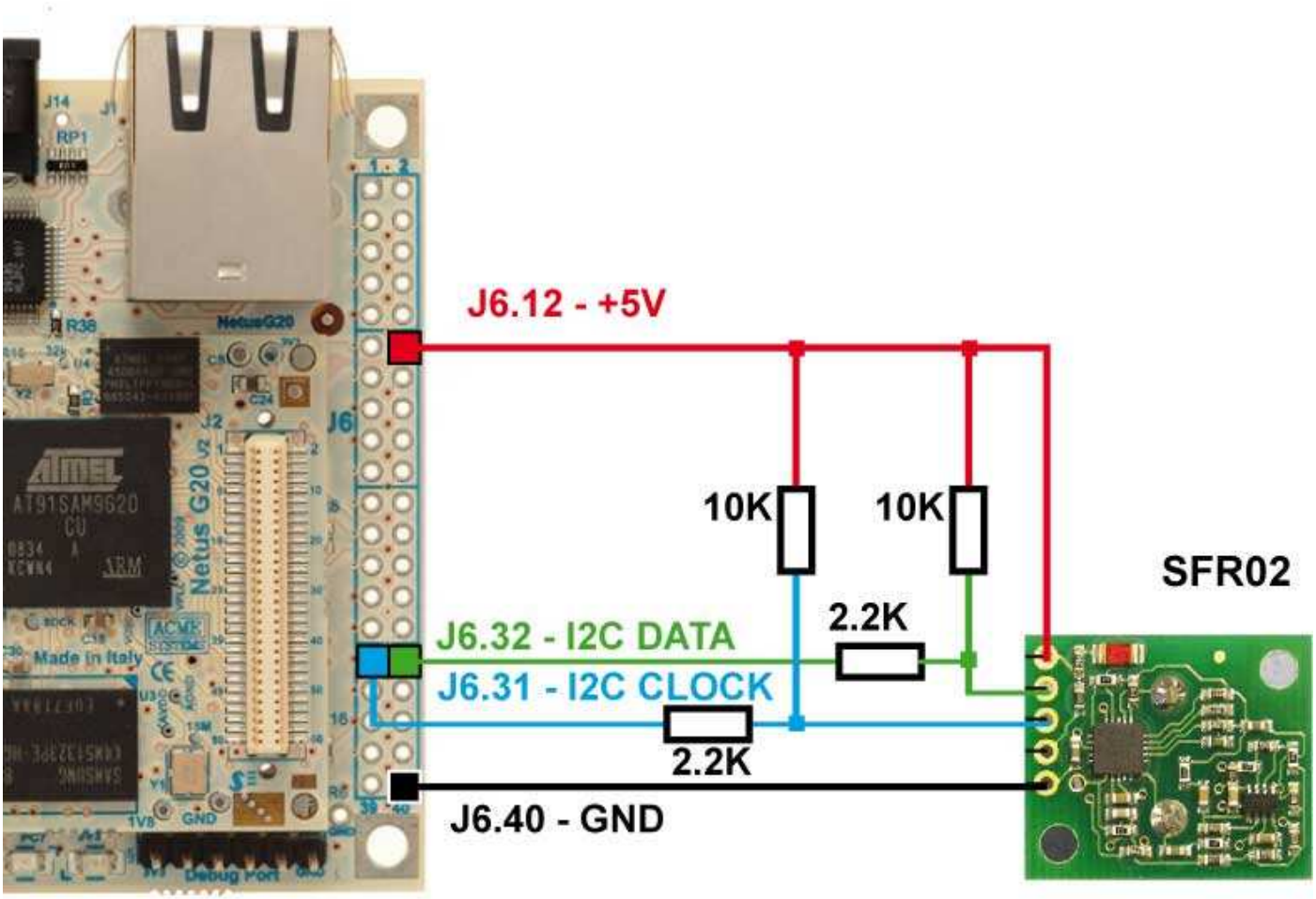
Using the SRF02 Ultrasonic range finder in I2C mode

The SRF02 is a single transducer ultrasonic rangefinder. It features both I2C and a Serial interfaces. This article illustrates how to use it in I2C mode (see the I2C specifications).

To try this tutorial you have to update your Debian Linux kernel image: How to update the kernel image.

Wiring



Be carefull to insert the 2K2 resistors to avoid damage on the FOXG20 GPIO lines that are at 3.3 volt

Example on code in Python

To manage the I2C bus in Python it need to install the **smbus** module available as Debian package and installable typing:

```
debarm:~# apt-get update
...
debarm:~# apt-get install python-smbus
```

This is an example of code that gets the distance in centimeters:

File: http://foxg20.acmesystems.it/download/examples/sfr02.py -

```
#!/usr/bin/python
import smbus
import time

# Define a class called Ranger

class Ranger():
        # Select the /dev/i2c-0 device
        b = smbus.SMBus(0)

        # Read the distance
        def getValue(self):
                # Write in the command register (0x00) the command
                # 0x51 (Real Ranging Mode - Result in centimeters)
                # using the default sfr02 I2C address 0x70
                self.b.write_byte_data(0x70,0x00,0x51)

                # Wait as explained on the datasheet
                time.sleep(0.066)

                # Read the hi value
                h = self.b.read_byte_data(0x70,0x02)

                # Read the low value
                l = self.b.read_byte_data(0x70,0x03)

                # Return the range in cm
                return h*256+l

# Create a Ranger object called sfr02
sfr02 = Ranger()

# Get the distance from it
print sfr02.getValue(), "cm"
```

To execute it type:

```
debarm:~# python sfr02.py
33 cm
```

Example on code in C

This is an example of C code that read the range in cm and type it on the terminal session. To try this example in C you can install the GCC directly on the FOX Board G20 and compile it typing:

```
debarm:~# gcc sfr02.c -o sfr02
debarm:~# ./sfr02
Range=287 cm
```

File: http://foxg20.acmesystems.it/download/examples/sfr02.c -

```c
#include <stdio.h>
#include <fcntl.h>
#include <stdlib.h>
#include "/usr/include/linux/i2c-dev.h"

int main(void)
{
        int fd;
        char filename[20];
        char buf[10];
        int res;
        int range=0;

        sprintf(filename, "/dev/i2c-0");
        fd = open(filename, O_RDWR);
        if (fd < 0) {
                printf("Error on open\n");
                exit(1);
        }

        if (ioctl(fd, I2C_SLAVE, 0x70) < 0) {
                printf("Error on slave address\n");
                exit(1);
        }


        buf[0] = 0x00;
        buf[1] = 0x51;
        if ((write(fd,buf,2))!=2) {
                printf("Error send the read command\n");
                exit(1);
        }

        // Wait for the measurement
        usleep(66000);

        buf[0] = 0x02;
        if ((write(fd,buf,1))!=1) {
                printf("Error on select the Range High Byte\n");
                exit(1);
        }

        if ((read(fd,buf,1))!=1) {
                printf("Error on read the Range High Byte\n");
                exit(1);
        }
        range = buf[0]<<8;

        buf[0] = 0x03;
        if ((write(fd,buf,1))!=1) {
                printf("Error on select the Range Low Byte\n");
                exit(1);
        }

        if ((read(fd,buf,1))!=1) {
                printf("Error on read the Range Low Byte\n");
                exit(1);
        }
        range |= buf[0];


        printf("Range=%d cm\n",range);
        close(fd);

        return 0;
}
```