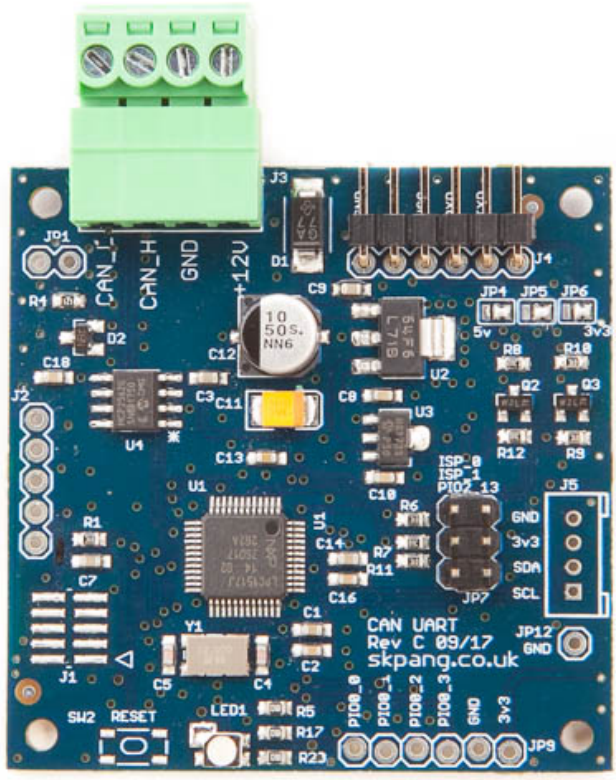

CAN to UART Converter Board

V1.2 June 2019

Product name	CAN to UART Converter Board
Model number	CAN-UART
Manufacturer	SK Pang Electronics Ltd

Contents

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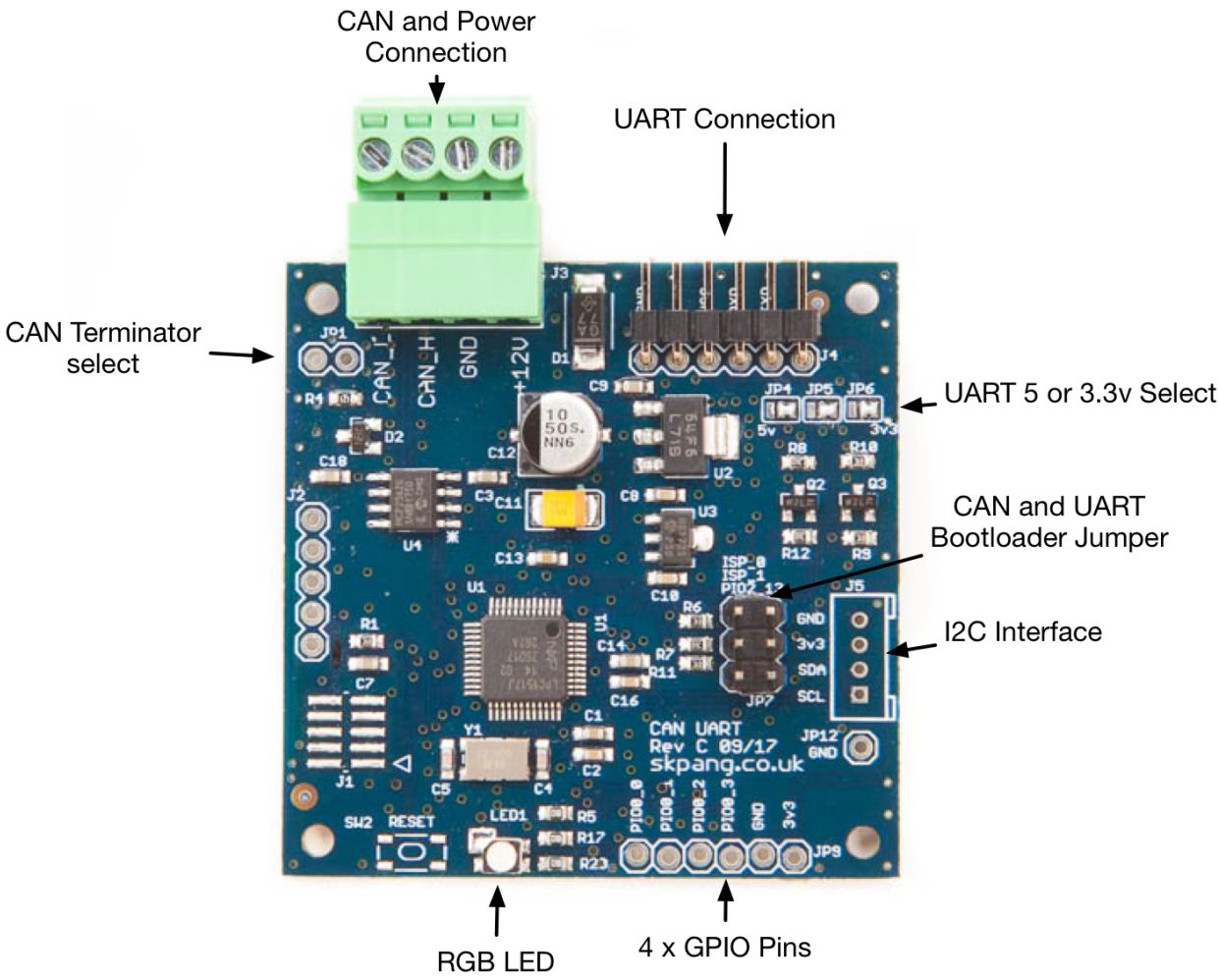
1. Introduction

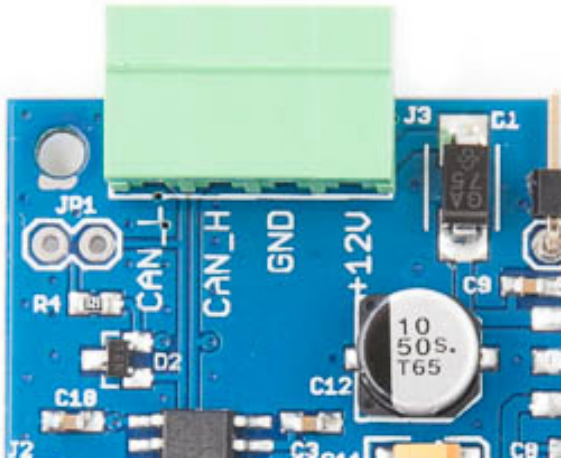
This board convers CAN message into UART and vice versa. CAN and UART baud rate is programable via a CAN message. The UART has a standard pinout. On board RGB LED for status indication. Firmware upgradable via CAN, UART or SWD.

1.1. Features

- Programmable CAN baud rate
- Programmable UART baud rate
- RGB LED status indictor
- Firmware upgradable via CAN, UART or SWD
- Selectable UART voltages (3.3v or 5v)
- 6 to 18v supply voltage with reverse polarity protection
- Powerful ARM Cortex M3 micro controller
- 4 User programmable IO pins
- CAN to UART message at ID 0x400 + node ID
- UART to CAN message at ID 0x300 + node ID
- CAN configuration message at 0x7E5



1.2. CAN and Power Connection

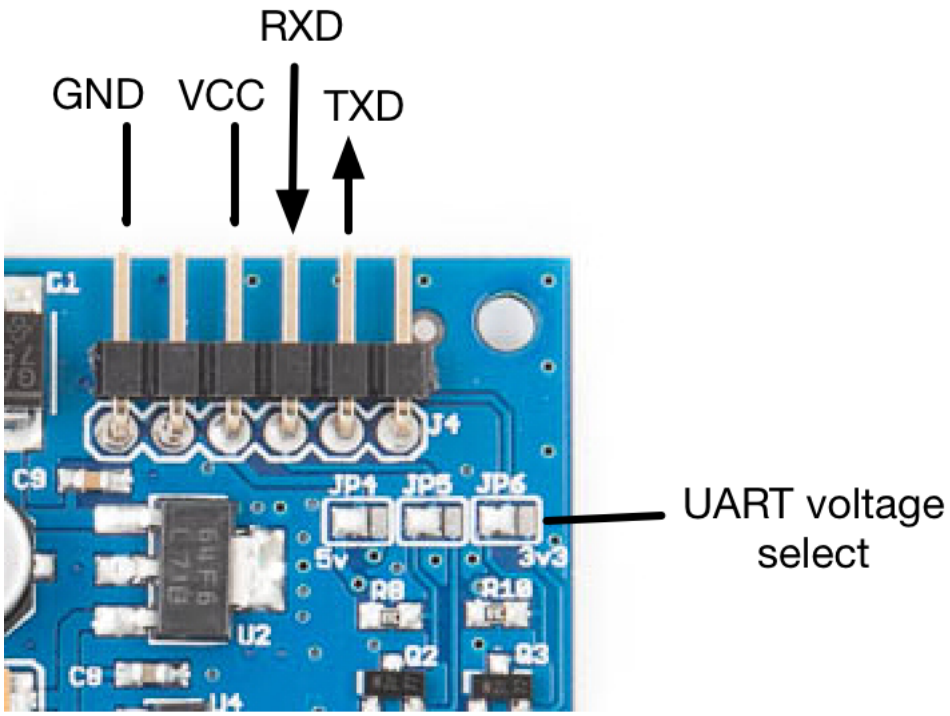


The CAN and power are connected via J3.

1.3. 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.

1.4. UART Connection and Voltage Select



The UART connection is via J4. The UART voltage is selectable via JP4,5,6. Solder all bridges on the left for 5v. Solder all the bridges on the right for 3.3v. Photo shown 5v been selected.

WARNING : Do NOT connect a 5v UART when the UART voltage has been set to 3.3v. This will damage the board.

1.5. RGB LED

There is a RGB LED fitted to the board. This colour and function are:

Colour and State	Function
Flashing white	Booting up
Flashing blue	CAN Transmit data
Flashing green	CAN Receive data
Solid blue	Baudrate changed, waiting for power cycle
Solid red	Unit fault

2. UART to CAN Usage

The board has a factory default of 500kbps for CAN, node is 0x0A and 9600bps for UART.

On receiving UART message, it is buffered until 8 characters are received then it is sent out on the CAN-bus with a CAN ID of 0x300 + node ID. If a CR (return) and LF (line feed) is received before 8 characters it will be sent out straight away.

The board is waiting for a CAN message on CAN ID of 0x400 + node ID. When a message is received it is sent out on the UART with the message length determined by the CAN message DLC.

For example:

UART received message

```
Hello + CR + LF
```

It will sent out on the CAN-bus

```
0x30a      48 65 6C 6C 6F 0D 0A
```

CAN received message and transmit to UART

CAN listen on 0x40a

```
ID: 0x40a  Len: 8  Data : 48 45 4C 4C 4F 0D 0A 00
```

It will sent out

```
HELLO + CR LF
```

3. IO Pins and Status Usage

CAN ID	DLC	D0	D1	D2	D3	D4
0x300+node ID + 1	5	Firmware version	IO Pin Status	Set IO Pin	IO Dir	Request IO Status

The IO pin direction need to be set first, see section 5. Board Configuration.

To request the status of the IO pin and firmware version. Sent a frame with a DLC of 5 with D4 set to 1.

Example:

ID:30b DLC:5 Data:00 00 00 00 01

You should get reply back like:

ID:30b DLC:5 Data:02 01 00 03 00

This show firmware version 2. Bit 0 of the IO pin high. Bit 0 and 1 set for input.

To set IO pin 2 and 3 high, sent a frame with D2 set accordingly.

Example:

ID:30b DLC:5 Data:00 00 0c 00 00

4. Reset to Factory Defaults

The board can be reset to factory defaults.

1.6. Procedure

With the power removed from the board, place a jumper across PIO2_13. Power up the board. Wait until the LED is flashing blue. Remove the jumper and power cycle the board.

5. BOARD CONFIGURATION Data Format

1.7. Unit Configuration

CAN ID	DLC	D0	D1	D2	D3	D4	D5	D6	D7
0x7E5	8	Node ID	Command	Data	00	00	0x7F	0xAA	0x55

D1 Command : 0x01 Set New node ID

0x02 Set CAN Baudrate

0x03 Set UART Baudrate

0x04 Reboot

0x05 Set IO Pin Direction

D2 Data :

New node ID Node ID (0x01 to 0x7F)

Example : To change the node ID to 0x0D and assume the currect node ID is 0x0A you need to sent:

ID:0x7E5 DLC:8 Data : 0A 01 0D 00 00 7F AA 55

CAN Baudrate 0 : 125kbps

1 : 250kbps

2 : 500kbps (Factory default)

3 : 1000kbps

Example : To set the CAN baudrate to 1000kbps you need to sent:

ID:0x7E5 DLC:8 Data : 0A 02 03 00 00 7F AA 55

UART Baudrate 0 : 1200

1 : 2400

2 : 4800

3 : 9600 (Factory default)

4 : 14400

5 : 19200

6 : 28800

7 : 38400

8 : 57600

9 : 115200

Example : To set the UART baudrate to 115200 you need to sent:

ID:0x7E5 DLC:8 Data : 0A 03 09 00 00 7F AA 55

IO Pin Direction

7	6	5	4	3	2	1	0
				PIO0_3 dir	PIO0_2 dir	PIO0_1 dir	PIO0_0 dir

A '1' will set the pin as input. A '0' will set the pin as output.

Example : To set PIO0_3 and PIO0_2 as output and PIO0_1 and PIO0_0 as input you need to sent:

ID:0x7E5 DLC:8 Data : 0A 05 03 00 00 7F AA 55

1.8. Defaults

The board is shipped with the following defaults:

CAN ID : 0x0A

CAN Baudrate : 500kbps

UART Baudrate : 9600bps

IO pins : All input

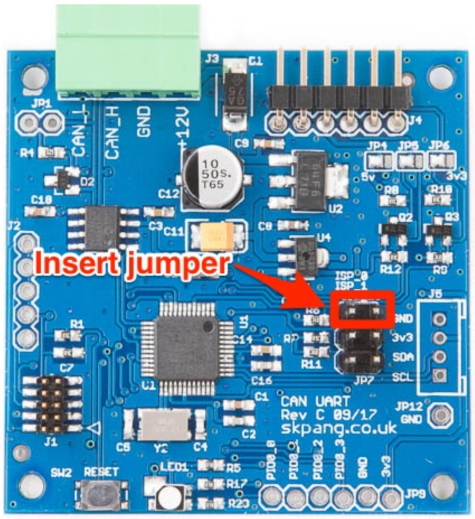
6. Firmware Update

The board firmware can be updated by serial or CAN.

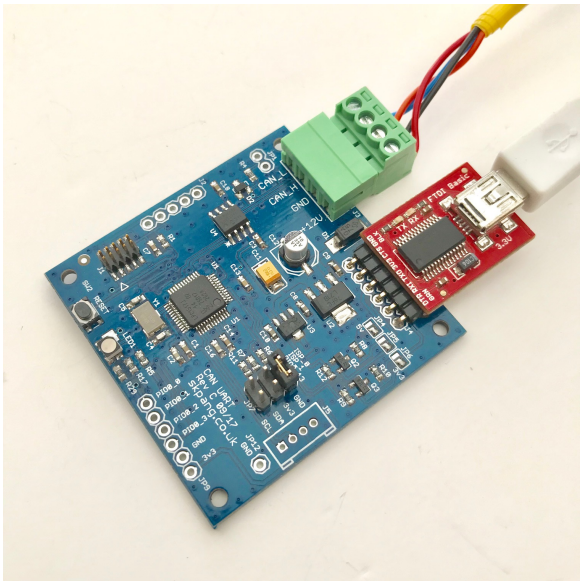
1.9. Update via Serial

Download and install Flash Magic software from Embedded Systems Academy.

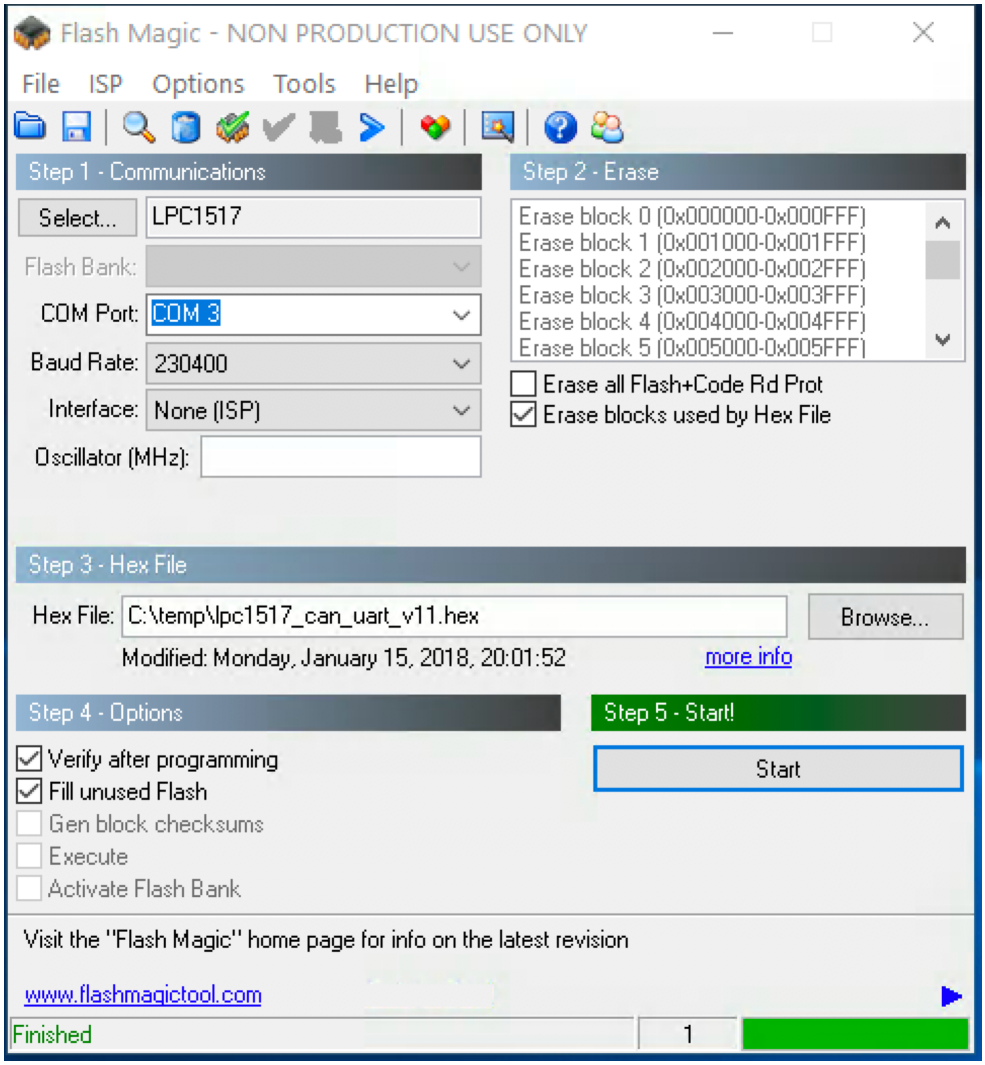
1. UART insert a jumper on ISP_0.



2. Insert a FTDI board into the UART pin.



3. Start Flash Magic and select the LPC1517 device.
4. Click the Browse button and select new firmware hex file.
5. Click the Start button and wait.
6. Check it when finished with no errors.
7. Remove jumper on ISP_0 and power cycle.

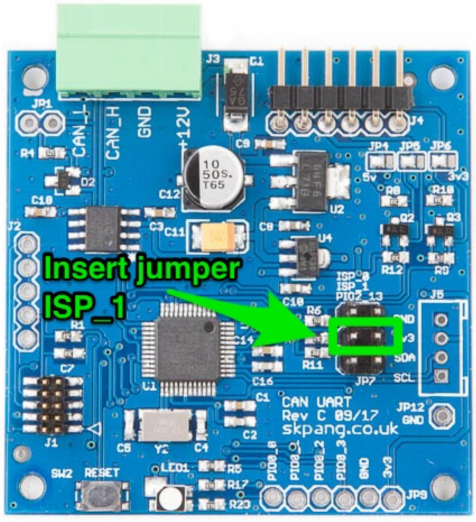


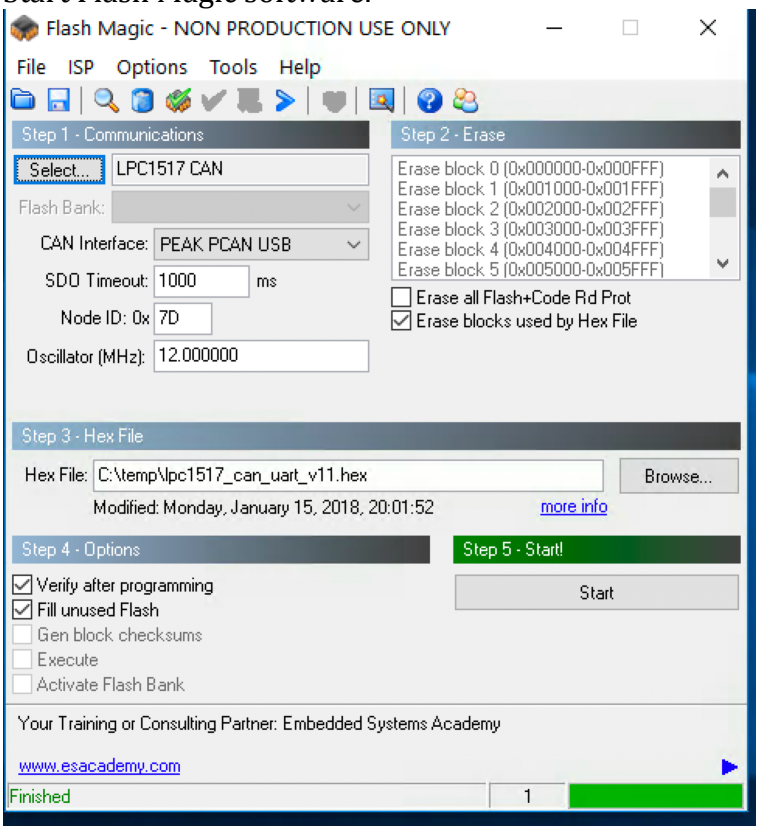
1.10. Update via CAN

To update via CAN, insert a jumper on ISP_1. A PCAN-USB Pro from Peak System is required. Also Flash Magic software from Embedded Systems Academy. Ensure the PCAN-USB Pro driver is installed and working correctly first.

Note : This method of update requires the board to be removed from an existing CAN network because it operates at 100kbps.

1. Insert a jumper across ISP_1 as shown in green.



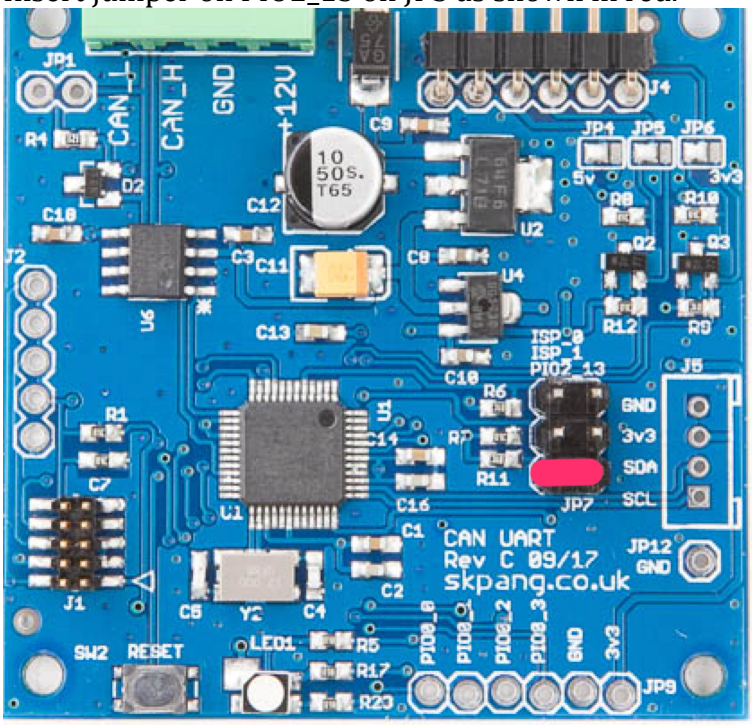
2. Ensure terminator JP1 is closed.Connect the CAN output from PCAN-USB Pro and power to the board via J3.
3. Start Flash Magic software.
4. 

5. Select LPC1517 CAN as the device.
6. Tick the checkbox Erase blocks used by Firmware, Verify after programming and Fill unused Flash.
7. Click the Browse button and select new firmware hex file.
8. Click the Start button and wait.
9. Check it when finished with no errors.
10. Remove jumper on ISP_1 and power cycle.

7. Setting back to factory defaults

To set the board back to factory defaults:

1. Disconnect power to the board.
2. Insert jumper on PIO2_13 on JP3 as shown in red.



3. Power up the board and check LED1 is flashing blue.
4. Disconnect power and remove the jumper.