

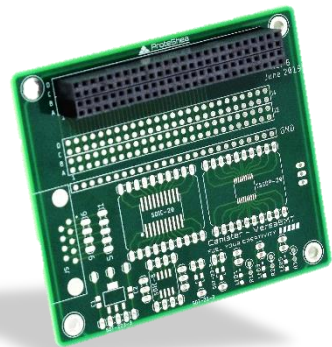


ProteShea

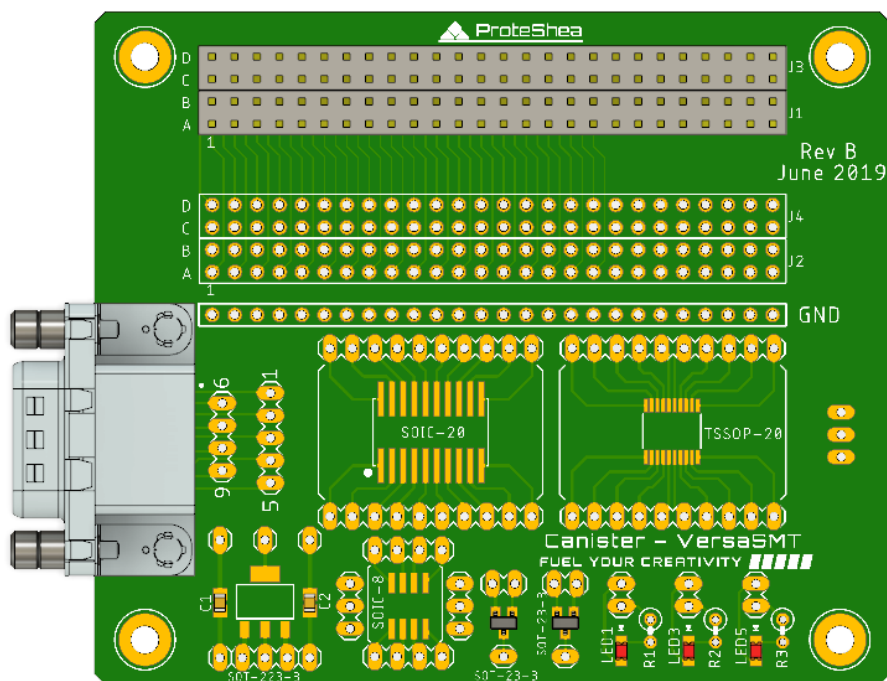
Learn. Apply. Create.™

Canister - VersaSMT™

ECCN (US): EAR99



USER MANUAL



FUEL YOUR CREATIVITY ™

Use of this product or documentation signifies acceptance of the legal terms and conditions set forth below. Disagreement with any part of the legal terms and conditions set forth below permits the return of this product within 30-days of the date of purchase, per the terms described below.

Website: <https://proteshea.com>
Phone: 772-336-9761

REVISION HISTORY




Date	Version	Revision
5/25/2019	1.0	Initial release
7/16/2019	2.0	Updated figures for Rev B board


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A. SYMBOL DESCRIPTION

Table 1. Symbol Description

Symbol	Warning Description
 ELECTRIC SHOCK WARNING	Symbol draws your attention to potential serious injury or death due to electric shock
 WARNING	Symbol draws your attention to potential serious or minor injury
 ESD CAUTION	Symbol draws your attention to notification that the device is sensitive to electro-static discharge (ESD). Handle electronics on an ESD workbench and wear proper protection and clothing to prevent accidental damage or loss of functionality.

 **WARNING:** To prevent injury, death, and/or damage to property while using this product, read this entire instruction manual.

B. IMPORTANT INSTRUCTIONS & SAFETY

WHEN USING THIS PRODUCT, BASIC PRECAUTIONS SHOULD ALWAYS BE FOLLOWED TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK, DAMAGE TO PROPERTY, AND/OR INJURY TO PERSONS, INCLUDING THE FOLLOWING:

1. Read all instructions before using the Canister.
2. Use the Canister only as described in this manual. Any other use not recommended by ProteShea may cause, without limitation, fire, electric shock, damage to property, and/or injury to persons.
3. Do not modify the Canister in any way that is not described in this user manual.
4. Do not use the Canister in a wet or extreme environment.
5. Do not operate the Canister after it malfunctions. Disconnect power at the main 5-pin DIN connector and unplug the AC/DC power supply from the AC source.
6. The Canister kits may contain small parts which pose a choking hazard, keep out of the reach of children less than 6 years of age.
7. When installing the Canister, see the **INSTALLATION** section for additional warnings and precautions.
8. For safe operation throughout the lifetime of this product, see the **MAINTENANCE** section.

C. INTENDED USES

The VersaSMT™ Canister is designed for use with the FuelCan™ and other Canister models (Adapticon™ and/or Modulus™) and can be stacked to provide the user's desired functionality.

Its intended users, 12+ years of age, include the following:

- Electronics hobbyists
- High school students interested in a STEM degree
- College students pursuing a STEM degree
- University researchers

Its intended use cases include the following:

- Raspberry Pi and Arduino evaluation and development
- Electronics prototyping and evaluation
- Teaching beginner soldering skills
- Teaching board interfacing
- Teaching communication interfaces to sensors
- Teaching power supply design

D. FEATURES

VersaSMT™ Canister contains the following:

- 4x26-pin header compatible with FuelCan™ Main Interface board
- Stackable with other Canister models (i.e. Adapticon)
- Footprints:
 - (1) SOIC-8
 - (1) SOIC-20
 - (1) SOT-223-3
 - (2) SOT-23-3
 - (1) TO-263-6
 - (1) TSSOP-20
 - (1) TSSOP-6
 - (1) DB9 Connector
- Small board footprint

E. TECHNICAL SPECIFICATIONS

Table 2. Overview of Technical Specification

Model	Canister – VersaSMT™
Mass	36 grams
Dimensions	3.05" x 3.55"
Max current rating of connector	5.7A
Operating Temperature	-55°C to 125°C



WARNING: To prevent risk of fire or damage, do not exceed maximum current or power ratings of the FuelCan’s provided AC-DC adapter.



WARNING: Combined current rating for the +5.0V and +3.3V supplies is 2.5A. Potential risk of fire, damage, or injury if this rating is exceeded. Ensure that these limits are not exceeded across the entire application including development board and full Canister board stack.

F. DESCRIPTION OF PRODUCT

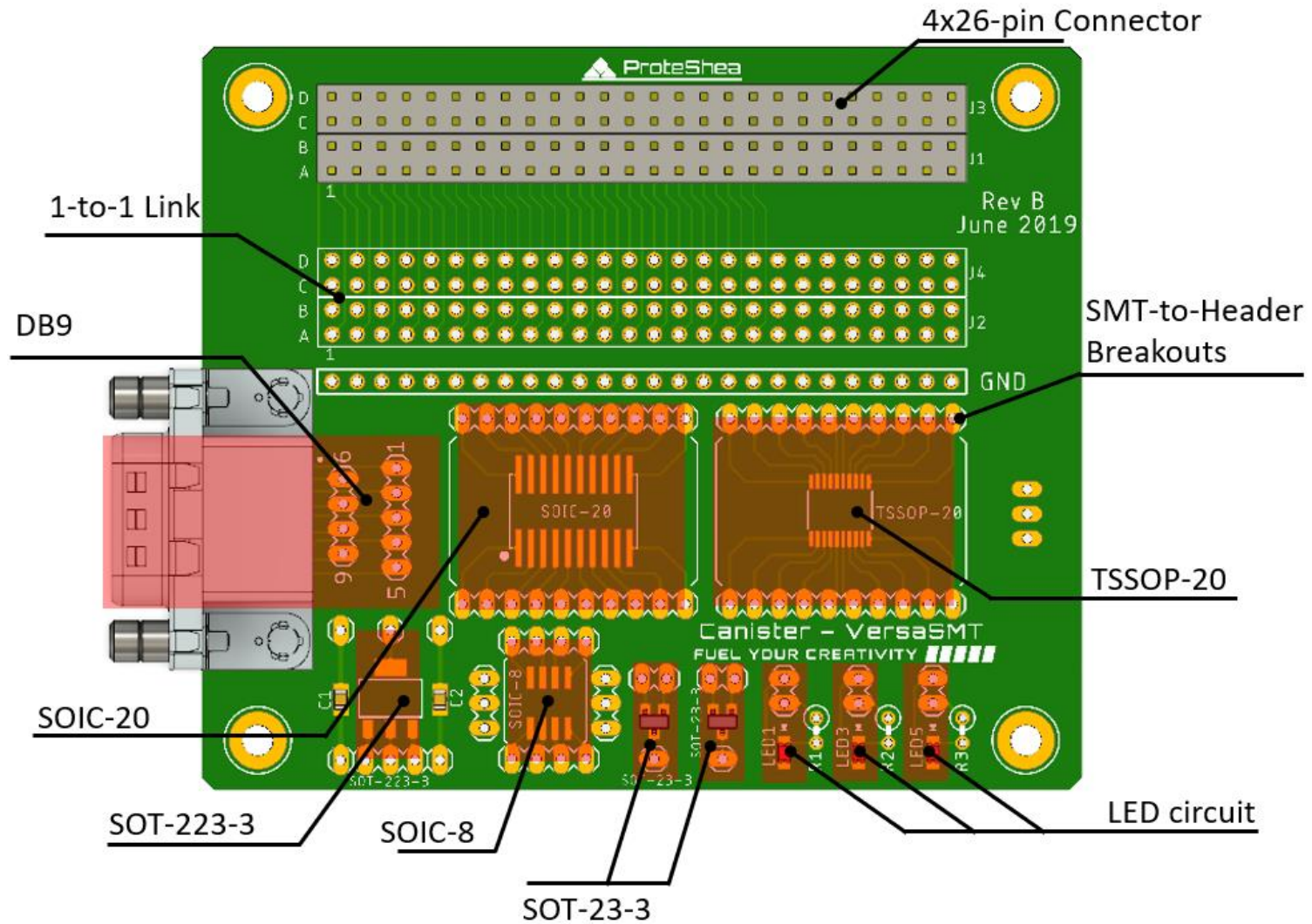


Figure 1. VersaSMT™ Description (Top View).

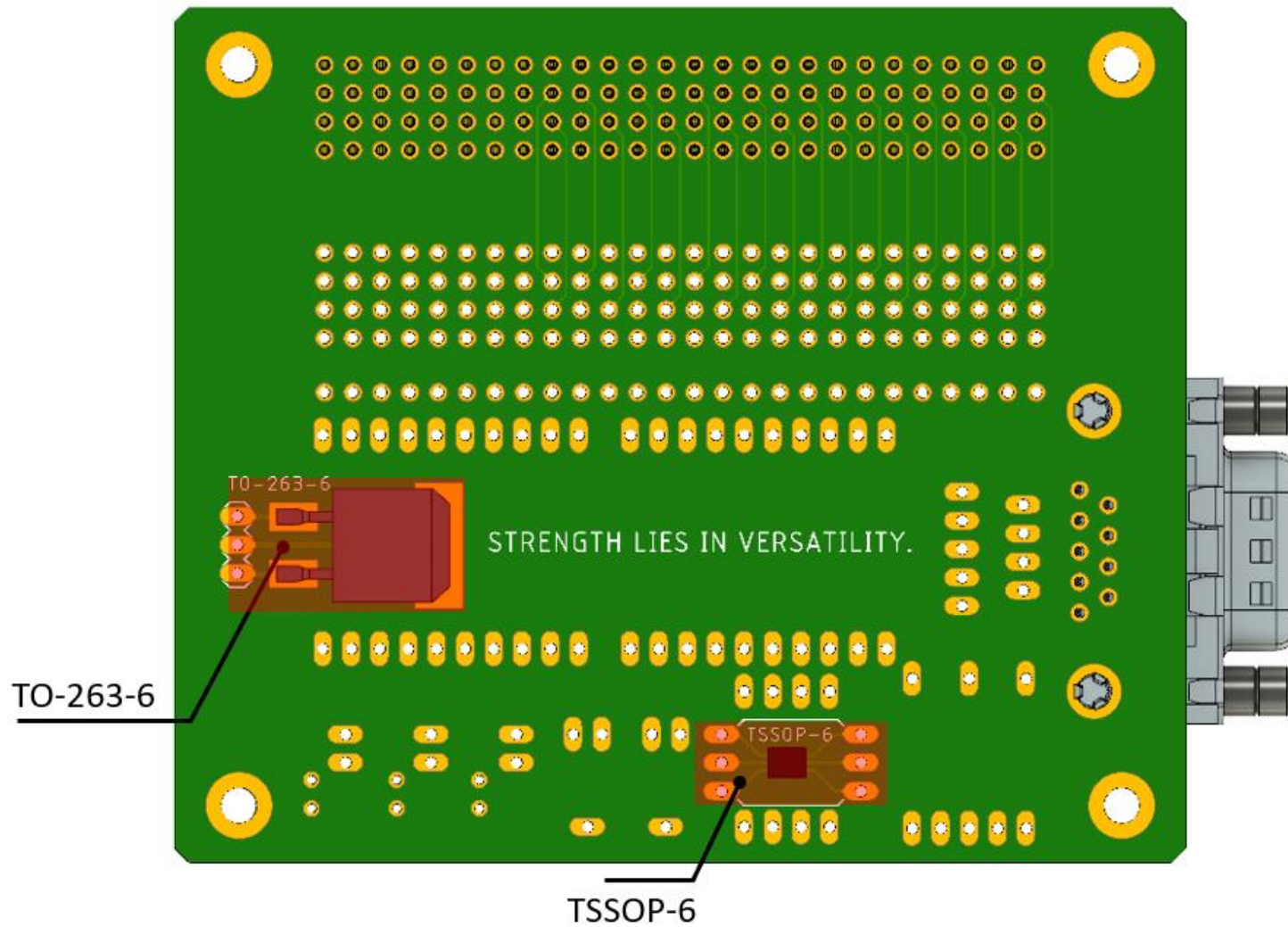


Figure 2. VersaSMT™ Description (Bottom View).

G. HOW TO USE PRODUCT

Table 3. Pinout for 4x26-pin Connector.

	1	2	3	4	5	6	7	8	9	10	11	12	13
D	GPIO-D01	GPIO-D02	GPIO-D03	GPIO-D04	GPIO-D05	GPIO-D06	GPIO-D07	GPIO-D08	GPIO-D09	GPIO-D10	GPIO-D11	GPIO-D12	GPIO-D13
C	GPIO-C01	GND	GPIO-C03	GND	GPIO-C05	GND	GPIO-C07	GND	GPIO-C09	GND	GPIO-C11	GND	GPIO-C13
B	GND	GPIO-B02	GND	GPIO-B04	GND	GPIO-B06	GND	GPIO-B08	GND	GPIO-B10	GND	GPIO-B12	GND
A	GPIO-A01	GPIO-A02	GPIO-A03	GPIO-A04	GPIO-A05	GPIO-A06	GPIO-A07	GPIO-A08	GPIO-A09	GPIO-A10	GPIO-A11	GPIO-A12	GPIO-A13

	14	15	16	17	18	19	20	21	22	23	24	25	26
GPIO-D14	GPIO-D15	GPIO-D16	GPIO-D17	GPIO-D18	GND	+5V0	GND	+3V3	GND	+12V0	GND	-12V0	
GND	GPIO-C15	GND	GPIO-C17	GPIO-C18	GND	+5V0	GND	+3V3	GND	+12V0	GND	-12V0	
GPIO-B14	GND	GPIO-B16	GND	GPIO-B18	GND	+5V0	GND	+3V3	GND	+12V0	GND	-12V0	
GPIO-A14	GPIO-A15	GPIO-A16	GPIO-A17	GPIO-A18	GND	+5V0	GND	+3V3	GND	+12V0	GND	-12V0	

Table 3 shows the pinouts for the 4x26-pin connector as shown in Fig. 1. The 1-to-1 link provides connections to the 4x26-pin connector so that the jumper wires can be used to connect from this header to the SMT breakout headers or to development board (i.e. Raspberry Pi 3 or Arduino Uno) in the FuelCan's prototyping area.

Figures 1 and 2 show which SMT-to-breakout headers correspond to which SMT component (highlighted in red). Additionally, if looking at the top or bottom layer of the board, the user can see the printed-circuit board traces to identify which header pins correspond to a SMT component pin.



ELECTRIC SHOCK WARNING: Plugging in the Canister to the Main Interface board improperly could pose a potential risk of fire, damage, electric shock, or injury.

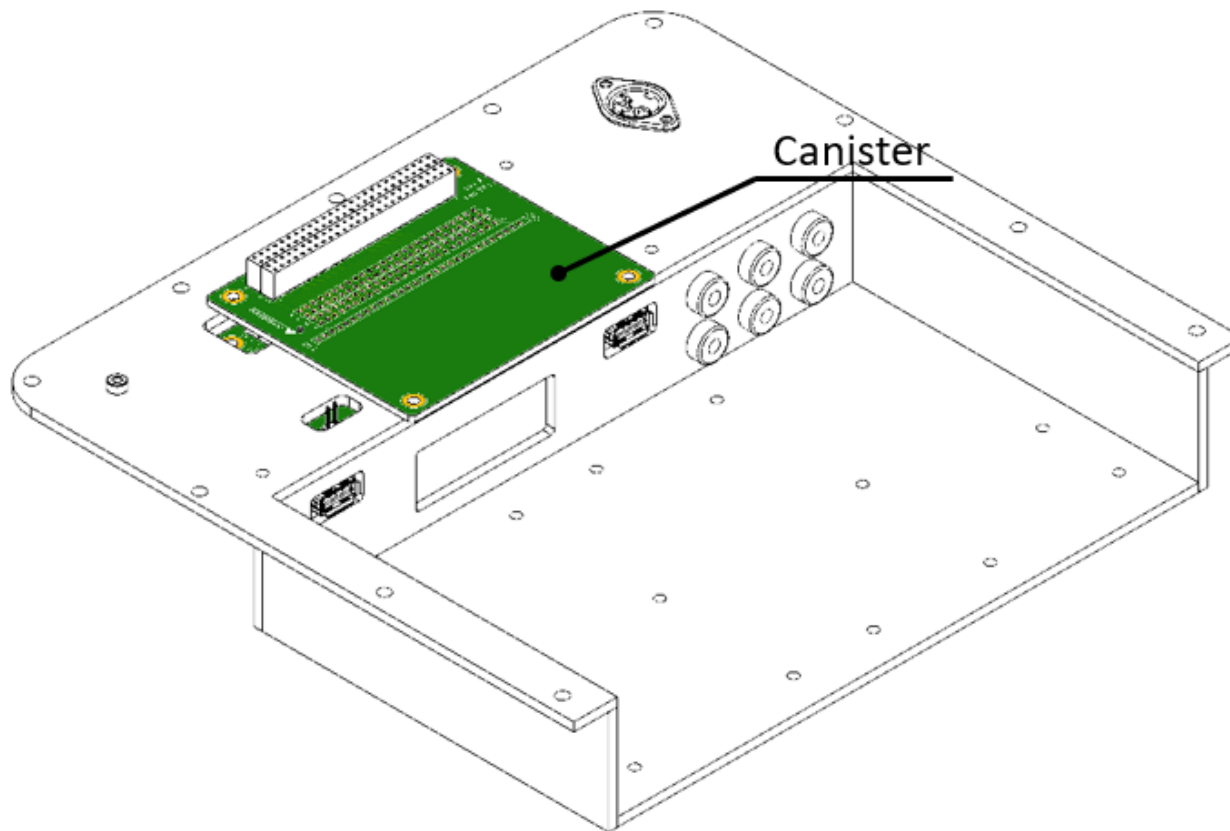


Figure 3. Installation of Canister in FuelCan™.

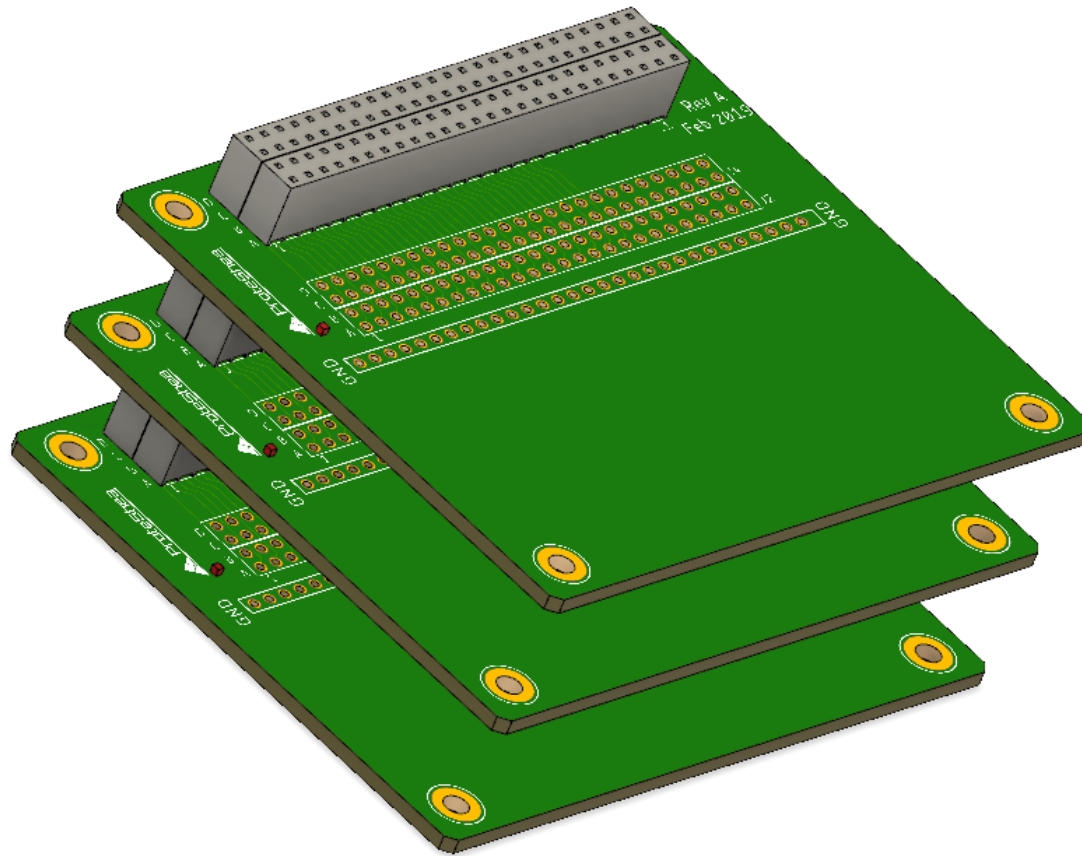


Figure 4. Example Canister Stack.

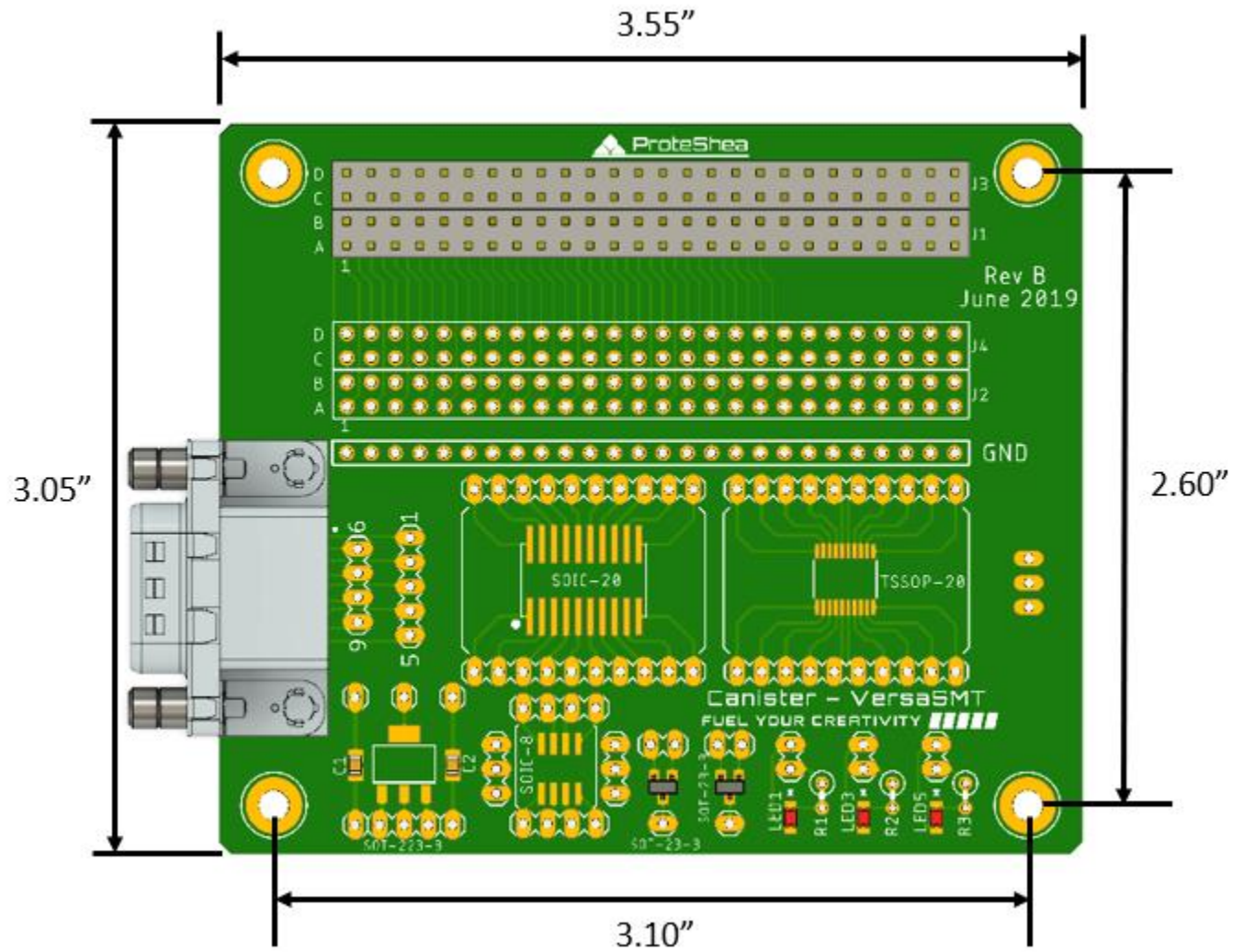


Figure 5. VersaSMT™ Dimensions.

H. INSTALLATION

Visit us at <https://proteshea.com/canisters/> to find up-to-date information and how-to videos for this Canister.

Follow the steps below for first-time operation of the Canister:



ELECTRIC SHOCK WARNING: Never use the FuelCan with a damaged AC-DC Adapter or power outlet cable. There is a potential danger of fatal electric shock.

Never plug in a Canister while the FuelCan is powered. There is a potential danger of fatal electric shock.



WARNING: Do not apply excessive force when plugging in Canister since this could crack the acrylic subassembly or damage the connector pins.



ESD CAUTION

1. Inspect AC-DC Adapter and power cables to ensure there are no cuts, defects, or other damages. Do not proceed if any damage is found.
2. Inspect the acrylic subassemblies on the FuelCan to ensure there are no cracks or other damage. Do not proceed if any damage is found.
3. Solder desired SMT components to correct footprint location using the text on the printed-circuit board.
4. Solder SMT-to-breakout headers in order to use soldered SMT component. It's easier to do this after the SMT component is installed.
5. With the Canister powered off, use a voltmeter to verify which SMT component pins connect to which SMT-to-breakout header. The printed-circuit board routing can also be seen in Figures 1 and 2.
6. Use Fig. 6 below to correctly orientate the Canister with the Fuelcan Main Interface or another Canister by aligning pin A1 on both boards.
7. Use two hands and apply even pressure on both sides of the Canister (areas marked in red in Fig. 7) to press into Main Interface board or another Canister board.

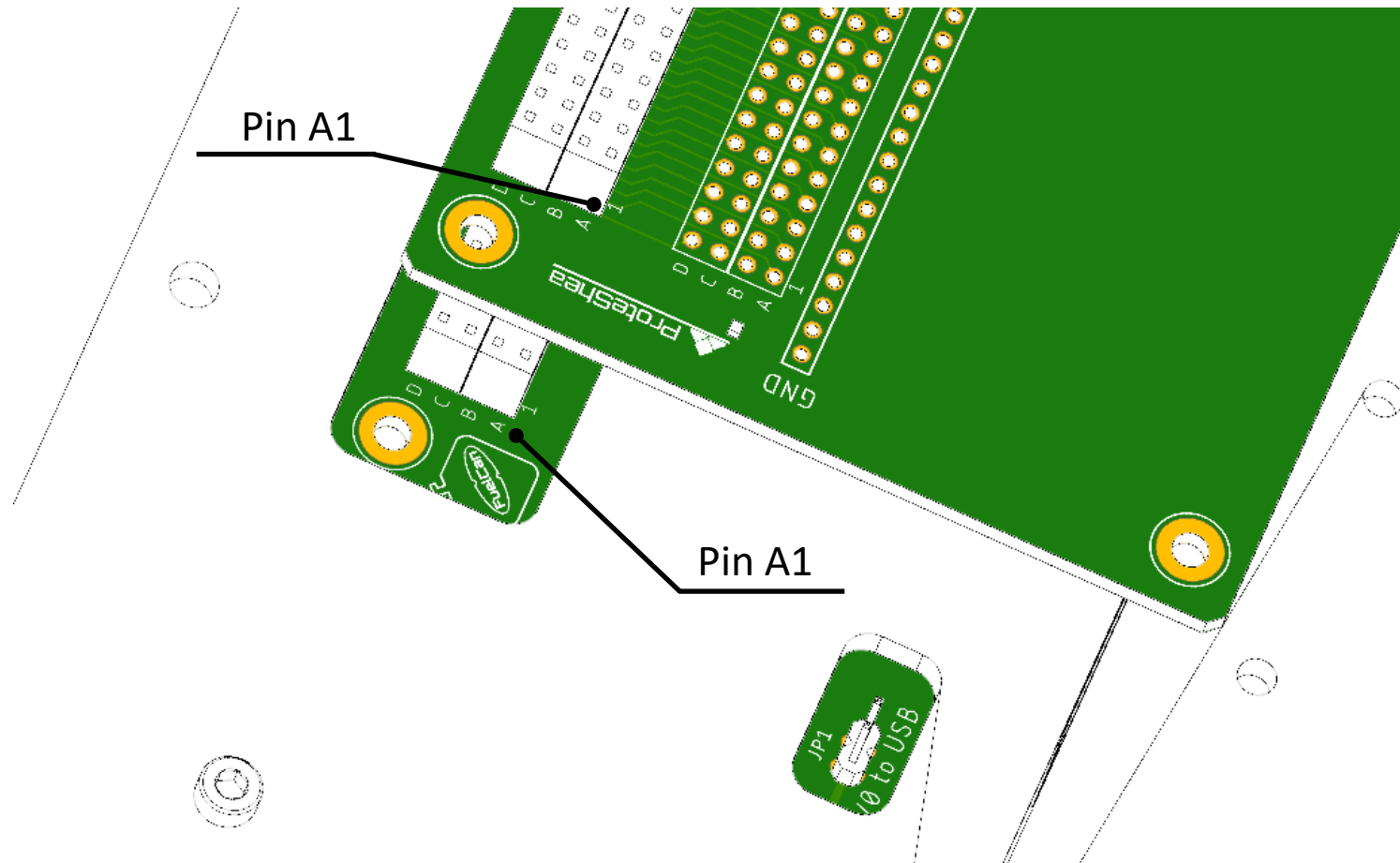


Figure 6. Proper Alignment of Canister to Main Interface Board.

I. REMOVAL

Follow the steps below for removal of the Canister from the FuelCan Main Interface board:



ELECTRIC SHOCK WARNING: Never use the FuelCan with a damaged AC-DC Adapter or power outlet cable. There is a potential danger of fatal electric shock.

Never plug in a Canister while the FuelCan is powered. There is a potential danger of fatal electric shock.



WARNING: Do not apply excessive force when removing Canister since this could crack the acrylic subassembly or damage the connector pins.



ESD CAUTION

1. Unplug the FuelCan's AC-DC Adapter to power down the voltage supplies to the Canister.
2. Use two hands and apply even pressure on both sides of the Canister (areas marked in red in Fig. 6) to pull the board vertically out of the Main Interface board.

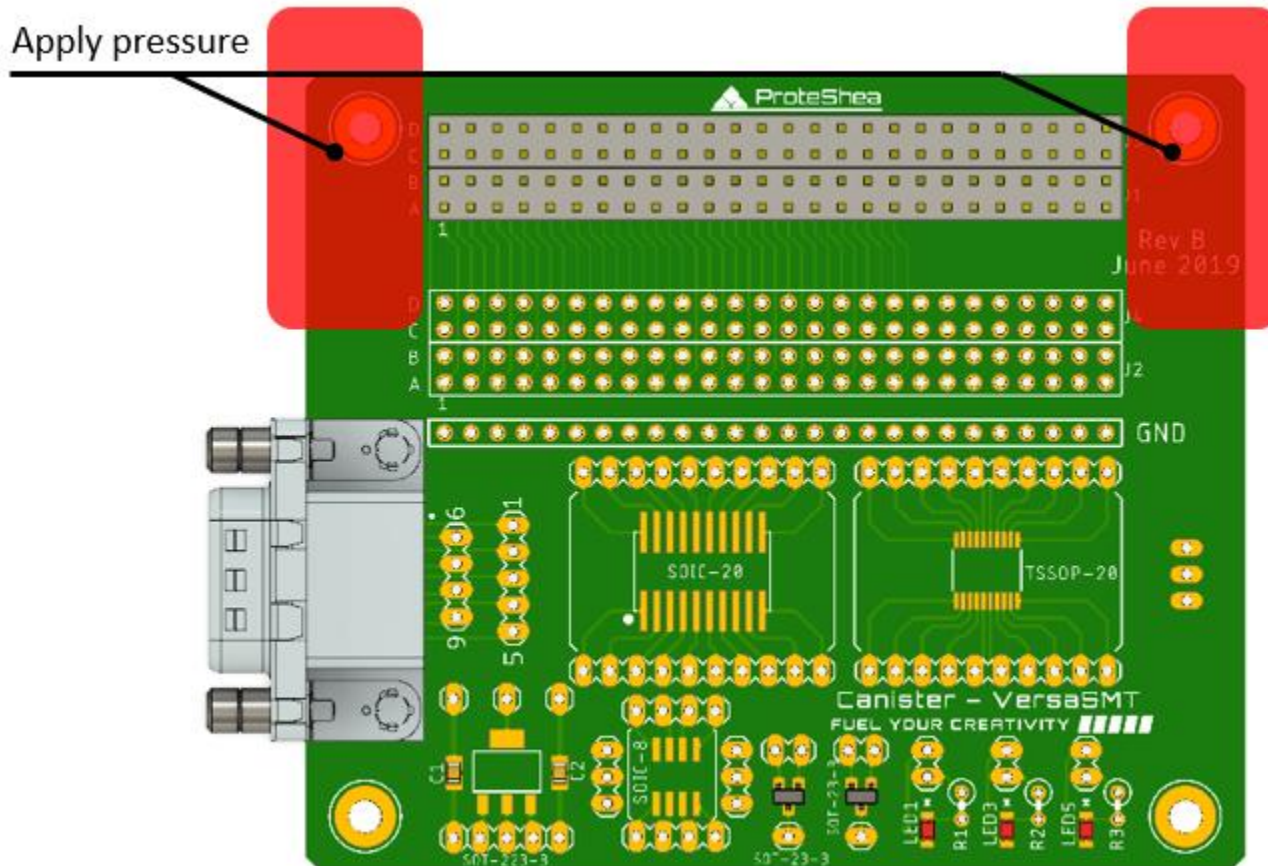


Figure 7. Areas to Apply Pressure for Installation or Removal.

J. OPERATION

Follow the steps below for operation of the Canister:



ELECTRIC SHOCK WARNING: Never use the FuelCan with a damaged AC-DC Adaptor or power cable. There is a potential danger of fatal electric shock.

Never plug in a Canister while the FuelCan is powered. There is a potential danger of fatal electric shock.



ESD CAUTION

1. Inspect AC-DC Adapter and power cables to ensure there are no cuts, defects, or other damages. Do not proceed if any damage is found.
2. Inspect the acrylic subassemblies on the FuelCan to ensure there are no cracks or other damage. Do not proceed if any damage is found.
3. Use Table 3 to properly use the GPIO (general purpose input output) and power pins on the 4x26-pin connector.
4. Use the text on the printed-circuit board to identify which component can be mounted to a footprint (i.e. SOIC-8).
5. Use jumper wires to connect the breakout headers to the 1-to-1 link or to development platform (Raspberry Pi 3 or Arduino).
6. Inspect Canister and development board for short-circuits before plugging into Main Interface board of FuelCan or into Canister stack.

K. MAINTENANCE

To ensure the longevity of your Canister, take proper precautions as listed below:

- Use two hands and apply even pressure to carefully plug-in or remove the Canister
- Inspect soldered wires for damage which could lead to potential short-circuits
- Store the Canister in a cool, dry place.
- Use only for intended purposes – see **INTENDED USES** section.

L. TROUBLESHOOTING

Problem	Cause	Solution
No power to Canister	AC-DC adapter shutdown voltage rails due to circuit protection	Unplug power and check for shorts between 4x26-pin connector of Canister and development board
Power regulator is overheating	Not enough copper or vias to dissipate heat	Add small DC fan or heat sync to top of component
Signal integrity issues from Canister to development board on FuelCan	Common ground wire not present in signal wire harness	Add ground wires between Canister and development board (the more the better)

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N. CONTACT INFORMATION

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Please send us your feedback and/or concerns by visiting <https://proteshea.com/contact/> or via email at support@proteshea.com

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