BE X-NUCLEO-IKO1A2

Accéléromètre et gyroscope

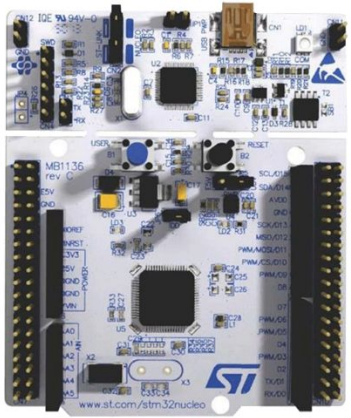
MAZARGUIL Marlon
QIN Xiaotong

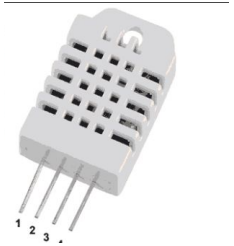
M1 SME
Université Paul Sabatier
2021/2022

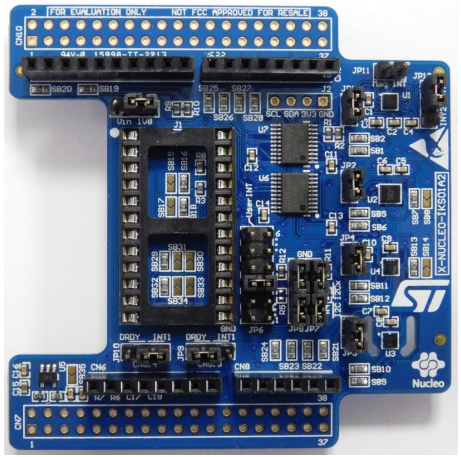
Sommaire

- Introduction
- PmodTMP2 (température)
- DHT22 (Capteur de Température)
- X-NUCLEO-IKO1A2
- Conclusion

Introduction







PmodTMP2 (capteur de température)

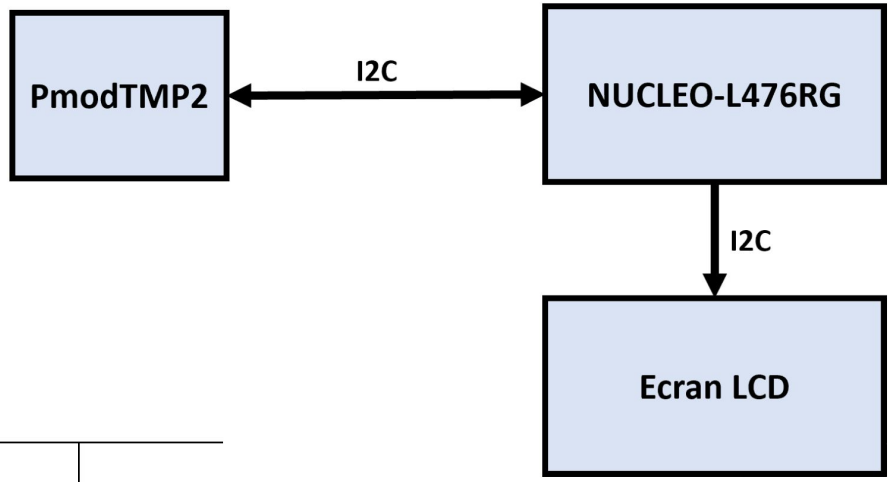


Table 20. I²C Bus Address Options

Binary							
A6	**A5**	**A4**	**A3**	**A2**	**A1**	**A0**	**Hex**
1	0	0	1	0	0	0	0x48
1	0	0	1	0	0	1	0x49
1	0	0	1	0	1	0	0x4A
1	0	0	1	0	1	1	0x4B

PmodTMP2 (capteur de température)

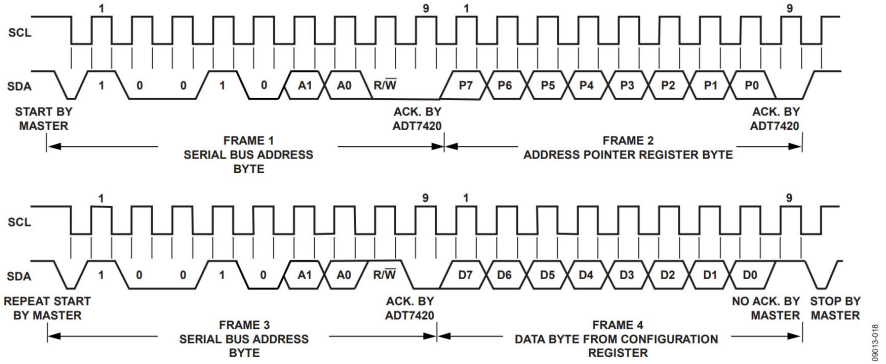
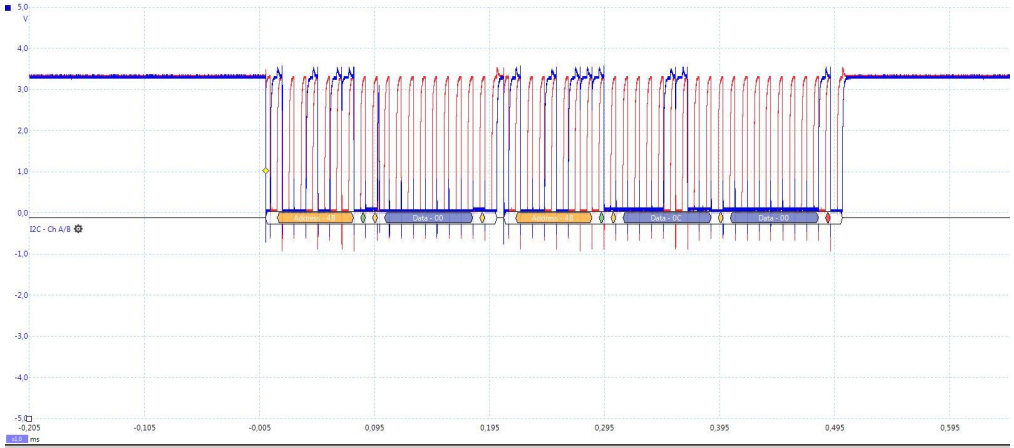
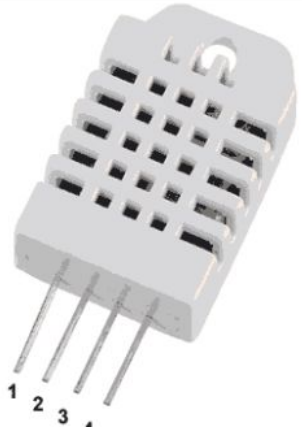


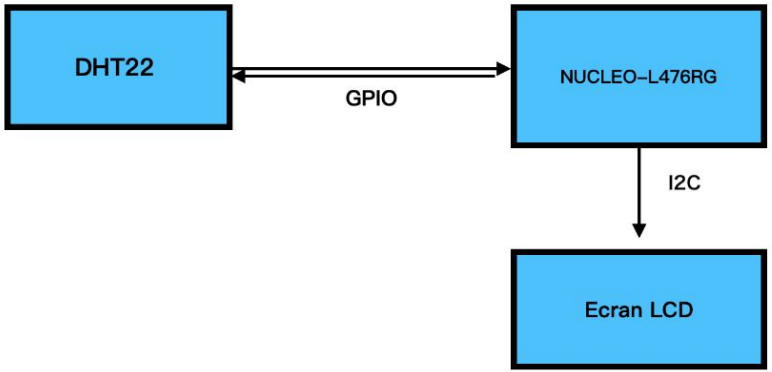
Figure 16. Reading Back Data from the Configuration Register

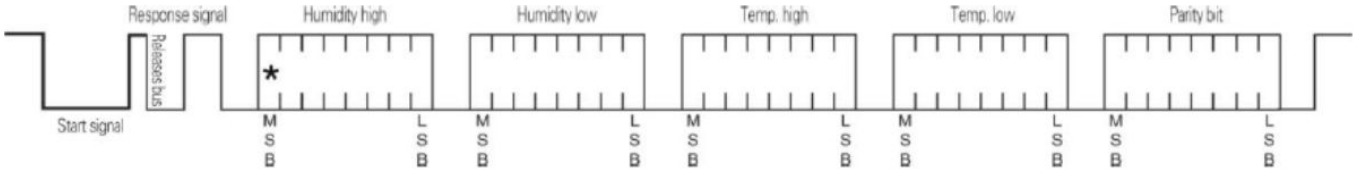


DHT22 (Capteur de Température)

DHT22 pins	
1	VCC
2	DATA
3	NC
4	GND

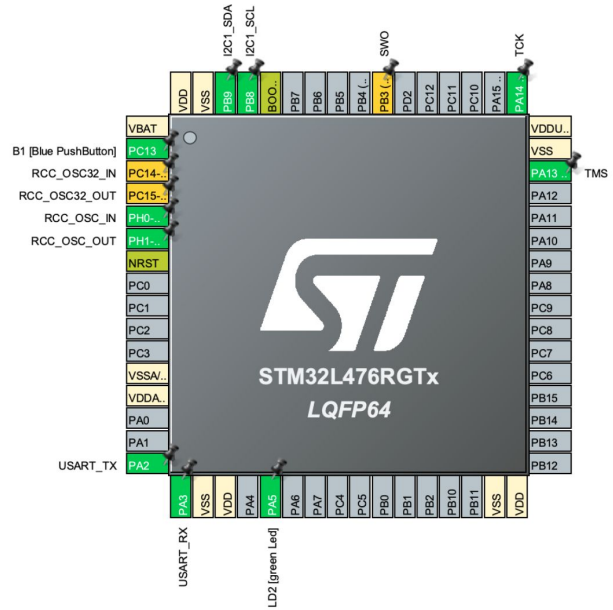






Pic5: AM2302 Single-bus communication protocol

DHT22 (Capteur de Température)

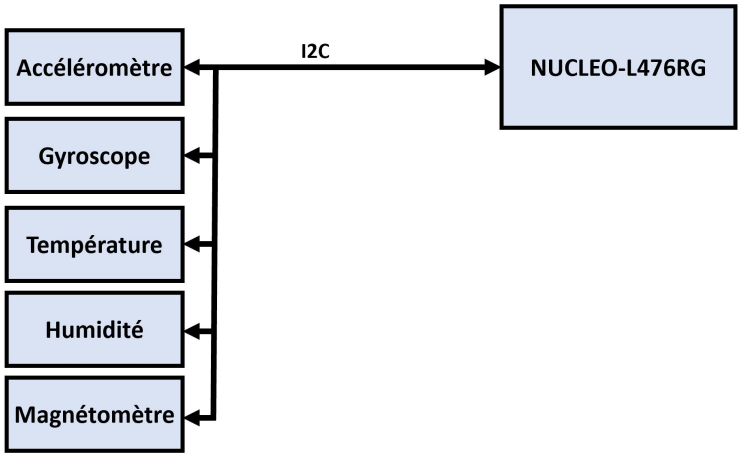


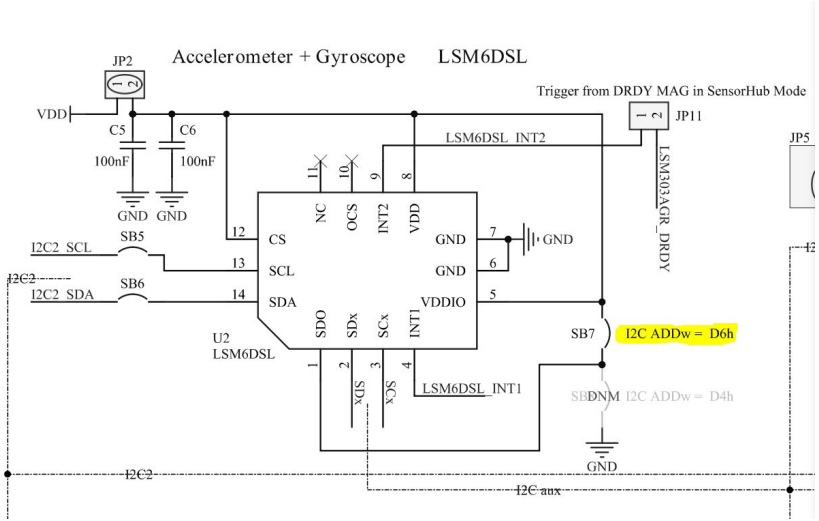

```
HAL_Delay(3000);
Data_Output(GPIOA, GPIO_PIN_1); //info vers le capteur
HAL_GPIO_WritePin(GPIOA, GPIO_PIN_1, GPIO_PIN_RESET);
DWT_Delay_us(1200); //signal de commande
HAL_GPIO_WritePin(GPIOA, GPIO_PIN_1, GPIO_PIN_SET);
DWT_Delay_us(30); //signal de commande
Data_Input(GPIOA, GPIO_PIN_1); //info vers le microcontroleur
```

Enfin pour on peut voir les valeur on doit finir les partie de LED:

```
/*commence transmission vers LCD*/
clearlcd();
sprintf(bufRH,"Humidite: %.1f", Humidite);
sprintf(bufT, "Temp.: %.1f C", Temperature);
lcd_position(&hi2c1,0,0);
lcd_print(&hi2c1,bufRH);
lcd_print(&hi2c1,"%");
lcd_position(&hi2c1,0,1);
lcd_print(&hi2c1,bufT);
reglagecouleur(0,0,255);
```

X-NUCLEO-IKO1A2

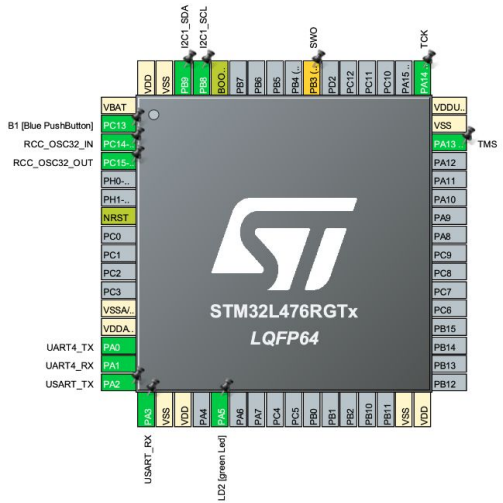


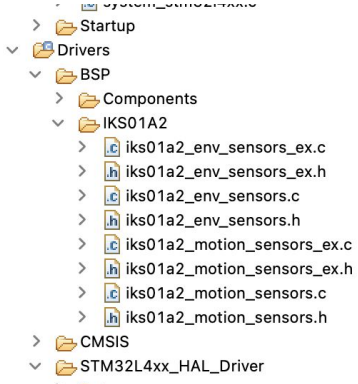



```
--- Starting new run ---
HTS221  humidity & temperature    = 0xBC
LPS22HB  pressure & temperature   = 0xB1
LSM303AGR magnetometer            = 0x40
LSM303AGR accelerometer           = 0x33
LSM6DSL accelerometer & gyroscope = 0x6A

HTS221: [temp]   23.70 C,   [hum] 47.09%
LPS22HB: [temp]   24.29 C, [press] 994.40 mbar
---
LSM303AGR [mag/mgauss]:    -400,      9,   -541
LSM303AGR [acc/mg]:          -7,     12,    967
LSM6DSL [acc/mg]:             1,     -5,   1030
LSM6DSL [gyro/mdps]:        210,  -1750,  -3780
```

X-NUCLEO-IKO1A2 (Température)



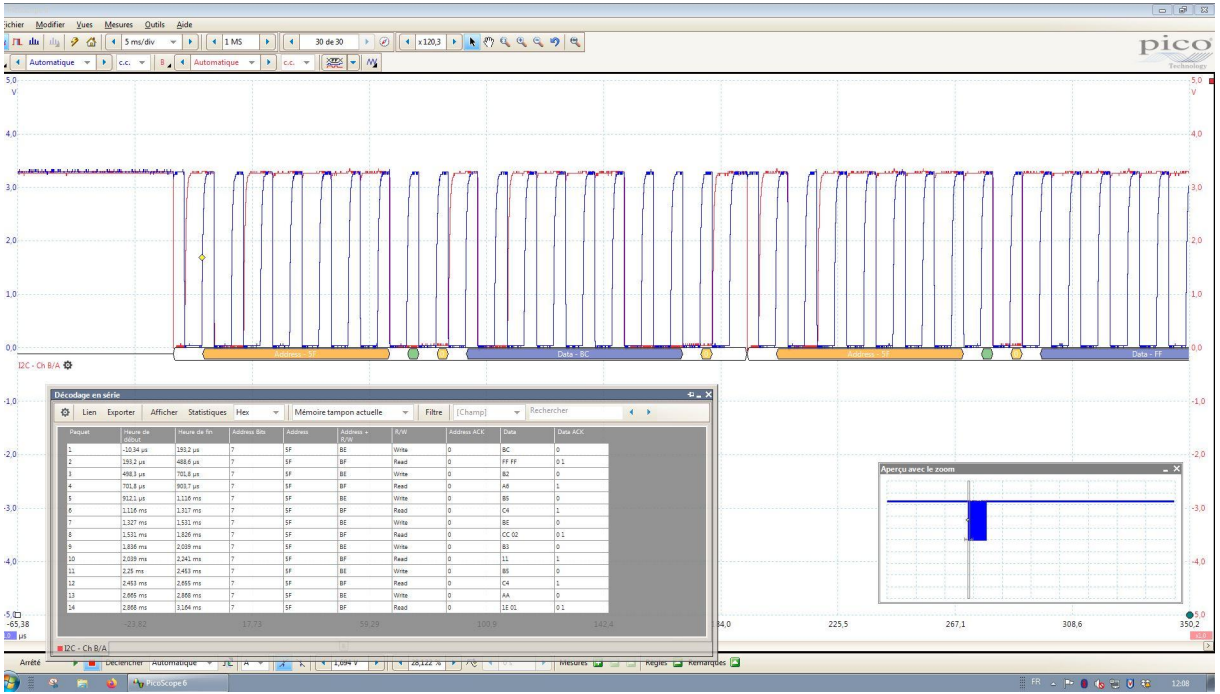



```c
int32_t IKS01A2_ENV_SENSOR_GetValue(uint32_t Instance, uint32_t Function, float *Value)
{
  int32_t ret;

  if (Instance >= IKS01A2_ENV_INSTANCES_NBR)
  {
    ret = BSP_ERROR_WRONG_PARAM;
  }
  else
  {
    if ((EnvCtx[Instance].Functions & Function) == Function)
    {
      if (EnvFuncDrv[Instance][FunctionIndex[Function]]->GetValue(EnvCompObj[Instance], Value) != BSP_ERROR_NONE)
      {
        ret = BSP_ERROR_COMPONENT_FAILURE;
      }
      else
      {
        ret = BSP_ERROR_NONE;
      }
    }
    else
    {
      ret = BSP_ERROR_WRONG_PARAM;
    }
  }

  return ret;
}
```

X-NUCLEO-IKO1A2 (Température)



X-NUCLEO-IKO1A2 (Gyroscope)

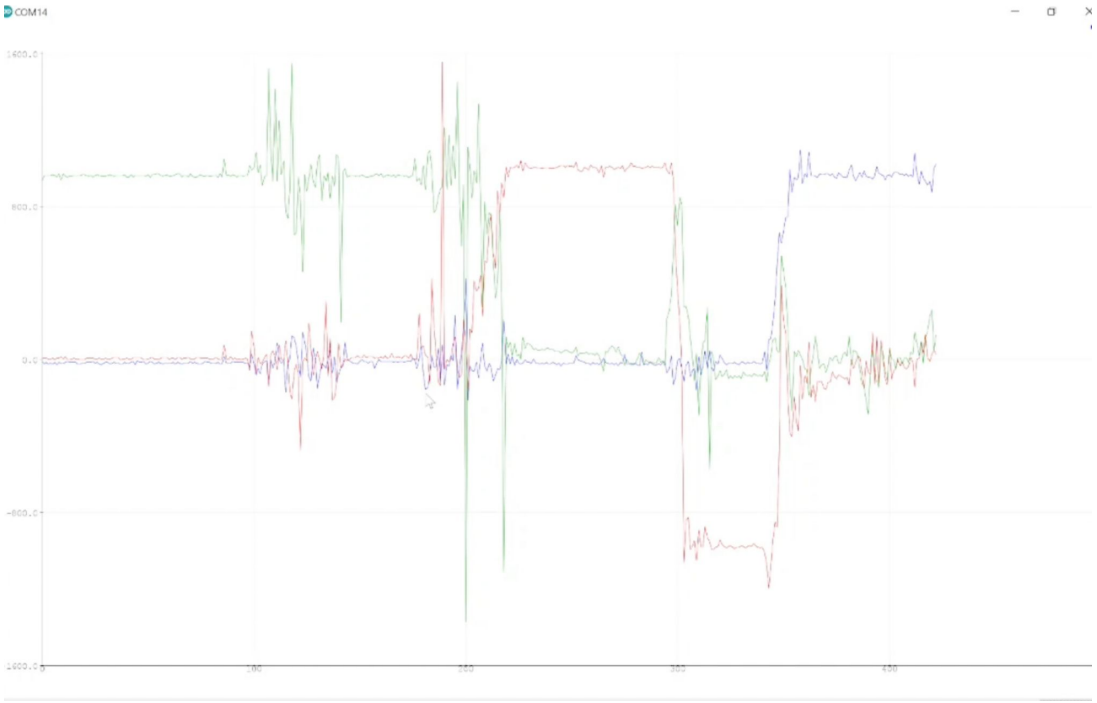
```
/* USER CODE BEGIN 2 */
if(IKS01A2_MOTION_SENSOR_Init(IKS01A2_LSM6DSL_0,MOTION_GYRO)==HAL_OK){
    IKS01A2_MOTION_SENSOR_Enable(IKS01A2_LSM6DSL_0,MOTION_GYRO);
}

if(IKS01A2_MOTION_SENSOR_Init(IKS01A2_LSM303AGR_ACC_0,MOTION_ACCELERO)==HAL_OK){
    IKS01A2_MOTION_SENSOR_Enable(IKS01A2_LSM303AGR_ACC_0,MOTION_ACCELERO);
}

if(IKS01A2_ENV_SENSOR_Init(IKS01A2_HTS221_0,ENV_TEMPERATURE)==HAL_OK){
    IKS01A2_ENV_SENSOR_Enable(IKS01A2_HTS221_0,ENV_TEMPERATURE);
}
if(IKS01A2_ENV_SENSOR_Init(IKS01A2_HTS221_0,ENV_HUMIDITY)==HAL_OK){
    IKS01A2_ENV_SENSOR_Enable(IKS01A2_HTS221_0,ENV_HUMIDITY);
}
/* USER CODE END 2 */

/* Infinite loop */
/* USER CODE BEGIN WHILE */
```

X-NUCLEO-IKO1A2 (Gyroscope)



Conclusion

- Ajouter à des projets existants
  - Skate électrique

- Développer le projet
  - Afficher en 3D (accéléromètre et gyroscope)
  - Ajouter des capteurs

Merci pour votre attention