# Testing and Verification

Bring up

You got your board in the mail! What first?

First, check for shorts on major nets (power/gnd, etc)

Ensure major nets are properly connected

If not assembled, consider starting with only a few components (non sensitive parts) for testing correct power setup

Start with small components that will be shadowed by larger components (SMD before thru-hole)
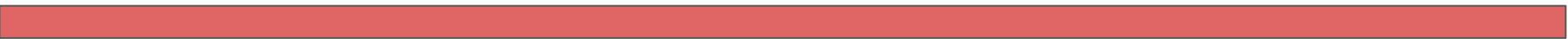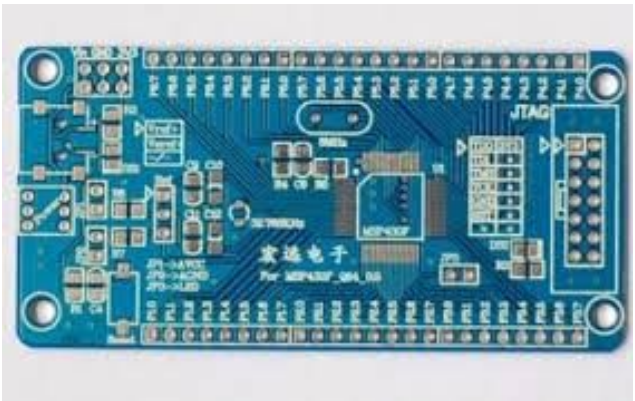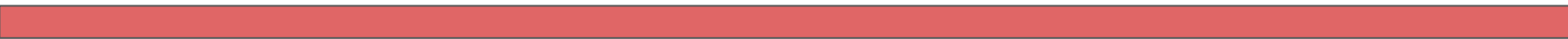
Multimeter Usage

Favorite feature - continuity beeper

When two terminals connected to things that are electrically connected, it beeps

Good if should be connected (gnd and gnd), bad if not (short)

Also useful for checking correct voltage on power, resistance to components, and diode tests

Test Cases

Pre-define tests you will run, in order to be tested

For example:

1) Test for shorts/properly connected on-board nets
2) Solder a few components, retest for shorts
3) Test power
4) Solder MCU
5) Recheck for shorts, connections
6) Test programming
7) Etc

ESD Protection

The board alone will probably be fine, but once you start adding sensitive components, best to protect from electrostatic discharge

Can use ESD mats, wrist bands, or discharge by touching something metal

Can fry your chips and you probably won't notice until you can't figure out why it doesn't work
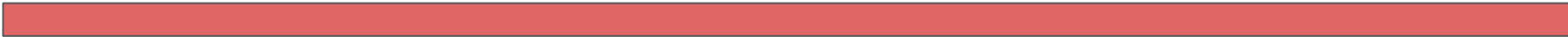
Powering the Board

Always use a current limited power supply, not a battery or plug, first

You can protect your circuit by keeping very low currents, preventing damage from shorts

Also will show you how much current you are drawing, can compare to expectations

Only when you have COMPLETED other testing should you switch to actual power source
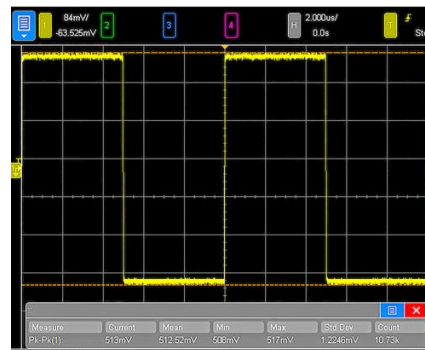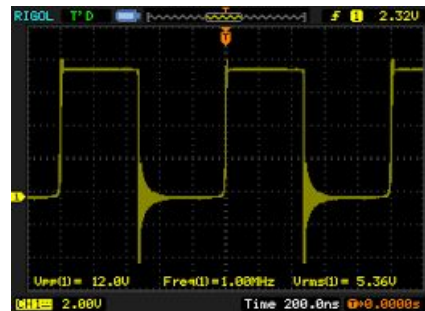
Oscilloscopes

Not using in this seminar

Displays waveforms from probed nets

Useful to check quality of digital signals such as communication lines, control signals

Can also probe for noise on power lines

Some have built in logic analyzers

Reflow

Can use reflow oven

Apply solder paste to all the pads

Place the parts in their correct places

Put through oven with specific heat curve

Can buy one, or make one!