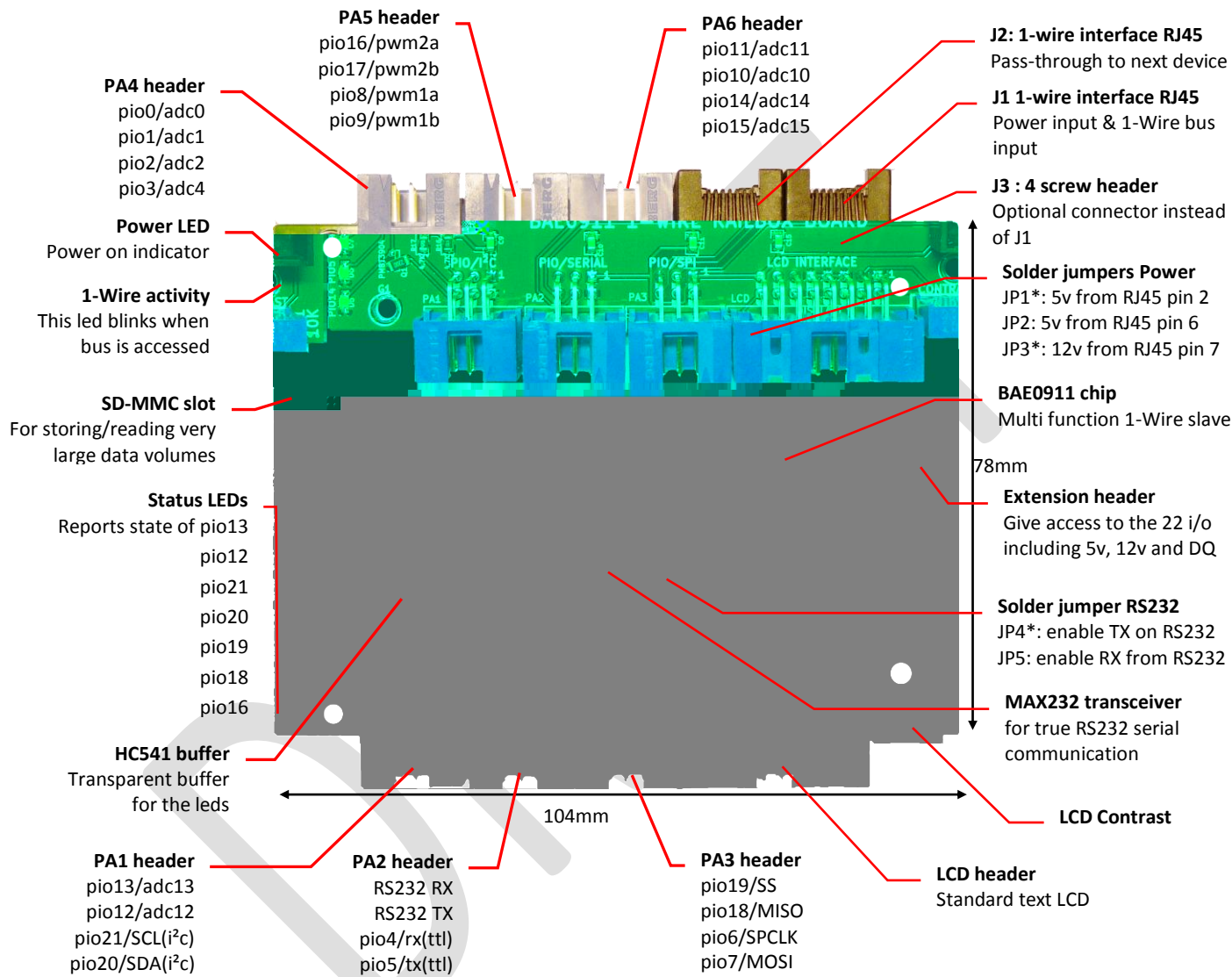


# 1-WIRE BAE0911 RAILBOX BOARD

(I/O, ADC, PWM, COUNTER, EEPROM, LCD, RS232, I<sup>2</sup>C, SDMMC)

## OVERVIEW

This board integrates the BAE0911 multifunction 1-wire programmable chip.



(\*)default jumper settings

The board requires stabilized 5Vdc input power to operate.

12 V dc input is not required by the board itself but is used to power optional extension boards like relay boards.

Maximum current consumption of the board itself is 200mA @ 5V with SDMMC operating.

**When powering extensions from the bae0911 railbox board, the maximum allowed current input is 500mA when RJ45 is used or 1500mA with J3 screw connector. This applies for both 5V and 12V inputs.**

## PINOUT

PA1	PIO / ADC / I <sup>2</sup> C
1	+5V
2	GND
3	pio13 / adc13
4	pio12 / adc12
5	pio21 / scl
6	pio20 / sda

PA2	PIO / SERIAL
1	+5V
2	GND
3	RS232 RX
4	RS232 TX
5	pio4/adc4/TTL RX
6	pio5/adc5/TTL TX

PA3	PIO / ADC / SPI
1	+5V
2	GND
3	pio19 / SS
4	pio18 / MISO
5	pio6 / adc6 / SPCLK
6	pio7 / adc7 / MOSI

P1	I/O EXTENSION
1	+12V
2	GND
3	+12V
4	GND
5	+5V
6	GND
7	+5V
8	DQ
9	PIO 13 / ADC 13
10	PIO 12 / ADC 12
11	PIO 21 / SCL
12	PIO 20 / SDA
13	PIO 19 / SS
14	PIO 18 / MISO
15	PIO 11 / ADC 11
16	PIO 10 / ADC 10
17	PIO 14 / ADC 14
18	PIO 15 / ADC 15
19	PIO 0 / ADC 0
20	PIO 1 / ADC 1
21	PIO 2 / ADC 2
22	PIO 3 / ADC 3
23	PIO 16 / PMW 2a
24	PIO 17 / PWM 2b
25	PIO 4 / ADC 4 / RX
26	PIO 5 / ADC 5 / TX
27	PIO 6 / ADC 6 / SPCLK
28	PIO 7 / ADC 7 / MOSI
29	PIO 8 / ADC 8 / PWM 1a
30	PIO 9 / ADC 9 / PWM 1b
31	Reserved
32	Reserved
33	Reserved
34	Reserved

PA4	PIO / ADC
1	+5V
2	GND
3	pio0 / adc0
4	pio1 / adc1
5	pio2 / adc2
6	pio3 / adc3

PA5	PIO / ADC / PWM
1	+5V
2	GND
3	pio16 / pwm2
4	pio17 / pwm4
5	pio8/adc8/pwm1
6	pio9/adc9/pwm3

PA6	PIO / ADC
1	+5V
2	GND
3	pio11 / adc11
4	pio10 / adc10
5	Pio14 / adc14
6	pio15 / adc15

J1	RJ45 1-Wire
1	GND
2	5Vdc input
3	GND
4	DQ (1wire)
5	GND
6	5Vdc (optional)
7	12Vdc input
8	GND

J2	RJ45 1-Wire
1	GND
2	5Vdc input
3	GND
4	DQ (1wire)
5	GND
6	5Vdc (optional)
7	12Vdc input
8	GND

LCD	
1	GND
2	+5V
3	Contrast
4	RS (pio14)
5	Read/Write (gnd)
6	Enable (pio15)
7	Data 0 (gnd)
8	Data 1 (gnd)
9	Data 2 (gnd)
10	Data 3 (gnd)
11	Data 4 (pio0)
12	Data 5 (pio1)
13	Data 6 (pio2)
14	Data 7 (pio3)
15	K+
16	K-

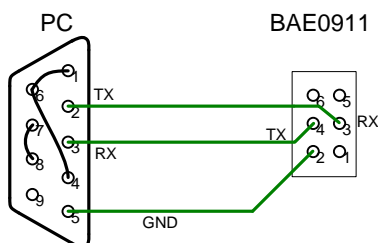
J3	Screw header
1	5Vdc input
2	12Vdc input
3	GND
4	DQ (1wire)

U4	SDMMC
1	Chip Select
2	MOSI
3	GND
4	+3,3V input
5	CLK
6	GND
7	MISO
8	Not connected
9	Not connected

The LCD interface works in 4 bit write mode and respects the standard text lcd pinouts.

The lcd backlight supplied with is 5v @ 20mA between K- and K+. *Reversing polarity will damage lcd.*

Connecting BAE0911 to a PC via RS232:



## RECOVERY OF AN UNRESPONSIVE BOARD

The BAE chips has two unique features:

- It allows to embed user program (AE code) with auto-start option
- The BAE chips are firmware upgradable.

There are some situation where the board may become unresponsive:

1. Interrupting firmware flash upgrade.
2. Upgrading with an invalid or bugged firmware.
3. A bugged AE code that hang the device inconjunction with autostart AE turned on.

In such situations, you may end with a bricked board.

### SOLVING A BRICKED BOARD SITUATION

Force DQ low by inserting a jumper on DQ (pin 8 of P1) and GND (pin 6 of P1)

P1 is the 34 pin extension header (pin 6 & 8 are on the same row )



**Recover mode:**  
Put a jumper between  
pin 6 & pin 8 and  
power-up

Steps:

Place the jumper, power the board, then remove the jumper.

At this time, the board accepts any firmware update commands initiated within 30 seconds before reverting to normal mode (ie. executing the internal firmware and AE code.)

Within this 30 seconds time window, execute an upgrade firmware wwith the following commands:

```
cp newfirmware.bin /owfsmountpoint/FC.0000000004xx/firmware/function
```

```
echo 1 /owfsmountpoint/FC.0000000004xx/eprom/erase.0
```

## SUPPORT

Online support is available via the forum on [www.brain4home.eu](http://www.brain4home.eu) and via the discussion list.  
To subscribe, [list-subscribe@brain4home.eu](mailto:list-subscribe@brain4home.eu)

## AVAILABILITY

Chips and boards can be ordered online on [www.brain4home.eu](http://www.brain4home.eu)

## CONDITION OF USE

The BAE chips are intended for hobbyist usage and are not approved for use where it constitute or may constitute a danger to human life or health.

## TERMS OF LICENSE

The software embedded in the chips is protected by copyright laws. Customer is not allowed to reverse engineer, decompile, or disassemble the embedded software.

## ABOUT THE AUTHOR

I'm Pascal Baerten, an IT consultant with technical background in automation. I followed A2 technical studies until 1985 where I played with CNC machines and pneumatic automates. Graduated in Computer Sciences from the Robert Shuman High school in Belgium in 1989, my thesis was titled "A terminal emulator" where I mastered serial communication and networking programming.

My first computer was a Sinclair ZX81, where I learned the basics of exploiting very constrained computing resources in assembler. Later, a Commodore 64 opened the way to interfacing computers with electronic toys.

Since 1990 I developed network based resource sharing solutions in assembler and C.: Telex server, Fax server, Minitel server, mainframe front end, mail server, print server, text2speech telephone server, database gateway, IM server ...

As skilled networking/server architect, I'm working as IT consultant for large financial companies since 1997.

In parallel, developments in home automation have contributed to accumulate some experience with microcontrollers and embedded computing.

## REVISION HISTORY

Revision #	Date	Description
0.1	Nov 17, 2010	Initial draft
0.11	June 2011	Added recovery method
0.15	Apr 3 2012	Changed to new pio mapping