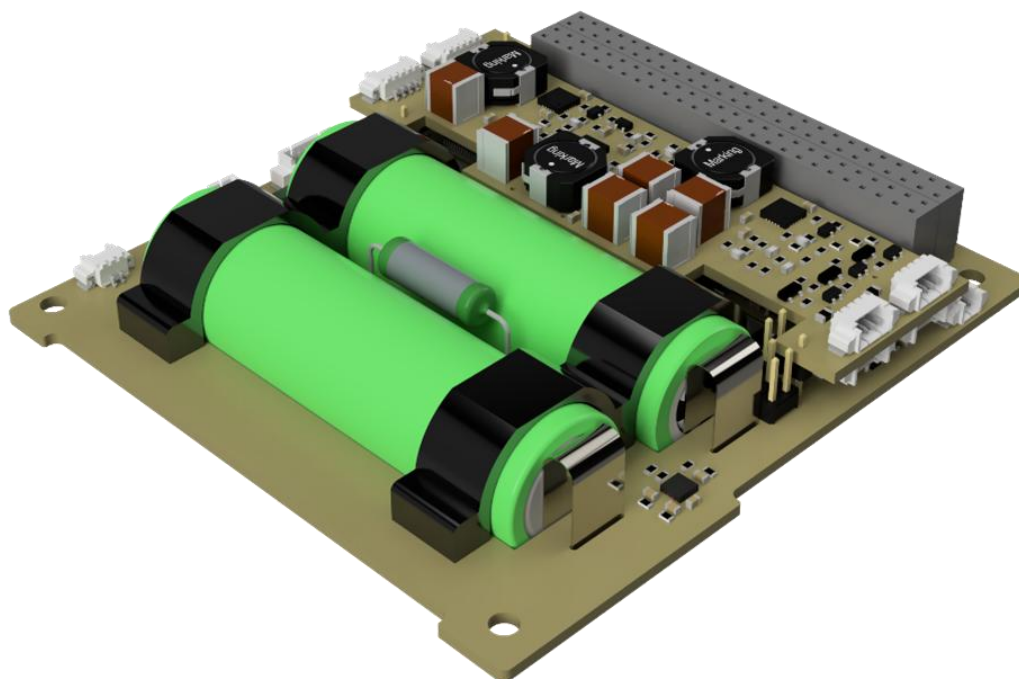




AMUN COMPACT POWER SUPPLY UNIT

DATASHEET

TABLE OF CONTENTS

1	<i>PRODUCT OVERVIEW</i>	4
2	<i>TECHNICAL SPECIFICATION</i>	5
2.1	SOLAR INPUT SYSTEM	6
2.2	BATTERY MANAGEMENT SYSTEM.....	7
2.3	POWER DISTRIBUTION SYSTEM.....	8
3	<i>INTERFACES</i>	10
3.1	ELECTRICAL.....	10
3.1.1	PC104 STACK CONNECTOR	10
3.1.2	SOLAR INPUT	11
3.1.3	RBF & DS.....	11
3.1.4	EGSE	12
3.1.5	UART DEBUG.....	12
3.2	SOFTWARE	13
3.3	MECHANICAL	14
4	<i>DELIVERABLES</i>	14
4.1	AFFIRMATION NOTE.....	14
5	<i>RELATED PRODUCTS</i>	15
6	<i>DISCLAIMER</i>	15

LIST OF FIGURES

Figure 2-1: Amun PSU 1U block diagram	5
Figure 2-2: Amun PSU 1U interface overview	5
Figure 2-3: Solar input system of Amun Compact	6
Figure 2-4: Real world SIS performance example of performance from Planetum-1 mission	7
Figure 2-5: Battery management system part of Amun Compact.....	7
Figure 2-6: Power distribution system of AMUN Compact.....	8
Figure 2-7: Typical efficiency for selected voltage output	9
Figure 2-8: Relative voltage drop per channel	9
Figure 3-1: Amun PSU 1U PC104 connector pinout reference	10
Figure 3-2: PSU solar input connector.....	11
Figure 3-3: Amun PSU RBF and Deployment switch diagram.....	11
Figure 3-4: PSU EGSE connector	12
Figure 3-5: Pinout of the debug connector	12
Figure 3-6: Debug cable.....	12
Figure 3-7: Mechanical interface of the Amun Compact PSU module.....	14

LIST OF TABLES

Table 2-1: Technical specification	6
Table 2-2: Solar input system technical specification.....	6
Table 2-3: Battery management system technical specification	7
Table 2-4: Power distribution system technical specification	8
Table 3-1: Overview of interfaces.....	10
Table 3-2: Solar input connector reference.....	11
Table 3-3: RBF and DS connector reference	11
Table 3-4: EGSE connector reference.....	12
Table 4-1: Deliverables	14

GLOSSARY

CAN	Controller Area Network
CSP	Cubesat Space Protocol
GND	Ground
I ² C	Inter Integrated Circuit
IC	Integrated Circuit
ICD	Interface Control Document
MPPT	Maximum Power Point Tracking
PSU	Power Supply Unit
RS485	Differential communication bus type
UART	Universal Asynchronous Receiver / Transmitter
VCC	Voltage at Common Collector

1 PRODUCT OVERVIEW

The Amun Compact is a power supply unit (PSU) for 1U class nanosatellites integrated in PC104 form factor. In just 0.2 U format, it provides the whole power supply chain starting with MPPT solar input system, through battery management system and up to regulated DC/DC converters branched into 6 controllable regulated channels and one battery voltage output channel.

The module consists of two printed circuit boards -The Solar Input System add-on board and the main board containing housing regulation, output control and protection, and communication interfaces.

Flight heritage on 10+ missions (e.g. LASARsat, CroCube, GRBBeta and external customers).

2 TECHNICAL SPECIFICATION

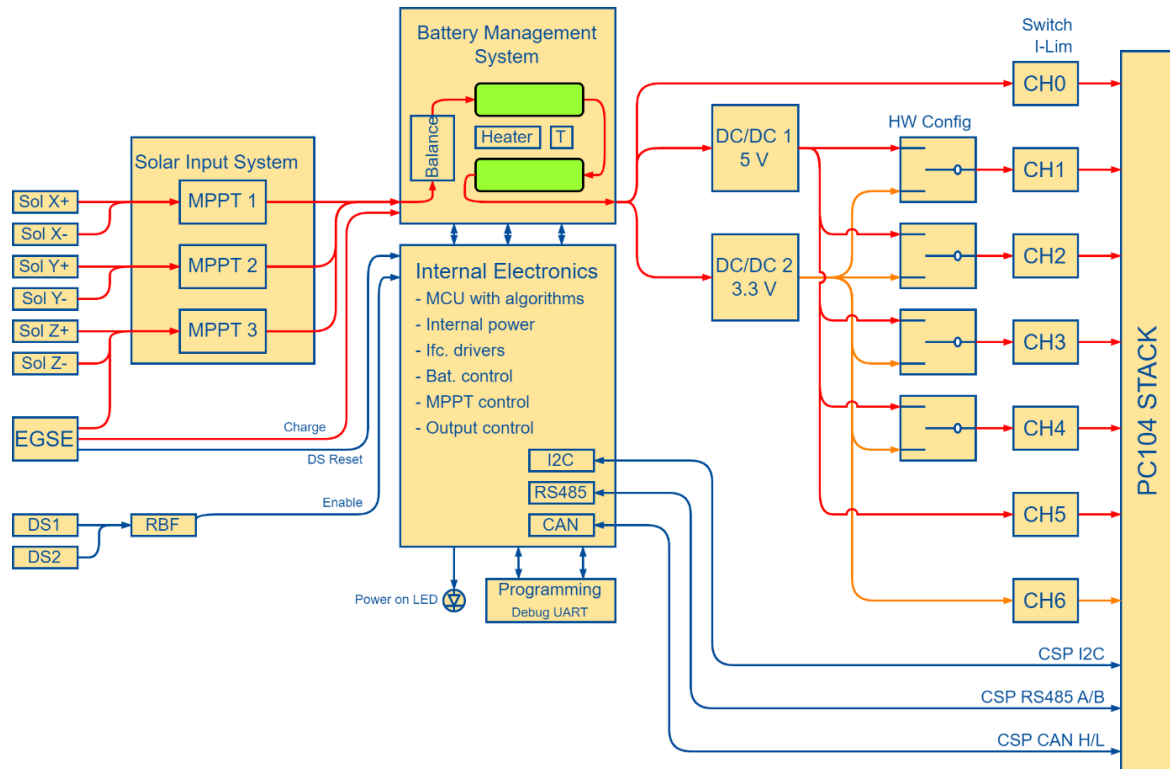


Figure 2-1: Amun PSU IU block diagram

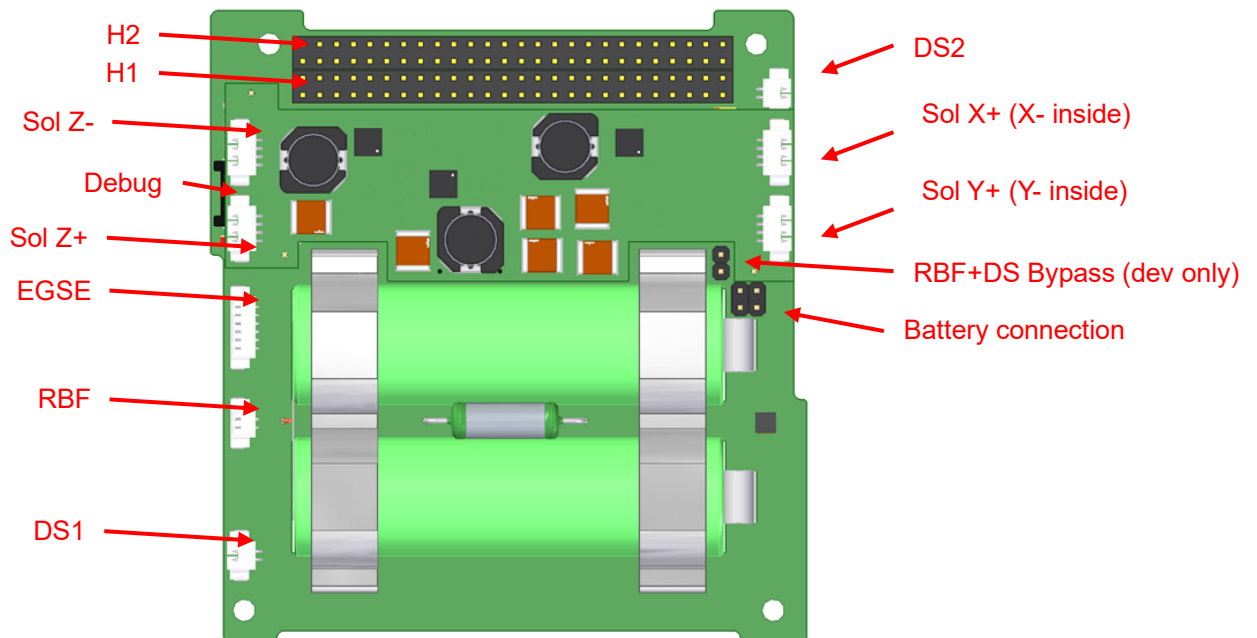


Figure 2-2: Amun PSU IU interface overview

Table 2-1: Technical specification

Parameter	Value	Unit
Operating Temperature	-40 to +85	°C
Dimensions	90.2 x 95.9 x 19.7 PC104	mm
Mass	185	g
Solar input	5 V @ 500 mA	
Power outputs	1x VBAT 1x 3.3 1x 5 4x 3.3/5 conf.	V
Battery configuration	2S1P	
Battery capacity	24	Wh
Battery voltage	typ. 7.2 max. 8.2	V
Reported data over software interface	Uptime Battery voltage Current draws Battery current in/out Solar input V/A/P	

2.1 SOLAR INPUT SYSTEM

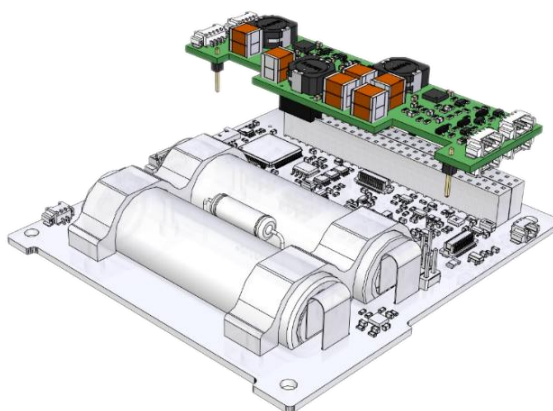


Figure 2-3: Solar input system of Amun Compact

Table 2-2: Solar input system technical specification

Parameter	Value	Unit
MPPT regulator channels	3	
Inputs per MPPT regulator	2	
Maximum input voltage	5.5	V
Maximum input current	550	mA
Efficiency	73	%

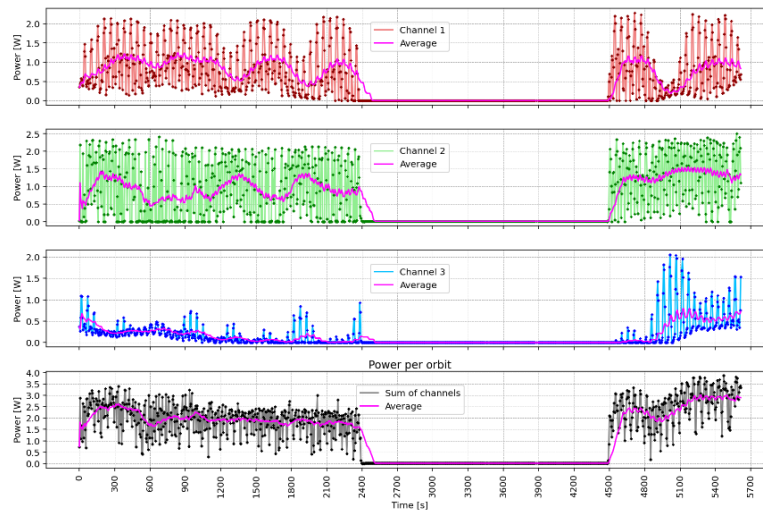


Figure 2-4: Real world SIS performance example of performance from Planetum-1 mission

The example in Figure 2-4 presents data from real-world measurement on Planetum-1 1U CubeSat for 1 orbit (LEO SSO). The satellite was in a random tumbling state. You can see the sunlit and eclipse times of the orbit. The data dispersion is caused by irregular measurement and the MPPT algorithm.

2.2 BATTERY MANAGEMENT SYSTEM

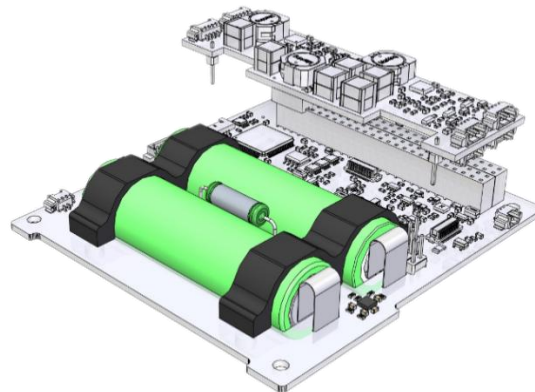


Figure 2-5: Battery management system part of Amun Compact

Table 2-3: Battery management system technical specification

Parameter	Value	Unit
Battery type	NCR18650B	
Typ. battery pack voltage	7.2	V
Typ. battery pack capacity	24	Wh
Max. combined discharge current	6	A
Battery balancing	Dedicated IC	
Battery temperature	Dedicated sensor	
Battery heater	Manual or automatic	

2.3 POWER DISTRIBUTION SYSTEM

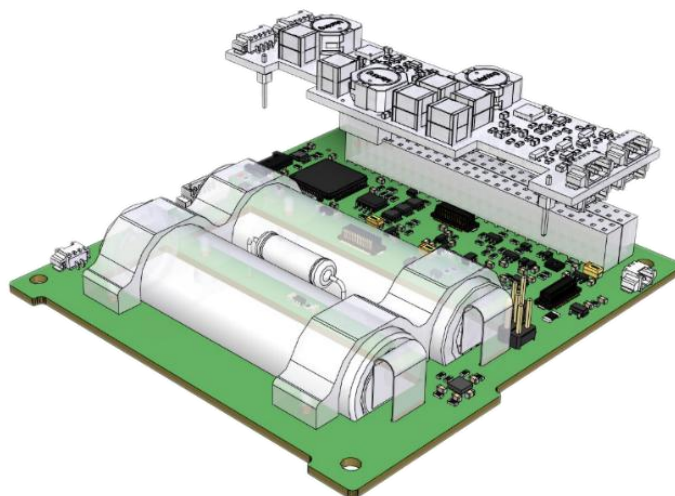


Figure 2-6: Power distribution system of AMUN Compact

Table 2-4: Power distribution system technical specification

Parameter	Value	Unit
Regulators	1x 3.3 1x 5	V
Power outputs	1x 3.3 (fixed) 1x 5 (fixed) 4x 3.3/5 (conf.) 1x VBAT	V
Typ. power output stability	50	mV (peak to peak)
Max. current draw per output	4	A
Max. combined current per regulator	6	A
Recommended max current draw per channel	1.5	A
Ty. 3.3 V self-consumption	0.155	mW
Ty. 5 V self-consumption	0.149	mW

All power outputs implement a power switch to control their on and off states.

The typical efficiencies of Amun at selected voltage levels are shown in Figure 2-7. These efficiencies were measured from the charged battery to the corresponding PC104 stack connector pin, encompassing all losses in the power path.

Figure 2-8 shows the typical voltage drop of each power output channel as a result of series resistance of the hardware implementation.

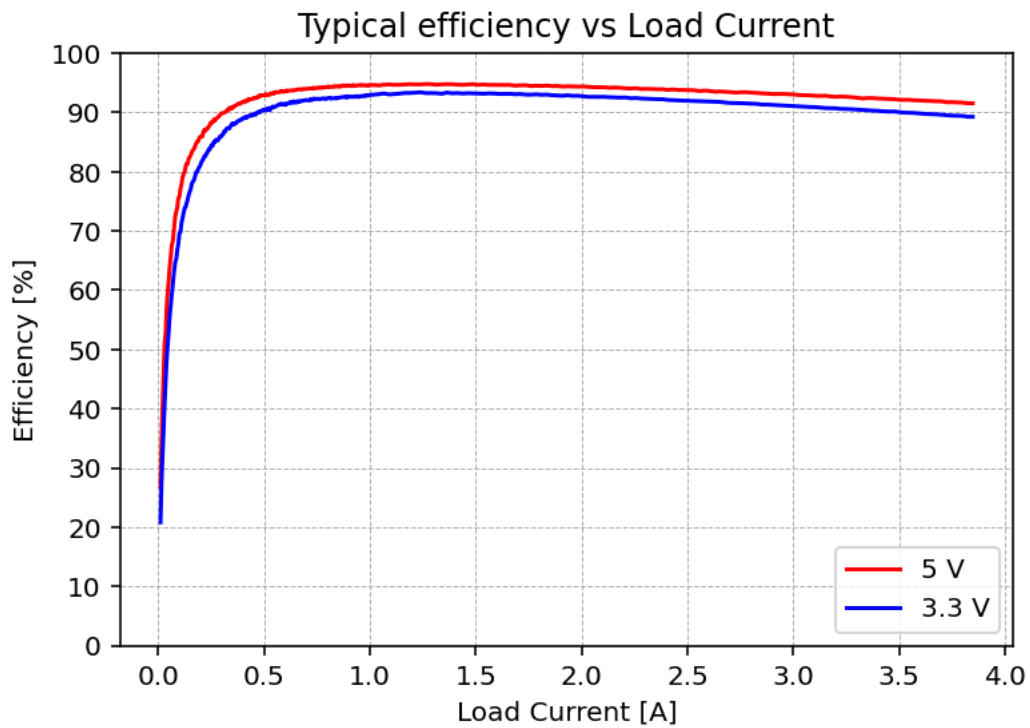


Figure 2-7: Typical efficiency for selected voltage output

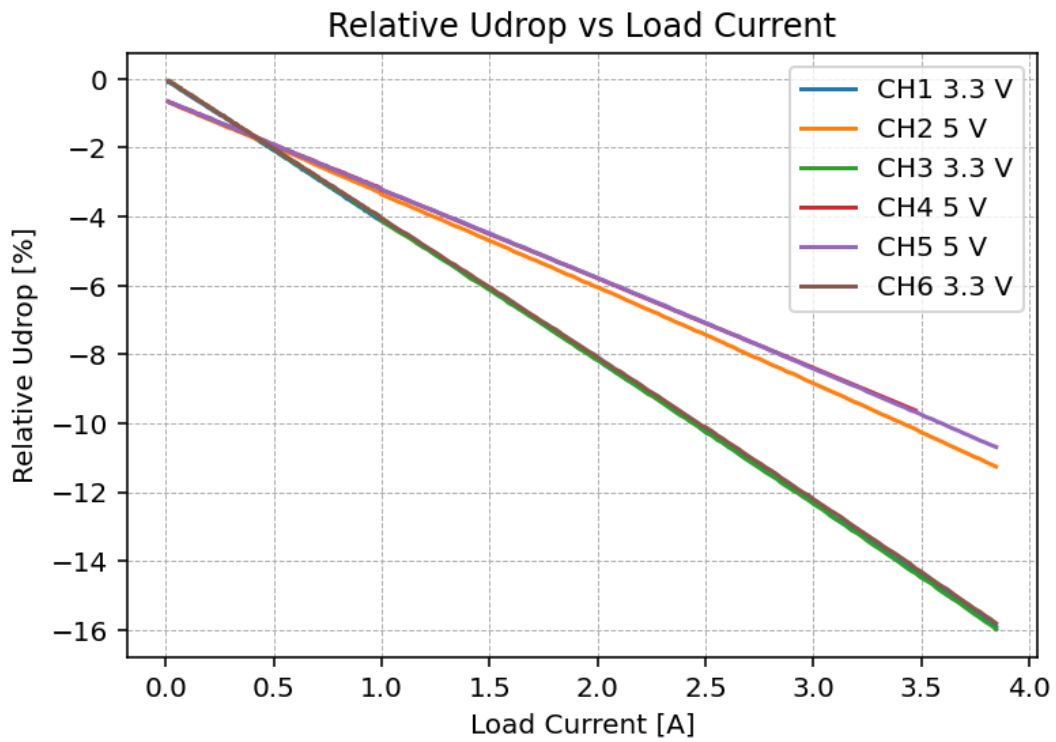


Figure 2-8: Relative voltage drop per channel

3 INTERFACES

Table 3-1: Overview of interfaces

Interface	Description
UART Debug	Typically implements plain text CLI.
CSP I ² C	CSP over I ² C bus. Speed up to 400 kHz
CSP RS485	CSP over RS485 KISS. Speed up to 38400 Baud rate.
CSP CAN	CSP over CAN. Speed up to 1 Mbit/s
Solar input	Input from solar panel (5 V @ 500 mA)
EGSE	Electronic Ground Support Equipment (DS Reset, Charging)
RBF	Remove Before Flight
DS1, DS2	Deployment switches for activation

3.1 ELECTRICAL

3.1.1 PC104 STACK CONNECTOR

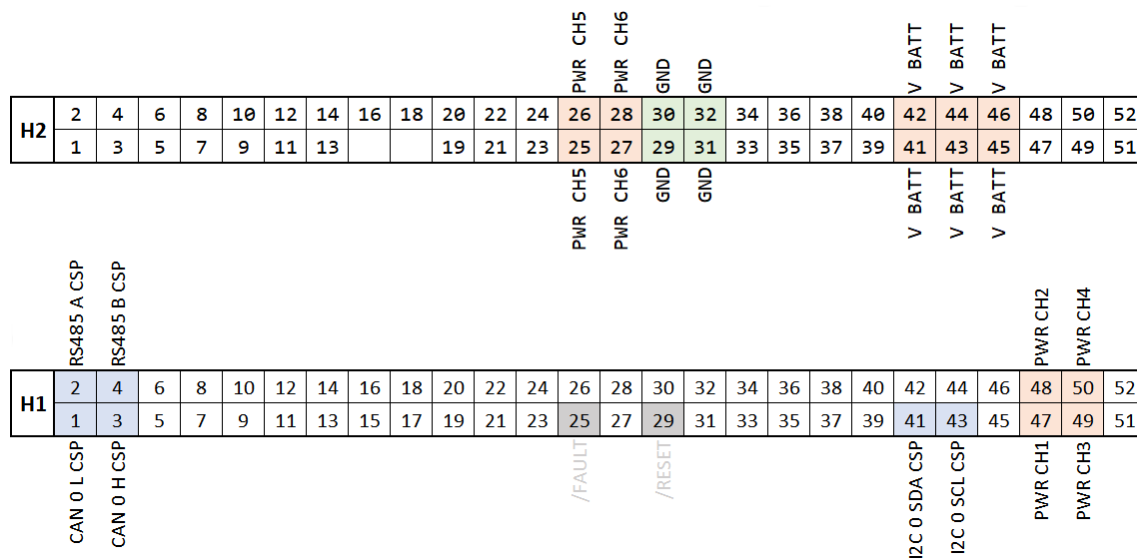


Figure 3-1: Amun PSU 1U PC104 connector pinout reference

The connector typically used is SAMTEC SSQ-126-03-G-D. Customization of the connector type is available on special request at order.

3.1.2 SOLAR INPUT

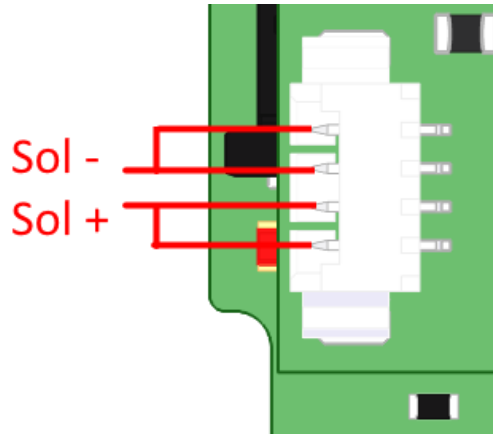


Figure 3-2: PSU solar input connector

Table 3-2: Solar input connector reference

Connector	Connector type
On module	Molex PicoBlade 53261-0471
Mates with (cable)	Molex PicoBlade 51021-0400 (crimp housing)

3.1.3 RBF & DS

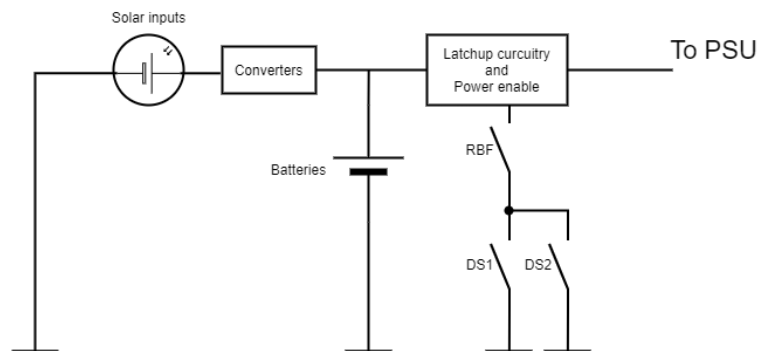


Figure 3-3: Amun PSU RBF and Deployment switch diagram

Once turned on, the PSU enters a latch-up state. To turn PSU off, DS and RBF must be **deactivated first**. Then DS Reset on the EGSE connector needs to be connected to Ground.

Table 3-3: RBF and DS connector reference

Connector	Type
On module	Molex PicoBlade 53261-0271
Mates with (cable)	Molex PicoBlade 51021-0200 (crimp housing)

3.1.4 EGSE

The PSU unit includes a connection for Electrical Ground Support Equipment (EGSE) that includes charging and interface to turn the PSU off.

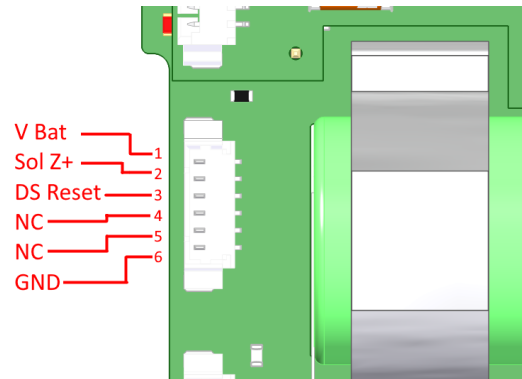


Figure 3-4: PSU EGSE connector

Table 3-4: EGSE connector reference

Connector	Type
On module	Molex PicoBlade 53398-0671
Mates with (cable)	Molex PicoBlade 51021-0600 (crimp housing)

3.1.5 UART DEBUG

UART Debug typically implements plain text CLI.

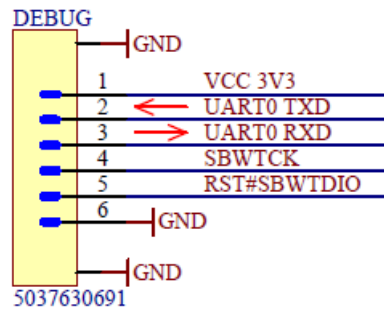


Figure 3-5: Pinout of the debug connector

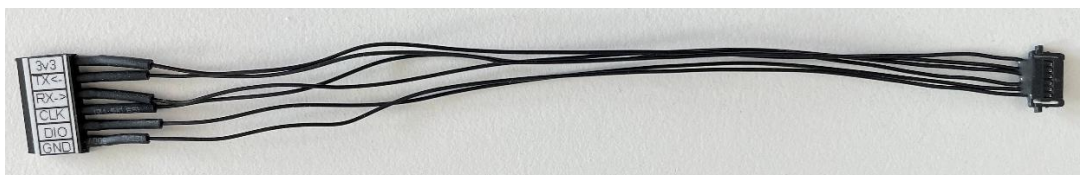


Figure 3-6: Debug cable

3.2 SOFTWARE

The Amun Compact PSU module implements CSP v1 as the main communication protocol on its RS485, CAN and I²C interfaces. The CSP address is always the same as the I²C slave address. Additionally, the module includes a command line interface (CLI) for operation and configuration available over debug UART and as a CSP service. For software support and development support contact Spacemanic directly.

3.3 MECHANICAL

The PSU is designed for PC104 format interface compatibility.

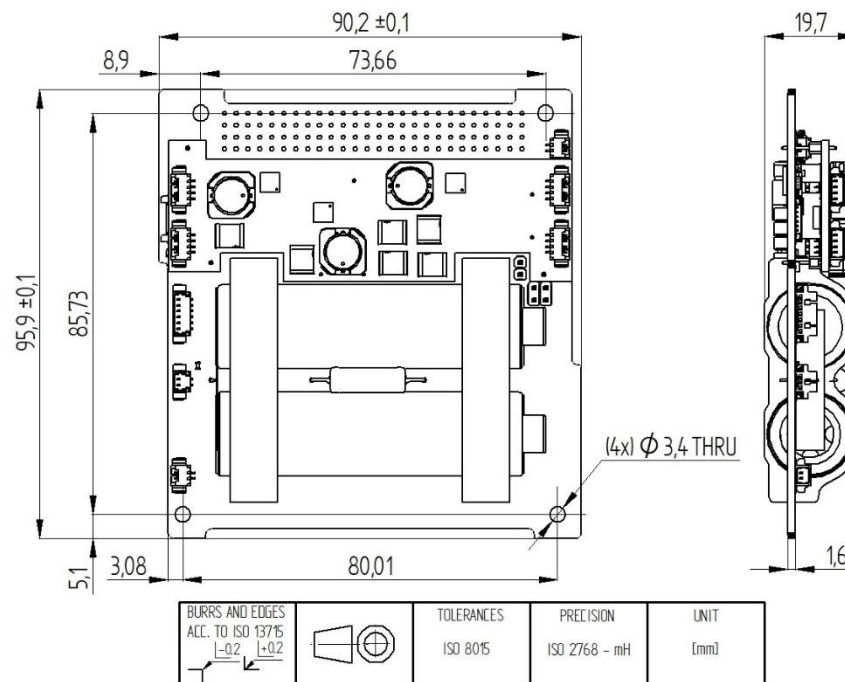


Figure 3-7: Mechanical interface of the Amun Compact PSU module

4 DELIVERABLES

Table 4-1: Deliverables

Type	Item	Note
Mechanical Part	4 pcs of standoffs F+M	to protect H1H2 connector
Wiring	3 pcs of RBF and deployment switch cable	Molex PicoBlade 51021-0200 ~15cm open-ended
Wiring	EGSE cable	Molex PicoBlade 51021-0600 ~15cm terminated to female 2.54mm header
Wiring	Debug cable	(Molex PicoLock 503764-0601) ~15cm terminated to female 2.54mm header
Documentation	Interface Control Document	
Support	Engineering support: 1 hour	

4.1 AFFIRMATION NOTE

Solar input cable (Molex PicoBlade 51021-0400) **NOT** included by default

5 RELATED PRODUCTS

You may also be interested in:

- [RA Solar panels](#)
- [1-16U CubeSat Platforms / Complete Mission](#)

6 DISCLAIMER

Spacemanic shall not be liable for any damages, losses, delays, or other consequences arising from improper use, unauthorized modifications, or incompatibility of the product with other systems, even in cases where these products are deployed in demanding environments such as satellite or space applications. The product is designed for specific use according to the technical specifications outlined in the official documentation, and the company is not responsible for any issues arising from usage beyond this scope.

The company is also not liable for damages caused by external factors that cannot be predicted or controlled, including but not limited to infrastructure failures, space conditions (e.g., radiation, microgravity), natural disasters, human error, unauthorized third-party interference, or unplanned changes in regulatory or legal requirements.

By using the product, the user acknowledges awareness of the risks associated with its use in satellite and space applications and accepts full responsibility for the correct deployment and use of the product.