**Running the system**

1. **Just depth electrodes normal data collection mode**

Overview

When using the depth probes for EIT collection (no cortical array). Configuration where four shunted electrodes are used to inject current in depth

Code/files required

1. Use branch ‘shunted\_swtiches4\_nano’ in EIT-team/ScouseTom repository
2. Upload ‘ScouseTom/src/arduino/ScouseTom\_Control/ScouseTom\_control.ino’ to arduino
3. ExpSetup example and protocol found in ‘ScouseTom/src/matlab/ExpSetup\_examples/ExpSetup\_depth.mat’
4. duplicate\_protocol.m

Usage

1. Each protocol needs to have 8 electrodes. Electrodes 1-4 are connected together to the source and electrodes 5-8 are connected together
2. Use duplicate\_protocol.m to create repeated ExpSetup.Protocol. Need to change source and sink every 30 s due to charging. Must be even number of source sinks (i.e multiple of 2 repeats)
3. The rest of ExpSetup is same as master
4. Use ScouseTom\_Start

Notes

1. In ScouseTom github there are branches for 2 shunt and 8 shunt options with examples of the ExpSetup in the expsetup folder.
2. **Just depth electrodes stim no stim collection mode**

Overview

Option for collecting data when not injecting EIT current, when injecting EIT current but not stimulating and when using EIT in normal mode with current injection and stimulation for each protocol. This is to get long period of baseline and also if you want to check differences in brain activity without EIT current and with EIT current.

Code/files required

1. Use branch ‘shunted\_swtiches4\_nano’ in EIT-team/ScouseTom repository
2. Upload ‘ScouseTom/src/arduino/ScouseTom\_Control/ScouseTom\_control.ino’ to arduino
3. ExpSetup example and protocol found in ‘ScouseTom/src/matlab/ExpSetup\_examples/ExpSetup\_depth\_stim\_nostim.mat’
4. start\_file\_depth.m
5. ScouseTom\_Start\_stim.m
6. Protocol.m

Input

1. In ScouseTom\_Start\_stim.m line 153 – change logpath = 'C:\Users\KAMPFF-LAB-EIT\EIT\Rat\_053\Depth\_All'; To the correct path
2. In ScouseTom\_ValidateExpSetup Lines 58-73 – comment out so you are not prompted each time. Otherwise you have to sit by computer the whole time
3. In start\_file\_depth.m Line 2 – change to number of protocol lines you are collecting for
4. In start\_file\_depth.m Line 5 - check port number of Arduino
5. In start\_file\_depth.m Line 25-29 – this is the number of repeats per protocol. It is set to do 8. If this changes then change these numbers

Usage

1. Run start\_file\_depth.m and everything should start
2. **Cortical and depth electrodes normal data collection mode**

Overview

When you are collecting data simultaneously in cortex and depth need to run two EIT systems simultaneously. Therefore need code that starts these both at the same time.

Code/files required

1. For master Arduino (controlling depth electrodes), use branch ‘shunted\_switches\_4nano\_ext\_trig’ in EIT\_team/ScouseTom repository
2. Upload ‘ScouseTom\_control.ino’ in this branch to master arduino
3. For slave Arduino (controlling cortical electrodes), use branch ‘trigger injection’ in EIT\_team/ScouseTom repository
4. Upload ‘‘ScouseTom\_control.ino’ in this branch to slave arduino
5. All controlling code is in ‘shunted\_switches\_4nano\_ext\_trig’ branch
6. Example of ExpSetup and protocols in ‘ScouseTom/src/matlab/ExpSetup\_examples/ExpSetup\_depth\_cortical.mat’
7. Start\_Script.m

Usage

1. Run Start\_Script.m and everything should start

Notes

1. The two current sources are triggered to resync every 5 s. You will notice this in the data as some epochs will have a big artefact that looks like a switching artefact. To change this change Line 71 in ScouseTom\_Control.ino in the ‘shunted\_switches\_4nano\_ext\_trig’ branch and in ‘trigger\_injection’ branch
2. **Cortical and depth electrodes stim no stim collection mode**

Overview

Option for collecting data when not injecting EIT current, when injecting EIT current but not stimulating and when using EIT in normal mode with current injection and stimulation for each protocol. This is to get long period of baseline and also if you want to check differences in brain activity without EIT current and with EIT current

Code/files required

1. For master Arduino (controlling depth electrodes), use branch ‘shunted\_switches\_4nano\_ext\_trig’ in EIT\_team/ScouseTom repository
2. Upload ‘ScouseTom\_control.ino’ in this branch to master arduino
3. For slave Arduino (controlling cortical electrodes), use branch ‘trigger injection’ in EIT\_team/ScouseTom repository
4. Upload ‘‘ScouseTom\_control.ino’ in this branch to slave arduino
5. All controlling code is in ‘shunted\_switches\_4nano\_ext\_trig’ branch
6. Example of ExpSetup and protocols in ‘ScouseTom/src/matlab/ExpSetup\_examples/ExpSetup\_depth\_cortical\_stim\_nostim.mat’
7. start\_file\_complex.m
8. ScouseTom\_StartFile\_c.m, ScouseTom\_StartFile.d

Input

1. In ScouseTom\_StartFile\_c.m – change Line 124 to path you saving data
2. In ScouseTom\_StartFile\_d.m – change Line 122 to path you saving data
3. In start\_file\_complex.m –change Line 2 to number of protocol lines
4. In start\_file\_compex.m – change Line 7 and 8 to port of two arduinos
5. In start\_file\_complex.m – change Line 52,53 and 68,69 to the number of repeats that you want. This is currently set to 8

Usage

1. Run start\_file\_complex and everything should start