

Board Bring-up Plan

Finn Hittson

November 16th, 2023

Board Bring-up Plan

The following sections outline a series of steps and checkpoints to make sure the fabricated board is work working with and whether its worth it to mount components and complete the board.

Visual Inspection

Visually inspect the board and check that there are no obvious shorts or shifted components overlapping with one another. Check that the embedded numbers that number the board layers are in the correct order. Make sure that no traces fall off the edge and do a rough comparison to the rendered 3D model of the board on KiCad to make sure the boards roughly match.

Measure for Electrical Shorts

Using a digital multi-meter, first check that power plane and ground plane are open with respect to each other. Then begin testing individual pads on the board, with respect to power and ground, to make sure there are no shorts.

Apply Power

Connect a power supply to the board and check that there is no current flow. With no components on the board, the circuit should be open so the current flow should be zero. Then begin checking that all power points are receiving the correct voltage, with respect to the power supply.

Power Regulators

Begin adding bypass capacitors one at a time and measure the current. A current should appear and then die out as the capacitors become charged. Repeat for all power regulator subsystems.

Microcontroller

Solder the microcontroller on with the bootloader connection hardware and the communication modalities. Load a bootloader onto the microcontroller and test that the chip is functional, the legs are working and communication is possible.

Battery Management

Solder the battery power management hardware onto the board. First test that power outputs are 3.3V and 5v from their respective IC's. Then check that communication between the fuel gauge and the microcontroller is possible.

Radio

Solder radio components and connect antenna. Use oscilloscope to check that antenna receive some signal. Check audio out signals that something is being passed to the amplifier. Then check communication between the microcontroller and the radio's IC.

Amplifier

Solder amplifier components and measure input and output signals to see if amplifier is working while adjusting potentiometer.

Memory

Solder memory components and test communication between microcontroller and SD card.

Display

Solder display to board and test communication between display and microcontroller.