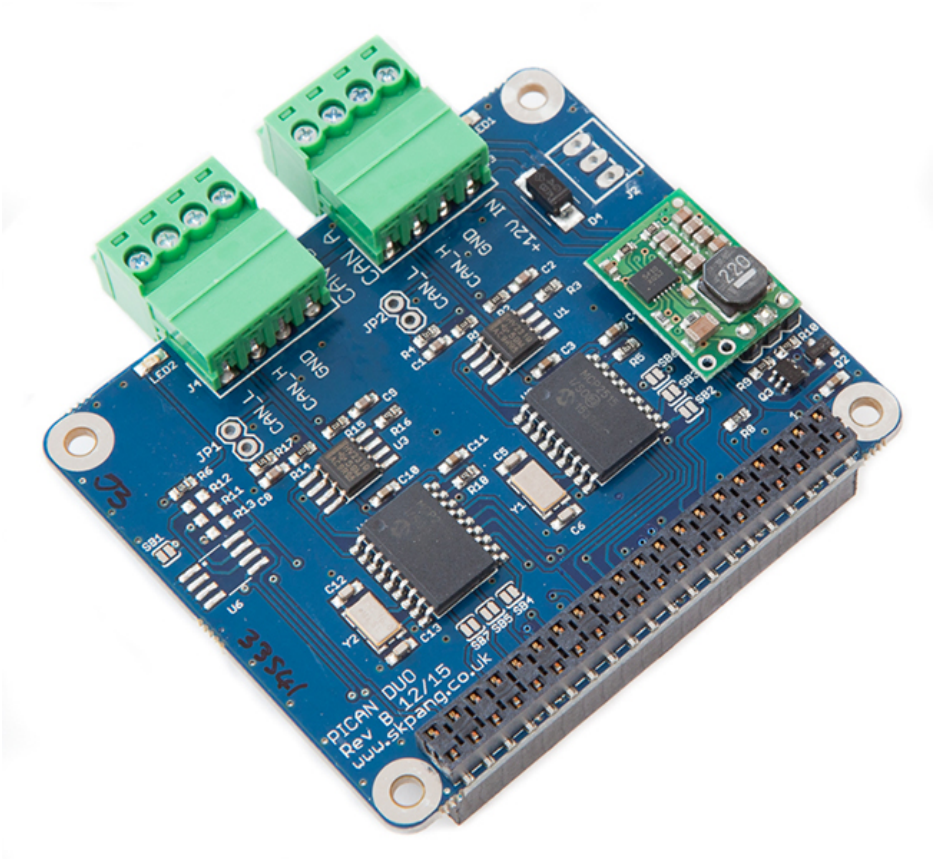

PiCAN2 DUO SMPS USER GUIDE

V1.3

Product name	PiCAN2 DUO SMPS CAN-Bus Board for Raspberry Pi
Model number	RSP-PICAN2DUOSMPS
Manufacturer	SK Pang Electronics Ltd

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1. Introduction

This PiCAN2DUO board provide two independent CAN-Bus channels for the Raspberry Pi 2. It uses the Microchip MCP2515 CAN controller with MCP2551 CAN transceiver. Connections are made via plug in 4 way screw terminal. This board has a 5v 1A SMPS that can power the Pi is well via the screw terminal.

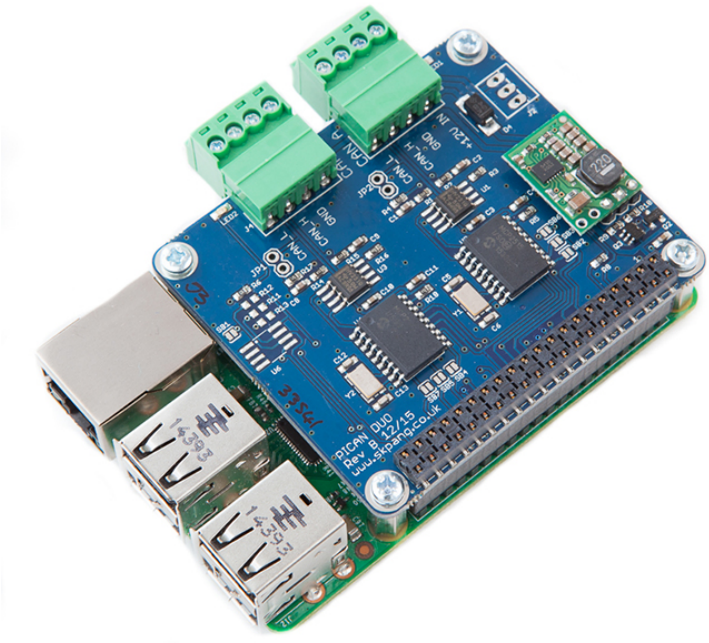
Easy to install SocketCAN driver. Programming can be done in C or Python.

1.1. Features

- CAN v2.0B at 1 Mb/s
- High speed SPI Interface (10 MHz)
- Standard and extended data and remote frames
- CAN connection via screw terminal
- 120Ω terminator ready
- Serial LCD ready
- LED indicator
- Four fixing holes, comply with Pi Hat standard
- SocketCAN driver, appears as can0 and can1 to application
- Interrupt RX on GPIO25 and GPIO24
- 5v 1A SMPS to power Raspberry Pi and accessories from screw terminal
    - Reverse polarity protection
    - High efficiency switch mode design
    - 6v to 20v input range

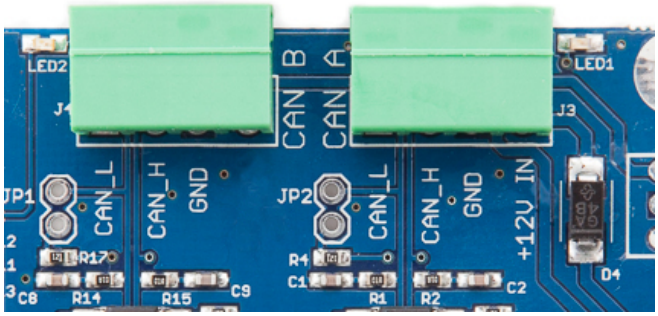
1.2. Hardware Installation

Before installing the board make sure the Raspberry is switched off. Carefully align the 40way connector on top of the Pi. Use spacer and screw (optional items) to secure the board.



1.3. Screw Terminal

The CAN connection can also be made via the 4 way screw terminal.



CAN B (J4)	
Pin number	**Function**
1	CAN_L
2	CAN_H
3	GND
4	n/c

CAN A (J3)	
Pin number	**Function**
1	CAN_L
2	CAN_H
3	GND
4	+12v In

Connector J3 pin 4 is the input for the SMPS, it has an input voltage range of 6v to 20v that is used to power the Raspberry Pi.

1.4. 120Ω Terminator

There is a 120Ω fitted to the board. To use the terminator solder a 2way header pin to JP1 and JP2 then insert a jumper.

1.5. LED

There are two red LEDs fitted to the board. This is connected to GPIO04 and GPIO26.

1.6. Not Fitted Items

JP5 can be use to power a serial LCD with data on TXD line from the Pi. There is also 5v supply on JP5.

2. Software Installation

It is best to start with a brand new Raspbian image. Download the latest from:

https://www.raspberrypi.org/downloads/raspbian/

After first time boot up, do an update and upgrade first.

```
sudo apt-get update
```

```
sudo apt-get upgrade
```

```
sudo reboot
```

Add the overlays by:

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

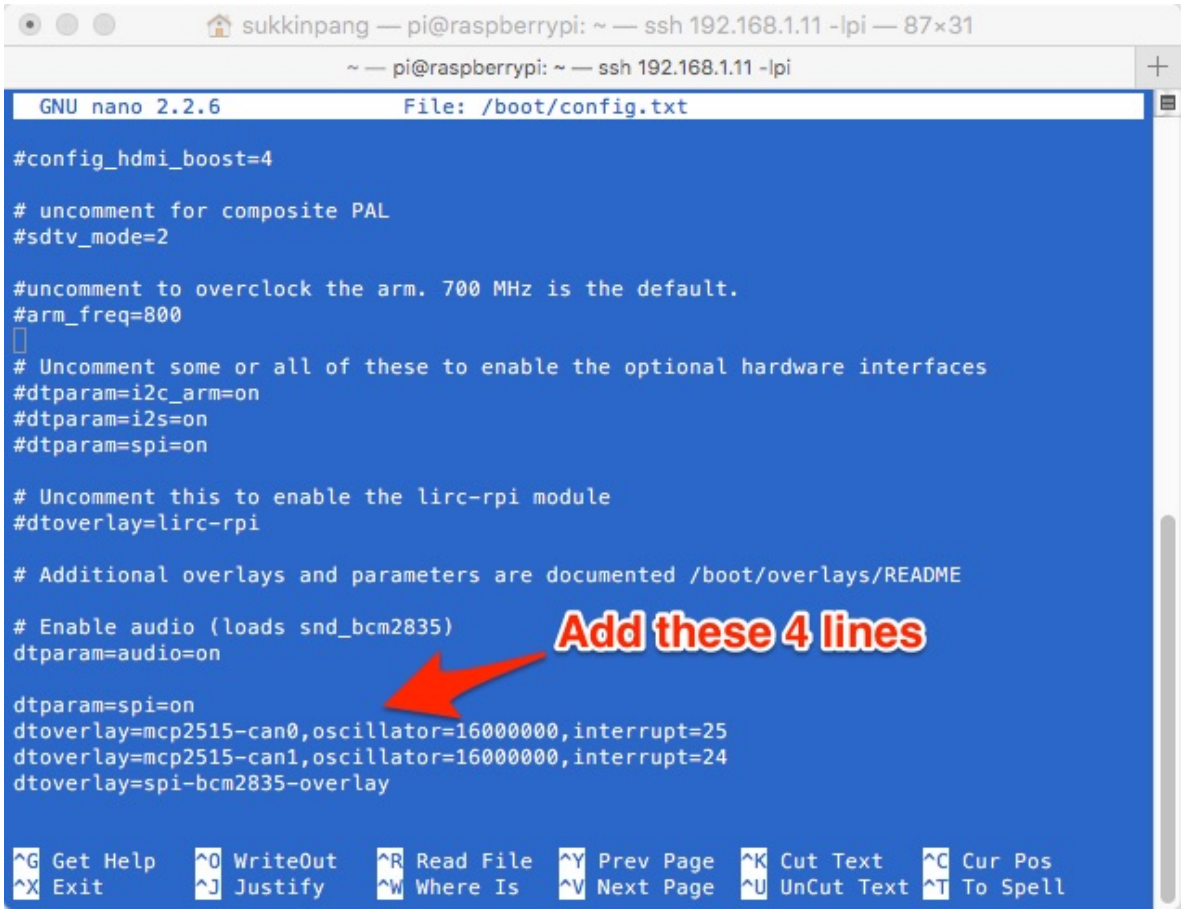
Add these 4 lines to the end of file:

```
dtparam=spi=on
```

```
dtoverlay=mcp2515-can0,oscillator=16000000,interrupt=25
```

```
dtoverlay=mcp2515-can1,oscillator=16000000,interrupt=24
```

```
dtoverlay=spi-bcm2835-overlay
```



Reboot Pi:

```
sudo reboot
```

1.7. Bring Up the Interface

You can now bring the CAN interfaces up:

```
sudo /sbin/ip link set can0 up type can bitrate 500000
sudo /sbin/ip link set can1 up type can bitrate 500000
```

Download and copy the CAN test programs to the Pi.

http://www.skpang.co.uk/dl/can-test_pi2.zip

Connect the PiCAN2 to your CAN network via screw terminal .

To send a CAN message on can0 (CAN B J4) use :

```
./cansend can0 7DF#0201050000000000
```

This will send a CAN ID of 7DF. Data 02 01 05 – coolant temperature request.

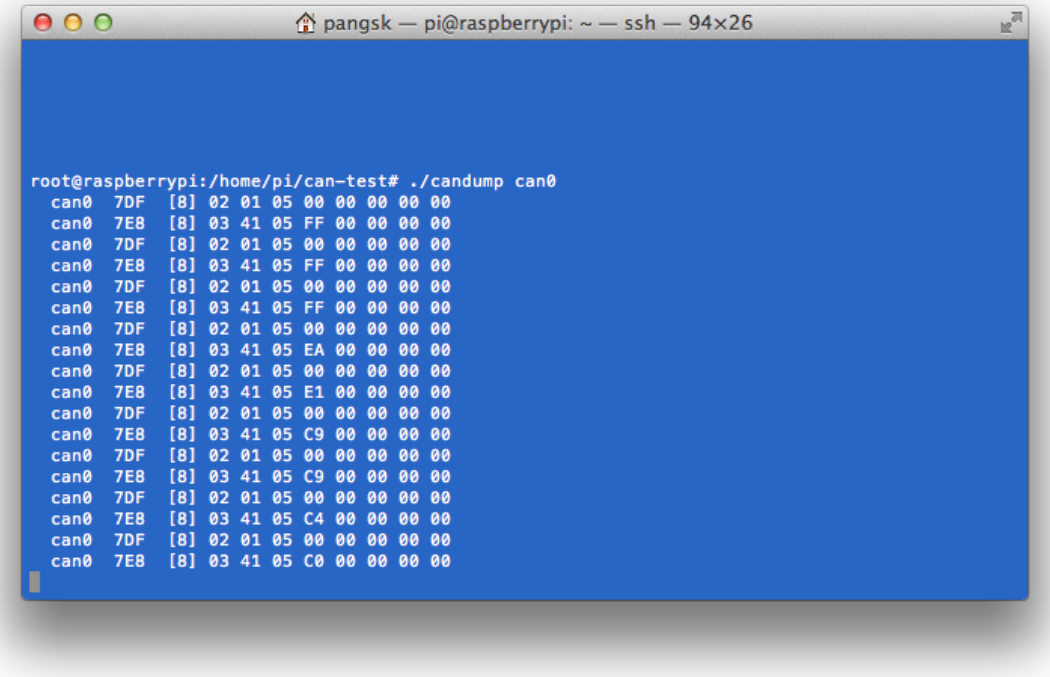
To send a CAN message on can1 (CAN A J3) use :

```
./cansend can1 7DF#0201050000000000
```

Connect the PiCAN to a CAN-bus network and monitor traffic by using command:

```
./candump can0
```

You should see something like this:



3. Writing Your Own Software

You can write your own application software in either C or Python.

1.8. Application in Python

Download the Python-CAN files from:

```
https://bitbucket.org/hardbyte/python-can/get/4085cffd2519.zip
```

Unzip and install by

```
sudo python3 setup.py install
```

Bring the CAN interface up if it is not already done:

```
sudo /sbin/ip link set can0 up type can bitrate 500000
```

Now start python3

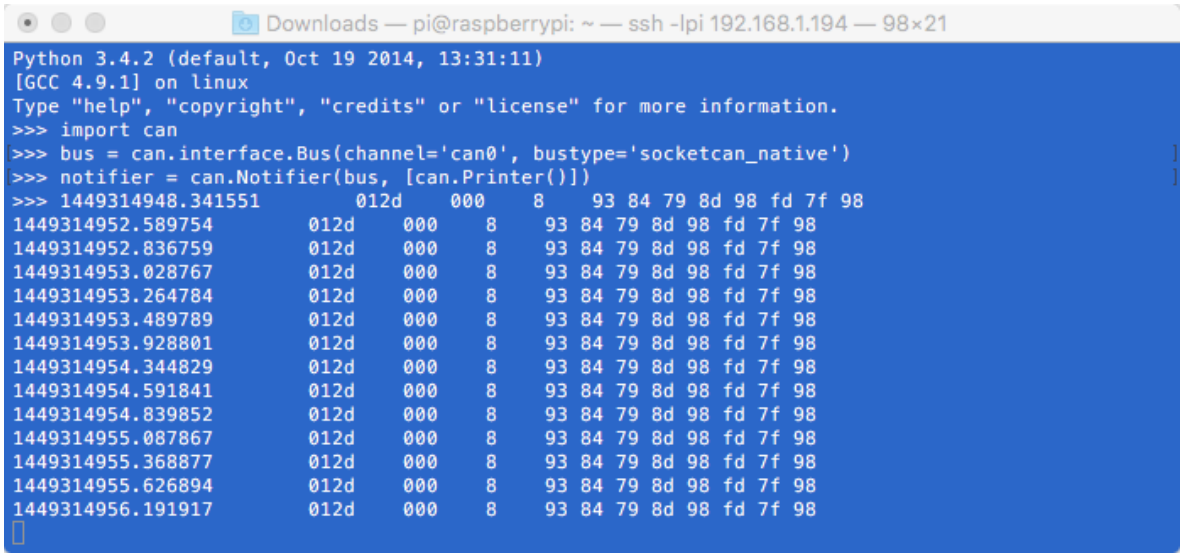
```
python3
```

To sent a message out type the following lines:

```
import can
bus = can.interface.Bus(channel='can0', bustype='socketcan_native')
msg = can.Message(arbitration_id=0x7de,
                  data=[0, 25, 0, 1, 3, 1, 4, 1],
                  extended_id=False)
bus.send(msg)
```

To received messages and display on screen type:

```
notifier = can.Notifier(bus, [can.Printer()])
```



1.9. Application in C

Bring the CAN interface up if it is not already done:

```
sudo /sbin/ip link set can0 up type can bitrate 500000
```

Download the source code and example files by typing the following in the command prompt:

```
wget http://skpang.co.uk/dl/cantest.tar
```

Unpack the tar file and change into directory by:

```
tar xf cantest.tar
cd linux-can-utils
```

The example file is called cantest.c to edit this file, type the following in the command prompt:

```
nano cantest.c
```

Line 77 is the CAN message to be sent out.

```
unsigned char buff[] = "7DF#0201050000000000";
```

7DF is the message ID and 0201050000000000 is the data. Change the data to suit.
Press CTRL-X to exit.
To compile the program type:

```
make
```

Check there are no errors. To run the program type:

```
./cantest
```