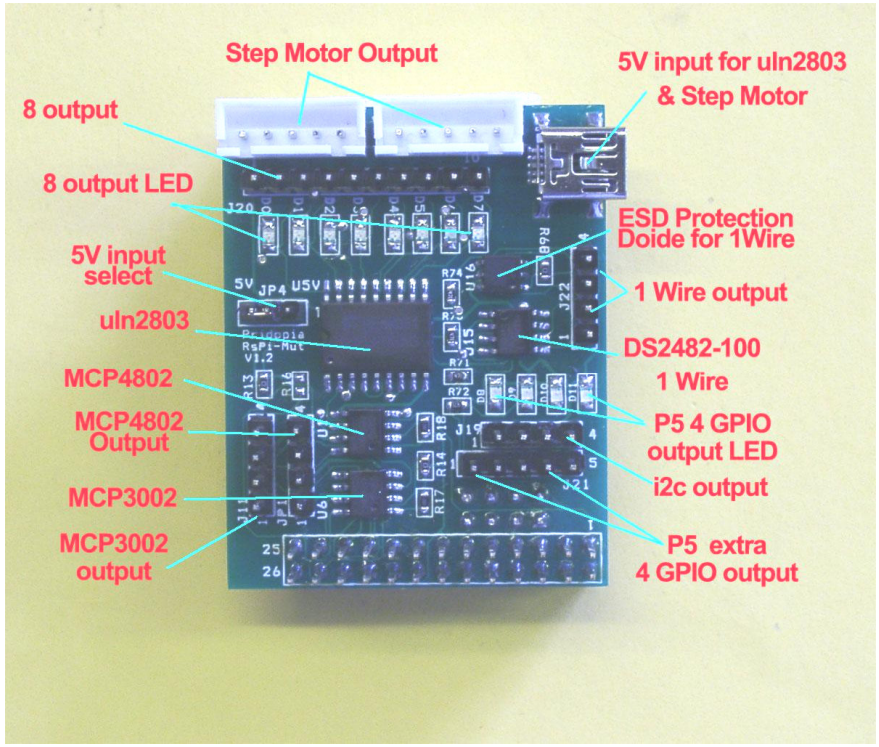
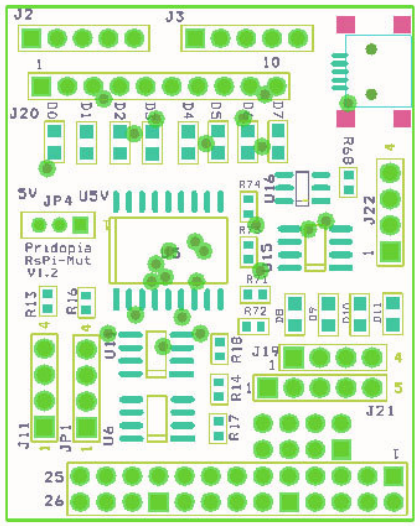
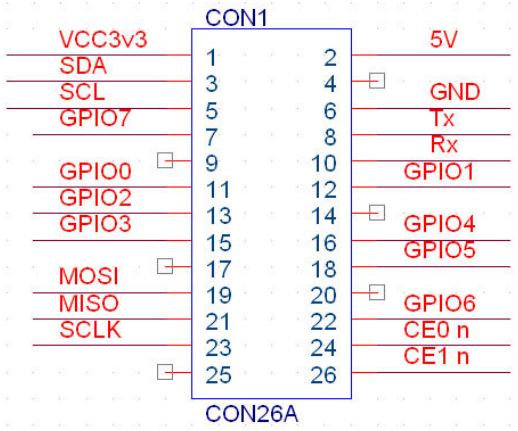
RsPi-ULN2803 & SPI AD/DA & 1-Wire User Manual







1. J2 J3 Step motor connector J2 (5V,D0,D1,D2,D3) J3(5V,D4,D5,D6,D7) can use Step motor (28BYJ-48 5VDC)
2. J20 pin1 – pin10 +5V,GND, D0, D1,D2,D3,D4,D5,D6,D7 OUTPUT
3. U5 **ULN2803** 8 darlington transistor array
4. J17 RS-Pi-V2 GPIO output S1, S2 D8,D9 output from V2 GPIO
5. J21 GPIO output pin1 – pin5 (GPIO 28,29,30,31,GND)
6. J19 i2c output pin1 - pin4 (GND,5V,SDA,SCL)
7. JP4 choose 5V input from Mini USB Port J7 or RS-Pi 5V
8. J7 Mini USB 5V input
9. U6 **MCP3002** SPI Interface 10 bit Analog-to-Digital Converter output J11 pin1 – pin4 (Vcc, AD0, GND, AD1)
10. U11 **MCP4802** SPI Interface 8 bit Digital-to-Analog Converter
    Or U11 **MCP4812** SPI Interface 10 bit Digital-to-Analog Converter
    Or U11 **MCP4822** SPI Interface 12 bit Digital-to-Analog Converter
    output JP1 pin1 – pin4 (DA0,GND,DA1,GND)
11. U15 DS2482-100 I2C to 1-Wire bridge device
    J22 1-wire Port pin 1 - pin4
    (5V,GND, OW (1-Wire Data, ESD Protected). RT (1-Wire Return/Ground ,ESC protected)
12. U16 DS9503P ESD protection diode
13. D8,D9, D10, D11 GPIO 28,29,30.31 output LED

U5 **ULN2803** use RS-Pi pin 11,12,13,15,16,18,22,7 as GPIO 0 to GPIO 7 input

New Pridopia scratch interface Pi_Scratch software you can download from our web site
http://www.pridopia.co.uk/rs-pi-set-scratch.html

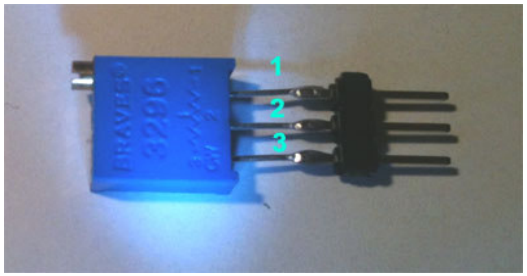
MCP3002 DEMO

```
COM22 - PuTTY
root@raspberrypi:/home/pi/adc# dir
atod    atod.o       gb_common.h  gb_spi.c  gb_spi.o
atod.c  gb_common.c  gb_common.o  gb_spi.h  makefile
root@raspberrypi:/home/pi/adc# ./atod
Which MCP3002 channel do you want to test? Type 0 or 1.
0

These are the connections for the MCP3002 analogue to digital test:
 GP11 to SCLK
 GP10 to MOSI
 GP9 to MISO
 GP8 to CSnA
 Trimpot connections:
  (call 1 and 3 the ends of the resistor and 2 the wiper)
  connect 3 to 3V3
  connect 2 to AD0
  connect 1 to GND
When ready hit enter.

0797 ##########################################################
```

MCP3002 TEST
USE J11 OUTPUT PIN 1 VCC PIN2 AD0 PIN3 GND
Control by CE0   Rs-Pi pin 24
CONNECT TO 10K Trimpot
Pin1 GND , PIN 2 AD0 PIN3 VCC



MCP4812 TEST
USE JP1 pin1 – pin4 (DA0,GND,DA1,GND)
Control by CE1 Rs-pi pin 26
PIN1 DA0 CONNECT TO Multimeter RED
PIN2 GND CONNECT TO Multimeter BLACK

MCP4812 demo

You also can use gertboard program atod & dtoa & leds in this board
You can download test program from our web site

http://www.pridopia.co.uk/pi-2803-ad-da-1wire.html

```
COM22 - PuTTY
root@raspberrypi:/home/pi/gertboard# ./dtoa
Which channel do you want to test? Type 0 or 1.
0
These are the connections for the digital to analogue test:
jumper connecting GP11 to SCLK
jumper connecting GP10 to MOSI
jumper connecting GP9 to MISO
jumper connecting GP7 to CSnB
Multimeter connections (set your meter to read V DC):
  connect black probe to GND
  connect red probe to DA0 on J29
When ready hit enter.

Your meter should read about 0V
When ready hit enter.

Your meter should read about 0.5V
When ready hit enter.

Your meter should read about 1.02V
When ready hit enter.
```

```
COM30 - PuTTY
root@raspberrypi:~# i2cdetect -y 0
     0  1  2  3  4  5  6  7  8  9  a  b  c  d  e  f
00:          -- -- -- -- -- -- -- -- -- -- -- -- --
10: -- -- -- -- -- -- -- -- 18 -- -- -- -- -- -- --
20: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
30: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
40: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
50: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
60: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
70: -- -- -- -- -- -- -- --
root@raspberrypi:~# /opt/owfs/bin/owserver --i2c=/dev/i2c-0:ALL
root@raspberrypi:~# /opt/owfs/bin/owdir
/28.7E1CC8030000
/bus.0
/uncached
/settings
/system
/statistics
/structure
/simultaneous
/alarm
root@raspberrypi:~# /opt/owfs/bin/owread /bus.0/interface/settings/name
DS2482-100root@raspberrypi:~#
root@raspberrypi:~#
```

18 -> DS2482-100 I2C 1-Wire bridge chip
/28.7E1CC8030000 - Connect & Detect DALLAS 18B20P TEMP Sensor

```
root@berry:~# /opt/owfs/bin/owserver --i2c=/dev/i2c-0:ALL
root@berry:~# /opt/owfs/bin/owdir
```

It appears that OWServer has found 1 1-wire busses, exactly what we're expecting to happen.
Lets see if we can get some more details.
Which chip on the breakout board is bus.0

```
root@berry:~# /opt/owfs/bin/owread /bus.0/interface/settings/name
DS2482-100
```

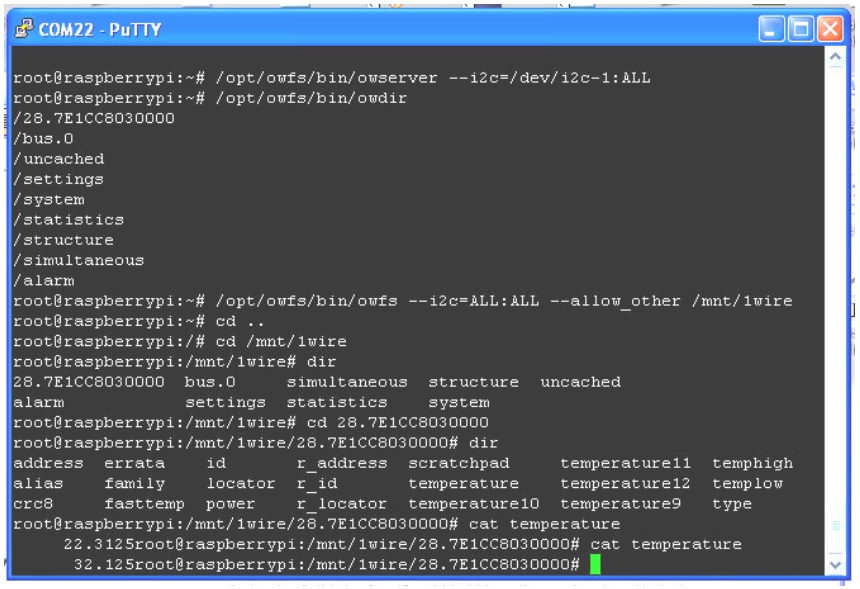
How about the i2c addresses of each bus entry. bus.0

```
root@berry:~# /opt/owfs/bin/owread /bus.0/interface/settings/address
/dev/i2c-0:18
```

Installation of the OWFS (One Wire File System)

First you need to install the following packages:
sudo apt-get update
sudo apt-get install automake autoconf autotools-dev gcc-4.7 libtool libusb-dev libfuse-dev swig python2.6-dev tcl8.4-dev php5-dev i2c-tools
If promoted answer Yes on any questions during the install.
Download the latest version of OWFS to your usr/src directory
cd /usr/src
sudo wget -O owfs-latest.tgz http://sourceforge.net/projects/owfs/files/latest/download
Unpack with the following command:
sudo tar xzvf owfs-latest.tgz
Next you must configure OWFS: (replace X.XXXX with the version number you downloaded)
cd owfs-X.XXXX
sudo ./configure
If everything is correct, you should get a result like this:
Current configuration:
Deployment location: /opt/owfs
Compile-time options:
Caching is enabled
USB is DISABLED
etc.
Next you need to compile OWFS which will take approx. 30 minutes with the following command:
sudo make
Next install OWFS which will take a few minutes
sudo make install
Once the installation has completed you need to create a mountpoint for the 1wire folder:
sudo mkdir /mnt/1wire

In order to use the 1wire devices without root privileges you have to change the FUSE settings, edit the fuse configuration file with:
sudo nano /etc/fuse.conf
Update this line: #user_allow_other and remove the # from the start, then save your changes
You can now start using OWFS to access your i2c devices and any connected sensors:
sudo /opt/owfs/bin/owfs --i2c=ALL:ALL --allow_other /mnt/1wire/
Using a terminal window navigate to the /mnt/1wire/ directory and use the ls command to list all connected devices.
If you have a temperature sensor connected you should have a folder starting with 28.xxxxxx
cd into this folder and then enter cat temperature to read the temperature of the sensor.



cat temperature -- 22.312 & 32.125

Package Content

1x Rs-Pi ULN2803 & SPI AD/DA & 1-Wire board
1x 2x4 2.54mm header (Rs-Pi V2-P5)
1x Manual