

# Commissioning Protocol for PCB NC1-1AA:

Performed by:

For the use of this document several points should be noted:

- Manufacturing/soldering steps are noted in green
- It is expected for the steps to be done from top to bottom.
- For measurements where polarity is relevant (including resistance measurements), the connection for the positive probe is noted first.
- For the expected resistance values it was assumed that no current will flow into any semiconductors the actual values might be lower. Consider the test passed when the measured value seems reasonable.
- All current values are only estimates. The measured value might differ substantially. Consider the test passed when the measured value is either below the expected value or can be considered safe.
- Tests where the description is marked with an asterisk (\*) can be considered optional when time is critical.

Assembly				
Description	Expected Value	Measured Value	Passed	Comments
Replace D6 with a red LED				
Remove C55 and C58				
Remove D11				
Remove D14 and D15				
Change R16 from 100K/0603 to 10K/0603				
Change R19 from 270R/0603 to 100R/0603				
perform optical check				

Power supply short circuit				
Check supply nets for short circuits				
① Measure resistances expected to be OL at the highest range on the multimeter				
Description	Expected Value	Measured Value	Passed	Comments
Resistance +VBAT → -VBAT	OL			
Resistance +VBAT → GND	OL			
Resistance CHG_A → GND	>10 kΩ			
Resistance CHG_B → GND	>10 kΩ			
Resistance CHG_C → GND	>10 kΩ			
Resistance +5V5 → GND	>1 kΩ			
Resistance +3V3 → GND	>10 kΩ			

Power supply 5.2 V				
Apply 4 V to +VBAT. Apply 6 V to charging connectors. Place magnet next to hall sensor. ⓘ Measure voltages with reference to GND.				
Description	Expected Value	Measured Value	Passed	Comments
Voltage on +5V2	5.1 V ... 5.3 V			
Switching frequency	0.9 MHz ... 1.1 MHz			
Apply a load current of 1.0 A ⓘ Measure voltages with reference to GND.				
Temperature of U28 *	<80 °C			
Temperature of L1 *	<80 °C			

Power supply 3.3 V				
Apply 4 V to +VBAT. Apply 6 V to charging connectors. Place magnet next to hall sensor. ⓘ Measure voltages with reference to GND.				
Description	Expected Value	Measured Value	Passed	Comments
Voltage on +3V3	3.2 V ... 3.4 V			
Switching frequency	1.9 MHz ... 2.1 MHz			
Apply a load current of 0.3 A ⓘ Measure voltages with reference to GND.				
Temperature of U29 *	<80 °C			
Temperature of L2 *	<80 °C			

Charger				
Apply 6 V to CHG_A CHG_B ② Measure voltages with reference to GND.				
Description	Expected Value	Measured Value	Passed	Comments
Voltage on +5V_CHG	5.0 V ... 6.0 V			
Charging current	0.0 A			
Connect Battery simulator or load and power supply to battery pads and set power supply to 3.7 V ② Measure voltages with reference to GND.				
Voltage on +5V_CHG	5.5 V ... 5.0 V			
Charging current	650 mA to 780 mA			
Temperature of U1 *	80 °C			
Disconnect CHG_A, apply 6 V to CHG_B ② Measure voltages with reference to GND.				
Charging current	650 mA to 780 mA			
Disconnect CHG_B, apply 6 V to CHG_C ② Measure voltages with reference to GND.				
Charging current	650 mA to 780 mA			
Disconnect charging supply, keep circuit in deep sleep.				
Quiescent Current	20 $\mu$ A to 30 $\mu$ A			

Failsafe				
Apply 4 V to +VBAT				
② Measure voltages with reference to GND.				
Description	Expected Value	Measured Value	Passed	Comments
FS_PULSE (TP13) high time	580 ns ... 1600 ns			
FS_PULSE (TP13) low time	220 ns ... 420 ns			
FS_DATA (TP14) pulse count	512			
When the controller is not programmed yet, apply a pulse to DATA_5V				
② Measure voltages with reference to GND.				
FS_EDGE (U4, pin 3)	Low pulse on every rising edge of DATA_5V			
FS_ACT/ (TP11)	Low			
DATA_FAILSAFE (TP12)	Valid Neopixel signal			
Short DATA_5V to GND (short Q3)				
② Measure voltages with reference to GND.				
FS_ACT/ (TP11)	Low after a delay of 100 ms			
DATA_FAILSAFE (TP12)	Valid Neopixel signal			