

## Interface Definition for Junior Design 2 FP, Solar Battery

Solar Panel	<ul style="list-style-type: none"> <li>• To Open/Short/Power measurement module</li> <li>• Voltage: 0-44V</li> <li>• Current: Up to 5.14A</li> <li>• MC4 connector</li> </ul>
Open/Short/Power measurement	<ul style="list-style-type: none"> <li>• To raspberry pi: <ul style="list-style-type: none"> <li>◦ Vopen: up to 5V</li> <li>◦ Isc: up to 5V</li> <li>◦ Vcurr: up to 5V</li> <li>◦ Icurr: up to 5V</li> </ul> </li> <li>• To charge controller (buck): <ul style="list-style-type: none"> <li>◦ Voltage: 0-44V</li> <li>◦ Current: Up to 5.14A</li> </ul> </li> </ul>
Raspberry Pi	<ul style="list-style-type: none"> <li>• Input: From Open/Short/Power measurement <ul style="list-style-type: none"> <li>◦ Vopen: up to 5V</li> <li>◦ Isc: up to 5V</li> <li>◦ Vcurr: up to 5V</li> <li>◦ Icurr: up to 5V</li> <li>◦ All negligible currents</li> </ul> </li> <li>• Input: Power: <ul style="list-style-type: none"> <li>◦ 5V +/- 0.2V</li> <li>◦ Up to 2.5A draw</li> </ul> </li> <li>• Input: Button: <ul style="list-style-type: none"> <li>◦ Mechanical button to flip through info</li> </ul> </li> <li>• Output: LCD Display: <ul style="list-style-type: none"> <li>◦ Current Power draw (Up to 5V)</li> <li>◦ Open voltage (Up to 5V)</li> <li>◦ Short circuit current (Up to 5V)</li> <li>◦ With 5% accuracy</li> </ul> </li> </ul>
Charge Controller, Buck	<ul style="list-style-type: none"> <li>• Input: Open/Short/Power measurement: <ul style="list-style-type: none"> <li>◦ 0 to 44V</li> <li>◦ Up to 5.14A</li> </ul> </li> <li>• ENable: High Impedance (HighZ) or LOW logic (0-0.5V) from Temperature Sensor and Control</li> <li>• Output: SLA battery: <ul style="list-style-type: none"> <li>◦ 10-14.2V +/- 0.5V</li> <li>◦ Up to 5A +/- 0.2A</li> </ul> </li> <li>• Test points: <ul style="list-style-type: none"> <li>◦ 1.32mm +/- 0.1mm via diameter for Vin</li> <li>◦ 1.32mm +/- 0.1mm via diameter for Vout</li> </ul> </li> </ul>
USB PD Power Delivery	<ul style="list-style-type: none"> <li>• Input: SLA Battery power: <ul style="list-style-type: none"> <li>◦ 10-14.2V +/- 0.5V</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>○ Up to 4.5A +/- 0.1A</li> <li>● Output: USB Port: <ul style="list-style-type: none"> <li>○ 5-20V +/- 0.5V</li> </ul> </li> <li>● Output: GND Via: <ul style="list-style-type: none"> <li>○ Must be at least 1mm in diameter. Allow ground witch hat to attach</li> </ul> </li> <li>● Output: VSRC voltage Test Pad: <ul style="list-style-type: none"> <li>○ Test pad must be at least 1.2mm in diameter. Allow testing of VSRC voltage</li> </ul> </li> <li>● Output: USBOUT voltage Test Pad: <ul style="list-style-type: none"> <li>○ Test pad must be at least 1.2mm in diameter. Allow testing of USBOUT voltage</li> </ul> </li> </ul>
Lead Acid Battery	<ul style="list-style-type: none"> <li>● Input: Charge controller: <ul style="list-style-type: none"> <li>○ 10-14.2V +/- 0.1V</li> <li>○ Up to 2A +/- 0.2A</li> </ul> </li> <li>● Output: 5V buck: <ul style="list-style-type: none"> <li>○ 10-14.2V +/- 0.1V</li> <li>○ Up to 3A</li> </ul> </li> <li>● Output: USB Power Regulator: <ul style="list-style-type: none"> <li>○ 10-14.2V +/- 0.1V</li> <li>○ Up to 1A +/- 0.1A</li> </ul> </li> </ul>
5V Buck converter	<ul style="list-style-type: none"> <li>● Input: Power from SLA: <ul style="list-style-type: none"> <li>○ 10-14.2V +/- 0.1V</li> <li>○ Up to 2A</li> </ul> </li> <li>● Output: Raspberry pi <ul style="list-style-type: none"> <li>○ 5V +/- 1V</li> <li>○ Up to 1A</li> </ul> </li> <li>● Output: Cut off: <ul style="list-style-type: none"> <li>○ 5V +/- 1V</li> <li>○ Up to 1.5A</li> </ul> </li> <li>● Output: Temp sensor: <ul style="list-style-type: none"> <li>○ 5V +/- 0.25V</li> <li>○ Minimal current</li> </ul> </li> </ul>
Cut off circuit	<ul style="list-style-type: none"> <li>● Input: Power 5V +/- 2% up to 2A</li> <li>● Input: Control Signal from uController</li> <li>● Output: Power 5V +/- 0.25V up to 2A</li> </ul>
Li-ion Charger	<ul style="list-style-type: none"> <li>● Input power: 5V +/- 2% up to 1100mA</li> <li>● Output: up to 4.2V +/- 4%, up to 1100mA</li> <li>● Output LED: Red and Blue for charging status</li> </ul>
Temperature Sensor and Control	<ul style="list-style-type: none"> <li>● Input power: 5V +/- 2% up to 100mA</li> <li>● 1-Wire data (0-5V logic) from sensors-Serial +/- 1°C</li> <li>● Output: LEDs for over temp indicator 0 to 5V +/- .1A</li> </ul>

	<ul style="list-style-type: none"><li>• 0-20mA to LEDs</li><li>• Power to sensors 5V +/- .1V, 0-.5mA</li></ul>
Fan	<ul style="list-style-type: none"><li>• Input power: 10-14.2V and up to 110mA</li></ul>