u8g2reference

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C++/Arduino Example

```
#include <Arduino.h>
#include <SPI.h>
#include <U8g2lib.h>

U8G2_SSD1306_128X64_NONAME_1_4W_SW_SPI u8g2(U8G2_R0, /* clock=*/ 13, /* data=*/ 11, /* cs=*/ 10, /* dc=*/

void setup(void) {
  u8g2.begin();
}

void loop(void) {
  u8g2.firstPage();
  do {
    u8g2.setFont(u8g2_font_ncenB14_tr);
    u8g2.drawStr(0,15,"Hello World!");
  } while ( u8g2.nextPage() );
  delay(1000);
}
```

The first argument of the constructor assignes the basic layout for the display:

Layout	Description
`U8G2_R0`	No rotation, landscape
`U8G2_R1`	90 degree clockwise rotation
`U8G2_R2`	180 degree clockwise rotation
`U8G2_R3`	270 degree clockwise rotation
`U8G2_MIRROR`	No rotation, landscape, display content is mirrored (v2.6.x)

All other arguments descibe the wiring of the display.

Available constructors are listed in the setup guide.

Note: U8G2_MIRROR works together with setFlipMode.

Reference

begin

- **C++/Arduino Prototype:**

```
bool U8G2::begin(void)
bool U8G2::begin(uint8_t menu_select_pin, uint8_t menu_next_pin, uint8_t menu_prev_pin, uint8_t menu_up_pi
```

- **Description:** Simplified setup procedure of the display for the Arduino enviornment. See the setup guide for the selection of a suitable U8g2 constructor. This function will reset, configure, clear and disable power save mode of the display. U8g2 can also detect key press events. Up to six buttons can be observed. The Arduino pin number can be assigned here. Use `U8X8_PIN_NONE` if there is no switch connected to the pin. The switch has to connect the GPIO pin with GND (low active button). Use getMenuEvent to check for any key press event. Select, next and prev pins are also required for the user interface procedures (for example userInterfaceMessage). `begin` will call

1. initDisplay
2. clearDisplay
3. setPowerSave

- **Arguments:** -
- **Returns:** Always 1/true
- **See also:** initDisplay setPowerSave clearDisplay U8X8::begin
- **Example:**

```
void setup(void) {
  u8g2.begin();
}

void loop(void) {
  u8g2.firstPage();
  do {
    u8g2.setFont(u8g2_font_ncenB14_tr);
    u8g2.drawStr(0,15,"Hello World!");
  } while ( u8g2.nextPage() );
  delay(1000);
```

clear

- **C++/Arduino Prototype:**

```
void U8G2::clear(void)
```

- **Description:** Clears all pixel on the display and the buffer. Puts the cursor for the print function into the upper left corner. `clear` will call

1. home
2. clearDisplay
3. clearBuffer

- **Arguments:**
- **Returns:** -
- **See also:** print home clearBuffer

clearBuffer

- **C++/Arduino Prototype:**

```
void U8G2::clearBuffer(void)
```

- **C Prototype:**

```
void u8g2_ClearBuffer(u8g2_t *u8g2);
```

- **Description:** Clears all pixel in the memory frame buffer. Use sendBuffer to transfer the cleared frame buffer to the display. In most cases, this procedure is useful only with a full frame buffer in the RAM of the microcontroller (Constructor with buffer option "f", see here). This procedure will also send a refresh message (refreshDisplay) to an e-Paper/e-Ink device.

- **Arguments:**
  - `u8g2` : A pointer to the u8g2 structure.
- **Returns:** -
- **See also:** sendBuffer
- **Example:**

```
void loop(void) {
  u8g2.clearBuffer();
  // ... write something to the buffer
  u8g2.sendBuffer();
  delay(1000);
```

clearDisplay

- **C++/Arduino Prototype:**

```
void U8G2::clearDisplay(void)
```

- **C Prototype:**

```
void u8g2_ClearDisplay(u8g2_t *u8g2);
```

- **Description:** Clears all pixel in the internal buffer AND on the connected display. This procedure is also called from begin. Usually there is no need to call this function except for the init procedure. Other procedures like sendBuffer and nextPage will also overwrite (and clear) the display.
- **Arguments:**
  - `u8g2` : A pointer to the u8g2 structure.
- **Returns:** -
- **Notes:**
  - This command can be used with all constructors (`_F_` , `_1_` , `_2_`).
  - Do not use this command within the picture loop (between firstPage and nextPage).
- **See also:** begin

disableUTF8Print

- **C++/Arduino Prototype:**

```
void U8G2::disableUTF8Print(void)
```

- **Description:** Disables UTF8 support for the Arduino `print` function. This is also the default setting.
- **Arguments:** -
- **Returns:** -
- **See also:** print, enableUTF8Print

drawBitmap

- **C++/Arduino:**

```
void U8G2::drawBitmap(u8g2_uint_t x, u8g2_uint_t y, u8g2_uint_t cnt, u8g2_uint_t h, const uint8_t *bitmap)
```

- **C:**

```
void u8g2_DrawBitmap(u8g2_t *u8g2, u8g2_uint_t x, u8g2_uint_t y, u8g2_uint_t cnt, u8g2_uint_t h, const uin
```

- **Description:** Draw a bitmap at the specified x/y position (upper left corner of the bitmap). Parts of the bitmap may be outside the display boundaries.The bitmap is specified by the array `bitmap` . A cleared bit means: Do not draw a pixel. A set bit inside the array means: Write pixel with the current color index.For a monochrome display, the color index 0 will clear a pixel (in solid mode) and the color index 1 will set a pixel.
- **Arguments:**
  - `u8g2` : Pointer to the `u8g2` structure (C interface only).
  - `x` : X-position (left position of the bitmap).
  - `y` : Y-position (upper position of the bitmap).
  - `cnt` : Number of bytes of the bitmap in horizontal direction. The width of the bitmap is `cnt*8` .
  - `h` : Height of the bitmap.
- **Returns:**-
- **Note:** This function should not be used any more, please use drawXBM instead.
- **See also:** drawXBM setBitmapMode

drawBox

- **C++/Arduino:**

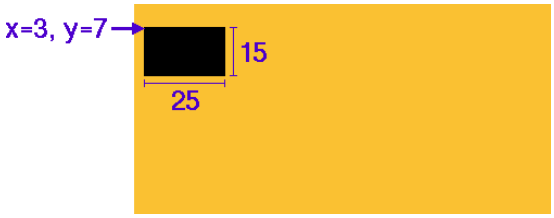
```
void U8G2::drawBox(u8g2_uint_t x, u8g2_uint_t y, u8g2_uint_t w, u8g2_uint_t h)
```

- **C:**

```
void u8g2_DrawBox(u8g2_t *u8g2, u8g2_uint_t x, u8g2_uint_t y, u8g2_uint_t w, u8g2_uint_t h)
```

- **Description:** Draw a box (filled frame), starting at x/y position (upper left edge). The box has width `w` and height `h`. Parts of the box can be outside of the display boundaries. This procedure will use the current color (setDrawColor) to draw the box. For a monochrome display, the color index 0 will clear a pixel and the color index 1 will set a pixel.
- **Arguments:**
  - `u8g2` : Pointer to the `u8g2` structure (C interface only).
  - `x` : X-position of upper left edge.
  - `y` : Y-position of upper left edge.
  - `w` : Width of the box.
  - `h` : Height of the box.
- **Returns:**
- **See also:** drawFrame setDrawColor
- **Example:**

```
u8g2.drawBox(3,7,25,15);
```



drawCircle

- **C++/Arduino:**

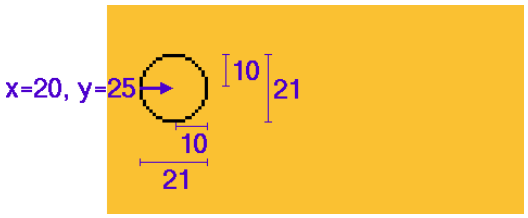
```
void U8G2::drawCircle(u8g2_uint_t x0, u8g2_uint_t y0, u8g2_uint_t rad, uint8_t opt = U8G_DRAW_ALL)
```

- **C:**

```
void u8g2_DrawCircle(u8g2_t *u8g2, u8g2_uint_t x0, u8g2_uint_t y0, u8g2_uint_t rad, uint8_t opt)
```

- **Description:** Draw a circle with radus `rad` at position `(x0, y0)`. The diameter of the circle is `2*rad+1`. Depending on `opt`, it is possible to draw only some sections of the circle. Possible values for `opt` are: `U8G2_DRAW_UPPER_RIGHT`, `U8G2_DRAW_UPPER_LEFT`, `U8G2_DRAW_LOWER_LEFT`, `U8G2_DRAW_LOWER_RIGHT`, `U8G2_DRAW_ALL`. These values can be combined with the `|` operator. This procedure will use the current color (setDrawColor) for drawing.
- **Arguments:**
  - `u8g2` : Pointer to the `u8g2` structure (C interface only).
  - `x0`, `y0` : Position of the center of the circle.
  - `rad` : Defines the size of the circle: Radus = `rad`.
  - `opt` : Selects some or all sections of the circle.
    - `U8G2_DRAW_UPPER_RIGHT`
    - `U8G2_DRAW_UPPER_LEFT`
    - `U8G2_DRAW_LOWER_LEFT`
    - `U8G2_DRAW_LOWER_RIGHT`
    - `U8G2_DRAW_ALL`
- **Returns:**
- **Note:** Draw color 2 (XOR Mode) is not supported.
- **See also:** drawDisc setDrawColor
- **Example:**

```
u8g2.drawCircle(20, 25, 10, U8G2_DRAW_ALL);
```



drawDisc

- **C++/Arduino:**

```
void U8G2::drawDisc(u8g2_uint_t x0, u8g2_uint_t y0, u8g2_uint_t rad, uint8_t opt = U8G_DRAW_ALL)
```

- **C:**

```
void u8g2_DrawDisc(u8g2_t *u8g2, u8g2_uint_t x0, u8g2_uint_t y0, u8g2_uint_t rad, uint8_t opt)
```

- **Description:** Draw a filled circle with radus `rad` at position `(x0, y0)`. The diameter of the circle is `2*rad+1`. Depending on `opt`, it is possible to draw only some sections of the disc. Possible values for `opt` are: `U8G2_DRAW_UPPER_RIGHT`, `U8G2_DRAW_UPPER_LEFT`, `U8G2_DRAW_LOWER_LEFT`, `U8G2_DRAW_LOWER_RIGHT`, `U8G2_DRAW_ALL`. These values can be combined with the `|` operator. This procedure will use the current color (setDrawColor) for drawing.
- **Arguments:**
  - `u8g2` : Pointer to the `u8g2` structure (C interface only).
  - `x0`, `y0` : Position of the center of the disc.
  - `rad` : Defines the size of the circle: Radus = `rad`.
  - `opt` : Selects some or all sections of the disc.
    - `U8G2_DRAW_UPPER_RIGHT`
    - `U8G2_DRAW_UPPER_LEFT`
    - `U8G2_DRAW_LOWER_LEFT`
    - `U8G2_DRAW_LOWER_RIGHT`
    - `U8G2_DRAW_ALL`
- **Returns:**
- **Note:** Draw color 2 (XOR Mode) is not supported.
- **See also:** drawCircle setDrawColor
- **Example:** See drawCircle

drawEllipse

- **C++/Arduino:**

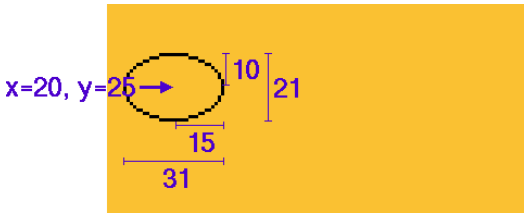
```
void U8G2::drawEllipse(u8g2_uint_t x0, u8g2_uint_t y0, u8g2_uint_t rx, u8g2_uint_t ry, uint8_t opt)
```

- **C:**

```
void u8g2_DrawEllipse(u8g2_t *u8g2, u8g2_uint_t x0, u8g2_uint_t y0, u8g2_uint_t rx, u8g2_uint_t ry, uint8_
```

- **Description:** Draw ellipse with radus `rx` and 'ry' at position `(x0, y0)`. `rx*ry` must be lower than 512 in 8 Bit mode of u8g2.
  Depending on `opt`, it is possible to draw only some sections of the disc. Possible values for `opt` are: `U8G_DRAW_UPPER_RIGHT`, `U8G_DRAW_UPPER_LEFT`, `U8G_DRAW_LOWER_LEFT`, `U8G_DRAW_LOWER_RIGHT`, `U8G_DRAW_ALL`. These values can be combined with the `|` operator. The diameter is twice the radius plus one.
- **Arguments:**
  - `u8g2` : Pointer to the `u8g2` structure (C interface only).
  - `x0`, `y0` : Position of the center of the filled circle.
  - `rx`, `ry` : Defines the size of the ellipse.
  - `opt` : Selects some or all sections of the ellipse.
    - `U8G2_DRAW_UPPER_RIGHT`
    - `U8G2_DRAW_UPPER_LEFT`
    - `U8G2_DRAW_LOWER_LEFT`
    - `U8G2_DRAW_LOWER_RIGHT`
    - `U8G2_DRAW_ALL`
- **Returns:**
- **Note:** Draw color 2 (XOR Mode) is not supported.
- **See also:** drawCircle
- **Example:**

```
u8g2.drawEllipse(20, 25, 15, 10, U8G2_DRAW_ALL);
```



drawFilledEllipse

```
void U8G2::drawFilledEllipse(u8g2_uint_t x0, u8g2_uint_t y0, u8g2_uint_t rx, u8g2_uint_t ry, uint8_t opt)
```

- **C:**

```
void u8g2_DrawFilledEllipse(u8g2_t *u8g2, u8g2_uint_t x0, u8g2_uint_t y0, u8g2_uint_t rx, u8g2_uint_t ry,
```

- **Description:** Draw a filled ellipse with radus `rx` and 'ry' at position `(x0, y0)`. `rx*ry` must be lower than 512 in 8 Bit mode of u8g2.Depending on `opt`, it is possible to draw only some sections of the disc. Possible values for `opt` are: `U8G_DRAW_UPPER_RIGHT`, `U8G_DRAW_UPPER_LEFT`, `U8G_DRAW_LOWER_LEFT`, `U8G_DRAW_LOWER_RIGHT`, `U8G_DRAW_ALL`.These values can be combined with the `|` operator.
- **Arguments:**
  - `u8g2` : Pointer to the `u8g2` structure (C interface only).
  - `x0`, `y0` : Position of the center of the filled circle.
  - `rx`, `ry` : Defines the size of the ellipse.
  - `opt` : Selects some or all sections of the ellipse.
    - `U8G2_DRAW_UPPER_RIGHT`
    - `U8G2_DRAW_UPPER_LEFT`
    - `U8G2_DRAW_LOWER_LEFT`
    - `U8G2_DRAW_LOWER_RIGHT`
    - `U8G2_DRAW_ALL`
- **Returns:**
- **Note:** Draw color 2 (XOR Mode) is not supported.
- **See also:** drawCircle
- **Example:** drawEllipse

drawFrame

- **C++/Arduino:**

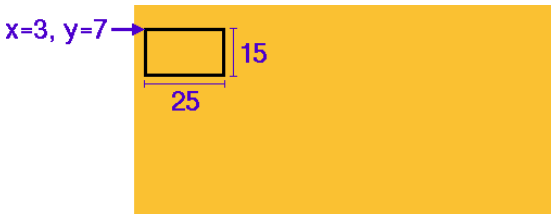
```
void U8G2::drawFrame(u8g2_uint_t x, u8g2_uint_t y, u8g2_uint_t w, u8g2_uint_t h)
```

- **C:**

```
void u8g2_DrawFrame(u8g2_t *u8g2, u8g2_uint_t x, u8g2_uint_t y, u8g2_uint_t w, u8g2_uint_t h)
```

- **Description:** Draw a frame (empty box), starting at x/y position (upper left edge). The box has width `w` and height `h`. Parts of the frame can be outside of the display boundaries. This procedure will use the current color (setDrawColor) to draw the box. For a monochrome display, the color index 0 will clear a pixel and the color index 1 will set a pixel.
- **Arguments:**
  - `u8g2` : Pointer to the `u8g2` structure (C interface only).
  - `x` : X-position of upper left edge.
  - `y` : Y-position of upper left edge.
  - `w` : Width of the frame.
  - `h` : Height of the frame.
- **Returns:**
- **See also:** drawBox setDrawColor
- **Example:**

```
u8g2.drawFrame(3,7,25,15);
```



drawGlyph

- **C++/Arduino Prototype:**

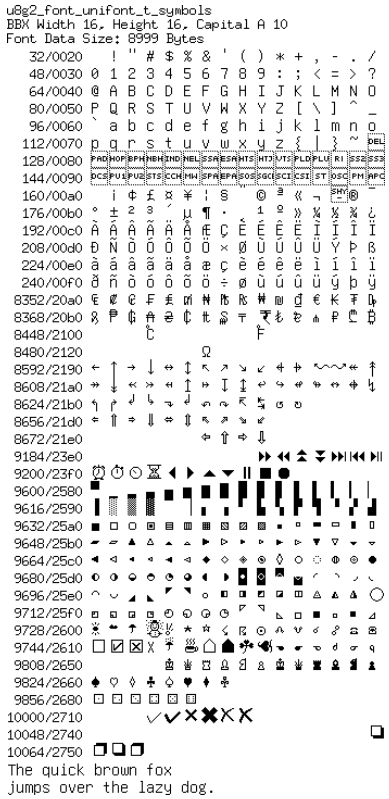
```
void U8G2::drawGlyph(u8g2_uint_t x, u8g2_uint_t y, uint16_t encoding)
```

- **C Prototype:**

```
void u8g2_DrawGlyph(u8g2_t *u8g2, u8g2_uint_t x, u8g2_uint_t y, uint16_t encoding);
```

- **Description:** Draw a single character. The character is placed at the specified pixel posion `x` and `y`. U8g2 supports the lower 16 bit of the unicode character range (plane 0/Basic Multilingual Plane): The `encoding` can be any value from 0 to 65535. The glyph can be drawn only, if the encoding exists in the active font.
- **Arguments:**
  - `u8g2` : A pointer to the u8g2 structure.
  - `x` , `y` : Position of the character on the display.
  - `encoding` : Unicode value of the character.
- **Returns:** -
- **Note:** This drawing function depends on the current font mode and drawing color.
- **See also:** setFont
- **Example:** The "snowman" glyph is part of the unicode weather symbols and has the unicode 9731 (dezimal) / 2603 (hex): "☃". The "snowman" is also part of the u8g2 font `u8g2_font_unifont_t_symbols` (see below).

```
  u8g2.setFont(u8g2_font_unifont_t_symbols);
  u8g2.drawGlyph(5, 20, 0x2603);      /* dec 9731/hex 2603 Snowman */
```



drawHLine

- **C++/Arduino:**

```
void U8G2::drawHLine(u8g2_uint_t x, u8g2_uint_t y, u8g2_uint_t w)
```

- **C:**

```
void u8g2_DrawHLine(u8g2_t *u8g2, u8g2_uint_t x, u8g2_uint_t y, u8g2_uint_t w)
```

- **Description:** Draw a horizontal line, starting at x/y position (left edge). The width (length) of the line is `w` pixel. Parts of the line can be outside of the display boundaries. This procedure uses the current color index to draw the line. Color index 0 will clear a pixel and the color index 1 will set a pixel.
- **Arguments:**
  - `u8g2` : Pointer to the `u8g2` structure (C interface only).
  - `x` : X-position.
  - `y` : Y-position.
  - `w` : Length of the horizontal line.
- **Returns:** -
- **See also:** setDrawColor, drawVLine

drawLine

- **C++/Arduino:**

```
void U8G2::drawLine(u8g2_uint_t x0, u8g2_uint_t y0, u8g2_uint_t x1, u8g2_uint_t y1)
```

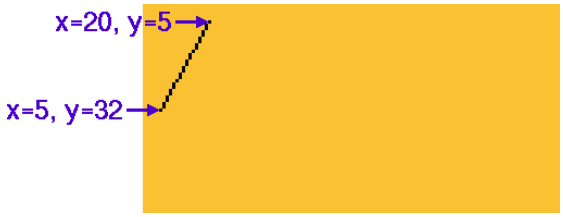
- **C:**

```
void u8g2_DrawLine(u8g2_t *u8g2, u8g2_uint_t x0, u8g2_uint_t y0, u8g2_uint_t x1, u8g2_uint_t y1)
```

- **Description:** Draw a line between two points. This procedure will use the current color (setDrawColor).
- **Arguments:**
  - `u8g2` : Pointer to the `u8g2` structure (C interface only).
  - `x0` : X-position of the first point.
  - `y0` : Y-position of the first point.
  - `x1` : X-position of the second point.
  - `y1` : Y-position of the second point.
- **Returns:**

- **See also:** drawPixel setDrawColor
- **Example:**

```
u8g2.drawLine(20, 5, 5, 32);
```



drawPixel

- **C++/Arduino:**

```
void U8G2::drawPixel(u8g2_uint_t x, u8g2_uint_t y)
```

- **C:**

```
void u8g2_DrawPixel(u8g2_t *u8g2, u8g2_uint_t x, u8g2_uint_t y)
```

- **Description:** Draw a pixel at the specified x/y position. Position (0,0) is at the upper left corner of the display. The position may be outside the display boundaries.This procedure uses the current color index to draw the pixel. The color index 0 will clear a pixel and the color index 1 will set a pixel.
- **Arguments:**
  - `u8g2` : Pointer to the `u8g2` structure (C interface only).
  - `x` : X-position.
  - `y` : Y-position.
- **Returns:**
- **See also:** setDrawColor

drawRBox

drawRFrame

- **C++/Arduino:**

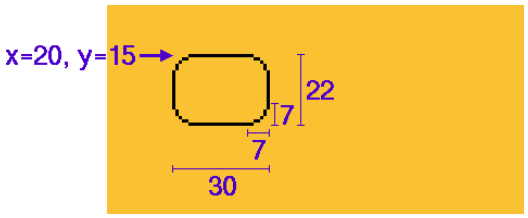
```
void U8G2::drawRBox(u8g2_uint_t x, u8g2_uint_t y, u8g2_uint_t w, u8g2_uint_t h, u8g2_uint_t r)
void U8G2::drawRFrame(u8g2_uint_t x, u8g2_uint_t y, u8g2_uint_t w, u8g2_uint_t h, u8g2_uint_t r)
```

- **C:**

```
void u8g2_DrawRBox(u8g2_t *u8g2, u8g2_uint_t x, u8g2_uint_t y, u8g2_uint_t w, u8g2_uint_t h, u8g2_uint_t r
void u8g2_DrawRFrame(u8g2_t *u8g2, u8g2_uint_t x, u8g2_uint_t y, u8g2_uint_t w, u8g2_uint_t h, u8g2_uint_t
```

- **Description:** Draw a box/frame with round edges, starting at x/y position (upper left edge). The box/frame has width `w` and height `h`. Parts of the box can be outside of the display boundaries. Edges have radius `r`. It is required that `w >= 2*(r+1)` and `h >= 2*(r+1)`. This condition is not checked. Behavior is undefined if `w` or `h` is smaller than `2*(r+1)`. This procedure uses the current color index to draw the box. For a monochrome display, the color index 0 will clear a pixel and the color index 1 will set a pixel.
- **Arguments:**
  - `u8g2` : Pointer to the `u8g2` structure (C interface only).
  - `x` : X-position of upper left edge.
  - `y` : Y-position of upper left edge.
  - `w` : Width of the box.
  - `h` : Height of the box.
  - `r` : Radius for the four edges.
- **Returns:** -
- **See also:** setDrawColor, drawFrame, drawBox
- **Example:**

```
    u8g2.drawRFrame(20,15,30,22,7);
```



drawStr

- **C++/Arduino Prototype:**

```
u8g2_uint_t U8g2::drawStr(u8g2_uint_t x, u8g2_uint_t y, const char *s)
```

- **C Prototype:**

```
u8g2_uint_t u8g2_DrawStr(u8g2_t *u8g2, u8g2_uint_t x, u8g2_uint_t y, const char *s);
```

- **Description:** Draw a string. The first character is placed at position `x` and `y`. Use setFont to assign a font before drawing a string on the display. To draw a character with encoding 127 to 255, use the C/C++/Arduino escape sequence "\xab" (hex value ab) or "\xyz" (octal value xyz). This function can not draw any glyph with encoding greater or equal to 256. Use drawUTF8 or drawGlyph to access glyphs with encoding greater or equal to 256.
- **Arguments:**
  - `u8g2` : A pointer to the u8g2 structure.
  - `x` , `y` : Position of the first character on the display.
  - `s` : Text.
- **Returns:** Width of the string.
- **Note 1:** This drawing function depends on the current font mode and drawing color.
- **Note 2:** Use the print function to print the value of a numeric variable.
- **See also:** setFont drawUTF8 drawGlyph print
- **Example:**

```
  u8g2.setFont(u8g2_font_ncenB14_tr);
  u8g2.drawStr(0,15,"Hello World!");
```

drawTriangle

- **C++/Arduino:**

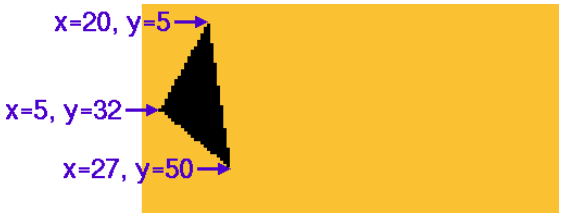
```
void U8G2::drawTriangle(int16_t x0, int16_t y0, int16_t x1, int16_t y1, int16_t x2, int16_t y2)
```

- **C:**

```
void u8g2_DrawTriangle(u8g2_t *u8g2, int16_t x0, int16_t y0, int16_t x1, int16_t y1, int16_t x2, int16_t y
```

- **Description:** Draw a triangle (filled polygon). Arguments are 16 bit and the polygon is clipped to the size of the display. Multiple polygons are drawn so that they exactly match without overlap:The left side of a polygon is drawn, the right side is not draw. The upper side is only draw if it is flat.
- **Arguments:**
  - `u8g2` : Pointer to the `u8g2` structure (C interface only).
  - `x0` : X-position point 0.
  - `y0` : Y-position point 0.
  - `x1` : X-position point 1.
  - `y1` : Y-position point 1.
  - `x2` : X-position point 2.
  - `y2` : Y-position point 2.
- **Returns:** -
- **Example:**

```
u8g2.drawTriangle(20,5, 27,50, 5,32);
```



drawUTF8

- **C++/Arduino Prototype:**

```
u8g2_uint_t U8g2::drawUTF8(u8g2_uint_t x, u8g2_uint_t y, const char *s)
```

- **C Prototype:**

```
u8g2_uint_t u8g2_DrawUTF8(u8g2_t *u8g2, u8g2_uint_t x, u8g2_uint_t y, const char *s);
```

- **Description:** Draw a string which is encoded as UTF-8. There are two preconditions for the use of this function: (A) the C/C++/Arduino compiler must support UTF-8 encoding (this is default for the gnu compiler, which is also used for most Arduino boards) and (B) the code editor/IDE must support and store the C/C++/Arduino code as UTF-8 (true for the Arduino IDE). If these conditions are met, you can use the character with code value greater than 127 directly in the string (of course the character must exist in the font file, see also setFont). Advantage: No escape codes are required and the source code is more readable. The glyph can be copied and paste into the editor from a "char set" tool. Disadvantage: The code is less portable and the `strlen` function will not return the number of visible characters. Use getUTF8Len instead of `strlen`.
- **Arguments:**
  - `u8g2` : A pointer to the u8g2 structure.
  - `x` , `y` : Position of the first character on the display.
  - `s` : UTF-8 encoded text.
- **Returns:** Width of the string.
- **Note 1:** This drawing function depends on the current font mode and drawing color.
- **Note 2:** Use the print function to print the value of a numeric variable.
- **See also:** setFont drawStr print
- **Example:**

```
  u8g2.setFont(u8g2_font_unifont_t_symbols);
  u8g2.drawUTF8(5, 20, "Snowman: ☃");
```

drawVLine

- **C++/Arduino:**

```
  void U8G2::drawVLine(u8g2_uint_t x, u8g2_uint_t y, u8g2_uint_t h)
```

- **C:**

```
  void u8g2_DrawVLine(u8g2_t *u8g2, u8g2_uint_t x, u8g2_uint_t y, u8g2_uint_t h)
```

- **Description:** Draw a vertical line, starting at x/y position (upper end). The height (length) of the line is `h` pixel. Parts of the line can be outside of the display boundaries. This procedure uses the current color index to draw the line. Color index 0 will clear a pixel and the color index 1 will set a pixel.
- **Arguments:**
  - `u8g2` : Pointer to the `u8g2` structure (C interface only).
  - `x` : X-position.
  - `y` : Y-position.
  - `h` : Length of the vertical line.

- **Returns:** -
- **See also:** setDrawColor, drawHLine

drawXBM

- **C++/Arduino:**

```
void U8G2::drawXBM(u8g2_uint_t x, u8g2_uint_t y, u8g2_uint_t w, u8g2_uint_t h, const uint8_t *bitmap)
void U8G2::drawXBMP(u8g2_uint_t x, u8g2_uint_t y, u8g2_uint_t w, u8g2_uint_t h, const uint8_t *bitmap)
```

- **C:**

```
void u8g2_DrawXBM(u8g2_t *u8g2, u8g2_uint_t x, u8g2_uint_t y, u8g2_uint_t w, u8g2_uint_t h, const uint8_t
void u8g2_DrawXBMP(u8g2_t *u8g2, u8g2_uint_t x, u8g2_uint_t y, u8g2_uint_t w, u8g2_uint_t h, const uint8_t
```

- **Description:** Draw a XBM Bitmap. Position (x,y) is the upper left corner of the bitmap. XBM contains monochrome, 1-bit bitmaps.
  The current color index is used for drawing (see setColorIndex) pixel values 1. Version 2.15.x of U8g2 introduces a solid and a transparent mode for bitmaps. By default, drawXBM will draw solid bitmaps. This differs from the previous versions: Use setBitmapMode(1) to switch to the previous behavior. The XBMP version of this procedure expects the bitmap to be in PROGMEM area (AVR only). Many tools (including GIMP) can save a bitmap as XBM. A nice step by step instruction is here (external link). The result will look like this:

Example:

```
#define u8g_logo_width 38
#define u8g_logo_height 24
static unsigned char u8g_logo_bits[] = {
   0xff, 0xff, 0xff, 0xff, 0x3f, 0xff, 0xff, 0xff, 0xff, 0x3f, 0xe0, 0xe0,
...
   0xff, 0x3f, 0xff, 0xff, 0xff, 0xff, 0x3f, 0xff, 0xff, 0xff, 0xff, 0x3f };
```

This could can be copied directly into your code. Use `drawXBM` to draw this bitmap at (0,0):

```
u8g2.drawXBM( 0, 0, u8g_logo_width, u8g_logo_height, u8g_logo_bits);
```

- **Arguments:**
  - `u8g2` : Pointer to the `u8g2` structure (C interface only).
  - `x` : X-position.
  - `y` : Y-position.
  - `w` : Width of the bitmap.
  - `h` : Height of the bitmap.
  - `bitmap` : Pointer to the start of the bitmap.
- **Returns:**
- **See also:** setBitmapMode
- **Note:** The XBMP version requires, that the bitmap array is defined in this way:

```
static const unsigned char u8g_logo_bits[] U8X8_PROGMEM = { ...
```

enableUTF8Print

- **C++/Arduino Prototype:**

```
void U8G2::enableUTF8Print(void)
```

- **Description:** Activates UTF8 support for the Arduino `print` function. When activated, unicode symbols are allowed for strings passed to the `print` function. Usually this function is called after `begin()` :

```
void setup(void) {
  u8g2.begin();
  u8g2.enableUTF8Print();               // enable UTF8 support for the Arduino print()
}
```

- **Arguments:** -
- **Returns:** -
- **See also:** print, disableUTF8Print
- **Example:**

```
void setup(void) {
  u8g2.begin();
  u8g2.enableUTF8Print();               // enable UTF8 support for the Arduino print() function
}
```

```
void loop(void) {
  u8g2.setFont(u8g2_font_unifont_t_chinese2);  // use chinese2 for all the glyphs of "你好世界"
  u8g2.firstPage();
  do {
    u8g2.setCursor(0, 40);
    u8g2.print("你好世界");              // Chinese "Hello World"
  } while ( u8g2.nextPage() );
  delay(1000);
}
```

firstPage

- **C++/Arduino Prototype:**

```
void U8G2::firstPage(void)
```

- **C Prototype:**

```
void u8g2_FirstPage(u8g2_t *u8g2);
```

- **Description:** This command is part of the (picture) loop which renders the content of the display. This command must be used together with nextPage. There are some restrictions: Do not change the content when executing this loop. Always redraw everything. It is not possible to redraw only parts of the content. The advantage is lesser RAM consumption compared to a full frame buffer in RAM, see sendBuffer.
- **Arguments:**
  - `u8g2` : A pointer to the u8g2 structure.
- **Returns:** -
- **Note:** This procedure sets the current page position to zero.
- **See also:** nextPage
- **Example:**

```
  u8g2.firstPage();
  do {
    /* all graphics commands have to appear within the loop body. */
    u8g2.setFont(u8g2_font_ncenB14_tr);
    u8g2.drawStr(0,20,"Hello World!");
  } while ( u8g2.nextPage() );
```

getAscent

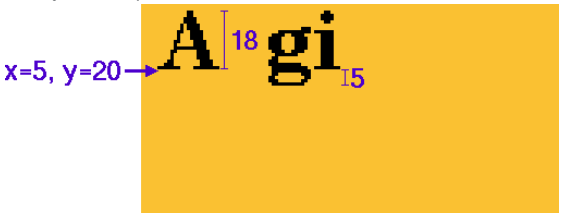
- **C++/Arduino:**

```
int8_t U8G2::getAscent(void)
```

- **C:**

```
int8_t u8g_GetAscent(u8g_t *u8g)
```

- **Description:** Returns the reference height of the glyphs above the baseline (ascent). This value depends on the current reference height (see setFontRefHeightAll).
- **Arguments:**
  - `u8g2` : Pointer to the `u8g2` structure (C interface only).
- **Returns:** The ascent of the current font.
- **See also:** setFont getDescent setFontRefHeightAll
- **Example:** In the picture below, the ascent is 18 and the descent value is -5 (minus 5!).



getDescent

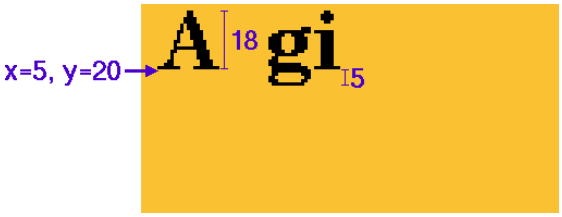
- **C++/Arduino:**

```
int8_t U8G2::getDescent(void)
```

- **C:**

```
int8_t u8g2_GetDescent(u8g2_t *u8g2)
```

- **Description:** Returns the reference height of the glyphs below the baseline (descent). For most fonts, this value will be negative. This value depends on the current reference height (see setFontRefHeightAll).
- **Arguments:**
  - `u8g2` : Pointer to the `u8g2` structure (C interface only).
- **Returns:** The descent of the current font.
- **See also:** setFont getDescent setFontRefHeightAll
- **Example:** In the picture below, the ascent is 18 and the descent value is -5 (minus 5!).



getDisplayHeight

- **C++/Arduino:**

```
u8g2_uint_t getDisplayHeight(void)
```

- **C:**

```
u8g2_uint_t u8g2_GetDisplayHeight(u8g2_t *u8g2)
```

- **Description:** Returns the height of the display.
- **Arguments:**
  - `u8g2` : Pointer to the `u8g2` structure (C interface only).
- **Returns:** The height of the display.
- **See also:** getDisplayWidth
- **Example:** -

getDisplayWidth

- **C++/Arduino:**

```
u8g2_uint_t getDisplayWidth(void)
```

- **C:**

```
u8g2_uint_t u8g2_GetDisplayWidth(u8g2_t *u8g2)
```

- **Description:** Returns the width of the display.
- **Arguments:**
  - `u8g2` : Pointer to the `u8g2` structure (C interface only).
- **Returns:** The width of the display.
- **See also:** getDisplayHeight
- **Example:** -

getMaxCharHeight

- **C++/Arduino:**

```
u8g2_uint_t getMaxCharHeight(void)
```

- **C:**

```
int8_t u8g2_GetMaxCharHeight(u8g2_t *u8g2)
```

- **Description:** Each glyph is stored as a bitmap. This returns the height of the largest bitmap in the font.
- **Arguments:**
  - `u8g2` : Pointer to the `u8g2` structure (C interface only).
- **Returns:** The largest height of any glyph in the font.
- **See also:** getMaxCharWidth
- **Example:** -

getMaxCharWidth

- **C++/Arduino:**

```
u8g2_uint_t getMaxCharWidth(void)
```

- **C:**

```
int8_t u8g2_GetMaxCharWidth(u8g2_t *u8g2)
```

- **Description:** Each glyph is stored as a bitmap. This returns the width of the largest bitmap in the font.
- **Arguments:**
  - `u8g2` : Pointer to the `u8g2` structure (C interface only).
- **Returns:** The largest width of any glyph in the font.
- **See also:** getMaxCharHeight
- **Example:** -

getMenuEvent

- **C++/Arduino:**

```
int8_t U8G2::getMenuEvent(void)
```

- **Description:** Returns a key press event. The pin numbers of up to six pins must be set with the begin function.

getMenuEvent return values
U8X8_MSG_GPIO_MENU_SELECT
U8X8_MSG_GPIO_MENU_NEXT
U8X8_MSG_GPIO_MENU_PREV
U8X8_MSG_GPIO_MENU_HOME
U8X8_MSG_GPIO_MENU_UP
U8X8_MSG_GPIO_MENU_DOWN

- **Arguments:** -
- **Returns:** 0, if no button was pressed or a key pressed event.
- **See also:** begin

getStrWidth

- **C++/Arduino Prototype:**

```
u8g2_uint_t U8G2::getStrWidth(const char *s)
```

- **C Prototype:**

```
u8g2_uint_t u8g2_GetStrWidth(u8g2_t *u8g2, const char *s);
```

- **Description:** Return the pixel width of string.
- **Arguments:**
  - `u8g2` : A pointer to the u8g2 structure.
  - `s` : text.
- **Returns:** Width of the string if drawn with the current font (setFont).
- **See also:** setFont drawStr

getUTF8Width

- **C++/Arduino Prototype:**

```
u8g2_uint_t U8G2::getUTF8Width(const char *s)
```

- **C Prototype:**

```
u8g2_uint_t u8g2_GetUTF8Width(u8g2_t *u8g2, const char *s);
```

- **Description:** Return the pixel width of an UTF-8 encoded string.
- **Arguments:**

- `u8g2` : A pointer to the u8g2 structure.
- `s` : UTF-8 encoded text.

- **Returns:** Width of the string if drawn with the current font (setFont).
- **See also:** setFont drawStr

home

- **C++/Arduino Prototype:**

```
void U8G2::home(void)
```

- **Description:** Puts the cursor for the print function into the upper left corner. Parts of the text might be invisible after this command if the glyph reference is not at the top of the characters..
- **Arguments:**
- **Returns:** -
- **See also:** print clear

initDisplay

- **C++/Arduino Prototype:**

```
void U8G2::initDisplay(void)
```

- **C Prototype:**

```
void u8g2_InitDisplay(u8g2_t *u8g2);
```

- **Description:** Reset and configure the display. This procedure must be called before any other procedures draw something on the display. This procedure leaves the display in a power save mode. In order to see something on the screen, disable power save mode first (setPowerSave). This procedure is called by the begin procedure. Either begin or `initDisplay` must be called initially.
- **Arguments:**
  - `u8g2` : A pointer to the u8g2 structure.
- **Returns:** -
- **See also:** setPowerSave begin
- **Example:**

nextPage

- **C++/Arduino Prototype:**

```
uint8_t U8G2::nextPage(void)
```

- **C Prototype:**

```
uint8_t u8g2_NextPage(u8g2_t *u8g2);
```

- **Description:** This command is part of the (picture) loop which renders the content of the display. This command must be used together with firstPage. There are some restrictions: Do not change the content when executing this loop. Always redraw everything. It is not possible to redraw only parts oft the content. The advantage is lesser RAM consumption compared to a full frame buffer in RAM, see sendBuffer. This procedure will send a refresh message (refreshDisplay) to an e-Paper/e-Ink device after completion of the loop (just before returning 0).
- **Arguments:**
  - `u8g2` : A pointer to the u8g2 structure.
- **Returns:** 0, once the loop is completed (all data transfered to the display).
- **Note:** This procedure adds the height (in tile rows) of the current buffer to the current page position.
- **See also:** firstpage
- **Example:**

```
u8g2.firstPage();
do {
  /* all graphics commands have to appear within the loop body. */
  u8g2.setFont(u8g2_font_ncenB14_tr);
  u8g2.drawStr(0,20,"Hello World!");
} while ( u8g2.nextPage() );
```

print

- **C++/Arduino Prototype:**

```
void U8G2::print(...)
```

- **Description:** This is the Arduino print() function. See the description on the Arduino Web Page here and here. This procedure will write the text to the current cursor position with the current font, set by setFont. The cursor position can be set by setCursor. Support for UTF-8 can be enabled with enableUTF8Print. This function can print variable values and supports the F() macro.
- **Arguments:** See link.
- **Returns:** -
- **Note 1:** This function depends on the current font mode and drawing color.
- **Note 2:** Use `print(u8x8_u8toa(value, digits))` or `print(u8x8_u16toa(value, digits))` to print numbers with constant width (numbers are prefixed with 0 if required).
- **See also:** print (U8x8), enableUTF8Print, setCursor, setFont
- **Example:**

```
u8g2.setFont(u8g2_font_ncenB14_tr);
u8g2.setCursor(0, 15);
u8g2.print("Hello World!");
```

sendBuffer

- **C++/Arduino Prototype:**

```
void U8G2::sendBuffer(void)
```

- **C Prototype:**

```
void u8g2_SendBuffer(u8g2_t *u8g2);
```

- **Description:** Send the content of the memory frame buffer to the display. Use clearBuffer to clear the buffer and the draw functions to draw something into the frame buffer. This procedure is useful only with a full frame buffer in the RAM of the microcontroller (Constructor with buffer option "f", see here). This procedure will also send a refresh message (refreshDisplay) to an e-Paper/e-Ink device.
- **Arguments:**
  - `u8g2` : A pointer to the u8g2 structure.
- **Returns:** -
- **Note:** Actually this procedure will send the current page to the display. This means, the content of the internal pixel buffer will be placed in the tile row given by the current page position. This means, that this procedure could be used for partial updates on paged devices (constructor with buffer option "1" or "2"). However, this will only work for LCDs. It will **not** work with most e-Paper/e-Ink devices because of the buffer switch in the display controller. Conclusion: Use this command only together with full buffer constructors. It will then work with all LCDs and e-Paper/e-Ink devices.
- **See also:** clearBuffer, updateDisplay
- **Example:**

```
void loop(void) {
  u8g2.clearBuffer();
  // ... write something to the buffer
  u8g2.sendBuffer();
  delay(1000);
```

sendF

- **C++/Arduino Prototype:**

```
void U8G2::sendF(const char *fmt, ...)
```

- **C Prototype:**

```
void u8g2_SendF(u8g2_t * u8g2, const char *fmt, ...)
```

- **Description:** Send special commands to the display controller. These commands are specified in the datasheet of the display controller. U8g2 just provides an interface (There is no support on the functionality for these commands). The

information is transfered as a sequence of bytes. Each byte has a special meaning:
  - Command byte (`c`): Commands for the controller. Usually this byte will activate or deactivate a feature in the display controller.
  - Argument (`a`): Some commands require extra information. A command byte then requires a certain number or arguments.
  - Pixel data (`d`): Instructs the display controller to interpret the byte as pixel data, which has to be written to the display memory. In some cases, pixel data require a special command also.
- **Arguments:**
  - `fmt` : A sequence (string) of `c` , `a` or `d` .
  - `...` : A sequence of bytes, separated by comma, one byte per char in the `fmt` string. The byte will be interpreted accordingly to the char at the same position of the `fmt` string.
- **Returns:** -
- **Note:** The C function will be available with v2.27
- **Example 1:** Send a single command byte: Enable display color inversion on many displays:

```
u8g2.sendF("c", 0x0a7);
```

- **Example 2:** Send multiple commands with arguments: Activate hardware scroll to the left on a SSD1306 display

```
u8g2.sendF("caaaaaac", 0x027, 0, 3, 0, 7, 0, 255, 0x2f);
```

setAutoPageClear

- **C++/Arduino Prototype:**

```
uint8_t U8G2::setAutoPageClear(uint8_t mode)
```

- **C Prototype:**

```
uint8_t u8g2_SetAutoPageClear(u8g2_t *u8g2, uint8_t mode)
```

- **Description:** Enables (mode=1) or disables (mode=0) automatic clearing of the pixel buffer by the firstPage and nextPage procedures. By default this is enabled and in most situation it is not required to disable this. If disabled, the user is responsible to set ALL pixel of the current pixel buffer to some suitable state. The buffer can be erased manually with the clearBuffer procedure. One application for using this function are situation where the background is rendered manually through a direct manipulation of the pixel buffer (see DirectAccess.ino example).
- **Arguments:**
  - `u8g2` : A pointer to the u8g2 structure.
  - `mode` : 0, to turn off automatic clearing of the internal pixel buffer. Default value is 1.
- **Returns:** The width of the buffer in tiles.
- **See also:** getBufferPtr

setBitmapMode

- **C++/Arduino Prototype:**

```
void U8G2::setBitmapMode(uint8_t is_transparent)
```

- **C Prototype:**

```
void u8g2_SetBitmapMode(u8g2_t *u8g2, uint8_t is_transparent);
```

- **Description:** Defines, whether the bitmap functions will write the background color (mode 0/solid, `is_transparent = 0`) or not (mode 1/transparent, `is_transparent = 1`). Default mode is 0 (solid mode).
- **Arguments:**
  - `u8g2` : A pointer to the u8g2 structure.
  - `is_transparent` : Enable (1) or disable (0) transparent mode.
- **Returns:** -
- **See also:** drawBitmap drawXBM
- **Note:** This function will be available with v2.15.x
- **Example:**

```
u8g2.setDrawColor(1);
u8g2.setBitmapMode(0);
u8g2.drawXBM(4,3, u8g2_logo_97x51_width, u8g2_logo_97x51_height,  u8g2_logo_97x51_bits);
u8g2.drawXBM(12,11, u8g2_logo_97x51_width, u8g2_logo_97x51_height,  u8g2_logo_97x51_bits);
```


```
u8g2.setDrawColor(1);
u8g2.setBitmapMode(1);
u8g2.drawXBM(4,3, u8g2_logo_97x51_width, u8g2_logo_97x51_height,  u8g2_logo_97x51_bits);
u8g2.drawXBM(12,11, u8g2_logo_97x51_width, u8g2_logo_97x51_height,  u8g2_logo_97x51_bits);
```

setBusClock

- **C++/Arduino Prototype:**

```
void U8G2::setBusClock(uint32_t clock_speed);
```

- **Description:** Arduino environment only: Assign the bus clock speed (frequency) for I2C and SPI. Default values will be used if this function is not called. This command must be placed before the first call to u8g2.begin() or u8g2.initDisplay().
- **Arguments:**
  - `clock_speed`: I2C or SPI bus clock frequency (in Hz)
- **Returns:** -
- **See also:** begin
- **Note 1:** Default bus speed values allow reliable use of the most slowest displays. On the other side a specific display may support higher bus clock speed. For example the SSD1327 defaults to 100KHz for I2C, but seems to support 400KHz in many cases. It is a good idea to test higher bus clock values in the current application. For I2C use "u8g2.setBusClock(200000);" or "u8g2.setBusClock(400000);". For SPI try values between "u8g2.setBusClock(1000000);" and "u8g2.setBusClock(8000000);".
- **Note 2:** U8g2 will always assign the best bus clock for the current display. However, if there are multiple clients on an I2C bus, then it might happen, that the selected I2C speed is too high for other devices. In this case, force U8g2 to use the speed which is acceptable for all clients: For example try "u8g2.setBusClock(100000);" which should work for all devices.

setClipWindow

- **C++/Arduino Prototype:**

```
void U8G2::setClipWindow(u8g2_uint_t x0, u8g2_uint_t y0, u8g2_uint_t x1, u8g2_uint_t y1 );
```

- **C Prototype:**

```
void u8g2_SetClipWindow(u8g2_t *u8g2, u8g2_uint_t x0, u8g2_uint_t y0, u8g2_uint_t x1, u8g2_uint_t y1 );
```

- **Description:** Restricts all graphics output to the specified range. The range is defined from `x0` (included) to `x1` (excluded) and `y0` (included) to `y1` (excluded). Use setMaxClipWindow to restore writing to the complete window.
- **Arguments:**
  - `u8g2`: A pointer to the u8g2 structure.
  - `x0`: Left edge of the visible area.
  - `y0`: Upper edge of the visible area.
  - `x1`: Right edge +1 of the visible area.
  - `y1`: Lower edge +1 of the visible area.
- **Returns:** -
- **See also:** setMaxClipWindow
- **Example:**