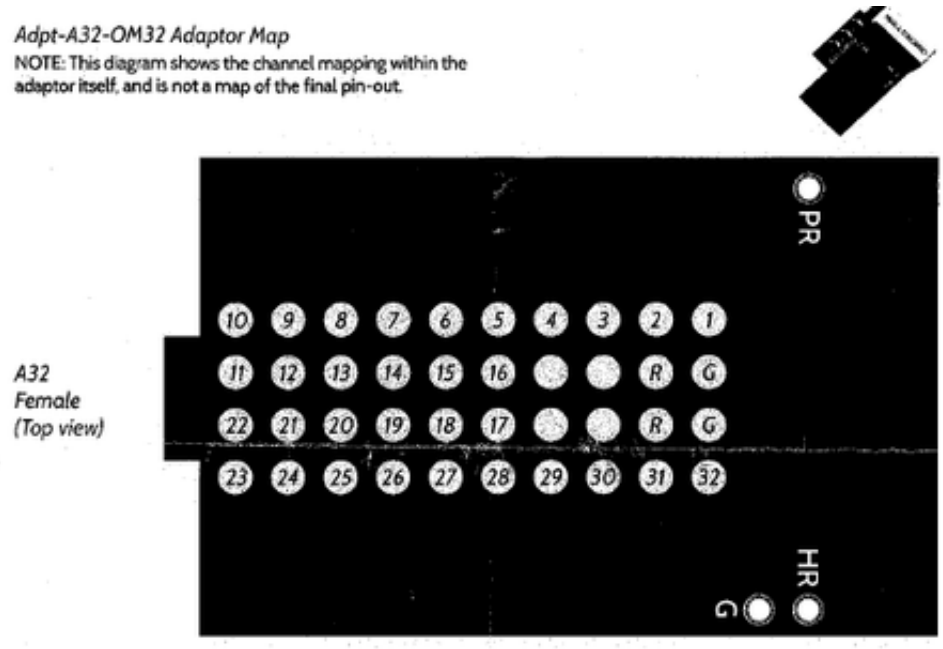
What are some good tips for grounding (animal ground) effectively (best signal/noise ratio)?

My acquisition system (Neuralynx) lets me choose what channels I use as reference for my signals. I get the lowest noise (25uV) when using one of the many probe sites in the neuronexus probe. Problem with this is that other probe sites are too close (same unit may show on all channels, ...). For some reason, the reference site on my probe is giving some 100 uV noise but that is another issue. Usually, I would use the animal ground to act as the reference. In this new acute, anesthetized setup, with neuronexus probes and adaptors, the animal ground is a silver wire cable (insulated but stripped ends) that I glue (conductive paint) to the ground pinhole on the Adpt-A32-OM32 board (see image). The other end of this silver wire is also exposed and wrapped around a head screw that is threaded to the skull of the mouse.
This setup gives me some 100uV noise too. I would like to bring this down to 25uV. We have grounded and hunted the noise out of the whole rig.
Are there any better ways of grounding neuronexus probes? Or are people comfortable with using a probe site as the reference?

Any helped welcomed.

Thanks.



2 people have
this question

- There are several different ways to reference and ground your animal, and you touch on a lot of them

in your message. Generally, each lab comes up with their own ground/ref protocol that works for them, and even that can change on a day-to-day basis depending on which set-up is providing the least noise on a given day.

The simples approach is to tie the ground and reference wires together and attach them to a skull screw.

Another approach is to ground the animal further away from the skull (e.g. in a muscle, or in the flank) and to reference more locally (e.g. skull screw).

For recordings taken in a Farraday cage or on a frame, I've sometimes seen the cage and/or frame grounded instead of the animal.

With larger animals I've seen the reference/ground wires placed in the craniotomy under the dura flap.

For very local referencing, usually a reference site on the probe is often a good method because the reference would be in the brain but not in the same structure as the rest of the sites.

Back when I was in grad school, sometimes we would reference off of a local site that could have otherwise been used to record. When we did, we would try to find a site with no active cell on it (when referenced to ground) and then use that site as a reference. Another technique when using a local site was to do some signal processing techniques, such as ICA, to pre-process your data before sorting. ICA tends to identify signals that are common across multiple channels, so if your reference site had a signal that therefore propagated across all of the channels, that kind of processing trick might be able to re-isolate that signal so you can identify what remains on the other channels.