



LM-510 LN2 Firmware Update and Calibration Procedure for New Style Probe



As of March 2020, the older cable-integrated LN2 oscillators have been replaced by a more modernized probe. The new style of probe requires LM-510 Panel firmware V2.14 and channel card firmware V1.10 at a minimum. The new LM-510 firmware is backwards compatible with the older style LN2 oscillators. LM-510s purchased with new style LN2 probes are shipped with the newest firmware installed and are calibrated at the factory. LN2 probes purchased on their own will require user calibration, and LM-510s with older firmware will require updates.

Firmware Update Procedure

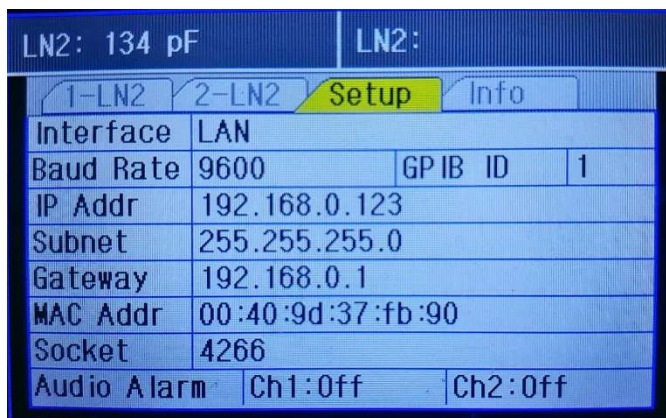
0. Determine the firmware version:

Firmware files are located on Cryomagnetics' website at www.cryomagnetics.com/downloads.

Power up the device, press **Menu**, then scroll to the **Info** tab. Note whether "Panel," "Panel(CV)," or "Panel(LP)" is shown. "Panel" requires the *lm-510.lz* file from the PSoC5 folder. "Panel(CV)" requires the *lm-510.lz* file from the PSoC5CV folder. "Panel(LP)" requires the *lm-510.lz* file from the PSoC5LP folder.

1. Configure the LM-510 for ethernet communications:

- 1.1. From the main display, press the **Menu** key, then select the **Setup** tab.
- 1.2. Make sure that the **Interface** is set to **LAN** and that the **IP Addr** and **Gateway** are configured correctly, i.e. the first three groups of digits are the same for both addresses (in this case, "192.168.0"). Note that the LM-510 needs to be restarted for **Interface** changes to take effect.



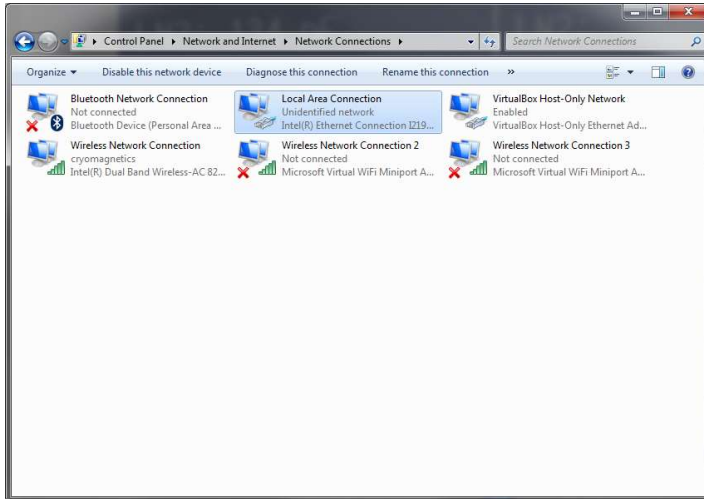
The screenshot shows the device's menu interface. At the top, it displays "LN2: 134 pF" and "LN2:". Below this are four tabs: "1-LN2", "2-LN2", "Setup" (which is highlighted in yellow), and "Info". The "Setup" screen shows the following configuration:

Interface	LAN		
Baud Rate	9600	GPIB ID	1
IP Addr	192.168.0.123		
Subnet	255.255.255.0		
Gateway	192.168.0.1		
MAC Addr	00:40:9d:37:fb:90		
Socket	4266		
Audio Alarm	Ch1:Off	Ch2:Off	

2. Configure the PC's ethernet connection:

- 2.1. Connect the PC to the LM-510 via ethernet.
- 2.2. If the LM-510 is connected to the PC through a router or switch, skip ahead to **Section 3**, otherwise continue with the following steps.
- 2.3. Configure the PC's ethernet adapter for the same Subnet and Gateway as the LM-510 and set a static IP address.

2.3.1. In Windows 7, this can be done by going to the **Network Connections** tab in the control panel.

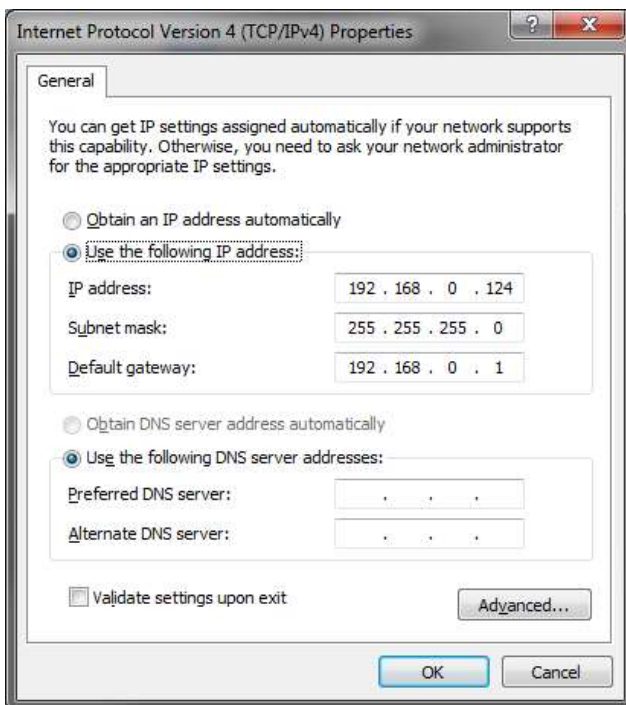


2.3.2. Right click on **Local Area Connection** and select **Properties**.

2.3.3. In the **Local Area Connection Properties** window, disable **Internet Protocol Version 6**.

2.3.4. Select **Internet Protocol Version 4** and click **Properties**.

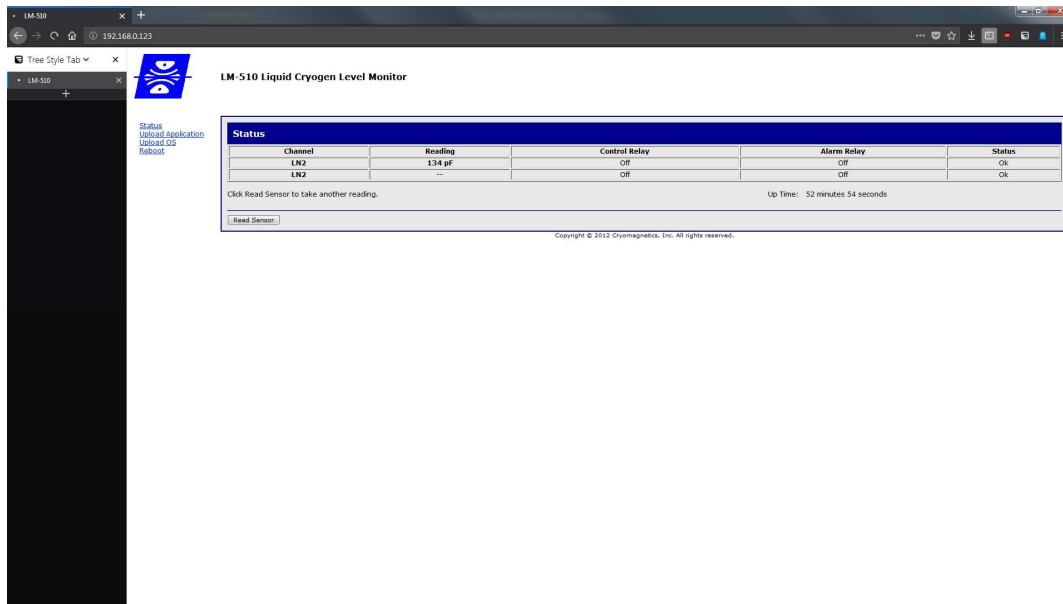
2.3.5. Select the **Use the following IP address** option. Set the **Subnet Mask** and **Default Gateway** to match those of the LM-510. Set the **IP Address** to a different address than the one used on the LM-510, making sure that the first three groups of digits match the **Default Gateway**.



2.3.6. The DNS server settings can be left blank. Hit **Ok** to return to the **Local Area Connection Properties** window and then hit **Ok**. **Local Area Connection** should show that it is connected. If it is not able to connect, double check the IP address settings for both the LM-510 and the ethernet adapter.

3. Upload the new LM-510 firmware and complete the update process:

- 3.1. On the desktop, open a browser and connect to the LM-510 using its IP address. A login popup will appear. The username is **root** and the password is **update**. The main LM-510 webpage will then be shown.



- 3.2. Select the **Upload Application** option, press the **Browse** button and locate the **lm-510.lz** firmware file, then hit the **Upload** button. The process will take a few minutes to complete.
- 3.3. While on the main display of the LM-510, enter **4829551** and then press **Menu**. This will open the advanced menu which allows the user to initiate firmware updates.
- 3.4. Select the **Firmware** tab. After a brief delay, a popup will appear. Press the **Enter** button to begin the update process. The device will reboot multiple times throughout the process before completion.
- 3.5. After the update and reboot sequence is complete, press the **Menu** key and select the **Info** tab to verify the new firmware versions.

Calibration Procedure

1. Calibrate empty level

- 1.1. Attach the probe to an LM-510 and a warm, dry LN2 sensor. Power on the LM-510.
- 1.2. Go to the LN2 channel's menu and set **Units** to **picoFarads**, then press **Menu** to return to the top display.
- 1.3. Note the reading. Return to the LN2 channel's menu. Enter the sensor reading in the **Empty Cap.** field.

2. Calibrate full level

- 2.1. Slowly submerge the LN2 sensor completely in LN2. Wait for the reading to stabilize.
- 2.2. Note the reading. Return to the LN2 channel's menu. Enter the sensor reading in the **Full Cap.** field.
- 2.3. Change **Units** back to the desired type. The probe and sensor are now calibrated and ready for use.