



Nextion Display Guide

(adapted from the 2020-2021 team website)

The purpose of this guide is to provide an overview of the Nextion display used in the ND formula hybrid car and describe the methods for modifying the display and sending data via UART.

1. Nextion Connections
2. Nextion Graphics
 - a. Software
 - b. Upload
3. Nextion Data
 - a. Format
 - Baud Rate:
 - The baud rate on the Nextion display can be set to several preset values
 - 2400, 4800, 9600, 19200, 31250, 38400, 57600, and 115200, 230400, 250000, 256000, 512000, and 921600
 - Setting baud rate of display was changed in three spots due to not being able to identify exactly where it was needed. One is in the program.s tab and the timers on each page.

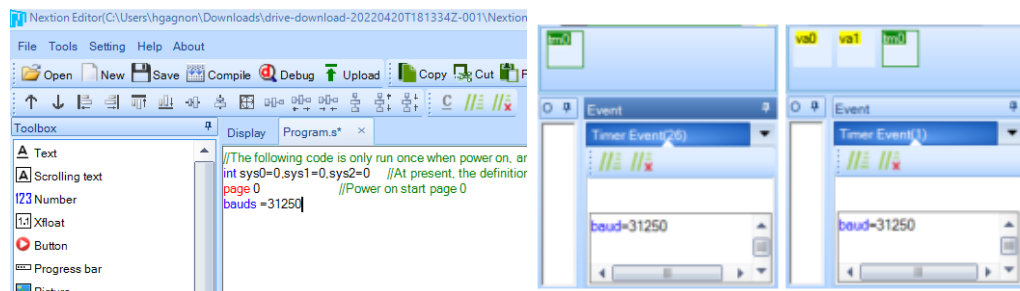


Figure 1 & 2: Setting the baud rate

- Writing to tools:
 - You can write to tools in multiple ways, such as a *Touch Press Event*, a *Preinitialize Event*, or a *Timer Event*
 - Example: Initializing a button to change the page
 - Click on the button you want to initialize (it should outline in blue after clicking), then type the page you want it to jump to in the “Touch Press Event box”



Figure 3: Initializing the info button

- You can also initialize a button to change colors when pressed or to change values on the screen. For example, typing `b0.bco=(value)` in the touch press event box would change the background color of the button to whatever color you want.
 - i. Each color in the Nextion Editor is denoted by a value (i.e. black = 0)

b. Current Display

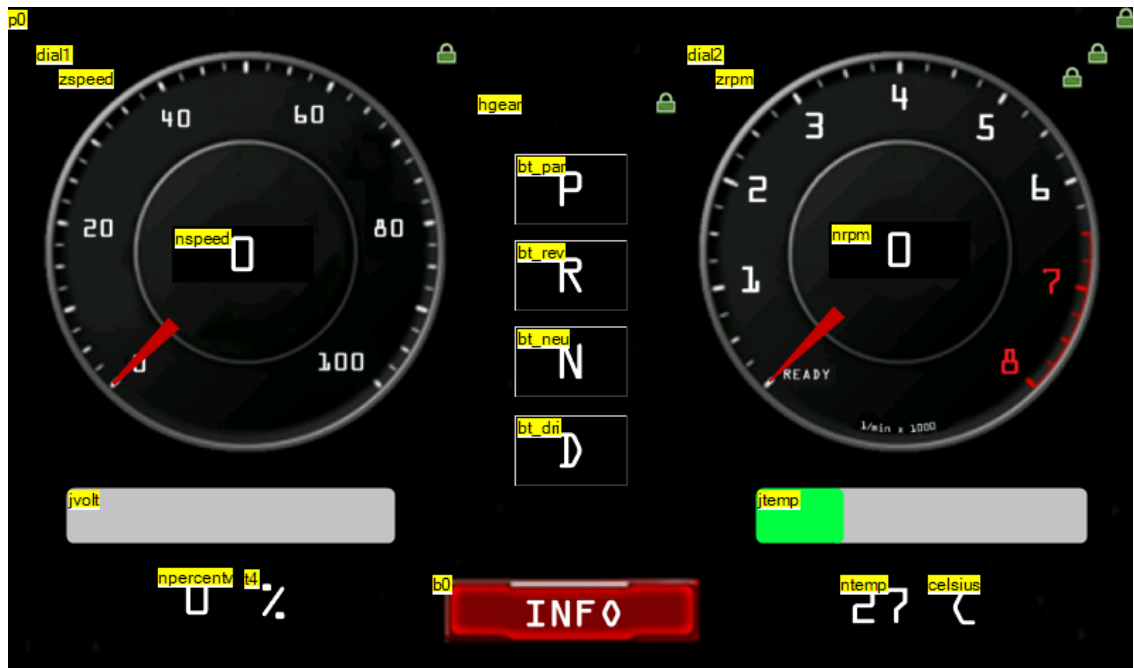


Figure 4: Page 0 of current Nextion display

- Speed
 - nspeed: the numerical speed value
 - zspeed: the gauge for the speed
 - Value 1-360, but code remaps the value accordingly

- RPM
 - nr_rpm: numerical rpm value
 - zrpm: gauge for the RPM
 - Value 1-360, but code remaps the value accordingly
- Gear
 - hgear: slider for gear of car
 - gear.val=0(D),33(N),66(R),100(P)
 - We currently do not utilize hgear on our display because there are no driver inputs given that there is no gear shift on the car at the moment. However, that would be a great thing for future teams to implement.
- Voltage
 - jvolt: sliding bar for capacitor percentage (values 1-100: calculated by code)
 - npercentv: capacitor percentage number
 - Although this isn't necessary because the code remaps each value accordingly, we found it helpful to set nrpm=zrpm as a timer event so that the gauge value always matched the numerical value on the tachometer
- Temperature
 - jtemp: sliding bar for temp range (values 1-100: calculated by code)
 - ntemp: temperature value

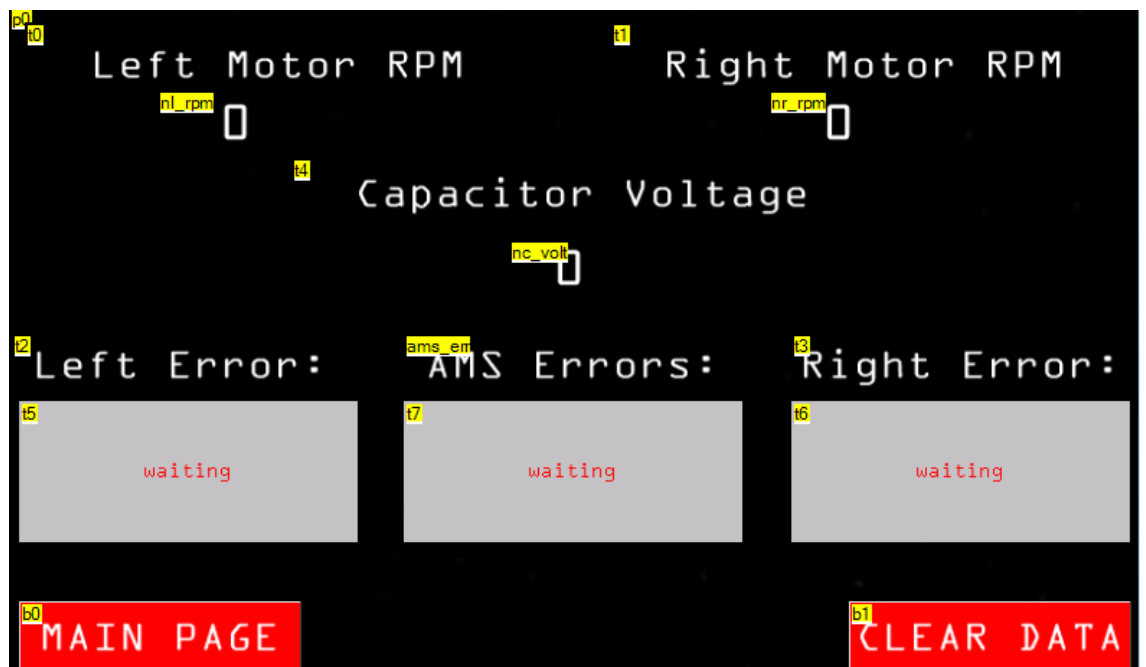


Figure 5: Page 1 of current Nextion Display

- RPM
 - nr_rpm: right motor numerical rpm value
 - nl_rpm: left motor numerical rpm value
- Voltage
 - nr_rpm: right motor numerical rpm value
- Buttons
 - b0: return to page 0
 - b1: clear data log manually
 - b2: return to page 0

c. Testing

- Testing can be done using a logic analyzer and connecting to the Rx pins on the board. Make sure to have the baud rate set correctly. If you are not worried about the baud and just want to see the data being sent, use the auto baud feature and make sure to have the signal display the ascii values.
 - You should ideally see three terminate functions before and after each command, and every command will be sent one character at a time.

4. Helpful Information

- a. I would recommend looking up videos on how to use the tools to fit your needs given that the tools can be controlled to display data differently.
- b. It may be useful to learn on an arduino since there is plenty of information online regarding arduinos and nextion displays. There are libraries for arduinos, thus making writing data easier.
- c. We attempted using a library to write using UART and found it very difficult and overly complicated.
- d. The functions on the code all write correctly to all the tools but are limited by the amount of instructions we can send to the display due to the chip's processing power and baud rate.
- e. Crucial Links:
 - <https://nextion.tech/instruction-set/>
 - <https://randomnerdtutorials.com/nextion-display-with-arduino-getting-started/>
 - <https://www.youtube.com/watch?v=OhYyBpjyR14&t=1201s>