ESHD: Assignment 7 + Answers

1. Place symbols of all considered sensors, all relevant components and wires on page 3.

2. Place symbols of 3 required RF Modules, all relevant components and wires on page 4.

3. Check that all components have appropriate footprints in their properties (menu:Tools → Edit Symbol Fields). Without them it is impossible to design and create a PCB.

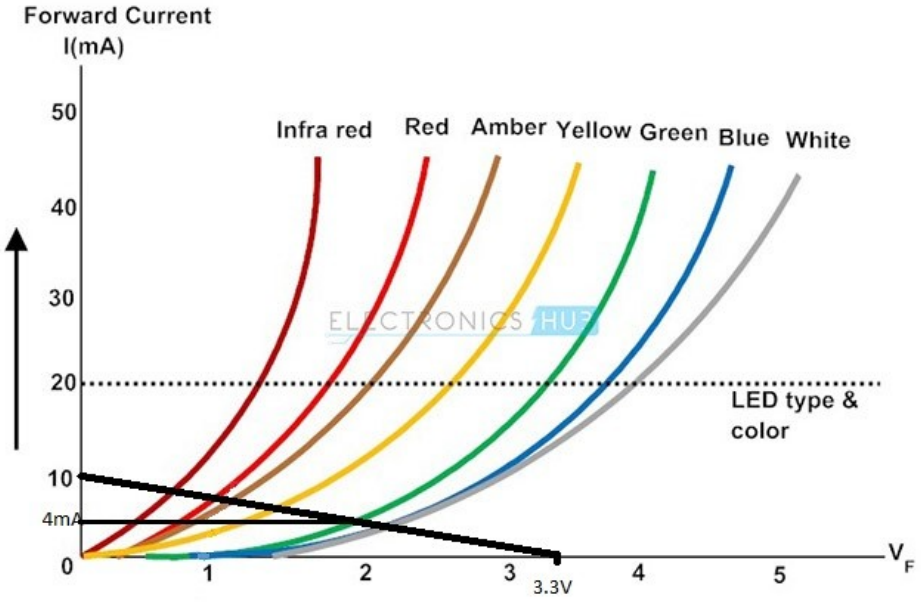
4. Solder 8-pin connector to the FRAM PCBA. Connect FRAM PCBA to STM32L475 PCBA using jumper wires.

5. Submit a picture showing physical connection of the PCBAs.

6. Copy everything from page 10 of IoT Kit into your page 6 and submit all project files, including ESHD- cache.lib, ESHD- rescue.lib and your libraries.

7. On page 10 of STM32L475 board, there is LED2, fed through resistor 330 Ohm. Calculate the current going through LED (and supplied by uC). This question is for 2 points.

Look at the Data Sheet of LED2, find Iforward vs. Vforward graph. Now take into account that with LED shorted the current through the resistor R20 will be 3.3/330 = 10mA. Draw a straight line from I=10mA on vertical axis to V=3.3V on horizontal axis:



Find a point of intersection of strait line with LED curve. Read the current on vertical axis (4mA – for Green, 6 – for yellow, 8 – for red), read the LED Vf voltage on the horizontal axis.

8. Page 10 of STM32L475 board, User's Pushbutton: calculate voltage value on the input EXTI13 of the microcontroller at 300us after closing B2. This question is for 2 points.

When the PB closes, there is C36, 0.1uF, charged to 3.3V and R24, 1k, - to discharge the cap. Transient process is described by the formula below:

Uc = 3.3V exp(-t/RC) = 3.3 exp(-3) = 3.3 * 0.0498 = 0.164V