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THE PROCESS OF CREATING A FONT

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THESIS

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Title

The Process Of Creating A Font

Abstract

The following thesis work describes the process of creating a new font including research and development stages of the project. The purpose of this work is finding my own style as a designer through a new format, such as typography, as well as learning more about typography in general and about the steps that are involved in typeface production.

The first part of the process included a lot of theoretical research on the history and classification of typefaces. Subsequently, the main information on these matters is provided in the thesis. The primary theme for this font included geometric and sci-fi elements. The main inspirations were architecture and music. The conceptualization process was divided into a number of logical steps, and is described from the very basics, such as looking for inspiration and ideas to further operations, essentially sketching and digitalizing the font. The explanation of the design and production process goes into detail, thoroughly explaining the actions needed in order to create a basic font.

The main outcome of this project is a font which consists of 27 characters. It is important to note that the project is incomplete, and the work will continue in the future. More glyphs will be added to the font, with priority given to numbers and the most used special characters.

Language
English

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Keywords

Font design, fonts, typography, graphic design

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1 INTRODUCTION

1.1 Starting Point

Typography is an essential part of communication nowadays, it surrounds us everywhere. For centuries, typographers have been developing various typefaces in order to meet needs for printing and design. Nowadays there are thousands of fonts to choose from, and new ones are designed every day. Some fonts are timeless and universal, but they can also be designed for a specific demand or project.

Thinking about functionality is important when designing a typeface. Every font is supposed to send a specific message, and it provides the critical first impression to the viewer, which he or she gets before even reading it. Different typefaces have their own faces and personalities, they evoke emotions.

Designers have to work with typography every single day. However, it does not always occur to us, how much time and effort is required in order to create a typeface. Developing even a basic font with minimal amount of characters is a long process which needs a lot of research and preparation. Every typeface has an idea behind it, as well as hours of exploration and production work.

1.2 Framework and approach

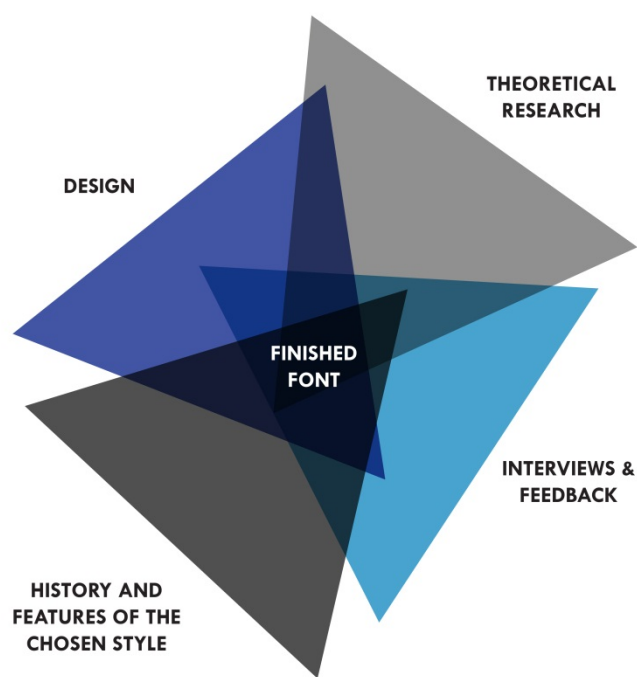
This thesis concentrates on going through the process of creating a basic font, and the various steps needed in order to get a finished product. Creating a typeface is a rather long process, and it requires a lot of preparation as well as theoretical knowledge before the practical implementation can be started. Taking a closer look at the required steps and practices needed in order to achieve the completion of the project are as important as the finished result itself.

My personal goal for the project was to learn more about typography in general, as well as understand the practices and actions behind the development and implementation of fonts. At the same time, typography seemed like a good new channel of expressing my own style as a designer.

The first four chapters of the thesis concentrate on the theory aspect of typography. Various features of different type families are discussed, as well as many other attributes of typographic elements. In my opinion, it was necessary to go through theoretical knowledge as deeply possible before starting practical implementation. In order to find the best approach and consider all the possibilities and aspects of font design, good knowledge base is required.

In the second half of the thesis my own development and implementation process is explained. The practical implementation starts with finding the right sources of inspiration and brainstorming the ideas and practical uses of the font. The first step of the actual designing process is basic sketching. After that, the letters are digitalized in Adobe Illustrator, and the font file itself is implemented in FonLab studio 5.

The actual font that is developed during this project is a sans serif geometrical font, and it consists of 27 characters, 26 of which are the letters of Latin alphabet. Since the development process was the focus of the thesis, the font itself does not have to be complete. However, the work on it will still be continued, and more characters will be added to it in the future.



Picture 1. Thesis framework

2 TYPOGRAPHY BASICS

In order to learn and understand type and typography, it is necessary to get a grasp of the terminology (the language of type), anatomy (the parts of type) and architecture (the framework of type). Since the basic terms, parts and details are prevalent among various fonts, knowing them would be beneficial in order to be able to select and handle type properly.

At the same time, recognizing the typographic elements can aid in producing new fonts. Through thoughtful and careful manipulations of the fundamental parts and elements, it is possible to achieve new individual outcomes. (Cullen 2012, 33.)

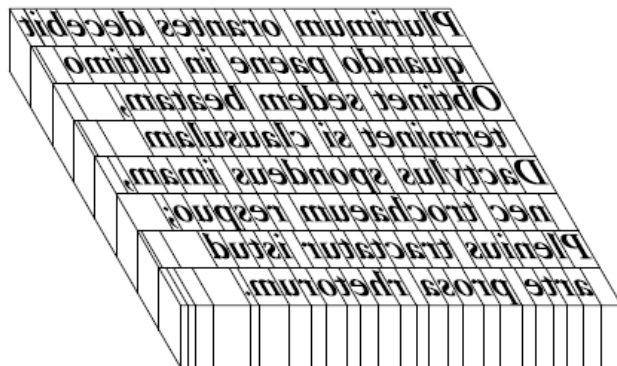


Picture 2. The parts of type (Source: Cullen 2012, 34)

2.1 History

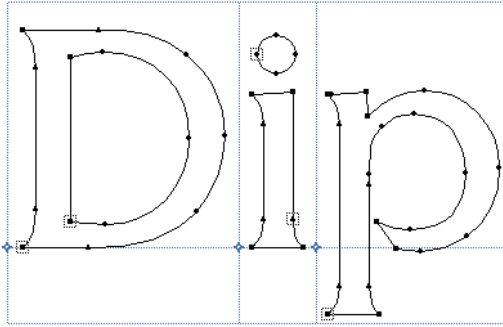
Typeface industry was born with the invention of movable type, which happened already in the 15th century. Even though Chinese and Koreans were already using movable type centuries before that, it is acknowledged that Gutenberg is the one who was able to create a complete typesetting and printing system out of this concept.

Gutenberg's technique revolves around arranging special alloy blocks that had letters cast on one of the sides into rows of text. In order for print to show correctly, the letters were reversed and arranged from right to left. The rows were placed one below the other, forming a page. At the same time, the spaces between the rows were filled with special metal strips in order to get the spacing between lines, the process also known as adding lead. The term leading is used to this day to indicate the distance between lines of type. (Felici 2012, 4.)



Picture 3. Schematic view of a body of handset metal type (Source: Felici 2012, 4)

This was also the time when the shapes of letters became regulated and arranged the way we know and recognize them now. (Willen and Strals 2009, 6) Even though nowadays the system of setting type seems completely different since it has been computerized, the concept of setting blocks for letters and the spaces between them remains the same. In fact, this approach is still the key to the whole structure. (Felici 2012, 4.)



Picture 4. Type in the font-editing program (Source: Felici 2012, 5)

2.2 Categorization

Understanding the way typefaces are divided and categorized is essential in order to be able to interpret their characteristics, forms and origin. These classes quite often correlate to various historical periods of art development. There are several diverse methods and terms for this classification, but the important part is the attributes and features that each “family” has. Knowledge of the main traits of each group provides a solid base in recognizing the primary structure of typography. (Willen and Strals 2009, 33.)

There are two main groups for all typefaces: serif and sans-serif. The difference between the two is that serif letters have a decorative “feet”, while sans-serifs do not. “Sans” means without in French, therefore, sans-serif typefaces are the ones that lack serifs.



Picture 5. Serif and Sans Serif typefaces (Source: FSI Fontshop International, 2010, 12)

Nowadays, serif typefaces are still the ones that are usually selected for reading text, as they are easier to read. Serifs play the role of a guide that helps the eye travel from one word to another. Sans serif typefaces, on the other hand, are mostly used for display purposes, such as titles, headlines or text in large sizes. They gained acclaim due to the expansion of printed production and advertisement communication. However, to some extent, sans serif fonts can be used for text as well. (Felici 2012, 40.)

The primary structure for typeface classification has its origins in the nineteenth century. The three main groups that were distinguished are Humanist, Transitional and Modern. These classes reflect three important periods in the history of art: Renaissance, Baroque and Enlightenment. In order to further acknowledge the differences between various typefaces, more classes were identified later on. (Lupton 2004, 42.)

2.3 Type families

Typeface classification is based on over 500 years of evolution in art history. Every typographic group has its distinct visual features, and it is essential to recognize them to be able to communicate with type efficiently. (Spokanefalls 2014.)

In order to classify a typeface, there are several elements that should be taken into account. The important aspects include stroke variation (contrast), serifs and bracketing, x-height and stress.

3 CLASSIFYING TYPEFACE BY HISTORICAL PERIOD

3.1 Old style

The term Old Style is usually used in correlation with roman typefaces designed in Italy during the late fifteenth – early sixteenth centuries as well as the ones that were created later in accordance with the style. To this day, old-style fonts are usually the ones reached for when it comes to setting font for long paragraphs of text. (Felici 2012, 45.) These typefaces are also sometimes called humanist letterforms. They have strong relation with calligraphy and movement of the hand. (Lupton 2004, 42.)



Picture 6. Humanist serif (Source: Cullen 2012, 41, 58)

The most important features of Old Style include only slight variation between the width of strokes; rather small serifs which usually have lightly curved bases; small x-heights; diagonal, oblique stress in round strokes; ascenders in lowercase characters often exceed the height of capital letters; the numeral characters have ascenders and descenders and diverge in size. Diagonal stress is one of the details that give Humanistic letterforms slightly oblique appearance, as it provides imitation of the pen angle, when held by hand. (Spokanefalls 2014.)

Examples of the most famous old-style faces are Caslon and Garamond. Some other humanist fonts are Centaur, Lynton and Vendetta.

3.2 Transitional / neoclassical

These typefaces represent the link between old-style principles towards more clean, rational and “modern” appearance. The start of this development can be marked at the end of the seventeenth century. (Felici 2012, 46.) The main features of traditional typefaces include almost vertical axis, increased stroke contrast, sharper forms, lightened brackets with flat bases, larger x-height, cap-height numerals, equal height between capital letters and ascenders. (Kane 2003, 49; Willen & Strals 2009, 34; Spokanefalls 2014)



Picture 7. Transitional serif (Source: Cullen 2012, 41, 59)

Even though transitional fonts are not as widely used for books and journals as old-style faces, they received a lot of acclaim for these purposes as well. Baskerville, Century and Times New Roman are standard examples of transitional typefaces.

3.3 Modern / didone

The name modern signifies the fact that this typeface family represents the last stage of development and transformation of humanistic styles, which were inspired by calligraphy and movement of a pen. On the other hand, modern faces can be recognized as the first attempt of giving a modern, contemporary appearance to characters and letters. The trend appeared in the late eighteenth century. (Spokanefalls 2014.)

The characteristics of modern typefaces contain strictly vertical axis in rounded strokes; sharp, extreme contrast between thin and thick strokes; thin, straight, unbracketed serifs, which means they meet strokes at right angles. (Willen & Strals 2009, 34) Modern fonts give very formal, crisp effect, and they gained recognition for usage in newspaper headlines. Bell, Bodoni and Didot are cases of modern typefaces.



Picture 8. Modern serif (Source: Cullen 2012, 59)

3.4 Slab serif

Slab serif, also known as square serif or Egyptian, was introduced in nineteenth century in the face of transformations brought by Industrial Revolution. Advanced features in technology and development of mass production required new letterforms that were able to grab attention and serve for advertising purposes rather than use in books and magazines, but at the same time they had to be readable and appeal to the masses. The majority of slab serif typefaces is rather bold and decorative, however, some of them can be quite polished and refined as well. (SpokaneFalls 2014.)

The main aspects that define slab serif fonts are heavily bracketed serifs; very little variation between stroke widths, so the weight appears rather uniform; vertical stress in rounded strokes. (Kane 2003, 49; Willen & Strals 2009, 34)



Picture 9. Egyptian slab serif (Source: Cullen 2012, 41, 59)

The examples of slab serif fonts include Clarendon, Memphis and Rockwell. Their bold, but simple design was ideal for advertising purposes.

3.5 Display type

Nowadays many typefaces fall into the category of decorative or display type. This group includes fonts with various elaborations and decorative elements. (Willen & Strals 2009, 35) There is a broad range of possibilities for the way display fonts look. They can be both serif and sans-serif, vary in width, weight and decoration. The letters do not have to be excessively embellished; they can be quite minimalist-looking as well, depending on a designer's needs and imagination. (Willen & Strals 2009, 45.)

When talking about display type, it is indicated that this kind of font is used at sizes 18 pt. and larger. The complex details and variation of forms make them unusable for paragraphs of text as display fonts are usually unreadable at small sizes. The main purpose behind using display typefaces is to make design noticeable, give it character and help in sending the right message through evoking emotions and associations. (Kane 2003, 14.)



Picture 10. Display type (Source: Kane 2003, 14)

Display fonts are meant to be used in posters, headlines, logos and other applications that require big sized letters. Even though book typefaces can be practiced in larger sizes, display type has a lot more to offer in terms of expressing the feeling of a design and sending a particular message. Display letters should not be necessarily readable, but they also take the information in a design to the next level. It is important for designers to realize the associations that various fonts give and how powerful different typefaces can be, in order to apply them successfully to their works and give the best experience to users. (Willen & Strals 2009, 43.)

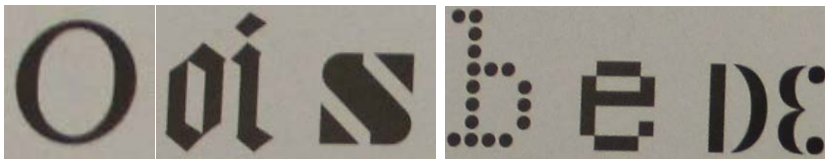
4 FORMAL ATTRIBUTES

There are eight formal attributes that are used for referring to the various elements when it comes to typeface design. These elements include construction, shape, proportions, modeling, weight, terminations, key characters and decoration. (Baines & Haslam 2005, 50.)

4.1 Construction

Every glyph in a font consists of various component parts, which are often indicated as strokes. There is a number of different ways the strokes can be put together in order to construct a single character.

Construction can be continuous or broken/interrupted. This refers to the transitions of the stroke, whether it is implemented as a single piece or there are breaks between elements. At the same time, construction can be also modular, meaning that letters are compiled from singular elements. The term also applies to character sets and indicates, whether the font is capital or lower case only, or if it has both the cases. (Baines & Haslam 2005, 50.)



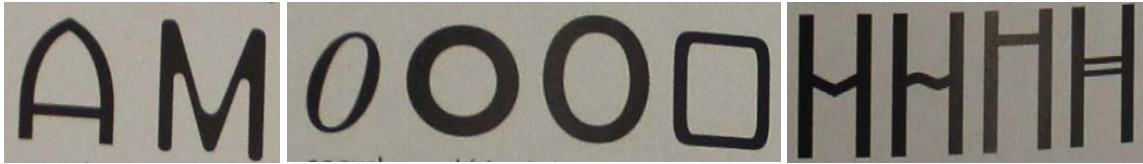
Picture 11. Continuous, broken and modular construction (Source: Baines & Haslam 2005, 50)

4.2 Shape

While designing a typeface, a basic set of alphabet characters is taken as a base. However, there are endless possibilities for changing the standard shapes of glyphs. Variations of shapes can include differences between stroke weights, rounded or straight corners, irregular elements.

Curves can be treated in many ways as well. There is a possibility of turning curves into angular shapes or having some parts sharper than others. Aspect of curves may also vary, as it can be oval, round, partially or completely square. These features apply to both round letters (such as O) as well as letter bowls (e.g. in letters R and P).

Other variations in shapes can happen in stems of characters. For example, they might be irregular, flared or made with concave elements. Crossbar is another element that may differ, not only its shape and width can be diverse, but also position and number of strokes. (Baines & Haslam 2005, 50.)



Picture 12. Shape variations (Source: Baines & Haslam 2005, 50)

4.3 Proportions

When it comes to typefaces, the term “proportion” is used to indicate the dimensions and extensivity of letterforms, as well as the way they occupy the space. Some examples may include sets of characters that come in more than one width. Condensed variation of a font is narrower than the original, medium width, while expanded version is wider and takes up more space.

However, width of characters is not the only aspect that is taken into account when talking about proportions. X-height also varies among fonts, and, depending on the typeface, glyphs can have different height even if they are the same point size. (Baines & Haslam 2005, 51.)



Picture 13. Condensed, medium (normal) and extended widths (Source: Baines & Haslam 2005, 51)

4.4 Modeling

Modeling refers to the way the width of a character changes and varies within its form. There are few components to it, which include contrast, angle of stress and transition. Contrast characterizes the diversity of form between the thinnest and thickest parts of a single glyph; axis of contrast, also known as the angle of stress, determines the position of the thinnest and thickest part; and, finally, transition refers to the way the thick and thin parts connect and interact. (Baines & Haslam 2005, 51.)



Picture 14. Contrast, angle of stress and transition (Source: Baines & Haslam 2005, 51)

4.5 Weight

Unlike modeling, which describes the fluctuations in weight of single characters, the term weight refers to the whole character set. Many fonts are available in only one weight; however, there is a great selection of typefaces that are available in a variety of weights, such as extra light, light, book, medium, semibold, bold, black, etc.

Medium weight is usually accepted as the default normal one. All the other weights revolve in correlation to it. Since the default weight varies from one typeface to another, other weights may not appear equal between typefaces either. (Baines & Haslam 2005, 51.)



Picture 15. Light, medium and bold weights (Source: Baines & Haslam 2005, 51)

4.6 Terminations

Termination refers to the way terminals are applied to the ends of glyph strokes. A terminal can be considered as the end of any stroke that does not incorporate a serif. There is a variety of termination options, and they exist for both serif and sans serif fonts. (About 2015)

Terminals can be applied for both the baseline and ascender ends. Some characters have more prominent terminals than others. They can also have various shapes, some examples include beak stroke, hooked stroke, oblique rectangular serif and slab serif. Glyphs c, e, r and a have very noticeable and recognizable terminals, and so do capital letters E, F, L and T. Analyzing these glyphs can be helpful in distinguishing and characterizing diverse typefaces. (Baines & Haslam 2005, 52.)



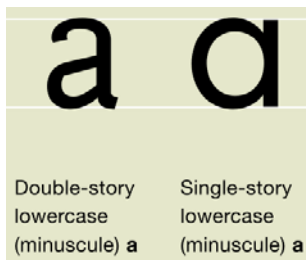
Picture 16. Terminals (Source: Fadeyev 2015)

4.7 Key characters

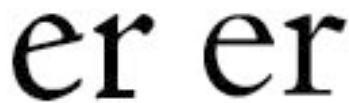
There are a few distinct characters in every font, and taking a look at their features helps to make basic distinctions between various fonts. For example, lower case character “a” can have a single or double storey, a crossbar of lower case “e” may be strictly horizontal or slightly diagonal, oblique.

Other character features and treatments include, for example, the way a character is positioned in relation to the baseline; whether it sits right on top of it or is descending below it. Apex is a rather distinguishable part as well, as it can be pointed, flat or concave, which is particularly apparent in glyphs like A and M. Also, there is a question of the leg shape, for example in such letters as R and K. The variety of leg shapes includes straight, curved or curved with tail. (Baines & Haslam 2005, 52.)

Many other characteristics help to recognize and separate letterforms and typefaces as well. Most are specific to either lower case or upper case characters.



Picture 17. Double and single storey in lowercase “a” (Source: Wikimedia 2015)



Picture 18. Oblique and horizontal cross bar in lowercase “e” (Source: Typophile 2015)



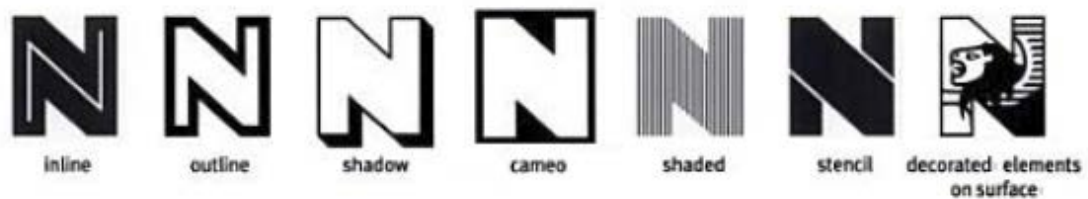
Picture 19. Apex variations (Source: Baines & Haslam 2005, 52)



Picture 20. Leg variations (Source: Baines & Haslam 2005, 52)

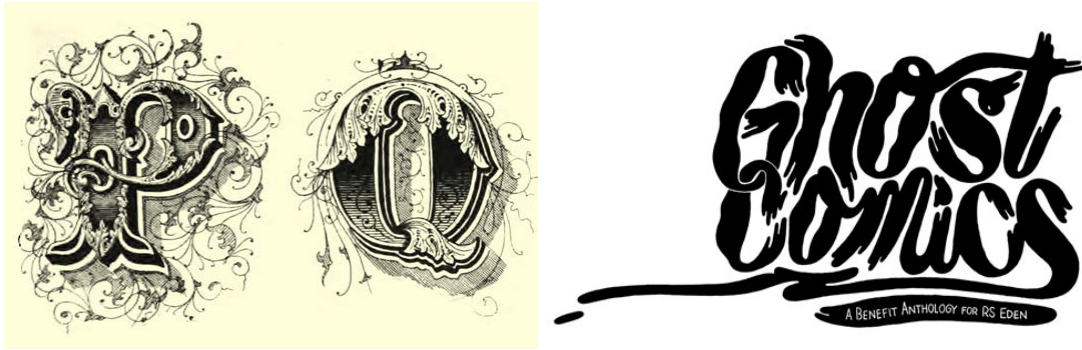
4.8 Decoration

Letters decoration can be contemplated as either source or attribute. Attribute detailing characterizes types of decoration that is applied to the letterforms that have already been created. This category includes inline, outline, shadow, cameo (reversed-out), shaded and stencil treatments, as well as decorating the surface of a letter itself with a picture. (Baines & Haslam 2005, 52.)



Picture 21. Various attribute treatments (Source: Baines & Haslam 2005, 52)

Letterforms can be recognized as embellished when an already existing font has been modified; however, if a glyph is decorative by itself, it is defined as “encompassing”. That means that the letter becomes the source of embellishment and it is a decorative element by design. (Baines & Haslam 2005, 75-76.)

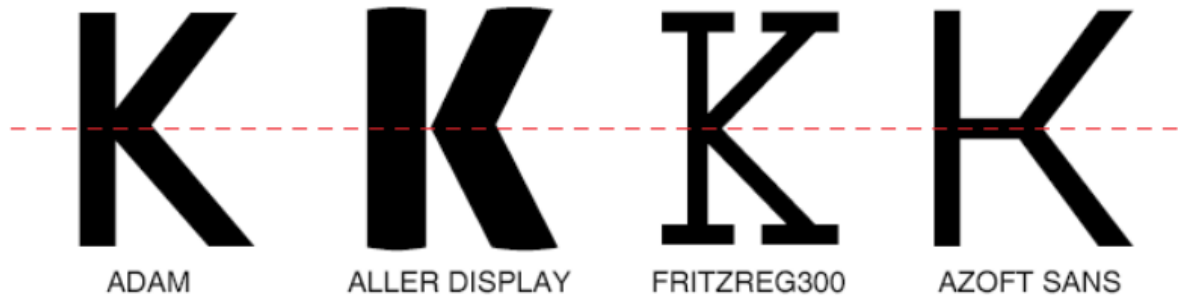


Picture 22. Embellishing and encompassing (Sources: Creative Market 2015; Creative Bloq 2015)

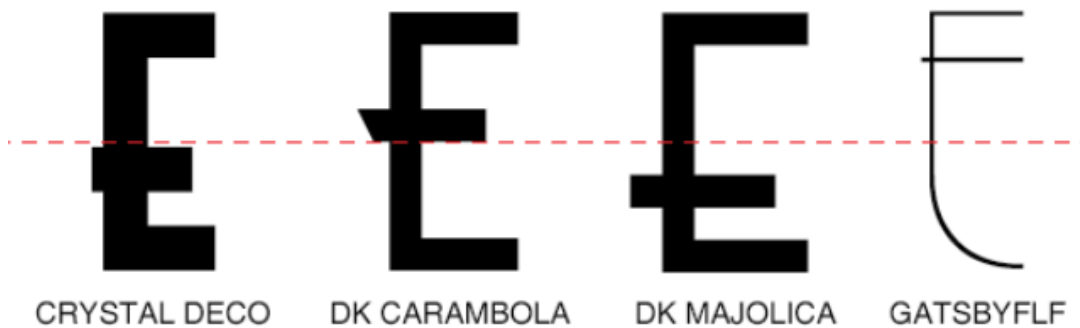
5 RHYTHM & PROPORTION

5.1 Stroke connections

One of the important things to consider when designing a typeface is the connections between various letter parts. Some of these include the position of crossbars, legs, etc. This can be done by drawing an imaginary line in the middle of the letter and then making a decision whether the connections will be below, above or on the same level with that line. The choice will greatly influence the proportions of letters in a font.



Picture 23. Vertical symmetry in letters



Picture 24. Asymmetric letters

Carefully placed crossbars and other letter parts will result in symmetrical, well-balanced letters. Adding them on the wrong level may result in distortion. However, depending on the typeface, the disruption of characters may be done on purpose.

5.2 Letter spacing

When working with type, one of the most important aims is to ensure the letters are distributed as evenly as possible. If the letterforms are designed and spaced correctly, the final result an even texture is achieved, which flows harmonically. However, even a well-designed typeface can be ruined by uneven spacing.

The density of the texture that one gets when using type is called its color. This refers to the way the whole mass of type appears to a viewer; how black or dark it appears. The main aim of a designer is to ensure that the color of type is even. To

be able to create a design with even color, there are several factors that have to be taken into account. They include the design of the type, tracking, which refers to spacing between letters, the spacing between the words, and leading, which means the spacing between the lines. All of these parameters depend on each other. (Bringhurst 1992, 25.)

5.3 Tracking

The process of adjusting the space between letterforms in the whole typeface, as well as in words, sentences and paragraphs, is referred to as tracking, or letter-spacing. Adjusting the tracking, especially for capital and lower capital letters, is a quite usual process. Setting the letters slightly apart gives more airy and spacious feeling. It is also useful for justified alignment, since it helps to fit the characters and words on the same line better.

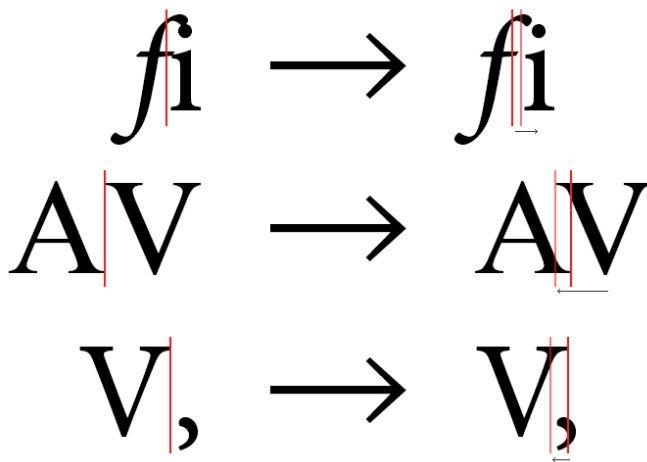
Negative tracking is not as commonly used, and it is generally considered not a good practice to reduce it in paragraphs of text, since it affects readability. However, for display fonts, and especially while using them at large sizes, negative tracking is advantageous for reducing overly wide gaps between characters and achieving better communication and flow between them. (Lupton 2004, 81.)

5.4 Kerning

When the letters are spaced equally, the overall pattern might still not appear uniform. This happens due to the fact that some letters and letter pairs produce too large gaps, especially if their forms come out at an angle or create an open space. For example, such characters as W, Y, V, T, L quite often appear problematic, but there are many other letters, and, especially, letter pairs, that need attention. This is when the process of kerning becomes necessary and useful.

Kerning, like tracking, is about adjusting spaces between characters. However, while tracking refers to at least a whole word, but more commonly to sentences and paragraphs, kerning means modifying and fixing the gaps between a pair of letters. (Lupton 2004, 80.)

The need for kerning is especially significant for display typefaces. Since they are mostly used at larger sizes, uneven spacing between glyphs becomes much more noticeable. At the same time, the gaps become more distinct and noticeable as the font size gets bigger, creating the necessity for calibrating them accordingly.



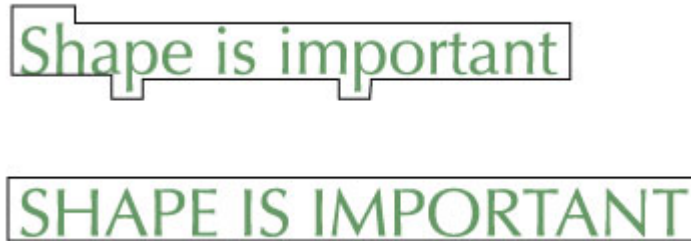
Picture 25. Kerning (Source: Wikimedia 2015)

While designing a typeface, it is important to create a table of kerning pairs, and adjust the spacing for each of them separately. However, even properly kerned fonts still quite often need hand-tuning, especially with the increasing font size.

5.5 Readability & legibility

Readability addresses to the fact that some fonts are much easier to read than others. Various studies have been conducted regarding the features that make a font readable and easy on the eyes, as well as the ways to enhance readability and cast the most readable typefaces. (Felici 2012, 71.)

The term readability mostly concerns a whole block of text, and how combinations of letters and words are recognized. It regards the way text is perceived as a whole, as well as the amount of effort a viewer needs in order to be able to read the text. (Michalisavraam 2015.)



Picture 26. The word shapes formed by lower and upper case (Source: Mighty Fine Graphics 2015)

Readability depends a lot on the way the typeface is handled. Such parameters as size of the typeface, grid and layout, as well as many others, need to be adjusted. For example, it is much easier to read text when the letters are evenly spaced; the leading, alignment and measure are set properly; color gives enough contrast, and the choice between lowercase and uppercase is appropriate. Usually lowercase letters are more readable, because they create a distinct shape around the word. Uppercase letters, on the other hand, form a rectangular coastline around words, so it is much harder for the eye to pick up the movement of letterforms. (Vanseo Design 2015.)

Legibility, on the other hand, is connected to individual characters and how easy it is to recognize each letter in a font. It varies from one font to another, depending on how simple or complicated letters are. In order to achieve good legibility, a font should have a relatively large x-height compared to the capital letters, as well as large open counters and reasonable width. Tracking, leading and kerning also play an important role, because tight spaces between characters or lines of type might make it harder for the viewer to recognize and distinguish each of them. (DesignWeb 2015.)



TYPOGRAPHY IS THE ART
AND SCIENCE OF COMMUN-
ICATING THROUGH TYPE.

Picture 27. Example of an inadequately legible font (Source: Mighty Fine Graphics 2015)

Even though the questions of readability and legibility concern mostly book typefaces, they are important for display typefaces as well. However, there is more freedom to designing a display typeface, as the main use includes headlines and posters, where lines of text are rather short. At the same time, display fonts are usually used in bigger sizes, which also helps the reader.

Sometimes display type is not meant at all to be neither legible nor readable, but rather make a visual impact. In that case, designers should make a decision what is more important for the design, and possibly, sacrifice those factors in order to achieve the right visual look and style for the project. When type is handled as an image or illustration, legibility is not necessarily a designer's goal and concern. Nonetheless, typeface readability and legibility are factors that need to be taken into an account, depending on the main purpose of the font and the way it is supposed to be able to send a certain message across.

6 THE PRIMARY PROCESS

The creation of the font was divided into several logical steps. Research and brainstorming were a crucial part of the process, and only after this had been done, it was possible to start the practical work.

Through the course of developing the typeface several techniques were used. The initial sketches were done by hand; however, the majority of the project was done in digital environment using several software programs.

6.1 Ideas and inspiration

The process started with determining the purpose and target group for the font. First of all, the decision was made to create a display sans-serif font, which is meant to be used in posters, flyers, logos, magazine headlines, etc. This allowed diminishing the necessity of creating lower case, and concentrating on constructing capital letters only. At the same time, the decision was made to create only the regular weight, and abandon any special characters as well. Later on it might be possible that the work on the font continues, and more glyphs will be added to it, such as numbers, punctuation marks and additional letters for Scandinavian languages.

The next step was to find a theme and influence for the typeface. I was greatly inspired by geometric and futuristic architecture, particularly the Space Needle, which is an observation tower in Seattle, USA. It was built by architects Edward E. Carlson and John Graham in 1961. The concepts that were implemented in this building were the idea of a flying saucer as well as a balloon bound to the ground. The base has an hourglass silhouette. (Wikipedia 2014.) Overall, the tower is very structured and geometric, and gives a rather futuristic, modern and innovative impression.



Picture 28. Space Needle (Source: Wikipedia Germany 2014)

At the same time, I wanted to find inspiration from Moscow, Russia, since this is my hometown. I found it in the architecture of Strogino metro station, which is situated in the North-western part of the city. The station is relatively new, it was opened at the beginning of 2008, and it is implemented in a rather simple but modern style by the architects A. Orlov and A. Nekrasov. The walls and ceiling are painted white, and the platform itself is coated with grey granite. There is also a line of arrow-shaped wooden benches which have stainless steel details running along the two edges of the platform. The main accent is the ceiling, which has an array of wedges each containing 16 triangle-shaped cutouts, hosting light elements inside them, which are implemented in shapes of giant droplets. I particularly liked the geometric cut outs in the ceiling, and the way they allowed light to come through, because it gives the room very light and airy feeling.

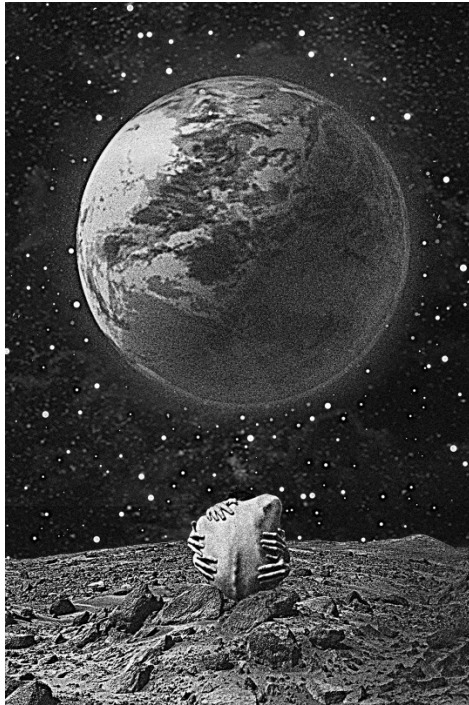


Picture 29. Strogino metro station (Source: Wikipedia 2014)

The other source of ideas was music. I got inspiration from the song “Death of a Martian” by Red Hot Chili Peppers, which also influenced the choice of naming the font. The song was released in 2006, as the last track of their double-album “Stadium Arcadium”. Red Hot Chili Peppers’ style is mainly funk rock; however, it also incorporates elements of punk rock, psychedelic rock as well as some others.

After making the decision on my theme and motif, a poster was created, in order to help with visualizing my ideas and developing the vision further. It displays a figure of a lonely alien from Mars, contemplating the distant Earth.

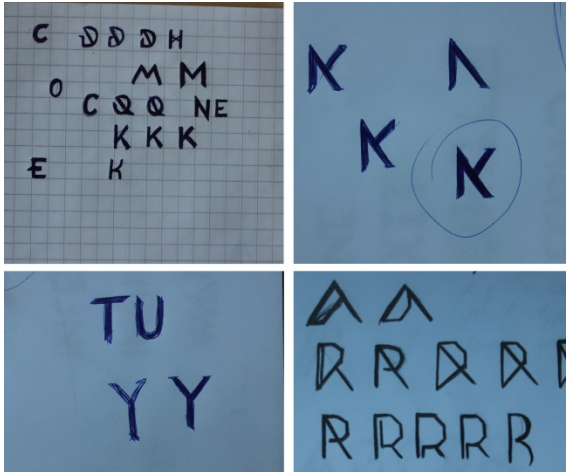
The main adjectives that I was planning to revolve creating the letters around included “futuristic”, “distressed”, “geometric”, “eccentric”, “funky”, and “mysterious”. These served as guides during the process of creating distinct elements for each letter as well as the overall impression the font was supposed to give to viewers.



Picture 30. Inspirational poster

6.2 The sketching process

After determining the style I was aiming for, the sketching process began. I started with the letters R, M and A, since they were the ones I was planning to give the most distinct features to, and then tried to design the rest of the alphabet revolving around them. For example, letters B and P were created based on R; V and W relied upon A, etc. The main difficulty was to create a set of letters that looked cohesive and united together, and not as they were taken from different fonts. This was the problem that continued to arise throughout the whole sketching stage, as changing even one feature in a letter sometimes meant making amends to the whole font.



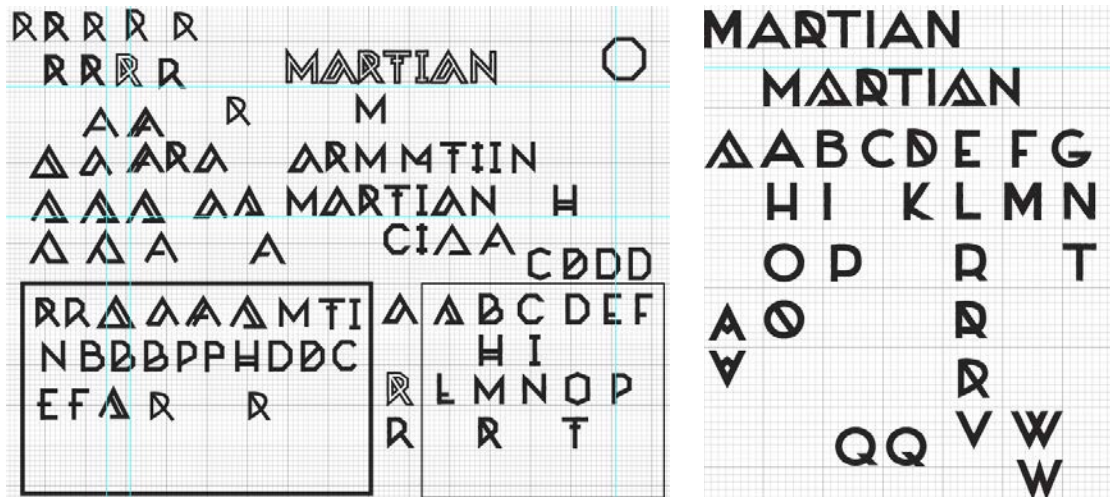
Picture 31. First sketches

Since the font was planned to be clean and geometric, the decision was made to make sure that all the letters have the same thickness, and there is no variations. However, in order to give some diversity, I designed terminals, which are the “tails” of letters, to be cut at an angle. This way, more light comes through the spaces between glyphs. The letters themselves are rather sharp and structural; most of them are quite spacious inside as well.

6.3 Digitalizing the font

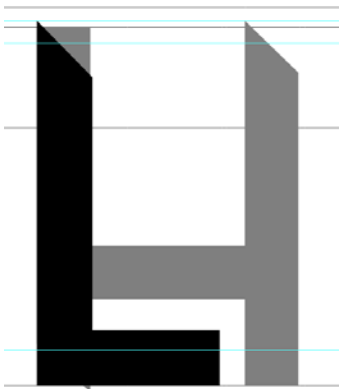
After coming up with initial sketches, the next step was to turn the letters into vector format. I used Adobe Illustrator CC as my software of choice for most of the digital designing process for the project.

First of all, I traced the scanned letters I had drawn by hand. This step was done by creating stroked curves and geometric shapes such as polygons, ellipses, etc. It was important to make sure I used strokes rather than fills at this point, since all the glyphs needed to have the same weight all round. At the same time, I could easily adjust the stroke size, so the width of the letters matches my vision.



Picture 32. Experimental process in Illustrator

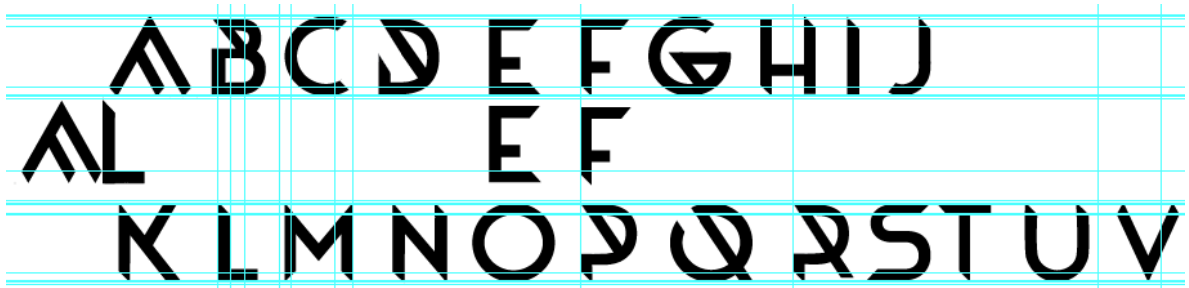
Just as with the original sketches, the tracing process started with letters A, R and M, which allowed me to reuse some of the structural parts for other letters. Using grids and guides helped to adjust the sizing precisely, and make sure the glyphs are all the same height. However, all the round parts as well as the angled terminals had to be placed slightly below the base line or above the cap height in order to make sure that they appear equal visually. At the same time, even though the idea was to create letters that have exactly the same stroke width, some of the glyphs had to be compromised. For example, stroke widths for L, I and J had to be slightly increased in order to compensate for their light color.



Picture 33. Difference between the stroke widths of L and H

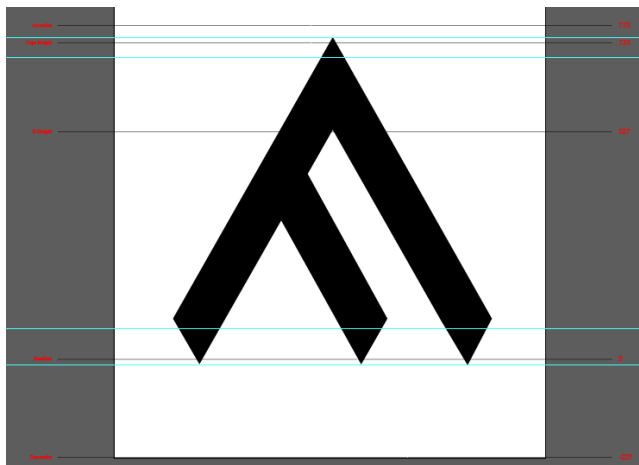
After tracing all the curves, the strokes had to be expanded to fills and all the parts needed to be united in single shapes. This created a lot of unnecessary anchor

points, so all the shapes were refined and the extra points were deleted before proceeding further.



Picture 34. Building the final version of the alphabet

Having the first draft of the alphabet ready, I downloaded a template which already had the right sizing and guides. Using this file, I created a separate document for every letter. After that, the glyphs were ready for transferring into FontLab Studio 5.



Picture 35. Individual letter setup

7 DIGITAL DEVELOPMENT IN FONTLAB

7.1 Fontlab studio 5 software

FontLab Studio has been one of the leading software tools for developing type for commercial and digital purposes since it was launched in early 2000s. It offers a free trial version as well as a full paid version. It also supports all main font formats for font outlines, such as Type 1, TrueType, Multiple Master and OpenType.

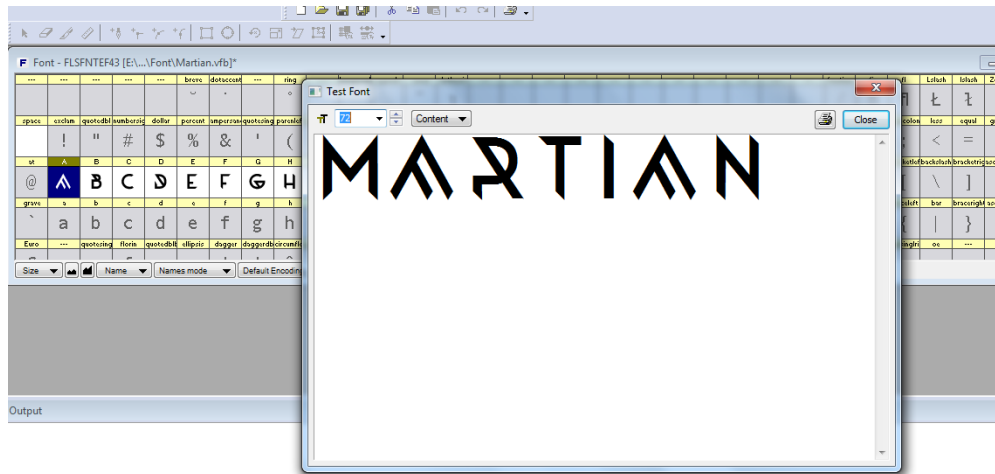
The program allows building glyphs from scratch as well as manipulating and refining them in any way, however, having already set up the letters in Illustrator, my main need for this software was to put everything together and create a ready font.

7.2 Transferring glyphs into Fontlab

In order to make sure to get all the FontLab features, it was necessary to install Python, which is a widely used general-purpose programming language. (Python 2015) It enhances FontLab's own tools, as well as adds extra functionality, and helps with rendering and exporting fonts.

Before pasting the letters into the program, all the parameters for x-height, cap height, ascender and descender had to be adjusted to match my Illustrator template. After that, I could just copy all the letters one by one from the Illustrator documents and paste them into corresponding spaces in FontLab.

Having all my letters in Fontlab allowed me to start the testing process, since I could already type with my glyphs and see how they fit and communicate together. This instantly revealed many mistakes I had made, and further refinements and tests have been performed.



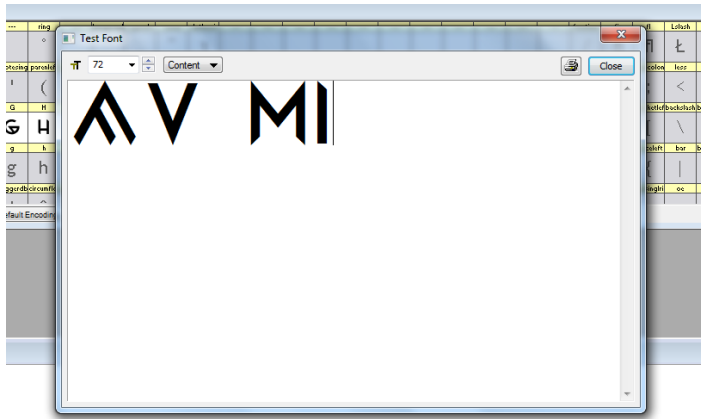
Picture 36. First test in FontLab

One of the main difficulties was to determine how much exactly the sharp points of letters extend below the baseline and above the cap line. If the points were not long enough, the letters appeared uneven, when paired together. So it was crucial to make sure that all the glyphs work together in harmony, whether in pairs and words or in phrases and sentences.

7.3 Setting metrics and kerning

After having all the letters placed into the program and the final adjustments to their shape made, the metrics and kerning values needed to be set and altered. The default setting did not suit the glyphs at all; some letters were coming together too tight, and there were a lot of unwanted gaps in various other letter combinations.

At first I set the same sidebearings value to the whole font. This meant that all the letters had the same amount of blank space from both left and right side. While it worked for letters with the straight stem, for example such as M, H, I; there were still a lot of problematic letters and letter combinations. This was particularly true for such characters as A and V, since they both come out at an angle.



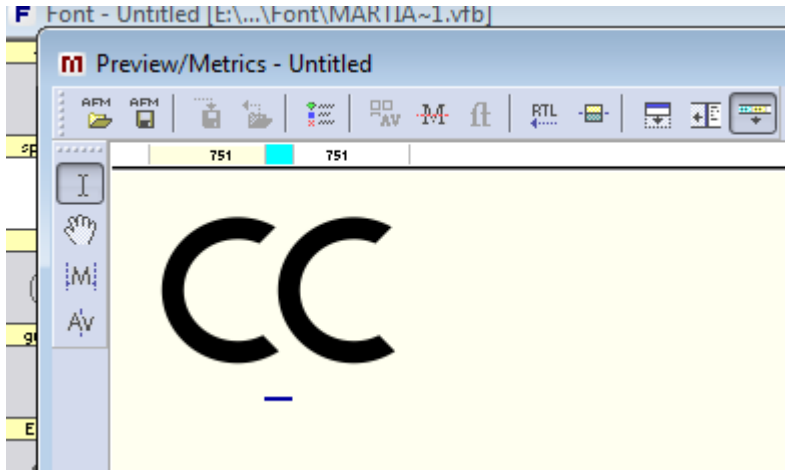
Picture 37. Problematic spacing areas and normal spacing

One of the options was to divide all the glyphs in the font into smaller groups, according to the features that every letter has. For example, round letters like O, Q and C could form one group, and V, W and Y could be separate as well. After that, every group would have a “leader” character, meaning that only that one particular glyph would have to be adjusted and kerned, and all the other members in the group would simply inherit the values. However, it is not necessary the “leader” glyph that has to be kerned, it can be any other member of the group as well. This method is really useful, especially if the font has an extremely large number of glyphs, since it would be rather impossible to go through each character pair separately.

However, since there were only 27 characters in my font at the time (26 letters and a dot), I decided to go through every single pair manually, meaning that I needed to adjust 702 possible combinations (26x27, because the dot character only needed to be kerned from one side, and adjusting the sidebearing value for the other side was enough).

The easiest way to make sure every combination was covered was to go through the letters in alphabetical order, e.g. AA, AB, AC, etc. At the same time, even though the letters in some pairs can be the same, e.g. AB and BA, the combinations are, of course, different.

Even though the process was quite long and tedious, it allowed me to adjust each pair exactly how I needed it to be. Some letters were set to be extremely close to each other, in order to avoid unwanted gaps.

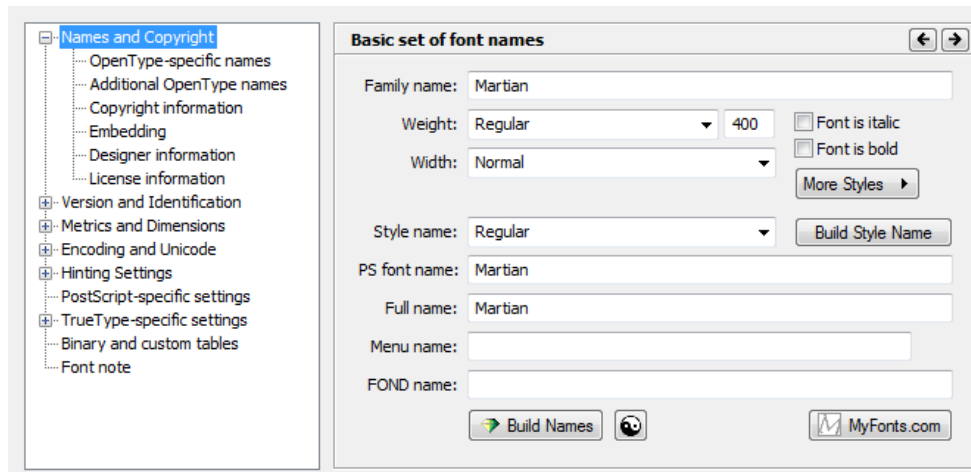


Picture 38. Kerning adjustment between the letters CC

7.4 Adding the font information

In order to prepare the font to be exported, it is necessary to include some additional information for the future users. Despite the fact that the font project was named upon creation, the font itself still remained untitled. At the same time, it was also necessary to indicate a few other font specifications, such as weight and width.

First of all, I set the name of the font. As I mentioned previously, the font was titled “Martian”. I set the weight as “regular”, since it is just the default version of the font, and width as “normal”. These options were enough, so I just left the rest of the features as it was set by default.



Picture 39. Setting the font's name and basic styles

At the same time, I added the copyright information, as well as designer and license information. This was necessary in order to claim my rights to the created font, and give the users an idea, in what kind of projects the font is allowed to be used.

7.5 Exporting the font. Postscript, TTF and OTF

The last step that needed to be done in order to make the font usable, was to export it. There are various options and formats for that purpose. The most common formats nowadays are PostScript, TTF (TrueType Font) and OTF (OpenType Font).

It is important to evaluate the future usage of the font and the specific characteristics that it has in order to choose the right format. However, it is, of course, possible to export it in other formats later on as well, if needed.

7.5.1 Postscript

PostScript was introduced by John Warnock, Charles Geschke, Doug Brotz, Ed Taft and Bill Paxton of Adobe in 1982 as a programming language for producing and

working with vector graphics. It is still widely used in electronic and desktop publishing fields. (Wikipedia 2015.)

PostScript typefaces consist of two main components. The actual typeface is stored in one file, and the second file is referred to as “binary” or “printer” file, which contains all the necessary information about a font, such as the full name of the typeface, metrics settings, meaning the character spacing; as well as some crucial data that is needed in order to get the font displayed on a computer or print it. Both files have to be saved and submitted. PostScript is the most preferred format to use for publishing purpose. (YearBooks 2015.)

One of the key features of PostScript is the fact that it is completely device independent. This means that no matter what resolution and color rendering methods the output device has, the language still takes the device abilities and capacity to the full advantage to ensure the best possible rendering result. The widely used Adobe Portable Document Format (PDF) is a more framed and solid version of Postscript. This means that almost any operation that is possible to get done in PostScript can be done in PDF as well.

The latest version of the language is PostScript 3, which was established in 1997. Nowadays it is a worldwide standard for printing and imaging. It is also integrated into majority of printers, which allows high-quality rendering of raster as well as vector graphics. (Adobe 2015.)

7.5.2 TrueType format

This format was developed back in the 1980s. It is a standard for digital fonts, and was created by Apple, however, subsequently, Microsoft obtained the license as well. Soon it has become the most prevalent operating system font format on both Mac OS and Microsoft Windows.

The original privilege that the format had was the fact that it allowed a high level of control for font developers, so their typefaces could be displayed in the exact way

they were meant to, regardless of the font size. Since now the technology has evolved rapidly, it is no longer exclusive to TrueType to have that pixel-level of control. (Wikipedia 2015.)

TrueType fonts require submitting only one file. However, every font weight, such as normal, light, bold, italic, light italic, bold italic, etc. requires a separate file.

7.5.3 OpenType format

OpenType is used for scalable computer fonts and is based on the TrueType format, meaning that it inherited the same basic structure. However, many new features have been added to this format, which are unavailable for TrueType, which makes it so versatile for adding many complex data structures to fonts.

The format was announced in 1996. It was developed by Microsoft with some contribution from Adobe. However, after the initial release, they continued to develop it for another decade. Nowadays OpenType is commonly used by all major computer platforms.

There is a variety of characteristics that are unique to the format and make it more favorable in some occasions than TrueType. First of all, it has the ability to support any writing scripts, since it contains the Unicode Character encoding. It is also able to accommodate up to 65,536 glyphs in one file, so there is no need to separate various stylistic alternatives in different files anymore, and it allows extensive language support. At the same time, there is a possibility to add special “replacement” characters, such as ligatures or alternative glyphs for one character. And, of course, all the metrics and kerning information is contained in the same file as the font itself as well. (Wikipedia 2015.)

Another important feature of TrueType is that it is truly cross-platform oriented. The font is rendered in the exactly same way, regardless of the operational system it is being run on. (Font Shop 2010, 4.)

7.5.4 The chosen format

After considering the features and potentials of the three main font formats, the decision was made to export the font as a TTF file. Despite OTF format being advantageous in a number of situations, it is not necessary for a font which is that simple and has very few characters. Since I do not have ligatures, additional weights, alternate characters or any other more advanced features, TTF format is completely sufficient. The choice also simplified the process of exporting the font file from FontLab, since the errors that can occur during exporting the file as OTF were eliminated.

8 THE RESULT

8.1 The finished font

The outcome of this project is a 27 character all-capital Display Sans Serif Font. The title of the font is “Martian”. It has distinctive geometric features, with no contrast between stroke widths. It is meant to be used in bigger sizes, in such applications as logos, posters, headlines, etc. Using the font in bigger sentences and paragraphs of text will affect the readability and legibility of text.

The style of the font is meant to be sci-fi, so it would be best suited for analogous projects and materials. However, the use of font is not limited to that genre.

In the future the number of characters will be expanded. The main priority is adding numbers and additional punctuation characters. This is an uppercase typeface only, so lower case will not be added. Special language character support should also be optimized, for at least several European languages.

A B C D E F G
 H I J K L M N
 O P Q R S T U
 V W X Y Z .



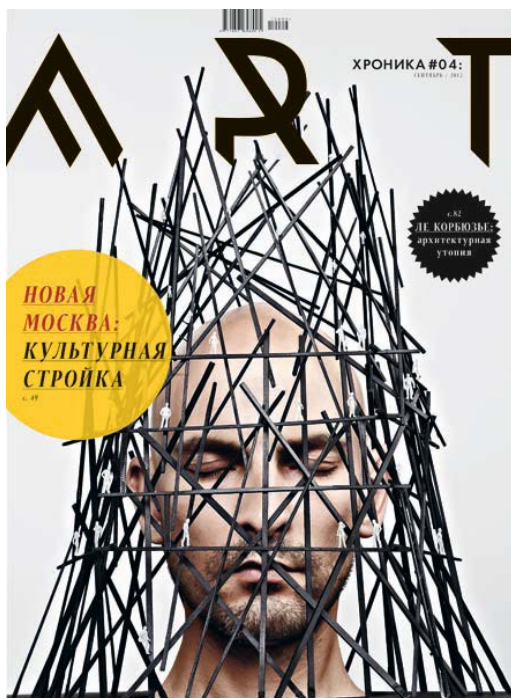
Picture 40. The finished font

8.2 Font tryout

In order to test the font and create some samples of using it in actual application, I made several designs. This way, the font can be seen in action for the purpose it was created.

First of all, I took a few magazine covers and replaced the titles with the ones written in my font. I also set up a few quick typographical posters and postcards. At the

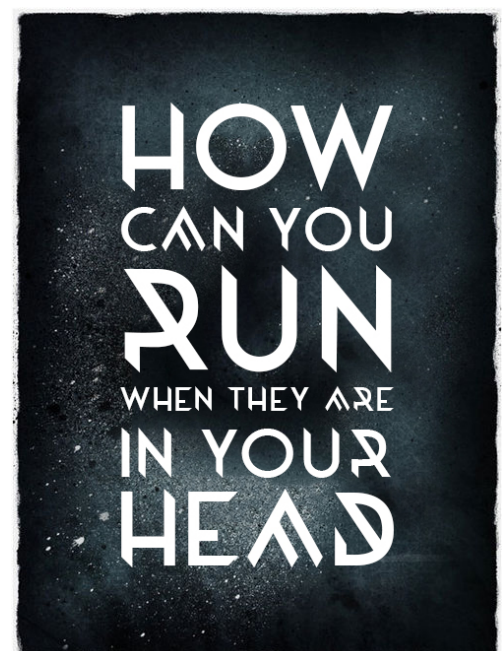
same time, I decided that the initial inspirational poster for the font that was made at the very beginning of the implementation process will be the final presentation poster as well.

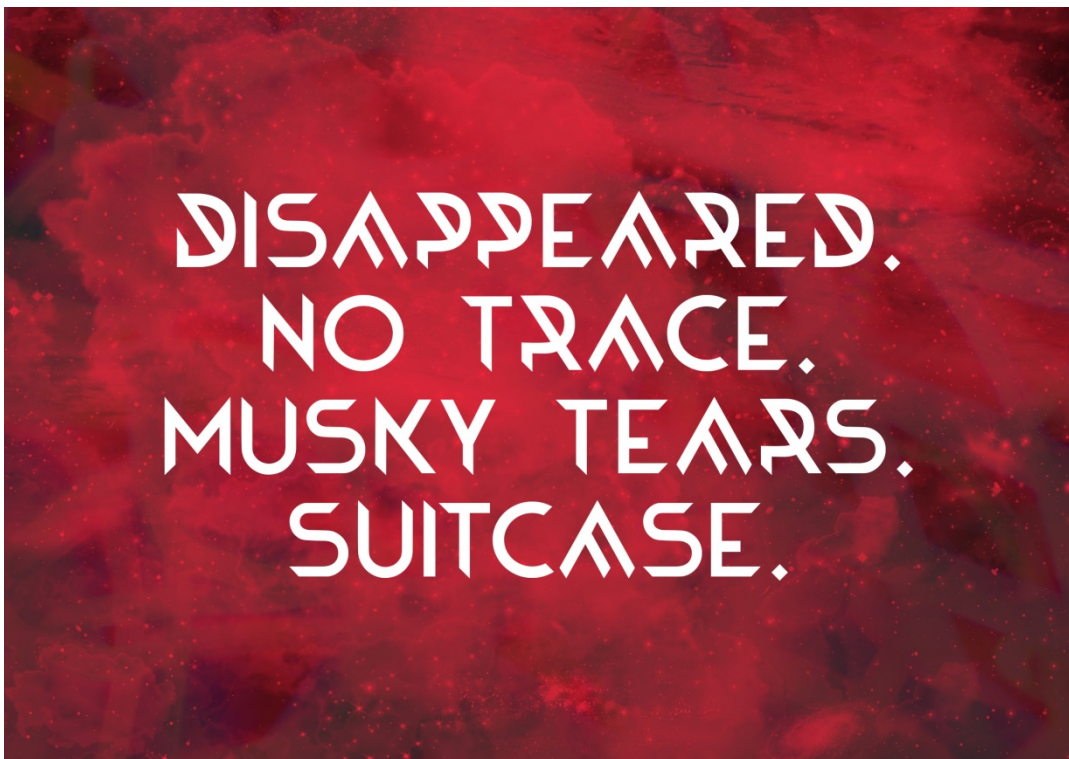


Pictures 41-43. Testing the font in magazine covers



Picture 44. The final poster





Pictures 45-48. Posters

CONCLUSION

Despite the fact that there are hundreds of thousands of fonts available, the process of creating one is often being underestimated. Developing a typeface requires a lot of theoretical knowledge, as well as design and technical skills. It also needs time, patience, and attention to detail.

In order to create a font it is important to set the target audience and type specifications and characteristics. Some typefaces are timeless and universal; however, sometimes it is necessary to create more unique fonts for a specific need or project.

The actual implementation process should always be preceded by theoretical research and brainstorming. The development process for even a simple font can be rather long. It usually starts with sketching. There is a number of tools a designer can use to digitalize a font, refine it and achieve the final result.

Designing a font is not just about building letters. It is equally important to set the right metrics and kerning values, in order to make sure that all the glyphs are working together in harmony.

Another important question to consider is usability. The more characters and languages a font can support, the more users and designers it can attract, and it can be used in more contexts as well. If possible, it is a good idea to keep expanding the font.

TERMINOLOGY

Serif - Tapered corners on the ends of the main stroke. Serifs originated with the chiseled guides made by ancient stonecutters as they lettered monuments. Some serif designs may also be traced back to characteristics of hand calligraphy. Note that serif type is typically thick and thin in stroke weight.

Sans serif - From the French, meaning “without serif”. A typeface which has no serifs. Sans serif typefaces are typically uniform in stroke width.

X-height - The height of the body, minus ascenders and descenders, which is equal to the height of the lowercase ‘x’.

Baseline - The imaginary horizontal line to which the body, or main component, of characters are aligned.

Ascender - The lowercase character stroke which extends above the x-height.

Descender - The lowercase character stroke which extends below the baseline.

Contrast - The amount of variation in between thick and thin strokes.

Bar - The horizontal stroke on the characters ‘A’, ‘H’, ‘T’, ‘e’, ‘f’, ‘t’.

Bowl - The curved stroke which surrounds a counter.

Bracket - A curved line connecting the serif to the stroke.

Counter - The empty space inside the body stroke.

Loop - The bottom part of the lowercase roman ‘g’.

Shoulder - The part of a curved stroke coming from the stem.

Stem - A stroke which is vertical or diagonal.

Stress - The direction in which a curved stroke changes weight.

Terminal - The end of a stroke which does not terminate in a serif.

(Spokanefalls 2014)

Glyphs – all the marks in a typeface, whether they are letterforms and numerals or punctuation marks and symbols. (Cullen 2012, 33)

Characters – typographic elements, such as letterforms, numerals or punctuation marks. In some typefaces there are several versions of each character represented by glyphs, such as lower case, upper case, italics, etc. (Cullen 2012, 33)

Measure – the length of a line of text. For a single-column design measure should ideally lie between 40 and 80 characters. Many typographers consider the perfect measure to be 65 characters

(Wikipedia 2014)

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