



## HMs DIY GUIDANCE

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## 1) INTRODUCTION

HMs DIY is a Garmin IQ-Datafield which enables you to create your own design for your Garmin device.

First you create your layout with the Designer tool on your PC (Windows only). You can see the layout immediately in the preview window - step by step. When you are happy with your creation, transfer the layout to your Garmin device using Garmin Connect Mobile or Garmin Express.

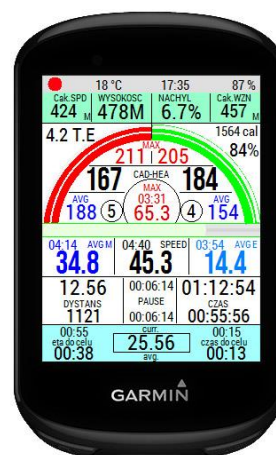
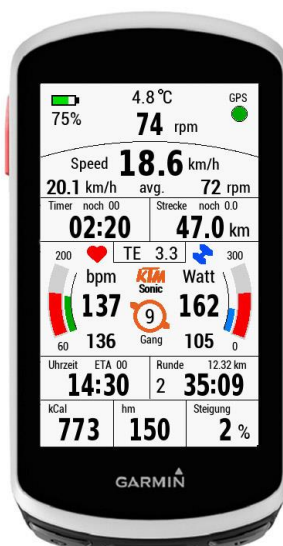
The possibilities HMs DIY offers are almost unlimited. All fonts and font sizes available on the Garmin device can be used, there are countless types of data that can be displayed, various graphical elements, statically and dynamically changeable colors are available. In addition to general data elements, there are also elements available specifically for running and cycling.

It is possible to create a full display layout that contains all data and graphics. It is also possible to create a single data field that can be displayed in combination with original Garmin data fields.

All Garmin devices that allow IQ data fields are supported.  
Both the metric and imperial measurement system is supported.  
Day/night color mode is also possible for devices that support it.

It must be noted, however, that different Garmin devices have different memory sizes. Not everything can be displayed on every device.

Some layout examples:



## 2) INSTALLATION

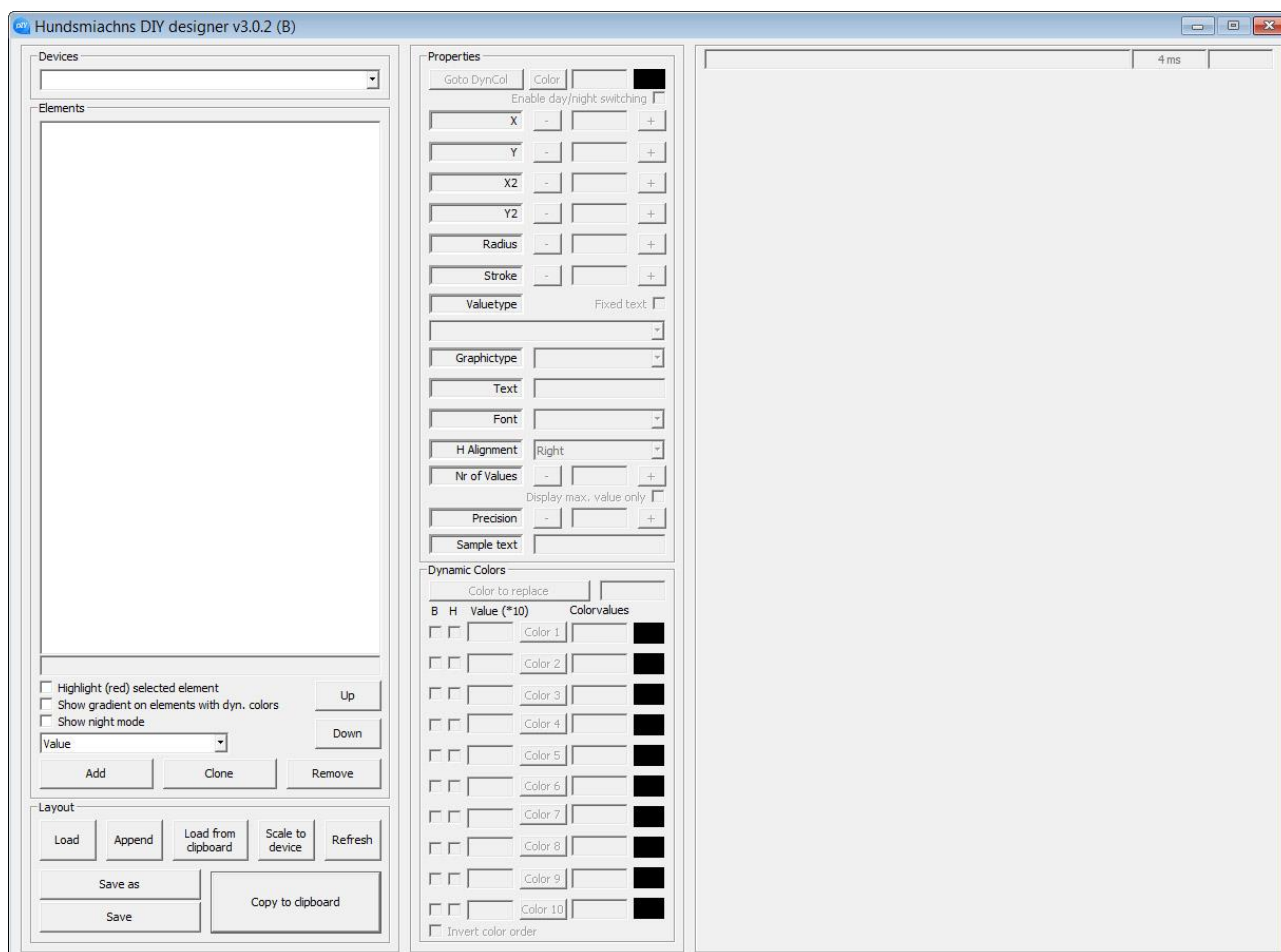
The installation is done in 2 steps. On your Windows PC install the Designer program, and on your Garmin device install the IQ data field "HMs DIY".

### 2a) Installation of the Designerprogram on your WIN-PC

Visit the Garmin IQ-Store on the Internet and search there for "HMs DIY" or go directly to the page of [HMs DIY](#). Here you will find a download link to a ZIP-file. Download this ZIP file and unzip it. You will find a file "fonts.txt", a collection of examples and the Designer program itself, which is hidden in another ZIP-file and is named "HMs\_DIYDesigner.exe" .

There is no need to run a setup-program - simply copy the executable and the font.txt file to a new created folder of your choice.

Now the designerprogram is ready for use!



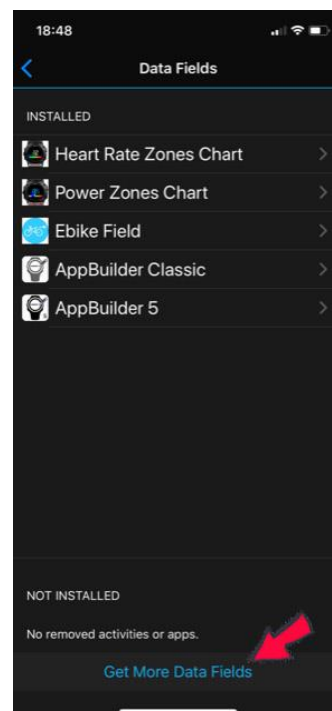
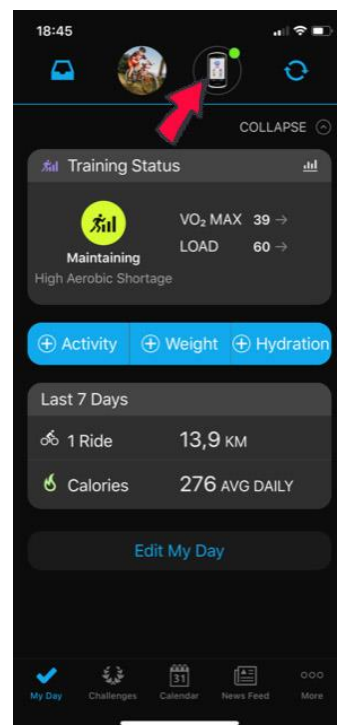
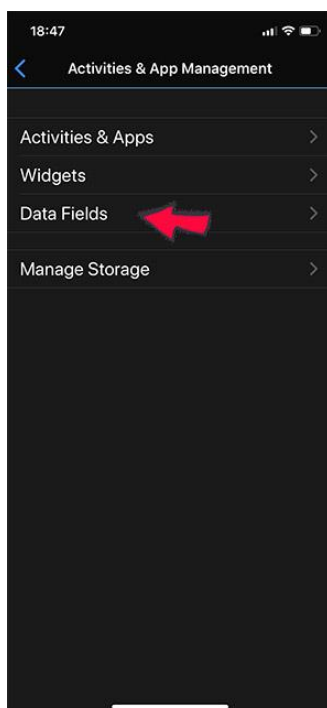
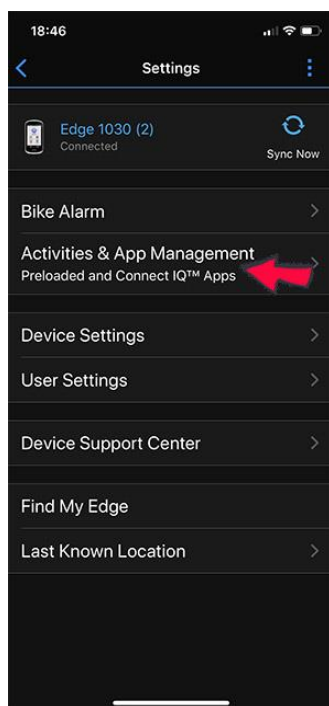
## 2b) Installation of the IQ-DIY datafield on your Garmin device

The installation of the IQ-DIY data field on your Garmin device can be done in 2 ways: using Garmin Connect Mobile or using Garmin Express.

### Installation with Garmin Connect Mobile:

On your mobile-phone start Garmin Connect Mobile, turn on your Garmin device and wait until the connection was established.

On your mobile phone tap on the device icon with the green dot

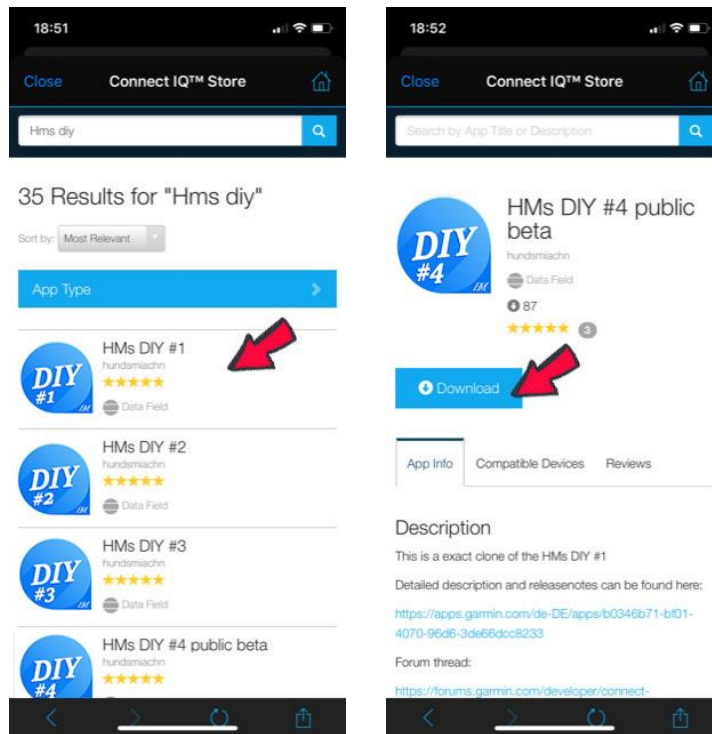


Tap on "Activities & App Management"

Tap on "Data Fields"

At the bottom tap on "Get More Data Fields"

Search for "HMs DIY" and you will find 6 clones of this datafield.



Tap on the desired clone (#1 if it is your first HMs DIY) and tap the Download-button.

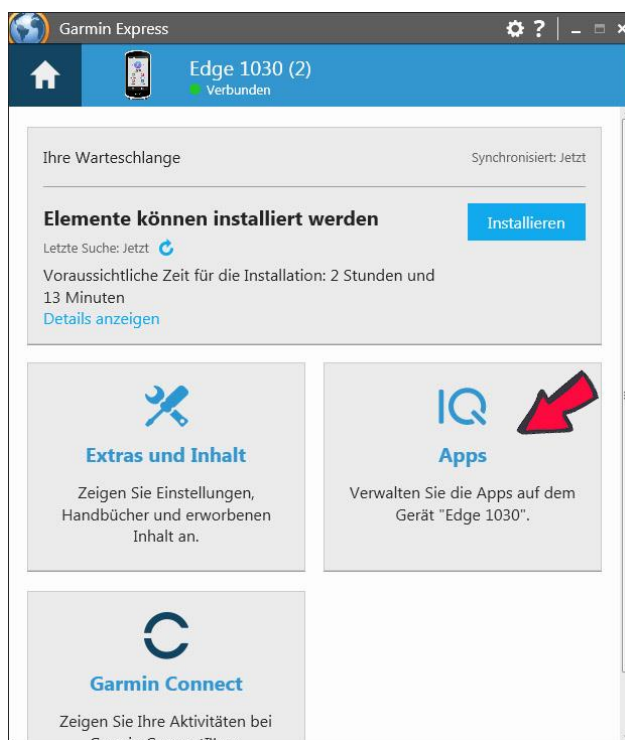
"Accept Terms"

On the next screen "Allow" the access.

The data field now will be installed on your device.

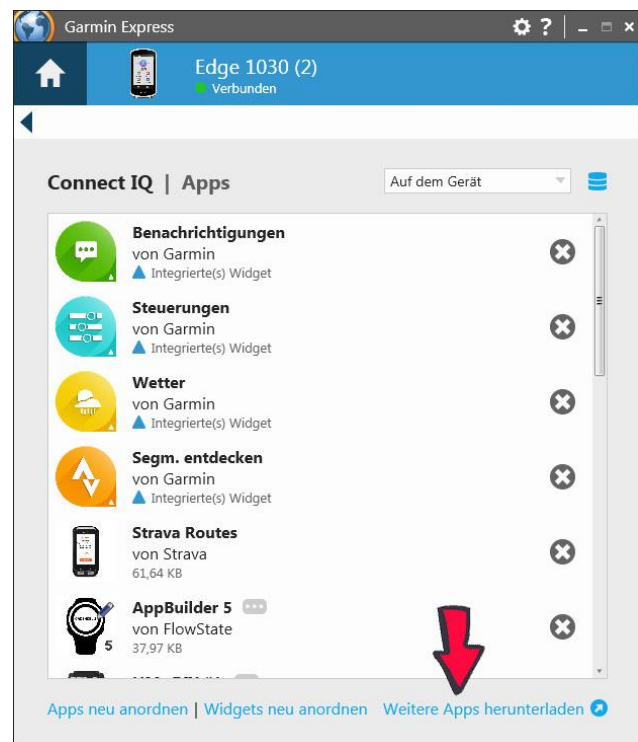
### Installation with Garmin Express:

Connect your device to your PC, start Garmin Express, tap on the device icon



Tap on "IQ Apps"

Tap bottom right on "Get More Apps"



Now you will be redirected to the IQ Store, where - like during the installation with Garmin Connect Mobile - (see there) - you search the data field "HMs DIY" and start the download.

### 3) DESIGNER TOOL

Before we start with the description of the Designer tool, we would like to draw your attention to the file "fonts.txt". This file must be located in the same directory as the Designer tool itself. It contains all information about the fonts used in the Designer tool.

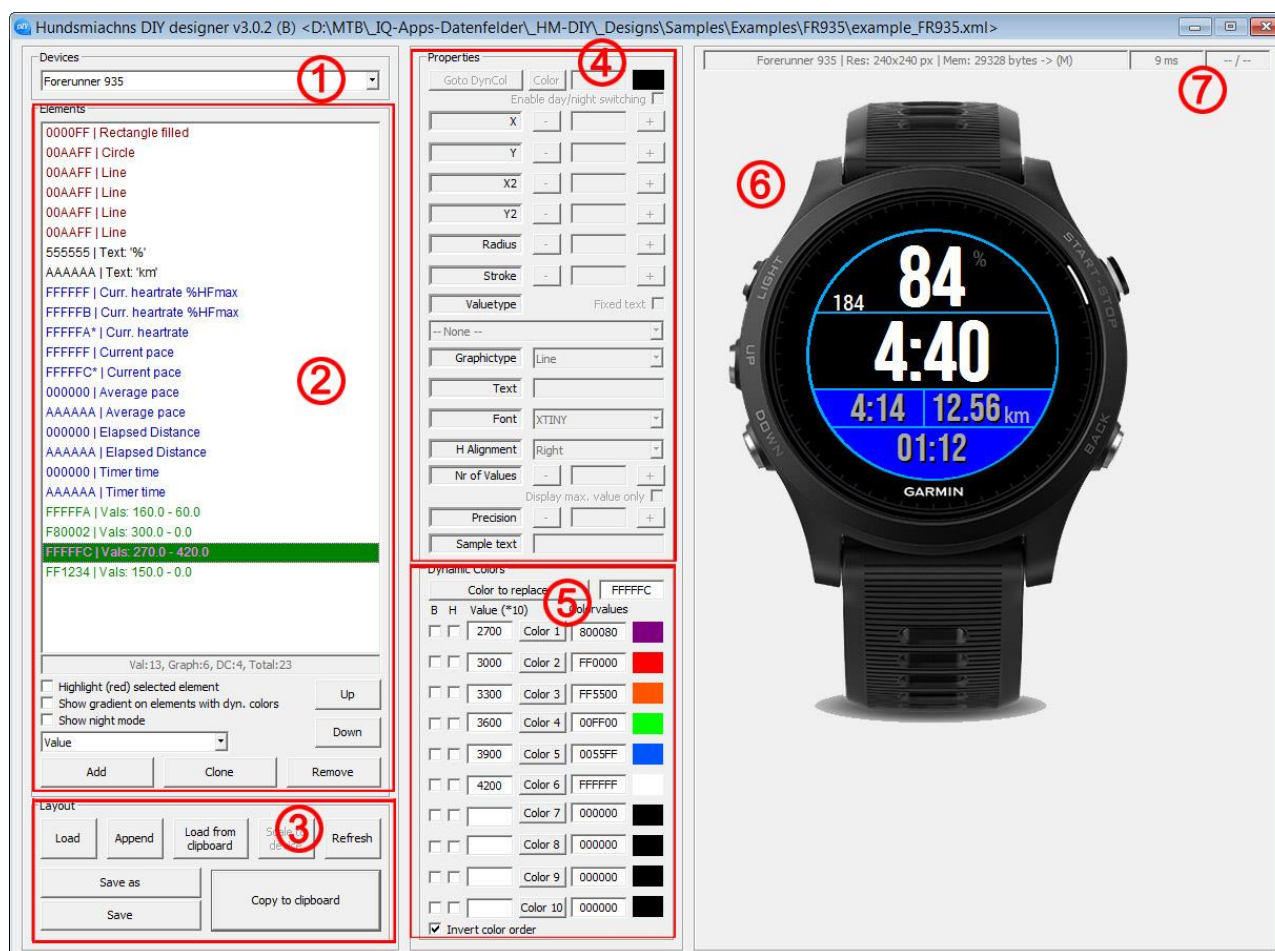
Unfortunately Garmin does not publish the fonts that are used in their devices. They are not available as Truetype-fonts (ttf). So similar fonts had to be found in order to display text and digits reasonably satisfactorily. This is the reason why there is a certain discrepancy between the preview in the designer and the actual appearance on the device.

In the Designer tool there are 9 replacement fonts built in, which can be adjusted as best as possible.

In the file "fonts.txt" a set of fonts is already defined for all devices. However, this can/must be further refined by the user by editing the file. How to do this will be explained in chapter "[Fontmapping for your device](#)".

To start the Designer tool simply double-click on the Designer-icon.

<Load> from the examples-collection: FR935 -> example\_FR935





## Keyboard Shortcuts:

<Ctrl>+Z	undoes up to 100 steps
<Ctrl>+<Shift>+A	applies the X/Y coordinates of the cursors position
<Ctrl>+<Shift>+Y	applies the X2/Y2 Koordinaten der Cursorposition
<Ctrl>+O	"Load"
<Ctrl>+S	"Save"
<Ctrl>+I	"Append"
<Ctrl>+<Shift>+S	"Save as"
<Ctrl>+B	"Copy to clipboard"
<Ctrl>+C	"Copy element"
<Ctrl>+V	"Paste element"
<Ctrl>+X	"Cut element"
<Space>	Checks or unchecks Day/Night Switching
<Ctrl>+Left/Right/Up/Down	can be used to move elements in the preview
<Shift>+Left/Right/Up/Down	changes X2/Y2 of the element

### (1) - Devices:

Choose your device.

### (2) - Elements:

An area that defines elements:

#### List of elements:

shows all elements which are created for this layout. For the highlighted element you can see all attributes in section (4) or (5).

#### Checkbox Highlight:

When checked, the highlighted element in the element-list will appear in red color in preview (6).

#### Checkbox Show Gradient:

All dynamic colored elements will appear in gradient-color in preview (6).

#### Checkbox Show Nightmode:

Shows the layout in nightmode if elements are set for [day/night switching](#).

#### Element type selection box: 4 element-types are available

**Value:** In the element list, values are marked blue. These are values like Speed, Pace, Time, Power etc.

**Graphic:** In the element list, graphic elements are marked red. These are elements like Line, Circle, Rectangle etc.

**Dynamic Color:** In the element list, dynamic colors are marked green. These defines colors and color-ranges for Values and Graphic Elements.

**Separator:** are elements that serve the better overview.



**Up / Down Button:**

Moves the highlighted element up or down in the element-list.

Each element represents a layer. The further down an element is in the list, the more it is in the foreground.

**Add Button:**

Adds an element below the current position in the element list. The type of the element must be selected before (see Element type selection box).

**Clone Button:**

Clones the highlighted element in the element list and sets the new element below the current position in the element list.

**Remove Button:**

Removes the highlighted element in the element list.

**(3) - Layout:**

**Load button:** Loads a stored layout.

**Append button:** Appends a stored layout to the loaded layout.

**Load from clipboard button:**

Loads your layout from the created string for restoring a lost xml file or for checking if the setup-string is complete. Of course not all elements can be recovered - separators and which device for example. (Default device is the EDGE 1030)

**Scale to device button:**

If you change the device (1) while a layout is loaded, this button will scale the layout to fit the new chosen device.

**Refresh button:**

Refreshes the layout-preview in section (6).

You can also simply click in the preview area to refresh.

**Save / Save as button:** Saves a layout.

**Copy to clipboard button:**

Creates the layout-string for the created layout and copies that string to the clipboard. This is the last step in creating a layout. The copied string has to be pasted into the string-field in the Setup of the IQ-datafield on the device (see "[Transferring your layout to your Garmin device](#)").

#### **(4) - Properties:**

An area that defines the properties of elements.

Different element types have different properties. Therefore some are enabled and some are disabled.

##### **Goto DynCol:**

Opens the "Dynamic Colors" associated element for the relevant variable element. (see "[Using dynamic Colors](#)")

##### **Color:**

Sets the color for the element.

For using dynamic colors see "[Using dynamic Colors](#)".

Please be aware that most devices cannot display every color value exactly.

##### **Enable day/night switching:**

Enables [night display color reversal](#) for the element. The color of this element will be inverted when switched to black background. The color check is made just before drawing the element. So every dynamic color will be inverted for every element separately.

Every color will be inverted, not just black and white.

If the checkbox stays unchecked, the color of the element will be the same in day and night mode.

##### **X / Y, X2 / Y2:**

Are the coordinates where the element is set.

##### **Radius:**

Defines the Radius of circles and arcs.

##### **Stroke:**

Defines the thickness of all kind of lines (Line, Rectangle, Circle, Arc).

##### **Valuetype:**

- For Text choose --nothing-- but check the control-box "Fixed text"
- For values: choose one of the drop-down list (Speed, Time...)
- For Graphic elements: choose the valuetype which the Graphic Element is connected to (to change colors or to draw a progress bar).

##### **Fixed text (control-box):**

Check this box if you want to set a label. Set Valuetype to "none".

##### **Limit is minimum value (control-box):** (alternatively)

Check box for using Graphs. See Graphic Element "Graph".

##### **Graphictype:**

Select the type of the Graphic element (see "[Graphic Elements](#)")

**Text:**

If you checked "Fixed text" to create a label: type in the text here.

If you have chosen a value like Speed or Time: define the format-mask here:  
you can add text to the mask of variables - for example:

Temperature: "\$V °C" will display: "12 °C"

Distance to go: "to go: \$V km" will display: "to go: 23 km"

(you can set decimal places - see next step)

There are different masks for Time available - see "[Time Formats](#)".

If you choose "Separator": type in the Separator-text.

**Font:**

Defines the font you will use for texts and variables.

**H Alignment:**

Defines the text-alignment: center, left, right.

**Nr. of Values:**

Defines the sample rate for variables in seconds. According to that figure the variable will be averaged for the given time.

Set Nr. of Values to 3 if you will display 3s Power.

**Display max. value only**

Activate the checkbox if the maximum value of this element reached in the activity should be displayed.

**Mark min/max values** (alternatively)

This checkbox is only offered for the graphic element GRAPH and shows small points for minimum and maximum in the graph.

**Precision:**

Defines the number of decimal places.

**Sample text:**

Defines the text of the element in the Designer tool - a "cosmetic" option.

### (5) - Dynamic Colors:

An area that defines the color(s) of elements.

For more details see: "[Using Dynamic Colors](#)".

### (6) - Preview of your design:

Here you can see if your layout meets your expectations - more or less WYSIWYG.

### (7) - Device info field:

Provides information about the selected device, the estimated update time for graphical elements, and if the mouse pointer is within the workspace, the position of the mouse pointer is displayed.

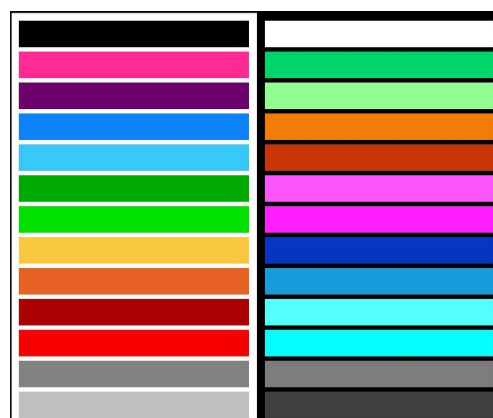
Click on the current element in the element-list and then apply the X and Y values with <Ctrl> + <Shift> + A.

The values for X2 and Y2 are applied with: <Ctrl> + <Shift> + Y.

### Remarks on day/night color reversal:

The picture on the right shows the color adjustment of [automatic color reversal](#) - Day -> Night.

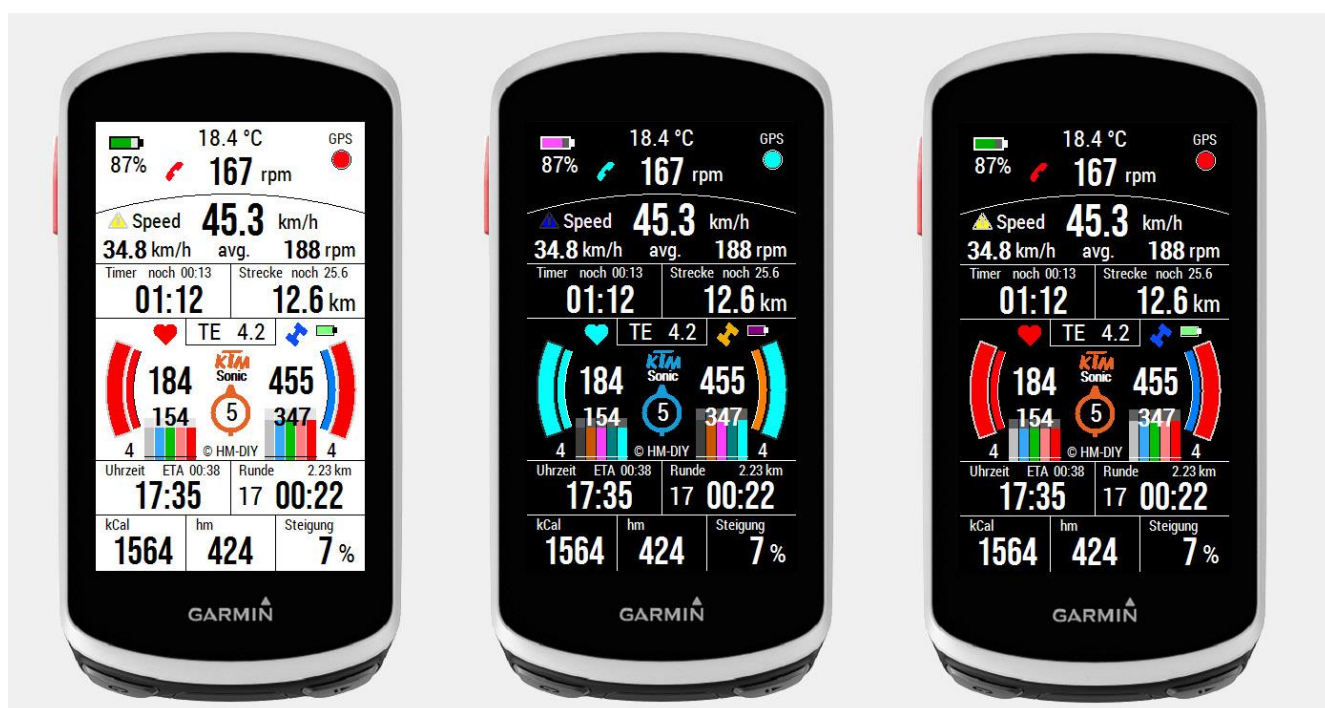
It seems reasonable to first select only the elements in black or white color for color inversion and to pay special attention to all others.



Original color scheme

all elements activated

only b/w activated



### 3a) GRAPHIC ELEMENTS

If you choose "Graphic" in the element type selection box in area (2) you can choose one of the following graphic elements in the Graphic type selection box in area (4):

The following applies to all graphical elements:

The color is selected under "Color".

If the color is to change depending on a value (e.g. Speed), this value must be selected under "Valuetype" and an associated dynamic color element must be created (see "[Using Dynamic Colors](#)").

#### **LINE:**

A line is defined by its starting point X/Y and by its end point X2/Y2.

The line thickness is selected by "Stroke".

#### **CIRCLE:**

A circle is defined by its center X/Y and by its radius.

The line thickness is selected by "Stroke".

#### **CIRCLE FILLED:**

A circle filled is defined by its center X/Y and by its radius.

#### **RECTANGLE:**

A rectangle is defined by its left/upper point X/Y

and by its right/bottom point X2/Y2.

The line thickness is selected by "Stroke".

#### **RECTANGLE FILLED:**

A rectangle filled is defined by its left/upper point X/Y

and by its right/bottom point X2/Y2.

#### **RCT HOR. FILLED:**

A rectangle horizontal filled is defined by its left/upper point X/Y

and by its right/bottom point X2/Y2. The rectangle filled is to grow depending on a value (e.g. Speed). This value must be selected under "Valuetype" and an associated dynamic color element must be created. The minimum-value (rectangle is empty) and the maximum value (rectangle is filled completely) are defined in that dynamic color element (see "[Using Dynamic Colors](#)").

A rectangle horizontal filled works like a progress bar and is always filled from left to right.

### **RCT VERT. FILLED:**

A rectangle vertical filled is the same as horizontal filled - but vertical filled.  
A rectangle vertical filled works like a progress bar and is always filled from bottom to top.

### **ARC:**

An arc is defined by its center X/Y, radius and by its start and end angel.  
The line thickness is selected by "Stroke".  
Zero degrees corresponds to the 3 o'clock position.  
The degree indication may exceed 360 degrees.

The picture below right shows 2 arcs:

The grey one has Start angle = 384 degrees  
and End angel = 336 degrees (defined from bottom to top).  
Stroke = 20

### **ARC DYN. FILLED:**

An arc dynamic filled is defined by its center X/Y, radius and by its start and end angel. It can act clockwise or anticlockwise.  
The red arc in the picture is a dyn. filled arc. It has  
Start angle = 383 degrees and End angel = 337 degrees  
(defined from bottom to top).  
Stroke = 16

The red arc dyn. filled in that example grows corresponding to power.  
No power, 0 Watt: the red arc is not visible.  
300 Watt: the arc is completely filled - it acts like a gauge.  
The minimum-value and the maximum value are defined in a dynamic color element (see ["Using Dynamic Colors"](#)).



### **DIRECTION ARROW:**

X/Y define the center of the arrow, radius defines the length from center of the arrow (total arrow length is 2x radius), stroke defines thickness of the arrow.

### **DIRECTION TRIANGLE:**

X/Y define the center of the triangle, radius defines the length from center of the triangle, stroke defines thickness of the triangle.

With -Y Offset both arrow and triangle can be removed from the center, so that the element moves on a circular path.

## GRAPH:

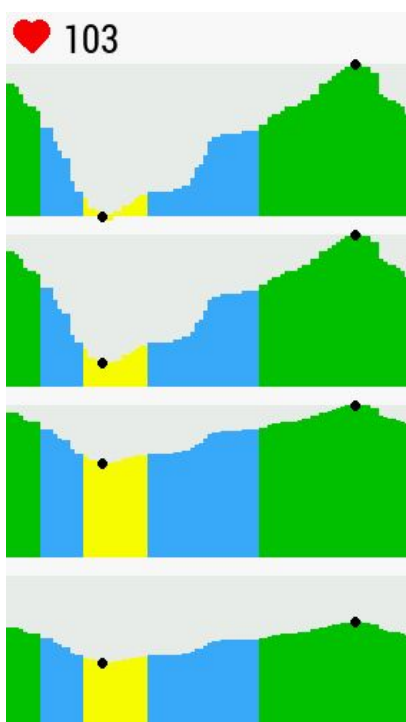
There are 4 types of graphs available:

- Graph left/top
- Graph right/top
- Graph left/bottom
- Graph right/bottom

X/Y and X2/Y2 defines a rectangle in which the graph is shown.

For each type of graph there are 4 possible combinations of the settings of "Limit is minimum value" and "Min./Max. value" (switches depending on the check status of the "Limit..." checkbox).

**Graph left/bottom:** (as an example)



### Graph 1:

Min. value = 0  
Limit min. value = checked  
(Height = curr. lowest to curr. highest value)

### Graph 2:

Min. value = 65  
Limit min. value = checked  
(Height = 65 to curr. highest value)

### Graph 3:

Max. value = 0  
Limit min. value = not checked  
(Height = 0 to curr. highest value)

### Graph 4:

Max. value = 170  
Limit min. value = not checked  
(Height = 0 to 170)

Properties			
Goto DynCol	Color	FF1234	
Enable day/night switching <input type="checkbox"/>			
X	-	0	+
Y	-	34	+
X2	-	282	+
Y2	-	134	+
Min value	-	0	+
Stroke	-	3	+
Valuetype	Limit is minimum value <input checked="" type="checkbox"/>		
Curr. heartrate <input type="text" value="103"/>			
Graphictype	(H) Graph left/bottom		
Text	<input type="text"/>		
Font	XTINY		
H Alignment	Right		
Nr of Values	-	94	+
Precision	-		+
Sample text	<input type="text"/>		
Mark min/max values <input checked="" type="checkbox"/>			

These graphs are connected to curr. HR, use dynamic Colors and "Mark min/max values" is checked (little dots).

A graph "left/bottom" starts at the left edge, grows to the right edge. When it is reached, the actual value always is on the right side and the graph moves to the left. Smaller values are at the bottom, larger values at the top.

Stroke defines the thickness (increment) of each value, which is updated every second.

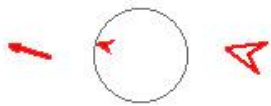
[Dynamic colors](#) can be used as with all other graphic elements.

A graph right/bottom runs in the opposite direction.

A graph right/top has the base of the graph on top.



## Explanation of setting the Direction Elements Arrow and Triangle:



For both elements applies:

3 different points can be selected as direction and the distance to this point can be displayed:

- 1) direction to and distance from the starting point of the activity
- 2) Direction North (the distance makes little sense here)
- 3) Direction to a defined point and distance to it

To display the distance to the chosen point there is the valuetype "Distance to coordinate".

There are 2 different possibilities to set one of the 3 directions mentioned above:

### Definition in the [setup of the data field](#):

Leave the input field for "Coordinates" empty -> Direction to the starting point

Type to Input field for "Coordinates" a "N" -> direction North

Enter coordinates -> direction to this point

The field "Valuetype" of the graphic element arrow or triangle remains on "-none-".

### Definition via "Valuetype" of the graphic element arrow or triangle:

For start point choose "Start coordinates" as value type

For North, select "North" as the value type

For any point choose "Setting coordinates" as value type

These coordinates must be [entered in the setup](#) of the data field!

To sum up:

If "Valuetype" remains "-none-" for Distance Arrow and Triangle, the entry in the setup input field applies.

If "Valuetype" is set to a value for Distance Arrow and Triangle, this value applies. With the value "Setting coordinates", the coordinates must be entered in the setup input field.

See also explanation for: [Heading vs. Track](#).

### 3b) USING DYNAMIC COLORS

Dynamic colors are used to change the color of an element (Value, Text, Graphic) or to hide it or/and to let it blink according to a valuetype on one hand, and on the other hand they are used to make dynamic filled graphic elements grow.

Besides the Value, Text or Graphic element, a corresponding Dynamic Colors element must be created.

Let us explain this with an example:

#### Color Changing Element:

We want to give the figure for Heartrate different colors depending on its value:

60-100 bpm: grey  
 100-120 bpm: blue  
 120-140 bpm: green  
 140-160 bpm: orange  
 above 160 bpm: red

First we have to add a value element,  
 Valuetype = Current heartrate,  
 set it to the right place X/Y.

Define any value as color, which otherwise  
 does not occur in the entire layout:

We'll use FFFFFFFA.

This color value has nothing to do with the  
 displayed color, but is the name of the  
 corresponding Dynamic Colors element.

Properties

Goto DynCol Color FFFFFFFA

Enable day/night switching ☐

X - 25 +

Y - 56 +

X2 - +

Y2 - +

Radius - +

Stroke - 1 +

Valuetype Fixed text ☐

Curr. heartrate

Graphictype Line

Text \$V

Font XTINY

H Alignment Left

Nr of Values - 1 +

Precision - 0 +

Sample text 183.55

Now we add a Dynamic Colors element.

As "Color to replace" - virtually the name of the Dyn. color element - we take the color value of the value element from above: FFFFFFFA.

And now we define the colors and the ranges for the colors.

-the biggest value on top!

-all values multiplied by 10!

60-100 bpm (600-1000): grey C0C0C0  
(Values below 60 bpm are also displayed in grey)

100-120 bpm (1000-1200): blue 00FFFF

And on top:

above 160 bpm (above 1600): red FF0000

The maximum value for "Value (\*10)" is:  
1048576

You see: there is a checkbox

at the bottom: "Invert color order".

Check this box if you give different colors to a Pace-value:

Pace values are set in seconds ( x 10).

The maximum value is 1048576. That means for time:  $1048576/10/60 = 1747$  minutes.

See example from the layout "example\_FR935".

B	H	Value (*10)	Color	Colorvalues
<input type="checkbox"/>	<input type="checkbox"/>	1600	Color 1	FF0000
<input type="checkbox"/>	<input type="checkbox"/>	1400	Color 2	FF8040
<input type="checkbox"/>	<input type="checkbox"/>	1200	Color 3	00FF00
<input type="checkbox"/>	<input type="checkbox"/>	1000	Color 4	00FFFF
<input type="checkbox"/>	<input type="checkbox"/>	600	Color 5	C0C0C0
<input type="checkbox"/>	<input type="checkbox"/>		Color 6	000000
<input type="checkbox"/>	<input type="checkbox"/>		Color 7	000000
<input type="checkbox"/>	<input type="checkbox"/>		Color 8	000000
<input type="checkbox"/>	<input type="checkbox"/>		Color 9	000000
<input type="checkbox"/>	<input type="checkbox"/>		Color 10	000000

☐ Invert color order

B	H	Value (*10)	Color	Colorvalues
<input type="checkbox"/>	<input type="checkbox"/>	2700	Color 1	800080
<input type="checkbox"/>	<input type="checkbox"/>	3000	Color 2	FF0000
<input type="checkbox"/>	<input type="checkbox"/>	3300	Color 3	FF5500
<input type="checkbox"/>	<input type="checkbox"/>	3600	Color 4	00FF00
<input type="checkbox"/>	<input type="checkbox"/>	3900	Color 5	0055FF
<input type="checkbox"/>	<input type="checkbox"/>	4200	Color 6	FFFFFF
<input type="checkbox"/>	<input type="checkbox"/>		Color 7	000000
<input type="checkbox"/>	<input type="checkbox"/>		Color 8	000000
<input type="checkbox"/>	<input type="checkbox"/>		Color 9	000000
<input type="checkbox"/>	<input type="checkbox"/>		Color 10	000000

☒ Invert color order

### Dynamic Filled Graphic Element:

Now let's make an example of a dynamic filled arc.

We want to grow an arc which corresponds to power.

See picture on page 13.

The red arc is empty at 0 Watt and is filled completely at 300 Watt:



First we have to add a Graphic element,  
 Graphictype = Arc dyn. filled  
 Valuetype = Current bikepower  
 set it to the right place X/Y, radius, angles.  
 Stroke = 16 (thickness of the arc)

Define any value as Color, which otherwise  
 does not occur in the entire layout:  
 We'll use F80002.

This color value has nothing to do with the  
 displayed color, but is the name of the  
 corresponding dynamic colors element.

Properties

Goto DynCol Color F80002

Enable day/night switching ☐

X - 141 +

Y - 280 +

Start angle - 383 +

End angle - 337 +

Radius - 122 +

Stroke - 16 +

Valuetype Fixed text ☒

(M) Current bike power

Graphictype Arc dyn. filled

Text

Font XTINY

H Alignment Right

Nr of Values - 1 +

Precision - +

Sample text

Now we add a Dynamic Colors element.

As "Color to replace" - virtually the name of the Dyn. color element - we take the  
 color value of the Graphic element from above: F80002.

And now we define the color  
 and the range for the arc.

Notice:

- the biggest value on top!
- all values multiplied by 10!

0 Watt: the minimum value

300 Watt (3000): the maximum value

The arc is colored red F80000.

The minimum value needs not to be 0.  
 For a heartrate gauge you can set the minimum  
 to 60 bpm (=600). That means: the arc stays  
 empty till the heartrate exceeds 60 bpm.  
 For temperature e.g. you can also set the  
 minimum to minus degrees.

Dynamic Colors

Color to replace F80002

B	H	Value (*10)	Colorvalues
<input type="checkbox"/>	<input type="checkbox"/>	3000	Color 1 F80000
<input type="checkbox"/>	<input type="checkbox"/>	0	Color 2 F80000
<input type="checkbox"/>	<input type="checkbox"/>		Color 3 000000
<input type="checkbox"/>	<input type="checkbox"/>		Color 4 000000
<input type="checkbox"/>	<input type="checkbox"/>		Color 5 000000
<input type="checkbox"/>	<input type="checkbox"/>		Color 6 000000
<input type="checkbox"/>	<input type="checkbox"/>		Color 7 000000
<input type="checkbox"/>	<input type="checkbox"/>		Color 8 000000
<input type="checkbox"/>	<input type="checkbox"/>		Color 9 000000
<input type="checkbox"/>	<input type="checkbox"/>		Color 10 000000

☐ Invert color order

The same pattern applies to create a rectangle dyn. filled!

## Element Fade In / Fade Out and Blinking:

As a further example we want to show or hide an element - depending on a value of the heart rate:

The element should be a big red exclamation mark, which is faded in from a heart rate of 150 and it should blink.

First we have to add an element, Fixed text = checked, Valuetype = -- None --, Text = **!**, select a large font and set X/Y to the desired position.

We define any value as a color, which otherwise does not appear in the entire layout: We use FF1234.

This color value has nothing to do with the displayed color (but is similar to the actual appearance-color).

Now we add a "Dynamic Colors" element.

As "Color to replace" - virtually the name of the Dyn. color element - we take the color value of the element (!) from above: FF1234.

HR 0: the minimum

HR 1500 (150): the threshold value

For the value 0 (up to 1500) we activate the "H" check mark for hiding.

For the value 1500 (and above) we activate the "B" check mark for blinking.

The colour of the exclamation mark is red FF0000.

B	H	Value (*10)	Colorvalues
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1500	Color 1 FF0000
<input type="checkbox"/>	<input checked="" type="checkbox"/>	0	Color 2 000000
<input type="checkbox"/>	<input type="checkbox"/>		Color 3 000000
<input type="checkbox"/>	<input type="checkbox"/>		Color 4 000000
<input type="checkbox"/>	<input type="checkbox"/>		Color 5 000000
<input type="checkbox"/>	<input type="checkbox"/>		Color 6 000000
<input type="checkbox"/>	<input type="checkbox"/>		Color 7 000000
<input type="checkbox"/>	<input type="checkbox"/>		Color 8 000000
<input type="checkbox"/>	<input type="checkbox"/>		Color 9 000000
<input type="checkbox"/>	<input type="checkbox"/>		Color 10 000000

☐ Invert color order

This means: The exclamation mark remains invisible until HF=149 and is faded in and blinks from HF=150.

### 3c) VALUE TYPES

There are nearly endless types of values available which can be added to a layout.

For the element "Value" you can choose the Valuetype from the dropdown-list in the Properties-area.

You will see - for the most of the valuetypes there is a specification in front of the name:

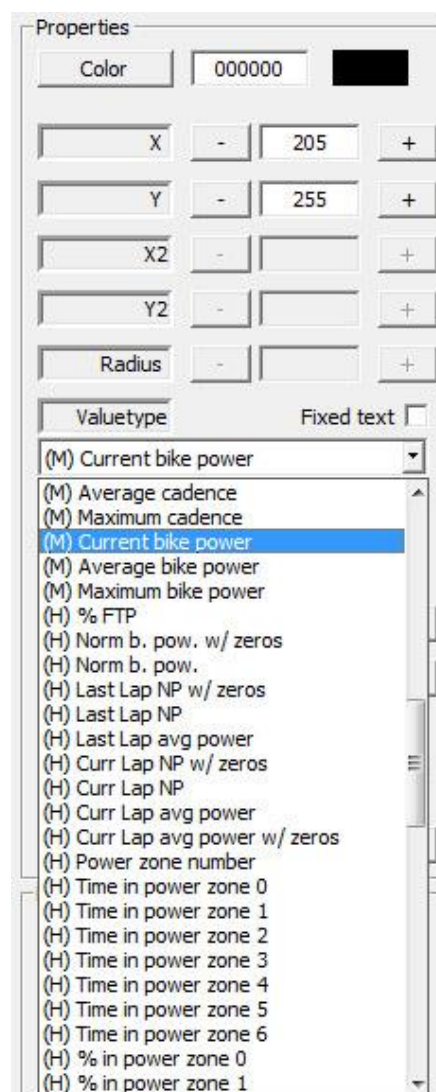
nothing: available on all devices.

(M): additionally available on devices with "medium memory".

(H): additionally available on devices with "high memory"

For more information see ["Appendix"](#).

Only those "Values" are offered for the selected device that can also be used on this device.



Most of the value types are self-explanatory.

#### LIST OF VALUE TYPES:

-- None --

used for Fixed text (labels)

**Name of destination**

**Name of next point**

**Current date/ time**

see ["Time Formats"](#)

**Timer time**

counts time when activity is running

**Current pause time**

starts when activity is paused, becomes 0 on restart

**Elapsed time**

counts time from start to end of an activity

**Last lap time**

**Current lap time**

**ETA (curr.sp)**

estimated time of arrival based on current speed

**ETA (avg.sp)**

estimated time of arrival based on average speed

**Time to dest (curr. sp)**

time to destination based on current speed

**Time to dest (avg. sp)**

time to destination based on average speed

**ETA next p. (curr.sp)**

estimated time of arrival to next point (curr. speed)

**ETA next p. (avg.sp)**

estimated time of arrival to next point (average speed)



<b>Time to next p. (curr.sp)</b>	time to next point (current speed)
<b>Time to next p. (avg.sp)</b>	time to next point (average speed)
<b>Total pause time</b>	cumulated pause times
<b>Current pace</b>	Pace: min/km or min/mile
<b>Average pace</b>	Pace values are capped to 9.59 min/km by default, because 4-digits pace values take up more space and are not very meaningful anyway.
<b>Maximum pace</b>	Setting/Cancellation for "Cap pace" can be made in the setup. See: " <a href="#">Cap pace at [s]</a> "
<b>Last lap avg. pace</b>	
<b>Current lap avg. pace</b>	
<b>Average pace (elapsed)</b>	
<b>Elapsed distance</b>	
<b>Distance to destination</b>	
<b>Distance to next point</b>	
<b>Distance to coordinate</b>	see " <a href="#">Explanation of Direction Elements</a> "
<b>Current lap distance</b>	
<b>Odometer</b>	Km/Mileage of the bike. <a href="#">To be set in setup.</a>
<b>Current speed</b>	
<b>Average speed</b>	
<b>Maximum speed</b>	
<b>Last lap avg. speed</b>	
<b>Current lap avg. speed</b>	
<b>Average speed (elapsed)</b>	
<b>Difference Avg-Curr speed</b>	Difference between avg. and current speed.
<b>Current cadence</b>	
<b>Average cadence</b>	
<b>Maximum cadence</b>	
<b>Steps goal</b>	For devices which are capable to count steps
<b>Steps today</b>	
<b>Steps remaining to goal</b>	
<b>Steps in activity</b>	
<b>Active minutes day</b>	
<b>Active minutes week</b>	
<b>Active minutes week goal</b>	
<b>Current bike power</b>	
<b>Average bike power</b>	
<b>Maximum bike power</b>	
<b>% FTP</b>	
<b>Watt per kg/pound</b>	You have to <a href="#">enter a weight in the settings!</a>
<b>Watt per kg/pound NP</b>	To display Watt/kg it is necessary to have Normalized bike power on your layout!
<b>Variability index</b>	Normalized bike power / power average
<b>Intensity factor</b>	Normalized bike power / FTP ( <a href="#">enter in settings!</a> )
<b>Normalized bike power</b>	NP (corresponds to Garmin's NP)
<b>Normalized b. power without zeros</b>	NP without zero-Watt values
<b>Last lap NP</b>	



Last lap NP without zeros  
Current Lap NP  
Current Lap NP without zeros  
Last lap average power  
Current Lap average power  
Current Lap average power without zeros

**TSS** Training Stress Score  
To display TSS it is necessary to have  
**Normalized bike power** on your layout and **FTP** in [setup!](#)

Power zone number  
Time in powerzone 0-6  
% in powerzone 0-6

Front derailleur index	gear number front <b>(use this section for Shimano!)</b>
Front derailleur max	maximum of gears front
Front derailleur size	number of gear-teeth front
Rear derailleur index	gear number rear
Rear derailleur max	maximum of gears rear
Rear derailleur size	number of gear-teeth rear

**ANT BikeCad status** Cadence Sensor  
**ANT BikeCad battery**  
**ANT BikeCad cadence**

**ANT BikeSpeedCad status** combined Speed/Cadence Sensor  
**ANT BikeSpeedCad battery**  
**ANT BikeSpeedCad cadence**  
**ANT BikeSpeedCad speed**  
**ANT BikeSpeedCad distance**  
**ANT BikeSpeed status**  
**ANT BikeSpeed battery**  
**ANT BikeSpeed speed**  
**ANT BikeSpeed distance**

**ANT Shift status** Following shifting-ANTs **work not with Shimano!**  
**ANT Shift battery** Use Front- and Rear-derailleur values above!  
**ANT Shift front gearIndex**  
**ANT Shift front gearMax**  
**ANT Shift front gearSize**  
**ANT Shift rear gearIndex**  
**ANT Shift rear gearMax**  
**ANT Shift rear gearSize**

**ANT BPower status** Power Sensor  
**ANT BPower battery**  
**ANT BPower Calc cadence**  
**ANT BPower Calc power**  
**ANT BPower Calc wheel dist**  
**ANT BPower Calc wheel speed**  
**ANT BPower Pedal power left %**



**Average gradient** of min, max, avg gradient should be 1.  
**Current heartrate**  
**Maximum heartrate**  
**Heartrate zone number**  
**Last lap average HR**  
**Current lap average HR**  
**Time in HR zone 0-5**  
**% in HR zone 0-5**  
**Calories spent**  
**Lap number**  
**Pressure** Air pressure in HectoPascals (hPa)  
**Battery value** Battery of device  
**GPS accuracy** 0-4 (no signal -> very good signal)

**GPS high acc indicator** This value is set to 1 the first time the current speed is under 5 km/h. Because GPS still jumps around at the beginning although it indicates max accuracy this indicator was added.  
 When accuracy is still low, a high current speed is displayed even if standing still. So this indicator gets a value of 1 the first time the speed is under 5 km/h, that generally indicates that GPS got a better fix on that position (see example\_FR935\_3.xml).  
 Checks also for gps accuracy > 3 not only the current speed.

**Current latitude**  
**Current longitude**  
**Current heading** can be displayed as degrees (\$V) or text (\$T)  
**Track** See [Heading vs. Track](#)

**Training effect** (aerobe only)

**Bike current gear** for 1-chainring mechanical systems only like on modern MTB. For electrical systems see ANT values!  
 Text: wheel circumference; chain ring; sprockets small to big; example SRAM Eagle X1 (29"):  
 220;30;10;12;14;16;18;21;24;28;32;36;42;50

**Temperature** updated every 5 minutes, for all devices which support temperature. An offset can be set (+/-) in settings, if your device is constantly deviating from the correct temperature.

**Pacer calc average speed** This field is mandatory when using pacer because all pacer calculations are based on this field. It just needs to be in the layout, it can be hidden in the background. The "nr of values" must be set to a value multiple of 30. This value defines in which timer range the current average speed is calculated and the ahead/behind time and predicted time are base on the already reached distance and this average speed. In the example file it is set to 300 (5mins): FR935/example\_FR935\_pacer.xml

**Pacer curr. ahead time** Shows the ahead/behind time.

This values represents how much second you are behind your goal pace at the moment.

**Pacer target ahead time** Shows your ahead/behind time. The difference to the above value (pacer curr ahead time) is that it predicts the time you are ahead/behind when you reach the goal based on your current average speed. This value needs the pacer target distance to be set. The values bases its prediction on the "Pacer calc average speed" value which is your current average speed over the last XX seconds (it should be at least 5 minutes (300s), so the value doesn't jump too quickly when the speed changes).

**Pacer predicted time** Shows the finish time based on already elapsed distance and average speed over last XX seconds/minutes.

Correlates to the Pacer target ahead time.

**Pacer predicted pace** Calculated finish pace based on above values

**Pacer total average pace** Current total average based including corrected distance (see below)

**Pacer corrected distance** Shows the current elapsed distance including the offset value (lap button press, see below)

**Pacer offset indicator** This graphic element (in example-layout a little yellow circle) is only shown when a distance offset value is set by lap button press (see below)

**Free memory** is to show a roughly estimate how much memory is free during testing of your layout. There should be at least 200 bytes free after starting the timer. Be aware that using the pacer will use about 800 bytes more after starting the timer!

**Datafield version**

**App name**

**Phone connected** Not connected = 0, connected = 1

**Notification count** [See Remarks to Notification count](#)

**Start coordinates**

**North**

**Setting coordinates**

These 3 values can only be used with the Graphic elements Direction arrow and triangle.

See "[Explanation of Direction Elements](#)".

**Sunrise**

**Sunset**

**Wind bearing**

**Wind speed**

Mask **\$V** displays degrees, **\$T** displays compass directions

### **Settings for Pacer:**

Pacer distance: distance in km: -> '21.1' (for a half marathon)

It is possible to enter more than one pacer distance separated by ';'.  
Multiple pacer distances only make sense when using target

pace 'PX:YY'!

Pacer target time/pace: the target time or target pace:

target time -> 'T2:05:05' (for 2h 05mins 05sec target time)

or target pace -> 'P5:30' (for a target pace of 5:30 min/km)

### **Distance correction:**

It is possible to press the lap button at a km marker during a race. The distance is then rounded to the nearest kilometer and "Pacer total average pace" and "Pacer corrected distance" are corrected. (5.1 km corrects to 5.0 km; 3.84 km corrects to 4.0 km).

When correction is active it is indicated by the "Pacer offset indicator" (little yellow circle in example-layout).

When lap button is pressed within 30 seconds again, the offset is reset.

An example layout can be found in the examples.zip ->

FR935/example\_FR935\_pacer.xml

Distance correction is disabled when a workout is active!

Ahead time and predicted pace are written into the fit file (optional).

### **Remarks to ANT Values:**

Applies to all ANT groups:

#### **Status:**

0: NOT PAIRED, 1: CLOSED, 2: SEARCHING, 3: TRACKING

#### **Battery:**

0 (or 7): INVALID, 1: NEW, 2: GOOD, 3: OK, 4: LOW, 5: CRITICAL

For the output of the value "Battery" you can choose between numeric and text:

Select the format mask in the text field:

\$V .... numeric

\$T .... text

Not all possible values are actually transmitted by all sensors.

Unfortunately it is different from sensor to sensor and manufacturer to manufacturer: try it out!

Instead of the ANT values for the general values like Speed, Cadence and Power, the "normal" values Speed, Cadence and Power can of course also be used. But with the ANT-Values you can e.g. give a warning if a sensor is not transmitting anymore.

### **Remarks to ANT LightNet modes:**

For the output you can choose between numeric and text: \$V or \$T

0 ... OFF	OFF
1 ... Steady beam 81-100% intensity	81-100%
2 ... Steady beam 61-80% intensity	61-80%
3 ... Steady beam 41-60% intensity	41-60%
4 ... Steady beam 21-40% intensity	21-40%
5 ... Steady beam 0-20% intensity	0-20%
6 ... Slow Flash	SLOW FLASH
7 ... Fast Flash	FAST FLASH
8 ... Random Flash	RANDOM FLASH
9 ... Auto	AUTO
10 ... Turn signal left self-cancelling	SIGNAL LEFT SC
11 ... Turn signal left	SIGNAL LEFT
12 ... Turn signal right self-cancelling	SIGNAL RIGHT SC
13 ... Turn signal right	SIGNAL RIGHT
14 ... Hazard - right and left signals flash	HAZARD
59 ... Custom mode 5 (manufacturer-defined)	CUSTOM 5
60 ... Custom mode 4 (manufacturer-defined)	CUSTOM 4
61 ... Custom mode 3 (manufacturer-defined)	CUSTOM 3
62 ... Custom mode 2 (manufacturer-defined)	CUSTOM 2
63 ... Custom mode 1 (manufacturer-defined)	CUSTOM 1

([back to ANT LightNet valuetypes](#))

### **Heading vs. Track**

There are 2 value types that have the same result:

**Current heading** and **Track (direction of travel)**

They show the own course in degrees (\$V) or in directions of the wind rose:

(\$T): N, NO, O, SO, S, SW, W, NW

The difference is that the two values are formed in the program in different ways. If one of them has an unstable display, choose the other one!

The same applies to the [Directions graphic elements Arrow and Triangle](#).

The display can be set based on heading or track.

If the direction display is unstable, use the alternative method.

[The selection is made in the setup!](#)

### **Remarks to Notification Count:**

Notification count not only counts missed calls, SMS, WhatsApp, but sometimes also other messages on the phone's lock screen!

It is therefore recommended to delete these messages regularly!

([back to Notification count value type](#))



### 3d) TIME FORMATS

#### Time:

For all time data (clocktime, elapsed time, pace) you can use different display formats:

**\$H:\$M:\$S** is the standard-format 00:00:00 (shows hours only if > 0)

**\$H:\$M:\$C** display format 00:00 (shows hours only if value > 0,  
shows seconds only if hours < 1)

**\$h:\$M:\$S** displays only one hour-digit if the number is in single digits

**\$m:\$S** displays only one minute-digit if the number is in single digits

Only parts of the format masks can also be used.

So **\$M:\$S** only shows minutes and seconds or **\$H:\$M** only hours and minutes.

#### 12 or 24 Hours Format:

is automatically taken over from the device setting.

For the 12 hour format **\$a** can be added to the mask to display AM/PM.

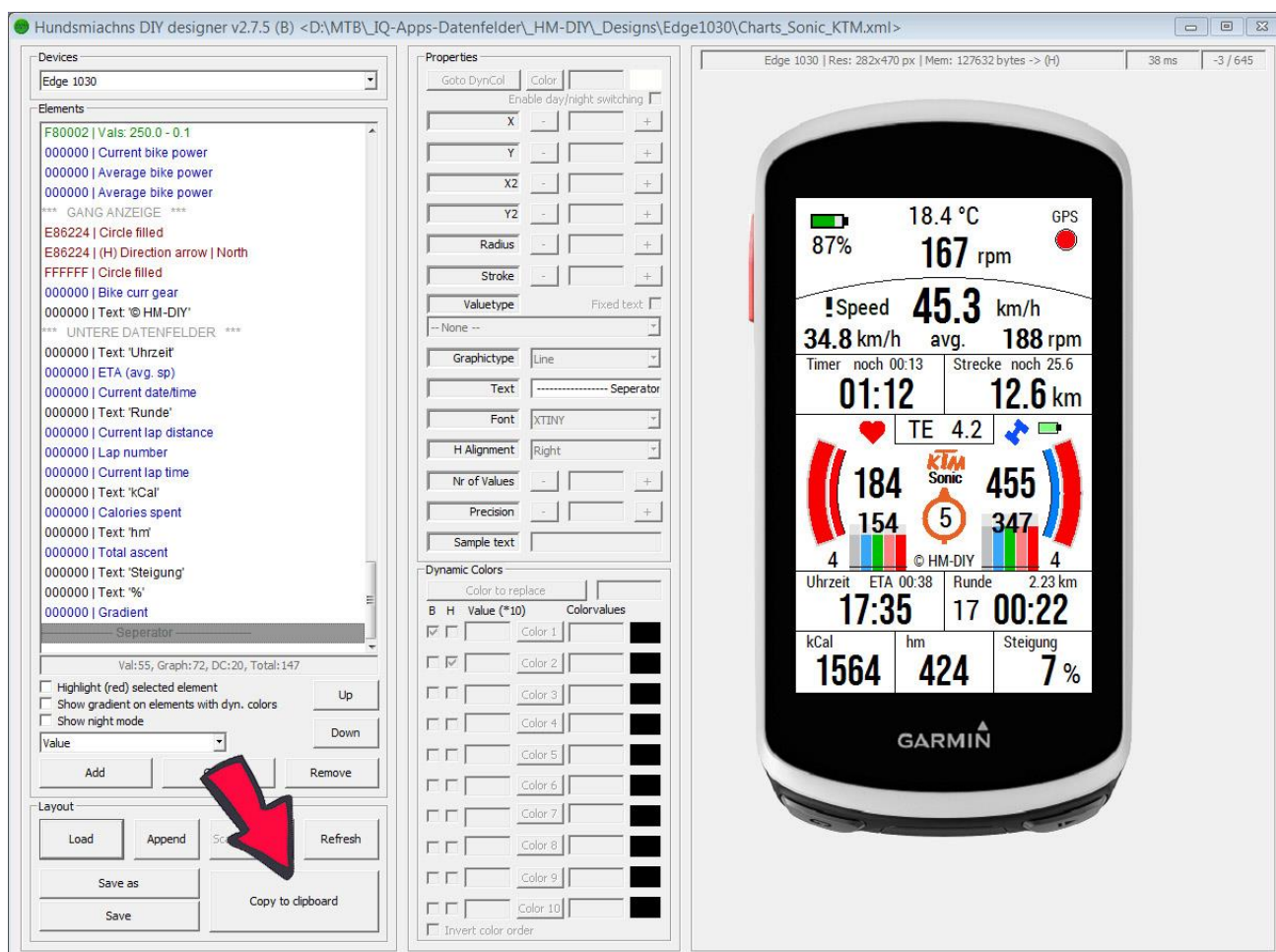
#### Date:

**\$N-\$D-\$Y** displays the date mm-dd-yyyy i.e.: 03-24-2020

## 4) TRANSFERRING YOUR LAYOUT TO YOUR GARMIN DEVICE

Once you are satisfied with the layout of your design in the Designer tool preview, the design needs to be transferred to your device.

On the Designer tool click the button "Copy to Clipboard".



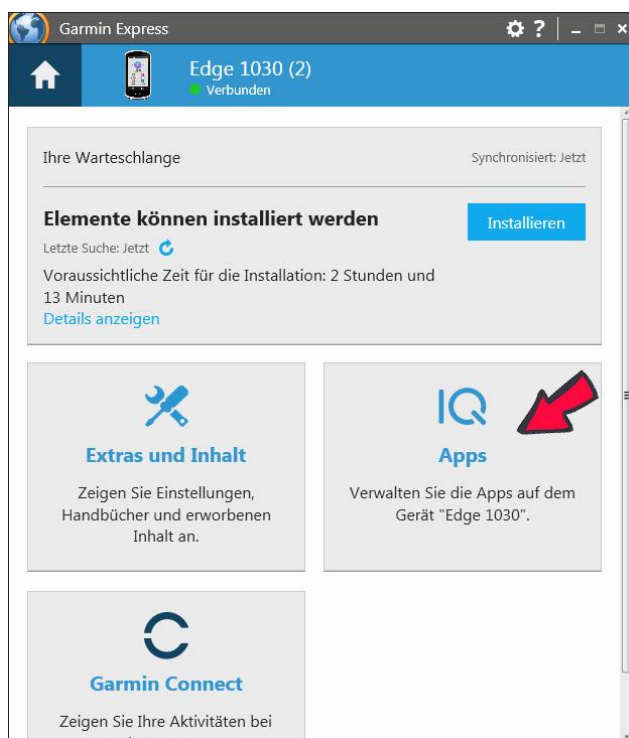
This copies a layout-string to the clipboard which is to be pasted into the setup-routine on your device.

Transferring the layout to your Garmin device can be done in 2 ways:  
using Garmin Express or using Garmin Connect Mobile.

## Transfer with Garmin Express:

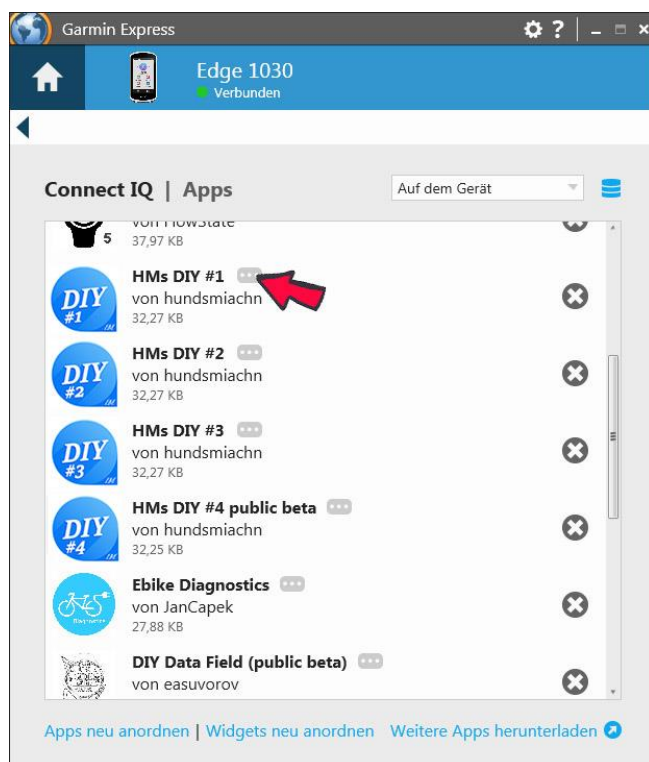
Connect your device to your PC, start Garmin Express, tap on the device icon.

A window opens - tap on IQ Apps:



Another window opens and shows all installed IQ-Apps and Datafields:

Tap the 3-dots-button of HMs DIY #



The Setup-window opens:

Garmin Express

**HMs DIY #1 Einstellungen**

**Description**  
Charts3\_oben\_SPEsh.xml

**Default layout string**  
B!!!iQJ!ww\*!yYK+(!!yN!!iQb!ww\*"+%z

**Running layout string**  
[Empty text box]

**Biking layout string**  
[Empty text box]

**Pacer distances [km or mi] (X;Y;...)**  
10.0;21.1;42.2

**Pacer target time/pace ('TH:MM:SS' or 'PM:SS')**  
T1:00:00

**Temperature offset [C or F]**  
0.0

**Total distance (Odometer) [m]**  
0

**Store pacer ahead times to fit file**  
☒ Aus

**FTP (Functional Threshold Power)**  
180

**Power Zones [z0;z1;...;z6]**  
52:80:105:140:170:195:300

**Cap pace at [s]**  
599

**Coordinates ['Lat.xx, Long.xx' or 'N']**  
[Empty text box]

**Weight [kg or pound]**  
[Empty text box]

**Use alternative direction of travel**  
☒ Ein

**Buttons:** Speichern, Abbrechen

### Description:

Information about the layout of this clone

### Default layout string:

Paste the copied string here!

### Alternate layout strings:

See below!

### Pacer-options

See: "[Setting for Pacer](#)"

### Temperature offset:

+/- offset if your device constantly shows a wrong temperature.

### Total distance - Odometer

to be set in meters. It is the actual value for the [Odometer value](#). Shows on display as km/miles!

**FTP** needed for [TSS](#) and [Intensity factor](#)

### Cap pace at [s]

Enter the time for the limit in seconds. Leave empty for no cap. See: "[Pace Valuetype](#)"

### Coordinates

for the Direction graphic elements. See: "[Explanation of Direction Elements](#)"

**Weight:** Your body weight for the calculation of [Watt per kg/pound](#)

### Use alternate direction of travel

See [Heading vs. Track](#)

Description (first input field) is for information only, which layout is stored for this clone.

Now paste the layout-string into the field "Default layout string".

For multifunctional watches you can define 2-more layout strings.

Also look at all other input fields and enter what is important for you.

Save your settings and disconnect your device safely from your PC.

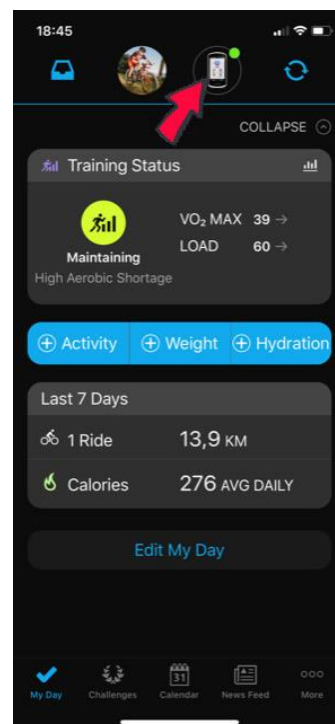
Let your device boot.

Now you have to choose a datafield big enough on your device to load the DIY-datafield.

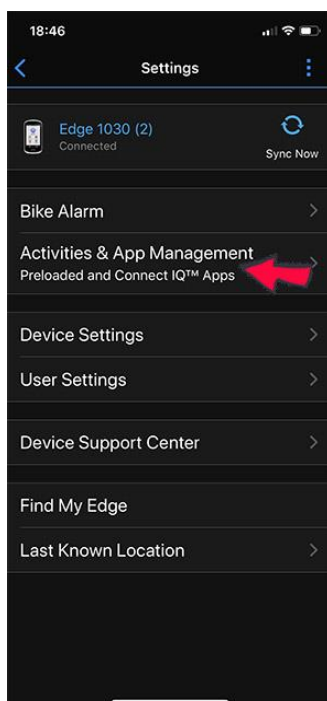
### **Transfer with Garmin Connect Mobile:**

On your mobile-phone start Garmin Connect Mobile, turn on your Garmin device and wait until the connection was established.

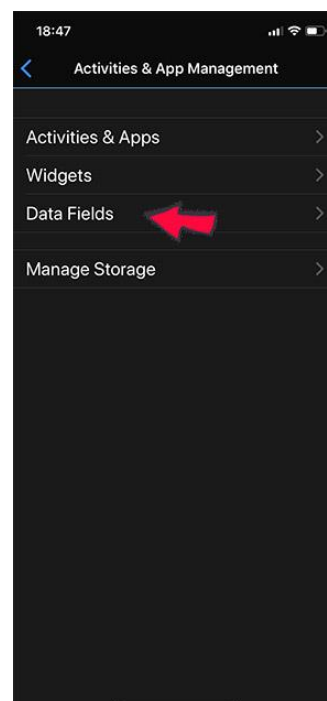
On your mobile phone tap on the device icon with the green dot.



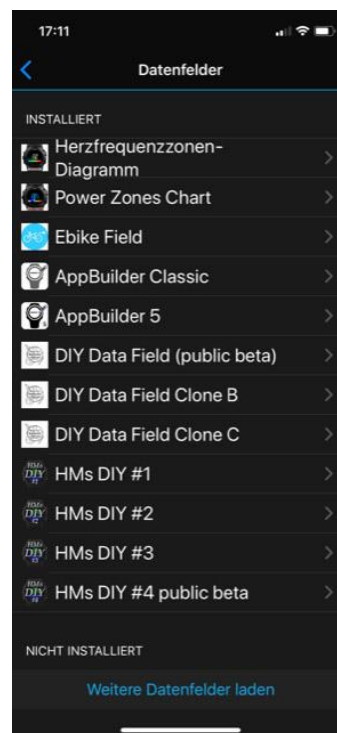
Tap on "Activities & App Management"



Tap on "Data Fields"



Tap on the desired DIY-Datafield  
and on the next screen tap on "Setup".



Now an input page opens, which [corresponds to the one shown above](#) (transfer via Garmin Express).

Paste the layout-string into the field "Default layout string".

For multifunctional watches you can define 2-more layout strings.

Type in all other data of your interest and save your settings.

Now you have to choose a datafield big enough on your device to load the DIY-datafield.

Enjoy!

## 5) FONTMAPPING FOR YOUR DEVICE

As described in chapter 3) DESIGNER TOOL Garmin does not publish the fonts that are used on their devices. They are not available as truetype fonts (ttf). So similar fonts had to be found in order to display text and digits reasonably satisfactorily. This is the reason why there is a certain discrepancy between the preview in the designer and the actual appearance on the device.

In the Designer tool there are 9 replacement fonts built in, which can be adjusted as best as possible.

### Available font IDs in the application DIY-Designertool:

```
#    IDR_FNT_ROBOTO_COND_BOLD
#    IDR_FNT_ROBOTO_COND_REG
#    IDR_FNT_BEBASNEUE_REG
#    IDR_FNT_DEJAVUSANS
#    IDR_FNT_DEJAVUSANS_BOLD
#    IDR_FNT_DEJAVUSANS_COND
#    IDR_FNT_DEJAVUSANS_COND_BOLD
#    IDR_FNT_STEELFISH_REG
#    IDR_FNT_STEELFISH_BOLD
```

The built-in fonts look like this:

ROBOTO Condensed Bold

ABCDEFGHIJKLMNO  
PQRSTUVWXYZÀÁÊË  
ÏÐabcdefghijklmnp  
qrstuvwxyzàáêëïðü&  
1234567890(\$£€.,!?)

ROBOTO Condensed Regular

ABCDEFGHIJKLMN  
OPQRSTUVWXYZÀÁ  
abcdefghijklmnpqr  
stuvwxyzàáêëïðü&1  
234567890(\$£€.,!?)

BEBASNEUE Reg

ABCDEFGHIJKLMNOPQR  
ABCDEFGHIJKLMNOPQR  
1234567890 (!@#\$%&')

DEJAVUSANS

ABCDEFGHIJKLM  
NOPQRSTUVWXYZ  
abcdefghijklm  
nopqrstuvwxyz  
0123456789  
!@#\$%^&\*()



# DEJAVUSANS BOLD

**ABCDEFGHIJKLM  
 NOPQRSTUVWXYZ  
 ZÀÁÊËÏÖøabcdefghijklmnop  
 hijklmnopqrstuv  
 wxyzàáéíöø&123  
 4567890(\$£€.,!?)**

# DEJAVUSANS CONDENSED BOLD

**ABCDEFGHIJKLMNO  
 PQRSTUVWXYZÀÁÊ  
 abcdefghijklmnopq  
 rstuvwxyzàáéíöø&1  
 234567890(\$£€.,!?)**

# STEELFISH REG

**ABCDEFGHIJKLMNQRST  
 UVWXYZÀÁÊËÏÖøabcdefgh  
 ijklmnopqrstuvwxyzàáéíö  
 øü&1234567890(\$£€.,!?)**

# STEELFISH BOLD

**ABCDEFGHIJKLMNQRSTUWXYZ  
 abcdefghijklmnopqrstuvwxyz  
 1234567890 (!@#\$%?&[\*^=+/-...])**

This mapping is stored in the fonts.txt file. There is a list of fonts for every Garmin device and there are several entries for every device for the different font types that are available on that device.

For many devices, the adaption was done already.

If you find, the layout showed in the designertool for your device is not satisfactory you have to adapt the font-settings for the designer by editing the file fonts.txt.

## How to adapt the fonts for your device:

First things first:

The fonts in your device are fixed and cannot be changed. Neither the appearance nor the font size can be changed. So you cannot change the fonts in your device by changing the appearance in the Designer. It works exactly the other way round! You have to adjust the appearance in the designer as much as possible to the actual appearance on the device.

From the downloaded examples-collection load from the folder FR935 the layoutfile font\_test1.xml and/or font\_test2.xml:

These look like this:



Now change the entry for "device" on the Designer to your device and press the "Scale to device" button.

If it looks like the left picture below, then the font mapping for your device has not yet been done. If it looks like the right picture, it has already been done (roughly).



In either case, save the fonttest layout under a new name for your device.  
Then transfer the layout to your device and check what it looks like.

Now the appearance must be adjusted in the Designer to match the appearance on the device. Probably you have to adapt fontsizes and alignments - maybe also fontfaces.

Now search the file fonts.txt for your device name to find all the fonts available in your device.

We will do this as an example for EDGE 1030. But it is the same procedure for all devices.

Search for "edge 1030".

You will find:

//DONE (means: the fonts were adapted already).

"Edge 1030" - "XTINY" ==> FNT\_ROBOTO\_CONDENSED\_16

"Edge 1030" - "TINY" ==> FNT\_ROBOTO\_CONDENSED\_22

"Edge 1030" - "SMALL" ==> FNT\_ROBOTO\_CONDENSED\_26

"Edge 1030" - "MEDIUM" ==> FNT\_ROBOTO\_CONDENSED\_29

"Edge 1030" - "LARGE" ==> FNT\_ROBOTO\_CONDENSED\_48

"Edge 1030" - "NR\_MILD" ==> FNT\_DEJAVU\_FITNESS\_30

"Edge 1030" - "NR\_MEDIUM" ==> FNT\_DEJAVU\_FITNESS\_35

"Edge 1030" - "NR\_HOT" ==> FNT\_DEJAVU\_FITNESS\_47

"Edge 1030" - "NR\_THAI\_HOT" ==> FNT\_DEJAVU\_FITNESS\_58

There you can see:

the font NR\_MILD for example is mapped to FNT\_DEJAVU\_FITNESS\_30.

Now search for FNT\_DEJAVU\_FITNESS\_30:

You will find:

**FNT\_DEJAVU\_FITNESS\_30;IDR\_FNT\_BEBASNEUE\_REG; 40; -7; 0; 8; -6**

(All different values in this line are separated by a semicolon.)

That means:

The font **NR\_MILD** of your device will be replaced by **BEBASNEUE\_REG** in the designertool.

The numbers at the end of the line represent:

40 ... fontsize

-7 ... horizontal offset in pixel when used left-alignment (+ to the right, - to the left)

0 ... horizontal offset in pixel when used center-alignment

8 ... horizontal offset in pixel when used right-alignment

-6 ... vertical offset (+down, - up)

For every font (every value-figure in your design) first try to adapt the fontsize.  
If the font in the preview seems to be too small, increase the fontsize or vice-versa.  
If you like to change the fontface - for example the font BEBASNEUE\_REG to font DEJAVUSANS CONDENSED BOLD, change the line:

```
FNT_DEJAVU_FITNESS_30;IDR_FNT_BEBASNEUE_REG; 40; -7; 0; 8; -6
```

to the new line

```
FNT_DEJAVU_FITNESS_30;IDR_FNT_DEJAVUSANS_COND_BOLD; 40; -7; 0; 8; -6
```

Save the file fonts.txt, close the Designer and start the Designer anew. Now the fontsizes and -faces should have been changed.

After you have adapted the fonts you have to adapt the place (alignments) of the figures.

The origin of text and numbers is approximately:

- left/upper corner for left-alignment
- right/upper corner for right-alignment
- center/upper point for center-alignment



However, this is not as accurate for the fonts in the Garmin devices as shown here. Therefore, adjustments using the offset values are usually necessary both horizontally and vertically.

In the font.txt file edit the horizontal and vertical offsets to match the appearance on the device. Estimate by how many pixels the figure has to be moved left/right/up/down to match the appearance on the device.

Change the values for alignments, save the fonts.txt file, close the designer, start it anew and check if the (false) position in the Designer matches the (false) position on the device.

DO NOT change the coordinates of the elements in the designer until the preview in the designer matches your device!

If you have made sure that the appearance in the designer matches the appearance on the device, and you have only achieved this by editing the offsets in the file fonts.txt, now place the elements in the designer in the correct position.

Save the design.

Transfer it to your device and check if it looks better now.

You have to continue these steps until the appearance on the device is as similar as possible to the appearance of the designertool.

Note: graphic elements like lines, circles, rectangles and so on always are on the right position. There can be no offset error for these.

### A practical example of offset adjustment:

You created a layout that looks good in the Designer preview, but after transfer to the device there are some differences:



Let's concentrate on the middle number: clock-time. It has fontsize NR\_THAI\_HOT.

On the watch, that figure is too low. It must be raised.

That means: the transferred y-coordinate is too large.

Estimate by how many pixels the time-value must be raised, so that it sits correctly on the watch. Let's say: 10 pixel up.

Open the file "fonts.txt" and search for the mapped font of NR\_THAI\_HOT of your device. For example:

```
FNT_VIVOACTIVE4_BOLD_NUMBER_FONT_6;IDR_FNT_BEBASNEUE_REG; 70; 0; 0; 0; 0
```

Add +10 pixel to the last number of that line for vertical offset.

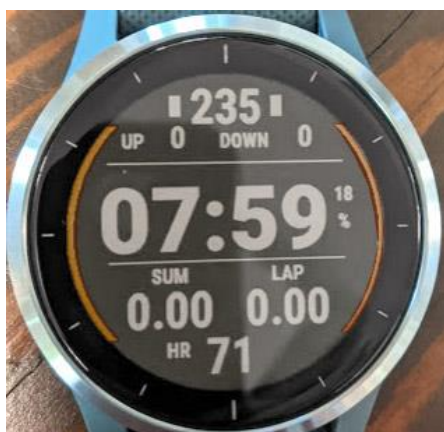
```
FNT_VIVOACTIVE4_BOLD_NUMBER_FONT_6;IDR_FNT_BEBASNEUE_REG; 70; 0; 0; 0; 10
```

Save the fonts.txt file and end the Designer tool.

Start the Designer anew. Now the time value is (hopefully) at the same (false) position like on the watch.

On the Designer raise the y-coordinate to bring the time-value on its right place.

Transfer the layout to your watch and check again.



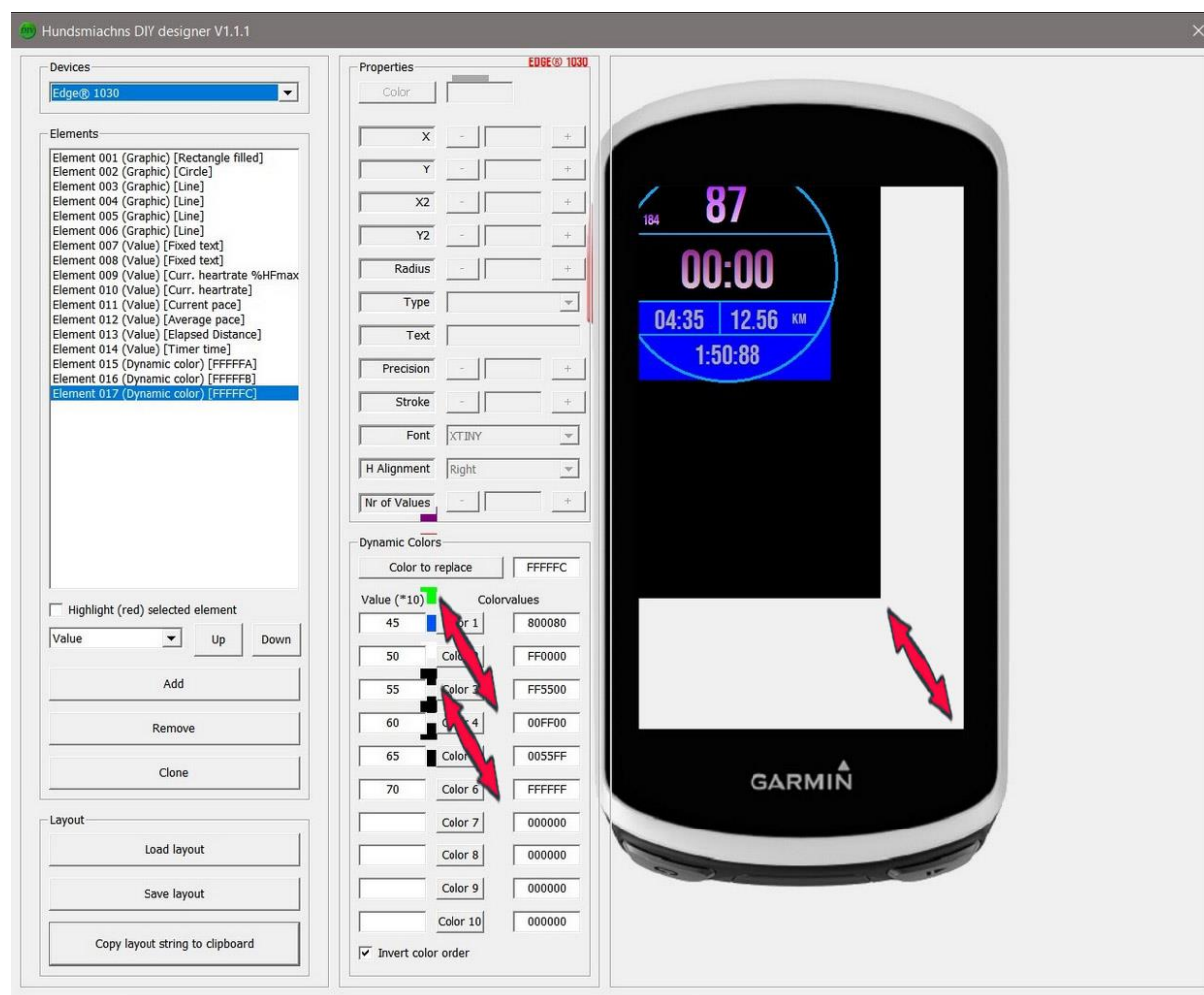
## 6) TROUBLESHOOTING

### Layout issues:

#### Problem is solved since version 2.4.6

If you are seeing some layout issues with the Designer tool on your PC, probably it is a problem with the font size of your PC-screen settings.

PC font size has to be 100 % for the Designer tool.



Please change the properties of the Designer-exe file so that it overrides the High DPI scaling settings with 'System (Enhanced)'.

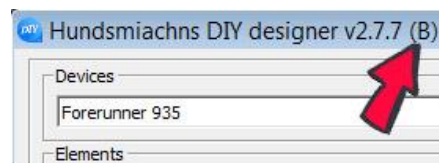
Right click the exe, click properties, click Change High DPI settings (or on WIN7: Compatibility), check High DPI scaling override, and choose SYSTEM from the drop down. Back out saving.

The Designer tool window will display correctly when opened.

### Incompatible string:

If the layout is not loaded on the Garmin device, but the message "Incompatible string!" appears, then the version and/or the generation of the DIY data field on the device does not match the version of the Designer program! The generation is indicated by a letter at the beginning of the transmitted string.

You can find the version and the generation letter in the headline of the designer program!



Update both the Designer and the DIY data fields on the device!

### PC screen is not high enough:

The screen of some PCs or laptops may not be high enough to display the entire Designer window (900 pixels height). The lower area is not visible.

There are keyboard shortcuts for this:

- "Load" -> Ctrl+O
- "Save" -> Ctrl+S
- "Append" -> Ctrl+I
- "Save as" -> Ctrl+Shift+S
- "Copy to clipboard" -> Ctrl+B
- "Copy element" -> Ctrl+C
- "Paste element" -> Ctrl+V
- "Cut element" -> Ctrl+X



## 7) APPENDIX

The complete documentation of the release notes can be viewed here: [Releasenotes](#)

### Device Memory

For the most of the valuetypes there is a specification in front of the name:

nothing: available for all devices.

(M): additionally available on devices with "medium memory".

(H): additionally available on devices with "high memory"

Current max elements: low memory devices: 30

medium memory devices: 35

high memory devices: 500

(Low memory devices are those with only 16 kb memory, for example FR235, FR630, D2 Bravo...)

### Garmin Device Properties

ID	Shape	WxH	Touch	Tone	Vibrate	DF Mem	Cadence	Speed	HR	Power	Shift	Color Depth
approachs60	round	240x240	+	--	+	29328	+	+	+	--	--	8
d2bravo	round	218x218	--	+	+	16384	+	+	+	+	--	4
d2bravo_titanium	round	218x218	--	+	+	16384	+	+	+	+	--	4
d2charlie	round	240x240	--	+	+	127632	+	+	+	+	+	8
d2delta	round	240x240	--	+	+	127632	+	+	+	+	+	8
d2deltapx	round	240x240	--	+	+	127632	+	+	+	+	+	8
d2deltas	round	240x240	--	+	+	127632	+	+	+	+	+	8
descentmk1	round	240x240	--	+	+	127632	+	+	+	+	+	8
edge1030	rectangle	282x470	+	+	--	127632	+	+	+	+	+	16
edge1030bontrager	rectangle	282x470	+	+	--	127632	+	+	+	+	+	16
edge130	rectangle	230x303	--	+	--	29328	+	+	+	+	--	1
edge520plus	rectangle	200x265	--	+	--	127632	+	+	+	+	+	16
edge530	rectangle	246x322	--	+	--	127632	+	+	+	+	+	16
edge820	rectangle	200x265	+	+	--	127632	+	+	+	+	+	16
edge830	rectangle	246x322	+	+	--	127632	+	+	+	+	+	16
edgeexplore	rectangle	240x400	+	+	--	127632	+	+	+	--	--	16
edge_1000	rectangle	240x400	+	+	--	127632	+	+	+	+	+	16
edge_520	rectangle	200x265	--	+	--	29328	+	+	+	+	+	16
epix	rectangle	205x148	+	+	+	131072	+	+	+	+	--	8
fenix3	round	218x218	--	+	+	16384	+	+	+	+	--	4
fenix3_hr	round	218x218	--	+	+	16384	+	+	+	+	--	4
fenix5	round	240x240	--	+	+	29328	+	+	+	+	+	8
fenix5plus	round	240x240	--	+	+	127632	+	+	+	+	+	8
fenix5s	round	218x218	--	+	+	29328	+	+	+	+	+	8
fenix5splus	round	240x240	--	+	+	127632	+	+	+	+	+	8
fenix5x	round	240x240	--	+	+	127632	+	+	+	+	+	8
fenix5xplus	round	240x240	--	+	+	127632	+	+	+	+	+	8
fenix6	round	260x260	--	+	+	29328	+	+	+	+	+	8
fenix6pro	round	260x260	--	+	+	127632	+	+	+	+	+	8
fenix6s	round	240x240	--	+	+	29328	+	+	+	+	+	8
fenix6spro	round	240x240	--	+	+	127632	+	+	+	+	+	8
fenix6xpro	round	280x280	--	+	+	127632	+	+	+	+	+	8
fenixchronos	round	218x218	--	+	+	29328	+	+	+	+	+	8



fr230	semiround	215x180	--	+	+	16384	+	+	+	--	--	4
fr235	semiround	215x180	--	+	+	16384	+	+	+	--	--	4
fr245	round	240x240	--	+	+	29328	+	+	+	--	--	8
fr245m	round	240x240	--	+	+	62096	+	+	+	--	--	8
fr45	round	208x208										4
fr630	semiround	215x180	+	+	+	16384	+	+	+	--	--	4
fr645	round	240x240	--	+	+	29328	+	+	+	--	--	8
fr645m	round	240x240	--	+	+	62096	+	+	+	--	--	8
fr735xt	semiround	215x180	--	+	+	29328	+	+	+	+	+	4
fr920xt	rectangle	205x148	--	+	+	16384	+	+	+	+	--	4
fr935	round	240x240	--	+	+	29328	+	+	+	+	+	8
fr945	round	240x240	--	+	+	127632	+	+	+	+	+	8
garminswim2	round	208x208										4
gpsmap66	rectangle	240x400	--	+	--	127632	+	+	+	--	--	16
gpsmap86	rectangle	240x400	--	+	--	127632	+	+	+	--	--	16
legacyherocaptainmarvel	round	218x218	+	--	+	29328	+	+	+	--	--	8
legacyherofirstavenger	round	260x260	+	--	+	29328	+	+	+	--	--	8
legacysagadarthvader	round	260x260	+	--	+	29328	+	+	+	--	--	8
legacysagarey	round	218x218	+	--	+	29328	+	+	+	--	--	8
marqadventurer	round	240x240	--	+	+	127632	+	+	+	+	+	8
marqathlete	round	240x240	--	+	+	127632	+	+	+	+	+	8
marqaviator	round	240x240	--	+	+	127632	+	+	+	+	+	8
marqcaptain	round	240x240	--	+	+	127632	+	+	+	+	+	8
marqcommander	round	240x240	--	+	+	127632	+	+	+	+	+	8
marqdriver	round	240x240	--	+	+	127632	+	+	+	+	+	8
marqexpedition	round	240x240	--	+	+	127632	+	+	+	+	+	8
oregon7xx	rectangle	240x400	+	+	--	127632	+	+	+	--	--	16
rino7xx	rectangle	240x400	+	+	--	127632	+	+	+	--	--	16
venu	round	390x390	+	--	+	29328	+	+	+	--	--	16
vivoactive	rectangle	205x148	+	--	+	16384	+	+	+	--	--	8
vivoactive3	round	240x240	+	--	+	29328	+	+	+	--	--	8
vivoactive3d	round	240x240	+	--	+	29328	+	+	+	--	--	8
vivoactive3m	round	240x240	+	--	+	29328	+	+	+	--	--	8
vivoactive3mlte	round	240x240	+	--	+	29328	+	+	+	--	--	8
vivoactive4	round	260x260	+	--	+	29328	+	+	+	--	--	8
vivoactive4s	round	218x218	+	--	+	29328	+	+	+	--	--	8
vivoactive_hr	rectangle	148x205	+	--	+	29328	+	+	+	--	--	8
vivolife	round	240x240										8

Thanks to **DaveBrillhart** for creating this list of all the Garmin devices!

## List of all available values in order of the dropdownlist

- -- None --
- Name of destination
- Name of next point
- Current date/ time
- Timer time
- Current pause time
- Elapsed time
- Last lap time
- Current lap time
- ETA (curr.sp)
- ETA (avg.sp)
- Time to dest (curr. sp)
- Time to dest (avg. sp)
- ETA next p. (curr.sp)
- ETA next p. (avg.sp)
- Time to next p. (curr.sp)
- Time to next p. (avg.sp)
- Total pause time
- Current pace
- Average pace
- Maximum pace
- Last lap avg. pace
- Current lap avg. pace
- Average pace (elapsed)
- Elapsed distance
- Distance to destination
- Distance to next point
- Distance to coordinate
- Current lap distance
- Odometer
- Current speed
- Average speed
- Maximum speed
- Last lap avg. speed
- Current lap avg. speed
- Average speed (elapsed)
- Difference Avg-Curr speed
- Current cadence
- Average cadence
- Maximum cadence
- Steps goal
- Steps today
- Steps remaining to goal
- Steps in activity
- Active minutes day
- Active minutes week
- Active minutes week goal
- Current bike power
- Average bike power
- Maximum bike power
- % FTP
- Watt per kg/pound

- Watt per kg/pound NP
- Variability index
- Intensity factor
- Normalized bike power
- Normalized b. power without zeros
- Last lap NP
- Last lap NP without zeros
- Current Lap NP
- Current Lap NP without zeros
- Last lap average power
- Current Lap average power
- Current Lap average power without zeros
- TSS
- Power zone number
- Time in powerzone 0-6
- % in powerzone 0-6
- Front derailleur index
- Front derailleur max
- Front derailleur size
- Rear derailleur index
- Rear derailleur max
- Rear derailleur size
- ANT BikeCad status
- ANT BikeCad battery
- ANT BikeCad cadence
- ANT BikeSpeedCad status
- ANT BikeSpeedCad battery
- ANT BikeSpeedCad cadence
- ANT BikeSpeedCad speed
- ANT BikeSpeedCad distance
- ANT BikeSpeed status
- ANT BikeSpeed battery
- ANT BikeSpeed speed
- ANT BikeSpeed distance
- ANT Shift status
- ANT Shift battery
- ANT Shift front gearIndex
- ANT Shift front gearMax
- ANT Shift front gearSize
- ANT Shift rear gearIndex
- ANT Shift rear gearMax
- ANT Shift rear gearSize
- ANT BPower status
- ANT BPower battery
- ANT BPower Calc cadence
- ANT BPower Calc power
- ANT BPower Calc wheel dist
- ANT BPower Calc wheel speed
- ANT BPower Pedal power left %
- ANT BPower Pedal power right %
- ANT BPower LoC pedal smooth
- ANT BPower L torq effectivn
- ANT BPower R pedal smooth
- ANT BPower R torq effectivn
- ANT FitEqu status

- ANT FitEqu battery
- ANT FitEqu distance
- ANT FitEqu heartrate
- ANT FitEqu speed
- ANT RunDyn status
- ANT RunDyn battery
- ANT RunDyn cadence
- ANT RunDyn ground cont balnce
- ANT RunDyn ground cont time
- ANT RunDyn stance time
- ANT RunDyn step count
- ANT RunDyn step length
- ANT RunDyn vert oscillation
- ANT RunDyn vert ratio
- ANT RunDyn walking flag
- ANT BikeRadar status
- ANT BikeRadar battery
- ANT LightNet status
- ANT LightNet battery
- ANT LightNet Headlight mode
- ANT LightNet Taillight mode
- ANT LightNet Sig. left mode
- ANT LightNet Sig. right mode
- ANT LightNet Sig. config mode
- ANT LightNet Other mode
- Current altitude
- Total ascent
- Total descent
- Altitude difference from start
- VAM curr avg
- VAM total avg
- Minimum altitude
- Maximum altitude
- Gradient
- Minimum gradient
- Maximum gradient
- Average gradient
- Current heartrate
- Maximum heartrate
- Heartrate zone number
- Last lap average HR
- Current lap average HR
- Time in HR zone 0-5
- % in HR zone 0-5
- Calories spent
- Lap number
- Pressure
- Battery value
- GPS accuracy
- GPS high acc indicator
- Current latitude
- Current longitude
- Current heading
- Track
- Training effect

- Bike current gear
- Temperature
- Pacer calc average speed
- Pacer curr. ahead time
- Pacer target ahead time
- Pacer predicted time
- Pacer predicted pace
- Pacer total average pace
- Pacer corrected distance
- Pacer offset indicator
- Free memory
- Datafield version
- App name
- Phone connected
- Notification count
- Start coordinates
- North
- Setting coordinates
- Sunrise
- Sunset
- Wind bearing
- Wind speed