Remote Control of g.MOBIlab with Simulink

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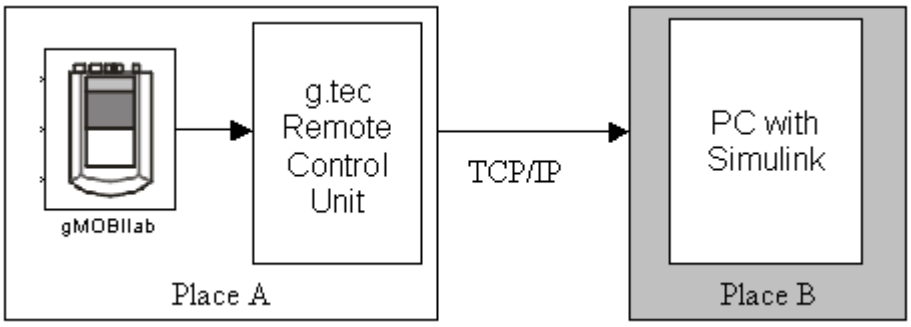
g.MOBIlab is a biosignal acquisition system for EEG, ECG, EMG, EOG and other sensors. In this tutorial the steps are described to remotely control g.MOBIlab over a network connection. Simulink is used as control environment.

DEVICE CONFIGURATION

Connect g.MOBIlab to the g.tec Remote Control Unit and switch on g.MOBIlab. Then connect the Remote Control Unit on place A and the PC with Simulink installed on place B to the TCP/IP network.

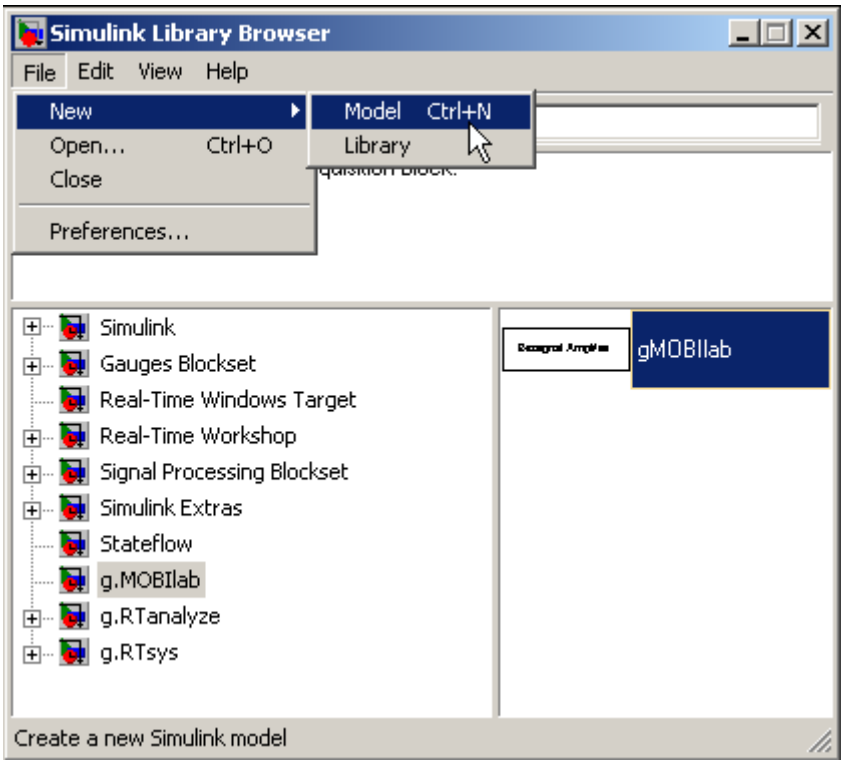


DRIVER CONFIGURATION

Start MATLAB by double clicking on the MATLAB icon and type

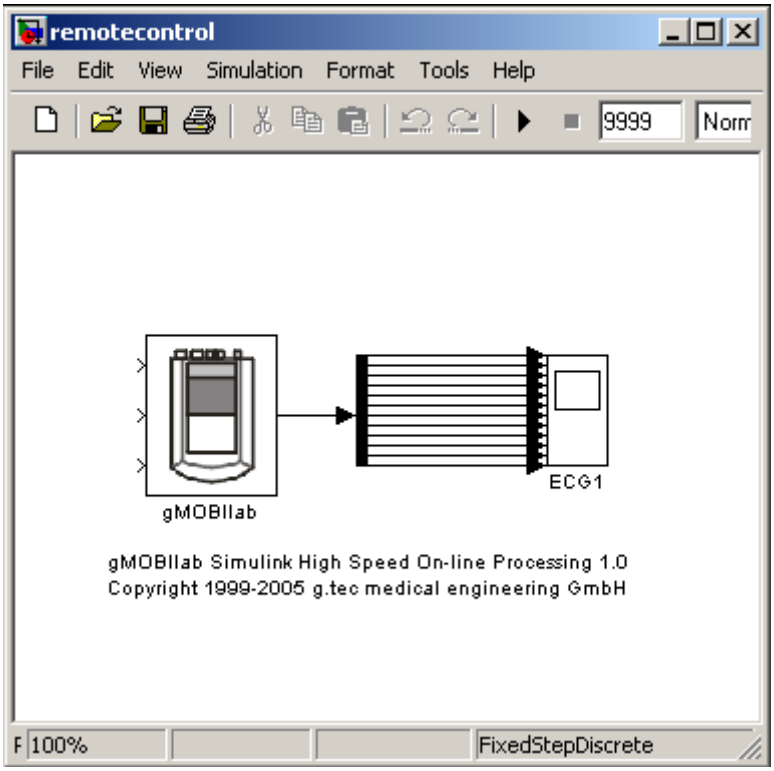
```
simulink
```

into the MATLAB command line to start up the **Simulink Library Browser:**

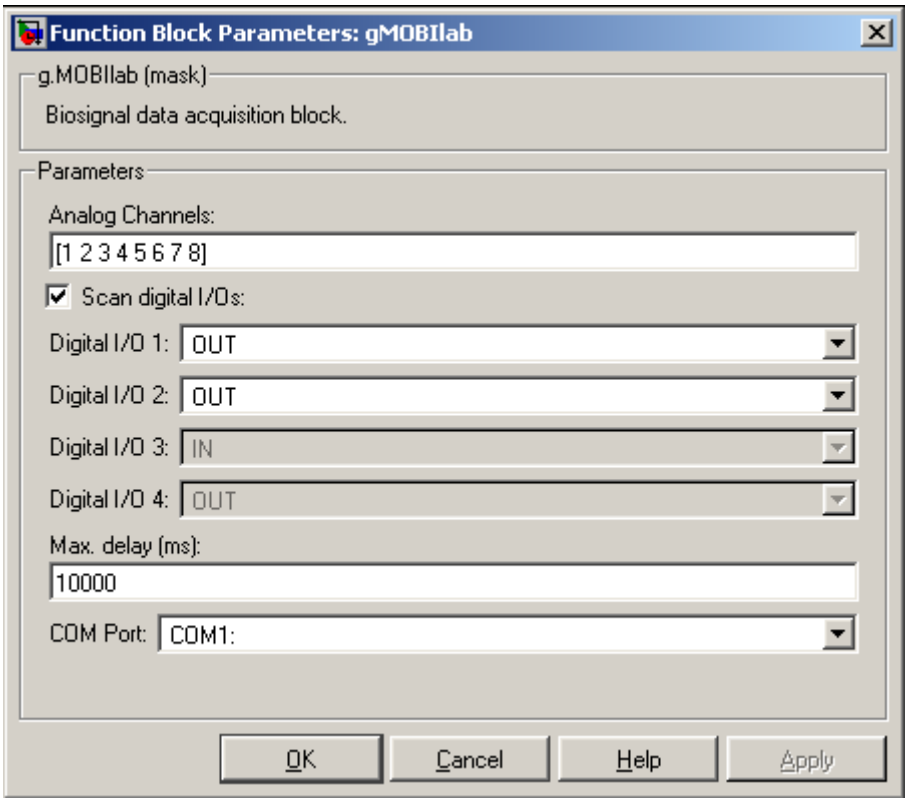


Open a new Simulink model from the **File** menu.

Then go to the `g.MOBIlab` folder in the **Simulink Library Browser** and drag the block `gMOBIlab` into the new Simulink model.



Double click onto the block to open the following window:



Editor box **Analog Channels** allows to specify the biosignal channels. Enter `[1 2 3 4 5 6 7 8]` to read in EEG, ECG and analog input channels.

Check **Scan digital I/Os** if digital inputs or outputs should be used. Digital inputs 1 and 2 can be defined as inputs or outputs. **Digital I/O 3** is always an input and can be used to read in data from the external switch that can be connected to g.MOBIlab. **Digital I/O 4** is always an output channel. Output channels are useful to send trigger signals to external devices for synchronization or to control an external device.

Max. delay (ms) allows to specify the maximum possible delay that the g.MOBIlab driver block can have. The highly optimized driver block ensures that all data from the acquisition device is read into Simulink. If the PC is busy with other tasks and can not perform the Simulink operations fast enough, the driver stores the data in a hardware buffer. After returning to the Simulink task the operations are performed as fast as possible. If the driver block detects an overflow an error message is shown.

Pull-down menu **COM Port** can be used to select the appropriate serial port that identifies the g.tec Remote Control Server.

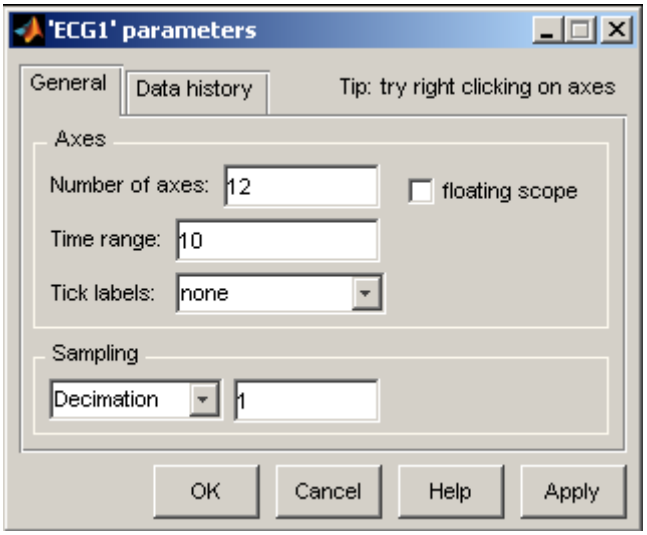
Now g.MOBIlab is correctly initialized.

Press **OK** to accept the settings and to close the window.

SIGNAL VISUALIZATION

Connect a **MUX** block to split the 12 channels.

Then copy a **Scope** block into the model and double click on it. Open the parameters window and enter `12` under **Number of axes**.



Press **OK** to close the window.

Connect the **MUX** block to the **Scope**.

Now the Simulink model and the Remote Control Unit are configured and the model can be started.

SUMMARY

The g.tec Remote Control Unit allows to read biosignal data over a network connection into Simulink. Simulink is used as front-end and all functions of g.MOBIlab can be used.

To perform the tutorial the following components are required:

g.MOBilab biosignal acquisition device
Simulink highspeed ONLINE processing blocks for g.MOBIlab
Remote Control unit for g.MOBIlab
PC or notebook with network connection
MATLAB 7 and Simulink 6