CAN to UART Converter Board

V1.0 September 2017

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 converts CAN message into UART and vice versa. CAN and UART baud rate is programmable 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 indicator
- 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.
1.5. RGB LED
There is a RGB LED fitted to the board. This colour and function are:

<table>
<thead>
<tr>
<th>Colour and State</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flashing white</td>
<td>Booting up</td>
</tr>
<tr>
<td>Flashing blue</td>
<td>Transmit data</td>
</tr>
<tr>
<td>Flashing green</td>
<td>Receive data</td>
</tr>
<tr>
<td>Solid blue</td>
<td>Baudrate changed, waiting for power cycle</td>
</tr>
<tr>
<td>Solid red</td>
<td>Unit fault</td>
</tr>
</tbody>
</table>

2. Usage
The board has a factory default of 500kbps for CAN 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

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

3. 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.
4. BOARD CONFIGURATION Data Format

1.7. Unit Configuration

<table>
<thead>
<tr>
<th>CAN ID</th>
<th>DLC</th>
<th>D0</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>D4</th>
<th>D5</th>
<th>D6</th>
<th>D7</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x7E5</td>
<td>8</td>
<td>Node ID</td>
<td>Command</td>
<td>Data</td>
<td>00</td>
<td>00</td>
<td>0x7F</td>
<td>0xAA</td>
<td>0x55</td>
</tr>
</tbody>
</table>

**D1 Command**: 0x01 New node ID
- 0x02 CAN Baudrate
- 0x03 UART Baudrate
- 0x04 Reboot

**D2 Data**:
- **New node ID**: Node ID (0x01 to 0x7F)
- **CAN Baudrate**
  - 0 : 125kbps
  - 1 : 250kbps
  - 2 : 500kbps (Factory default)
  - 3 : 1000kbps
- **UART Baudrate**
  - 0 : 1200
  - 1 : 2400
  - 2 : 4800
  - 3 : 9600 (Factory default)
  - 4 : 14400
  - 5 : 19200
  - 6 : 28800
  - 7 : 38400
  - 8 : 57600
  - 9 : 115200
1.8. Defaults
The board is shipped with the following defaults:

- CAN ID : 0x0A
- CAN Baudrate : 500kbps
- UART Baudrate : 9600bps

5. Firmware Update
The board firmware can be updated by serial or CAN.

To update via CAN, insert a jumper on ISP_1. To update via UART insert a jumper on ISP_0.

1.9. Update via CAN
To update the firmware via CAN, 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 above in green.
2. Ensure terminator JP1 is closed.
3. Connect the CAN output from PCAN-USB Pro and power to the board via J3.
4. Start Flash Magic software.
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.