Design test preparation

**Initial**

1. 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(DS1-4).
2. Solder resistors for the LEDs (R1-R3-R4-R23) and decoupling capacitors (C1-C6) for the power supplies.

**Low-voltage supply:**

1. Now apply 5V to J4-6(+) and J4-4(GND)
2. Measure 5V at TST13(+) and TST6(GND) which is 5V low-voltage sensors.

**High-voltage supply:**

1. Apply 12 V to J2-2(+), J2-1(GND).
2. Measure 12V at TST9(+) and TST1(GND) which is high-voltage/low-side.
3. Measure 12V at TST10(+) and TST3(GND) which is high-voltage/high-side input.
4. Measure 12V at TST11(+) and TST4(GND) which is high-voltage/high-side output.
5. Measure 5V at TST12(+) and TST5(GND) which is 5V high-voltage sensors.
6. Check that all the LEDs are turned on.

**Drivers**

1. Solder the optocoupler at Opto1-4(ACPL-W70L) and the drivers at Drv1-4(NCP81074A).
2. Solder resistors R5-R16 and decoupling capacitors C7-C14.
3. Apply a PWM signal at J3-4(PWM1). 5V with duty-cycle at 50%.
4. Measure the input signal at the optocoupler between TST14(+) and TST6(GND). Measure the ouput from the driver between TST18(+) and TST3(GND).
5. Apply a PWM signal at J3-3(PWM2). 5V with duty-cycle at 50%.
6. Measure the input signal at the optocoupler between TST15(+) and TST6(GND). Measure the ouput from the driver between TST19(+) and TST1(GND).
7. Apply a PWM signal at J3-2(PWM3). 5V with duty-cycle at 50%.
8. Measure the input signal at the optocoupler between TST16(+) and TST6(GND). Measure the ouput from the driver between TST20(+) and TST4(GND).
9. Apply a PWM signal at J3-1(PWM4). 5V with duty-cycle at 50%.
10. Measure the input signal at the optocoupler between TST17(+) and TST6(GND). Measure the ouput from the driver between TST21(+) and TST2(GND).

**Sensors**

1. Solder voltage sensors U2-U3(ACPL-C870), current sensor(ACS723) and amplifier U1(LMC6484).
2. Solder resistors R17-R33, capacitors C15-C23, Zener diodes Dz1-2(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 TST22(+) and TST6(GND). For 10V input this should be 1.03V.

**Output voltage sensor:**

1. Apply 10V to the output of the converter. Measure the output signal from the voltage sensor between TST23(+) and TST6(GND). For 10V input this should be 434mV.

**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:

* TST24(+) & TST6(GND) – Before filters
* TST25(+) & TST6(GND) – After 500Hz filter
* TST26(+) & TST6(GND) – After 50kHz 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.