

MPP PROBE

Model MPP-EM2S+

Instruction Manual



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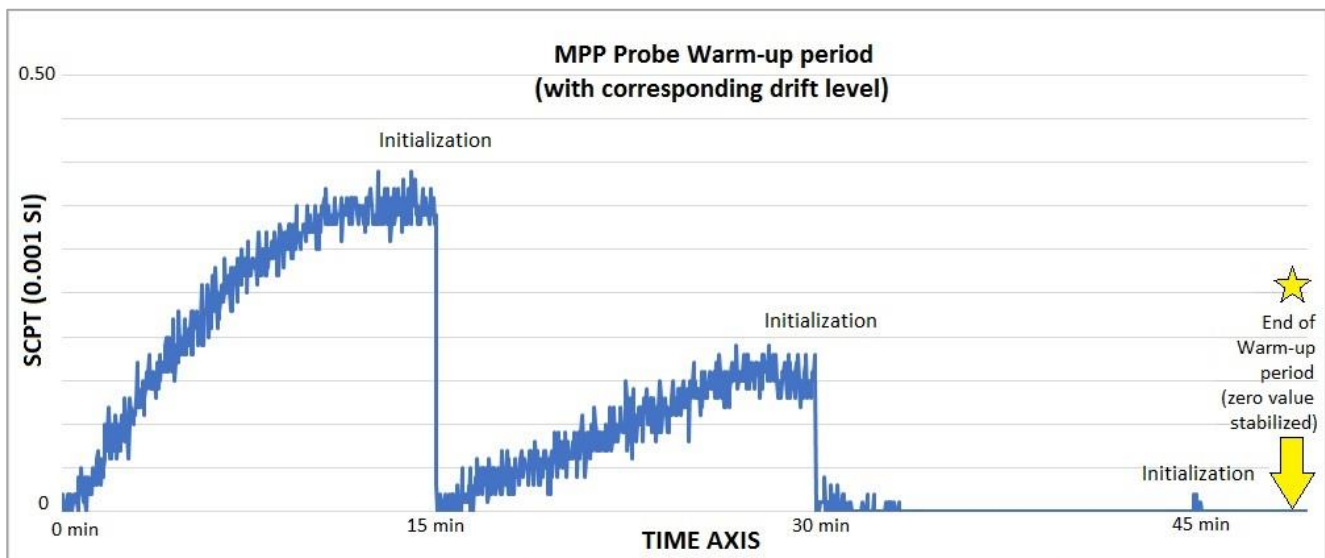
Table of contents

WARNINGS: Measure Stability and Battery Discharge	3
1. Introduction	5
2. Mineral Conductivity – General Rules	6
3. Equipment List.....	7
4. Batteries	9
5. Probe buttons and switches.....	12
6. Archer² field computer characteristics	14
7. Quick Start.....	17
8. Starting.....	18
9. Display.....	22
10. Setting parameters	23
11. Reading modes.....	29
12. Software installation and file transfer.....	40
13. Readings interpretation.....	49
14. How to re-install GDD MPP Software	50
15. Software update installation	51
16. Importing a file in Microsoft Excel	55
17. Troubleshooting	57
18. Technical Support	67
Annex 1 : Example of a Dumped File.....	68
Annex 2 : Graphics from Manual and Continuous Modes	69

WARNINGS: Measure Stability and Battery Discharge

Measure Stability (Drift)

The MPP-EM2S+ is a useful geophysical instrument that will help you to get the information that you need to design an appropriate geophysical survey. In order to obtain stable values (which should be around 0) and avoid signal drift, **it is highly recommended to leave the probe ON during one hour before taking the first measurement**. After one hour, you must re-initialize the probe and then, you are ready to take measurements. To minimize the drift once you have started to take measurements, you must initialize the probe every 1, 5, 10 or 15 minutes. By default, the option 1 minute between every initialization is activated.



If you want to take measurements right away after turning on the probe, we suggest that you initialize the probe every minute or, for best results, before each reading for the first 30 to 60 minutes.

This preventive procedure decreases the risk to take erroneous values that would be caused by weather variations or by other external causes that lead to a drift of the instrument. It is therefore very important to often re-initialize in order to maintain the «0» base value used in the calculation of the displayed values.

Please take note that values are more stable after 20 minutes and are completely stable after 50 to 60 minutes.

Battery Discharge

***** It is recommended to put the Archer² field computer on charge when not in use to avoid discharge of the battery.**

***** For the probe, when the level of the AA batteries charge is low, the value of the readings could be inaccurate and you could not be able to initialize the probe.**

The specifications described in this Instructions Manual is valid at temperatures between 0°C and 70°C. At temperatures lower than 0°C, some specifications, like the batteries life, could be different.

1. Introduction

Thank you for choosing the MPP-EM2S+ Multi Parameter Probe developed by Instrumentation GDD to help you optimize your prospecting efforts. This probe will help you to better determine the nature, the exact position as well as the intensity of magnetic/conductive horizons along your cores and samples. The simplicity of the measurement process and the automatic recording will allow you to easily obtain conductivity and magnetic susceptibility profiles corresponding to the core.

Here are the key benefits of the new MPP-EM2S+ probe:

- It provides you the ability to measure at all time the magnetic susceptibility with or without the presence of a conductor such as pyrrhotite.
- It has improved software to measure in continuous mode using a time base with specific lengths of your choice.
- It is equipped with new software to quickly create a profile from the measurements taken in continuous mode.

Because the probe's response towards a conductor is similar to a conventional electromagnetic (EM) survey's response, it will provide you more significant information than an ohmmeter or a visual interpretation would do. To give an example, if the conductive zones of your core are evaluated by an ohmmeter, the occurrence of chalcopyrite will induce a reading corresponding to a conductive zone. In fact, chalcopyrite, even if it seems massive, will often not produce an anomaly detectable by an EM survey. Along the core, the MPP-EM2S+ probe will have a similar response as the EM response and will only indicate the conductors detectable by this type of survey. The use of the MPP-EM2S+ probe could, therefore, prevent you to beginning an EM survey campaign for a type of ore that would not respond to this approach.

In the previous example, the phenomenon that explains the absence of conductivity is probably related to the chalcopyrite ore distribution in the sample. If the chalcopyrite grains are not touching each other but are linked only by very thin filaments, the ohmmeter will detect the conductor presence because of these tiny filaments connecting them. However, the grains, being linked only by those filaments, will not form a sufficient surface to be detected by the probe.

For an equivalent content of conductive material, the probe's response will be higher in function of the conductor's surface. You could try the following experience. Take an aluminium paper foil (a few cm²), put the probe on the sheet and note the intensity of the anomaly. Roll the sheet in a small ball, put the probe on the ball and take the reading again. You will see that the intensity of the anomaly is higher for a larger contact surface even if the substance conductivity and quality are the same.

2. Mineral Conductivity – General Rules

Pyrrhotite often occurs in thin but continuous veins. It causes multiple and very high EM anomalies.

Chalcopyrite is hardly detectable for two reasons.

- 1- It is 20 times less conductive than pyrrhotite.
- 2- It occurs, more often, in disseminated grains or clusters rather than in continuous beds, as the pyrrhotite or graphite that extend in horizons of hundreds of meters.

Pyrite and galena are not conductive when they respond to an EM survey even within a single crystal. However, we have observed some very conductive samples of silver-bearing galena (Kamouraska) and pyrite rich in gold. (Balmorals and Wrightbar mines).

Sphalerite, arsenopyrite and stibnite are never conductive and are not detectable with EM and IP surveys.

Rich graphite beds can be more conductive than pyrrhotite. Occasionally they are not conductive at all. Graphite can also show all intermediary conductivity values.

It is important to note that, with or without the presence of a conductor such as pyrrhotite, the MPP-EM2S+ probe will measure the magnetic susceptibility value.

At all times, the MPP-EM2S+ provides an estimated EM conductivity value.

3. Equipment List

When receiving a GDD MPP probe, model MPP-EM2S+, ensure that it contains the following elements:



1. One (1) MPP-EM2S+ wireless probe
2. Four (4) rechargeable AA batteries with charger
3. One (1) MPP wall power supply with international plug kit (universal voltage)
4. One (1) standard serial communication cable
5. One (1) Archer² Field computer with one rechargeable 10600mAh Li-Ion battery, one hand strap and one capacitive stylus
6. Two (2) Archer² micro USB sync cables
7. One (1) Archer² AC charger with international plug kit (universal voltage)
8. One (1) Screwdriver (for Archer² battery cap)
9. One (1) MPP Instruction Manual
10. One (1) MPP utilities CD-ROM/USB stick (contains MPP software, sync softwares, MPP manuals, Archer² manual)
11. One (1) Archer² Quick Start Guide

Not shown on the illustration:

1x Black carrying case

1x Set of international adapters for AA charger

1x Spare cap for MPP probe's batteries holder

4. Batteries

4.1 Archer² field computer batteries

It is strongly recommended that you always keep a charged battery within the Archer² field computer.

It is therefore suggested that you put the Archer² field computer on charge when not in use for up to two weeks to avoid discharge of the Li-ion batteries. Always use the battery and the charger provided with the Archer² to avoid any damage or overcharging. Charge the battery at room temperature for a more efficient charging. The battery will not charge at cold or hot temperature.

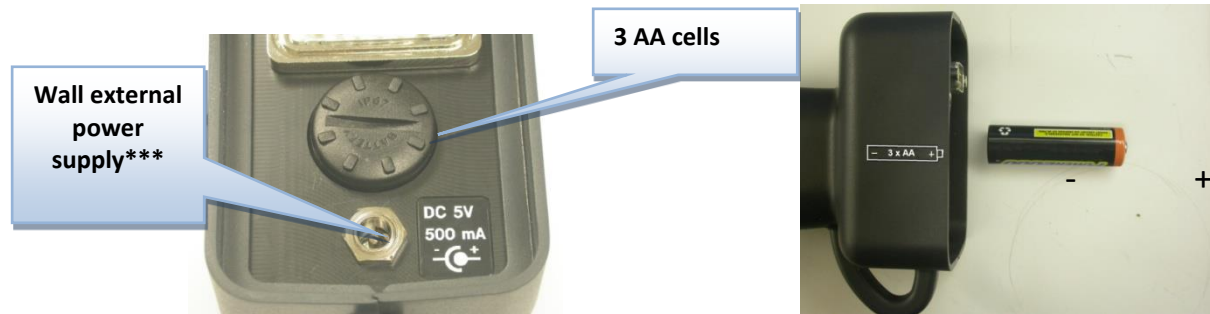
A fully charged battery will have a battery life of up to 20 hours. This can vary depending on the use or the temperature.

To check the remaining battery power on the Archer², tap on the Title bar and select the battery icon from the list of applications that drops down. The remaining battery power appears.



4.2 Supplying power to the probe

With the MPP 1000 Series, it is possible to use three AA batteries or the wall power supply included with the MPP set.



***** The use of another power supply than the one provided by GDD could damage the probe.**

4.3 Battery level indicator

If the power of the probe is supplied by three AA batteries, it is important to verify that the level of the batteries charge is sufficient.

Press and hold the BI button to turn on the lights.



Lights signification

Lights on	Status	Time remaining in wireless mode**	Time remaining in cable mode**
Red, yellow, green	The batteries are fully charged	7.5 hours	9 hours
Red, yellow	The batteries are partially discharged	0-4 hours	0-4 hours
Red	The batteries are not enough charged to supply the probe	2-3 minutes	2-3 minutes
No lights on	The batteries are absent or totally discharged	0	0

** This information is an approximation only. The time remained depends of the type of cells and the operating conditions.

4.4 Recharging AA batteries

Simply put the AA batteries in the charger and plug it in the wall using the 120 V plug located at the back of the charger or another plug adapter. The AA batteries charger is made to be used at 50/60Hz – 120/240V.



4.5 Recharging Li-ion batteries

The Li-ion battery pack of the Archer2 field computer must be recharged with the charger provided with the MPP set. This battery pack lasts approximately 1000 to 3000 charging cycles before it needs to be replaced. Use the screw driver provided with the MPP set to remove the battery cap if you need to replace the battery.



5. Probe buttons and switches

5.1 On / Off Switch

Turn on the probe with the On / Off toggle switch.

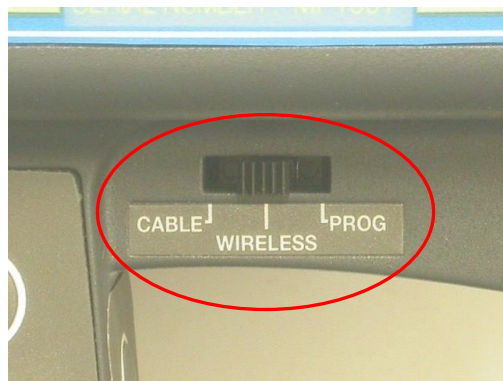


5.2 Cable / Wireless / Prog Switch

The **Cable / Wireless / Prog.** switch is used to select the operating mode.

*** **It is important to place the switch in the position wanted before turning the probe on.**

The **Cable** and **Wireless** positions are used to operate with or without cable. The **Prog** position is not used for normal operation. If the operating mode must be changed during the operation, the probe must be turned off before changing it.



5.3 STAMP and MEM buttons

There are two buttons on the handle of the MPP–EMS2+ probe. These buttons have the same utility as the **STAMP** and **MEMORY** keys in the Archer² field computer and were designed to facilitate handling. See *Section 11 – Reading Modes* for more details.



5.4 BI button



See *Section 4.3 – Battery level indicator* to know how to use this button.

6. Archer² field computer characteristics

If you have any question regarding the Archer² field computer characteristics, you can refer to Archer² Manual provided on the MPP Utilities CD-ROM/USB Stick.

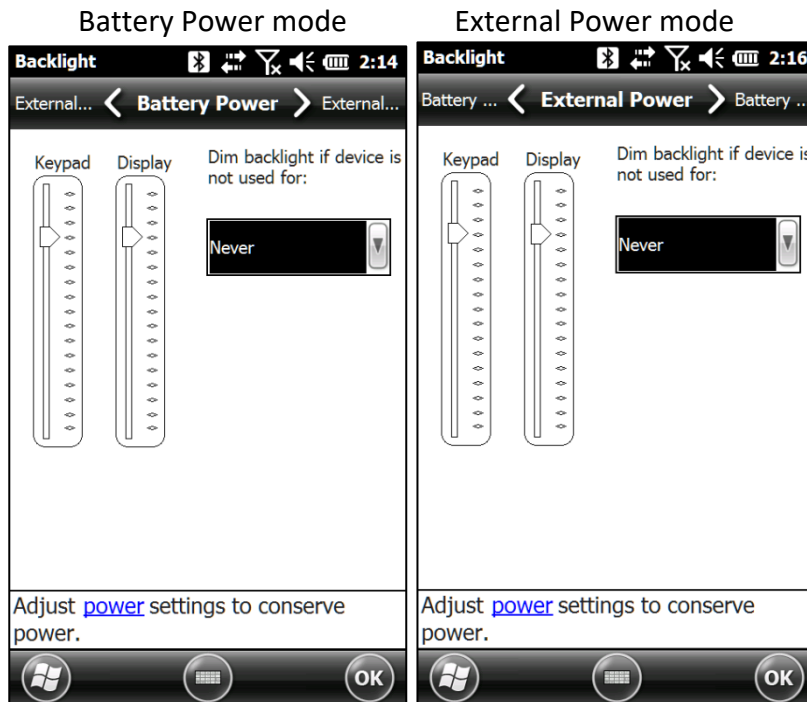
Important note: Using a finger may still be the preferred option for projected capacitive screen technology, but we understand a stylus may also be necessary (like when it's cold). The way you hold a capacitive stylus really impacts how it works. To register a point, it is like the screen is taking a sample from which to calculate the position. It then snaps to the closest line on a grid. If you hold a capacitive stylus at an angle, it registers less area and does not calculate your true position as well. For best results on a capacitive screen like the Archer², hold the stylus as perpendicular to the screen or straight up as you can.

Here are a few suggested settings (these settings are already configured by GDD when the instrument leaves GDD's office):

Go to the Home page, and tap on Settings in the Favorites bar. Tap on the System icon in the Settings page.

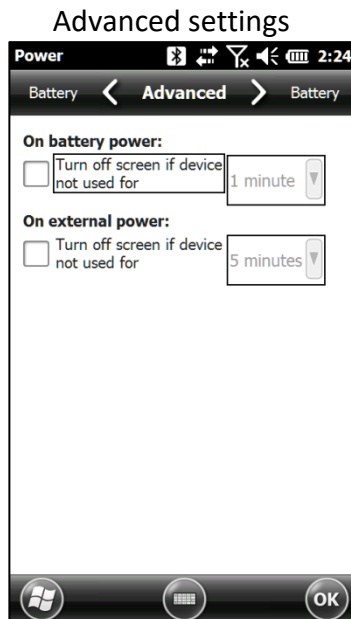


Backlight



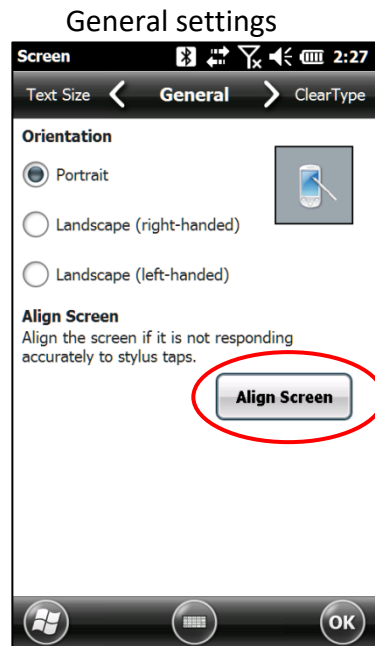
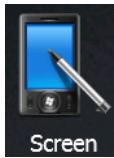
Tap on < or > of the upper bar to get the External Power page or the Battery Power page.
Tap OK to go back to the Settings page.

Power:



Tap on < or > of the upper bar to get the Advanced page.

Screen :



Tap on Align Screen to make sure that the screen will respond accurately to stylus taps.

Tap on OK of the Screen page and on X of the Settings page to go back to the Home page.

7. Quick Start

1. Insert three fully charged AA batteries into the probe and a fully charged Li-ion battery into the Archer2 field computer. (*Section 4 – Batteries*)
2. Place the Cable / Wireless / Prog Switch on Wireless position. (*Section 5.2 – Cable / Wireless / Prog Switch*)
3. Turn on the probe and the Archer² field computer. (*Sections 5.1 – ON/OFF Switch and 6 – Archer² field computer characteristics*)
4. Tap on the MPP icon in the Favorites bar of the Home page of the Archer² field computer.
5. Enter the sample diameter or select the Wall option for a flat surface and click Confirm.
6. Move away the probe from any conductive or magnetic material (point it in the air) and click in the GDD logo space to initialize.
7. Configure parameters, i.e. file name, spacing, mode, etc. (*Section 10 – Setting parameters*)
8. Take and record readings. (*Section 11 – Reading modes*)
9. Create a file to save readings. (*Section 10.4 - Memory*)
10. Transfer the file to your computer using the USB cable. (*Section 12 – Software installation and file transfer*).

8. Starting

8.1 Starting– Wireless (Bluetooth) mode

***** It is highly recommended to leave the probe ON during one hour before taking the first measurement.**



1. Turn and pull the cap of the battery holder, and insert 3 AA batteries into the probe. Push and turn the cap to close it. Or, plug the wall external power supply in the power jack.



2. Place the Cable – Wireless – Prog switch in Wireless position.



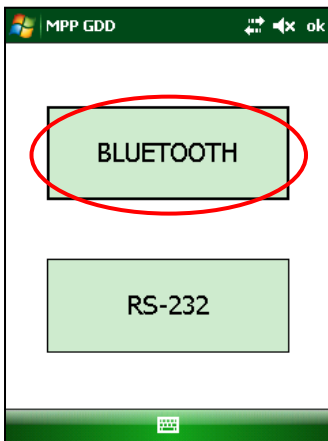
3. Turn on the probe with the On/Off switch placed on the right side of the probe.



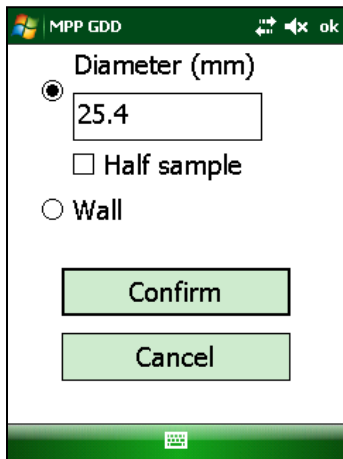
4. Turn on the Archer² field computer.



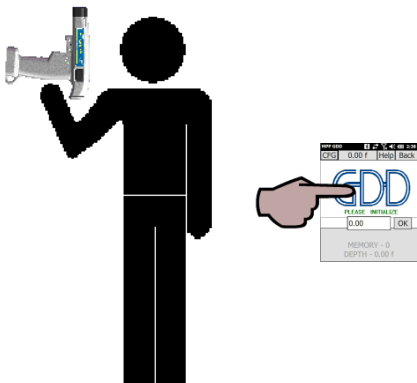
5. Tap on the MPP icon in the Favorites bar of the Home page. Use the capacitive stylus provided with the Archer² field computer or your finger to avoid damaging the screen.



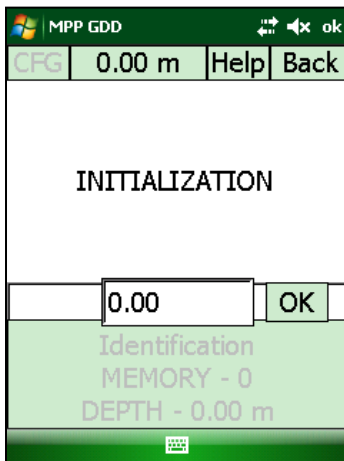
6. Select **Bluetooth** mode.



7. Enter the sample diameter or select the 'Wall' option for a flat surface. Click on **Confirm**.



8. Set the different parameters you need to use (see **Section 10 – Setting parameters**) according to the reading mode you chose (see **Section 11 – Reading modes**). Once the setting is finished, come back to the GDD logo screen, keep the end of the probe far from metal objects (point it towards the sky) and initialize it by tapping on the GDD logo.



9. The **INITIALIZATION** message should flash for few seconds and after this, the reading screen should appear. You are ready to take readings according to the reading mode you chose (see **Section 11 – Reading modes**).

*** If the **INITIALIZATION** message still appears, see **Section 17 – Troubleshooting**.

8.2 Starting – Cable mode

Connect the serial RS-232 cable between the Archer² field computer and the MPP probe.



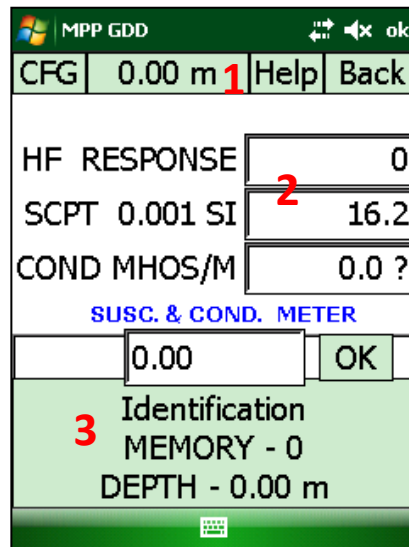
The steps for the Cable mode are the same than those of the Wireless mode (*Section 8.1 - Starting–Wireless mode*) except steps **3** and **7**.

At step **3**, the Cable – Wireless – Prog switch must be in Cable position.

At step **7**, select the RS-232 mode.

9. Display

The main screen displays three sections: The menu bar (1), the displayed measurements (2) and the memory space (3).



Several times per second, the probe measures and displays three physical properties which are:

HF RESPONSE: Conductor response measured in Hertz (Hz). It measures high frequency variations. Its value increases with the quantity of conductive material in the sample. It decreases with the distance between the probe and the sample.

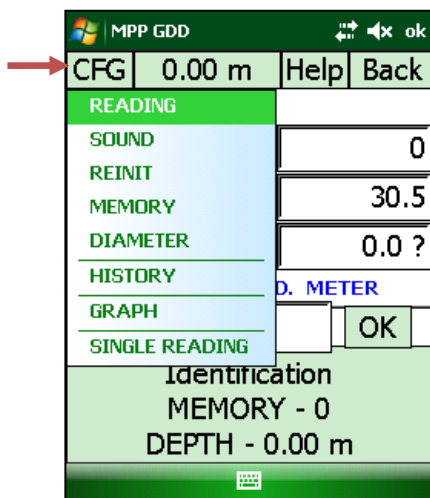
SCPT 0.001 SI: Magnetic susceptibility is a constant ($\times 10^{-3}$). SI = International system of units. Its value increases with the quantity of magnetite in the sample and decreases with the distance between the probe and the sample. It is important to note that, with or without the presence of a conductor, the MPP-EM2S+ probe will measure the magnetic susceptibility value at all times.

COND MHOS/M: Conductivity measured in MHOS/M. It is independent on the quantity of conductive material in the sample (HF Response) and independent on the distance between the probe and the sample.

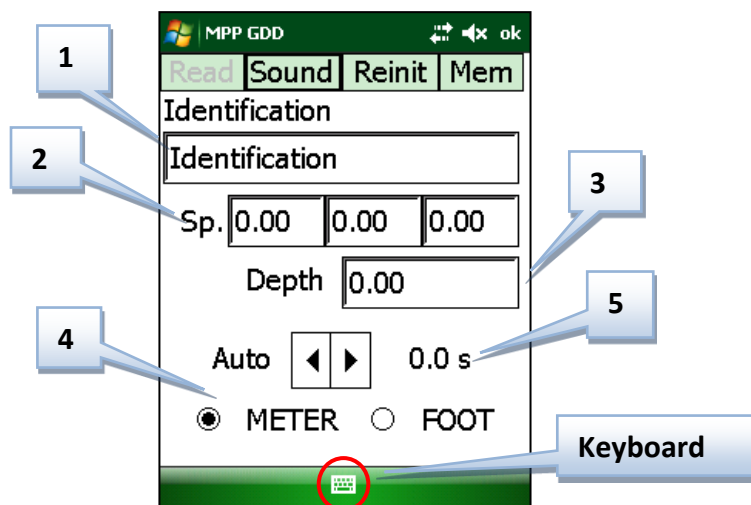
Under the measures you can find a space reserved for the samples or core identification (**Identification**). The **MEMORY** space indicates how many readings have been taken and the **DEPTH** value (position along the core) of the measure to come.

10. Setting parameters

To set the parameters of the reading modes, click on the CFG menu of the main screen. In this menu, it is possible to set Reading, Sound, Reinit, Memory and Diameter parameters.



10.1 Reading



1: Identification

This field allows you to identify your reading series. Click on the keyboard icon to enter the name you want.

2: Spacing

This parameter sets the distance between two readings. If the readings are taken with regular spacing, only one entry is needed. You can enter up to three distances, one for each of the three boxes. If the spacing is different at each reading, it is also possible to set the distance manually (see *Section 11 – Reading modes*). In this case, enter 0 into each of the three Sp. boxes.

3: Depth

This parameter indicates the depth of the first reading. The depth will increase after each reading following the spacing set.

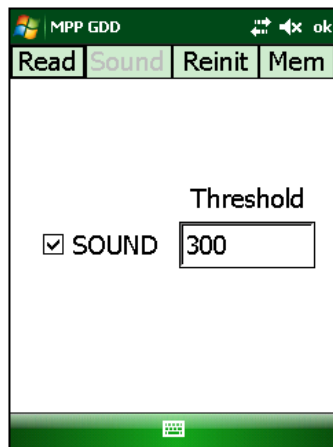
4: Unit

Select the right measuring unit of the spacing and depth parameters.

5: Recording frequency

Use this setting only if you need to work in continuous mode (see *Section 11.2 – Continuous mode*). The time selected represents the time between two readings.

10.2 Sound



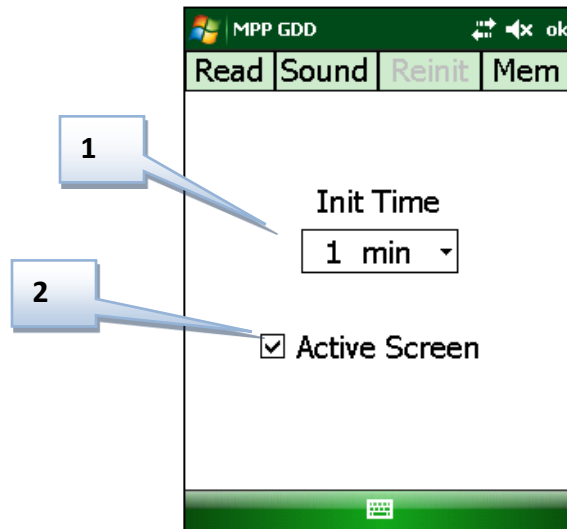
Unfortunately, this option is not available with the Archer² field computer.

This sound is the one you hear when a conductive material is detected. If the box is selected, the sound is enabled. You can set a threshold detection value for the HF RESPONSE. For values higher than threshold, the instrument will beep. The default threshold is set to 300.

The sign # appears in the Memory space of the main screen of the program if the sound is disabled.

10.3 REINIT page

The initialization is the operation that restores the readings to zero.



1: Initialization time

Remember: it takes at least 40 minutes for the probe to warm-up. Before that time is reached, you need to initialize the probe every minute or before each reading. After the probe is ready, it is possible to set the time between two initializations. The default time is one minute. Otherwise, you could also set the time for either 5, 10 or 15 minutes. The new time set will be activated after the next initialization.

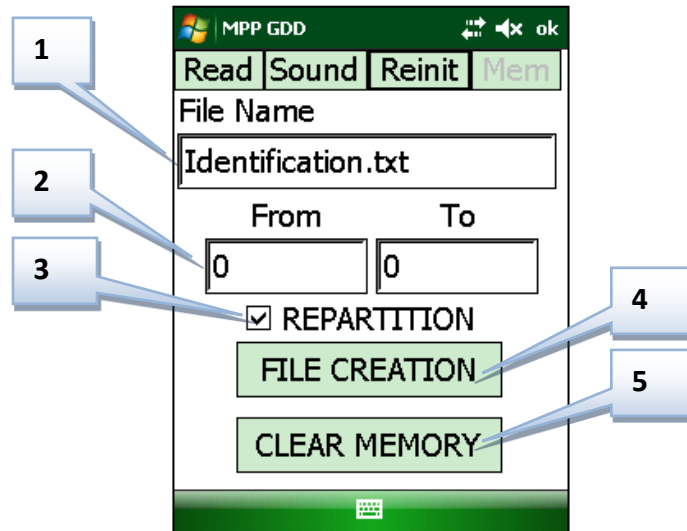
***** You will not be able to take measurements if you do not initialize the probe 30 seconds after the software asks you to do it.**

2: Active screen

You must select the Active Screen box. This function enables the touchscreen function of the Archer² field computer. It is required to initialize the probe when the software asks it.

10.4 Memory

To be able to download the recorded readings in your personal computer, a file must be created with the readings. This step is done with the Memory page. The Memory parameters are set **at the end of the process (when the readings are recorded)**.



1: Identification

If you have already entered a name for your readings series in the Reading page, it will appear in this field. If not, you can enter a new name. The name entered in this field will be the same as the created file. The .txt extension must still be written at the end of the name.

2: Memory range

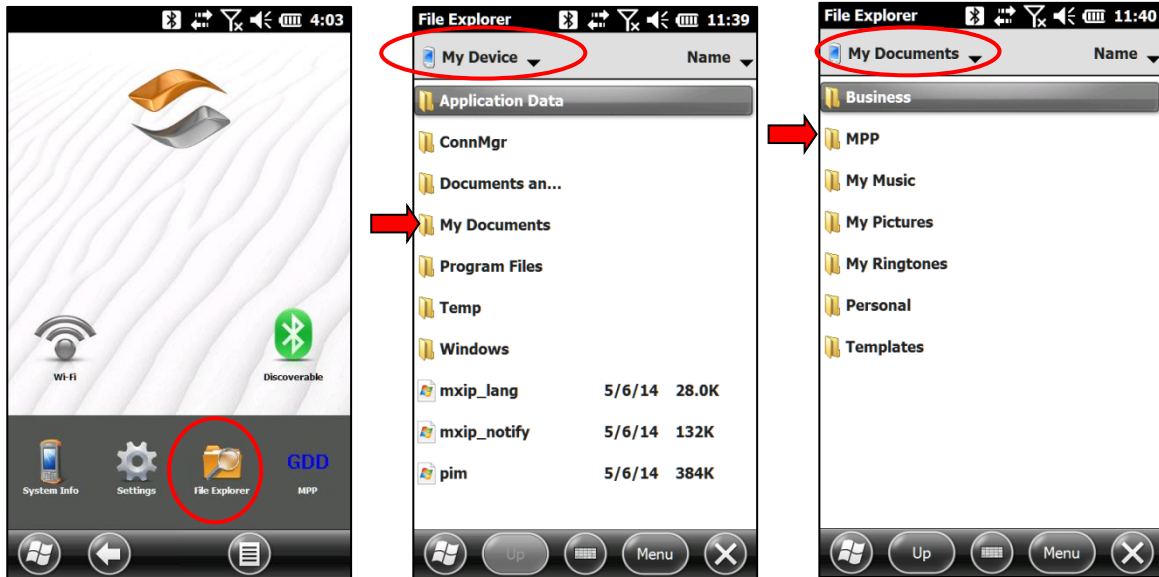
By default, this range contents all the recorded readings. It is possible to select only a little section of the entire range to create the file. The numbers indicate the number of each memory and not the depth of each reading. If the *Range Error* message appears, check if the numbers of the memories you selected are existing.

3: Repartition

The Repartition case must be checked only if you use continuous mode. This will distribute the readings equally between the marked positions (Stamps) in the dumped file. Checking the Repartition case when using the manual mode could cause erroneous positions in the dumped file.

4: File creation

Start the file creation by clicking the **File Creation** button. Make sure that you correctly set the Identification and Memory range parameters before starting the file creation. If the file is created after many hours of operation (with a lot of recorded readings), it is possible that the file will take up to twenty minutes to be created. The message *File complete* will appear. See following images to find the created file:

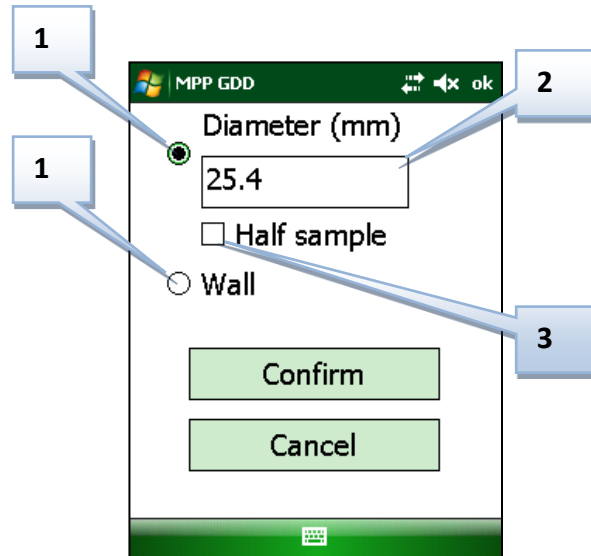


See **Section 12 – Software installation and file transfer** to know how to transfer a file from the Archer² field computer to a desktop computer.

5: Clear memory

After the file creation process, restore the readings recorder to zero by clicking the Clear memory button. Before doing that, make sure that the file is well created. A *Confirmation* message appears when the Clear memory button is clicked to prevent errors. If the memories are not cleared, the next recorded readings will be added to the readings still in the memory.

10.5 Diameter



1: Diameter or Wall button

If you are scanning a core sample, select the Diameter option. For a flat surface, select the Wall option.

2: Diameter

Enter the core sample diameter in millimeters in this field if the Diameter option is selected.

3: Half Sample checkbox

Check this case if you are scanning a spit core sample.



Half sample

11. Reading modes

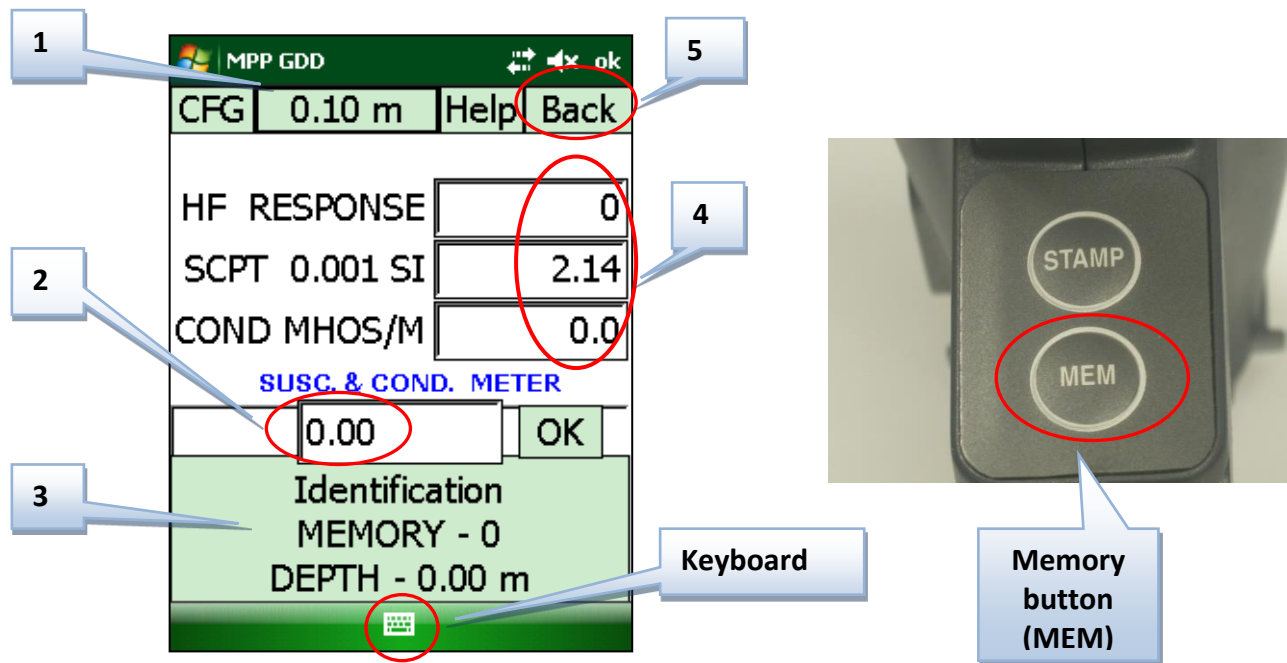
In this section, the settings mentioned are those in *Section 10 – Setting parameters*.

It is possible to take readings by using four different methods with the MPP-EM2S+. These methods are **manual**, **continuous**, **graphic** and **single reading** modes.

11.1 Manual mode

Needed settings (Reading page in the configuration-CFG menu): Spacing, Depth, Unit.

How to use:



1: Spacing button

This button indicates the activated spacing. If more than one spacing has been configured in the three boxes of the parameter (Section 10.1), it is possible to switch between the spacings by clicking on this button.

2: Depth field

This field shows the depth where the next reading must be taken. For irregular distances between the readings, it is possible to set the distance manually before each reading by writing the depth in this field by using the keyboard. You have to confirm the new entry by clicking on the OK button at the right of the Depth field.

3: Memory space

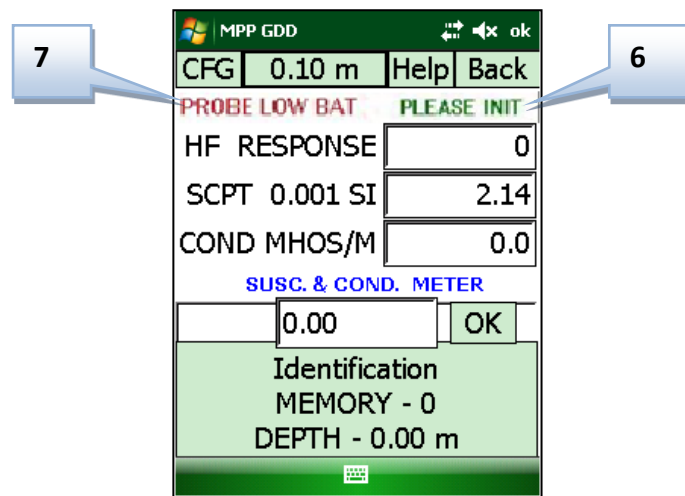
To record a reading, click on this space or push the MEM button of the probe. The depth shown in Depth field will increase according with the spacing shown in the spacing button after each time the Memory space or button is clicked.

4: Readings space

This space shows the values of the readings. If the values increase by themselves (without measurements), initialize the probe to restore the values to zero before taking a new reading (drift - see Warnings at the beginning of this Guide). For more details about the signification of the readings, see Section 13.

5: Back button

This button allows the user to erase the last value recorded. It is possible to erase all readings recorded one after another by clicking on this button. A *Confirmation* message appears when this button is clicked to prevent error.



6: PLEASE INIT message

By default, this message appears every minute. When it appears, a probe initialization is required. If the probe is not initialized after 30 seconds, the GDD logo with the message PLEASE INITIALIZE will appear and the readings will stop. The readings will resume when the probe will be initialized (you just need to press the readings space). It is possible to change the time between two initializations in the REINIT page (see Section 10.3). If you are not able to initialize the probe when you see the GDD logo, you will need to close the software and open it again.

7: PROBE LOW BAT message

This message indicates that the charge of the AA batteries is not sufficient to supply the probe. The batteries must be replaced or recharged. **When the level of the batteries charge is low, the value of the readings could be inaccurate.**

Recommendations:

- Make sure that the contact between the core sample and the end of the probe is the same for each reading you take. Otherwise, you will obtain different values if you repeat your reading with a different angle or a different position of a couple of millimetres (see *Section 13 - Reading interpretation*).
- Create a file after each reading series. (See *Section 10.4 – Memory page*).

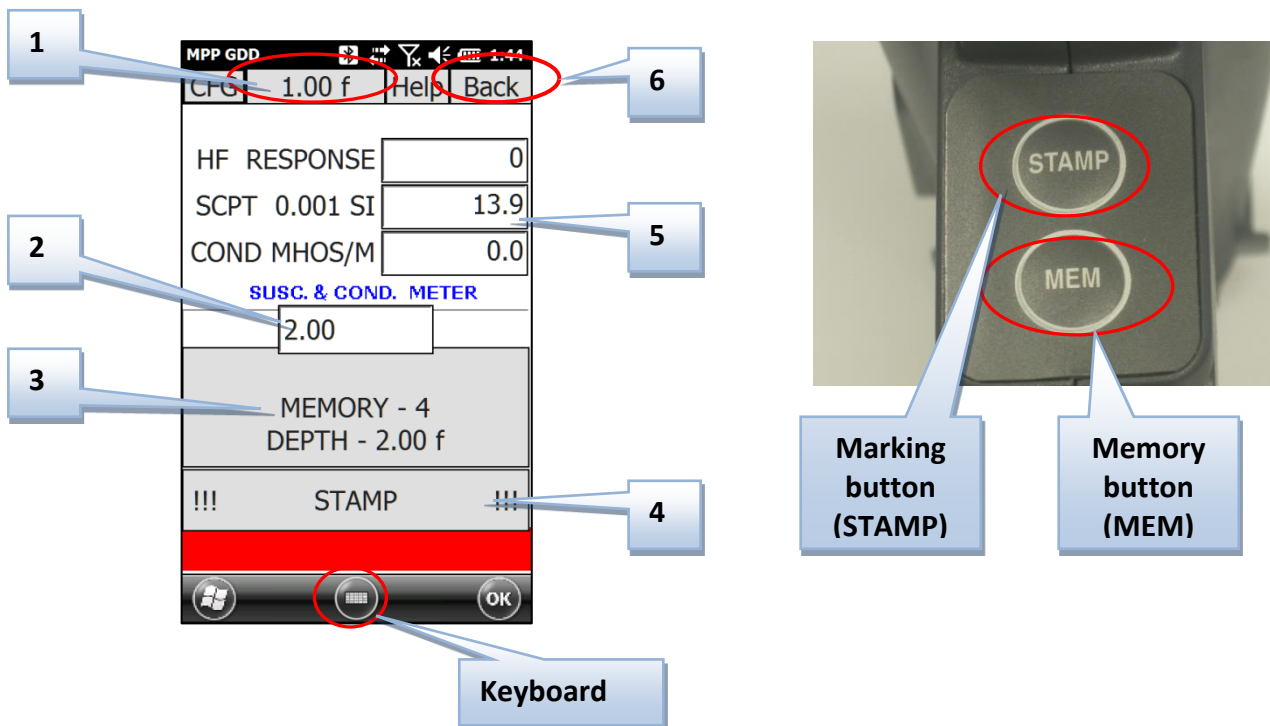
11.2 Continuous mode

In this mode, the readings are recorded automatically according to the recording frequency you need (every second, every five seconds, etc.). Marking different positions along the core sample will help you to have a more accurate graphic.

Needed settings (Reading page in the configuration-CFG menu):

Space, Depth, Unit, Recording frequency.

How to use:



1: Spacing button

This button indicates the activated spacing. If more than one spacing has been configured in the three boxes of the parameter (Section 10.1), it is possible to switch between the spacings by clicking on this button.

2: Depth field

This field shows the depth where the next point must be marked (stamp button). For irregular distances between the readings, it is possible to set the distance manually before each marking by writing the depth in this field by using the keyboard.

3: Memory space

The readings are recorded automatically according to the recording frequency (Reading page in the configuration-CFG menu) you need (every second, every five seconds, etc.). To start the recording, click on this space or push the MEM button of the probe. Use the same way to stop the recording. **The MEM button is not used to record one reading at a time in this mode.** When the recording is activated, the bottom of the Stamp bar turns to green and a REC message appears with the number of memories.

4: STAMP bar

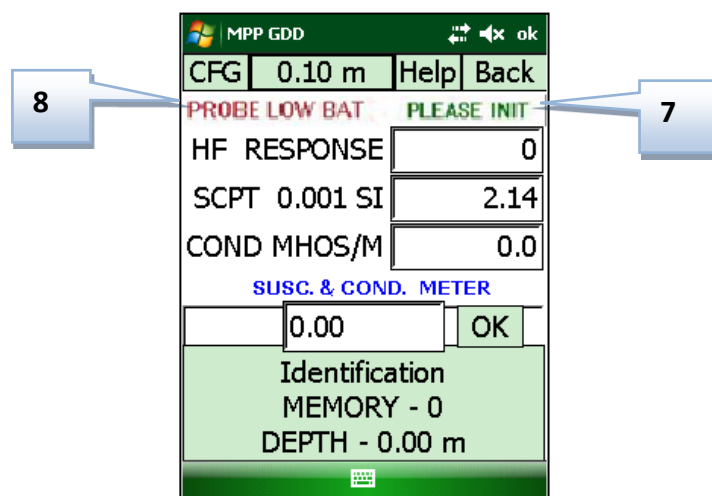
The bottom of the STAMP bar is red when the recording is disabled and green when it is enabled. Use this bar or the STAMP button of the probe to mark a position. The positions marked will allow you to create a graph with your data on your personal computer. The more marks that you have, more accurate the graph will be.

5: Readings space

This space shows the values of the readings. **In this mode, it is highly recommended to wait about 40 minutes to let the probe warming-up before starting to take readings (drift - see Warnings at the beginning of this Guide).** Otherwise, you will have to initialize the probe to restore the values to zero before taking each reading, and initializing the probe will stop the recording. You will have to restart the recording after each initialization. For more details about the signification of the readings, see Section 13.

6: Back button

This button allows the user to erase the last recording. It is possible to erase all readings recorded one after another by clicking on this button. A *Confirmation* message appears when this button is clicked to prevent error.



7: PLEASE INIT message

By default, this message appears every minute. When it appears, a probe initialization is required. If the probe is not initialized after 30 seconds, the GDD logo with the message PLEASE INITIALIZE will appear and the readings will stop. The readings will resume when the probe will be initialized (you just need to press the readings space). It is possible to change the time between two initializations in the REINIT page (see Section 10.3). If you are not able to initialize the probe when you see the GDD logo, you will need to close the software and open it again.

8: PROBE LOW BAT message

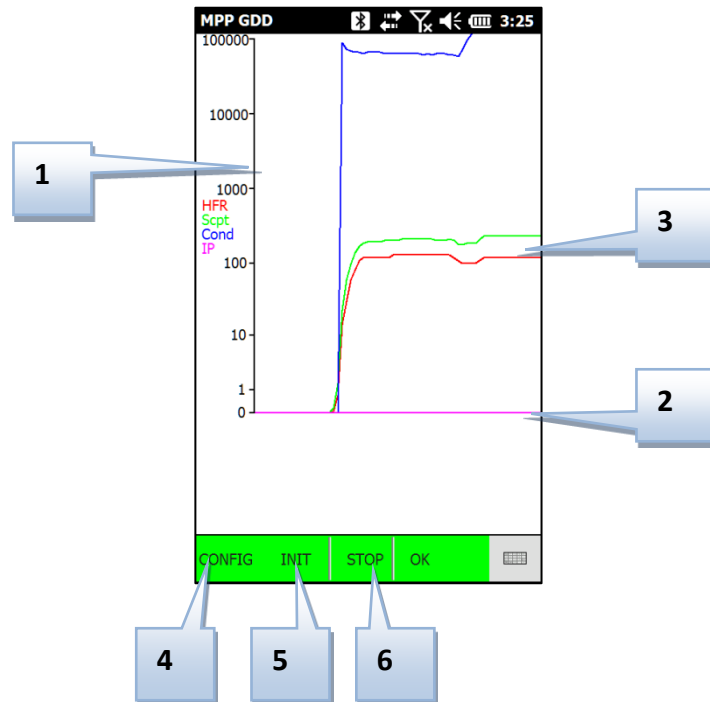
This message indicates that the charge of the AA batteries is not sufficient to supply the probe. The batteries must be replaced or recharged. **When the level of the batteries charge is low, the value of the readings could be inaccurate.**

Recommendations:

- Keep a constant speed to move the probe along the core sample to obtain a real graph, and make sure that the contact between the core and the end of the probe is the same for each reading you take.
- If the conductivity of some points on the core seems to be very high (999999), check if this conductivity is true by reading again slowly the conductivity of these points with the MPP probe.
- Create a file after each readings series. (See *Section 10.4 – Memory page*).

11.3 Graph mode

The graph mode allows you to visualize the readings graphically in real time. The curves of HF Response, magnetic susceptibility and conductivity are shown simultaneously. **In this mode you cannot record data.**



1: Vertical axis

This axis has a logarithmic scale (from 0 to 100 000). The axis units are Hertz and MHOS/M. The magnetic susceptibility has no unit but the values shown are 10^3 times higher than the real values.

2: Horizontal axis

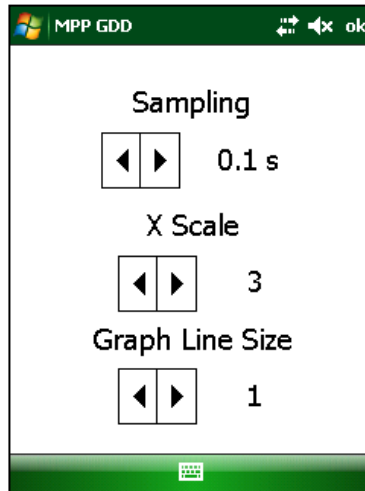
This axis has a time scale. The curves appear according to the motion of the probe on the core sample.

3: Curves

- HF response: red (Hertz)
- Magnetic susceptibility: green (10^{-3} SI)
- Conductivity: blue (Mhos/m)

4: CONFIG button

This button allows you to set the parameters of the graphic mode. These parameters are the sampling frequency, the horizontal axis scale and the width of the lines draft on the graph.



The sampling frequency can be selected from 0.1 to 5 seconds. For example, the reading will appear on the graph each 0.1 second if you have selected 0.1s.

The value of the X scale is absolute from 1 to 5. This will set the speed that the graph will appear with. A value of 5 represents a longer distance between two readings on the graph; the graph will appear faster. The default value for the X scale is 3. This parameter is just a visualization setting; the graph will be the same whatever the value selected. It will just come up with a different speed on the screen.

The Line Size is the width of the lines draft on the graph. The default value is 1, the maximum size is 5. This parameter is just a visualization setting.

5: INIT button

This button allows you to initialize the probe before taking readings.

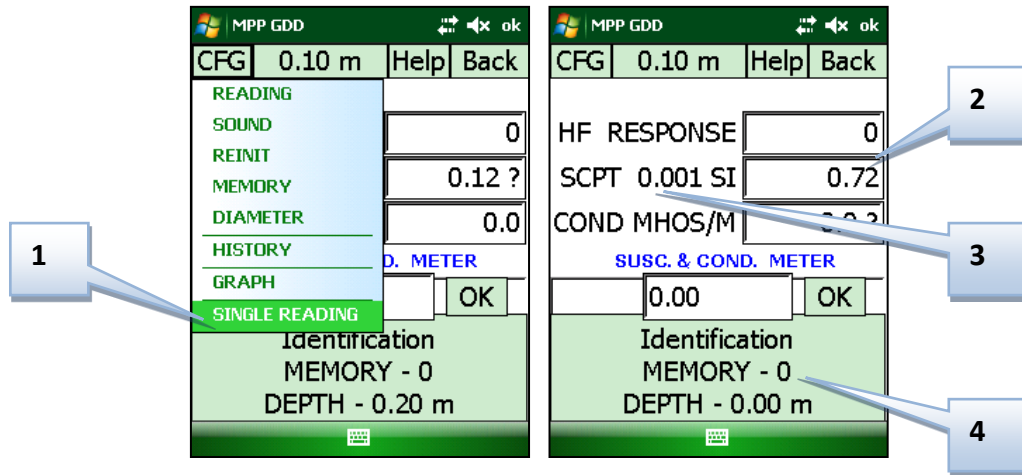
6: START/STOP button

Tap on this button to start the graph. When the graph is activated, the menu bar will become green. To see the readings on the graph, move the probe along the core samples as for the continuous mode. The readings will appear in real time at the right of the screen.

To disable the graph mode, click on STOP button (the START button will become the STOP button after the graph will be activated). During this process, when the PLEASE INIT message appears, keep the end of the probe far from metal objects and click on INIT button. To record the values, you must press the MEM button on the probe.

11.4 Single Reading mode

The single reading mode initializes the probe and allows taking a single reading. After the probe is initialized, you have 15 seconds to take a reading before you have to reinitialize the probe. The reading values will be displayed on the screen with a resolution of 10^{-6} SI for readings lower than 10×10^{-3} SI. The reading will remain there until the probe is initialized again.

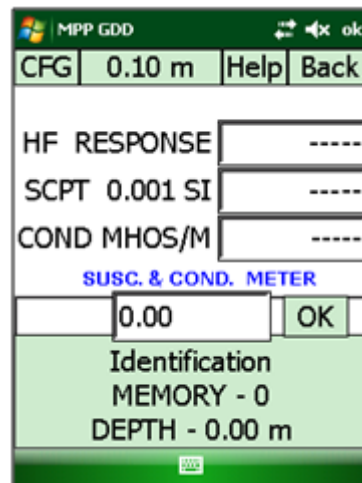


1. Single reading Mode

A check will appear next to this option if it is active.

2. Display

The reading display is frozen in this mode. If "----" is shown in the fields, the probe is initialized and is ready to take a reading.



3. Readings space (Initialization)

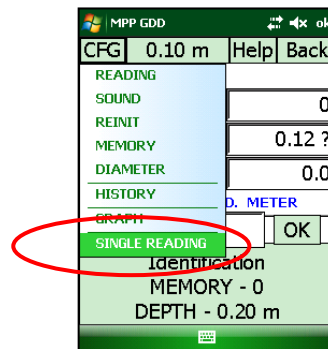
Pressing the GDD Logo or the readings space will initialize the probe and start the 05 seconds timer. Touching the readings space again will reinitialize the probe and reset the 05 seconds timer.

4. Memory button

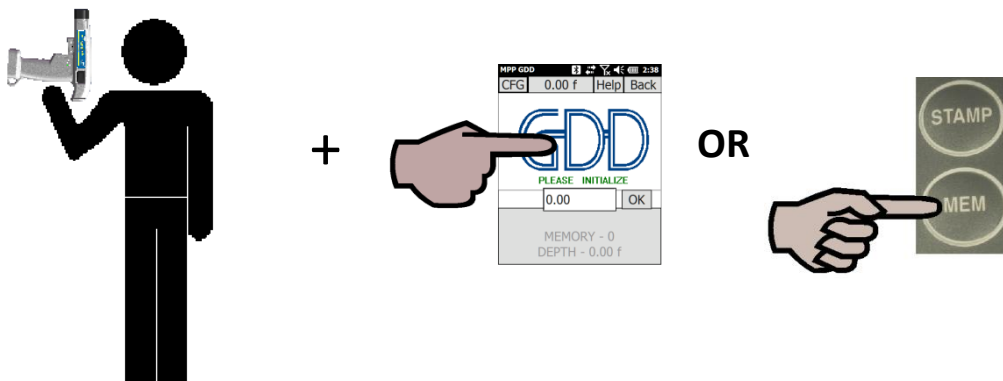
Pressing the Memory space on the Archer² field computer or push the MEM button on the probe for the first time will initialize the probe. A beep is emitted when the initialization is done. Pressing the Memory space on the Archer² field computer or push the MEM button on the probe again will take a reading and store it in memory. A beep will confirm that the reading has been saved.

Steps: how using this mode

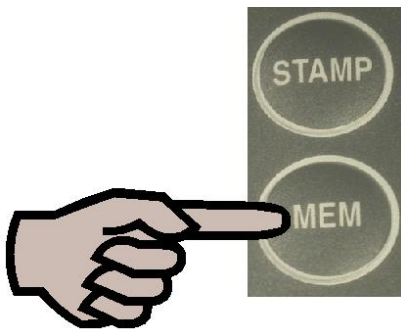
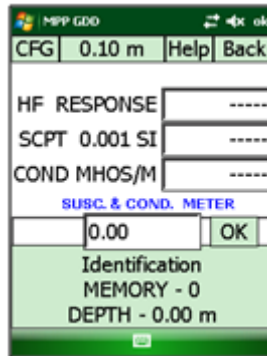
1. Select Single Reading from the CFG menu to activate this mode.



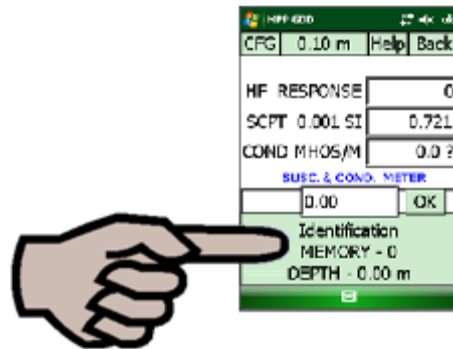
2. Move the end of the probe far from metal objects and initialize it by tapping on the GDD logo or on the MEM button of the probe.



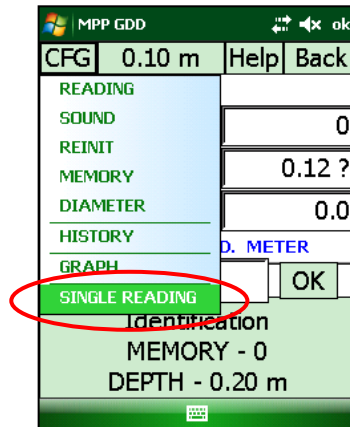
- When “-----“appears, position the probe on the sample and press the MEM button to take a reading.



OR



- Repeat steps 2 and 3 to take several readings.
- When done, select Single Reading from the CFG menu to deactivate this mode.



12. Software installation and file transfer

In order to establish communication between the Archer² field computer and a desktop PC, you need to install the appropriate synchronisation software.

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

Install ActiveSync if you run Windows XP or earlier.

Another way of transferring data between your Archer² and your PC is to set the PDA device as a USB connection. Refer to the detailed sections below.

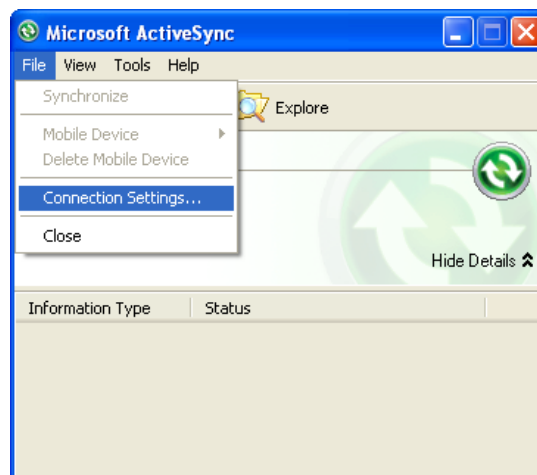
It is possible to download the free software directly on Microsoft web site.

12.1 ActiveSync Installation

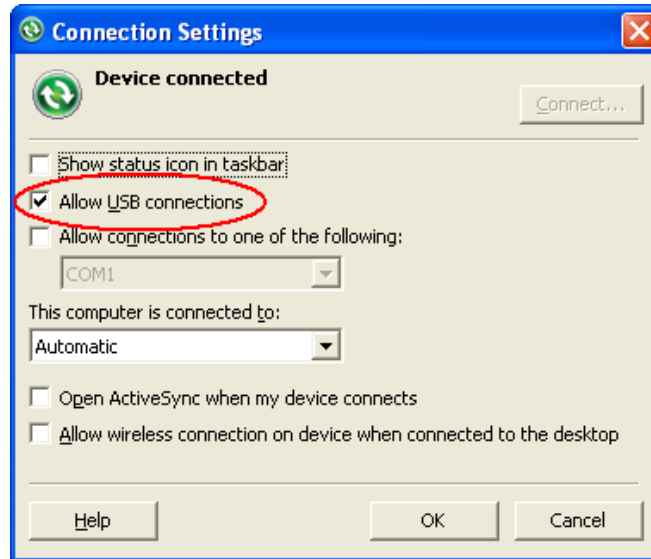
1. Once ActiveSync is installed, a gray icon will appear in the bottom right corner of your desktop PC screen.



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

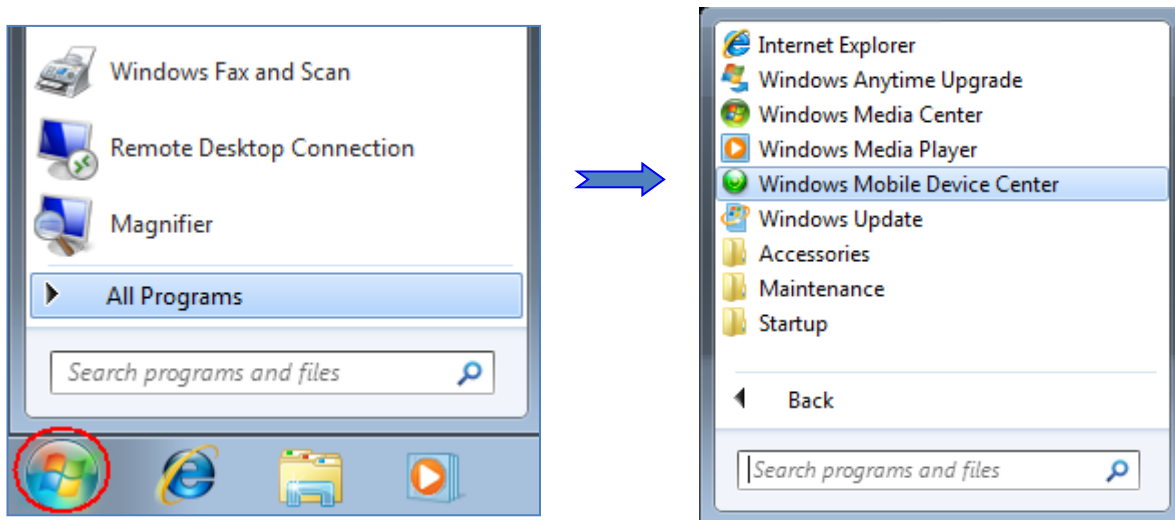


3. Check *Allow USB connection with this desktop computer.*

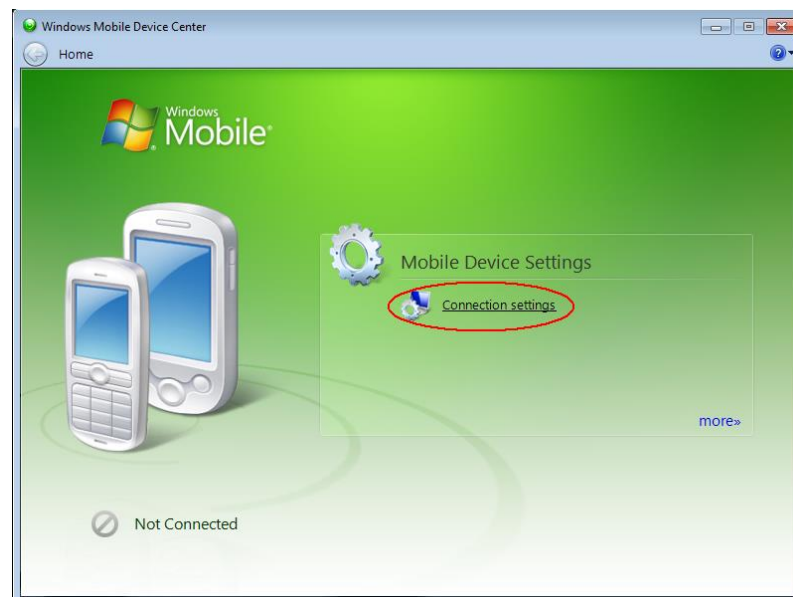


12.2 Windows Mobile Device Center Installation and settings

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



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



3. Check *Allow USB connections*



4. To establish connection with a desktop PC, connect the micro USB cable between the Archer² and the desktop PC.

5. Turn the PDA ON.

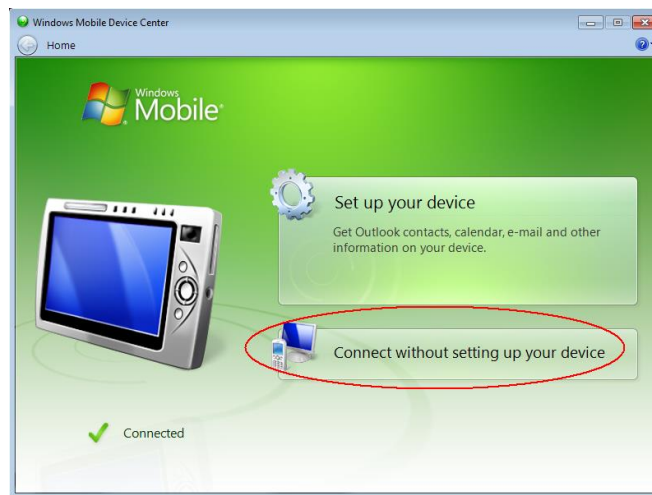
6. The Windows Mobile Device Center application will connect with the PDA.



7. A small *PCLink* icon appears on the Archer² title bar.



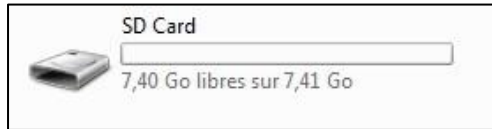
8. To transfer files from the Archer² to a desktop PC, from the Windows Mobile Device Center, click *Connect without setting up your device*.



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



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



11. Use the drag and drop; or cut, copy and paste functions to move file(s) from your Archer² to your desktop PC.

The GDD Generic data file is named: File_Name.gdd

The GDD fulwave file is named: File_Name.fuwave

12.3 Connecting the Archer2 field computer with a desktop PC

1. Turn ON the Archer2 field computer.



2. Connect the USB cable between the Archer2 field computer and your desktop computer.
3. The desktop *ActiveSync* (or Windows Mobile Device Center) icon is now green.



4. A small *PCLink* icon appears on the Archer2 title bar.



12.4 Transferring file(s) from the Archer2 field computer to a desktop PC

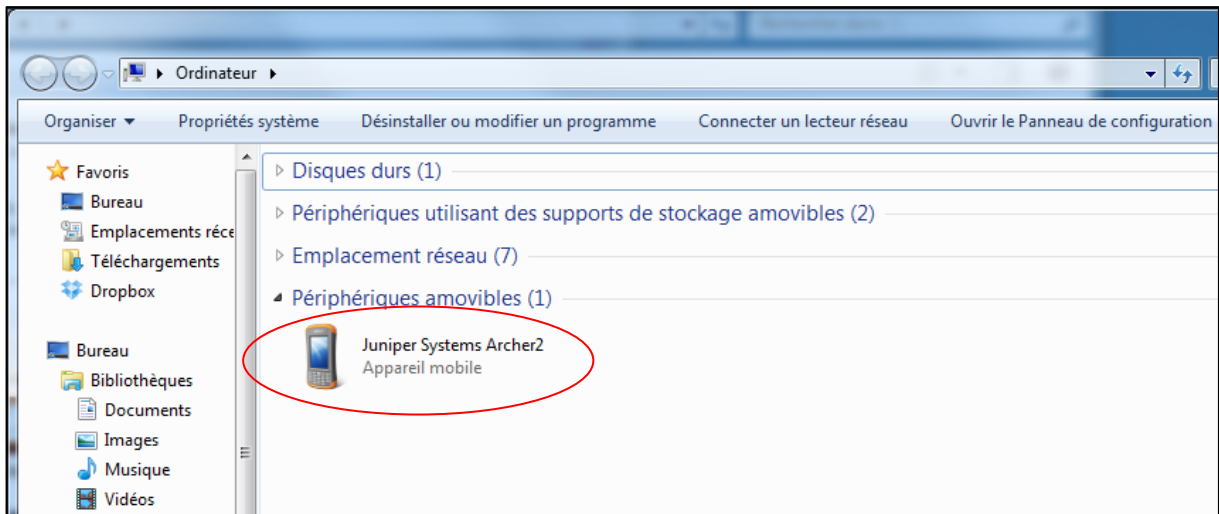
1. Double click on the *My Computer* icon on your desktop PC.



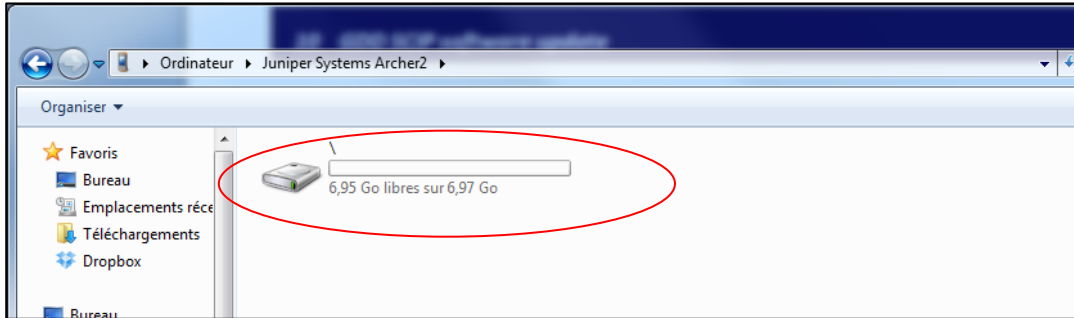
From the **Windows Mobile Device Center**, click *Connect without setting up your device*.



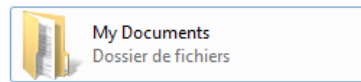
2. Double click on the *Mobile Device* icon.



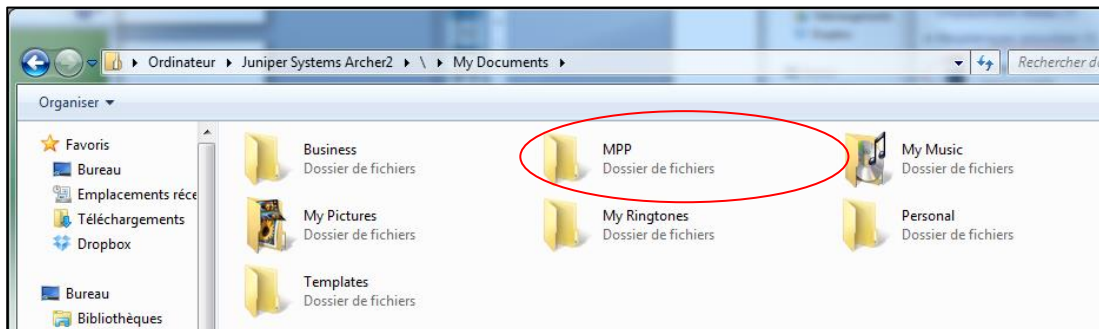
3. Double click on the *Main folder* icon.



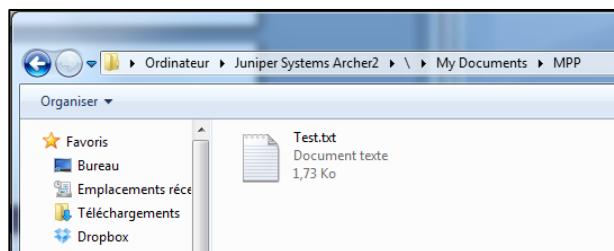
4. Double click on the *My Documents* folder.



5. Open the MPP folder.



6. Use the drag and drop or cut, copy and paste functions to move file(s) between your Archer2 and your desktop PC. The data file is named: File_Name.txt



7. Open the saved files with Notepad or Excel.

12.5 Convert the Archer² as a USB drive

The Archer² has a slot for a micro SD card located in the battery compartment. To insert or remove a card follow these steps (As per the Archer² User Guide):

- 1) Power off the handheld by holding the power button until the Power Button menu appears and selecting Power Off. CAUTION: Power-off the Archer² before removing the battery. If you remove the battery without powering-off the handheld, you may damage the handheld and/or lose data.
- 2) Loosen the screws to the battery compartment, and remove the door. The hand strap remains attached. CAUTION: The Archer² is not sealed against water and dust when the battery door is not installed properly.
- 3) Remove the battery pack.
- 4) An image on the battery compartment label shows the correct location and orientation for the SD card (slot on the right). Push the card into the slot to insert it. To remove the SD card, pull it out.



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

Once, the SD card is installed. In the main screen of the Archer², go in the Settings menu.

1. In the main screen of the Archer², go in the Settings menu
2. Go in the "connections" folder and then select the "USB to PC option".
3. Select "SD Card - Use as external drive (Mass Storage)"
4. The Archer² can now be accessed from the Windows File Explorer.



13. Readings interpretation

13.1 HF/Cond Distinction

In the case of conductive sulphides: The HF response provides an indication of sulphides quantity. The Conductivity (Mhos/m) provides an indication of sulphides quality. The conductivity of a small and a large aluminium foil will be similar but the HF response will increase with the size of the aluminium surface.

13.2 Results Signification

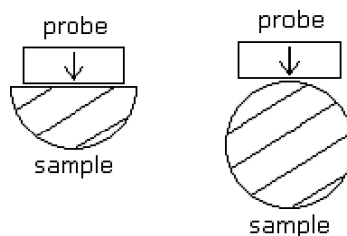
HF RESPONSE: the number in this window represents the value of the HF response.

SCPT 0.001 Magnetic Susceptibility: the number in this window represents the value of the magnetic susceptibility. As mentioned previously, it is important to note that, in the presence of a conductor, the MPP-EM2S+ probe will measure the magnetic susceptibility value. In the presence of pyrrhotite combined with a small amount of magnetite or no magnetite at all, the magnetic susceptibility will be measured.

COND MHOS/M Calculated Conductivity: it is important to note that in the presence of some magnetite in the sample, the MPP-EM2S+ probe will overestimate the conductivity value. The « > » sign appearing before conductivity value indicates that real conductivity is higher than 999999. It is recommended to take the measurement again on the points marked with > or where the value is 999 999 after reinitializing to make sure that the readings are real.

13.3 Sample Shape and Distance

The measured values could depend on the shape of the sample. For an equivalent content of conductive/magnetic ore, the response will increase with an increasing surface of contact. In the same way, the response will decrease with an increasing distance between the probe and the sample, the probe has to be in contact with the sample.



14. How to re-install GDD MPP Software

If the MPP software is accidentally erased from the Archer² field computer, it is possible to re-install it from **MPP Utilities CD-ROM/USB stick**.

It is possible to do this the same way as described in *Section 15 – Software update installation* using the MPP Utilities CD-ROM/USB stick (instead of GDD web site).

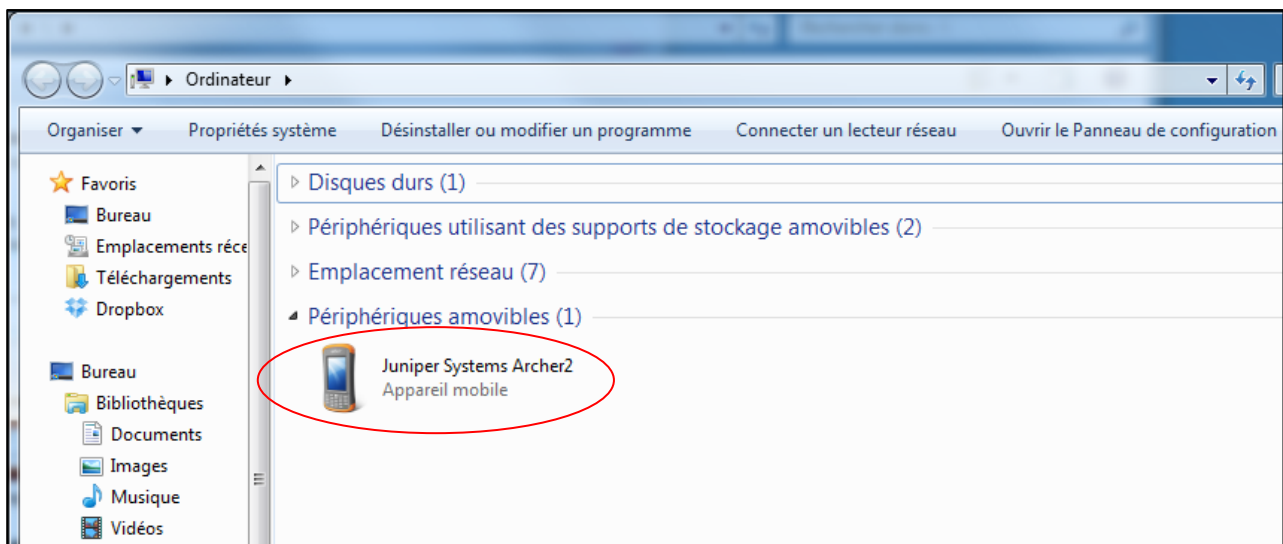
After the re-installation, if the software name **MPP_en** does not appear in the **Start** menu, select **Settings** in the **Start** menu, click on **Menus** icon and tick off **MPP_en** in the list.

15. Software update installation

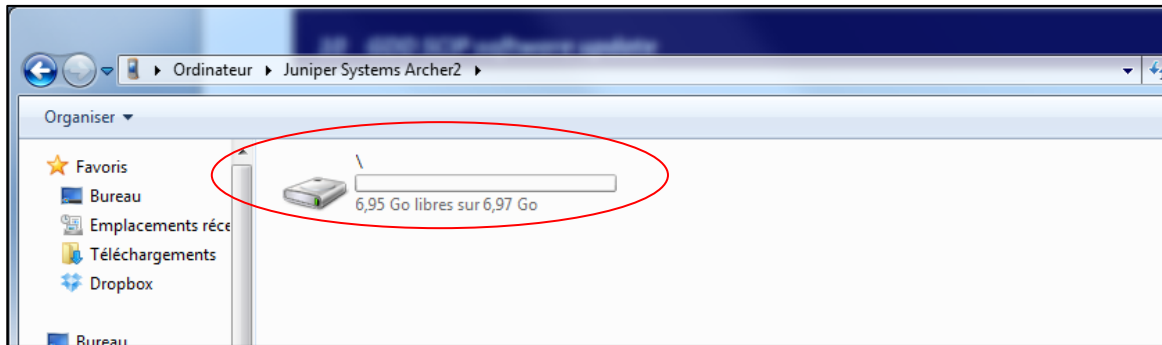
1. Connect the USB cable between the Archer² field computer and your desktop computer.
2. Double click on the *My Computer* icon on your PC's desktop.



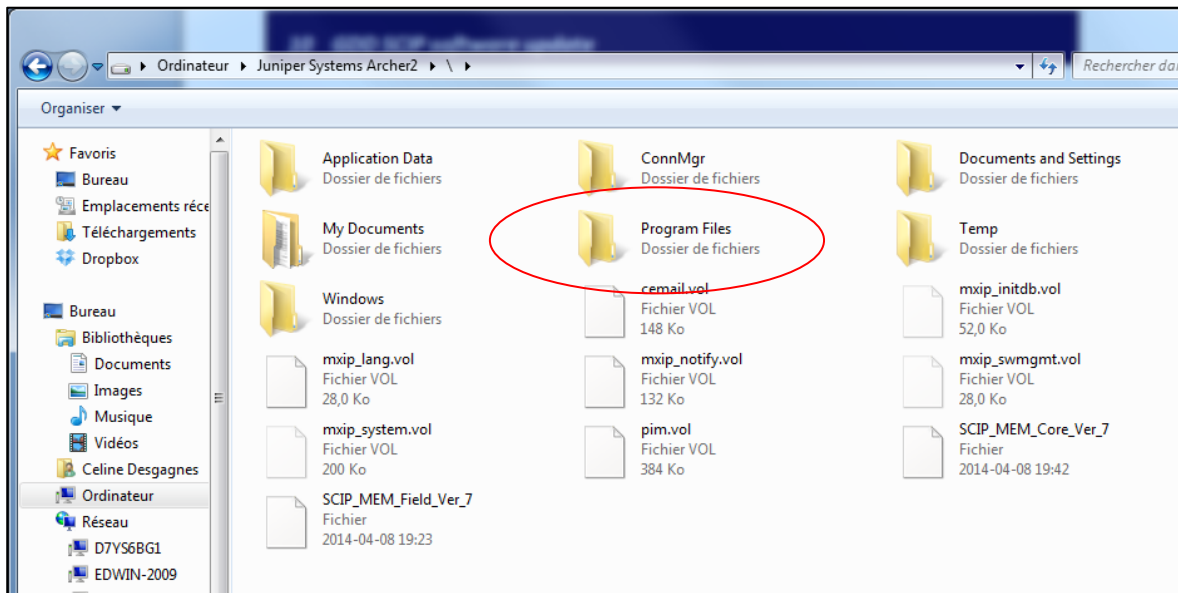
3. Double click on the *Mobile Device* icon.



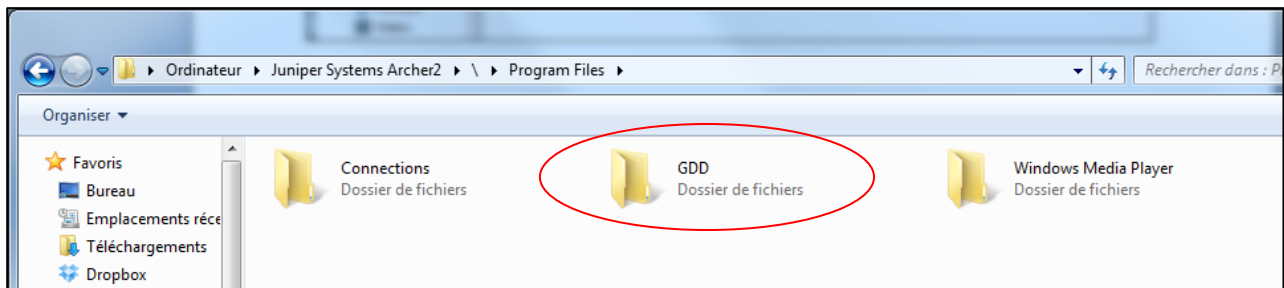
4. Double click on the *Main folder* icon.



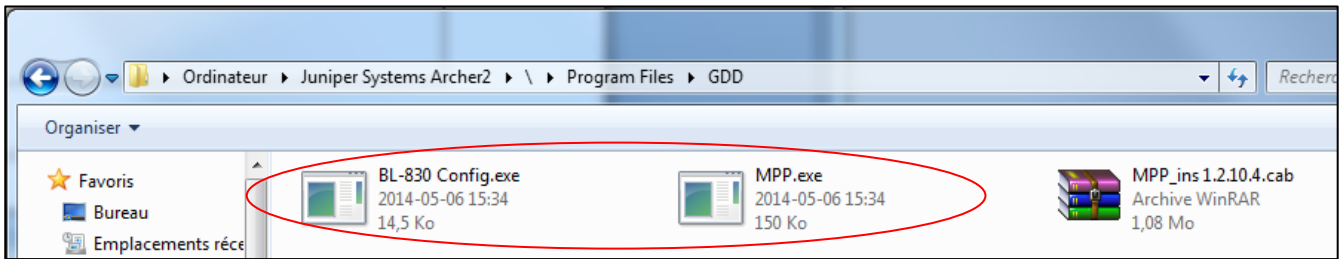
5. Double click on the *Program Files* icon.



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

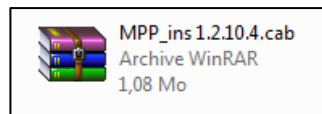


7. Erase MPP.exe and BL-830 Config.exe files.

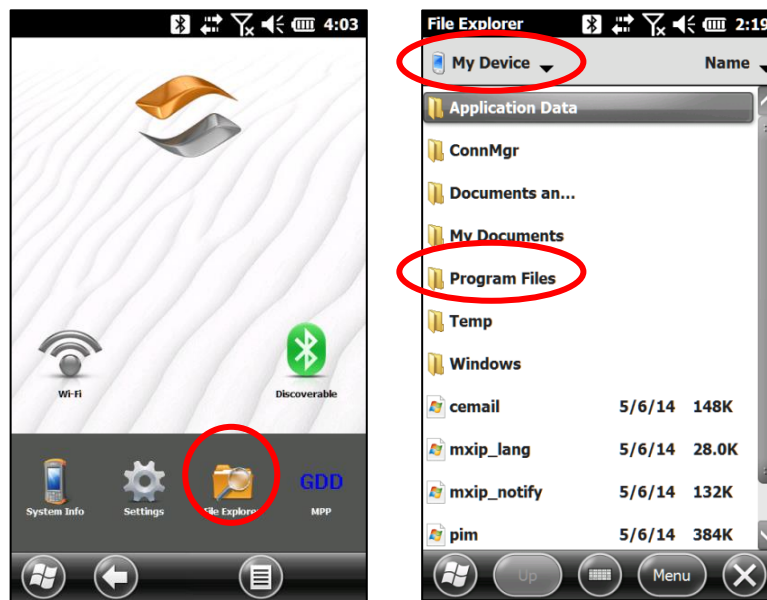


Keep the older version of the .cab file as a back-up. Make sure that the name of the new software file is different than the old one.

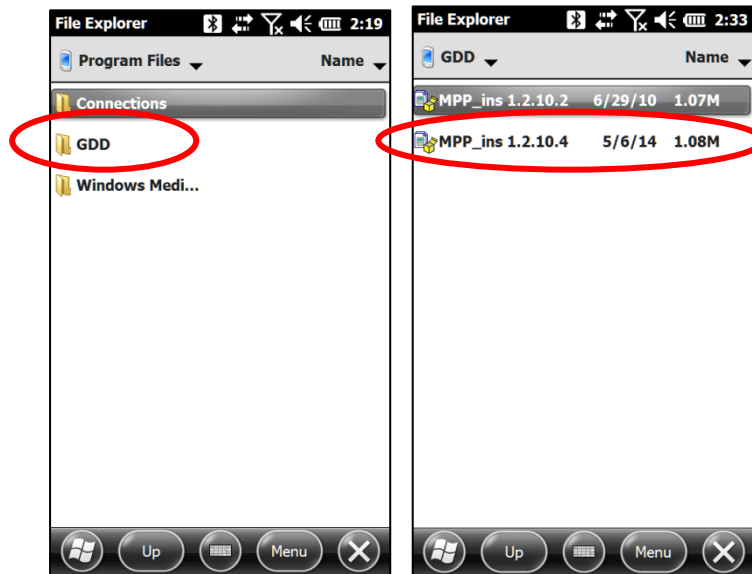
8. Use the drag and drop or the copy and paste functions to move the new GDD MPP software file from your computer to your Archer² field computer's GDD folder.



9. On your Archer² field computer, open File Explorer and Program Files.



10. Open the GDD Folder and click on the new MPP_ins.cab file.



11. This message could appear. Tap on OK to continue.



12. Tap on OK when the installation is finished.

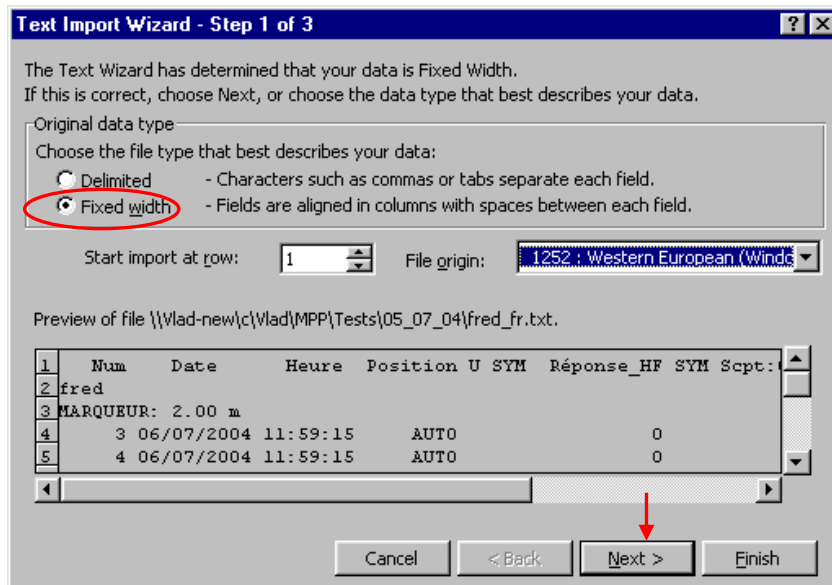
16. Importing a file in Microsoft Excel

Open the Microsoft Excel software.

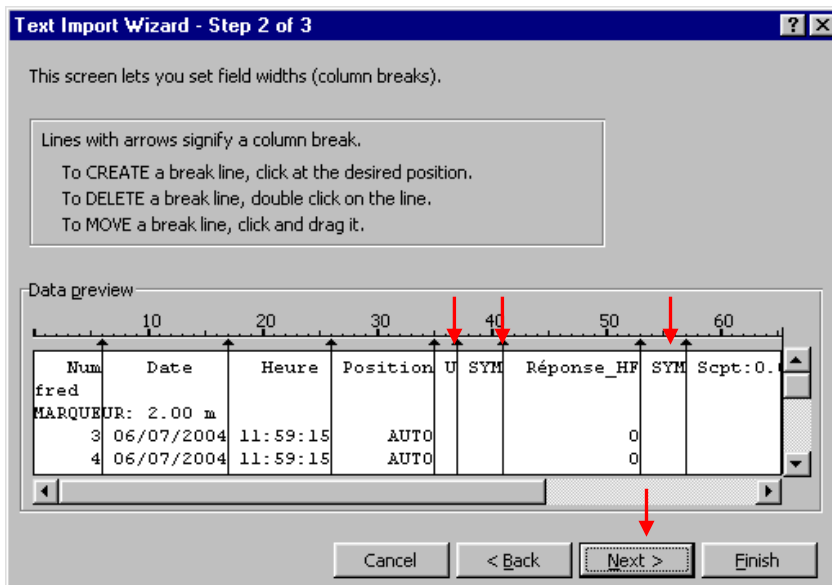
In the tool bar, select **File** and **Open**.

In **Type of files**, select **All Files (*.*)**. In **Look in**, you have to localize your file. This is very important in order to find the file you need. The file extension is **.txt**. Then select the file you want to open and click on **Open**.

You should now see **Text Import Wizard – Step 1 of 3**. Select **Fixed width**. Select **Next**.

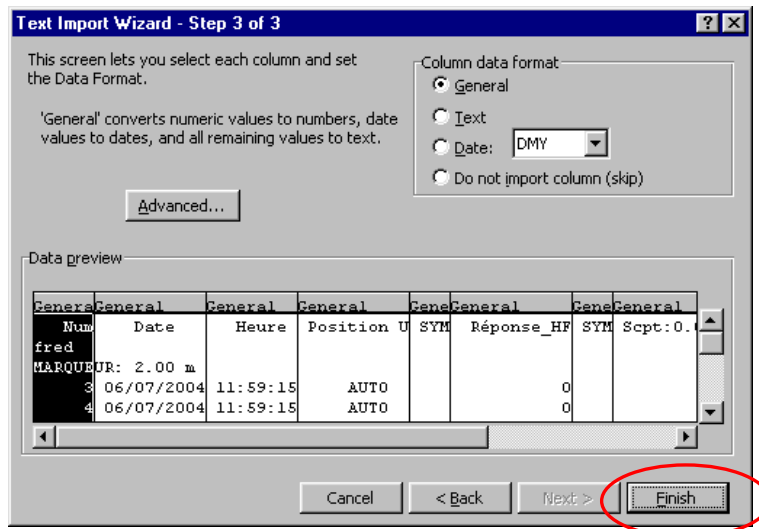


Text Import Wizard – Step 2 of 3.

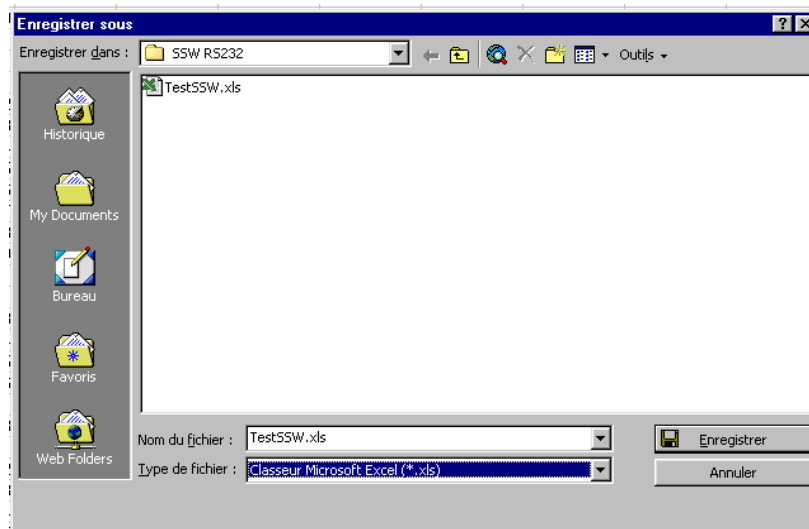


Make sure that break lines separate the following titles: **U** (position 35-37), **SYM** (position 37-41) and **SYM** (position 53-57). Select **Next**.

Text Import Wizard – Step 3 of 3. Select Finish.



It is very important that you save your file at this point. To do so, go to the tool bar and select: **File, Save as:** In the **Save in:** field, choose the folder in which you want to save it. In the **Save as type:** field, select Microsoft Excel Workbook (*.xls). In the **File name** field, choose the name you want to save. Click on **Save** button.

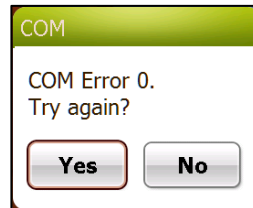


17. Troubleshooting

17.1 Errors while starting the MPP software

➤ **Problem:**

In **Bluetooth** mode, a **COM Error** message appears:



✓ **Solution:**

- Look at the Bluetooth icon in the Dashboard:



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

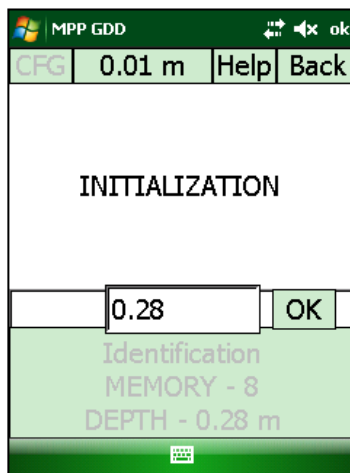


Try again to start the MPP_en software.

- The **Cable / Wireless / Prog.** switch must be in **Wireless** position and the probe must be **ON**. The selected position of the **Cable / Wireless / Prog.** switch must be in place before turning the probe on.
- Check if AA batteries are sufficiently charged by pushing on the BI button of the probe. If no lights are on or if only the red light is on, replace the batteries or use the external power supply provided by GDD. The Bluetooth mode requires more power than the Cable mode.
- Check if a Bluetooth Partnership has been established between the Archer2 field computer and the probe (see **Section 17.3 – Bluetooth Partnership**).

➤ **Problem:**

During the initialization, **INITIALIZATION** message still remains on the screen.



✓ **Solutions:**

- In **Cable** operating mode, check if the RS-232 cable is correctly connected. Make sure that the green LED of the USB/serial adapter is on. If the LED is off, contact Instrumentation GDD Technical support.
- In **Cable** operating mode, if Bluetooth option is available, check if the selected position of the **Cable / Wireless / Prog.** switch is **Cable**. The selected position of the **Cable / Wireless / Prog.** switch must be in place before turning the probe on.
- In **Bluetooth** operating mode, check if the RS-232 cable is not connected between the probe and the Archer² field computer.

- In **Bluetooth** operating mode, check if a Bluetooth **Incoming Port (COM1 to COM9)** has been configured. This Incoming Port could be in conflict with the Port used by your MPP probe.

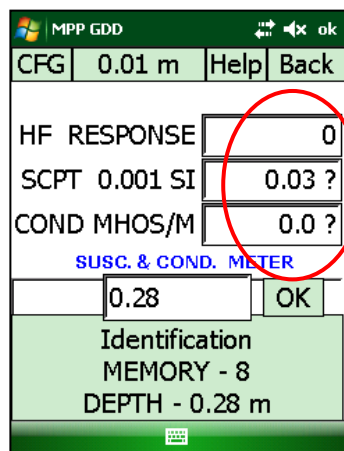


- Check if the probe is **ON**.
- Make sure that AA batteries are sufficiently charged. The Initialization process requires much power. If the probe batteries are not fully charged, the program will not be able to initialize.

17.2 Errors during the measuring process

➤ **Problem:**

After initialization, the readings seem to be unstable.

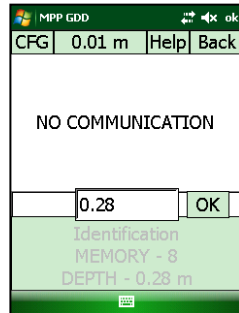


✓ **Solutions:**

- As mentioned in the **Warnings** on the first page of this manual, it is highly recommended that you leave the probe ON for one hour before taking the first measures.
- If it is impossible to wait for one hour before taking measurement, re-initialize the probe frequently (see **Section 10.3 – Re-Initialization**).

➤ **Problem:**


The message **No Communication** appears during measuring process.

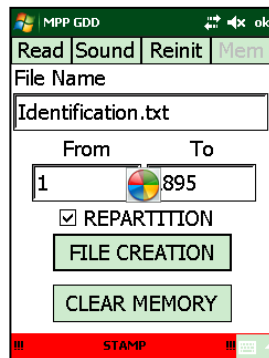


✓ **Solutions:**


- Move away the probe from any conductive or magnetic material (point it in the air) and try to initialize the probe again by clicking on the **No Communication** message.
- If the **No Communication** message still remains on the screen, check if the **Cable / Wireless / Prog.** switch or the ON/OFF switch were not moved accidentally.
- Check if AA batteries are sufficiently charged. It is important to pay attention to the screen of the Archer² field computer. Some messages can appear. The **PROBE LOW BAT** message means that the probe batteries are sufficiently discharged to give erroneous readings. After a few seconds, if batteries are not replaced, the **No Communication** message appears. It is important to close the MPP software before turning the probe off.

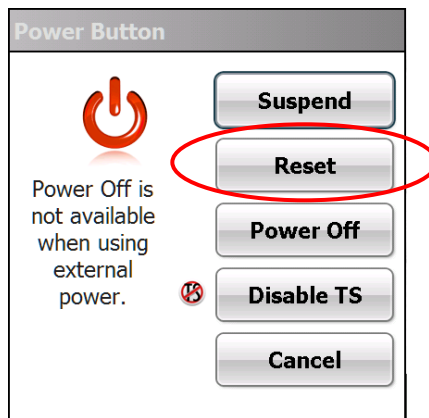
➤ **Problem:**

The screen is *frozen*, nothing happens after a click, or the  icon turns continuously for more than one minute.



✓ **Solution:**

- If the  icon turns continuously after clicking on **File Creation (Section 10.4)**, this is normal. A correct file creation may take several minutes.
- When the Archer² field computer seems to be *frozen*, press and hold the Power button until the Power Button menu appears. Tap on Reset. This problem may occur when the probe is turned off before closing of the MPP software.

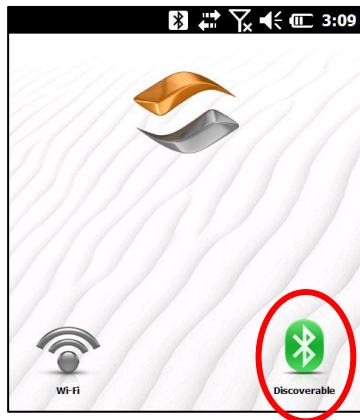


If none of these solutions suggested in the Section 17 – Troubleshooting can resolve your problem, contact Instrumentation GDD –Technical Support (see Section 18 – Technical Support).

17.3 Bluetooth Partnership

To avoid wasting time on searching for Bluetooth devices, a Bluetooth partnership must be established between the Archer2 field computer and the MPP probe before connecting. **This partnership was set up by GDD before the unit was sent out.** However, it is possible that you might have to reconfigure it and here are the instructions:

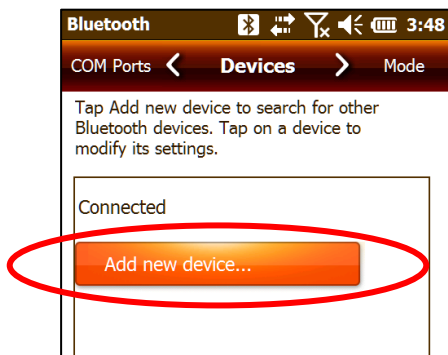
1. Turn on the MPP probe and place the **Cable/Wireless** switch in Wireless position.
2. Turn on the Archer2 field computer.



3. Make sure the Bluetooth is on. If the icon is gray, tap on the icon to enable it.



4. Tap on the Bluetooth icon in the Title bar.



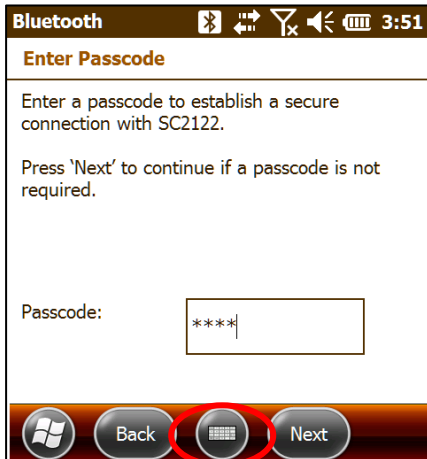
5. Tap on *Add new device...*



6. The program searched for Bluetooth Devices. This step may take a few seconds.



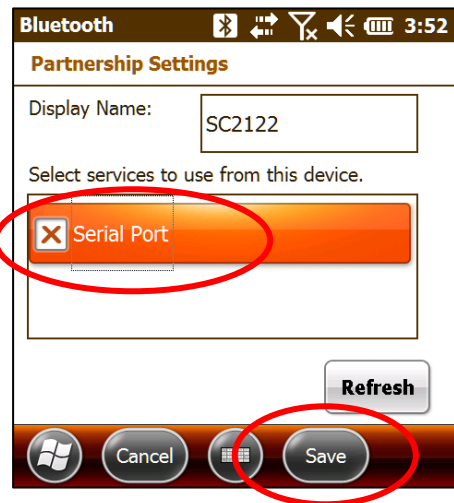
7. Select the MPP's name (MPXXXX) and click on *Next*.



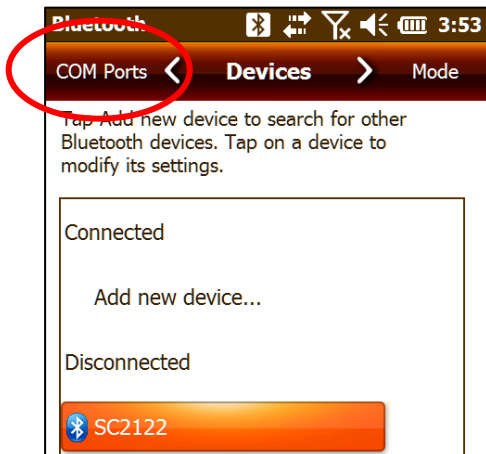
8. Enter the passcode **1234** and tap on *Next*. Open the virtual keyboard or use the numeric keypad of the Archer 2 field computer.



9. This message may appear for a few seconds. Tap on Advanced or wait until it disappears and tap on your MPP's name.



10. Check *Serial Port* and tap on *Save*.



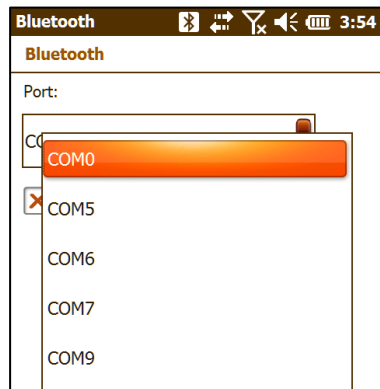
11. Select *COM Ports*.



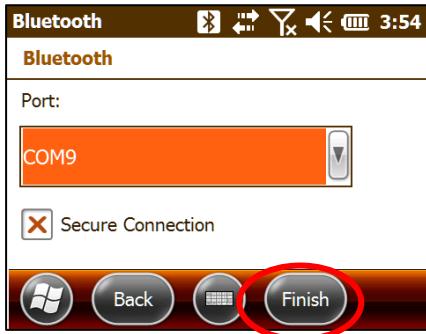
12. Tap on *New Outgoing Port*.



13. Select your MPP's name and tap on *Next*.



14. Open the port menu.



15. Select *COM9* and tap on *Finish*.



16. The name of your MPP should appear with the *COM9* tag. Tap on the *OK* button to close the window.

17. The connection between the Archer2 field computer and the MPP probe is now possible via the Bluetooth operating mode.

18. Technical Support

Telephone: +1(418) 478-5469

E-Mail: info@gddinstruments.com

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

Annex 1 : Example of a Dumped File

	Num	Date	Hour	Position	U	Diameter	Half	SYM	HF_Resp	SYM	Scpt	SYM	Cond
STAMP:	0.00	m											
	2	29-01-09	10:39:42	0.00	m	25.4	No		30		27.9		38.1
	3	29-01-09	10:39:44	0.04	m	25.4	No		0	?	0.3	?	0.0
	4	29-01-09	10:39:46	0.08	m	25.4	No		0	?	0.4	?	0.0
	5	29-01-09	10:39:48	0.12	m	25.4	No		0	?	0.5	?	0.0
	6	29-01-09	10:39:51	0.15	m	25.4	No		0		0.6	?	0.0
	7	29-01-09	10:40:19	0.19	m	25.4	No		6		7.4		783
	8	29-01-09	10:40:21	0.23	m	25.4	No		50		91.3		577
	9	29-01-09	10:40:23	0.27	m	25.4	No		11		38.3		666
	10	29-01-09	10:40:25	0.31	m	25.4	No		2		12.6	?	0.0
	11	29-01-09	10:40:27	0.35	m	25.4	No		2		6.5	?	0.0
	12	29-01-09	10:40:29	0.38	m	25.4	No		1		3.1	?	0.0
	13	29-01-09	10:40:31	0.42	m	25.4	No		2		7.7	?	0.0
	14	29-01-09	10:40:33	0.46	m	25.4	No		1		9.3	?	0.0
STAMP:	0.50	m											
	16	29-01-09	10:40:36	0.50	m	25.4	No		2		9.5	?	0.0
	17	29-01-09	10:40:38	0.56	m	25.4	No		1		8.6	?	0.0
	18	29-01-09	10:40:40	0.63	m	25.4	No		1		5.5	?	0.0
	19	29-01-09	10:40:42	0.69	m	25.4	No		1		6.0	?	0.0
	20	29-01-09	10:40:44	0.75	m	25.4	No		2		9.0	?	0.0
	21	29-01-09	10:40:46	0.81	m	25.4	No		1		7.0	?	0.0
	22	29-01-09	10:40:48	0.88	m	25.4	No		2		11.1	?	0.0
	23	29-01-09	10:40:50	0.94	m	25.4	No		1		3.7	?	0.0
STAMP:	1.00	m											
	25	29-01-09	10:40:52	1.00	m	25.4	No		1		3.9	?	0.0
	26	29-01-09	10:40:54	1.07	m	25.4	No		1		4.0	?	0.0
	27	29-01-09	10:40:56	1.14	m	25.4	No		26		43.2		612
	28	29-01-09	10:40:58	1.21	m	25.4	No		11		23.6		1553
	29	29-01-09	10:41:00	1.29	m	25.4	No		5		15.6		7347
	30	29-01-09	10:41:02	1.36	m	25.4	No		4		15.0		9351
	31	29-01-09	10:41:04	1.43	m	25.4	No		5		16.4		5647
STAMP:	1.50	m											

With the default settings, the readings are equally distributed between two stamped marks (the REPARTITION box in the MEMORY page of the MPP Program is checked) in the continuous mode. That is why it is important to move the probe with a constant speed along the core sample. If you unchecked the REPARTITION box, the word AUTO will appear instead of the position. In manual mode, checking Repartition box will cause erroneous positions.

In this dumped file, the ? symbol (SYM) means that the probe cannot measure the magnetic susceptibility and the conductivity accurately. This problem occurs when the values are too low (around zero).

Annex 2 : Graphics from Manual and Continuous Modes

