in the CUST. It shows the mathematical repetition of the calculated grid. So your shape probably does not exactly fit to the grid displayed here as the default, **which does not mean your spacing will be not be good!** You could adjust your shapes to make it totally grid fitting, but this is not compulsory! Even after you apply Auto-Spacing, don't expect the shape to fit the grid — the visualization here is a mathematical repetition of measurements!

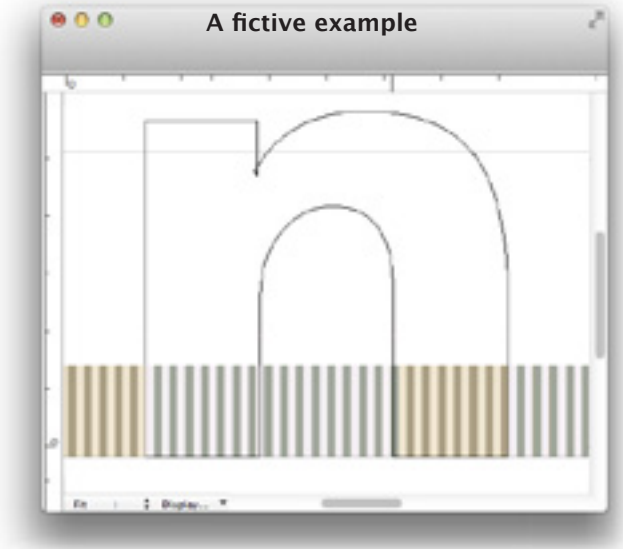
View 2 shows the sidebearings taken from the CUST measured from the sides. The visualization of the n-stem interval is turned off, so you can see what you will get after applying Auto-Spacing.

Sidenote: The **VISUAL GRID** basically visualizes the output based on measurements of the n-interval and given values like the grid-steps and the Spacing Table (CUST).

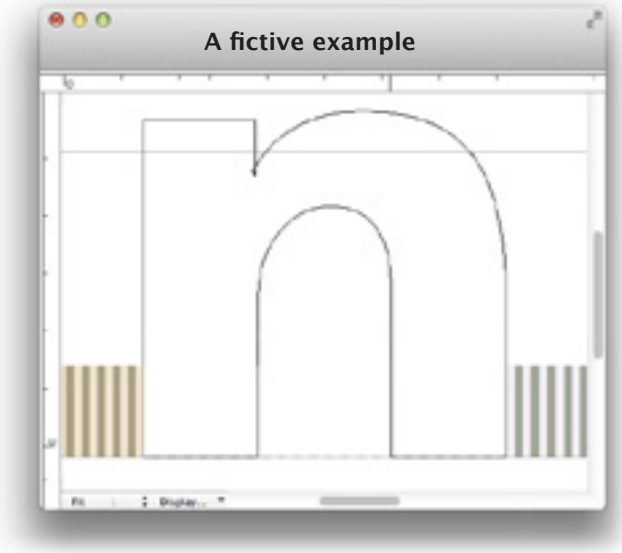
It visualizes the system behind the tool in a way. You also get a preview of the values you are applying to sidebearings, defined in the CUST.

View 1 / **View 2** lets you preview the regular grid (View A), which is based on the rounded stem interval or the “real” sidebearings for left and right, like they are added to the sides when you apply Auto-Spacing.



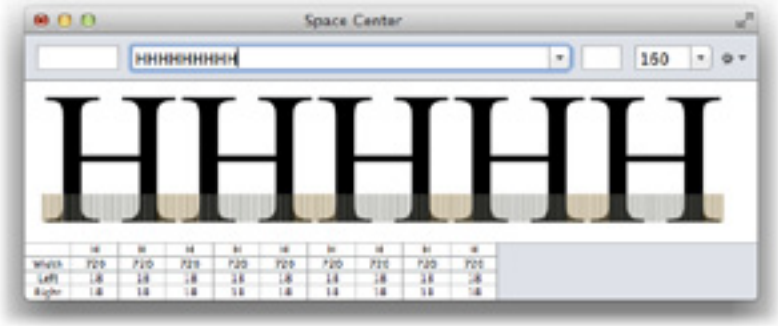


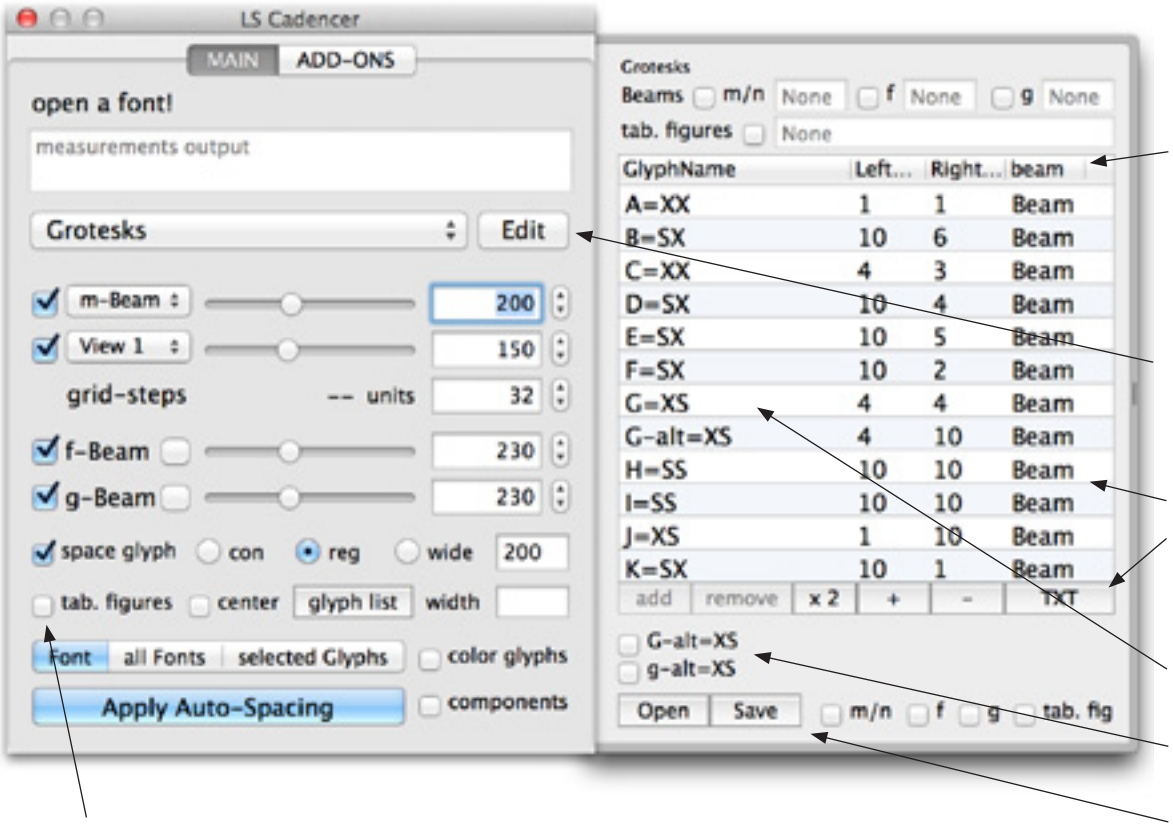
View 1 – visualization of the stem interval and its calculations — not necessarily totally fitting to the grid.



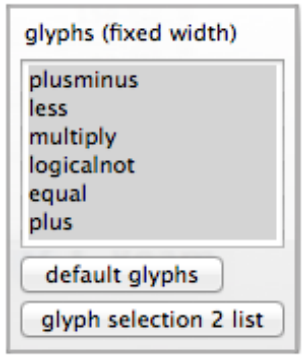
View 2 – visualization of the sidebearings added to the right / left side of a stem. Values 11 & 10 are transferred from the content selected CUST

Additionally in RoboFont:
The Visual Grid is also shown in the Space Center — turn off/on with **show** button. This is currently restricted to displaying maximum 26 characters in a row to keep performance of the tools.





There are additional inputs for the **space glyph** (simply use one of the buttons change the width or use the input box to provide a value) and the **tab. figures**. The latter is a second step, after regular auto-spacing was applied, to adjust certain glyphs to a fixed value. If active it is necessary to provide a value for the width and the glyphnames (button glyph list), which will get the fixed width. You can set entries to the list by selecting certain glyphs or using the default glyph list. ->



Basically LS Cadencer needs a Spacing Table called **CUST** to apply automatic spacing. Some of these are included in the tool, which can be adapted or expanded. The CUST stores a simplified system of glyphnames, sidedefinitions and values (left/right) applied to the sidebearings of the glyphs and a Beam position. The first column contains the **glyphname** and the **sidedefinition (separated by equal =)** then a column for **ValueLeft** and a column for **ValueRight**.

The third column (beam) indicates if the **Beam** Position from the m-/n-Beam slider is applied. Then the entry should be **Beam**. If you want to have a different position for certain glyphs then a value for the vertical position has to be provided (e.g. **500**). It only influences glyphs with a stem definition (S or SS) and not extreme measurements (X or XX). This might lead to a better result when your uppercase vertical stems are bent for example.

To see the content of a CUST select one from the Pop-Up menu — like Grotesks for example, then click **Edit** to open (or close) the list with the Spacing Table entries.

If you want to modify an existing or an imported CUST simply change any of the entries or switch to TXT mode to make changes. Then the pop-up shows **CUST (user-defined)**

Alternate Glyphs are indicated by **-alt** in between glyph name and sidedefinition, like for example: **G-alt=XS**

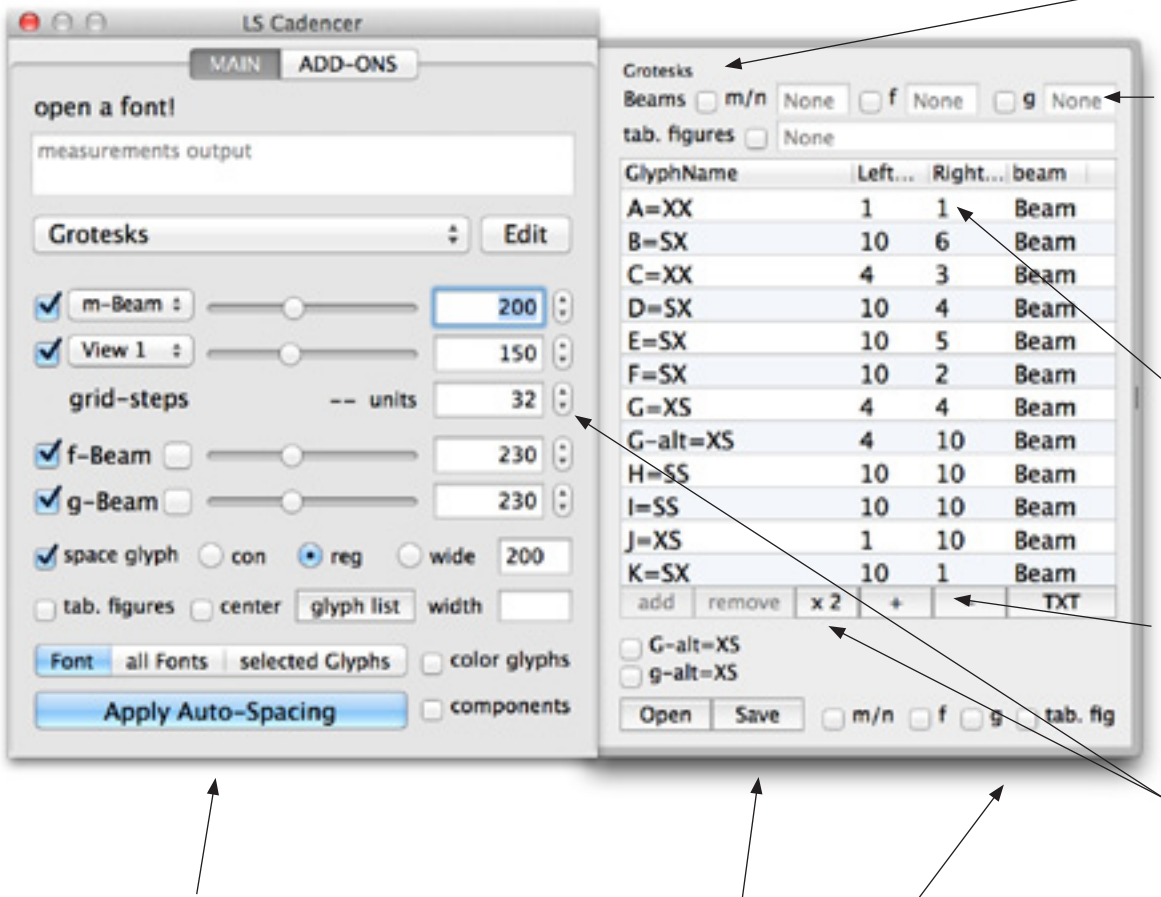
Important! You can include up to **4 alternate glyphs** in one CUST. To use an alternate glyph for Auto-Spacing it has to be activated by using these checkboxes below the Spacing Table List.

You can **Save**/export a **CUST** as a .csv file to modify it with an external text editor and Open/import it back again afterwards.

Basically you can add any glyph name which is present in your characterset, otherwise these will be skipped.

Sidedefinition The sides of each glyph (left & right) for measurements are either defined by **extreme** (X) or **stem** (S). An uppercase H would have both sides as a “stem” = SS , an uppercase O would have both sides defined as “extreme” = XX for example, which leads to four possible definitions for the sides of a glyph: (should be uppercase letters)

SS (Stem/Stem) SX (Stem/Xtreme)
XX (Xtreme/Xtreme) XS (Xtreme/Stem)



Indicator shows which CUST is selected in Pop-Up on the left.

When importing a CUST with contains a n-Beam value, it will be displayed here. Optionally you can activate **m/n-Beam (f-Beam, g-Beam or tabular settings)** to lock the related Beam! Then the slider of the related Beam will become inactive to make sure the position can not be changed in the tool. If a CUST doesn't contain these informations the boxes will show None.

How to modify a CUST:

- select a CUST from the Pop-Up menu (it can be a predefined one, a user-defined or an imported one)
- **simply edit a value** (you can change the value back afterwards) **in the list and the CUST will appear in the Pop-Up menu like this:** CUST (user-defined)
- now you can click on any entry in the CUST list on the right and modify glyphnames, sidedefinitions and values.

[+] [–] these will add 1 or subtract 1 to/from all entries of the spacing table.

[TXT] will switch to text mode — to edit entries in the tools text editor (for details see next page)

[x 2] will multiply all entries in the spacing table and also the grid-steps by 2 in order to get a finer grid. You can switch forth and back between multiply by 2 and divide by 2.

add/remove an entry! select an entry in the list and click to remove, or simply click to insert (a new item will be added to the list). Look for the entry **glyphname=XX** — eventually you need to scroll down the list, because it is ordered alphabetically.

Make sure the glyphname and sidedefinition (e.g. XX) is separated by equal =!

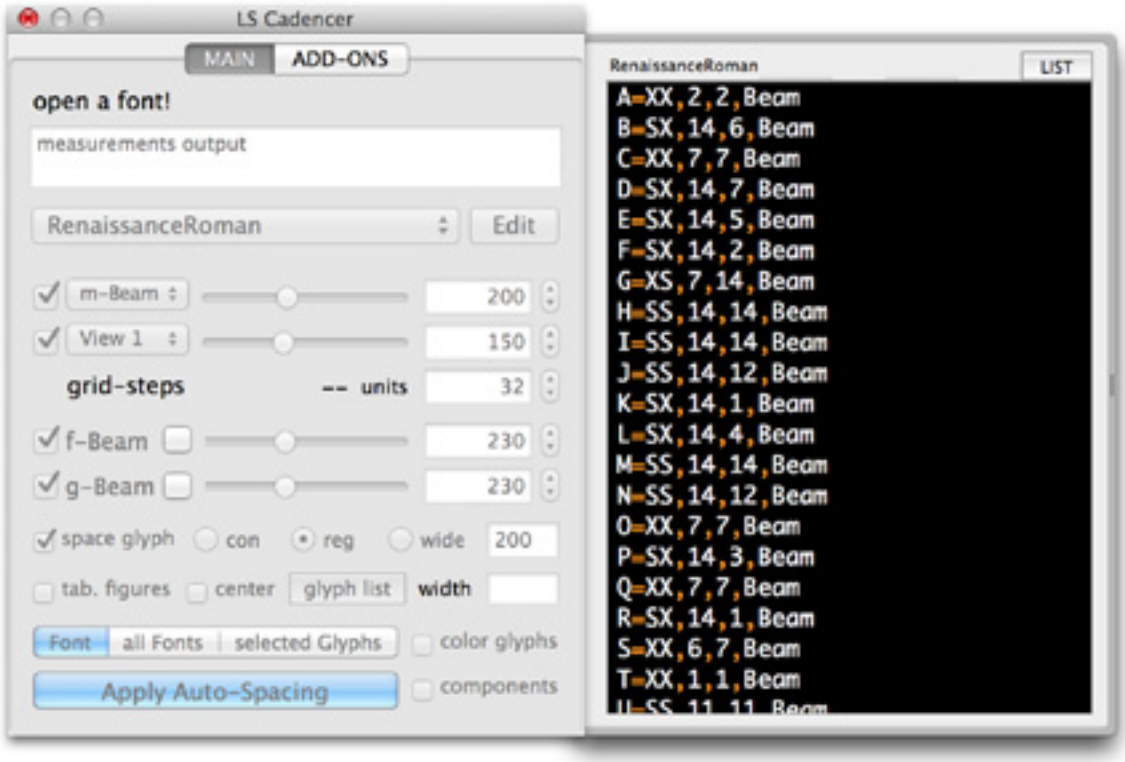
Possible Sidedefinitions (should be uppercase letters):

SS (Stem/Stem) SX (Stem/Xtreme)
XX (Xtreme/Xtreme) XS (Xtreme/Stem)

Apply Auto-Spacing will start the spacing process depending on the Font, all Fonts or selected glyphs. You can additionally color the glyphs which were adjusted and activate components to change component glyphs related to changes to the base glyphs.

Important! When selected glyphs is used: the selected glyphs have to be present in the spacing table of course!

When **exporting a CUST (Save)** as .csv file you can also include the current Position of the n-Beam (f-Beam or/and g-Beam) and also tabular figures settings, which is then stored in the CUST as well. When importing a CUST with an n-Beam it will be present in the tool and displayed, like described above.



CUST Editor in Text Mode.

The Spacing Tables (CUSTs) can also be displayed in text mode. This helps to quickly edit or copy/paste entries.
Make sure you follow the exact syntax of a CUST! e.g.

A=XX,2,2,Beam
B=SX,14,6,Beam
H=SS,14,14,Beam
q=XS,4,9,Beam
...

Important! The editor in the tool only stores glyphnames and related side definitions! not comments, alternate, beam-positions, tab.figure settings etc!

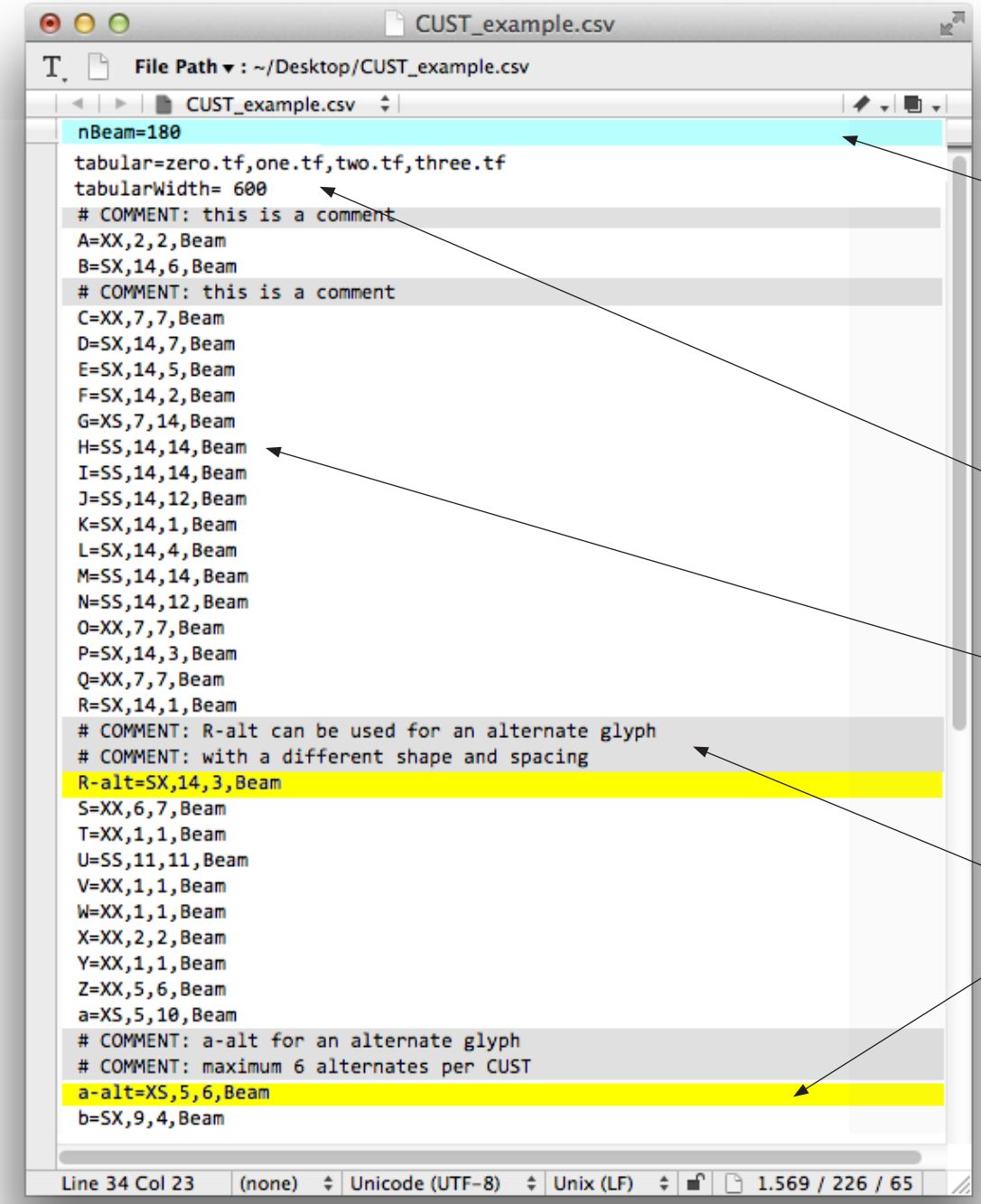
To switch back to List mode click the LIST button.

Be aware that if the syntax is wrong it won't switch back to the List mode!

Important! Accented glyphs don‘t have to be necessarily included in your CUST. They can be included, but accented glyphs can also be spaced by using a group/class file. (ADD-ONS). Sample file of a group/file is attached to the LS Cadencer App.

If your shape of a related glyph differs, like for example the shape of AE on the left is different, steeper for example, from A. AE should be included in the CUST!

Important! The order of glyphnames in the CUST is important as well!
For example if a component uses a basglyph twice or more times (e.g. your colon is made out of two periods as components) then the period (the base glyph) has to come first in the spacing table list to maintain proper sidebearings for the component glpyh!



For editing an external Spacing Table (CUST) in a Text Editor the content (see left) should exactly match the CUST File syntax as described below. An external CUST file should always use the .csv file extension.

You can include a m-/n-Beam Position in the **first line** (not mandatory). If you do, it should read like: **mBeam=180 or nBeam=200** for example. The m-/n-Beam value (vertical position of measurement line will be imported from the .csv file too and can be used in the Cadencer tool and applied to Auto-spacing)
It is also possible (not mandatory) to include the **f-Beam and g-Beam** position. (if all 3 Beams are included in a CUST the first 3 lines should look like this for example:

nBeam=200
fBeam=250
gBeam=220

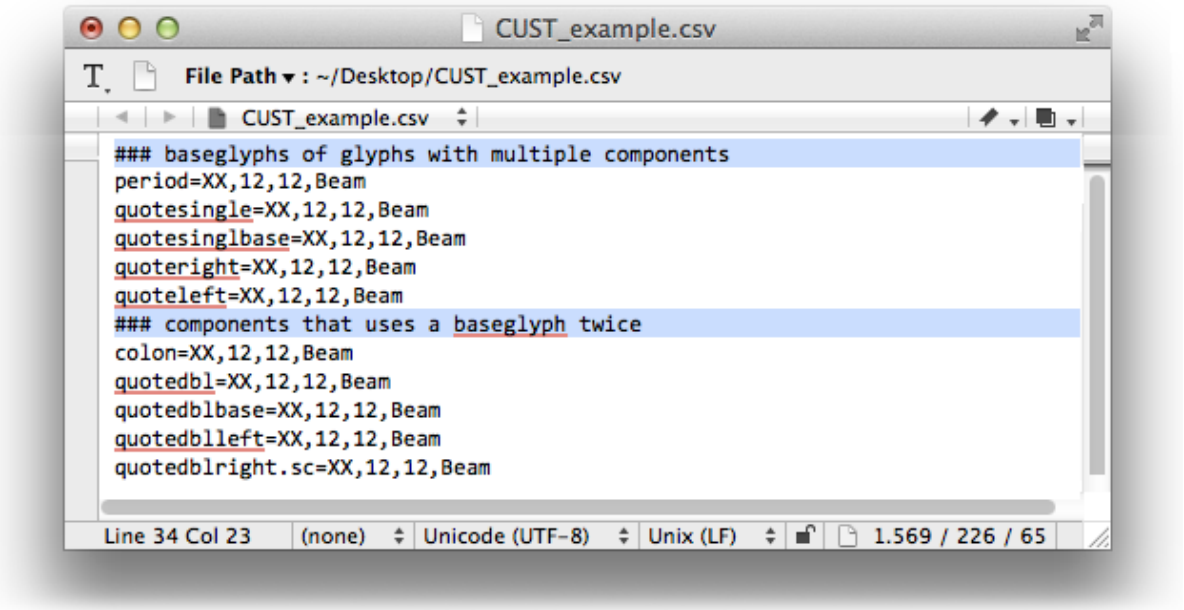
You can (not mandatory) also include a line of tabular figures (or any other glyph) that should get a fixed width as an additional line like this:
tabular=divide,plus,zero.tf,one.tf,two.tf,three.tf
If you include tabular you also have to include another line with the target width of these glyphs: **tabularWidth=600**
These glyphs will be adjusted to the provided width then as a second step after regular auto-spacing was applied.

A sidedefinition looks like this for example: **H=SS,14,14,Beam**
- Glyphname and Sidedefinition are separated by equal (=).
- Sidedefinitions should be uppercase letters X or S.
- Values for left and right are separated by commas.
- the last entry should be Beam or a value (integer) e.g. 500

IMPORTANT: this Beam entry/value only influences glyphnames with a stem definition! (SX – left, XS – right or SS on both sides)
- You can add comments by starting a line with #

You can add up to 4 alternates for glyph shapes by adding -alt in between glyphname and sidedefinition (=XS in this case): a-alt=XS,5,10,Beam
This is useful for example if you want to include a single story g and a double story g in your CUST — so your CUST is more flexible and applicable to a wider range of typefaces.

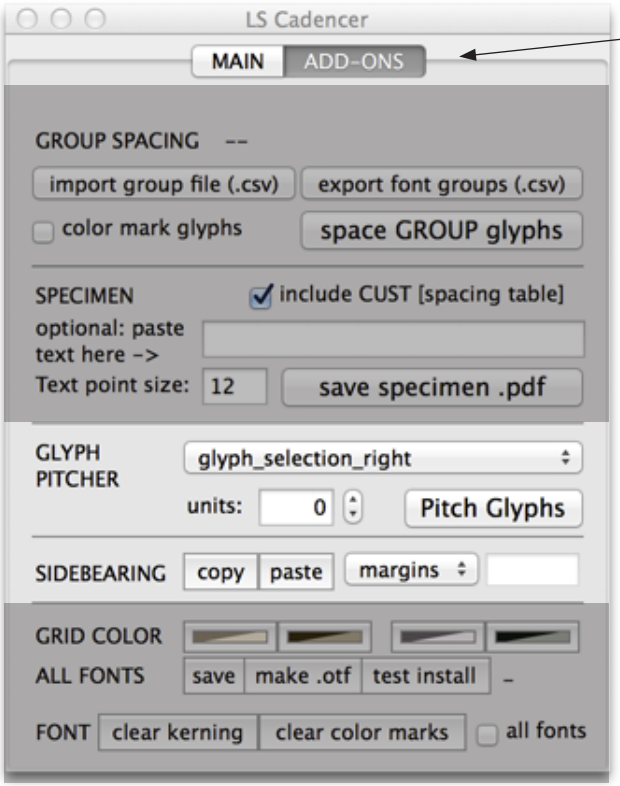
Important! always follow the exact syntax! You can always export a spacing table from the tool to use it as a reference!



Important! The order of glyphnames in the CUST is important as well!

On the left you see a small snippet of a spacing table, to show how the order should look like in the following cases:
For example if a component uses a basglyph twice or more times (e.g. your colon is made out of two periods as components) then the period (the base glyph) has to come first in the spacing table list to maintain proper sidebearings for the component glpyh!

If the sidebearings of a component glyph were not spaced properly, the order in the spacing table could be a reason for that.



ADD-ONS / ADDITIONAL STUFF
can be found in the second tab.

GLYPH PITCHER is basically meant for refining certain glyphs with, for example, round shapes. You can tweak these after you have applied Auto-Spacing with a CUST. Like if your rounds seem to be spaced too tight you can adjust them afterwards by font units with the glyph pitcher. **Important:** These adjustments are not stored in the spacing table!

First use the **Pop-Up** menu to choose which sidebearings (only left, only right or both) of the glyphs shall be pitched/adjusted.

Before finally using the **Pitch Glyphs** button, you have to set the value (Font units) and select the glyphs in the font-window you want to adjust. Choose _right, _left or both for adjusting either the right, the left or both sidebearings of the selected glyphs.

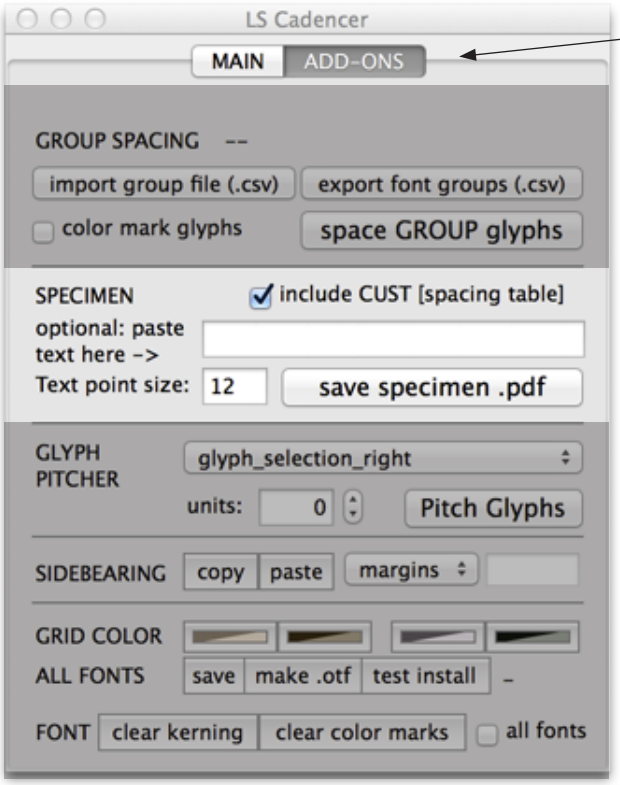
glyph_selection_right
glyph_selection_left
glyph_selection_both

SIDEBEARING is basically meant for quickly copying margins/sidebearings from one to another or to multiple glyphs. It is also possible to copy margins from multiple glyphs to multiple glyphs. In this case it is necessary that the amount of copied glyph margins is equal to the amount of pasted glyph margins (Side note: the order of copied glyph margins is also taken into account and is kept for pasting to glyphs!)

Besides from copying margins it is also possible to copy beamed margins by changing the pop-up menue to beam margins and providing a value at which vertical position the beam measures the sides!

It works like copy/paste: select a glyph - copy and then select another or even multiple glyphs to paste the margins from the copied glyph. (e.g select A (copy) and select Adieresis, Aring, Aacute, etc. (paste).
Or for example select A-Z (copy) - select a.sc-z.sc (paste) to copy all margins of uppercase letters to smallcaps. (this is only an example to explain the functionality and not how to apply proper spacing!)

This function helps to quickly copy glyph margins to other glyphs manually.



ADD-ONS / ADDITIONAL STUFF
can be found in the second tab.

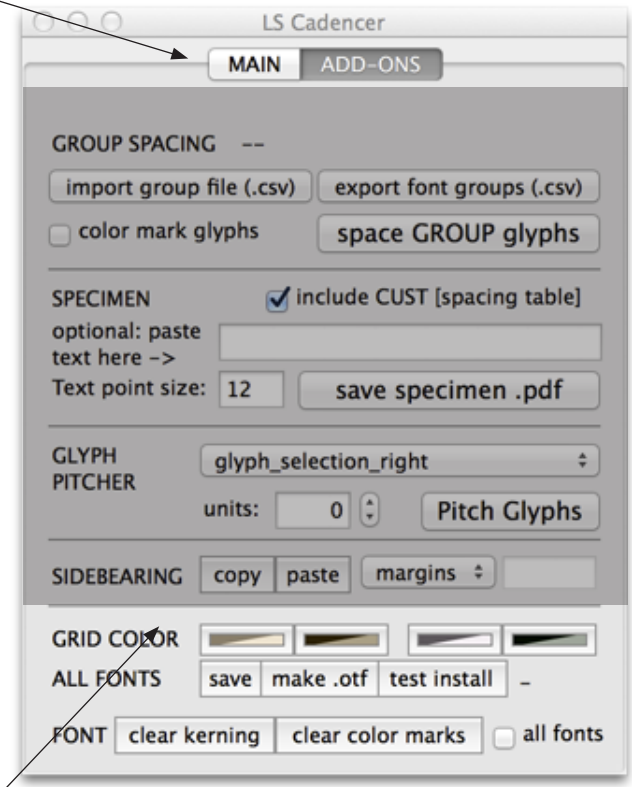
SPECIMEN (only available in RoboFont)

Optionally you can show CUST info on the specimen, which shows which Spacing Table is selected or was just applied. It will always include the current displayed CUST in the PopUp.

Optional: You can simply paste a text in the text box, otherwise it will use “Lorem Ipsum dolor...” as a text.

SAVE SPECIMEN will save a size A4 .pdf for quick proofing the result.

You can set a point size of the specimen text. For big sizes you should Test Install the font and use your own sheets for proper proofing.



- you can save all open fonts
- you can Test Install all open fonts to use them in other applications
- you can generate all open fonts as .otf files to the desktop

clear Kerning
Removes all Kerning Pairs in Font.
Important! This can not be undone!

clear colored glyphs
Clears color marked glyphs in font or in all **open fonts** (checkbox).

ADD-ONS / GROUP SPACING
is meant for adjusting (accented) glyphs after Auto-Spacing was applied to the basic characterset. It uses a group/class file, which is known from kerning, structured similar to a Python dictionary.

The first entry indicates the side, which will be taken for sidebearings and the name of the group (e.g. L_a or Left_a / R_a or Right_a). Important is the underscore in between, which works as a separator!

The name of a group has no influence on the spacing — important is the key glyph (first entry in the square bracketed list), from which the sidebearing is taken, is followed by glyph entries that will get the sidebearing of the key glyph.

Left_ or L_ means that all entries share the same left sidebearing, glyphs in Right_ or R_ share the right sidebearing. As you can see in the image below, combined glyphs like AE for example are included in R_E (or Right_E) because they share the same right sidebearing, or in other words it is the same shape on the right side.

Note that every group should be present as a Left_ and Right_ group because the left and the right sidebearings of glyphs need to be adjusted.

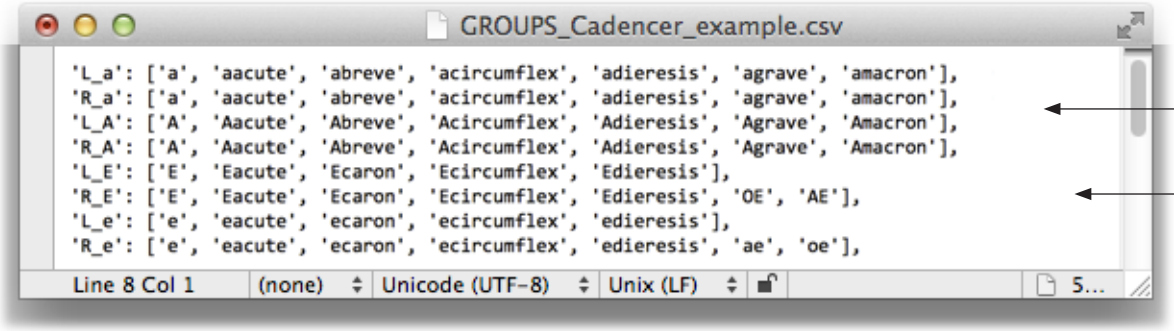
It is possible to export your Kerning groups/classes present in the font as a .csv from the tool — the exported file should only be used as a basis to build the Cadencer Group file.

Please make sure that your .csv file matches the syntax used in the example. All entries need to have single or double quotes and are separated by a space — in the square brackets a comma as well. At the end of every line there is a comma before the line breaks.

Note: Possible errors when importing an external file could be, for example, linebreaks at the end of the entries or missing commas at the end of a line. Look at **GROUPS_Cadencer_example.csv** file to check the syntax!

Important! Please be aware that the Group Spacing function uses a Beam to measure / adjust sidebearings of glyphs in a group. So there could be inconsistencies in metrics values, for example if AE has a slightly different shape than A.

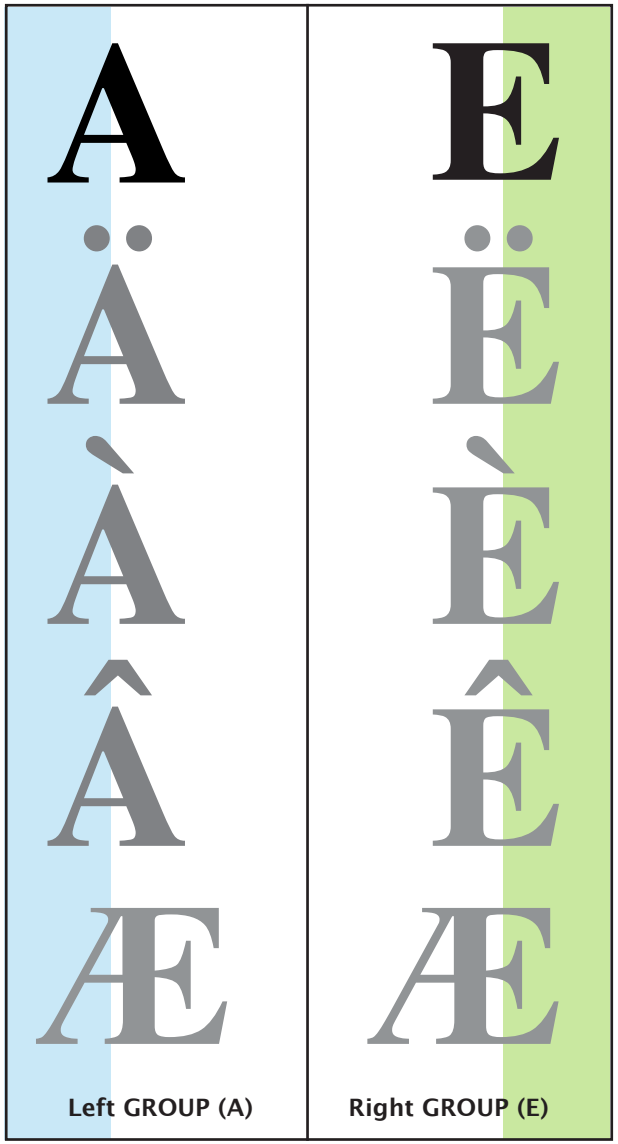
The list of glyphs (in square brackets) always starts with the KEY GLYPH, which is the reference for measuring the sidebearings (spacing). The values taken from the measurements of the Key Glyph will be transferred to all other glyphs in the Group!



Each entry is separated by a comma and space!

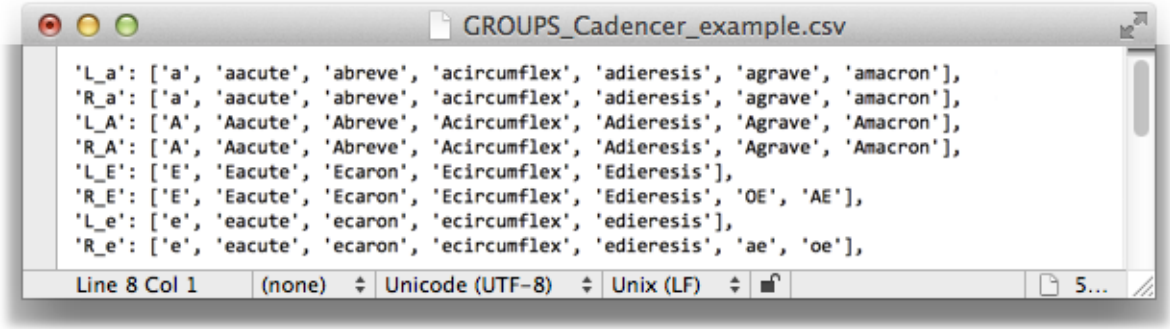
AE & OE are sharing the right sidebearing with E – so they are included in the right group of E.

Example of a Left GROUP (A) / Right GROUP (E):
'L_A': ['A', 'Adieresis', 'Agrave', 'Acircumflex', 'AE'],
'R_E': ['E', 'Edieresis', 'Egrave', 'Ecircumflex', 'AE'],



Spacing Groups in LS Cadencer are comparable to Kerning groups/Classes. In LS Cadencer the groups are built based on the visual appearance of the Glyphs, so the sorting of glyphs will differ from kerning groups/classes.

In Glyphs one might not need the Group Spacing function because there are Metrics Classes (I am not familiar with them). In case you want to use the Group Spacing from LS Cadencer you need to turn off Auto-Adjustments in Font-Info.



Each entry is separated by comma and space!

LS Cadencer has only a few Groups included in an example file. The groups need to be extended by the User!

AE is sharing the right sidebearing with E so it will be included in the right group of E.

Note: if the left side of A in AE differs in shape from A there might be slight differences in spacing!

LS Cadenculator

A tool for measuring existing fonts and converting metrics to use in LS Cadenculator for Auto-Spacing.

LS Cadenculator is more elementary than LS Cadencer. Basically it can be used for extracting valid values for the cadencer system and LS Cadencer. Usually you would measure fonts of a certain kind of category of typefaces to get good results. So a category could be for example: Renaissance Roman, geometric Grotesks or high contrast modern serif typefaces, to name only a few. One could use the Vox Classification of typefaces to find other categories. for example. To get a proper result the fonts should share parameters, like for example weights and widths, italic angle and so on.

Basically you have to provide a folder of fonts (make sure that .ufo or .otf selection in the tool matches the content of the folder!). If the folder only contains one single font — the tool duplicates it virtually and uses the same font for measurements. This can be helpful if you want to extract a Spacing Table (CUST) of a single font in order to use it for Auto-Spacing in LS Cadencer.

When LS Cadenculator is applied to a bunch of different fonts, it will output the most common values appearing in the measurements.

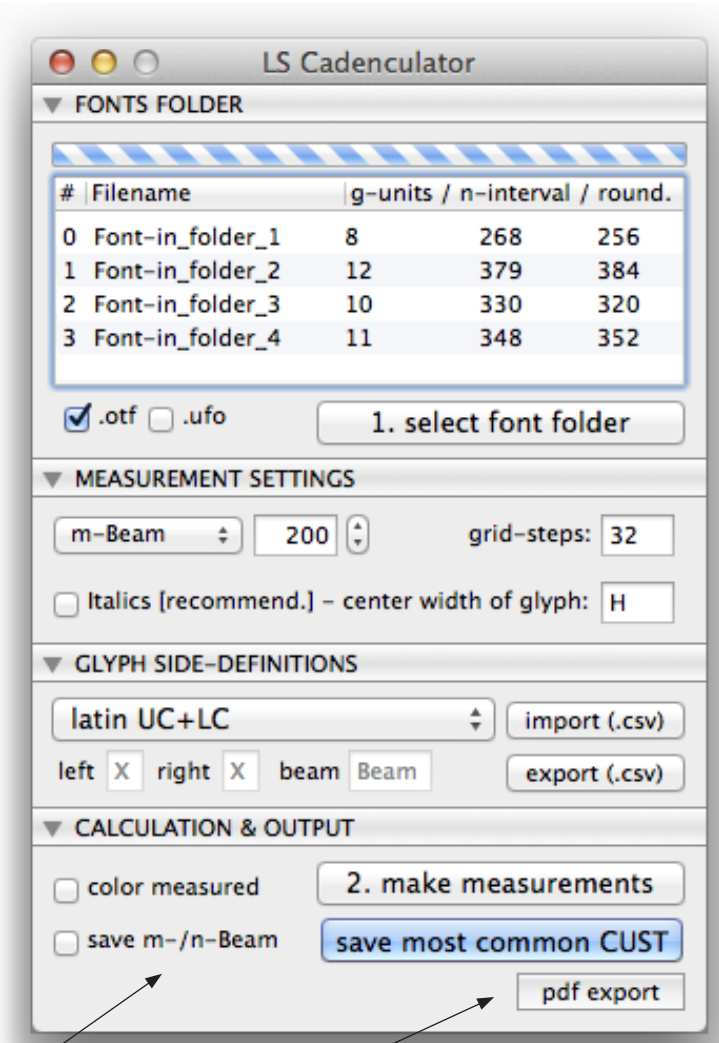
Be aware that the tool converts metrics information stored in the fonts. Some fonts are restricted from doing so.

❶ **Select a folder containing .otf or .ufo files.** All font files in the folder will be measured.
- **select checkbox (.otf or .ufo)**

Usually one would use a collection of fonts from the same genre, sharing similar design parameters, like for example Renaissance Roman, geometric Grotesks or high contrast modern serifs sharing the same weight, etc., in order to get a good result when exporting graphs or Spacing Table files (CUST).

List of fonts / filenames in the selected folder. Shows up after you have selected the font import folder. The filenames will be displayed then. After you apply **make measurements** it will display the PostScript name if there is one defined in font-info.

Additionally, basic measurements of glyph n will be displayed. Like the calculated Grid-Steps-Units, the length of the interval of glyph n and the rounded value, which was applied for the calculation.



MEASUREMENT SETTINGS:
These influence the calculations.

Beam Position relates to the m-/n-Beam in LS CADENCER. It is the vertical position for measurements in glyph n and glyphs with sidedefinition 'stem'.

m-/n-Beam: The vertical position has to be adjusted in such a way that it cuts exactly 2 vertical stems (without hitting a serif, e.g. in italics). To find the right position, open the fonts you are going to measure, use a guideline in the glyph-view of n and set vertical position to the UI.

Note: if you change **beam position** or any other parameter you need to apply **make measurements** again.

❷ **Make measurements** to calculate the cadence units, required for LS CADENCER.

When saving most common CUST files, the beam position can be included in the file as well in order to reuse the beam position in LS Cadencer.

pdf export — opens a dialog to export visual graphs of the measurements.
To output a single glyph use input field or select a set from Pop-Up menu. When using a set you can **save glyph(s) diagrams** over and over again, choosing different output sets one after another.

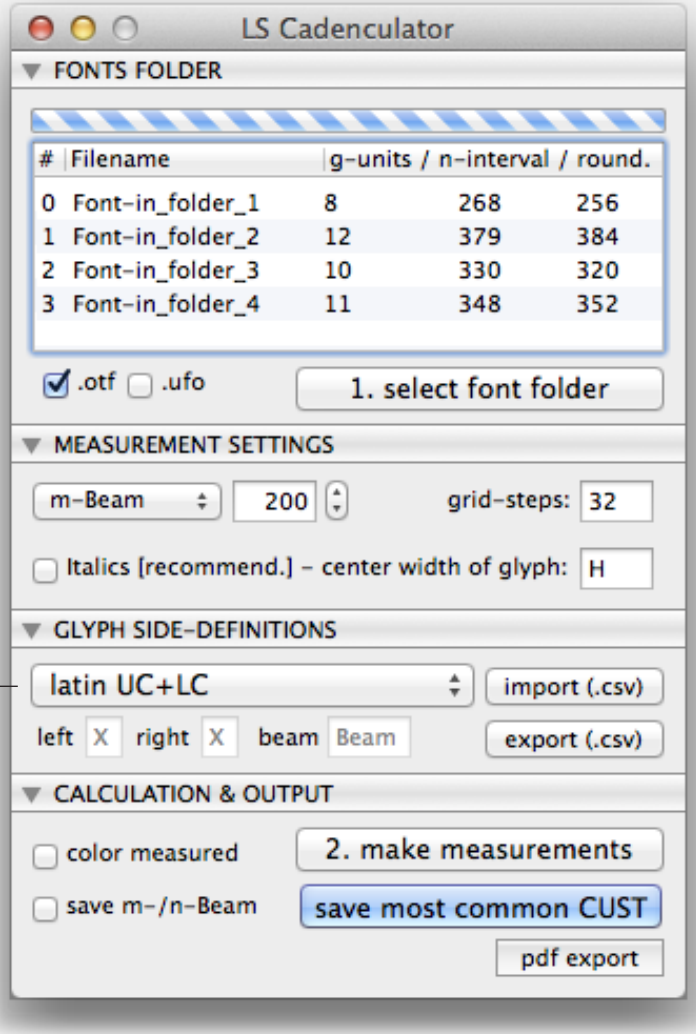
❸ **save most common CUST** (.csv) a spacing table to import/use in LS Cadencer. Values are based on calculations of provided fonts in the selected folder and the CUST contains most common values of these calculations. **report.txt** is a plain text report of the data.

Italic [offset] - (only for italic fonts.)
Tries to calculate a shift when measuring italics (which are based on horizontal metrics). For details see **measuring italics** next page.

You can select a set of glyphs which will be measured from the pop-up menu.

If you select “glyph selection” from the popup you need to open a font and select some glyph which shall be measured! Be aware that the fonts in the selected folder are measured, not the one from which the glyphs are selected. The glyph selection only defines the glyphs which will be measured!

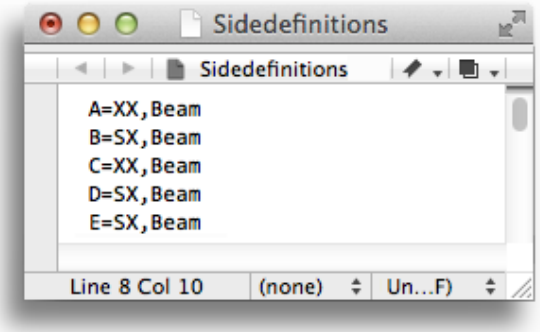
The input left / right defines the measurements of the sidebearings (X or S) of the selected glyphs. **beam** defines the vertical position of the measure-ment, either Beam or an integer value. (e.g. 500)



Import/Export
A Sidedefinitions.csv file.
You can customize a .csv file in a text editor and import it.

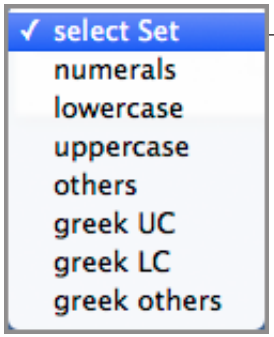
Sidedefinitions are necessary to define the kind of measurement of the left/right sidebearing and also for the vertical position of measurement.

SIDE-DEFINITIONS is basically a file with a list of glyphnames. It can include basically any glyphname (it should be present in your character-set to get a result of course). Additionally there are indicators like X for extreme or S for stem, like they are used in LS Cadencer to define the type of measurement. Some definitions are included in the tool; these can be exported and modified.

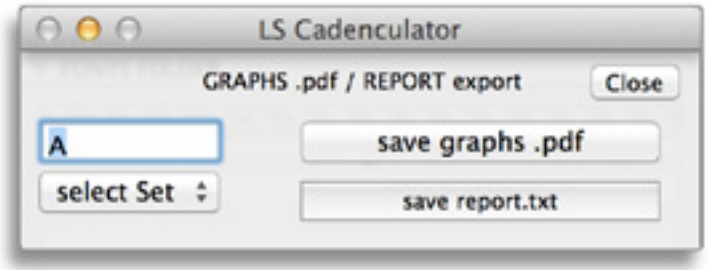


Sidedefinitions.csv: you can basically use any glyphname (it has to be present in your font file to get an output). You can use comments by indicating the line by #.
Important: the syntax has to be exactly like this: Alpha=XX,Beam
Beam indicates if the vertical position of the measurement should be equal to the position of m-/n-Beam. This entry can be either Beam or an integer value (e.g. 500).

Input for a single glyph, that should be exported as a graph.



Different glyphsets provided with the tool to output graphs. You need to make measurements before!



Note: Unfortunately at the moment it is only possible to output graphs for glyphs of these sets. So if your imported Sidedefinitions.csv contains none of these characters you can not output graphs.

But you can of course always export the CUST (most common spacing table) and the **report.txt**

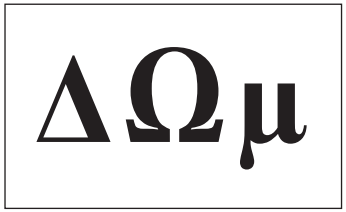
side note:
if you change the content of the folder (+ make measurements over and over) the pdf output adds the old and the new graphs to the exported document.
so the newer measurements (or a new selection of glyphs for outputting as pdf) will always be at the end of the pdf

The only way to circumvent adding up the results in the pdf is to close the extension and reopen when content of folder was changed and export a new pdf.

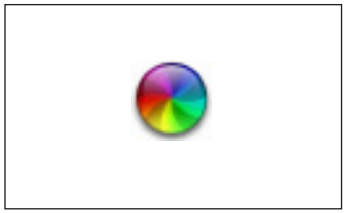
Measuring Italics:
It is recommended to activate the ITALIC's checkbox. Because in many existing italic fonts sidebearings are irregularly shifted, because not all font editors used slanted sidebearings back in the day. The ITALIC's function tries to even this out by using a reference glyph. The glyph H is used as the default, because sidebearings are (or should be) equal in most cases.

Alternatively the user can adjust the ItalicSlantOffset in Robofont to even out sidebearings. Go to font.info -> robofont and adjust ItalicSlantOffset until both sidebearings of a slanted glyph (e.g. H) are even. This is necessary to get proper results in measurements.

LS Cadenculator - calculating Greek glyphs
Be aware that there are math glyphs — they will be treated the same if in characterset:
/uni03BC/mu
/uni03A9/Omega
/uni0394/Delta



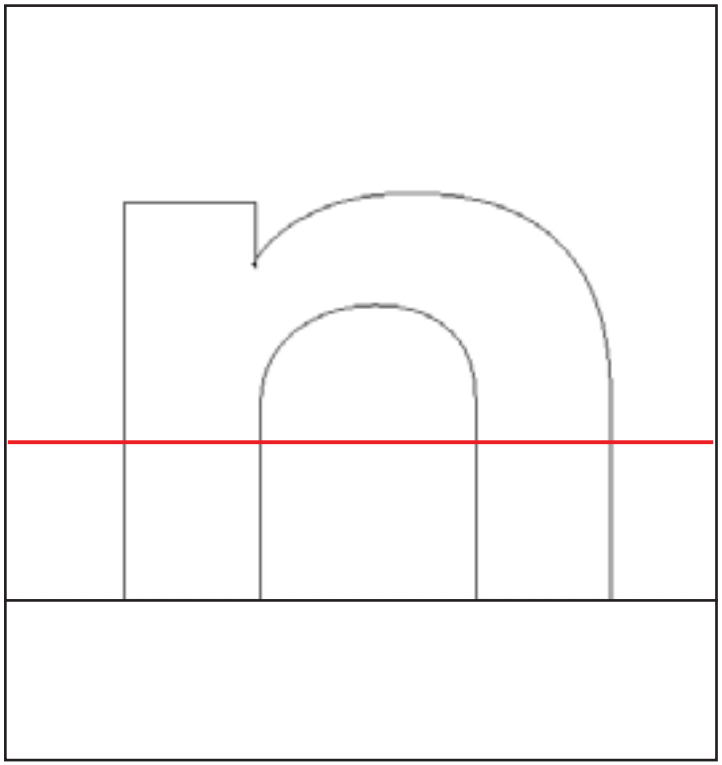
LS Cadenculator: When batch measuring a lot of fonts (20 files in a folder have been tested) the output — especially of PDF glyphsets (from the popup) can take a while — depending on the amount of glyphs and fonts transferred to PDF. Please be patient, even if it seems that your font editor doesn't react!

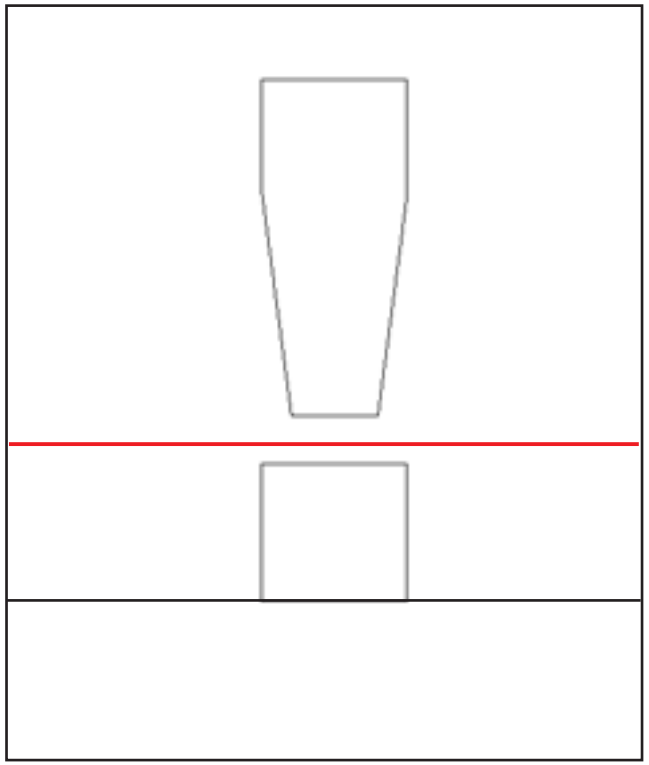


In some cases errors may occur.
In that case the n-Beam is at a position where it doesn't hit a stem of the exclam. If the sides of the exclam are defined by a stem (e.g. exclam=SS) the exclam can not be Auto-Spaced or measured with LS Cadenculator in a proper way. When such a case occurs in LS Cadenculator you will get a message with info about which glyph caused the problem.

Possible solutions: remove the exclam definition from your CUST — or set sidedefinitions to extreme (XX) — then of course you need to adapt the values of the left and the right side as well.

n-Beam





Fitting Results

On the next pages you will find fitting results of respaced existing typefaces compared to their original spacing. Please note that these examples were made pretty quickly and without big refinements.

Bembo Monotype — Original

The invention of printing from movable types was one of the chief events affecting the history of European civilization. The task of duplicating texts without variance was impossible before Gutenberg equiped the scholar with the accuracy of type. Prejudiced connoisseurs in the fifteenth century deplored the new mass-production of books, but men of letters eagerly hailed the printing press as a method of disseminating knowledge in permanent form; and the earliest printed books soon rivalled in beauty, as they superseded in economy, the fine manuscripts of their day.

Bembo Monotype — Cadencer (n-base 32)
Renaissance Roman

The invention of printing from movable types was one of the chief events affecting the history of European civilization. The task of duplicating texts without variance was impossible before Gutenberg equiped the scholar with the accuracy of type. Prejudiced connoisseurs in the fifteenth century deplored the new mass-production of books, but men of letters eagerly hailed the printing press as a method of disseminating knowledge in permanent form; and the earliest printed books soon rivalled in beauty, as they superseded in economy, the fine manuscripts of their day.

Adobe Garamond — Original

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Renaissance Roman

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Adobe Caslon Pro — Original

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Renaissance Roman

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Adobe Jenson — Original

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Adobe Jenson — Cadencer (n-base 32)
Renaissance Roman

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Baskerville [Monotype] Regular — Original

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Baskerville [Monotype] Regular — Cadencer (n-base 32)
Renaissance Roman

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Minion Pro Regular — Original

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Minion Pro Regular — Cadencer (n-base 32)
Renaissance Roman

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Times New Roman — Original

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Times New Roman — Cadencer (n-base 32)
Renaissance Roman

The invention of printing from movable types was one of the chief events affecting the history of European civilization. The task of duplicating texts without variance was impossible before Gutenberg equiped the scholar with the accuracy of type. Prejudiced connoisseurs in the fifteenth century deplored the new mass-production of books, but men of letters eagerly hailed the printing press as a method of disseminating knowledge in permanent form; and the earliest printed books soon rivalled in beauty, as they superseded in economy, the fine manuscripts of their day.

Lucida Sans — Original

The invention of printing from movable types was one of the chief events affecting the history of European civilization. The task of duplicating texts without variance was impossible before Gutenberg equiped the scholar with the accuracy of type. Prejudiced connoisseurs in the fifteenth century deplored the new mass-production of books, but men of letters eagerly hailed the printing press as a method of disseminating knowledge in permanent form; and the earliest printed books soon rivalled in beauty, as they superseded in economy, the fine manuscripts of their day.

**Lucida Sans — Cadencer (n-base 32 /
Humanistic Sans Semi Flat Curves [g-alt])**

The invention of printing from movable types was one of the chief events affecting the history of European civilization. The task of duplicating texts without variance was impossible before Gutenberg equiped the scholar with the accuracy of type. Prejudiced connoisseurs in the fifteenth century deplored the new mass-production of books, but men of letters eagerly hailed the printing press as a method of disseminating knowledge in permanent form; and the earliest printed books soon rivalled in beauty, as they superseded in economy, the fine manuscripts of their day.

Futura Medium — Original

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**Futura Medium — Cadencer
Grotesks (n-base 42)**

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DTL Prokyon Regular — Original

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DTL Prokyon Regular — Cadencer (n-base 32)
Humanist Sans [note: left side bearing of g = d]

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Gill Sans — Original

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Gill Sans — Cadencer (n-base 40)
Humanist Sans

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Adobe Garamond Bold — Original

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DTL Albertina Book – Original

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Adobe Garamond Bold (n–base 37)
Renaissance Roman

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DTL Albertina Book (n–base 32)
Renaissance Roman

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DTL Haarlemmer Regular — Original

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DTL Haarlemmer Regular — Cadencer (n-base 32)
Renaissance Roman

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DTL Documenta Regular — Original

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DTL Documenta Regular — (n-base 32)
Renaissance Roman

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DTL Haarlemmer Medium — Original

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DTL Haarlemmer Bold — Original

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DTL Argo Regular — Original

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DTL Argo Regular— Cadencer (n-base 32)
Humanist Sans

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DTL Caspari Regular — Original

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