http://www.cubesatkit.com/

CubeSat Kit™ Breakout Board

Hardware Revision: A

Interface for Logic Analyzer and I2C/SPI Protocol Analyzer

Applications

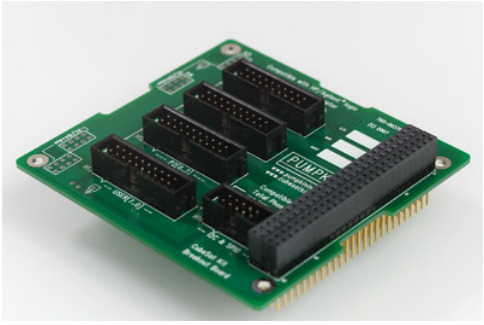
- CubeSat Kit debugging & testing

Features

- Direct connection to logic analyzer & protocol analyzer probes via simple 0.100" grid dual-row shrouded headers
- Provides entire CubeSat Kit I/O space, plus other signals
- Passive circuit design
- PC/104-size footprint, with +5V and GND on PC/104 J1/J2 connectors
- 2-layer green-soldermask PCB

Compatible with

- HP®/Agilent® termination adapter P/N 01650-63203 or equivalent using 20-pin connector
- Total Phase® I2C / SPI protocol analyzers using 10-pin connector



ORDERING INFORMATION

Pumpkin P/N 711-00380

Option Code	Configuration
/00 (standard)	standard

Contact factory for availability of optional configurations.

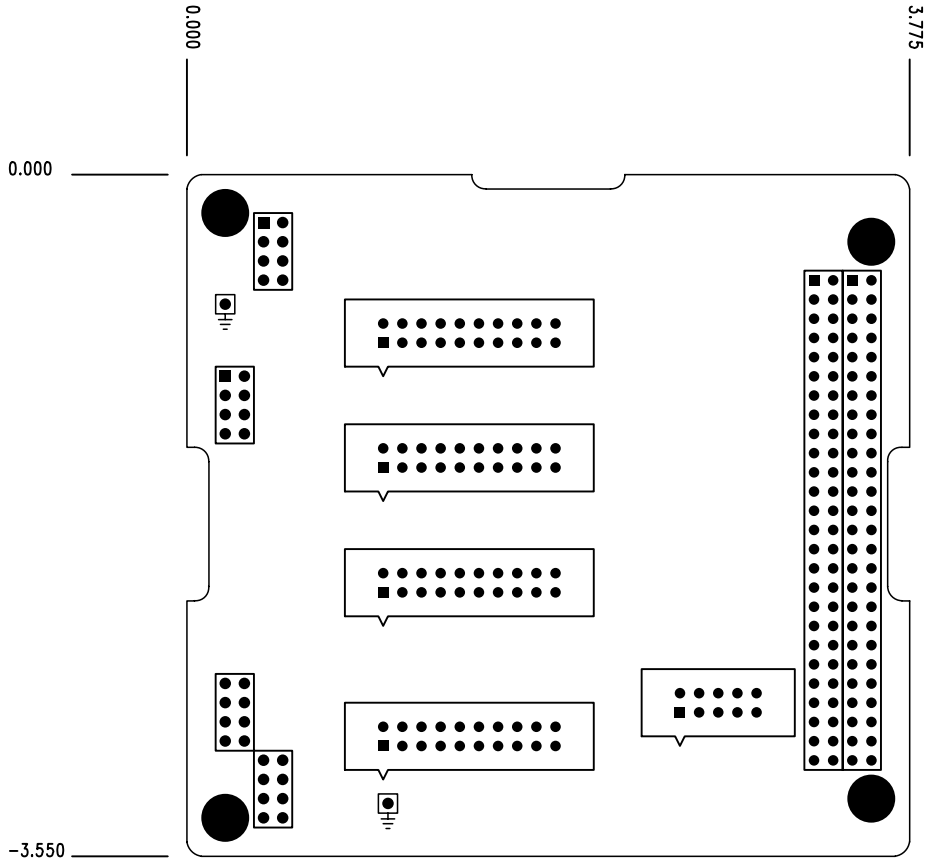
ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Value	Units
Operating temperature	T_A	-40 to +85	ºC

PHYSICAL CHARACTERISTICS

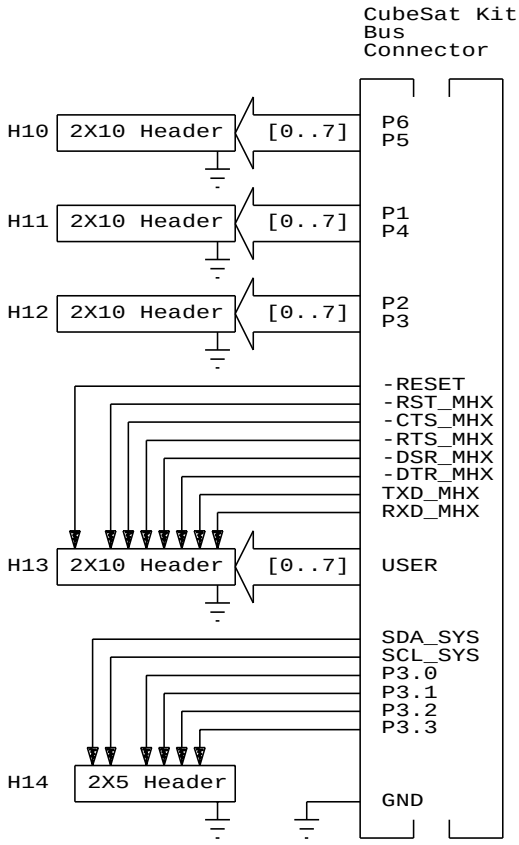
Parameter	Conditions / Notes	Symbol	Min	Typ	Max	Units
Mass	With vertical boxed headers			59		g
Height of components above PCB	With vertical boxed headers				11	mm
Height of components below PCB [1]					2	mm
PCB width	Corner hole pattern matches PC/104			96		mm
PCB length				90		mm
PCB thickness				1.6		mm

SIMPLIFIED MECHANICAL LAYOUT [2]

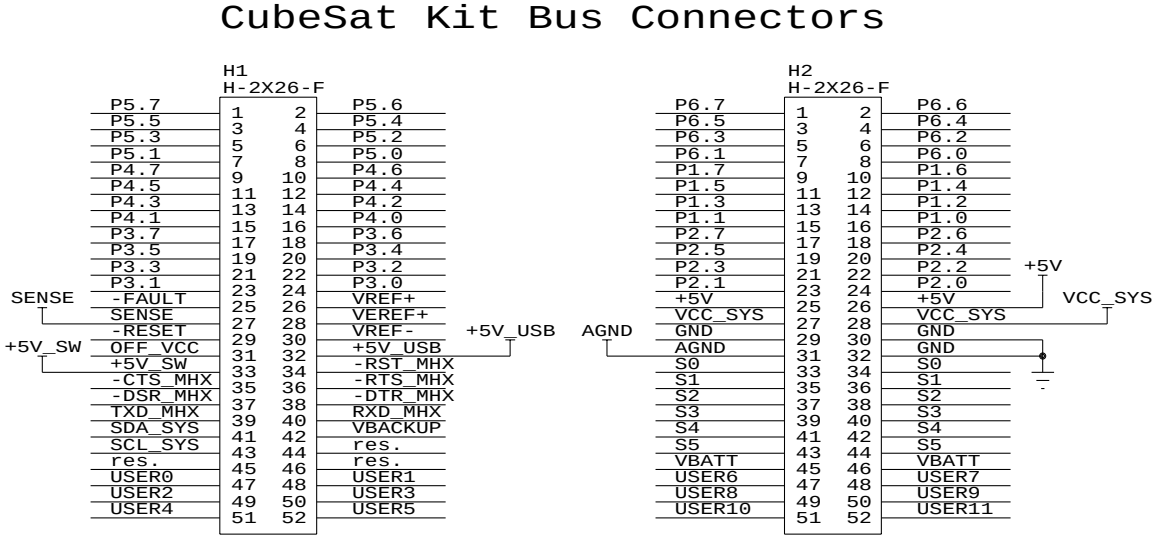


[1] Does not include length of PC/104 stackthrough header pins (H1 & H2) of 10.4mm.
[2] Dimensions in inches.

BLOCK DIAGRAM



CubeSat Kit Bus PIN DESCRIPTIONS



CubeSat Kit Bus PIN DESCRIPTIONS – MSP430 I/O Port 1

Name	Pin	I/O	Description
P1.0	H2.16	I	General-purpose 3.3V I/O. Connected to H11.3.
P1.1	H2.15	I	General-purpose 3.3V I/O. Connected to H11.5.
P1.2	H2.14	I	General-purpose 3.3V I/O. Connected to H11.7.
P1.3	H2.13	I	General-purpose 3.3V I/O. Connected to H11.9.
P1.4	H2.12	I	General-purpose 3.3V I/O. Connected to H11.11.
P1.5	H2.11	I	General-purpose 3.3V I/O. Connected to H11.13.
P1.6	H2.10	I	General-purpose 3.3V I/O. Connected to H11.15.
P1.7	H2.9	I	General-purpose 3.3V I/O. Connected to H11.17.

CubeSat Kit Bus PIN DESCRIPTIONS – MSP430 I/O Port 2

Name	Pin	I/O	Description
P2.0	H2.24	I	General-purpose 3.3V I/O. Connected to H12.3.
P2.1	H2.23	I	General-purpose 3.3V I/O. Connected to H12.5.
P2.2	H2.22	I	General-purpose 3.3V I/O. Connected to H12.7.
P2.3	H2.21	I	General-purpose 3.3V I/O. Connected to H12.9.
P2.4	H2.20	I	General-purpose 3.3V I/O. Connected to H12.11.
P2.5	H2.19	I	General-purpose 3.3V I/O. Connected to H12.13.
P2.6	H2.18	I	General-purpose 3.3V I/O. Connected to H12.15.
P2.7	H2.17	I	General-purpose 3.3V I/O. Connected to H12.17.

CubeSat Kit Bus PIN DESCRIPTIONS – MSP430 I/O Port 3

Name	Pin	I/O	Description
P3.0	H1.24	I	General-purpose 3.3V I/O. Connected to H12.18.
P3.1	H1.23	I	General-purpose 3.3V I/O. Connected to H12.16.
P3.2	H1.22	I	General-purpose 3.3V I/O. Connected to H12.14.
P3.3	H1.21	I	General-purpose 3.3V I/O. Connected to H12.12.
P3.4	H1.20	I	General-purpose 3.3V I/O. Connected to H12.10.
P3.5	H1.19	I	General-purpose 3.3V I/O. Connected to H12.8.
P3.6	H1.18	I	General-purpose 3.3V I/O. Connected to H12.6.
P3.7	H1.17	I	General-purpose 3.3V I/O. Connected to H12.4.

CubeSat Kit Bus PIN DESCRIPTIONS – MSP430 I/O Port 4

Name	Pin	I/O	Description
P4.0	H1.16	I	General-purpose 3.3V I/O. Connected to H11.18.
P4.1	H1.15	I	General-purpose 3.3V I/O. Connected to H11.16.
P4.2	H1.14	I	General-purpose 3.3V I/O. Connected to H11.14.
P4.3	H1.13	I	General-purpose 3.3V I/O. Connected to H11.12.
P4.4	H1.12	I	General-purpose 3.3V I/O. Connected to H11.10.
P4.5	H1.11	I	General-purpose 3.3V I/O. Connected to H11.8.
P4.6	H1.10	I	General-purpose 3.3V I/O. Connected to H11.6.
P4.7	H1.9	I	General-purpose 3.3V I/O. Connected to H11.4.

CubeSat Kit Bus PIN DESCRIPTIONS – MSP430 I/O Port 5

Name	Pin	I/O	Description
P5.0	H1.8	I	General-purpose 3.3V I/O. Connected to H10.18.
P5.1	H1.7	I	General-purpose 3.3V I/O. Connected to H10.16.
P5.2	H1.6	I	General-purpose 3.3V I/O. Connected to H10.14.
P5.3	H1.5	I	General-purpose 3.3V I/O. Connected to H10.12.
P5.4	H1.4	I	General-purpose 3.3V I/O. Connected to H10.10.
P5.5	H1.3	I	General-purpose 3.3V I/O. Connected to H10.8.
P5.6	H1.2	I	General-purpose 3.3V I/O. Connected to H10.6.
P5.7	H1.1	I	General-purpose 3.3V I/O. Connected to H10.4.

CubeSat Kit Bus PIN DESCRIPTIONS – MSP430 I/O Port 6

Name	Pin	I/O	Description
P6.0	H2.8	I	General-purpose 3.3V I/O. Connected to H10.3.
P6.1	H2.7	I	General-purpose 3.3V I/O. Connected to H10.5.
P6.2	H2.6	I	General-purpose 3.3V I/O. Connected to H10.7.
P6.3	H2.5	I	General-purpose 3.3V I/O. Connected to H10.9.
P6.4	H2.4	I	General-purpose 3.3V I/O. Connected to H10.11.
P6.5	H2.3	I	General-purpose 3.3V I/O. Connected to H10.13..
P6.6	H2.2	I	General-purpose 3.3V I/O. Connected to H10.15.
P6.7	H2.1	I	General-purpose 3.3V I/O. Connected to H10.17.

CubeSat Kit Bus PIN DESCRIPTIONS – Analog References

Name	Pin	I/O	Description
VREF+	H1.26		Not used.
VREF-	H1.30		Not used.
VEREF+	H1.28		Not used.

CubeSat Kit Bus PIN DESCRIPTIONS – I2C Bus

Name	Pin	I/O	Description
SDA_SYS	H1.41	I	I2C data. Connected to H14.3.
SCL_SYS	H1.43	I	I2C clock. Connected to H14.1.

CubeSat Kit Bus PIN DESCRIPTIONS – Control & Status

Name	Pin	I/O	Description
-FAULT	H1.25		Not used.
SENSE	H1.27		Not used.
-RESET	H1.29	I	System reset signal. Connected to H13.4.
OFF_VCC	H1.31		Not used.

CubeSat Kit Bus PIN DESCRIPTIONS – RBF and Launch Switches

Name	Pin	I/O	Description
S0	H2.33 H2.34	–	Not used.
S1	H2.35 H2.36	–	Not used.
S2	H2.37 H2.38	–	Not used.
S3	H2.39 H2.40	–	Not used.
S4	H2.41 H2.42	–	Not used.
S5	H2.43 H2.44	–	Not used.

CubeSat Kit Bus PIN DESCRIPTIONS – Power

Name	Pin	I/O	Description
VBATT	H2.45 H2.46		Not used.
+5V_USB	H1.32		Not used.
+5V	H2.25 H2.26		Not used.
+5V_SW	H1.33		Not used.
VBACKUP	H1.42		Not used.
VCC_SYS	H2.27 H2.28		Not used.
AGND	H2.31		Not used.
GND	H2.29 H2.30 H2.32	–	Ground reference. Connected to H10.20, H11.20, H12.20, H13.20, H14.2 & H14.10.

CubeSat Kit Bus PIN DESCRIPTIONS – Transceiver Interface

Name	Pin	I/O	Description
-RST_MHX	H1.34	I	+5V transceiver I/O. Connected to H13.6.
-CTS_MHX	H1.35	I	+5V transceiver I/O. Connected to H13.8.
-RTS_MHX	H1.36	I	+5V transceiver I/O. Connected to H13.10.
-DSR_MHX	H1.37	I	+5V transceiver I/O. Connected to H13.12.
-DTR_MHX	H1.38	I	+5V transceiver I/O. Connected to H13.14.
TXD_MHX	H1.39	I	+5V transceiver I/O. Connected to H13.16.
RXD_MHX	H1.40	I	+5V transceiver I/O. Connected to H13.18.

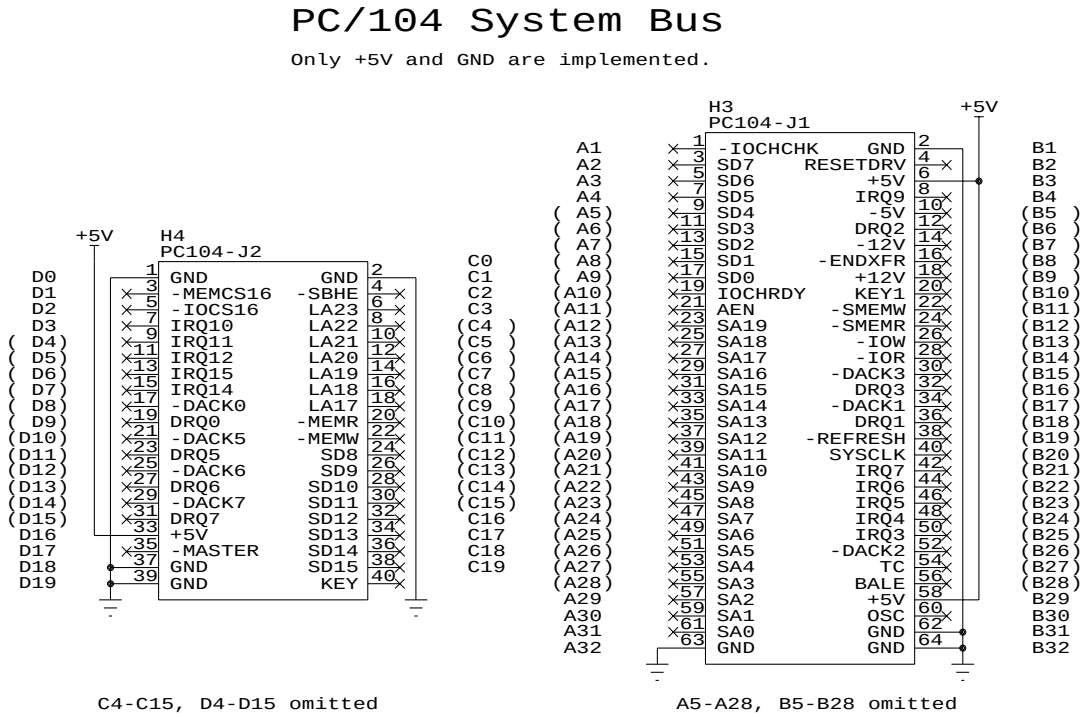
CubeSat Kit Bus PIN DESCRIPTIONS – User-defined

Name	Pin	I/O	Description
USER0	H1.47	I	User-defined. Connected to H13.17.
USER1	H1.48	I	User-defined. Connected to H13.15.
USER2	H1.49	I	User-defined. Connected to H13.13.
USER3	H1.50	I	User-defined. Connected to H13.11.
USER4	H1.51	I	User-defined. Connected to H13.9.
USER5	H1.52	I	User-defined. Connected to H13.7.
USER6	H2.47	I	User-defined. Connected to H13.5.
USER7	H2.48	I	User-defined. Connected to H13.3.
USER8	H2.49		Not used.
USER9	H2.50		Not used.
USER10	H2.51		Not used.
USER11	H2.52		Not used.

CubeSat Kit Bus PIN DESCRIPTIONS – Reserved

Name	Pin	I/O	Description
res.	H1.44	–	Reserved for future use.
res.	H1.45	–	Reserved for future use.
res.	H1.46	–	Reserved for future use.

PC/104 System Bus PIN DESCRIPTIONS



The Breakout Board implements a subset of the PC/104 specification in the form of two connectors that provide only +5V and GND for PC/104 modules. Only a total of 32 pins are implemented, 16 on J1 and 16 on J2. By adding up to 4 8-pin connectors to the Breakout Board, PC/104 modules can be plugged directly into the Breakout Board to obtain +5V power and GND. No other connections between the PC/104 bus and the CubeSat Kit Bus are provided.

LOGIC ANALYZER / PROTOCOL ANALYZER INTERFACES

The Breakout Board's interfaces are entirely passive, without any sort of isolation. Therefore any probes plugged into the Breakout Board are connected directly to the CubeSat Kit bus. Probe input impedances of 100kΩ or more are recommended.

TRADEMARKS

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