

IIC control servo

1. Learning goals

In this course, we mainly learn to use Jetson NANO and 16-channel servo debugging board to control the servo through IIC.

2. Preparation

Connect the SDA and SCL of the module to the SDA and SCL pins of the Jetson NANO board. VCC and GND are connected to 3.3V and GND of Jetson NANO respectively. As shown below.

Jetson Nano J41 Header					
Sysfs GPIO	Name	Pin	Pin	Name	Sysfs GPIO
	3.3 VDC <i>Power</i>	1	2	5.0 VDC <i>Power</i>	
	I2C_2_SDA <i>I2C Bus 1</i>	3	4	5.0 VDC <i>Power</i>	
	I2C_2_SCL <i>I2C Bus 1</i>	5	6	GND	
gpio216	AUDIO_MCLK	7	8	UART_2_TX <i>/dev/ttyTHS1</i>	
	GND	9	10	UART_2_RX <i>/dev/ttyTHS1</i>	
gpio50	UART_2_RTS	11	12	I2S_4_SCLK	gpio79
gpio14	SPI_2_SCK	13	14	GND	
gpio194	LCD_TE	15	16	SPI_2_CS1	gpio232
	3.3 VDC <i>Power</i>	17	18	SPI_2_CS0	gpio15
gpio16	SPI_1_MOSI	19	20	GND	

gpio17	SPI_1_MISO	21	22	SPI_2_MISO	gpio13
gpio18	SPI_1_SCK	23	24	SPI_1_CS0	gpio19
	GND	25	26	SPI_1_CS1	gpio20
	I2C_1_SDA <i>I2C Bus 0</i>	27	28	I2C_1_SCL <i>I2C Bus 0</i>	
gpio149	CAM_AF_EN	29	30	GND	
gpio200	GPIO_PZ0	31	32	LCD_BL_PWM	gpio168
gpio38	GPIO_PE6	33	34	GND	
gpio76	I2S_4_LRCK	35	36	UART_2_CTS	gpio51
gpio12	SPI_2_MOSI	37	38	I2S_4_SDIN	gpio77
	GND	39	40	I2S_4_SDOOUT	gpio78

2.2 You need to open the IIC service of jetson NANO board.

2.3 Install I2Ctool

Input following command in command terminal,

```
sudo apt-get update
```

```
sudo apt-get install -y i2c-tools
```

Wait patiently for the successful installation to complete.

2.4 Check whether the installation is successfully

Input following command in command terminal,

```
apt-cache policy i2c-tools
```

If system output is as follows, the installation is successful.

i2c-tools:

Installed: 4.0-2

Candidate: 4.0-2

Version list:

*** 4.0-2 500

500 <http://ports.ubuntu.com/ubuntu-ports/bionic/universe/arm64/Packages>
 100 /var/lib/dpkg/status

2.5 Scan all i2c devices on a certain bus, and print out the device i2c bus address.

`sudo i2cdetect -y -r -a 1`

```

    0  1  2  3  4  5  6  7  8  9  a  b  c  d  e  f
00: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
10: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
20: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
30: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
40: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
50: 50 -- -- -- -- -- -- -- -- -- -- -- -- -- --
60: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
70: -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
  
```

2.6 Install smbus

Input following command in command terminal,

`sudo apt-get update`

`sudo apt-get install -y python3-smbus`

3. Module protocol

Protocol				
IIC communication				
Address	0x2D			
	Number	Angle		
Data	1-16	0-180		
Serial communication (baud rate 9600)				
	Start bit	Servo number	Servo angle	End bit
Data	'\$'	'A-P'	'0-180'	'#'
Eg	Servo1 turn to 180°: \$A180#			

4. Code

About code, please view [16CServo-iic.py](#) file.

4.1 Define the device address of the module

```
Servo_ADD = 0x2D
```

4.2 Initialize IIC communication

```
def IICServo(servonum, angle):
    bus.write_byte_data(Servo_ADD, servonum, angle)
    time.sleep(0.1)
```

4.3 Set the angle of the servo S1 to 0

```
IICServo(1,0)
```

5. Running code

Input following command in command terminal of jetson nano.

```
python3 16CServo-iic.py
```

6. Experimental phenomena

After the program is run successfully. The servo will rotate 0°, after 2s it will rotate 180°.