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g.tec GUGER TECHNOLOGIES

g.MOBIlab+ MOBILE LABORATORY

g.MOBIlab+ Driver
USER MANUAL V1.14.01

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To the Reader

Welcome to the medical and electrical engineering world of g.tec!
Discover the only professional biomedical signal processing platform under MATLAB and Simulink. Your ingenuity finds the appropriate tools in the g.tec elements and systems. Choose and combine flexibly the elements for biosignal amplification, signal processing and stimulation to perform even real-time feedback.

Our team is prepared to find the better solution for your needs.
Take advantage of our experience!

Dr. Christoph Guger Dr. Guenter Edlinger

Researcher and Developer
Reduce development time for sophisticated real-time applications from month to hours.
Integrate g.tec's open platform seamlessly into your processing system.
g.tec's rapid prototyping environment encourages your creativity.

Scientist
Open new research fields with amazing feedback experiments.
Process your EEG/ECG/EMG/EOG data with g.tec's biosignal analyzing tools.
Concentrate on your core problems when relying on g.tec's new software features like ICA, AAR or online Hjorth's source derivation.

PREFACE

This section includes the following topics:

Related Products

Using This Guide – Suggestions for reading the handbook

Conventions – Text formats in the handbook

For more detailed information on any of our elements, up-dates or new extensions please visit our website www.gtec.at or just send us an email to office@gtec.at

RELATED PRODUCTS

g.tec provides several biosignal analysis elements that are especially relevant to the kinds of tasks you perform with g.MOBIlab+ Driver.

For more detailed information on any of our elements, up-dates or new extensions please visit our website www.gtec.at or just send us an email to office@gtec.at

USING THIS GUIDE

It is assumed that you are familiar with:

- g.MOBIlab+ hardware and manual

Chapter "Installation and Configuration" lists hardware and software requirements and explains the installation of the software.

Chapter "Quick Start" introduces basic features and capabilities of g.MOBIlab+.

CONVENTIONS

Item	Format	Example
C++ source code	Courier	to open a g.MOBIlab+ type `HANDLE hdevice = OpenDevice();`
Menu items	**Boldface**	Select **Save as …** from the **File** menu.

INSTALLATION AND CONFIGURATION

Installation of Bluetooth dongle and g.MOBIlab+ hardware

For the g.MOBIlab+ hardware installation please refer to ”gMOBIlabInstructionsForUse.pdf” for g.MOBIlab+. To connect g.MOBIlab+ to a PC or Notebook please see “gMOBIlabBluetoothInstallation.pdf”.

Installing the g.MOBIlab+ Driver software

Perform the following steps for installation

1. If there is any old version of the g.MOBIlab+ driver package on your computer please uninstall it.

2. It is highly recommended to turn off the User Account Control (UAC) of the Windows 7 operating system. Please see last page of this document how to do this.

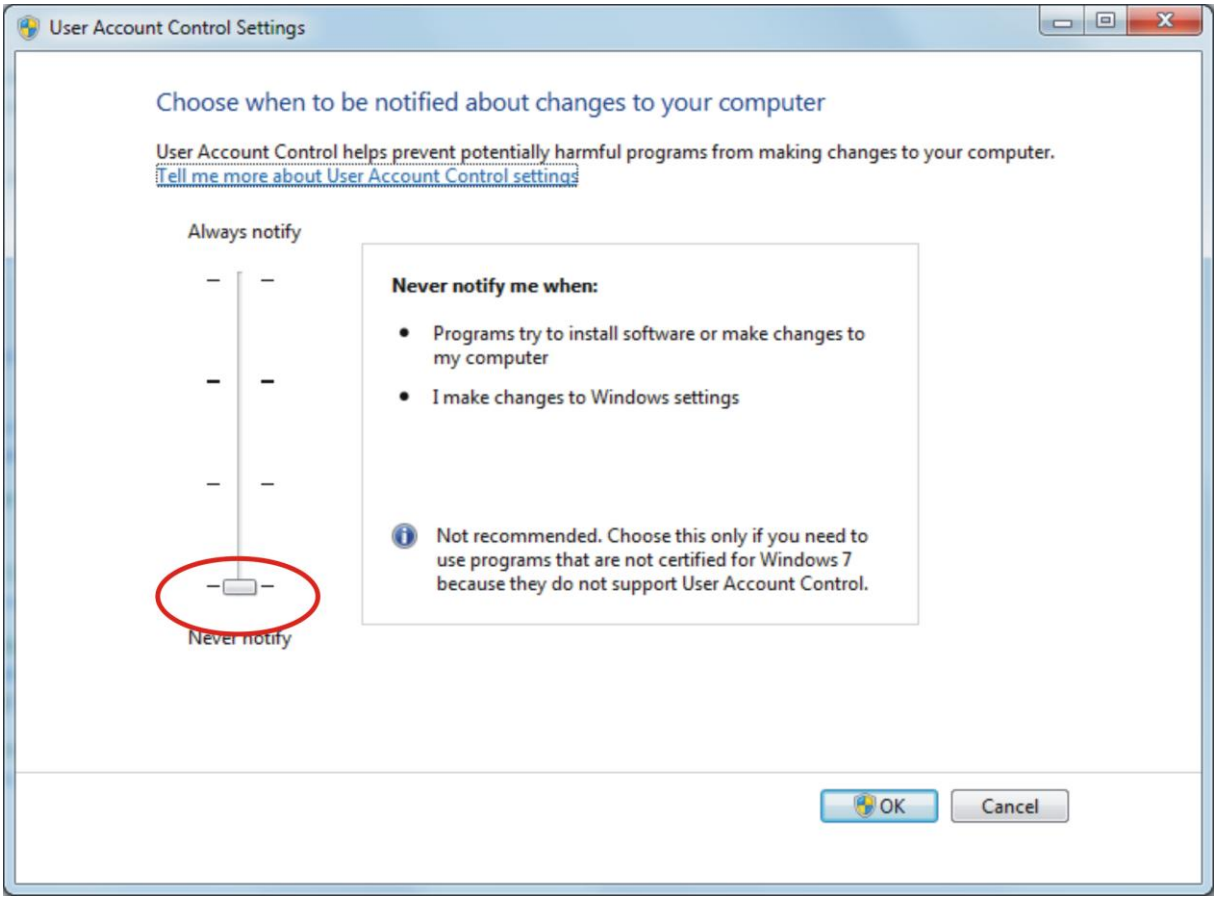
3. Close all running applications.

4. Insert the g.tec installation CD, open the `g.MOBIlab/g.MOBIlab+ Driver` directory, select the correct directory for the architecture of the PC (`Win32` or `Win64`). To install the g.MOBIlab+ Driver and double-click the `setup.exe`. This opens the following welcome dialog (see picture below):

5. Click **Next**. Please read the **License Agreement** for g.MOBIlab+ Driver and if you agree with the terms click **I Agree** and **Next**. Then just follow the steps on the screen.

Turn off User Account Control (UAC)

Please switch off the User Account Control Settings on your system: Click on the Windows **Start** button → **Control Panel → System and Security → Change User Account Control Settings**. Set the slider to the lowest position (Never notify).



Documentation

The g.MOBIlab+ Driver documentation can be found on the CD in pdf format. Use the Acrobat Reader to view the documentation.

QUICK START

Once you have completed the installation of g.MOBIlab+ Driver you can test your installation following the steps in this section.

Quick Start will introduce you into the following topics:

Running gMOBIlabPCdemo.exe

Selecting Hardware Channels

Setting Digital Channels

Storing Data, Pause and Resume Data Acquisition

Closing gMOBIlabPCdemo.exe

Error Messages

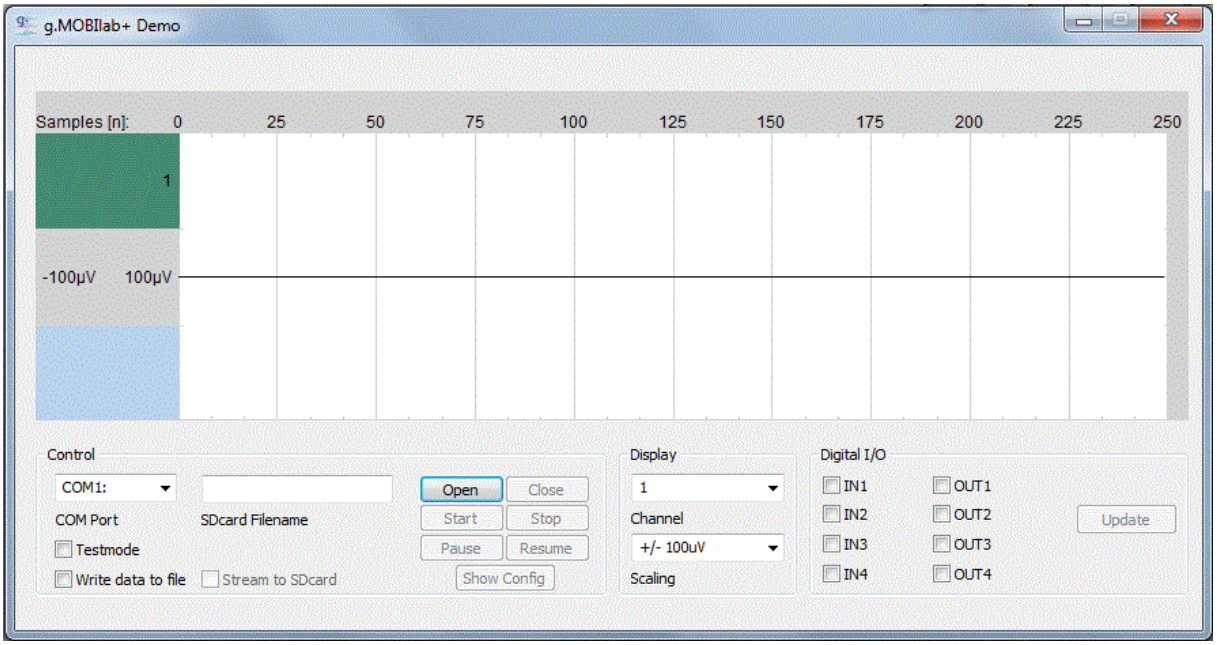
Viewing Data

RUNNING gMOBIlabPCdemo.exe

1. Run **gMOBIlabPCdemo.exe** to explore the functionality of the software package from the directory

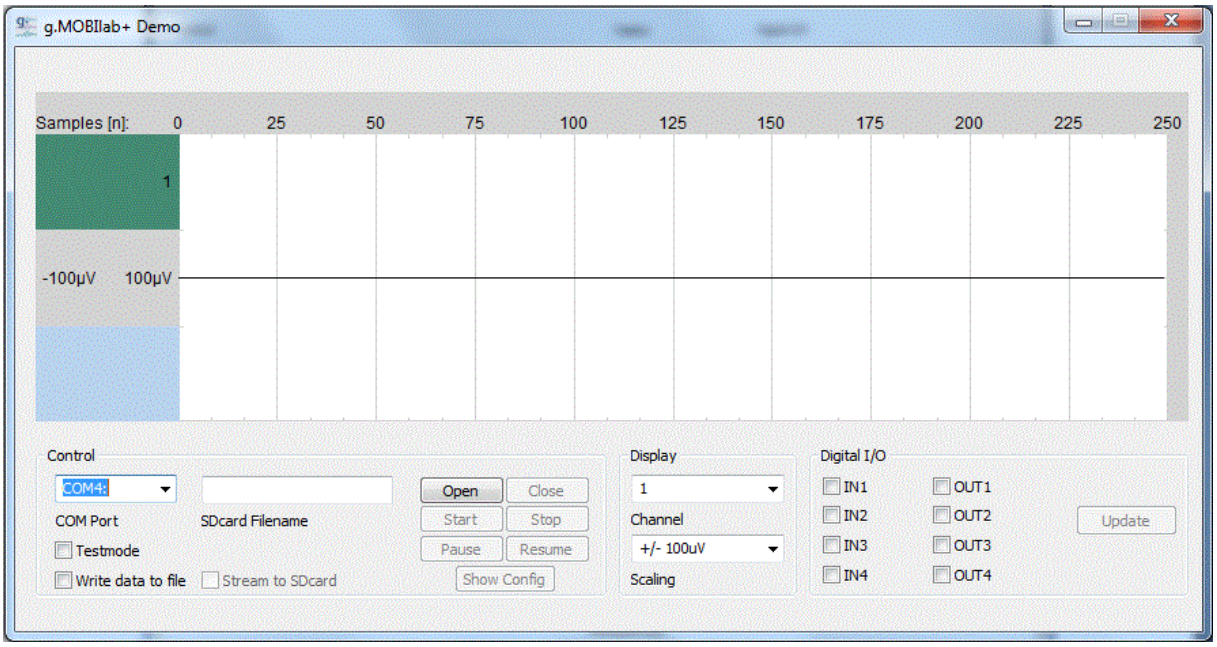
   ```
   C:\Program Files\gtec\gMOBIlabDriver
   ```

   or double click on the icon **g.MOBIlab+ PC Demo** on the desktop. The following dialog appears:



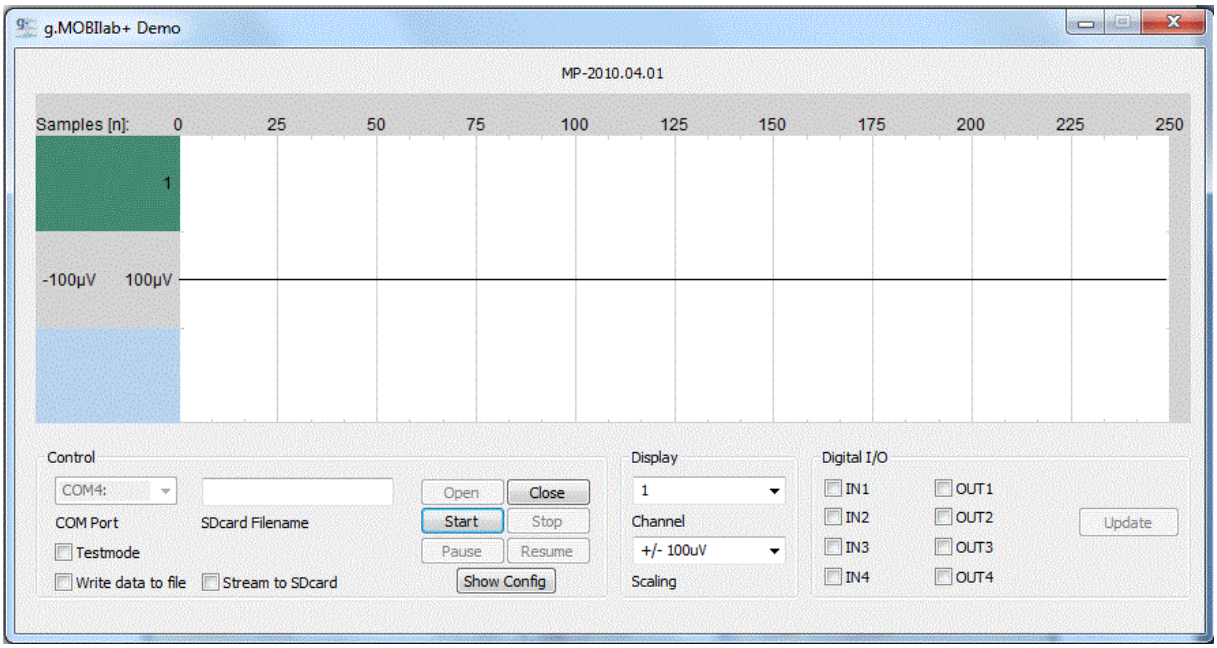
2. Establish the connection from the PC to the g.MOBIlab+ by Bluetooth connection or serial cable connection to the correct COM port. If you are not sure how to do this please refer to the "gMOBIlabBluetoothInstallation.pdf" to set up the connection.

3. Select desired COM connection from the combo box **COM Port**



4. Press **Open** to open the connection to the g.MOBIlab+ and read the device state (SDcard inserted, device is currently streaming to SDcard). The **COM Port** list box will be disabled when the **Open** button is clicked. It is enabled again when the **Close** button is clicked. The serial number of the g.MOBIlab+ device is displayed in the upper panel of the window. See figure below.

5. Select the desired channel you want to display in the section **Display** from the combo box **Channel**

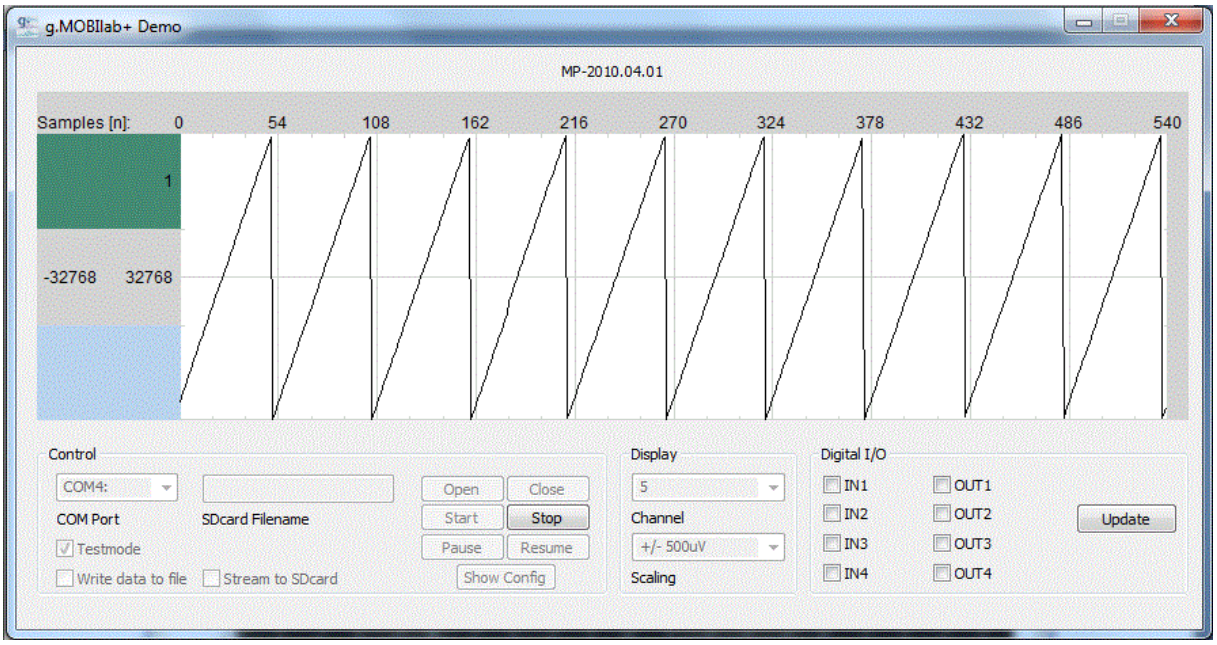


6. Use the button **Show Config** to inspect the configuration of your g.MOBIlab+. It is possible to store this configuration to a file (`gMOBIlabConfig.cfg` is the default filename) or to copy it by drag & drop to a text file.

7. After initializing the Bluetooth or serial connection, you can choose between different operation modes of g.MOBIlab+. To test the connection and data transmission perform these steps:

    - Select the Checkbox **Testmode** in the Control section to run g.MOBIlab+ in testmode and start the data acquisition by clicking the **Start** button. You will see a saw tooth signal with different slopes depending on the channel selected for display. The saw tooth signal is a 16 bit integer consisting of running from -32768 to +32767, see scaling in the figure below.

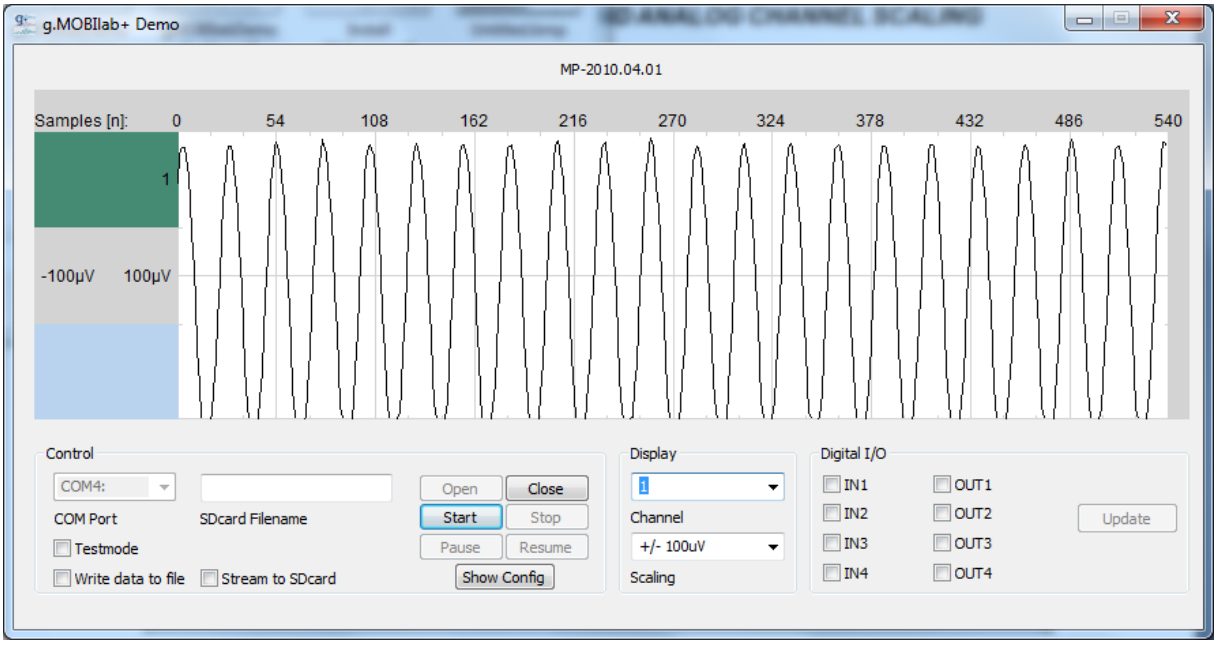
    - Use the **Stop** button to stop the data acquisition.



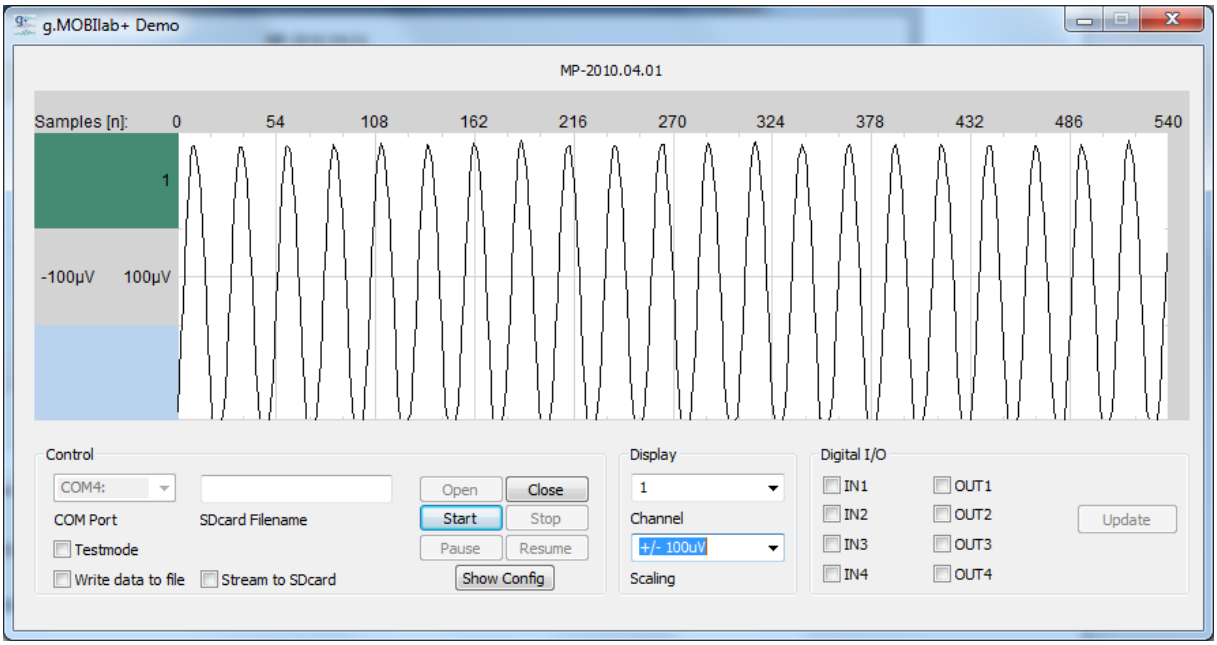
8. Finally use the **Close** button for closing the Bluetooth or serial connection.

SELECTING HARDWARE CHANNELS AND ANALOG CHANNEL SCALING

1. Select the desired analog channel to be displayed in the demo application from the combo box **Channel** in the **Display** section. You can choose one of the eight analog channels provided by g.MOBIlab+.



2. In the “Display” section the scaling for the analog channel to be displayed can be selected in the combo box “Scaling”.

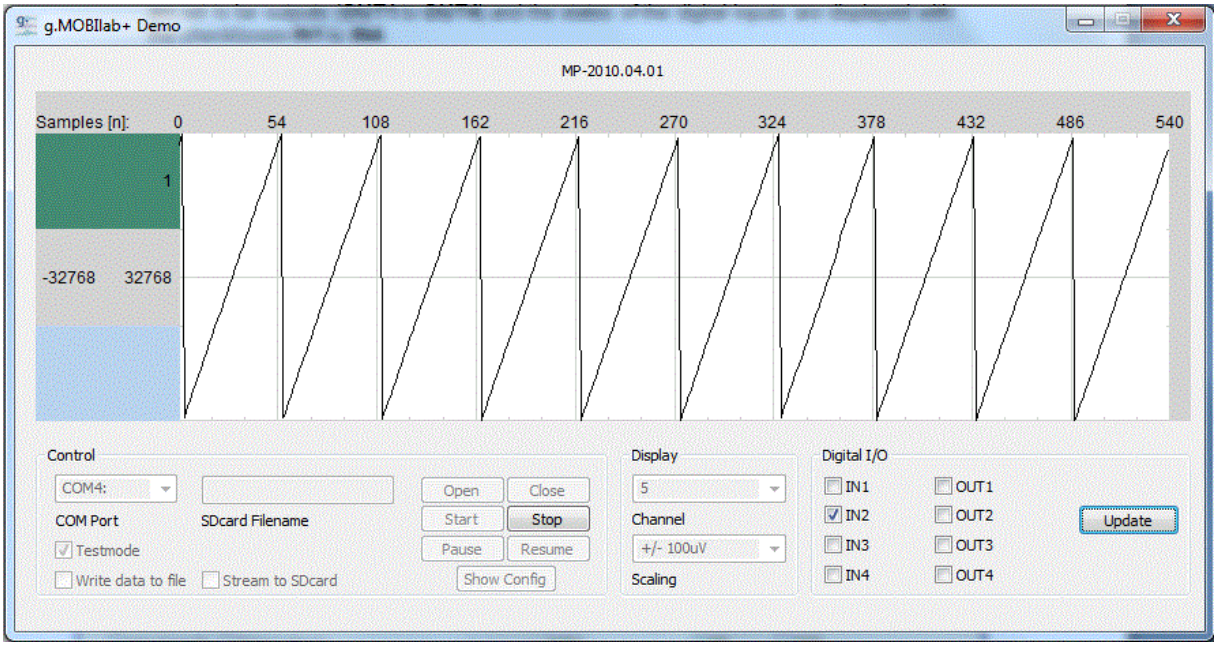


SETTING DIGITAL CHANNELS

1. g.MOBIlab+ provides eight digital channels. In the g.MOBIlab+ demo program the digital I/Os are set to be outputs (**OUT1** to **OUT4**) and the states of the digital inputs are displayed with the checkboxes **IN1** to **IN4**.

2. With the four check boxes **OUT1** to **OUT4** in the **Digital I/O** section the digital outputs can be set. To send the digital output settings to the g.MOBIlab+ hardware click the **Update** button in the **Digital I/O** section.

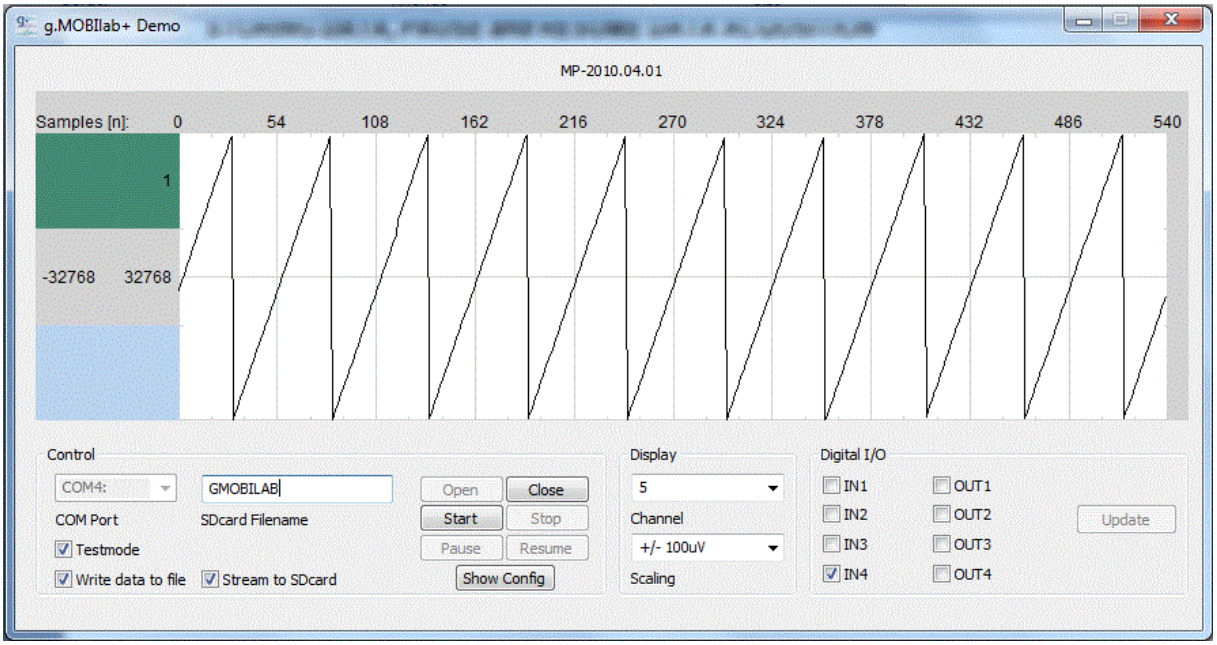
3. By clicking the **Update** button the four check boxes **IN1** to **IN4** show the current state of the four digital inputs.



Note that in testmode the four digital inputs are toggled internally by g.MOBIlab+. Digital inputs and outputs can not be set by the user in this mode.

STORING DATA, PAUSE and RESUME DATA ACQUSITION

The g.MOBIlab+ demo application provides two options for storing data: (1) You can store the data transmitted from g.MOBIlab+ directly on your PC or (2) you can select to store data acquired by g.MOBIlab+ to the implemented SD card on the g.MOBIlab+ hardware.



1. Select the check box **Write data to file**. A file dialog will open when you click the **Start** button, which asks for an appropriate file name e.g. gMOBIlabData.bin, which is the default filename. The data of all channels will be stored to this file in the g.MOBIlab+ file format. For more information about the file format please refer to the "`gMOBIlabplusDataFormat.pdf`" found on the g.MOBIlab+ CD.

2. Select the check box **Stream to SDcard** to enable streaming to SD card.

    - Using this function a filename in the **SDcard Filename** text box must be provided. This filename can have a maximum length of eight characters.

    - Streaming to SD card enabled will enable the **Pause** and **Stop** buttons when the acquisition is started. Clicking on the **Pause** button during data acquisition stops the data transmission to the PC but g.MOBIlab+ continues to stream data to SD card in the same file format as in the first method to record data.

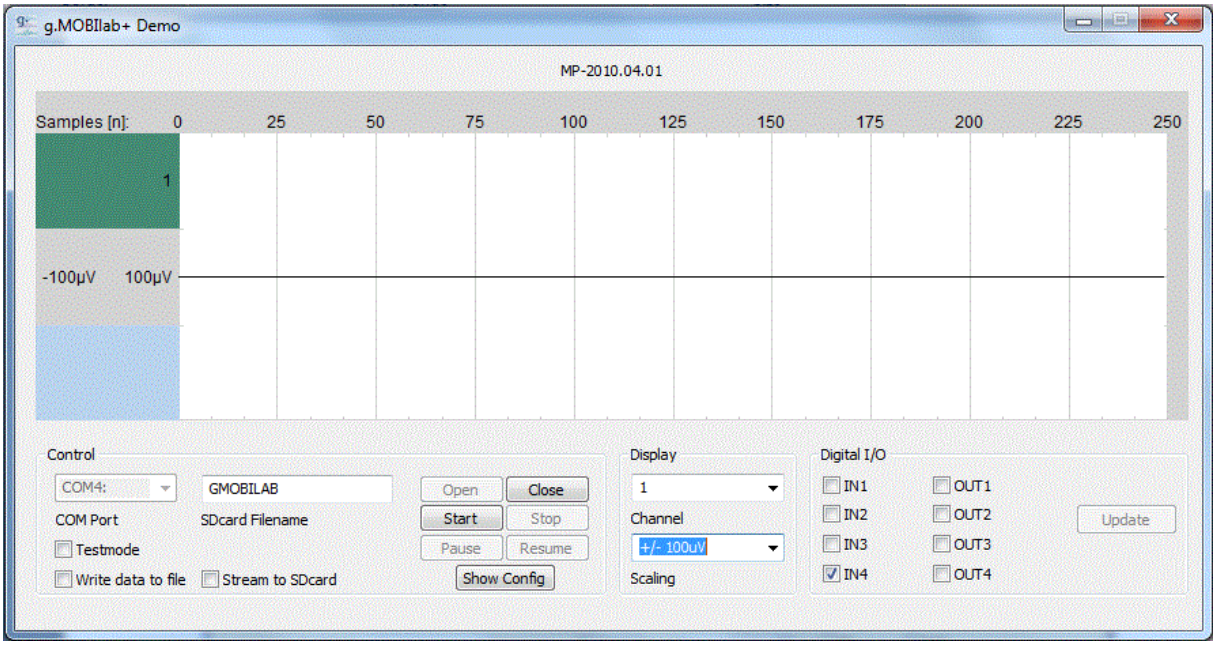
    - If **Pause** is clicked, the **Resume** button will be enabled, which allows the user to resume data transmission from g.MOBIlab+.

Both storage methods can be used at the same time.

Press **Stop** to stop the acquisition.

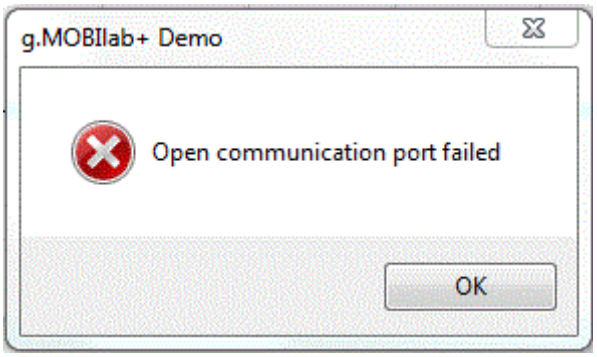
CLOSING gMOBIlabPCdemo.exe

- Press **Stop** if an acquisition is running.
- Press **Close** to disconnect from the g.MOBIlab+ and to free resources.
- Press the cross icon on the dialog window to close the demo application.



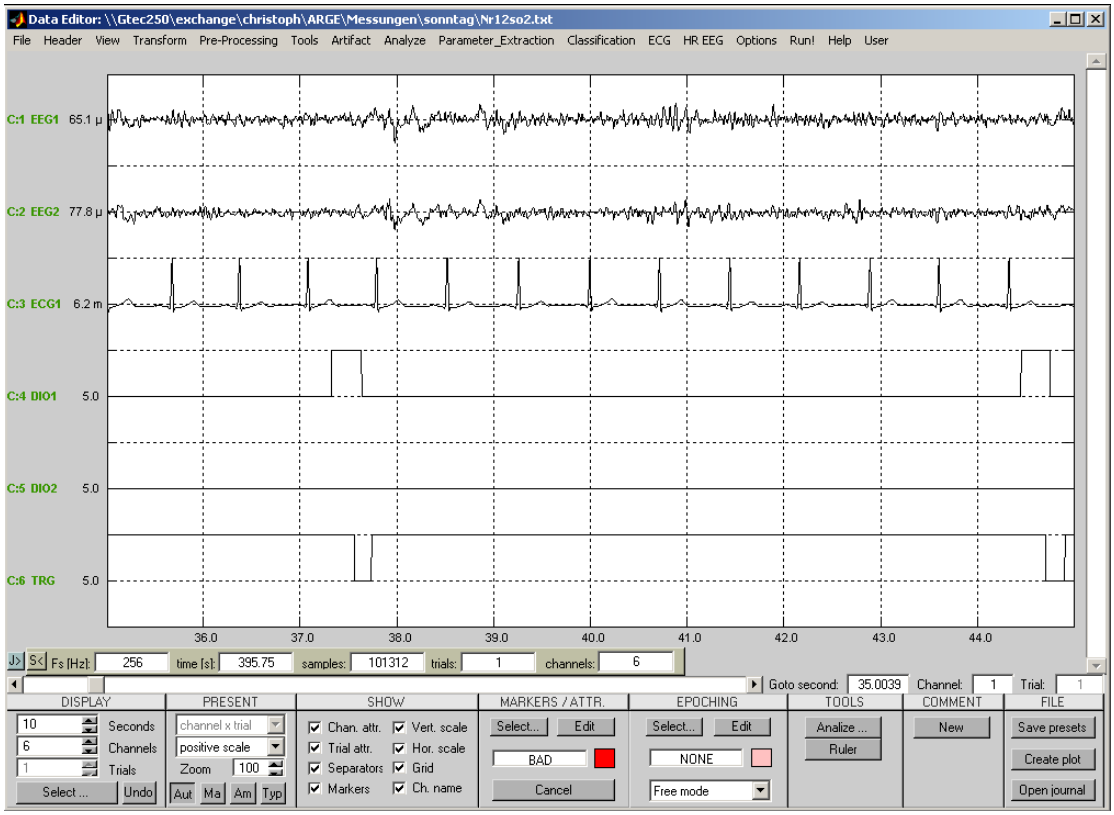
ERROR MESSAGES

Error messages are displayed in message boxes. Click **OK** to proceed.



VIEWING DATA

Use *g.BSanalyze* to visualize the recorded data.



Viewing Data using g.BSanalyze

Product Page (Web)

Please visit our website www.gtec.at for

- Update announcements
- Downloads
- Troubleshooting
- Additional demonstrations

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