Bitmap fonts

Bitmap fonts are **supported** by default in **PixiJS**. In order that a bitmap font can be used**, two files** must be prepared. A **graphic file** and a **data file** (.fnt or .xml) which describes the font, usually this is xml based depending with which tool the bitmap font is created.

Bitmap fonts are **used** because they can be prepared in advance and it is possible to add **graphical effects** which are not possible otherwise. Another reason why bitmap fonts are used it because of **performance**.

In **PixiJS each time** a **standard text** element is used, a **new canvas** element must be **created**. If a **bitmap text** is used, all elements are **existing already** in the **memory** and just needed to put in place.

If the **number of characters** is **limited** it's always the **preferred** choice to use a **bitmap font**.

Tools

There are several tools available which can be used for free.

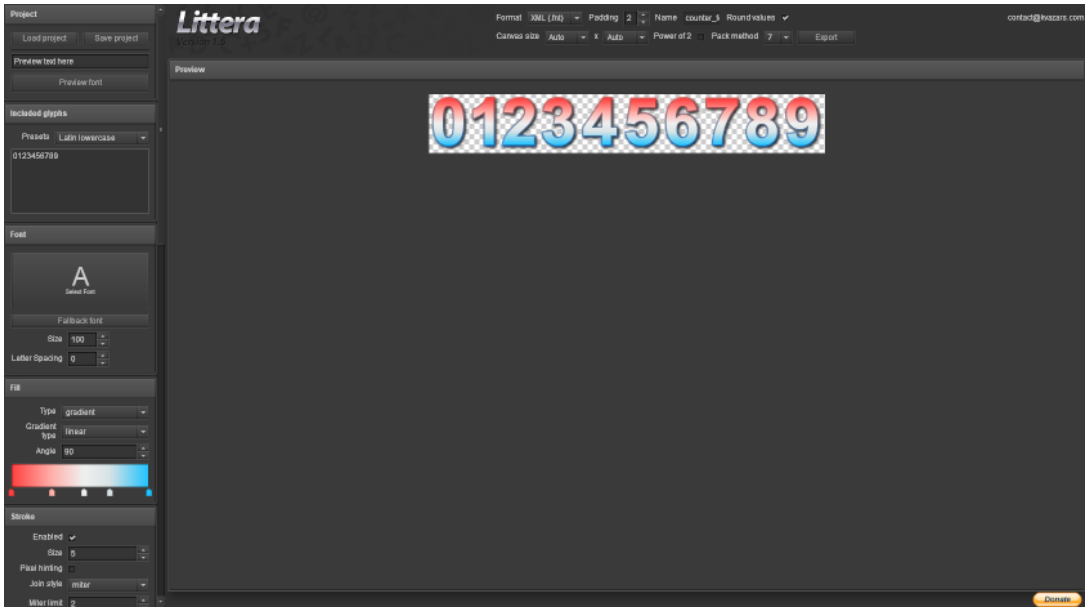
See http://www.angelcode.com/products/bmfont/

In general, the following attributes of the bitmap font can be adjusted:

- Characters which are included
- Font
- Font size
- Fill
- Stroke
- Glow
- Shadow
- Bevel

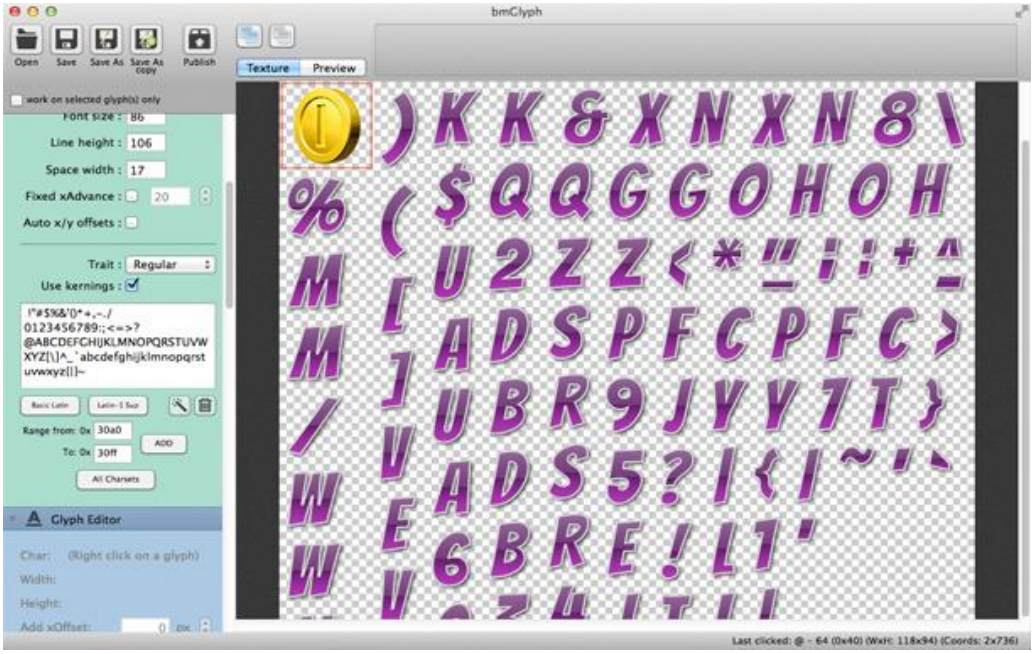
Littera bitmap font generator

Littera is a **flash tool**, which is free. Littera is supporting only ttf-format. **Not working since** support of Flash stopped **end of 2020**.



bmGlyph

bmGlyph is an application which is implemented **only** for **Mac OS**. Bitmap **fonts** are **created always** in dimension which are **POT** (256x256, 512x512) and should be **adjusted afterwards** to save space.



Bitmap font for games

In our **games** we use **bitmap fonts** for **different elements**. **Some** of these fonts are **general** fonts which are the same for each game, **others** are **specifically** prepared **for each game**.

General bitmap fonts:

- display font
- jackpot fonts
- symbol font

Game specific bitmap fonts:

- win font
- paytable font
- counter font
- banner font
- value font

If a **bitmap font** is **created** in the **data file** the **path** of the graphic always **ends with the filetype**.
If the **bitmap font** is **included** in a **sprite sheet** (in most cases) **remove** the **file type** (.png). **Otherwise** the **game** will look for a separate graphic file which doesn't exists and will therefore **not start**.

Bitmap fonts
Version 1.1

Display font

The display font **includes** not only **numbers** and **formatting characters** but also **all Latin characters** in **upper case** and **lowercase** and some specific **currency symbols**.
It is used in our displays to show the values but it can be used also in other elements.

Jackpot fonts

For our **jackpots** we have **different bitmap fonts**. One is used in the **jackpot displays** to show the current value of a jackpot. Another one is used in the **jackpot win** panel which is shown when a jackpot is won. A third one is used for the **jackpot label**.

Symbol font

The symbol font is used to display **win values** on the **reel symbols**. This is optional and **only** used in games with a **cash spin feature** so far. The effect can be adjusted for each game, but it should be used the same font.

Win font

The win font is used to display the win. It should be **similar like** the **logo**. In order to achieve this, the **same font** should be used, as long as the **numbers** in the font are **good to read**. **Otherwise** a **similar font** should be used.
In order to **prevent** the **characters** from **jumping** while the win is counted up in the game this **font** is **prepared** in a **special way** which is described below.

Paytable font

The paytable font is used to show the **win values** in the **paytable**.

Value font

The value font is used to show **values** on a **button**. We use the **same bitmap font** for all **games** only the **colour/effect** is **adjusted** to the **button icons** of the game.

Banner font

In some games the **highest possible win** is shown in a **banner**, therefore we need a special bitmap font which should be **similar** like the **text** in the **banner**.

Counter font

In games which have a **bonusspin feature** and additional bonusspins can be won during the bonus a specific counter font must be prepared.
Like the win font the counter font must also **prepared** in a way to **prevent** the **numbers** from **jumping**.

Specific preparation of the win font & counter font

These two fonts are **prepared** in a special way, to prevent the **numbers** from **jumping** while the value is changing.

In order that the win and counter **fonts** are **looking** as **good** as possible and similar like the logo we **prepare** just **simple bitmap fonts** in **black or white** without any effect where the **necessary effects** will be **added afterwards**. For **each effect** what we use **one file** must be created.

- xxx_font_fill (bitmap font with fill only)
- xxx_font_fill_stroke (bitmap font with fill and stroke)
- xxx_font_fill_stroke_shadow (bitmap font with fill, stroke and shadow)

In most cases we prepare two files (xxx_font_fill and xxx_font_fill_stroke). In some cases, it might be necessary to prepare more depending which effects are need.

Rename the **files** after they are unzipped like above, e.g. win_font_fill and win_font_fill_stroke (both, **graphic** and **data file**).

By **default**, when a **bitmap font** is **created** most of the **numbers** have a **different width**.

```
<font>
  <info face="win_font" size="50" bold="0" italic="0" charset="" unicode="" stretchH="100" smooth="1" aa="1" padding="2,2,2,2" spacing="0,0" outline="0"/>
  <common lineHeight="60" base="37" scaleW="447" scaleH="62" pages="1" packed="0"/>
  <pages>
    <page id="0" file="win_font.png"/>
  </pages>
  <chars count="13">
    <char id="48" x="2" y="2" width="40" height="48" xoffset="-2" yoffset="0" xadvance="33" page="0" chnl="15"/>
    <char id="49" x="44" y="2" width="26" height="47" xoffset="-3" yoffset="1" xadvance="19" page="0" chnl="15"/>
    <char id="50" x="72" y="2" width="37" height="47" xoffset="-3" yoffset="0" xadvance="29" page="0" chnl="15"/>
    <char id="51" x="111" y="2" width="36" height="48" xoffset="-3" yoffset="0" xadvance="28" page="0" chnl="15"/>
    <char id="52" x="149" y="2" width="37" height="47" xoffset="-3" yoffset="1" xadvance="30" page="0" chnl="15"/>
    <char id="53" x="188" y="2" width="36" height="47" xoffset="-3" yoffset="1" xadvance="28" page="0" chnl="15"/>
    <char id="54" x="226" y="2" width="38" height="48" xoffset="-2" yoffset="0" xadvance="31" page="0" chnl="15"/>
    <char id="55" x="266" y="2" width="34" height="47" xoffset="-2" yoffset="1" xadvance="25" page="0" chnl="15"/>
    <char id="56" x="302" y="2" width="37" height="48" xoffset="-2" yoffset="0" xadvance="30" page="0" chnl="15"/>
    <char id="57" x="341" y="2" width="37" height="48" xoffset="-2" yoffset="0" xadvance="30" page="0" chnl="15"/>
    <char id="44" x="380" y="29" width="20" height="29" xoffset="-3" yoffset="27" xadvance="13" page="0" chnl="15"/>
    <char id="46" x="402" y="29" width="20" height="21" xoffset="-3" yoffset="27" xadvance="13" page="0" chnl="15"/>
    <char id="58" x="424" y="14" width="21" height="35" xoffset="-2" yoffset="12" xadvance="14" page="0" chnl="15"/>
    <char id="32" x="0" y="0" width="0" height="0" xoffset="-2" yoffset="12" xadvance="11" page="0" chnl="15"/>
  </chars>
</font>
```

Original fnt file

Original bitmap font graphic file

In order to **make** them **all equal size** the **graphic** and the **data file** must be **changed afterwards**. Always **change** the **file** which has **most effects**, because there are **most space** is **needed** for the **numbers**.

Steps to adjust the graphic and data file:

1. Check which **character** is the **widest** and **calculate** the **additional space** which is needed if **all other numbers** will have the **same width**
2. Create a **new graphic** width the **calculated bigger size** (xxx_font.psd) and **copy and rename** the **data file** (xxx_font.fnt)
3. **Copy each number** from the **original file** with the **original size** and put it **at the calculated position** in the **new file** (**change** the **x** value in the **data file** immediately after you put the number in the new graphic file to prevent mistakes)
   The **graphic** must be always **centred**, e.g. if width=17px and new width=33px, x must be moved 8px ((33-17)/2) to the right to be centred.
4. **After** all **numbers** are **copied** to the **new file**, **add** the **other characters** of the bitmap font in the **new file**, their **size doesn't need to be changed**, only the **x** positions must be **adjusted**
5. **After** the new **graphic** file is **ready**, **adjust** the needed **values** in the **data file**
   - **x** (new positions)
   - **xoffset** (set it to 0)
   - **xadvance** (set it to the max width of the numbers)
   - **scaleW** (width of the new graphic file)

```
<font>
  <info face="win_font" size="50" bold="0" italic="0" charset="" unicode="" stretchH="100" smooth="1" aa="1" padding="2,2,2,2" spacing="0,0" outline="0"/>
  <common lineHeight="60" base="37" scaleW="489" scaleH="62" pages="1" packed="0"/>
  <pages>
    <page id="0" file="win_font.png"/>
  </pages>
  <chars count="13">
    <char id="48" x="2" y="2" width="40" height="48" xoffset="0" yoffset="0" xadvance="40" page="0" chnl="15"/>
    <char id="49" x="44" y="2" width="40" height="47" xoffset="0" yoffset="1" xadvance="40" page="0" chnl="15"/>
    <char id="50" x="86" y="2" width="40" height="47" xoffset="0" yoffset="0" xadvance="40" page="0" chnl="15"/>
    <char id="51" x="128" y="2" width="40" height="48" xoffset="0" yoffset="0" xadvance="40" page="0" chnl="15"/>
    <char id="52" x="170" y="2" width="40" height="47" xoffset="0" yoffset="1" xadvance="40" page="0" chnl="15"/>
    <char id="53" x="212" y="2" width="40" height="47" xoffset="0" yoffset="1" xadvance="40" page="0" chnl="15"/>
    <char id="54" x="254" y="2" width="40" height="48" xoffset="0" yoffset="0" xadvance="40" page="0" chnl="15"/>
    <char id="55" x="296" y="2" width="40" height="47" xoffset="0" yoffset="1" xadvance="40" page="0" chnl="15"/>
    <char id="56" x="338" y="2" width="40" height="48" xoffset="0" yoffset="0" xadvance="40" page="0" chnl="15"/>
    <char id="57" x="380" y="2" width="40" height="48" xoffset="0" yoffset="0" xadvance="40" page="0" chnl="15"/>
    <char id="44" x="422" y="29" width="20" height="29" xoffset="0" yoffset="27" xadvance="20" page="0" chnl="15"/>
    <char id="46" x="444" y="29" width="20" height="21" xoffset="0" yoffset="27" xadvance="20" page="0" chnl="15"/>
    <char id="58" x="486" y="14" width="21" height="35" xoffset="0" yoffset="12" xadvance="21" page="0" chnl="15"/>
    <char id="32" x="0" y="0" width="0" height="0" xoffset="0" yoffset="12" xadvance="11" page="0" chnl="15"/>
  </chars>
</font>
```

New fnt file

New bitmap font graphic file

6. If there are **more bitmap font** files, create **another layer**, **put** the **bitmap font there** and **position** the **characters centred** on the **characters** of the **layer below**.

Bitmap font psd file

7. **Copy** the **empty space line** (id=32) and **change** the **ids** to **160** and **8239** (special empty space signs with no line break), the counter doesn't need to be increased.

On the final psd file, effects can be added and the **exported png** is used **together** with the **new data file** in the **game**.