IP RECEIVER

Models GRx8-32, GRx8mini and GRx2 with Android software

Instruction Manual

INSTRUMENTATION GDD

1963 rue Frank-Carrel, suite 203
Quebec (QC), Canada, G1N 2E6
Tel.: +1 (418) 478-5469

E-Mail: info@gdd.ca
Web site: www.gddinstruments.com

Visit our web site at:

www.gddinstruments.com

To:

- Discover GDD's new products.
- Download the latest version of the Instruction Manual.
- Comment on or ask questions about products.

TABLE OF CONTENTS

1. *Introduction*

The highly sensitive GDD IP Receiver, models GRx8-32, GRx8*mini* and 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 IP receiver can use any Android device to process data acquisition. The software is free of charge and available on the Google Play Store: https://play.google.com/store/apps/details?id=com.gddinstrumentation.rxPp

GDD's IP receiver models:

GRx8-32

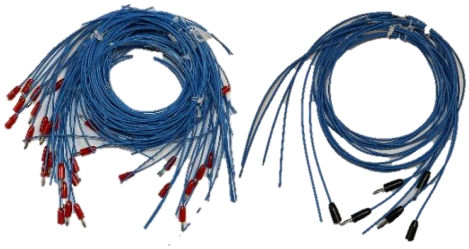
GRx8*mini*

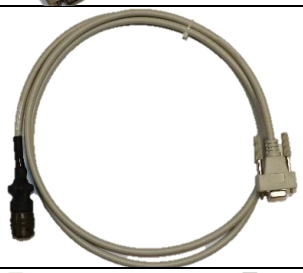
GRx2

Characteristics	GRx8-32	GRx8*mini*	GRx2
Reception poles-dipoles	1 to 32 poles/dipoles, for dipole-dipole, pole-dipole or pole-pole arrays.	1 to 8 poles/dipoles for dipole-dipole, pole-dipole or pole-pole arrays.	1 to 2 poles/dipoles, for dipole-dipole, pole-dipole or pole-pole arrays.
Programmable windows	The GRx8-32 offers twenty fully programmable windows for higher flexibility in defining the IP decay curve.	The GRx8*mini* offers twenty fully programmable windows for higher flexibility in defining the IP decay curve.	The GRx2 offers twenty fully programmable windows for a higher flexibility in the definition of the IP decay curve.
User mode available	Arithmetic, logarithmic, semi-logarithmic, Cole-Cole and user defined.	Arithmetic, logarithmic, semi-logarithmic, Cole-Cole and user defined.	Arithmetic, logarithmic, semi-logarithmic, Cole-Cole and user define.
IP display	Chargeability values, Apparent Resistivity, and IP decay curves can be displayed in real	Chargeability values, Apparent Resistivity and IP decay curves can be displayed in real time.	Chargeability values, apparent resistivity and IP decay curves can be displayed in real time.

	time. Before data acquisition, the GRx8-32 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.	Before data acquisition, the GRx8*mini* 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.	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	Capacity of 32 GB on the Cat S42 smartphone to store up to 64 000 readings with all 32 channels activated, memory expandable with a MicroSD card. Each reading includes the full set of parameters characterizing measurements. Data is stored on flash type memory that does not require any lithium battery for safeguard purposes.	Capacity of 32 GB on the Cat S42 smartphone to store up to 64 000 readings with 8 poles/dipoles, memory expandable with a MicroSD card. Each reading includes the full set of parameters characterizing measurements. Data is stored on flash type memory that does not require any lithium battery for safeguard purposes.	Capacity of 32 GB on the Cat S42 smartphone to store over 64 000 readings. memory expandable with a MicroSD card. Each reading includes the full set of parameters characterizing measurements. Data is stored on flash type memory that does not require any lithium battery for safeguard purposes.
Full wave data with IP Post-Processing software	The GRx8-32 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.	The GRx8*mini* 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.	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.

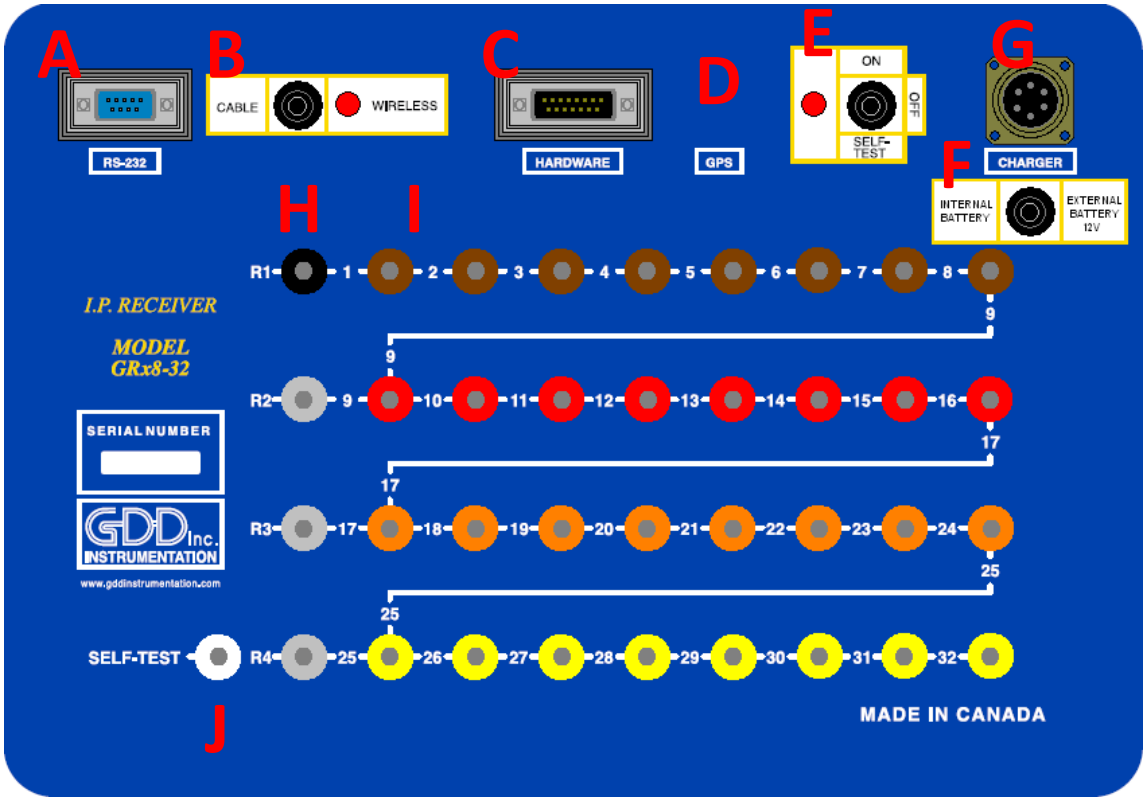
2. *Receiver Accessories*

Accessories	Description	GRx8-32	GRx8*mini*	GRx2
	IP Receiver	**X**	**X**	**X**
	Android smartphone Cat S42 with charger	**X**	**X**	**X**
	IP Receiver charger	**X**	**X**	**X**
	Blue cables with red banana connectors and black banana connectors	**X**	**X**	**X**

	Standard serial communication cable	**X**	**X**	**X**
	Rugged serial communication cables (*Amphenol connector*)	**X**	**X**	
	USB adapters cables	**X**	**X**	**X**
	External GPS antenna (SMA connector)	**X**	**X**	**X**
	USB flash drive	**X**	**X**	**X**
	Travel universal adapter	**X**	**X**	**X**

3. *Receiver Components*

3.1 Model GRx8-32:



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

This connector is used to connect the RS-232 cable between the Android device and the GRx8-32.

B - CABLE/WIRELESS switch

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

C - HARDWARE connector - 15 pin programming port

This connector is used to update the CPU and PLD software.

D - GPS Connector

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

E - ON/OFF/SELF-TEST switch

This switch is used to turn the GRx8-32 ON or to perform a self-test. The red light indicates that the GRx8-32 is ON or in the SELF-TEST position.

F - INTERNAL/EXTERNAL BATTERY switch

This switch is used to select the internal batteries or the external battery pack, provided by GDD.

G - CHARGER connector

This connector is used to charge the receiver batteries. The *Internal Battery / External Battery (F)* switch must be on *Internal battery*.

H - R1 to R4 terminals

In pole configuration, the reference terminals (R1 to R4) are the infinite electrodes. In dipole configuration, the reference terminal is the first electrode in differential with the second electrode.

I - NUMBERED terminals

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

J - SELF-TEST terminal

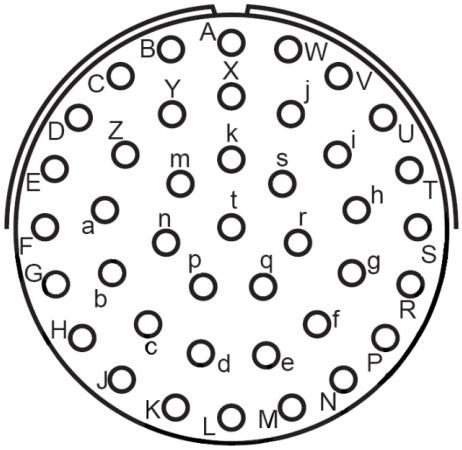
This terminal is used to perform a self-test.

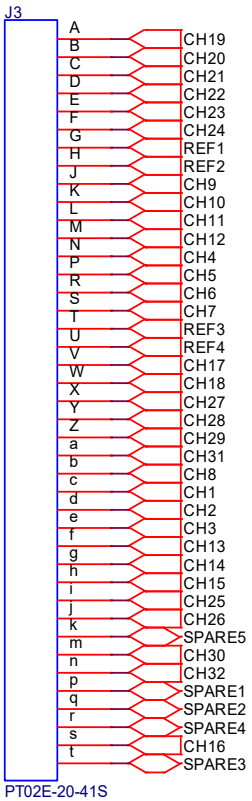
K - RS-232 external Connector

This connector is used to connect the rugged serial communication cable (Amphenol connector), which allows communication between the Android device and the GRx8-32 receiver.

L - Input signal connector

This connector is used to connect the wires coming from the electrodes to the receiver channels to keep the Pelican case closed while taking the readings. An optional cable mount connector (41 pos.) can be purchased and used with the instrument.

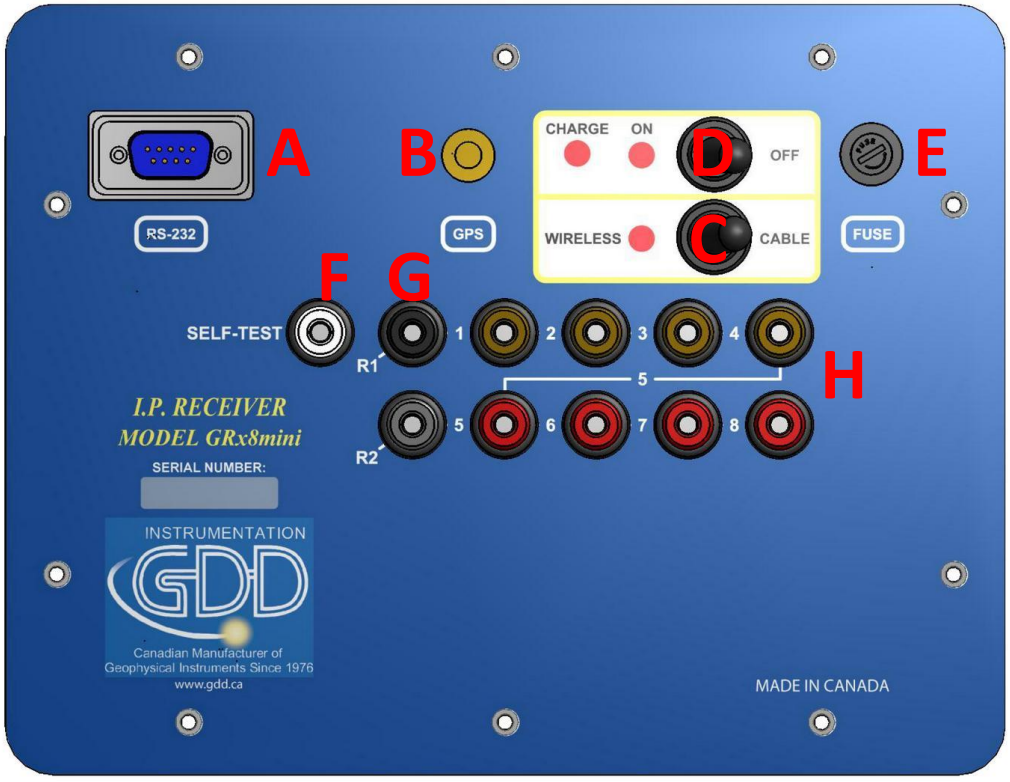




M - External battery connector

This connector is used to connect the external battery pack. The Internal/External battery switch (F) must be on External battery position.

3.2 Model GRx8mini:



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

This connector is used to connect the serial communication cable between the Android device and the GRx8*mini*.

B - GPS Connector

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

C - CABLE/WIRELESS switch

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

D - ON/OFF switch

This switch is used to turn the GRx8*mini* ON. The ON red light indicates that the GRx8*mini* is ON.

E - FUSE

This fuse prevents damages that could be caused by a defective charger.
Replacement fuse: 5x20mm 6A 125V fast action

F - SELF-TEST terminal

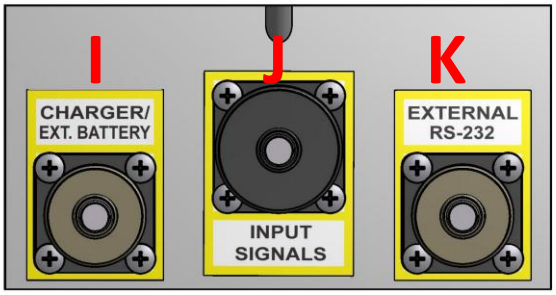
This terminal is used to perform a self-test.

G - R1 and R2 terminals

In pole configuration, the reference terminals (R1 and R2) are the infinite electrodes. In dipole configuration, the reference terminal is the first electrode in differential with the second electrode.

H - NUMBERED terminals

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

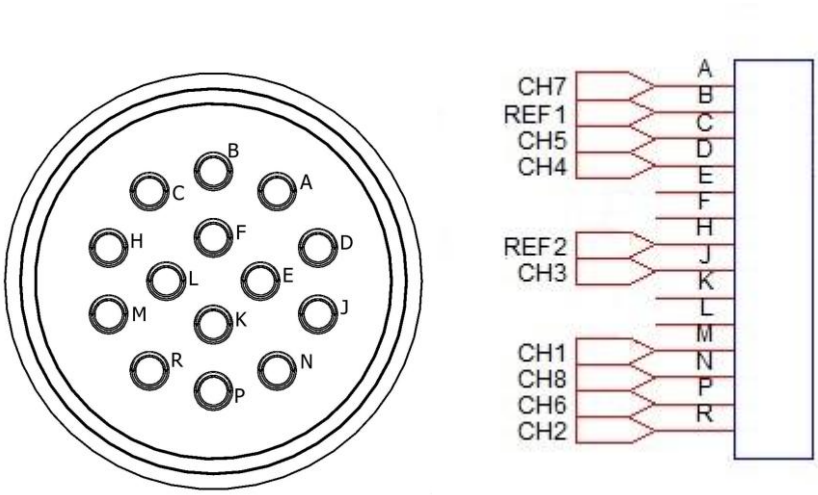


I - CHARGER/EXT. BATTERY connector

This connector is used to charge the receiver's batteries. It can also be used to connect an external battery pack provided by GDD (optional). The CHARGE red light on the top of the receiver indicates that the internal batteries are charging. The light turns off when the batteries are fully charged.

J - Input signal connector

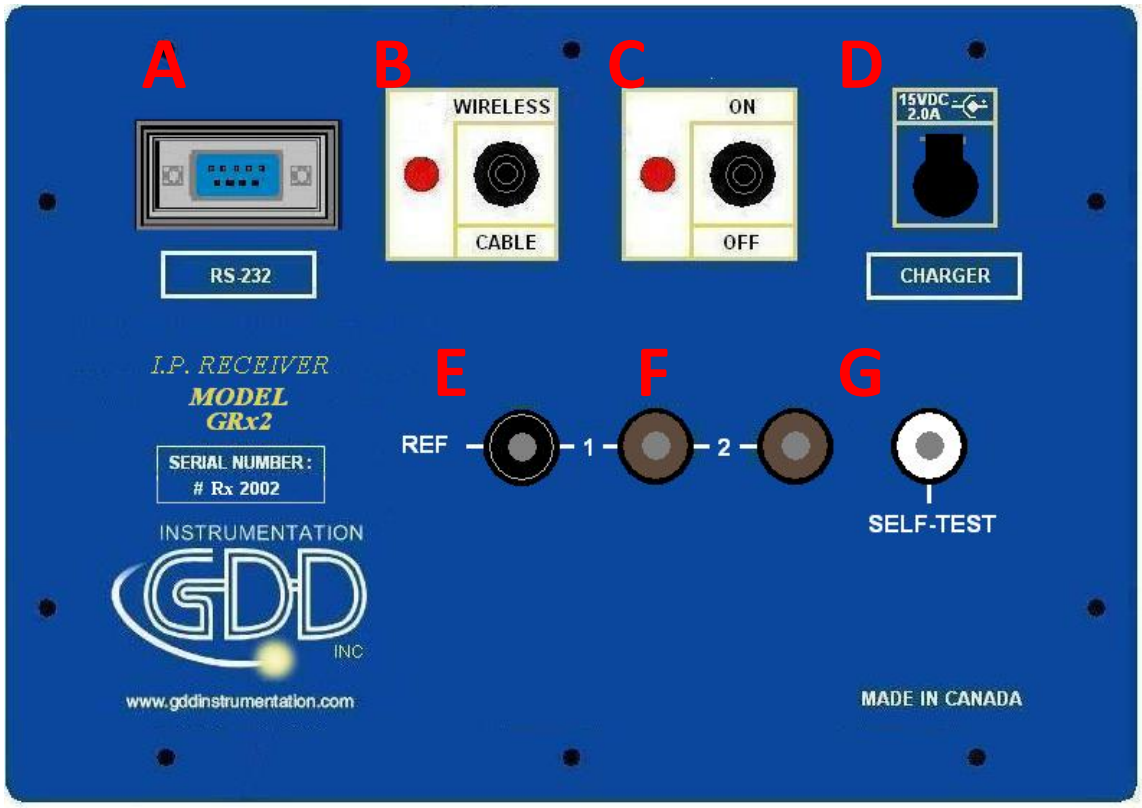
This connector is used to connect the wires coming from the electrodes to the receiver channels to keep the Pelican case closed while taking the readings. An optional cable mount connector (14 pos.) can be purchased and used with the instrument.



K - RS-232 external Connector

This connector is used to connect the rugged serial communication cable (Amphenol connector), which allows communication between the Android device and the GRx8*mini* receiver.

3.3 Model GRx2:



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

This connector is used to connect the RS-232 cable between the Android device and the GRx2 receiver.

B - CABLE/WIRELESS switch

This switch is used to select CABLE (RS-232) or WIRELESS (Bluetooth) communication with the Android device. 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).

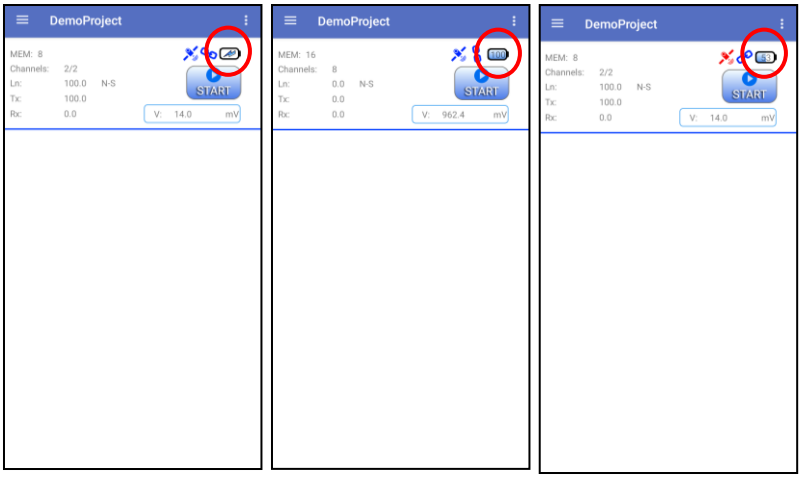
4. *Power*

GDD's IP Receivers are powered by internal rechargeable Lithium-ion batteries or an external rechargeable Lithium-ion battery pack (option available for GRx8-32 and GRx8mini only). Nickel-Cadmium batteries are also available in the older versions of receivers.

Ni-CD battery

Li-Ion battery

The power level of the Rx internal batteries is indicated on the main screen of the GDD Rx software. In the cases of GRx8*mini* and GRx2 models, the charging status is also indicated.



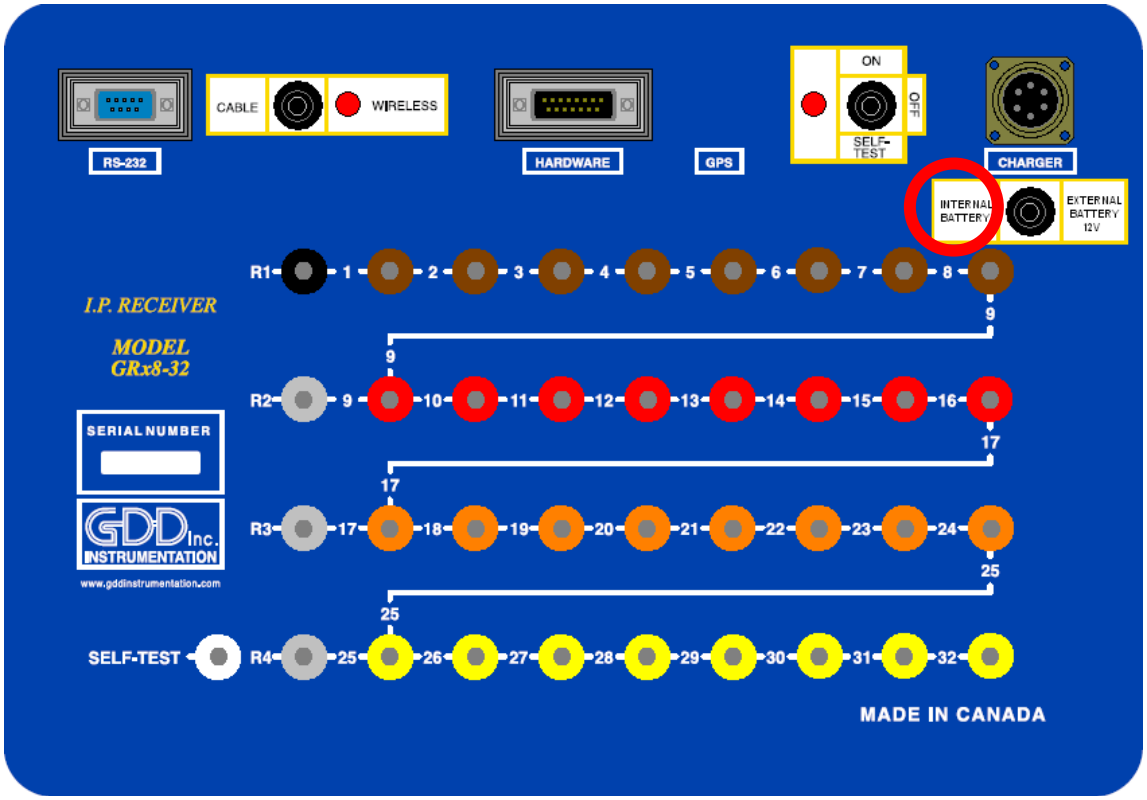
Here are a few tips for using and storing your **lithium-ion** powered receiver:

Usage

- **Using a different battery power supply than the one supplied by GDD could damage the batteries and the receiver.**
- **The connector located on the back of the receiver is used to connect the External Battery Pack supplied by GDD (option available for GRx8-32 and GRx8mini only). Connecting other external batteries using this connector could damage the batteries and the receiver.**
- **Do not replace the receiver's internal batteries without authorization and advice from GDD's technicians.**
- The total operating time of the receiver depends on environmental conditions. Using the receiver in very cold weather (-20^{0}C to –40^{0}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 between each use.

- **GRx8mini:** The CHARGE red light indicates that the batteries are charging. It turns off once the batteries are fully charged.

- **GRx8-32:** A LED under the *Internal battery* switch on the receiver is red when the batteries are charging. It turns off once the batteries are fully charged.



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, dry place.
- **GRx8-32:** Place the “Internal battery / External battery” switch on “External battery” position to minimize self-discharge of the batteries.
- If stored for several months, check the battery charge level every six months and recharge them to 50% if they are below 30% charge.
- Never store fully charged or completely discharged Lithium-Ion batteries for an extended period of time.

5. *Quick Start Guide*

Generally, Android devices don't have any RS-232 port. To use the GDD RxIP with the serial communication cable, you would need an USB/RS-232 adapter like the one supplied by GDD and shown below. You would also need a USB connector adapted to your Android device.

1. Connect electrodes into terminals.

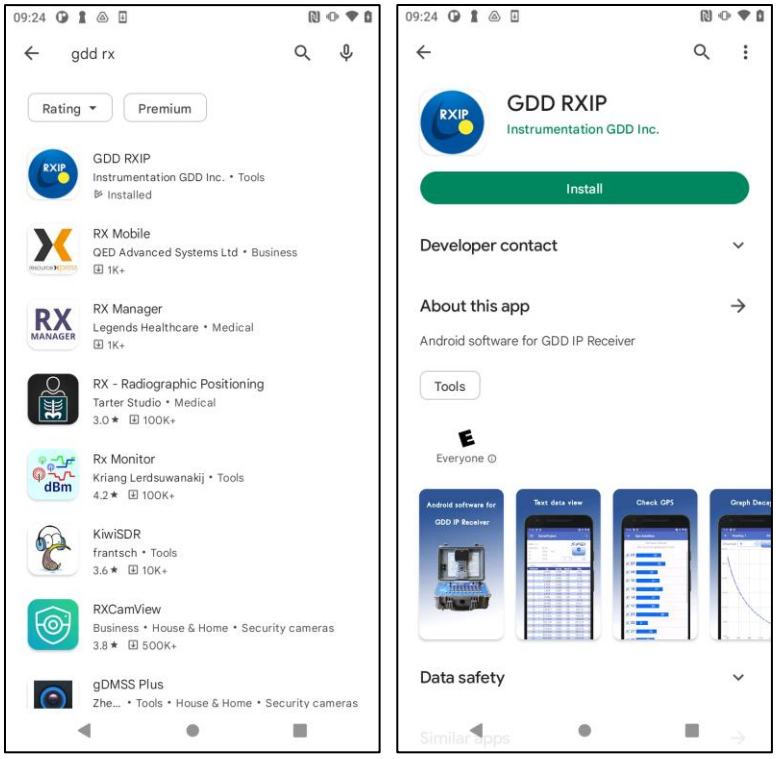
2. Turn ON the IP receiver using the **ON/OFF** switch on the receiver's panel.

3. Select the communication mode using the **CABLE/WIRELESS** switch on the receiver's panel.
   GRx8-32 and GRx8mini: In CABLE mode, the red light will turn ON only when the GDD Rx software is active.

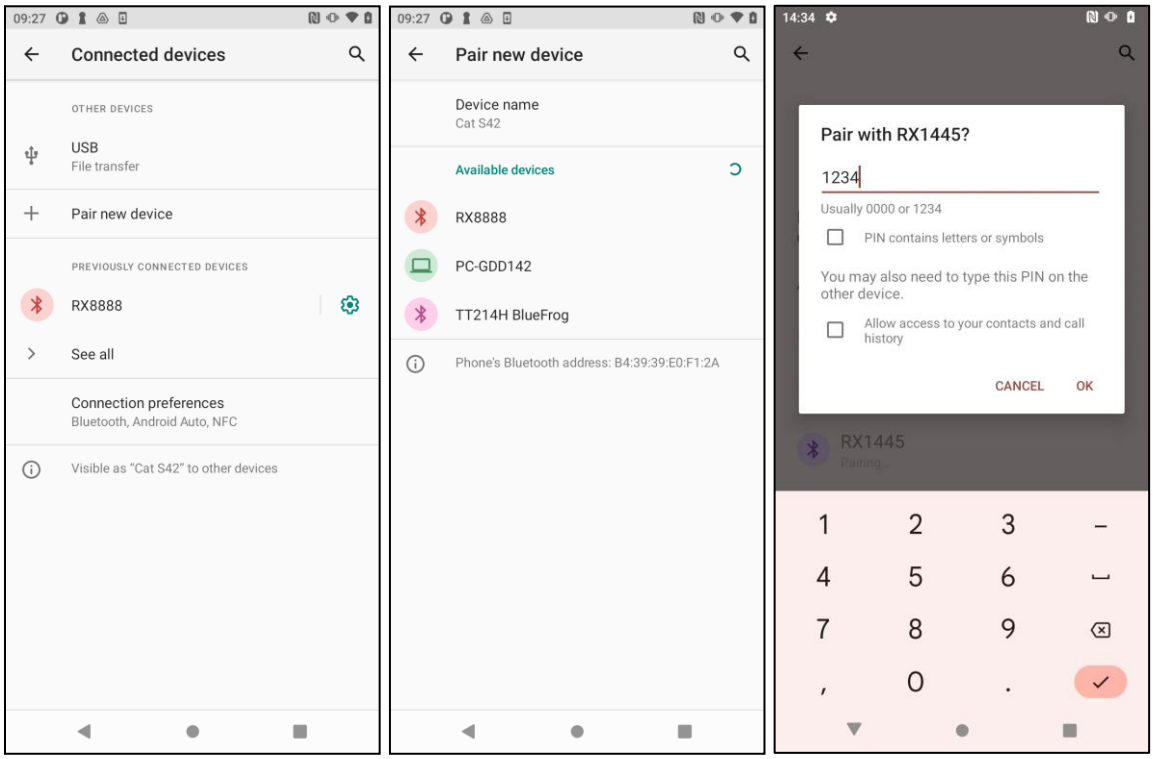
4. **CABLE communication only:**
   GRx8-32 and GRx8mini: Connect the rugged serial communication cable (Amphenol connector) between the Android device and the receiver's RS-232 external connector.
   GRx2: Connect the RS-232 cable between the Android device and the receiver's RS-232 connector on the panel.

5. Turn on your Android device.

6. If this is the first time you use your Android device with the GDD RxIP, you need to install the GDD RxIP software from the Google Play store:
   https://play.google.com/store/apps/details?id=com.gddinstrumentation.rxPp

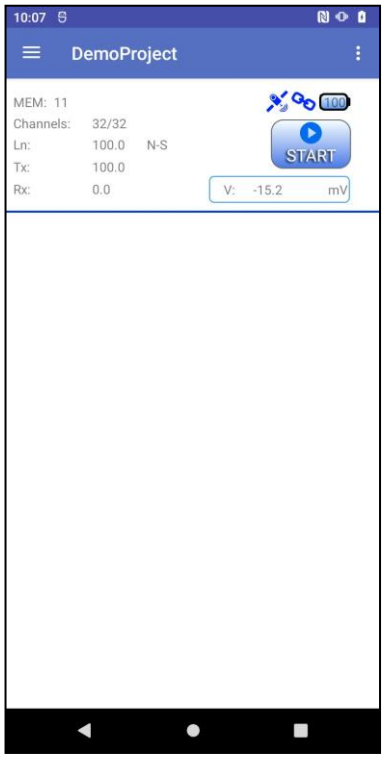


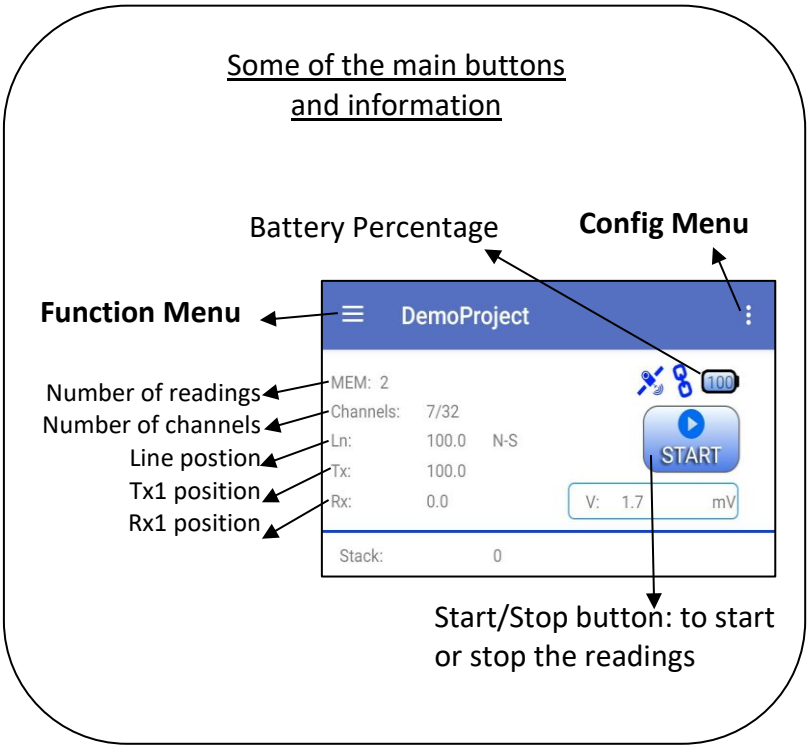
7. If this is the first time you use your Android device with this given receiver and you want to use Bluetooth connection, you need to pair the receiver with your Android device.
   Use 1234 as PIN to pair any GDD receiver.



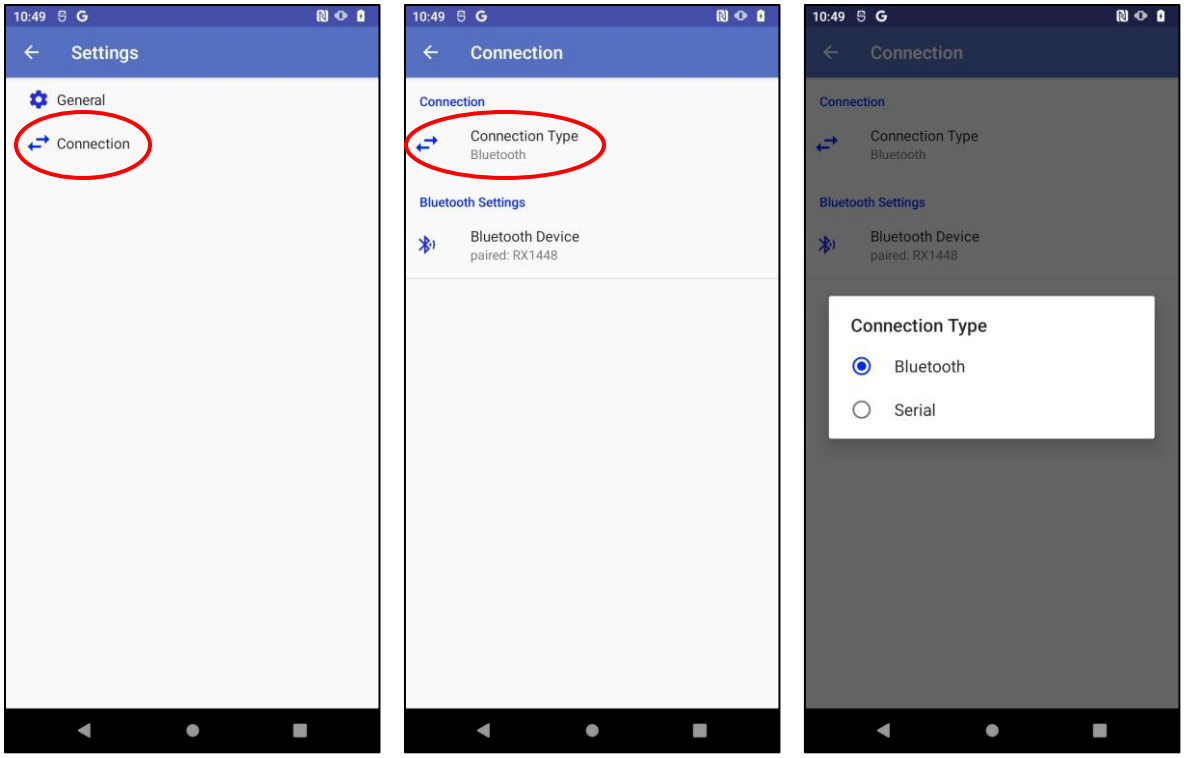
8. Click on **GDD RxIP** icon.

9. The main screen should look as followed:

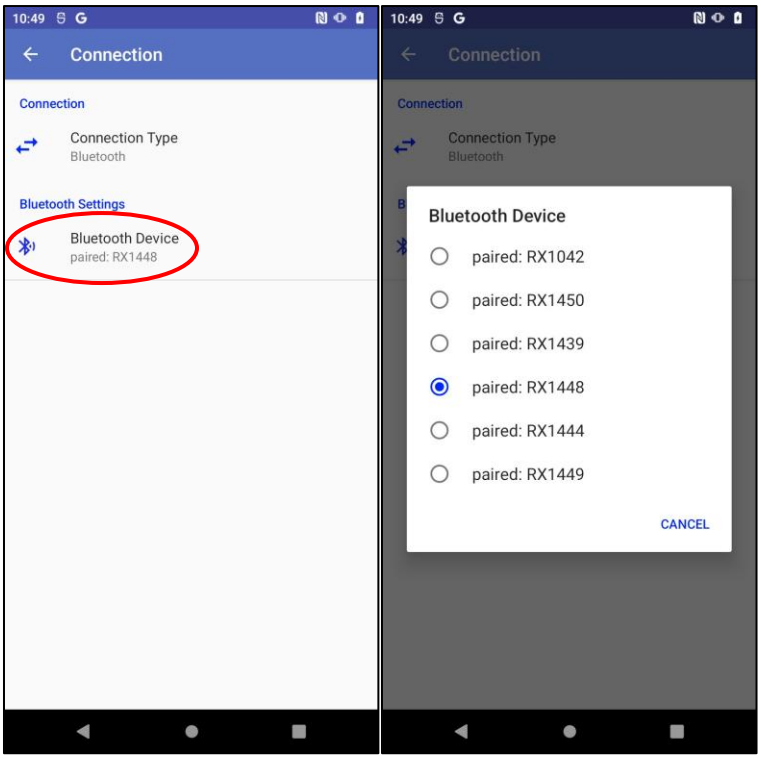




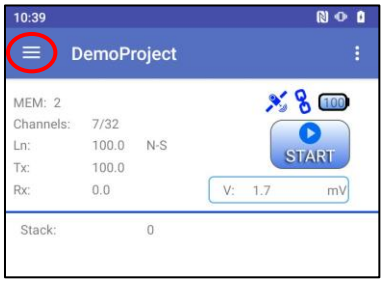
10. Go to **Config Menu->Settings->Connection** and select your **Connection Type** (either **Bluetooth** (Wireless connection) or **Serial** (Cable connection)).

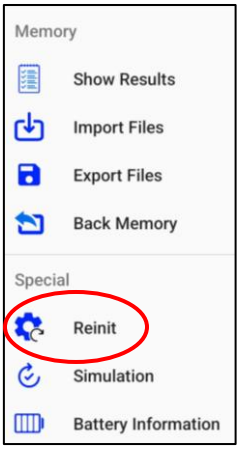


11. Make sure your Rx device is paired with the Android software in **Bluetooth Settings**.

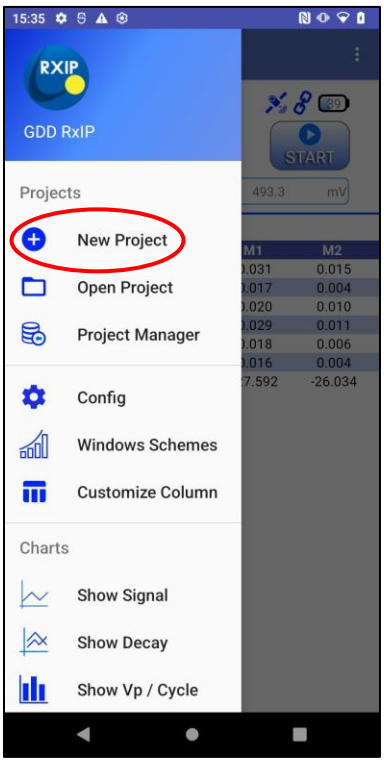


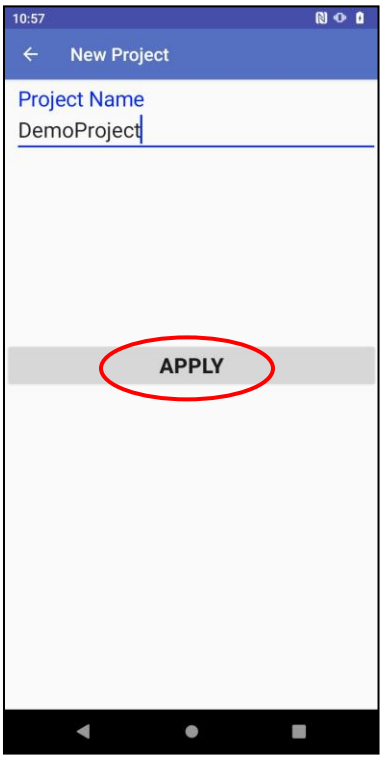
12. Go to **Function Menu->Reinit** (in the **Special** section) to reinitialize the connection between the Android and the receiver. Do this every time you choose a different receiver in **Bluetooth Connection.**



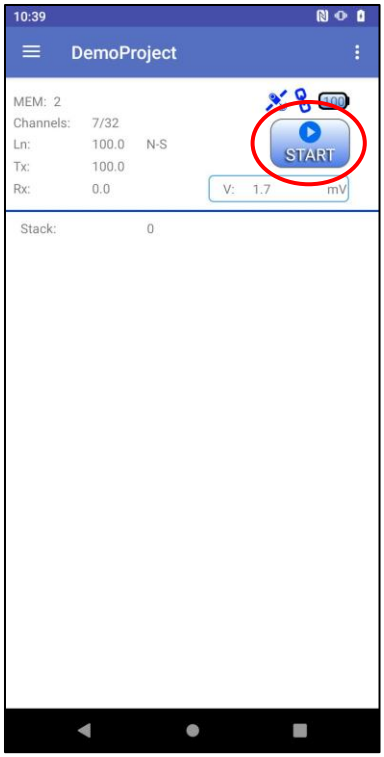


13. Go to **Function Menu->New Project** (in the **Projects** section) to name your new project. Click "**Apply**" when done.

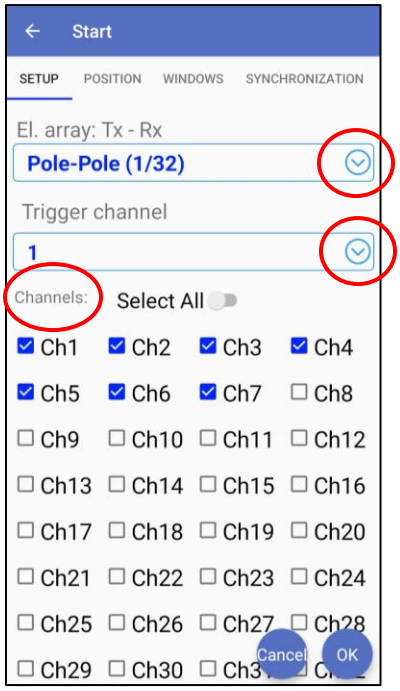




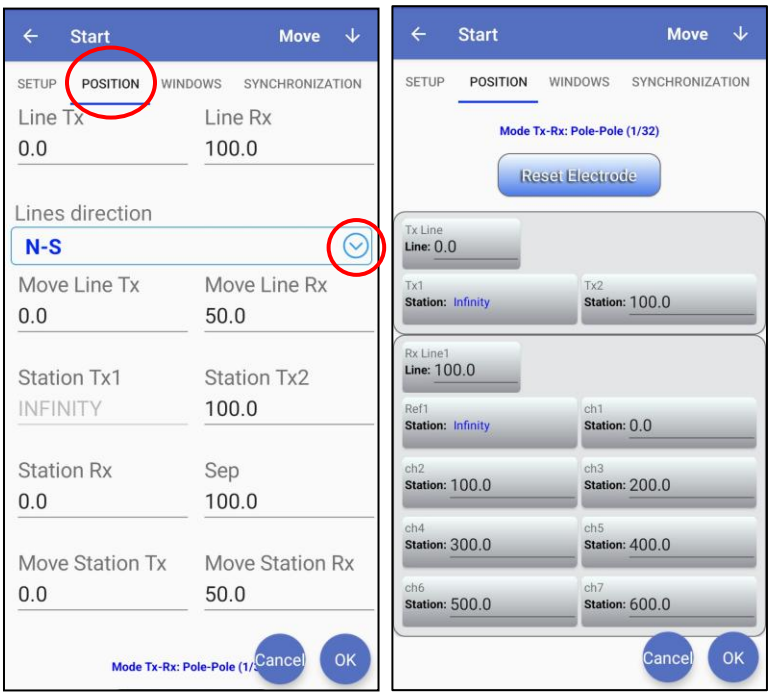
14. Click **Start** to begin the acquisition process.



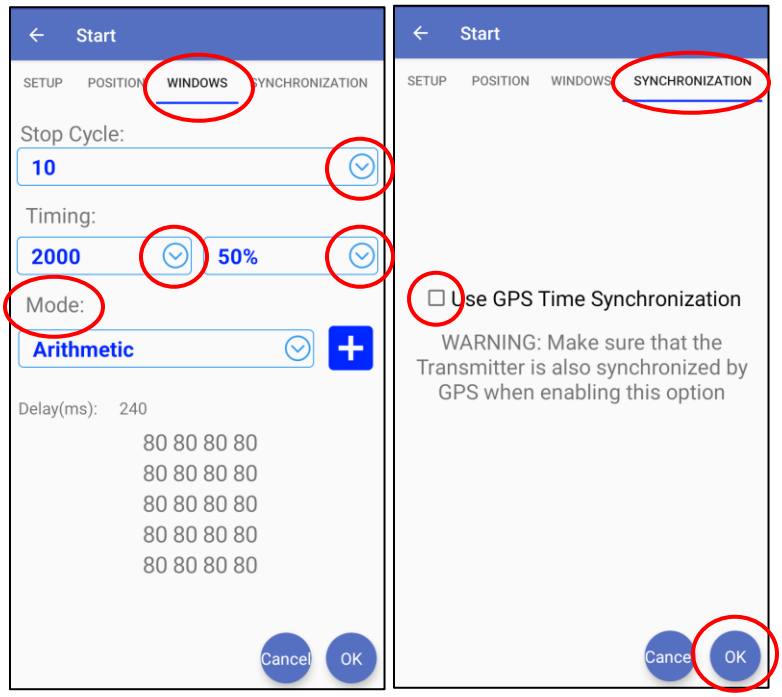
15. Select the electrode arrays and the trigger channel. Select the active channels individually or using the "**Select All**" switch.



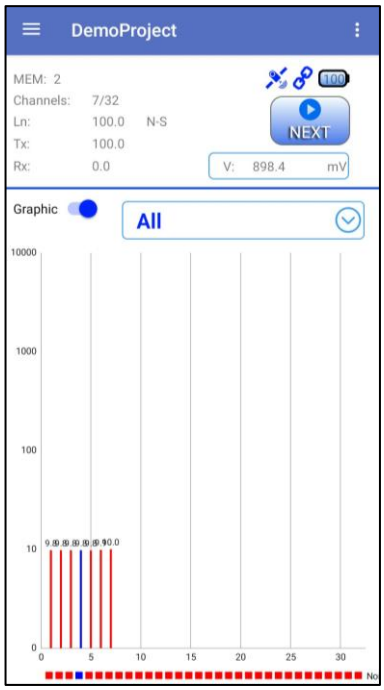
16. Go to “**Position**” and enter the Tx line number, the Rx line number, the line direction, the transmitter position (Tx1 and Tx2), the receiver position, the separation, the transmitter movement offset and the receiver movement offset.
Scroll up to be able to change the parameters manually.



17. Go to “**Windows**” and select the maximum number of stacks, the signal time and the mode. Then, go to “**Synchronization**” if you want to use **GPS Time Synchronization**.
Press **OK** when done.

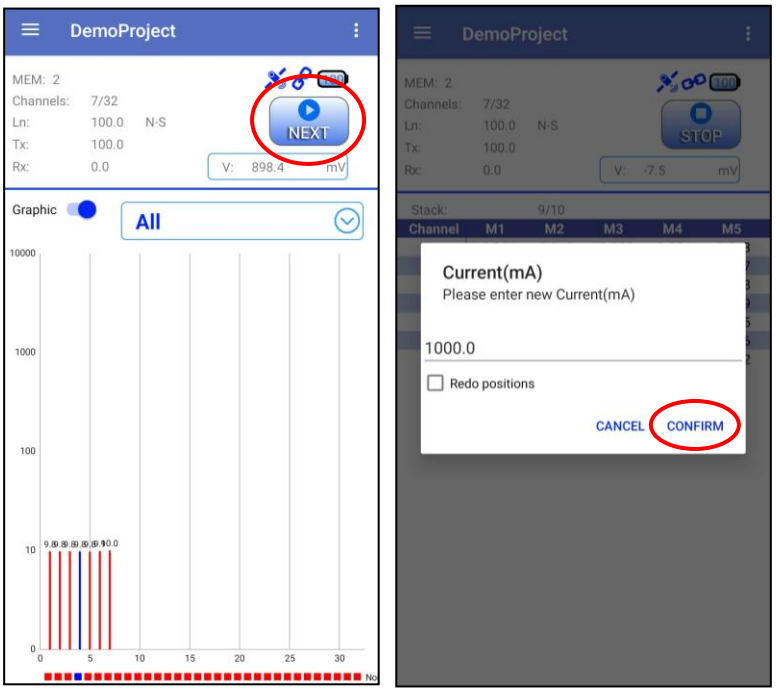


18. The contact resistance graph appears.

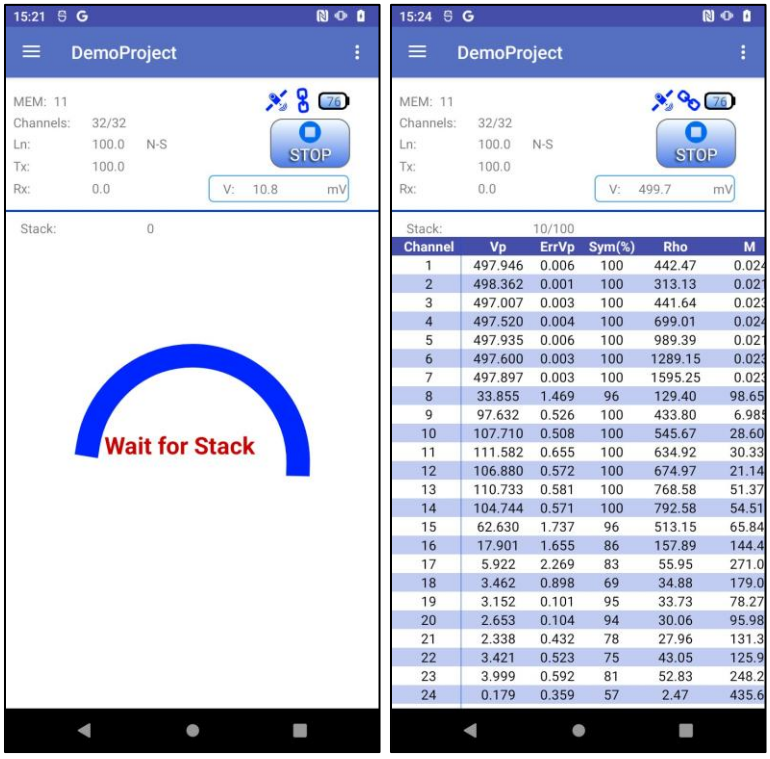


*Note: If all stations show an INFINITE contact, the reference electrode might be disconnected.

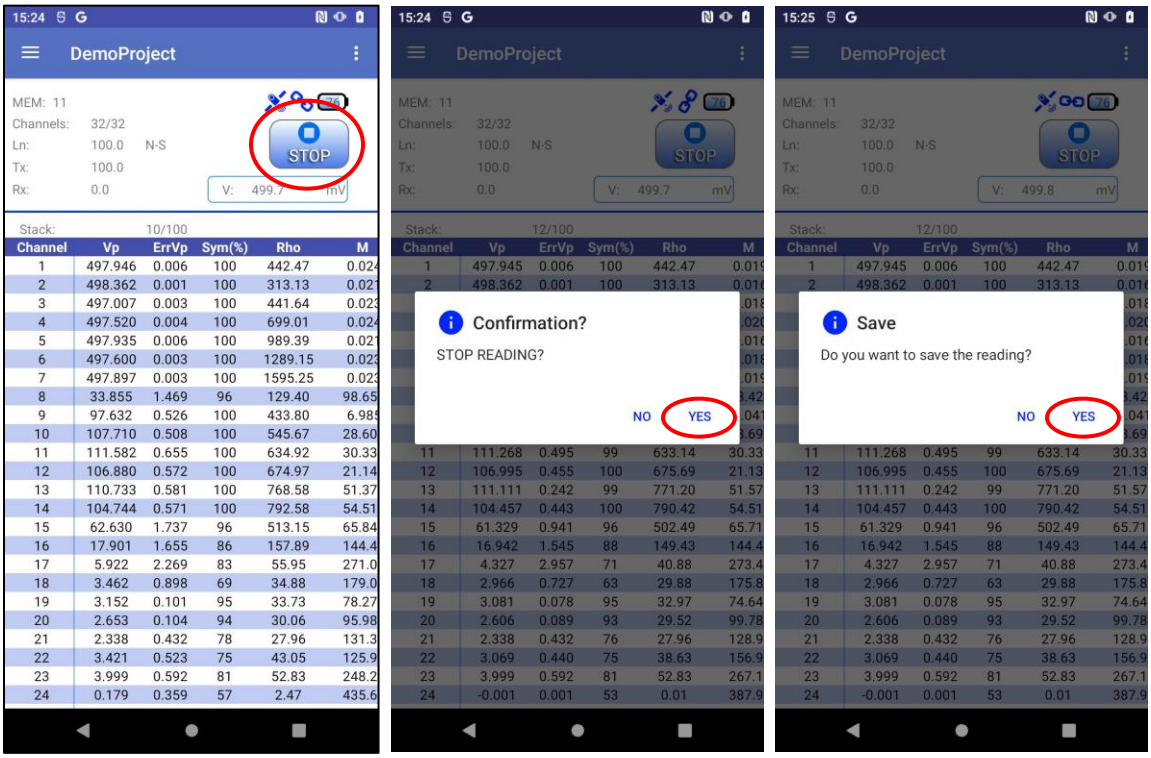
19. Click "**Next**" to continue.
Enter the transmitter current and click "**Confirm**" to start the readings.



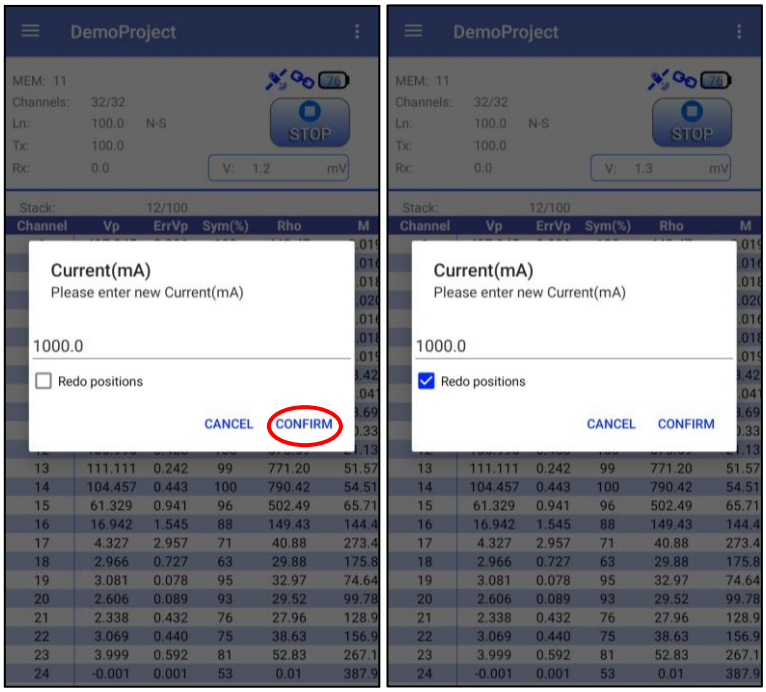
20. The following screens appear.



21. Click **STOP** or wait until the end of the acquisition to stop the readings and save the data.
Click **Yes** to confirm the operation.
Click **Yes** to save readings.



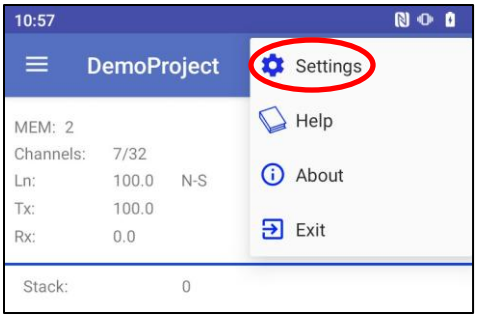
22. Re-enter the transmitter's output current value if it has changed and click **CONFIRM** to save the current value.
    Check the "**Redo positions"** option to change the transmitter or receiver position.

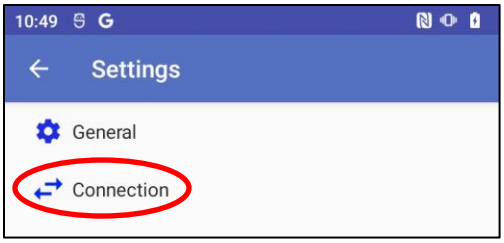


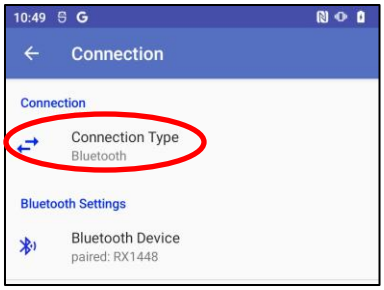
Note: The "redo positions" option alters the reading that was just completed in order to correct or revise the coordinates before saving the reading to the file. It should not be used to pre-set the next reading.

6. *Serial/Bluetooth Communication*

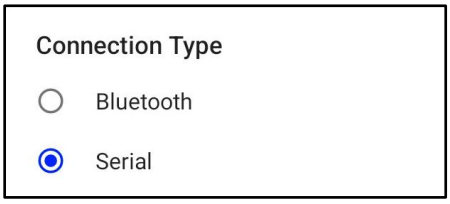
Go to **Config Menu->Settings->Connection->Connection Type**



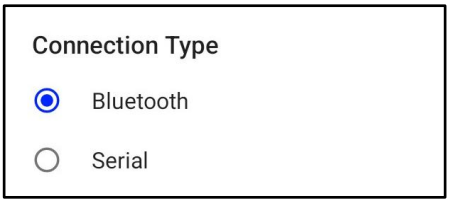




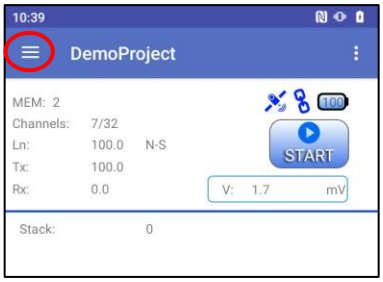
1. Select **Serial** connection type to use the receiver with a cable connection.

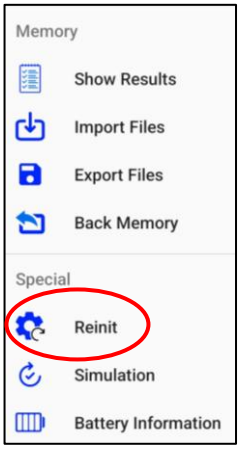


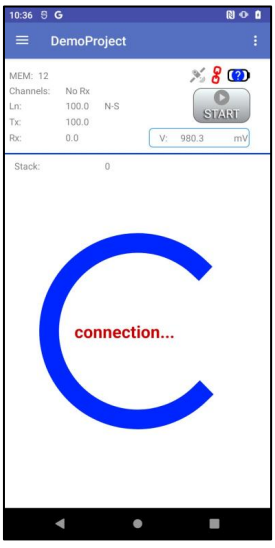
2. Select **Bluetooth** connection type to use the receiver with a wireless connection.



3. Go to **Function Menu->Reinit** to reinitialize the connection between the Android and the receiver. The following screen should appear.







7. Cold Weather and Harsh Environments Tips

The GRx8-32, GRx8*mini* and GRx2 receivers are designed to be used in cold weather (up to -40°C) but it is very important to consider these few tips to prevent damage or malfunction:

1. Never charge the internal batteries of the receiver in sub-zero;

2. As much as possible, turn on the receiver in a warm place before using it in cold weather;

3. Never turn off the receiver when using it in cold weather to keep the batteries warm;

4. If possible, use the serial communication (RS-232 cable) between the Android device and the receiver to prevent malfunction of the Bluetooth communication, and to maximize the battery charge.

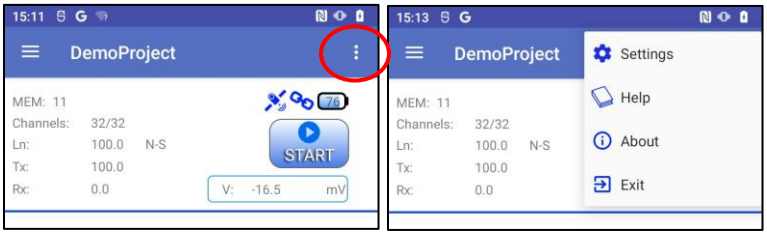
When using the receiver during rainy days, please consider the following tips to ensure a long-term instrumental reliability:

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 and leave the pelican case lid open as well as remove the connectors' cap so that humidity is freed from the instrument;

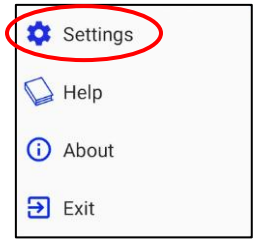
2. If possible, while collecting data, close the lid of the pelican case to avoid water soaking the jack connectors and potentially short the channels.

8. Config Menu

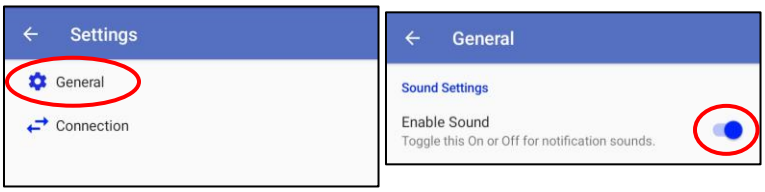
Config Menu contains the following commands:



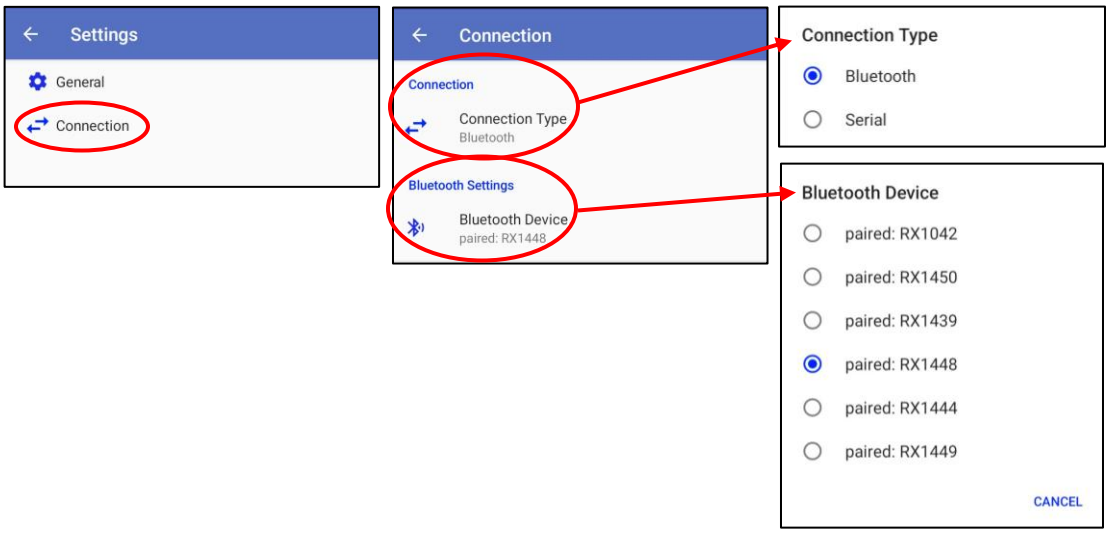
8.1 Settings



The **General** option allows to switch **ON** and **OFF** all sound notifications in the software.



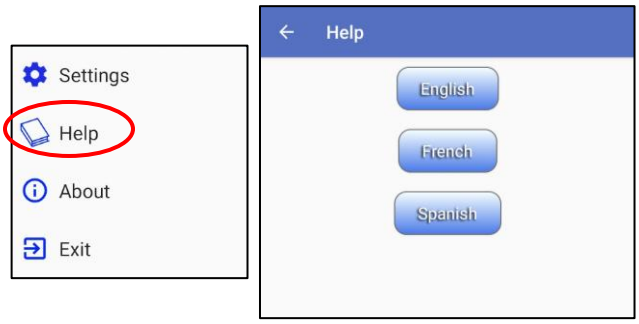
The **Connection** option allows to choose the communication mode between **Serial** (RS-232) and **Bluetooth** (Wireless). In the **Bluetooth settings**, you can select a receiver to pair with the device.



*Go to **Function Menu->Reinit** every time you change the communication mode or pair a different receiver to the device in Bluetooth mode.*

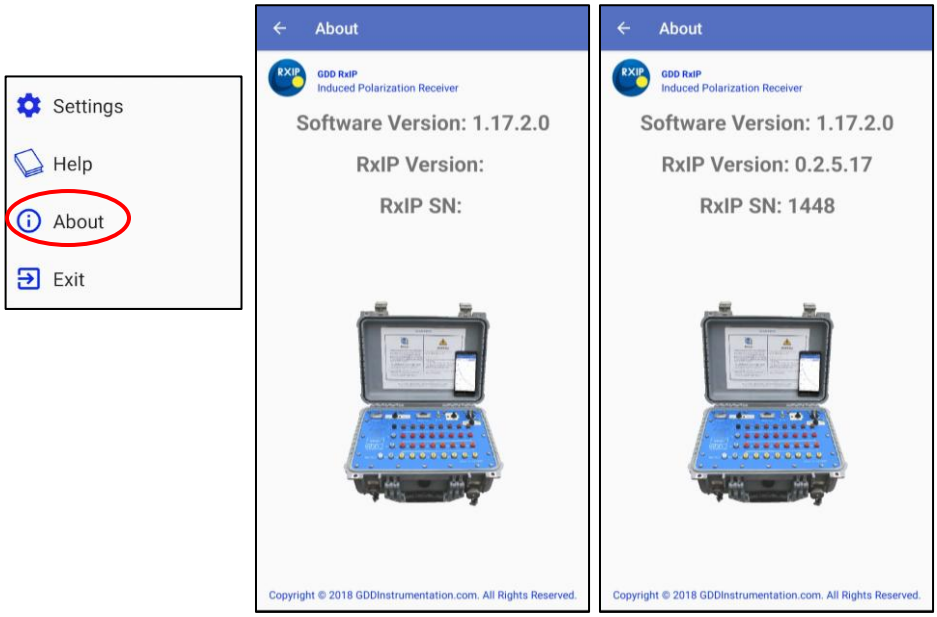
8.2 Help

The **Help** option allows to choose a **user manual** in different languages. The manual will be downloaded from the GDD Web Site.



8.3 About

The **About** option allows to see the **Software Version**, the **RxIP Version** and the **RxIP Serial Number**.

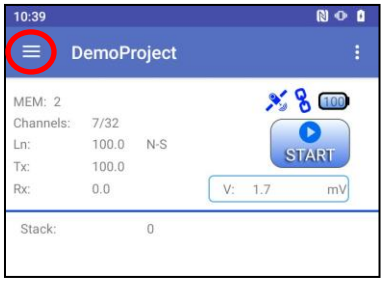


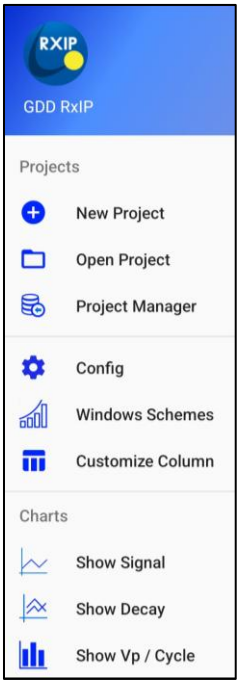
8.4 Exit

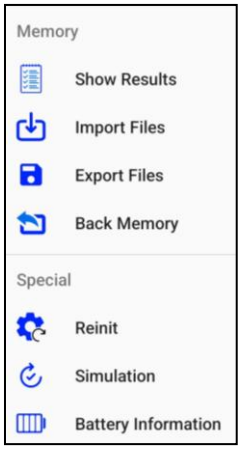
The **Exit** option allows to quit the software. Always use this command to prevent the software from staying in background memory.

9. *Function Menu*

Click on the **Function Menu** bar to select one of the following options:







Projects

Projects options:

- New Project - Create and name a new project
- Open Project - View your projects
- Project Manager - Rename or delete a project

Config

Config options:

- Setup - Set the electrode arrays, the trigger channel and the active channel(s)
- Position - Set the position parameters
- Windows - Choose a mode
- Synchronization - Use GPS Time Synchronization

Windows Schemes

Windows Schemes options:

- Create a new Windows Scheme
- Save the current Windows Scheme
- Import Windows Schemes from a file
- Windows Schemes manager
- Edit the current Windows Schemes

Charts

Charts options:

- Show signal - Signal graph
- Show decay - Decay graph
- Show Vp / cycle - Vp and cycle graph

Memory

Memory options:

- Show results – show a table of all readings
- Import files - Importation of data
- Export files - Exportation of data
- Back memory - Delete last reading

Special

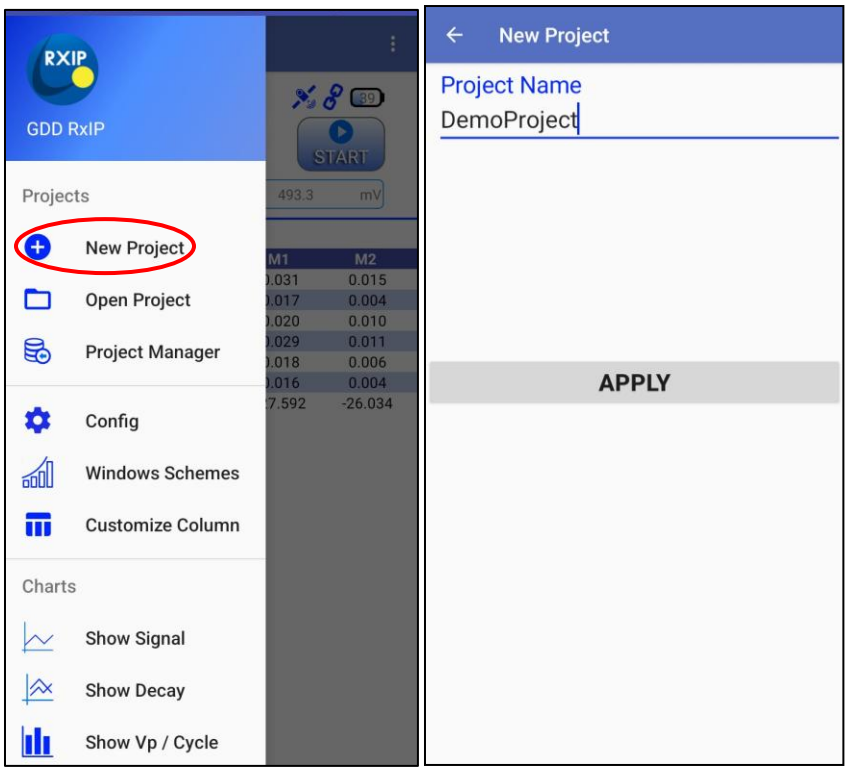
Special options:

- Reinit - Reinitialize the connection
- Simulation - Test the receiver with the internal simulator
- Battery information - View battery information

9.1 *Projects Option*

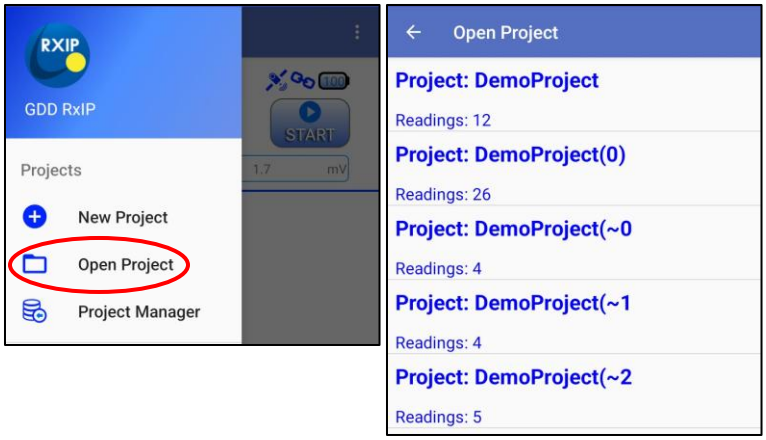
9.1.1 New Project

Use this command to create a new project. Go to **Function Menu->New Project**, name your project and click on "**Apply**".



9.1.2 Open Project

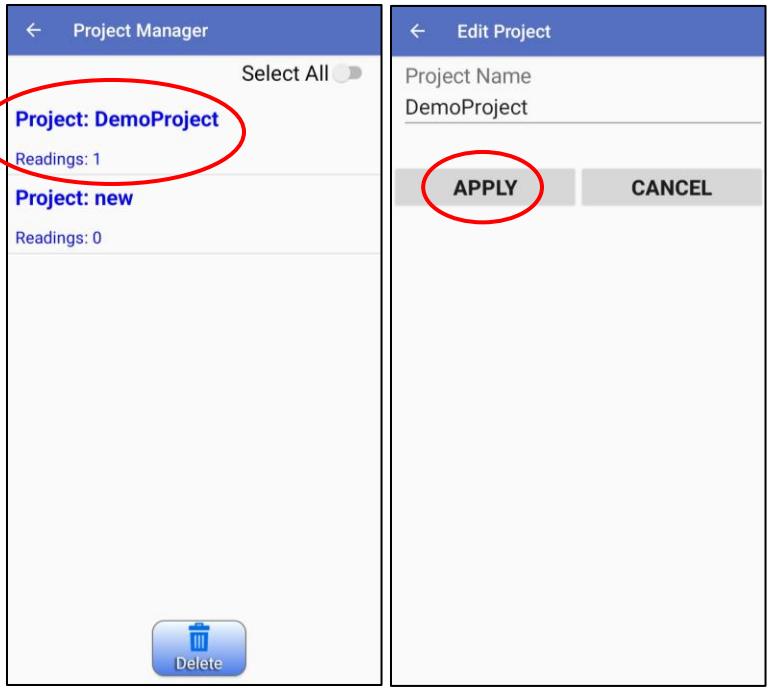
Use this command to select a project to open. Go to **Function Menu->Open Project**. You will see all saved projects in your Android system memory. You will also see the number of readings of each project.



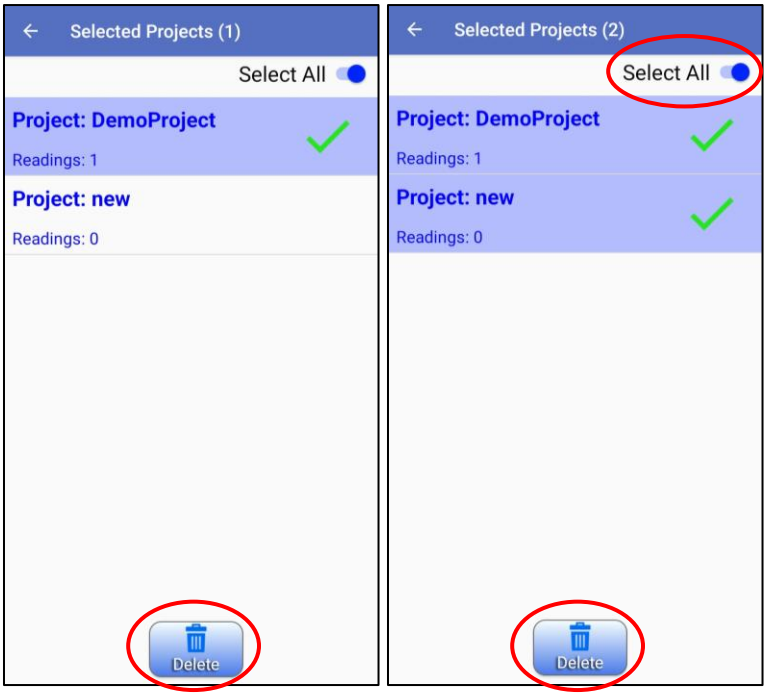
9.1.3 Project Manager

Use this command to rename or delete existing projects.

To rename a project, press and hold the desired project until the following window appears. Then, edit the name of the project and click on "**Apply**".



To delete one or more projects, select desired projects, individually or using the "**Select All**" switch, and click on the "**Delete**" button at the bottom.

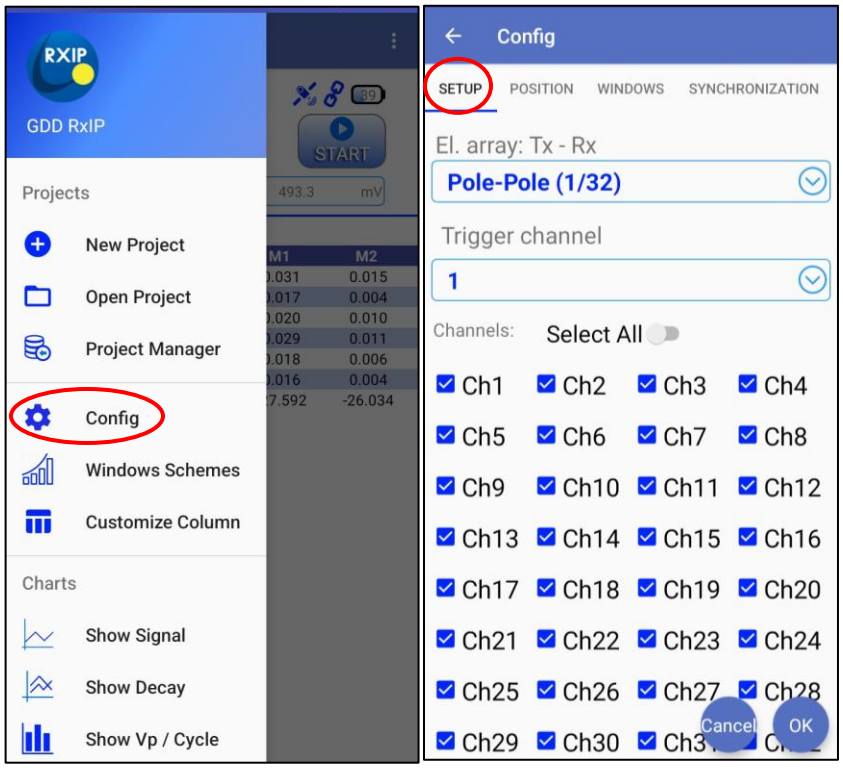


9.2 *Config Option*

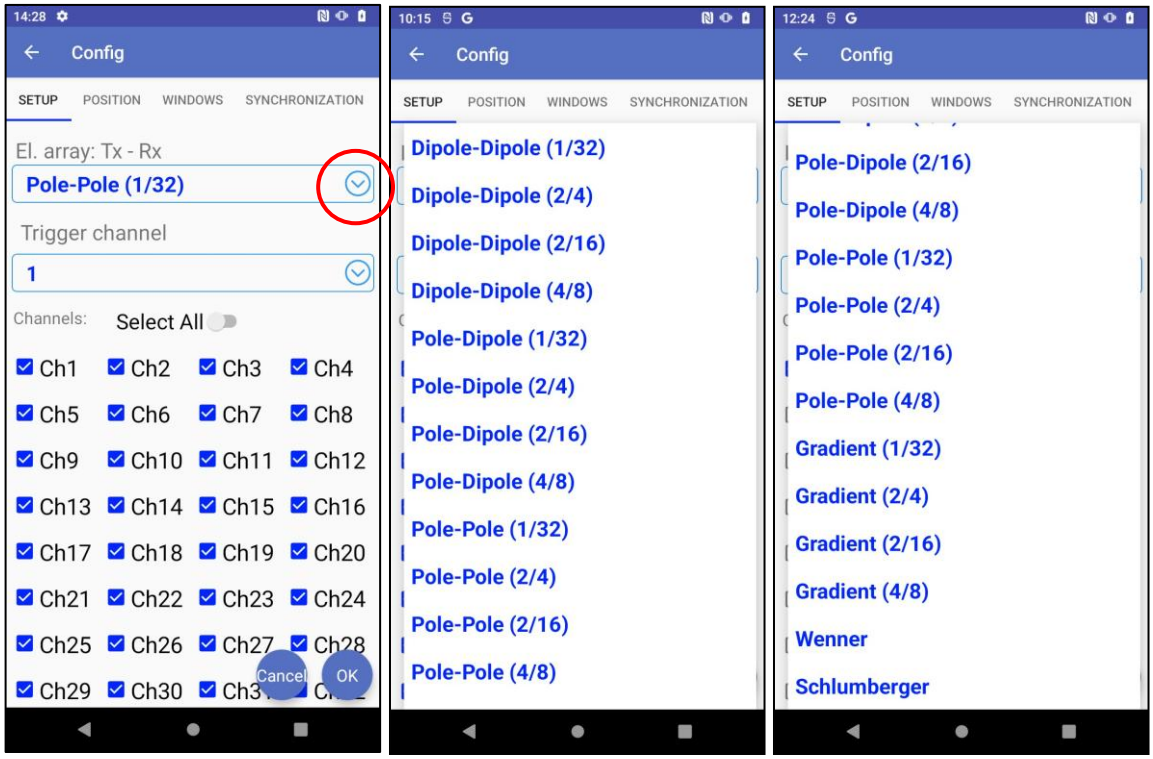
9.2.1 Setup

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

1. Select **Function Menu->Config->Setup**. The following window appears.



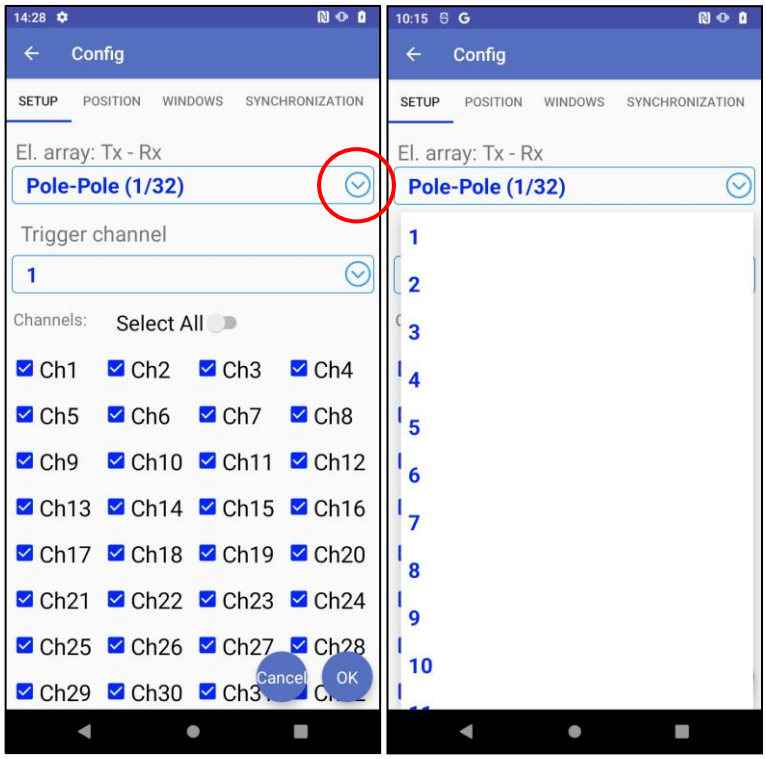
2. Select the **electrode arrays** configuration.



- Dipole-Dipole (1/32)
- Dipole-Dipole (2/4)*
- Dipole-Dipole (2/16)
- Dipole-Dipole (4/8)
- Pole-Dipole (1/32)
- Pole-Dipole (2/4)*
- Pole-Dipole (2/16)
- Pole-Dipole (4/8)
- Pole-Pole (1/32)
- Pole-Pole (2/4)*
- Pole-Pole (2/16)
- Pole-Pole (4/8)
- Gradient (1/32)
- Gradient (2/4)*
- Gradient (2/16)
- Gradient (4/8)
- Wenner
- Schlumberger

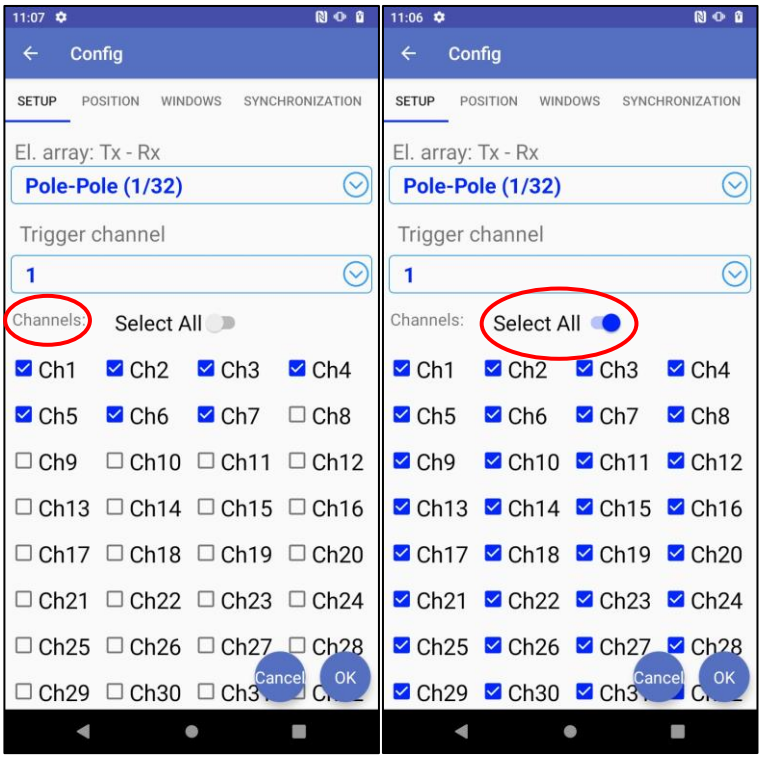
*For GRx8*mini* model only

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



Always select the channel with the strongest and cleanest signal. Normally, it's the closest to the transmitter channel.

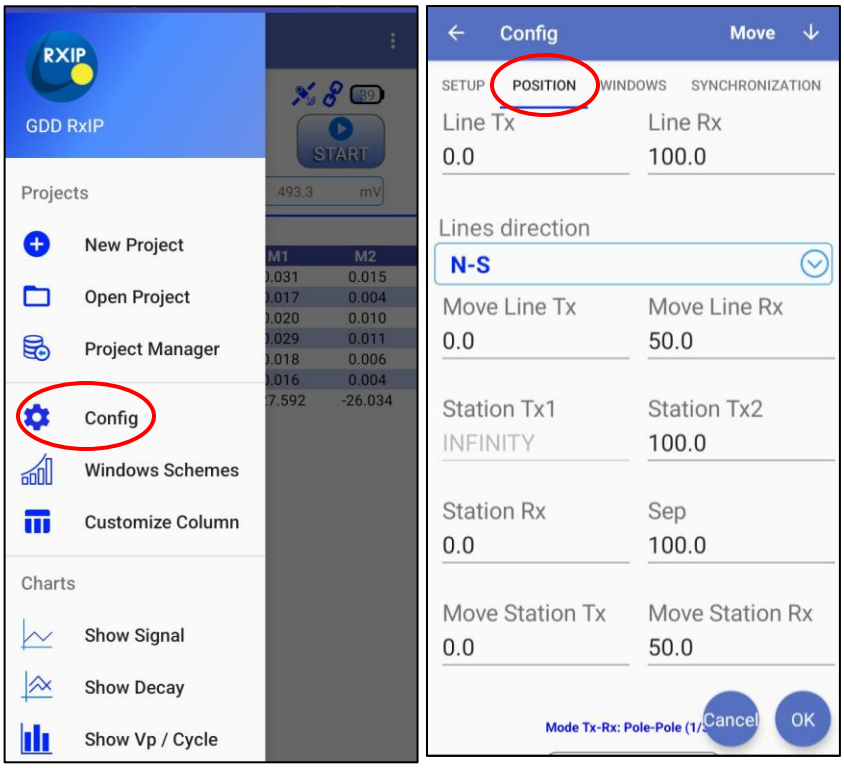
4. Check the **active channel(s)**. Use the "**Select All**" switch to either select all or unselect all channels. You can also select each channel individually.



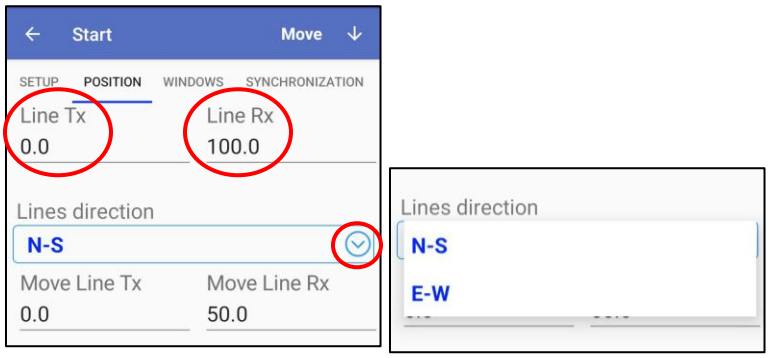
9.2.2 Position

The **Position** option is used to set the following parameters: the Tx line number, the Rx line number, the line direction, the transmitter position (Tx1 and Tx2), the first electrode position, the separation between the electrode, the transmitter movement offset and the receiver movement offset.

1. Select **Function Menu->Config->Position**.

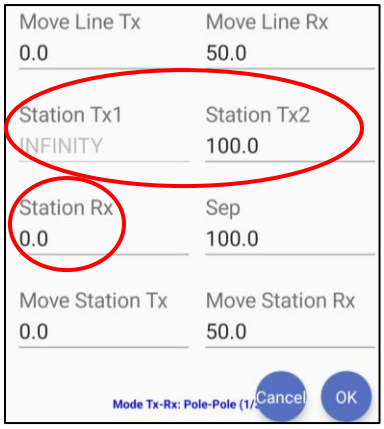


2. Enter the positions of the Tx and Rx line and select their direction.



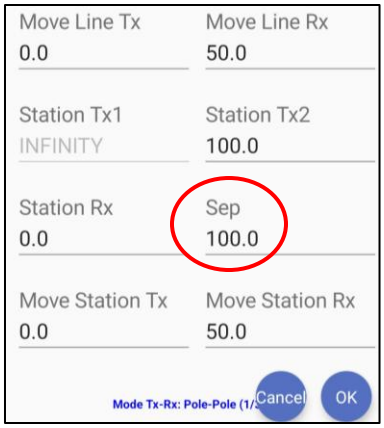
The labels **N-S** and **E-W** are used to define the direction of the lines.

3. Enter the position of the Tx1 and Tx2 station (electrodes) and the position of the first station (electrodes) of the receiver line.



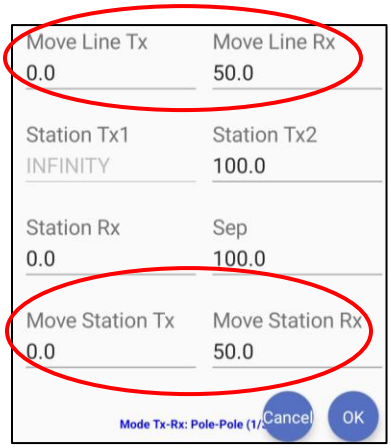
A negative number is used to define South and West.

4. Enter the separation between the electrodes of the receiver.



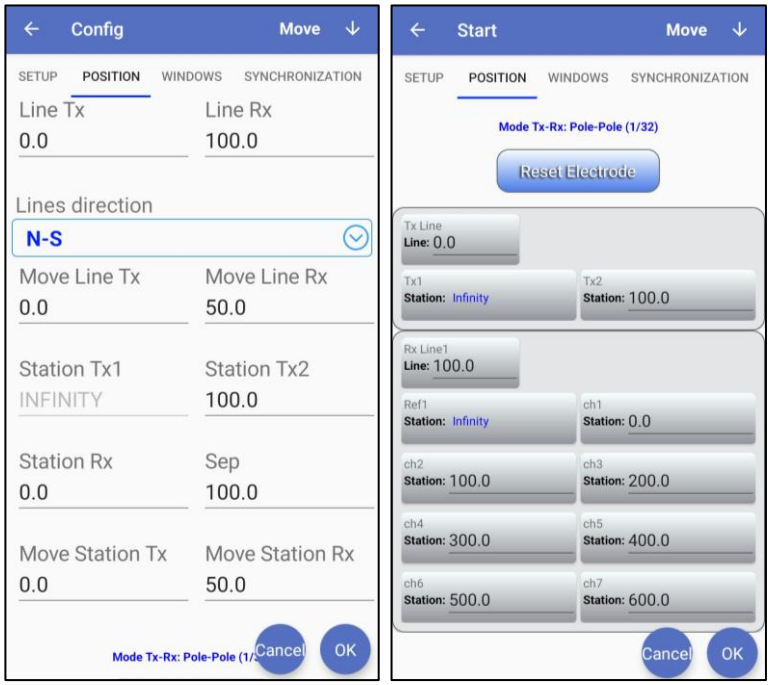
A negative number is used to define South and West.

5. Enter the moving distance of the transmitter and receiver electrodes for the next reading.

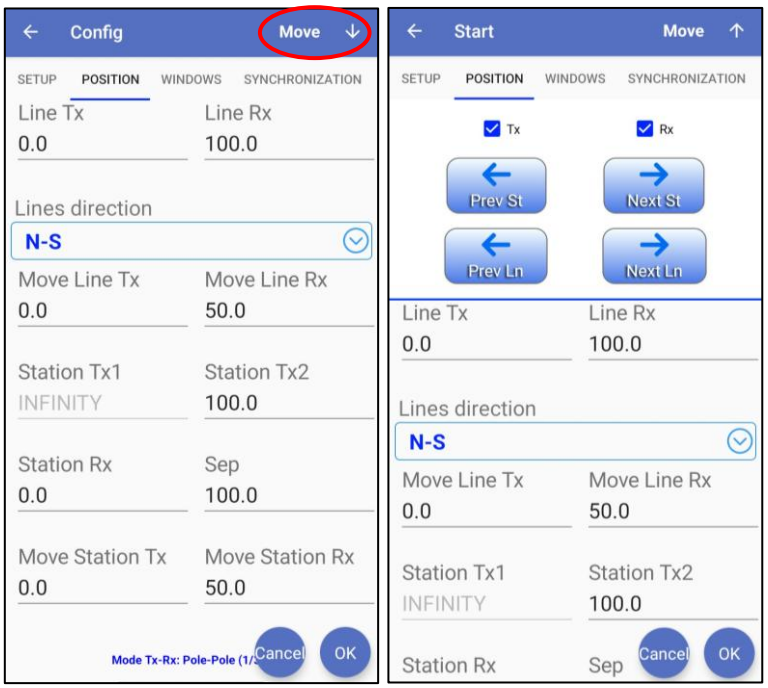


A negative number is used to define South and West.

6. Scroll up to change parameters manually and confirm the position setup in the position table.



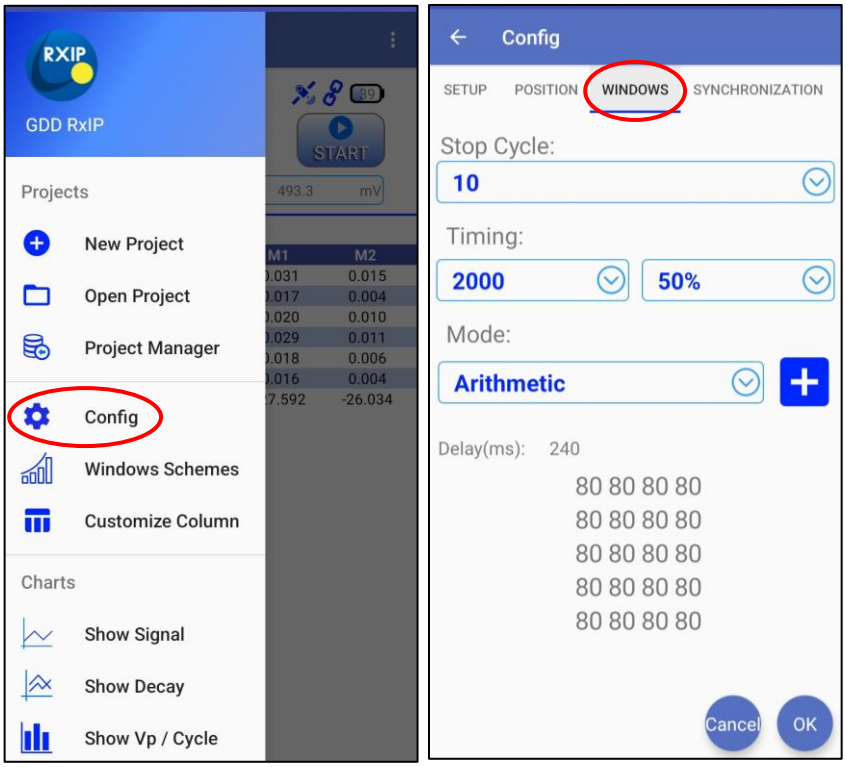
7. Click on "**Move**" to change line or station positions of the Tx or Rx electrodes based on the value in the **Move line** and **Move Station** fields. Use **Next** and **Prev** buttons to move the positions for the next or previous reading.



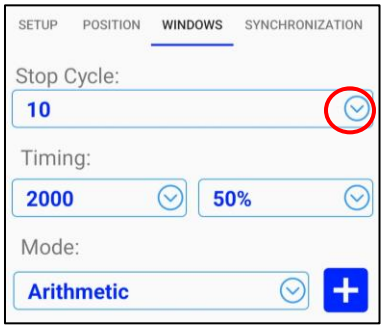
9.2.3 Windows

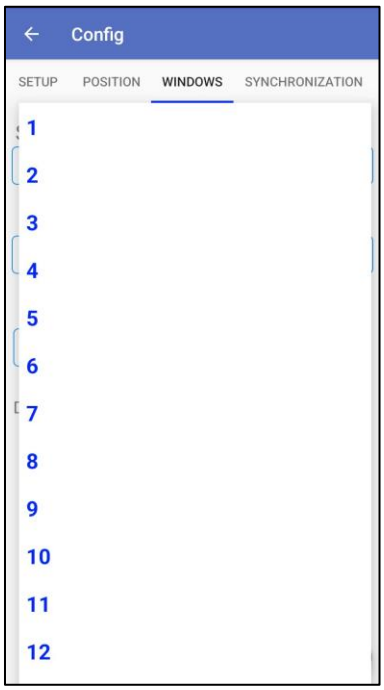
Use the **Windows** option to set the signal timing and the mode.

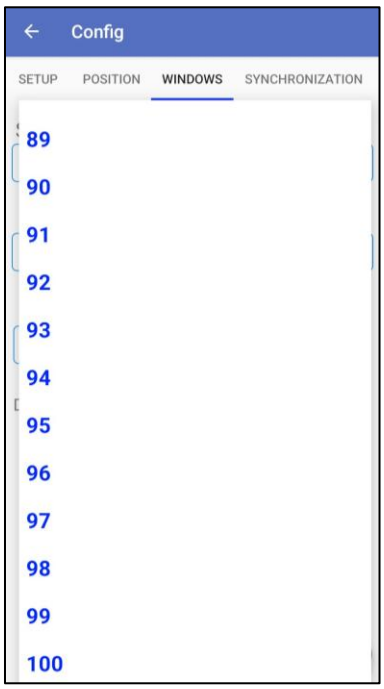
1. Select **Function Menu->Config->Windows**.



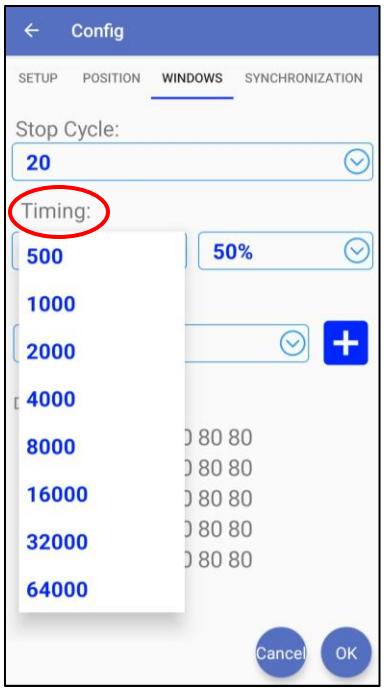
2. Select the maximum number of cycles for the stackings.



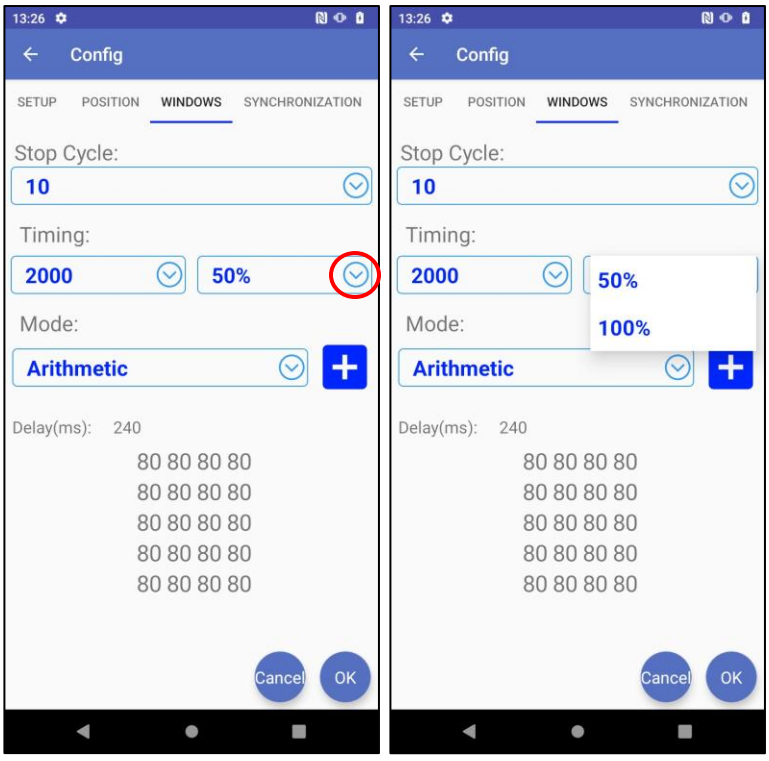




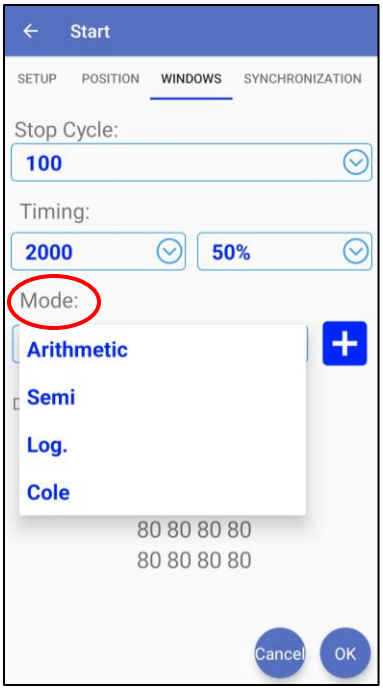
3. Select the signal **Timing** in ms of 1 cycle.



4. Select the **Duty Cycle** (50% or 100%)



5. Select the **Mode** (windows time definition)



- Arithmetic
  Windows: 20
  Delay (ms): 240
  Timing (ms): 2000
  80, 80, 80, 80, 80, 80, 80, 80, 80, 80,
  80, 80, 80, 80, 80, 80, 80, 80, 80, 80

- Semi logarithmic
  Windows: 20
  Delay (ms): 40
  Timing (ms): 2000
  40, 40, 40, 40, 40, 40, 80, 80, 80, 80,
  80, 80, 80, 160, 160, 160, 160, 160, 160, 160

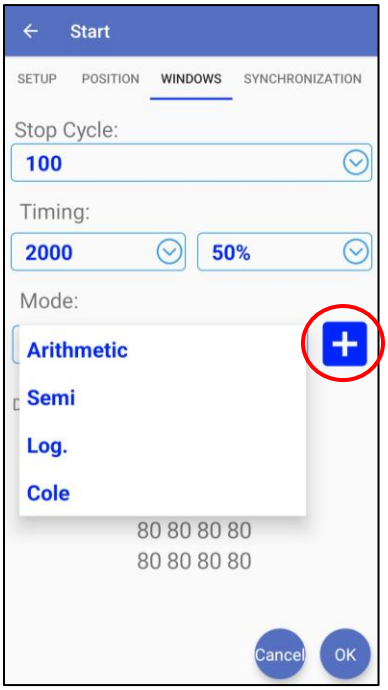
- Logarithmic
  Windows: 4
  Delay (ms): 160
  Timing (ms): 2000
  120, 220, 420, 820

- 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

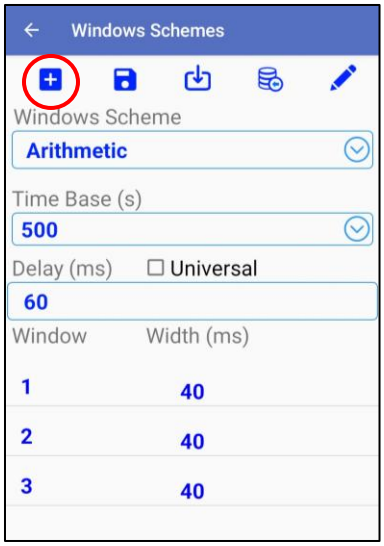
- User defined mode:

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

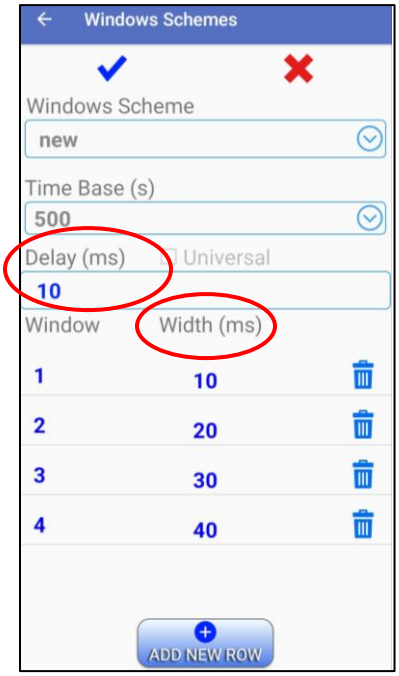
In User Mode, you can use settings you have previously saved, or you can create new settings.
If you have already created new settings, choose the mode you want in the list.
If you haven't, click on the  button on the right.

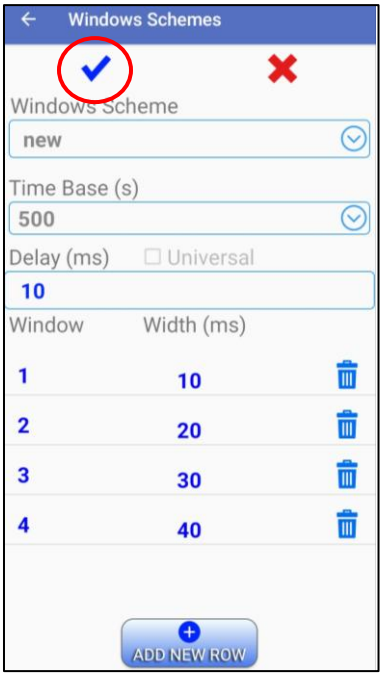


The **Windows Schemes** page will appear. Click on the **New Windows Scheme** button. Enter a new name and click **OK**.



Click on **Edit** and enter the **Delay** and the **window(s) Width**. Then, click on the check mark to save your new settings.





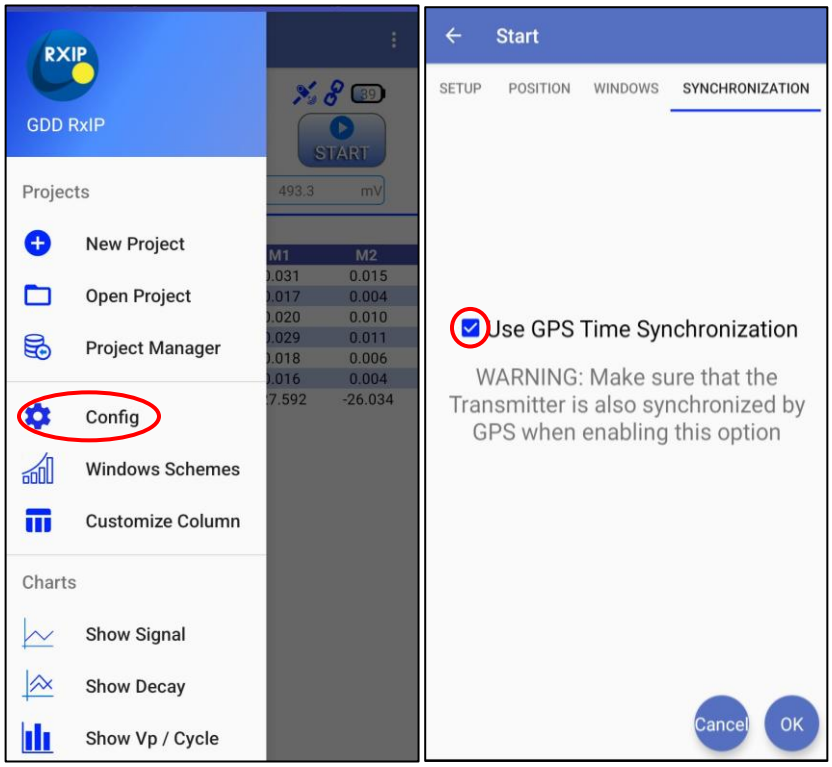
OR

You can import settings from your memory by pressing on the "**Import Windows Schemes**" button.

9.2.4 Synchronization

Use the **GPS time synchronization** option if you need to synchronize your receiver to your transmitter using GPS time instead of synchronizing with the signal of the trigger channel.

1. Select **Function Menu->Config->Synchronization**.
2. Check "**Use GPS Time Synchronization**" to enable the GPS synchronization.

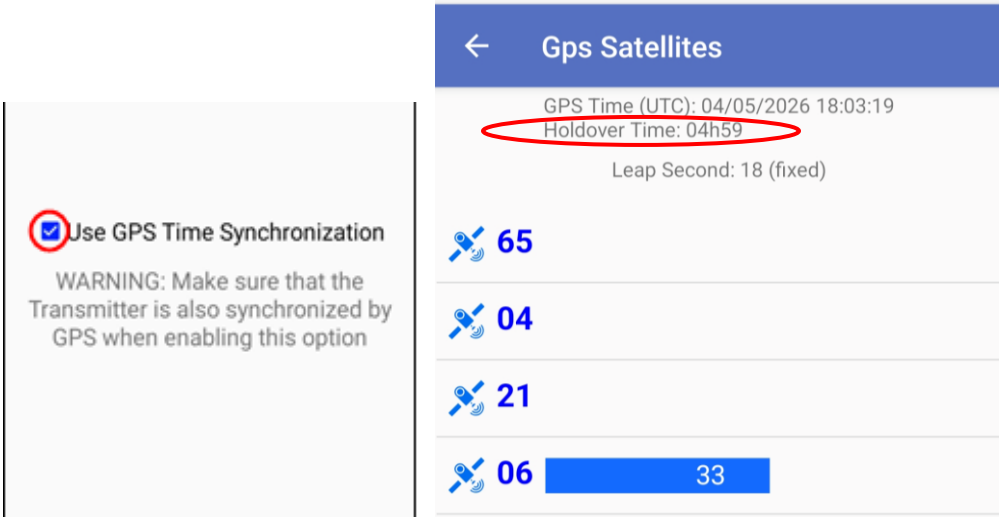


IMPORTANT: Make sure that your transmitter is also synchronized by GPS before using this option. You will need the *GDD EM-IP Tx Controller* to synchronize the transmitter.

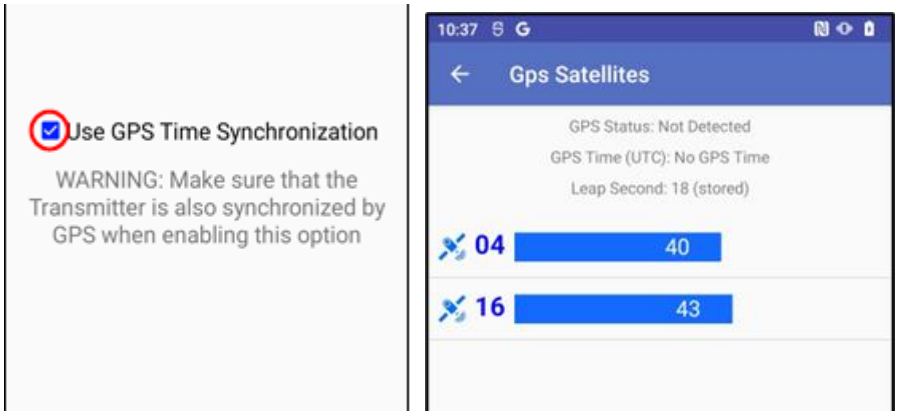
Note that the GPS synchronization is disabled every time you start the program even if you checked it the last time you used it.

3. 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 (Section 9.2.5).**
    - If possible, compare the GPS time of your transmitter with the GPS time of your receiver. They must have exactly the same GPS time

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.



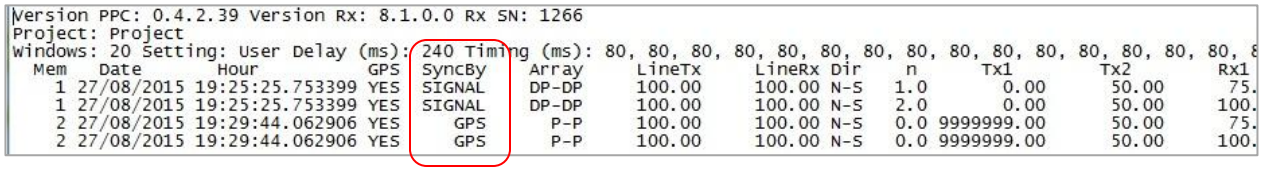
If you checked *Use GPS Time synchronization* and if there is no GPS signal or if it is lost for more than 5 hours, the receiver will automatically switch to synchronize with the ground signal.



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 Vp values are negative, you can switch the polarity of the current transmission at the transmitter (switch the wires at the HV block) and all Vp will become positive.

4. The *.gps* output file indicates if the receiver is synchronized with signal or GPS (see *Section 9.6* to know how to create a *.gps* file).



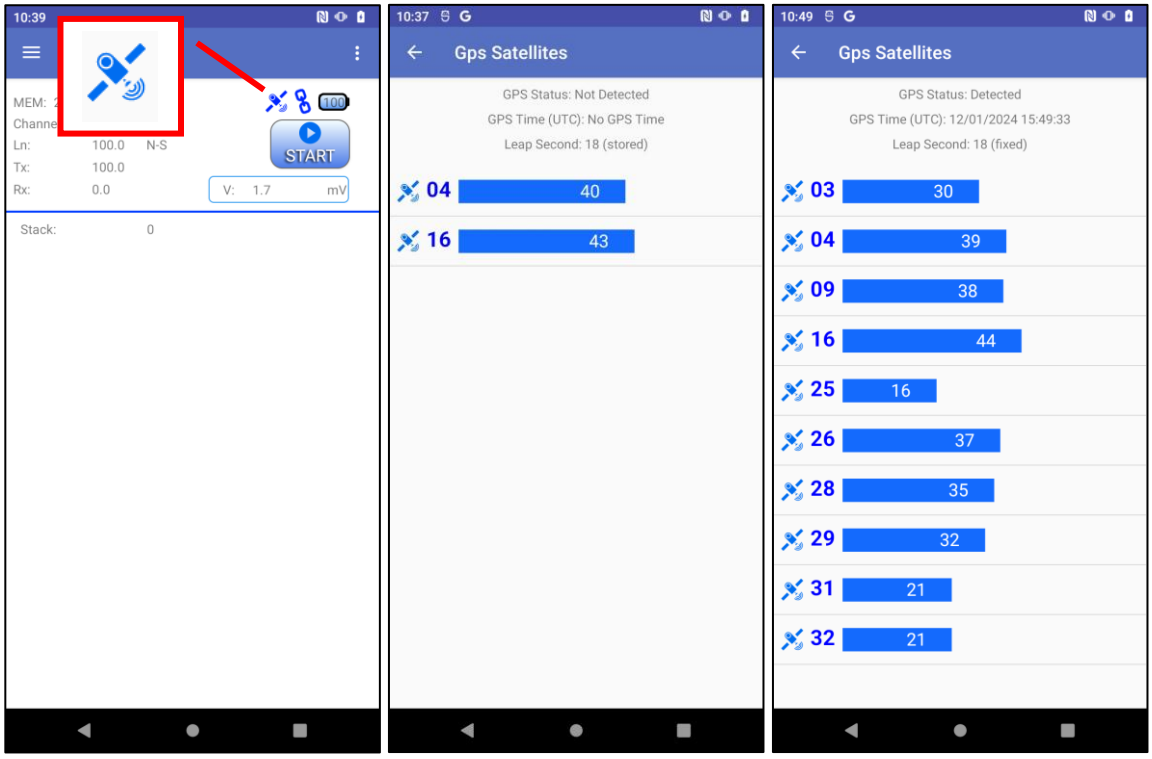
```
Version PPC: 0.4.2.39 Version Rx: 8.1.0.0 Rx SN: 1266
Project: Project
Windows: 20 Setting: User Delay (ms): 240 Timing (ms): 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 8
  Mem    Date        Hour          GPS  SyncBy   Array     LineTx     LineRx Dir    n       Tx1        Tx2        Rx1
    1 27/08/2015 19:25:25.753399 YES  SIGNAL   DP-DP     100.00     100.00 N-S   1.0        0.00       50.00       75.
    1 27/08/2015 19:25:25.753399 YES  SIGNAL   DP-DP     100.00     100.00 N-S   2.0        0.00       50.00      100.
    2 27/08/2015 19:29:44.062906 YES     GPS     P-P     100.00     100.00 N-S   0.0 9999999.00       50.00       75.
    2 27/08/2015 19:29:44.062906 YES     GPS     P-P     100.00     100.00 N-S   0.0 9999999.00       50.00      100.
```

The *SyncBy* column indicates SIGNAL if the receiver is synchronized with the signal connected to the trigger channel and GPS if the receiver is synchronized with the GPS time.

IMPORTANT: Even if the file indicates that your receiver is synchronized with the GPS time, 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.

9.2.5 Check GPS

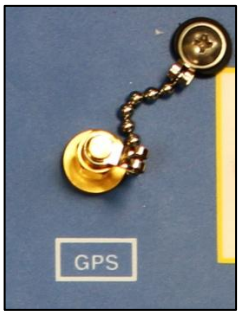
The satellite icon on the main screen of the software indicates the GPS connection status.



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 satellites are being tracked by the GPS module.

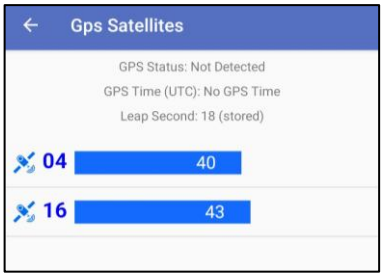
Connect an external antenna (SMA) to the GPS connector of the GRx receiver for more efficiency.



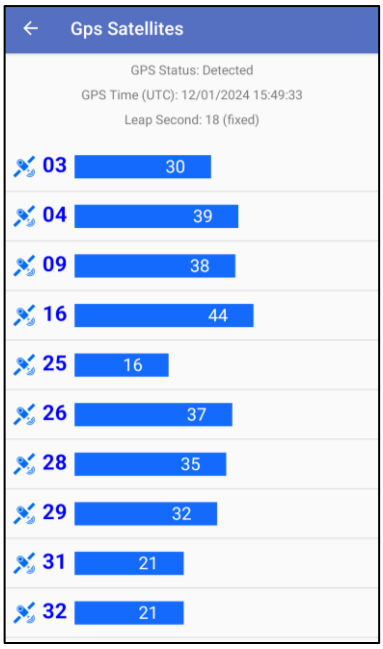
After turning on the GRx receiver, it can take up to 2 or 3 minutes for the GPS receiver to track and synchronize with satellites.

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.

If the GPS module is not synchronized with satellites, the following window will appear.



Once the GPS module is synchronized with satellites, the following window should appear.



This window allows you to verify if the GPS works properly. You can close this window and continue to work normally with your receiver. You can occasionally verify if the GPS is still tracking the satellite.

The GPS timestamps will appear in the *.gps* file (see section 9.6.3). The data in this file is the same than that of the *.gdd* file except for the GPS timestamp (the time in the *.gdd* file comes from the Android device).

Example of *.gps* file

```
Version PPC: 0.4.2.39 Version Rx: 8.1.0.0 Rx SN: 1266
Project: Project
Windows: 20 Setting: Arith. Delay (ms): 240 Timing (ms): 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 8
 Mem   Date       Hour          GPS  SyncBy    Array    LineTx    LineRx Dir    n      Tx1       Tx2       Rx1
   1 27/08/2015 15:00:07.049443 YES  SIGNAL    DP-DP    100.00    100.00 N-S   1.0     25.00     50.00     75.00
   1 27/08/2015 15:00:07.049443 YES  SIGNAL    DP-DP    100.00    100.00 N-S   2.0     25.00     50.00    100.00
   1 27/08/2015 15:00:07.049443 YES  SIGNAL    DP-DP    100.00    100.00 N-S   3.0     25.00     50.00    125.00
   1 27/08/2015 15:00:07.049443 YES  SIGNAL    DP-DP    100.00    100.00 N-S   4.0     25.00     50.00    150.00
   1 27/08/2015 15:00:07.049443 YES  SIGNAL    DP-DP    100.00    100.00 N-S   5.0     25.00     50.00    175.00
   1 27/08/2015 15:00:07.049443 YES  SIGNAL    DP-DP    100.00    100.00 N-S   6.0     25.00     50.00    200.00
   1 27/08/2015 15:00:07.049443 YES  SIGNAL    DP-DP    100.00    100.00 N-S   7.0     25.00     50.00    225.00
   1 27/08/2015 15:00:07.049443 YES  SIGNAL    DP-DP    100.00    100.00 N-S   8.0     25.00     50.00    250.00
   2 27/08/2015 15:03:47.001726 YES  SIGNAL    DP-DP    100.00    100.00 N-S   1.0     25.00     50.00     75.00
```

If the GPS module is synchronized with satellites, the column GPS will show YES as shown in the picture above. See *Section 9.2.4* to know more about SyncBy column.

If the GPS module synchronization with satellites is lost, the synchronization will be kept for 5 hours (holdover). In that case, the Date and Hour will continue to increase following the GPS time, but the GPS column will show NO as shown in the picture below.

```
Version PPC: 0.4.2.39 Version Rx: 8.1.0.0 Rx SN: 1266
Project: Project
Windows: 20 Setting: Arith. Delay (ms): 240 Timing (ms): 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80,
 Mem   Date       Hour          GPS  SyncBy    Array    LineTx    LineRx Dir    n      Tx1       Tx2       Rx1
   1 28/08/2015 17:03:35.592977 NO   SIGNAL      P-P    100.00    100.00 N-S   0.0 9999999.00     50.00      75.
   1 28/08/2015 17:03:35.592977 NO   SIGNAL      P-P    100.00    100.00 N-S   0.0 9999999.00     50.00     100.
   2 28/08/2015 17:04:31.580638 NO   SIGNAL    DP-DP    100.00    100.00 N-S   1.0 9999999.00     50.00      75.
   2 28/08/2015 17:04:31.580638 NO   SIGNAL    DP-DP    100.00    100.00 N-S   2.0 9999999.00     50.00     100.
   3 28/08/2015 17:05:31.578131 NO   SIGNAL    DP-DP    100.00    100.00 N-S   1.0 9999999.00     50.00      75.
   3 28/08/2015 17:05:31.578131 NO   SIGNAL    DP-DP    100.00    100.00 N-S   2.0 9999999.00     50.00     100.
```

If there is no GPS synchronization with satellites from the beginning or if the GPS signal is lost for more than 5 hours, the Date and Hour will be replaced by *NO GPS TIME*, also applied for fullwave files.

```
Version PPC: 0.4.2.39 Version Rx: 8.1.0.0 Rx SN: 1266
Project: Project
Windows: 20 Setting: Arith. Delay (ms): 240 Timing (ms): 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80,
 Mem   Date       Hour          GPS  SyncBy    Array    LineTx    LineRx Dir    n      Tx1       Tx2       Rx1
   1        NO GPS TIME          NO   SIGNAL    DP-DP    100.00    100.00 N-S   1.0 9999999.00     50.00      75.00
   1        NO GPS TIME          NO   SIGNAL    DP-DP    100.00    100.00 N-S   2.0 9999999.00     50.00     100.00
   2        NO GPS TIME          NO   SIGNAL      P-P    100.00    100.00 N-S   0.0 9999999.00     50.00      75.00
   2        NO GPS TIME          NO   SIGNAL      P-P    100.00    100.00 N-S   0.0 9999999.00     50.00     100.00
   3        NO GPS TIME          NO   SIGNAL    DP-DP    100.00    100.00 N-S   1.0 9999999.00     50.00      75.00
   3        NO GPS TIME          NO   SIGNAL    DP-DP    100.00    100.00 N-S   2.0 9999999.00     50.00     100.00
```

The GPS timestamps will also appear in the fullwave file (see *Section 9.6.3* to create a fullwave file) or in the raw data file *.mem*.

Example of a fullwave file

```
Version PPC: 0.4.2.39 Version Rx: 8.1.0.0 Rx SN: 1266
Project: Project
Windows: 20 Setting: Arith. Delay (ms): 240 Timing (ms): 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 8
MEM: 1 FULL WAVE: 8 channel(s) 27/08/2015 15:00:07 (Time GPS) ARRAY: DP-DP LINE TX: 100.00 N-S LINE RX
          Time GPS          GPS        CH01        CH02        CH03        CH04        CH05        CH06
27/08/2015 15:00:07.049443 YES     4402.110    4417.473    4446.574    4415.306   -4404.320    4367.173
27/08/2015 15:00:07.069458 YES     5594.123    5619.028    5625.894    5617.490   -5593.644    5572.307
27/08/2015 15:00:07.089446 YES     5917.275    5948.031    5945.424    5948.056   -5916.514    5904.229
27/08/2015 15:00:07.109414 YES     5992.098    6025.043    6020.204    6026.248   -5991.927    5982.474
27/08/2015 15:00:07.129439 YES     6008.621    6041.841    6036.090    6042.971   -6007.934    5999.322
27/08/2015 15:00:07.149438 YES     6011.757    6044.923    6039.294    6046.429   -6011.360    6002.895
27/08/2015 15:00:07.169437 YES     6012.301    6045.485    6040.224    6046.776   -6011.911    6004.075
27/08/2015 15:00:07.189437 YES     6012.851    6045.410    6040.478    6047.488   -6012.057    6004.236
```

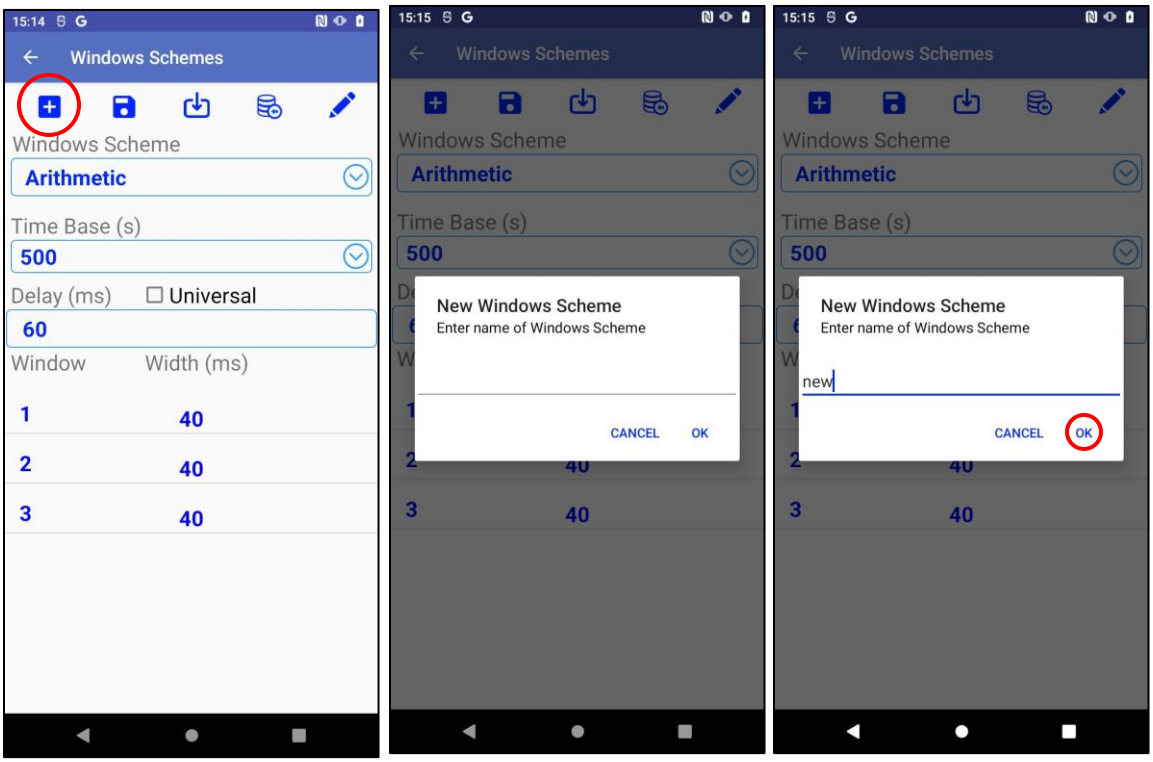
Take note that for some reasons, such as weak signal areas, the GPS module will not be able to track and synchronize with satellites.

9.3 *Windows Schemes Option*

This command opens the window which allows you to view, edit, create, delete, import and export Windows Schemes. A Windows Scheme describes the Decay curve with up to 20 windows of defined **Width (ms)** started with **Delay (ms)** from the beginning of the OFF-time. The **Time Base (s)** is the duration in seconds of each ON and each OFF cycle.

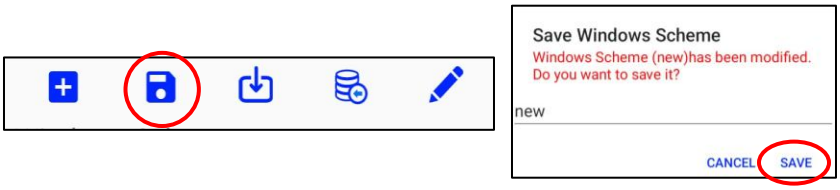
9.3.1 New Windows Scheme

Create a new Windows Scheme button will ask you to enter a name for the new Windows Scheme, then you can edit the created scheme to configure Windows settings.



9.3.2 Save Windows Scheme

Save the current Windows Scheme button will save the currently selected Windows Scheme if their settings have been changed. You can confirm the name to replace the settings in the existing scheme or rename the scheme to get a new custom one. You cannot save one of standard Windows Schemes unless you rename it to get a new custom one.

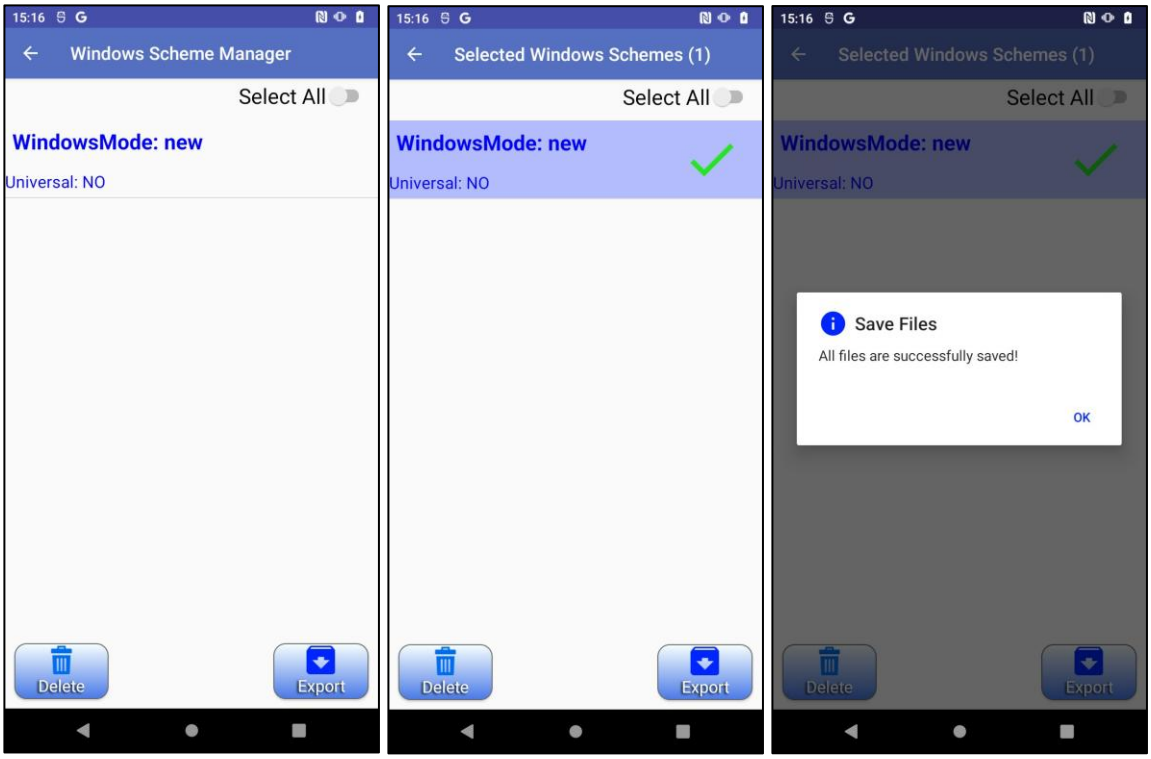


9.3.3 Import Windows Schemes

Import Windows Schemes button allows to import one or more Windows Schemes from a **.wnd** file in the memory of your Android device. This way, you can exchange custom (user defined) Windows Schemes between your Android devices.

9.3.4 Windows Scheme Manager

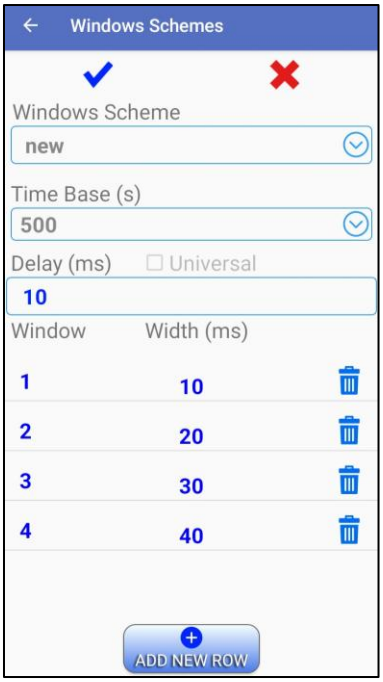
Windows Scheme manager button calls the window where you can select one or more Windows Schemes to delete or export in a **.wnd** file. The created **.wnd** file will be placed in the **\Documents\GDDRX** folder in the main memory of your Android device and will have the current date as name of file.



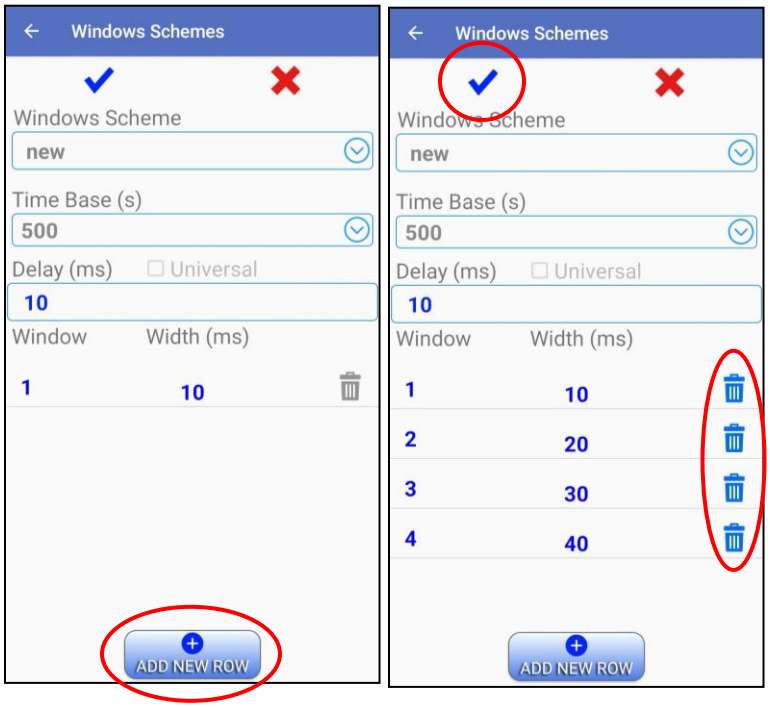
9.3.5 Edit Windows Scheme

Edit the current Windows Scheme button calls the window which allows to setup Delay and Decay Windows for the selected Windows Scheme and Time Base.

Tap on **Delay** to change the delay value in milliseconds.
Tap on **Window** line to change the width value in milliseconds for this decay window.



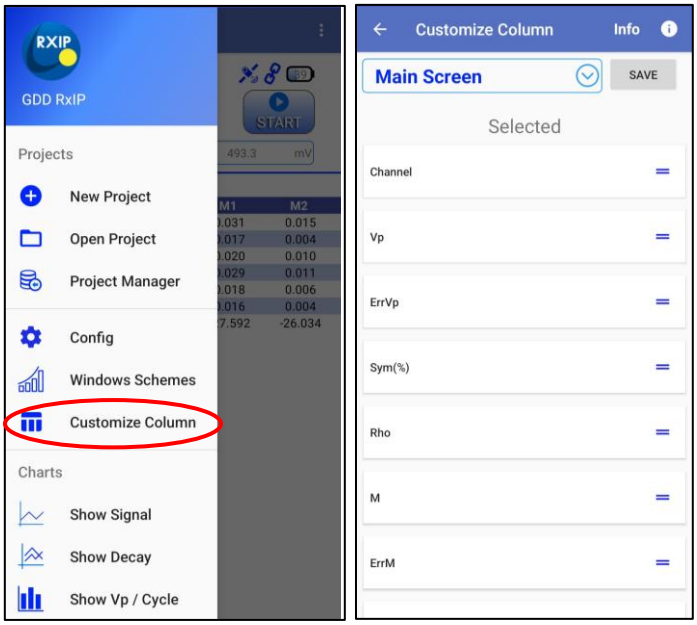
Click on "**Add New Row**" button to add a decay window.
Click on the trash can logo to delete a decay window.
Click "**Save**" when done.



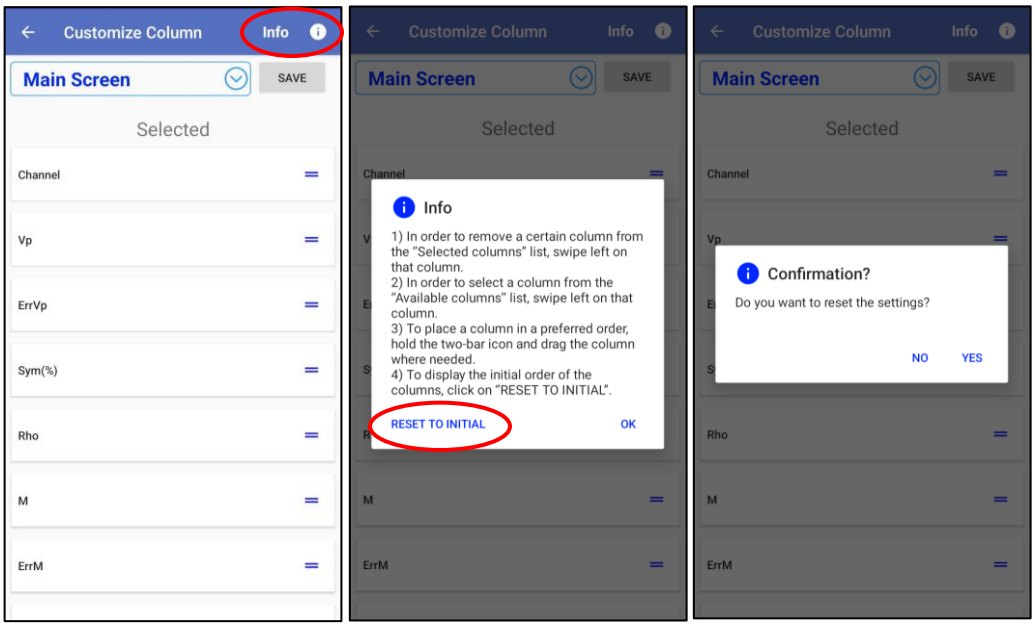
9.4 *Customize Column Option*

The **Customize Column** option is designed to customize the data presentation in the main window as well as in the **Show Results** window. You can select the columns to show and put them in a preferred order.

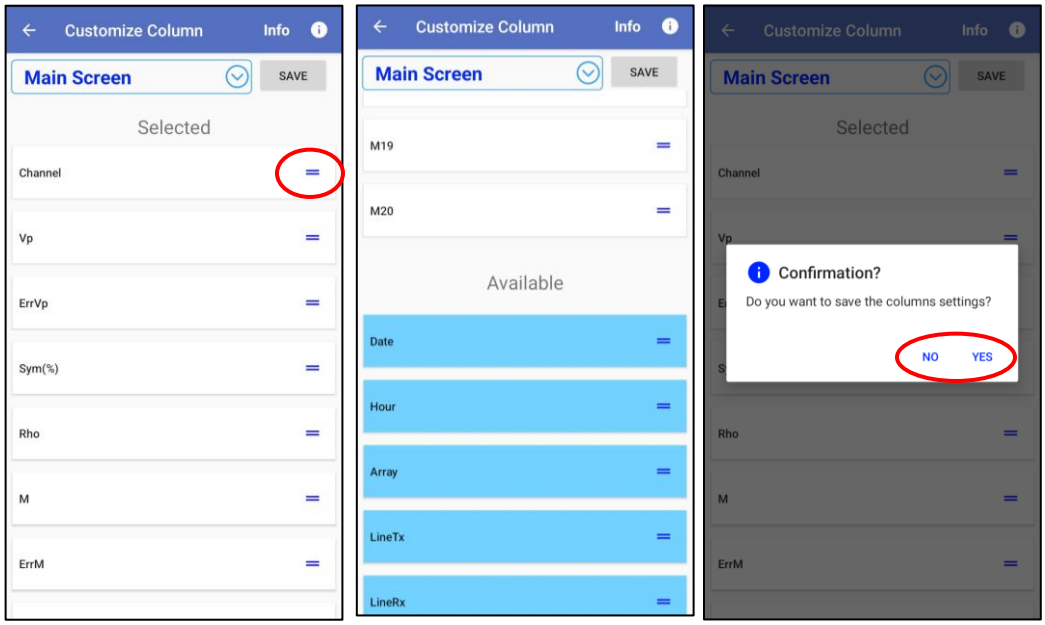
Select **Function Menu->Customize Column**.



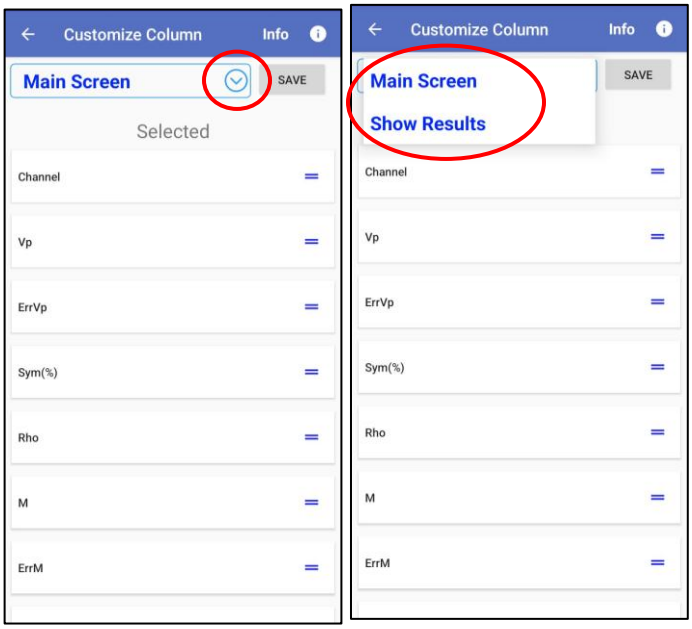
The "**Info**" button opens a window with the instructions.
You also have access to the "**Reset to Initial**" button that places the columns in the original order.



1) To remove a certain column from the “Selected” columns list, swipe left.
2) To select a column from the “Available” columns list, swipe left on that column.
3) To place a column in a preferred order, hold the two-bar icon and drag the column where needed.



You can choose to make these changes for the main screen and/or the **Show Results** option by clicking on the arrow.

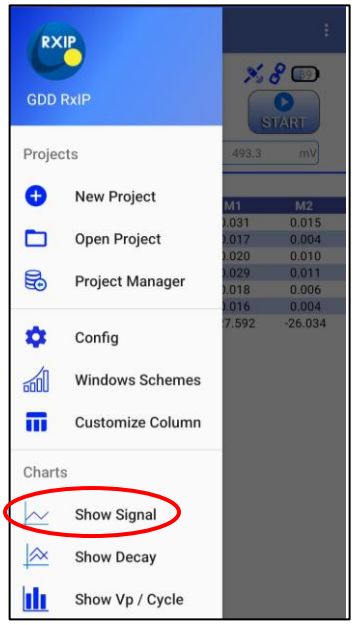


9.5 *Charts Option*

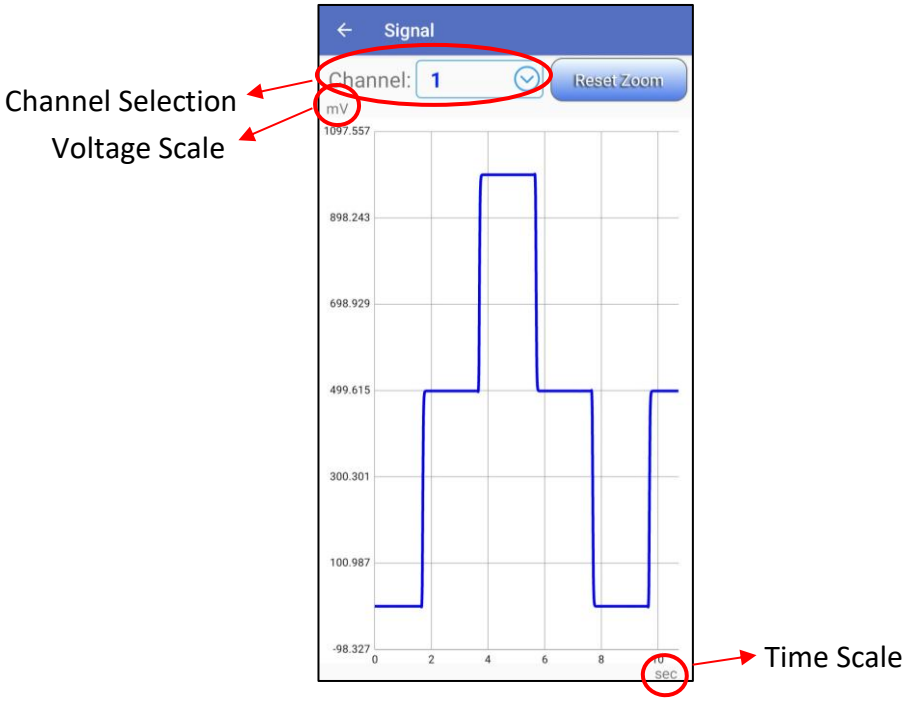
9.5.1 Show Signal

The **Show Signal** option is used to display the signal graph of a selected channel.

Select **Function Menu->Show Signal** (in the **Charts** section)



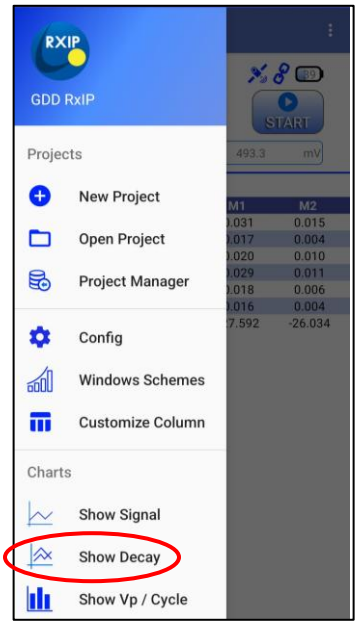
1. The following screen appears.



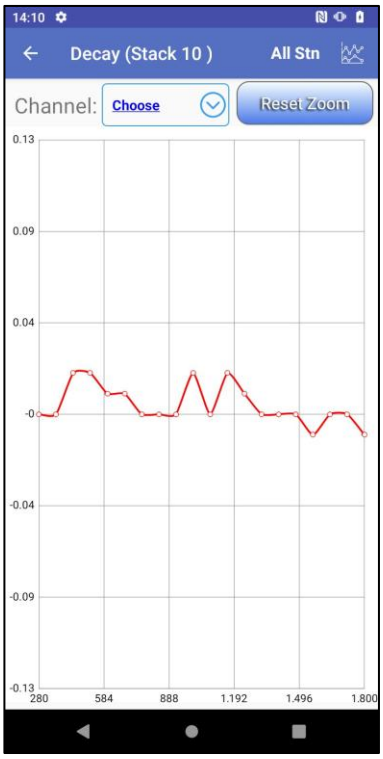
9.5.2 Show Decay

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

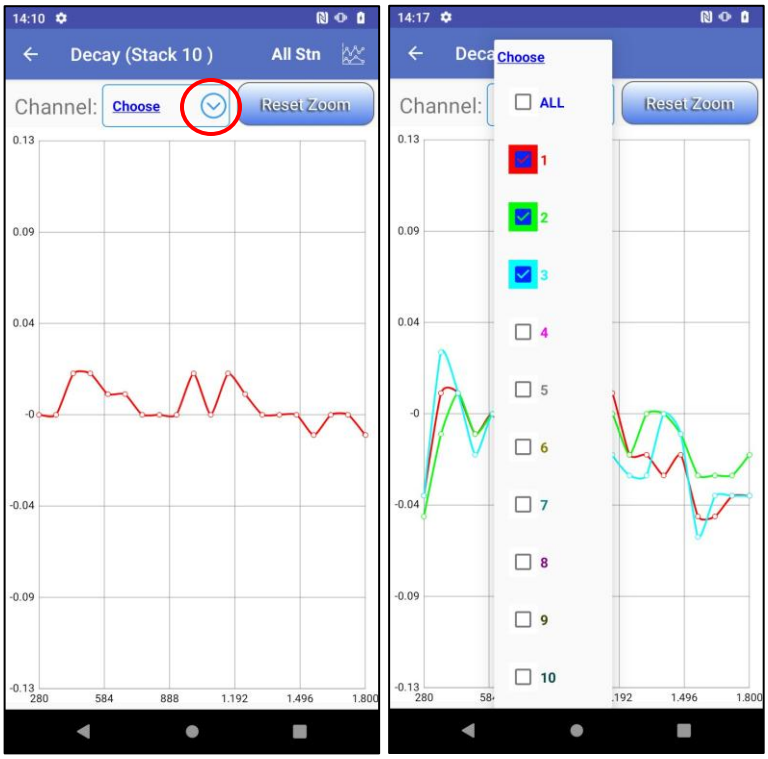
1. Select **Function Menu->Show Decay**



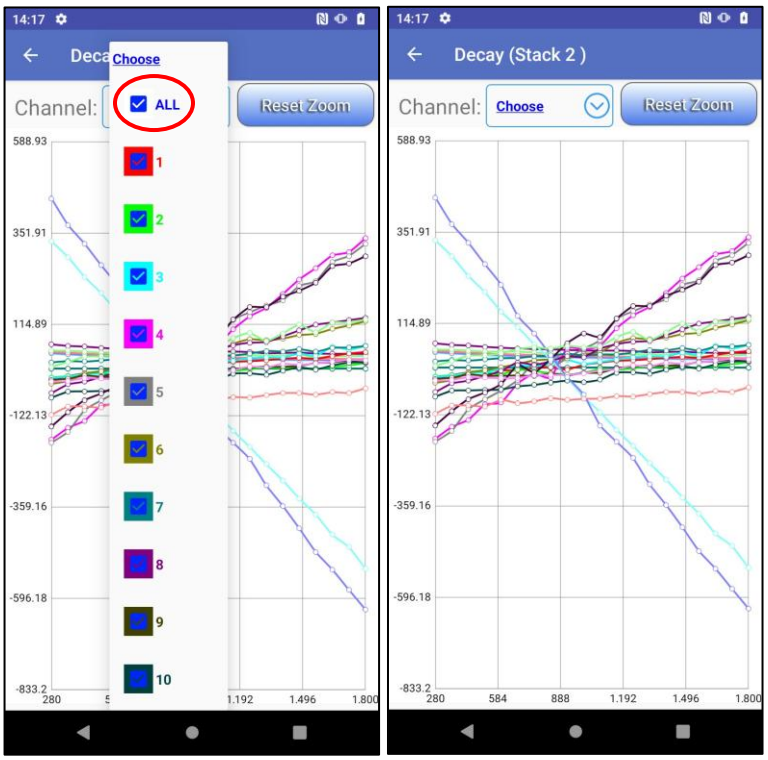
2. The following screen appears.



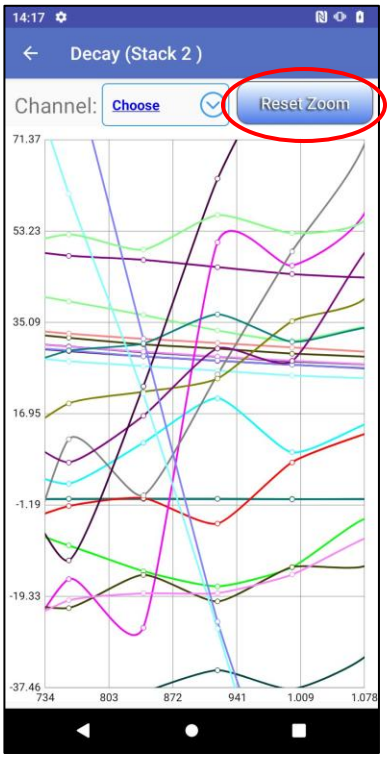
3. Select the display channel.



4. **ALL** button will check all the channels.



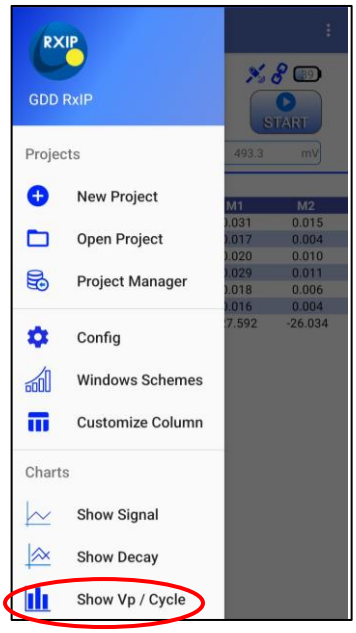
5. To zoom-in and zoom-out, use two fingers to pinch the screen horizontally or vertically. You can also double tap on the screen to zoom-in.
   To go back to the main graph scale, press the **Reset Zoom** button.



9.5.3 Show Vp / Cycle

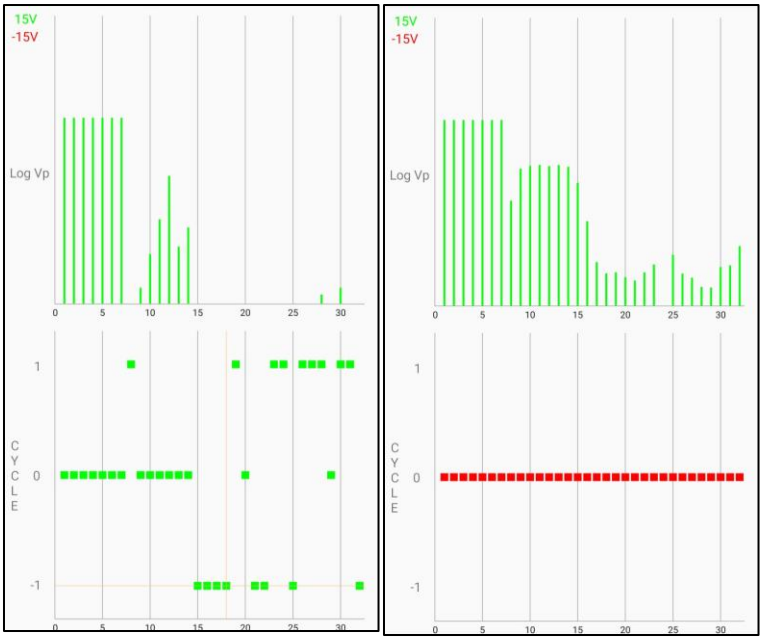
The **Vp and Cycle** option is used to show the channel synchronization. This option can be useful for troubleshooting if you have any connection problems. The **Vp** part of the graph shows the primary voltage of all your electrodes. The current graph is an example; your **Vp** graph will depend on the physical configuration of the electrodes.

1. Select **Function Menu->Show Vp / Cycle**



2. The following graph appears.

- Green line indicates that this Vp is positive.
- Blue line indicates that this Vp is negative.
- Red dots indicate that the GRx is not synchronized.
- Green dots indicate that the GRx is synchronized.
- If the GRx is synchronized and the green dots are not moving in the same direction, check the position of the electrodes on the GRx8-32 front panel.

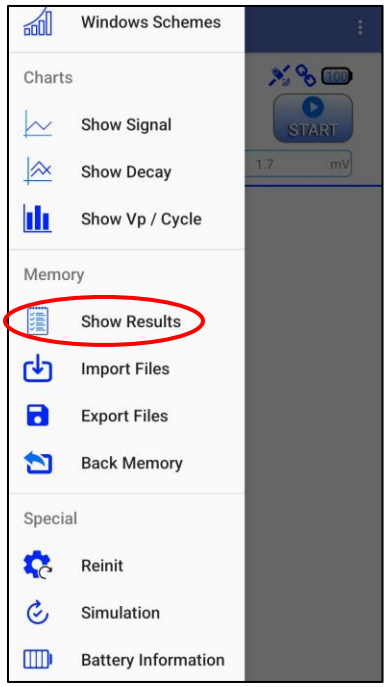


9.6 *Memory Option*

9.6.1 Show Results

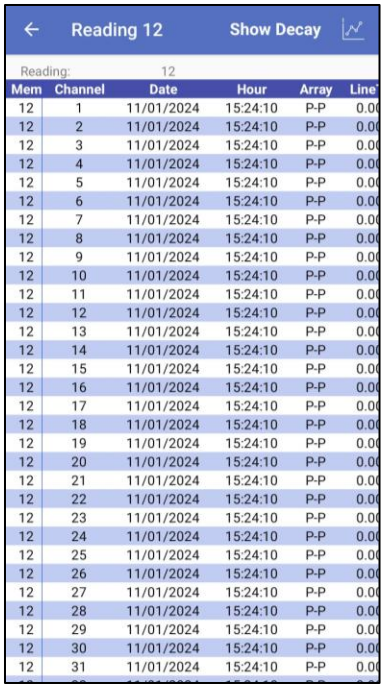
Show Results option is used to view all readings in a selected project.

1. Select **Function Menu->Show Results** (in **Memory** section)



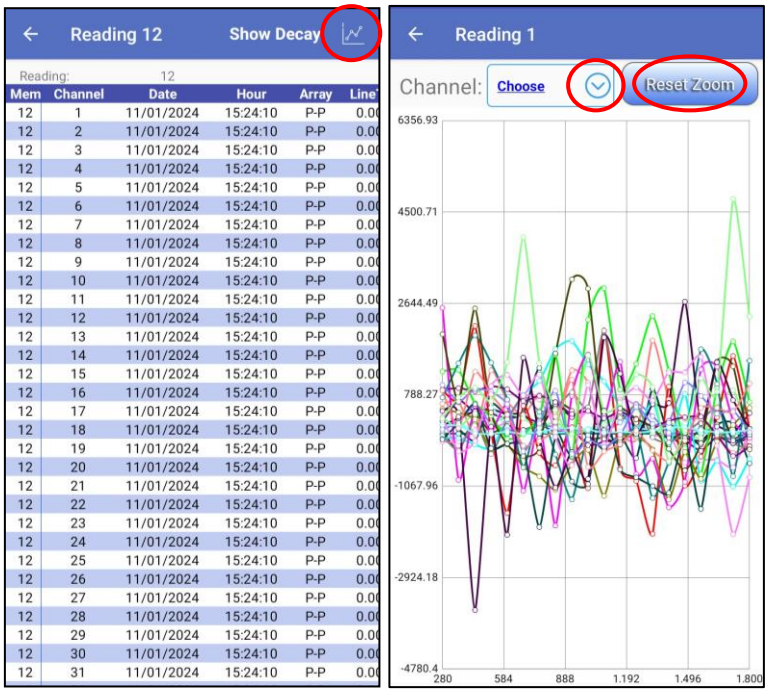
2. Select the project you would like to see the readings of and press on the reading.

3. The readings appear (To see all the text, just slide the screen. The landscape screen orientation may be more appropriate to consult the readings.).



4. Click on **Show Decay**. You can choose the channels you want to see on the graph by clicking on the channel list.

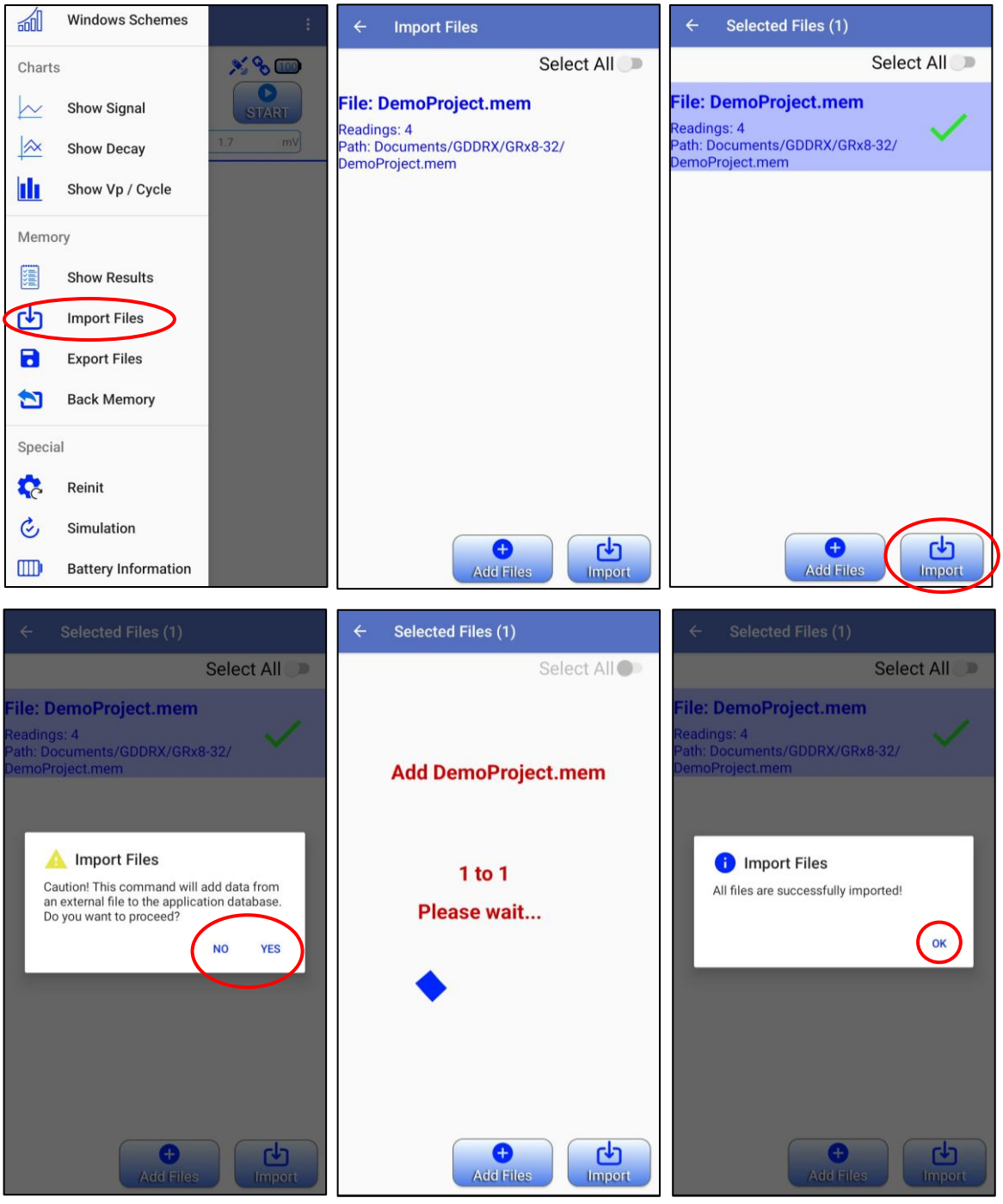
   Zoom-in and zoom-out by pinching the screen. Use **Reset Zoom** button to get back to the main graph scale.



9.6.2 Import Files

This command allows to migrate the memory with readings between Android devices.
When you create output data files for the selected projects, you always get *.mem* files which contain raw data with all settings associated with the readings.

1. Select **Function Menu->Import Files.** Select the *.mem* files you want to import and confirm that you want to proceed or not when you see the following alert. All projects with all readings will be added into the application database.

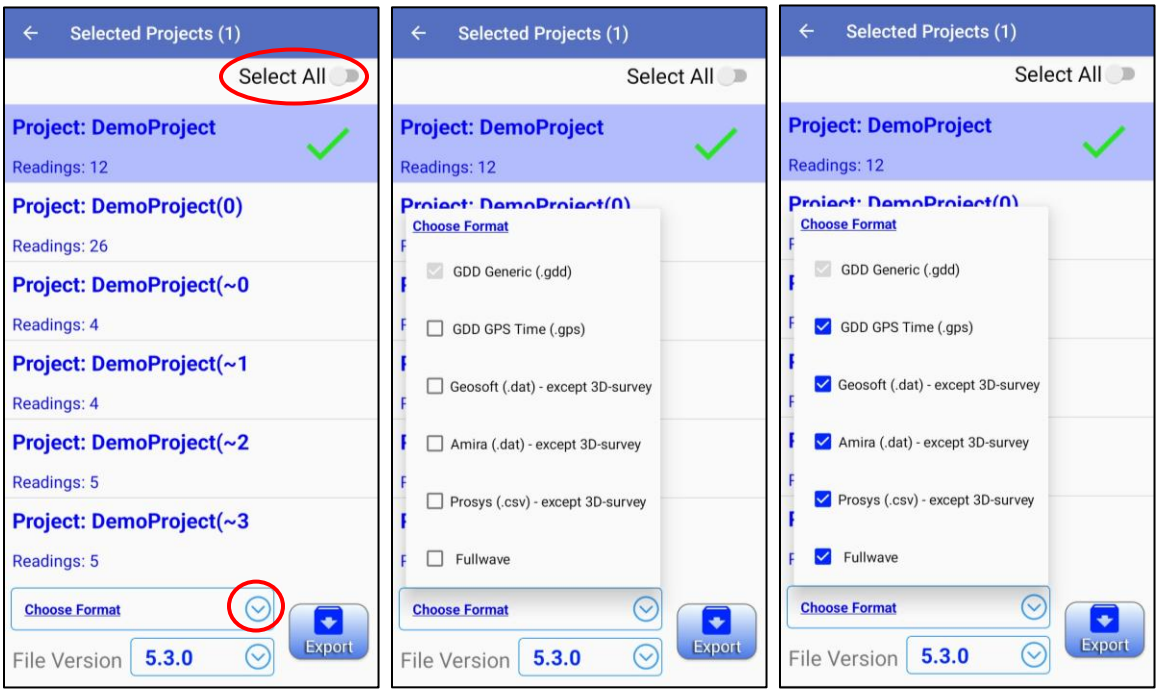


9.6.3 Export Files

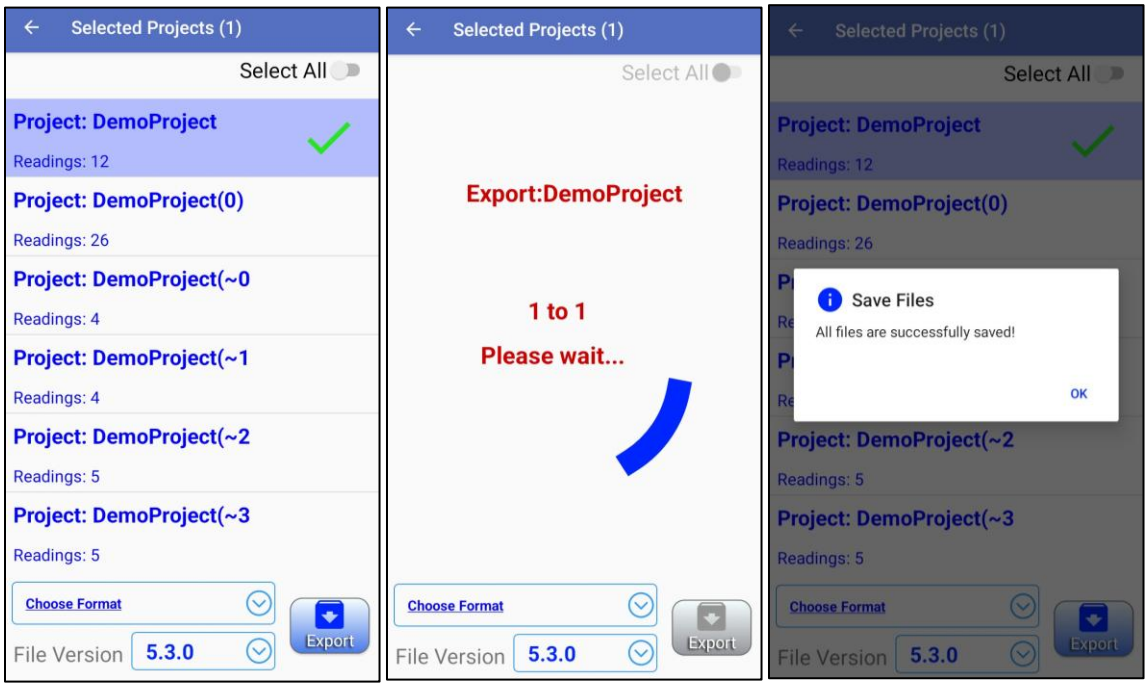
This command is used to get output data files.

1. Select **Function Menu->Export Files**.

Select the projects to output. Use **Select All** switch if needed.
Select the desired output formats.
The **GDD Generic** *.gdd* is a text file format and is always selected.
The **GDD GPS Time** . *gps* is a text file format like *.gdd* but with the GPS time
The **Geosoft** format can be chosen to create a specific file to be imported in Geosoft software. Take note that in the Geosoft file (.dat file), some information as core ID, length and diameter is missing.
The **Amira** format is a text file format organized based on AMIRA file standard.
The **Prosys** format can be use with the software *Prosys* from IRIS Instrument.
The **Fullwave** format can be selected to create a file that contains the full waveform sampled data in text format.



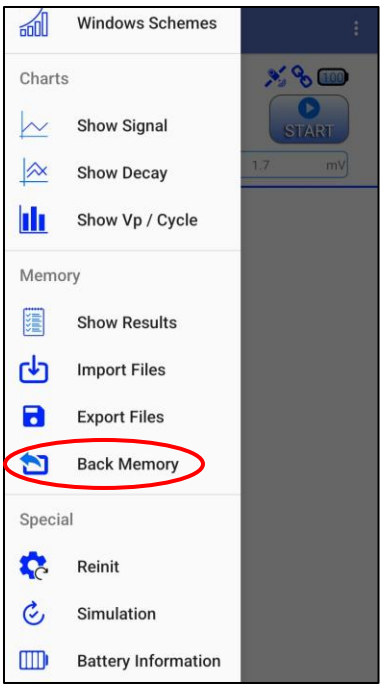
Click on **Export** button to create the output files. They will have the same names as projects and will appear in the *Internal storage**Documents*\GDDRX*\ folder in the main memory of your Android device.
Wait until the following message appears.



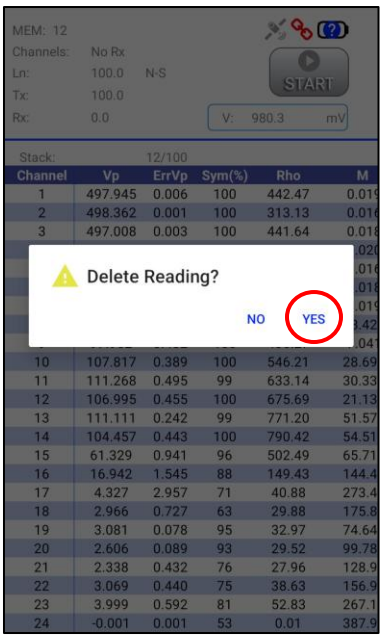
9.6.4 Back Memory

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

1. Select **Function Menu->Back Memory**



2. Click **Yes** to clear the last readings.

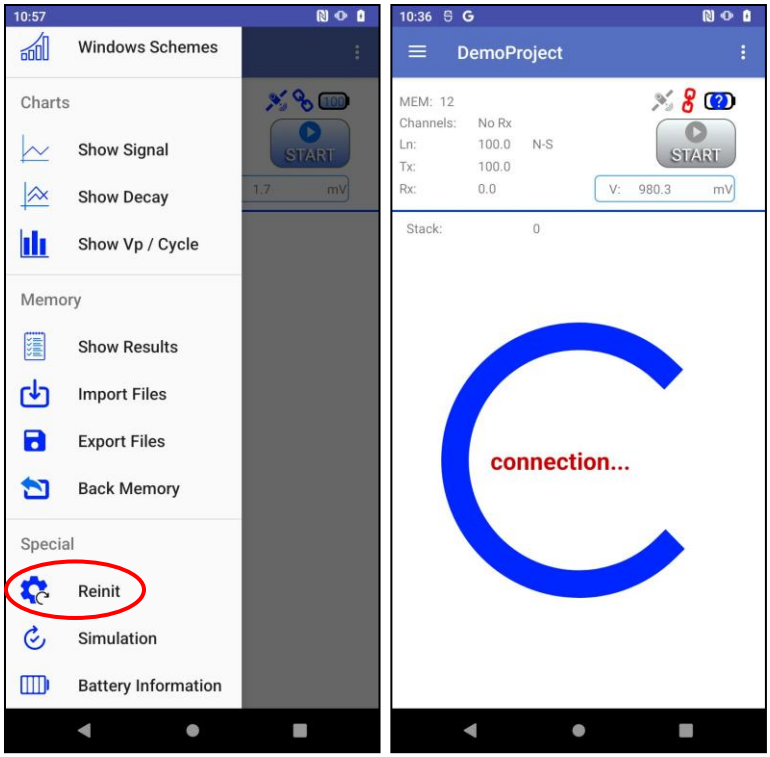


9.7 *Special Option*

9.7.1 Reinit

The **Reinit** option is used to reset the receiver's configurations and communication with the Android device.

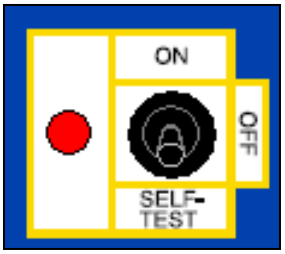
1. Select **Function Menu->Reinit (in the "Special" section).** The following screen should appear.
Repeat this step every time you change connection modes or when you choose a different Bluetooth device



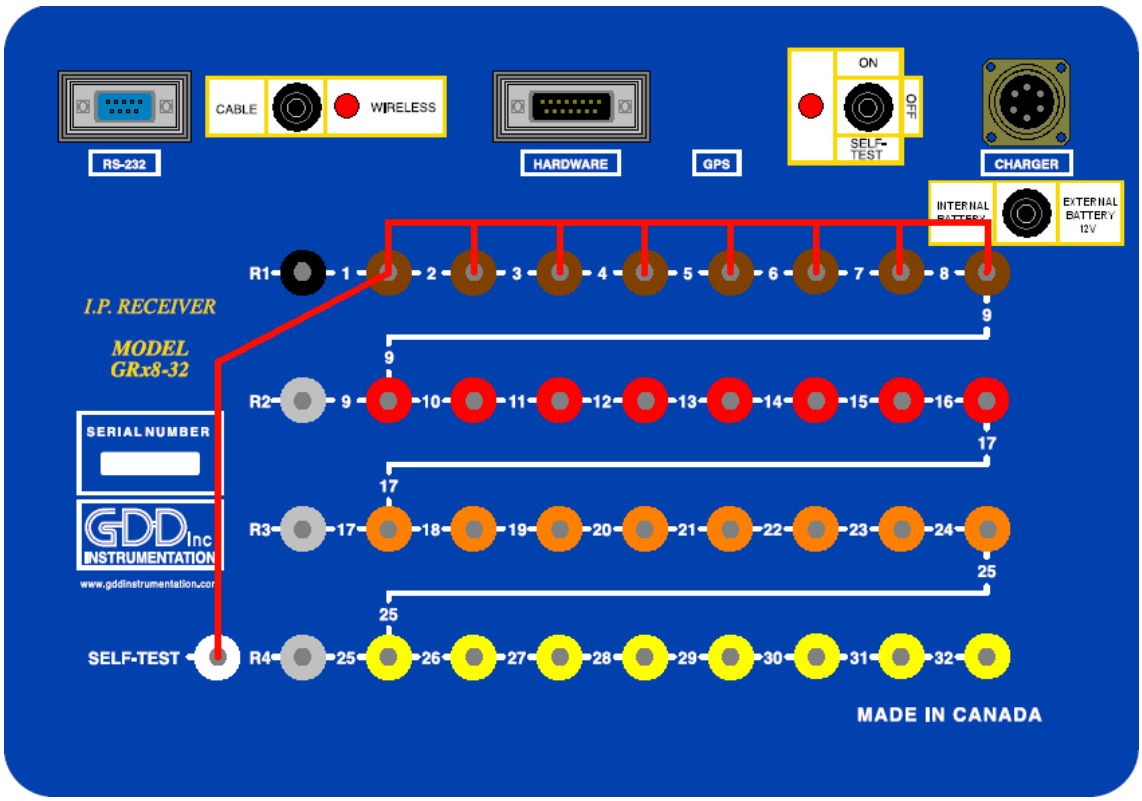
9.7.2 Simulation

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. Select the **SELF-TEST** mode using the ON/OFF/SELF-TEST switch.

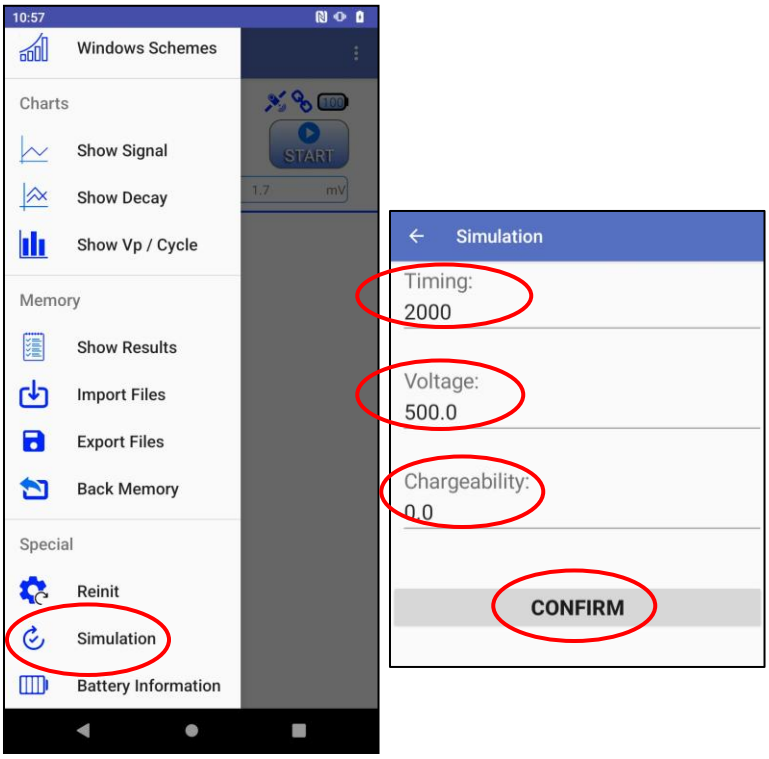


2. Short the **SELF-TEST terminal** with the channel(s) you want to test. The picture below shows a self-test testing the first eight channels.

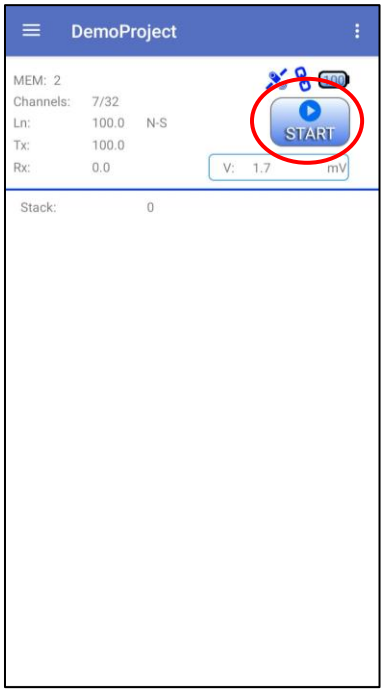


3. Select **Function Menu->Simulation**

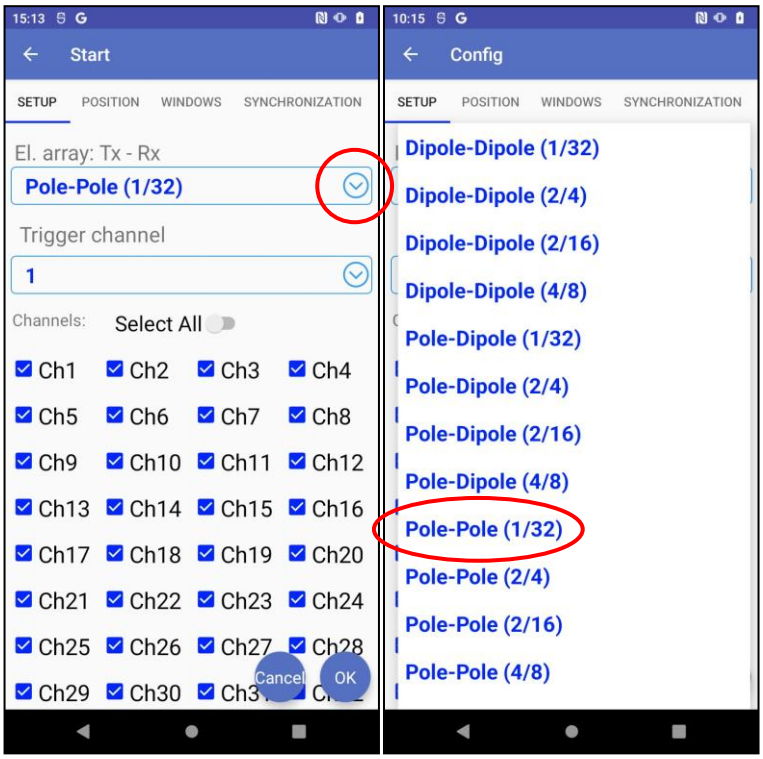
Enter the **waveform timing** (default=2000ms)
Enter the **primary voltage** (default=500mV)
Enter the **chargeability** (default=0)
Click **Confirm** when done.



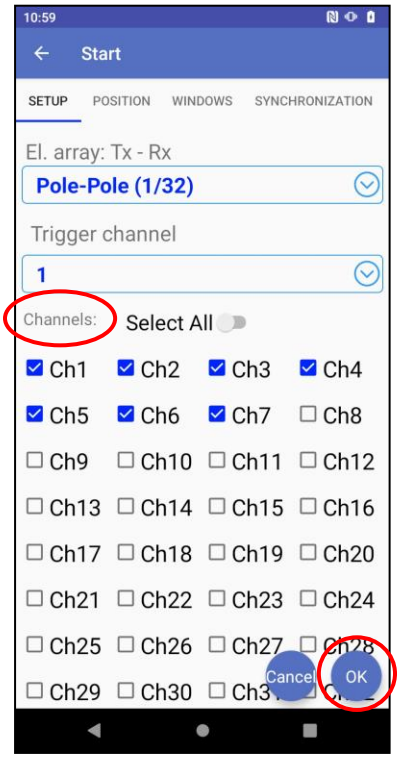
4. Click **START** to begin the acquisition process.



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



6. Check the channel(s) you want to test. Press **OK** when done.



If you keep the default settings, you should obtain the following results for all channels:

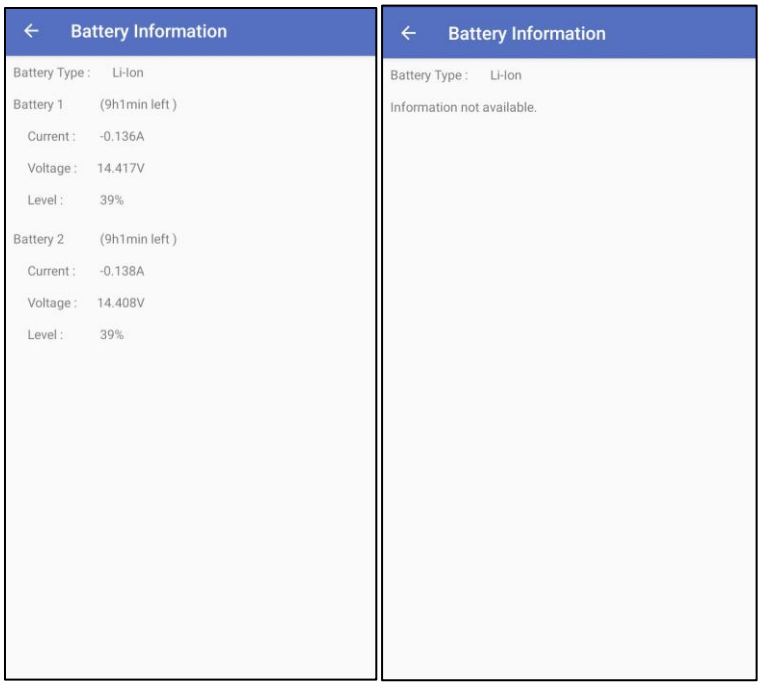
Vp ≈ 500mV M ≈ 0.000

When you enter a VP of 500 mV in the self-test simulation mode, it is possible that the actual voltage generated is 504, 505, 506 mV, etc. It does not mean that the channels are not working properly. It would be a problem if the VP value is not the same during a reading for every channel. For example, a value of 520mV for one channel while you get a value of 503mV for the other ones.

9.7.3 Battery information

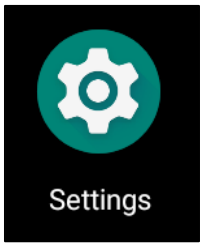
Go to **Function Menu->Battery Information** to see details about the battery.
You will see:

- The battery type
- The battery autonomy
- The current
- The voltage
- The charging percentage

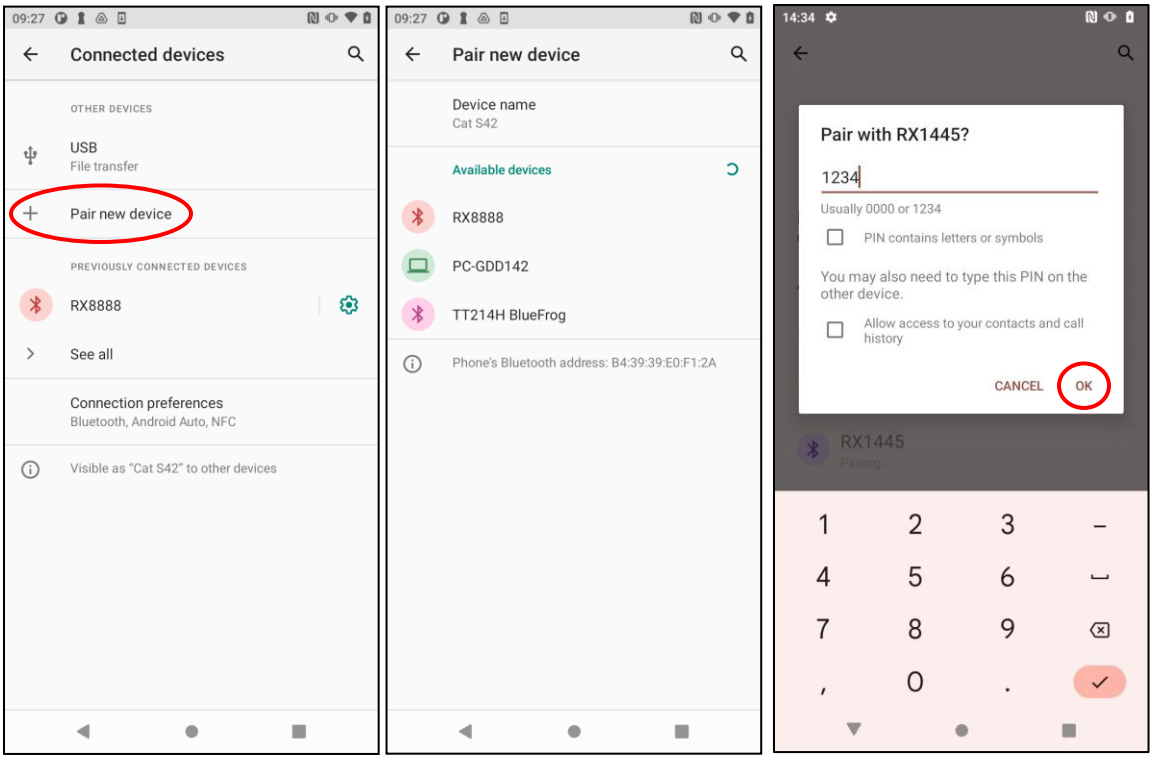


10. *Bluetooth Configuration*

1. On your Android home screen, go to **Settings->Connected Devices**



2. Go to **Pair new device** and select the serial number of your receiver. (Your GDD IP receiver must be **ON** and in **Wireless** mode)
   Enter **1234** as the PIN when asked.
   Click on **OK** to complete this step.



11. *GDD RxIP Software Update*

GDD RxIP software is updated automatically.

You can also search the app in Google Play Store and click on update when an update is needed.

If you cannot access Google Play, contact us by email and we will send you an update link.

12. *Troubleshooting*

This section suggests problems that could occur while using GDD's Rx8-32, Rx8*mini* or Rx2 and their solutions.

➢ Problem:

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

✓ Solution:

- In Cable mode, the receiver will only be ON when the GDD Rx program is active on the android device.
- If the receiver's battery power rating is below the critical threshold, the receiver will not turn on.

➢ Problem:

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

✓ Solution:

- 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:

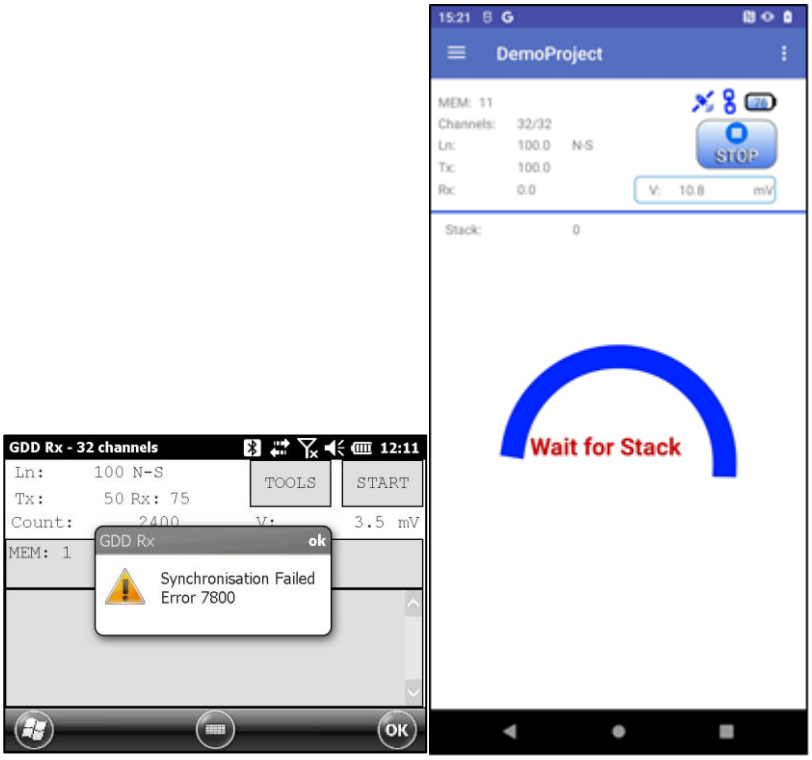
The GRx receiver wireless light stays on even if the receiver is turn off.

✓ Solution:

- Turn the switch to cable and back to wireless and the light will turn off.

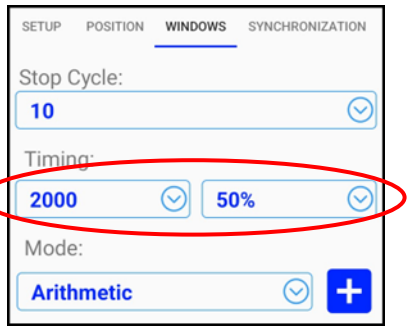
➢ Problem:

A synchronization error message appears while synchronizing with the receiver, or the RxIP waits for stack indefinitely.

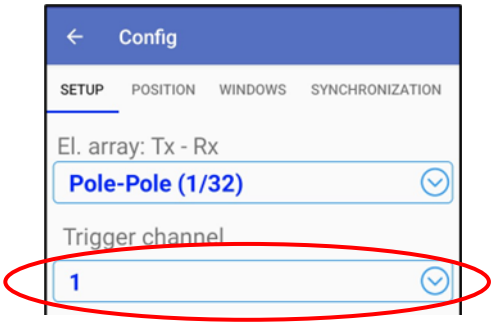


✓ Solution:

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



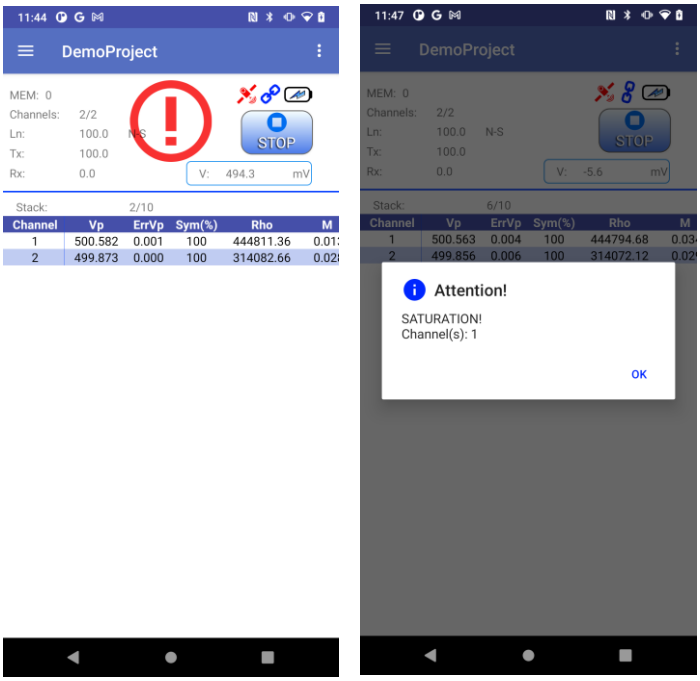
- Check if the signal (Vp > 2) of the trigger channel is high enough. Otherwise, try to synchronize with another channel. You should select the channel that receives the higher signal as the trigger channel.



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

➢ <u>Problem</u>:

A warning sign appears in the main window during the acquisition process. If you click on the warning sign, a saturation message appears.



✓ <u>Solution:</u>

- 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 do 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.

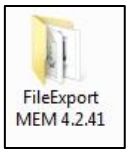
➢ Problem:

Creating files or transferring files takes too much time.

✓ Solution:

- The size of the fullwave file explains the export time on the PDA. We have developed an IP Post-Process software and we could 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 USB stick provided by GDD. Or contact GDD technical support for more information.

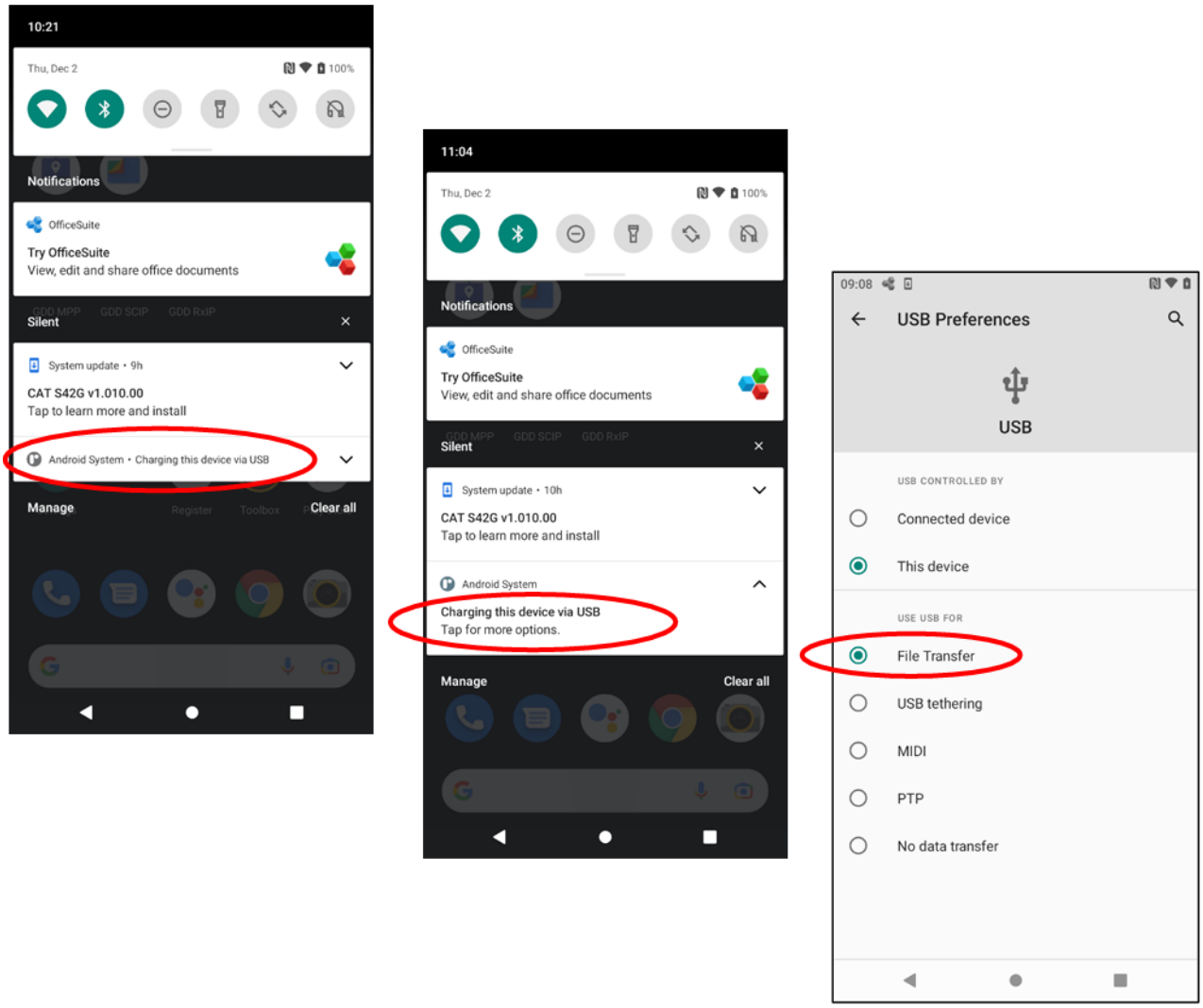


➢ Problem:

The Android device internal storage doesn't show up in the computer File Explorer when the Android device is connected to the computer.

✓ Solution:

- Click on the USB connection setting then choose the File transfer mode. The Android device internal storage will now appear in the computer File Explorer.



➢ Problem:

Something is wrong with one or multiple channels.

✓ Solution:

- Perform a Self-test simulation (Section 9.7.2, p.71).
- Perform a contact verification (Section 12.1, p.83)
- If one channel is malfunctioning, replace the bad channel with the spare channel (Section 12.2, p.88)

➢ Problem:

Something is wrong with the general functioning of the Rx.

✓ Solution:

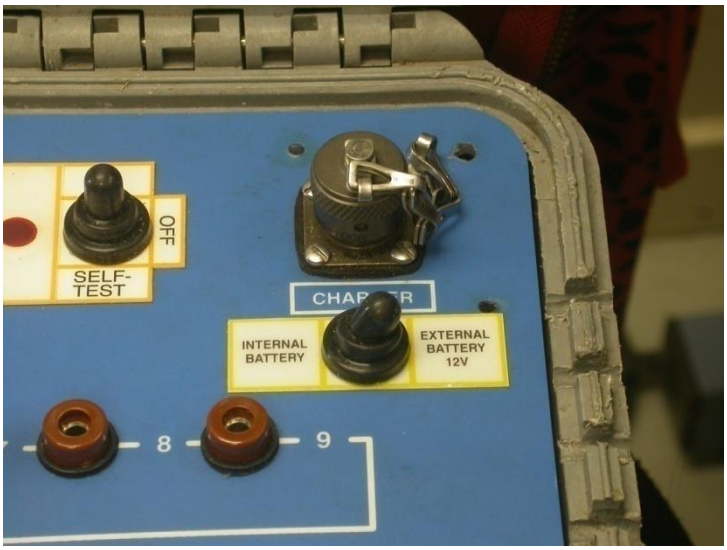
- Perform a voltage verification (Section 12.3, p.97).

12.1 *Contact verification procedure*

Read these instructions carefully. Failure to follow each step properly could damage the receiver.

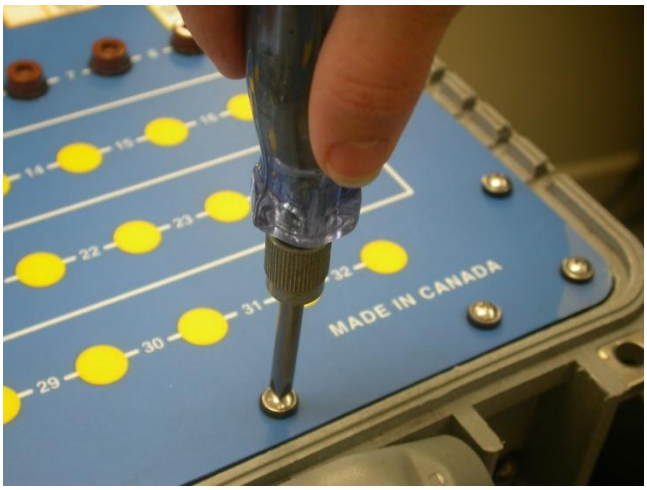
This verification needs the use of an ohmmeter.

1. Place the *Internal/External battery* switch in *External* position.

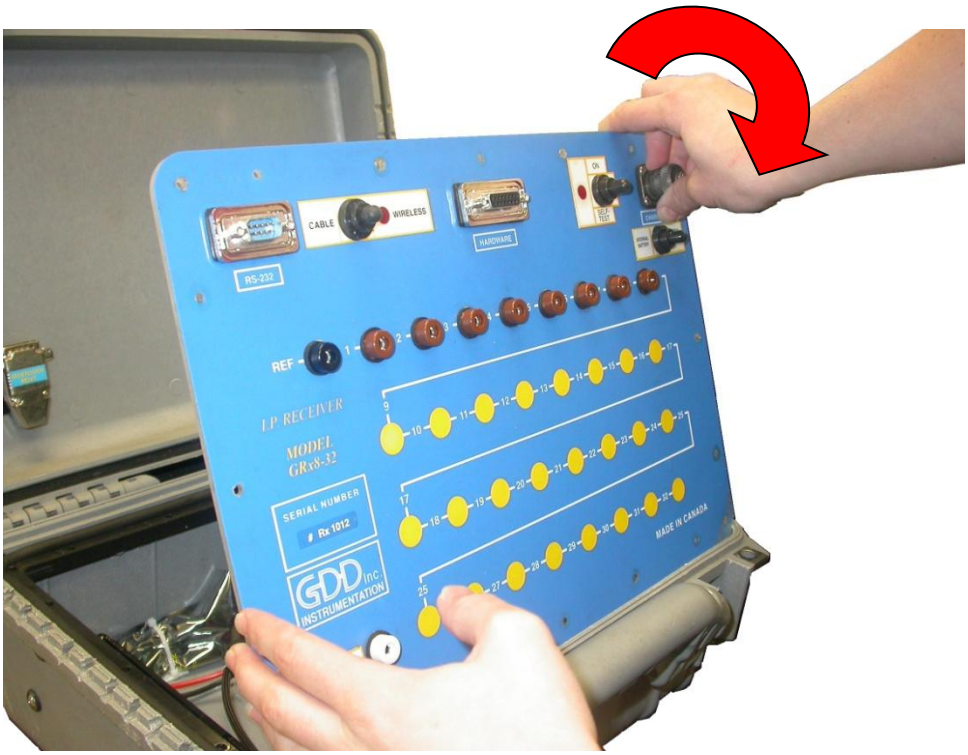


If the switch is in *Internal battery* position, internal circuits could still be powered up.

2. Remove all the screws on the GRx8-32 front panel.

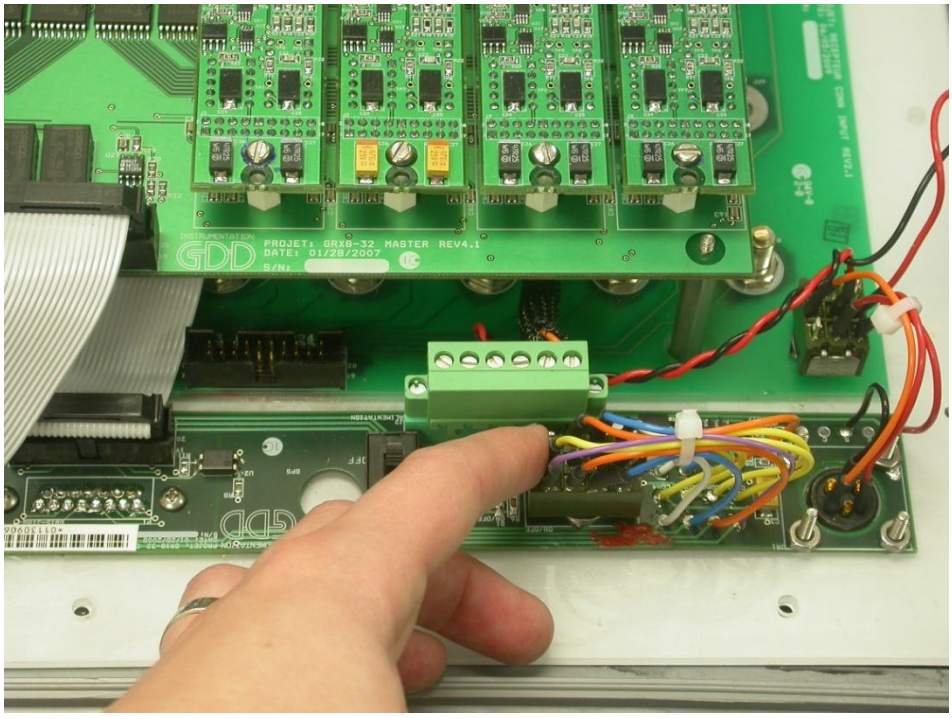


3. Flip the front panel.

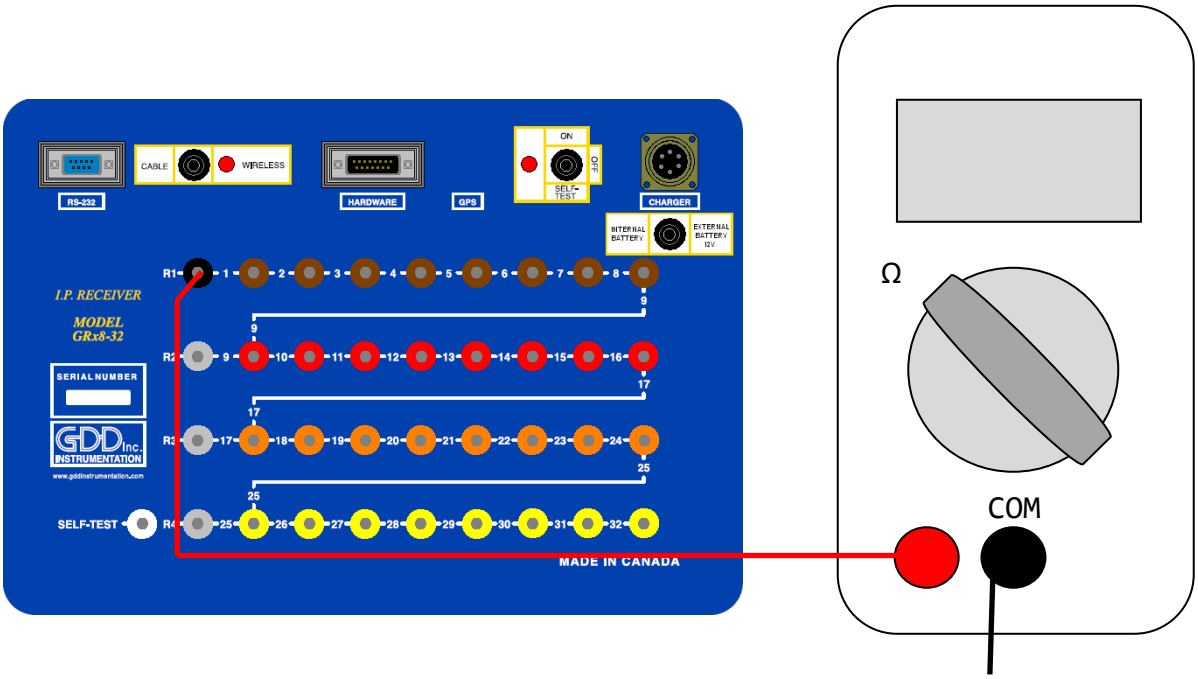


4. ***!IMPORTANT!***

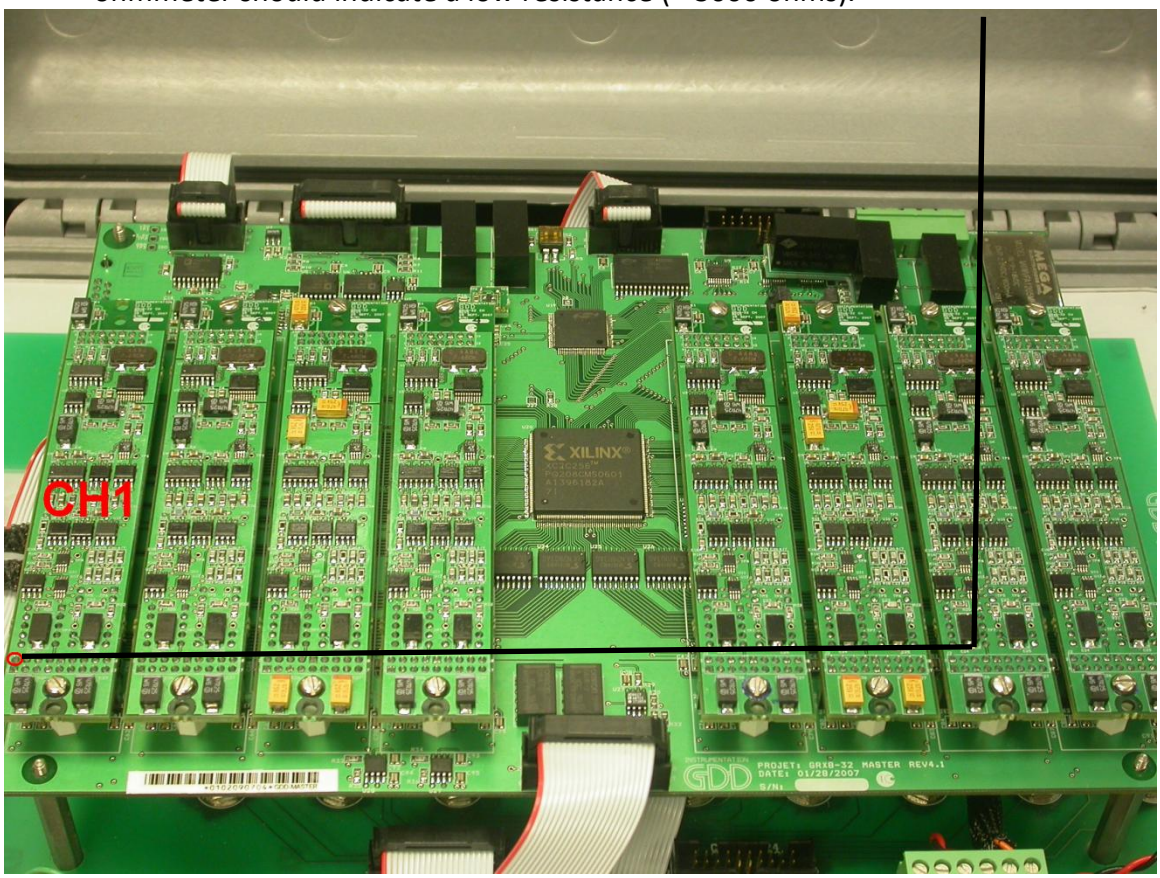
Touch the back of the ON/OFF switch to prevent electro static discharge.



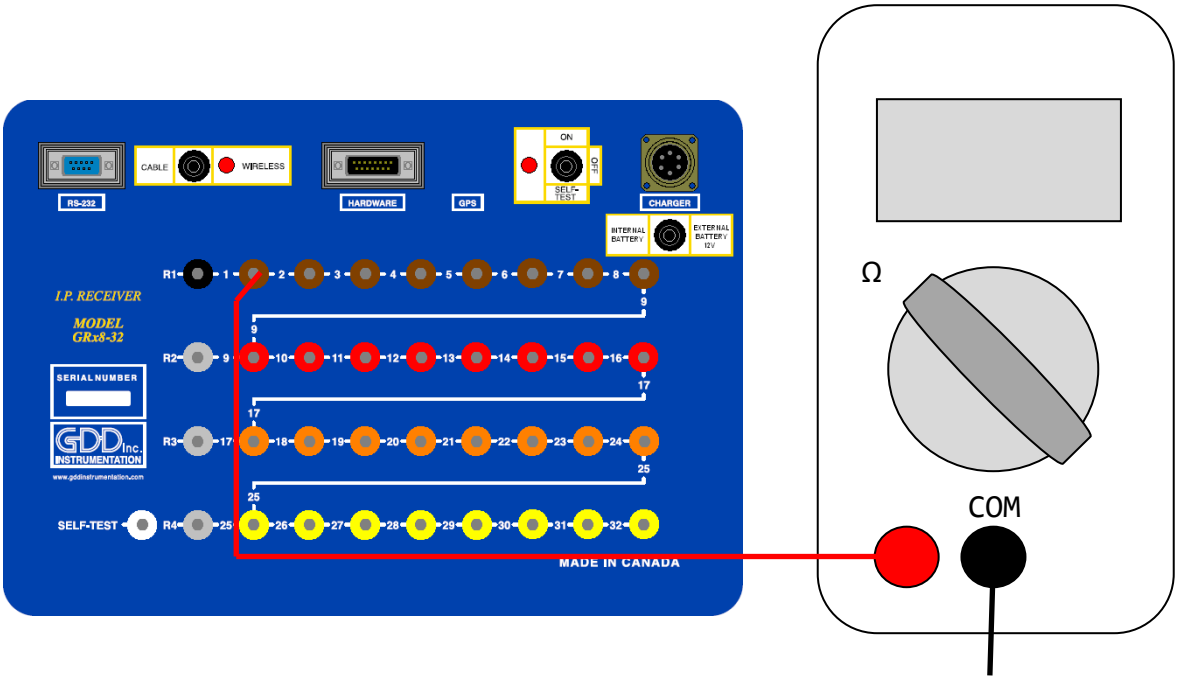
5. Connect the first electrode of the ohmmeter on the REF terminal.



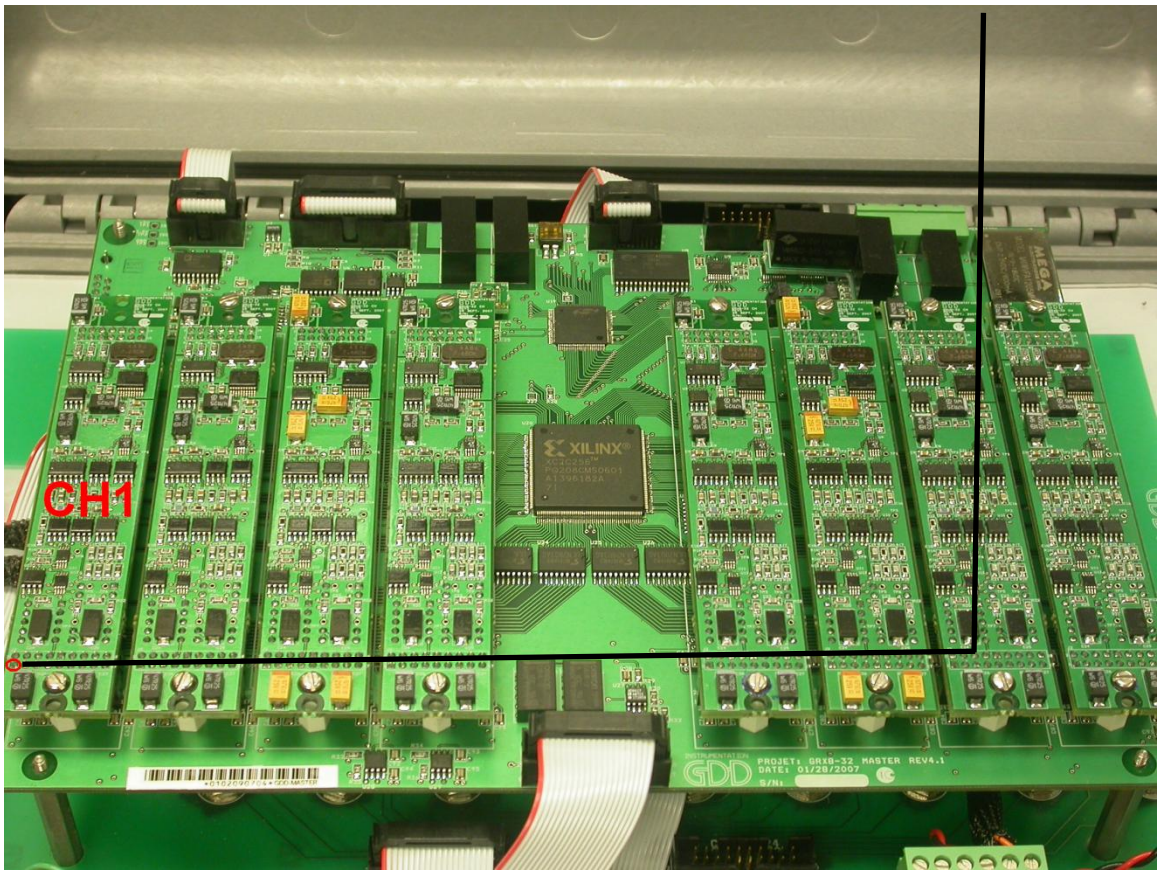
6. With the second electrode of the ohmmeter, touch the pin 2 of the channel #1. The ohmmeter should indicate a low resistance (< 3000 ohms).



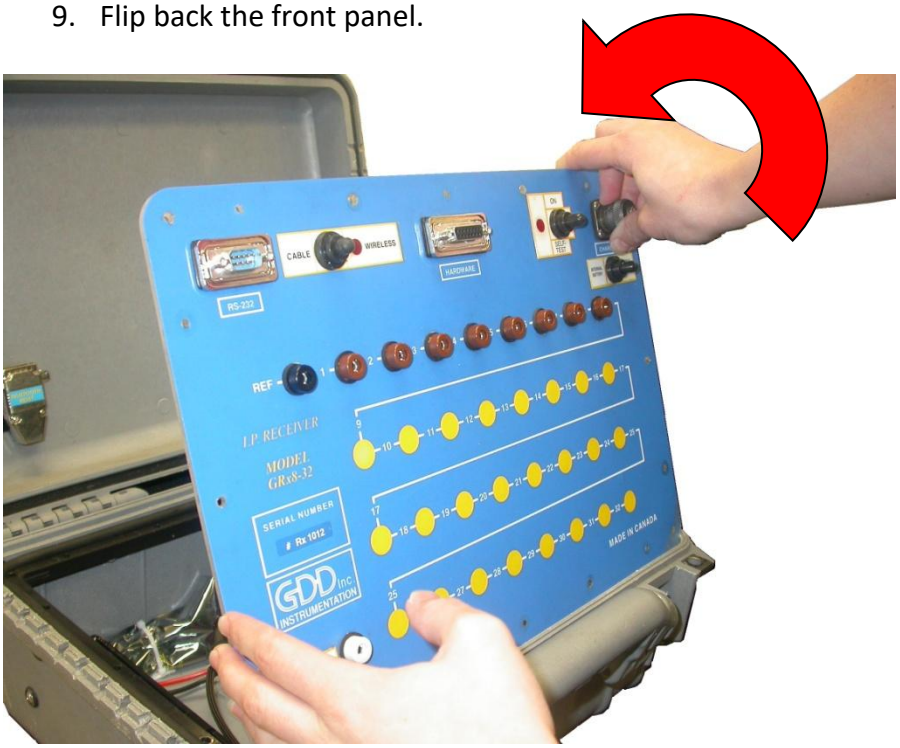
7. Connect the first electrode of the ohmmeter on the CH1 terminal.



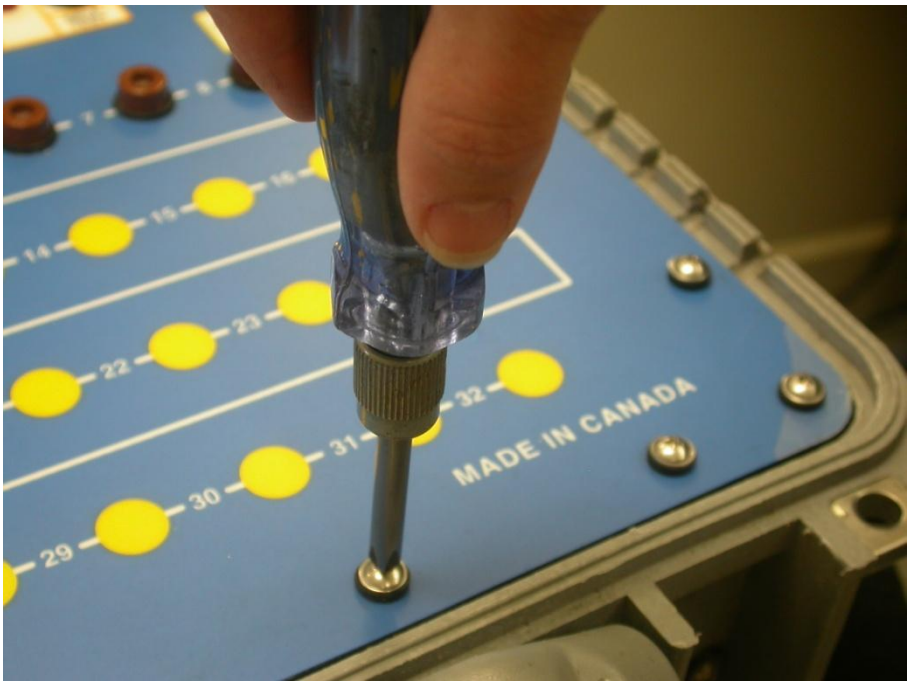
8. With the second electrode of the ohmmeter, touch the pin 1 of the channel #1. The ohmmeter should indicate a resistance of 0 ohm.



9. Flip back the front panel.



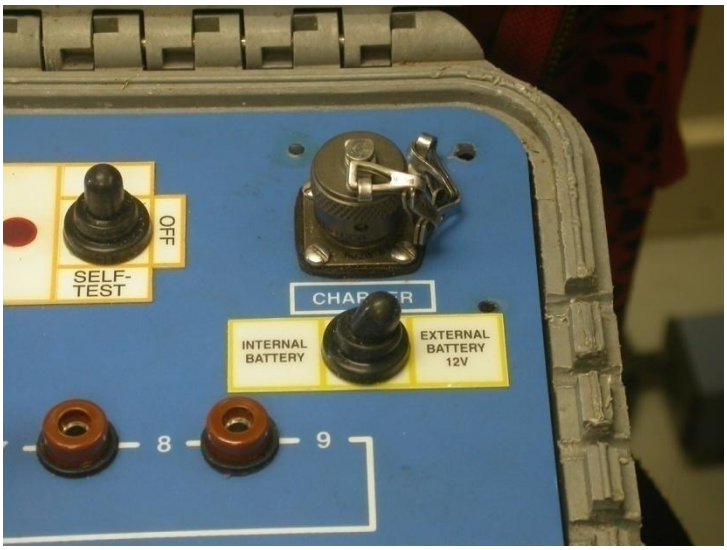
10. Put back all the front panel's screws.



12.2 *Replace a channel procedure*

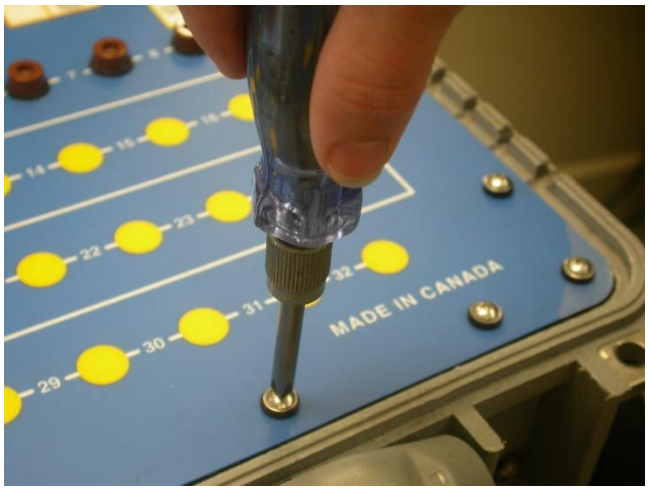
Read these instructions carefully. Failure to follow each step properly could damage the receiver.

1. Place the *Internal/External battery* switch in *External* position.

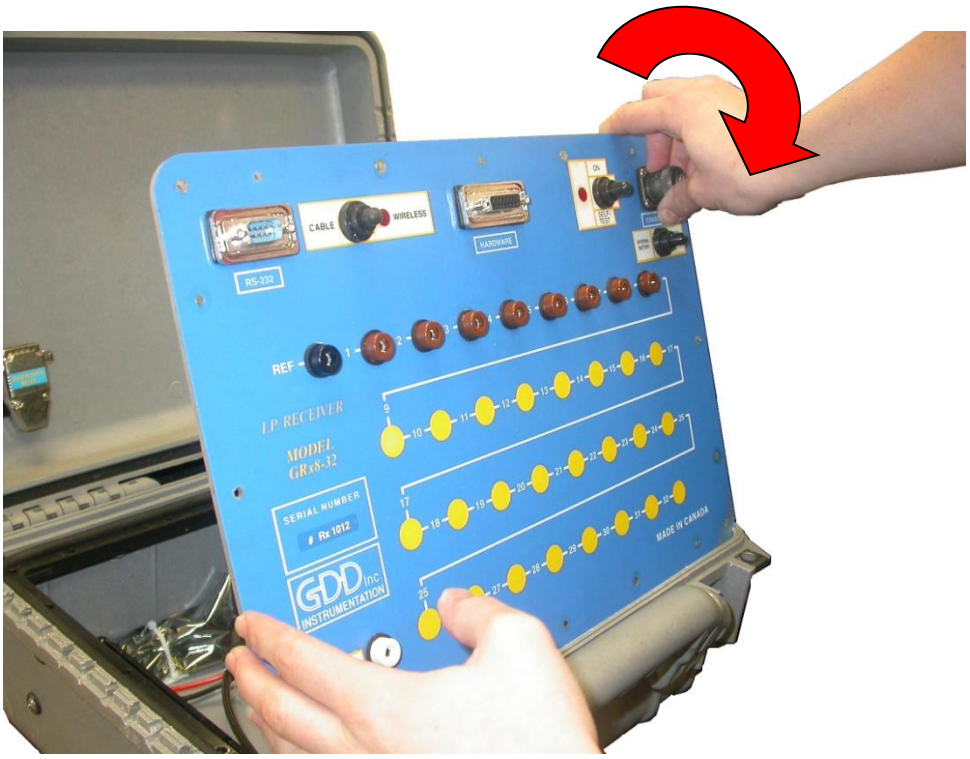


If the switch is in *Internal battery* position, internal circuits could still be powered up.

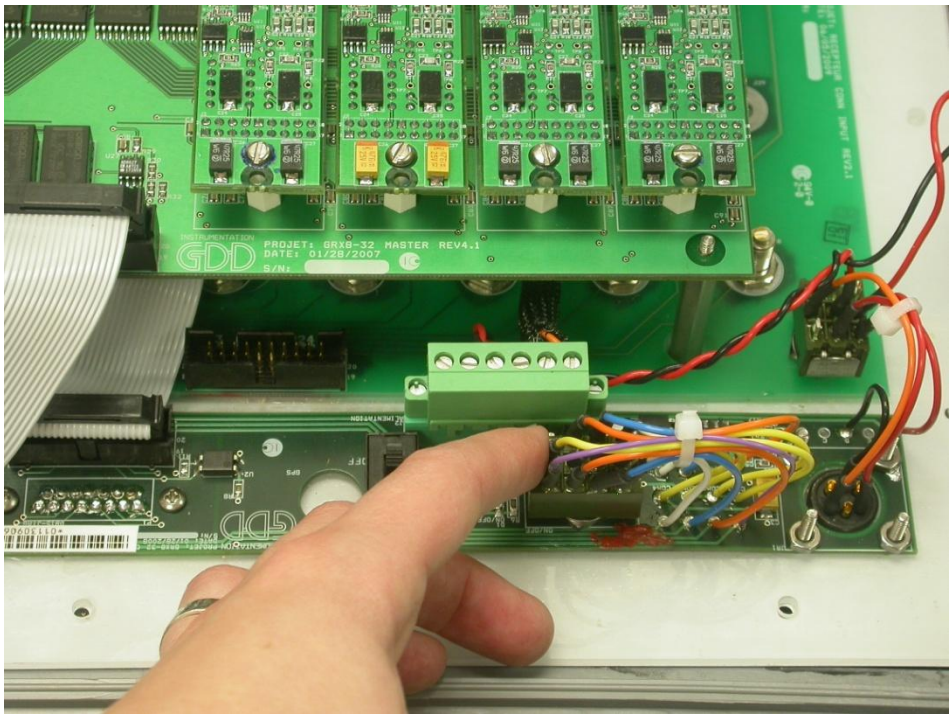
2. Remove all the screws on the GRx8-32 front panel.



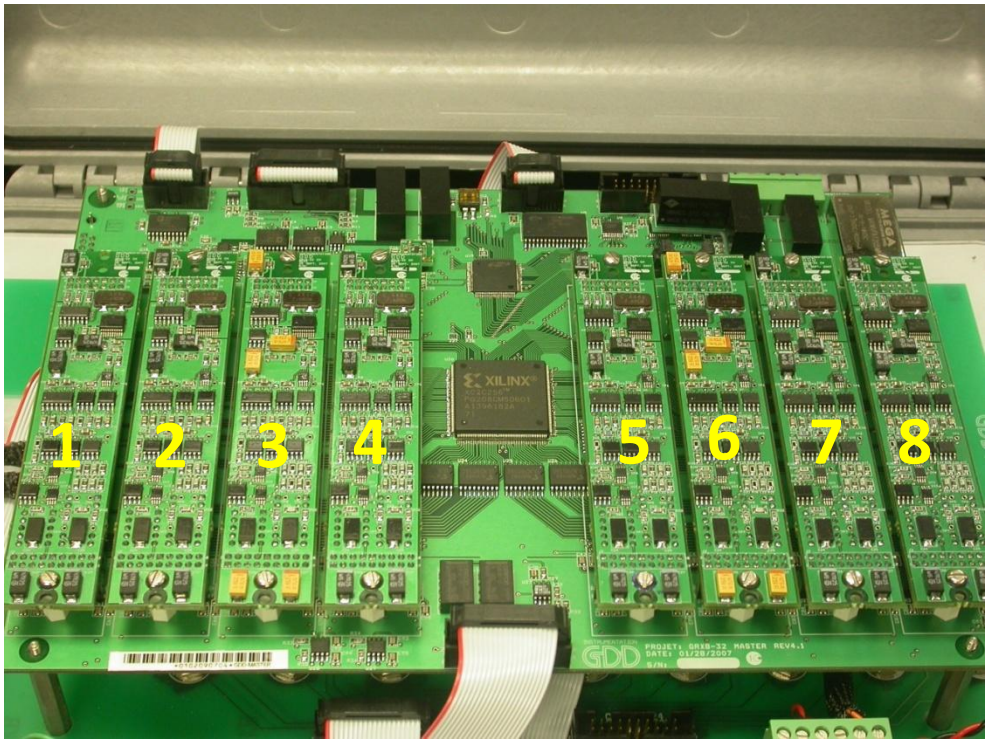
3. Flip the front panel.



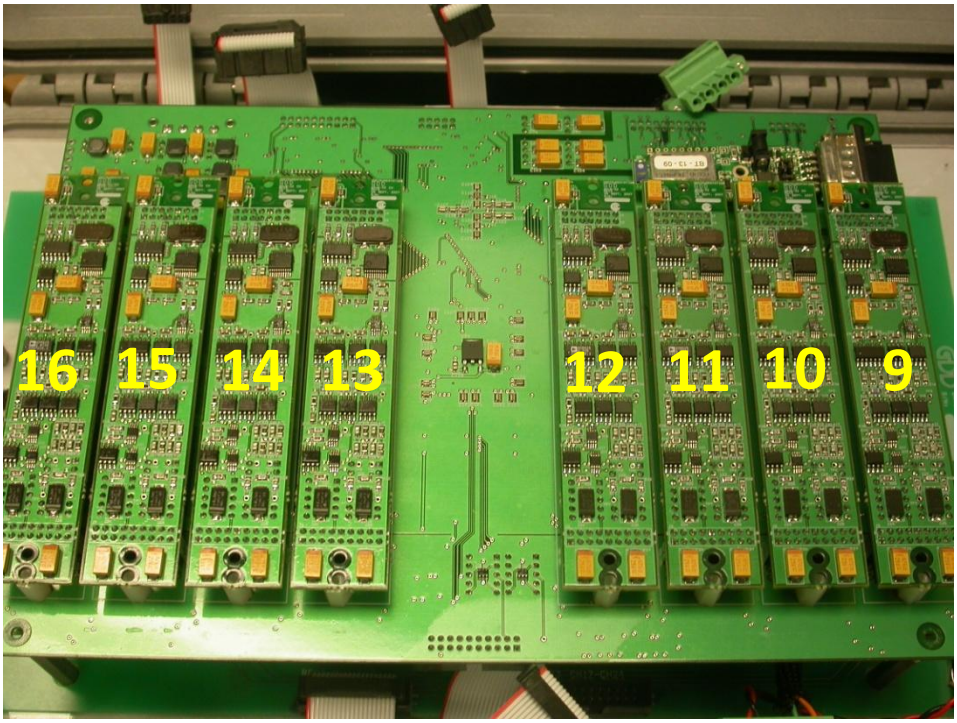
4. ***!IMPORTANT!***
   Touch the back of the ON/OFF switch to prevent electro static discharge.



5. The channel boards are placed in order from left to right. Channel 1 is on the left.

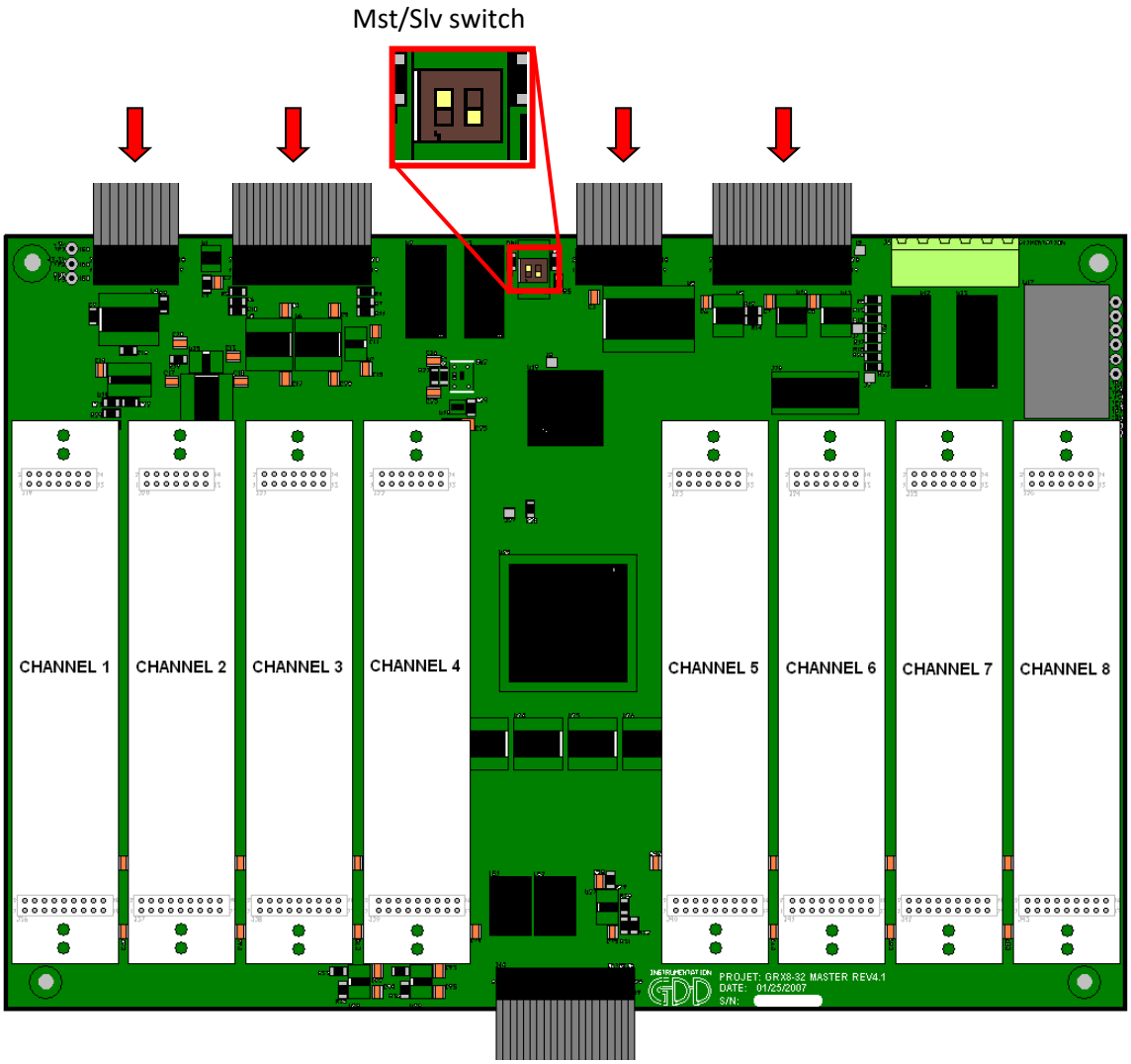


For a 16 channels receiver, there are 8 channels located on the back of the main circuit. Channel 9 is located under channel 1.

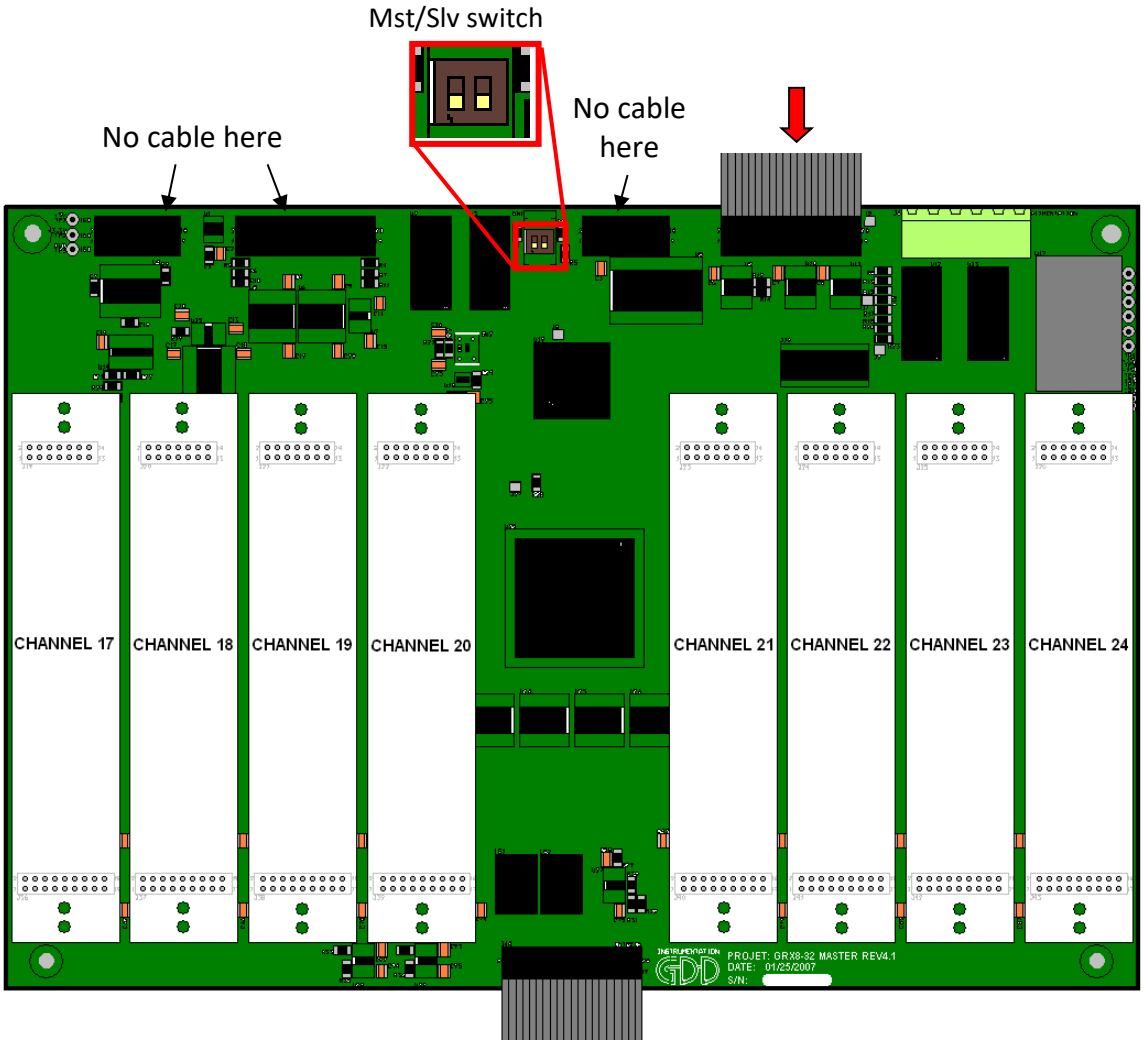


For a 32 channels receiver, there are two main circuits: the Master and the Slave. The first 16 channels are on the Master circuit and the channels 17 to 32 are on the Slave circuit. Here are some tips to recognize the Master and the Slave circuits:

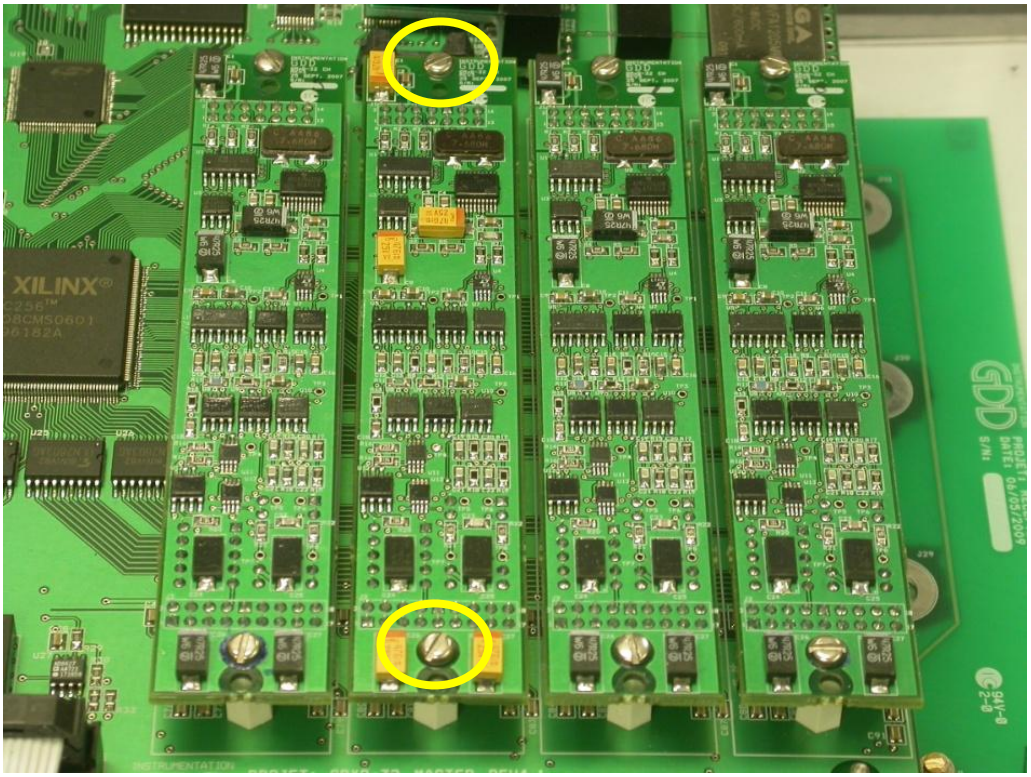
MASTER

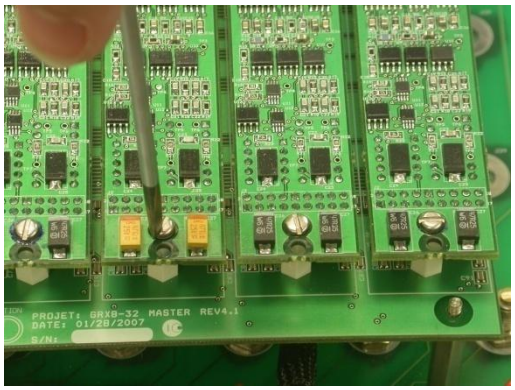


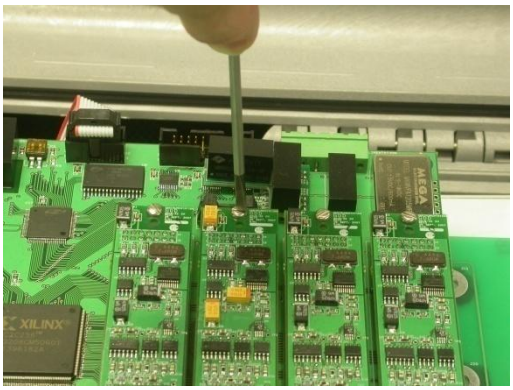
SLAVE


Mst/Slv switch
No cable here
No cable here
CHANNEL 17
CHANNEL 18
CHANNEL 19
CHANNEL 20
CHANNEL 21
CHANNEL 22
CHANNEL 23
CHANNEL 24
PROJET: GRX8-32 MASTER REV4.1
DATE: 01/25/2007
S/N:

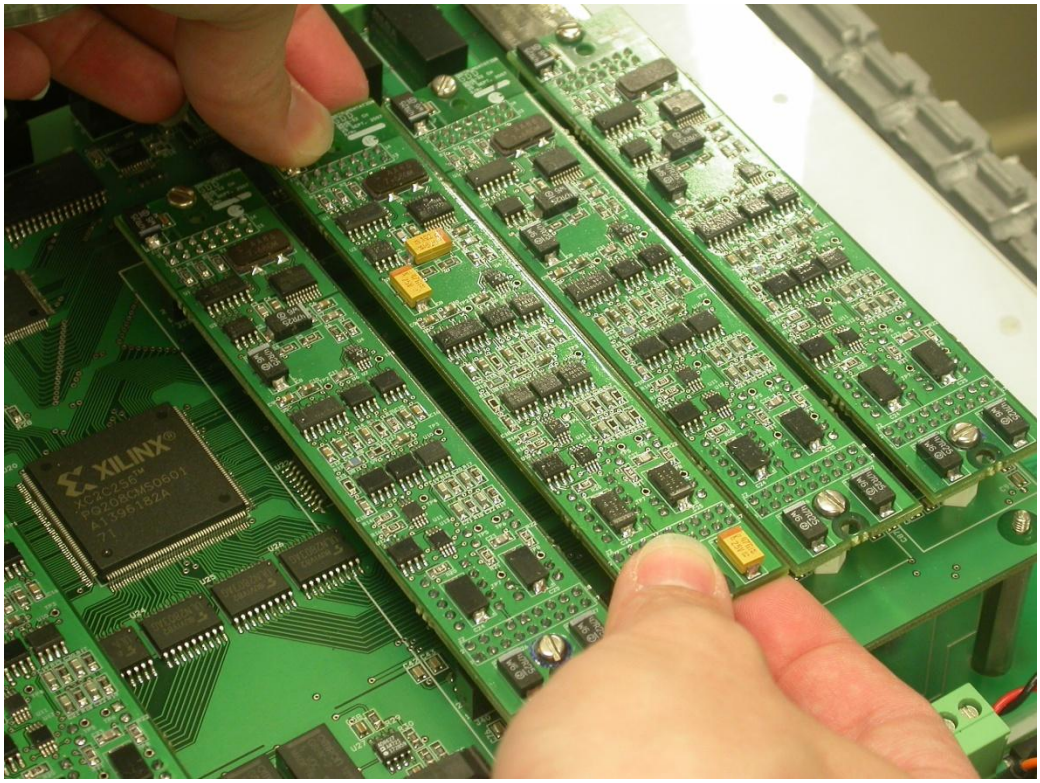
6. There are two bolts on each channel that keeps the channel board in place. Unscrew the bolts of the channel board you have to replace.



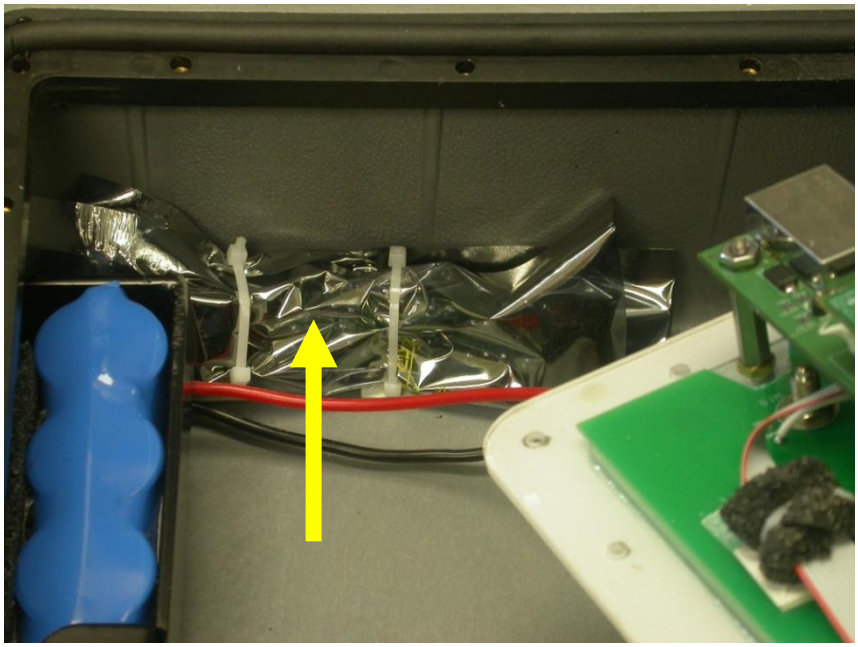




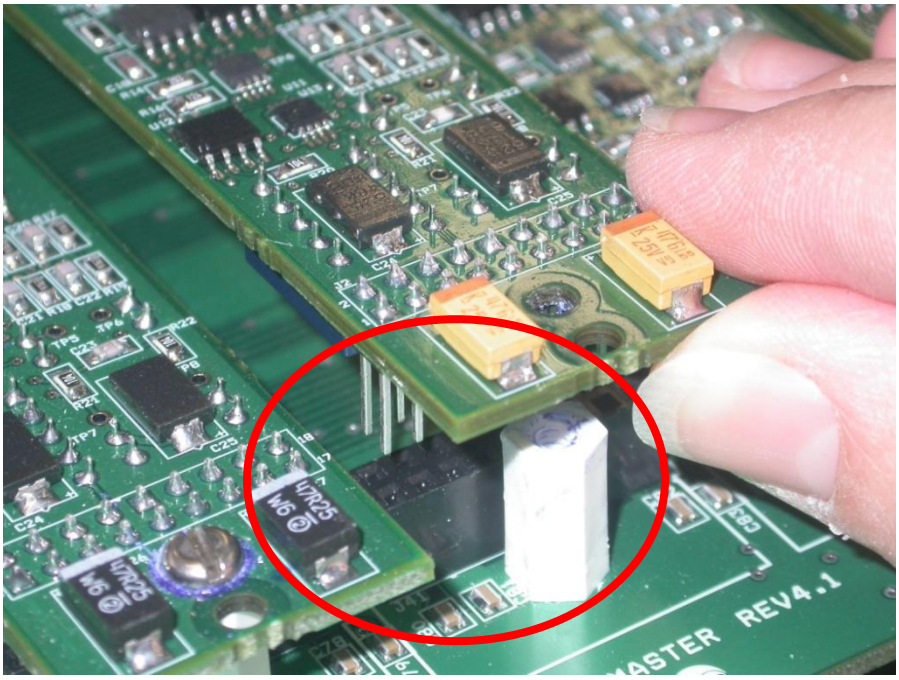
7. Remove the channel from the main circuit board.



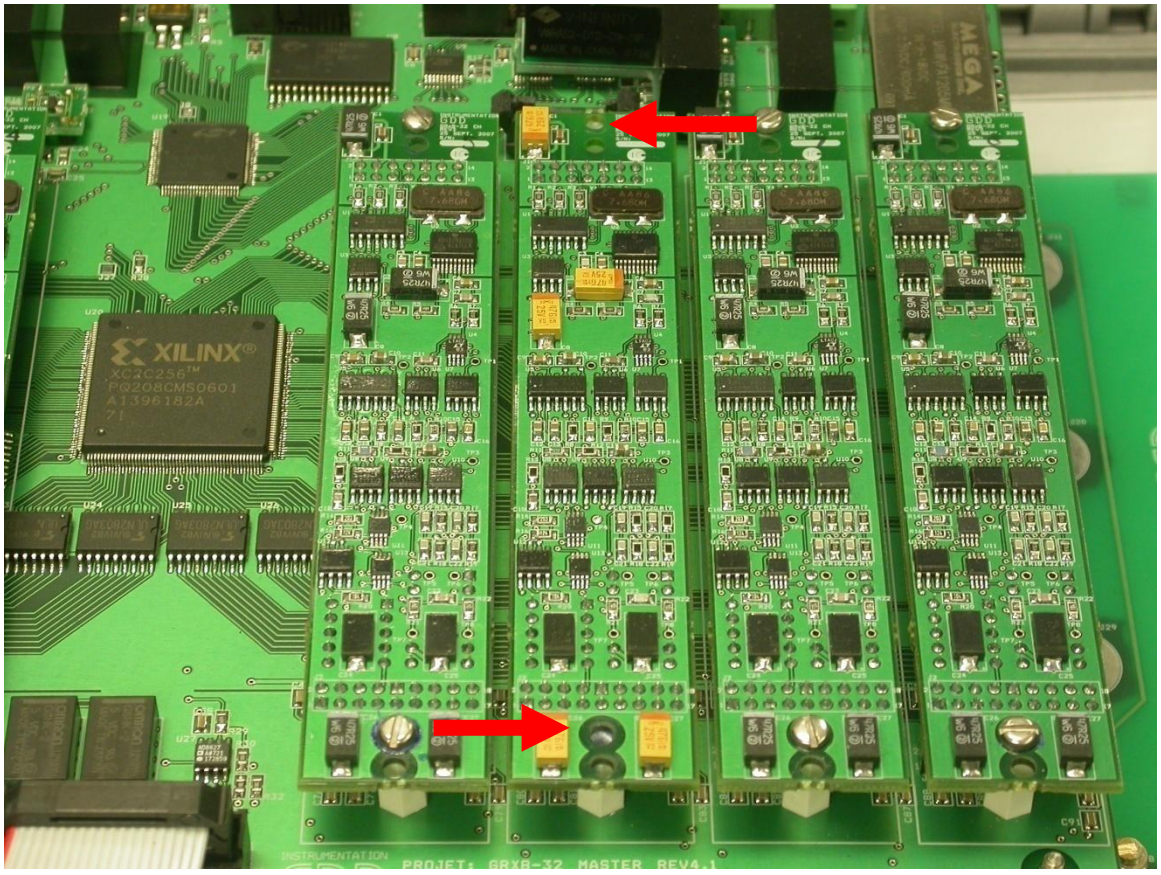
8. Remove the spare channel from the receiver box. The spare channel is in a static shielding bag.



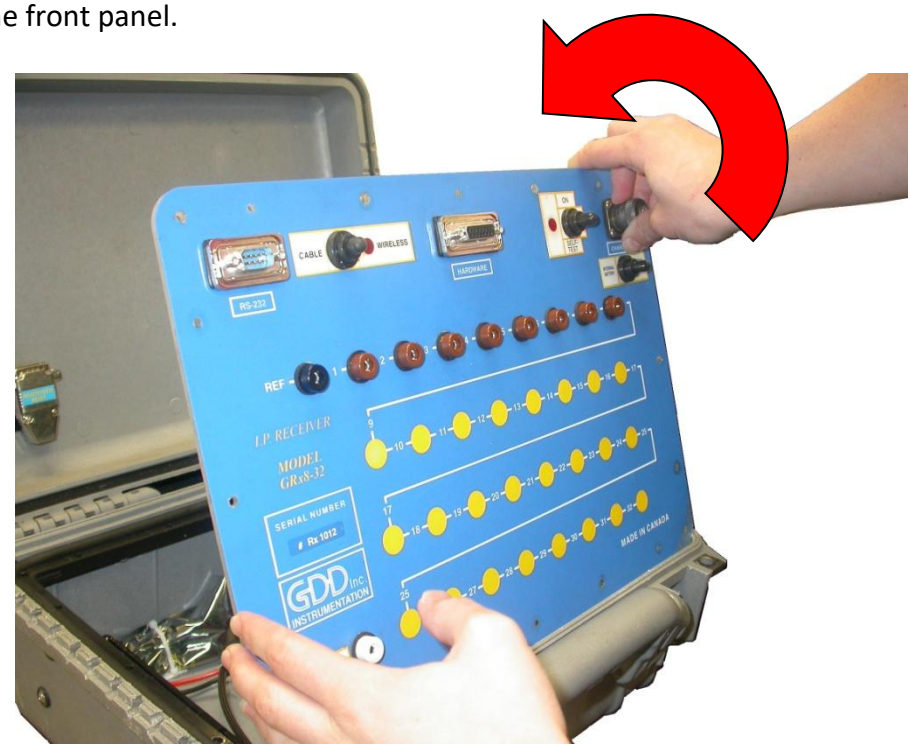
9. Install the spare channel. Make sure that the two plug connectors of the channel board are well inserted into the two header connectors.



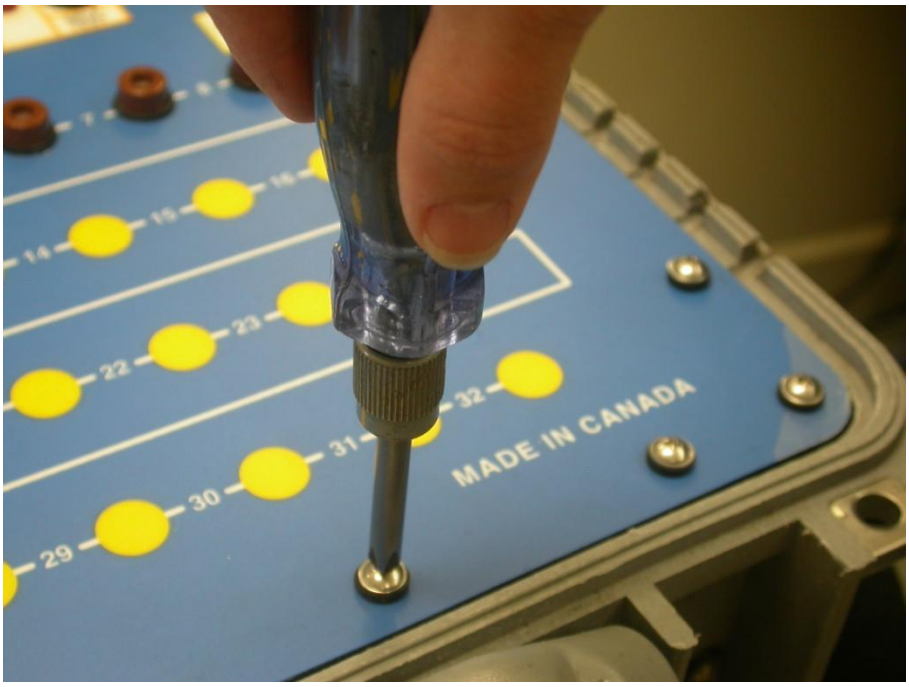
10. Screw the bolts.



11. Flip back the front panel.



12. Put back all the front panel's screws.

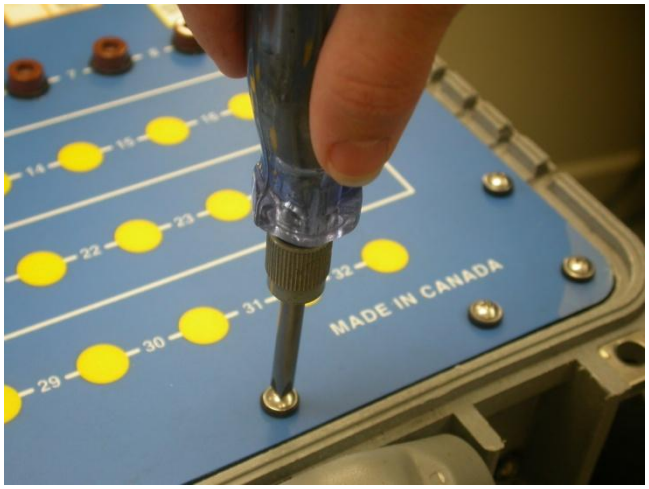


12.3 *Voltage verification procedure*

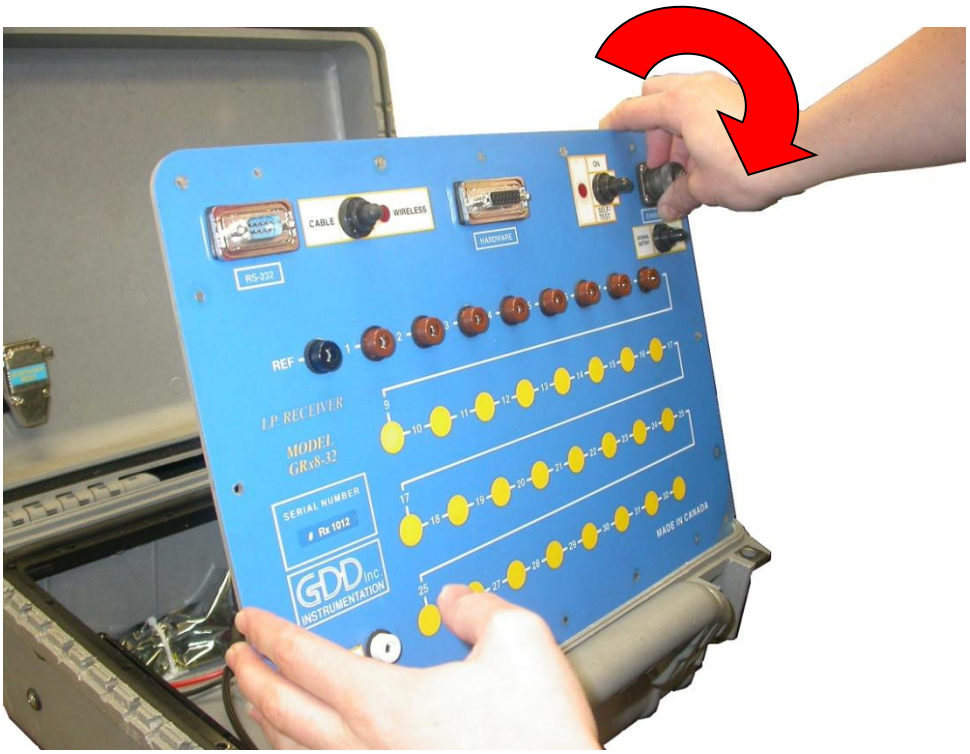
Read these instructions carefully. Failure to follow each step properly could damage the receiver.

You need to use a DC voltmeter to measure the power supplies of the receiver.

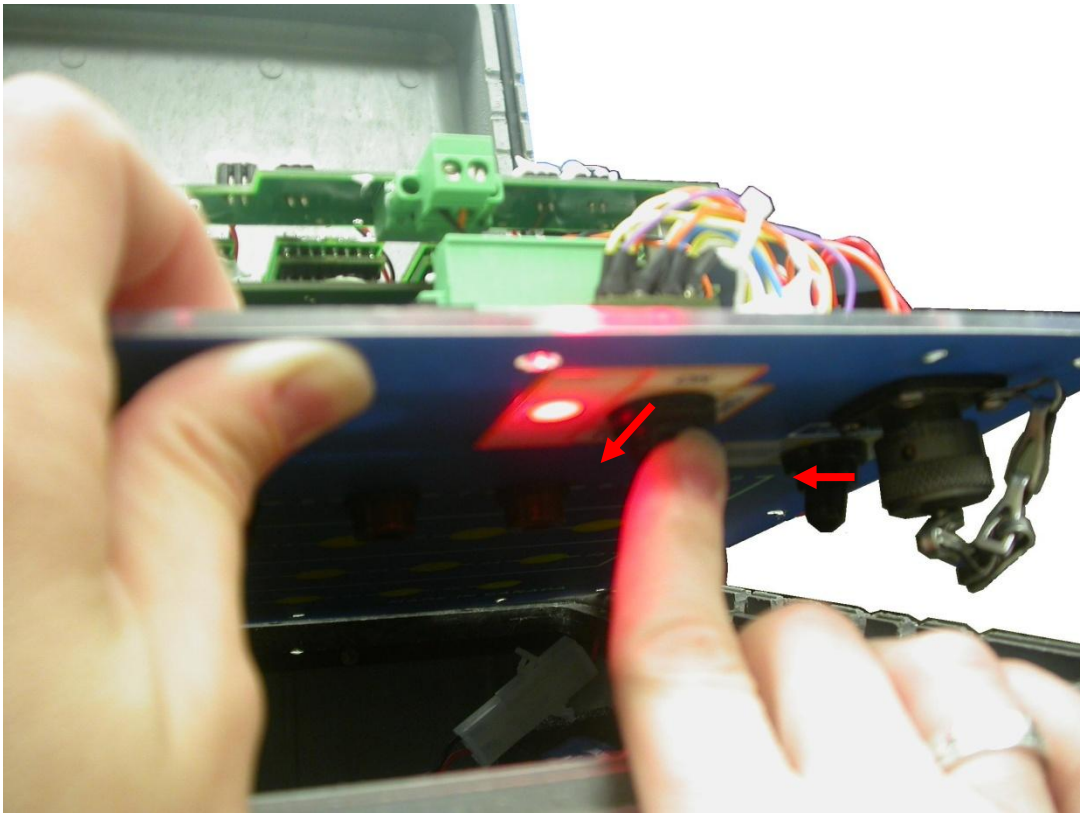
1. Remove all the screws on the GRx8-32 front panel.



2. Flip the front panel.

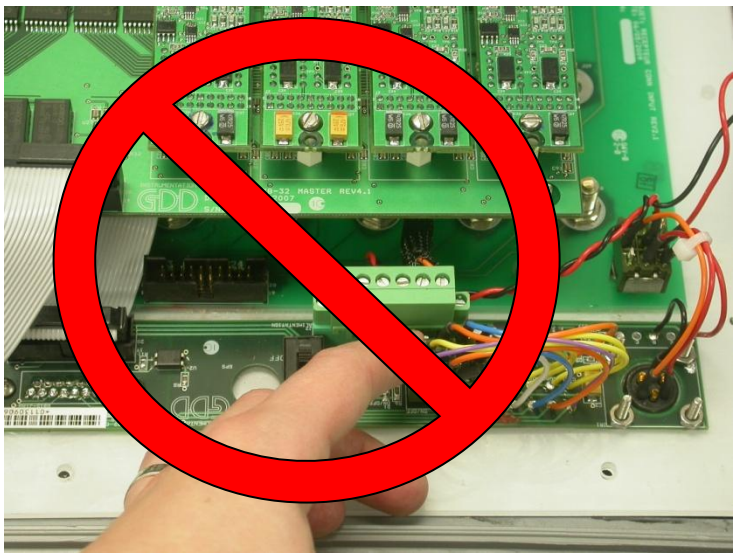


3. Place the *Internal / External battery* switch in *Internal* position and the *On / Off / Self-test* switch in *Self-test* position.



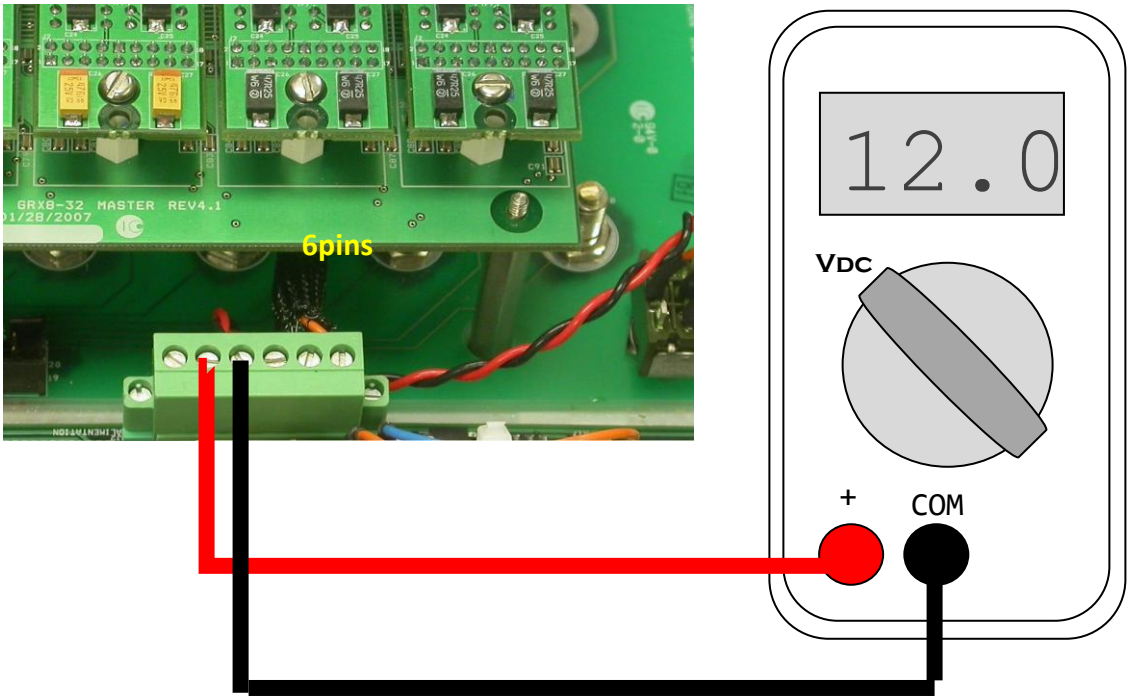
The red light should be turned on. **That means that all the internal circuits in the receiver are powered up.**

4. Do not touch anything with your fingers inside the receiver. All the circuits are powered up. You have to be careful.

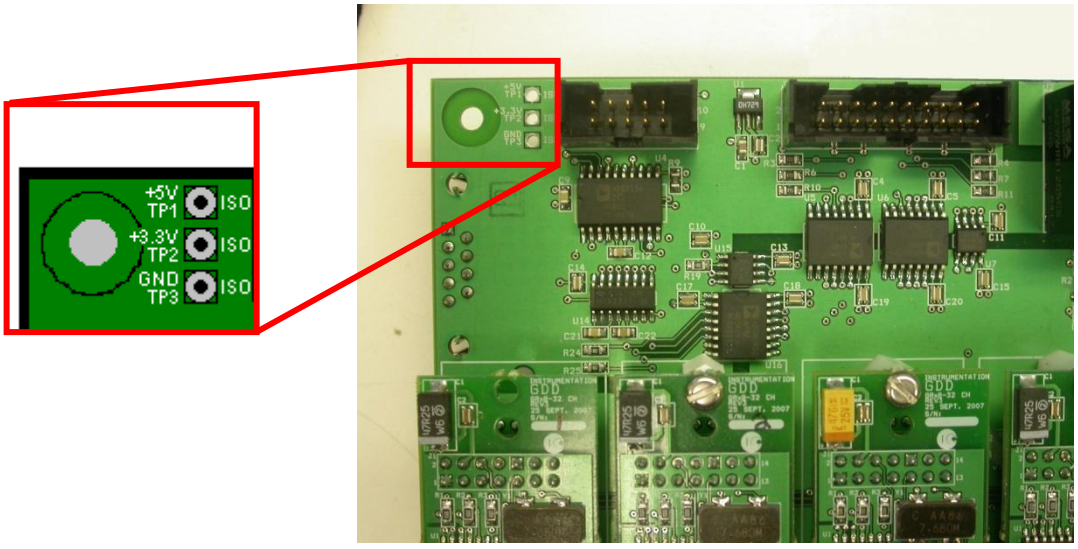


At any time during the process, make sure that there is no contact between the two probes of your voltmeter.

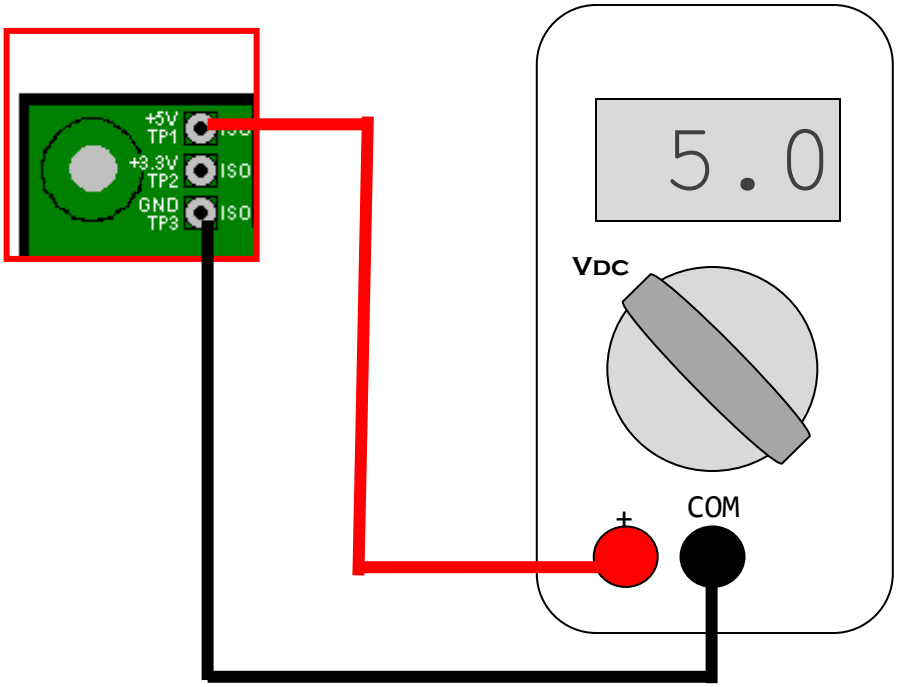
5. Check the voltage of the battery on pin 2 and 3 of the 6 pins connector. The voltage range should be from 10.8V to 13.6V.



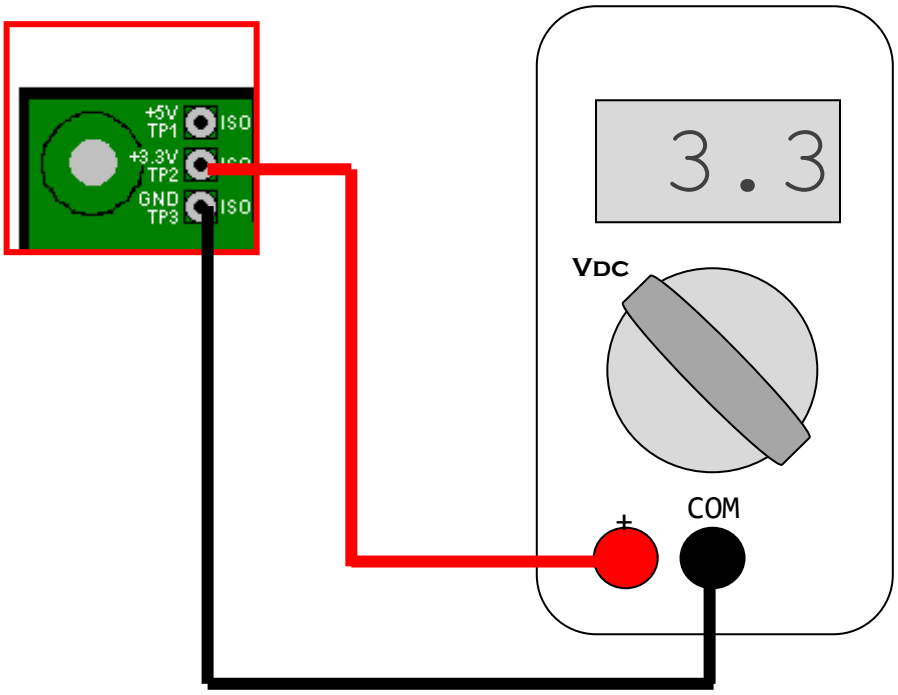
6. Measure the voltages of test points TP1 to TP3 on the main circuit. Always keep the COM probe on the GND test point (TP3) and measure each voltage one after the other (TP1, TP2) with the + probe.



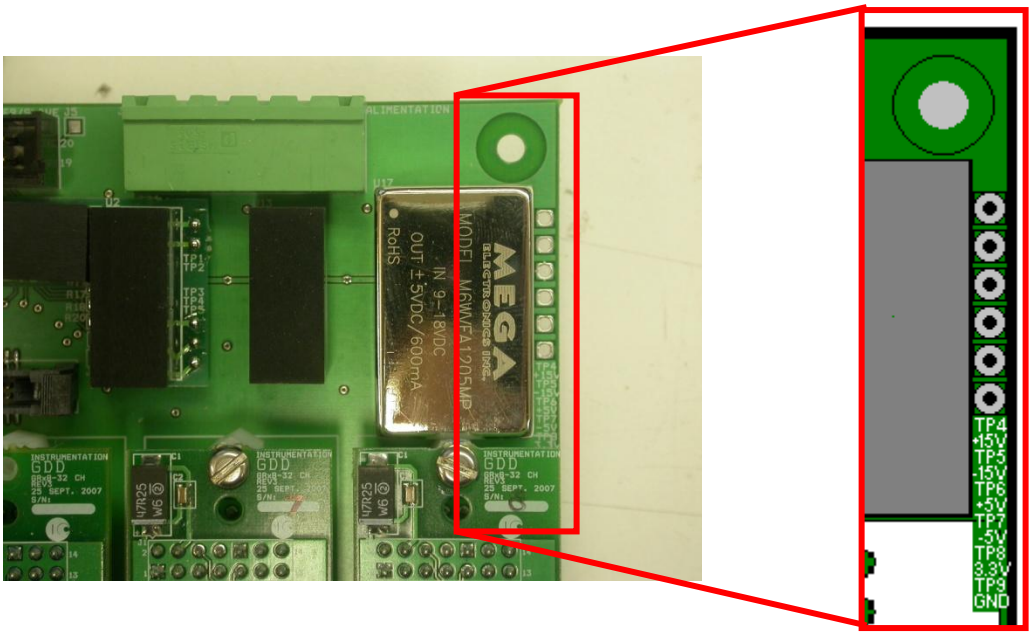
TP1


+5V
TP1
+3.3V
TP2
GND
TP3
ISO
ISO
5.0
VDC
+
COM

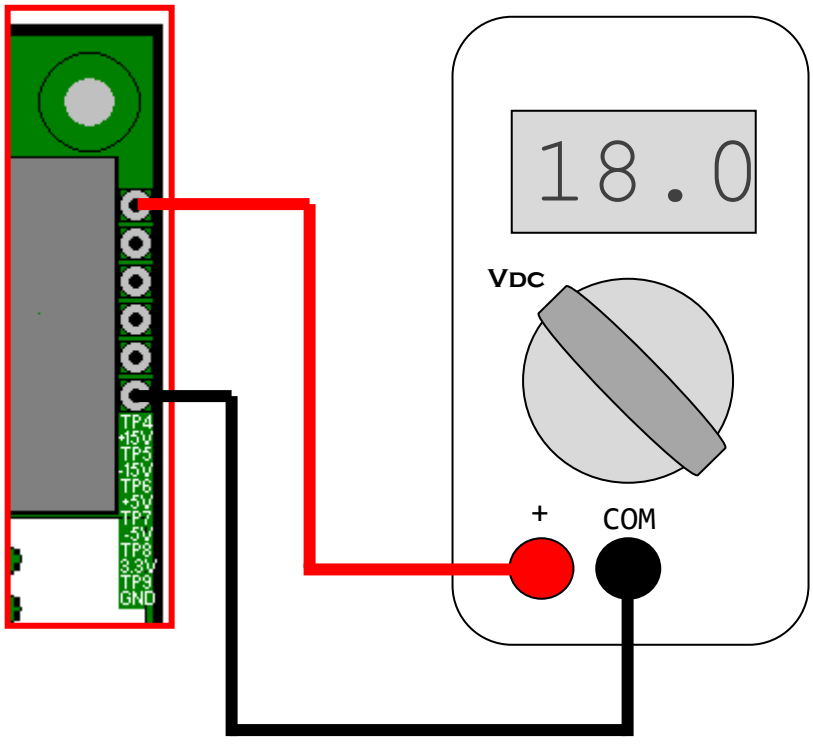
TP2


+5V
TP1
+3.3V
TP2
GND
TP3
ISO
ISO
3.3
VDC
+
COM

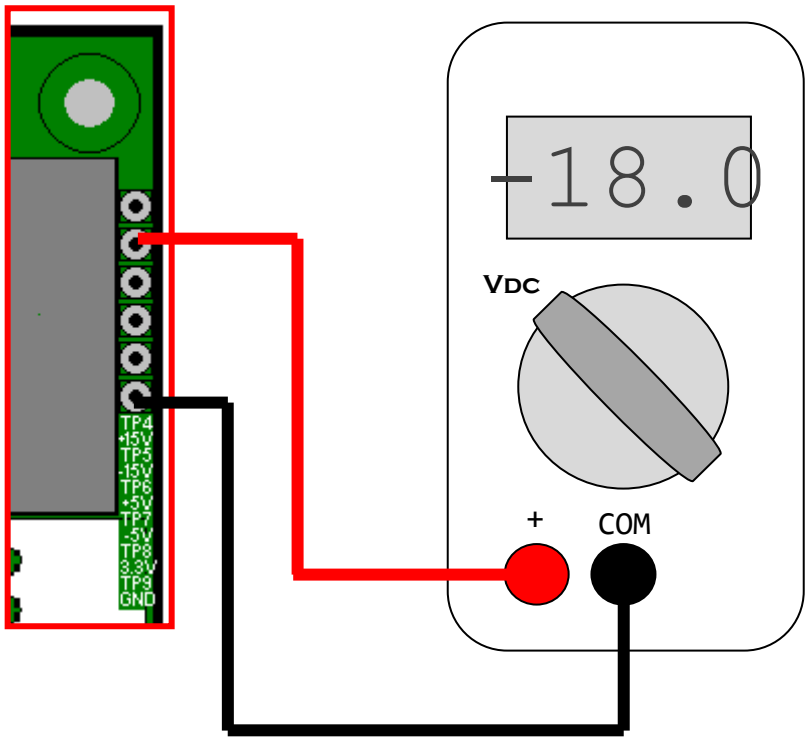
7. Measure the voltages of test points TP4 to TP9 on the main circuit. Always keep the COM probe on the GND test point (TP9) and measure each voltage one after the other (TP4 to TP8) with the + probe.



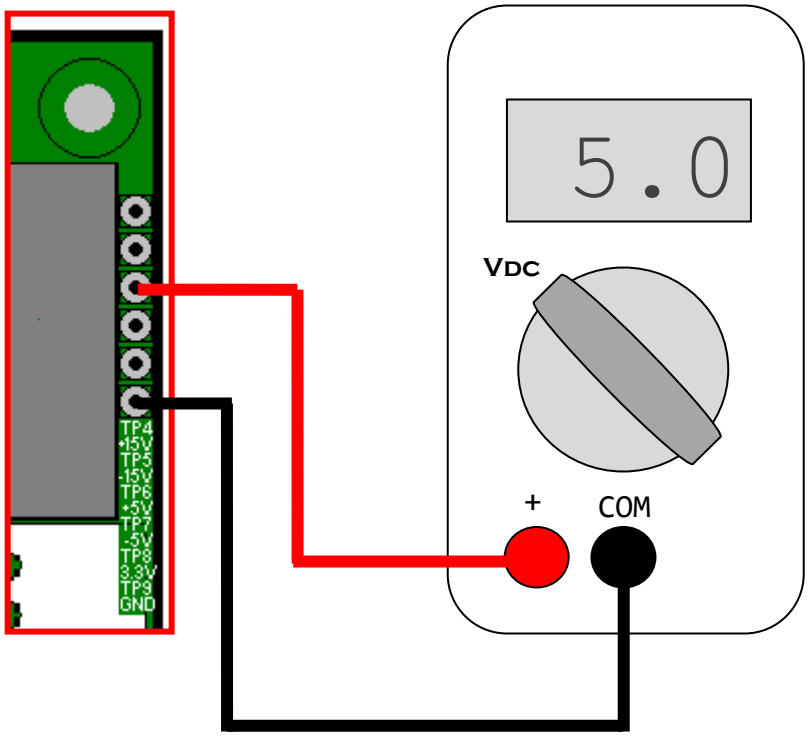
TP4



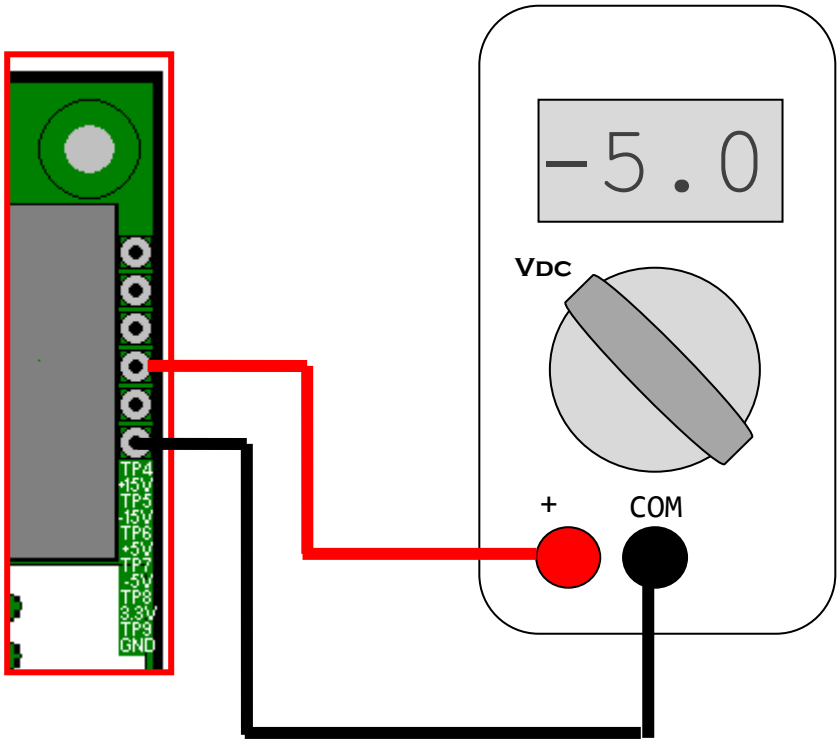
TP5


TP4
+15V
TP5
-15V
TP6
+5V
TP7
-5V
TP8
3.3V
TP9
GND
-18.0
VDC
+
COM

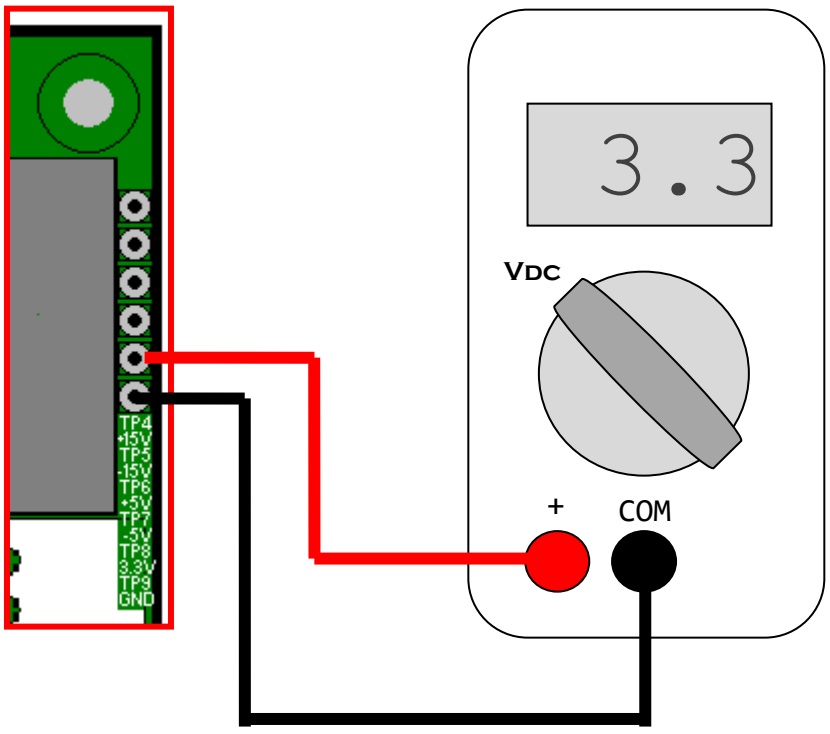
TP6


TP4
+15V
TP5
-15V
TP6
+5V
TP7
-5V
TP8
3.3V
TP9
GND
5.0
VDC
+
COM

TP7

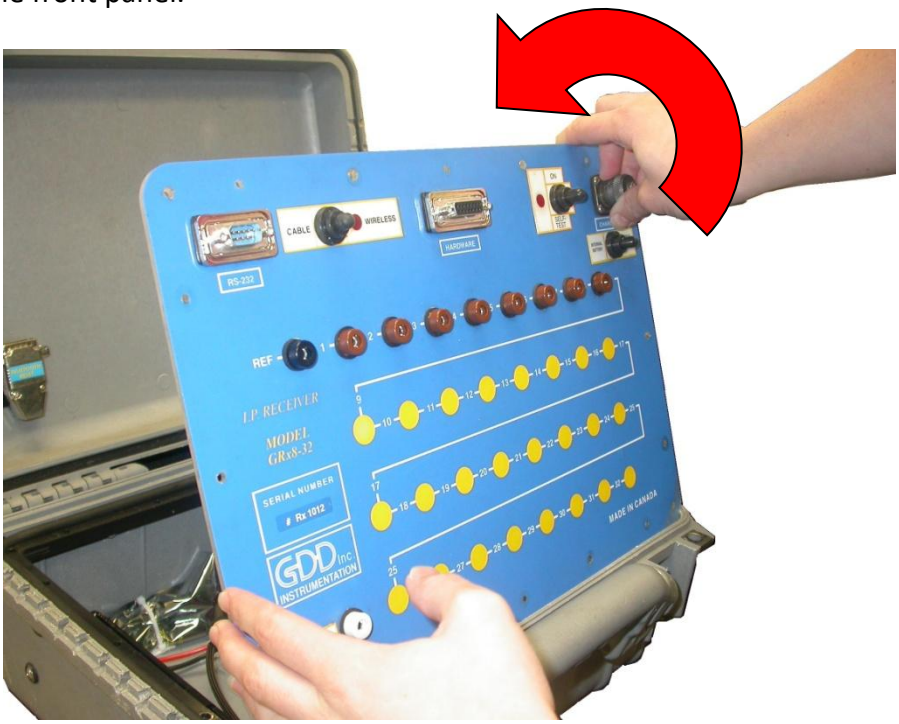

-5.0
VDC
+
COM
TP4
+15V
TP5
-15V
TP6
+5V
TP7
-5V
TP8
3.3V
TP9
GND

TP8

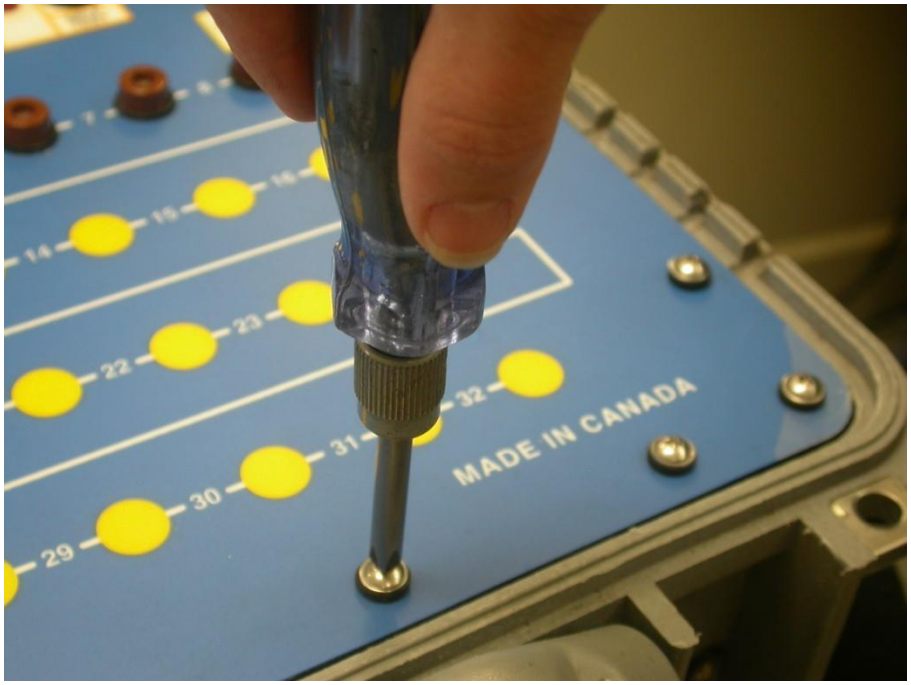

3.3
VDC
+
COM
TP4
+15V
TP5
-15V
TP6
+5V
TP7
-5V
TP8
3.3V
TP9
GND

8. Turn off the *On / Off / Self-test* switch and place the *Internal / External battery* switch in *External position*.

9. Flip back the front panel.



10. Put back all the front panel's screws.



13. *Specifications*

13.1 *General specifications*

	GRx8-32	GRx8*mini*	GRx2
Number of channels	8, 10, 16, 24 or 32	8	2
Size (receiver only)	41 x 33 x 17 cm (16 x 13 x 7 in)	27 x 24.6 x 12.4 cm (10.62 x 9.68 x 4.87 in)	24 x 18 x 11 cm (9 x 7x 4 in)
Weight (receiver only)	7 kg (15 lbs)	3.1 kg (7 lbs)	1.6 kg (3.5 lbs)
Enclosure	Heavy-duty pelican case, environmentally sealed	Heavy-duty pelican case, environmentally sealed	Heavy-duty pelican case, environmentally sealed
Communication options	RS-232 (serial) and Bluetooth (wireless) to communicate with the Android device	RS-232 (serial) and Bluetooth (wireless) to communicate with the Android device	RS-232 (serial) and Bluetooth (wireless) to communicate with the Android device
Power supply	- 14.4V 13.6Ah rechargeable Lithium-Ion internal battery - 14.4V 13.6Ah rechargeable Lithium-Ion external battery pack (optional)	- 14.4V 6Ah rechargeable Lithium-Ion internal battery - 14.4V 6Ah rechargeable Lithium-Ion external battery pack (optional)	- 10.8V 3.4Ah rechargeable Lithium-Ion internal battery
Temperature range	-40 to +60°C (-49 to +140°F)	-40 to +60°C (-49 to +140°F)	-40 to +60°C (-49 to +140°F)
Humidity range	Waterproof	Waterproof	Waterproof

13.2 *Technical specifications*

	GRx8-32	GRx8*mini*	GRx2
Survey capabilities	Resistivity and Time domain IP	Resistivity and Time domain IP	Resistivity and Time domain IP
Twenty chargeability windows	Arithmetic, logarithmic, semi-logarithmic, Cole-Cole and user defined	Arithmetic, logarithmic, semi-logarithmic, Cole-Cole and user defined	Arithmetic, logarithmic, semi-logarithmic, Cole-Cole and user defined
Synchronization	- Automatic re-synchronization - Process on primary voltage - Signal - GPS time synchronization	- Automatic re-synchronization - Process on primary voltage - Signal - GPS time synchronization	- Automatic re-synchronization - Process on primary voltage - Signal - GPS time synchronization
Noise reduction	Automatic stacking number	Automatic stacking number	Automatic stacking number
Computation	Apparent resistivity, chargeability, standard deviation, and % of symmetrical Vp	Apparent resistivity, chargeability, standard deviation, and % of symmetrical Vp	Apparent resistivity, chargeability, standard deviation, and % of symmetrical Vp
Ground Resistance	Up to 1.5 MΩ	Up to 1.5 MΩ	Up to 1.5 MΩ
Signal waveform	Time domain (ON+, OFF, ON-, OFF)	Time domain (ON+, OFF, ON-, OFF)	Time domain (ON+, OFF, ON-, OFF)
Time base	0.5, 1, 2, 4, 8 and 16 seconds	0.5, 1, 2, 4, 8 and 16 seconds	0.5, 1, 2, 4, 8 and 16 seconds
Input impedance	5 GΩ at 0.125 Hz and 130 MΩ at 7 Hz	5 GΩ at 0.125 Hz and 130 MΩ at 7 Hz	5 GΩ at 0.125 Hz and 130 MΩ at 7 Hz
Primary voltage range	±10 µV to ±15 V for any channel	±10 µV to ±15 V for any channel	±10 µV to ±15 V for any channel
Input Common-Mode Voltage range with respect to reference in dipole-dipole configuration	±15 V	±15 V	±15 V
Protection	500V (on each channel)	500V (on each channel)	500V (on each channel)
Input	True differential for common-mode rejection in dipole configuration	True differential for common-mode rejection in dipole configuration	True differential for common-mode rejection in dipole configuration

Voltage measurement (Vp)	Resolution 1 µV Accuracy ≤ 0,15%	Resolution 1 µV Accuracy ≤ 0,15%	Resolution 1 µV Accuracy ≤ 0,15%
Chargeability measurement (M)	Resolution 1µV/V Accuracy ≤ 0,4%	Resolution 1µV/V Accuracy ≤ 0,4%	Resolution 1µV/V Accuracy ≤ 0,4%
SP offset adjustment	± 5 V, Automatic compensation through linear drift correction per steps of 150µV, with resolution of 1µV	± 5 V, Automatic compensation through linear drift correction per steps of 150µV, with resolution of 1µV	± 5 V, automatic compensation through linear drift correction per steps of 150µV, with resolution of 1µV
Filter	Eight-pole Bessel low-pass 15 Hz, notch filter 50 Hz and 60 Hz	Eight-pole Bessel low-pass 15 Hz, notch filter 50 Hz and 60 Hz	Eight-pole Bessel low-pass 15 Hz, notch filter 50 Hz and 60 Hz

GRx8-32: Reads up to 32 ch. simultaneously in poles or dipoles.

GRx8*mini*: Reads up to 8 ch. simultaneously in poles or dipoles.

GRx2: Reads up to 2 ch. simultaneously in poles or dipoles.

GRx8-32: 32 channels configuration allows 3D survey:

- 4 lines X 8 channels
- 2 lines X 16 channels
- 1 line X 32 channels

GRx8*mini*: 8 channels configuration allows 3D survey:

- 2 lines X 4 channels
- 1 line X 8 channels

Android application software / simple to use.

Real-time data and automatic data stacking

Screen graphics: decay curves, apparent resistivity, chargeability, Vp.

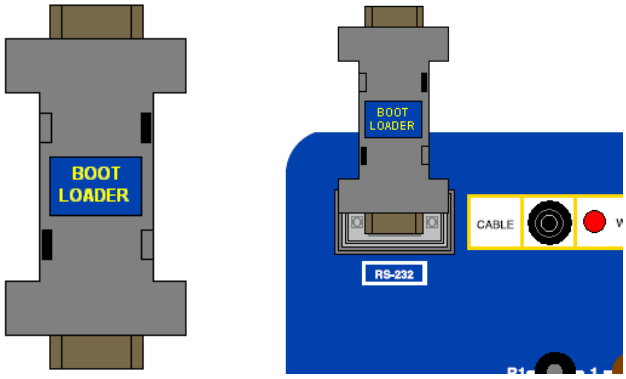
20 programmable chargeability windows

One 24 bit A/D converter per channel

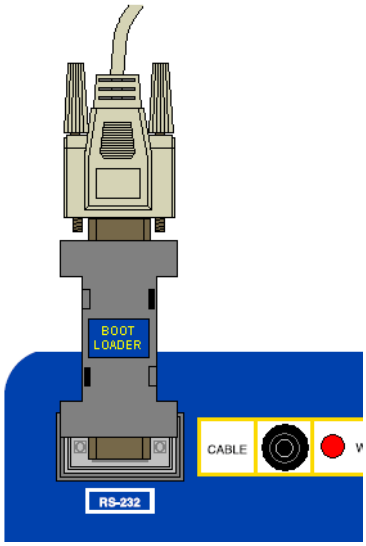
Internal test generator (Self-test mode)

14. *Firmware update*

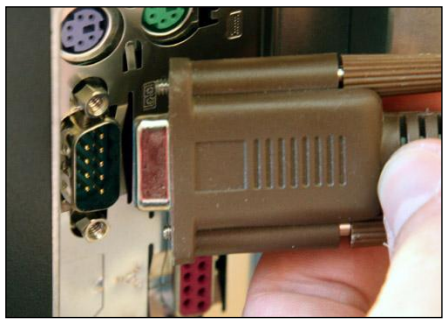
1. Insert the *Bootloader* key into the *RS-232* connector.



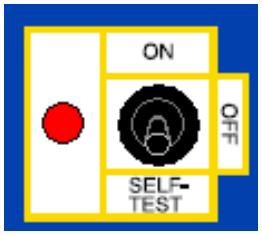
2. Connect one end of the serial communication cable to the *Bootloader* key.



3. Connect the other end of the serial communication cable to the *COM1* or *COM2* port on your desktop computer.

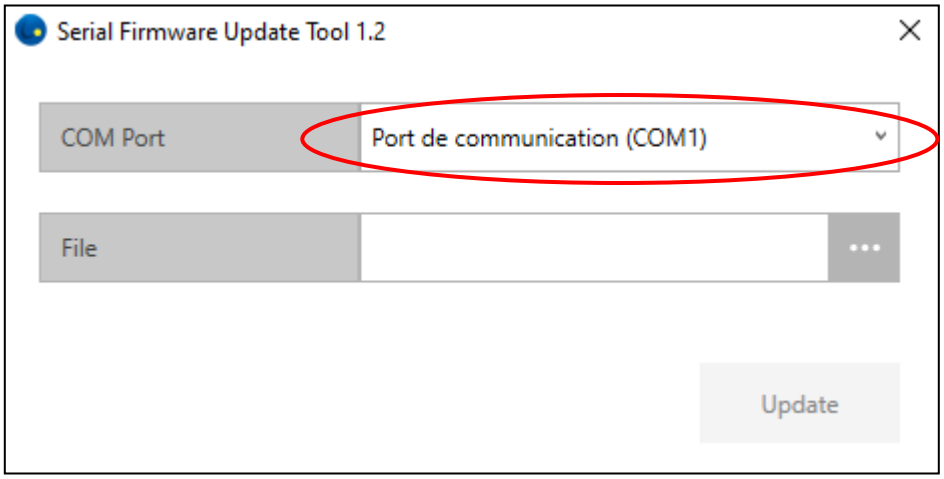


4. Place the Cable-Wireless switch in Cable position and the On-Off-Self Test switch in Self-Test position.

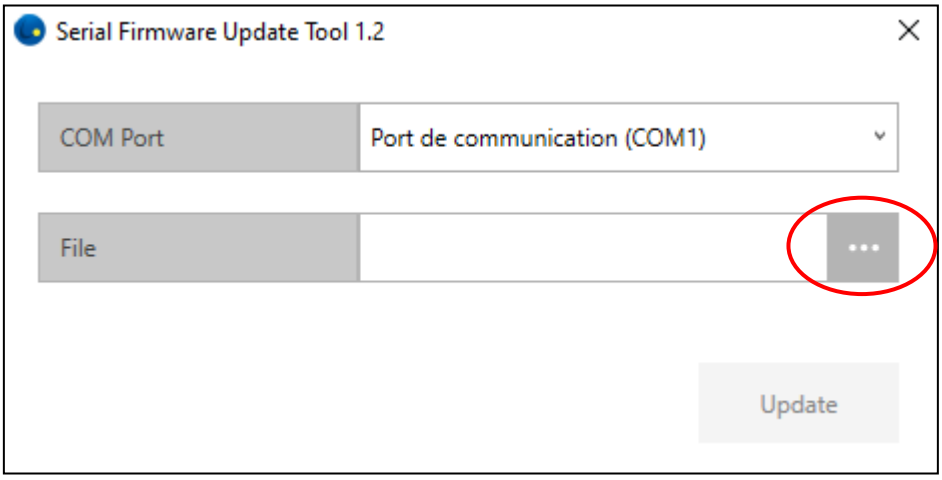


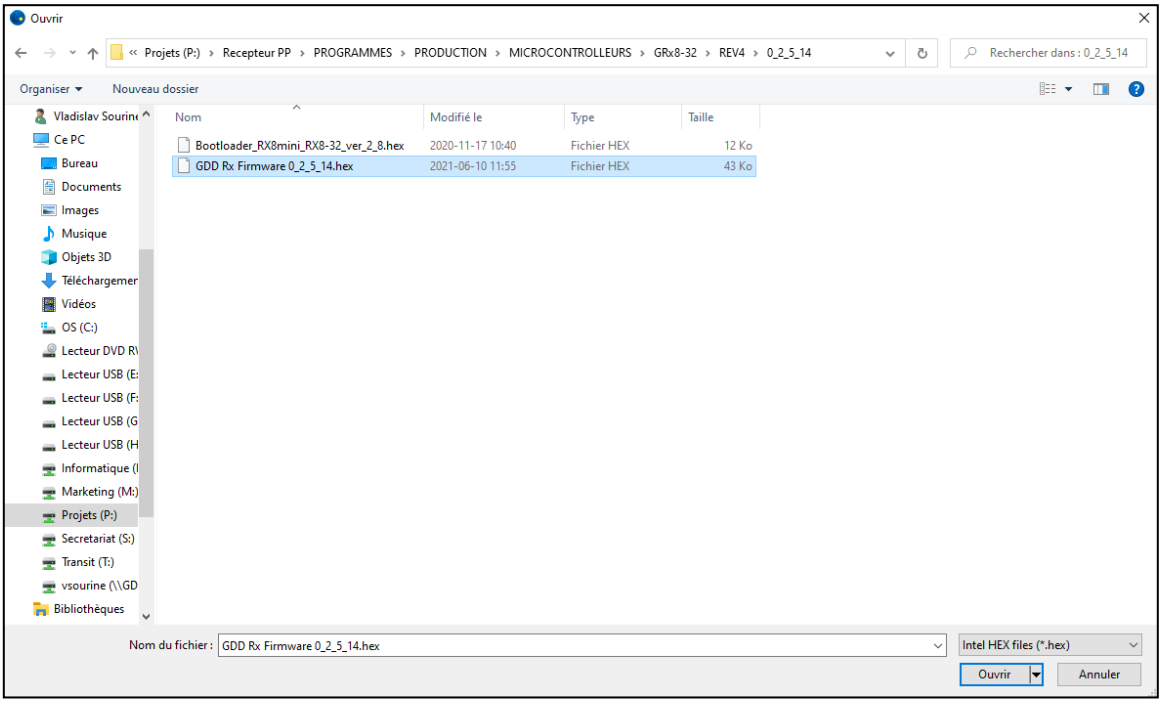
5. Copy the *FWUpdate.exe (Serial Firmware Update Tool)* program on your computer and open it.

6. Select the serial port.

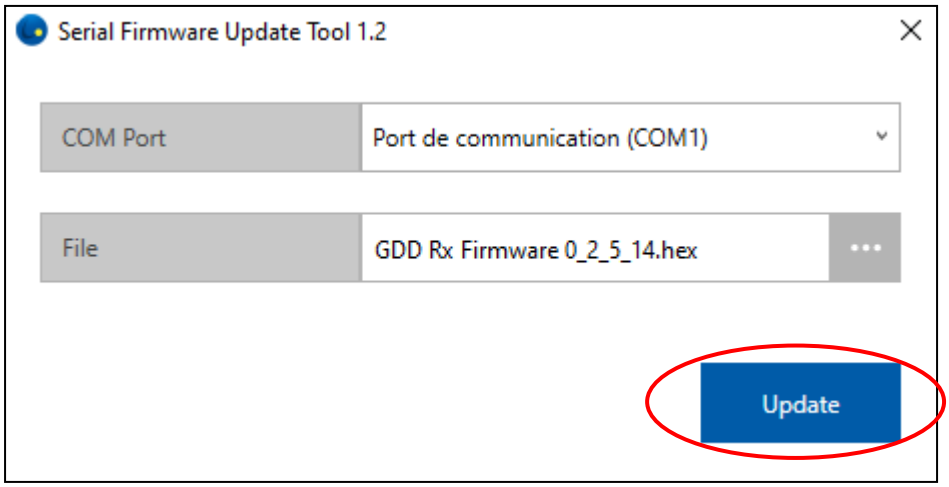


7. Select the firmware file to program.

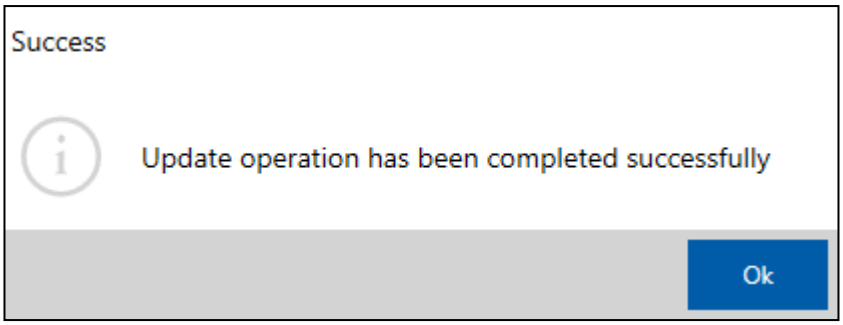




8. Click on *Update* button.



9. At the end of the transfer, the following screen appears.



10. Click *OK* to close the window.

11. Close the *Serial Firmware Update Tool*. Your receiver's software should be updated.

15. *Technical help*

If you encounter a problem not described in this manual, do not hesitate contacting **Instrumentation GDD** for help at:

Tel.: +1 (418) 478-5469

E-mail: info@gdd.ca

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 2026

Version: manual-ip-receiver-2026-05-01-A2-EN.docx

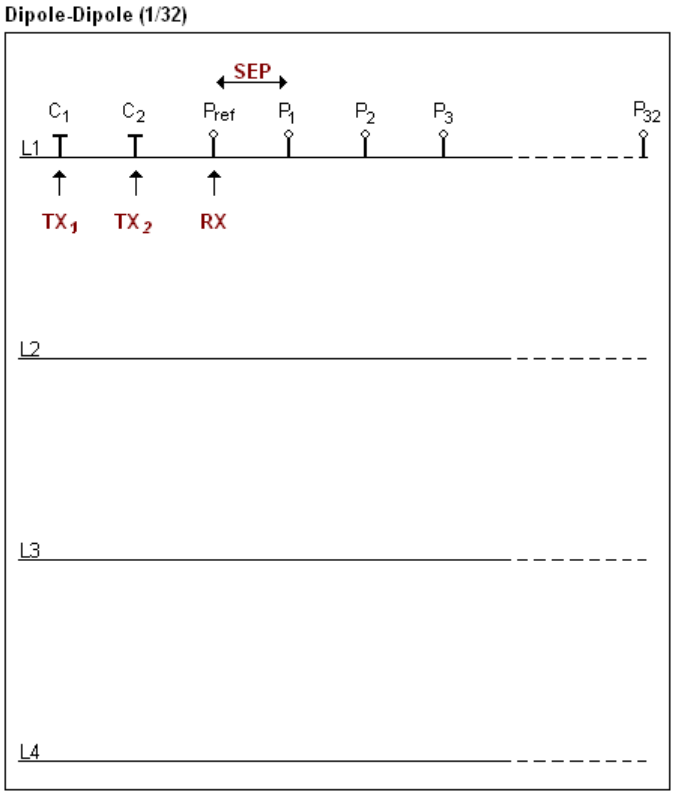
Annex 1 – Geometrical parameters

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

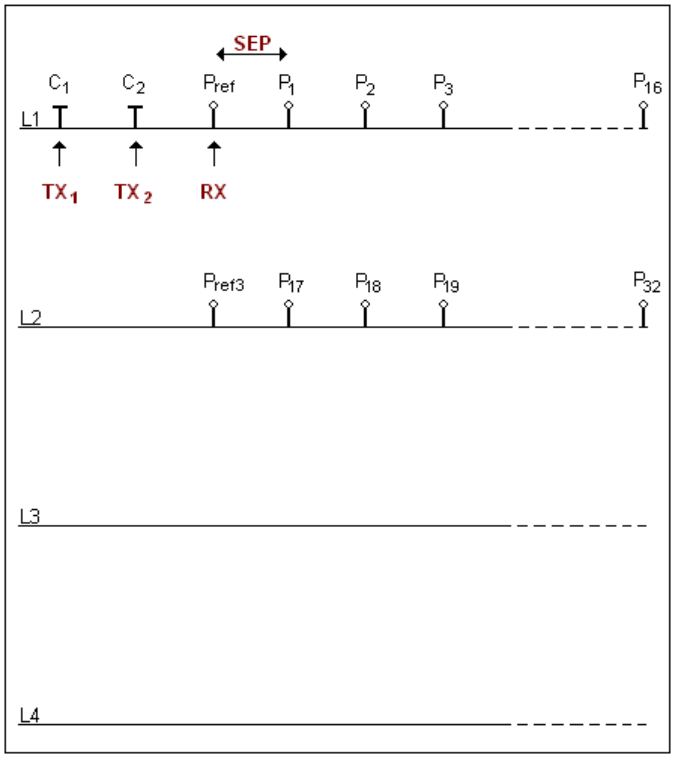
Electrode array	Geometrical parameters to enter				Maximum number of dipoles
Dipole-Dipole	Tx1	Tx2	Rx	Sep	32
Pole-Dipole		Tx2	Rx	Sep	32
Pole-Pole		Tx2	Rx	Sep	32
Gradient	Tx1	Tx2	Rx	Sep	32
Wenner	Tx1	Tx2			1
Schlumberger	Tx1	Tx2		Sep	1

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

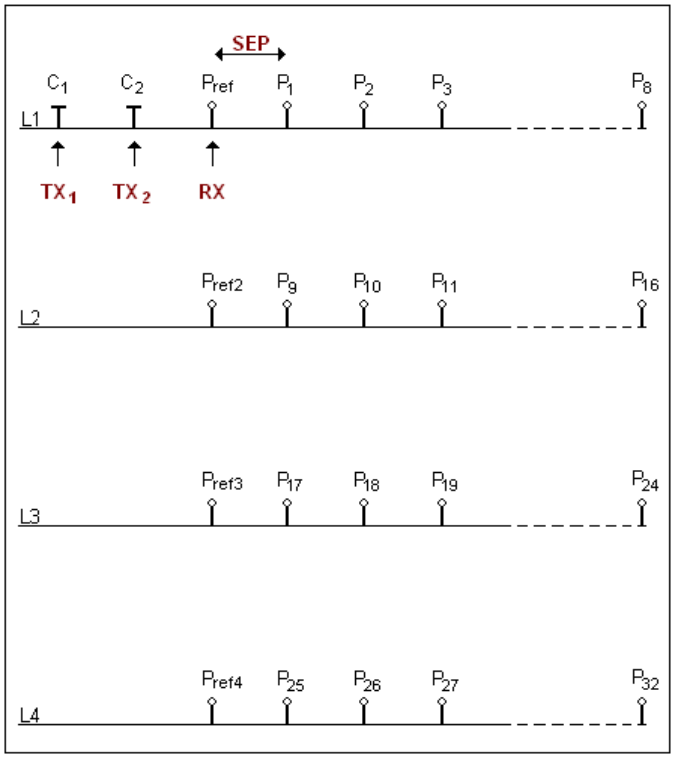
Note: For all electrode arrays, the Tx line and the RX line(s) can be different.



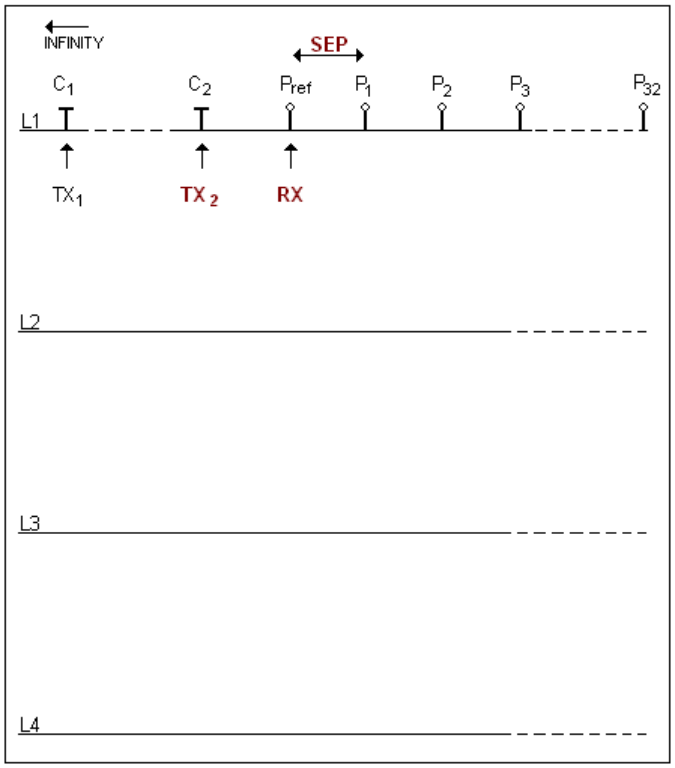
Dipole-Dipole (2/16)



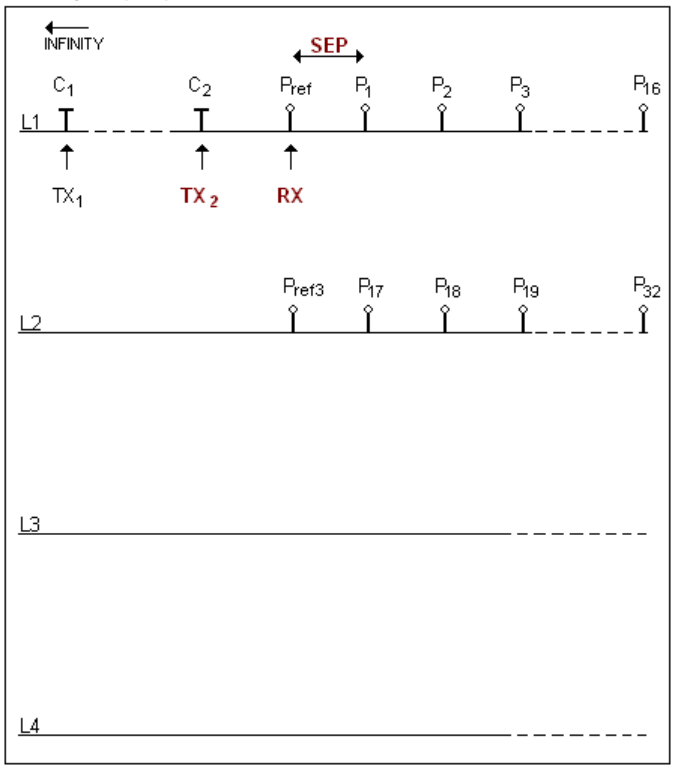
Dipole-Dipole (4/8)

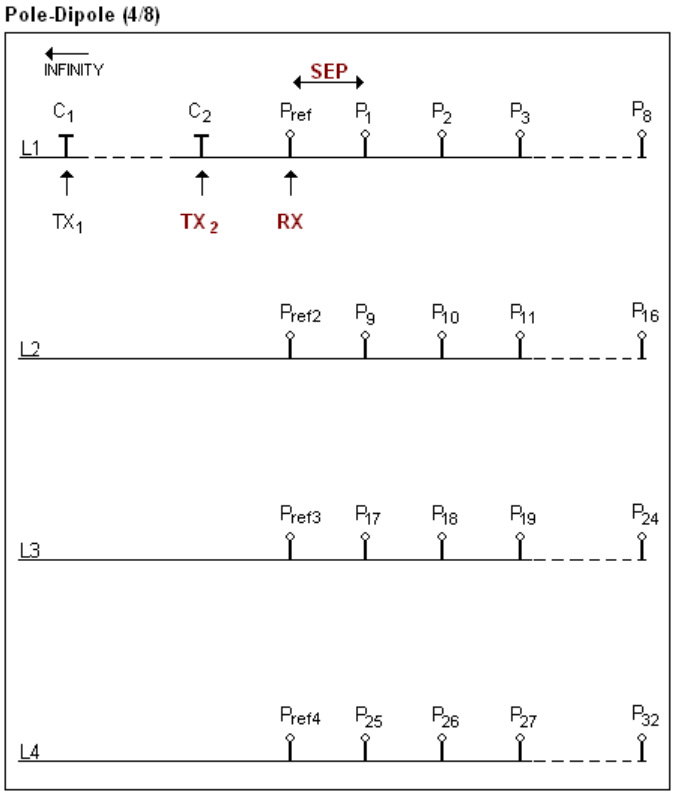


Pole-Dipole (1/32)

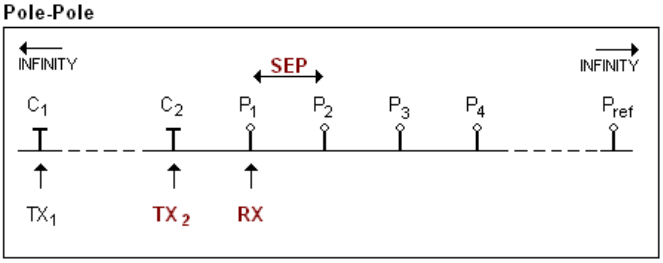


Pole-Dipole (2/16)



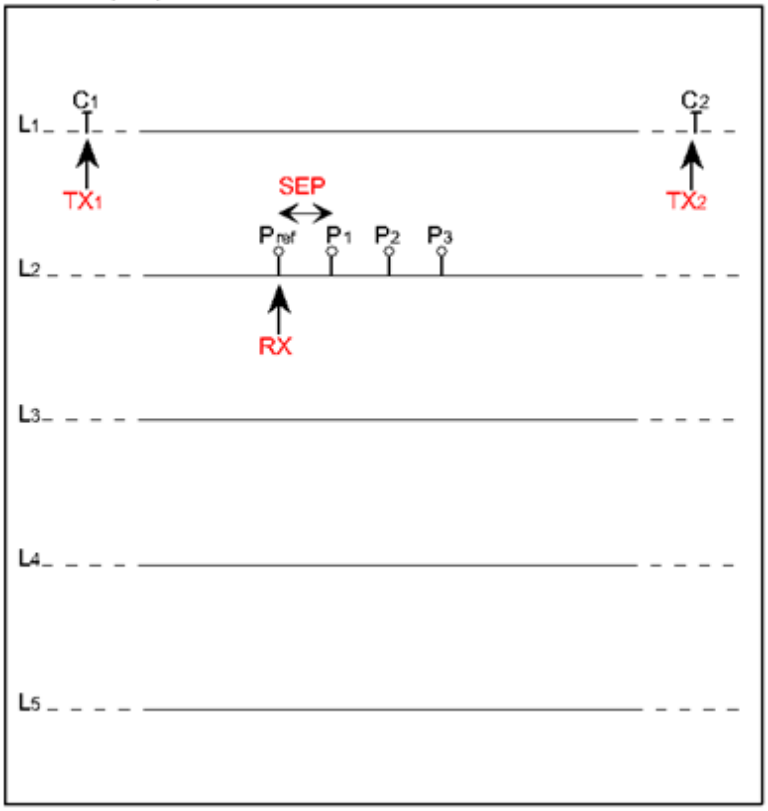


The electrode C1 has to be set far from the other electrodes, usually 5 times the maximum distance between C2 and Pref.

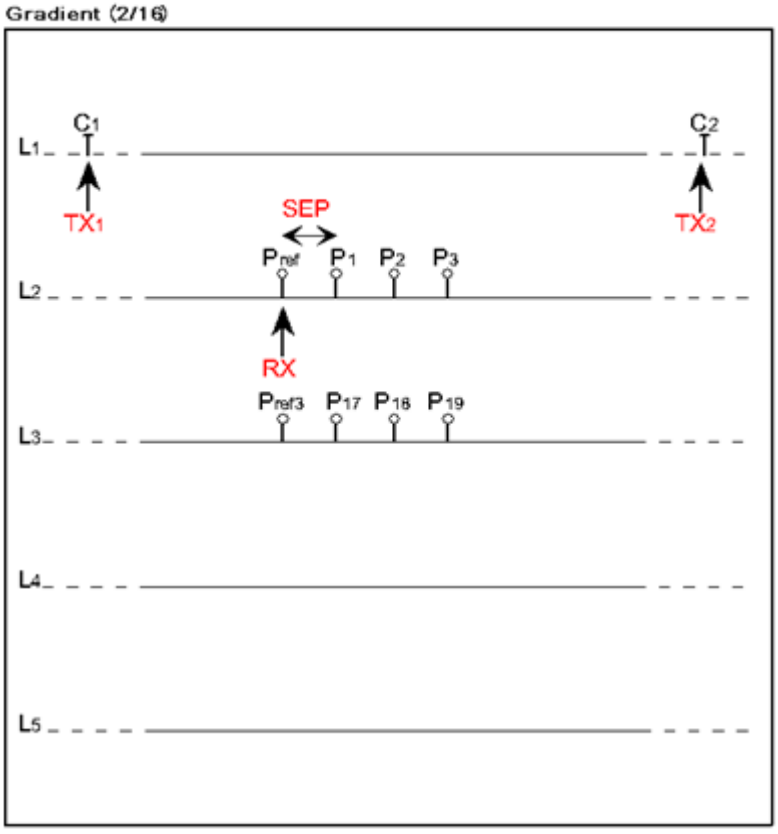


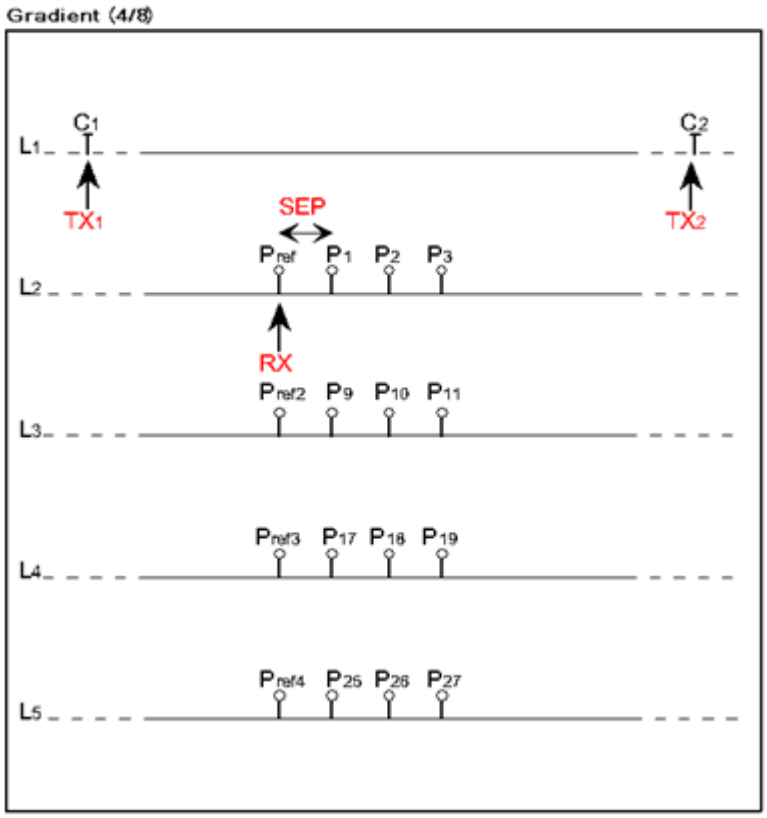
The electrodes C1 and Pref have to be set far from C2 and P1, usually 10 times the maximum distance between C2 and P1.

Gradient (1/32)

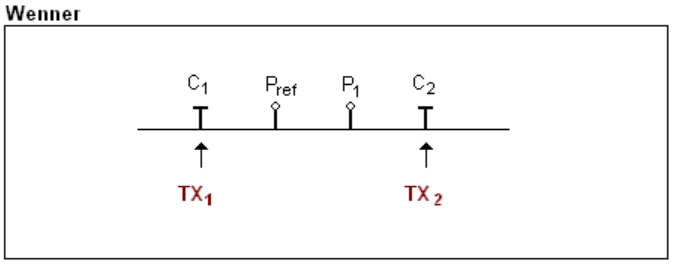


Gradient (2/16)

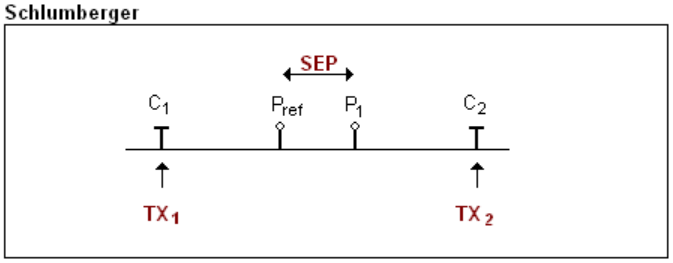




The electrodes C1 and C2 are fixed. The electrode P is moved parallel to C inside a zone located in the central part of C1, C2.



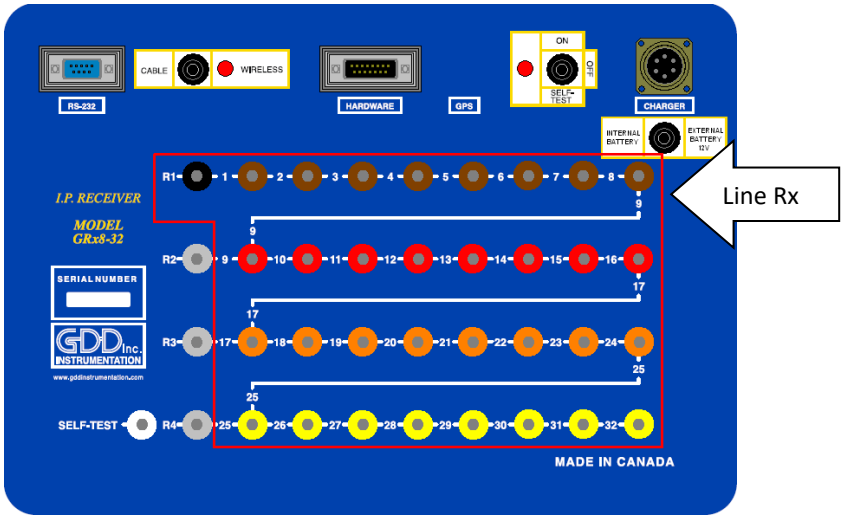
The electrodes C1, Pref, P1 and C2 are equidistant.



The electrodes Pref and P1 are located at the middle point of electrodes C1 and C2.

Annex 2 – 3D Survey

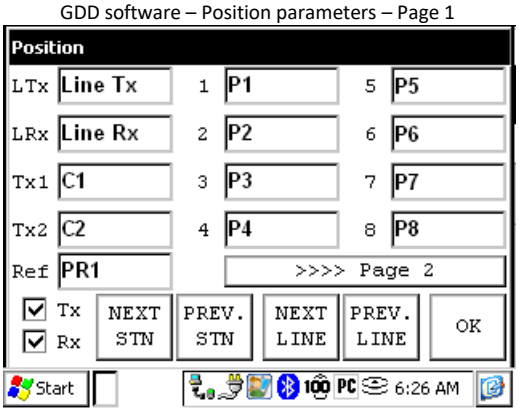
1. Receiver Dipole (1/32)



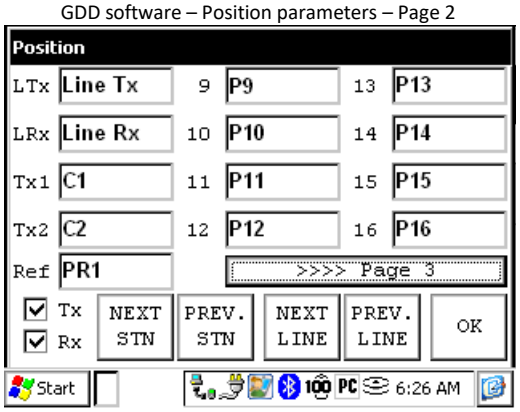
Electrode number (software parameter)	Electrode position *on the receiver*	Electrode color *on the receiver*	Electrode line number (software parameter)
PR1	1st row – 1st hole	Black	Line Rx
P1	1st row – 2nd hole	Brown	Line Rx
P2	1st row – 3rd hole	Brown	Line Rx
P3	1st row – 4th hole	Brown	Line Rx
P4	1st row – 5th hole	Brown	Line Rx
P5	1st row – 6th hole	Brown	Line Rx
P6	1st row – 7th hole	Brown	Line Rx
P7	1st row – 8th hole	Brown	Line Rx
P8	1st row – 9th hole	Brown	Line Rx
P9	2nd row – 2nd hole	Red	Line Rx
P10	2nd row – 3rd hole	Red	Line Rx
P11	2nd row – 4th hole	Red	Line Rx
P12	2nd row – 5th hole	Red	Line Rx
P13	2nd row – 6th hole	Red	Line Rx
P14	2nd row – 7th hole	Red	Line Rx
P15	2nd row – 8th hole	Red	Line Rx
P16	2nd row – 9th hole	Red	Line Rx
P17	3rd row – 2nd hole	Orange	Line Rx
P18	3rd row – 3rd hole	Orange	Line Rx
P19	3rd row – 4th hole	Orange	Line Rx
P20	3rd row – 5th hole	Orange	Line Rx
P21	3rd row – 6th hole	Orange	Line Rx
P22	3rd row – 7th hole	Orange	Line Rx
P23	3rd row – 8th hole	Orange	Line Rx
P24	3rd row – 9th hole	Orange	Line Rx
P25	4th row – 3rd hole	Yellow	Line Rx
P26	4th row – 4th hole	Yellow	Line Rx
P27	4th row – 5th hole	Yellow	Line Rx
P28	4th row – 6th hole	Yellow	Line Rx
P29	4th row – 7th hole	Yellow	Line Rx
P30	4th row – 8th hole	Yellow	Line Rx
P31	4th row – 9th hole	Yellow	Line Rx
P32	4th row – 10th hole	Yellow	Line Rx

Dipole number	Dipole description
D1	P1-PR1
D2	P2-P1
D3	P3-P2
D4	P4-P3
D5	P5-P4
D6	P6-P5
D7	P7-P6
D8	P8-P7
D9	P9-P8
D10	P10-P9
D11	P11-P10
D12	P12-P11
D13	P13-P12
D14	P14-P13
D15	P15-P14
D16	P16-P15
D17	P17-P16
D18	P18-P17
D19	P19-P18
D20	P20-P19
D21	P21-P20
D22	P22-P21
D23	P23-P22
D24	P24-P23
D25	P25-P24
D26	P26-P25
D27	P27-P26
D28	P28-P27
D29	P29-P28
D30	P30-P29
D31	P31-P30
D32	P32-P31

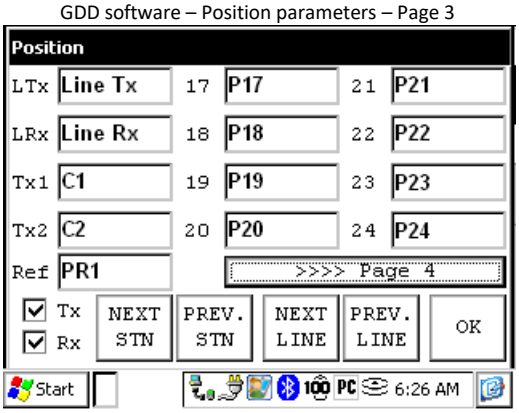
GDD software – Position parameters – Page 1



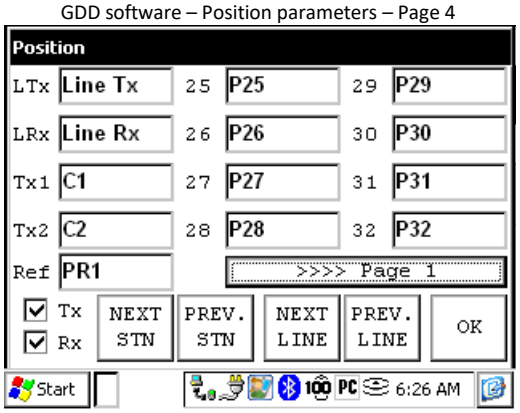
GDD software – Position parameters – Page 2



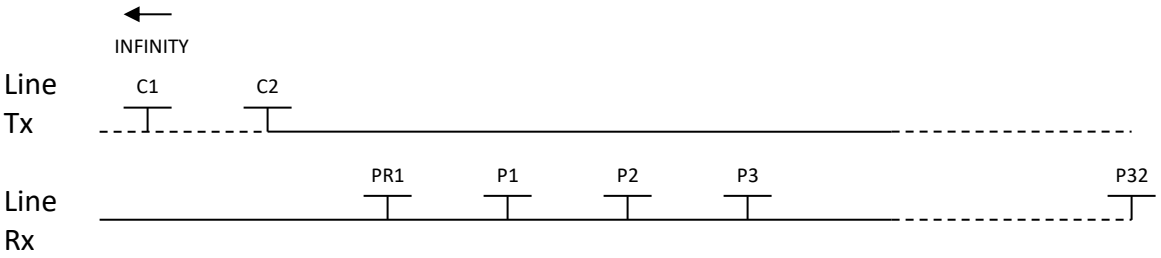
GDD software – Position parameters – Page 3



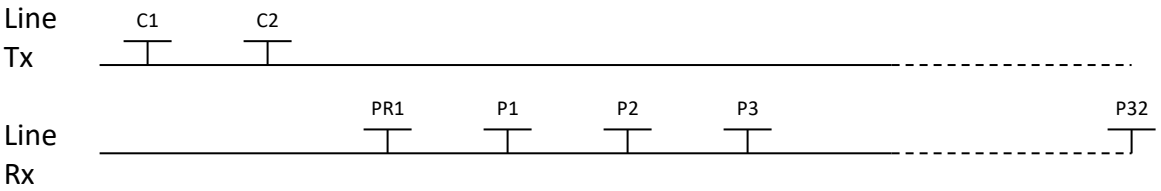
GDD software – Position parameters – Page 4



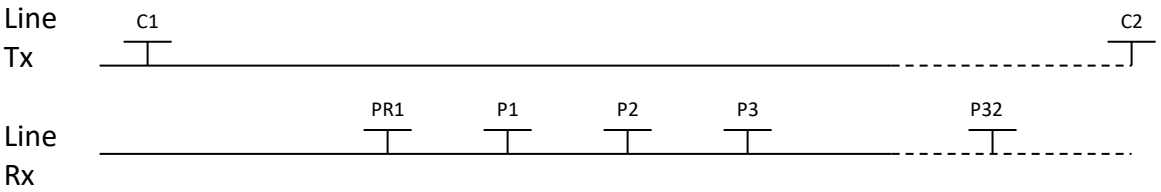
Pole-Dipole (1/32)



Dipole-Dipole (1/32)

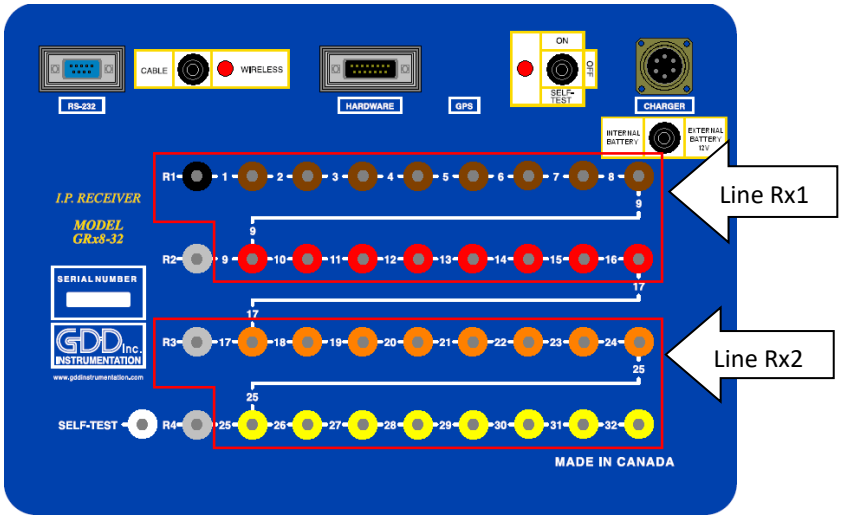


Gradient (1/32)



*The transmitter and the receiver can be on the same line.

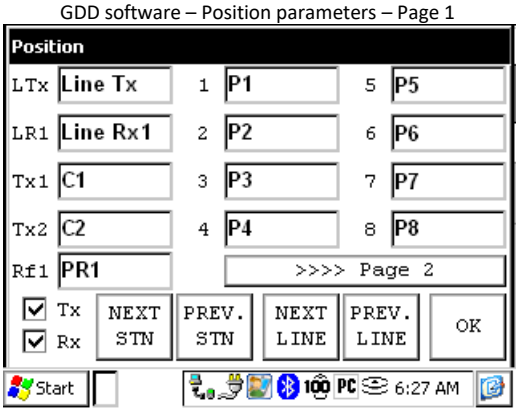
2. Receiver Dipole (2/16)



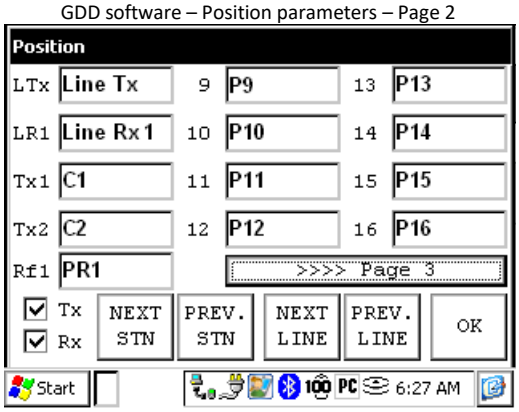
Electrode number (software parameter)	Electrode position *on the receiver*	Electrode color *on the receiver*	Electrode line number (software parameter)
PR1	1st row – 1st hole	Black	Line Rx1
P1	1st row – 2nd hole	Brown	Line Rx1
P2	1st row – 3rd hole	Brown	Line Rx1
P3	1st row – 4th hole	Brown	Line Rx1
P4	1st row – 5th hole	Brown	Line Rx1
P5	1st row – 6th hole	Brown	Line Rx1
P6	1st row – 7th hole	Brown	Line Rx1
P7	1st row – 8th hole	Brown	Line Rx1
P8	1st row – 9th hole	Brown	Line Rx1
P9	2nd row – 2nd hole	Red	Line Rx1
P10	2nd row – 3rd hole	Red	Line Rx1
P11	2nd row – 4th hole	Red	Line Rx1
P12	2nd row – 5th hole	Red	Line Rx1
P13	2nd row – 6th hole	Red	Line Rx1
P14	2nd row – 7th hole	Red	Line Rx1
P15	2nd row – 8th hole	Red	Line Rx1
P16	2nd row – 9th hole	Red	Line Rx1
PR3	3rd row – 1st hole	Grey	Line Rx2
P17	3rd row – 2nd hole	Orange	Line Rx2
P18	3rd row – 3rd hole	Orange	Line Rx2
P19	3rd row – 4th hole	Orange	Line Rx2
P20	3rd row – 5th hole	Orange	Line Rx2
P21	3rd row – 6th hole	Orange	Line Rx2
P22	3rd row – 7th hole	Orange	Line Rx2
P23	3rd row – 8th hole	Orange	Line Rx2
P24	3rd row – 9th hole	Orange	Line Rx2
P25	4th row – 3rd hole	Yellow	Line Rx2
P26	4th row – 4th hole	Yellow	Line Rx2
P27	4th row – 5th hole	Yellow	Line Rx2
P28	4th row – 6th hole	Yellow	Line Rx2
P29	4th row – 7th hole	Yellow	Line Rx2
P30	4th row – 8th hole	Yellow	Line Rx2
P31	4th row – 9th hole	Yellow	Line Rx2
P32	4th row – 10th hole	Yellow	Line Rx2

Dipole number	Dipole description
D1	P1-PR1
D2	P2-P1
D3	P3-P2
D4	P4-P3
D5	P5-P4
D6	P6-P5
D7	P7-P6
D8	P8-P7
D9	P9-P8
D10	P10-P9
D11	P11-P10
D12	P12-P11
D13	P13-P12
D14	P14-P13
D15	P15-P14
D16	P16-P15
D17	P17-PR3
D18	P18-P17
D19	P19-P18
D20	P20-P19
D21	P21-P20
D22	P22-P21
D23	P23-P22
D24	P24-P23
D25	P25-P24
D26	P26-P25
D27	P27-P26
D28	P28-P27
D29	P29-P28
D30	P30-P29
D31	P31-P30
D32	P32-P31

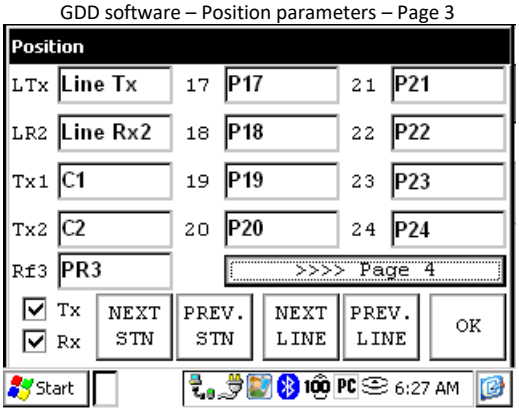
GDD software – Position parameters – Page 1



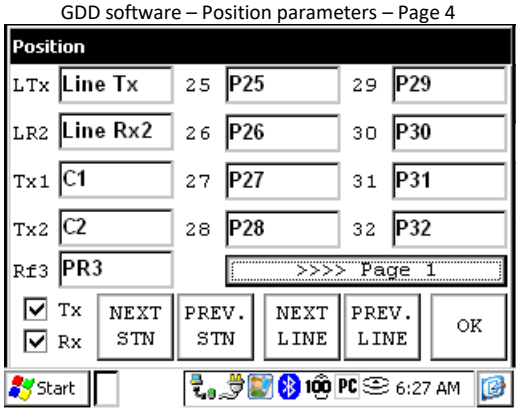
GDD software – Position parameters – Page 2



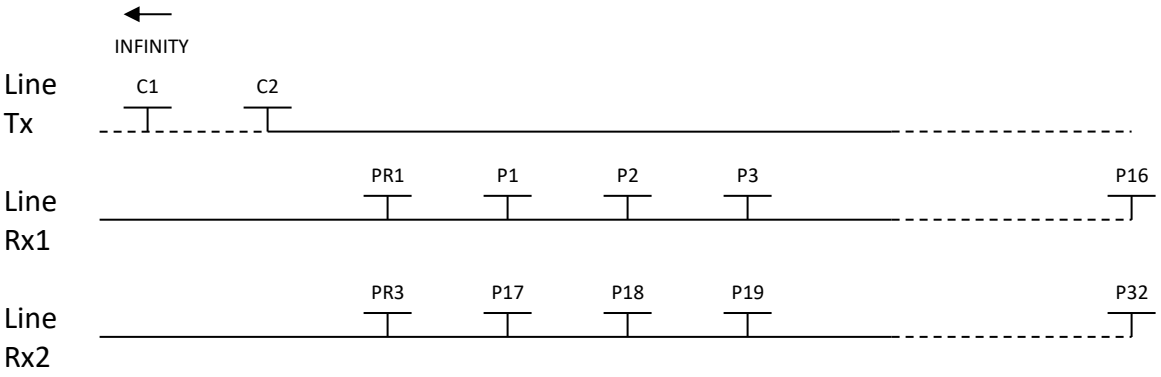
GDD software – Position parameters – Page 3



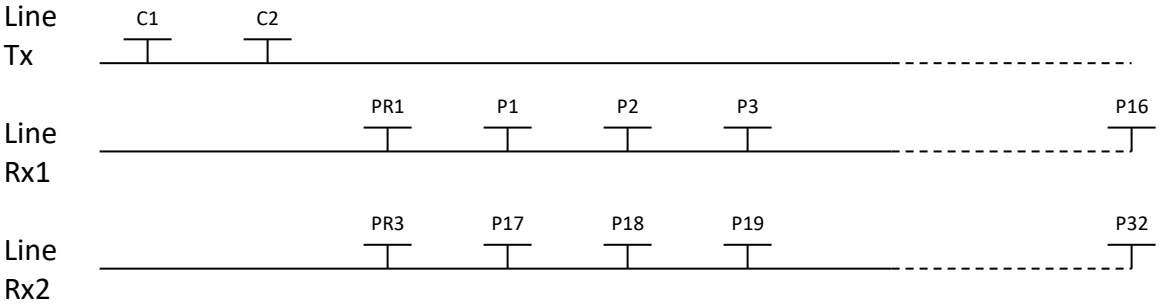
GDD software – Position parameters – Page 4



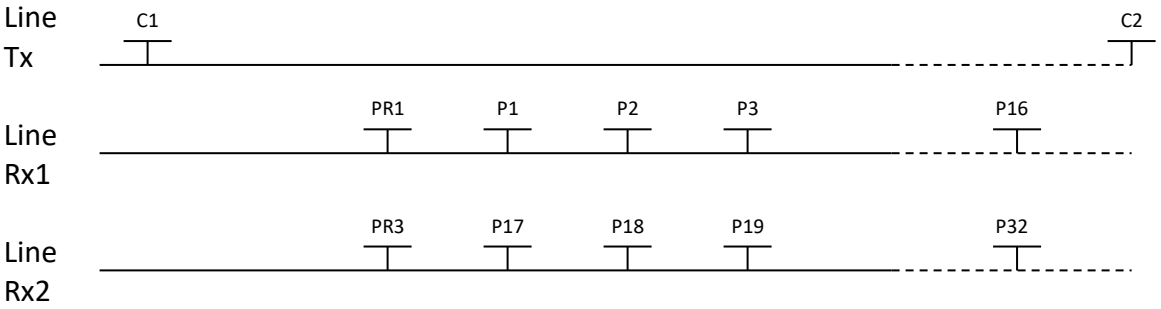
Pole-Dipole (2/16)



Dipole-Dipole (2/16)

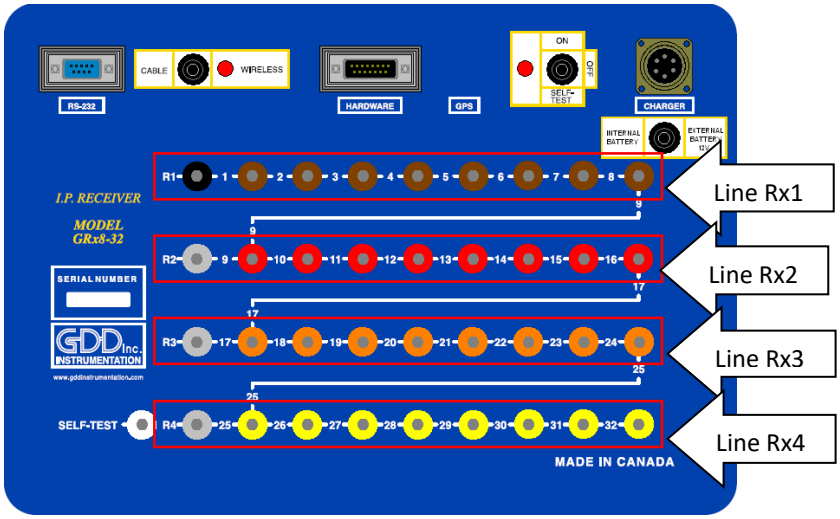


Gradient (2/16)



*The transmitter and the receiver can be on the same line.

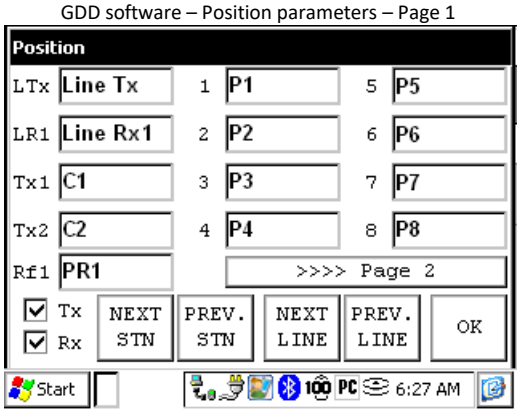
1. Receiver Dipole (4/8)



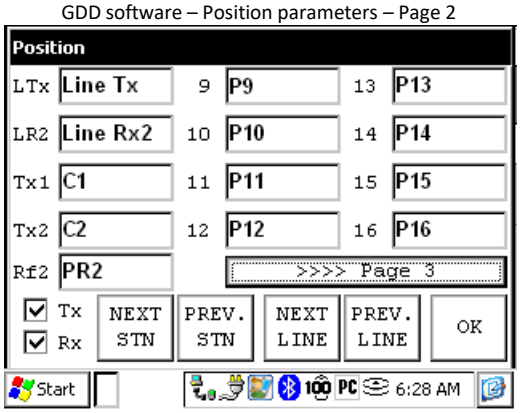
Electrode number (software parameter)	Electrode position *on the receiver*	Electrode color *on the receiver*	Electrode line number (software parameter)
PR1	1st row – 1st hole	Black	Line Rx1
P1	1st row – 2nd hole	Brown	Line Rx1
P2	1st row – 3rd hole	Brown	Line Rx1
P3	1st row – 4th hole	Brown	Line Rx1
P4	1st row – 5th hole	Brown	Line Rx1
P5	1st row – 6th hole	Brown	Line Rx1
P6	1st row – 7th hole	Brown	Line Rx1
P7	1st row – 8th hole	Brown	Line Rx1
P8	1st row – 9th hole	Brown	Line Rx1
PR2	2nd row – 1st hole	Grey	Line Rx2
P9	2nd row – 2nd hole	Red	Line Rx2
P10	2nd row – 3rd hole	Red	Line Rx2
P11	2nd row – 4th hole	Red	Line Rx2
P12	2nd row – 5th hole	Red	Line Rx2
P13	2nd row – 6th hole	Red	Line Rx2
P14	2nd row – 7th hole	Red	Line Rx2
P15	2nd row – 8th hole	Red	Line Rx2
P16	2nd row – 9th hole	Red	Line Rx2
PR3	3rd row – 1st hole	Grey	Line Rx3
P17	3rd row – 2nd hole	Orange	Line Rx3
P18	3rd row – 3rd hole	Orange	Line Rx3
P19	3rd row – 4th hole	Orange	Line Rx3
P20	3rd row – 5th hole	Orange	Line Rx3
P21	3rd row – 6th hole	Orange	Line Rx3
P22	3rd row – 7th hole	Orange	Line Rx3
P23	3rd row – 8th hole	Orange	Line Rx3
P24	3rd row – 9th hole	Orange	Line Rx3
PR4	4th row – 2nd hole	Grey	Line Rx4
P25	4th row – 3rd hole	Yellow	Line Rx4
P26	4th row – 4th hole	Yellow	Line Rx4
P27	4th row – 5th hole	Yellow	Line Rx4
P28	4th row – 6th hole	Yellow	Line Rx4
P29	4th row – 7th hole	Yellow	Line Rx4
P30	4th row – 8th hole	Yellow	Line Rx4
P31	4th row – 9th hole	Yellow	Line Rx4
P32	4th row – 10th hole	Yellow	Line Rx4

Dipole number	Dipole description
D1	P1-PR1
D2	P2-P1
D3	P3-P2
D4	P4-P3
D5	P5-P4
D6	P6-P5
D7	P7-P6
D8	P8-P7
D9	P9-PR2
D10	P10-P9
D11	P11-P10
D12	P12-P11
D13	P13-P12
D14	P14-P13
D15	P15-P14
D16	P16-P15
D17	P17-PR3
D18	P18-P17
D19	P19-P18
D20	P20-P19
D21	P21-P20
D22	P22-P21
D23	P23-P22
D24	P24-P23
D25	P25-PR4
D26	P26-P25
D27	P27-P26
D28	P28-P27
D29	P29-P28
D30	P30-P29
D31	P31-P30
D32	P32-P31

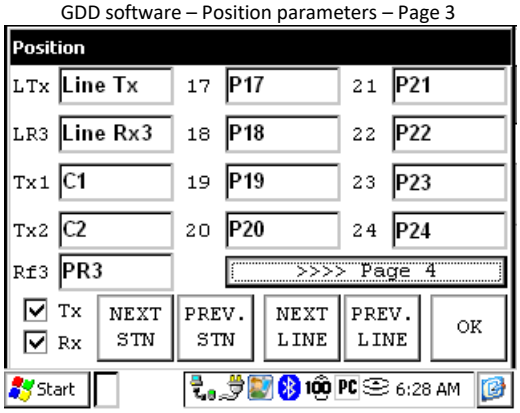
GDD software – Position parameters – Page 1



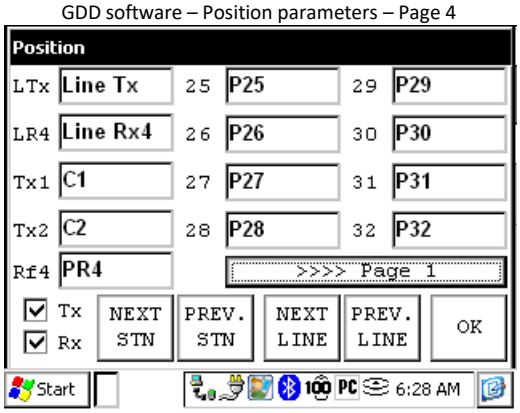
GDD software – Position parameters – Page 2



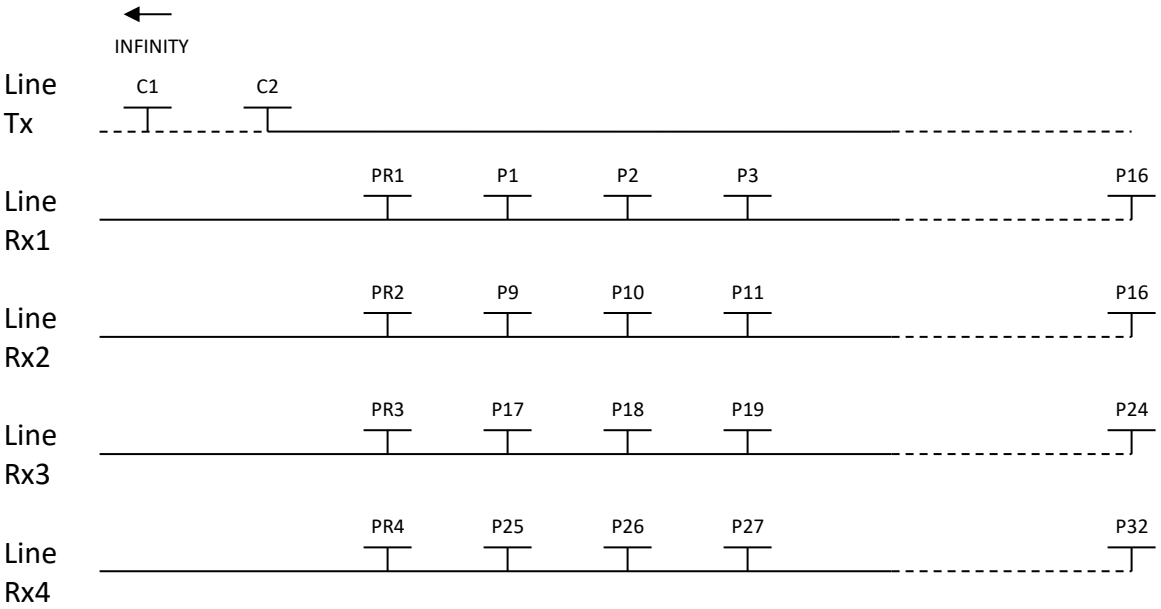
GDD software – Position parameters – Page 3



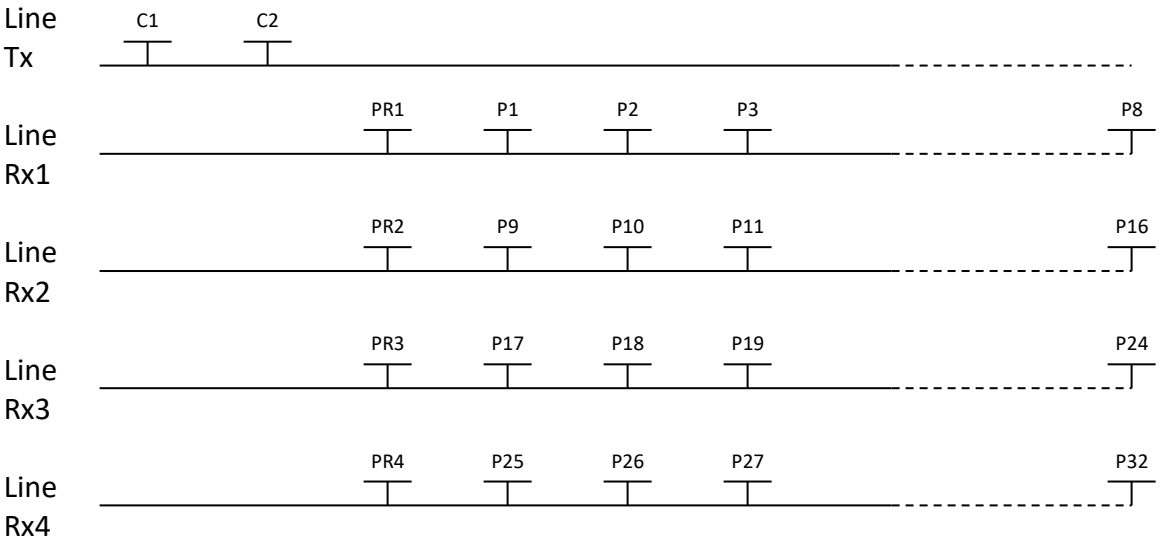
GDD software – Position parameters – Page 4



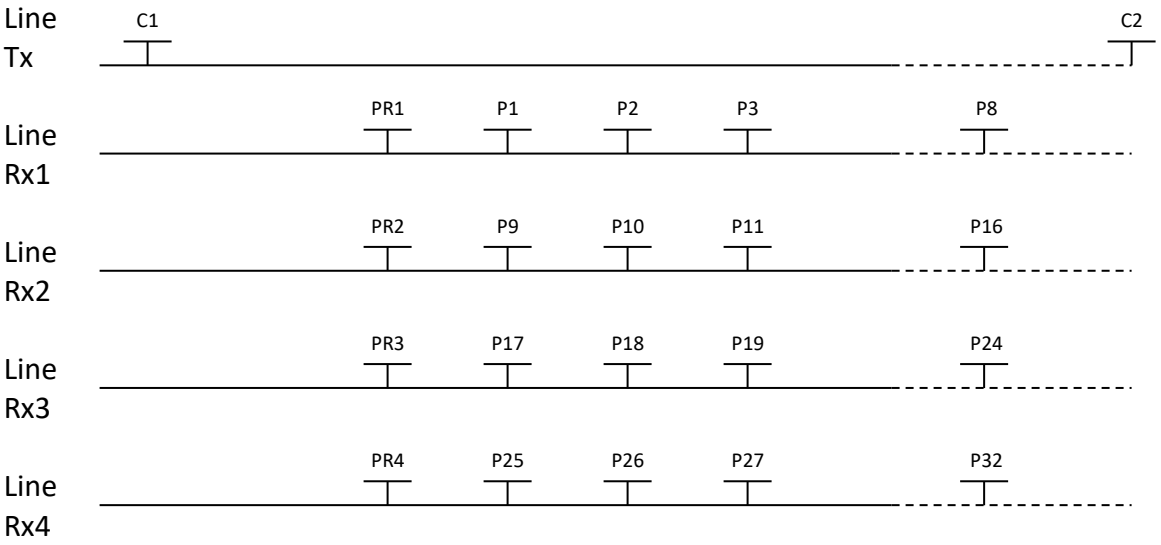
Pole-Dipole (4/8)



Dipole-Dipole (4/8)

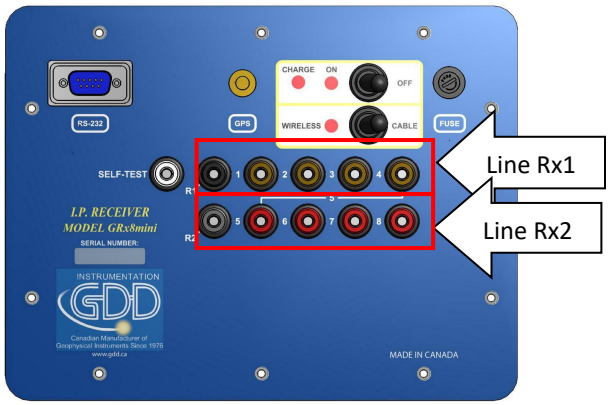


Gradient (4/8)



*The transmitter and the receiver can be on the same line.

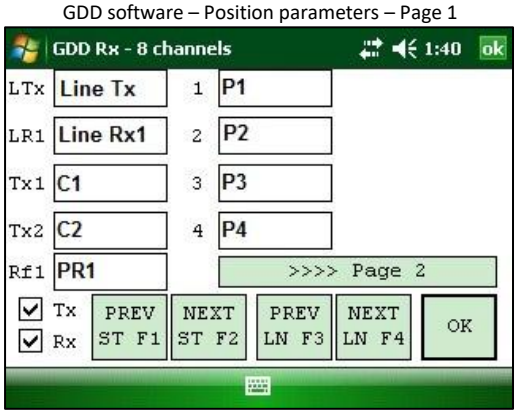
2. Receiver Dipole (2/4) – For GRx8*mini* model only



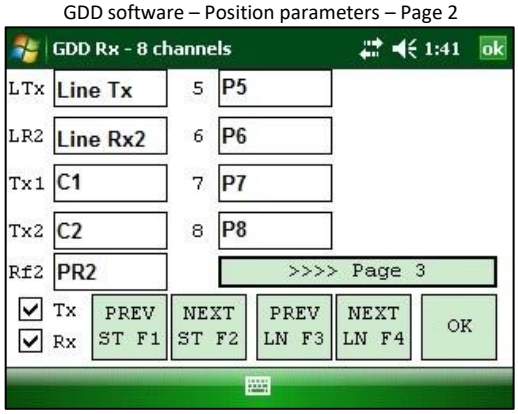
Electrode number (software parameter)	Electrode position *on the receiver*	Electrode color *on the receiver*	Electrode line number (software parameter)
PR1	1st row – 1st hole	Black	Line Rx1
P1	1st row – 2nd hole	Brown	Line Rx1
P2	1st row – 3rd hole	Brown	Line Rx1
P3	1st row – 4th hole	Brown	Line Rx1
P4	1st row – 5th hole	Brown	Line Rx1
PR2	2nd row – 1st hole	Grey	Line Rx2
P5	2nd row – 2nd hole	Red	Line Rx2
P6	2nd row – 3rd hole	Red	Line Rx2
P7	2nd row – 4th hole	Red	Line Rx2
P8	2nd row – 5th hole	Red	Line Rx2

Dipole number	Dipole description
D1	P1-PR1
D2	P2-P1
D3	P3-P2
D4	P4-P3
D5	P5-PR2
D6	P6-P5
D7	P7-P6
D8	P8-P7

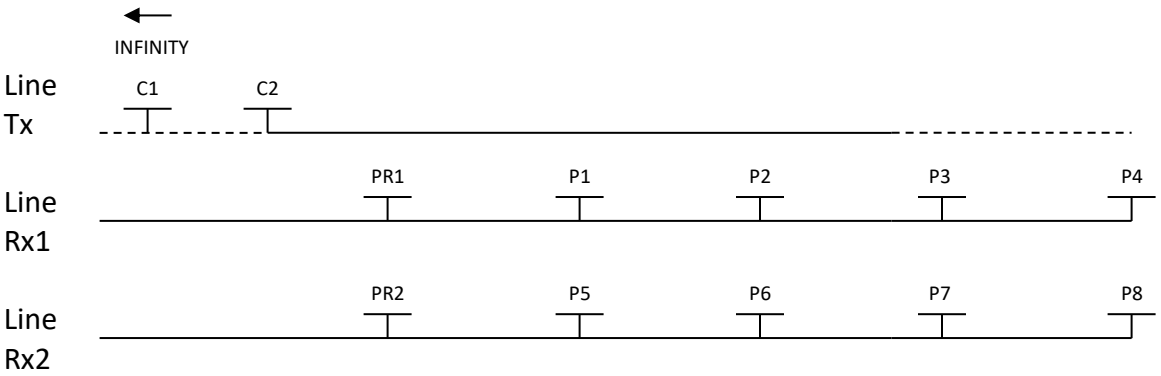
GDD software – Position parameters – Page 1



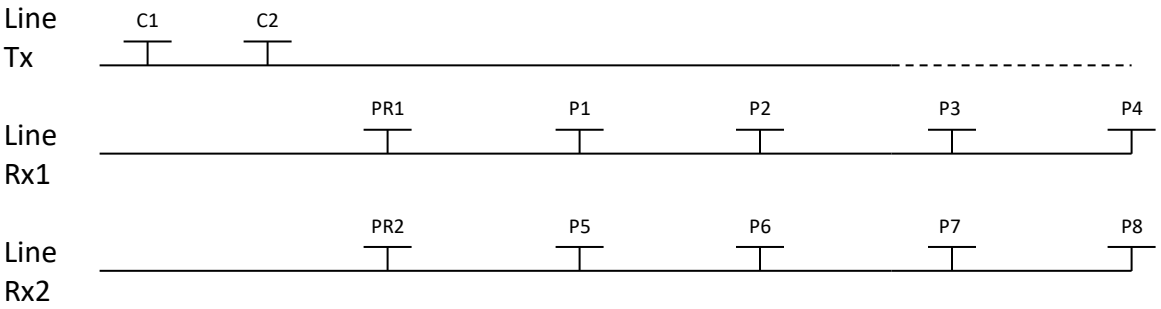
GDD software – Position parameters – Page 2



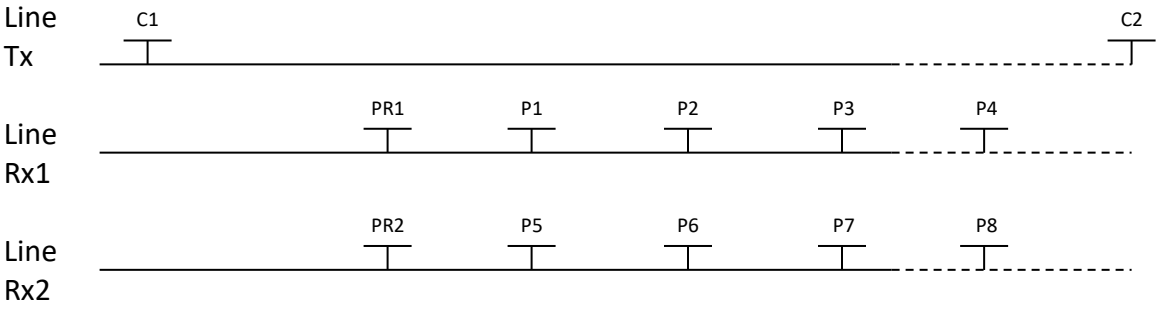
Pole-Dipole (2/4)



Dipole-Dipole (2/4)



Gradient (2/4)

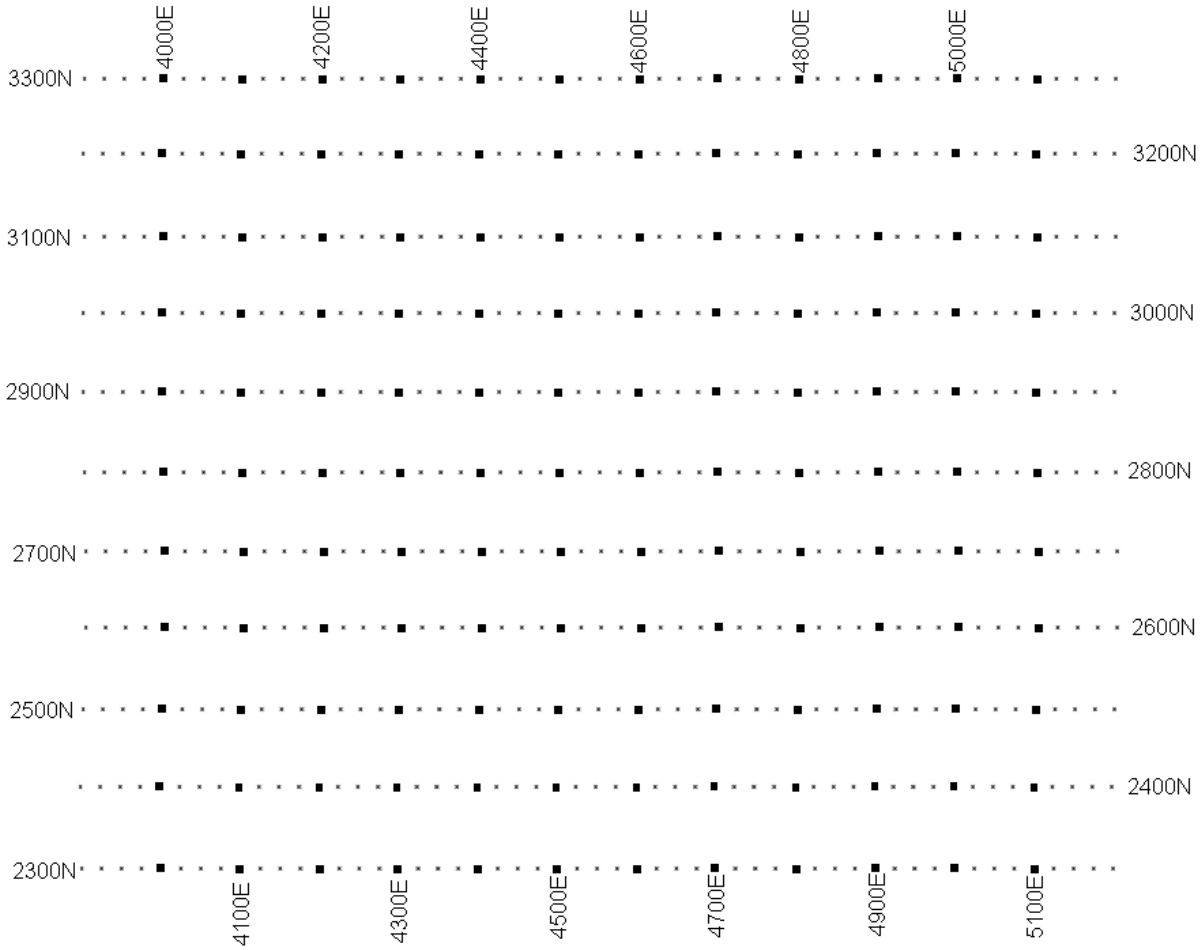


*The transmitter and the receiver can be on the same line.

Annex 3 – Field survey setup

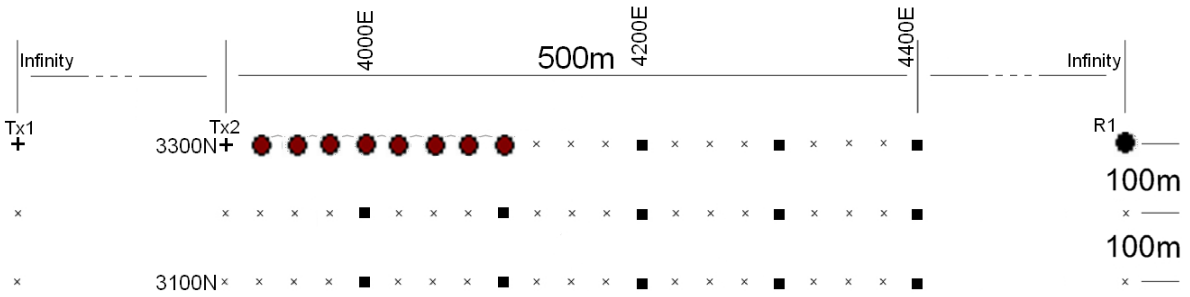
Survey setup

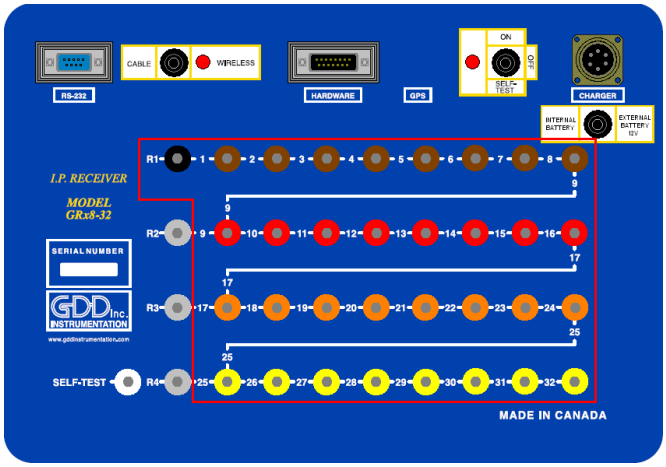
Line information



This survey consists 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

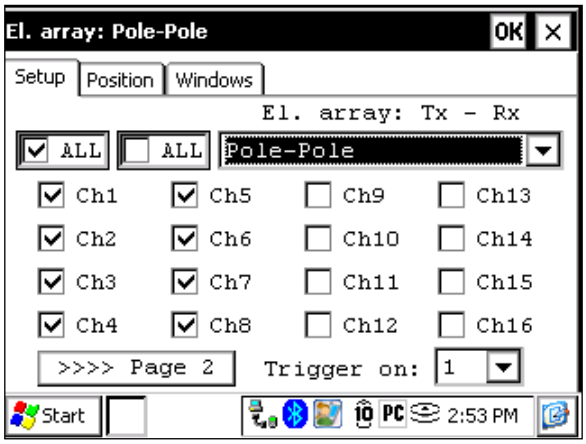




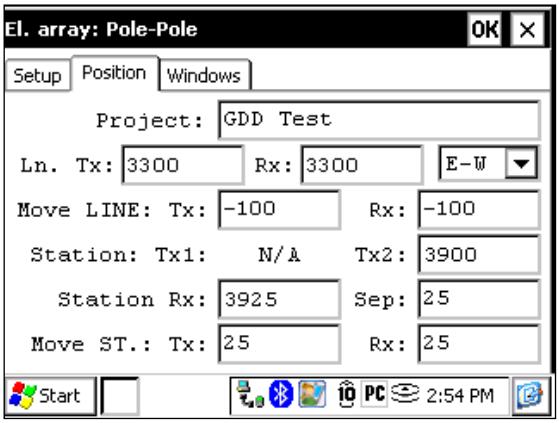
Legend
x Station
\+ Tx electrode
Rx electrode
R1 Reference electrode

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

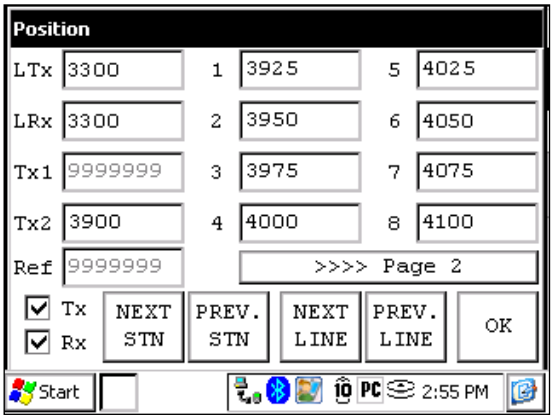
1) Select Pole-Pole in the setup page.



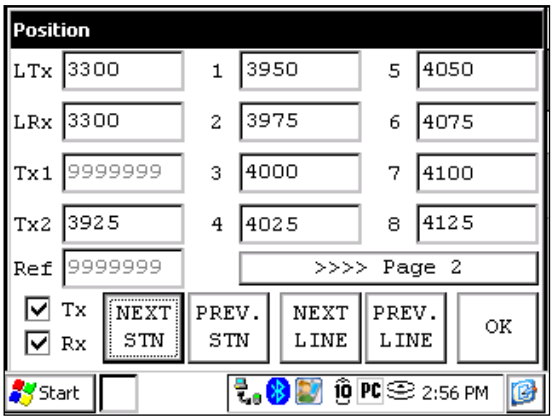
2) Enter the positions corresponding to your survey parameters.



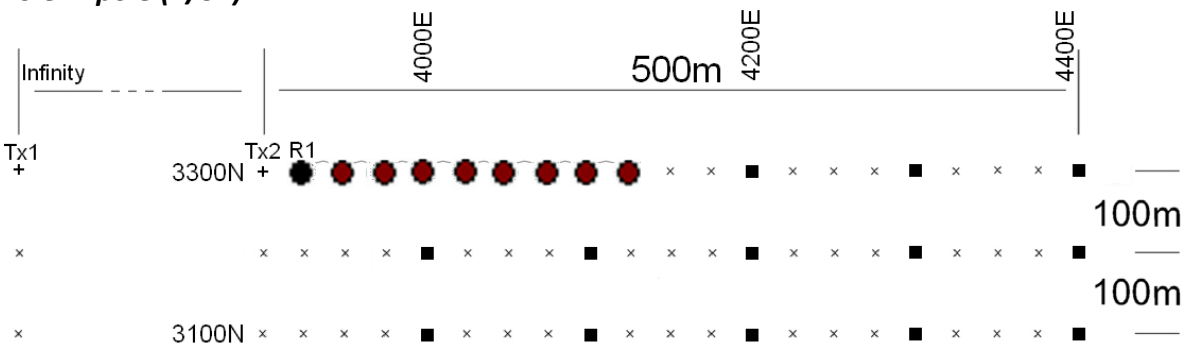
3) If all the values are correct, click the Ok button to continue and take a reading. If something is incorrect, you can modify it on this page.

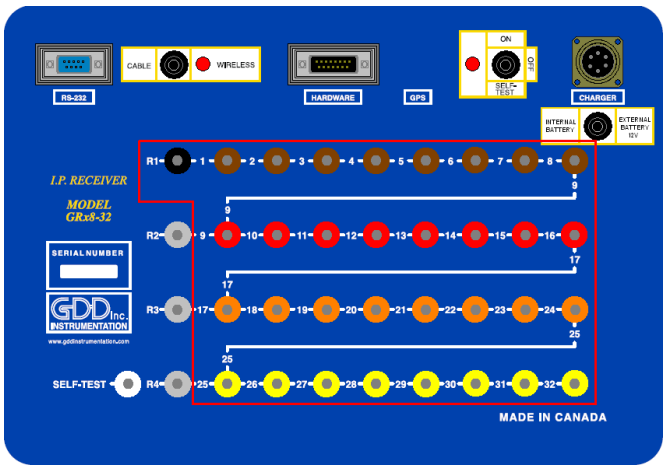


4) When the reading is done, click the NEXT STN button to increment the positions.



Pole-Dipole (1/32)

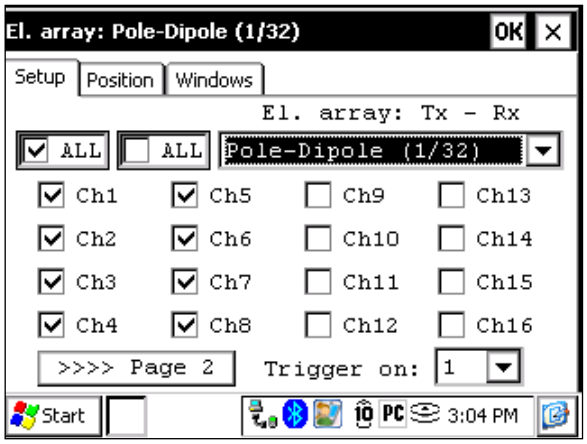




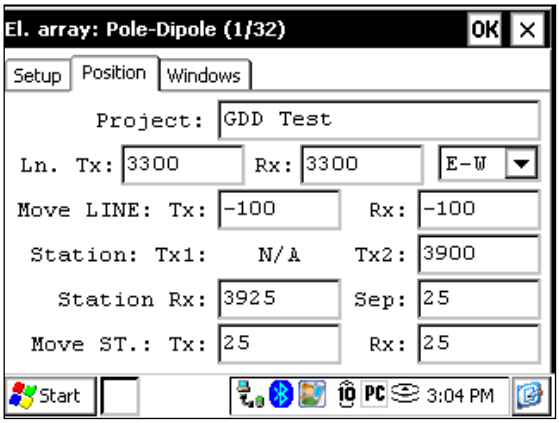
Legend
x Station
\+ Tx electrode
Rx electrode
R1 Reference electrode

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

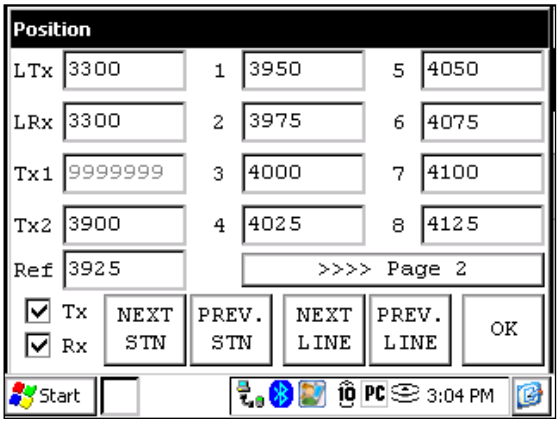
1) Select Pole-Dipole (1/32) in the setup page. The Pole-Dipole (2/16) and Pole-Dipole (4/8) options are explained in the 3D survey section at the end of this document.



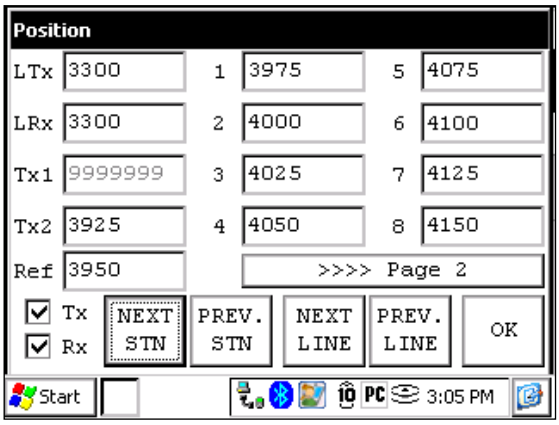
2) Enter the positions corresponding to your survey parameters.



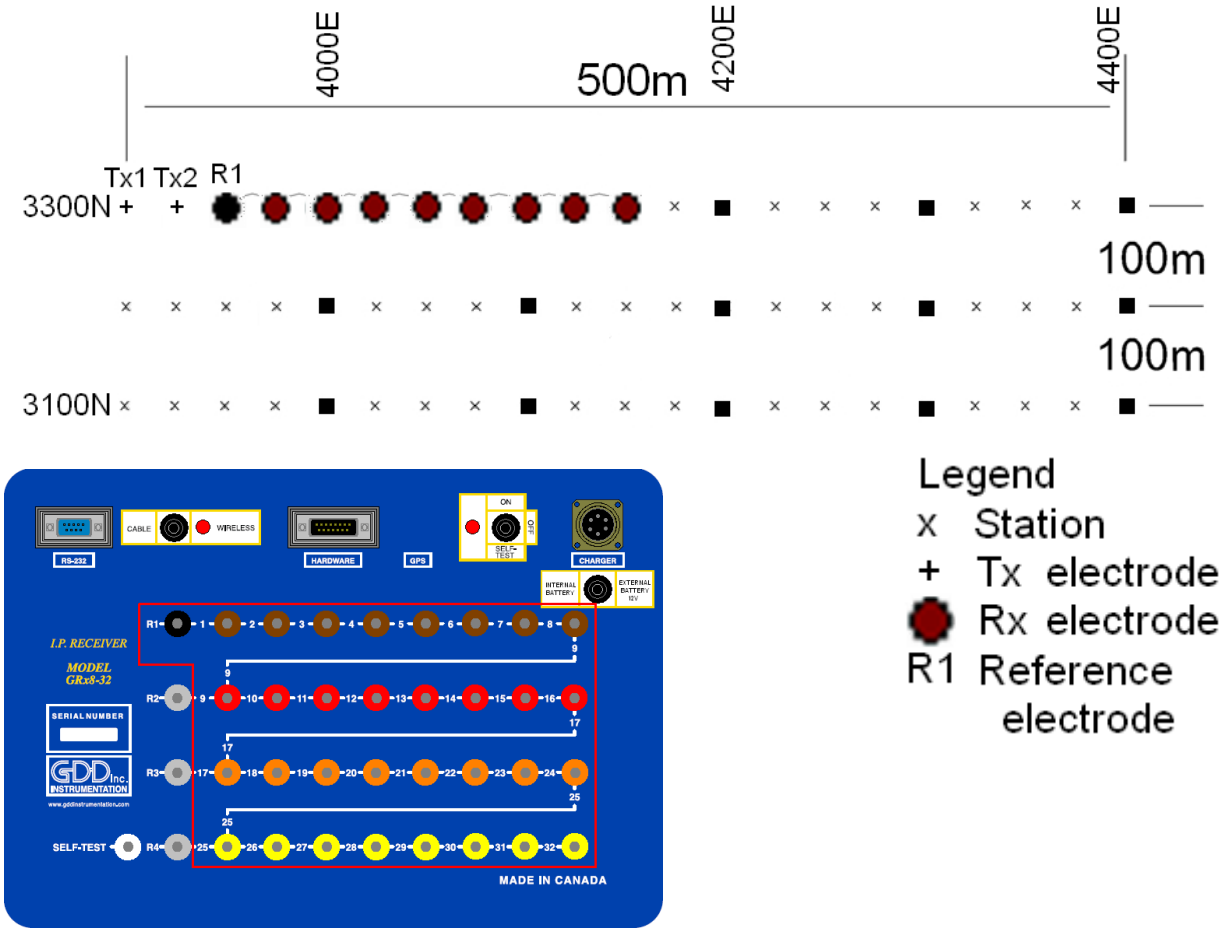
3) If all the values are correct, click the Ok button to continue and take a reading. If something is incorrect, you can modify it on this page.



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

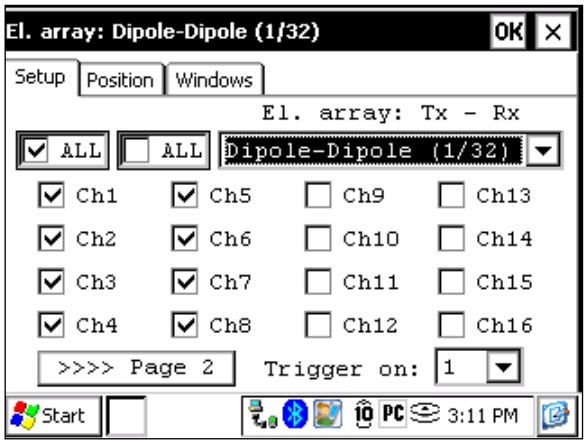


Dipole-Dipole (1/32)

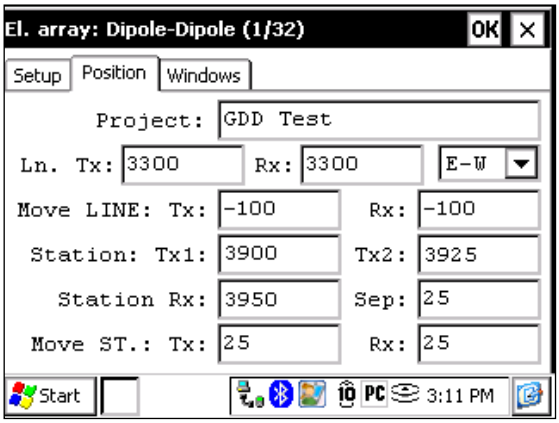


For this dipole-dipole setup, 8 electrodes of the GDD-Rx will be used.

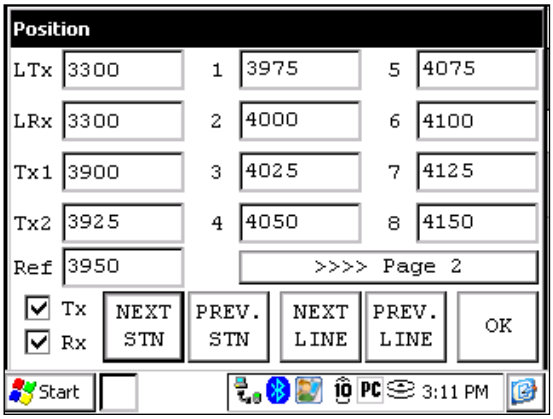
1) Select Dipole-Dipole (1/32) in the setup page.



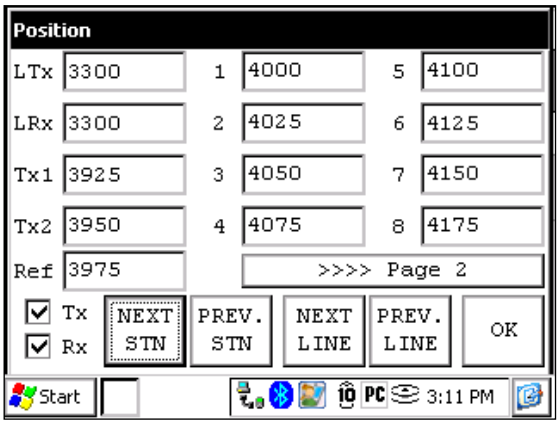
2) Enter the positions corresponding to your survey parameters.



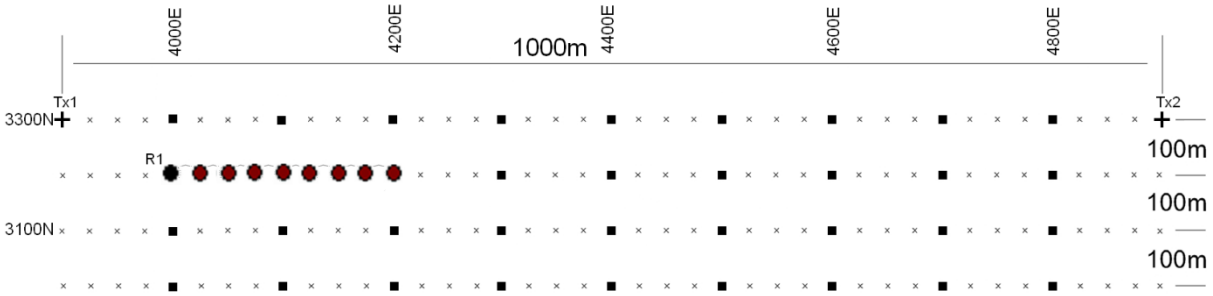
3) If all the values are correct, click the Ok button to continue and take a reading. If something is incorrect, you can modify it on this page.

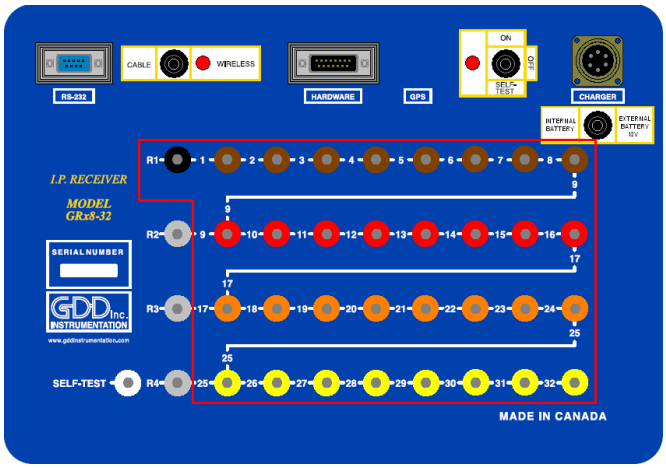


4) When the reading is done, click the NEXT STN button to increment the positions.



Gradient (1/32)





Legend

x Station

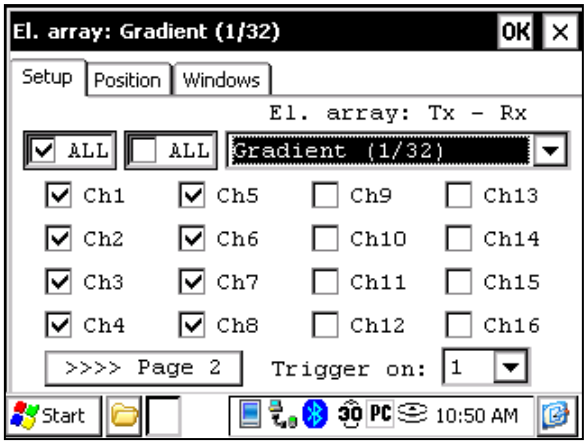
\+ Tx electrode

Rx electrode

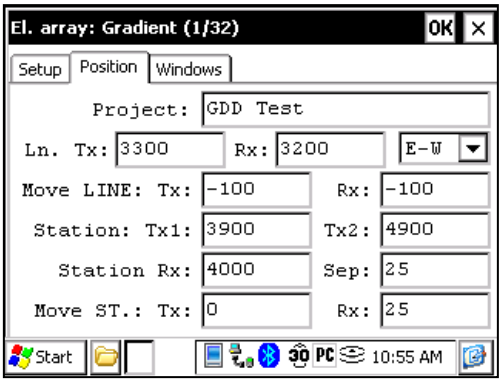
R1 Reference electrode

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

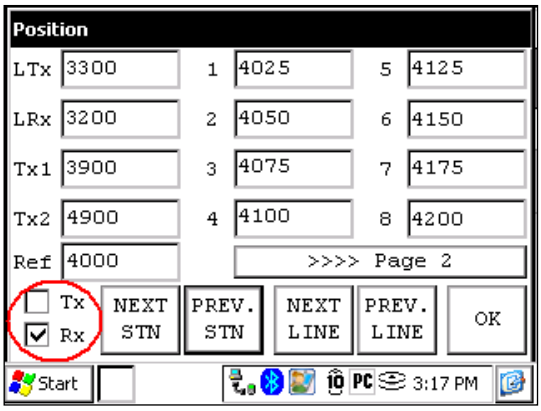
1) Select Gradient (1/32) in the setup page.



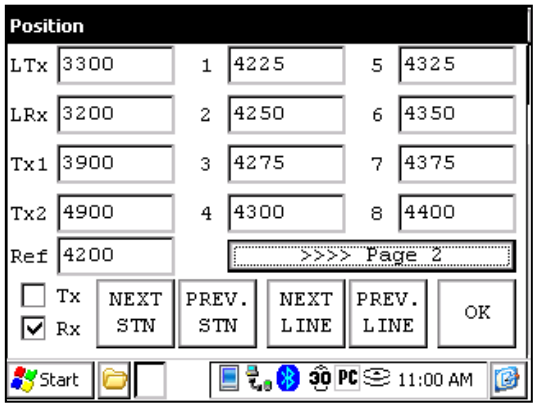
2) Enter the positions corresponding to your survey parameters.



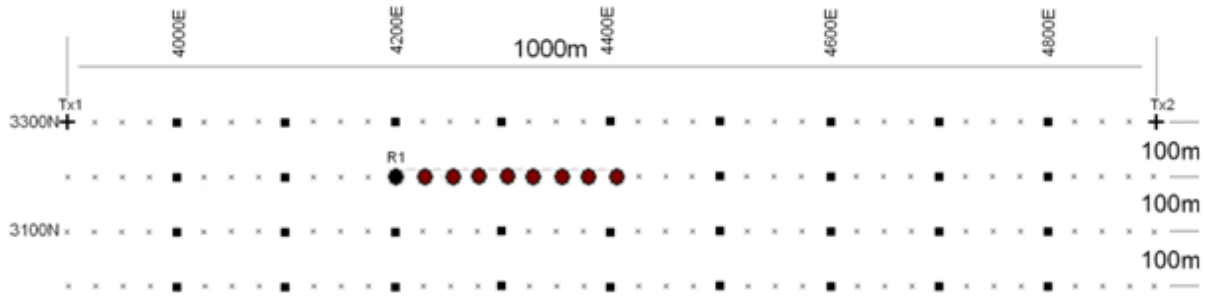
3) If all the values are correct, click the Ok button to continue and take a reading. If something is incorrect, you can modify it on this page. Uncheck the Tx box so that only the Receiver electrodes position will change.



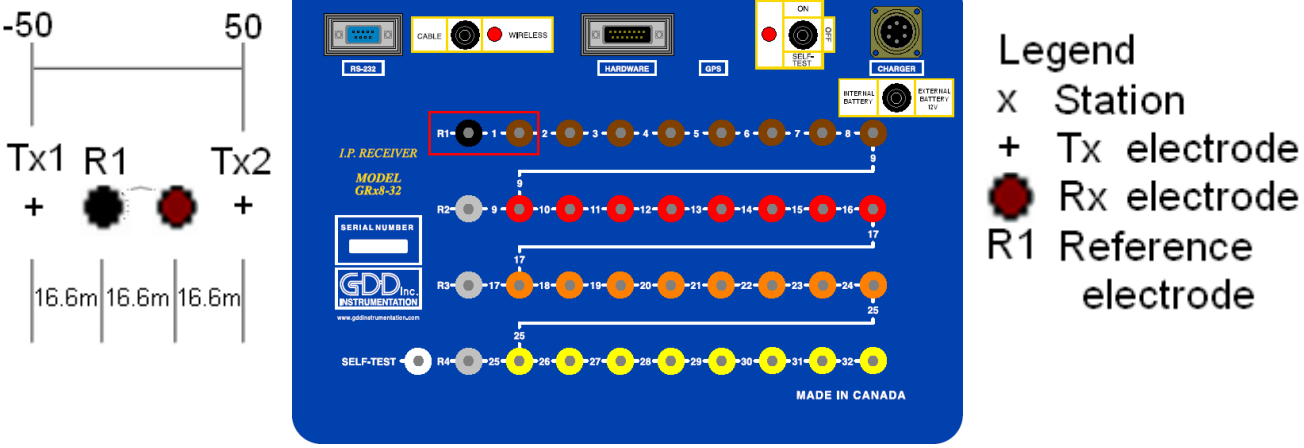
4) When the reading is done, make sure that the Tx box is unchecked, click the NEXT STN button to increment the positions. Only the Receiver electrodes position changes.
In this example, you will need to click the NEXT STN button 8 times to be at the position indicated on the next screen.



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

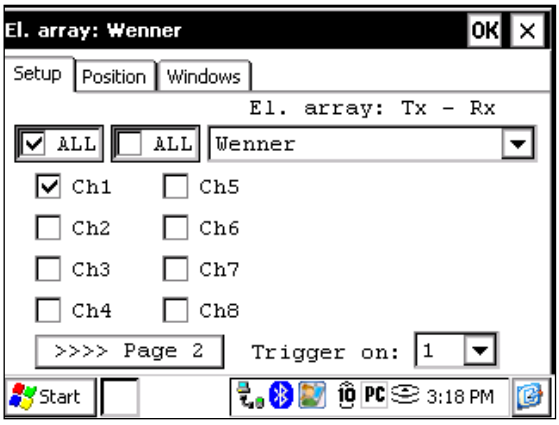


Wenner

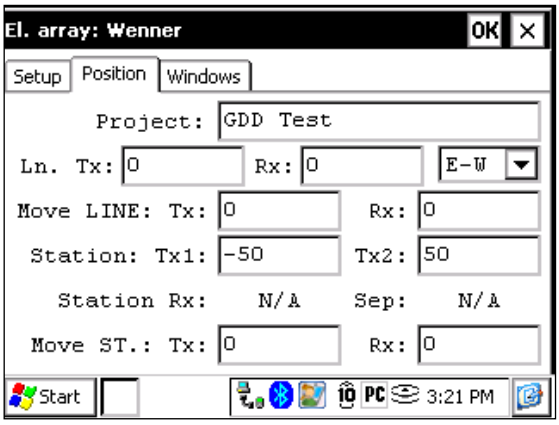


A Wenner setup uses only two electrodes, the Reference R1 and the electrode 1 of the GDD Rx.

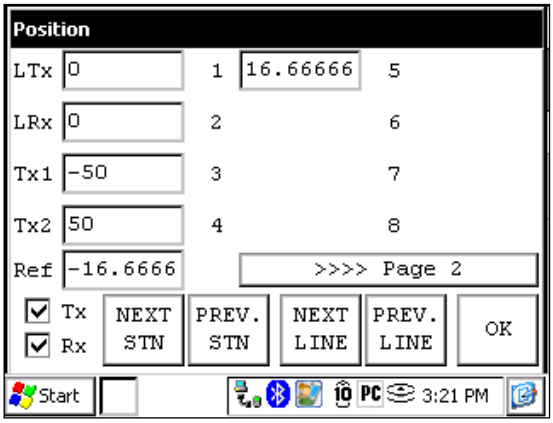
1) Select Wenner in the setup page and check only one channel.



2) Enter the positions corresponding to your survey parameters.

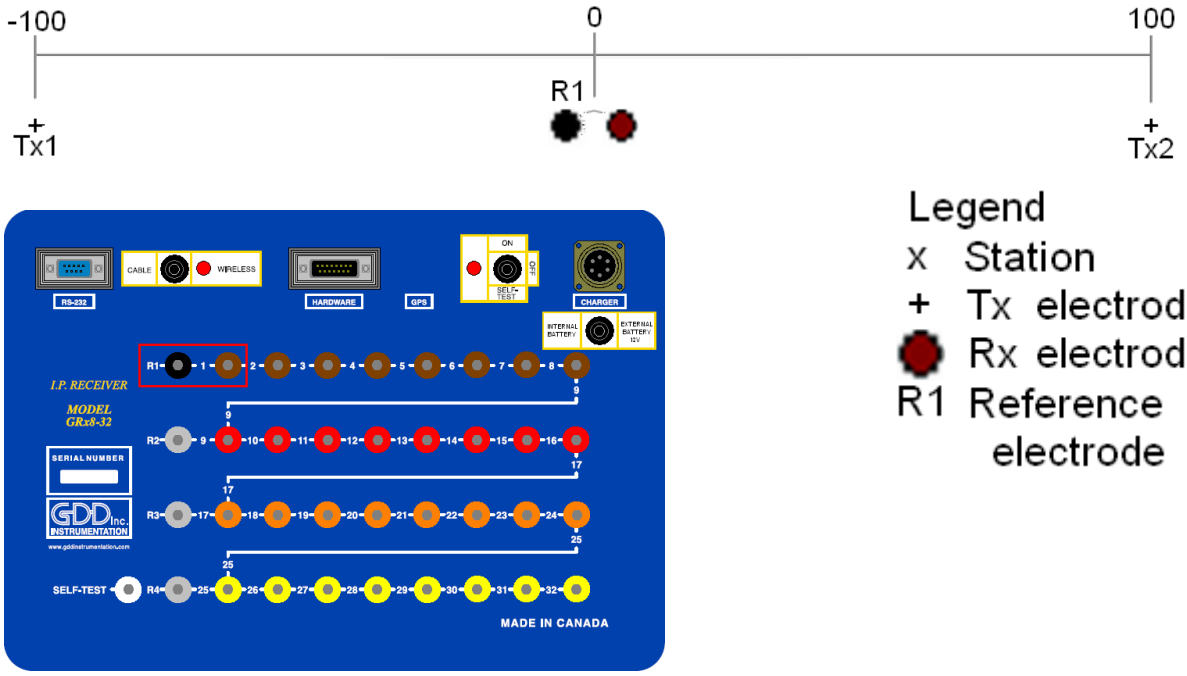


3) If all the values are correct, click the Ok button to continue and take a reading. If something is incorrect, you can modify it on this page.



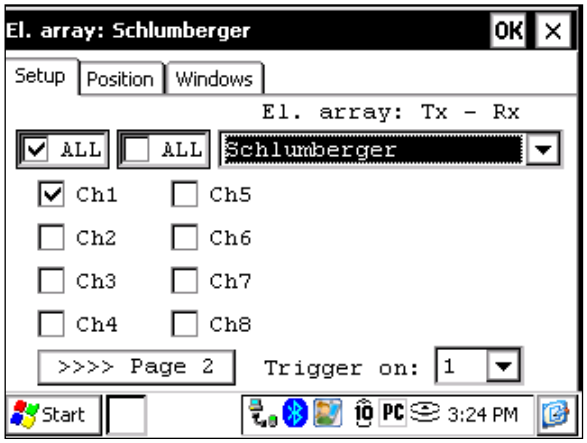
4) For a Wenner survey, you will have to manually enter the parameters for each reading. To access the Position page, click the Tools button and select the Config option in the pop-up menu.

Schlumberger

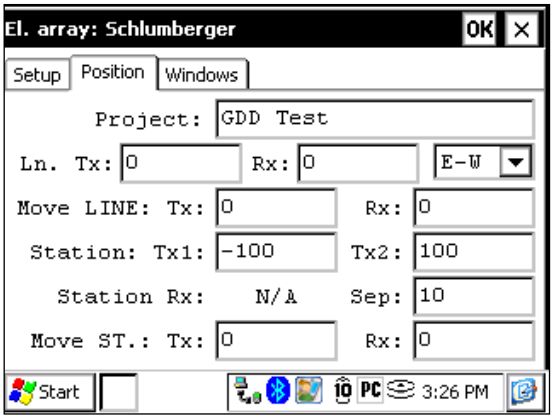


A Schlumberger setup uses only the Reference R1 and the electrode 1 of the GDD Rx.

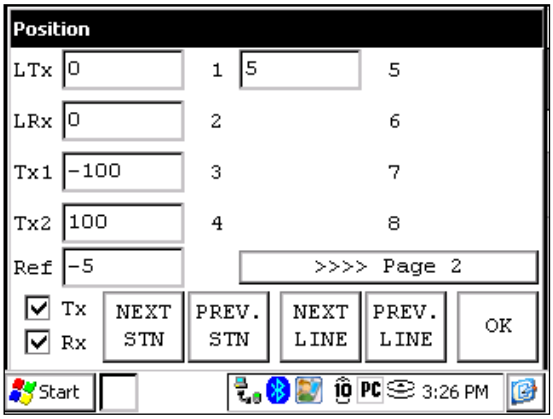
1) Select Schlumberger in the setup page.



2) Enter the positions corresponding to your survey parameters.

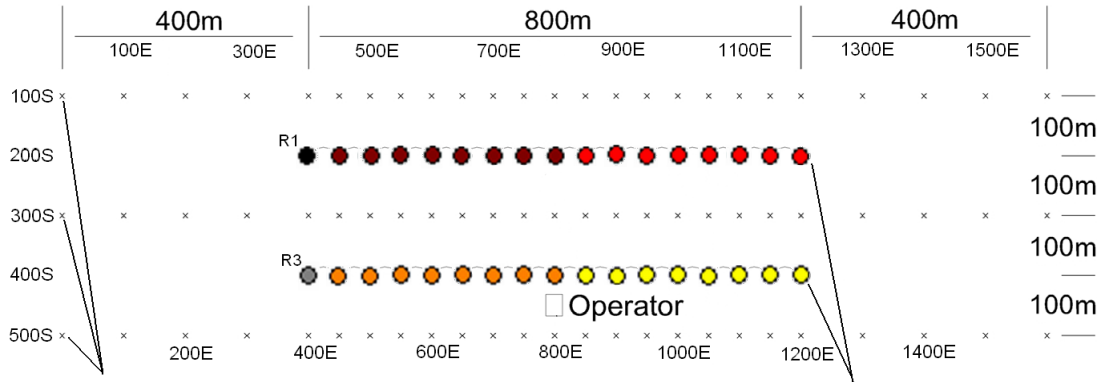


3) If all the values are correct, click the Ok button to continue and take a reading. If something is incorrect, you can modify it on this page.



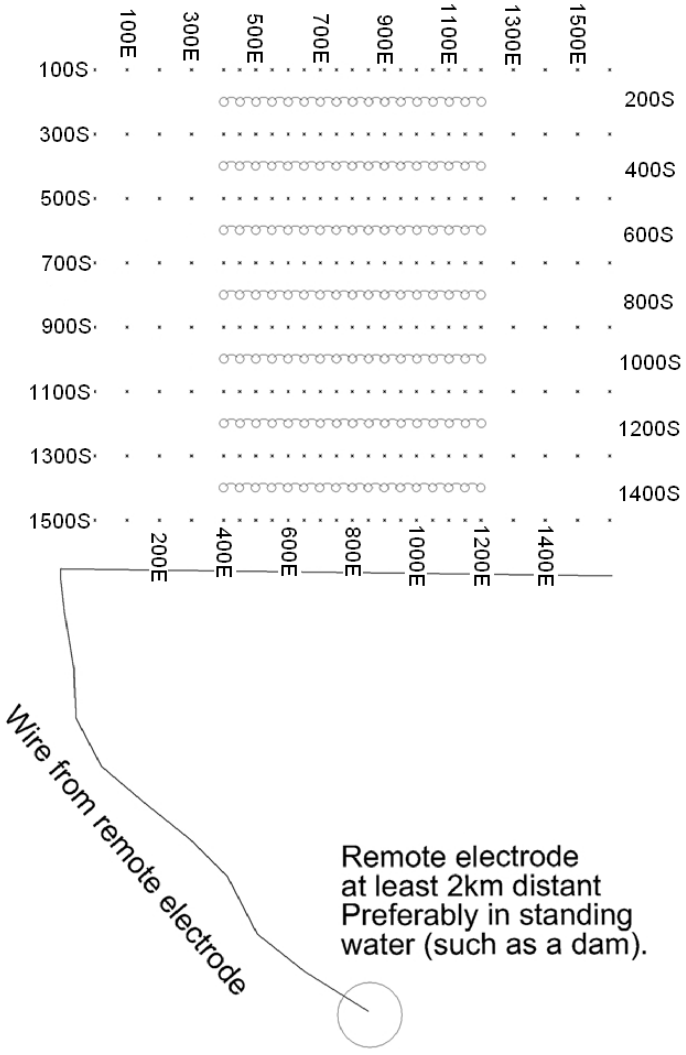
4) For a Schlumberger survey, you will have to manually enter the parameters for each reading. To access the Position page, click the Tools button and select the Config option in the pop-up menu.

3D Survey: Pole-Dipole (2/16)

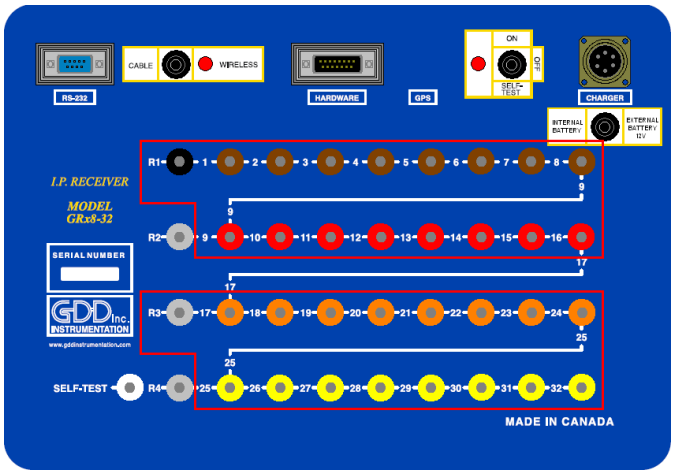


Transmitter pole electrodes
3 lines of electrodes
100m either side of the receiver line
17 electrodes plus 4 at each end
=25 per line x 3 lines
=75 transmitter pole electrodes

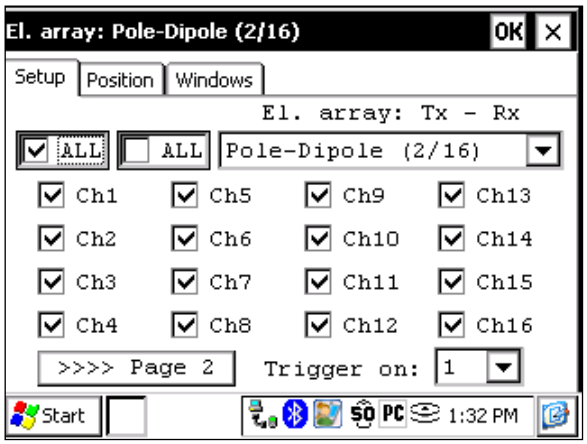
Receiver electrodes
2 lines
17 electrodes per line
16 dipoles per line
Fixed location



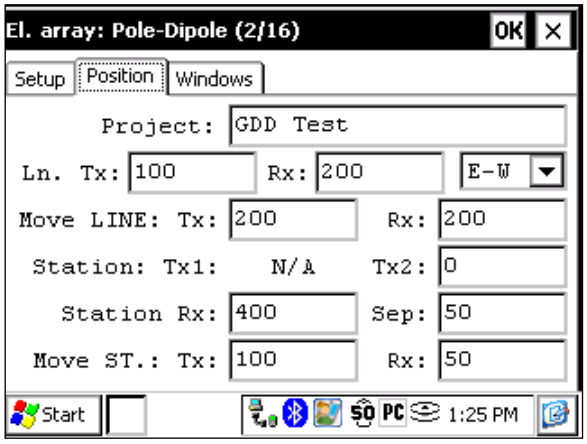
As shown on the images on the previous page, this setup is for 2 lines of 16 dipoles each using a GDD Rx-32. For the reference pins, R1 and R3 will be used; R2 and R4 will not be used since this is a 2 line setup.



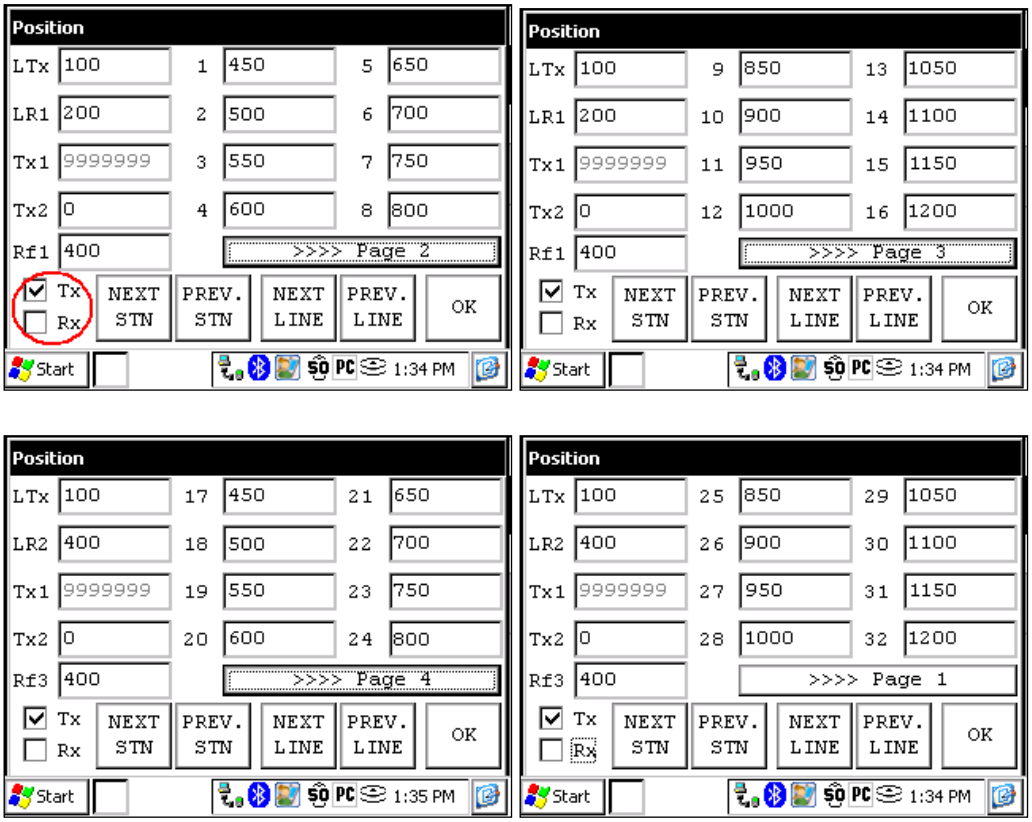
1) Select the Pole-Dipole 2/16 on the Setup tab.



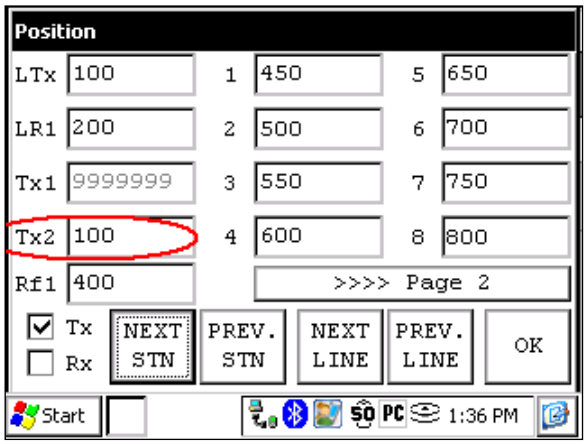
2) On the Position tab; enter the parameters of your survey.



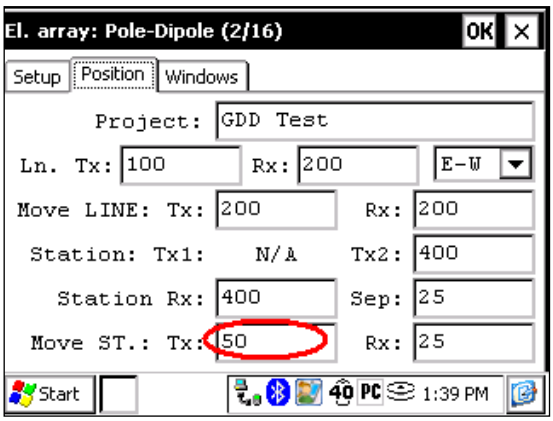
3) Uncheck the Rx box so that only the Tx position will change when you click the NEXT STN and NEXT LINE buttons. Verify that the positions of the 32 electrodes are set properly. Hit the OK button to close this window. On the next screen, click Start to take readings.



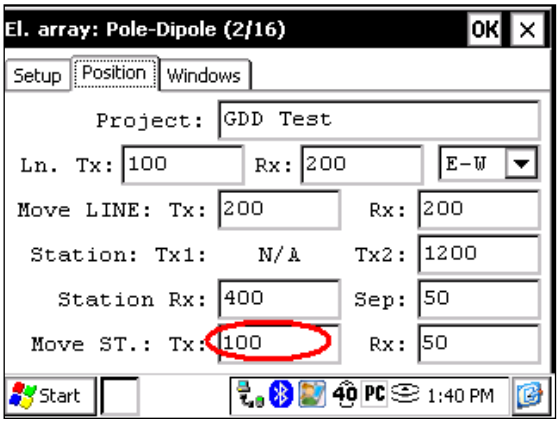
4) After readings are taken and stored, click the Start button. Click the NEXT STN button and only the Tx2 station will be incremented by 100 since it was entered as the Tx spacing.



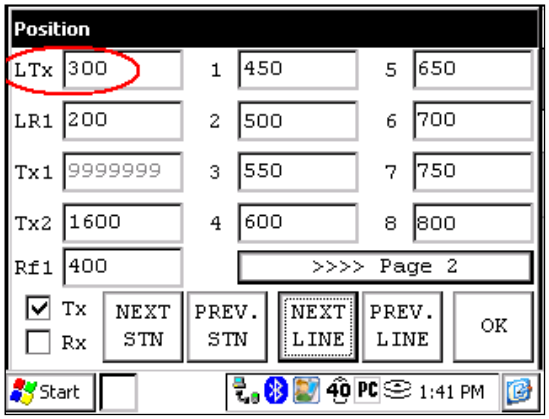
5) When the Tx2 station position is at 400, you will have to modify the spacing from 100 to 50. Select Tools -> Config and the next screen will appear. Select the Position tab and change the Move St.: TX: to 50.



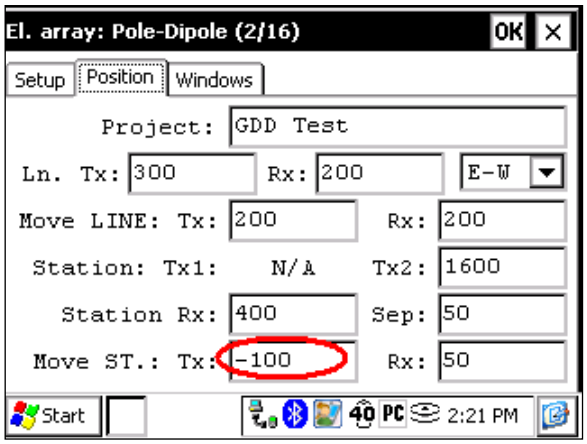
6) Continue the survey. When the Tx2 station position is at 1200, you will have to change the spacing back to 100.



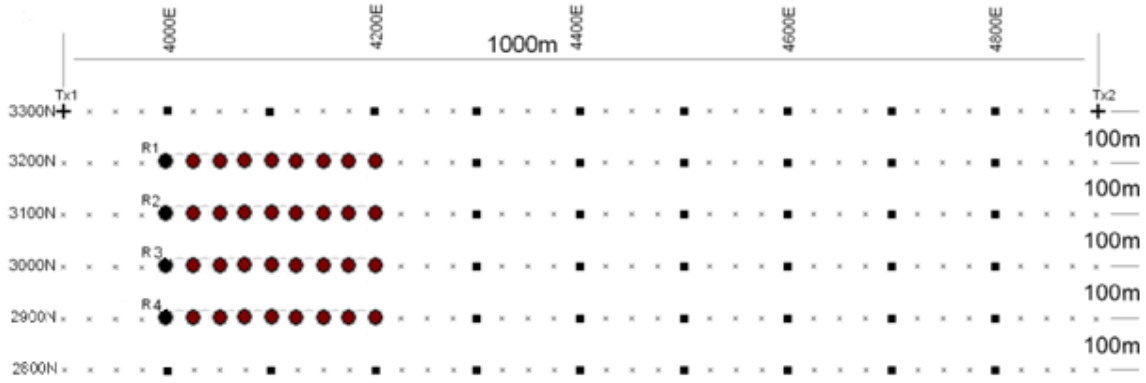
7) When the line is complete press NEXT LINE to increment the LTx.

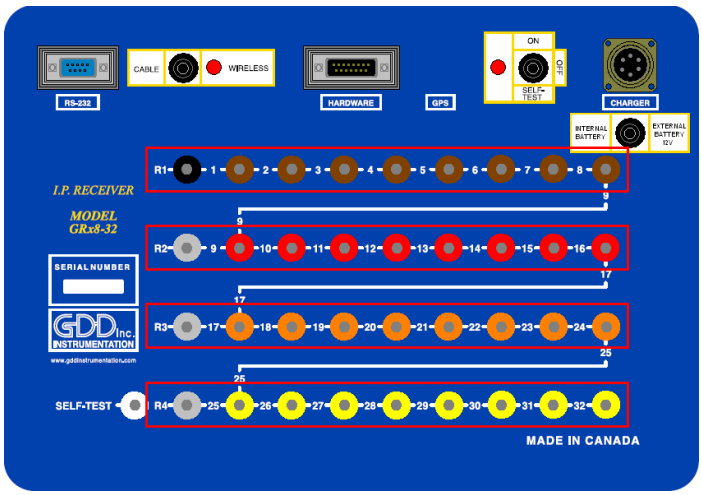


8) When the line is done, change the Move ST.: TX: to -100 or the Tx2 position to 0 depending on where you are starting the next line.



3D survey: Gradient (4/8)

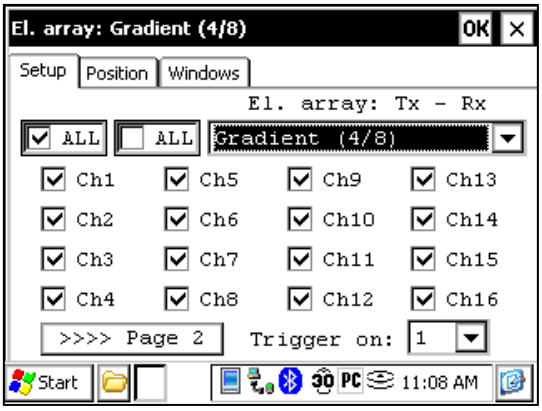




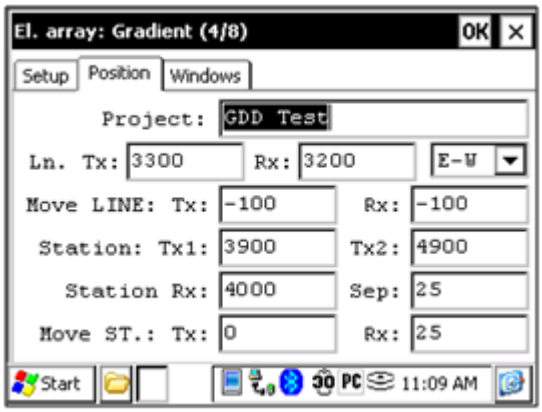
Legend
x Station
\+ Tx electrode
Rx electrode
R1 Reference electrode

For this Gradient setup, 32 electrodes of the GDD-Rx will be used.

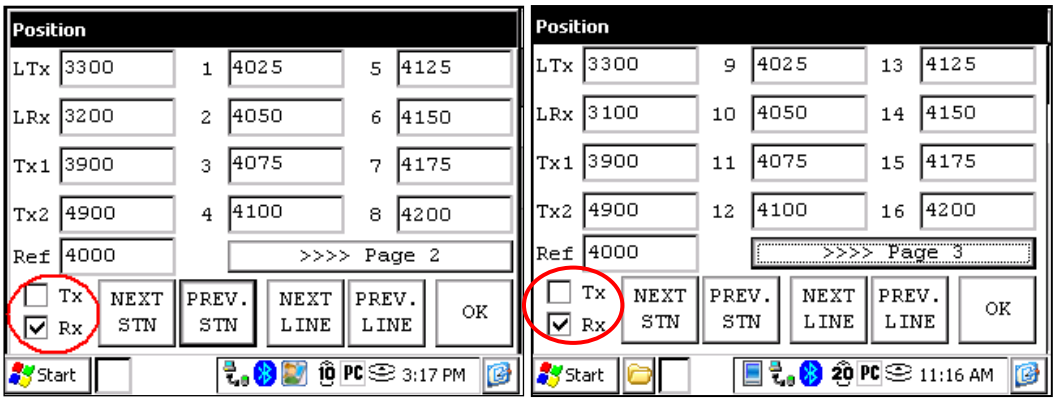
1) Select Gradient (4/8) in the setup page.

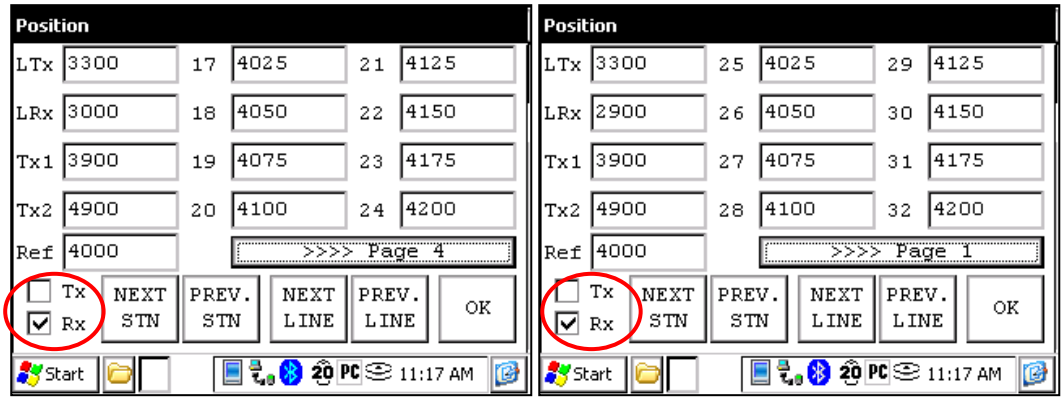


2) Enter the positions corresponding to your survey parameters.

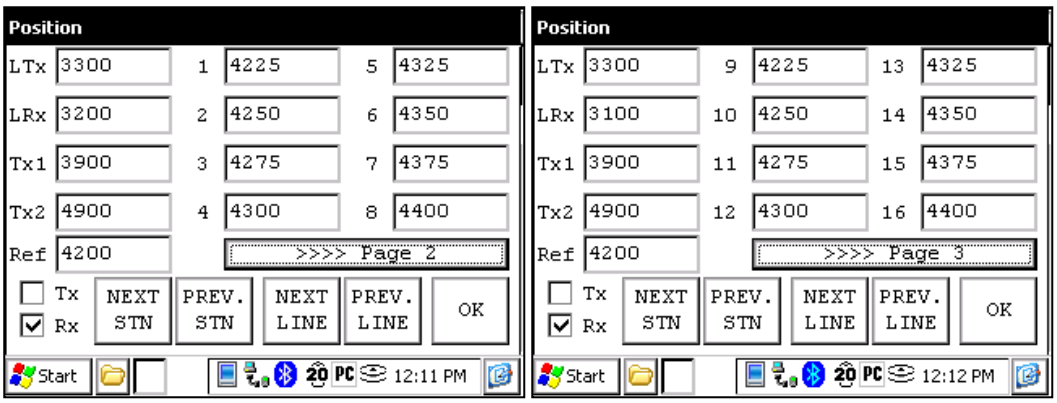


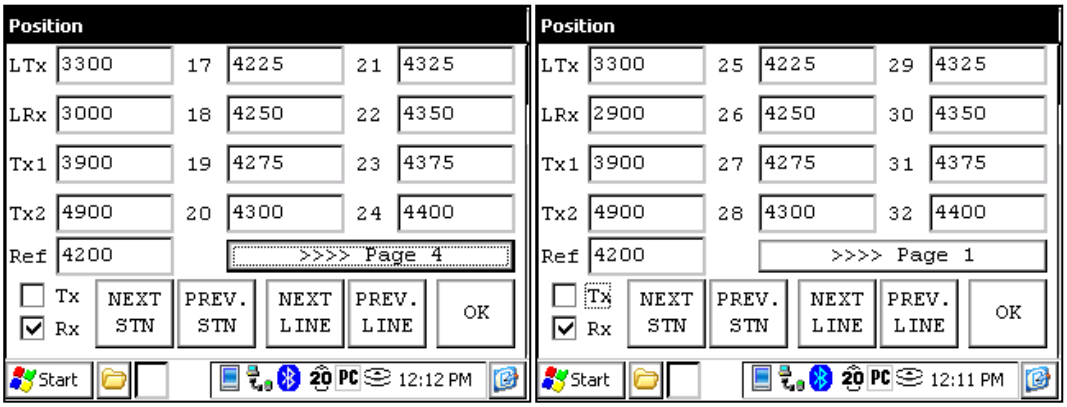
3) If all the values are correct, click the Ok button to continue and take a reading. If something is incorrect, you can modify it on these pages. Uncheck the Tx box so that only the Receiver electrodes position will change.



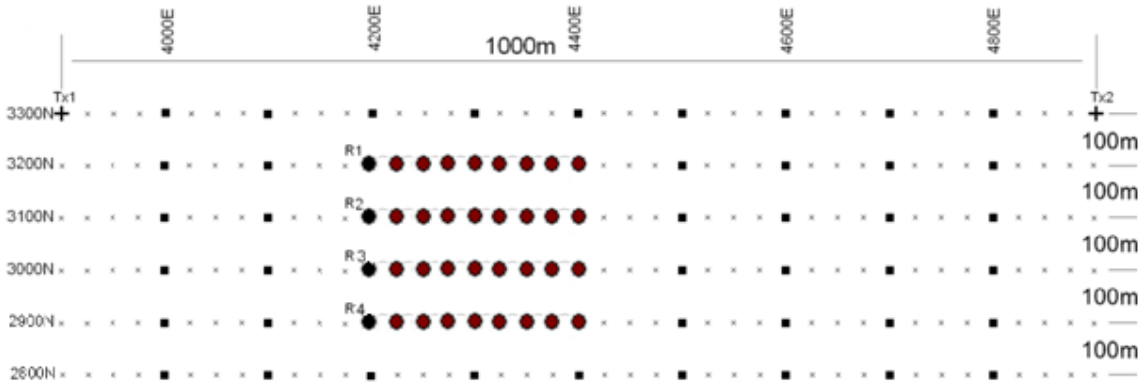


4) When the reading is done, make sure that the Tx box is unchecked, click the NEXT STN button to increment the positions. Only the electrodes position on the Receiver will change.
   In this example, you will need to click the NEXT STN button 8 times to be at the position indicated on the next screen.



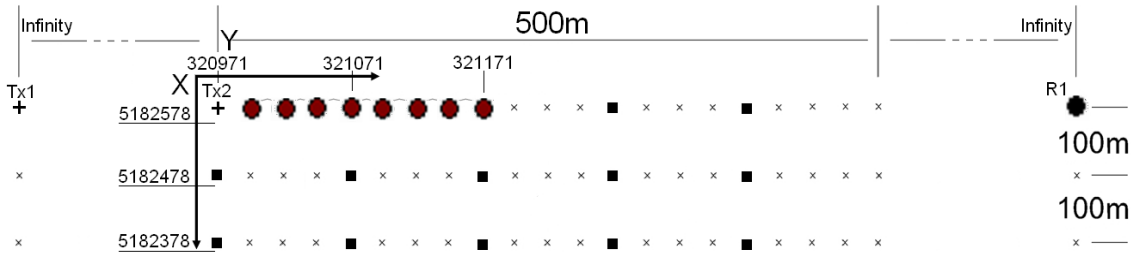


5) Your next setup on the field should be like this.

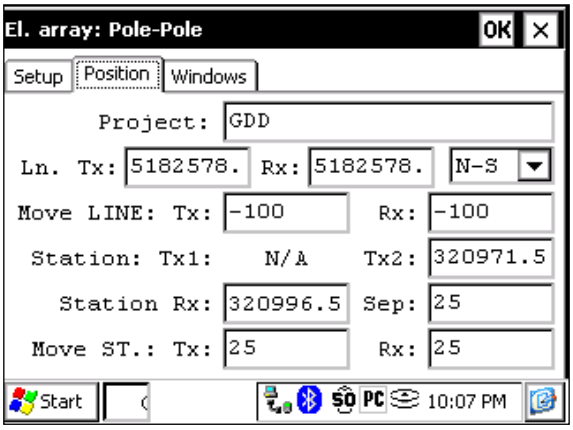


GPS Positions

Setting GPS positions instead of nominal positions

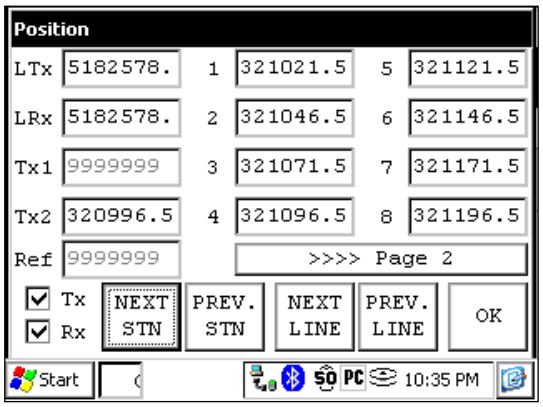


Starting position: X – 320971.52 Easting Y – 5182578.35 Northing

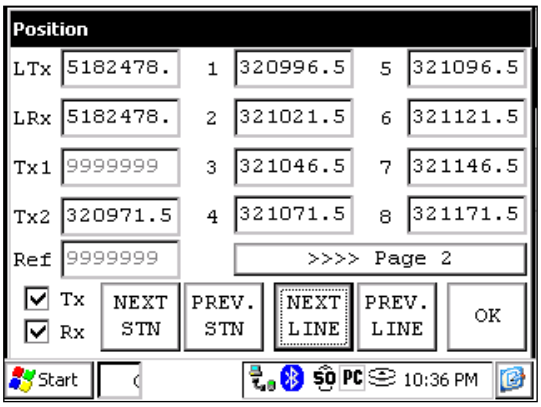


Instead of using a relative position system (the starting position being 0,0), you can enter a GPS position in meters in the Line TX, Line RX, Tx1, Tx2 and Station Rx cases. You can enter any number between -9999999 and 9999999.

Next Station



Next Line



Annex 4 – Example Dump File (.gdd format)

Version PPC: 0.4.2.42 Version Rx: 0.2.5.10 Rx SN: 1309

Project:

Windows: 20 Setting: Arith. Delay (ms): 240 Timing (ms): 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 80, 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 firmware
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)
Setting:	Selected mode (Arith., Semi, Log., Cole, User)
Delay (ms):	Delay in ms before the first window (depending on the selected mode)
Timing (ms):	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.

Mem	Memory number
Date	Date, format DD/MM/YYYY (date of the PDA when recording the reading)
Hour	Time, format HH:MM:SS (time of the PDA when recording the reading)
Array	Electrode Array; P-P, P-DP, DP-DP, WEN, GRAD
LineTx	Transmitter Line Label
LineRx	Receiver Line Label
Dir	Line Direction (N-S or E-W)
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