

# ***IP RECEIVER***

***Model GRx2***

## ***Instruction Manual***



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# 1 Introduction

The highly sensitive GDD IP Receiver (model GRx2) is a compact unit designed for high productivity resistivity and time-domain induced polarization (IP) surveys in mineral exploration, groundwater exploration, geotechnical investigations and other related fields. It features high capabilities allowing it to work in any field conditions. It can be configured for multi-pole or multi-dipole reception. The receiver uses a PDA handheld PC to process data acquisition and the software can easily be updated via internet.

## Characteristics:

- **Reception poles/dipoles:** 2 poles/dipoles, for dipole-dipole, pole-dipole or pole-pole arrays.
- **Programmable windows:** The GRx2 offers twenty fully programmable windows for a higher flexibility in the definition of the IP decay curve.
- **User modes available:** Arithmetic, logarithmic, semi-logarithmic, Cole-Cole and user define.
- **IP display:** Chargeability values, apparent resistivity, IP decay curves and pseudosections can be displayed in real time thanks to the WVGA LCD TFT screen. Before data acquisition, the GRx2 can be used as a one channel graphic display for monitoring the noise level and checking the primary voltage waveform through a continuous display process.
- **Internal memory:** Over 64 000 readings can be stored in the internal memory of the PDA. Each reading includes the full set of parameters characterizing measurements. Data are stored on flash type memory and cannot be lost even if the battery of the PDA is totally discharged or absent.
- **Full wave data with IP Post-Processing software:** The GRx2 records and saves the full wave data (\*.mem file). This raw data can be imported, visualized and processed using GDD's IP Post-Processing software.

## 2 GRx2 accessories

|   |    |  |
|---|----|--|
| A | 1x | IP receiver, model GRx2  |
| B | 1x | Archer <sup>2</sup> Field computer with one rechargeable 10600mAh Li-Ion battery, one hand strap and one capacitive stylus                   |
| C | 1x | GRx2 IP receiver wall charger with international plug kit (universal voltage)  |
| D |    | Red and black banana cables  |
| E | 1x | Archer <sup>2</sup> AC charger with international plug kit (universal voltage)   |
| F | 1x | Rugged serial communication cable 9 pos D-SUB female - 9 pos. D-SUB female   |
| G | 2x | Archer <sup>2</sup> micro USB sync cable   |
| H | 1x | Screwdriver (for Archer <sup>2</sup> battery cap)  |
| I | 1x | External GPS antenna (SMA connector)   |
| J | 1x | Archer <sup>2</sup> Field PC Quick Start Guide   |
| K | 1x | GRx2 Instruction Manual and GRx2 Utilities CD/USB Stick (contains GDD Rx software, Sync softwares, GRx2 manuals, Archer <sup>2</sup> manual) |

### Optional:

- GDD-RTE01 communication box with USB cable
- Allegro<sup>2</sup> standard kit
- Archer<sup>2</sup> Field PC spare battery
- Spare channel

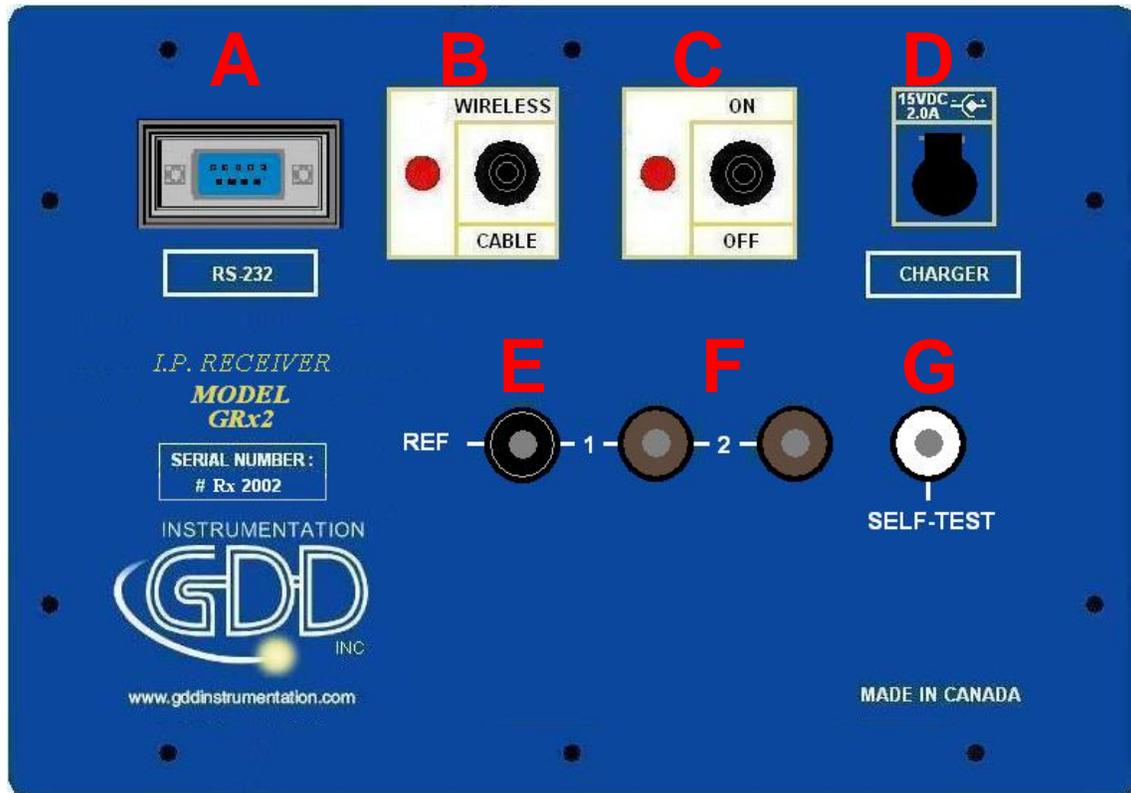
Allegro<sup>2</sup> field PC





### 3 GRx2 components

The GRx2 components are described in this section.



**A - RS-232 connector - 9 pin serial communication port**

This connector is used to connect the RS-232 cable between the Archer<sup>2</sup> Field PC and the GRx2 receiver.

**B - CABLE/WIRELESS switch**

This switch is used to select CABLE (RS-232) or WIRELESS (Bluetooth) communication with the PDA. The red light indicates WIRELESS position.

**C - ON/OFF switch**

This switch is used to turn the GRx2 ON. The red light indicates ON.

**D - CHARGER connector**

This connector is used to charge the battery of the receiver with the wall power supply.

**E - REF terminal**

This terminal is the infinite electrode in pole configuration. In dipole configuration, this terminal is the first electrode in differential with the second electrode.

**F - NUMBERED terminals**

These terminals are referenced to the Ref terminal (infinity in pole configuration). In dipole configuration, the numbered terminals are differential terminals.

**G - SELF-TEST terminal**

This terminal is used to perform a self test.



**H - GPS connector (SMA)**

This connector is used to connect an external GPS antenna (SMA).

## 4 Power

GDD's GRx2 IP Receiver is powered by internal rechargeable lithium-ion batteries.

Here are a few tips for using and storing your lithium-ion powered receiver:

### Usage

- Using a different battery power supply than the one supplied by GDD could damage the batteries and the receiver.
- The connector labelled CHARGER is used only to recharge the internal batteries.
- Do not replace the receiver internal batteries without the authorization and advice from GDD's technicians.
- The total operating time of the receiver will depend on the environmental conditions. Using the receiver in very cold weather (-20°C to -40°C) will lower the operating time.
- The receiver will turn itself off when the batteries reach a critical level.
- To extend battery life, avoid frequent full discharge and charge more often between uses.
- The power level of the batteries and the charging status appear on the main screen of the Archer<sup>2</sup> Field PC when using the GDD Rx program.

### Power level

GDD Rx - 8 channe 2:51

|          |                |       |       |
|----------|----------------|-------|-------|
| Ln:      | 10 N-S         | TOOLS | START |
| Tx:      | 30             |       |       |
| Rx:      | 35             |       |       |
| Count:   | 7000           |       |       |
| V:       | -435.2 mV      |       |       |
| MEM: 2   | BATTERY: 15.1% |       |       |
| Stack: 2 |                |       |       |

GDD Rx - 8 chann 12:35

|          |           |         |      |
|----------|-----------|---------|------|
| Ln:      | -150 N-S  | TOOLS   | STOP |
| Tx:      | 30        |         |      |
| Rx:      | 35        |         |      |
| Count:   | 31100     |         |      |
| V:       | -7.8 mV   |         |      |
| MEM: 2   | B: 13.6%  |         |      |
| Stack: 2 | I: 1000.0 |         |      |
| CH       | Rho       | Vp      |      |
| 01       | 32.34     | 499.924 | 0.0  |
| 02       | 42.25     | 499.825 | 0.0  |

### Charging

GDD Rx - 2 channe 2:16

|          |                   |       |       |
|----------|-------------------|-------|-------|
| Ln:      | 0 N-S             | TOOLS | START |
| Tx:      | 0                 |       |       |
| Rx:      | 0                 |       |       |
| Count:   | 5500              |       |       |
| V:       | 592.7 mV          |       |       |
| MEM: 0   | BATTERY: Charging |       |       |
| Stack: 2 |                   |       |       |

GDD Rx - 2 channe 2:17

|          |           |         |      |
|----------|-----------|---------|------|
| Ln:      | 0 N-S     | TOOLS   | STOP |
| Tx:      | 0         |         |      |
| Rx:      | 0         |         |      |
| Count:   | 10700     |         |      |
| V:       | -516.3 mV |         |      |
| MEM: 0   | B: Chrgn  |         |      |
| Stack: 2 | I: 1000.0 |         |      |
| CH       | Rho       | Vp      |      |
| 01       | 0.00      | 507.371 | -0.0 |
| 02       | 0.00      | 506.576 | -0.0 |

## Charge completed

| GDD Rx - 2 channe |                    |
|-------------------|--------------------|
| Ln:               | 0 N-S              |
| Tx:               | 0                  |
| Rx:               | 0                  |
| Count:            | 1100               |
| V:                | 27.3 mV            |
| MEM: 0            | BATTERY: Completed |

| GDD Rx - 2 channe |           |         |      |
|-------------------|-----------|---------|------|
| Ln:               | 0 N-S     |         |      |
| Tx:               | 0         |         |      |
| Rx:               | 0         |         |      |
| Count:            | 5400      |         |      |
| V:                | -9.2 mV   |         |      |
| MEM: 0            | B: Cmplt  |         |      |
| Stack: 3          | I: 1000.0 |         |      |
| CH                | Rho       | Vp      |      |
| 01                | 0.00      | 507.372 | 0.0  |
| 02                | 0.00      | 506.566 | -0.0 |

## Storage

- To avoid permanent capacity loss, store the receiver and the external battery pack at 40% charge.
- Store the receiver and the external battery pack in a cool and dry place.
- If stored for several months, check the batteries charge level every six months and recharge them up to 50% if they are below 30% charge.  
Never store fully charged or completely discharged Lithium-Ion batteries for an extended period.

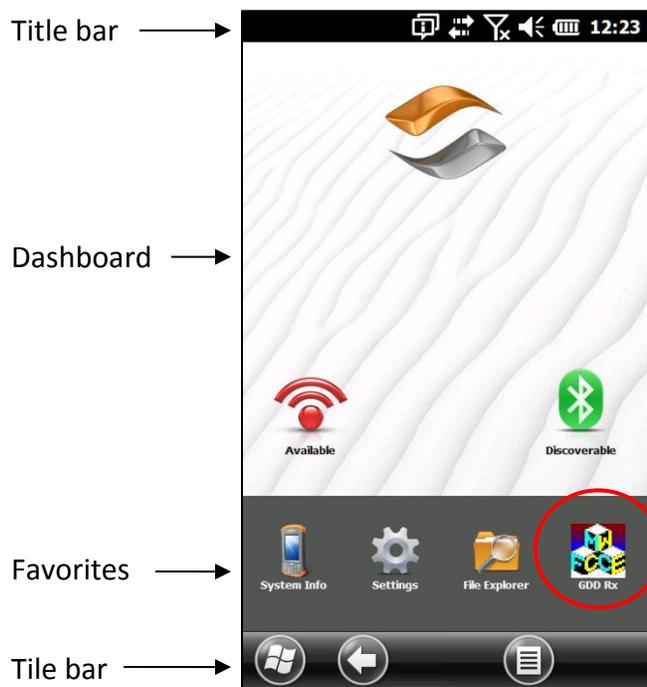
## 5 Quick start guide

**Important note:** Using a finger may still be the preferred option for projected capacitive screen technology, but we understand a stylus may also be necessary (like when it's cold). The way you hold a capacitive stylus really impacts how it works. To register a point, it is like the screen is taking a sample from which to calculate the position. It then snaps to the closest line on a grid. If you hold a capacitive stylus at an angle, it registers less area and does not calculate your true position as well. For best results on a capacitive screen like the Archer<sup>2</sup>, hold the stylus as perpendicular to the screen or straight up as you can. In this section, you will see some tips to use the Archer<sup>2</sup> keypad to perform some actions of the GDD Rx program.

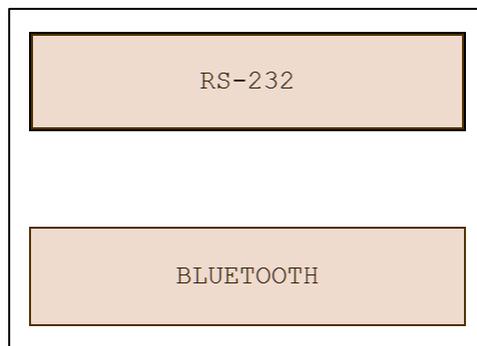
1. Connect electrodes into terminals.
2. Turn ON the IP receiver using the ON/OFF switch on the GRx2 panel.
3. Select the communication mode using the CABLE/WIRELESS switch on the GRx2 panel.
4. Connect the RS-232 cable between the Archer<sup>2</sup> Field PC and the GRx2 RS-232 connector (CABLE communication only).
5. Turn ON the Archer<sup>2</sup>Field PC with the ON/OFF key.



6. Tap on the GDD Rx program icon in the Favorites bar of the Home Page.



7. Select the communication mode: *RS-232 (CABLE)* or *BLUETOOTH (WIRELESS)*. You can move back and forth between the different actions using the tab button (  ) of the keypad. Press Enter button (  ) of the keypad to perform the highlighted action.



8. The following screen appears.

START/STOP button: Start or Stop readings  
TOOLS button: Rx option menu  
Number of channels

Line number and direction  
Transmitter and receiver position  
Trigger channel count and voltage  
Memory number and Rx battery level

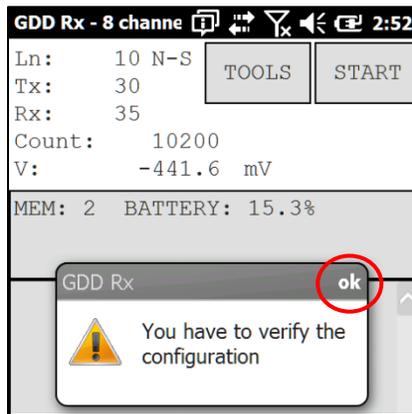
OK button: close the GDD Rx program

|          |           |
|----------|-----------|
| Ln:      | 10 N-S    |
| Tx:      | 30        |
| Rx:      | 35        |
| Count:   | 7000      |
| V:       | -435.2 mV |
| MEM:     | 2         |
| BATTERY: | 15.1%     |

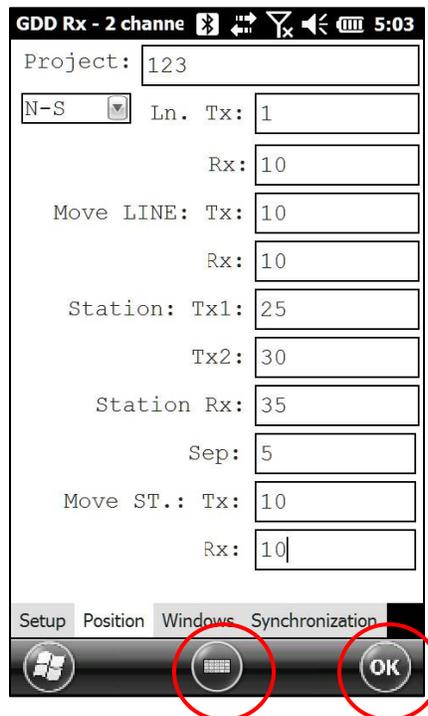
9. Click START (or press  $\rightarrow$ , and  $\leftarrow$  on the keypad) to begin the acquisition procedure.

|          |           |
|----------|-----------|
| Ln:      | 10 N-S    |
| Tx:      | 30        |
| Rx:      | 35        |
| Count:   | 7000      |
| V:       | -435.2 mV |
| MEM:     | 2         |
| BATTERY: | 15.1%     |

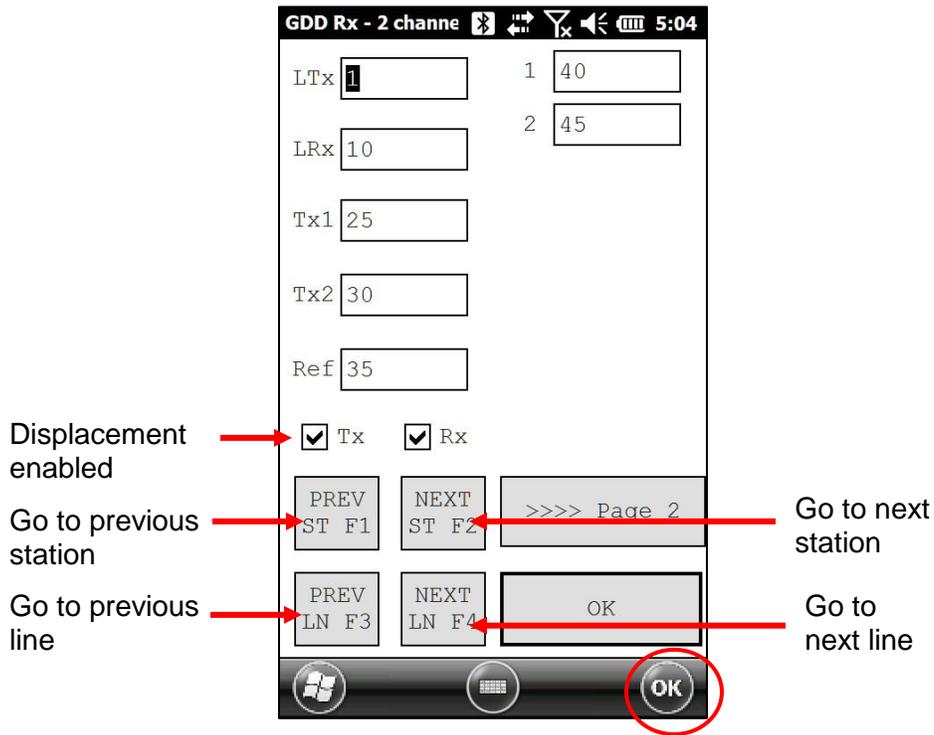
10. The following screen appears. Tap OK to continue.



11. Enter the project, line, station, move displacement, etc. for Tx and Rx. Use the virtual keyboard at the bottom of the screen or use the numeric keypad of the Archer<sup>2</sup> Field PC to enter numeric values. Use the tab button (➡) to advance the cursor to the next tab stop. Click OK (or press shift ⬆+5 OK on the keypad) to continue.

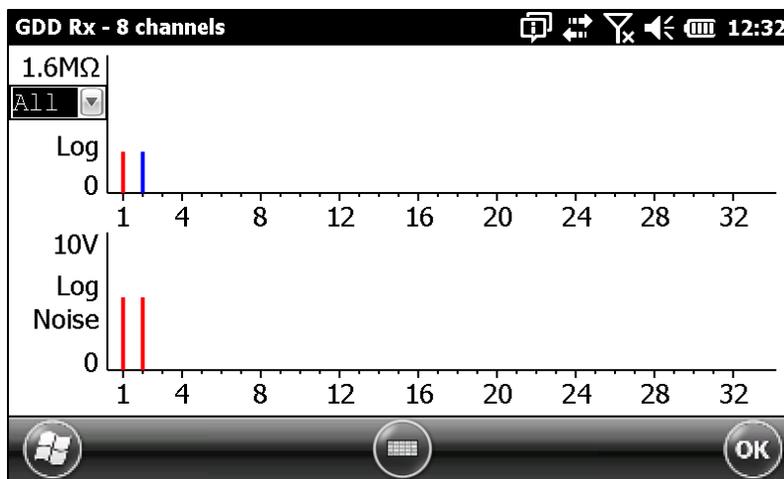


12. Verify if the positions are correct and click OK (or press shift  $\hat{U}$ +5 OK on the keypad) to continue.



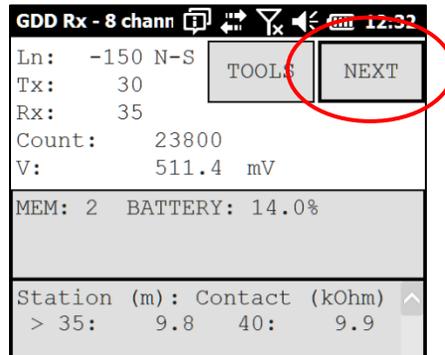
**IMPORTANT: F1 to F4 shortcut key are not available with the Archer<sup>2</sup>Field PC.**

13. The Contact and Noise graph appears. If the values displayed are normal, click OK (or press shift  $\hat{U}$ +5 OK on the keypad) to close the window.

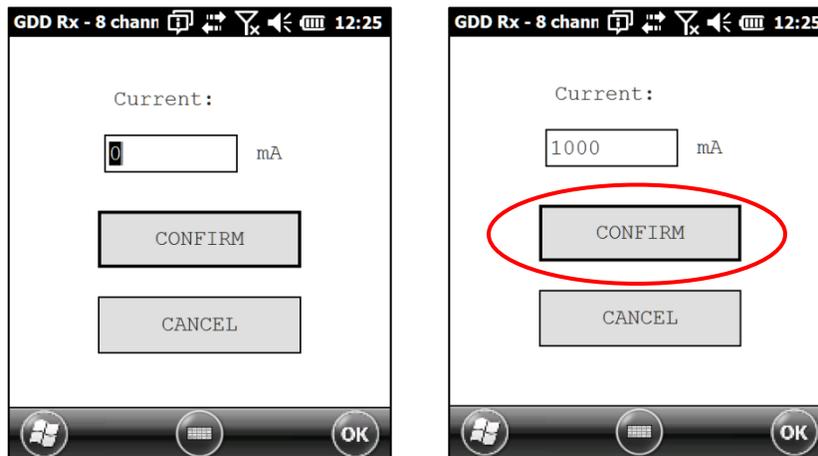


14. Click NEXT (or press Tab  $\rightarrow$ , and Enter  $\leftarrow$  on the keypad) to continue.

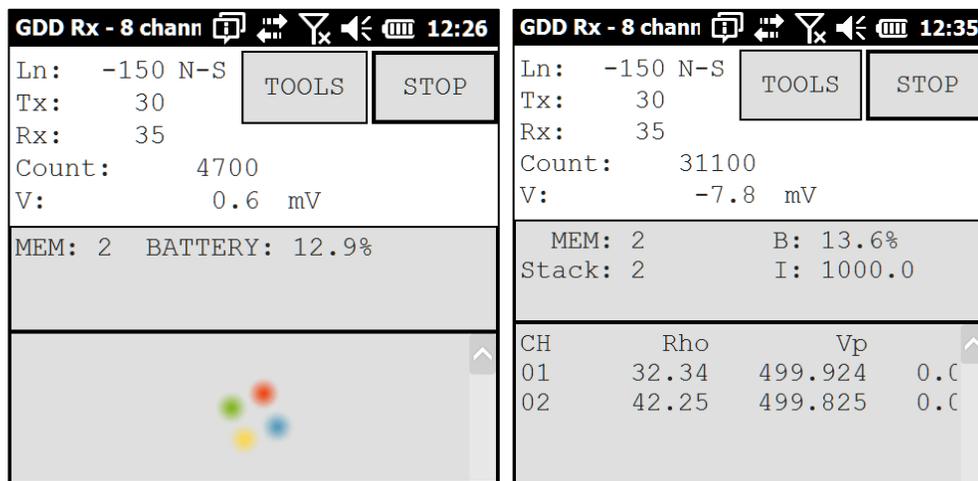
\*Note: If all stations show an INFINITE contact, the reference electrode might be disconnected.



15. Enter the transmitter current and click CONFIRM to start the readings.



16. The following screens appear.

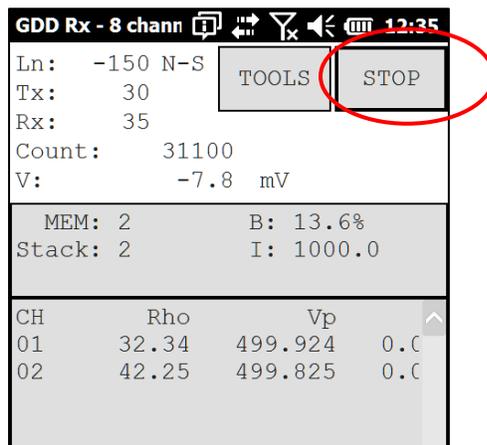


If using the optional GDD-RTE01 communication box (refer to section 8.2.5) to collect live information broadcasted by the GDD Tx4 IP transmitter, the Tx current "I" and power "P" can be displayed alternatively in the Rx main screen under the TOOLS and STOP/START buttons. To switch from one information to the other, use the following shortcut Key: "V" or click on the text label directly on the screen.

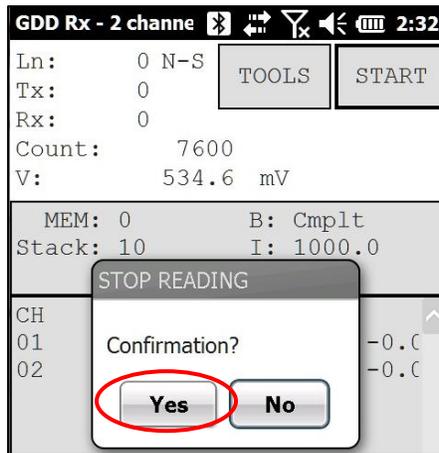


If no transmitter information can be received at the GRx2, the following symbol will be displayed instead of I and P: N/A.

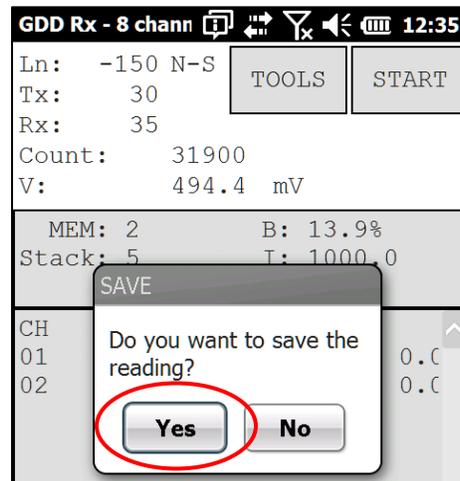
- Click STOP or wait until the end of the acquisition to stop the readings and save the data.



- Click YES to confirm the operation.

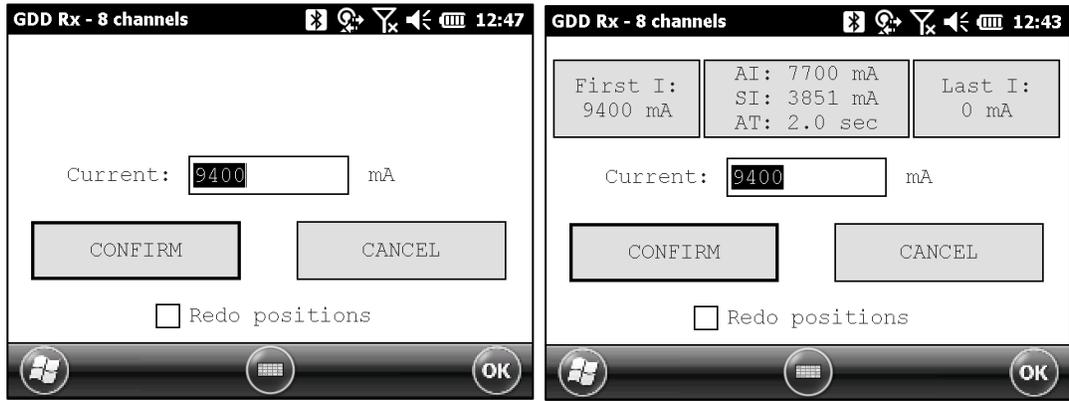


19. Click YES to save readings into the memory.



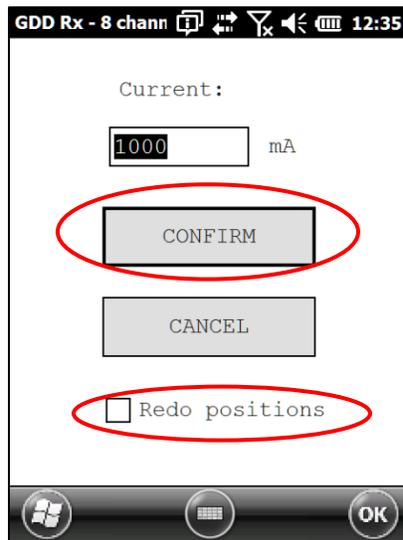
20. Re-enter the transmitter's output current value if it has changed and click CONFIRM to save the current value.

If using the optional GDD-RTE01 communication box (refer to section 8.2.5) to collect live information broadcasted by the GDD Tx4 IP transmitter, this menu will show additional Tx current options to choose as the final "I" value. These are the first "I" transmitted, the average "AI" (with information regarding Standard Deviation "SI" and average time between each Tx values broadcasted "AT") and the last "I" transmitted. Click on one of the corresponding button.



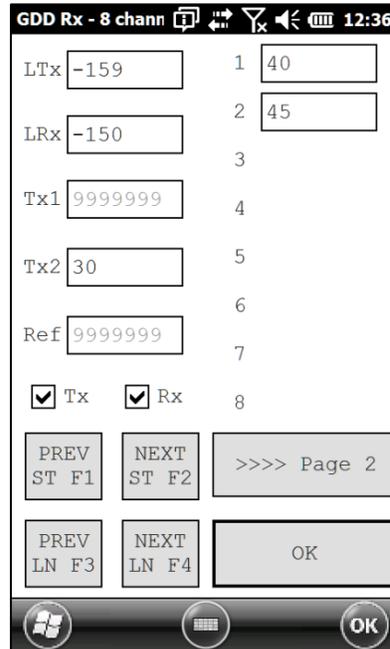
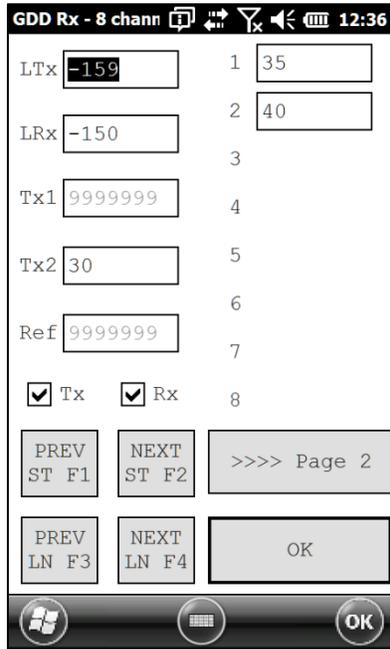
Check the REDO POSITIONS option to change the transmitter or receiver position.

Change the current value if it has changed and click CONFIRM to save the current value.

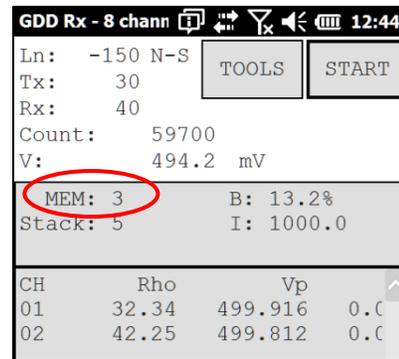
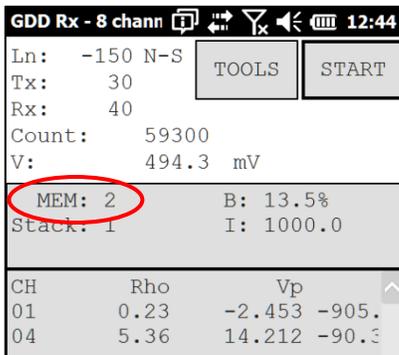


20.1. If the REDO POSITIONS option is checked, enter the transmitter and receiver position and click OK.

\*Each position can be changed individually or moved by clicking Next or Prev.



Once your acquisition is finished, use Left and Right arrow buttons (shift  $\uparrow$  + 4  $\leftarrow$  or 6  $\rightarrow$ ) to compare your current data with that of your previous acquisitions. Use the Up and Down arrows to see all the channels. By clicking on Start, the program will automatically come back to the last acquisition and will start a new acquisition procedure.



21. Repeat steps 9 through 20 to take another set of readings.

## 6 RS232/Bluetooth communication

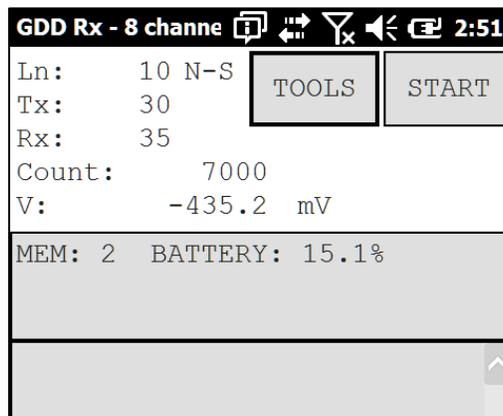
1. Select the “RS-232” communication mode to use the GRx2 with a serial communication cable.



2. Select the “BLUETOOTH” communication mode to use the GRx2 with a wireless connection.



3. The following screen appears and you are ready to begin.



In Bluetooth mode, if a “COM Error” message appears, see *Section 12 – Troubleshooting*.

## 7 *Cold weather and harsh environments tips*

The GRx2 receiver is designed to be used in cold weather (up to -40°C) but it is very important to consider these few tips to prevent damages or malfunctions:

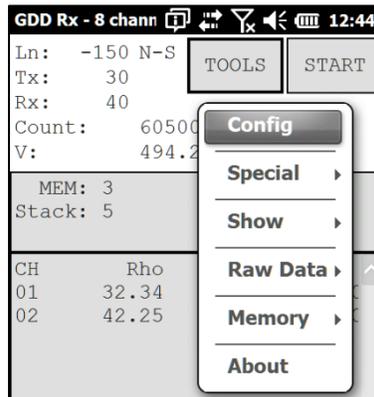
1. Never charge the internal batteries of the GRx2 in sub-zero;
2. As much as possible, turn on the GRx2 receiver in a warm place before using it in cold weather;
3. Never turn off the GRx2 receiver when using it in cold weather to keep the batteries warm;
4. If possible, use the serial communication (RS-232 cable) between the Archer<sup>2</sup> PDA and the GRx2 to prevent malfunction of the Bluetooth communication, and to maximize the battery charge.

When using the GRx2 receiver during rainy days, please consider the following tips to ensure a long term instrumental reliability:

1. The receiver's control panel, including each connector and input channel, is water resistant. Nevertheless, it is important to bring the receiver back at the base of operation after each day, to leave the pelican case lid open and to remove the connectors' cap so that humidity is freed from the instrument;
2. If possible while collecting data, close the lid of the pelican case to avoid water to soak the jack connectors and potentially short the channels;

## 8 Tools menu

Click TOOLS to select one of the following options or press **→|**, and **←|** on the keypad to open the Tools menu, and press shift **↑ + 8 ▾** or **2 ▲** to highlight the different options. Then press **←|** to open the highlighted option.



### Config

Use the CONFIG option to change:

- Staking parameters
- Electrode array
- Active channel
- Trigger channel
- Line number and position
- Transmitter and receiver position
- Signal timing
- Mode
- GPS time synchronization

### Special

Use the SPECIAL option to:

- Reinitialize the GRx2
- Test the GRx2 with the internal simulator
- Set signal processing options
- Select battery type (if not automatically detected)
- Open Port (enables the RF (radio frequency) communication between GDD's IP transmitter Tx4 and receiver using the optional GDD-RTE01 box.

## **Show**

Use the SHOW option to display:

- Hotkeys (shortcut keys menu)
- Pseudosection
- Signal graph
- Contact and Noise monitor graph
- Vp and Cycle synchronization graph
- Decay curve
- Windows chargeability
- SP (self potential)

## **Raw Data**

Use Raw Data options to:

- Check GPS
- Start recording a Binary Data File (.bdf)

## **Memory**

Use the MEMORY option to:

- See the History
- Recall the previous memory
- Clear the memory
- Save data in a file

## **About**

Use the ABOUT option to display GDD Rx software version number.

## 8.1 Config option

### 8.1.1 Setup

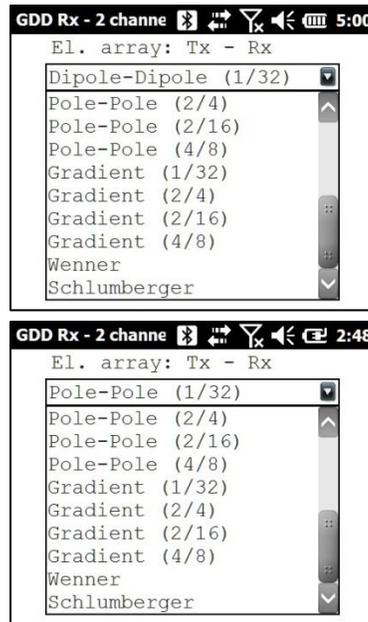
The SETUP option is used to set the electrode arrays, the active channel(s) and the trigger channel.

1. Select Tools | Config | Setup, the following window appears.



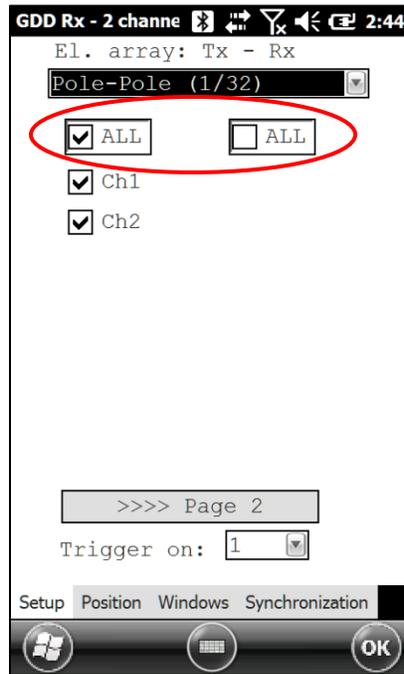
2. Select the electrode arrays configuration.

- Dipole-Dipole (1/32)
- Pole-Dipole (1/32)
- Pole-Pole (1/32)
- Gradient (1/32)
- Wenner
- Schlumberger

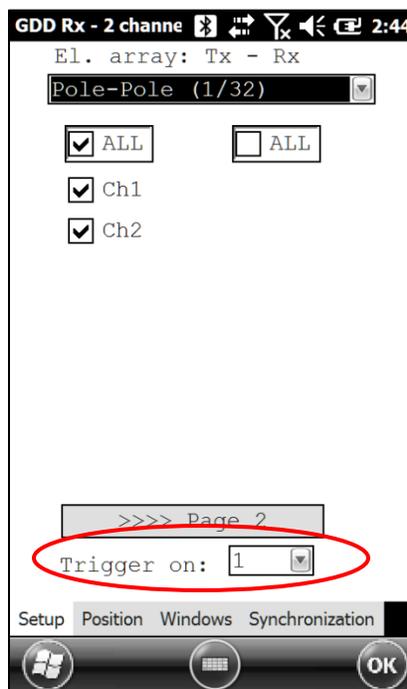


**IMPORTANT:** Dipole-Dipole (2/16), Dipole-Dipole (4/8), Pole-Dipole (2/16), Pole-Dipole (4/8) and other modes (2/16) or (4/8) are used with a 16 or 32 channels receiver only.

3. Check the active channel(s). Tap on the  ALL checkbox to select all channels or tap on the  ALL checkbox to unselect all channels.



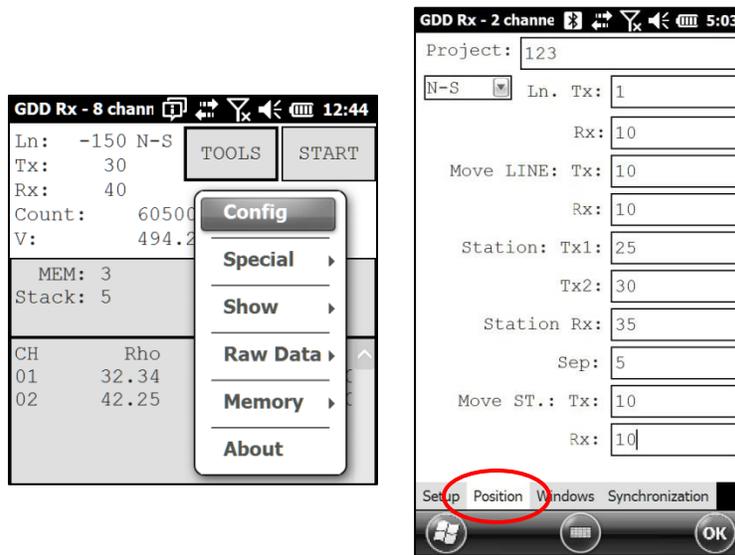
4. Select the trigger channel, this channel is used for the synchronization process.



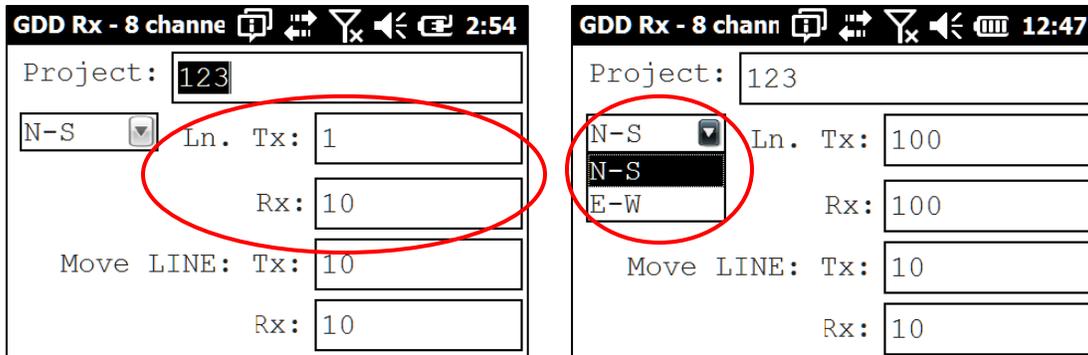
## 8.1.2 Position

The POSITION tab is used to set these parameters: the Tx line number, the Rx line number, the line direction, the transmitter position (Tx1 and Tx2), the receiver position, the separation, the transmitter movement offset and receiver movement offset.

1. Select Tools | Config | Position



2. Enter line number and select line direction. Use the keyboard at the bottom of the screen or use the numeric keypad of the Archer<sup>2</sup> Field PC.



A negative number cannot be entered for line; the labels N, S, E and W are used to define direction.

3. Enter the transmitter and receiver first electrode position.

The screenshot shows the 'GDD Rx - 8 chann' interface. The 'Project' field is set to '123'. The 'Ln.' dropdown is set to 'N-S'. The 'Tx' field is '100'. The 'Rx' field is '100'. The 'Move LINE' section has 'Tx' and 'Rx' both set to '10'. The 'Station' section has 'Tx1' set to '0', 'Tx2' set to '30', and 'Station Rx' set to '40'. The 'Sep' field is '5'. A red oval highlights the 'Station Tx1', 'Tx2', and 'Station Rx' fields.

A negative number is used to define South and West direction.

4. Enter the separation between electrodes of the receiver.

The screenshot shows the 'GDD Rx - 8 chann' interface. The 'Project' field is '123'. The 'Ln.' dropdown is 'N-S'. The 'Tx' field is '100'. The 'Rx' field is '100'. The 'Move LINE' section has 'Tx' and 'Rx' both set to '10'. The 'Station' section has 'Tx1' set to '0', 'Tx2' set to '30', and 'Station Rx' set to '40'. The 'Sep' field is '5'. A red oval highlights the 'Sep' field.

A negative number is used to define South and West direction.

5. Enter the transmitter and receiver electrodes moving distance.

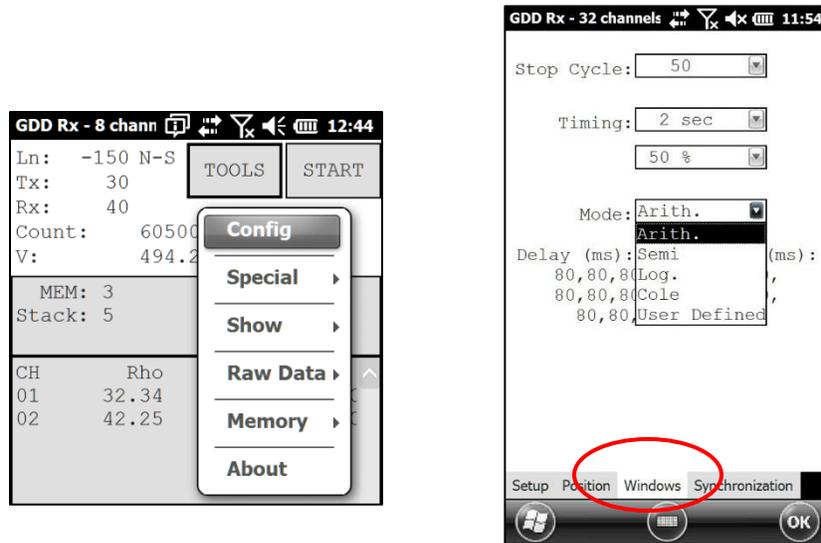
The screenshot shows the 'GDD Rx - 2 channe' interface. The 'Project' field is '123'. The 'Ln.' dropdown is 'N-S'. The 'Tx' field is '1'. The 'Rx' field is '10'. The 'Move LINE' section has 'Tx' and 'Rx' both set to '10'. The 'Station' section has 'Tx1' set to '25', 'Tx2' set to '30', and 'Station Rx' set to '35'. The 'Sep' field is '5'. The 'Move ST.' section has 'Tx' and 'Rx' both set to '10'. A red oval highlights the 'Move LINE' section, and another red oval highlights the 'Move ST.' section.

A negative number is used to define South or West direction.

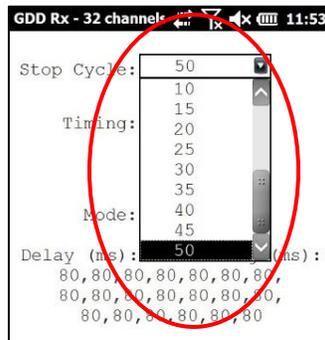
### 8.1.3 Windows

The WINDOWS option is used to set the signal timing and the mode.

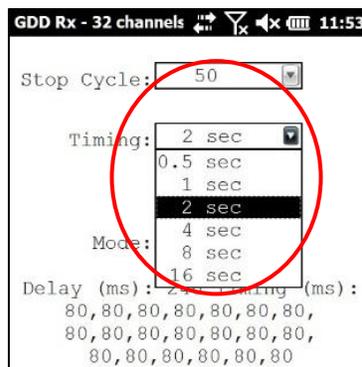
1. Select Tools | Config | Windows. The following screen appears.



2. Select the maximum number of stacks.



3. Select the signal timing.





- Logarithmic

Windows: 4  
 Delay (ms): 160  
 Timing (ms): 2000  
 120, 220, 420, 820

- Cole

Windows: 20  
 Delay (ms): 20  
 Timing (ms): 2000  
 20, 30, 30, 30, 40, 40, 50, 60, 70, 80,  
 90, 100, 110, 120, 130, 140, 150, 160, 180, 200

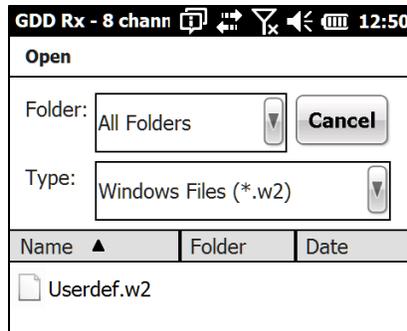
- User defined

Windows: between 1 and 20  
 Delay (ms): user defined  
 Timing (ms): user defined

In the USER mode, you can load settings you have saved before, or you can create new settings.



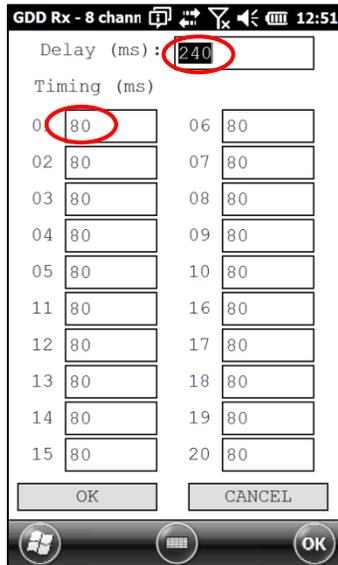
Click YES to load your settings from a previously saved file. This window will appear.



In this dialog box, select your file. The Windows window appears automatically. Click OK. The saved values will be loaded in the User defined mode.

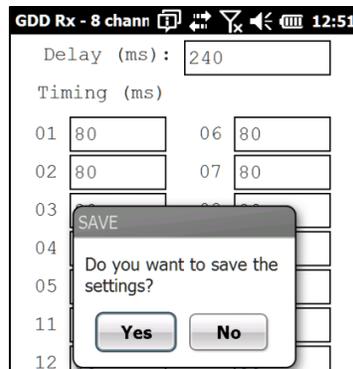
OR

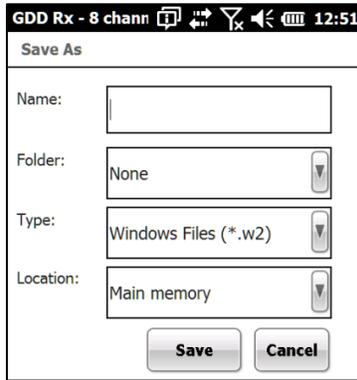
Click NO to manually enter the delay and window(s) width.



Click OK when your settings are configured.

Click YES to save your new settings.

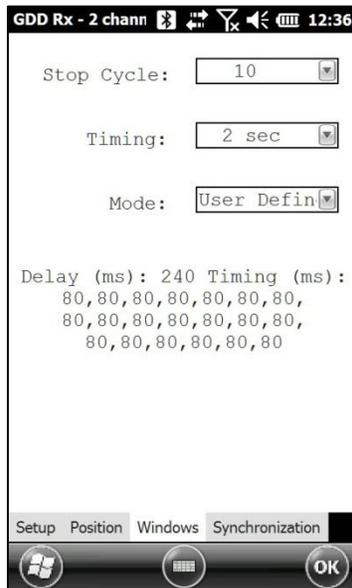




Enter your filename and the location where you want to save your file. The User defined settings will be saved so you can reload them in the Archer<sup>2</sup> Field PC later.

Click NO if you do not want to save your User defined settings in a file.

In all cases, you will be brought back to this display and the settings you have entered in the User defined window will be loaded into the Archer<sup>2</sup> Field PC.



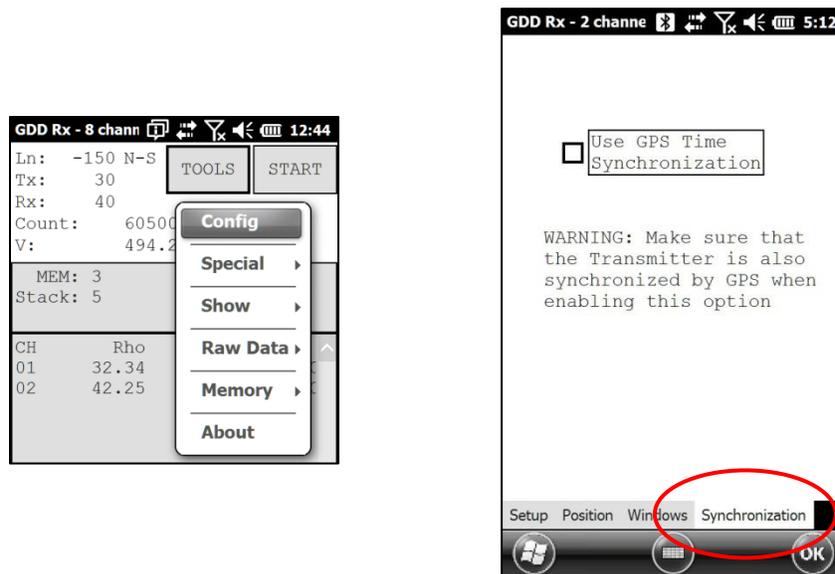
## 8.1.4 Synchronization

Use the GPS time synchronization if you need to synchronize your receiver to your transmitter using GPS time.

### Requirements:

- Your receiver must be equipped with an internal GPS module.
- Your Archer<sup>2</sup> PDA must have the Rx software version # 4.3.39 and your receiver must have Rx firmware # 0.5.1.7 (or newer versions).
- Your transmitter (itself or linked to another unit) must be synchronized with a GPS.

1. Refer to *Section 8.4* to verify if a satellite is being tracked by the GPS module of your receiver.
2. Select Tools | Config | Synchronization. The following screen appears.



3. Check *Use GPS Time Synchronization* to enable the GPS synchronization.



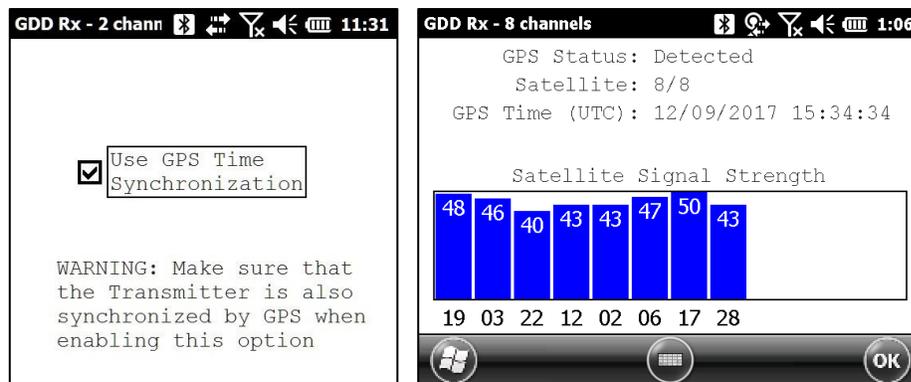
**IMPORTANT: Make sure that your transmitter is also synchronized by GPS before using this option.**

**Note that the GPS synchronization is disabled every time you start the program even if you checked it the last time you used it.**

4. Before starting your acquisition process, make sure your transmitter and your receiver are well synchronized:
  - Wait for about 15 minutes before taking your first reading to ensure that the GPS module of the receiver gets the real UTC GPS time.
  - If possible, compare the GPS time of your transmitter with the GPS time of your receiver. They must have exactly the same GPS time (see *Section 8.4* to know how to get the GPS time of the receiver).
5. During the acquisition process, you can verify if your receiver is still synchronized with GPS (see *Section 8.4* to know how to verify the GPS signal):

#### GPS well synchronized

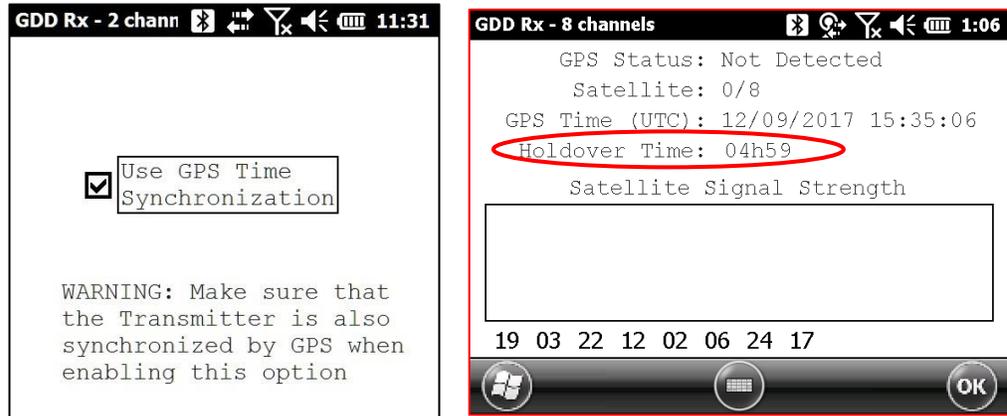
If you checked *Use GPS Time synchronization* and if a GPS signal is detected, your receiver will be synchronized with GPS.



**IMPORTANT: it does not confirm that your receiver is well synchronized with your transmitter. In the case that your transmitter and your receiver are not well synchronized together, your data could be erroneous.**

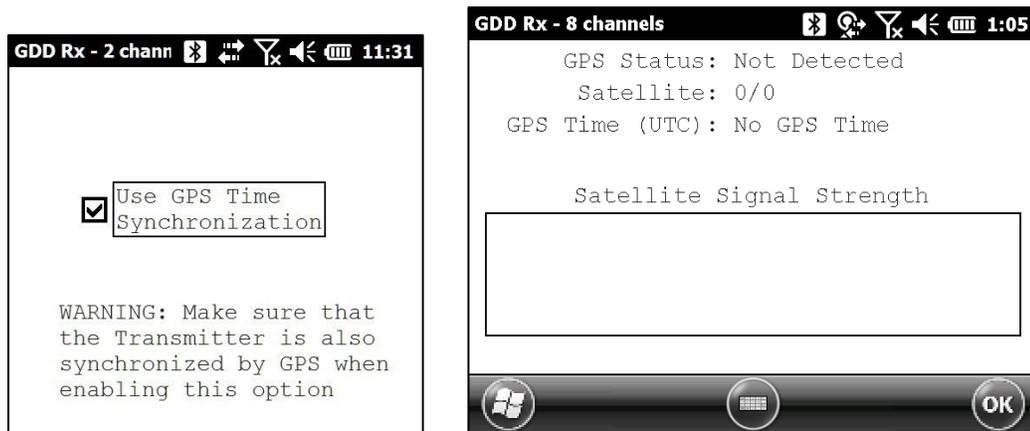
## GPS signal lost for less than 5 hours

If you checked *Use GPS Time synchronization* and if the GPS signal is lost for less than 5 hours, your receiver will still be synchronized with GPS using the internal GPS clock.



## No GPS signal from the beginning, GPS signal lost for more than 5 hours or Use GPS Time synchronization unchecked

If you checked *Use GPS Time synchronization* and if there is no GPS signal or if it is lost for more than 5 hours, the receiver will automatically switch to synchronize with the ground signal.



Note that the data acquired with the GPS synchronization can be more accurate than those acquired with the ground signal, especially over noisy environment.

**IMPORTANT:** During the acquisition process, if all your  $V_p$  values are negative, you can switch the polarity of the current transmission at the transmitter (switch the wires at the HV block) and all de  $V_p$  will become positive.

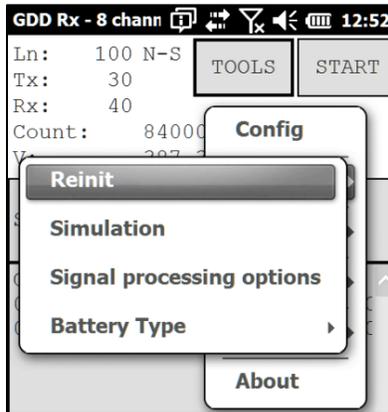


## 8.2 Special option

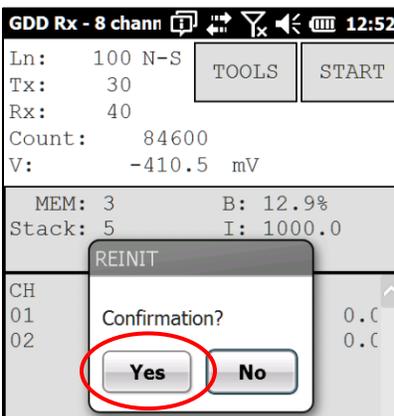
### 8.2.1 Reinit

The REINIT option is used to reset GRx2 communication with the Archer<sup>2</sup> Field PC. This option is useful when the Bluetooth communication is lost.

1. Select Tools | Special | Reinit



2. Click YES to reinitialize the GRx2.



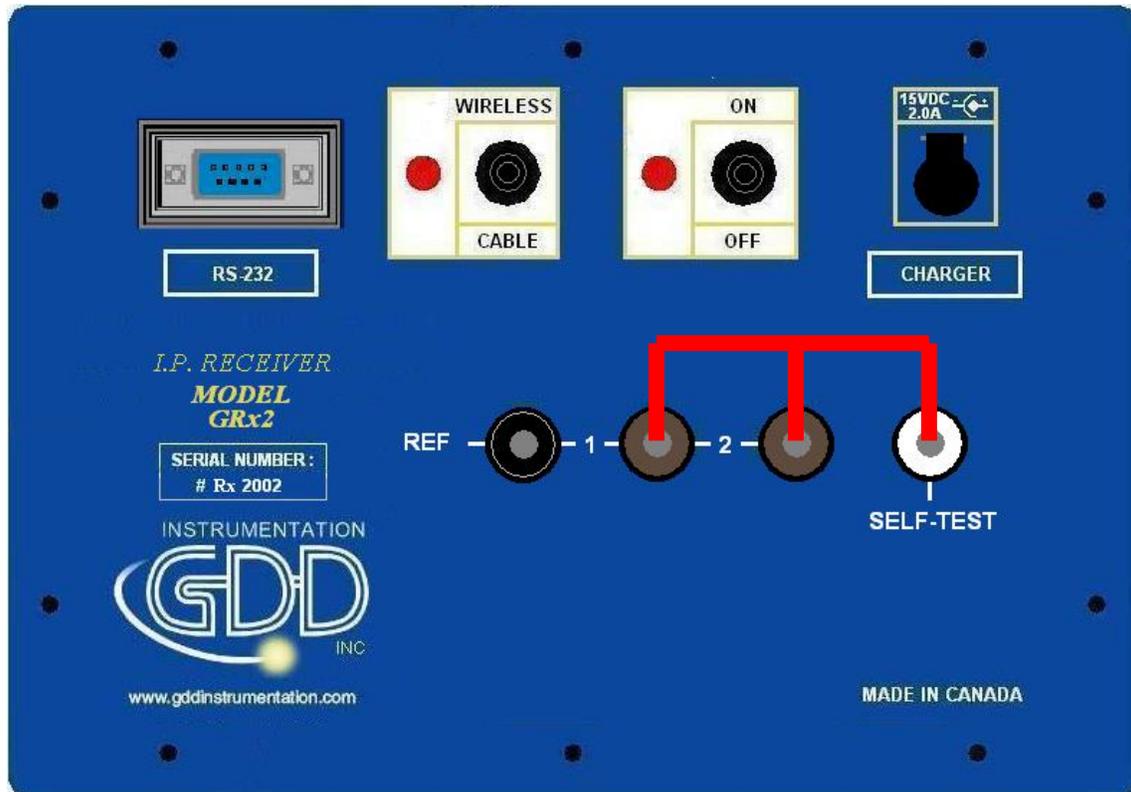
**\*\*\* WARNING \*\*\***

Please ensure your MEM number is the same than before having reinitialized your GRx2. If MEM displays a 0 value, you may need to exit the GDD\_Rx software, wait 15 seconds and start the application again. The MEM should be back to its original count. This issue happens when the PDA does not detect the SD card.

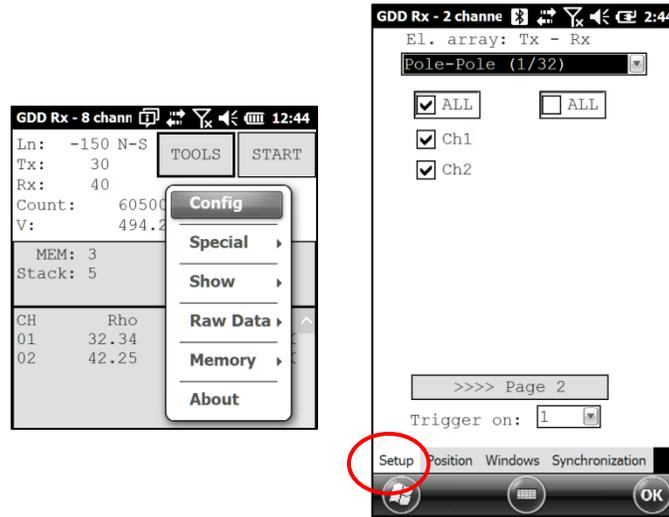
### 8.2.2 Simulation

The SIMULATION option is used to perform a self test with the internal waveform generator (**you need to select the Pole-Pole configuration to use this option**).

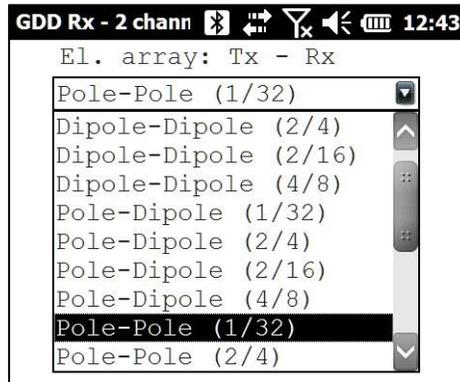
1. Short the SELF-TEST terminal with the channel(s) you want to test. The picture below shows a self-test with the two channels.



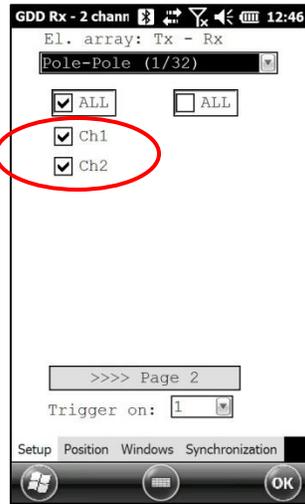
2. Turn ON the receiver.
3. Select Tools | Config | Setup



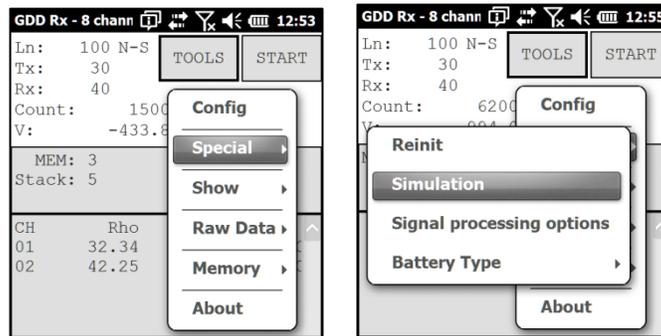
4. Select the Pole-Pole (1/32) array configuration.



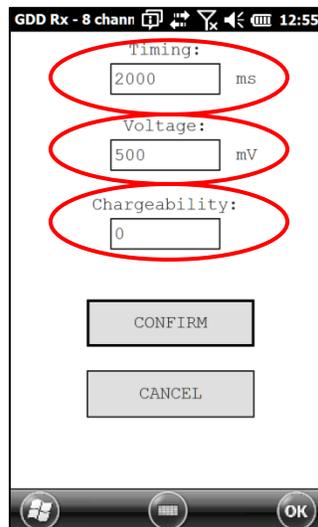
5. Check the channel(s) you want to test. Click Ok.



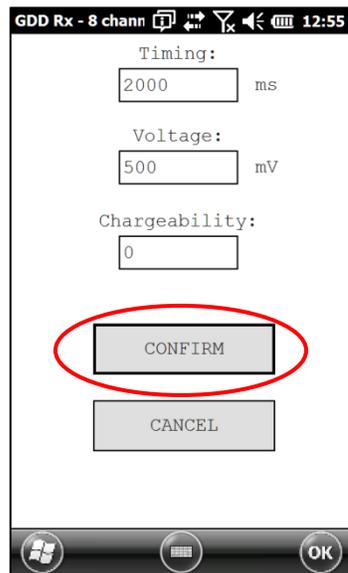
6. Select Tools | Special | Simulation



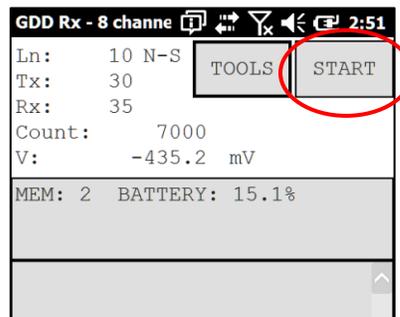
7. Enter the waveform timing (default = 2000ms).
8. Enter the primary voltage (default = 500mV).
9. Enter the chargeability (default = 0).



- Click on CONFIRM. The output signal of the self-test electrode will be activated only once you have click on CONFIRM.



- Click START to begin the acquisition process.

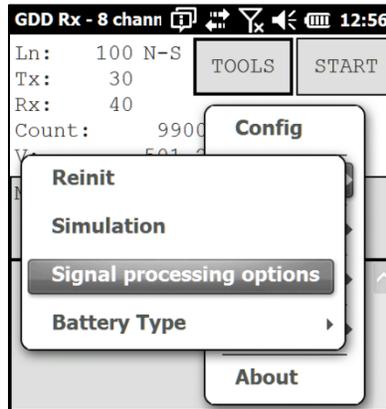


- It is important to disable the self-test output signal before starting a new acquisition process to prevent any erroneous values caused by the noise induced by the internal waveform generator. Go to simulation window and enter 0mV in the Voltage field.

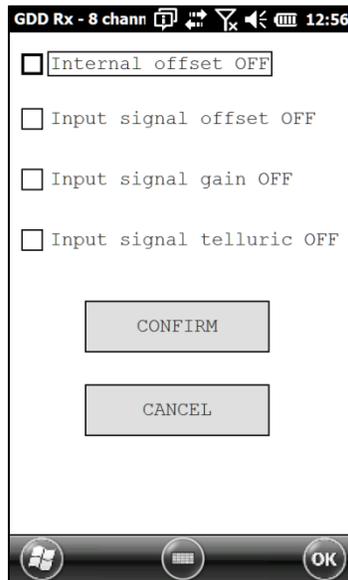
### 8.2.3 Signal Processing Options

The SIGNAL PROCESSING OPTIONS are used to disable the default gain and offset settings. When offset and gains are applied, the signal to noise ratio is improved.

1. Select TOOLS | Special | Signal Processing Options



2. Check the checkboxes of the settings you want to disable and click CONFIRM.

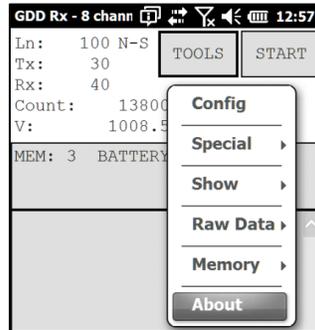


**Note that the gains and offsets are enabled (applied) every time you start the GDD Rx program again even if you disabled them the last time you used them.**

## 8.2.4 Battery type

With GRx8-32 firmware version 2.5.5 or higher, the GDD Rx program detects the type of batteries in the receiver automatically. It cannot be done with GRx2.

Select Tools | About



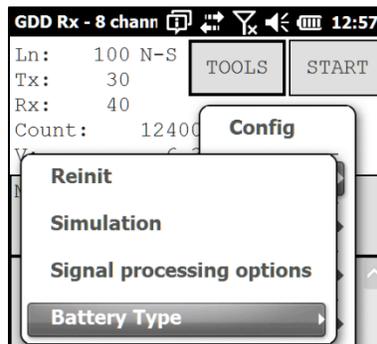
If a battery type is detected, the information will appear in the *About* pop-up window.

If the GDD Rx program cannot detect the battery type (GRx8-32 firmware 2.5.4 or earlier, or GRx2 receiver), the *About* pop-up window will indicate *Battery Type: not detected*.

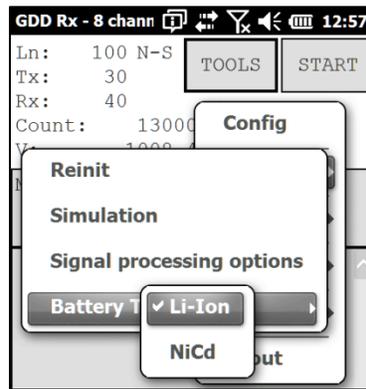


In which case, it is possible to select the battery type manually.

Select Tools | Special | Battery Type



Select the type of batteries in your receiver. **All GRx2 receivers have Li-Ion batteries.**

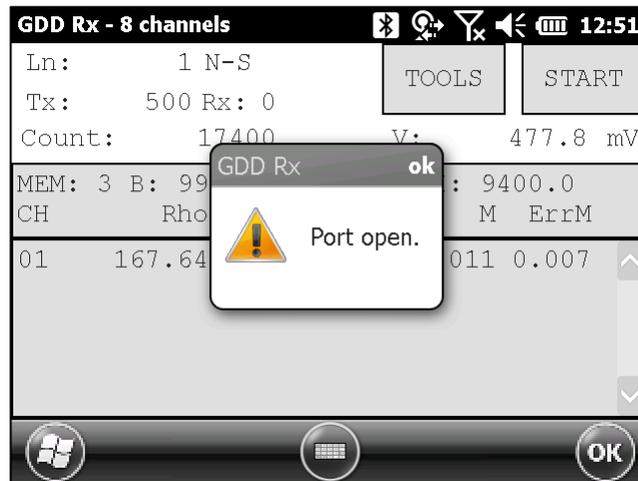


If you select the wrong battery type, the battery level indicated in the main window of the GDD Rx program will be slightly different from the actual value.

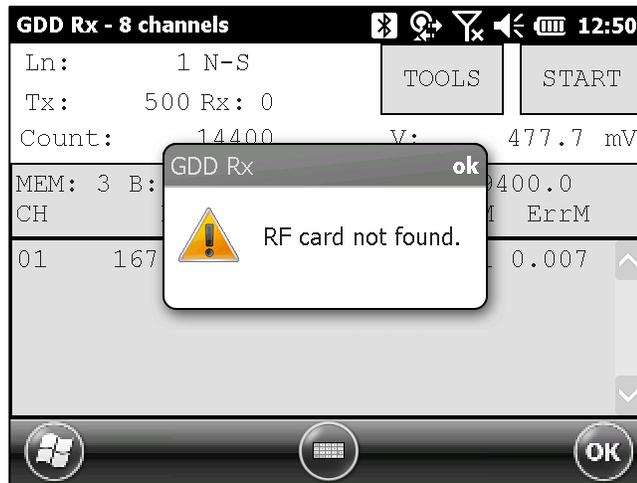
### 8.2.5 Open Port

The OPEN PORT option is used to enable the Tx-Rx RF communication when using the optional GDD-RTE01 box.

1. Connect the optional GDD-RTE01 box to the USB port of your Archer<sup>2</sup>
2. Select Tools | Special | Open Port



If the GDD-RTE01 box is not connected or defective, the following message will pop up.

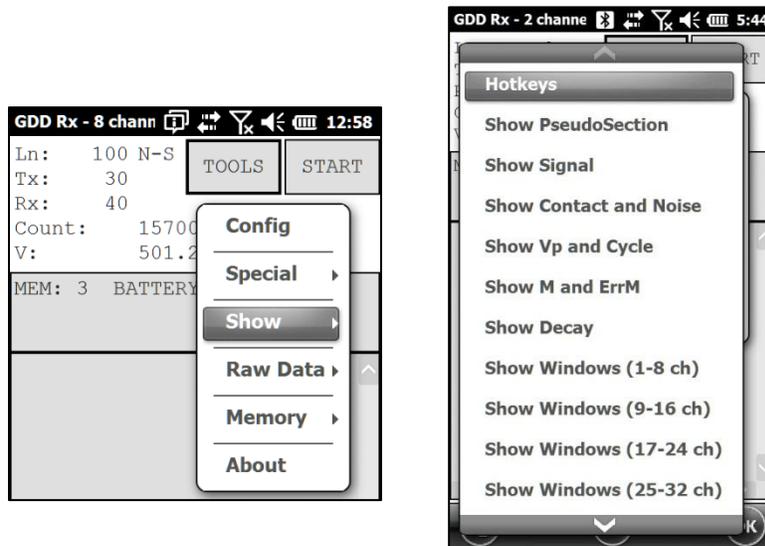


## 8.3 Show option

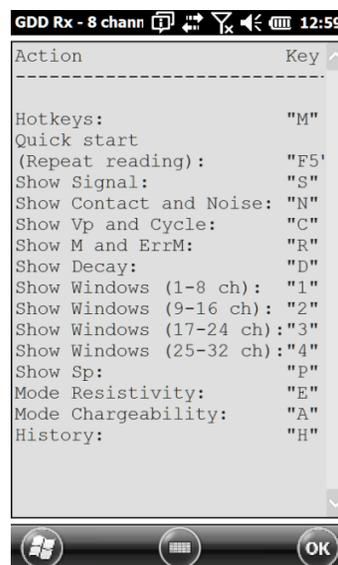
### 8.3.1 Hotkeys

The HOTKEYS option is used to display the shortcut keys menu.

1. Select Tools | Show | Hotkeys



2. The following screen appears.

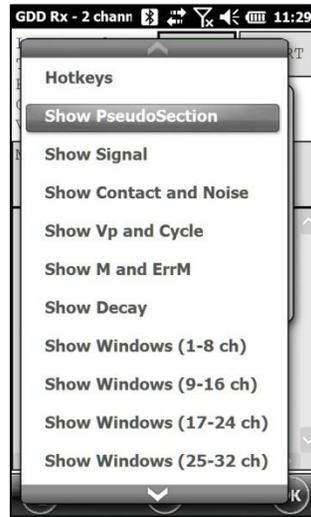


Use the shortcut keys to navigate quickly between the different options.

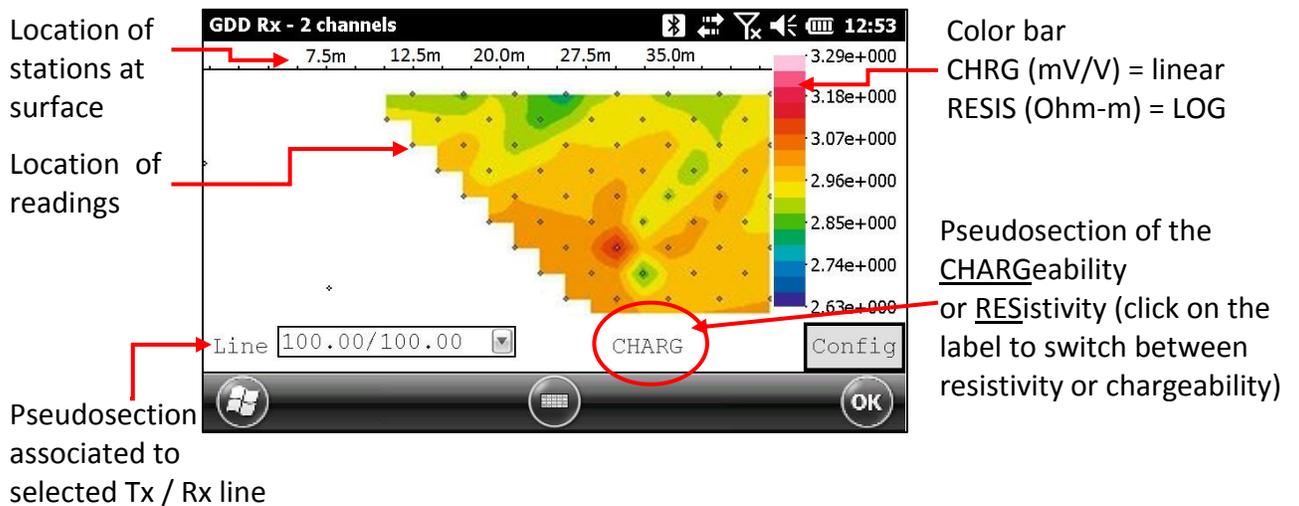
### 8.3.2 Pseudosection

The Pseudosection option is used to display the calculated pseudosection (in color) for each surveyed line.

1. Select Tools | Show | Show Pseudosection



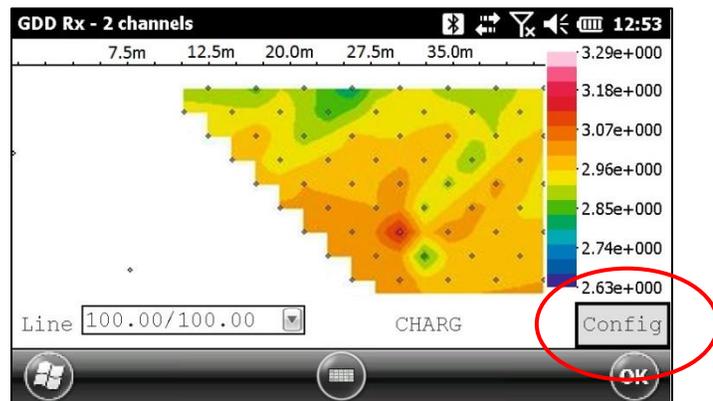
2. The following screen appears.



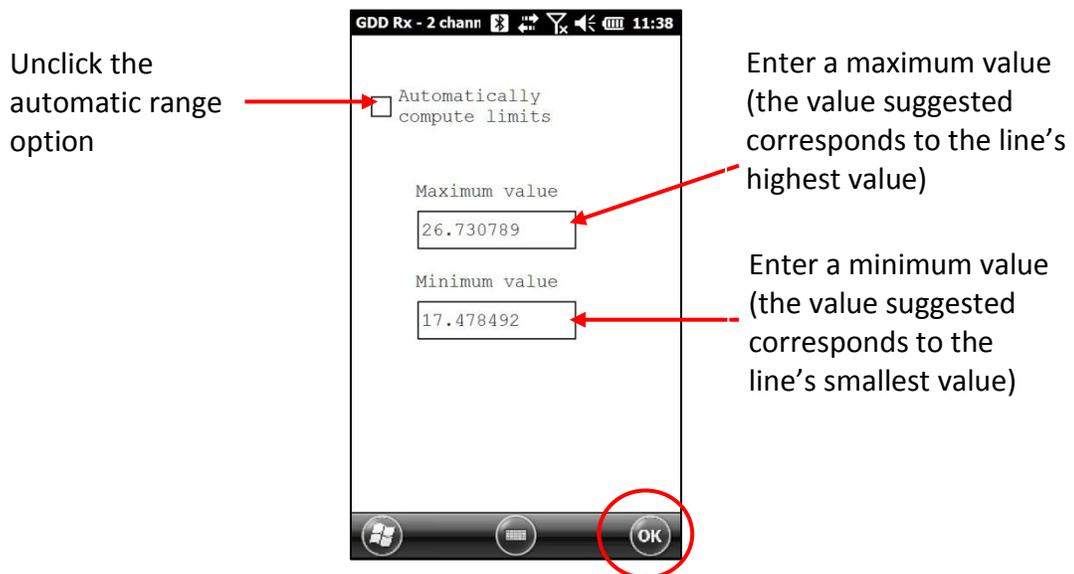
Note: Use the hotkey 'I' to invert the Pseudo colors

3. Color bar editing.

Click on the “Config” button in the pseudosection main screen.



The following screen appears.



To validate and go back to the pseudosection view, click on the OK button.

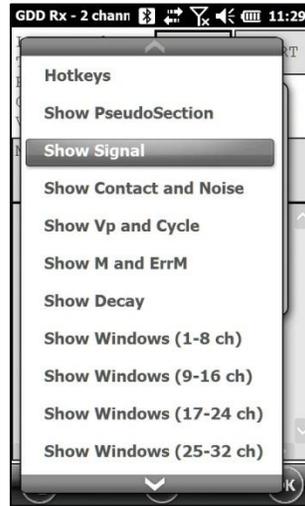
4. To visualize the whole pseudosection, use arrow buttons (shift  $\uparrow$  + 4 $\leftarrow$  or 6 $\rightarrow$ ) on the PDA keyboard:



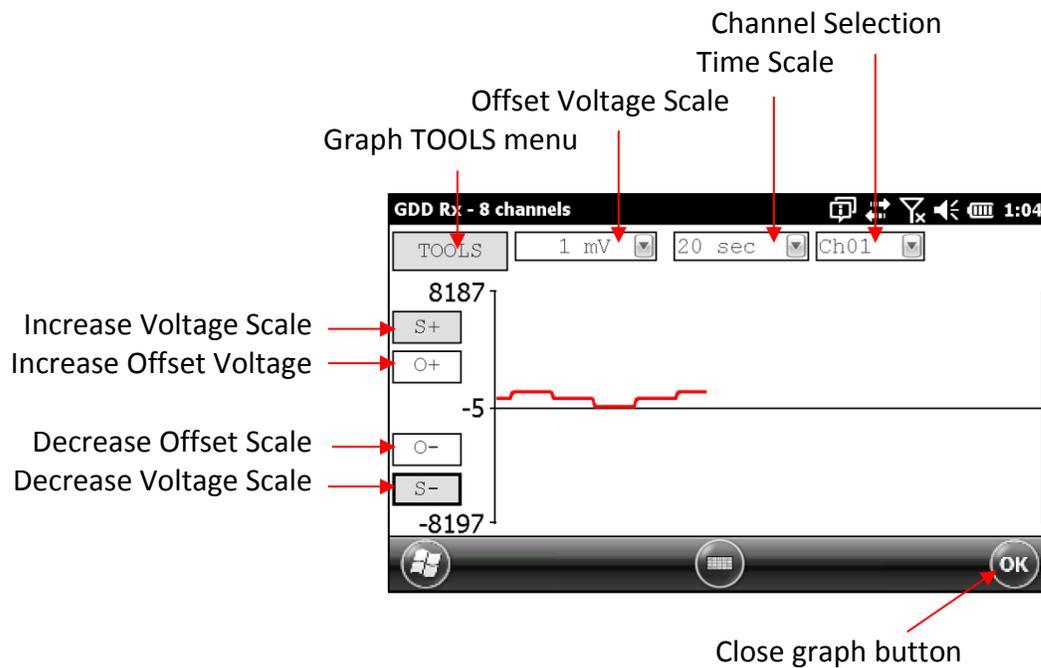
### 8.3.3 Signal

The SIGNAL option is used to display the signal graph of a selected channel.

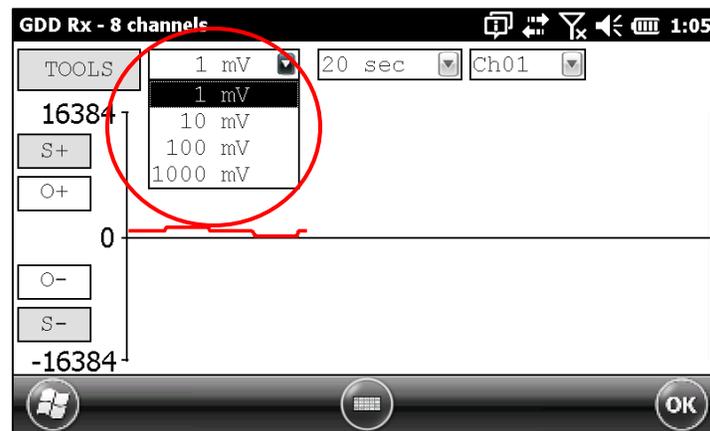
1. Select Tools | Show | Show Signal



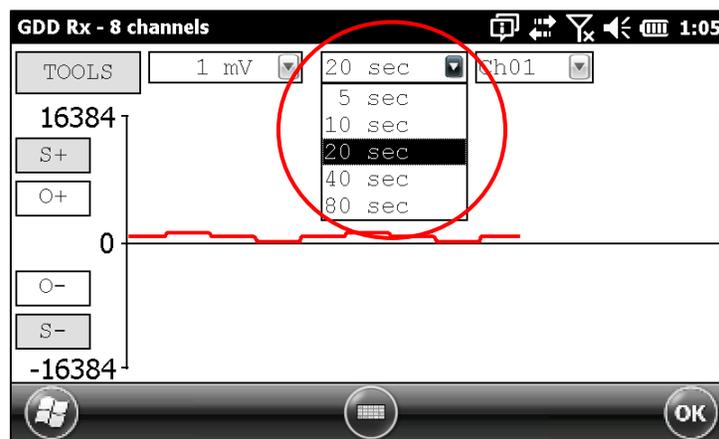
2. The following screen appears.



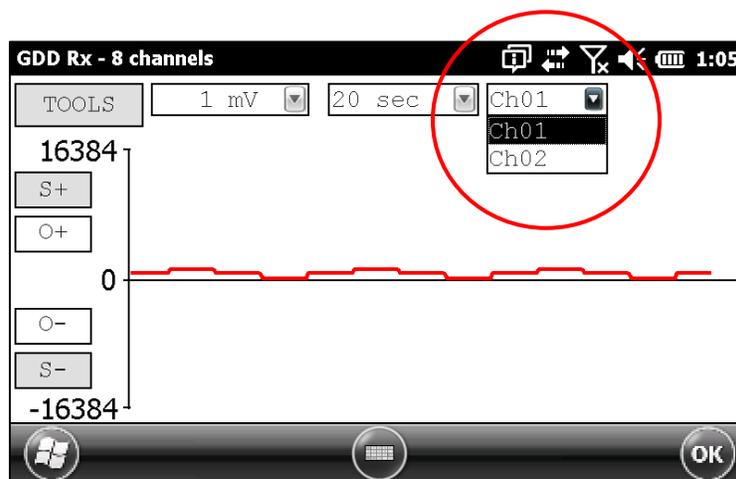
3. Select offset voltage scale.



4. Select time scale.



5. Select display channel

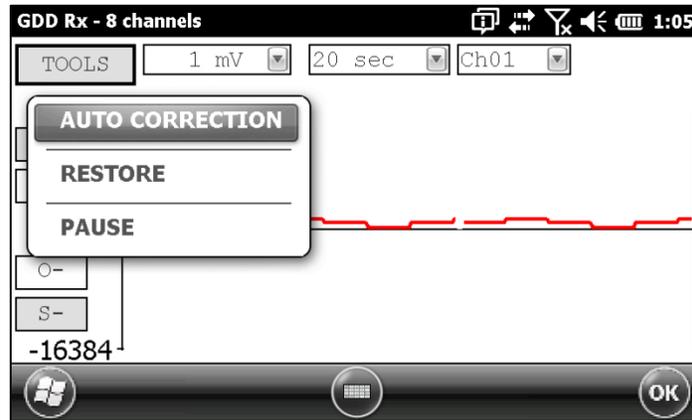


### 8.3.3.1 Tools menu

#### 8.3.3.1.1 Auto Correction

The AUTO CORRECTION option is used to optimize the graph scale and correct the offset of the signal. This option should be used after one signal period (8 sec for a 2 sec time base).

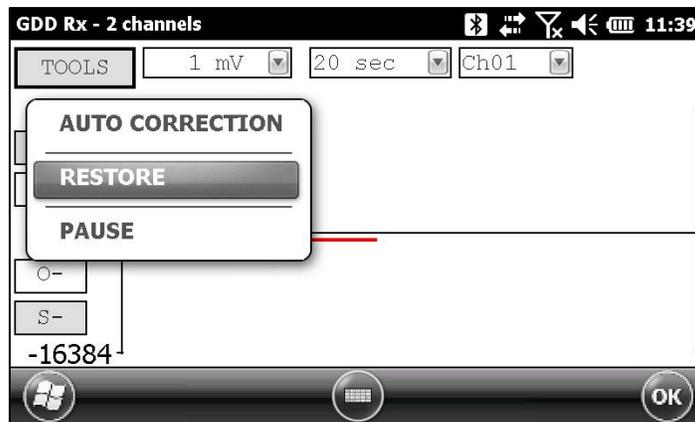
1. Select Tools | Auto Correction



#### 8.3.3.1.2 Restore

The RESTORE option is used to reset the settings to default.

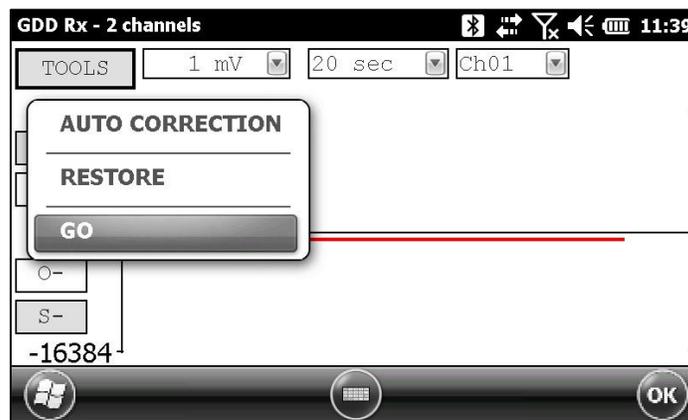
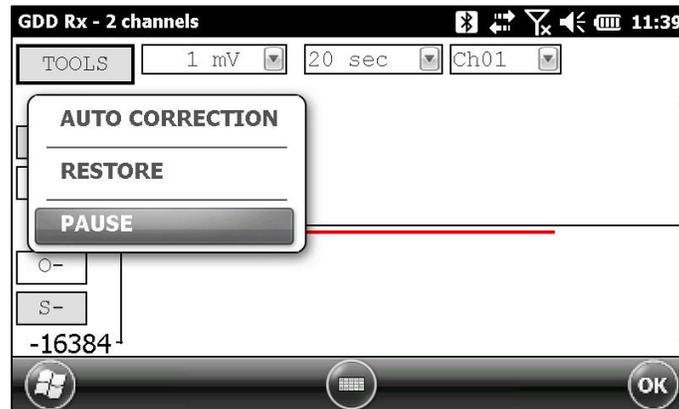
1. Select Tools | Restore



### 8.3.3.1.3 PAUSE/GO

The PAUSE/GO option is used to pause or play the signal.

1. Select Tools | Pause or Tools | Go

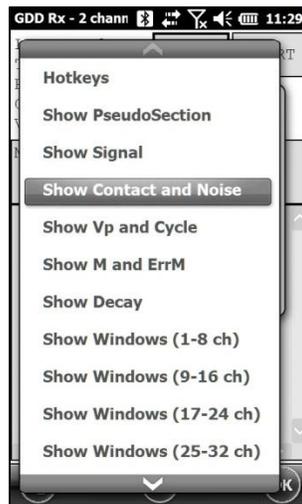


### 8.3.4 Contact and Noise

The CONTACT AND NOISE option is used to display the noise graph of all channels. This option can be useful for troubleshooting if you have noise problem. The Contact graph shows the contact resistance between your electrodes and the ground.

\*This option should be used before your transmitter sends current. If the transmitter sends current, the Vp signal will be displayed for each active channel.

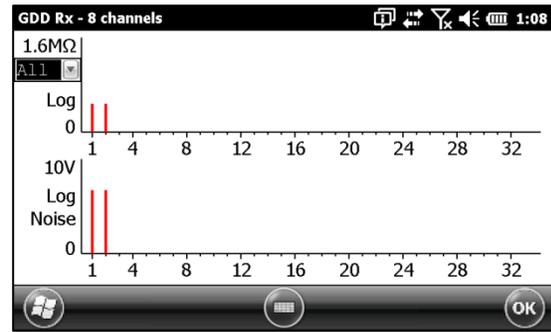
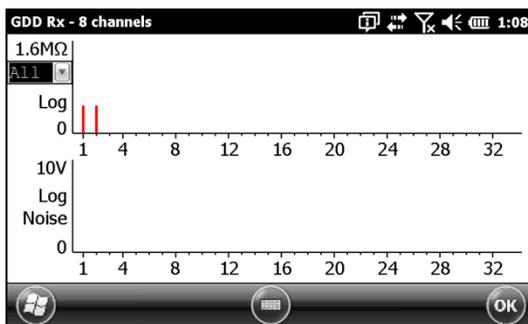
1. Select Tools | Show | Show Noise



2. The following screen appears.

Transmitter is *not* sending current

Transmitter is sending current

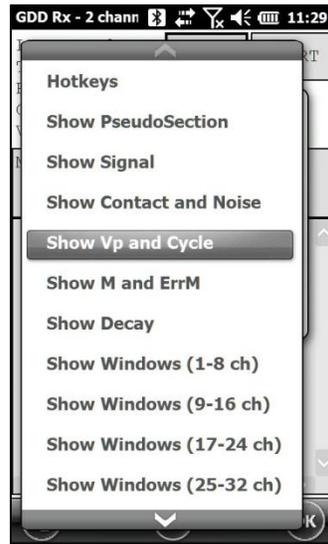


### 8.3.5 Vp and Cycle

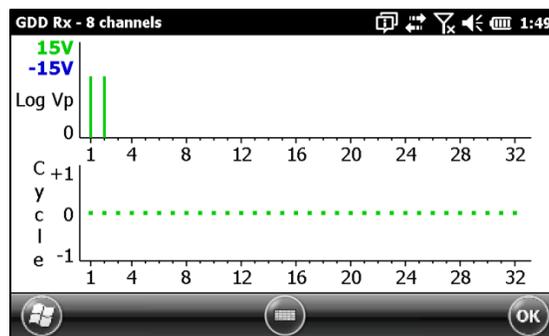
Steps 14 to 16 of *Section 5* of this Manual must be done before using this feature.

The VP AND CYCLE option is used to show the channel synchronization. This option can be useful for troubleshooting if you have connection problem. The VP part of the graph shows the primary voltage of all your electrodes. The current graph is an example; your VP graph will depend on the physical configuration of the electrodes.

1. Select Tools | Show | Show Cycle



2. The following screen appears.



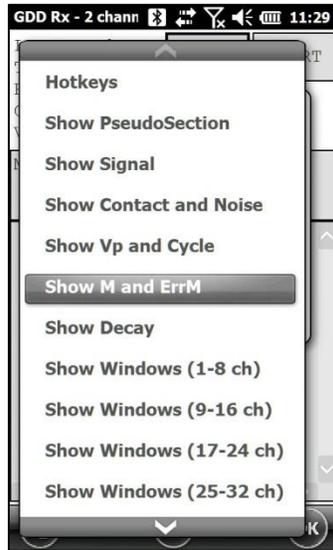
- Green line indicates that this Vp is positive.
- Blue line indicates that this Vp is negative.
- Red dots indicate that the GRx2 is not synchronized.
- Green dots indicate that the GRx2 is synchronized.
- If the GRx2 is synchronized and the green dots are not moving in the same direction, check the electrodes position on the GRx2 front panel.

### 8.3.6 Show M and errM

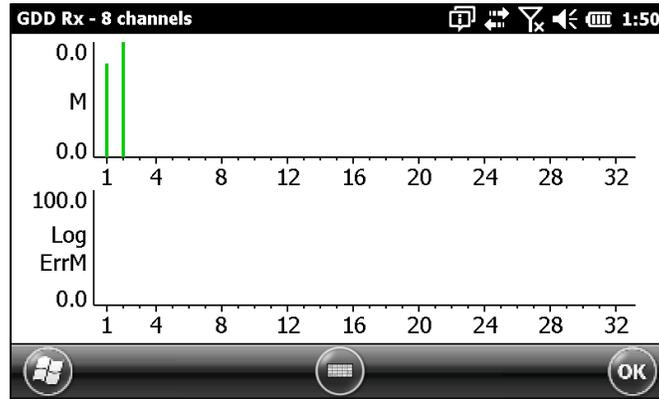
Steps 14 to 16 of *Section 5* of this Manual must be done before using this feature.

The Show M and errM option is used to display the chargeability and the error in chargeability for each channel.

1. Select Tools | Show | M and errM



2. The following screen appears.

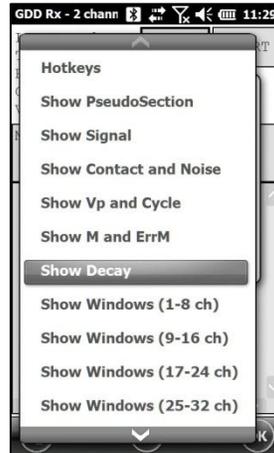


### 8.3.7 Decay Curve

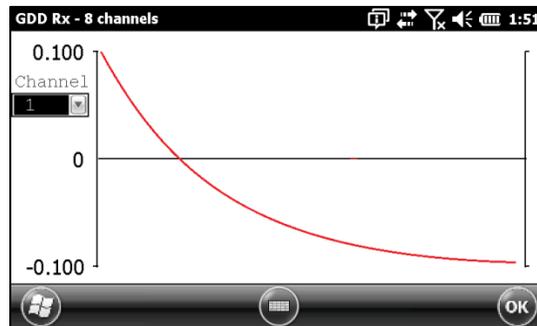
Steps 14 to 16 of *Section 5* of this Manual must be done before using this feature.

The *Decay Curve* option is used to display the decay graph of a selected channel.

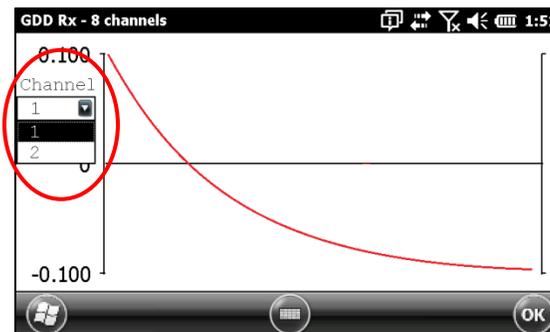
1. Select Tools | Show | Show Decay



2. The following screen appears.



3. Select the displayed channel.

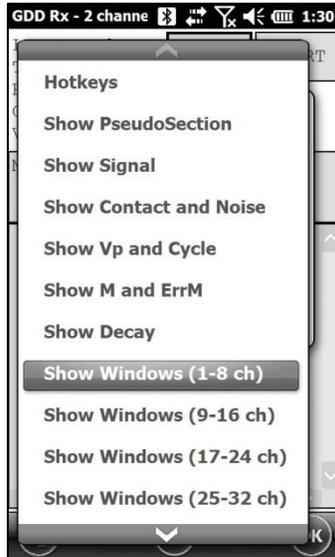


### 8.3.8 Show Windows

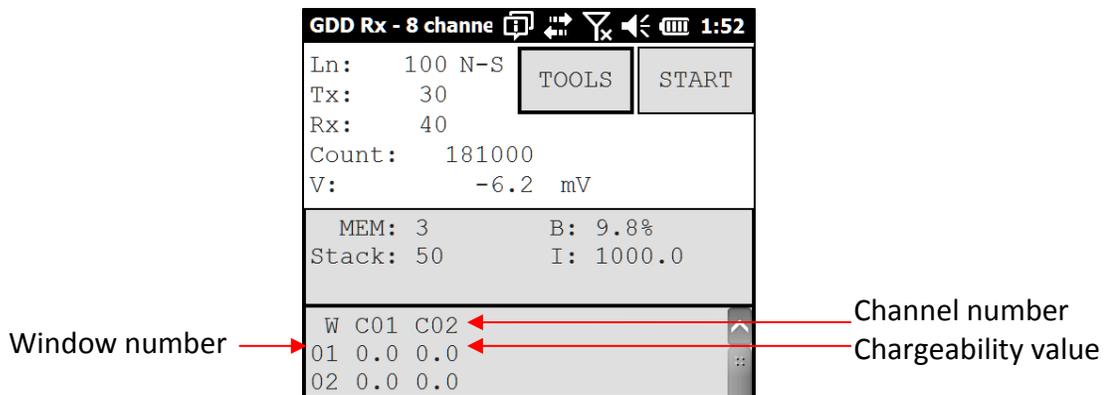
Steps 14 to 16 of *Section 5* of this Manual must be done before using this feature.

The *Show Windows* option is used to display the windows chargeability of each channel.

1. Select Tools | Show | Show Windows (1-8 ch)



2. The following screen appears.

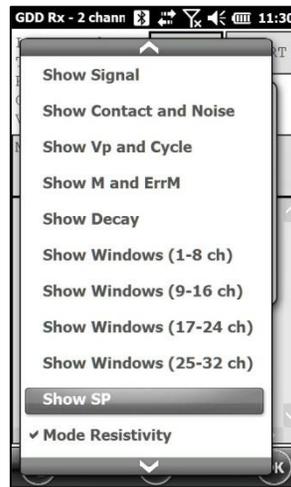


### 8.3.9 Show Sp

Steps 14 to 16 of *Section 5* of this Manual must be done before using this feature.

The SHOW SP option is used to display the self potential (SP) in mV of each channel.

1. Select Tools | Show | Show SP



2. The following screen appears.

A screenshot of a mobile application interface. At the top, it says 'GDD Rx - 8 channe' and '1:53'. Below the title bar, there are two buttons: 'TOOLS' and 'START'. The screen displays the following data:

Ln: 100 N-S  
Tx: 30  
Rx: 40  
Count: 183200  
V: 1008.3 mV

MEM: 3      B: 9.9%  
Stack: 50      I: 1000.0

| CH | Sp     | SpMin  | SpMax  |
|----|--------|--------|--------|
| 01 | -502.7 | -510.6 | -502.5 |
| 02 | -504.8 | -510.6 | -504.6 |

Red arrows point from the text 'Channel number' to the 'CH' column and from 'Self potential value' to the 'Sp' column.

## 8.4 Raw Data option

### 8.4.1 Check GPS

To use the GPS function, your receiver must be equipped with an internal GPS module. This GPS module is designed for use with applications that require accurate time (getting GPS timestamps in output files, synchronizing a receiver with a transmitter using GPS signal, recording raw data without synchronization for post processing, etc.).

The *Check GPS* option is used to verify if a satellite is being tracked by the GPS module.

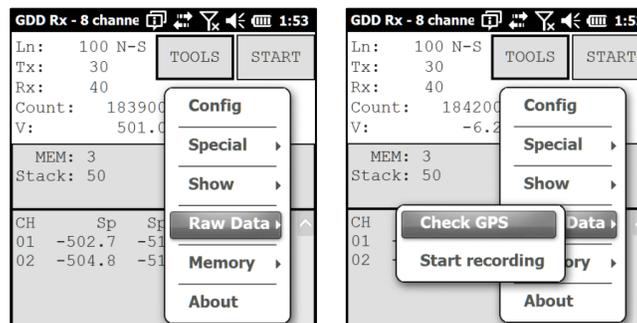
Connect an external antenna (SMA) to the GPS connector of the GRx2 receiver for more efficiency.



After turning on the GRx2 receiver, it can take up to 2 or 3 minutes for the GPS receiver to track and synchronize with a satellite.

**Important: the internal GPS module of the receiver can take up to 15 minutes to get the UTC time. Wait for this time before taking your first reading if your receiver needs to get the same GPS time than another device.**

Select Tools | Raw Data | Check GPS







### 8.4.2 Start Recording (raw data)

This option is used to record raw data without any synchronization with a transmitter signal. This can be useful to record the telluric or noise from the ground.

The receiver will record a reading every 20 ms. Thanks to the GPS module, each recorded reading will be accurately time stamped. Your receiver must be equipped with an internal GPS module to use GPS with the raw data function.

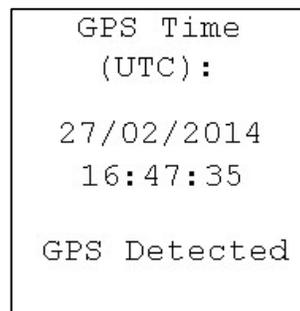
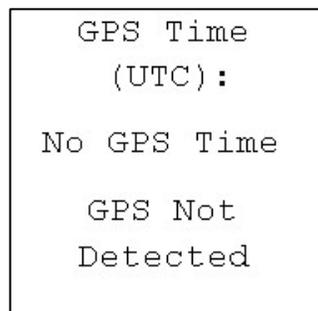
1. Make sure that channel 1 or R1 is connected to the ground.

If a pole configuration is selected in the Setup – Config menu, make sure that channel R1 is connected to the ground.

If a dipole configuration is selected in the Setup – Config menu, make sure that channel 1 is connected to the ground.



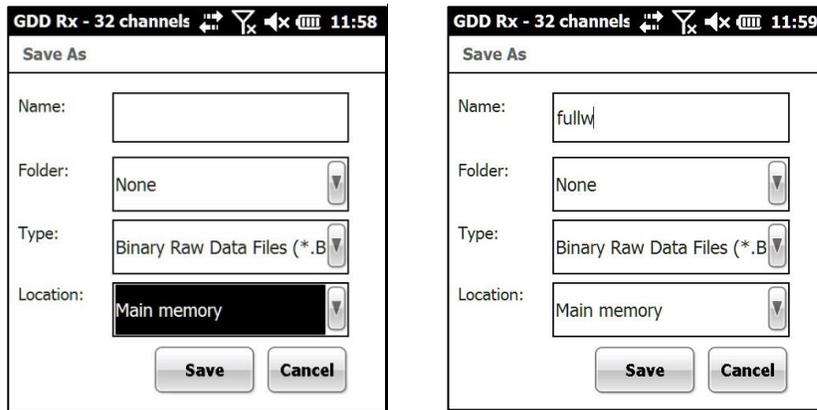
2. If you want to verify the GPS time, select Tools | Raw Data | Check GPS



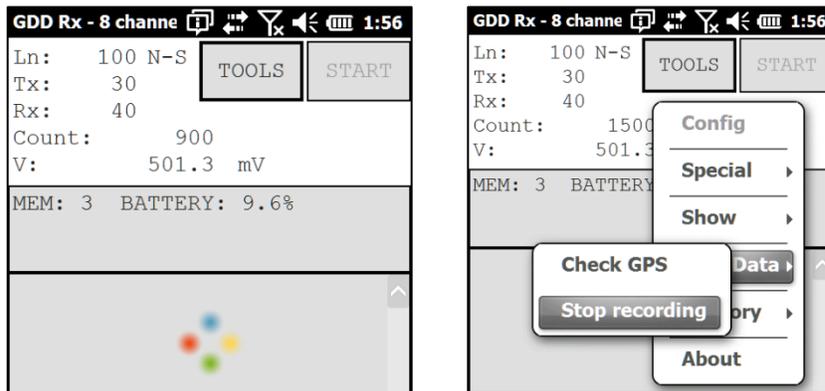
If you see No GPS Time, either the internal GPS module cannot receive any data from a satellite, or your receiver does not have this option.

3. To begin the data acquisition, select Tools | Raw Data | Start recording.

4. You will be prompted to name your file.



5. The following icon will appear and data will be recorded until you stop the acquisition by selecting Tools | Raw data | Stop recording.

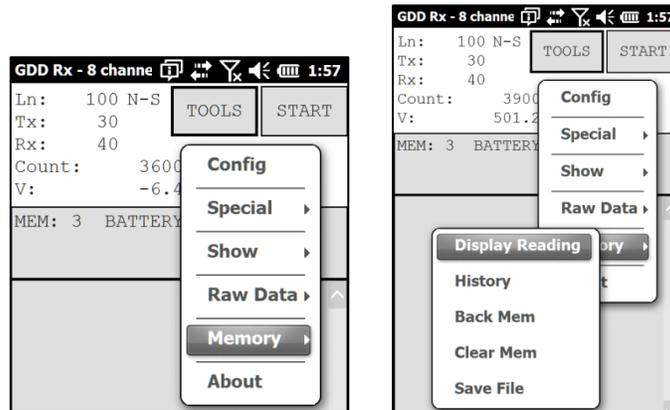


The extension of the file created with your raw data is '.bdf'. This binary format file can be imported and visualized using GDD's IP Post-Processing software.

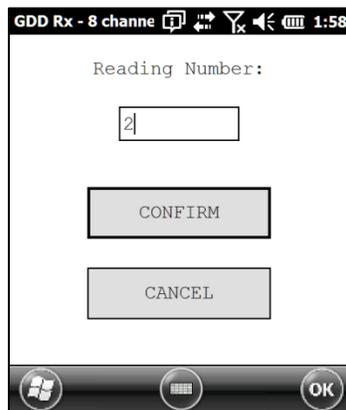
## 8.5 Memory option

### 8.5.1 Display Reading

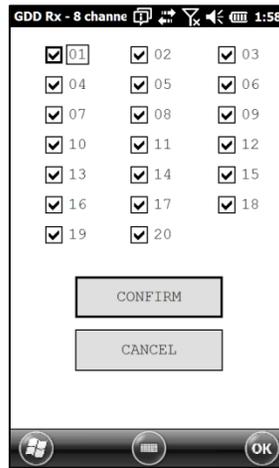
The Display Reading option displays a particular reading on the PDA as the operator would see it in the field even if no receiver is connected to the PDA.



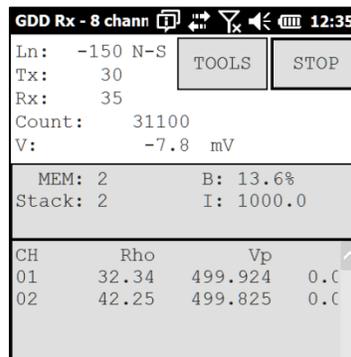
The following window will appear. The number in the *Reading Number:* field is always the Memory number of the latest reading taken. Enter the number of the reading you want to see. Click on CONFIRM.



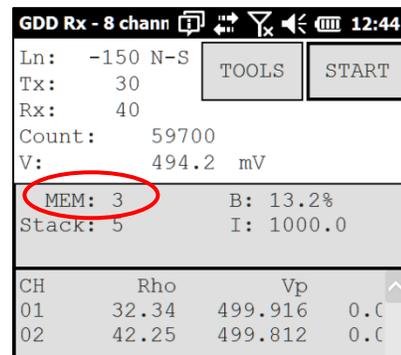
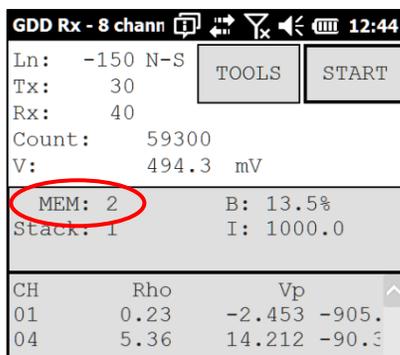
Select the chargeability windows you want to see and click CONFIRM.



The selected readings appear.



Use Left and Right arrow buttons (shift  $\uparrow$  + 4 $\leftarrow$  or 6 $\rightarrow$ ) to compare your current data with that of your previous acquisitions. Use the Up and Down arrows to see all the channels.



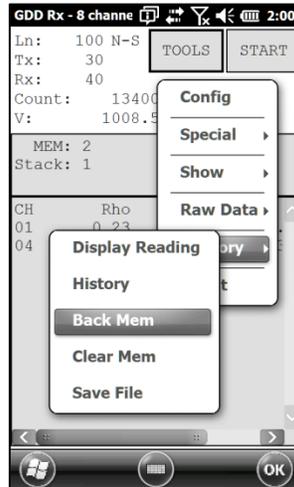
Keep in mind that there is no indication of which reading is monitored on the PDA display. At this point, it is possible to use the show menu to display some graphics or values of the channels.



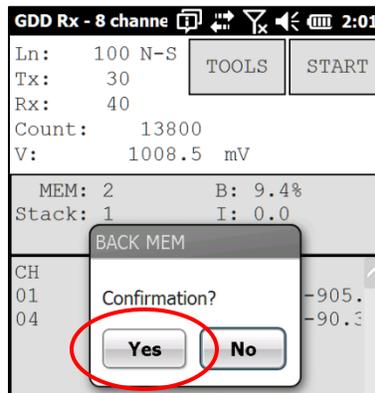
### 8.5.3 Back Mem

The *Back Mem* option is used to clear the last readings of the memory one by one.

1. Select Tools | Memory | Back Mem



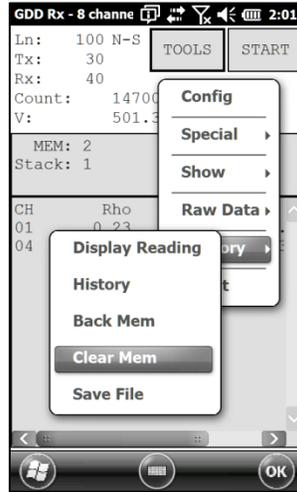
2. Click Yes to clear the last readings.



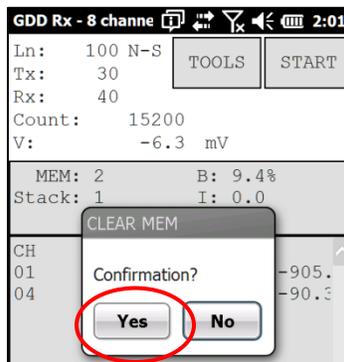
## 8.5.4 Clear Mem

The *Clear Mem* option is used to clear all the readings of the memory.

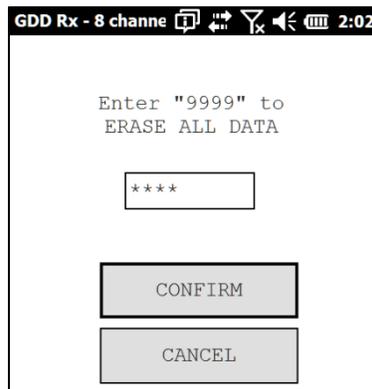
1. Select Tools | Memory | Clear Mem



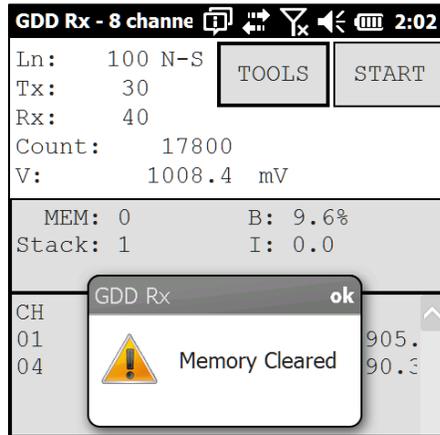
2. Click Yes to confirm the operation.



3. Enter 9999 in the text box and click CONFIRM to clear all the readings of the memory.



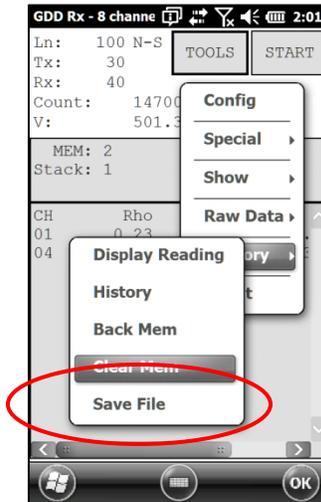
4. A message will follow to confirm your operation.



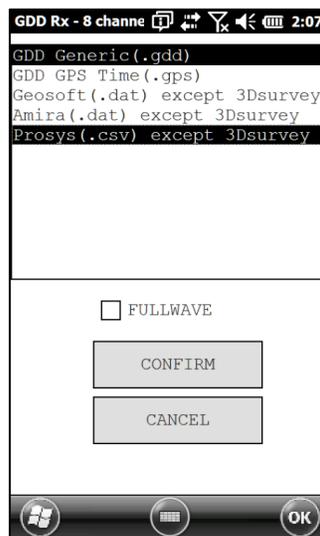
## 8.5.5 Save File

The *Save File* option is used to save the readings into a file.

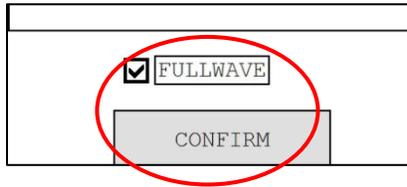
1. Select Tools | Memory | Save File



2. Select the output file format available according to your electrode configuration (only one output file format could be available). A GDD Generic file is always created even if you choose another format.



3. Select *FULLWAVE* if you want to create the *ascii* format fullwave file and click CONFIRM.

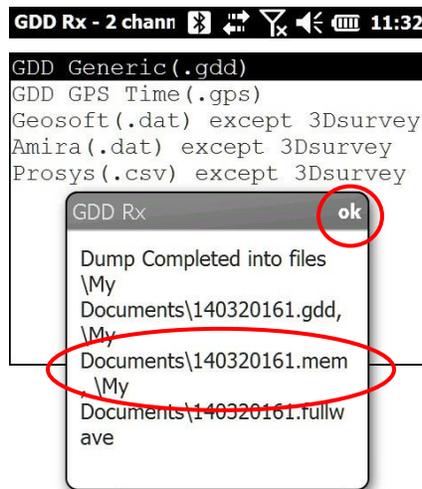


**Saving the FULLWAVE file will take significant time. We recommend to copy the .mem file from the PDA to you computer and to create this file using the IP Post-Processing software or the File Export PC utility to speed up the process.**

4. Enter the file name and click Save (the saving operation can take several minutes).



5. The following screen appears; click **OK** to close the pop up dialog box.



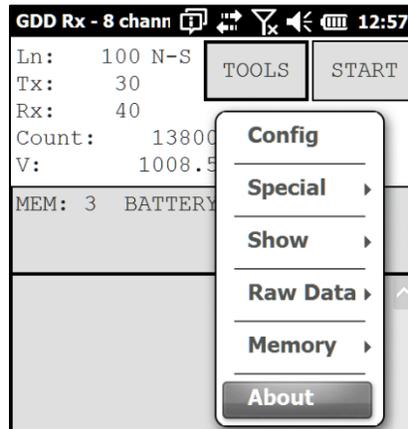
The *.mem* file, as the *.gdd* file, is automatically created by the system. The *.mem* file has a specific format required to be used with the new GDD IP Post Process software. Contact GDD for more information about this new software.

If using the GDD-RTE01 communication boxes, an *ascii* file (*gdd\_rte.log*) will be created at the same location than your IP data. This *gdd\_rte.log* file contains the output current and power values broadcasted by the GDD IP transmitter (model Tx4).

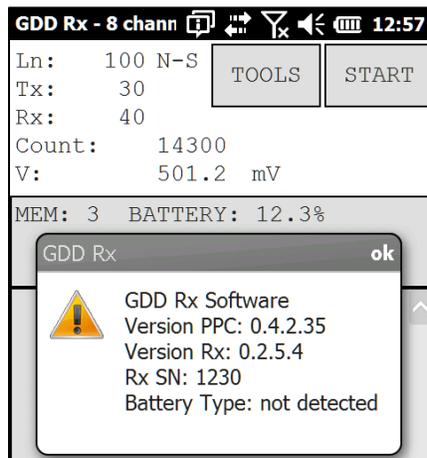
## 8.6 About option

The *About* option is used to display the software version number.

1. Select Tools | About



2. The following screen appears.



\*See *Section 8.2.4* for more information about *Battery Type*.

## 9 Transferring data

To establish communication between the Archer<sup>2</sup> Field PC and a desktop PC, you need to install the appropriate synchronisation software.

Windows 7, 8 or Vista 64 bits users will require Windows Mobile 64 bits while Windows 7, 8 or Vista 32 bits users will need to install Windows Mobile 32 bits. Refer to the “*Sync PDA on Windows 10.pdf*” document located on the CD-ROM/USB Stick if your experience problems using *Windows 10*. Install ActiveSync if you run Windows XP or earlier.

All three software are available on the CD/USB Stick supplied by GDD.

Another way of transferring data between your Allegro<sup>2</sup> and your PC is to set the PDA device as a USB connection. Refer to the detailed sections below.

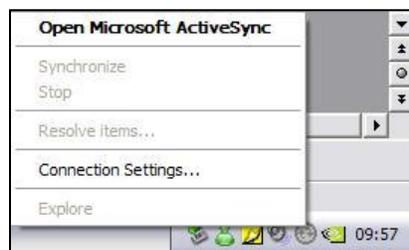
### 9.1 ActiveSync

#### 9.1.1 Installation and settings

1. Once ActiveSync is installed, a gray icon will appear in the bottom right corner of your desktop PC screen.



2. Right click on the *ActiveSync* icon to open the following menu and select *Connection Settings...*



3. Check *Allow USB connection with this desktop computer.*



### 9.1.2 Connecting the Archer<sup>2</sup> Field PC to a desktop PC

1. Turn the PDA *ON*



2. Connect the USB cable between the Archer<sup>2</sup> Field PC and your desktop computer.
3. The desktop *ActiveSync* (or Windows Mobile Device Center) icon is now green.



4. A small *PCLink* icon appears on the Archer<sup>2</sup> title bar.

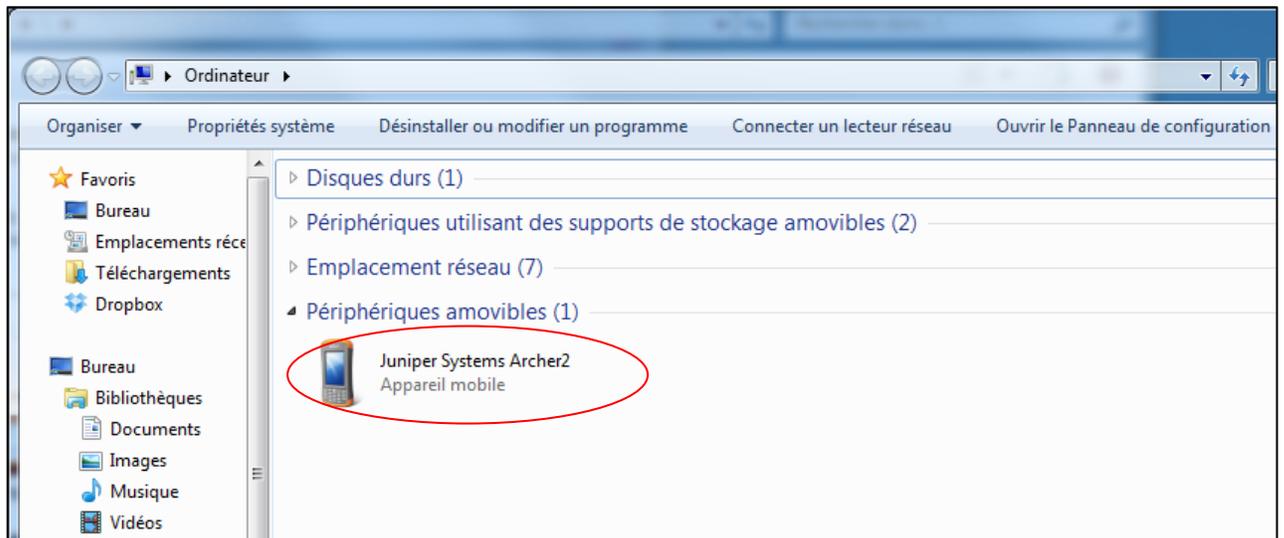


### 9.1.3 Transferring file(s) from the Archer<sup>2</sup> Field PC to a desktop PC

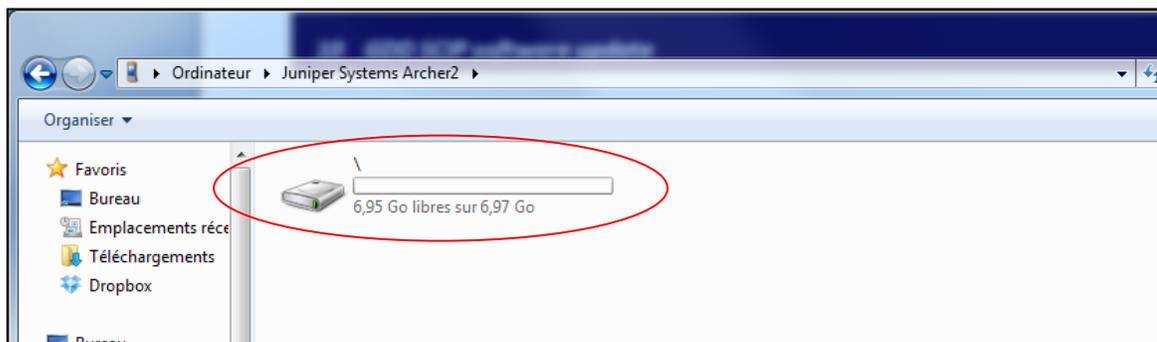
1. Double click on the *My Computer* icon on your desktop PC.



2. Double click on the *Mobile Device's* icon.



3. Double click on the *Main folder* icon.



4. Double click on the *My Documents* folder.

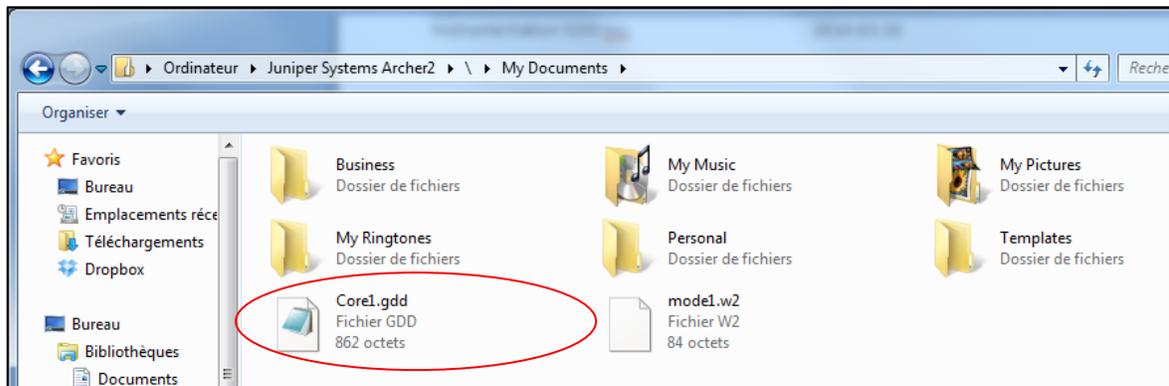


5. Use the drag and drop or cut, copy and paste functions to move file(s) between your Archer<sup>2</sup> and your desktop PC.

The data file is named: File\_Name.gdd

The GDD binary file is named: File\_Name.mem

If created, the fullwave file is named: File\_Name.fullwave

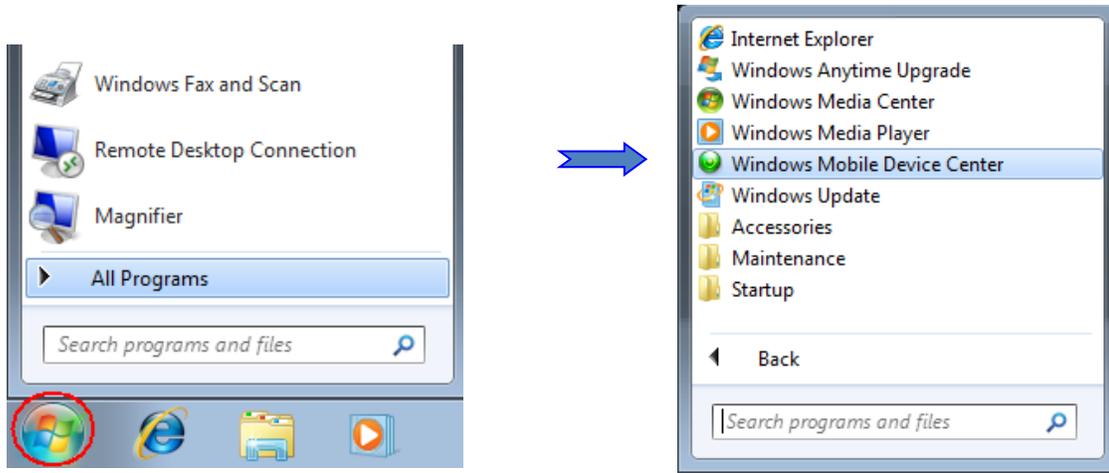


6. Open the saved files with Notepad or Excel.

## 9.2 Windows Mobile Device Center

### 9.2.1 Windows Mobile Device Center installation and settings

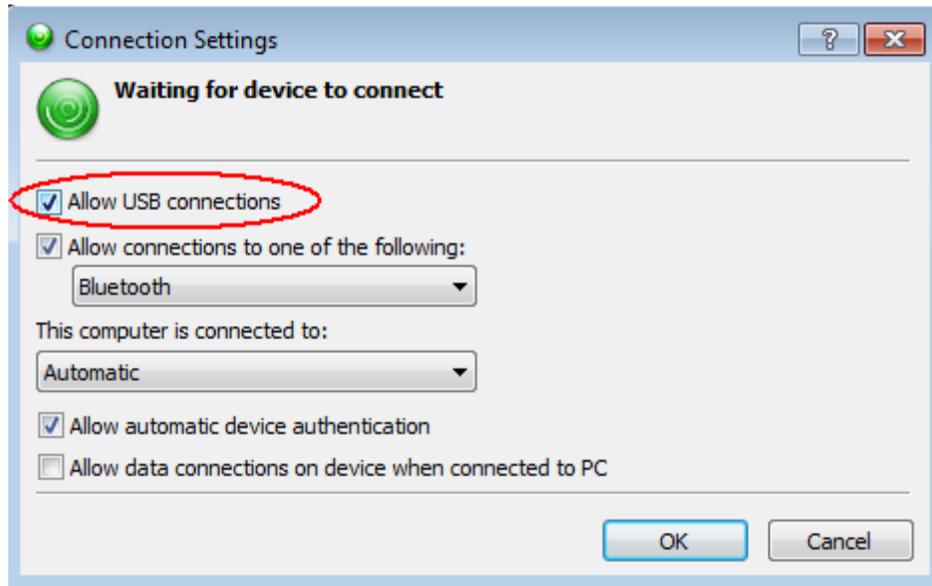
1. Once Windows Mobile Device Center 32 or 64 bits is installed, click the Windows Start Menu icon and then click *All Programs* to display all installed programs. Click *Windows mobile Device Center* to launch the application.



2. Under *Mobile Device Settings* option, click on *Connection settings*.



3. Check *Allow USB connections*



### 9.2.2 Establishing connection with a desktop PC

1. Connect the micro USB cable between the Archer<sup>2</sup> and the desktop PC
2. Turn the PDA *ON*.



1. application will connect with the PDA.



2. A small *PCLink* icon appears on the Allegro<sup>2</sup> title bar.



### 9.2.3 Transferring file(s) from the Archer<sup>2</sup> to a desktop PC

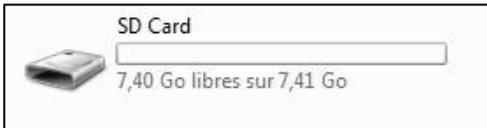
1. From the Windows Mobile Device Center, click *Connect without setting up your device*.



Click *Browse the content of your device* under the *File Management* section.



2. Double click on the SD Card (if that is where you saved your files).



3. Use the drag and drop; or cut, copy and paste functions to move file(s) from your Archer<sup>2</sup> to your desktop PC.

The GDD Generic data file is named: File\_Name.gdd

The GDD binary file is named: File\_Name.mem

If created, the fullwave file is named: File\_Name.fullwave

\* See *Section 8.5.5 (SAVE FILE)* for more information about alternate output formats and creation of the FULLWAVE file.



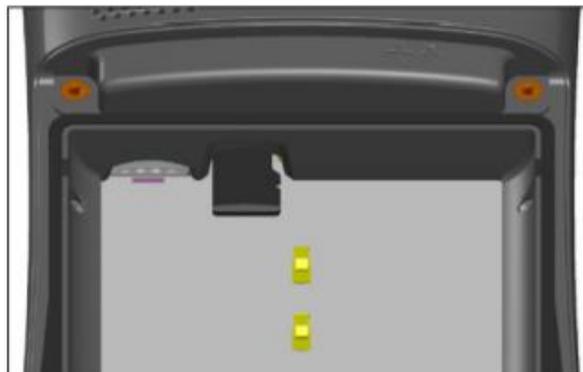
| Nom            | Type                | Taille   | Modifié le       | Créé le          |
|----------------|---------------------|----------|------------------|------------------|
| GDD            | Dossier de fichiers |          | 2016-05-03 20:23 | 2016-05-03 20:23 |
| fullw.RDF      | Fichier RDF         | 485 Ko   | 2016-05-04 15:16 | 2016-05-04 15:16 |
| Test1.fullwave | Fichier FULLWAVE    | 1 163 Ko | 2016-05-06 20:14 | 2016-05-04 15:38 |
| Test1.gdd      | Fichier GDD         | 13 Ko    | 2016-05-06 20:14 | 2016-05-04 15:38 |
| Test1.gps      | Fichier GPS         | 13 Ko    | 2016-05-06 20:14 | 2016-05-04 15:38 |
| Test1.mem      | Fichier MEM         | 303 Ko   | 2016-05-06 20:14 | 2016-05-04 15:38 |

4. Open the saved files with Notepad or Excel.

## 9.3 USB connection

The Archer<sup>2</sup> has a slot for a micro SD card located in the battery compartment. To insert or remove a card follow these steps (As per the Archer<sup>2</sup> User Guide):

1. Power off the handheld by holding the power button until the Power Button menu appears and selecting Power Off. **CAUTION:** Power-off the Archer<sup>2</sup> before removing the battery. If you remove the battery without powering-off the handheld, you may damage the handheld and/or lose data.
2. Loosen the screws to the battery compartment, and remove the door. The hand strap remains attached. **CAUTION:** The Archer<sup>2</sup> is not sealed against water and dust when the battery door is not installed properly.
3. Remove the battery pack.
4. An image on the battery compartment label shows the correct location and orientation for the SD card (slot on the right). Push the card into the slot to insert it. To remove the SD card, pull it out.



5. Replace the battery pack, and attach the battery door.
6. Power up the handheld.

Once, the SD card is installed. In the main screen of the Archer<sup>2</sup>, go in the Settings menu.

1. In the main screen of the Archer<sup>2</sup>, go in the Settings menu
2. Go in the "connections" folder and then select the "USB to PC option".
3. Select "SD Card - Use as external drive (Mass Storage)"
4. The Archer<sup>2</sup> can now be accessed from the Windows File Explorer.



## 10 Bluetooth configuration

### 10.1 Bluetooth partnership configuration

1. Make sure that the Bluetooth is on. If the Bluetooth icon in the Dashboard of the Archer<sup>2</sup> Field PC is gray, click on the icon to enable it.



2. Click on the Bluetooth icon in the Title bar.



3. Click on *Add new device*.



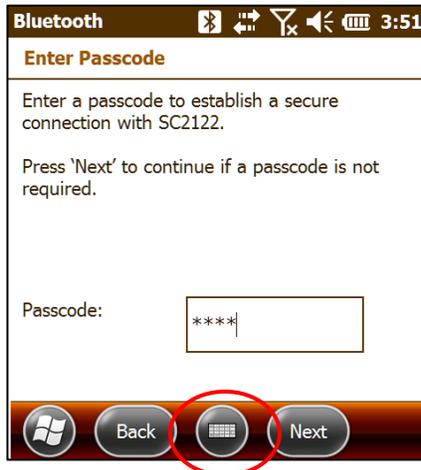
4. The program searches for Bluetooth Devices. This step may take a few seconds.



5. Select the GRx2's name (*RxXXXX*) and click on *Next*.



6. Enter the passcode 1234 and click *Next*. Open the virtual keyboard or use the numeric keypad of the Archer<sup>2</sup> Field PC.



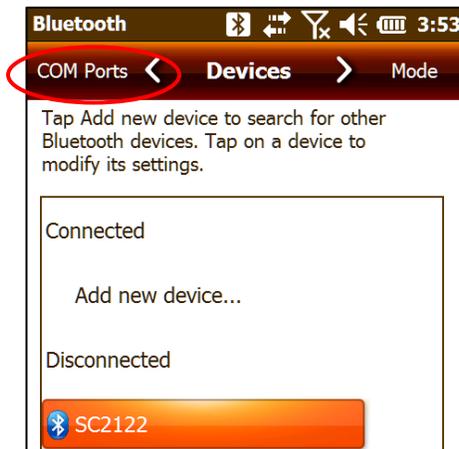
7. This message may appear for a few seconds. Click on Advanced or wait until it disappears and click on your GRx2 name.



8. Check *Serial Port* and click on *Save*.



9. Select *COM Ports*.



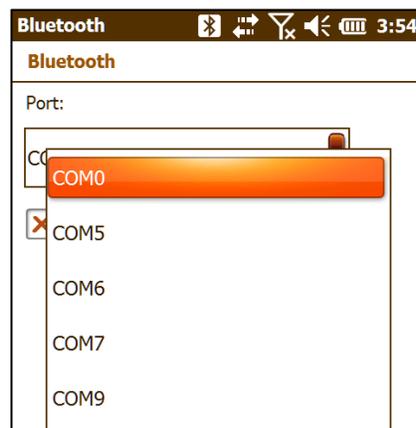
10. Click on *New Outgoing Port*.



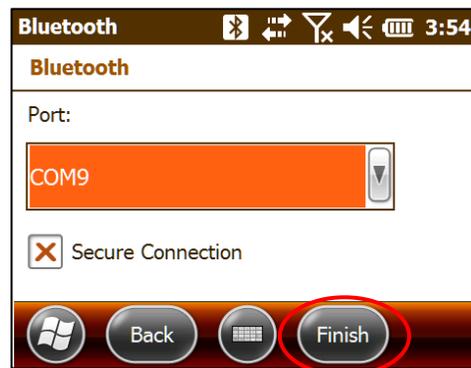
11. Select your GRx2's name and click on *Next*.



12. Open the Port menu.



13. Select *COM9* and click *Finish*.



14. The name of your GRx2 receiver should appear with the COM9 tag. Click on the OK button to close the window.



## 11 GDD Rx software update

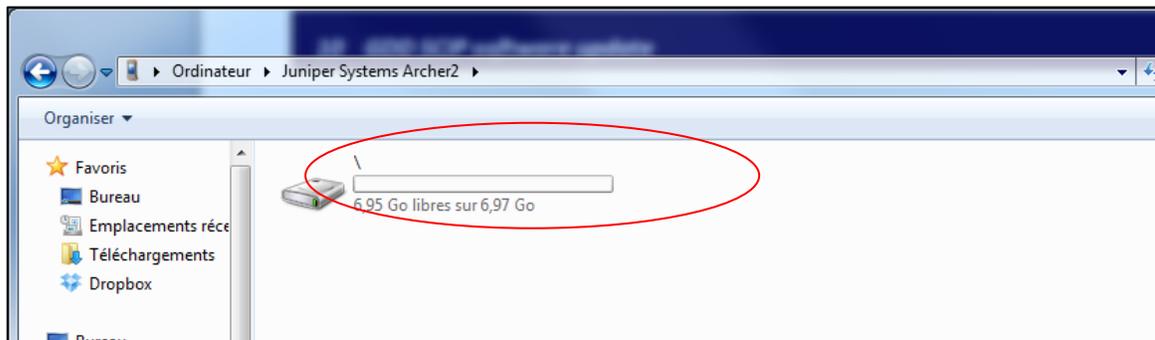
1. Connect the USB cable between the Archer<sup>2</sup> Field PC and your desktop computer.
2. Double click on the *My Computer* icon on your PC's desktop.



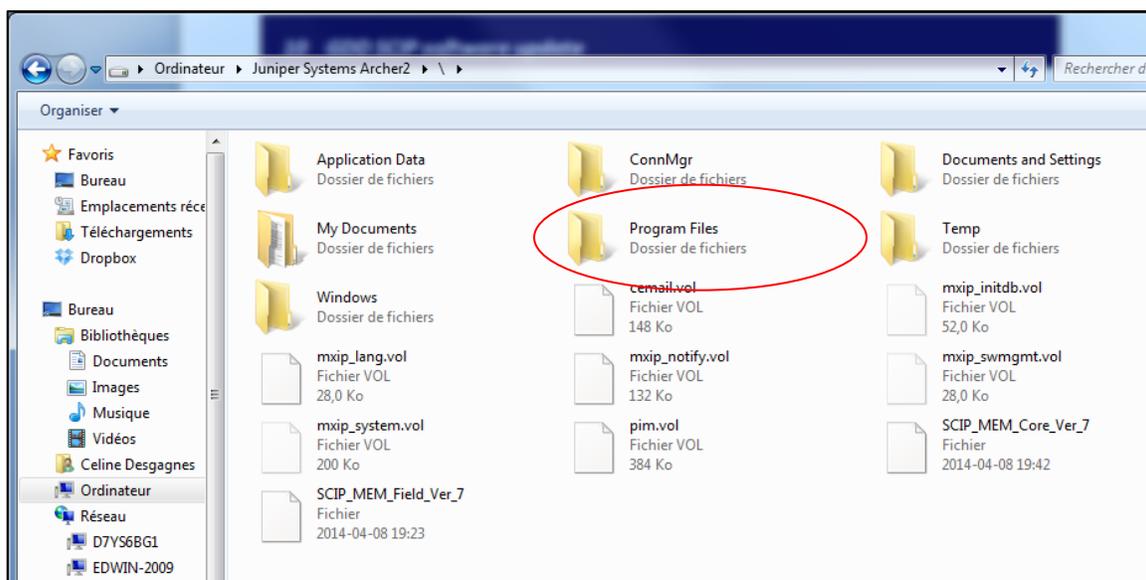
3. Double click on the *Mobile Device* icon.



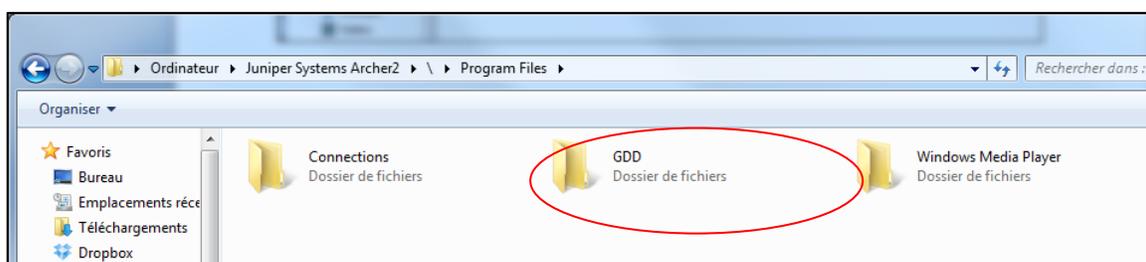
4. Double click on the *Main folder* icon.



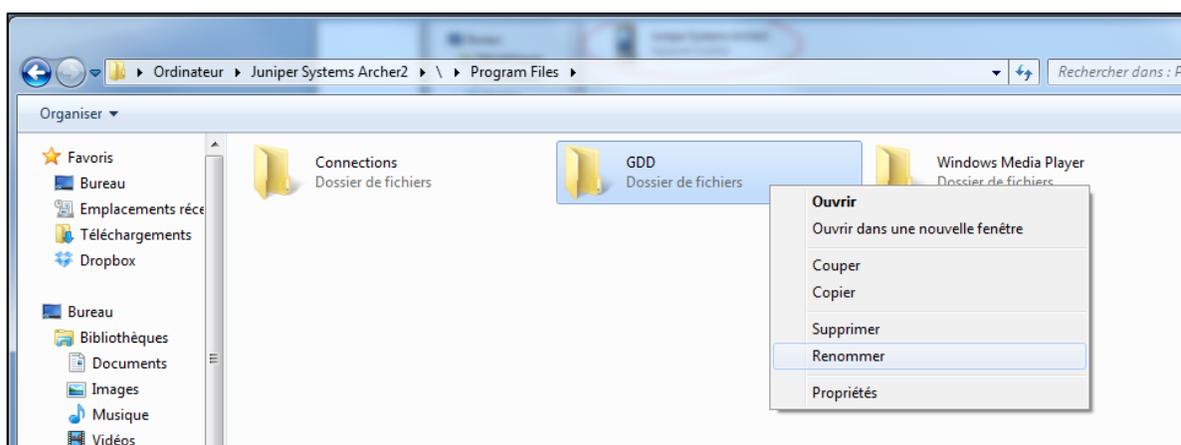
5. Double click on the *Program Files* icon.



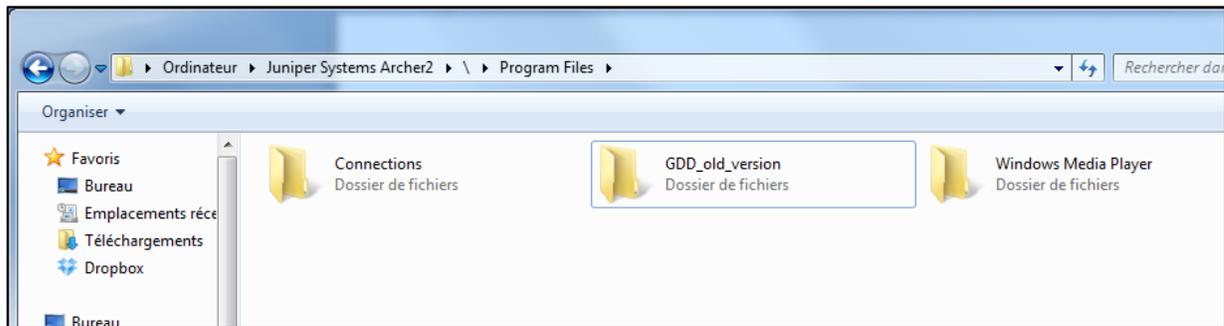
6. The GDD Rx program files are located in the GDD folder.



7. Rename the old version of the folder to keep a backup on your Archer<sup>2</sup> Field PC. Right click on the GDD folder and select Rename.



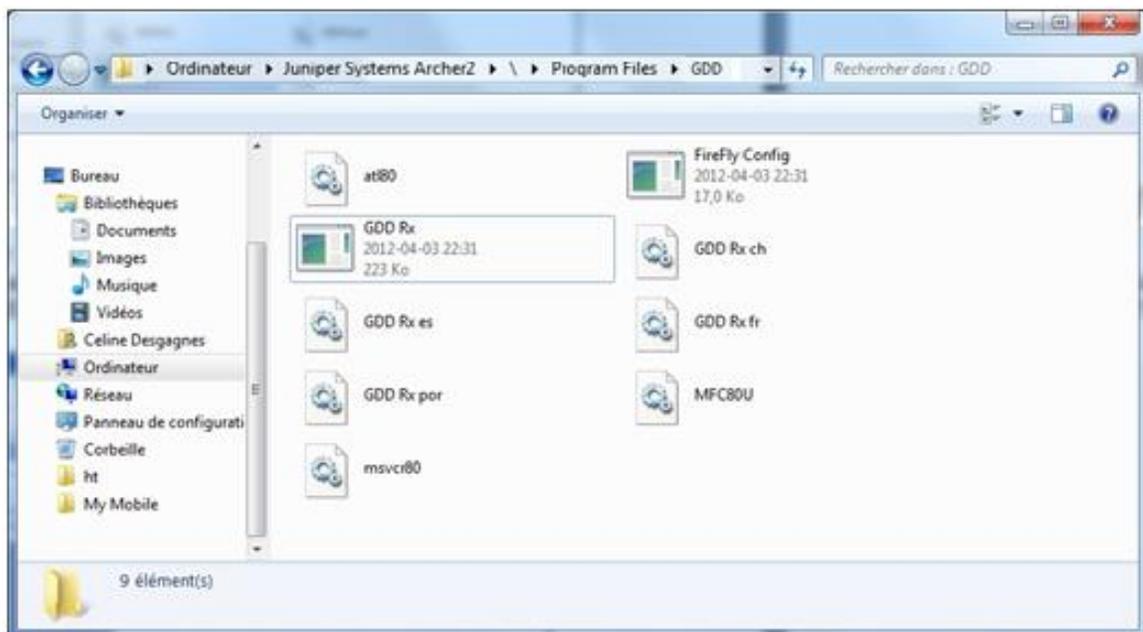
8. Rename the folder (example: GDD\_ Old\_Version).



9. Right click on the *Program Files* window and create a new GDD folder.



10. Use the drag and drop or the copy and paste functions to move the new GDD Rx software files from your computer to the GDD folder of your Archer<sup>2</sup> Field PC.



## 12 Troubleshooting

This section explains some problems that could occur when using the GDD GRx2 as well as proposed solutions.

For any issues regarding the Archer<sup>2</sup> Field PC other than these related to the GDD program, please refer to the user manual of the Archer<sup>2</sup> Field PC available on the utilities CD/USB stick provided by GDD.

➤ Problem:

The receiver is not ON when the On-Off switch is at 'On'.

✓ Answer:

- In Cable mode, the receiver will only be ON when the GDD Rx program is active on the pocket PC.
- If the receiver's battery power rating is below the critical threshold, the receiver will not turn on. (See *Section 4 - Power* for more details.)

➤ Problem:

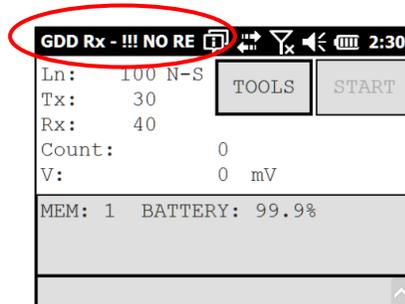
The Internal Battery Label on the receiver panel does not light when the power supply is connected to the receiver.

✓ Answer:

- Verify if the battery is already fully charged. If the batteries are full, the light does not turn on.
- Verify that the 120V or 240V (black) power cable is plugged into the power supply and that it is connected to a power source.
- Verify that the connector is properly inserted into the power supply connector.
- Verify that the "Internal battery / External battery" switch is on "Internal battery".
- Verify that the power supply is working properly: unplug the power supply from the receiver and from its power source. Plug it into the power source again and the green light should turn on.

➤ Problem:

The message: 'GDD Rx – No Receiver' is shown in the program bar of the GDD Rx program. It stays on the bar even if the Archer<sup>2</sup> Field PC is connected to the receiver.



✓ Answer:

- Check that the receiver's On-Off switch is at On and that the LED is on.
- Verify that the receiver's batteries are powered enough and not within the critical threshold limit.
- In Cable mode, verify that the cable is plugged correctly on the receiver and on the Archer<sup>2</sup> Field PC.
- In Bluetooth mode, close the GDD Rx program and try to start it again. If the program does not detect the receiver in Bluetooth mode, open the program in RS232 mode and save all your data. When your data are saved, reset your Archer<sup>2</sup> Field PC by pressing and holding the Power button. The following message appears. Select Reset.



➤ Problem:

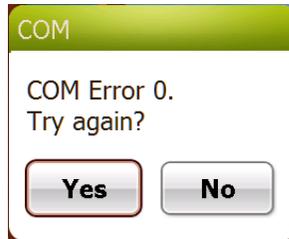
The receiver does not turn on when the On-Off switch is at 'On'.

✓ Answer:

- If the receiver's battery power rating is below the critical threshold, the receiver will not come on line. (See the Power section for more details.)

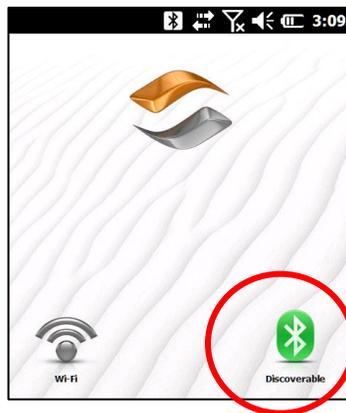
➤ Problem:

In Bluetooth mode, the following message appears.



✓ Answer:

- Make sure that the Cable / Wireless switch is on Wireless position and that the receiver is turned on.
- Look at the Bluetooth icon in the Dashboard:



If it is gray, click on the icon to enable it.



Try to start the SCIP software in Bluetooth mode again.

- See *Section 10.1* to know how to verify if a partnership has been established between your receiver and your Archer<sup>2</sup> Field PC.
- Reset your Archer<sup>2</sup> Field PC by pressing and holding the Power button. The following message appears. Select Reset.



➤ Problem:

The message “Battery Error” appears on the main screen of the GDD Rx program on the Archer<sup>2</sup> PDA.

✓ Answer:

- A problem occurs during the receiver battery charging: over voltage, charging under 0°C or over 45°C, charging time too long, defective battery, etc.
- Try to disconnect and connect the AC charger.

➤ Problem:

A red icon appears during the acquisition process. If you click on it, a saturation message appears.

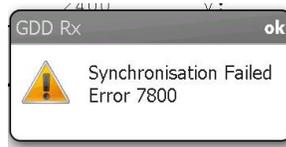


✓ Answer:

- If this message appears, it means that the signal on some of the channels is higher than 15 volts. The channels of the receiver are protected against voltage up to 500V but they can read a Vp of up to 15V only. To prevent the voltage saturation, you can try to reduce the transmitted current at the transmitter.

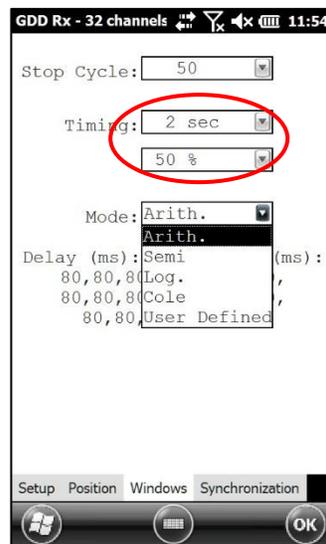
➤ Problem:

A synchronization error message appears while synchronizing with the receiver.

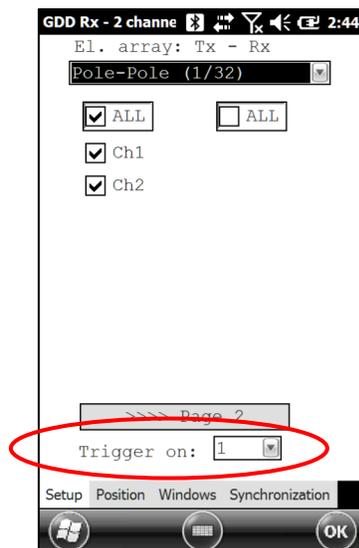


✓ Answer:

- Make sure that the Timing and Duty Cycle of the receiver corresponds to the Time base and Duty Cycle of the transmitter.



- Check if the signal ( $V_p > 2$ ) of the trigger channel is high enough. Otherwise, try to synchronize with another channel. You should select the channel that receives the higher signal as the trigger channel.



- Check if the transmitter works properly. If the transmitted signal is asymmetrical, the receiver may not synchronize.

➤ Problem:

Creating files or transferring files takes too much time.

✓ Answer:

- The size of the fullwave file explains the export time on the PDA. We have developed a small File Export PC utility specifically for our clients exporting large fullwave files on a regular basis. We would recommend using this tool to generate the fullwave files instead of doing it on the PDA. It will speed up the export process.

You will find the software and the instructions on the CD-ROM/USB stick provided by GDD. Or contact GDD technical support for more information.



➤ Problem:

It is not possible to start Windows Mobile Device Center and transfer the IP data from the Allegro for computer operating under *Windows 10*.

✓ Answer:

- Refer to the “Sync PDA on Windows 10.pdf” document located on the CD-ROM/USB stick provided by GDD.

## 13 Technical help

If you encounter a problem not described in this manual, do not hesitate to contact **Instrumentation GDD Inc.** for assistance at:

Tel.: +1 (418) 877-4249  
Fax: +1 (418) 877-4054  
Toll free line: 1-877-977-4249 (in Canada)  
E-mail: support-technique@gdd.ca

Emergency out of business hours:

Pierre Gaucher: Home phone: +1 (418) 657-5870  
Cell phone: +1 (418) 261-5552  
Régis Desbiens: Home phone: +1 (418) 658-8539  
Cell phone: +1 (418) 570-3408

Any GDD IP Receiver that breaks down while under warranty or service will be replaced free of charge upon request for the duration of repairs, except for shipping fees. This service is subject to instrument availability but we have been able to honour this commitment up to now.

Printed in Canada in 2017

*Version: manual-ip-receiver-Archer2-GRx2-2017-12-07 -EN.docx*

## 14 Specifications

### 14.1 General specifications

|                         |   |
|-------------------------|---|
| Number of channels:     | 2   |
| Size (receiver only):   | 24 x 18 x 11 cm (9 x 7x 4 in)   |
| Weight (receiver only): | 1.6 kg (3.5 lbs)  |
| Enclosure:              | Heavy-duty Pelican case,<br>environmentally sealed                                  |
| Communication options:  | RS-232 (serial) and Bluetooth<br>to communicate with a PDA<br>USB for data download |
| Power supply:           | 10.8V 3.4Ah rechargeable<br>Lithium-Ion internal battery                            |
| Temperature range:      | -40 to +60°C (-49 to +140°F)  |
| Humidity range:         | Waterproof  |

### 14.2 Technical specifications

|                               |  |
|-------------------------------|--|
| Survey capabilities:          | Resistivity and Time domain IP   |
| Twenty chargeability windows: | Arithmetic, logarithmic,<br>semi-logarithmic, Cole-Cole and<br>user defined                      |
| Synchronization:              | Automatic re-synchronization<br>Process on primary voltage<br>Signal<br>GPS time synchronization |
| Noise reduction:              | Automatic stacking number  |
| Computation:                  | Apparent resistivity,<br>chargeability, standard<br>deviation, and % of symmetrical Vp           |
| Ground Resistance:            | Up to 1.5 MΩ   |
| Signal waveform:              | Time domain (ON+, OFF, ON-, OFF)   |
| Time base:                    | 0.5, 1, 2, 4 , 8 and 16 seconds  |
| Input impedance:              | 5 GΩ at 0.125 Hz and 130 MΩ at 7 Hz  |

|   |  |
|---|--|
| Primary voltage range:  | $\pm 10 \mu\text{V}$ to $\pm 15 \text{ V}$ for any channel   |
| Input Common-Mode Voltage Range with respect to reference in dipole-dipole configuration: | $\pm 15 \text{ V}$   |
| Protection:   | 500V (on each channel)   |
| Input:  | True differential for common-mode rejection in dipole configuration  |
| (Vp) Voltage measurement:   | Resolution $1 \mu\text{V}$<br>Accuracy $\leq 0.15\%$   |
| (M) Chargeability measurement:  | Resolution $1 \mu\text{V/V}$<br>Accuracy $\leq 0.4\%$  |
| (SP) offset adjustment:   | $\pm 5 \text{ V}$ , automatic compensation through linear drift correction per steps of $150 \mu$ , with resolution of $1 \mu\text{V}$ |
| Filter:   | Eight-pole Bessel low-pass 15 Hz, notch filter 50 Hz and 60 Hz   |

PDA menu-driven software / simple to use

Real-time data and automatic data stacking

Screen-graphics: decay curves, resistivity, chargeability, Vp and pseudosection

20 programmable chargeability windows

One 24 bit A/D converter per channel

Internal test generator (Self-test mode)

For more details about Archer<sup>2</sup> rugged field PC specifications, refer to the Archer<sup>2</sup> manual included in the CD provided by GDD.

## Annex 1 – Geometrical parameters

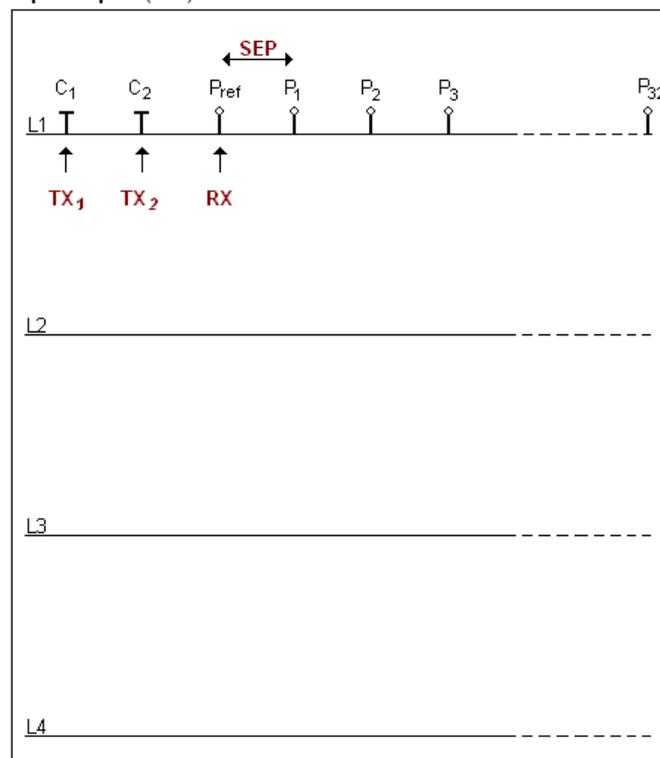
This annex explains how to configure your receiver according to the selection of the electrode array.

| Electrode array | Geometrical parameters to enter |     |    |     | Maximum number of dipoles |
|-----------------|---------------------------------|-----|----|-----|---------------------------|
|                 | Tx1                             | Tx2 | Rx | Sep |                           |
| Dipole-Dipole   | Tx1                             | Tx2 | Rx | Sep | 32                        |
| Pole-Dipole     |                                 | Tx2 | Rx | Sep | 32                        |
| Pole-Pole       |                                 | Tx2 | Rx | Sep | 32                        |
| Gradient        | Tx1                             | Tx2 | Rx | Sep | 32                        |
| Wenner          | Tx1                             | Tx2 |    |     | 1                         |
| Schlumberger    | Tx1                             | Tx2 |    | Sep | 1                         |

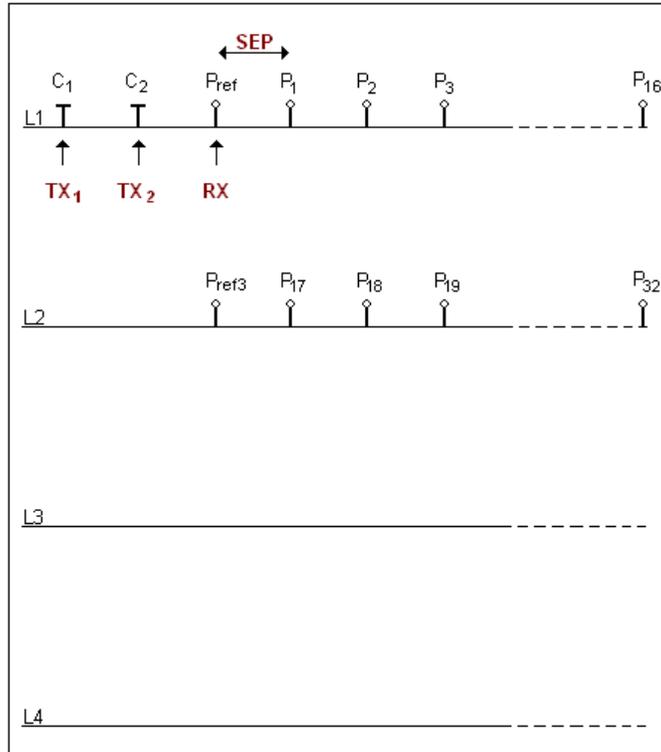
Tx1: Transmitter first electrode position  
 Tx2: Transmitter second electrode position  
 Rx: Receiver first electrode position  
 Sep: Separation between two receiver electrodes

**Note: For all electrode arrays, the Tx line and the RX line(s) can be different.**

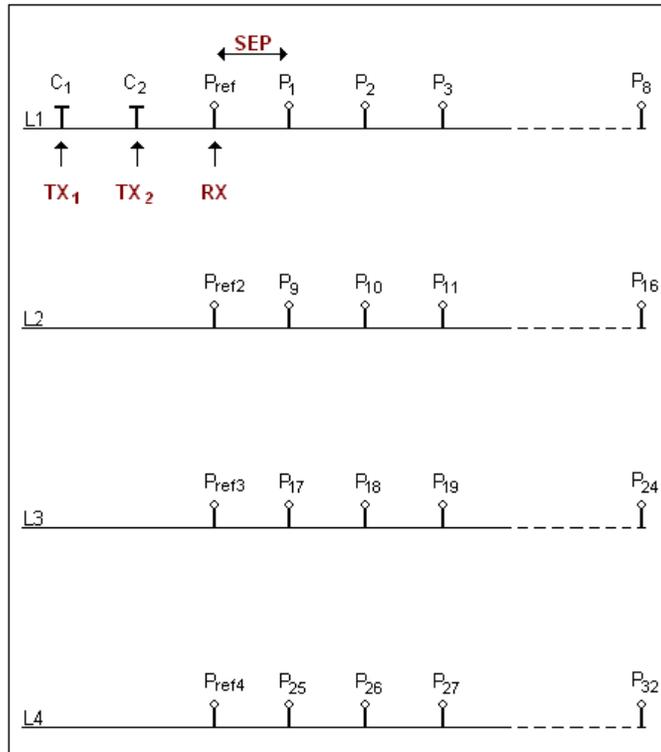
Dipole-Dipole (1/32)



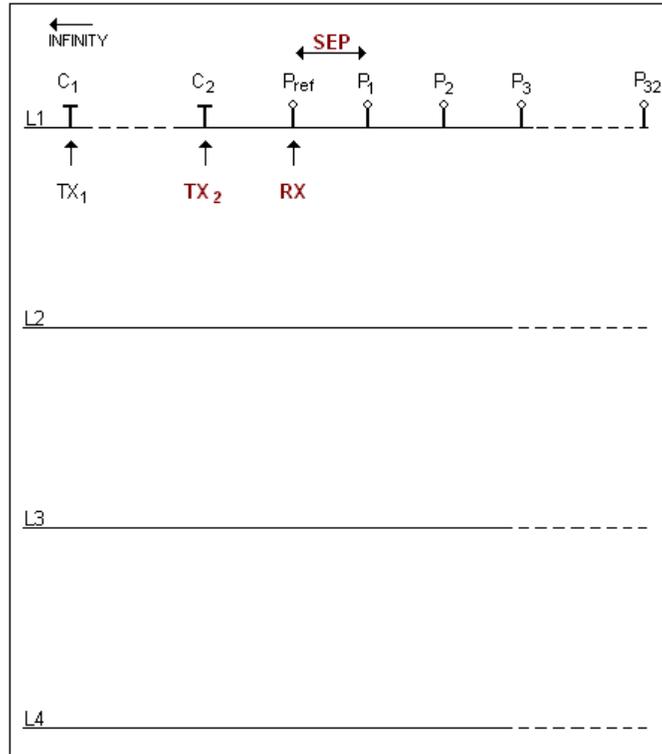
Dipole-Dipole (2/16)



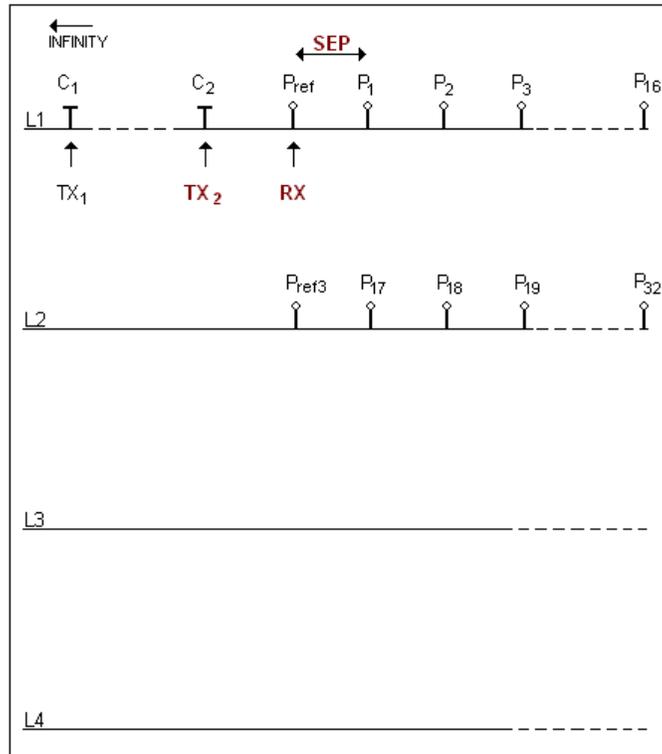
Dipole-Dipole (4/8)



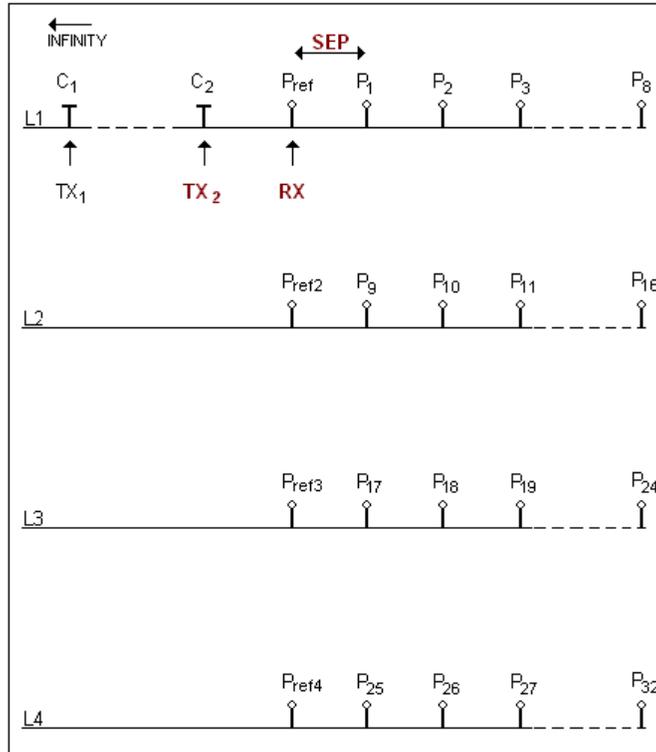
**Pole-Dipole (1/32)**



**Pole-Dipole (2/16)**

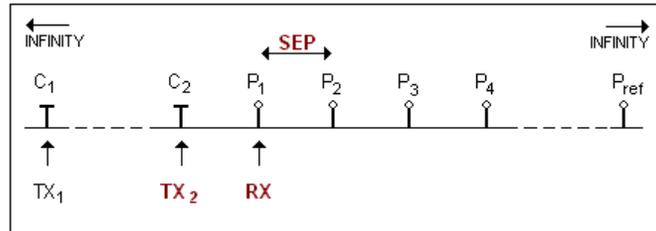


### Pole-Dipole (4/8)



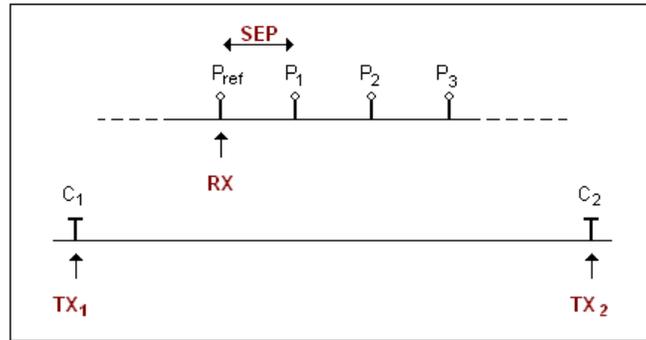
The electrodes C<sub>1</sub> has to be set far from the other electrodes, usually 5 times the maximum distance between C<sub>2</sub> and P<sub>ref</sub>.

### Pole-Pole



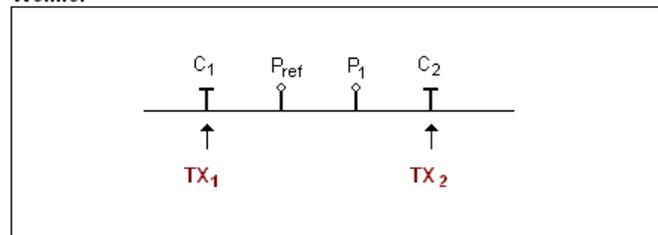
The electrodes C<sub>1</sub> and P<sub>ref</sub> have to be set far from C<sub>2</sub> and P<sub>1</sub>, usually 10 times the maximum distance between C<sub>2</sub> and P<sub>1</sub>.

### Gradient



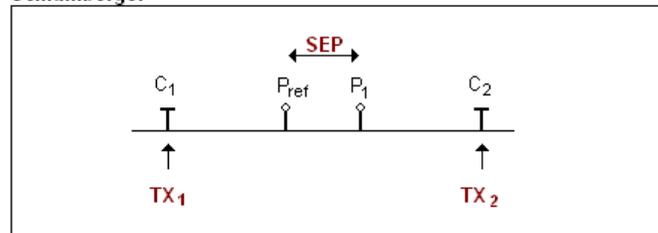
The electrodes  $C_1$  and  $C_2$  are fixed. The electrode  $P$  is moved parallel to  $C$  inside a zone located in the central part of  $C_1$ ,  $C_2$ .

### Wenner



The electrodes  $C_1$ ,  $P_{ref}$ ,  $P_1$  and  $C_2$  are equidistant.

### Schlumberger

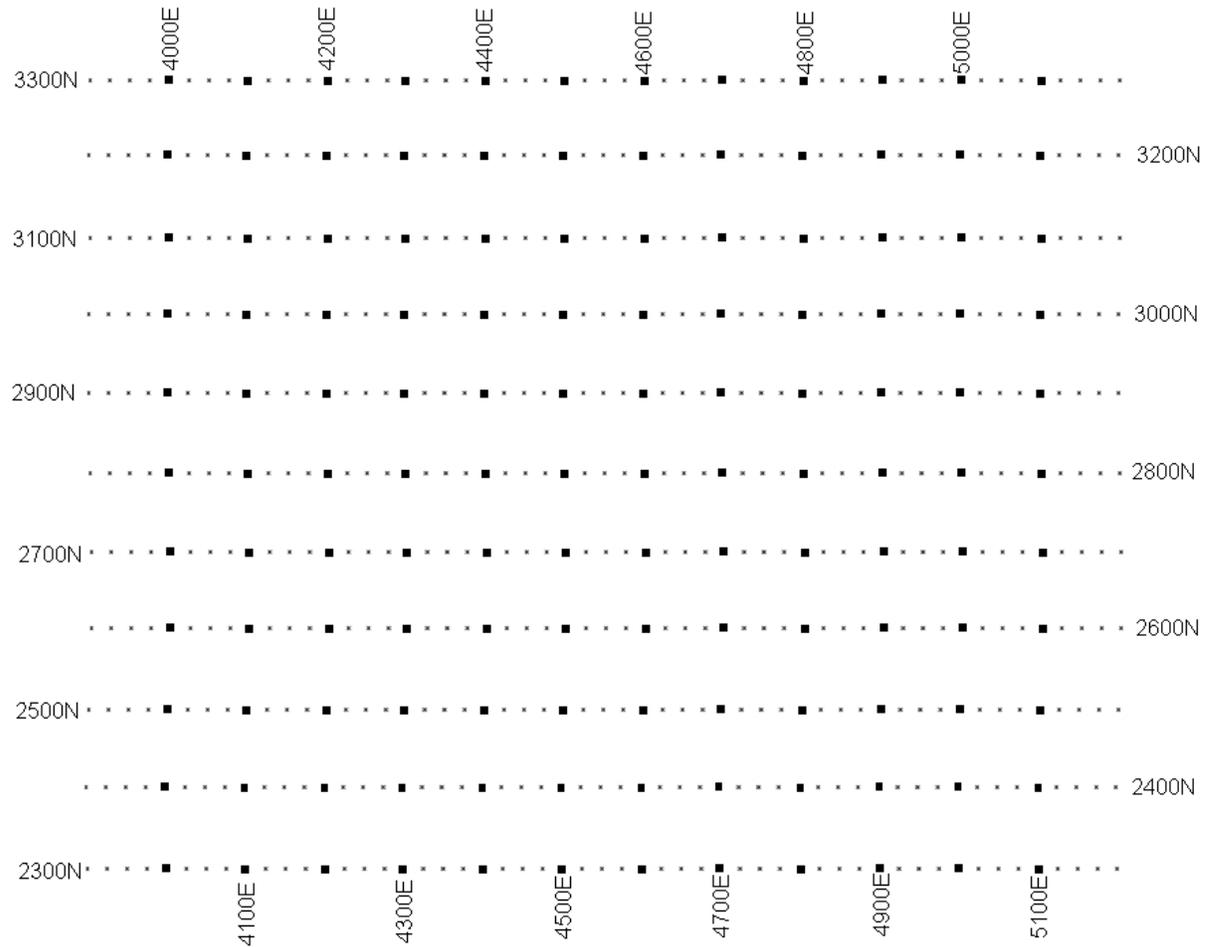


The electrodes  $P_{ref}$  and  $P_1$  are located at the middle point of electrodes  $C_1$  and  $C_2$ .

## Annex 2 – Field survey setup

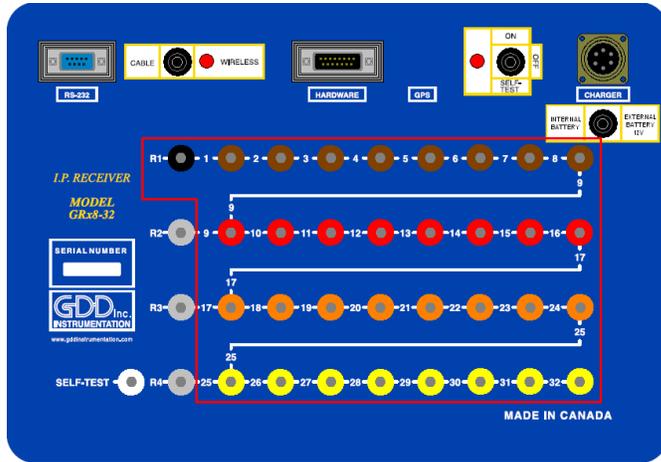
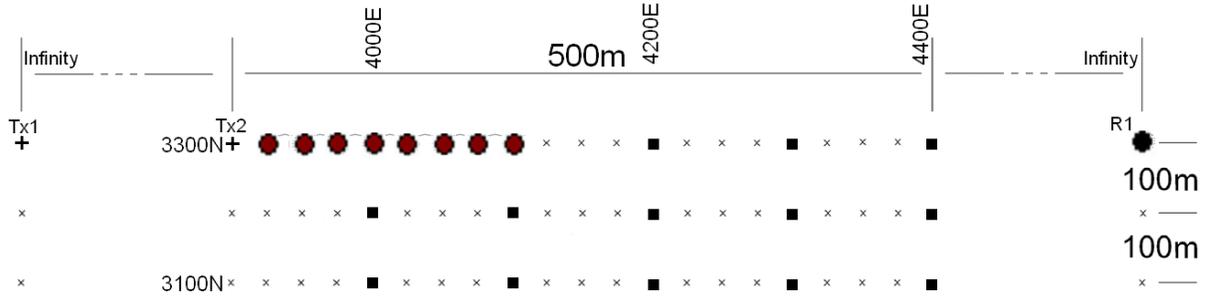
### Survey setup

#### Line information



This survey will consist of 11 lines, each separated by 100m. Each line is 1.3 km long. The examples below will begin at position 3300N-3900E.

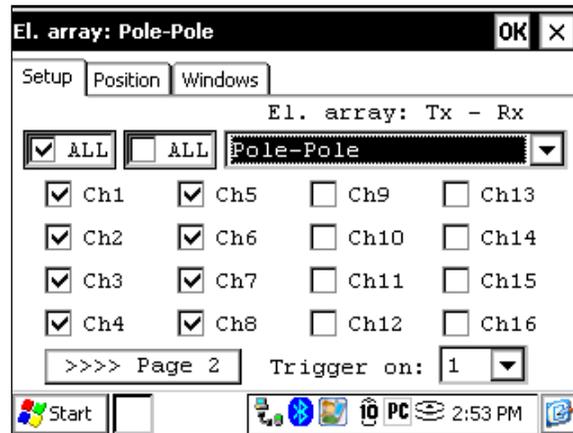
## Pole-Pole



- Legend**
- x Station
  - + Tx electrode
  - Rx electrode
  - R1 Reference electrode

For this pole-pole setup, 8 electrodes of the GDD-Rx will be used.

- 1) Select Pole-Pole in the setup page.

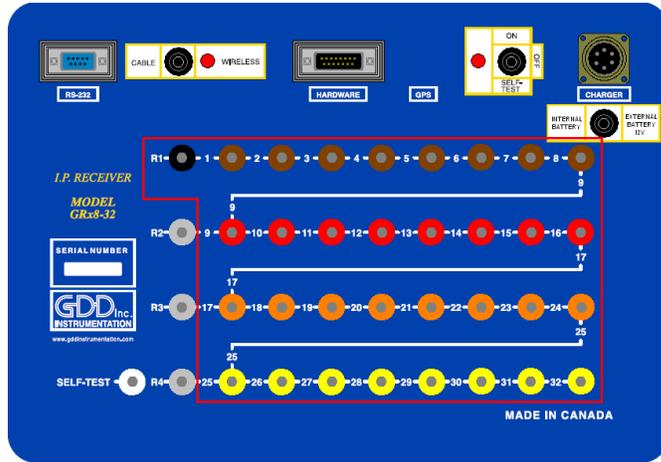
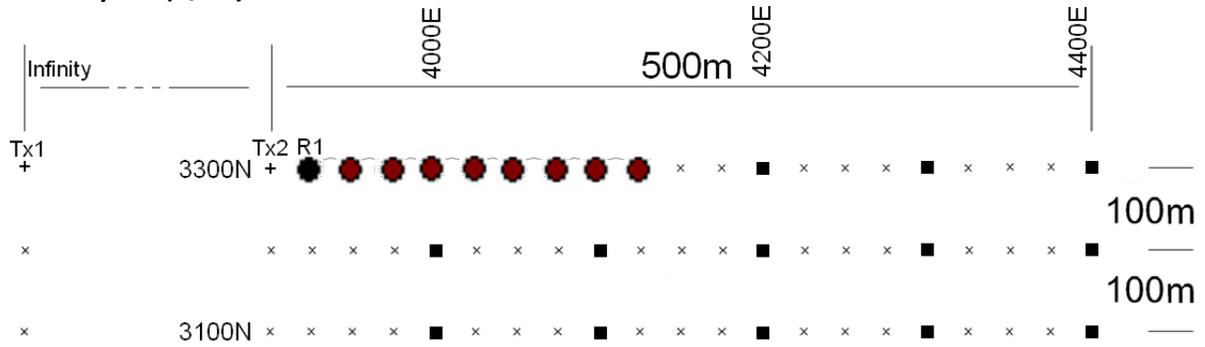


2) Enter the positions corresponding to your survey parameters.

3) If all the values are correct, click the Ok button to continue and take a reading. If something is incorrect, you can modify it on this page.

4) When the reading is done, click the NEXT STN button to increment the positions.

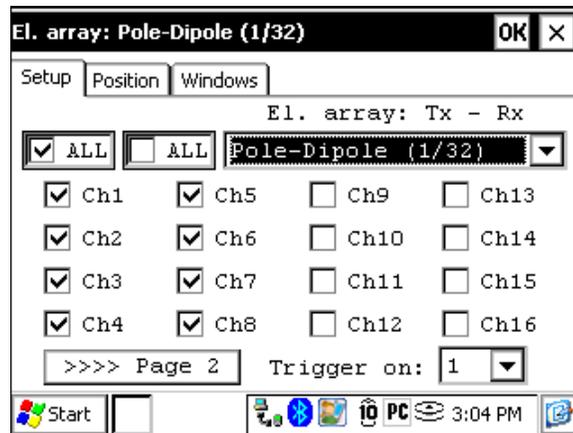
## Pole-Dipole (1/32)



- Legend
- x Station
  - + Tx electrode
  - Rx electrode
  - R1 Reference electrode

For this pole-dipole setup, 8 electrodes of the GDD-Rx will be used.

- 1) Select Pole-Dipole(1/32) in the setup page. The Pole-Dipole (2/16) and Pole-Dipole (4/8) options are explained in the 3D survey section at the end of this document.



2) Enter the positions corresponding to your survey parameters.

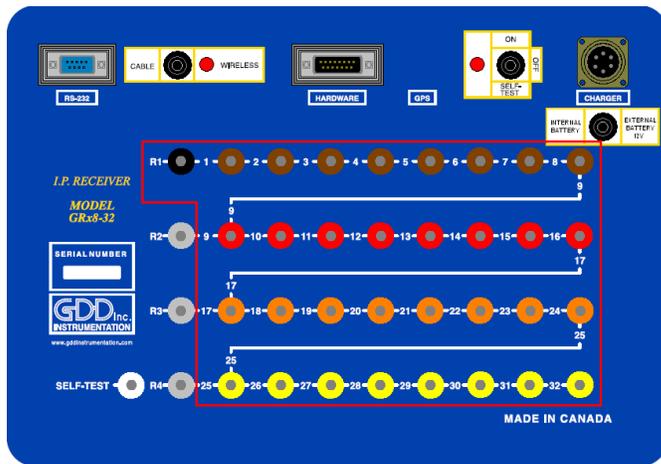
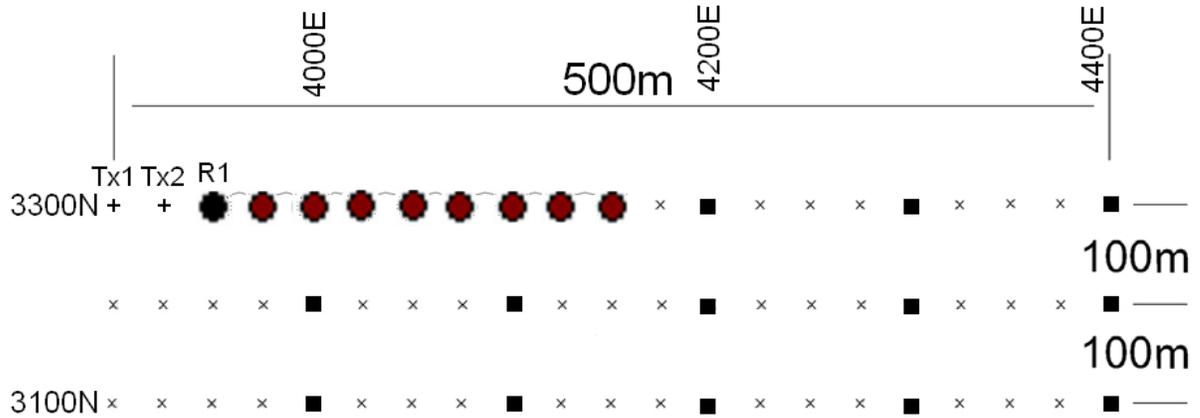
3) If all the values are correct, click the Ok button to continue and take a reading. If something is incorrect, you can modify it on this page.

|     |         |             |      |   |      |
|-----|---------|-------------|------|---|------|
| LTx | 3300    | 1           | 3950 | 5 | 4050 |
| LRx | 3300    | 2           | 3975 | 6 | 4075 |
| Tx1 | 9999999 | 3           | 4000 | 7 | 4100 |
| Tx2 | 3900    | 4           | 4025 | 8 | 4125 |
| Ref | 3925    | >>>> Page 2 |      |   |      |

4) When the reading is done, click the NEXT STN button to increment the positions.

|     |         |             |      |   |      |
|-----|---------|-------------|------|---|------|
| LTx | 3300    | 1           | 3975 | 5 | 4075 |
| LRx | 3300    | 2           | 4000 | 6 | 4100 |
| Tx1 | 9999999 | 3           | 4025 | 7 | 4125 |
| Tx2 | 3925    | 4           | 4050 | 8 | 4150 |
| Ref | 3950    | >>>> Page 2 |      |   |      |

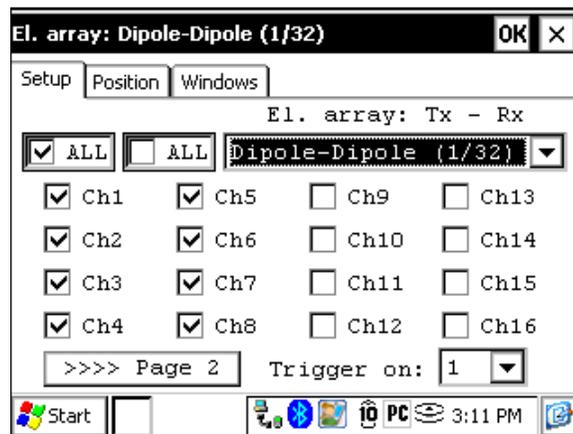
### Dipole-Dipole (1/32)



- Legend**
- x Station
  - + Tx electrode
  - Rx electrode
  - R1 Reference electrode

For this dipole-dipole setup, 8 electrodes of the GDD-Rx will be used.

- 1) Select Dipole-Dipole (1/32) in the setup page.



2) Enter the positions corresponding to your survey parameters.

3) If all the values are correct, click the Ok button to continue and take a reading. If something is incorrect, you can modify it on this page.

| LTx  | LRx  | Tx1  | Tx2  | Ref  | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 3300 | 3300 | 3900 | 3925 | 3950 | 3975 | 4000 | 4025 | 4050 | 4075 | 4100 | 4125 | 4150 |

>>>> Page 2

Tx    NEXT STN    PREV. STN    NEXT LINE    PREV. LINE    OK  
 Rx

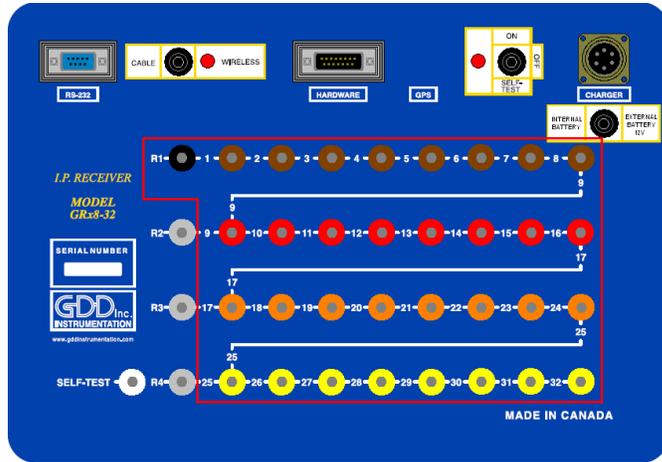
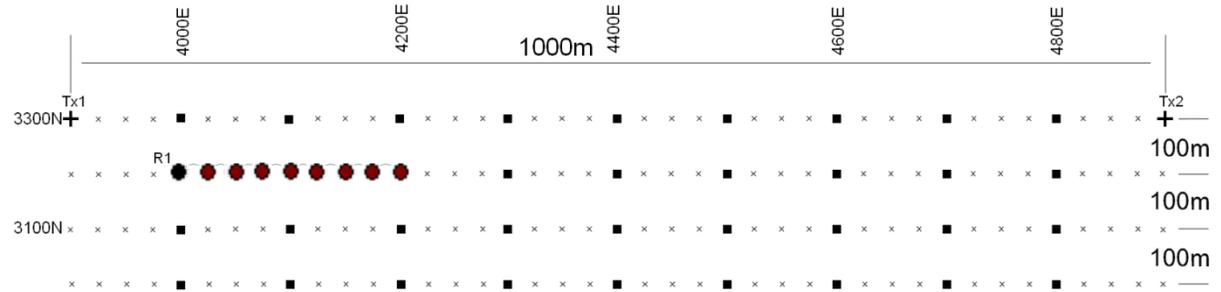
4) When the reading is done, click the NEXT STN button to increment the positions.

| LTx  | LRx  | Tx1  | Tx2  | Ref  | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |
|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 3300 | 3300 | 3925 | 3950 | 3975 | 4000 | 4025 | 4050 | 4075 | 4100 | 4125 | 4150 | 4175 |

>>>> Page 2

Tx    NEXT STN    PREV. STN    NEXT LINE    PREV. LINE    OK  
 Rx

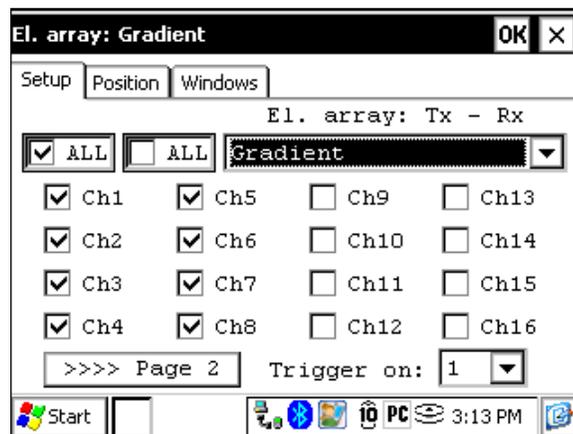
## Gradient



- Legend**
- x Station
  - + Tx electrode
  - Rx electrode
  - R1 Reference electrode

For this Gradient setup, 8 electrodes of the GDD-Rx will be used.

- 1) Select Gradient in the setup page.



- 2) Enter the positions corresponding to your survey parameters.

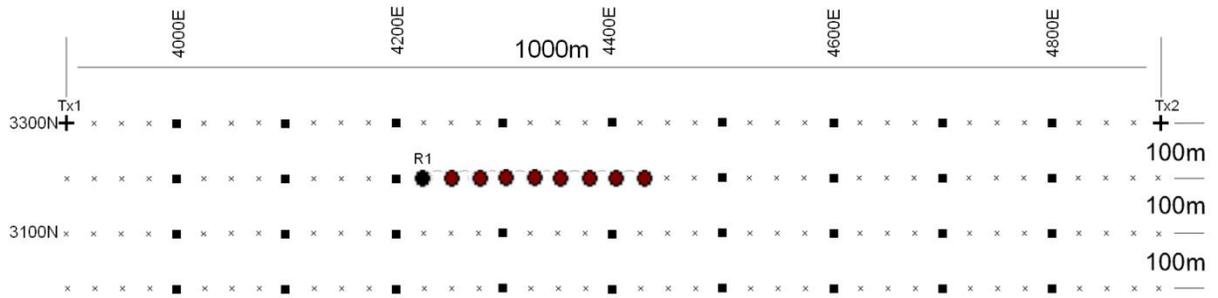
- 3) If all the values are correct, click the Ok button to continue and take a reading. If something is incorrect, you can modify it on this page. Uncheck the Tx box so only the Receiver electrodes position will change.

| Position                               |      |             |      |        |
|--|------|-------------|------|--------|
| LTx                                    | 3300 | 1           | 4025 | 5 4125 |
| LRx                                    | 3200 | 2           | 4050 | 6 4150 |
| Tx1                                    | 3900 | 3           | 4075 | 7 4175 |
| Tx2                                    | 4900 | 4           | 4100 | 8 4200 |
| Ref                                    | 4000 | >>>> Page 2 |      |        |
| <input type="checkbox"/> Tx            | NEXT | PREV.       | NEXT | PREV.  |
| <input checked="" type="checkbox"/> Rx | STN  | STN         | LINE | LINE   |
|  |      |             |      | OK     |

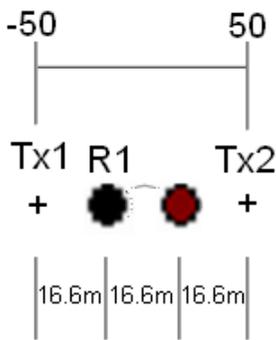
- 4) When the reading is done, make sure that the Tx box is unchecked, click the NEXT STN button to increment the positions, only the Receiver electrodes position will change.

| Position                               |      |             |      |        |
|--|------|-------------|------|--------|
| LTx                                    | 3300 | 1           | 4250 | 5 4350 |
| LRx                                    | 3200 | 2           | 4275 | 6 4375 |
| Tx1                                    | 3900 | 3           | 4300 | 7 4400 |
| Tx2                                    | 4900 | 4           | 4325 | 8 4425 |
| Ref                                    | 4225 | >>>> Page 2 |      |        |
| <input type="checkbox"/> Tx            | NEXT | PREV.       | NEXT | PREV.  |
| <input checked="" type="checkbox"/> Rx | STN  | STN         | LINE | LINE   |
|  |      |             |      | OK     |

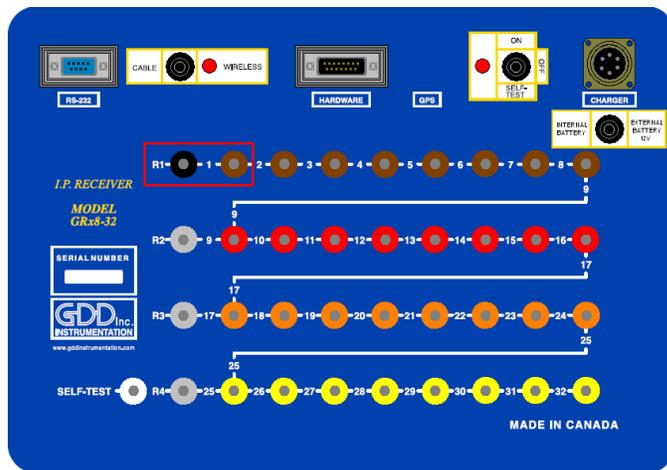
- 5) Your next setup on the field should be like this.



**Wenner**

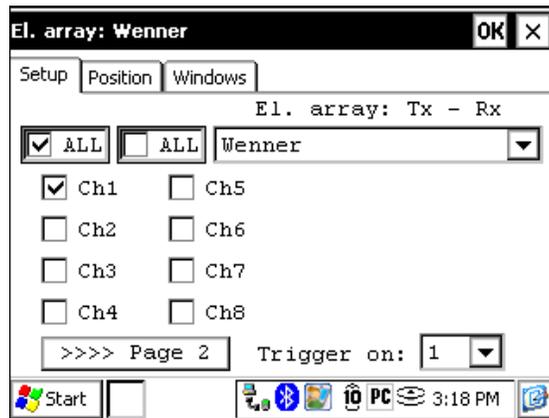


- Legend**
- x Station
  - + Tx electrode
  - Rx electrode
  - R1 Reference electrode

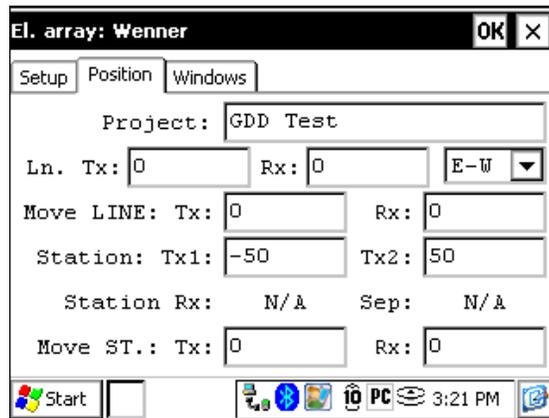


A Wenner setup uses only two electrodes, the Reference R1 and the electrode 1 of the GDD Rx.

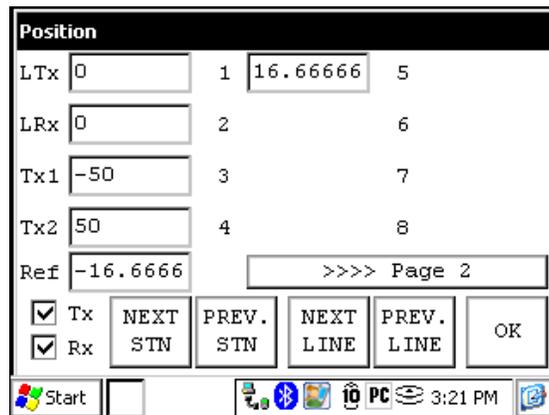
- 1) Select Wenner in the setup page and check only one channel.



- 2) Enter the positions corresponding to your survey parameters.

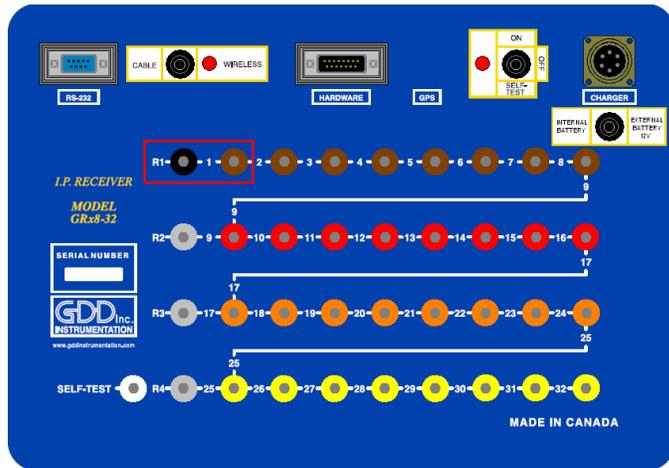
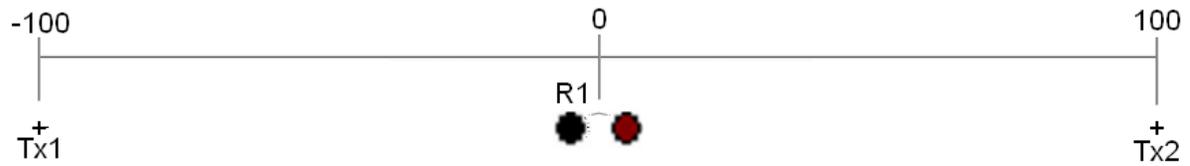


- 3) If all the values are correct, click the Ok button to continue and take a reading. If something is incorrect, you can modify it on this page.



- 4) For a Wenner survey, you will have to manually enter the parameters for each reading. To access the Position page, click the Tools button and select the Config option in the pop-up menu.

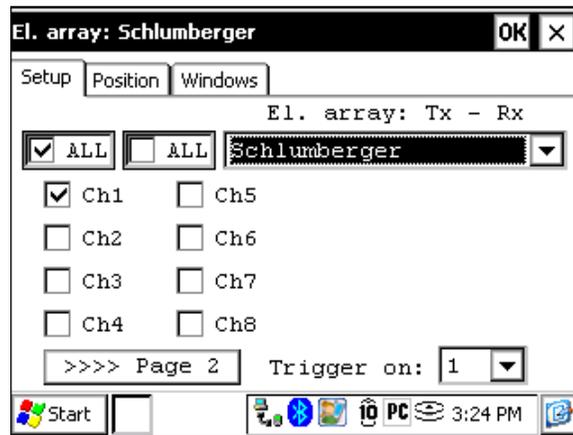
## Schlumberger



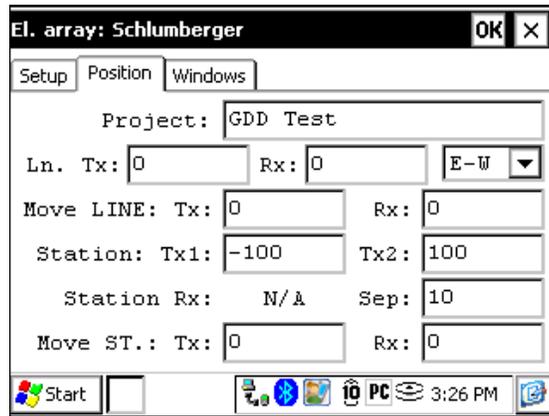
- Legend
- x Station
  - + Tx electrode
  - Rx electrode
  - R1 Reference electrode

A Schlumberger setup uses only the Reference R1 and the electrode 1 of the GDD Rx.

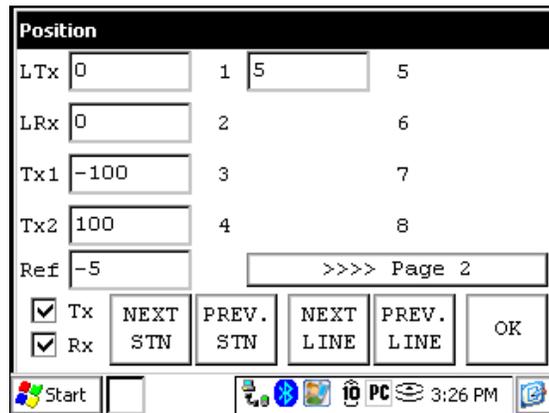
- 1) Select Schlumberger in the setup page.



2) Enter the positions corresponding to your survey parameters.

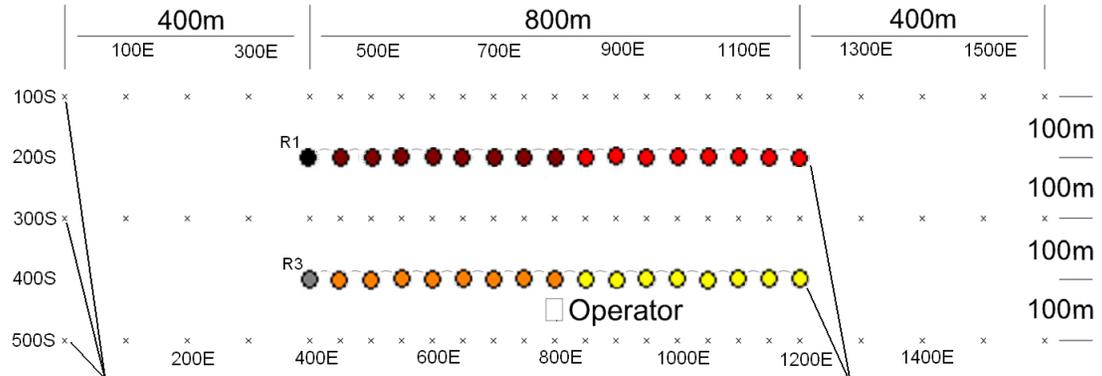


3) If all the values are correct, click the Ok button to continue and take a reading. If something is incorrect, you can modify it on this page.



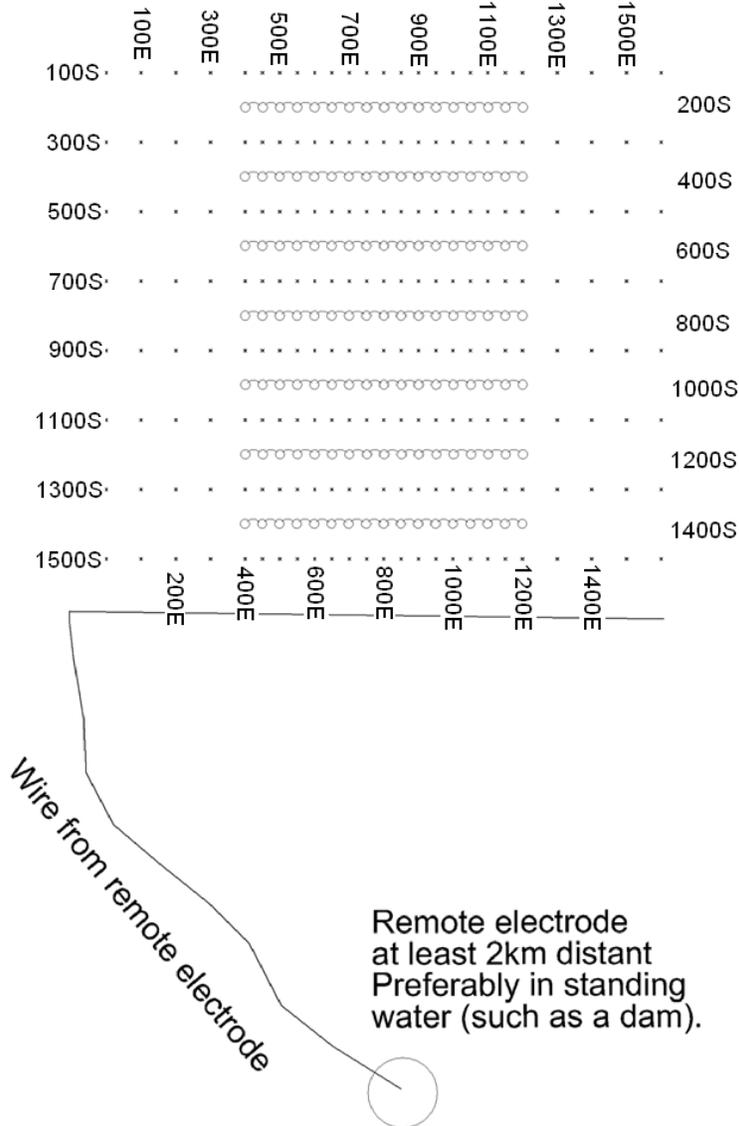
4) For a Schlumberger survey, you will have to manually enter the parameters for each reading. To access the Position page, click the Tools button and select the Config option in the pop-up menu.

### 3D Survey

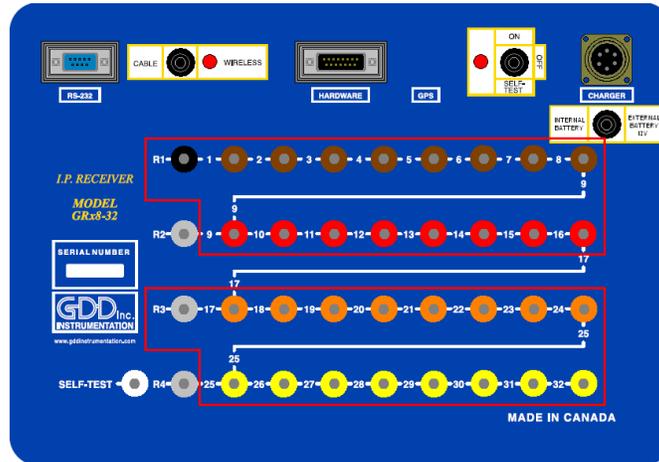


Transmitter pole electrodes  
 3 lines of electrodes  
 100m either side of the receiver line  
 17 electrodes plus 4 at each end  
 =25 per line x 3 lines  
 =75 transmitter pole electrodes

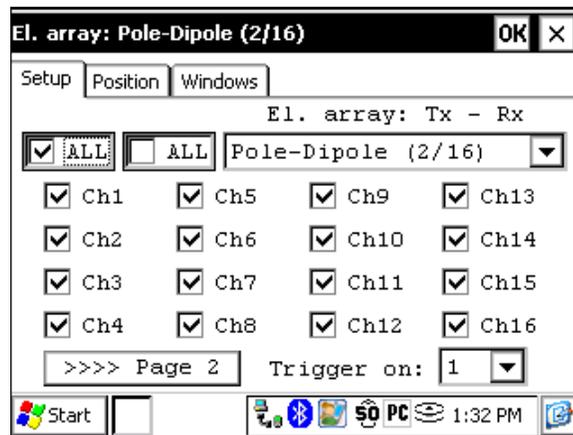
Receiver electrodes  
 2 lines  
 17 electrodes per line  
 16 dipoles per line  
 Fixed location



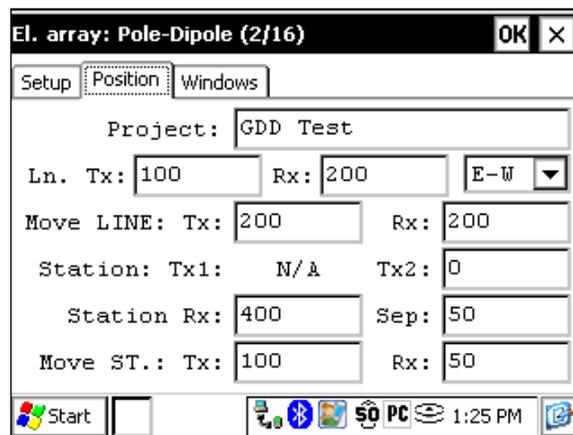
As shown on the images on the previous page, this setup is for 2 lines of 16 dipoles each using a GDD Rx-32. For the reference pins, R1 and R3 will be used; R2 and R4 will not be used since this is a 2 lines setup.



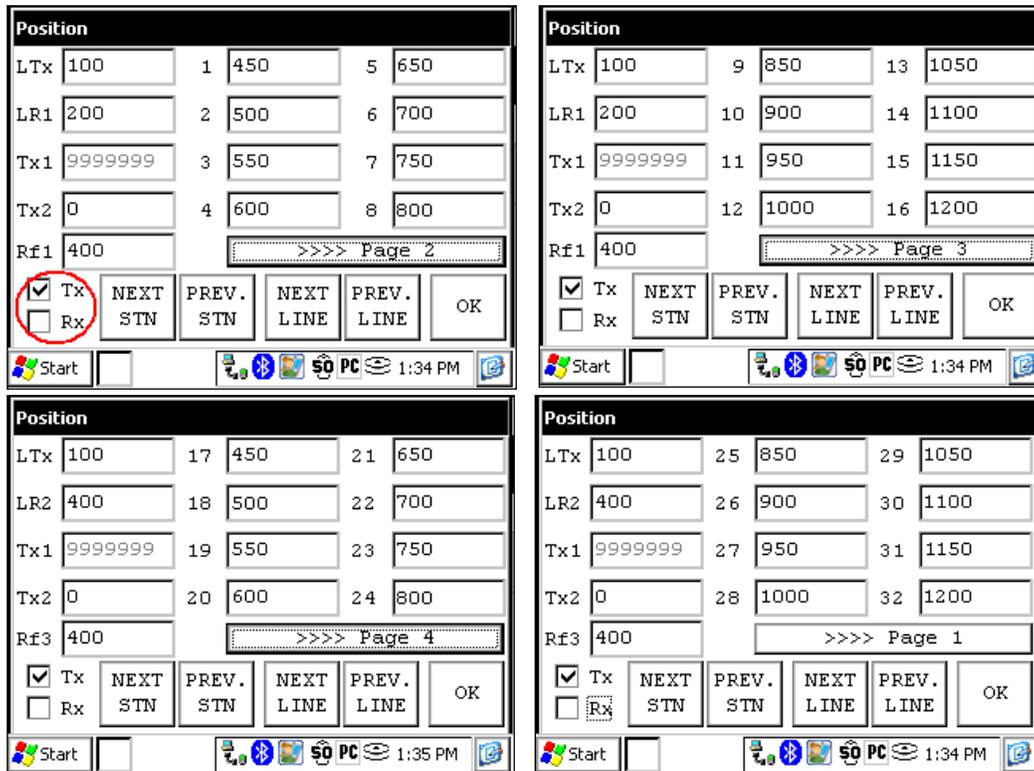
1) Select the Pole-Dipole 2/16 on the Setup tab.



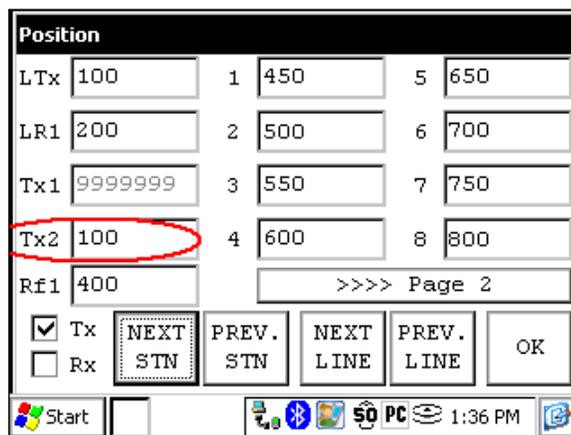
2) On the Position tab; enter the parameters of your survey.



- 3) Uncheck the Rx box so only the Tx position will change when you click the NEXT STN and NEXT LINE buttons. Verify that the positions of the 32 electrodes are set properly. Hit the OK button to close this window. On the next screen, click Start to take readings.



- 4) When readings are done and stored, click the Start button. Click the NEXT STN button and only the Tx2 station will be incremented by 100 since it was entered as the Tx spacing.



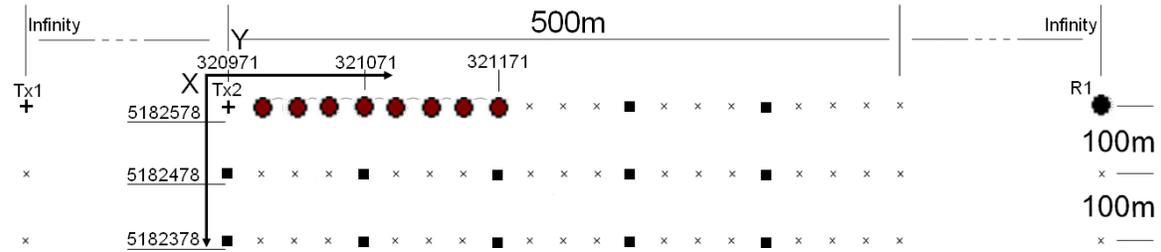


- 8) When the line is done, change the Move ST.: TX: to -100 or the Tx2 position to 0 depending on where you are starting the next line.

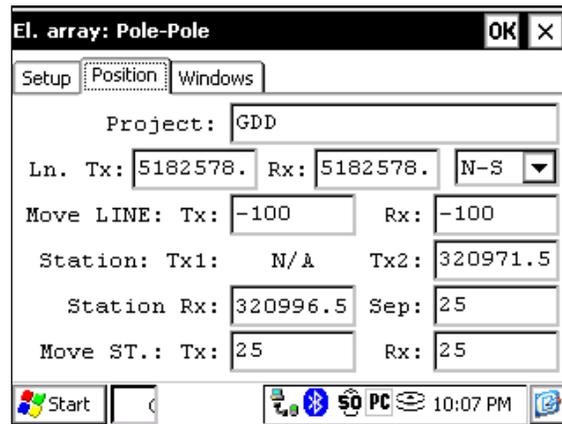
| El. array: Pole-Dipole (2/16) |          |             |
|-------------------------------|----------|-------------|
| Setup                         | Position | Windows     |
| Project: GDD Test             |          |             |
| Ln. Tx:                       | 300      | Rx: 200 E-W |
| Move LINE: Tx:                | 200      | Rx: 200     |
| Station: Tx1:                 | N/A      | Tx2: 1600   |
| Station Rx:                   | 400      | Sep: 50     |
| Move ST.: Tx:                 | -100     | Rx: 50      |

## GPS Positions

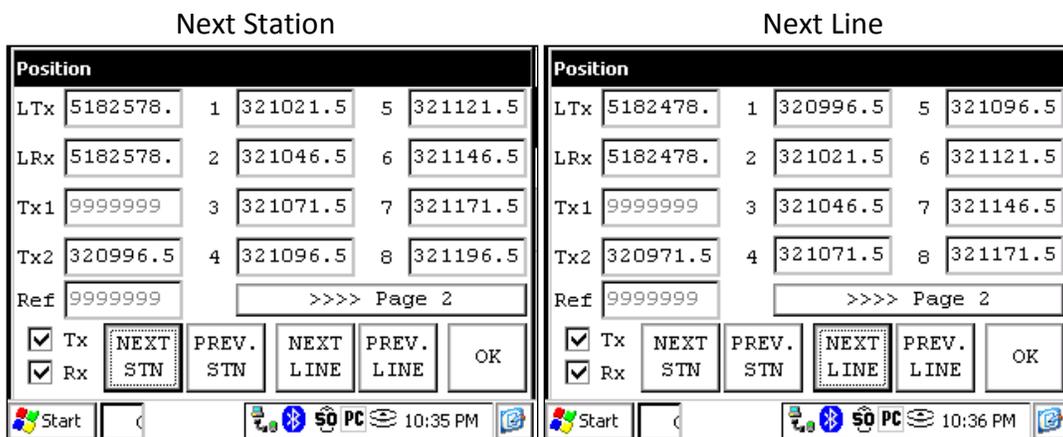
Setting GPS positions instead of nominal positions



Starting position: X – 320971.52 Easting Y – 5182578.35 Northing



Instead of using a relative position system (the starting position being 0,0), you can enter GPS position in meters in the Line TX, Line RX, Tx1, Tx2 and Station Rx cases. You can enter any number between -9999999 and 9999999.



## Annex 3 – Example Dump File

Version PPC: 0.4.2.42 Version Rx: 0.5.1.8 Rx SN: 1309

Project:

Windows: 20 Setting: Arith. Delay (ms): 240 Timing (ms): 80, 80

| Mem | Date       | Hour     | Array | LineTx | LineRx | Dir | n   | Tx1        | Tx2  | Rx1  | Rx2        | Contact | Rho  |
|-----|------------|----------|-------|--------|--------|-----|-----|------------|------|------|------------|---------|------|
| 1   | 06/11/2013 | 08:09:55 | P-P   | 0.00   | 0.00   | N-S | 0.0 | 9999999.00 | 0.00 | 0.00 | 9999999.00 | 8.9     | 0.00 |
| 1   | 06/11/2013 | 08:09:55 | P-P   | 0.00   | 0.00   | N-S | 0.0 | 9999999.00 | 0.00 | 0.00 | 9999999.00 | 16.0    | 0.00 |
| 1   | 06/11/2013 | 08:09:55 | P-P   | 0.00   | 0.00   | N-S | 0.0 | 9999999.00 | 0.00 | 0.00 | 9999999.00 | 21.2    | 0.00 |
| 1   | 06/11/2013 | 08:09:55 | P-P   | 0.00   | 0.00   | N-S | 0.0 | 9999999.00 | 0.00 | 0.00 | 9999999.00 | 24.2    | 0.00 |

| Sp   | SpMin | SpMax | Vp      | ErrVp | Sym(%) | M     | ErrM  | In       | Time | DC | Stack | M01   |
|------|-------|-------|---------|-------|--------|-------|-------|----------|------|----|-------|-------|
| 0.4  | 0.4   | 0.4   | 125.112 | 0.001 | 100    | 7.947 | 0.009 | 1000.000 | 2000 | 50 | 10    | 7.974 |
| 0.5  | 0.4   | 0.7   | 250.336 | 0.001 | 100    | 7.945 | 0.002 | 1000.000 | 2000 | 50 | 10    | 7.954 |
| 0.7  | 0.7   | 0.8   | 375.726 | 0.002 | 100    | 7.947 | 0.002 | 1000.000 | 2000 | 50 | 10    | 7.961 |
| -0.0 | -0.1  | 0.9   | 500.038 | 0.002 | 100    | 7.945 | 0.000 | 1000.000 | 2000 | 50 | 10    | 7.952 |

### First section - File header:

|               |                                      |
|---------------|--------------------------------------|
| Version PPC : | Version of the Rx program on the PDA |
| Version Rx :  | Version of the Rx software           |
| Rx SN :       | Serial number of the IP Receiver     |

### Second section:

|           |                      |
|-----------|----------------------|
| Project : | Name of your project |
|-----------|----------------------|

### Third section:

|            |  |
|------------|--|
| Windows :  | Number of windows (depending on the selected mode)                   |
| Settings : | Selected mode (Arith., Semi, Log., Cole, User)                       |
| Delay :    | Delay in ms before the first window (depending on the selected mode) |
| Timing :   | Timing of each window (depending on the selected mode)               |

- The file is divided in 4 sections. The fourth one contains the data.
- Sections 2 and 3 will be repeated within the same file following a parameter change.
- Infinite values within Rho, TX1 and RX2 (in pole arrays) are represented by 9999999.00.
- Values in section 4 are delimited by one or more spaces. Therefore the import software must treat consecutive delimiters as one.
- Each line in section 4 has a fix number of entries. If less than 20 windows are defined for a selected entry, the unused columns will be padded with 999.99
- The example file is truncated on the right side omitting column M02 to M20

#### Section 4 Column headers:

|            |   |
|------------|---|
| Mem:       | Memory number   |
| Date       | Date, format DD/MM/YYYY   |
| Hour       | Time, format HH:MM:SS   |
| Array      | Electrode Array; P-P, P-DP, DP-DP, WEN, GRAD  |
| Line Tx:   | Transmitter Line Label  |
| Line Rx:   | Receiver Line Label   |
| Dir:       | Line Direction (North-South or East-West)   |
| n:         | Number or Rank of dipole  |
| Tx1:       | First electrode of the transmitter  |
| Tx2:       | Second electrode of the transmitter   |
| Rx1:       | First electrode of the dipole   |
| Rx2:       | Second electrode of the dipole  |
| Contact:   | Soil resistance in kOhm; XX.X, INFINI or ----- (undefined)                            |
| Rho:       | Resistivity in Ohm*m  |
| Sp:        | Self potential in mV  |
| SpMin:     | Minimum value of SP in mV   |
| SpMax:     | Maximum value of SP in mV   |
| Vp:        | Primary voltage in mV   |
| ErrVp:     | Error of Vp: standard deviation of the data set used to calculate the primary voltage |
| Sym(%):    | Symmetry in %   |
| M:         | Chargeability in mV/V   |
| ErrM:      | Error of M: standard deviation of the data set used to calculate the chargeability    |
| In:        | Current in mA   |
| Time:      | Transmitter timing in ms  |
| Stack:     | Number of stacks  |
| DC:        | Duty Cycle in %   |
| M01 – M20: | Windows of chargeability  |

\*\* Date and Time are those of the PDA for the *.gdd* file and GPS time for the *.gps* file.