The conventional control characters for the uppercase.

The conventional control characters for the lowercase.

2. CONTROL CHARACTERS

In order to make sure that similar parts are handled in a similar way, we draw certain characters first and use those decisions as a basis for the rest. We call these characters, control characters. Usually they are the **H, D and O** for the uppercase and the **n, p and o** for the lowercase.

The control characters **HDO** and **nop** are used as controls because they contain one character that it has straight parts, one that has round parts and one that has both. The decisions you make by drawing and spacing these characters can be used to draw and space many of the others. This way you ensure all these characters will get along together and save yourself time.

HHHH OOOO

After you space the **H**, do the same thing to the **O.** The letterspacing in HHHH should be visually equal to the letterspacing in **OOOO.**

The **H** and **O** are symmetrical so they should be centered on their setwidths; the left and right sidebearings should be equal.

The left side of the **D** has a straight part like the **H** and the right side has a round part like the **O**. Therefore, set the **D**'s left side sidebearing (B) to the sidebearing of the **H** (B) and set the **D**'s right sidebearing (A) equal to the sidebearing of the **O** (A).

HHDHOHODOO

By following this method, spacing similar parts summarily, this string should have an even balanced rhythm.

3. SPACING THE CONTROL CHARACTERS

First we space the **H**. Type this string into the metrics window without guides: **HHHH**. Adjust the setwidth of the **H** until the letterspace seems balanced. A good starting point for the letterspace between **H**'s is that it should appear to be approximately half the interior space. Don't worry about the sidebearings for now. Just get the spacing so it looks right.

Second we space the **O**. Type the string **OOOO** next to **HHHH**. Adjust the width of the **O** until the **O** string has a similar rhythm to the **H** string. The space between **OOOO** should appear equal to the space between **HHHH**.

When you think you have the letterspacing for the **H** and **O** worked out, Both characters need to be positioned correctly on their setwidths. Now we start thinking about the sidebearings.

Both characters are symmetrical so each of their respective sidesbearings should be equal on both sides. Slide each character on its set width until the sidebearings are equal. In other words, they should be centered on there set widths.

Next we space the **D**. The left side of the **D** has a straight part like the **H** and the right side has a round part like the **O**. Therefore, set the **D**'s left side sidebearing to the sidebearing of the **H** and set the **D**'s right sidebearing equal to the sidebearing of the **O**.

Now try this string: **HHDHOHODOO**. The **D** should appear to pull a bit to the left between **H**'s. Between **O**'s it should appear to pull slightly to the right. The **H** and **O** should appear centered when set between each other.

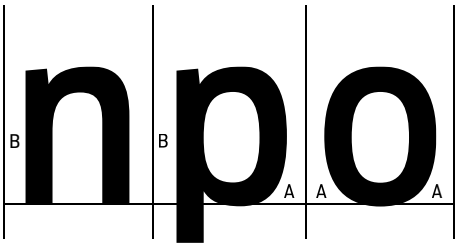
It may take some fiddling to get right. Remember that changes to one control character need to be reflected in the others.

nnnn oooo

After you space the **n**. Do the same thing to the **o**. The letterspacing in **nnnn** should be visually equal to the letterspacing in **oooo**.

The **o** is symmetrical so it should be centered on its set width. The **n** is not symmetrical but should appear visually centered between correctly spaced **o**'s. The right sidebearing (C) needs to be less than the left sidebearing (B).

The left sidebearing of the **p** (D) should be less than the left sidebearing of the **n** (B) but greater than the right sidebearing of the **n** (C). Set the right sidebearing of the **p** (A) to the same as the sidebearing of the **o** (A).



If you are drawing a sanserif, it is a bit more simple because there aren't any serifs to get in the way. Set the left sidebearing of the **p** (B) the same as the left sidebearing of the **n** (B). Set the right sidebearing of the p to the same as the sidebearing of the **o** (A).

nnpnonopoo

By following this method, spacing similar parts similarly, this string should have an even balanced rhythm.

Spacing the lowercase works in a similar way to the uppercase.

First space the **n** using the string, **nnnn** and the space **o** using this string, **oooo**. Just worry about the spacing, not the sidebearings for now.

Now position the **n** and **o** correctly on their set widths. First, center the **o** on its set width. Next, set the **n**. The **n** is not symmetrical so its sidebearings should not be set equally. However, it should appear centered between **o**'s. Use the string **oonoo** to visually center the **n** on its set width.

Next we space the **p**. Similar to the **D**, the left side of the **p** has a straight part like the left side of the **n** and the right side has a round part like the **o**. However, when serifs are involved it is a bit more tricky. The left side of the **p** has less serifs than the left side of the **n** so its sidebearing should be set slightly less than the left sidebearing of the **n**. Set the **p**'s right sidebearing equal to the **o**'s sidebearing.

Now try this string: **nnpnonopoo**. The **p** should appear to pull a bit to the left between **n**'s. Between **o**'s it should appear to pull slightly to the right. The **n** and **o** should appear centered when set between each other.

HHEHOHOEOO

The left side of the **E** is the same as the left side of the **H** so we know to set its left sidebearing the same as the **H**. Now you can spend you time figuring out the spacing of the unique right side. Set the right sidebearing so the **E** appears centered between **H**'s and between **O**'s.

HHGHOHOGOO

Similarly, the left side of the **G** is the same as the left side of the **O** so we know to set its left sidebearing the same as the **O**. Now you can spend your time setting the right sidebearing. Set the right sidebearing so the **G** appears centered between **H**'s and between **O**'s.

EH ED DO DG HEDGE

We know that the new characters, **G** and **E** will space correctly with the **D** as well as to each other because we know the **D**, **G** and **E** all appear centered between **H**'s and between **O**'s.

nnhnonohoo

Predictably, this method works the same in the lowercase. Set the right sidebearing of the **h** equal to the right sidebearing of the **n** because they are the same shape. The left side of the **h** is similar to the **p** so set the **h**'s right sidebearing equal to the **p**'s right sidebearing.

nndnonodoo dop

The right side of the **d** is also similar to the left side of the **p** — the serif is just in a different place. Set the right sidebearing of the **d** equal to the left sidebearing of the **p**. Set the **d**'s left sidebearing equal to the **o**'s sidebearing. Because of this method we know that the **o** will appear centered between the **d** and **p**.

4. DRAWING AND SPACING THE REST

It can take a while to achieve the right balance between the rounds and the straights. It is worth taking the time to do it right though. The decisions made with the control characters are the basis for spacing the rest of the typeface.

Always look at what you are drawing between control characters. The space within the character needs to be balanced with the space around the character. Move through the character set in groups of similar parts so you can keep track of your decisions easier.

Each character should always appear centered between control characters. Similar parts should have similar sidebearings.

Punctuation should also be drawn between both the uppercase control characters and the lowercase control characters. For example, **HH.H.HO.O** and **nn.n.no.o** or **HH(H)HO(O)** and **nn(n)no(o)**.

HHRHHOHOROO

The **R**'s left sidebearing is set equal to the left sidebearing of the **H**. The right side **R** is adjusted so it appears centered between **O**'s but it looks too tight on the right between **H**'s.

HHRHHOHOROO

However, if the right side bearing is set so it appears centered between **H**'s when it is between **O**'s, there is too much room on the right side. Don't worry kerning pairs are coming to the rescue soon. In the meantime, set the right sidebearing of the **R** to favor the character group with the most members — letters with straight parts.

Looking ahead: Kerning pairs are also used to correct combinations of extreme characters whose structures have built in spacing problems, like **LT**. In addition, it is used for uppercase to lowercase combinations like **Yo**. Above, the light grey indicates the set width of each character. The dark grey indicates where the set widths are overlapping to get the correct amount of letter spacing. In the days of metal type, this overlapping was not possible. Special characters had to be made for these combinations which was expensive and a pain for the user. These days, these exceptions are just programmed into a table within in the font software and are read by most computer applications automatically.

5. EXCEPTIONS

Sometimes it is not possible to find the right balance between both the straight and the round control characters.

For example: **HRHHOROO**

If the **R** is spaced so it is goes with the **O**'s it will be too tight with the **H**. and vice versa. What we need to do make an exception to the system. The exception is called kerning. We will discuss kerning more in depth later. You cannot kern a font without it being well spaced first.

Which combination should you favor? **HRHH** or **OROO**? In general, spacing should always favor the most common situations. Kerning is used for the exceptions. The largest group of similar characters is the straight group. Therefore, space the **R** so it looks good with the **H**'s. The letterspace between **RO** will be compensated for later with kerning.

A well spaced font with no kerning is always better looking than a poorly spaced and poorly kerned font.

CONCLUSION

Always use this method of drawing and spacing as a starting point. The design of a typeface may dictate some deviation. For example, shape differences in the bowl of the **D** and the curve of the **O** may mean their sidebearings should be exactly the same. The goal is for the spacing to appear perfect not be mathematically perfect.

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WASHINGTON

Yikes! The tracking is way too tight on this word. The entire word needs more open letter spacing.

WASHINGTON

The tracking looks better now. However there is way too much space between the **W** and **A**. The kerning between those characters needs to be tightened up. Also, the kerning between the **N** and **G** looks too tight.

AV VO HAVE DEVO

When you are creating kerning pairs, be careful not to over kern. Kerning pairs have to be balanced with non-kerning letter combinations. For example, it is tempting to make extremely close kerning pairs for **AV** and **VO**. However, when these pairs show up in a word it is obvious that these kerning pairs are too tight relative to the other characters. **HA** and **VE** cannot get kerned any tighter. Therefore the **AV** kerning pair needs to looser so there is a balance.

AV VO HAVE DEVO

Here a compromise has been made in the kerning pairs **AV** and **VO**. They have been set looser so there is a balance between the kerning pairs and the non-kerning letter combinations. The rhythm of the word stays even and balanced.

KERNING:
Kerning is often confused with tracking. It is important to get them straight. Kerning refers to the letter space between pairs of characters. Tracking refers to the spacing of an entire word, line or paragraph. If an entire word seems that it is set too tight of too loose, you adjust the tracking. If a pair of characters within a word are too tight or too loose, you adjust the kerning.

In a typeface, the designer can create kerning pairs. Kerning pairs are specific exceptions made to the letterspacing compensate for difficult character combination. They are created to maintain an even rhythm in text.

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Start with the uppercase. Check all the caps between **A**'s. Look at the combination on both sides, **AB** and **BA**. Kern where necessary.

Using this method, kerning the next character B can start with this string. You already checked **AB** and **BA** in the first string. By the time you get to kerning Z, the only combination you will need to check is string **HHZZZHOHOO**.

Not surprisingly, characters with similar parts and similar sidebearings should be kerned in a similar way. If they this is not happening, double check to make sure the sidebearings are set correctly. Don't fix spacing mistakes with kerning.

It's kerning pairs to the rescue! A kerning pair allows spacing exception to happen between specific character combinations without effecting the spacing of the rest.

Creating a set of kerning pairs is the last step is drawing a typeface. It should be done after the designer has drawn and spaced all the characters and is satisfied with them.

Kerning is accomplished by checking every single character combination and kerning those that need it. It is not as daunting as it sounds if you use this method though.

Start with the uppercase. Check all the caps between **A**'s. Look at the combination on both sides, **AB** and **BA**. Kern where necessary.

Check your kerning by looking at the rhythm of the entire string. The control characters are there so you can see how each combination relates to the rest of the character set. This will help avoid kerning too tightly.

Kerning might seem like a lot of work. It is tedious but with practice it gets easy. In general a well-spaced font that has been thoroughly kerned will have between 1000-2000 kerning pairs. 3000 is excessive. A font with 4000 and more kerning pairs may overwhelm some applications and fail to rasterize correctly. If your font needs that many kerning pairs to look good, it may not be well spaced. Pay attention when you are kerning: if a certain character consistently needs to be kerned to almost every other character it probably needs a sidebearing adjustment.

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nnavanonoo

Kerning the lowercase is done the same as the uppercase just with a string using the lowercase control characters. Go through the strings **nnaaanonoo, nnabanonoo** and so on. Then **nnbbbnonoo, nnbcbnonoo** and so on.

Yannoners

The uppercase also needs to get kerned to the lowercase. Go through the strings **Aannoners, Bannoners** and so on. Then **Abnnoners** and so on.

0012101011

Usually figures need kerning also. Go through the strings **0011101011, 0012101011** and so on. Then **0022201011, 0023201011** and so on and so on

0047401011

With some experience, you should be able to predict which characters will be kerning pairs. It is still important to check them all though.

HH¿A?HOOHO

nn¿a?noono

00$201011

Punctuation and monetary symbols should also get checked. You can save time by not checking combinations that would never be used. For example, it would probably be overkill to check these combinations **HHAHOOHO.**