



BPS BiDisp4

User manual

SYSTEMS FOR PRODUCTION MANAGEMENT, TRACEABILITY AND VISUALIZATION

Table of Contents

| | |
|---|-----------|
| 1.Overview | 3 |
| 2. Technical data | 4 |
| 2.1 Mounting | 5 |
| 3. Setup | 5 |
| 3.1 Get the current IP address..... | 5 |
| 3.2 Changing IP – Using the same network..... | 5 |
| 3.3 Enter a new IP address | 8 |
| 3.4 Network and Display configuration | 8 |
| 4. Communication..... | 12 |
| 4.1 MQTT payload syntax | 12 |
| 4.2 MQTT Payload commands..... | 13 |
| 4.2 BCS – BiDisp3 Command strings..... | 19 |
| 4.3 BCS Commands..... | 20 |
| 5. Character sets | 25 |
| 5.1 Special graphical symbols | 27 |

1. Overview

BiDisp 4 is a durable digital character display designed for industrial settings. Colours and graphic symbols can help convey status updates quickly and clearly.

Display your way

Customize your message by varying your text, numbers, symbols, colours, fonts, and indicators.

It is also designed to allow stacking both vertically and horizontally, providing customization flexibility.

Built to withstand

Binar's durable character displays are designed to endure industrial environments. They are commonly paired with Binar's Takt and Andon systems and referred to as production and tempo boards.



Communicate more clearly

The display uses green for positive values, yellow for information or warning, and red for negative values (such as downtime), making the status clear and easy to understand.

It also employs graphic symbols like arrows or dynamic bars to enhance communication. Rising and falling trends are illustrated, and different colours are used to represent various intervals, making percentages more noticeable.



2. Technical data

| CONNECTION | | TECHNICAL DATA | |
|--|--|-----------------------------|--|
|  | Power connector | Communication | Ethernet, TCP; 10/100 Mbit/s; RJ45 connector |
| | <p>A suitable power supply is LP-PW14 from Binar Solutions AB (part no 51336).</p> | Power supply | Power consumption |
|  | Ethernet connector | Readability distance | Up to 50m |
| | | LED Pitch | 6 mm between LEDs in both x and y direction. |
| | | Panel size | L 79.8 cm x H 20 cm W 6 cm |
| | | Modules | 4x2 led modules |
| | | Font sizes | Small: 5x7 px Medium: 8x15 px Large: 8x16 px |
| | | Foreground/Background color | RGB, freely settable |
| | | CE | EN 61000-6-4 and EN 61000-6-2 |
| | | IP class | 30 |
| | | Temperature range | -20 - 50°C |
| | | Humidity | 0 - 95% non-condensing |
| | | Mounting | M6 nut/bolt |
| | | Art.number | 54630 |

2.1 Mounting

The BiDisp4 profile features M6 nut/bolt head channels that enable assembly in various ways, such as direct installation on flat surfaces, mounting on angles, and attaching to brackets for wires, among others.

3. Setup

3.1 Get the current IP address

- Connect the power to the BiDisp4.

The BiDisp4 will display the current IP and MAC addresses upon start-up.

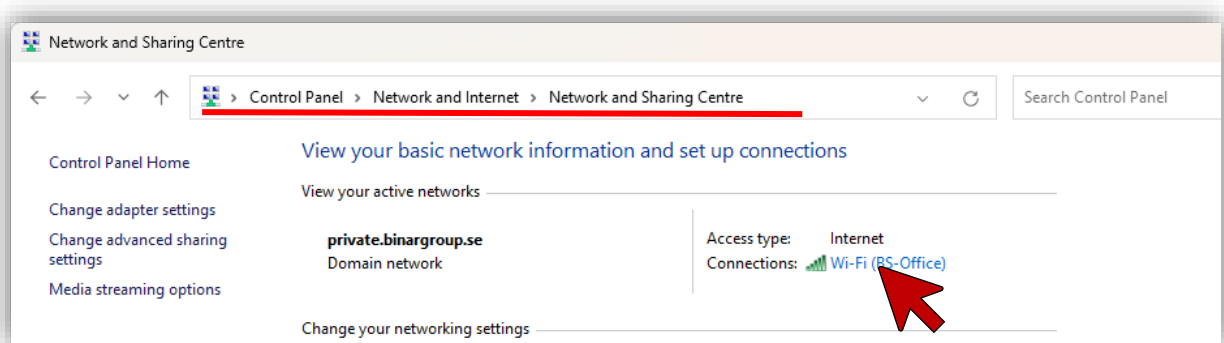
Please take note of the IP address, which has a default value of 192.168.1.254.

3.2 Changing IP – Using the same network

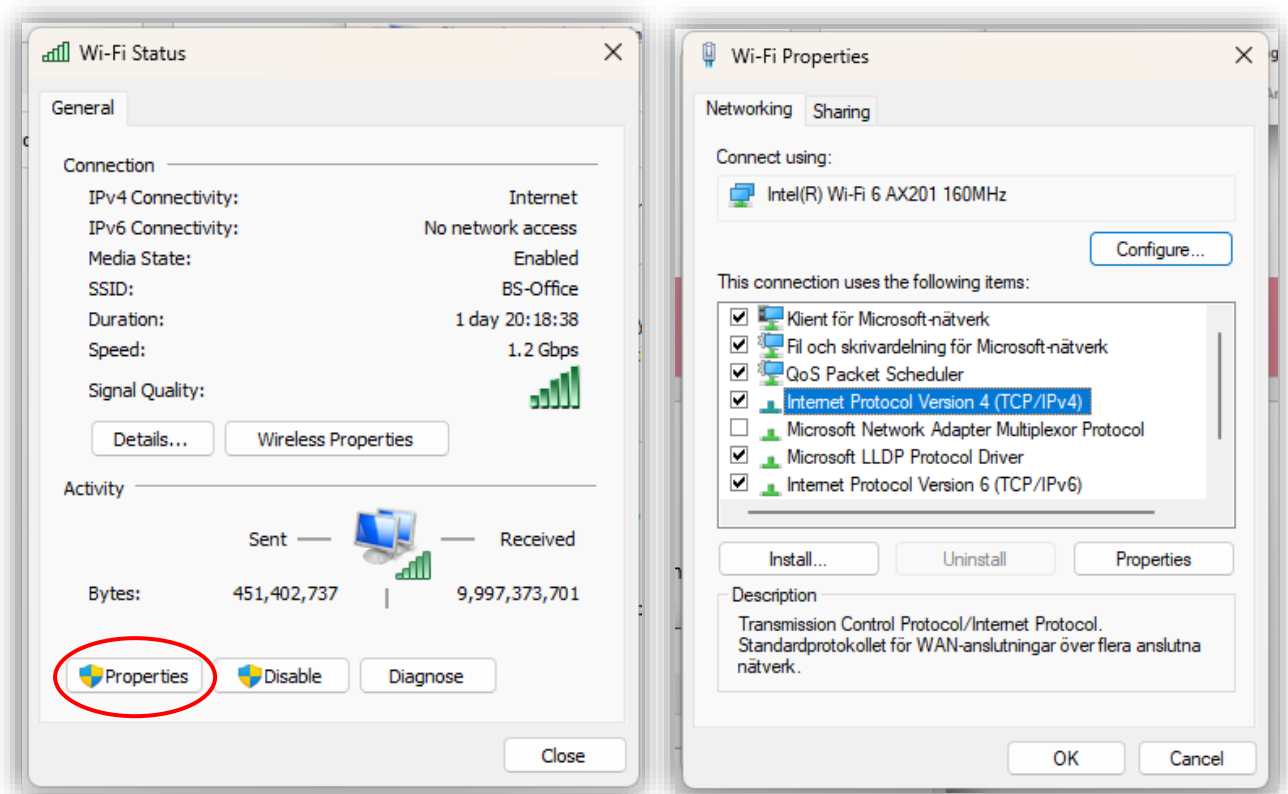
To change the IP address, access a web browser on a device connected to the same network as BiDisp4. If BiDisp4 and the computer are connected to the same router, the router should automatically allow access. If not, you may need to configure your computer to be on the same network as BiDisp4.

Here is an example on how to do this (in Windows 11):

1. Open the Control Panel.
2. Select “Network and Sharing Centre”
3. Select “Change adapter settings”.
4. Click the link in the Connection panel to open your active Ethernet connection.



5. Select “Properties”,
6. Select “Internet Protocol Version 4 (TCP/IPv4), click on [Configure...]



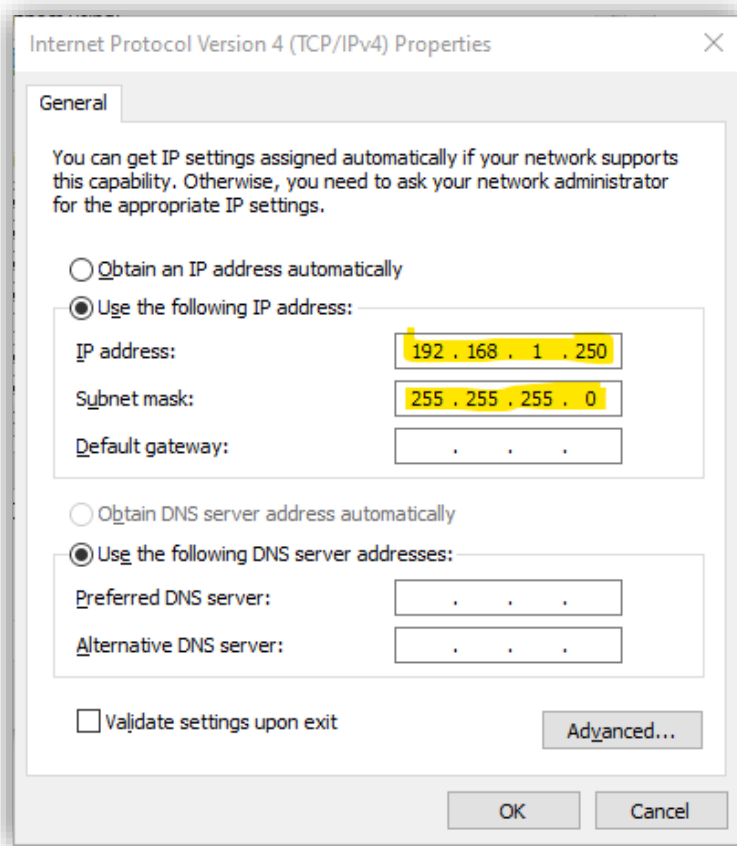
7. To ensure that the computer is connected to the same network as BiDisp4, select “Use the following IP address” and enter e.g.

IP address “192.168.1.250”

(last number can be 2 – 254, NOT 0, 1, 254 or 255)



and Subnet mask “255.255.255.0”.

Then click “OK”.



Note – Enter an IP address that connects the computer to the same network as BiDisp4. This instruction applies if BiDisp4 has its default address (192.168.1.254). If BiDisp4 uses a different IP address, adjust accordingly.

3.3 Enter a new IP address

-  Connect your computer and BiDisp4 to the same network.
-  Open a web browser
- Access the BiDisp4 Network Configuration page by entering the address displayed when you power up BiDisp4 (most likely the default address is 192.168.1.254), as described in section [3.2 Changing IP – Using the same network](#)
- Input the desired IP address, netmask, and gateway, and then click “Save Configuration”.
- BiDisp4 will restart and display the new IP address upon start-up.

If several BiDisp4 are to be configured, just connect the next one and repeat the steps above.

3.4 Network and Display configuration

Access the BiDisp4 settings pages by connecting to the same network as BiDisp4 and typing its IP address into your web browser.

NETWORK CONFIGURATION

| | |
|--------------------|--|
| IP Address | Set IP address |
| IP Netmask | Set IP netmask |
| IP Gateway | Set IP gateway |
| TCP Port | Set TCP Port for commands |
| MQTT Address | Set MQTT address TBD Kenneth |
| MQTT Port | Set MQTT port |
| Save Configuration | Saves the network configuration. This action will reboot the display. |

Network Configuration

IP Address:

default: 172.17.1.65

IP Netmask:

default: 255.255.0.0

IP Gateway:

default: 172.17.0.1

TCP port:

default: 3027

MQTT Address:

default: 192.168.0.111

MQTT Port:

default: 1883

Save Configurations

This action will reboot the display.

MQTT Options

MQTT Topic:

default: 'bidisp4/#'

Update MQTT Topic

MQTT Payload

example: {"value": {"cmd": "-sc0 -sg0,0,128,16 -f2 -cf2 -eb0 -t\"This is BiDisp4\""}}

Send payload

Test Display

© Copyright 2021 Binar Solutions AB

MQTT OPTIONS

| | |
|-------------------|---|
| MQTT Topic | The MQTT topic to subscribe to. |
| Update MQTT Topic | Saves the MQTT topic setting. |
| MQTT Payload | A MQTT payload can be entered and sent to the BiDisp4 for test purposes. The MQTT payload syntax. |
| Send Payload | Sends the MQTT payload to BiDisp4. |

DISPLAY TEST

| | |
|--------------|--|
| Test Display | Will send test data (text, fonts, foreground/background colors, etc.) to verify display functionality. |
|--------------|--|

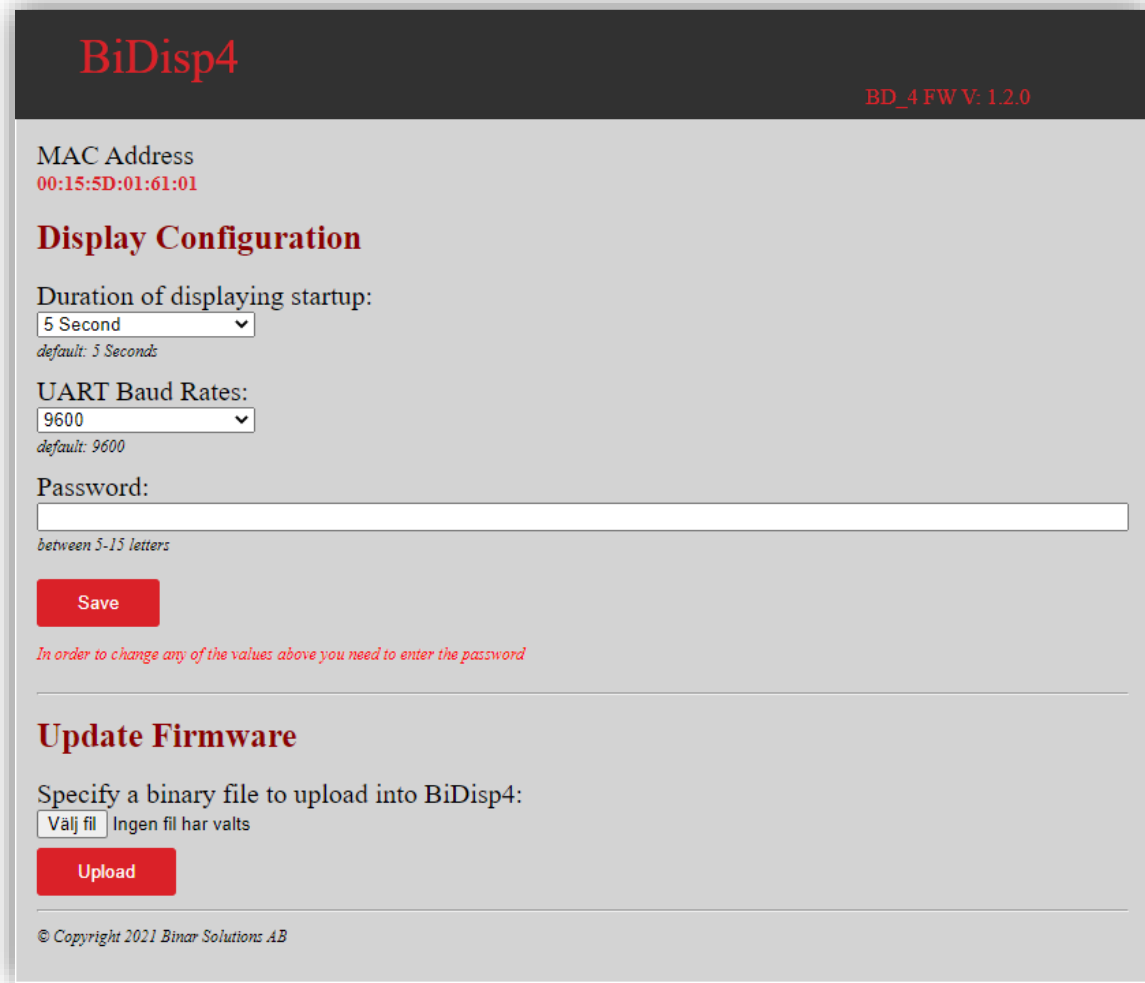


Selecting the "Admin" button located on the right side of the page header will reveal the Display Configuration/Firmware update page detailed below.

| | |
|-------------|------------------------------------|
| MAC address | BiDisp4 MAC address is shown here. |
|-------------|------------------------------------|

DISPLAY CONFIGURATION

| | |
|---------------------------------|--|
| Duration of displaying startup: | Specifies the duration during which the IP and MAC addresses will be displayed at system start-up (requires password to change). |
| UART Baud rates: | If BiDisp4 has an RS232/485 interface, the Baud rate can be adjusted here after entering a password. |
| Save | Save Duration and Baud rate settings. To save, enter the password "BiNaR". |



UPDATE FIRMWARE

Upload: To update the BiDisp4 firmware, choose an update file (.bin) from Binar Solutions AB and upload it by clicking the “Upload” button.



Afterwards, to return to the Network Configuration page, simply click the “Home” button located on the right-hand side of the page header.

4. Communication

MQTT

BiDisp4 can serve as a MQTT client and is mainly managed through MQTT payload commands. The MQTT address, port and topic are set from the Network configuration section [3.4 Network and Display configuration](#)

There is also another way of communication called.

BCS strings can be embedded into the MQTT payload data by means of the “cmd” key.

4.1 MQTT payload syntax

Here is an overview of the JSON formatted MQTT payload commands. All Keys are described in detail in section [4.2 MQTT Payload commands](#)

| | |
|------------------------------|---|
| Payload = | |
| { | |
| "value": { | |
| "config": { | |
| "n": { | Text area selection (0 – 15) |
| "default": <i>n</i> , | Text area reset (0=No action; 1=Reset) |
| "geometry": { | Text area size and position |
| "x": <i>n</i> , | X position of upper left corner |
| "y": <i>n</i> , | Y position of upper left corner |
| "w": <i>n</i> , | Width (pixels) |
| "h": <i>n</i> | Height (pixels) |
| }, | |
| "font": " <i>text</i> ", | Font (small, medium, large) |
| "spacing": <i>n</i> , | Text spacing (0 – 8) |
| "fixed_width": <i>n</i> , | Num char width (0=Proport.; 1=Fixed) |
| "halign": " <i>text</i> ", | Horizontal alignment (left, right, center) |
| "valign": " <i>text</i> ", | Vertical alignment (top, bottom, center) |
| "fg_color": " <i>text</i> ", | Fg color (red, blue, green, etc; or <i>rrggbb</i>) |
| "bg_color": " <i>text</i> ", | Bg color (red, blue, green, etc; or <i>rrggbb</i>) |
| "text": " <i>text</i> ", | Text to display |
| "rotate": <i>n</i> , | Text rotation (0, 90, 180, 270) |
| "scroll": <i>n</i> , | Left scrolling speed (1 – 16, 0 = off) |
| "flash": <i>n</i> , | Text blinking (0=Off; 1=On) |
| "hide": <i>n</i> | Text area hiding (0=Show; 1=Hide) |
| }, | |
| "n": { | Text area selection (0 – 15) |
| }, | |
| "clear": <i>n</i> , | Clear text at Text area (0 – 15; -1=All) |
| "reset": <i>n</i> , | Text area reset (0 – 15; -1=All) |
| "cmd": " <i>text</i> ", | Using a “BiDisp3 command string” |
| "intensity": <i>n</i> | Display intensity (0 – 100) |
| } | |
| } | |

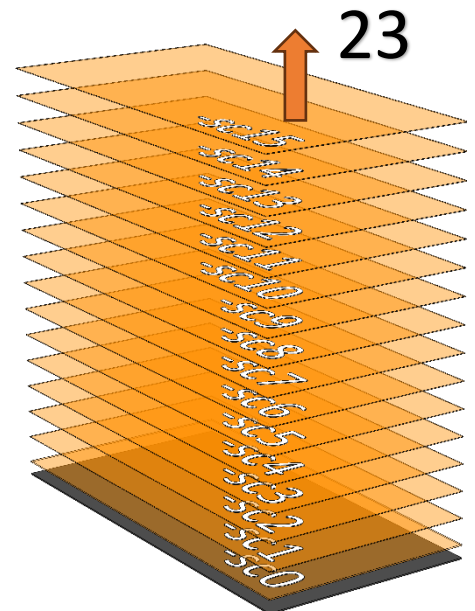
Example:

Payload =

```
{
  "value": {
    "config": {
      "4": {
        "geometry": {
          "x": 0, "y": 0, "w": 64, "h": 16, "font": "medium",
          "spacing": 3, "halign": "right", "valign": "bottom", "fg_color": "000000", "bg_color":
          "0000FF", "text": "This is BiDisp", "rotate": 0, "scroll": 12, "flash": 1, "hide": 0},
        "intensity": 80}}
  }
}
```

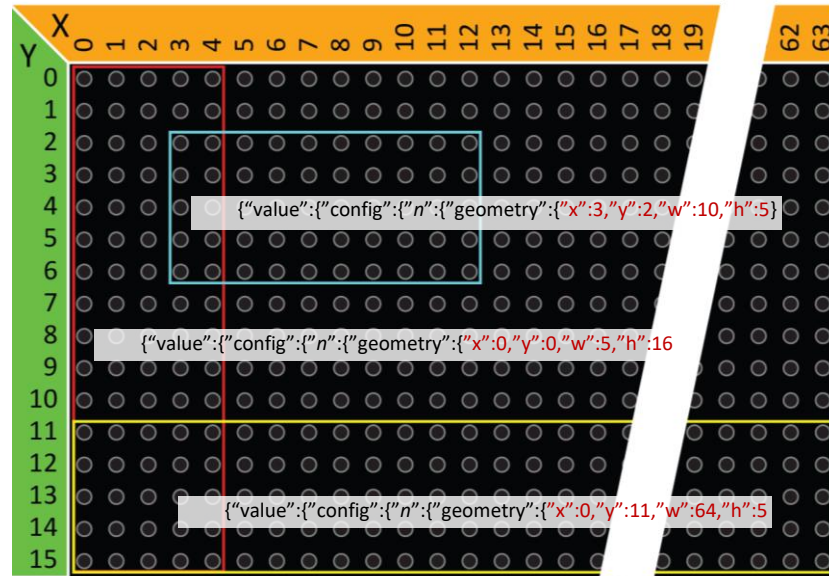
4.2 MQTT Payload commands

| KEY | VALUE | DESCRIPTION |
|---------------------------------|--|--|
| "0 - 23" Text area | Key/Value pairs configuring the specified Text area. | <p>Selects which Text area to operate at, 0–23.</p> <p>The Text areas can be seen as a stack of surfaces. Each Text area can be assigned its own text, font, colors, and other properties. The size and positions of the Text areas is set by the “geometry” key (described below).</p> <p>The bottom Text area has id 0 and the top area id 23.</p> <p>If a Text area overlaps another Text area the one having the highest id will show.</p> <p>Use Text area 0: {"value": {"config": {"0": { }}}}</p> <p>Use Text area 12: {"value": {"config": {"12": { }}}}</p> |
| "geometry" Position and Size | { "x": n, "y": n, "w": n, "h": n } | <p>Defines the position and size of a Text area.</p> <p>x X (horizontal) position of the upper left corner. 0 is the leftmost pixel. The display width sets possible X positions. 0–63 for a 64x16 display, 0–127 for a 128x16 display, etc.</p> <p>y Y (vertical) position of the upper left corner. 0 is the topmost pixel. The display height sets the bottommost Y position.</p> <p>w The width of the Text area in pixels. The display width sets the possible widths. 1–64 for a 64x16 display, 1–128 for a 128x16 display, etc.</p> |






h The height of the Text area in pixels. The display height sets the possible heights.

The example below shows a 64x16 display. The 0,0 point is the pixel in the upper left corner.



Note that if a Text area overlaps another Text area the one having the highest id will show.

There is no check or warning given for overlapping Text areas.

| KEY | VALUE | DESCRIPTION |
|-------------------|---------------------|--|
| "font" | "small" | Selects which font to use. |
| Font | "medium" "large" | There are three fonts to choose from as shown below. |
| | | Small (5x7 px, default) <code>{"value":{"config":{"n":{"font":"small"}}}}</code> |
| | |  |
| | | Large (8x16 px) <code>{"value":{"config":{"n":{"font":"large"}}}}</code> |
| | |  |
| | | Medium (8x15 px) <code>{"value":{"config":{"n":{"font":"medium"}}}}</code> |
| | |  |
| "spacing" | 1 - 8 | Sets the character spacing, 0–8 pixels. Some examples below: |
| Character spacing | | 0 pixels spacing <code>{"value":{"config":{"n":{"spacing":0}}}}</code> |
| | |  |

8 pixels spacing

```
{"value": {"config": {"n": {"spacing": 8}}}}
```



Default spacing for font Small is 1 px and 2 px for font Large and Medium.

"halign" *"left"*
Horizontal *"right"*
alignment *"center"*

Sets the horizontal alignment for text within the current Text area (not the entire display area).

Left (default)

```
{"value": {"config": {"n": {"halign": "left"}}}}
```



Right

```
{"value": {"config": {"n": {"halign": "right"}}}}
```



Center

```
{"value": {"config": {"n": {"halign": "center"}}}}
```



KEY VALUE DESCRIPTION

"valign" *"top"*
Vertical *"bottom"*
alignment *"center"*

Sets the vertical alignment for text within the current Text area.

Top (default)

```
{"value": {"config": {"n": {"valign": "top"}}}}
```



Bottom

```
{"value": {"config": {"n": {"valign":
```

```
"bottom"}}}}
```



Center

```
{"value": {"config": {"n": {"valign": "center"}}}}
```



"fixed_
width"

0, 1

Sets whether numerical characters are displayed with proportional or fixed (monospaced) width.

Characters affected are 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, +, -, /, * and Space.
All other characters are always displayed proportional.

Proportional or Fixed font width

All characters proportional.

`{"value": {"config":`

`{"n": {"fixed_width": 0}}}`



Numerical characters fixed width, all other proportional.

`{"value": {"config":`

`{"n": {"fixed_width": 1}}}`



`"text"`

`"text"`

Sends the text to be displayed within the current Text area.

Text

If the text doesn't fit in the Text area, only the part of the text that fits will be displayed.

to display

Example: `{"value": {"config": {"n": {"text": "This is BiDisp"}}}`

Special Graphical symbols

When using the fonts Large and Medium there are a set of special graphical symbols available (□0), that can be used for things like small animations, indicating results or status, etc. They are accessed by putting a tilde (~) sign before the character corresponding to the desired symbol. To show the tilde (~) sign itself use two tilde signs in a row (-t"~~").

Example: `{"value": {"config": {"n": {"text": "~F"}}}` (defines an "Surprised" smiley as text)



Below are some of the special symbols available at present (see all □0):



~< ~= ~> ~A ~B ~C ~D ~E ~F ~G ~H ~I ~J ~K ~L

KEY

VALUE

DESCRIPTION

`"fg_color"`
Foreground color

`"black"`

Sets font color (red is default). Specified by using fixed color names ("black", "red", "green", etc).

`"red"`

`"green"`

OR as a RGB value built by hexadecimal values:

`"orange"`

(*rr*= red (value 00–FF); *gg*= green (value 00–FF); *bb*= blue (value 00–FF))

`"blue"`

`"yellow"`

Example, red font (default): `{"value": {"config": {"n": {"fg_color": "red"}}}`

`"white"`

Example, red font (default): `{"value": {"config": {"n": {"fg_color": "ff0000"}}}`

`"purple"`

Below are some color examples:

`"aqua"`

`"black" "000000" "red" "ff0000" "green" "00ff00" "orange" "ffa500"`

`"rrggbb"`

`"blue" "0000ff"`



"yellow" "ffff00" "white" "ffffff" "purple" "ff00ff" "aqua" "00ffff"

"bg_color" "black" Sets background color (black is default). Specified by using fixed color names ("black", "red", "green", etc).
 Background "red"
 color "green" OR as a RGB value built by hexadecimal values:
 "orange" (*rr*= red (value 00–FF); *gg*= green (value 00–FF); *bb*= blue (value 00–FF))
 "blue"
 "yellow" Example, green background: {"value": {"config": {"n": {"bg_color": "green"}}}}
 "white" Example, green background: {"value": {"config": {"n": {"bg_color": "00ff00"}}}}
 "purple"
 "aqua"
 "rrggb" Below are some color examples:
 "black" "000000" "red" "ff0000" "green" "00ff00" "orange" "ffa500"
 "blue" "0000ff"



"yellow" "ffff00" "white" "ffffff" "purple" "ff00ff" "aqua" "00ffff"

"rotate" 0, 90, Sets text rotation within the Text area.
 Rotation 180, 270

0° {"value": {"config": {"n": {"rotate": 0}}}}



90° CW {"rotate": 90}}}



180° CW {"rotate": 180}}}



270° CW {"rotate": 270}}}

{"value": {"config": {"n":



Text area size in the examples: `{"x":0,"y":0,"w":64,"h":16}` `{"x":0,"y":0,"w":16,"h":16}`

MQTT – TEXT AREA COMMANDS

| KEY | VALUE | DESCRIPTION |
|----------------------------------|---|--|
| <code>"scroll"</code> Scroll | <code>0</code> (= Off) <code>1 - 16</code> | <p>Text can be scrolled leftwards. This command sets the scroll speed, 1–16. 0 means no scroll.</p> <p>Examples:</p> <p>No scrolling (default): <code>{"value": {"config": {"n": {"scroll": 0}}}</code></p> <p>Slowest scrolling: <code>{"value": {"config": {"n": {"scroll": 1}}}</code></p> <p>Fastest scrolling: <code>{"value": {"config": {"n": {"scroll": 16}}}</code></p> |
| <code>"flash"</code> Flash | <code>0, 1</code> | <p>This command controls text blinking.</p> <p>Examples:</p> <p>Blinking OFF (default): <code>{"value": {"config": {"n": {"flash": 0}}}</code></p> <p>Blinking ON: <code>{"value": {"config": {"n": {"flash": 1}}}</code></p> |
| <code>"hide"</code> Hide/Show | <code>0, 1</code> | <p>Sets visibility for the current Text area.</p> <p>Note that the command affects both text and background.</p> <p>Examples:</p> <p>Show (default): <code>{"value": {"config": {"n": {"hide": 0}}}</code></p> <p>Hide: <code>{"value": {"config": {"n": {"hide": 1}}}</code></p> |
| <code>"default"</code> Reset | <code>0, 1</code> | <p>Resets all parameters to their default values for the specified Text area.</p> <p>Examples:</p> <p>Reset Text area 0: <code>{"value": {"config": {"0": {"default": 1}}}</code></p> <p>No action: <code>{"value": {"config": {"0": {"default": 0}}}</code></p> |

MQTT – GENERAL COMMANDS

| KEY | VALUE | DESCRIPTION |
|---------------------------|----------------------|--|
| "clear" Clear text | -1 (= All) 0 - 15 | <p>Clears (erases) the text for the specified Text area (0–15) or for all Text areas (-1).</p> <p>Examples:</p> <p>Clear text at Text area 0: {"value": {"clear": 0}}</p> <p>Clear text at Text area 15: {"value": {"clear": 15}}</p> <p>Clear text at all Text areas: {"value": {"clear": -1}}</p> |
| "reset" Reset | -1 (= All) 0 - 15 | <p>Resets all parameters to their default values for the specified Text area (0–15) or for all Text areas (-1).</p> <p>Examples:</p> <p>Reset Text area 0: {"value": {"reset": 0}}</p> <p>Reset Text area 15: {"value": {"reset": 15}}</p> <p>Reset all Text areas: {"value": {"reset": -1}}</p> |
| "intensity" Brightness | 0 - 100 | <p>Sets the display intensity (LED brightness) in the range 0–100, where 100 is the brightest and 0 the weakest.</p> <p>Note that the brightness setting is saved permanently and will not be changed until the next brightness command is received.</p> <p>Examples:</p> <p>Weakest intensity: {"value": {"intensity": 0}}</p> <p>Brightest intensity: {"value": {"intensity": 100}}</p> |
| "cmd" Reset | "text" | <p>The older BCS text string commands (□Error! Reference source not found.). can also be embedded into the MQTT data by means of the "cmd" key.</p> <p>Example: {"value": {"cmd": "-sc0 sg0,0,63,15 -t\"This is BiDisp+\""}}</p> |

4.2 BCS – BiDisp3 Command strings

Although BiDisp4 is intended to be managed via MQTT payload commands, there is an alternative communication method called "BCS" (BiDisp3 Command Strings).

BCS can be utilised for:

Backward compatibility reasons if BiDisp4 must operate at a high load (BiDisp4 can process a maximum of 9-10 MQTT payloads

per second), or if BiDisp4 needs to be controlled by a Programmable Logic Controller (PLC), for instance.

The BCS strings can also be incorporated into the MQTT payload data using the "cmd" key.

4.3 BCS Commands

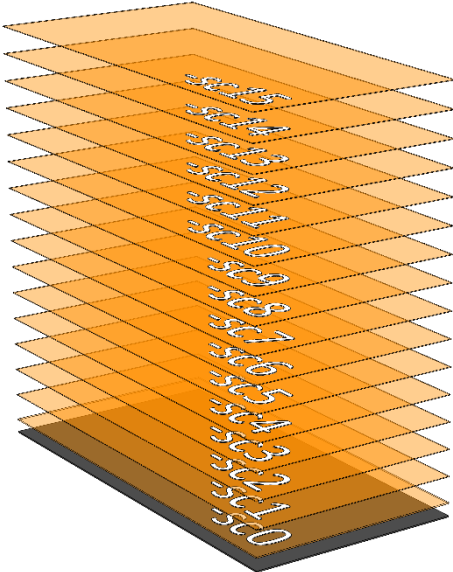
Below is a description of the BCS syntax. Please note that parameters always begin with a hyphen and are separated by a space. The string ends with <CR> and/or <LF>, and multiple command strings can be combined in one line using a | (pipe) as a delimiter.

BCS – GENERAL COMMANDS

| FUNCTION | COMMAND | DESCRIPTION |
|--------------|---------|--|
| Brightness | -in | Display brightness 0–100%. Note that the brightness setting is saved permanently and will not be changed until the next brightness command is received. -i0 OFF -i50 50% brightness -i100 Max brightness (default) |
| Master Reset | -dac | Resets all parameters to their default values for all Text areas. |

BCS – DEFINING TEXT AREAS

| FUNCTION | COMMAND | DESCRIPTION |
|-----------|---------|--|
| Text area | -scn | <p>Selects which Text area to operate at, 0–23.</p> <p>The Text areas can be seen as a stack of surfaces. Each Text area can be assigned its own text, font, colors, and other properties. The size and positions of the Text areas is set by the -sg command (described below). The bottom Text area has id 0 and the top area id 23.</p> <p>If a Text area overlaps another Text area the one having the highest id will show.</p> <p>Once a Text area has been selected all the following commands (position/size, text, color, font, spacing, etc) will affect that Text area.</p> |



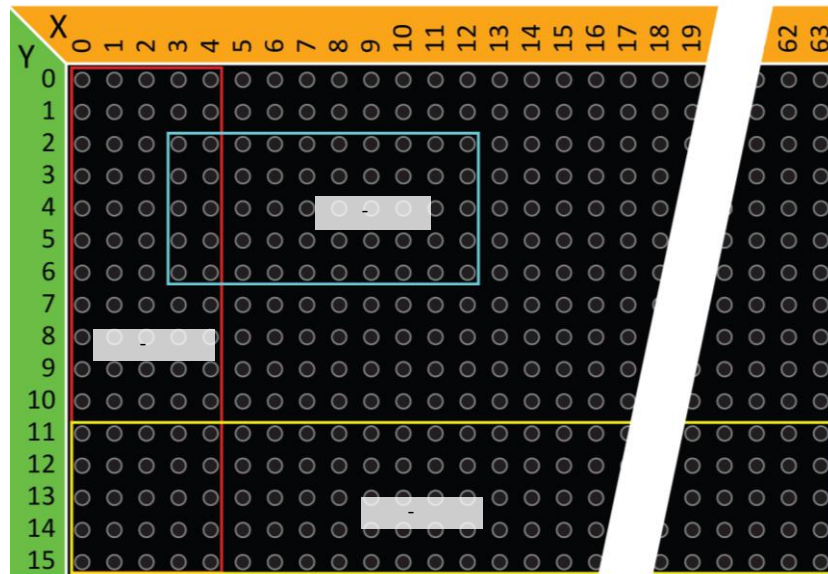
Text area 0 is default, and will be used if no Text area has been selected.

-sc0 Select Text area 0 (default)

-sc12 Select Text area 12

| | | |
|-------------------|------------|--|
| Position and Size | -sgx,y,w,h | Defines the position and size of a Text area. |
| | x | X (horizontal) position of the upper left corner. 0 is the leftmost pixel. The display width sets possible X positions. 0–63 for a 64x16 display, 0–127 for a 128x16 display, etc. |
| | y | Y (vertical) position of the upper left corner. 0 is the topmost pixel. The display height sets the bottommost Y position. |
| | w | The width of the Text area in pixels. The display width sets the possible widths. 1–64 for a 64x16 display, 1–128 for a 128x16 display, etc. |
| | h | The height of the Text area in pixels. The display height sets the possible heights. |

The example below shows a 64x16 display. The 0,0 point is the pixel in the upper left corner.



Note that if a Text area overlaps another Text area the one having the highest id will show.

There is no check or warning given for overlapping Text areas.

BCS – TEXT AREA COMMANDS

| FUNCTION | COMMA ND | DESCRIPTION |
|----------|----------|-------------|
|----------|----------|-------------|

| | | |
|------|-----|--|
| Font | -fn | Selects which font to use. There are three fonts to choose from as shown below. |
|------|-----|--|

| | |
|-----|-------------------------|
| -f0 | Small (5x7 px, default) |
|-----|-------------------------|

A black rectangular area containing the text "This is BiDisp" in a small, red, pixelated font.

| | |
|-----|-----------------|
| -f1 | Large (8x16 px) |
|-----|-----------------|

A black rectangular area containing the text "This is BiDisp" in a large, red, pixelated font.

| | |
|-----|------------------|
| -f2 | Medium (8x15 px) |
|-----|------------------|

A black rectangular area containing the text "This is BiDisp" in a medium-sized, red, pixelated font.

Area size in the examples: -sg0,0,128,16

| | | |
|-------------------|-------|--|
| Character spacing | -slsn | Sets the character spacing, 0–8 pixels. Some examples below: |
|-------------------|-------|--|

| | |
|-------|------------------|
| -sls0 | 0 pixels spacing |
|-------|------------------|

A black rectangular area containing the text "This is BiDisp" in a red, pixelated font with no spacing between characters.

| | |
|-------|------------------|
| -sls8 | 8 pixels spacing |
|-------|------------------|

A black rectangular area containing the text "T h i s i s B i D" in a red, pixelated font with 8 pixels of spacing between characters.

Default spacing for font Small is 1 px and 2 px for font Large and Medium.

| | | |
|----------------------|-------|--|
| Horizontal alignment | -shan | Sets the horizontal alignment for text within the current Text area (not the entire display area). |
|----------------------|-------|--|

| | |
|-------|----------------|
| -sha0 | Left (default) |
|-------|----------------|

A black rectangular area containing the text "This is BiDisp" in a red, pixelated font, left-aligned.

| | |
|-------|-------|
| -sha1 | Right |
|-------|-------|

A black rectangular area containing the text "This is BiDisp" in a red, pixelated font, right-aligned.

| | |
|-------|--------|
| -sha2 | Center |
|-------|--------|

A black rectangular area containing the text "This is BiDisp" in a red, pixelated font, center-aligned.

Area size in the examples: -sg0,0,128,16

| | | |
|--------------------|-------|--|
| Vertical alignment | -svan | Sets the vertical alignment for text within the current Text area. |
|--------------------|-------|--|

-sva0 Top (default)



-sva1 Bottom



-sva2 Center



Font width -sfm n

Sets whether numerical characters are displayed with proportional or fixed (monospaced) width.

Characters affected are 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, +, -, /, * and Space.

All other characters are always displayed proportional.

-sfm0 All characters proportional



-sfm1 Numerical characters fixed width, all other proportional.



Text to display -t "text"

Sends the text to be displayed within the current Text area.

The text should be enclosed in quotation marks.

If the text doesn't fit in the Text area, only the part of the text that fits will be displayed.

Special Graphical symbols

When using the fonts Large and Medium there are a set of special graphical symbols available (□0), that can be used for things like small animations, indicating results or status, etc. They are accessed by putting a tilde (~) sign before the character corresponding to the desired symbol. To show the tilde (~) sign itself use two tilde signs in a row (-t"~~").

Example: -f1 -t"~F" (defines font Large and an "Surprised" smiley as text)



Below are the special symbols available at present (see all □0):



~< ~= ~> ~A ~B ~C ~D ~E ~F ~G ~H ~I ~J ~K ~L

Foreground color -cf n

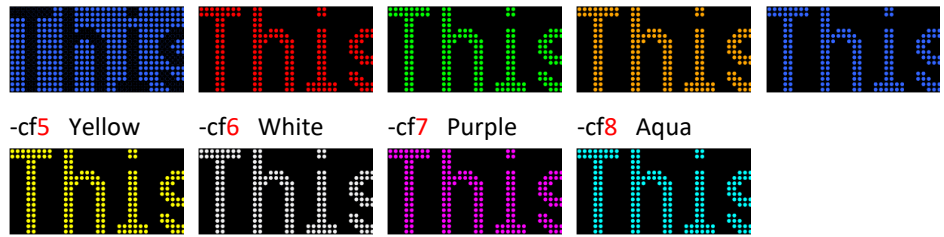
Sets font color.

-cf0 Black (Off) -cf1 Red (default)

-cf2 Green

-cf3 Orange

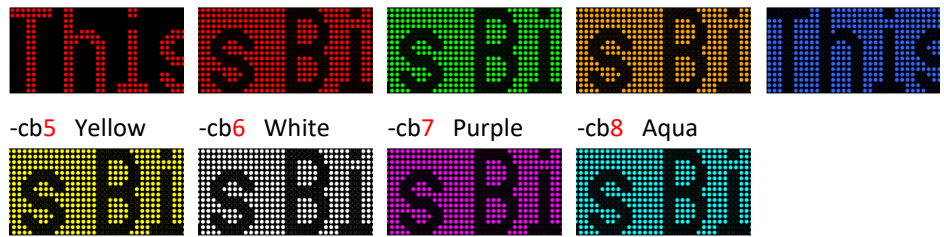
cf4 Blue



-cf5 Yellow -cf6 White -cf7 Purple -cf8 Aqua

Background color -cbn Sets background color.

-cb0 Black (default) -cb1 Red -cb2 Green -cb3 Orange -cb4 Blue



-cb5 Yellow -cb6 White -cb7 Purple -cb8 Aqua

Rotation -srn Sets text rotation within the Text area.

-sr0 0°



-sr1 90° CW



-sr2 180° CW



-sr3 270° CW



Area size in the examples: -sg0,0,64,16

-sg0,0,16,16

Scroll -nssn Text can be scrolled leftwards. This command sets the scroll speed, 1–16.

-nss0 No scrolling (default)

-nss1 Slowest scrolling

-nss16 Fastest scrolling

Flash -rn This command controls text blinking

-r0 Blinking OFF (default)

-r1 Blinking ON

Delete -clr Erases all text in the current Text area.

| | | |
|-----------|--------|---|
| Reset | -dc | Resets all parameters to their default values for the current Text area. |
| Hide/Show | -shown | Sets visibility for the current Text area. Note that the command affects both text and background. - show0 Hide - show1 Show (default) |

5. Character sets

The character encodings for all BiDisp4 fonts follows ISO/IEC 8859-15.

The control character area 0-31 is not implemented.

In the control character area 128-159 special graphical symbols are implemented.

Small (5x7 px, default)

Large (8x16 px)

Medium (8x15 px)



| Hex | Dec | | Hex | Dec | | Hex | Dec | | Hex | Dec | | Hex | Dec | | Hex | Dec | |
|-----|-----|----|-----|-----|---|-----|-----|---|-----|-----|---|-----|-----|---|-----|-----|---|
| 20 | 32 | | 30 | 48 | 0 | 40 | 64 | @ | 50 | 80 | P | 60 | 96 | ` | 70 | 112 | p |
| 21 | 33 | ! | 31 | 49 | 1 | 41 | 65 | A | 51 | 81 | Q | 61 | 97 | a | 71 | 113 | q |
| 22 | 34 | " | 33 | 50 | 2 | 42 | 66 | B | 52 | 82 | R | 62 | 98 | b | 72 | 114 | r |
| 23 | 35 | # | 33 | 51 | 3 | 43 | 67 | C | 53 | 83 | S | 63 | 99 | c | 73 | 115 | s |
| 24 | 36 | \$ | 34 | 52 | 4 | 44 | 68 | D | 54 | 84 | T | 64 | 100 | d | 74 | 116 | t |
| 25 | 37 | % | 35 | 53 | 5 | 45 | 69 | E | 55 | 85 | U | 65 | 101 | e | 75 | 117 | u |
| 26 | 38 | & | 36 | 54 | 6 | 46 | 70 | F | 56 | 86 | V | 66 | 102 | f | 76 | 118 | v |
| 27 | 39 | ' | 37 | 55 | 7 | 47 | 71 | G | 57 | 87 | W | 67 | 103 | g | 77 | 119 | w |
| 28 | 40 | (| 38 | 56 | 8 | 48 | 72 | H | 58 | 88 | X | 68 | 104 | h | 78 | 120 | x |

| | | | | | | | | | | | | | | | | | |
|----|----|---|----|----|---|----|----|---|----|----|---|----|-----|---|----|-----|---|
| 29 | 41 |) | 39 | 57 | 9 | 49 | 73 | l | 59 | 89 | Y | 69 | 105 | i | 79 | 121 | y |
| 2A | 42 | * | 3A | 58 | : | 4A | 74 | J | 5A | 90 | Z | 6A | 106 | j | 7A | 122 | z |
| 2B | 43 | + | 3B | 59 | ; | 4B | 75 | K | 5B | 91 | [| 6B | 107 | k | 7B | 123 | { |
| 2C | 44 | , | 3C | 60 | < | 4C | 76 | L | 5C | 92 | \ | 6C | 108 | l | 7C | 124 | |
| 2D | 45 | - | 3D | 61 | = | 4D | 77 | M | 5D | 93 |] | 6D | 109 | m | 7D | 125 | } |
| 2E | 46 | . | 3E | 62 | > | 4E | 78 | N | 5E | 94 | ^ | 6E | 110 | n | 7E | 126 | ~ |
| 2F | 47 | / | 3F | 63 | ? | 4F | 79 | O | 5F | 95 | _ | 6F | 111 | o | 7F | 127 | |

| Hex | Dec | | Hex | Dec | | Hex | Dec | | Hex | Dec | | Hex | Dec | | Hex | Dec | | Hex | Dec | | | | |
|-----|-----|---|-----|-----|---|-----|-----|---|-----|-----|---|-----|-----|---|-----|-----|---|-----|-----|---|----|-----|---|
| 80 | 128 | ⬆ | 90 | 144 | ☐ | A0 | 160 | | B0 | 176 | ° | C0 | 192 | À | D0 | 208 | Ð | E0 | 224 | à | F0 | 240 | đ |
| 81 | 129 | ⬇ | 91 | 145 | ◯ | A1 | 161 | ı | B1 | 177 | ± | C1 | 193 | Á | D1 | 209 | Ñ | E1 | 225 | á | F1 | 241 | ñ |
| 82 | 130 | ⬅ | 92 | 146 | ⊕ | A2 | 162 | ç | B2 | 178 | ² | C2 | 194 | Â | D2 | 210 | Ò | E2 | 226 | â | F2 | 242 | ò |
| 83 | 131 | ➡ | 93 | 147 | ☒ | A3 | 163 | £ | B3 | 179 | ³ | C3 | 195 | Ã | D3 | 211 | Ó | E3 | 227 | ã | F3 | 243 | ó |
| 84 | 132 | ↖ | 94 | 148 | ☒ | A4 | 164 | € | B4 | 180 | ž | C4 | 196 | Ä | D4 | 212 | Ô | E4 | 228 | ä | F4 | 244 | ô |
| 85 | 133 | ↗ | 95 | 149 | ⊕ | A5 | 165 | ¥ | B5 | 181 | μ | C5 | 197 | Å | D5 | 213 | Õ | E5 | 229 | å | F5 | 245 | õ |
| 86 | 134 | ↘ | 96 | 150 | ☒ | A6 | 166 | Š | B6 | 182 | ¶ | C6 | 198 | Æ | D6 | 214 | Ö | E6 | 230 | æ | F6 | 246 | ö |
| 87 | 135 | ↙ | 97 | 151 | ☒ | A7 | 167 | § | B7 | 183 | · | C7 | 199 | Ç | D7 | 215 | × | E7 | 231 | ç | F7 | 247 | ÷ |
| 88 | 136 | ⬆ | 98 | 152 | ☒ | AA | 168 | š | B8 | 184 | ž | CC | 200 | È | D8 | 216 | ∅ | EE | 232 | è | F8 | 248 | ∅ |
| 89 | 137 | ⬆ | 99 | 153 | ☒ | A9 | 169 | © | BB | 185 | ¹ | C9 | 201 | É | DD | 217 | Ù | E9 | 233 | é | FF | 249 | ù |
| 8A | 138 | ⬆ | 9A | 154 | ☒ | AA | 170 | ª | BA | 186 | º | CA | 202 | Ê | DA | 218 | Ú | EA | 234 | ê | FA | 250 | ú |
| 8B | 139 | ⬆ | 9B | 155 | ☒ | AB | 171 | « | BB | 187 | » | CB | 203 | Ë | DB | 219 | Û | EB | 235 | ë | FB | 251 | û |





















| | | | | | | | | | | | | | | | | | | | | | | | |
|----|-----|--|----|-----|--|----|-----|---|----|-----|---|----|-----|---|----|-----|---|----|-----|---|----|-----|---|
| 8C | 140 | | 9C | 156 | | AC | 172 | ¬ | BC | 188 | Æ | CC | 204 | ì | DC | 220 | Ü | EC | 236 | ì | FC | 252 | ü |
| 8D | 141 | | 9D | 157 | | AD | 173 | | BD | 189 | æ | CD | 205 | í | DD | 221 | Ý | ED | 237 | í | FD | 253 | ý |
| 8E | 142 | | 9E | 158 | | AE | 174 | ® | BE | 190 | ÿ | CE | 206 | î | DE | 222 | þ | EE | 238 | î | FE | 254 | þ |
| 8F | 143 | | 9F | 159 | | AF | 175 | - | BF | 191 | ç | CF | 207 | ï | DF | 223 | ß | EF | 239 | ï | FF | 255 | ÿ |

5.1 Special graphical symbols

When using large and medium fonts, there is a collection of unique graphical symbols accessible for various purposes such as small animations, displaying outcomes or status, etc. To access them, simply place a tilde (~) before the corresponding symbol character. To display the tilde (~) sign itself, use two consecutive tilde characters (~~).

The symbols ~#128–159 are already integrated into the "normal" font and hence, do not require the leading tilde sign.

| Dec | Char | Name | | Dec | Name | | Dec | Name | |
|----------|------|-------------------|--|-----------|------------|--|-----------|----------------|--|
| 126 + 60 | ~< | Smiley Displeased | | 126 + 128 | N Up | | 126 + 144 | Box Checked | |
| 126 + 61 | ~= | Smiley Neutral | | 126 + 129 | S Down | | 126 + 145 | Circle Empty | |
| 126 + 62 | ~> | Smiley Pleased | | 126 + 130 | W Left | | 126 + 146 | Circle Checked | |
| 126 + 65 | ~A | Depressed | | 126 + 131 | E Right | | 126 + 147 | Upper half | |
| 126 + 66 | ~B | Displeased | | 126 + 132 | NW | | 126 + 148 | Bar Thick | |
| 126 + 67 | ~C | Neutral | | 126 + 133 | NE | | 126 + 149 | Dot | |
| 126 + 68 | ~D | Pleased | | 126 + 134 | SE | | 126 + 150 | Bar Thin | |
| 126 + 69 | ~E | Happy | | 126 + 135 | SW | | 126 + 151 | Level 0 | |
| 126 + 70 | ~F | Surprised | | 126 + 136 | VBar Thick | | 126 + 152 | Level 1 | |

| | | | | | | | | | |
|----------|----|------------------|---|-----------|------------|--|-----------|---------|---|
| 126 + 71 | ~G | Angry |  | 126 + 137 | VBar Thin |  | 126 + 153 | Level 2 |  |
| 126 + 72 | ~H | Small Displeased |  | 126 + 138 | Left half |  | 126 + 154 | Level 3 |  |
| 126 + 73 | ~I | Small Neutral |  | 126 + 139 | Right half |  | 126 + 155 | Level 4 |  |
| 126 + 74 | ~J | Small Pleased |  | 126 + 140 | |  | 126 + 156 | Level 5 |  |
| 126 + 75 | ~K | Small Happy |  | 126 + 141 | |  | 126 + 157 | Level 6 |  |
| 126 + 76 | ~L | Small Surprised |  | 126 + 142 | Box Filled |  | 126 + 158 | Level 7 |  |
| | | | | 126 + 143 | Box Empty |  | 126 + 159 | Level 8 |  |