Power Measurement Instructions

T-110.6120

Special Course in Data Communication Software P

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1 Preparation

Items needed for the measurements:

- 1 x Monsoon Mobile Device Power Monitor (with USB & power cables)

- 1 x Mobile device with removable lithium battery

- 2 x "banana" plugs (red & black) with mini grabber J-hooks

- Copper foil tape

- Electrical tape (Insulating tape)

- Windows PC (or virtual machine)

2 Bypassing the lithium battery

The purpose of the following setup is to bypass the battery of the mobile device and power the device using the Monsoon Power Monitor. The setup allows the device to continue communicating with the battery. The connection is created by insulating the Voltage (+) terminal on the battery and creating a direct bypass between the Power Monitor Vout to the device. The circuit is completed by connecting directly to the Ground (-) terminal on the battery [1].

1. Remove the lithium battery from the device and make a note of the battery's voltage and capacity.

2. Locate the Voltage (+) and Ground (-) terminals on the battery. Cover the Voltage (+) terminal with a small piece of insulating tape. (See Figure 1.)

3. Cut a ~10 cm piece of the copper foil tape and split the piece in half.

4. Reconnect the battery with the thin copper foil pieces in place between the battery's and the device's Voltage (+) and Ground (-) connectors. (See Figure 2.)

5. Secure the connection with insulating tape and make a note for yourself which copper foil is connected to the Voltage (+) and Ground (-) connectors. Try to power-up the device. The device should not power-up because the battery has been bypassed.

3   Connecting the Monsoon Power Monitor

1. Make sure the power monitor is powered off.

2. Connect the banana plugs to the voltage output channels on the power monitor and the corresponding J-hooks to the foil pieces on the battery bypass setup. Make sure you connect the red Voltage (+) and black Ground (-) connectors accordingly on both the power monitor and the mobile device.

3. You can now power on the monitor. The mobile device won't power on yet since the Vout has to be turned on from the measurement software.

4   Using the power measurement software

1. Connect the USB cable of the power monitor to the PC. Use the USB port on the back of the device. The front connectors are for USB passthrough.

2. Launch the PowerTool software on the PC. If the software doesn't recognize the power monitor, try powering the monitor off and on again and reconnecting the USB cable.

3. Set the Vout to the correct value depending on the battery of your mobile device. Enable the Vout on the software. Power up the mobile device.

4. Configure the recorded values (usually Power and Current avg.) and press Run to start the measurement. When you're done press Stop.

5. You can save the measurement data in binary format using the Save button and export the data in csv format using the Export button. The data export might take a long time. You can save the data in binary format and open it later (on another machine) and export it into csv if you run out of time in the lab.

5   Data analysis

The exported csv file can be analyzed in Matlab, R or any other statistical analysis software.
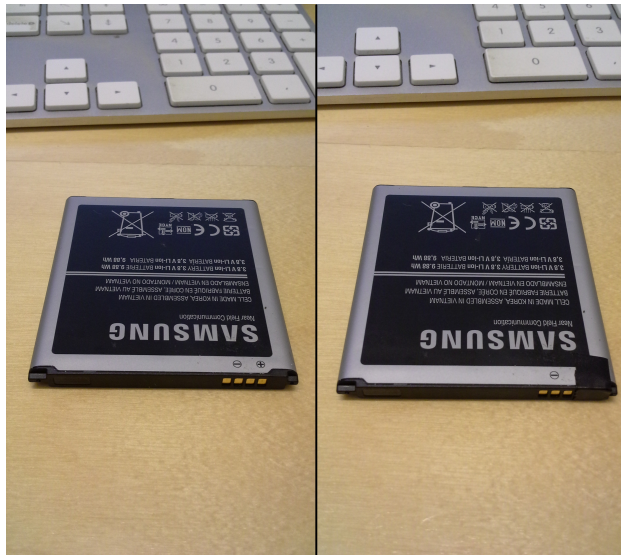
6 Images

Figure 1: Battery preparation. Voltage (+) terminal covered.

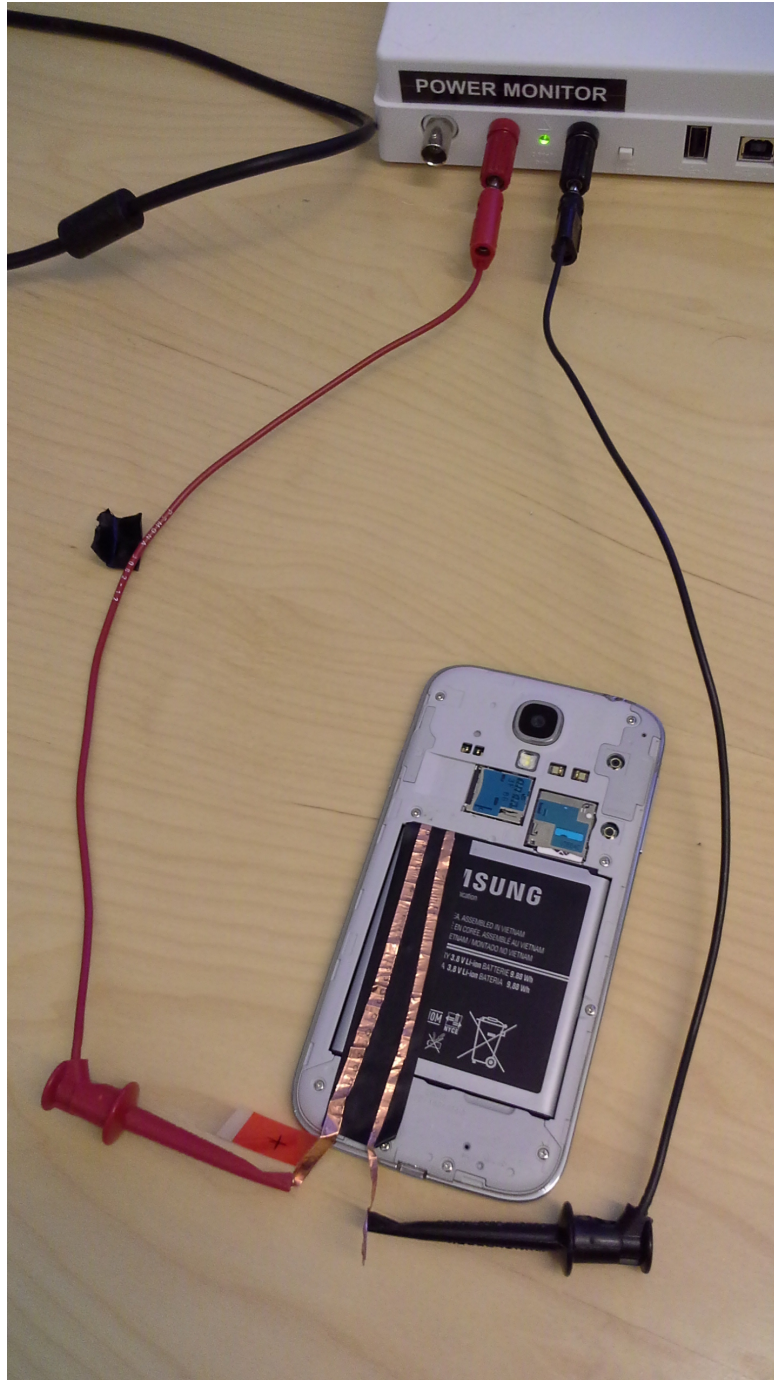Figure 2: Voltage (+) and Ground (-) connectors bypassed with foil tape.

Figure 3: Monsoon Power Monitor connected.

References

[1] Monsoon Solutions, Inc., *Mobile Device Power Monitor Manual.*
Available: `http://msoon.github.io/powermonitor/PowerTool/doc/`
`Power\%20Monitor\%20Manual.pdf.`