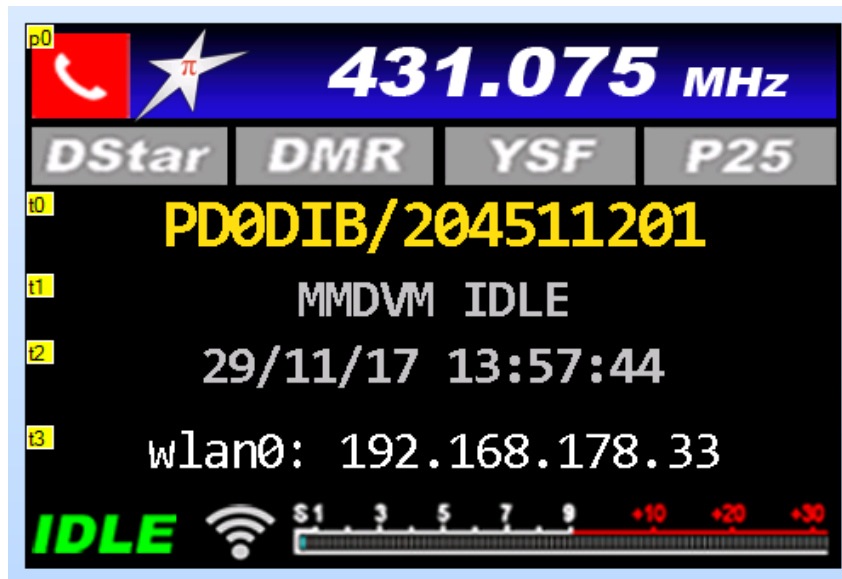


How-to-build or modify your Nextion® Screens for MMDVMHost

“THE SAMPLE SCREEN PROJECT”

This document's goal is to help you start to build your own screens or modify existing screens .



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This document is based on:

The MMDVMHost build form G4KLX (Jonathan) as of November 25, 2017 (commit 64eb59b and later): <https://github.com/g4klx/MMDVMHost>

Pi-Star version 3.4.6 Dashboard 20171125

<http://www.pistar.uk/downloads/>

and the Nextion Editor version 0.52 from iTead®:

<http://nextion.itead.cc>

Facebook Support Group: <https://www.facebook.com/groups/Nextion/>

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Introduction

From the author

Rob van Rheenen | PD0DIB

A licensed Dutch HAM operator since 1977 (so English is *not* my native language and you have to forgive me my bad spelling and syntax). Long time on HF, VHF and UHF and D-Star with the basic gear, but stopped being “radio-active” in 1997 for job and family matters.

Now I’m retired and have time again to spend on this fantastic hobby. Restarted in 2016 and decided to go digital (no place / not allowed placing huge antennas). Started (again) with D-Star, but quickly adopted DMR too. As I’m living in an area with no digital repeaters in reach, discovered the hotspot and build / using several of them with various radio-modem boards.

Discovered the NEXTION ® device and decided to add those to my projects. As I love to build and ‘program’ (I’m in the process of building a digital multi-mode voice repeater, based on MMDVM, MMDVMHost and Pi-Star), I discovered too that the documentation for this device is poor. So I’ve decided to start the Nextion support Facebook group and wrote some How-To’s for this device.

Grabbing all those How-To’s together and made this tutorial with a sample screen to give some insights of the workings of the NEXTION ® Editor.

Hope this will inspire you to build and publish your designs and tips & tricks.

73
PD0DIB

The Nextion display as an add-on

The Nextion programmable screen is very popular for use in combination with a MMDVMHost hotspot or repeater.

However, there are no real manuals, examples or whatsoever, so we thought that putting our experience in this document could be of help for other starters.

The Nextion device is a programmable interactive screen with touch-screen possibilities. There are two types of screen available: the Basic ("T") and Enhanced ("K") in various sizes from 2.4 inch to 7 inch. The Basic type will do for all examples and explanations in this document. We are not using the touch-screen part for the use as a hotspot or repeater screen (yet). In this document we will try to explain the basics to design your own personal screen and have included a sample screen which will be used for a step-by-step walk-through exercise.

What you need

You will need the next items to make your own screens:

- The Nextion Editor, which you can download for free here:
<https://nextion.itead.cc/resources/download/nextion-editor/>
- The basic screens for MMDVMHost, which you can download here:
<https://github.com/g4klx/MMDVMHost>
 - There are three Nextion sub-folders:
 - Nextion_G4KLX, which contains all the screen-sizes and both .hmi and .tft files with the standard logo's
 - Nextion_ON7LDS, which contains all elements from the G4KLX screens; ON7LDS can display the IP-address from the hotspot and the decoded info from Talker Alias too. This will be explained in another chapter.
 - Nextion_DB2OE, which contains not all sizes (3.5" is not there), but has some nice logo's; both .hmi and .tft files are there.
- A Nextion screen ☺. For this tutorial screen ("The Project screen"), preferable a 3.5 inch Basic or Enhanced (Basic will do all).
- To build "The Project screen" : the zipped file in the file-section from the Facebook group <https://www.facebook.com/groups/Nextion/> with the name "**NEXTION_Tutorial_Project.7z**"; this file is zipped with 7-Zip (free), you have to unzip it (preferable with 7-Zip, it is free, but every Zip-program can handle this zipped file)
- If you want to connect the screen to your computer to upload the screens to your Nextion (which I do): an USB-to-TTL (UART) adapter to connect the screen via USB to your computer. Not all adapters are supported, see Chapter [How to upload your design](#) into the Nextion and connect your screen
- A photo editor like Photoshop¹ or Paint.net (free to download) or equivalent to edit and size the logo's and other graphic stuff you want to be part of the screen.
⇒ ***You cannot edit graphics or fonts with the Nextion Editor, they have to be the right size/pixels for your screen size!***

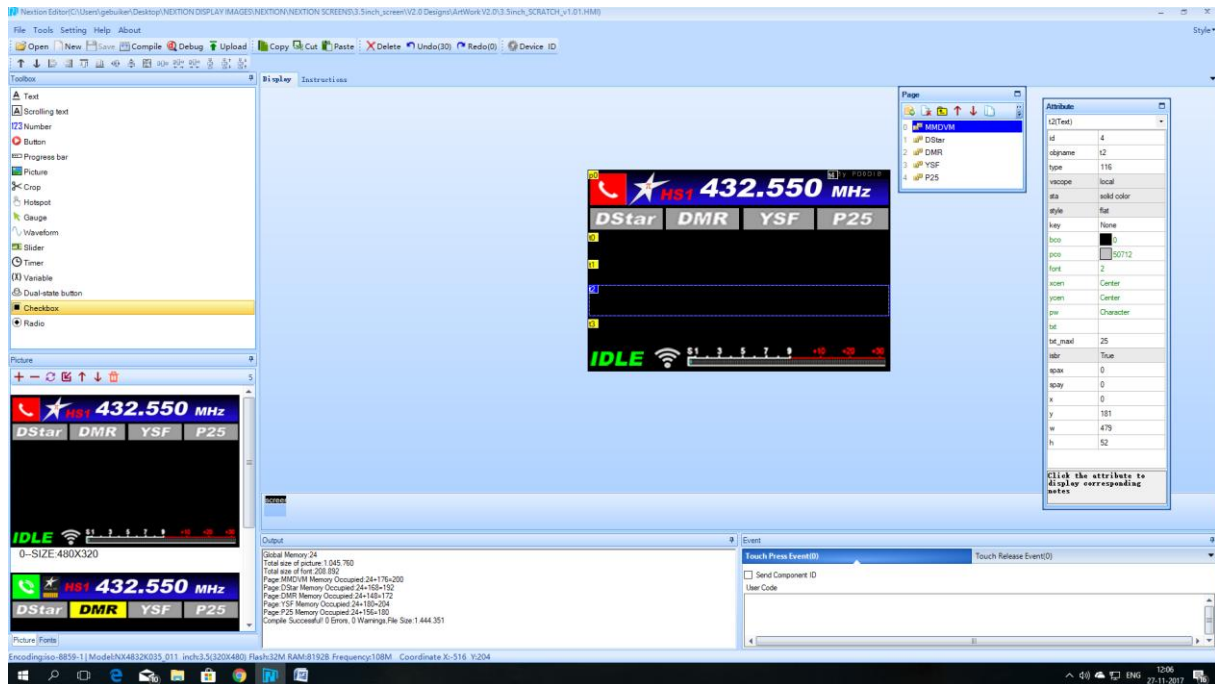
¹ Do you know Photoshop CS2 is FREE? You have to Google / search for it, but it is a legal free version; I'm using it for my designs too.

What's in this project zip-folder

This project is containing:

- This tutorial as PDF document
- The .hmi file from ON7LDS as “The Basic screen” – filename **ON7LDS_BasicScreen.hmi**
- The .hmi file **3.5inch_V2.0_The_ProjectScreen.hmi** ready for use (but it is more exciting to follow this tutorial and build this screen by yourself 😊)
- The .tft file **3.5inch_V2.0_The_ProjectScreen.tft** to upload via micro-SDCard to your NEXTION device
- The folder “ArtWork” which contains all used backgrounds for “The Project screen” (Basic or Enhanced, 3.5 inch):
 - The ArtWork is based on a hotspot which is set on 431.075 MHz, the default Pi-Star frequency when downloaded/installed.
 - If you are using a different frequency, you have to modify all of the background graphics in the folder **ArtWork** to the frequency you’re using. The frequency is put in as a separated layer in the .psd (Photoshop) files, so modifying just that layer will do the job.

The Nextion Editor – an overview



The Editor screen is divided in sub-windows.

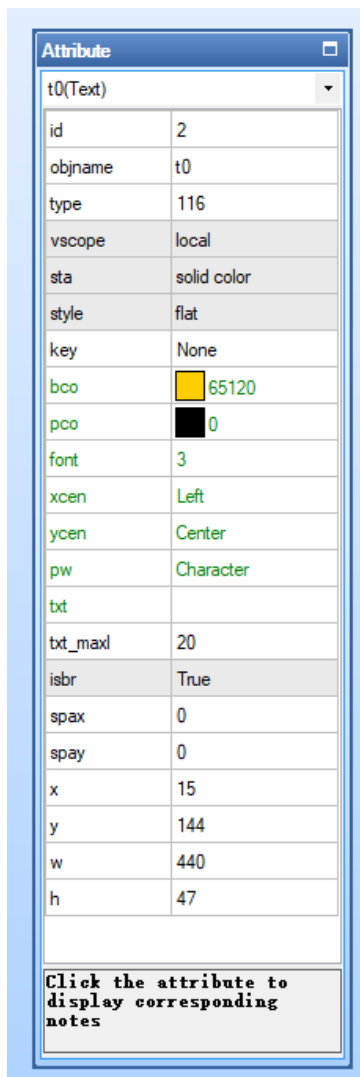
In the display window is an example from the project you're working on.

In this example the Nextion is getting the most of the info from the MMDVMHost, so the Editor can't display all info in this example, since it is not connect to the device (radio-modem) which is delivering that info.

But we can modify the way that info is presented and add "static" info to the screen pages.

The Attribute window

With Attributes you can set parameters for all type of fields, in this tutorial we will focus on how to set and change the parameters for a text field to explain the possibilities.



t0(Text): Pull down menu, you can select a particular text field here. Also useful to check the numbering of your text fields.

⇒ **See the chapter regarding reserved text field numbers.**

id: System field.

objname: to give that text field a specific name.

⇒ **See the chapter regarding reserved text field names.**

type: system field.

vscope: Variable scope(local-visible in current page, global-visible in all pages):0-local;1-global. (did notice that this option is not working for me, probably have to play some more with this option.)

sta: Background fill:0-crop image;1-solid color;2-image; to change the background behavior.

style: Set a border or 3-D effect for that field. Click the attribute to display corresponding notes.

key: Binding keyboard; bind that field to a specific key / keyboard layout. (no experience with it.)

bco: Set background color. Click on the colored block or number to select. If your color is not in the pull down menu, use add more colors to add a color for this project. It will give you the RGB settings too, handy if you want to use the same color in your Artwork (or vice versa) to select that color. Use the WEB-color scheme for a correct color.

pco: Set font color. Click on the colored block or number to select. If your color is not in the pull down menu, use add more colors to add a color for this project. It will give you the RGB settings too, handy if you want to use the same color in your Artwork to select the same color.

font: Select the font number to use in that field from the Font Manager.

xcen: horizontal center: center, left or right aligning the text in the text box.

ycen: vertical center: center, up or down aligning the text in the text box.

pw: make the text box a standard textbox or a password text box; during design, made it a textbox and put in your password; then change this setting to password, the entered text will be showed as ***** and have to match the entered text.

txt: The content for that field.

txt_maxl: Maximum number of digits / letters in that box.

isbr: turn word-wrap on/off. With this feature you can make a text box instead of a field. Test the word-wrap in the design phase for correct wrapping.

spax: horizontal spacing between individual letters/numbers in that field

spay: vertical spacing between lines (text block) in that 'block'

x and y: horizontal (x) and vertical (y) place of that field on the screen

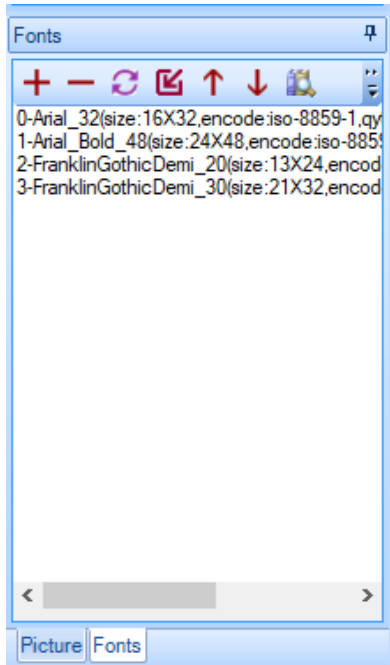
w and h: Width and height from that text field or -block

The Font Manager

In the down-left corner is the Picture- and Font manager window. Here we go into the fonts part (Click on the tab **Fonts** at the bottom of that window):

Adding a font

The Editor has **NO font library built-in**, just a Font Manager. So we have to generate each font we



want to use. In existing screens (.hmi files), fonts that are used in that particular screen are existing in the Font Manager and can be (re)used.

If you want to use a non-existing font, you have to generate and add that font to the screen.

There is a tool for it, which you can find at the top-menu-bar of the screen, called **Tools**.

Click on it and select *Font Generator*. A new window pops-up. Select a font, size, etc... and click **Generate font**. It will ask you to save the font (make a folder for it for future use in other projects), after saving it will ask you to import the font into your project.

Click *Yes* to add the font and it will show up in the Font Manager of your project.

Buttons in the Font manager window

Saved fonts can be added to the project with the **+** button in top of the font manager; with the **-** button you can delete a font from your project (if it is not in use in any place of your project).

With the **circle-arrows** you can replace a font with an existing font from your library in your font-folder. This is an important feature for ON7LDS screens, font number 1,2,3 and 4 are needed with that number (place in the font-list) to let auto-sizing TA info correctly do the job (t0.txt and t2.txt field on the DMR-page / Page 2 in the Project screen).

With the **'squared' arrow** you can add a font above the selected font, so keep the numbering the way you want; pay attention to the ordering of the fonts, see remark by circle arrows

With the **up- and down** arrows you can sort the project fonts in the manager (important for the ON7LDS Screens, see that chapter).

The most right button shows an example of the complete font-set from the selected font.

The Picture manager

In the same window as the font manager is the Picture Manager. Click on the Picture button on the bottom of that window:



Most of the buttons on top of this window has a similar function as in the Font Manager as far it adding, deleting and numbering concerns .

However, some functions are extended:

- You can Export a picture by right-click the mouse so that you can edit that picture in a external editor as Photoshop or similar program;
- You can replace a picture by right-click the mouse and change that picture for a new / edited one. It is replaced in the Picture manager and replaced in your design too on all screens from the opened project where you did use that picture.

The Nextion Editor has no graphic / picture editor, you can't edit anything from that picture.

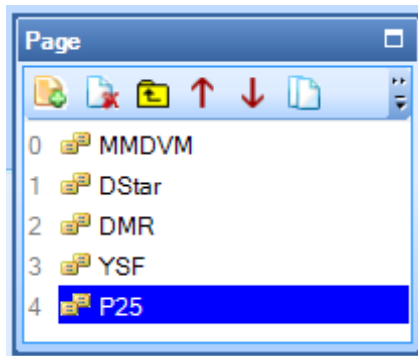
That means you have to prepare the image (composition, size/pixels) in a photo/picture program. I'm using Photoshop CCS2 (it's free!), but any photo-editor will do.

In this given example, the sizing is for a 3.5"screen. You need to size the pictures so it will fit into the screen size. For example: 480 pixels is the maximum width for a 3.5"screen.

If the picture is larger, it will result in an error; you have to resize the picture with the external image-editor, such as Photoshop.

The Page Manager

The Page Manager is simple, yet with a powerful feature: the copy page function.



First we can rearrange the pages in the project by the red arrow keys.

REMARK: do not change this order for the MMDVM pages, they are 'called' by the page number/name by MMDVMHost.

To add a page, use the "page +" button

To remove a page, use the "red-crossed" button

To add a page, use the "folder-up" button

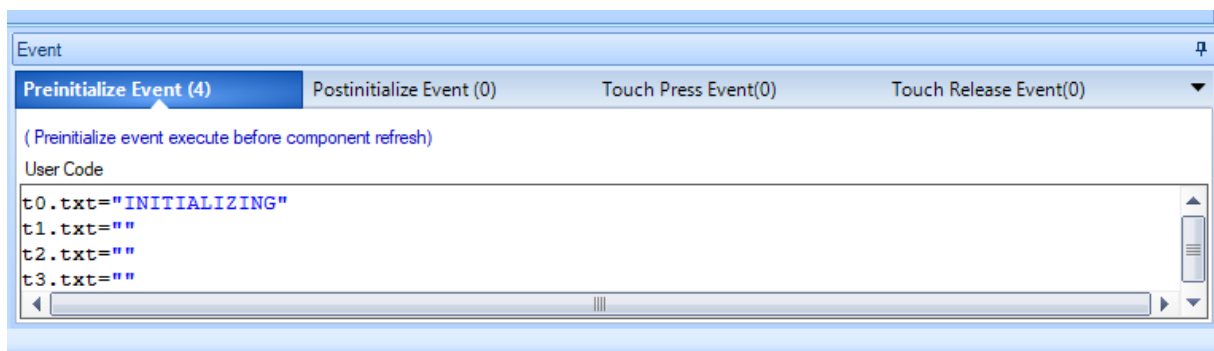
And if you want to copy a page, select the page you want to copy and click on the most right button. This is 'powerful': if, for example, you have designed the D-Star page to your satisfaction and all the fields correctly positioned, you can copy that page, rename it to YSF (page 3) and, with minimal corrections, that page is ready too; do the same with P25 and you're ready ☺.

The Event window

In the lower-right part of the Editor, you see the Event window. I'm not going "in-depth" for this, just explaining how (basic) I'm using it.

If you are in the designing phase, it is handy to use dummy text to see how font and colors are displayed on that page (as we do in the Project screen). Normally, I clean up all the fields by removing the dummy text when I'm ready, but it is not necessarily needed ². In the Preinitialize part of this window, you can see how/what content is showed when the Nextion is powered on; you can put in your own text between the quotes per page.

In this example for Page 0, I've put in the text INITIALIZE in t0.txt. After completed the init-phase, this text will be replaced by MMDVMHost by your call / DMR-ID in the Idle screen. The tx.txt="" will replace the dummy text (if you didn't cleanup) with a blank line.

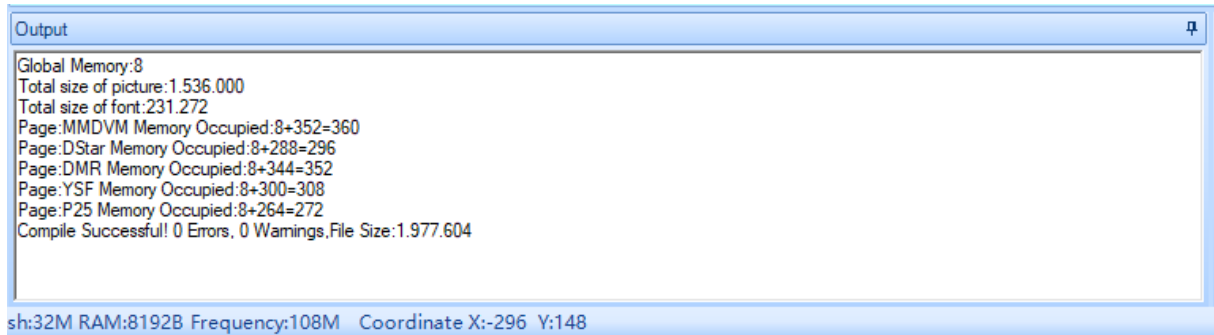


² Some Nextion screens, special the 3.5" screens, don't handle the refresh cycle correct (new firmware is promised by iTeaD); if you see some 'strange' things in your text field happening, please do not use this option and replacemove all text for that field with "".

The Output window

In the Output window you can see, after compiling, debug or upload your design, errors in this project. As long there are errors, you can't upload the screen to the Nextion device.

Double click on an reported error shows more info regarding that error.



The “Project screen” explained Step-By-Step

In this chapter we will explain step-by-step the build of “The Project screen”.



Step 1: prepare all graphics needed

In the Project folder, this work is all done, you can find it in the ArtWork folder.

As earlier noted, I’m using Photoshop (CS2, it’s free) to make the graphics. You have to pixel-size the image according the screen size you’re going to use; in this example the screen size is 3.5inch.

I’m not a Photoshop expert, so I’m using “the Basics” from that program to make my graphics; there are for sure better workflows to make better graphics.

The 3.5inch screen has a 480x320 pixel resolution, so the maximum picture resolution should not be exceed the screen resolution. The background image for this screen is 480x320.

My “Workflow”, using Photoshop (think every photo-editor can use this workflow if it can handle layers):

1. Making a background layer 480x320 pixels (sample screen: 3.5inch) in the color I wanted; in this example black
2. On that background layer, I put all static elements, one element per layer. So all logo’s, “buttons”, graphics or pictures has its own layer. Reason: I make one “Master” per screen size and switch on on/off the layers I want to use on the background for a particular screen.
3. *Remember, you have to reserve space on that background for the text/info fields from MMDVMHost; in the example: the lines “INITIALIZING”, “MMDVMHost – G4KLX”, “Pi-Star – MW0MWZ” and “Design: PD0DIB” is reserved space for the MMDVMHost info and should not used for other elements.*
4. Save your background:
 - a. As a .psd file, so you can continue to edit or reuse (and switch on/off) all layers individual
 - b. As a .jpg or .png (I prefer .png): the NEXTION Editor can’t handle .psd images

The easiest way to build a screen, is to download a screen with all the MMDVMHost text fields already in it.

You can download the basic screens from ON7LDS here; *it is in the project folder too*:

Download the size you want to use; "The Project screen" used in this tutorial is 3.5 inch:

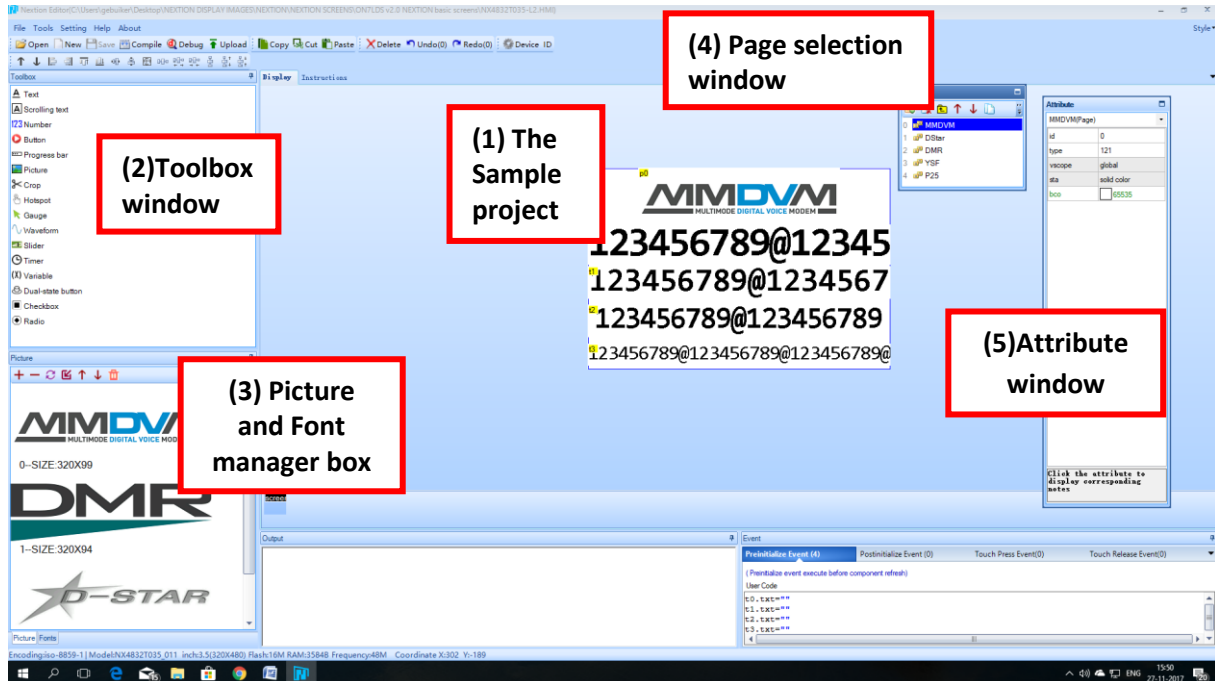
If you want to build the screen from scratch, you need to know which tx.txt fields are reserved for MMDVMHost info: see this Chapter: [Field numbers MMDVMHost](#) ⇄ [Nextion display](#)

Save (or make a copy) from the downloaded screen (.hmi file) for future use and give your project-screen (save as) a name that suites you.

Start to build “The Project screen”

The Editor screen: an overview

First thing to do is starting the Nextion Editor and open the project folder to load the *ON7LDS_BasicScreen.hmi* file:



What is on the Editor screen:

- (1) The first page of the sample project. The ‘content’ (Dummy text and numbers) is just a help to design your page, that will be removed if the page-design is ready.
- (2) The Toolbox in which you can add all kinds of field types like text, scrolling text, pictures, etc.. to you project
- (3) Picture- and Font manager; showed is the picture manager, you can switch between pictures and fonts with the buttons down in that window
- (4) Page selector to switch to the page you’re working on (in the sample screen: the mode-pages as Idle, D-Star, DMR, etc..).
- (5) The Attribute window to select / change behavior and presentation from fields like font, (background) color, text, width and height, etc...

The two lower based windows are not explained (yet), you don’t need them for this tutorial.

Step 3 Modifying Page 0 - MMDVM page

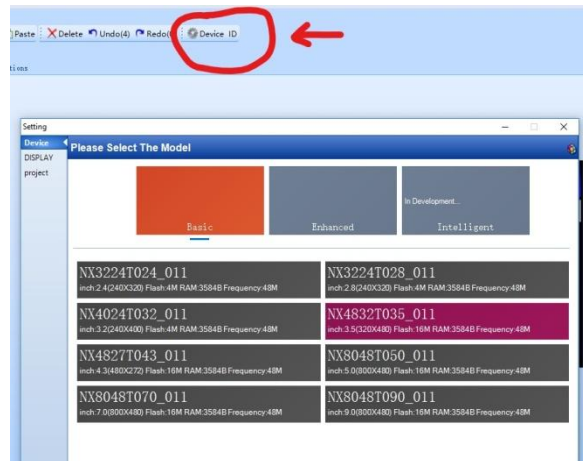
You have to select the correct model NEXTION device:

There are, as explained earlier, two models:

- 1) NX4832T035_0xx – the Basic model
- 2) NX4835K035_0xx – the Enhanced model

This project is based on 1), the Basic model (3.5inch);

if you have the 2) Enhanced model, no problem: just change the model (see picture) and the Editor will automatically converted the model specifications to your model. This will only convert the model



spec's, not the (pixel) sizing of the ArtWork backgrounds or any number (value) in this tutorial. If you want to use another size, you have to recalculate those values, fonts and ArtWork-pixel sizing.

After selecting the correct model we are going to modify the background to the new design. For that, we have to replace the MMDVM logo for the new background:



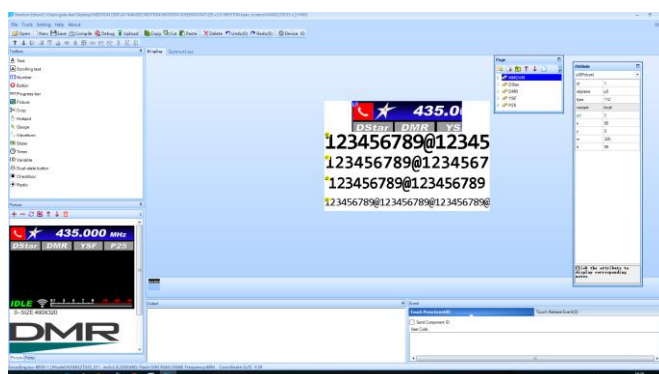
- (1) Right-click on the MMDVM logo in the Picture manager and select replace, file manager opens and you have to go to the folder ArtWork.
- (2) Select **IDLE SCREEN copy.png** from that folder, click **Open**.

A window is popping up with the text *Import successfully 1 pieces*, click OK.

In the Picture manager, the MMDVM logo should be changed into the chosen background picture.

If you did just as explained, you should have this window:

The MMDVM logo in the Picture manager is replaced by the background image from the folder



ArtWork. The MMDVM logo in the project window (screen) is, if you click on it, also changed, but has not yet the right format.

So we're going to change that: click on the picture in the project window to select the picture. Move by clicking the picture and drag it to the upper-left corner.

Now we have to resize the picture window:

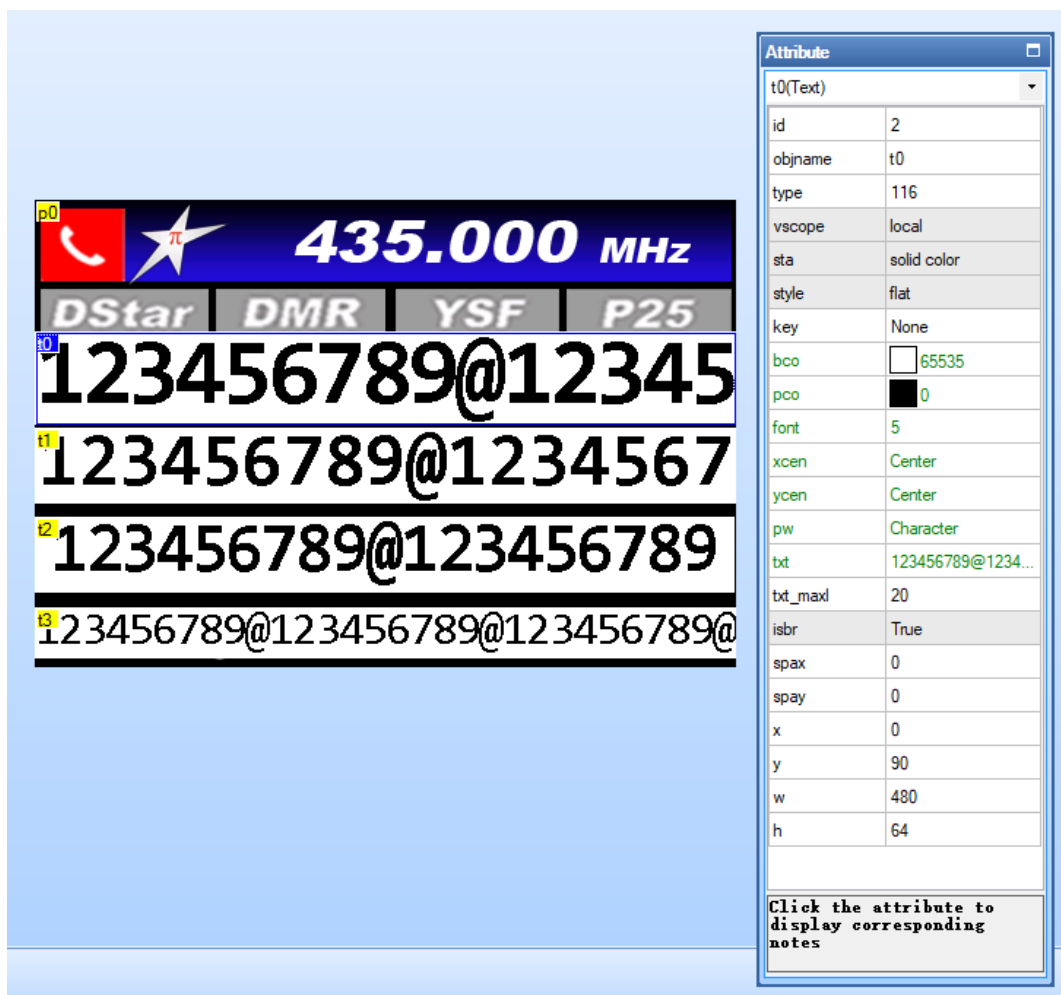
Go to the Attribute window on the right and change the values on the bottom 2-lines: **w** (width) into 480 and **h** (height) to 320.

Now we have this project screen:

The background is changed into the new design and we have to change the text fields to match with this new design.

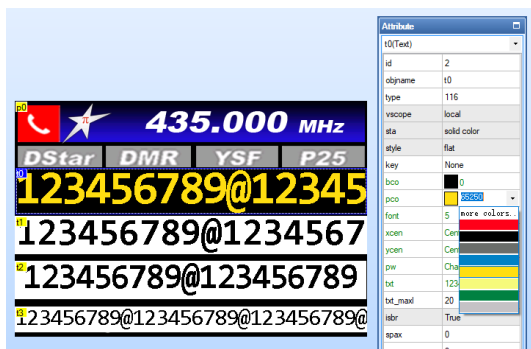


Click on the upper text fields (t0) and go to the Attribute window:



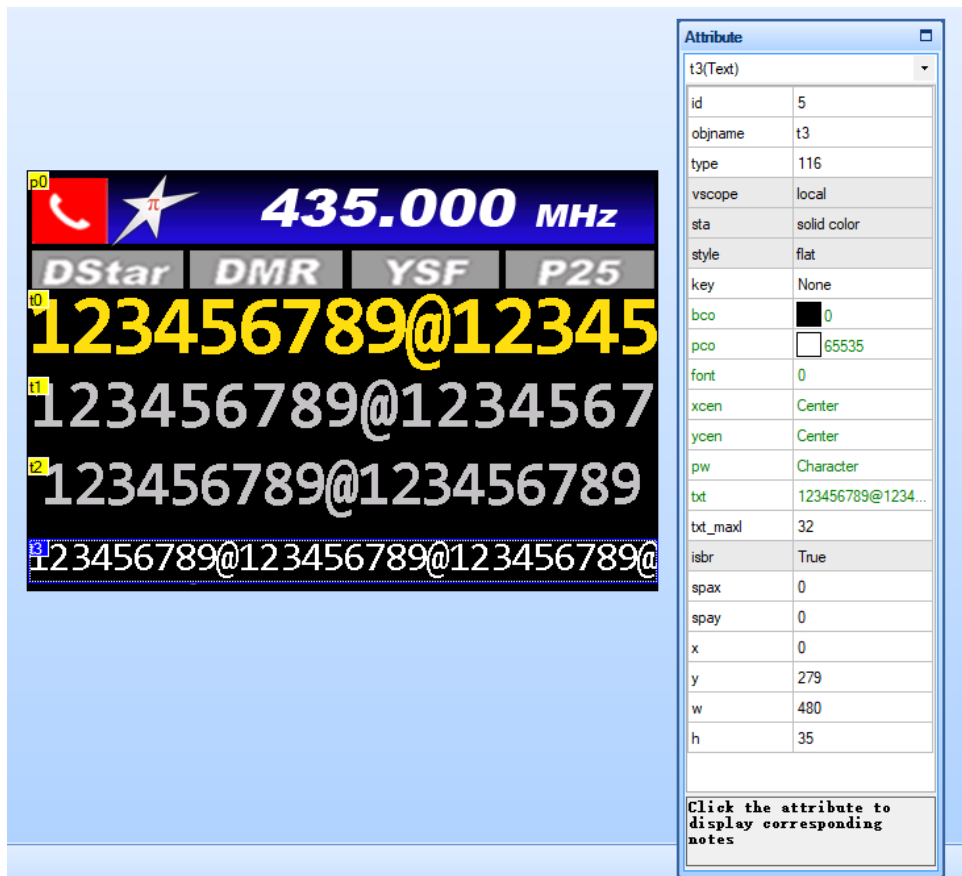
Find **bco** in the Attribute window, click on number displayed; a pull down menu will open and you can select from the available colors. Pick black to change the background of the field into that color. Find **pco** in the Attribute window and do the same to change the font color, but chose dark yellow as the font color (or any other color you want but pay attention to readability).

Now you should have this screen in your project window:



Do the same with the t1, t2 and t3 fields: make the background (bco) black, but change the font (pco) **t1** and **t2** into light-grey and **t3** into white (or pick any other color you want but pay attention to readability). If a color you want is not available in the pull down menu, add that color by clicking *more colors* in the dropdown menu, a new window will open and you can add more colors to this project.

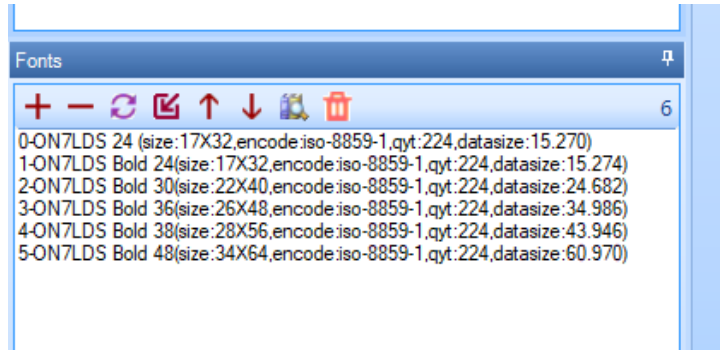
If you have completed all the text fields you have this screen:



Now we have to resize and rearrange the text fields to free space for the bottom part of the design to make that part visible.

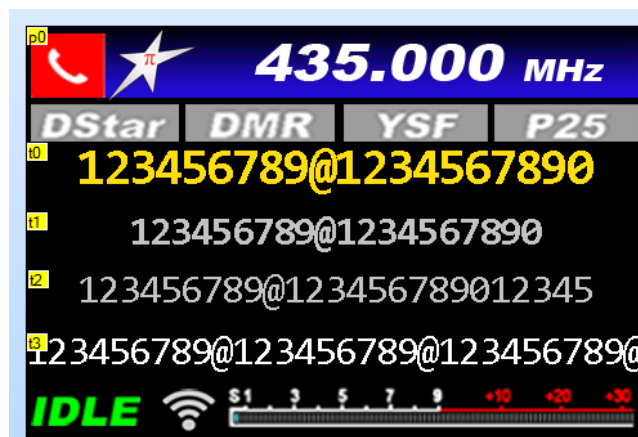
We can do that to use smaller fonts for the content.

1. Change the Picture manager into Font manager (lower left window) by clicking on the **Fonts** button; the existing fonts for this project will show:



2. Click on the upper text field (**t0**) and find **font** in the Attribute window.
3. Change the number (5) into 2 and Enter; the font size will change to that size.
4. Then go in the Attribute window to the bottom line **h** (height) for that field and change the number to 45. On the project screen you see the new font size and the text field height is changed according to that font.
5. now click on text field **t1** and do the same, but change the font number into 1 and field height into 35
6. Change **t2** to font 1 and field height 35 and **t3** to font 0 and field height 35
7. Re arrange the fields in the screen by clicking and dragging to free the lower part of the screen, so you can see the new designed part (Idle and S-meter bar).

After completed all the steps, you should have this screen:



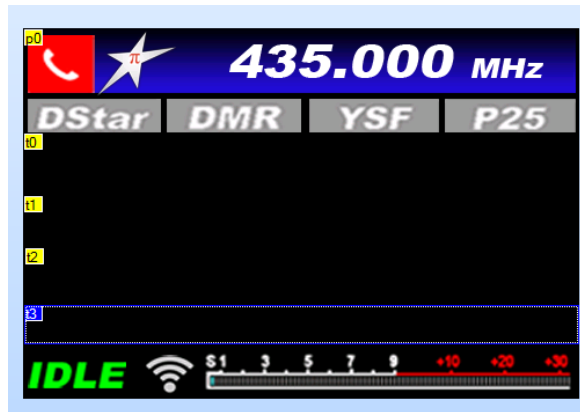
Now we have to delete the existing content (the numbers) in the text fields:

1. Select by clicking text field **t0**
2. Find **txt** in the Attribute window and remove all letters and numbers in the Attribute window by **txt**, followed by Enter; so the field must be empty.
3. Repeat with the other text fields to clear the existing content.

WARNING: do not select the field by clicking the text field and Delete. Then you have removed the complete field!

Go to the Attribute window, select in the **txt** – part the content and remove it from there. If you delete the complete field by accident, go to the menu ruler, select and execute an undo to go one step back to undo removing that field (you have to see **tx** (x = field number)).

This is the Idle-screen – page 1 if you completed all steps, check t0, t1, t2 and t3 are all there:



Step 4 Modifying Page 1 – D-Star page

This page is similar to the MMDVM page with some exceptions:

1. Replace / resize the D-Star logo exactly the way as you replaced the MMDVM logo on Page 0 (Step 3) with the **D-Star copy.png** file in the *ArtWork* folder.
2. **Do not change the font-size**, but do change the background- and font color accordingly to Step 3.
3. Rearrange the text fields to free the lower part (Busy; S-meter bar) to make that part visible.

Step 5 Modifying Page 2 – DMR page

This page needs some more attention and rework, due to the Talker Alias / auto-resizing the information which can be displayed on this page.

Start exactly as in Step 2 replacing / resizing the DMR logo with the **DMR copy.png file** in the *ArtWork* folder.

Since there is more info on this page than on any other page, we have to free more space for the new design.

WARNING: do not alter the text field's **t0** and **t2**, they have to be exactly as they are to display and auto-resize the TA info on the Nextion. In a next revision we will explain how to alter this part too.

Remarks regarding the DMR page (only if you use ON7LDS designed screens with Talker Alias info, as in this tutorial):

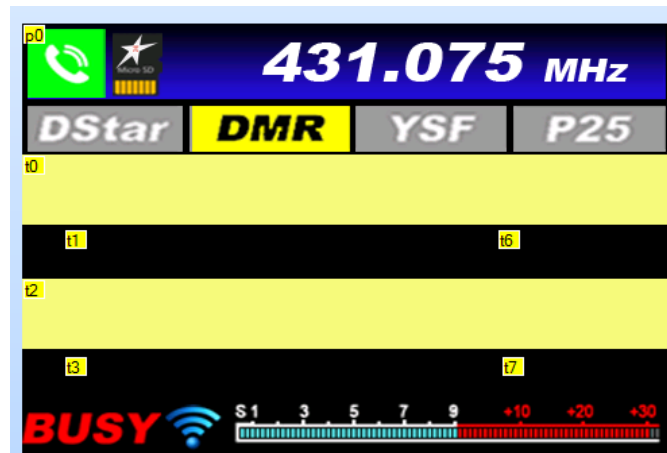
1. The font colors (**pco**) for **t0** and **t2** are “hard coded”, we will explain the colors in the ON7LDS screen Chapter. Therefore, you cannot alter the font color for those fields and you cannot change the background color to any color you want due to readability (black font on a black background is hard to read ☹).
2. The screen is too small to display all the info, so we have to make choices:
 - a. There are two fields which are not visible in the original ON7LDS page, but they are there, hidden beyond **t0** and **t2**: the fields showing RSSI: **t4** and **t5**³
 - b. Since nearly all radio-modem boards for hotspots (DVMega, ZUMspot) are not “transmitting” the RSSI value, we leave those fields behind the **t0** and **t1** fields; however if you have a board who can handle the RSSI (like ZUM board and other boards, mostly for repeaters), you have to rework the sizing of all other fields to make **t4** and **t5** visible. You have to **read the ON7LDS chapter carefully** to handle the font sizing correctly to make auto-resizing Talker Alias info possible

Take the next steps to modify the DMR page:

1. Replace / resize the DMR logo for the one in the *ArtWork* folder: **DMR copy.png** if you did not already; it is the same workflow as in Step 2
2. Leave the text field size and font size for **t0** and **t2** as they are.
3. Change the **font value** for **t1**, **t3**, **t6** and **t7** to **1** in Attributes (**pco**)
4. Change the **field size** for the same text fields to **32** in Attributes (**h** (height) values)
5. Rearrange the position of text fields to free the bottom part (Busy, S-Meter) and make those visible; probably **t5** (RSSI) will be partly visible, move **t5** behind **t2**
6. Change the background color for **t0** and **t2** to light-yellow for visibility of the Call / Talker Alias info (use **bco** in the Attribute window to do so); do not change the font color
7. Change the background color (**bco**) into black for all other text fields
8. Change the font color to light-grey (**pco**) for all other text fields
9. Remove all content form all text fields, as explained in Step 2: MMDVM page, notice the warning and remarks.

³ We've made the background AND the font color for both **t4** and **t5** yellow so they don't interfere with **t0** and **t2**. If you want to use those fields, you have to alter them according your design.

After completing all steps, you should have this screen in your project window:



Step 6: modifying Page 3 – YSF page

This page is similar to the MMDVM page (Step 2) with some exceptions:

1. Replace / resize the D-Star logo exactly the way as you replaced the MMDVM logo on Page 0 (Step 3) with the *D-Star copy.png* file in the *ArtWork* folder.
2. **Do not change the font-size**, but do change the background- and font color accordingly to Step 3.
3. Rearrange the text fields to free the lower part (Busy; S-meter bar) to make that part visible.

Step 7: Modifying page 4 – P25 page

This page is similar to the MMDVM page (Step 2) with some exceptions:

1. Replace / resize the D-Star logo exactly the way as you replaced the MMDVM logo on Page 0 (Step 3) with the *D-Star copy.png* file in the *ArtWork* folder.
2. **Do not change the font-size**, but do change the background- and font color accordingly to Step 3.
3. Rearrange the text fields to free the lower part (Busy; S-meter bar) to make that part visible.

Congratulations, now you have completed all steps to change “The Basic screen” into “The Project screen” 😊.

Study all the steps you’ve made to design your own screen; we welcome you to post them (please zip both .tft and .hmi files and publish the zipped file into the file section from the Facebook support group for Nextion: <https://www.facebook.com/groups/Nextion/> ; post pictures to show your design too.

Field numbers MMDVMHost ⇔ Nextion display

MMDVM Page

```
"t0.txt= callsign, dmrid  
"t0.txt= LOCKOUT  
"t1.txt= MMDVM IDLE  
"t1.txt= ERROR  
"t2.txt= date/time  
"t3.txt= ipaddress
```

DStar Page

```
"t0.txt= type, my1, my2  
"t1.txt= your  
"t2.txt= reflector  
"t3.txt= rssi  
"t3.txt= rssiAccum1 / DSTAR_RSSI_COUNT  
"t4.txt= ber  
"t4.txt= berAccum1 / float(DSTAR_BER_COUNT)
```

DMR Page

```
"t0.txt= type, src  
"t0.txt= 1 Listening  
"t1.txt= group ? "TG" : "", dst  
"t2.txt= type, src  
"t2.txt= 2 Listening  
"t3.txt= group ? "TG" : "", dst  
"t4.txt= rssi  
"t4.txt= rssiAccum1 / DMR_RSSI_COUNT  
"t5.txt= rssi  
"t5.txt= rssiAccum2 / DMR_RSSI_COUNT  
"t6.txt= ber  
"t6.txt= berAccum1 / DMR_BER_COUNT  
"t7.txt= ber  
"t7.txt= berAccum2 / DMR_BER_COUNT
```

YSF Page

```
"t0.txt= type, source  
"t1.txt= dest  
"t2.txt= origin  
"t3.txt= rssi  
"t3.txt= rssiAccum1 / YSF_RSSI_COUNT  
"t4.txt= ber  
"t4.txt= berAccum1 / float(YSF_BER_COUNT)
```

P25 Page

```
"t0.txt= type, source  
"t1.txt= group ? "TG" : "", dest  
"t2.txt= rssi  
"t2.txt= rssiAccum1 / P25_RSSI_COUNT  
"t3.txt= ber  
"t3.txt= berAccum1 / float(P25_BER_COUNT)
```

Comments by ON7LDS Screens (source = Github by ON7LDS):

[REWORK IN NEXT REVISION: how to change **t0** and **t2** including auto-sizing]

The ON7LDS Screens has some changes compared to the G4KLX Screens:

- On the main screen there is a field to display the active IP address of the device. On Linux it is preceded with the network interface name.
- DMR: if received, the Talker Alias is decoded and displayed. The TA will be in green, so user knows it is a decoded TA displaying.

This happens on-the-fly: as the parts of the TA arrive, they will immediately be shown.

- If you want to change the ON7LDS screen layout, the only thing to keep in mind is that the MMDVMHost program will select following font numbers:
 - Default font for TA field : font 4
 - TA > 16 characters : font 3
 - TA > 20 characters : font 2
 - TA > 24 characters : font 1
 -
- ⇒ **REMARK (ON7LDS screens only):** you can't change the font-color for field-text t0 and t2 (received call) in the DMR-Page (ON7LDS screen only), they are set by MMDVMHost and have a meaning:
 - Starts with Black (received call or start TX (your own call))
 - Changes to Green if TA data is decoded
 - Changes to Grey if RX ended (for 3 seconds, than the screen goes to Idle).

This will limit the possibilities to change the background color for that field too!
Check the chosen background for readability.

There always have to be at least 5 fonts, of which font 1 – 4 are used for the TA. If your display is wide enough to show all characters in one font, you must copy this font to the lesser ('smaller') fonts.

i.e.: the 3.2" the display can show more than 31 characters (the maximum TA length) in font 2, so this font is also copied to font 1.

How to upload your design into the Nextion and connect your screen

Upload your design into your Nextion

To upload your designed screen into the Nextion screen, you can use one of the two options:

1. A micro-SD Card and a card reader/writer. Copy the .tft file from your design to the SD Card (it should be the only file on that card!). Power off the Nextion screen, place the card in the card slot and power on the Nextion screen. The screen will automatically upload the image, while showing the progress, and when the upload is complete, you see your design. Power off the Nextion screen and remove the SD Card. You're finished.
 - a. How to make and where to find the compiled (.tft) file: In the Nextion Editor under Files you find the option Open build folder. If your design is finished, click on Compile in the Editor and the .tft file is saved in that folder.
2. Connect your Nextion device via an USB-to-TTL (UART) adapter to your PC. Look which com-port it is connected to and select Upload in your Nextion Editor. Select the correct com-port and start the upload. As is the case with the TFT file upload, the screen will display its progress as the upload progress. Once it hit 100% your image will appear. Disconnect the USB to TTL adapter from the computer.

Connect the NEXTION via USB to your PC or Raspberry

Since the most radio-modem boards are covering the needed GPIO pins to connect your Nextion, you can connect your screen via an USB-to-TTL (UART) adapter. Not all USB-to-TTL adapters are supported.

I'm using a CH340(G) USB-to-TTL (UART) adapter for both programming (connecting the Nextion to the PC-USB) and to connect the Nextion to the Raspberry via USB.

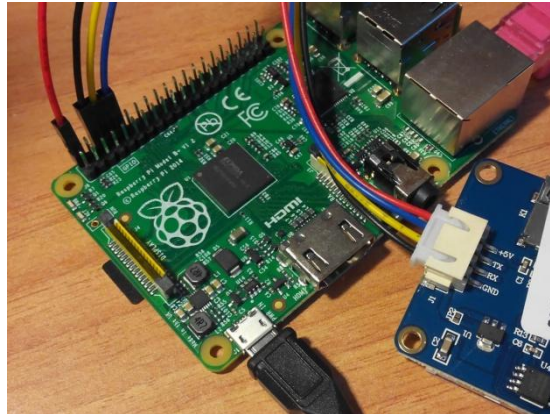
I've experienced that for Windows 10 (64, Pro) there is no need to install 'special' drivers; this adapter is working with Raspberry / Pi-Star too.



CH340 (G) USB to TTL (UART) example

Connected to the GPIO pins – Raspberry (all versions, included Pi Zero)

- Red = 5v+ PIN 2
- Black = Ground PIN 6
- Yellow (RX on Nextion) = GPIO14 PIN 8
- Blue (TX on Nextion) = GPIO15 PIN 10



The NEXTION configured in MMDVMHost

This document is based on the existing build from G4KLX as of November 2017; for Pi-Star users: as of version 3.4.6 with dashboard 20171125

Pi-Star configuration

Pi-Star users live easier 😊 : All necessarily steps are pre-programmed by The Master (Thanks Andrew, buy him a beer): go to the configuration page for Pi-Star and set Nextion layout to ON7LDS to ‘activate’ the TA info on your Sample display.

MMDVMHost Configuration				
Setting	Value			
DMR Mode:	<input checked="" type="radio"/>	RF Hangtime: 10	Net Hangtime: 10	
D-Star Mode:	<input type="radio"/>	RF Hangtime: 10	Net Hangtime: 10	
YSF Mode:	<input type="radio"/>	RF Hangtime: 10	Net Hangtime: 10	
P25 Mode:	<input type="radio"/>	RF Hangtime: 20	Net Hangtime: 20	
MMDVM Display Type:	Nextion ▼	Port: /dev/ttyUSB0 ▼	Nextion Lay out:	ON7LDS ▼
Apply Changes				

General Configuration	
Setting	Value

Your own MMDVMHost build: changes in mmdvmhost.ini

Not using Pi-Star? You can use this screen too in your own MMDVMHost build:

The screen layout has to be selected with the parameter Screen layout in the MMDVM.ini file in the Nextion section. If you use option 2, the auto-size font functionality for Talker Alias is activated.

- 0 = auto (future use, for now it's G4KLX layout)
- 1 = G4KLX layout
- 2 = ON7LDS layout

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Credits

Special credits for those who made this all possible (buy them a beer, or two, or three, or ...PayPal them so they can continue support this great project ☺):

- OM Jonathan Naylor (G4KLX): “Spiritual” leader and lead-developer for the MMDVMhost project and all the connected utilities;
- OM Andrew Taylor (MW0MWZ) : Lead-developer Pi-Star;
- OM Dennis Björn Karl Boniakowsky (DB2OE) for his NEXTION Screen layouts;
- OM Lieven (ON7LDS): who made “The Basic screen” for this project and wrote parts of the MMDVMHost code to support the NEXTION devices;
- Max Donoghue (VE3TMT) as Co-writer / Editor for this tutorial
- All users from the Facebook group <https://www.facebook.com/groups/Nextion/> for their tips and tricks.

Sources

- The MMDVMHost project by Jonathan Naylor:
 - <https://github.com/g4klx/MMDVMHost/>
- The Pi-Star project by Andrew Taylor:
 - <http://www.pistar.uk/index.php>
- Nextion Support group:
 - <https://www.facebook.com/groups/Nextion/>

You can find the latest version of this project tutorial in this support group, including all files needed for “The Sample screen” project.

Document history and Disclaimer / Copyright

Document history

Revision	Publishing date	Author	Changes and remarks
V1.00	Not published	RvR	Put together earlier How-to's into one document; first concept
V1.10	Not published	RvR	Layout changes and added "The Project screen"
V2.00	Not published	RvR	Extended the document with configuration and connecting part
V2.01	Not published	RvR / MD	Rework and adding more info (Credits; Sources; Disclaimer, etc...); preparing for publishing
V2.02	November 30, 2017	RvR / MD	Review comments/remarks by Max Donoghue are included in this version; first published version.
V2.03	December 7, 2017	RvR	Added new paragraphs explaining the Editor windows and functions of Attributes.

RvR = Rob van Rheenen
MD = Max Donoghue

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