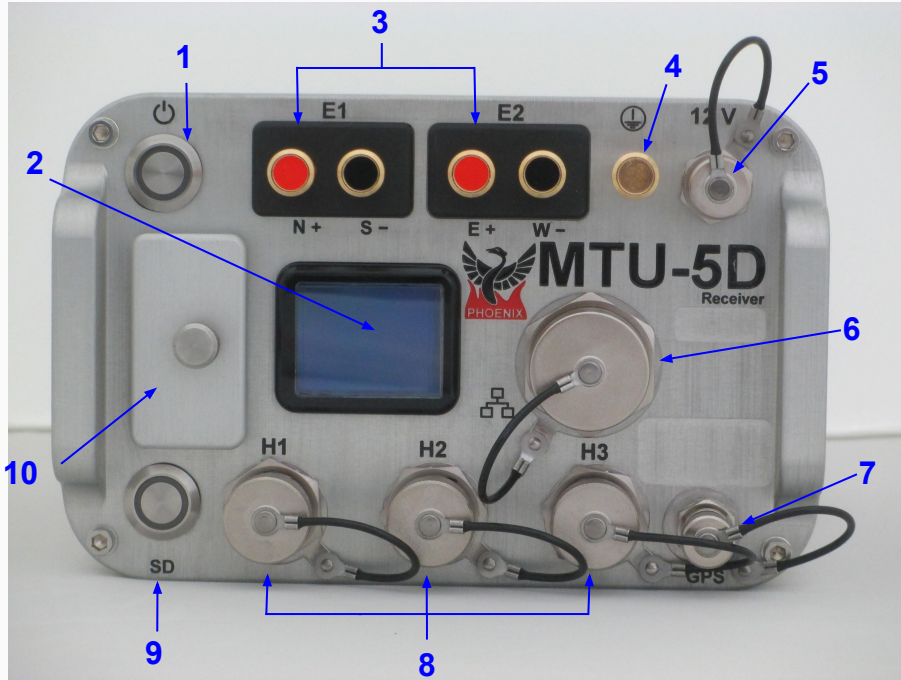


# MTU-5D Quick Start Guide for MT



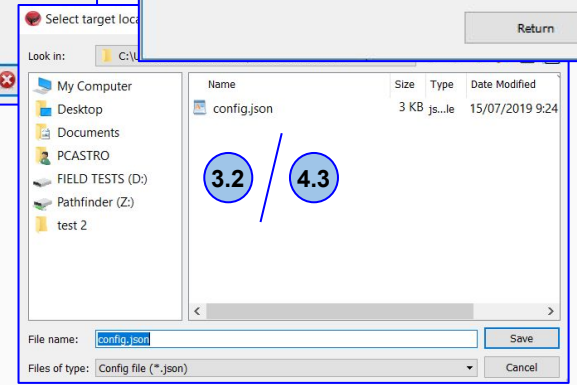
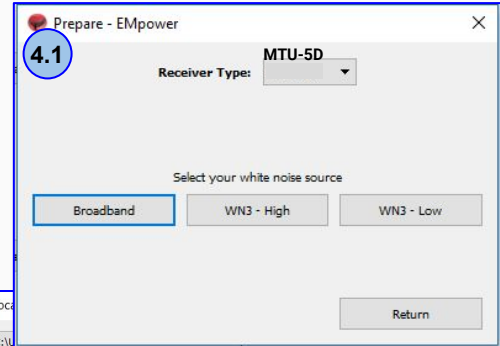
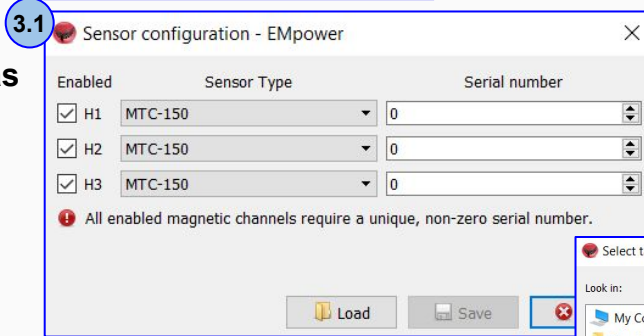
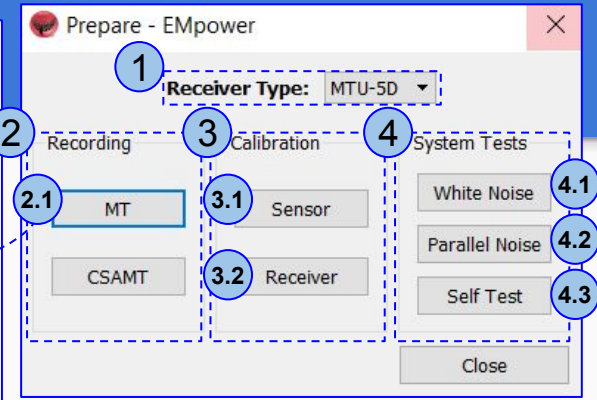
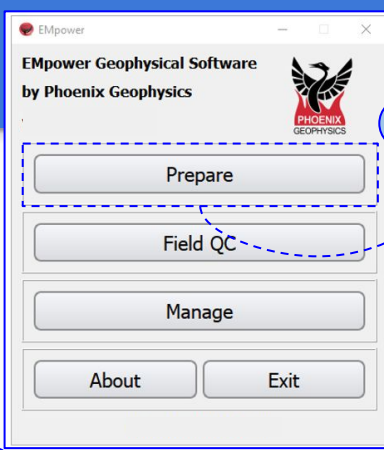
MTU-5D (components) .....	2
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## Components

1	Power/Record button and indicator
2	Display
3	E1 (Ex) electrode connectors E2 (Ey) electrode connectors
4	Ground electrode connector
5	12VDC power input
6	LAN connector
7	GPS antenna connector
8	H1 (Hx) magnetic sensor connector H2 (Hy) magnetic sensor connector H3 (Hz) magnetic sensor connector
9	SD card button and indicator
10	SD card slot and cover

# Creating a Configuration File



Open **EMpower** and click the **Prepare** button and complete the required information

## 1. Select the **Receiver Type**

## 2. **Recording**

### 2.1. **MT - Configuration Creator**

Use the **Calibration** and **System Test** options as needed

## 3. **Calibration**

### 3.1. **Sensor Calibration**

### 3.2. **Receiver Calibration** *(No additional configuration needed)*

## 4. **System tests**

### 4.1. **White Noise**

### 4.2. **Parallel Noise - Configuration Creator**

### 4.3. **Self Test** *(No additional configuration needed)*

# Configuration Creator

1. Check that the **Receiver type** is **MTU-5D**

2. Select the **Schedule**

2.1. **Manual** or **Automatic Start**

2.2. Or for a specific schedule use, **Single Shot**, **Daily** or **Weekly** and click **Add Schedule** to define the time and date

3. **Channels Settings**

4. Define the Receiver Settings

- **Sampling Mode**
- **Sampling Rate**

5. **Configuration Layout**

1

2

2.1

2.2

3

4

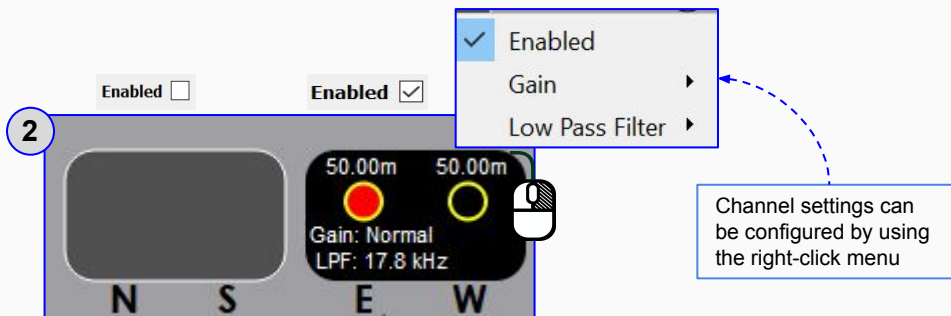
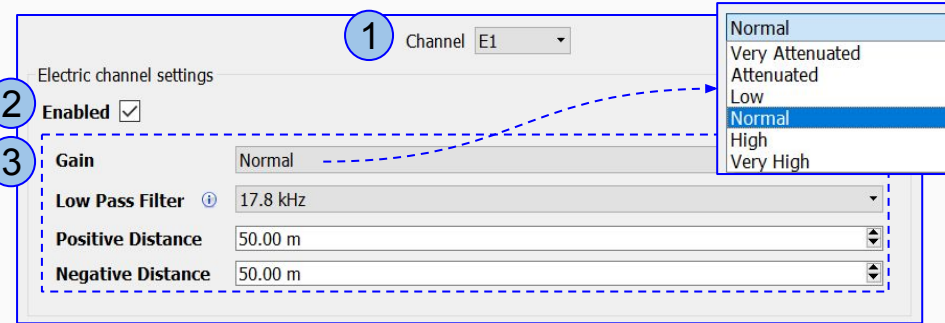
5

! To use the magnetic sensor data from a different recording or use a remote reference, all recordings **must** have a matching Sampling Mode and Sampling Rates. Otherwise, EMpower will not allow to process data using borrowed channels or remote reference

i This section is used for inputting the parameters and instrument details that will be used for the recording

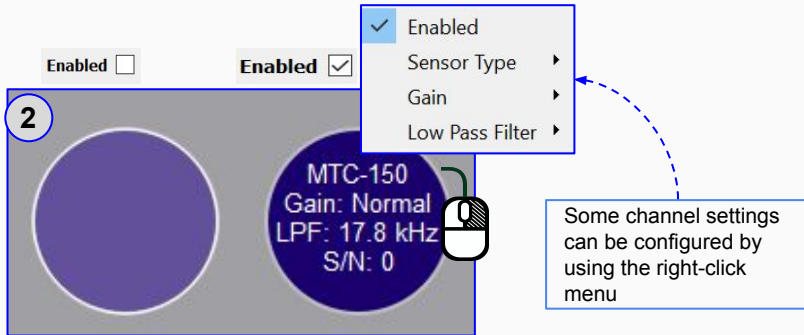
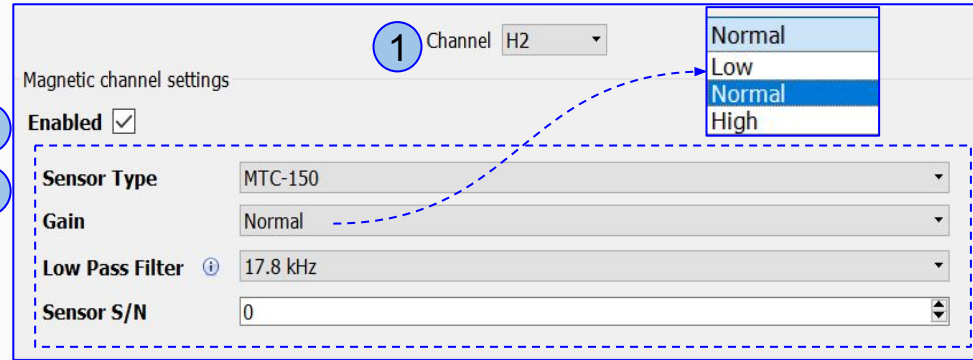
# Electric Channel Settings

1. Select the **Electric** channel
2. **Enable** or **Disable** the channel(s)
  - Disable the channel(s) if you do not plan to use them during the recording (*This will save space on the SD card.*)
3. Complete the information in the **Electric channel settings**



# Magnetic Channel Settings

1. Select the **Magnetic** channel
2. **Enable** or **Disable** the channel(s)
  - Disable the channel(s) if you do not plan to use them during the recording (*This will save space on the SD card*)
3. Fill in the required information on the **Magnetic channel settings**



# Saving a Configuration File

## 1. Insert the SD Card

- The computer must be equipped with an SD card slot or use a USB card reader

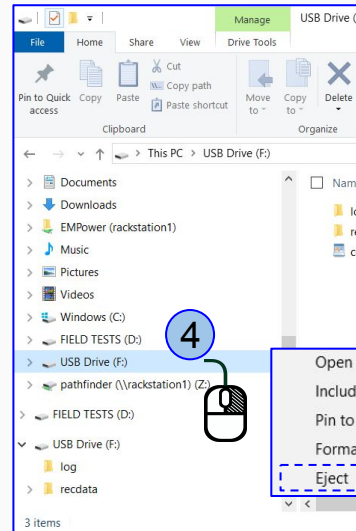
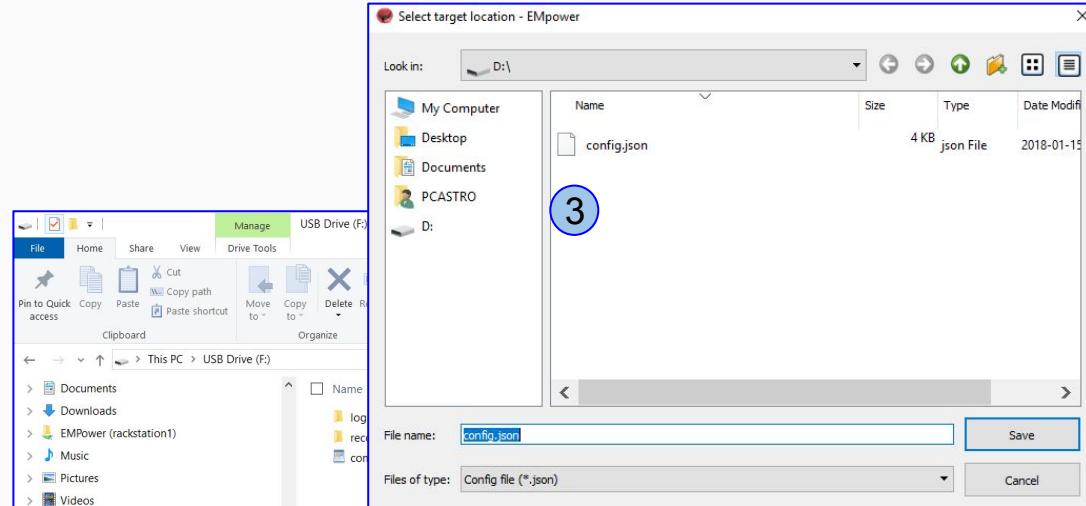
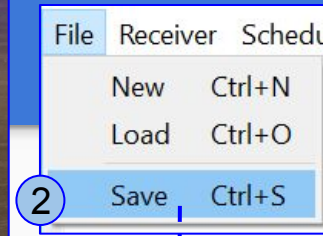
## 2. Click the **File** menu

- **Save or Ctrl+S**
- **Select the SD card**
- **EMpower** will automatically create the file **“config.json”**

## 3. Save the configuration file (*config.json*) in the root folder of the **SD card**

## 4. Open the file Explorer

- Right click **SD card** drive
- **Select Eject option**
- **Pull out the SD Card**



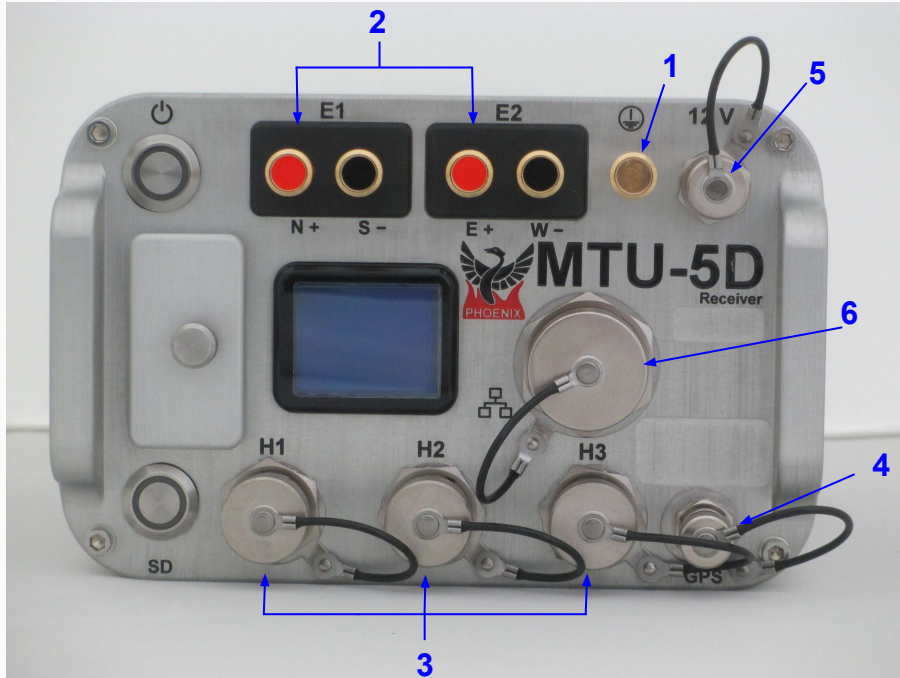
Only SD cards supplied by Phoenix are supported. Other SD cards that comply with the SDXC standard may work depending on the card rating and environmental conditions



# MTU-5D Connections

Start by connecting:

1. Ground electrode
2. Electrodes to channel **E1**(Ex) (N+, S-) and channel **E2**(Ey) (E+, W-)
3. Magnetic sensors to channels **H1**(Hx), **H2**(Hy) and **H3**(Hz)
4. GPS antenna
5. 12V DC Power Source
6. Network connector



In the field, it is often most efficient to connect the components to the receiver following the order on the right



# SD Card - Recording Data

## Recording

1. Insert the **SD card** and close the cap
2. To turn on the receiver, press the **Power** button briefly, wait until both **LEDs** are solid blue
  - 2.1. LED pattern for **Automatic Start** recording
3. If the schedule type was configured as **Manual**, press the **Power** button briefly and release to start recording



*\*For any problem with the SD Card, check the Troubleshooting manual*

- 2 Press the power button briefly and release

	Starting	Acquiring GPS	Ready
Power			
SD			

- 2.1 **Automatic Start**  
*The recording starts automatically according to the schedule*

	Recording
Power	
SD	

Press the power button briefly and release

- 3

	Ready	Channels Detection	Recording
Power			
SD			



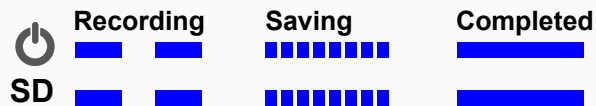
### Indicators

- Rapid, equal pulses
- Solid color / Off

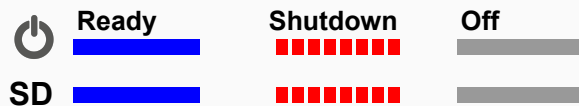
# Stopping a recording

1. Press the **Power** button briefly and release it to stop recording
  - Wait until both LEDs are steady blue
2. Turn off the receiver by pressing the **Power** button for a few seconds, until the **LEDs** will flash red
  - Wait until both **LEDs** turn off
3. Eject the **SD card**
  - Press the **SD card** and release, pull the **SD card**


- 1 Press the **Power** button briefly and release



- 2 Keep pressing the power button 3 sec and release



## Indicators

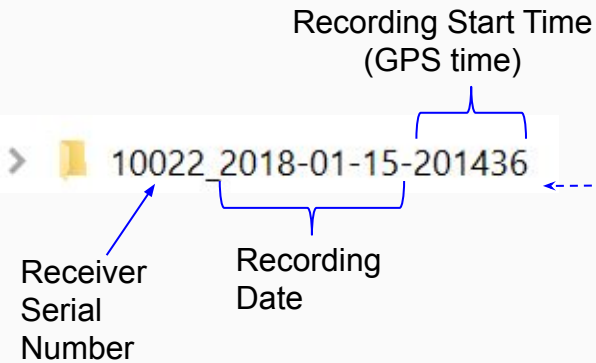
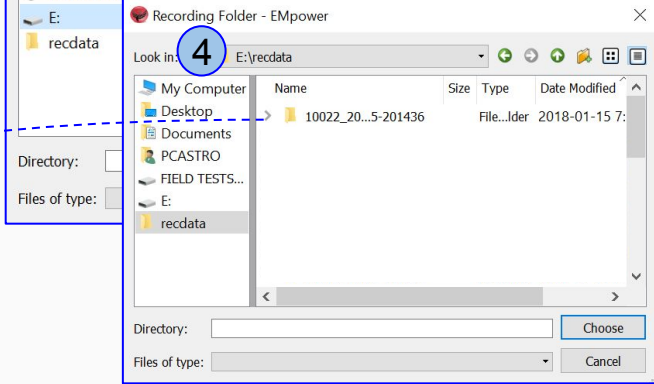
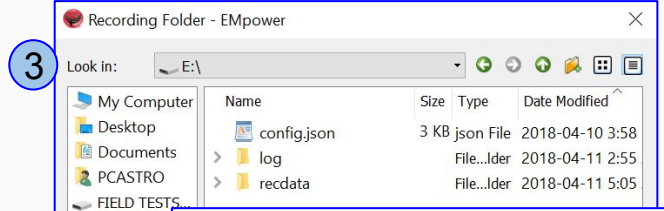
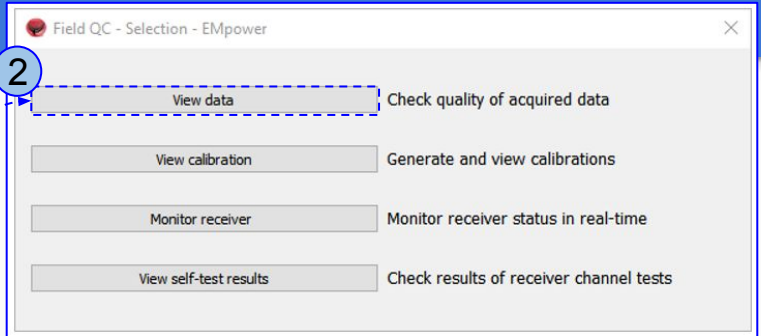
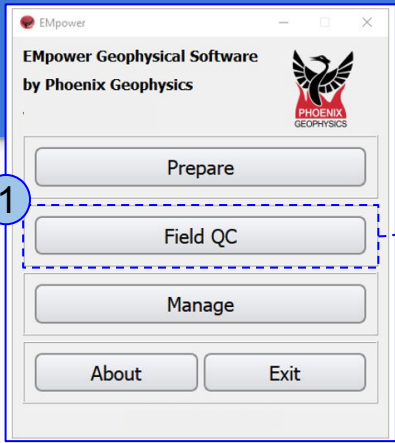
 *Rapid, equal pulses*

 *Solid color / Off*



# Importing - Field QC

1. Click the **Field QC** button
2. Select **View data**
3. Select the **SD card**
  - o The recording creates two folders, log and recdata
4. Open the **recdata** folder
  - o Select the recording file
  - o Click **Choose**



## Review and Process the recording information

1. Review the Electrode **Resistance** values and make the necessary corrections
  - Electrode **Distance (m) to GND**
  - **Polarity**
  - **E-Azimuth**
  - **External Filter**
2. Ensure that the magnetic sensors were detected and make the necessary corrections
  - **Serial #**
  - **Polarity**
  - **H1-H-3 Azimuth**
3. **View Recording Details** (see page 14)
4. After reviewing the information, **Process** the data (see next page)

Channel	Sensor	Detected
H1	MTC-50H	Not Present

*The warning icon indicates that something might be wrong with the recording, review the recording information and make necessary changes*

# Process Data

1. Click the **Process** button
  - o Verify that the channels and references selected are the desired ones
2. Define the time period by entering a start and end date/time
3. Enable the electric power grid filter that corresponds to the frequency carried by the power lines in the survey region (50Hz, 60Hz or None)
4. Click the **Process** button
5. A live display of the resistivity curve will appear after a few seconds

*\*This resistivity curve is not saved.  
It is purely for QC purposes*

Field QC - EMpower

MB 10 (21 h 25 m 47 s)

Status

Approved  Unapproved  Rejected

Tools

MB 8 Serial 10128 - EMpower

Magnetic Channels

Hx = H1 MTC-150 53874  
Hy = H2 MTC-150 53909  
Hz = H3 N/A N/A

Reference type: Magnetic

Select Manually

Electric Channels

Use the following

Ex = E1  
Ey = E2

Select Manually

Processing timeframe

Time zone

GPS  Site time zone: America/Edmonton (GPS-06:00)

Start: 2017-08-27 11:10:53 End: 2017-08-28 10:59:07

Sunrise: 06:54 Sunset: 20:40  
Duration: 23 h 48 m 14 s

Electric power grid filter

50 Hz  60 Hz  None

Cancel Process

Magnetics Selection - EMpower

Hx: Hy: Hz:

Hx and Hy are mandatory channels

Ok

Channel Selection - ...

Ex Ey

E1 E1  
E2 E2

Ok Cancel

EMpower

Resistivity

MB 8 Serial 10128 (Evaluation)  
Aug 27 17:10:53 to Aug 28 10:59:07 GPS (23 h 48 m 14 s)

Amplitude [mV]

Frequency [Hz]

Amplitude [mV]	Frequency [Hz]	XY	YX
100	10000	100	100
100	1000	100	100
100	100	100	100
100	10	100	100
100	1	100	100
100	0.1	100	100

Gain	LPF [Hz]	DC [V]
x4	10000	-0.012
x4	10000	0.088
N/A	N/A	N/A

# View Recording Details

Review that the following levels are within valid limits for quality control:

- 1. Battery Voltage
- 2. Internal Temperature
- 3. Number of Satellites
- 4. Saturated Frames

- If saturation is not close to ~0%, review the channel configuration (see pages 4 - 6), the channel gain might be too high and/or there is artificial noise on your site

## 5. Time Series Level

**Recording Details:** 10155\_2019-04-24-085903 - EMpower

**Recording ID:** 10155\_2019-04-24-085903  
**Survey Name:** 10155 MT  
**Station Name:**  
**Company Name:**  
**Receiver Type:** MTU-5D  
**Instrument Serial:** 10155  
**Operator:**

**Timing Details:** Start Time, Stop Time, Duration, Latitude, Longitude, Altitude

**Instrument Info:** OS Version: v1.27.1, Motherboard Model: BMB01-G, Motherboard Serial: 03100B

**Battery:** Low: 12.44 V, High: 12.869 V  Details  
**Temperature:** Low: 20°C, High: 38°C  Details

**Decimation:** Recorded 0.1 seconds at 96000 samples/s every 60 seconds, 1 second at 24000 samples/s every 60 seconds, and continuously at 150 samples/s

**GPS Timing Card:** Serial Number: 200188, Model: BTM01-I, Firmware Version: 00010029X, # of Satellites: 7 - 12 satellites  Details

Tag	Board S/N	Model	Firmware	Sat	Signal Ranges	
1	E1	201462	BCM03-B	1001a	0 %	View Levels
2	E2	201427	BCM03-B	1001a	~0 % - View	View Levels
3	H1			0 %	View Levels	
4	H2			0 %	View Levels	

**Callout 1: Battery Voltage** - Plot of Voltage (V) vs Time. Shows a steady decline from ~12.8V to ~12.4V.

**Callout 2: Internal Temperature** - Plot of Temperature (°C) vs Time. Shows a peak around 38°C.

**Callout 3: Number of Satellites** - Plot of # of Satellites vs Time. Shows fluctuating satellite counts between 7 and 12.

**Callout 4: Saturated Frames - E2** - Plot of # of Saturated Frames vs Time. Shows a very low number of saturated frames, near zero.

**Callout 5: Time Series Level - E1** - Plot of Signal [V] vs Time. Shows signal levels with Maximum (red), Average (green), and Minimum (blue) values.



*Please check out the [FAQs](#)*

*<https://phoenixgeophysics.freshdesk.com/>*

*Or email us at: [support@phoenix-geophysics.com](mailto:support@phoenix-geophysics.com)*