

XK91: PC/104 CubeSat Bridge

Interface Control Document

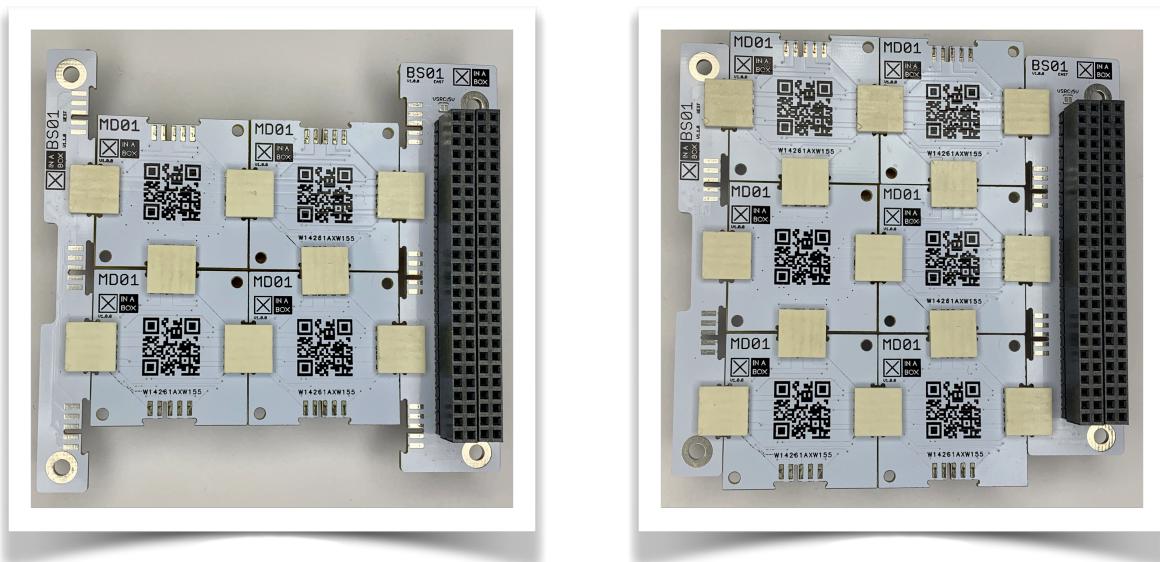
The BS01 is a set of xChips (BS01 East and BS01 West), that connected with 4 or 6 xChips in between forms a PC/104 standardised PCB.

The MB01 is a mechanical backplane that allows for further stability.

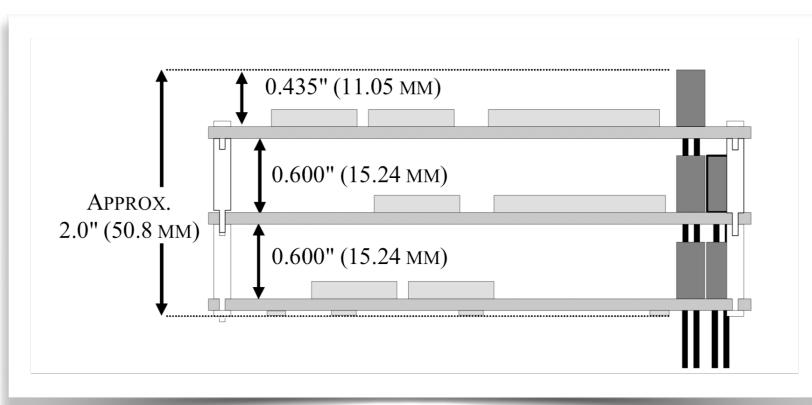
The xChips follows the PC/104 Specification Version 2.6

Mechanical characteristics

The BS01 allow for both 4 or 6 standard sized xChips to be used.



See the above images to identify which connector points to use for 4 and 6 xChips respectively.



When using 4 xChips, the total circuits fits inside the PC/104 standardised 90.17 mm in height, i.e. PC/104 "Compliant". When using 6 xChips, the circuits expand to 96 mm. While larger than the PC/104 standard, it still fits inside a CubeSats 100 mm maximum, and it fits inside the PC/104 "overhang area", i.e. PC/104 "Bus-compatible"

The width in both cases are 95.89 mm.

The stacking height between the boards are 15.24 mm as per the above PC/104 standard.

Mounting:

The four major holes are all 3mm (M3):

The 2 studs (Spacers) (6+7.5mm) + the support PCB (1.6mm) equals 15.1 mm:

M3 6MM STUD *Digi-Key: RPC1917-ND*

M3 7.5MM STUD *Digi-Key: RPC2230-ND*

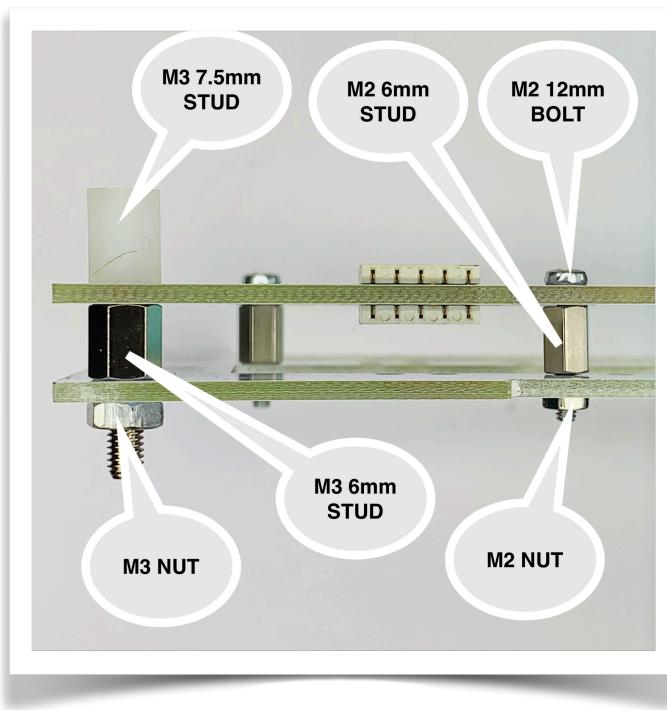
M3 BOLT 6.1MM *Digi-Key: 732-13702-ND*

The xChip holes are all 2mm (M2). To mount the xChip to the support PCB use:

M2 NUT *Mouser: 855-M80-2430000B*

M2 BOLT 12MM *Digi-Key: 335-1151-ND*

M2 6MM STUD *Digi-Key: 732-12828-ND*



The M3 NUT is for the last layer only. The 7.5mm M3 STUD can also be placed instead of the M3 NUT and a BOLT at the top can be used instead - as per the above BOM.

For training purpose the support PCB can be left out and ±14 mm STUDs can be used instead.

If the support PCB is left out, xChips can be replaced without unstacking the CubeSat.

Interfaces

BS01: CubeSat PC/104 Connector

	2	4	6	8	10	12	14	16	18	20	22	24	26 Vsrc 5v	28 Vcc 3.3v	30 GND	32 GND	34	36	38	40	42	44	46	48	50	52
H2	1	3	5	7	9	11	13	15	17	19	21	23	25 Vsrc 5v	27 Vcc 3.3v	29 GND	31	33	35	37	39	41	43	45	47	49	51
H1	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40 RxD	42	44	46	48	50	52
	1	3	5	7	9	11	13	15	17	19	21 I2C SCL	23 I2C SDA	25	27	29	31	33	35	37	39 TxD	41 I2C SDA	43 I2C SCL	45	47	49	51



The connectors used is a pair of: ESQ-126-39-G-D 2x26 Stack-Through samtec.com

Pins:

- GND on H2-29, H2-30, H2-32
- Vcc (3.3v) on H2-27,H2-28
- Vsrc (5v) on H2-25, H2-26 - only occasionally used by xChips
- UART RxD/TxD on H1-39 and H1-40. Orientation of RxD and TxD is selectable on the back of the BS01 using solder pads. Default is NC - Not Connected
- I2C System on H1-41 (SDA) and H1-43 (SCL)
- I2C Application/Payload on H1-21 (SCL) and H1-23 (SDA)
- Choice of I2C pins to use is selectable on the back of the BS01 using solder pads. Default is I2C Application/Payload
- All other pins are NC - Not Connected.

Electrical characteristics

- xChips are reliant on 3.3v on the Vcc pins as per above. No conversion of power levels from 5v (Vsrc) to 3.3v occurs on the BS01.
- I2C bus relies on 3.3v levels.

Solder Pads

- The solder pads on the back top (behind the "BS01") is UART configuration:
 - Top is DTE
 - Bottom is DCE
- The solder pads on the back bottom is I2C configuration:
 - Top is SYSTEM
 - Bottom is Application/PAYLOAD
- VSRC5V, solder this for activate 5V passthrough on the BS01