

Troubleshooting John R. Leeman GEARS 2023



Image: DeviantArt

DEBUGGING

The 9 Indispensable Rules for Finding Even the Most Elusive Software and Hardware Problems



- Make it Fail
- Quit Thinking and Look
- Divide and Conquer
- Change One Thing at a Time
- Keep an Audit Trail
- Check the Plug
- Get a Fresh View
- If You Didn't Fix it, It Ain't Fixed



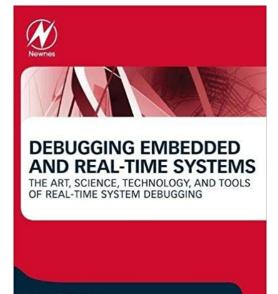
DAVID J. AGANS

ROBERT A. PEASE

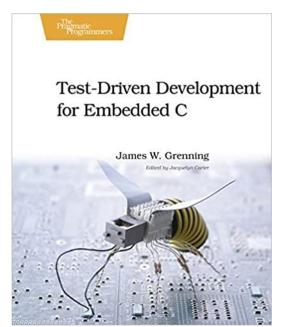
Troubleshooting Analog Circuits

EDM SERIES FOR DESIGN ENGINEERS





Arnold S. Berger





Look at the fuses, power source, and batteries







Image: Arrow, Rockwell, Grainger

Look/listen - anything loose, burned, etc?

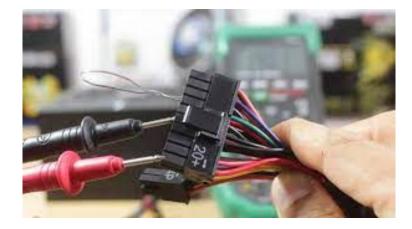






Image: epectech, eeweb

Check voltages - start with the power supply inputs/outputs







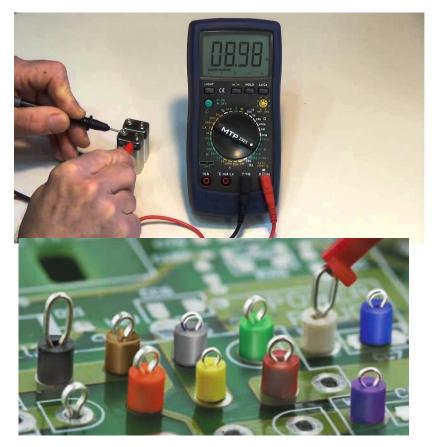
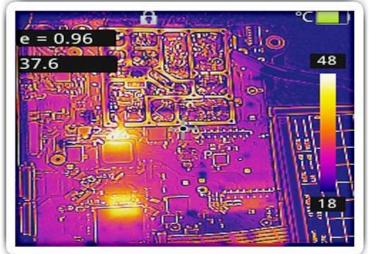


Image: YouTube, StackExchange, Tower Fasteners

Look for thermal anomalies



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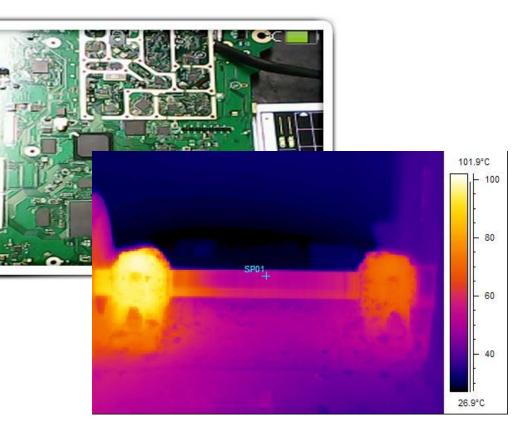
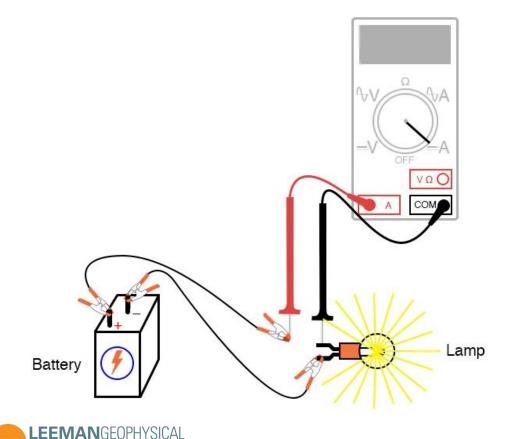


Image: ProMax Electronics, RMS, DigiKey

Look at the device current draw

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Look for loose, dirty, corroded connections

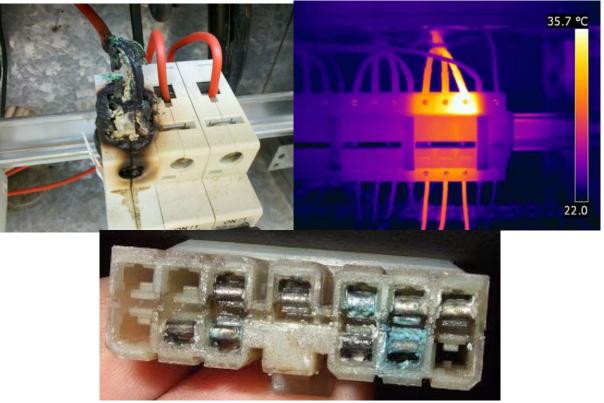




Image: Mance, ElectricalEquipment.org, focusst.org

Follow signals or power rails with a binary search approach

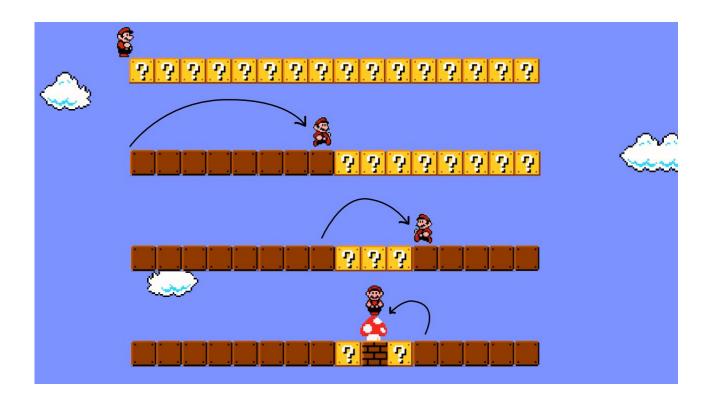




Image: TopCoder

Be wary of in-circuit component checks

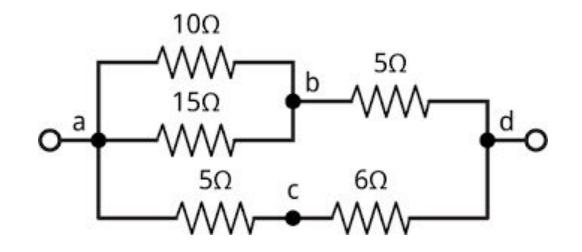




Image: lispology

Common failures

- Loose connections
- Failed power supply
- Failed capacitors
- Ground loops/issues
- Leaking air/hydraulics
- Failed conductors
- Improper operation
- Lack of lubrication
- Loose set screws/pulleys

