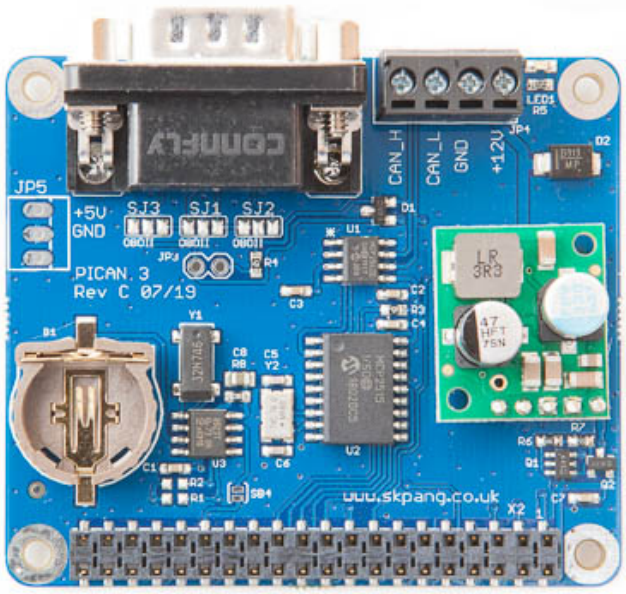

PiCAN3 CAN-Bus with 3A SMPS + RTC

USER GUIDE V1.0

Product name	PiCAN3 CAN-Bus Board for Raspberry Pi 4 with 3A SMPS + RTC
Model number	RSP-PICAN3
Manufacturer	SK Pang Electronics Ltd

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1. Introduction

his PiCAN2 board provide CAN-Bus capability for the Raspberry Pi 4. It uses the Microchip MCP2515 CAN controller with MCP2551 CAN transceiver. Connection are made via DB9 or 3 way screw terminal. This board includes a 3A switch mode power suppler that powers the Pi is well.

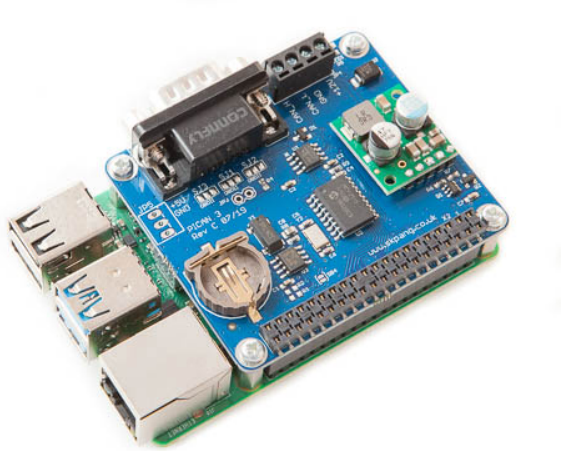
Easy to install SocketCAN driver. Programming can be done in C or Python.

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 standard 9-way sub-D connector or screw terminal
- Compatible with OBDII cable
- Solder bridge to set different configuration for DB9 connector
- 120Ω terminator ready
- Serial LCD ready
- LED indicator
- Foot print for two mini push buttons
- Four fixing holes, comply with Pi Hat standard
- SocketCAN driver, appears as can0 to application
- Interrupt RX on GPIO25
- 5v 3A SMPS to power Raspberry Pi and accessories from DB9 or screw terminal
    - Reverse polarity protection
    - High efficiency switch mode design
    - 6v to 20v input range
- RTC with battery backup (battery not included, requires CR1225 cell)

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.

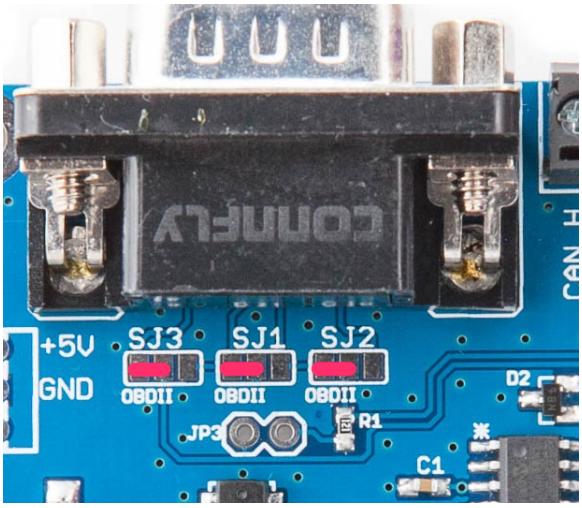


1.2. Configuring DB9 Connector

The CAN connection can be made via the DB9 connector. The connector be configured for different pinout. Depend if you are using an OBDII cable or a CAN cable.

1.3. OBDII Cable

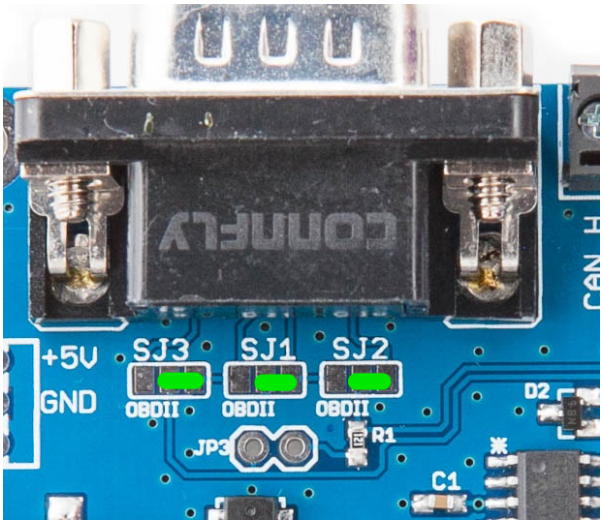
Close the solder bridges on the lefthand side on SJ1, SJ2 and SJ3 as shown with a red line.



DB9 Pin number	Function
2	GND
3	CAN_H
5	CAN_L

1.4. CAN Cable

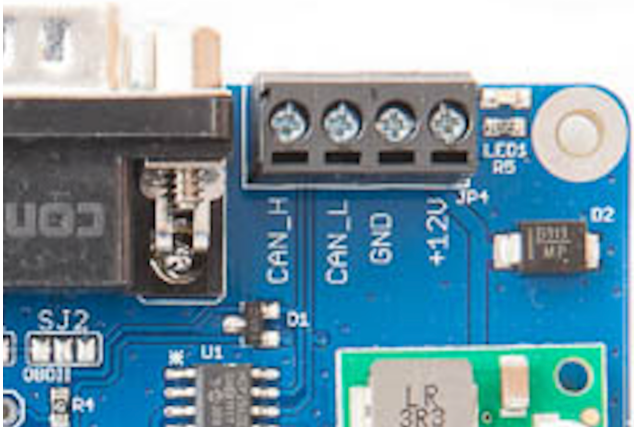
Close the solder bridges on the righthand side on SJ1, SJ2 and SJ3 as shown with a green line.



DB9 Pin number	Function
3	GND
7	CAN_H
2	CAN_L

1.5. Screw Terminal

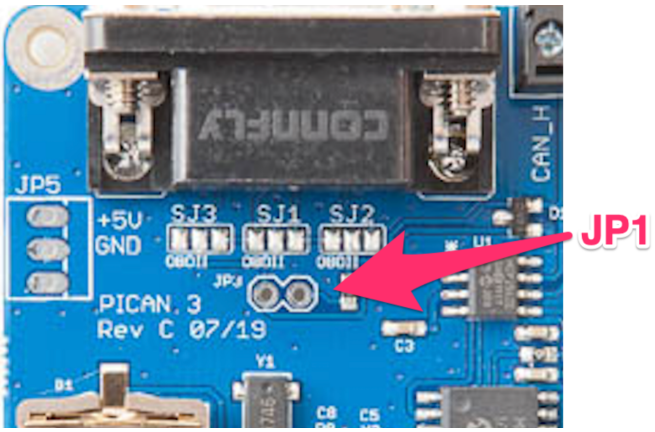
The CAN connection can also be made via the 4 way screw terminal.



Pin number	Function
1	CAN_H
2	CAN_L
3	GND
4	+12v In

1.6. 120Ω Terminator

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



1.7. LED

There is a red LED fitted to the board. This is connected to GPIO22.

3. 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.

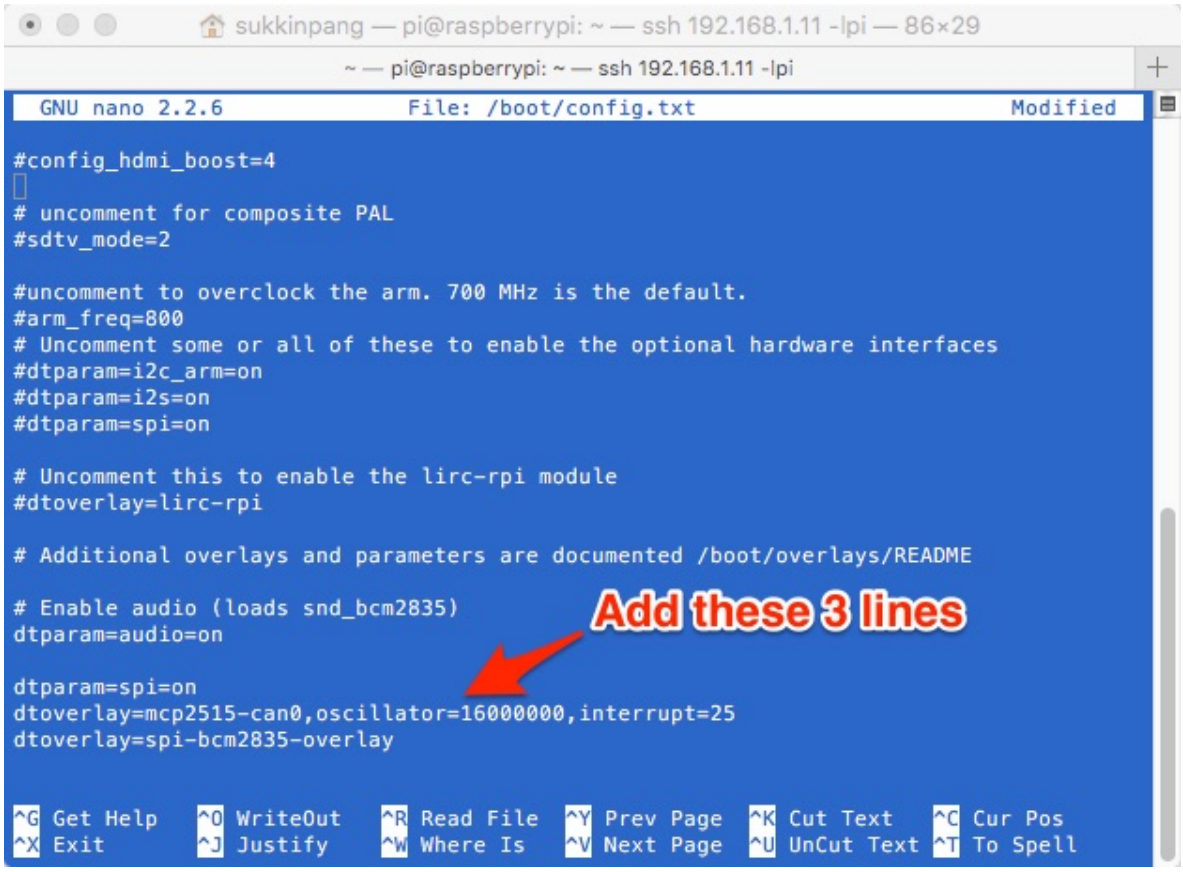
```
sudo apt-get update
sudo apt-get upgrade
sudo reboot
```

Add the overlays by:

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

Add these 3 lines to the end of file:

```
dtparam=spi=on
dtoverlay=mcp2515-can0,oscillator=16000000,interrupt=25
dtoverlay=spi-bcm2835-overlay
```



Reboot Pi:

```
sudo reboot
```

1.8. Installing CAN Utils

Install the CAN utils by:

```
sudo apt-get install can-utils
```

1.9. Bring Up the Interface

You can now bring the CAN interface up at 500kbps:

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

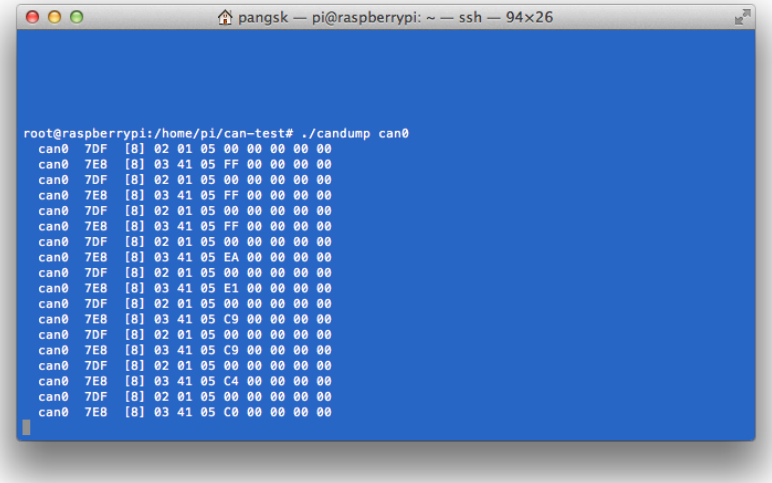
To send a CAN 2.0 message use :

```
cansend can0 7DF#0201050000000000
```

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

```
candump can0
```

You should see something like this:



4. Real Time Clock (RTC) Software Installation

Insert a CR1220 battery (not supplied) into battery holder. Ensure the "+" is facing upward.

Install the i2c-tools by:

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

Then check the RTC:

```
sudo i2cdetect -y 1
```

You should see 68 or UU on address 0x68:

```
pi@raspberrypi:~ $ i2cdetect -y 1
     0  1  2  3  4  5  6  7  8  9  a  b  c  d  e  f
00:          -- -- -- -- -- -- -- -- -- -- -- -- --
10: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
20: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
30: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
40: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
50: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
60: -- -- -- -- -- -- -- -- 68 -- -- -- -- -- -- --
70: -- -- -- -- -- -- -- --
pi@raspberrypi:~ $
```

Add the overlays by:

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

Add these lines to the end of file:

```
dtparam=i2c_arm=on
dtoverlay=i2c-rtc,pcf8523
```

Reboot Pi:

```
sudo reboot
```

Now you need to disable the "fake hwclock" which interferes with the 'real' hwclock

```
sudo apt-get -y remove fake-hwclock
sudo update-rc.d -f fake-hwclock remove
sudo systemctl disable fake-hwclock
```

Start the original hw clock script by:

```
sudo nano /lib/udev/hwclock-set
```

and comment out these three lines:

```
#if [ -e /run/systemd/system ] ; then
# exit 0
#fi
```

and comment out these two lines:

```
#/sbin/hwclock --rtc=$dev --systz --badyear
#/sbin/hwclock --rtc=$dev --systz
```

Reboot the Pi.

Ensure the Ethernet cable or Wifi is on. This will get the time from the network.

Set the clock by:

```
sudo hwclock -w
```

To read the clock:

```
sudo hwclock -r
```

5. Python Installation and Use

Ensure the driver for PiCAN 3 board is installed and working correctly first.

Clone the pythonCan repository by:

```
git clone https://github.com/hardbyte/python-can
```

```
cd python-can
```

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

Check there is no error been displayed.

Bring up the can0 interface:

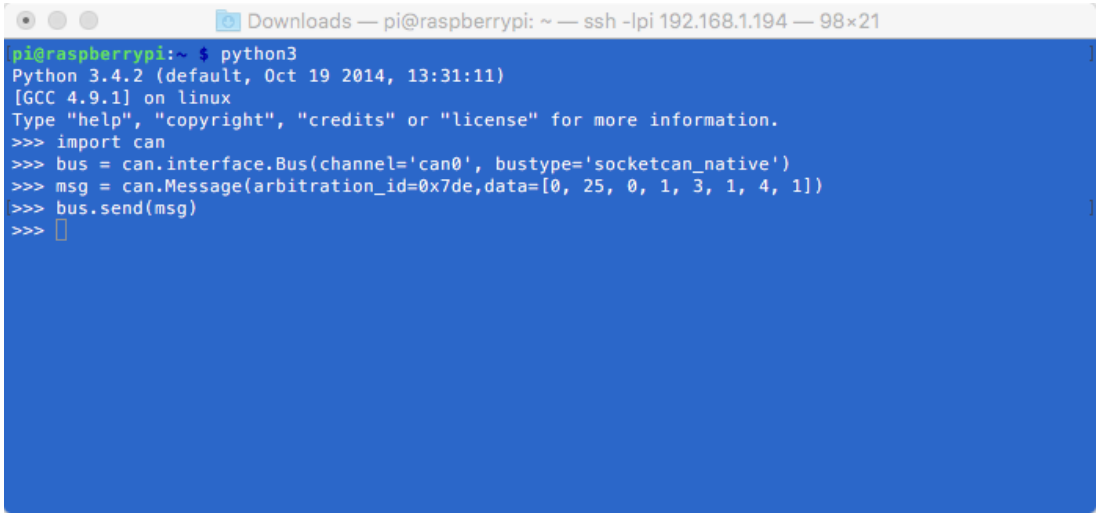
```
sudo /sbin/ip link set can0 up type can bitrate 500000
```

Now start python3 and try the transmit with CAN frame.

```
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 in:

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