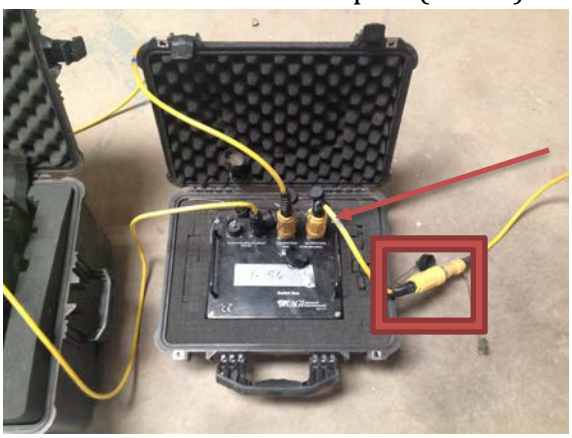
Super Sting Field Set up

1. Pick a survey location, it is important to keep the line straight
2. Lay out the cable, make sure that the connections are correct, order matters with this system. Also, the SuperSting and Switch box will be located in the middle of the line.
3. Pound in steel stakes every 4 meters (three stake configuration is shown below left). Each location where you pounded a stake will be referred to as an electrode.

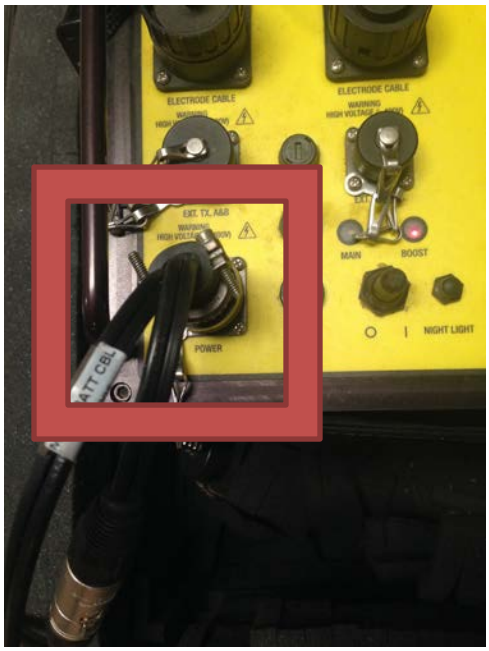
4. Connect the cable to the electrodes (shown above right with four electrode stakes)
    a. Make sure the cables are in numerical order (i.e. 1-14 leads to 15-28 with 14 and 15 next to one another)
    b. Cables come in sets of two so 1-28 and 29-56 are the same sets of cables and can be in any order so long as the sets are chronological
5. Connect the cable representing electrodes 1-28 into the switch box (below).

6. Connect the cable representing electrodes 29-56 into the switch box, you will have to use a male-to-male adapter (below).



7. Connect the switch box to the SuperSting, either port can be used depending one which end (male or female) you are dealing with (below).

8. Connect the SuperSting to the 12 V batteries or generator



9. The overall setup of the SuperSting should look something like this:

Running a survey

```
      AGI SUPER STING
Date: 20110721 Time: 21:38:18

1. Automatic mode
2. Manual mode
3. Test mode
4. Log settings
5. File management
6. System settings
7. System information



Select mode:
Current method: RES
Battery voltage:  13.28 V
```

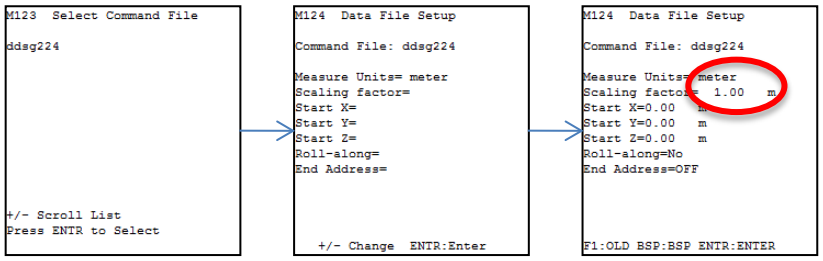
1) Power up the SuperSting and you will see the main menu, shown right.
    a. To move around in the menus you use the number of the interface you want to access (i.e. press the 6 on the keypad to access System settings).
2) To start the survey you are going to click #1 and going into the "Automatic mode" menu
3) From this, select "Create data file" by pressing #2
4) We will need to provide a name for your data.
    a. The name is limited to 8 characters, so we will need to abbreviate. Something like LC_LINE, standing for location and the line number.
    b. To type a filename, you have to use the alpha numeric keypad. Basically, you have to use the F1, F2 or F3 keys to type the letters you want. For example, to type A, one presses F1 followed by #7. To type B, one presses F2 followed by #7. To type C, one presses F3 followed by #7. To type any number, one simply presses the number key on it's own. So, in the example shown below to type LINE 1, one would press F3 - #4 for L, F3 - #9 for I, F2 - #5 for N, F2 - #8 for E and then #1 for 1.
5) After we have typed in the name of the data file press ENTER to continue
6) Now we need to select a command file, the command file is a user determined command file.
    a. The command file contains the instructions for the SuperSting. It tells it which electrode pairs to transmit on and which ones to measure on. This is

an 8-channel system, meaning it can transmit on a single pair take up to 8 measurements simultaneously.

b. The most common command files include:
    i. Dipole-Dipole for XX electrodes (with or without reciprocals). Preloaded on UW SuperStings
    ii. Wenner for XX electrodes (with or without reciprocals). Preloaded on UW SuperStings
    iii. Schlumberger for XX electrodes (with or without reciprocals).
    iv. Gradient for XX electrodes
    v. Pole-Dipole for XX electrodes (w/infinity electrode. Preloaded on UW SuperStings
    vi. Pole-Pole for XX electrodes (w/two infinity electrodes)
    vii. Mixed Command files (i.e. any of the above merged together). Dipole-StrongGradient w/30% reciprocals preloaded on UW SuperStings.
    viii. 3D command files (e.g. Radial Dipole-Dipole, Mixed Dipole-Gradient, etc.)
    ix. Borehole-Borehole or Borehole –Surface command files (e.g. Bipole-Bipole, etc.)
    x. Marine Resistivity command files (e.g. Dipole-Dipole, Wenner, Gradient, etc.)

c. If a specialized command file is required, speak to Brad and he can help to develop a new command file to fit your needs.

7) Once you select the right command file, you need to input information relevant to the survey. It is important to make sure the "Units" are in meters and the "Scaling factor" is set to the survey electrode spacing (i.e. 2 m). This is shown in the image below:

8) 

9) Click ENTER to continue the setup.
10) Select "Switch box" by pressing #1
11) On the second menu select "Eight channel" by pressing #8
12) At the SWITCH BOX SETTINGS, press #1 (Add Switch Box). When you see the "Switch Box 28", press the "+" key until you see "SWITCH BOX 56". Then, press ENTR to select that switch box. When finished, press MEN to exit.
13) At the CABLE ADDRESS SETTINGS, press #1 (ADD CABLE SECTION). The menu will look like the image below. When you see the "ELEC LOW", press the "1" then ENTR. Now the cursor will be flashing at "ELEC HIGH", press "14" then ENTR. You will see: "1 1 14" listed in the space below the text. This indicates that you have defined the first cable section to consist of electrode addresses 1 thru 14. Now, you must

enter the remaining sections of cable. So, repeat the above procedure (PRESS 1 followed by the numbers of the starting LOW and ending HIGH electrodes) until all cable sections have been entered and the menu is similar to the image on the right side. When finished, press MEN to exit.

14)

```
M62  Cable Address Setup

1. Add cable section
2. Clear table

Elec Low:          High:
Section    ElecL   ElecH



+/- scroll ENTR:Edit F3:Delete

MEN: Exit
```

```
M62  Cable Address Setup

1. Add cable section
2. Clear table

Elec Low:          High:
Section    ElecL   ElecH

+/- scroll ENTR:Edit F3:Delete

MEN: Exit
```

1	1	14
2	15	28
3	29	42
4	43	56

15) The next menu is the MEASUREMENT SETTINGS menu. In the field, I'd recommend you press the F1 key until you see FACTORY. These default settings will work well in most sites and should be the first settings you try.

16)

```
M61  Measurement Settings

1. Cycles: 2
2. Max error: 2.0
3. Max repeat: 1
4. Max current:  2000mA
5. Measure time: 1.2s
6. Separate potential: OFF
7. Measure mode: RES
8. Single-Step Cmd Lines: OFF
9. Use Address Table
F1. Defaults:FACTORY
F2. Save user defaults

MEN: Exit
```

17) At the CONTACT RESISTANCE TEST MENU, press #1 and make sure to start with electrode #1, then press #2 and enter electrode 56. Press F1 to start the test. If all the electrodes are connected, the test will inject current on the "A" electrode and measure the resistance sequentially on the next electrode down (referred to as the "B" electrode).

   a. If the SuperSting records an error, most likely an electrode is not properly connected. It is safe to reconnect the electrode while the SuperSting is not running and, once the electrode is reconnected, the Contact Resistance can be resumed.
   b. Contact resistances are hoped to be low (in the 100's to 2000's) but can be higher depending on where you are working. If contact resistances are consistently above 4000 or higher, it is advised that at least one more stake be added to each electrode.

18) Now, you've returned to the main menu of the AUTOMATIC menu. The last thing to do is check that the selected command file, datafile name, scaling factor, starting XYZ, starting command line number, and Roll-along settings are what you expect. When finished, press MEA to start collecting data.

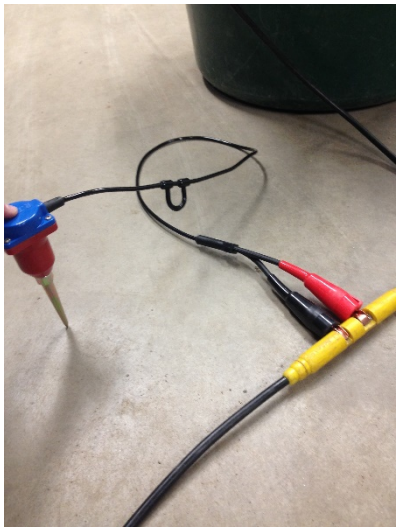
Seismic Standard Operating Procedures

Coordinate system on the ground

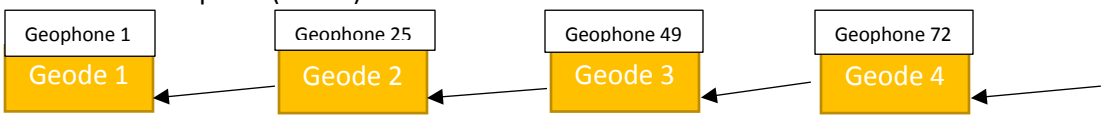
1. Insert a flag that will be your origin (0 m) for your seismic line and take GPS latitude/longitude using decimal format.
2. Lay out the measuring-tape along your desired bearing: take compass measurement.

Setting up for Seismic Recording

1. Once the tape measures are out, take the geophones and drop them in the desired locations.
    a. Place the first geophone at location 0 and then proceed with your desired spacing.
2. Next, spool out the geophone cables (in the buckets) so that the yellow take outs fall where the geophones will be planted.
3. Go down the line and place the geophones, with the spike vertical, into the ground, push/stomping the geophone down so that just the top of the phone is visible.
    a. Be sure that you are planting the geophones into solid ground (not loose soil) and that it has been planted so that it will not move around during recording.
    b. Sometimes the loose topsoil may need to be removed to gain the most effective measurements.
4. Attach the alligator clips on the geophones to their appropriate cable take outs (right).



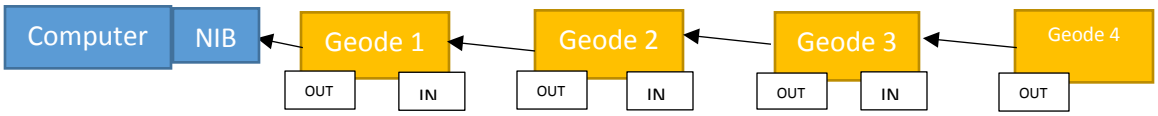
5. Attach the geophone cable to the geode such that the cable from further down the line attaches to the next geode closer to the computer.
    a. The cable with geophones 25-48 will attach to geode #2 which is located at geophone 25 and the cable for geophones 1-24 will attach to geode #1 located at geophone 1 and the computer (below).



6. Take the yellow cables, on spools, and distribute them between the geodes and the first geode and the computer.

7. Attach the yellow connection cables (below) so that the cable leading from geode #3 to geode #4 is attached to the OUT port on geode#4 and the IN port on geode #3 (below).

   a. The connection line should lead from the geode farthest away and into the computer.
   b. The computer connection cable gets plugged into the OUT port on geode #1 and the NIB on the other end.



8. Each geode has a power cable that screws into the geode and gets connected to a 12 V battery (right).
   a. When the geode is connected to power, pressing the button on the side should produce a blue flashing light.

9. When the connection cables, geophones, and geodes are all hooked up and powered on, the computer operator fires up the computer (using Geometrics Seismodule Controller) and the program should see all of the geodes in the line.
   a. If not all geodes are seen, close out of the program and go down the line, making sure all of the geodes have been turned on (blue lights flashing) and plugged in properly.
   b. Also, if no geodes are showing up, be sure that the switch on the NIB has been flipped to ON and the NIB is plugged into the computer securely.
10. When powering down the system, shut down the Seismodule Controller before disconnecting anything else.

11. The final geode setup should look like the above picture and include the battery power cable, two (or one if the last geode) yellow connection cables, and the geophone cable.

Thinking through Geophone Setup and Computer Operation

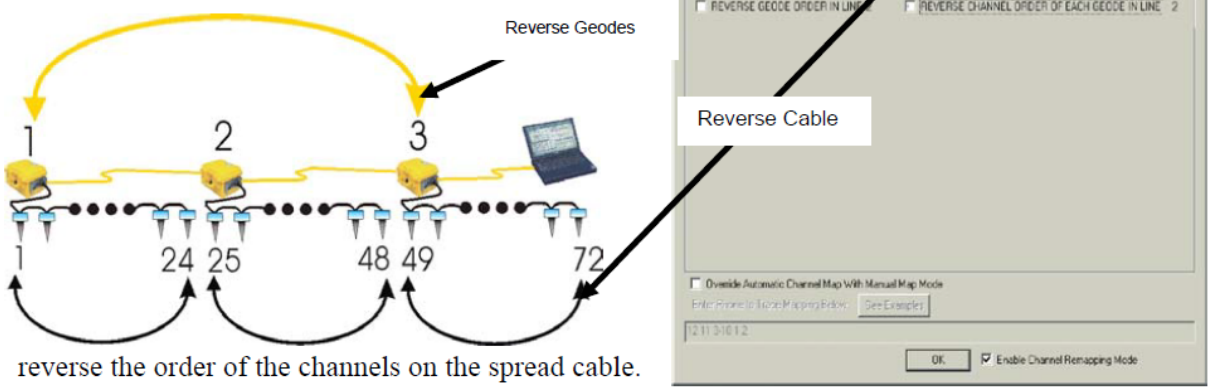
- Using two geodes/cable-lines, total number of phones is 2*24 or 48 phones.
    - If using four geodes, the total number of phones is 4*24 or 96 phones.
- Total line length is (48-1 or 96-1)*phone-spacing.
- Assume (use) a 2 meter phone spacing to make a 94 meter long line.
    - With a 2.5 meter spacing, a 96 phone line will end up being 237.5 meters long.
- Do shots (gun/hammer/truck hammer) every 10 meters starting at -10 meters: i.e., shots at -10, 0, 10, 20, 30, 40… meters offset from coordinate system origin (flag). Name the shot files: *dayNcrewM.dat* .
- With hammer, use 8 shots that are stacked together to improve the signal to noise ratio (SNR). With gun, use 2-4 shots depending on SNR.
- In MGOS program: Undo stacks for bad shots and false triggers.
    - Bad shots may include: not a solid shot on the hammer plate, a double hit on the hammer plate, noise (vehicles, rain, airplanes, wind), or anything that causes undue noise or distortion of the shot

Remapping channels for two Geodes (or three)

1. Default phone order: far-offset is 1 and near-offset (next to big plug) is 24.
2. Default Geode ordering is 1 for Geode plugged into NIB/LAPTOP and 2 for other Geode plugged into 1 with yellow cable.

3.7.11.10.4 Automatic Channel Remapping

Automatic channel remapping allows you to reverse either the order of the Geodes on the line, or



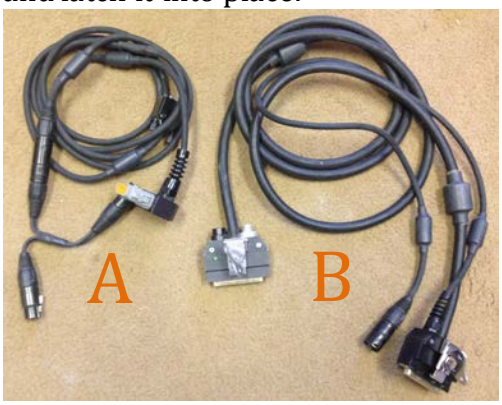
reverse the order of the channels on the spread cable.

The above diagram shows the result *after* both channels and Geodes have been reversed, renumbering the line so that low channels start on the left hand side and increase towards the right. In the dialog box, the automatic remapping boxes referencing line 2 remain unchecked, since the default orientation on line two was correct.

Noggin GPR Standard Operating Procedures

Setting up the Noggin GPR (250MHz and 500Mhz)

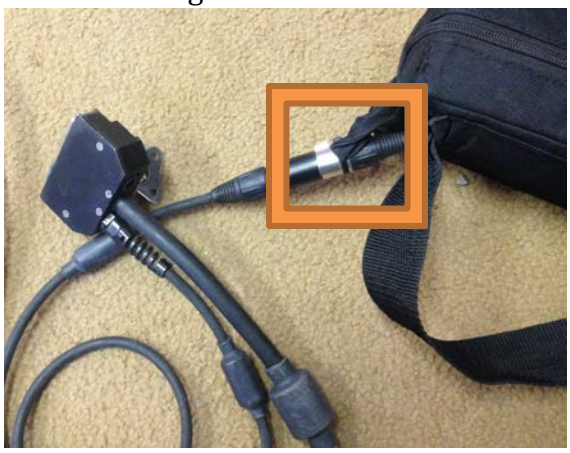
1. Attach yellow pull arm (to the side of the antenna that does not have a port to connect to the rest of the console) by removing the pins from the U-shaped bars to secure it into place (right).
2. Place cable B (the end with only one connector) into the large port on the antenna and latch it into place.



3. Place the wheel ("THIS SIDE UP" sticker facing up (below middle)) above the cable and attach it in the same manner as the pull arm (below left).
    a. Screw the yellow wheel cable into the grey port on cable B (below right).

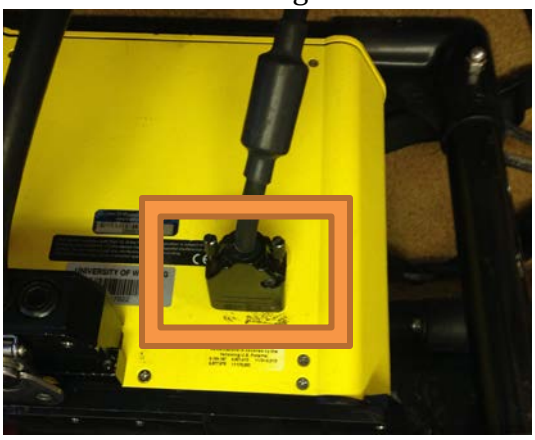
4. Feed cable B along the length of the pull arm (strapping it in place) so that it does not drag in the dirt.

5. Attach a battery to the end of cable B and take the remaining port and attach it to the back of the viewing console and latch into place.
    a. When the battery and viewing console are hooked up, a red light will appear on the viewing console.



6. Plug cable A into the GPS (in the backpack) which should snap into place.

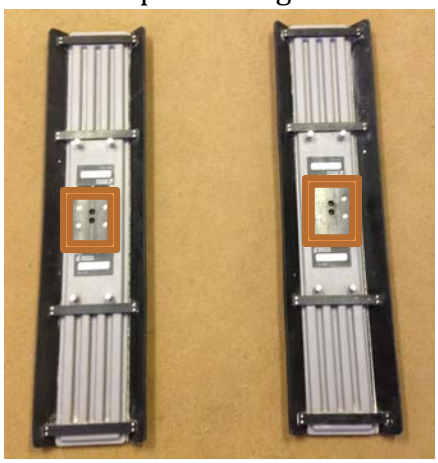
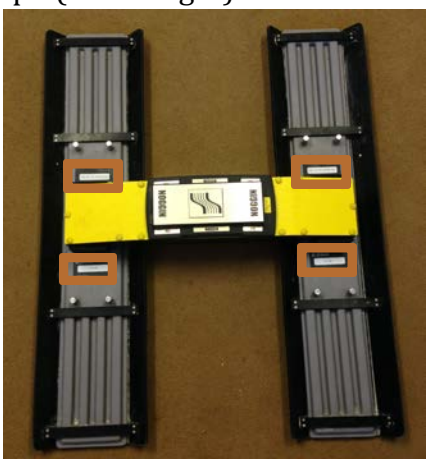
7. Plug the other end of cable A into the viewing monitor and screw into place.



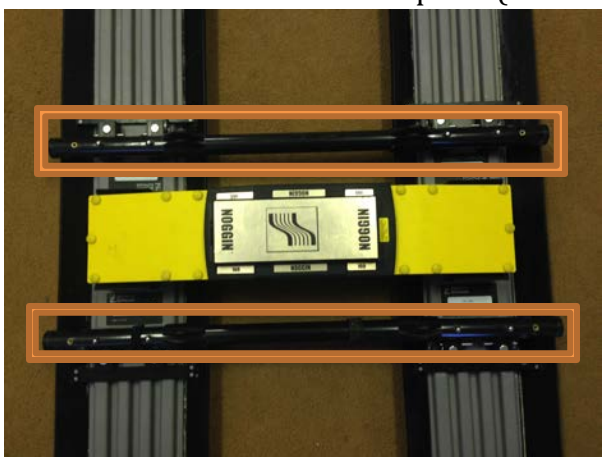
8. Plug cable A into another battery.
    a. When the battery and GPS are hooked in, a red light will appear on the GPS.
9. The batteries can both be placed in the backpack for ease of carrying.
10. At this point, the console is ready to be set up for a survey.

Setting up the Noggin GPR (100Mhz)

1. Place the grey sleds parallel to one another on the ground (below left).
2. Place the gold pin on the bottom of the yellow antenna into their designated slots on the grey sleds (below left), forming a bridge between the two (below right).
    a. Lock into place using the black clips (below right).

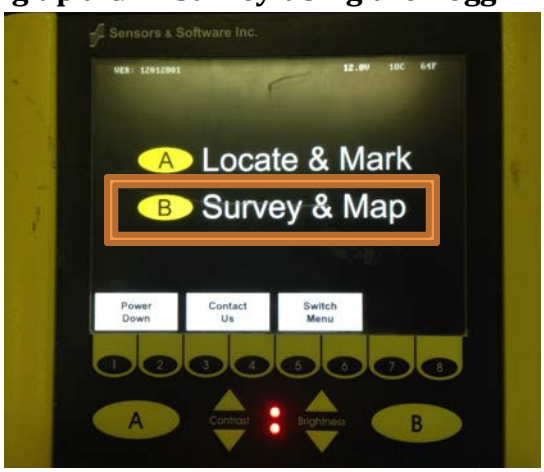
3. Take the black support rods and slide them onto the silver pins on the grey sleds (below left) so that the rods do not sit on the black plastic bands on the sleds (below right).
    a. Pin this rods into place (there are 8 total pins) (below right).

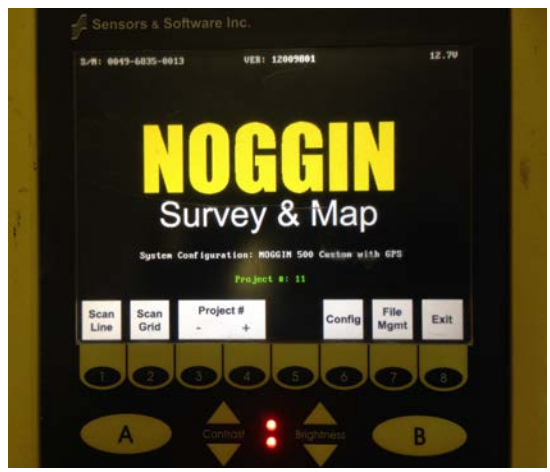



4. Place two corner pieces on the pull arm and two on the wheel so that the holes are pointing upward (below left).
    a. Wheel should have "THIS SIDE UP" sticking up (below left).
5. Attach the wheel on the side of the antenna that has the plug-in for the rest of the console (below middle) and the pull arm on the opposite side (below right).
    a. Screw in the wheel and the pull arm (this can possibly take some time and patience) (below right).
        i. If a screw is tight, do not force it but rather realign the parts and try once more.

6. Now that the antenna is set up, proceed with setting up the rest of the console just as if it were a 500MHz or 250MHz antenna.

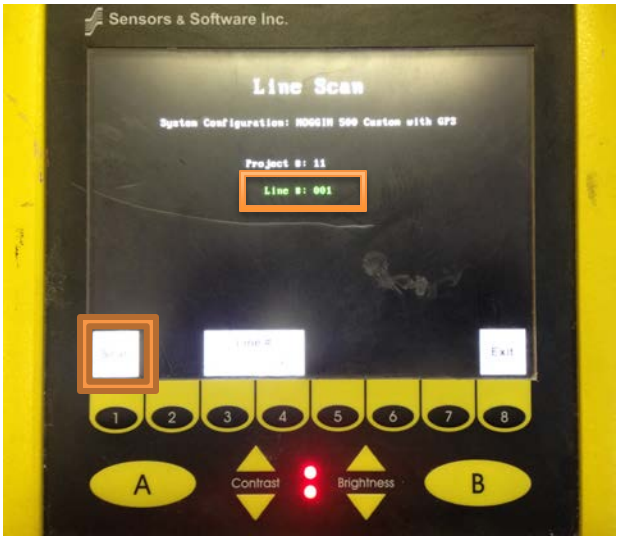
Setting up a GPR Survey using the Noggin:

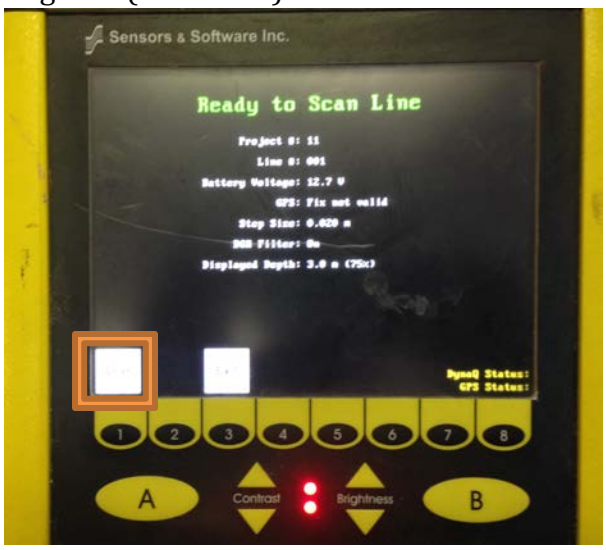




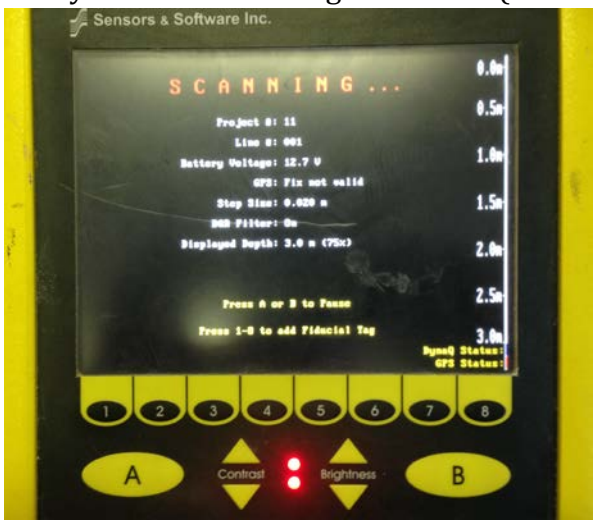
1. Press any button to power up the unit.
2. When the equipment starts up select Survey & Map (above left) by pressing the B button.
3. This should take you to the main menu (above right).
    a. From here we can adjust the settings using the Config button. When you're in the configuration menu (below) you can change the velocity used to convert time to depth and the units of display.

b. From the main menu make sure the project you're selecting is green. If it is green that means no data has been previously stored in this project. This is location, which the data is going to be recorded. Make sure someone in your group writes this project number down. If the project is red, then use the project buttons to select one that is green (below left).





4. Once all the settings are correct go ahead and hit scan line
5. The display will show you which project your in and the line number. Have someone in the group write down a brief description of the location and the corresponding line number, prior to collecting the data (above left).
6. Press Scan
   a. A screen will come up verifying the settings, go ahead and check these and then press scan again (above right).
7. The scanning screen (below left) will pop and you are ready to start walking and your data will being to come in (below right).



   a. There are a few things to note about this screen. The DynQ status should always be a Dark blue. If the bar turns to a light blue, that means you need to

slow your walking speed down. If the bar turns white you're walking WAY to fast, slow down.

   b. The GPS status should be green. If the bar is green it means you have good satellite signal, if it turns yellow you should wait for the GPS to aquire. In this case it's ok to continue because we are recording distances with the wheel and should be walking in a straight line.

8. When you're finished with the line press the A or B button to pull up the menu.
   a. In this menu you can play with the colors, gain and all kinds of other stuff
9. Press Exit to save the line, you should see that in your project the line number will increase.