# ICEPS Option Sheet

## How to use this Option Sheet:

1. Please fill-in this Option Sheet carefully. In case you have questions, we advise contacting ISISPACE prior to sending the Option Sheet at: sales@isispace.nl. Note that you are responsible to make sure the inputs you make are correct, since ISISPACE will produce the product accordingly, and shall not be responsible to verify your inputs or liable to provide refunds, make alterations or send a new product in case your input does not reflect your needs correctly.

2. Fill in the form digitally. You will need to have Adobe Acrobat reader installed (free download available at http://get.adobe.com/reader/)

3. Press the check button at the end to verify if your Option Sheet is complete.

4. Once you are ready, press the Enable Read Only button to prevent accidental changes, save the changes and send the digitally filled-in Option Sheet by email to your Sales Representative.

## Customer Contact Information

| | |
|---|---|
| Contact Name: | |
| Email Address: | |
| Phone Nr: | |
| Organization / Company / Institution | |
| Address: | |
| Address (Cont'd): | |
| Country: | |

## Additional Information (Optional)

| | |
|---|---|
| Intended use (EM/FM/QM) | |
| Mission name | |

## For ISISPACE Use – Leave Blank –
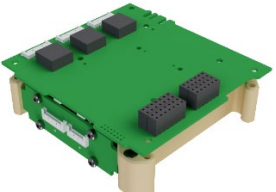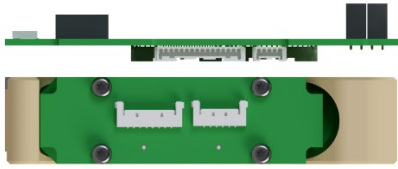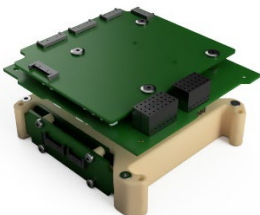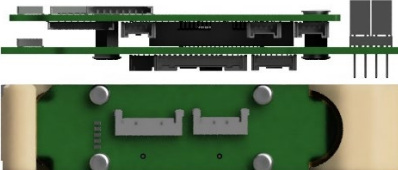
| | |
|---|---|
| Order Confirmation: | |
| Allocated WO: | |
| Sales responsible: | |
| Project/Ref.: | |

## General Configuration

### Configuration of ICEPS

The ICEPS consist of PIU (Power Integrated Unit) PCB and a PBP (Power battery pack). The PBP is available in 2S1P (two battery cells in series) and 4S1P (four battery cells in series). Additionally an daughterboard (DB) can be mounted on the PIU (Type C).

With Type B and Type C there will always be a harness included of 6-7 cm to connect the PBP to the PIU.

| Select | Type | Description | Configuration | |
|---|---|---|---|---|
| | A | PIU with PBP-2S1P.<br><br>The PBP is mounted on the PIU. |  |  |
| | B | PIU with PBP-4S1P.<br><br>The PBP can be mounted anywhere in the stack, no daughterboard. |  |  |
| | C | PIU with DB and PBP-4S1P.<br><br>The PBP can be mounted anywhere in the stack. |  |  |

## ISS Compliance Testing

A prerequisite to approval for satellite deployment from the International Space Station (ISS) is to have three independent inhibits on the EPS in addition to conducting additional acceptance testing on the battery cells and pack. This additional battery testing is not provided by default. The testing is done according to "CREWED SPACE VEHICLE BATTERY SAFETY REQUIREMENTS" by NASA, document no.: JSC-20793 Rev D and "JEM Payload Accommodation Handbook - Vol. 8 - Small Satellite Deployment Interface Control Document" by JAXA, document no: JX-ESPC-101133-D.

> **Note:** the below selection indicates the level of acceptance testing to perform on the battery packs. It does **not** guarantee acceptance by the ISS program for a satellite launch from the ISS.

| Select | Item | Description |
|---|---|---|
| | Default | No additional testing is performed on the cells and battery pack. |
| | ISS Acceptance | Additional testing is performed to have the battery pack compatible with the ISS program requirements.<br><br>Please contact your sales representative regarding additional charges. |

# Electrical Configuration

## Mounting hole grounding

The board is mechanically mounted in a CubeSat structure by means of four mounting holes. By default, these holes are connected to the subsystem electrical ground by means of broadband RF capacitors in parallel with a high impedance bleed resistor (510 k$\Omega$ per mounting hole)

If required, alternative grounding schemes can be accommodated. For non-standard options additional costs and / or lead time applies. Please contact your sales representative for further information

| Select | Item | Description |
|---|---|---|
|  | Default | Broadband RF Grounding (default) in parallel with high impedance resistor. |
|  | Alternative | Connect mounting holes to electrical ground with a 0 Ohm Resistor. |

## I$^2$C pin selection

Even though only one I$^2$C bus is used, there are two locations on the CSKB that the I$^2$C bus can be mapped to.

| Select | I$^2$C Data (SDA) |
|---|---|
|  | H1-41 (default) |
|  | H1-23 (alternative) |

| Select | I$^2$C Clock (SCL) |
|---|---|
|  | H1-43 (default) |
|  | H1-21 (alternative) |

It is possible to place the I$^2$C main CSKB bus pull-ups on the ICEPS. This is not done by default.

| Select | Item | Description |
|---|---|---|
|  | Default | No pull-ups mounted on the ICEPS |
|  | Alternative | Custom value for pullups |

Please leave a note in the text area below detailing your request. ISISPACE will review the information provided and contact you as soon as possible. For non-standard options additional costs and / or lead time applies. Please contact your sales representative for further information

| Custom pull-up value | k$\Omega$ |
|---|---|

## Separation Switches

The ICEPS can work with two or three plunger switches. If two separation switches are selected the battery low side enable is completely bypassed and enabled by default.

| Select | Item | Description |
|---|---|---|
|  | Default | Two separation switches. |
|  | Alternative | At least three separation plunger switches. |

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**BIC:** RABONL2U
**Reg. nr.:** 27293068
**VAT:** NL817198611B01

## ABF (Apply Before Flight) pin selection

ABF signal from ICEPS to CSKB. For non-standard options additional costs and / or lead time applies. Please contact your sales representative for further information

| Select | Item | Description |
|---|---|---|
| | Default | H2-51 & H2-50 |
| | Alternative | Please select one option: |
| | | H2-51 & H1-45 |
| | | H2-50 & H1-45 |
| | | H2-51 only |
| | | H2-50 only |
| | | H1-45 only |
| | | None |

## If applicable: Type C Daughterboard Voltage Domain Setting

### VD3

| Select | Item | Description |
|---|---|---|
| | Default | 5V |
| | Alternative | Voltage domain setting custom output voltage range: 1.0V – 13.0V |

Please leave a note in the text area below detailing your request. ISISPACE will review the information provided and contact you as soon as possible. For non-standard options additional costs and / or lead time applies.

| VD3 | V |
|---|---|

### VD4

| Select | Item | Description |
|---|---|---|
| | Default | 3.3V |
| | Alternative | Voltage domain setting custom output voltage range: 1.0V – 13.0V |

Please leave a note in the text area below detailing your request. ISISPACE will review the information provided and contact you as soon as possible. For non-standard options additional costs and / or lead time applies.

| VD4 | V |
|---|---|

### VD5

| Select | Item | Description |
|---|---|---|
| | Default | 28.2V |
| | Alternative | Voltage domain setting custom output voltage range: 16.0V – 32.1V |

Please leave a note in the text area below detailing your request. ISISPACE will review the information provided and contact you as soon as possible. For non-standard options additional costs and / or lead time applies.

| VD5 | V |
|---|---|

# Software Configuration

## I2C Address

Each board that is attached to the I$^2$C bus requires a unique bus address. The users can specify any other address if the default is not compatible with their system. The address can be any 7-bit number with the exception of reserved addresses, specified in the I$^2$C bus specification (https://www.nxp.com/docs/en/user-guide/UM10204.pdf) and listed below:

| Slave address (binary) | Slave address (hex) |
|---|---|
| 0000 000 | 0x00 |
| 0000 001 | 0x01 |
| 0000 010 | 0x02 |
| 0000 011 | 0x03 |
| 0000 1XX | 0x04 – 0x07 |
| 1111 XXX | 0x78 – 0x7F |

| Select | Item | Value |
|---|---|---|
|  | Default | 0x20 7-bit I$^2$C Address |
|  | Alternative | Alternative 7-bit I$^2$C Address |

Please leave a note in the text area below detailing your request. ISISPACE will review the information provided and contact you as soon as possible. For non-standard options additional costs and / or lead time applies.

| Alternative 7-bit I$^2$C Address | |
|---|---|

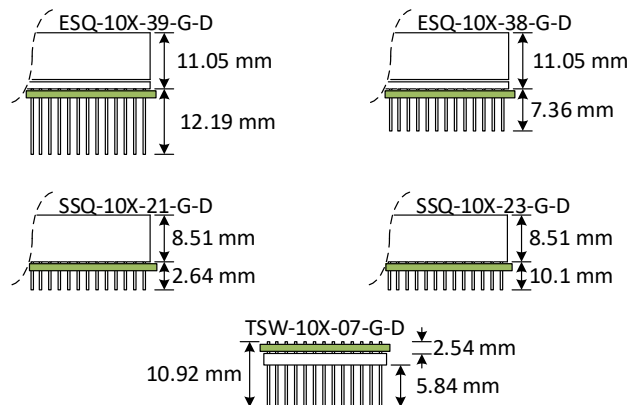# Connector Type and Placement

## CSKB configuration



Figure 1: CSKB Configuration Layout

**Note:** The board location with respect to the connector is marked by the green line in the drawing above (the line represents the PCB).

Doc. ID:      ISIS-ICEPS2-OS-0001
Doc. Title:      ICEPS Option Sheet
Version:      3.0

| Select | Connector name | H [mm] | P [mm] | Remarks |
|---|---|---|---|---|
| | SSQ-107-21-G-D & SSQ-106-21-G-D (default)<br><br>Stack termination bottom.<br><br>No other CSKB components possible below the ICEPS. | 8.51 | 2.64 | |
| | ESQ-107-38-G-D & ESQ-106-38-G-D<br><br>Standard stack through.<br><br>Other CSKB components possible on top and bottom. | 11.01 | 7.3 | Additional cost and / or lead time may apply. |
| | ESQ-107-39-G-D & ESQ-106-39-G-D<br><br>Standard stack through.<br><br>Other CSKB components possible on top and bottom. | 11.01 | 12.19 | Additional cost and / or lead time may apply. |
| | TSW-107-07-G-D & TSW-106-07-G-D<br><br>Stack termination top.<br><br>No other CSKB components possible above the ICEPS. | 0.94 | 9.98 | Additional cost and / or lead time may apply. |
| | Alternative<br><br>Write full SAMTEC codes below: | | | This option must be approved by ISIS before order confirmation and may have an additional cost and / or lead time. |

## Additional Comments