Design test preparation

**Initial**

* Solder all connectors, test points, vias and protection diode D1(VB20100C).

**Power Supplies:**

1. Start by soldering the in\_TRACO1, out\_TRACO1(TMA 1212S), voltage regulator J1(LD1117) and their LEDS(DS1-2-4).
2. Solder resistors for the LEDs (R1-R3-R23) and decoupling capacitors (C1-C4) for the power supplies.
3. Create low voltage connector for 5V supply

**Low-voltage supply:**

1. Now apply 5V to J4-6(5V-LV) and J4-4(GND)
2. Measure 5V at 5V-LV(+) and GND-LV which is 5V LV sensors.

**High-voltage supply:**

1. Apply 12V to J2-2(12V+), J2-1(GND).
2. Measure 12V at 12V(+) and GND-in which is high-voltage/low-side.
3. Measure 12V at 12V-in(+) and L-in(GND) which is high-voltage/high-side input.
4. Measure 5V at 5V-HV and GND-sen which is 5V high-voltage sensors.
5. Check that all the LEDs are turned on.

**Optocouplers**

1. Solder the optocoupler at Opto1-2(ACPL-W70L).
2. Solder decoupling capacitors C7+C9.
3. Solder voltage divider at the optocoupler supply pin
4. Measure 5V at the supply pin(6) of the optocoupler.
5. Apply a PWM signal at PWM-in-1. 5V with duty-cycle at 50%.
6. Measure the input signal at the optocoupler between TST1(PWM) and GND-LV.
7. Apply a PWM signal at PWM-in-2. 5V with duty-cycle at 50%.
8. Measure the input signal at the optocoupler between TST2(PWM) and GND-LV.

**Drivers**

1. Solder the drivers at Drv1-2(NCP81074A).
2. Solder the resistors R5-R10.
3. Solder decoupling capacitors C8+C10.
4. Apply a PWM signal at PWM-in-1. 5V with duty-cycle at 50%.
5. Measure the output from driver1 between PWM1 and L-in(GND).
6. Apply a PWM signal at PWM-in-2. 5V with duty-cycle at 50%.
7. Measure the output from the driver between PWM2 and GND-in.

**Sensors**

1. Solder voltage sensor U2(ACPL-C870), current sensor(ACS723) and amplifier U1(LMC6484).
2. Solder resistors R17-R22+R25+R32-R33, capacitors C15-C18+C23, Zener diodes Dz1(BZX84C4).
3. Connect jumper between pin J5-2 and J5-3.

**Input voltage sensor:**

1. Apply 10V to the input of the converter. Measure the output signal from the voltage sensor between Vi-sen(+) and GND-sen. For 10V input this should be 1.03V.

**Current sensor:**

1. Attach a resistive load at at the output.
2. Connect 10V to the input of the converter, and 5V at J2-2 & J2-4(+) with J3-4 as GND.
3. Measure the current through the resistor and compare with the voltage measured between:

* IL-sen Raw(+) & GND-sen – Before filters
* IL-sen 500(+) & GND-sen – After 500Hz filter

1. This should be done with different resistances to validate the A-V conversion in the sensor.

**Power circuit**

1. Solder MOSFET M1-M4(IPB200N15).
2. Solder resistors R34-R37, capacitors C24-C32 and inductor L1.

**Buck test:**

1. Apply 5V at J3-2(+) and J4-4(GND).
2. Apply a PWM signal (5V, 50%) at J3-4(+) J4-4(GND). Connect resistive load to the output.
3. Apply 10V at the input off the converter.
4. Measure the output voltage and current. Should be 5V, 0.5A.
5. Measure the output of the sensors as well.

**Boost test:**

1. Apply 5V at J3-4(+) and J4-4(GND)
2. Apply a PWM signal (5V, 50%) at J3-1(+) J4-4(GND). Connect resistive load to the output.
3. Apply 10V at the input off the converter.
4. Measure the output voltage and current. Should be 20V, 0.2A.
5. Measure the output of the sensors as well.