PCB Debugging Report

Board: ESP32_Dev_Board v2.1
Session ID: 528246a9...
Date: 2025-08-06T21:46:31.307968
Status: Resolved

Executive Summary

The debugging session for ESP32_Dev_Board identified and resolved critical issues affecting board functionality. The root cause was determined to be: Output capacitor C5 failed short circuit, overloading regulator. The issue was resolved by: Replaced shorted output capacitor C5.

Symptoms Reported:	5
Measurements Taken:	8
Issues Identified:	1
Resolution Status:	Complete

Reported Symptoms

- Board not powering on
- No LED indicators active
- USB enumeration failing
- Voltage regulator getting hot
- No 3.3V on MCU power pins

Test Measurements

Test Point	Value	Unit	Notes
VBUS	5.1	V	USB power input
VCC_3V3	0.3	V	Main 3.3V rail
Regulator_Input	5.0	V	Before regulator
Regulator_Output	0.3	V	After regulator
Regulator_Enable	3.3	V	Enable pin
Current_Draw	850	mA	Total current
Regulator_Temp	95	°C	Surface temperature
3V3_to_GND_Resistance	12	Ω	Power rail resistance

Issue Analysis

Issue 1: USB Enumeration Failure

Severity:	HIGH
Category:	digital
Confidence:	85%

USB device is not being recognized by the host

Probable Causes:

- Incorrect D+/D- routing or connection
- Missing or incorrect termination resistors
- Crystal frequency incorrect or not oscillating

Recommended Tests:

- Measure VBUS voltage (should be 5V)
- Check D+ and D- signal integrity with scope
- Verify crystal oscillation frequency

Resolution

Root Cause: Output capacitor C5 failed short circuit, overloading regulator

Resolution: Replaced shorted output capacitor C5

Observations:

• Found shorted output capacitor C5

• Capacitor showed burn marks on PCB

• After replacing C5, 3.3V rail measures correctly

Recommendations

Preventive Measures:

- Implement regular testing procedures for critical components
- Add protection circuits to prevent similar failures
- Document this failure mode in the knowledge base
- Consider design review for vulnerable components
- Update manufacturing test procedures