Project :		
SmartBrick		
DOCUMENT :		
Mechanical specification		
REFERENCE :		
AL/RL/1048/001		
DATE :	VERSION :	AUTHOR :
5/12/2010	**1A**	**Robert Lacoste / ALCIOM**
SUMMARY:		
This document is the mechanical specification of the SmartBrick modules and standard enclosures.		

DOCUMENT HISTORY			
DATE	VERSION	AUTHOR	COMMENT
05/12/10	1A	R.Lacoste / ALCIOM	Initial version

CONTENTS

1 Introduction

The **SmartBrick** products from ALCIOM are high performance analog and mixed-signal OEM modules. These modules are both daisy-chainable and stackable to build plug'n play compact and efficient smart instrumentation and acquisition systems.
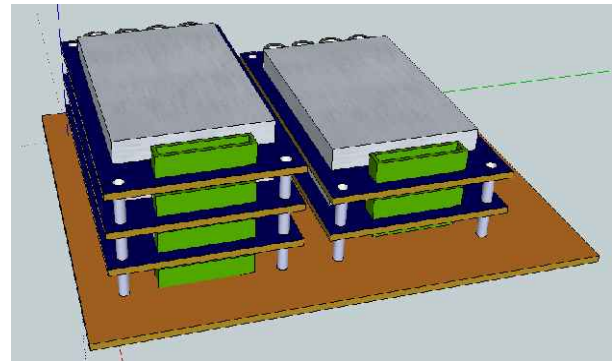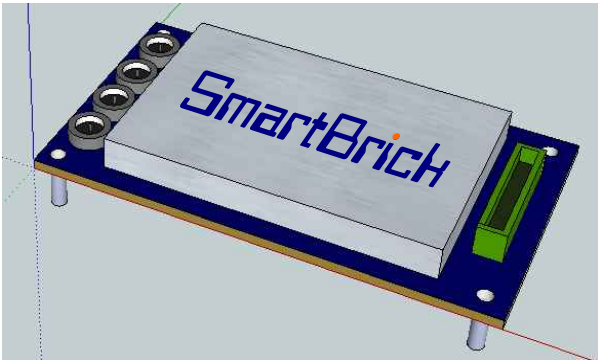
The **SmartBrick** modules are driven by a host system (microcontroller, DSP or PC, either embedded or remote) through the patented ultra-flexible **SmartBus** interface, compatible with USB, I2, SPI or UART links. Open source software libraries provides an easy interface with any user-developped application in virtually any langage : Labview, C, C++, C#, Visual Basic, Mathlab/Scilab, etc.
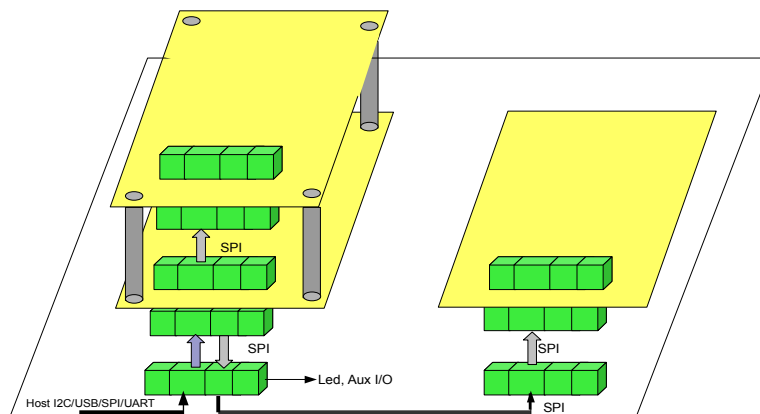
This document is the mechanical specification of the **SmartBrick** system. It presents the mechanical size and interfaces of the **SmartBrick** modules, as well as the mechanical specification of the standard enclosures proposed by ALCIOM for easy integration.
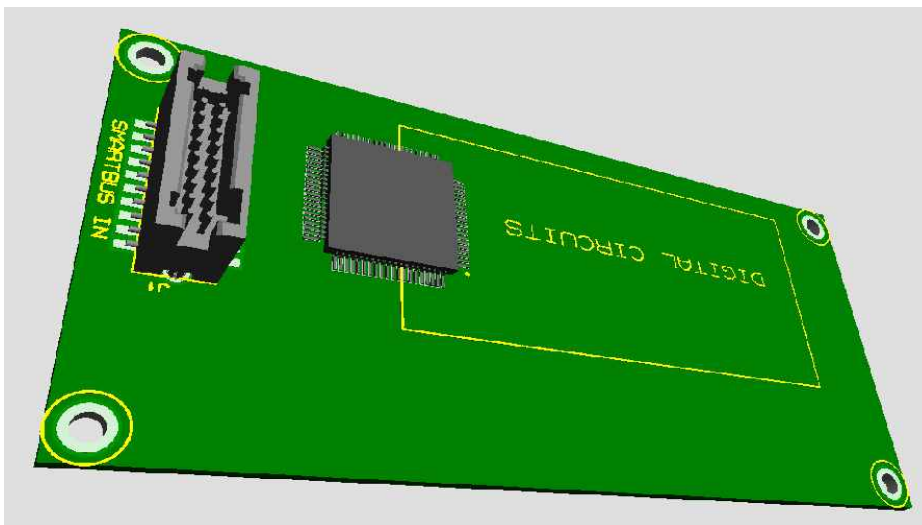
2 Modules

This chapter presents the mechanical specifications common to all **SmartBrick** modules.

2.1 Concept

Each **SmartBrick** module is physically a standardized compact and shielded high quality printed circuit board, using four to height conducting layers (depending on module complexity). Both sides are used :

On the bottom side each module has a **SmartBus** host and daisy chain connector. This connector allows to interconnect the module to its controling host through USB, ISC, SPI or UART, and allows also to link other modules stack through a daisy chaining concept. The bottom side is also used for noisy electronic circuitry.

On the top side each module has a mating **SmartBus** stacking connector, which allows to stack several modules transparently. The top side has also a shielded enclosure which includes all sensitive mixed signal electronics. Analog I/Os are done through 1 to 5 subminiature UFL connectors. Lastly a dedicated connector allows factory operations.
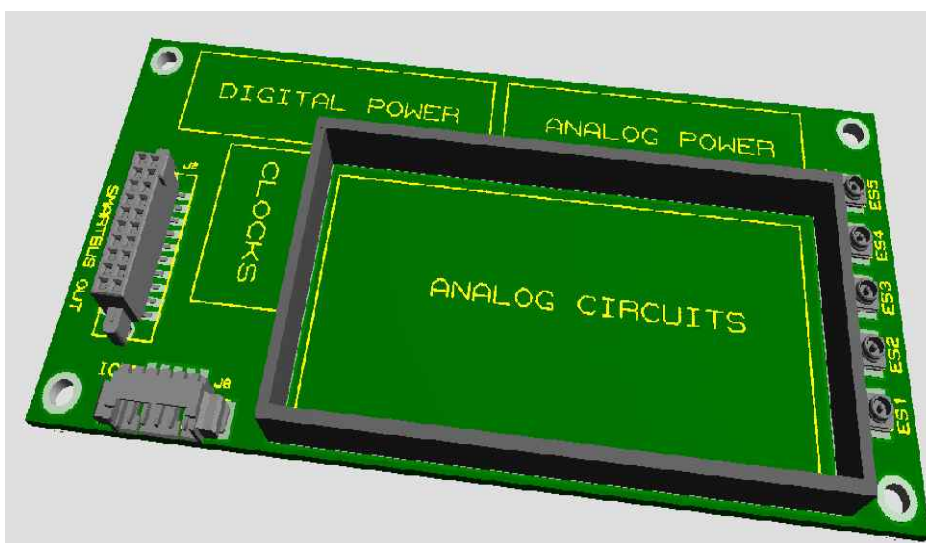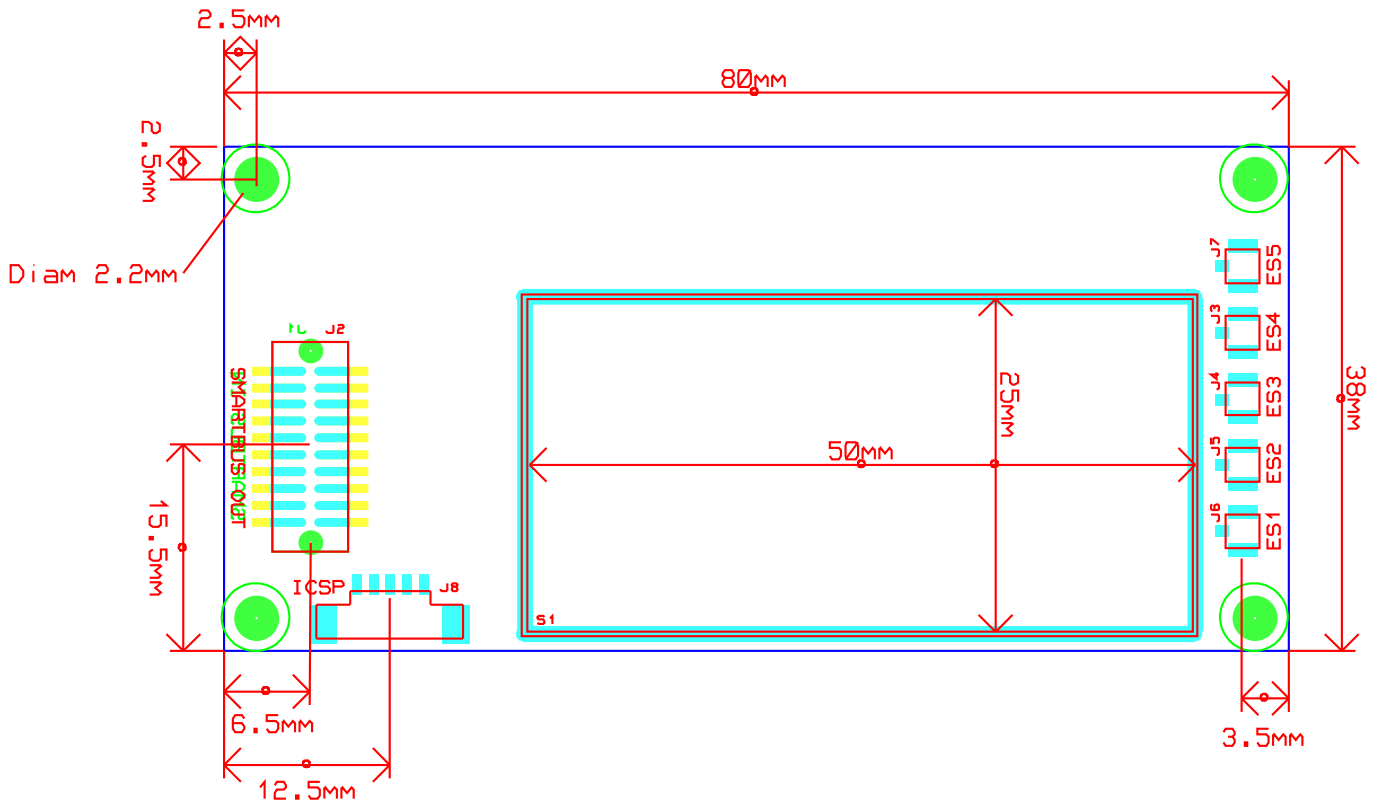

Mechanical fixing is done through four 2mm screws and spaces, insuring high vibration immunity.
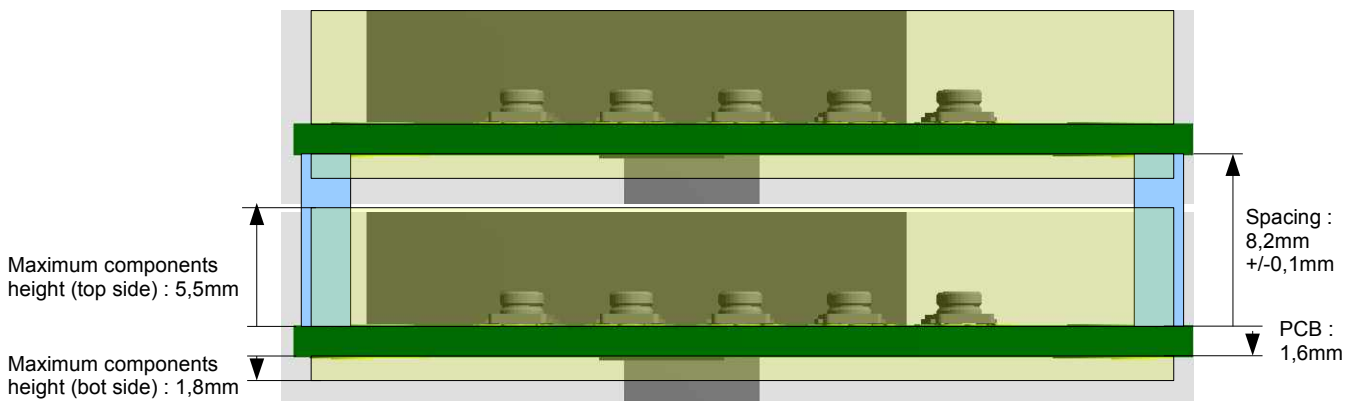
2.2 Mechanical design

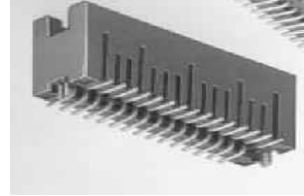The mechanical specifications of the modules are the following :

Top view :

Side view :

2.3 Mechanical interfaces

2.3.1   SmartBus host/Chain connector (bottom side)

1,27mm fine pitch, 2x10 pins vertical header
TYCO Series AMPMODU 50/50, reference 5-104656-2
Available from Radiospares under reference 406-821)

2.3.2   SmartBus stack connector (top side, to be used also for carrier boards)

1,27mm fine pitch, 2x10 vertical receptacle, 8,13mm stacking height
TYCO Series AMPMODU 50/50, reference 5-104652-2
Available from Radiospares under reference 406-764)

### 2.3.3   Analog signal connectors

MOLEX Micro-coaxial receptacle reference 73412-0114
Available from Radiospares under reference 702-5429)
Compatible with HITTITE UFL series

Mating UFL to SMA jumper : Roving Neworks ref RN-UFL-SMA6
Available from Digikey under reference 740-1031-ND
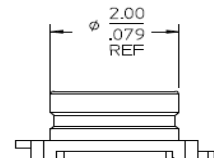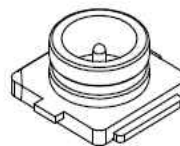
2.3.4   Factory programming connector

Picoblade 1,25mm pitch 5pin header
MOLEX reference 53261-0571
Available from Radiospares under reference 542-7270)
Mating connector : Molex ref 51021-0500 (Radiospares ref 447-6580)
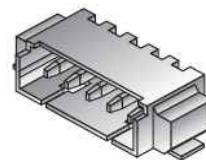
2.3.5   Spacers and screws

Recommanded spacers :

*   Nickel-plated hex spacer MF M2xH4xL8, SKIFFY reference 304 1080 400 50
*   Stainless steel star washer M2, SKIFFY reference 344 0200 415 53 (giving 8,2mm when stacked with a 8mm spacer)
*   Stainless steel nuts M2, SKIFFY reference 051 0200 415 53

3 XS enclosure

3.1 Concept

The SmartBrick XS enclosure allows to fit a single SmartBrick module. This lost cost solution provides only one way to interconnect the module to the host : USB, and powers the module from the USB port itself. Its front panel can accept up to 4 SMA connectors.
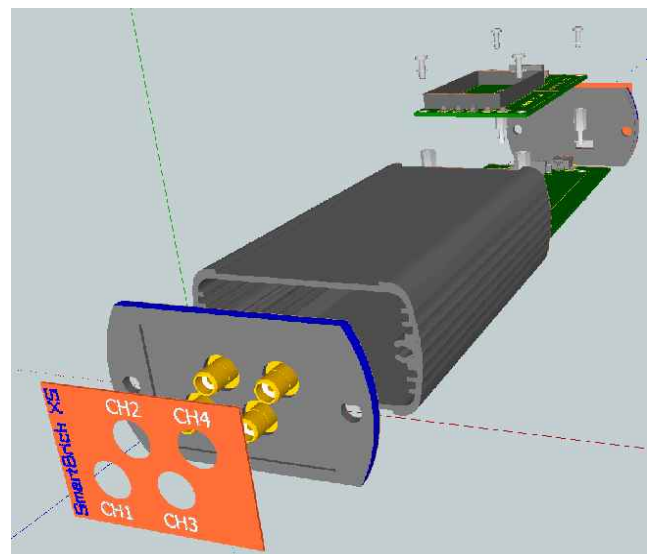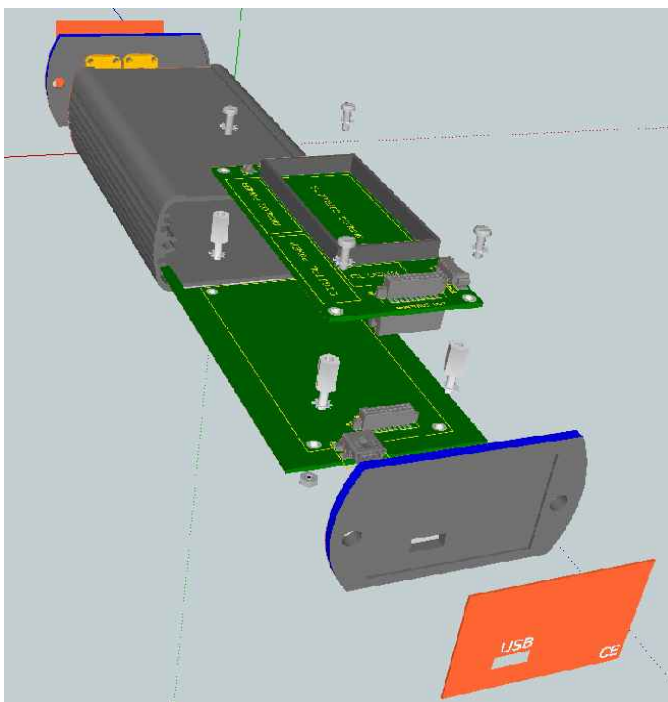
It is based on a ALUBOS 600-0100 standard aluminium extruded enclosure from BOPLA and a corresponding custom motherboard PCB.
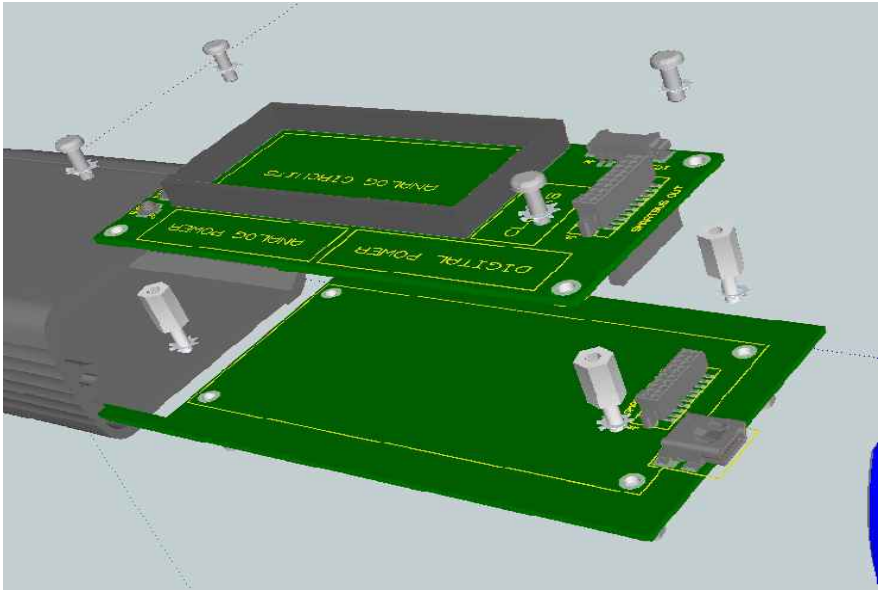
3.2 Mechanical design

External dimensions : Width 59,4mm, height 34,6mm, depth 120mm
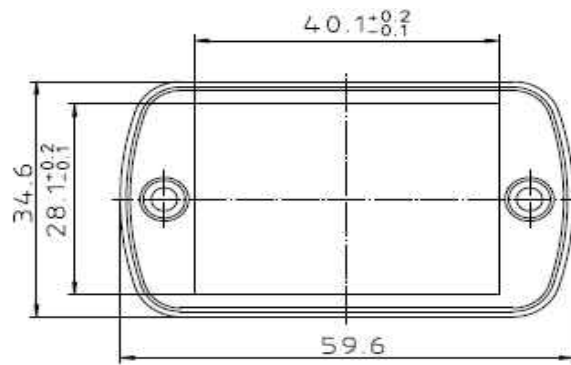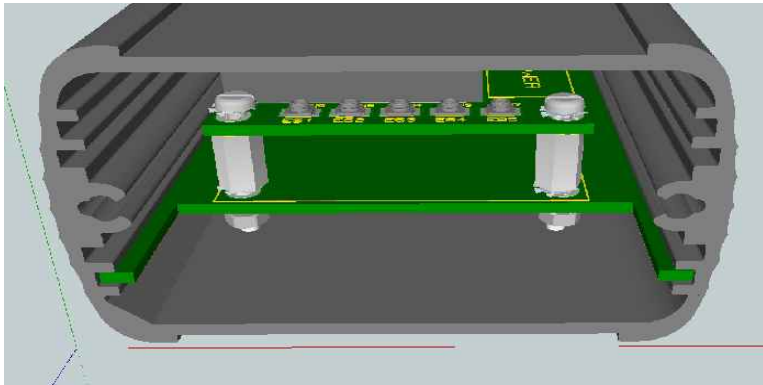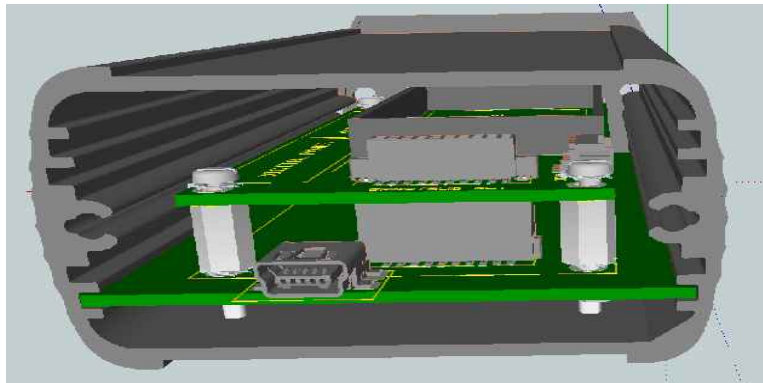

Mechanical structure is as follows :

The SmartBrick module is fixed on the XS motherboard with four sets of spacers, washers, nuts and screws.

When assembled the XS motherboard + module assembly slides inside the enclosure and allows access to USB and analog connectors. These connectors are routed to front panel connectors through SMA to UFL jumpers (1 to 4) :
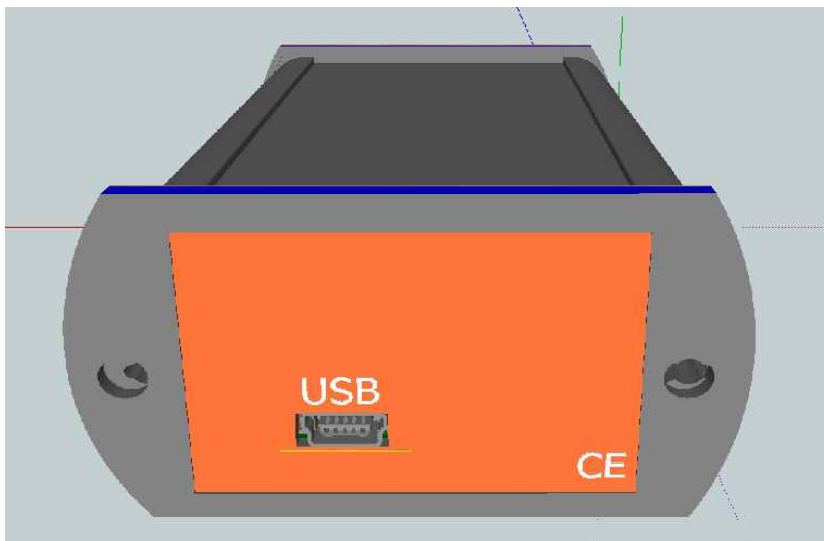
3.3 Mechanical interfaces

Front side : 1 to 4 SMA connectors, one status LED

Back side : Mini-B USB connector

4 XL enclosure

4.1 Concept

The SmartBrick XL enclosure allows to fit up to 15 SmartBrick modules (3 stacks of 5 modules). In its basic configuration it provides either USB, RS232 or RS485 host connexion, plus internal SPI/I2C connectors for prototyping. As an option it provides Ethernet/TCP-IP connectivity.

The SmartBrick XL motherboard includes, as an option, an ultra-stable +/-10ppb OCXO reference clock and/or an external 10MHz reference clock input with its internal VCTXO and PLL low noise 12MHz clock generation circuitry.

The SmartBrick XL is powered from a wall-plug 5V/20W power supply, even if USB power is supported for up to 2 modules (without Ethernet) or 1 module (with Ethernet). Its front panel can accept up to 40 SMA connectors.
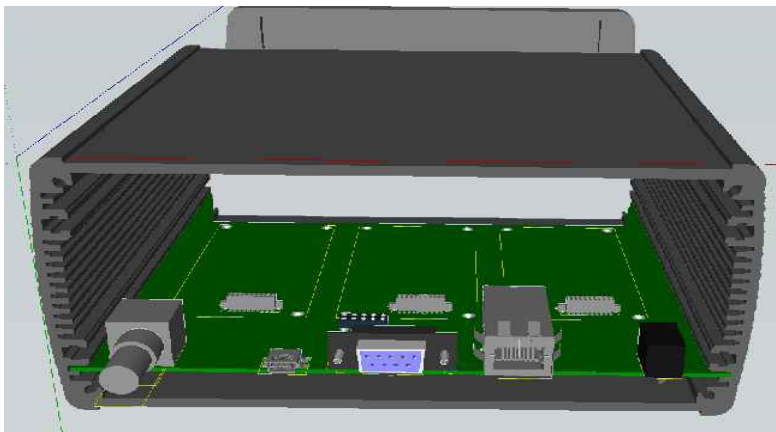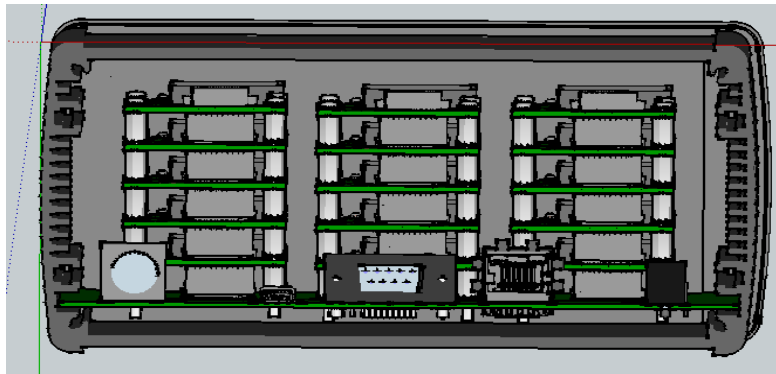
It is based on a ALUBOS 1650-0150 standard aluminium extruded enclosure from BOPLA and a corresponding custom motherboard PCB.

4.2 Mechanical design

External dimensions : Width 171,6mm, height 84,6mm, depth 170mm
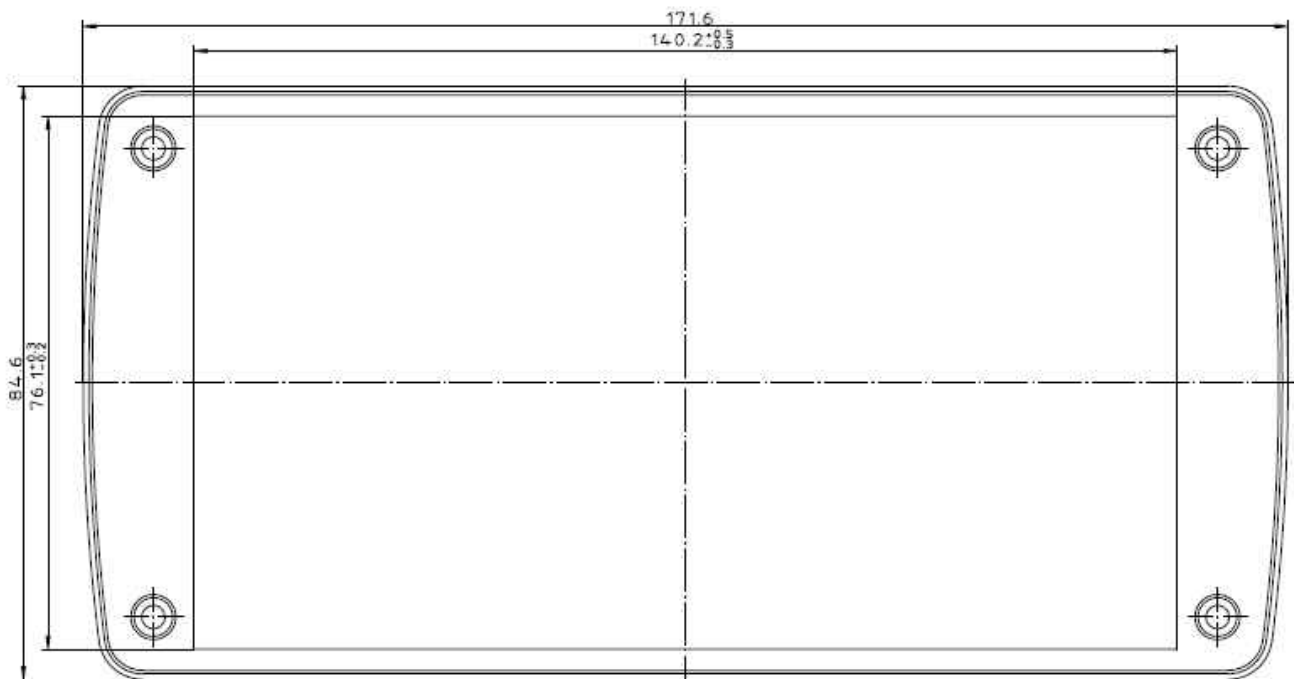
Mechanical structure is as follows :

4.3 Mechanical interfaces

The front panel accepts up to 16 SMA connectors and 2 DB15 connectors, 1 status LED :

The back panel provides USB, serial connections as well as optionals Ethernet and 10MHz clock inputs, plus DC power supply input.