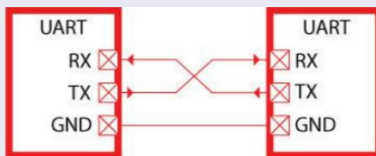


Principe de communication série avec UART

Principe de communication série avec UART

- ▶ UART (Universal Asynchronous Receiver Transmitter) est un contrôleur de communication série, asynchrone et full-duplex



- ▶ Une donnée est envoyée bit par bit
- ▶ L'envoi d'une donnée (7/8 bits) s'effectue sous forme d'une trame
- ▶ Une trame UART



- ▶ La vitesse de transmission est mesurée en bauds (bits de données par seconde) : 9600, 19200, 38 400, etc.

Communication série entre une RPi3 et un PC

Branchements

➡ On utilisera un câble TTL/USB (Transistor-Transistor Logic / Universal Serial Bus)



Raspberry Pi Pinout	
3v3 Power	1
BCM 2 (SDA)	3
BCM 3 (SCL)	5
BCM 4 (GPICLK0)	7
Ground	9
BCM 17	11
BCM 27	13
BCM 22	15
3v3 Power	17
BCM 10 (MOSI)	19
BCM 9 (MISO)	21
BCM 11 (SCLK)	23
Ground	25
BCM 0 (ID_SD)	27
BCM 5	29
BCM 6	31
BCM 13 (PWM1)	33
BCM 19 (MISO)	35
BCM 26	37
Ground	39
5v Power	4
5v Power	6
Ground	8
BCM 14 (TXD / Transmit)	8
BCM 15 (RXD / Receive)	10
BCM 18 (PWM0)	12
Ground	14
BCM 23	16
BCM 24	18
Ground	20
BCM 25	22
BCM 8 (CE0)	24
BCM 7 (CE1)	26
BCM 1 (ID_SC)	28
Ground	30
BCM 12 (PWM0)	32
Ground	34
BCM 16	36
BCM 20 (MOSI)	38
BCM 21 (SCLK)	40

Communication série entre une RPi3 et un PC

Branchements

- Câble noir (GND) → (GND) Pin6
- Câble blanc (RX) → (TX) Pin8
- Câble vert (TX) → (RX) Pin10



Communication série entre une RPi3 et un PC

Configuration

- Sur le PC, installer screen pour avoir les pilotes du câble

```
sudo apt install screen
```

- Sur la carte RPi3

- Activer la communication série UART

Éditer le fichier /boot/config.txt

```
sudo nano /boot/config.txt
```

Insérer à la fin du fichier les lignes suivantes :

```
enable_uart=1 #Activer l'UART
```

```
uart_2ndstage=1 #Activer le débogage (traces du boot)
```

Communication série entre une RPi3 et un PC

Recommandation

- Par défaut, le bluetooth utilise UART pour se connecter au SoC, alors que les pins GPIO8 et GPIO10 utilisent un mini-UART

- Il est recommandé de désactiver le bluetooth
- L'utilisation des UART avant désactivation du bluetooth

```
$ ls -l | grep serial
```

```
pi@raspberrypi:~$ ls -l /dev | grep serial
lrwxrwxrwx 1 root root      5 nov. 12 20:52 serial0 -> ttyS0
lrwxrwxrwx 1 root root      7 nov. 12 20:52 serial1 -> ttyAMA0
```

- Ajouter `dtoverlay=pi3-disable-bt` dans le fichier `/boot/config.txt`

```
$ sudo systemctl disable hciuart
```

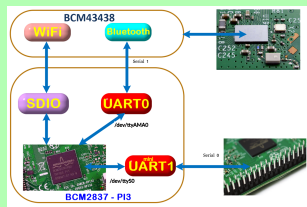
```
$ sudo systemctl disable bluealsa
```

```
$ sudo systemctl disable bluetoothdmesg
```

- Vérification après la désactivation du bluetooth

```
$ ls -l /dev | grep serial
```

```
pi@raspberrypi:~$ ls -l /dev | grep serial
lrwxrwxrwx 1 root root      7 nov. 12 20:35 serial0 -> ttyAMA0
lrwxrwxrwx 1 root root      5 nov. 12 20:35 serial1 -> ttyS0
```



Connexion depuis le PC

Connexion à la RPi3 depuis le PC

- Déterminer le terminal associé au câble après le branchement au port USB


```
$ dmesg | grep tty
```
- Lancer le terminal


```
$ sudo screen /dev/ttyUSB0 115200
```
- Brancher la RPi3 à l'alimentation

```

MESS:00:00:01.004468:0: hdmi: HDMI:EDID giving up on reading EDID block 0
MESS:00:00:01.018276:0: hdmi: HDMI:EDID error reading EDID block 0 attempt 0
MESS:00:00:01.017986:0: hdmi: HDMI:EDID error reading EDID block 0 attempt 1
MESS:00:00:01.024757:0: hdmi: HDMI:EDID error reading EDID block 0 attempt 2
MESS:00:00:01.031528:0: hdmi: HDMI:EDID error reading EDID block 0 attempt 3
MESS:00:00:01.038299:0: hdmi: HDMI:EDID error reading EDID block 0 attempt 4
MESS:00:00:01.045069:0: hdmi: HDMI:EDID error reading EDID block 0 attempt 5
MESS:00:00:01.051840:0: hdmi: HDMI:EDID error reading EDID block 0 attempt 6
MESS:00:00:01.058611:0: hdmi: HDMI:EDID error reading EDID block 0 attempt 7
MESS:00:00:01.065382:0: hdmi: HDMI:EDID error reading EDID block 0 attempt 8
MESS:00:00:01.072153:0: hdmi: HDMI:EDID error reading EDID block 0 attempt 9
MESS:00:00:01.078967:0: hdmi: HDMI:EDID giving up on reading EDID block 0
MESS:00:00:01.084468:0: hdmi: HDMI:hdm1_get_state is deprecated, use hdm1_get_display_state instead
MESS:00:00:01.092966:0: hdmi: HDMI:hdm1_get_state is deprecated, use hdm1_get_display_state instead
MESS:00:00:01.091689:0: brfs: File read: /mfs/sd/bcm2710-rpi-3-b.dtb
MESS:00:00:01.091351:0: Loading 'bcm2710-rpi-3-b.dtb' to 0x100 size 0x6743
MESS:00:00:02.067385:0: brfs: File read: 26435 bytes
MESS:00:00:02.072838:0: brfs: File read: /mfs/sd/config.txt
MESS:00:00:02.077192:0: dtparam: l2c_arm-on
MESS:00:00:02.097576:0: dtparam: spi-on
MESS:00:00:02.114699:0: dtparam: audio-on
MESS:00:00:02.137677:0: brfs: File read: 1838 bytes
MESS:00:00:02.141530:0: brfs: File read: /mfs/sd/cmdline.txt
MESS:00:00:02.146277:0: Read command line from file 'cmdline.txt':
MESS:00:00:02.152144:0: 'console=serial0,115200 console=tty1 root=PARTUUID=d9b3f436-02 rootfstype=ext4 elevator=deadline fsck.repair=yes rootwait quiet splash
plymouth.ignore-serial-consoles'
MESS:00:00:03.071228:0: oplonan: oplonan_get_pin_num: pin EMMC_ENABLE not defined
MESS:00:00:04.004955:0: brfs: File read: 166 bytes
MESS:00:00:04.045376:0: brfs: File read: /mfs/sd/kernel7.img
MESS:00:00:04.049336:0: Loading 'kernel7.img' to 0x0000 size 0x52af08
MESS:00:00:04.055508:0: Device tree loaded to 0x20f19408 (size 0x0b66)
MESS:00:00:04.062973:0: uart: Set PL011 baud rate to 103448.300000 Hz
MESS:00:00:04.069454:0: uart: Baud rate change done...
MESS:00:00:04.072887:0: uart: Baud rate[ 8.792075] Under-voltage detected! (0x00050005)

Raspbian GNU/Linux 10 raspberrypi ttyS0
raspberrypi login: █

```