Lab 5: Communication Peripherals

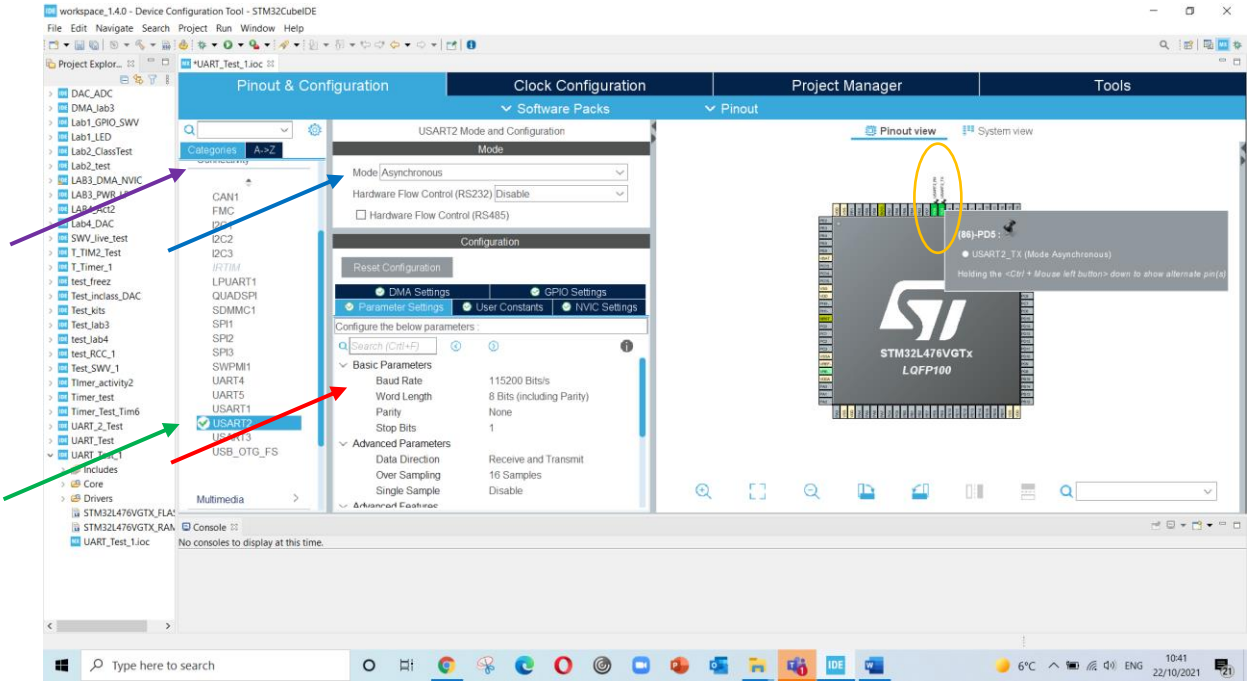
Activity 1: UART configuration

Aim: Learn to how to configure UART communication peripheral on STM32L4 DISCO board using STM32CubeIDE.

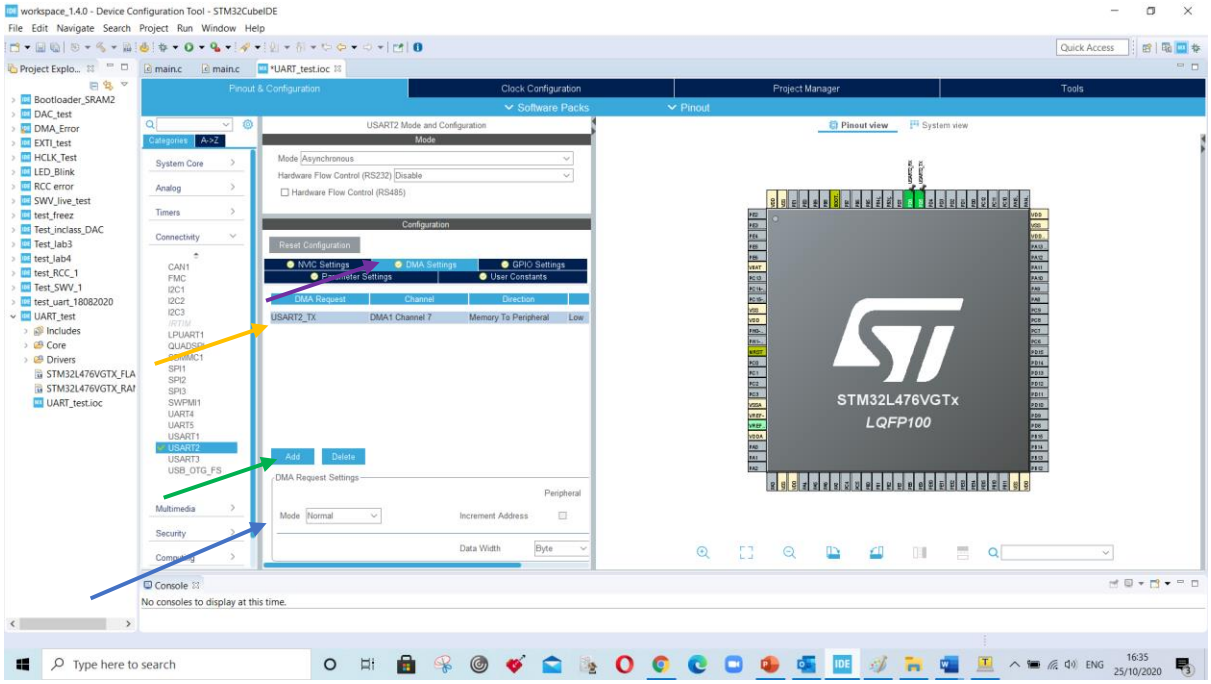
Objectives:

1- Learn how to configure the UART
2- Use DMA to transmit data through UART
3- Testing the functionality by TeraTerm (Serial Comm software).

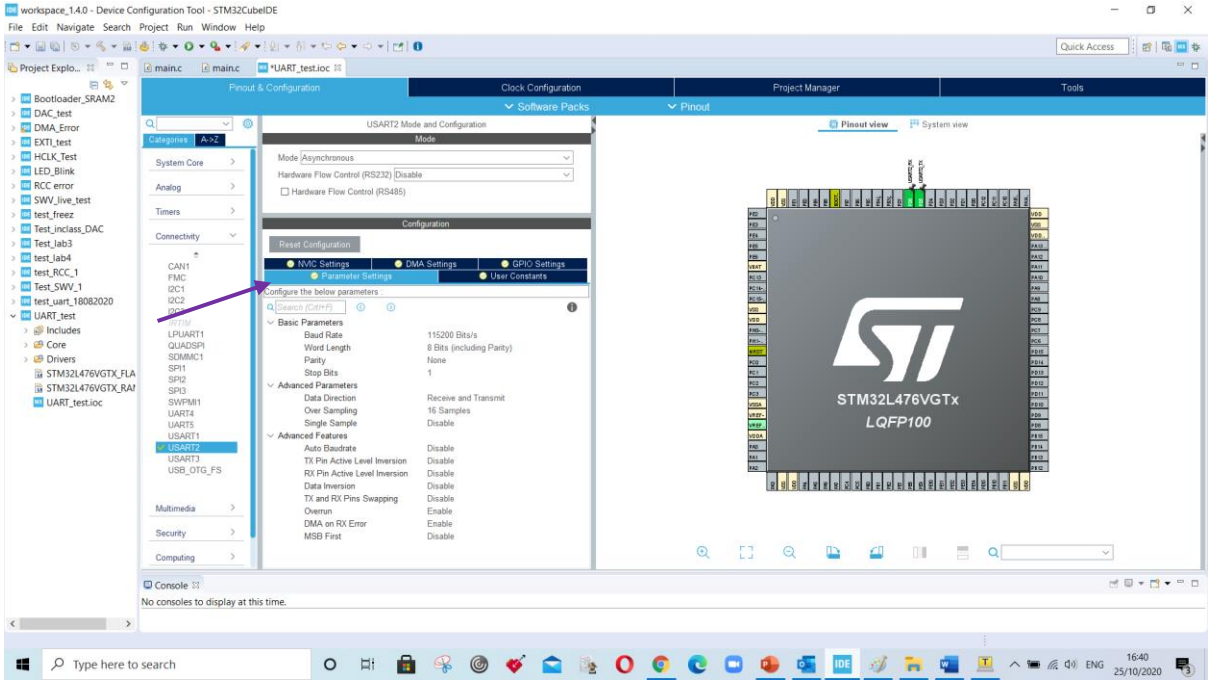
Step 1: Create a project in STM32CubeIDE. In Pinout & Configuration, Expand 'Connectivity' menu and select 'UART2' and in Mode window select 'Asynchronous' in Mode tab then relocate the green highlighted pins by mouse while holding **CTRL** key on keyboard to Pin PD5 for Tx and PD6 for RX alternatively Select the PD5 as UART2_Tx and PD6 as UART2_RX. Note the parameter setting in configuration window.



Step 2: In configuration window select ‘DMA setting’ window ‘Add’ DMA channel for ‘UART2_TX’ and select ‘**Normal**’ mode for DMA request setting.



Step 3: In configuration window select ‘parameter setting’ and keep the default settings.



Basic Parameters	
Baud Rate	115200 Bits/s
Word Length	8 Bits (including Parity)
Parity	None
Stop Bits	1

Step 4: Generate the code and add the code section given below:

Declare global variable:

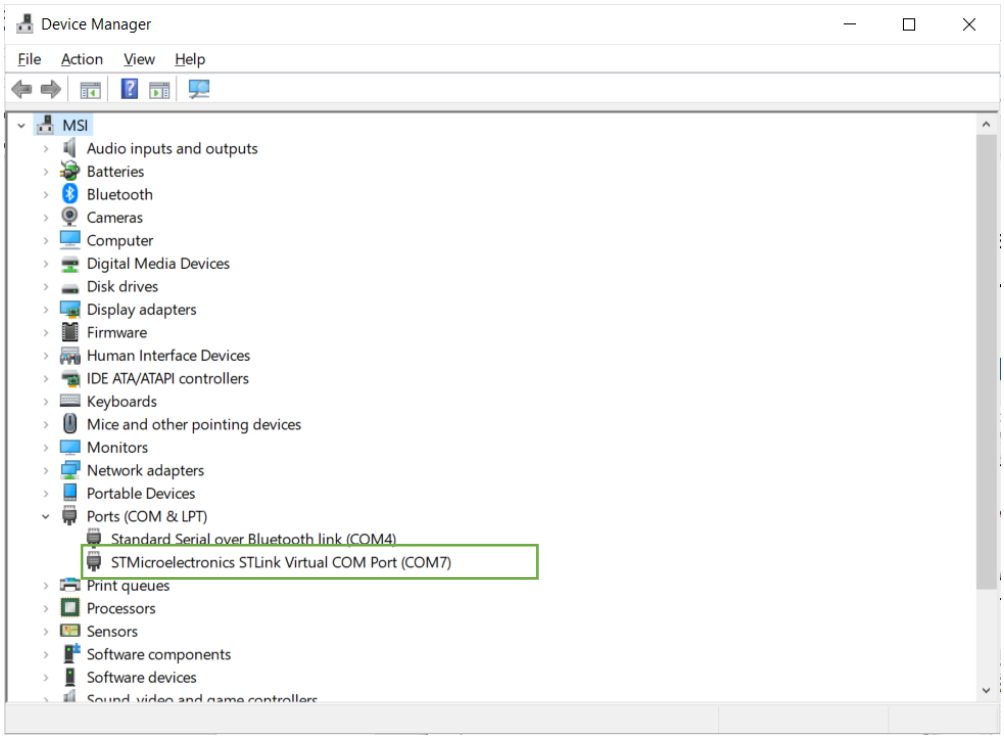
```
/* USER CODE BEGIN PV */
uint8_t Message_Tx[]={"UART 2 STM32l4756VG test message\r\n"};
```

```
  /* USER CODE BEGIN 2 */
/**
  * @brief Send an amount of data in DMA mode.
  * @note   When UART parity is not enabled (PCE = 0), and Word Length is
configured to 9 bits (M1-M0 = 01),
  *         the sent data is handled as a set of u16. In this case, Size must
indicate the number
  *         of u16 provided through pData.
  * @param huart UART handle.
  * @param pData Pointer to data buffer (u8 or u16 data elements).
  * @param Size  Amount of data elements (u8 or u16) to be sent.
  * @retval HAL status
  */
if (HAL_UART_Transmit_DMA(&huart2, Message_Tx, sizeof(Message_Tx)/sizeof(Message_Tx[0])-1) != HAL_OK)
  {
    Error_Handler();
  }
```

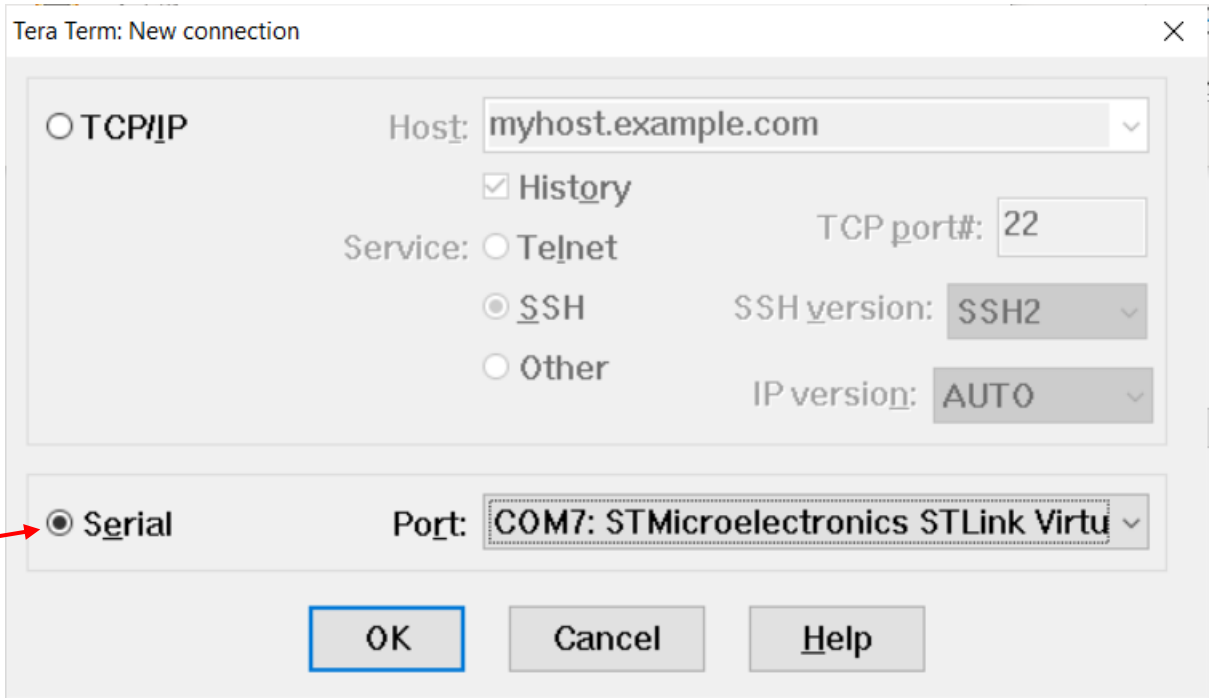
Run and build the project.

Todo: State what other function are available for UART peripherals.

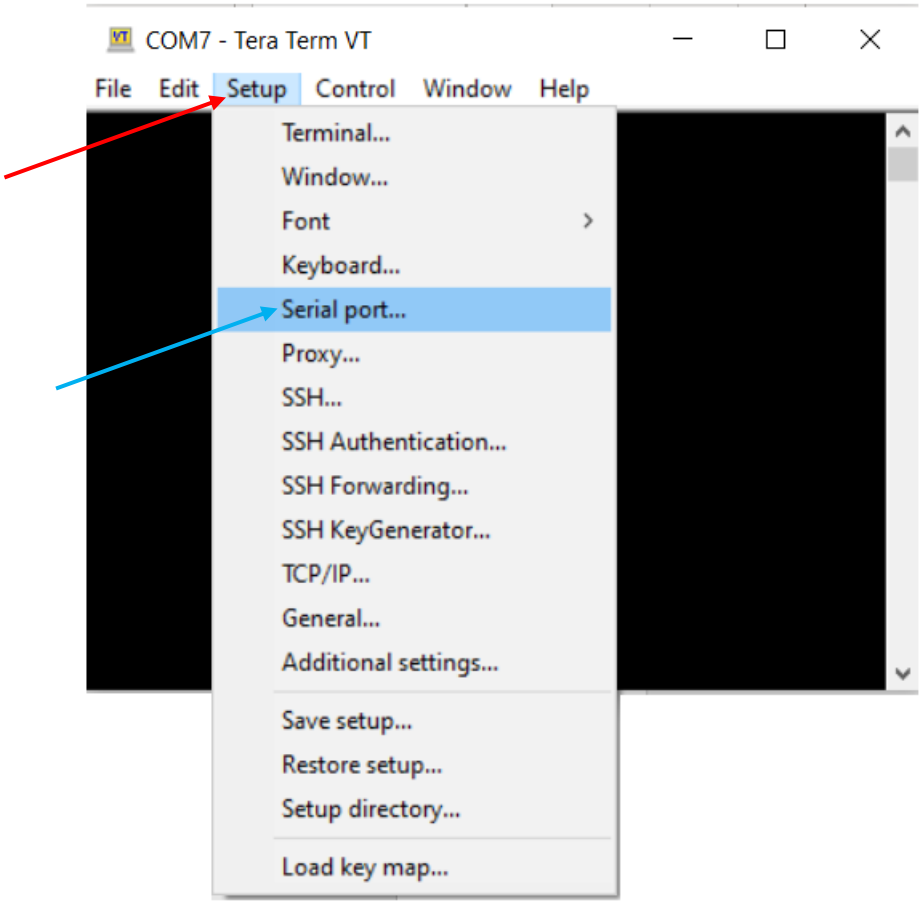
Step 5: Open **Device manger** to know the serial port number for 'STMicrelectronics STLink Virtual COM Port'.



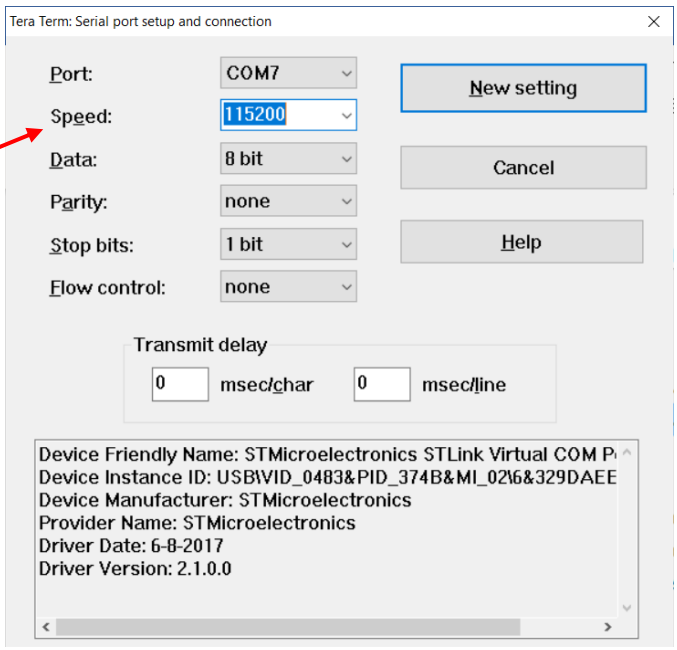
Step 5: Install and Open 'TeraTerminal' software and select the 'Serial' option and in port menu select 'STMicrelectronics STLink Virtual COM Port'.



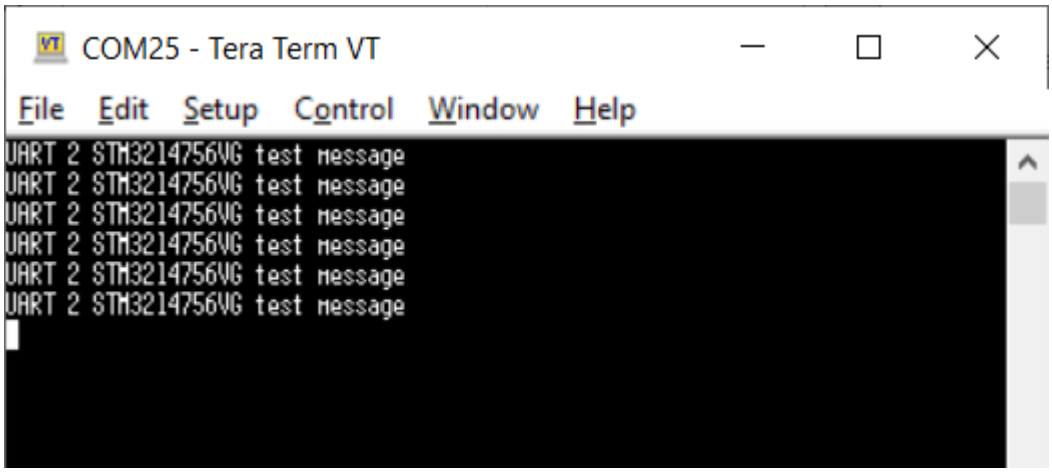
In TeraTerminak software click on Menu 'Setup' and select 'Serial Port'.



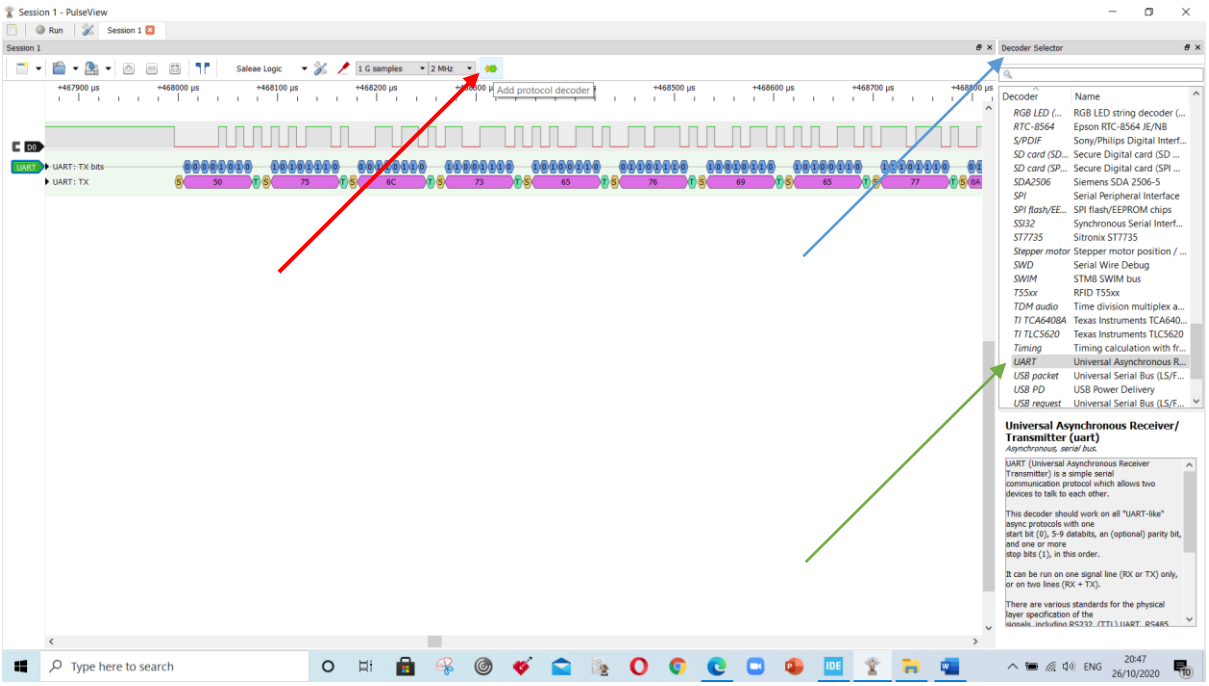
Configure the speed to ‘115200’ and verify the other parameters to STM32L4 UART parameters and finally click on ‘New Setting’.



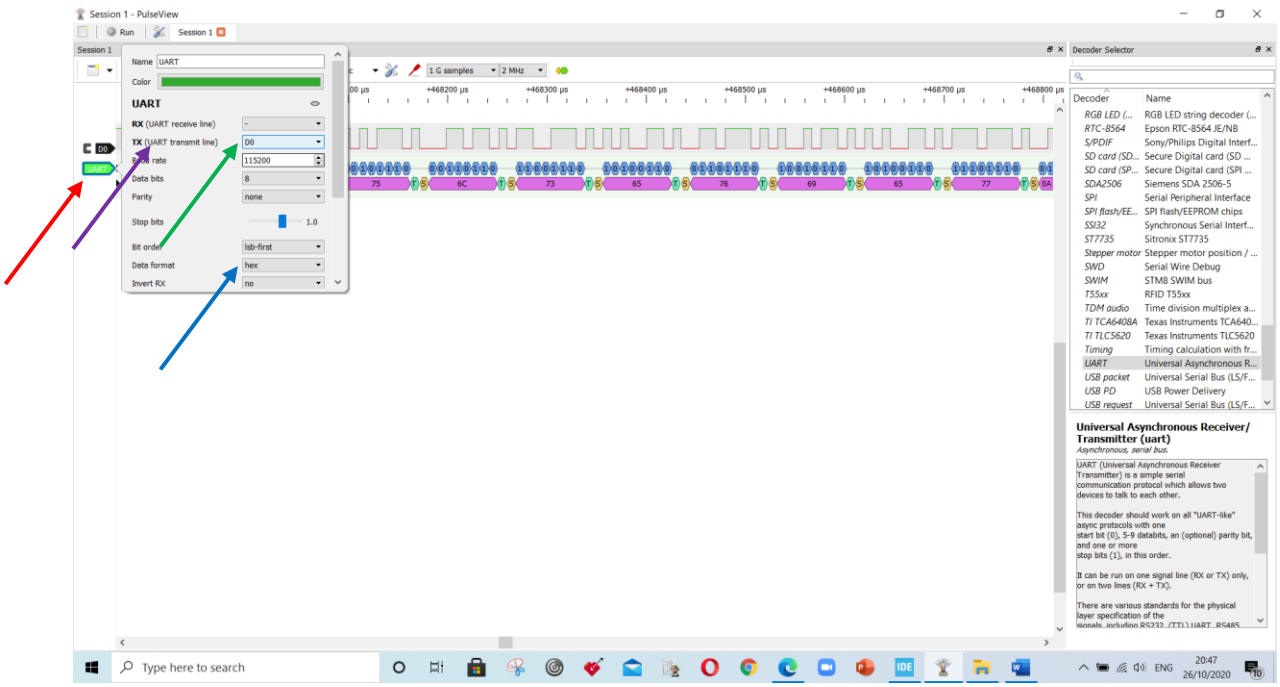
Press **Reset Button number of times** on STM32L4 DISCO kit and view the transmitted message.



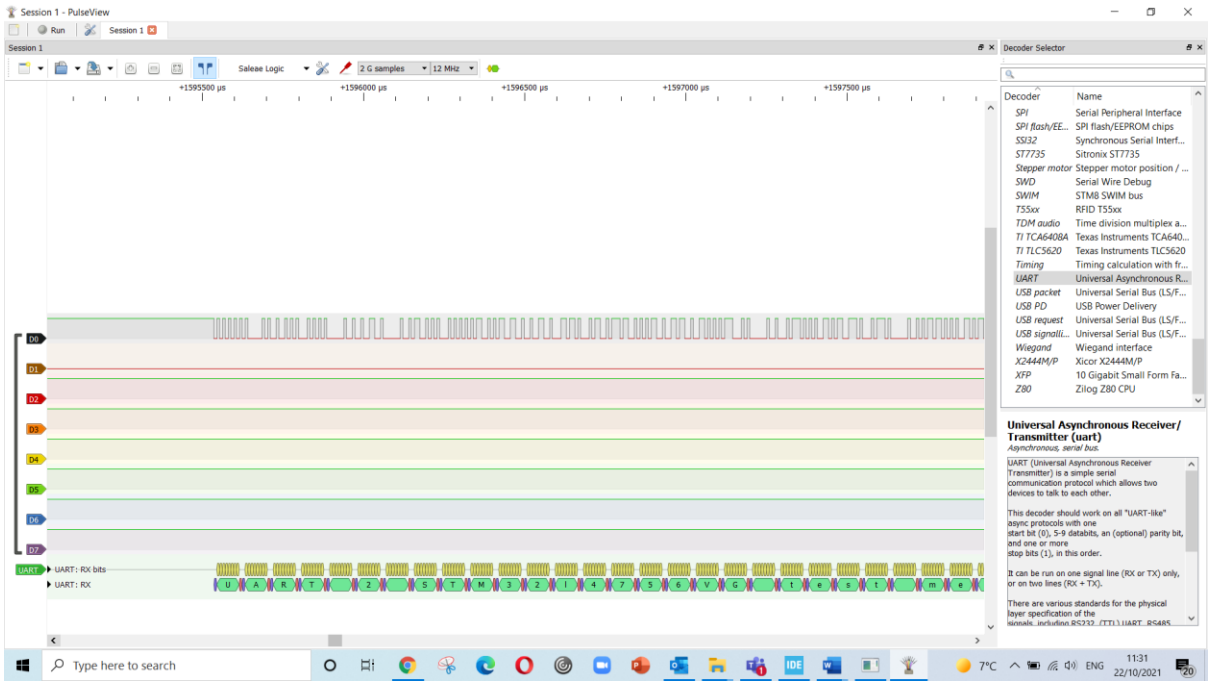
Step 6: Change the UART2_TX pin to ‘PA2’ and generate the code and run the project. Attach logic analyzer ‘D0’ to pin ‘PA2’ and GND to GND pins. Click on ’Add protocol decoder’ and from ‘decoder selector’ window double click on ‘UART’ protocol.



Step 6: Now click on ‘UART’ on left and look into ‘Tx menu’ for ‘D0’. From **Data format** drop down list select ‘ascii’ .



Step 7: Press the reset button on STM32L4 Disco and zoom in the data area and view the output as below.



To do: View the data protocol for even and odd parity.