

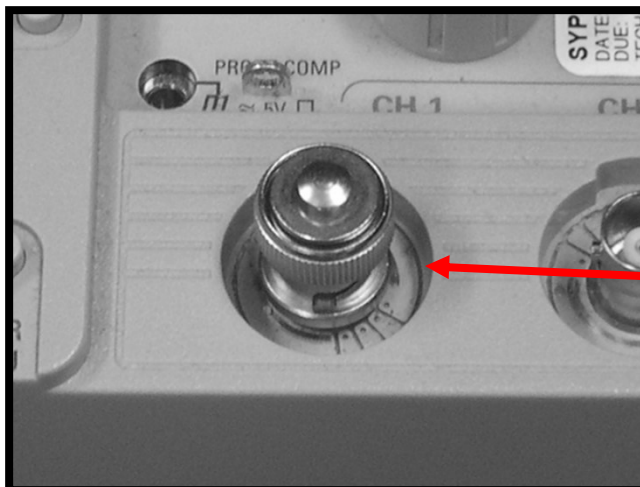
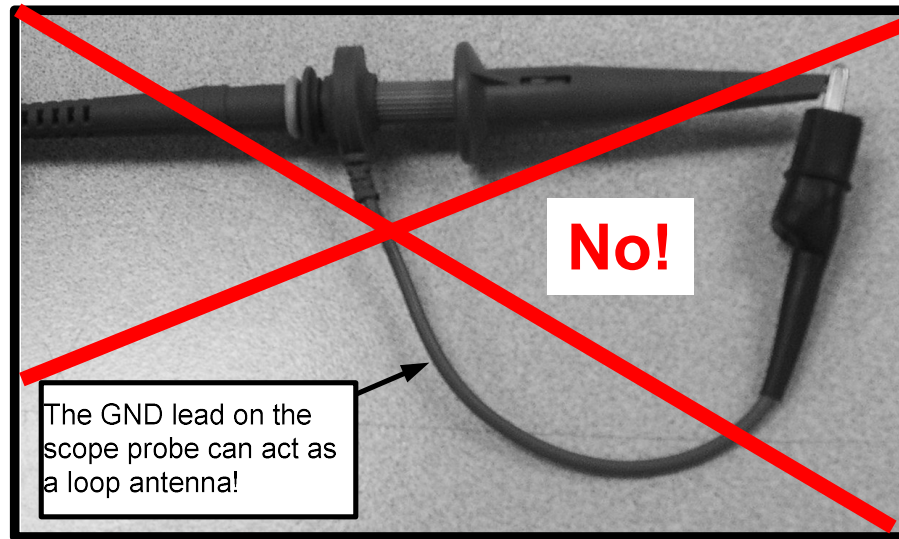


Making Accurate Oscilloscope Measurements for Noise, Switching, and High Frequency Signals

Art Kay and Tim Green
Texas Instruments Inc – Tucson
May 6, 2017



Oscilloscope Noise, Switching, and High Frequency Measurement



BNC Shorting Cap
Check Noise Floor of Instrument

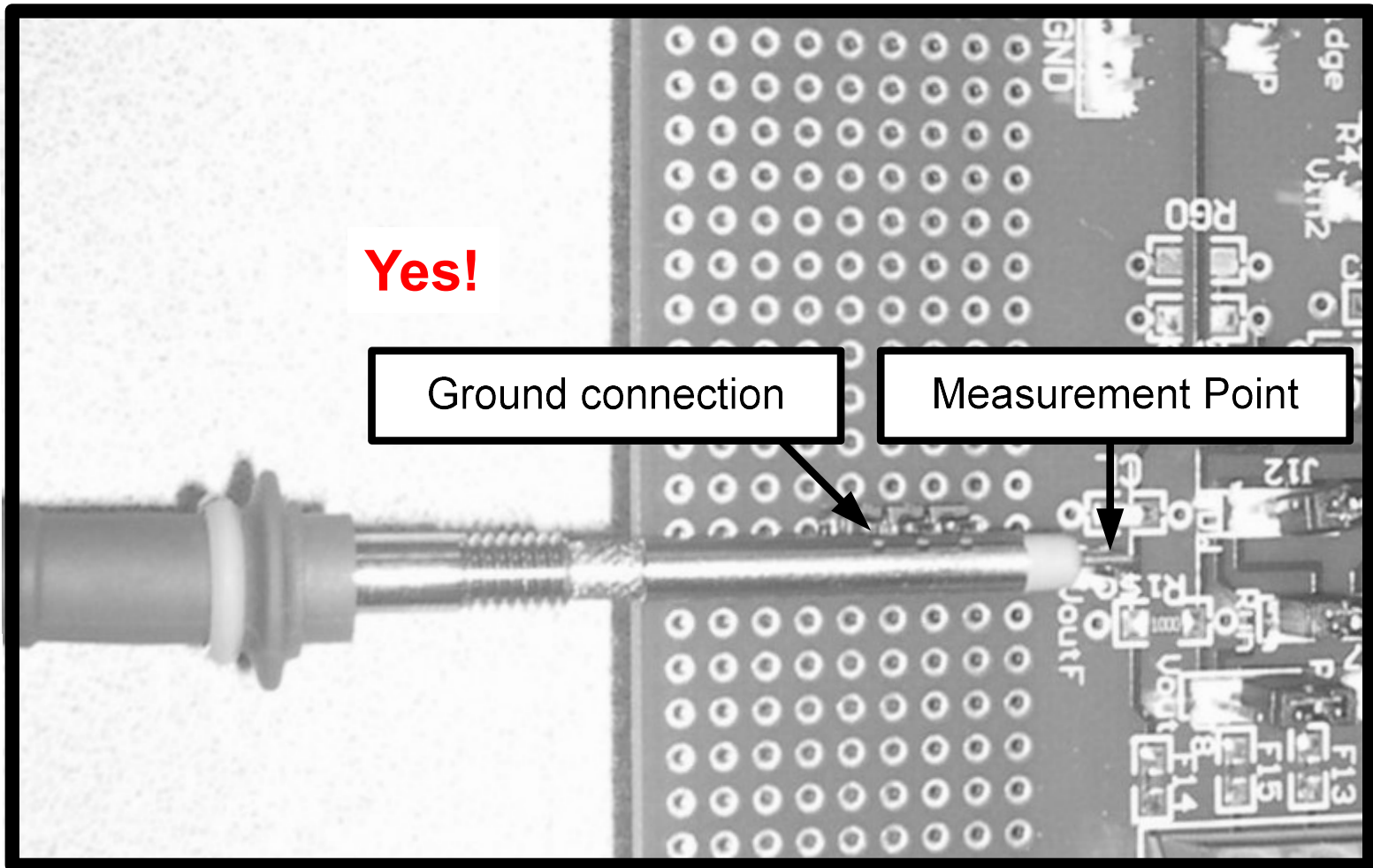


Option 1

Adjacent Ground Connection



**No scope Probe Ground Lead -
Ground connection at an adjacent measurement point!**





Option 2

Solder Wick Ground Connection



What is Solder Wick?

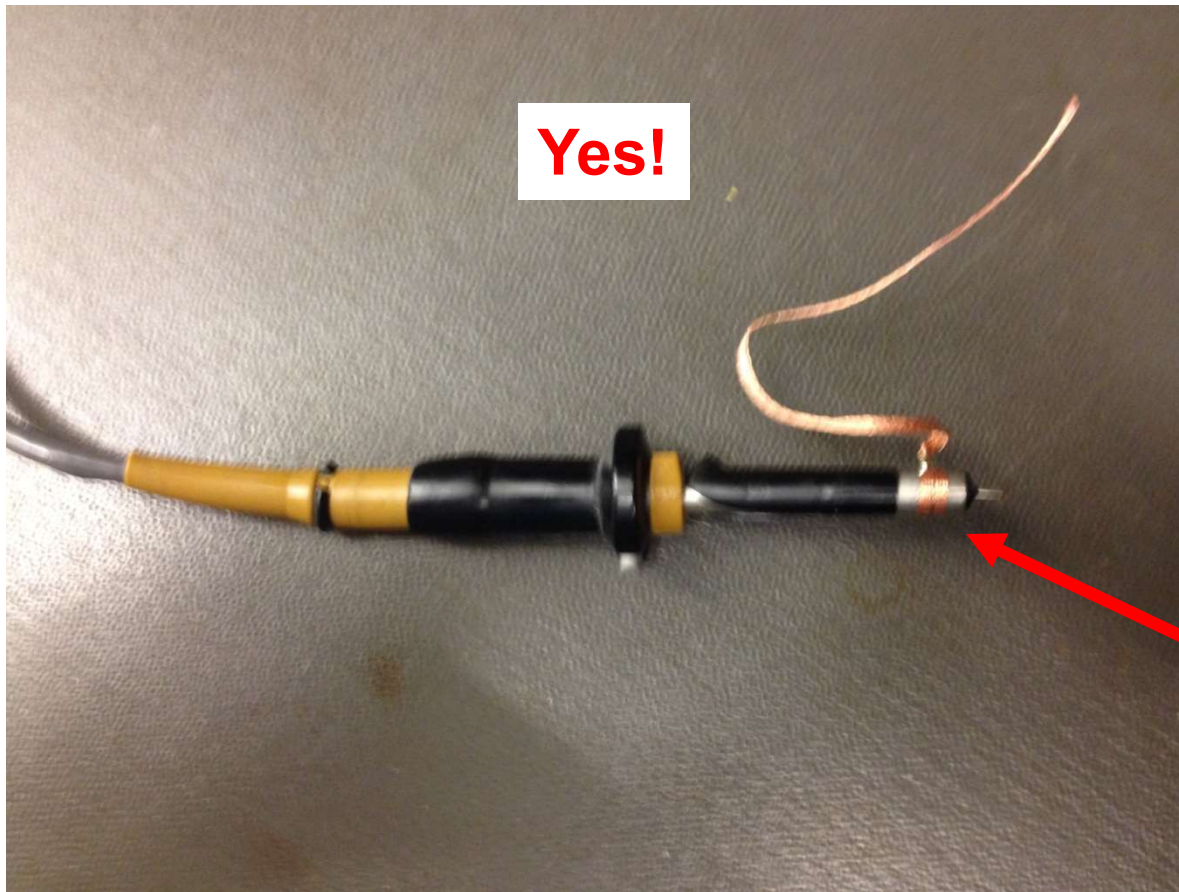


Desoldering braid, also known as desoldering **wick** or **solder wick**, is finely braided 18 to 42 AWG copper wire coated with rosin flux, usually supplied on a roll. The end of a length of braid is placed over the soldered connections of a component being removed.

<https://en.wikipedia.org/wiki/DesolderingWikipedia>



***No scope Probe Ground Lead -
Ground connection through solder wick to a local
GND point!***

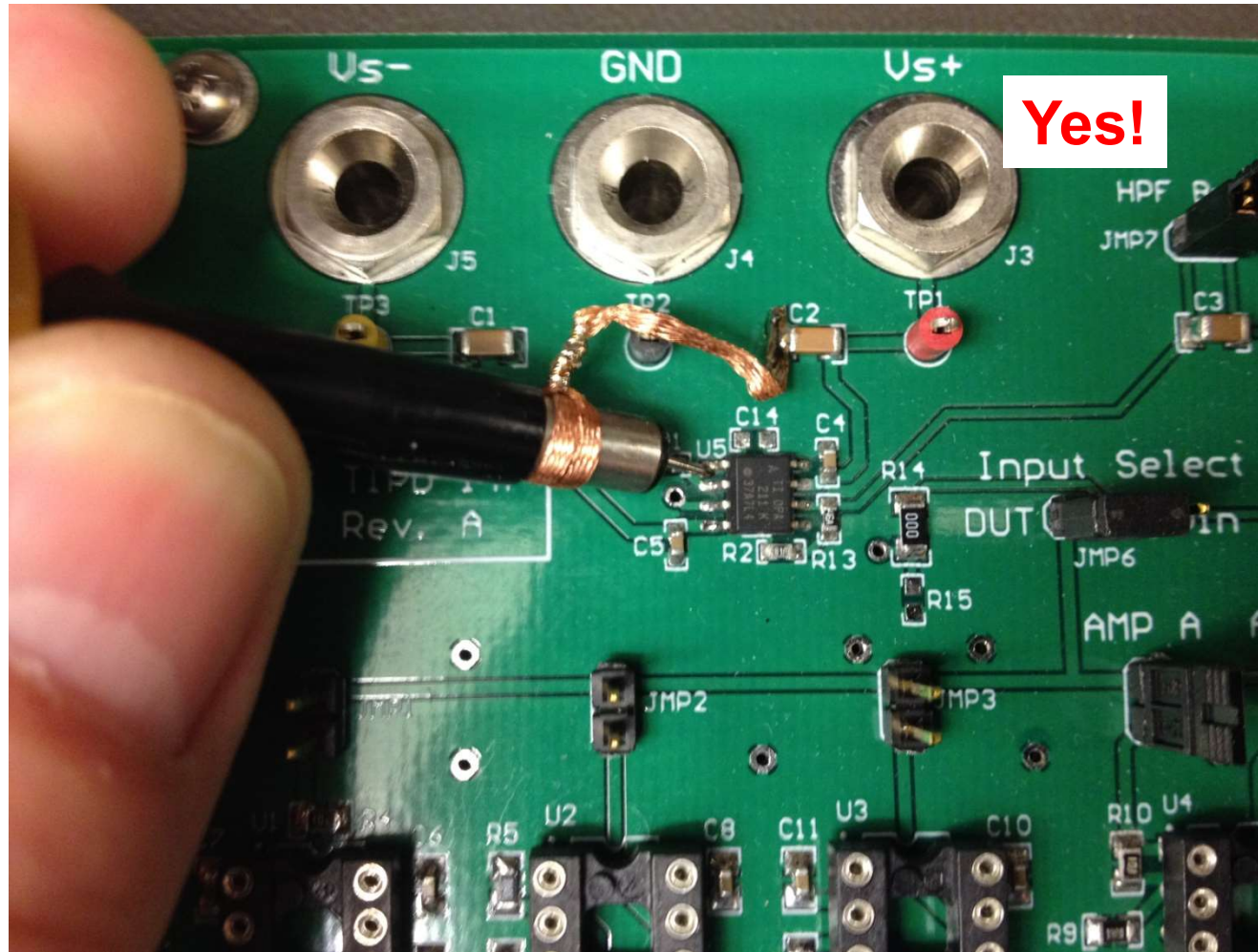


Use solder wick for a good high frequency ground connection.

High frequency travels on the outside skin of the wire. Solder wick has many, many strands of copper wire!



**No scope Probe Ground Lead -
Ground connection through solder wick to a local
GND point**



Connect tip of scope probe directly to point to be measured. Solder "solder wick ground" very, very close to IC ground



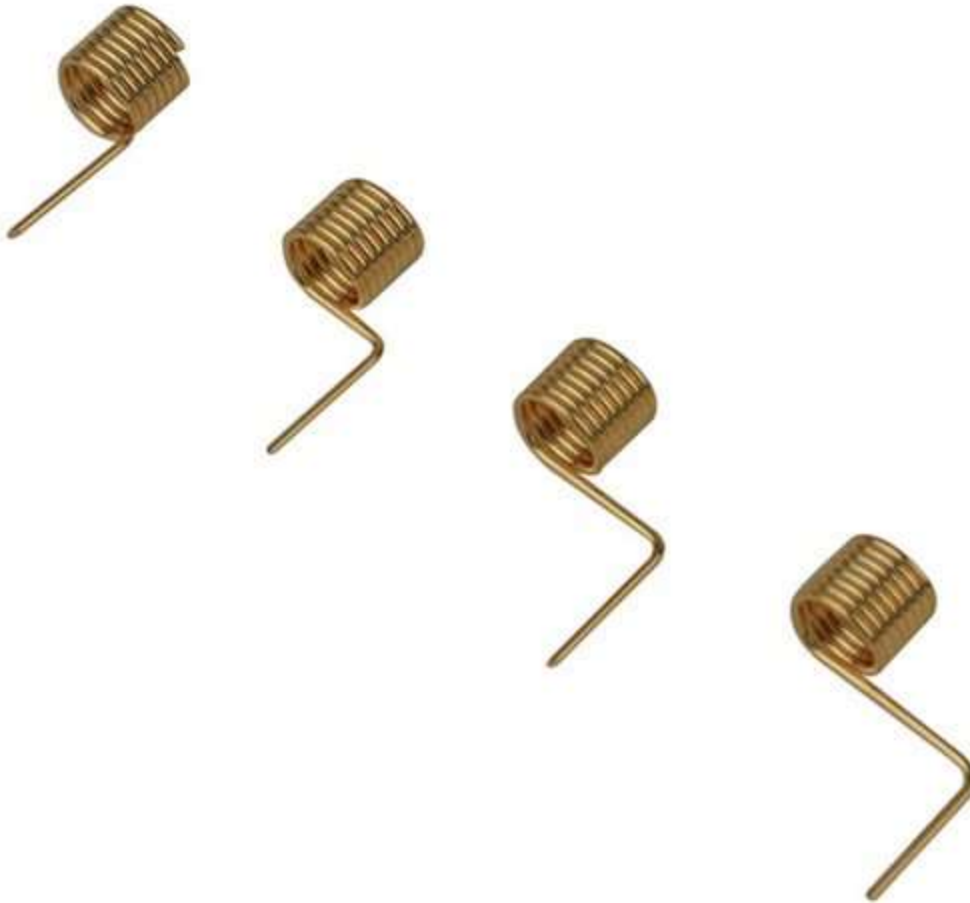
Option 3

Oscilloscope Probe Ground Tip Connection



Oscilloscope Probe Tip Ground Kit

Often found with scope lead kits or can be purchased after-market.





Oscilloscope Probe Tip Ground – Make your Own!

Can use AWG #24 Solid Bus Wire to make your own.

Bus Bar Hook-up Wire 100 Foot Reel

Features

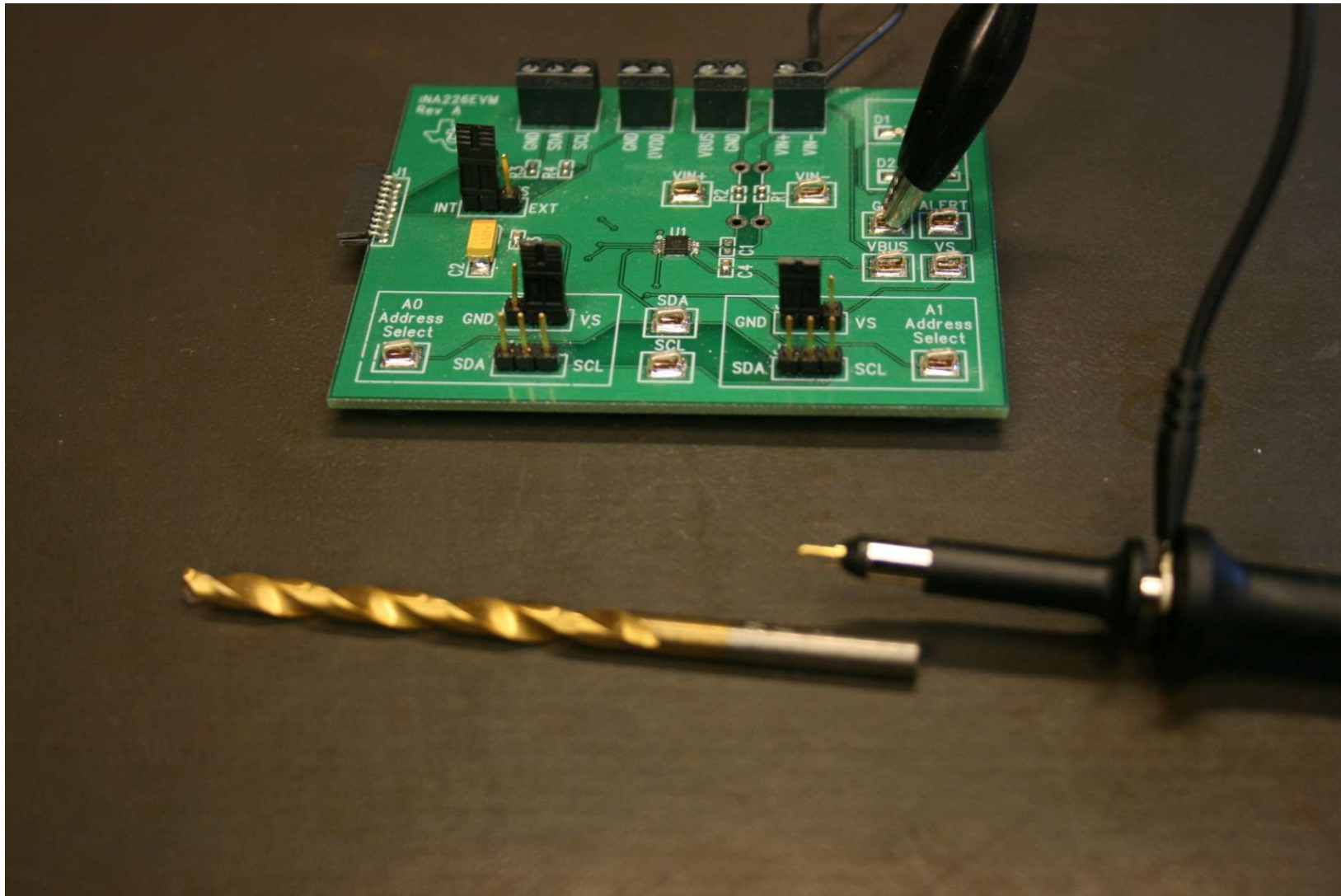
- Tinned copper
- Solid, soft drawn annealed bare copper
- Single conductor
- 24 AWG wire gauge
- Outer diameter: 0.020"
- Length of reel: 100 feet
- Current rating: 5A
- Approvals: ASTM-B-3, QQ-W-343-Type-S





Oscilloscope Probe Tip Ground – Make your Own!

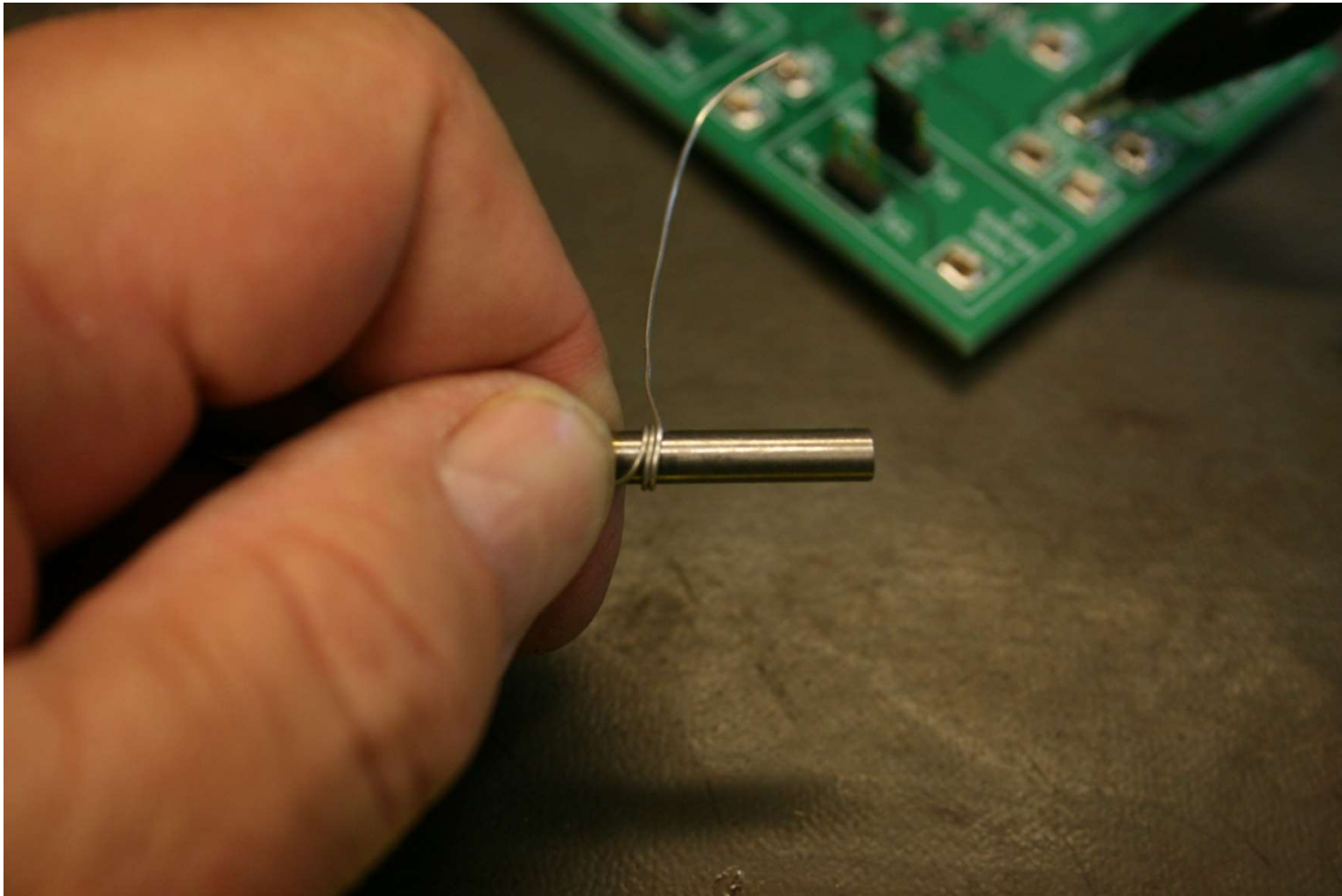
Use a drill bit slightly smaller than the scope probe diameter.





Oscilloscope Probe Tip Ground – Make your Own!

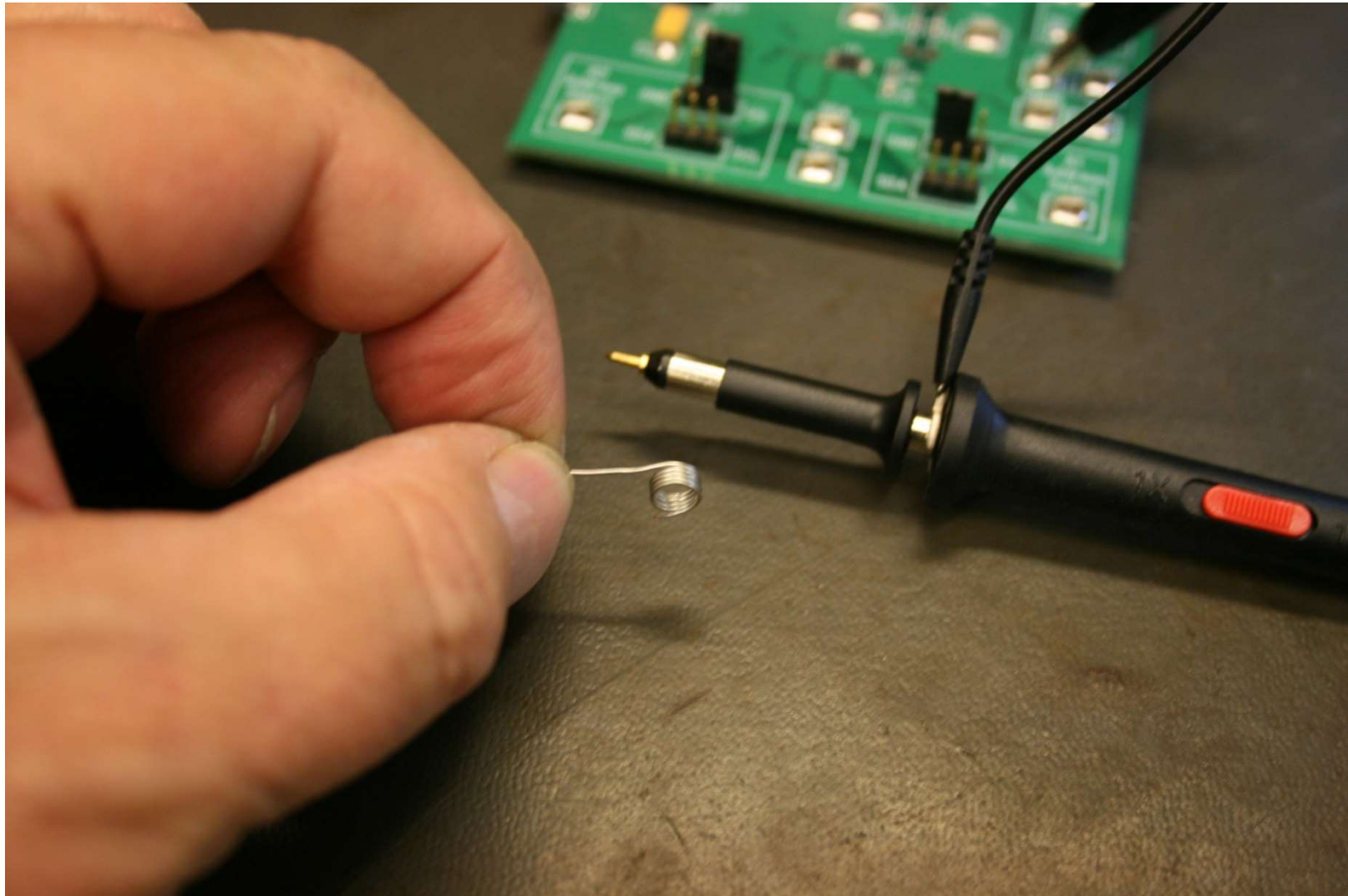
Tightly wind 10 turns of the bus wire around the drill bit shank.





Oscilloscope Probe Tip Ground – Make your Own!

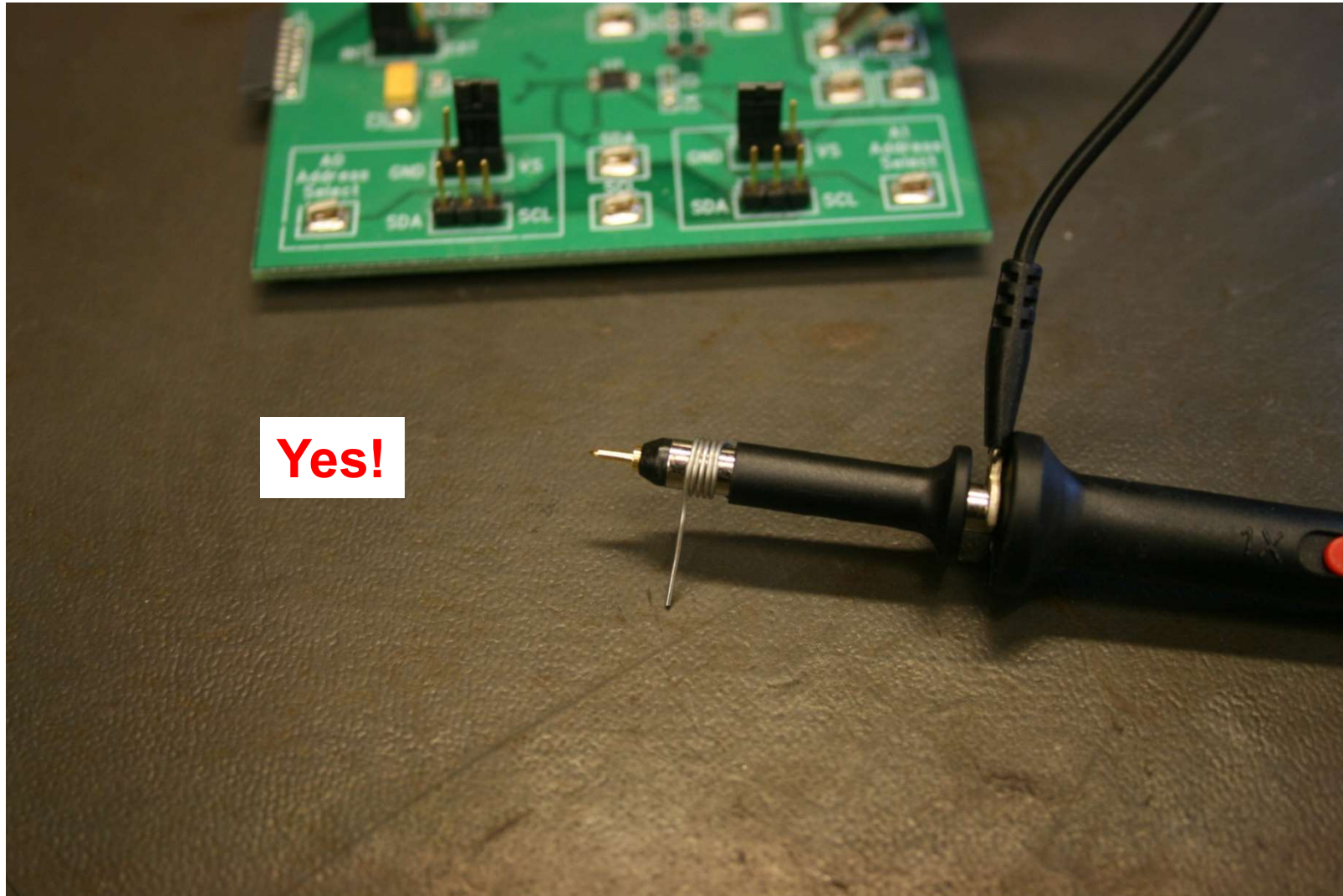
Slide the coil off of the drill bit shank.





Oscilloscope Probe Tip Ground – Make your Own!

Slide the bus bar coil onto the scope probe shaft.



Yes!



Oscilloscope Probe Tip Ground – Make your Own!

Probe the desired circuit point and a nearby local ground point.

