PSM Comm 2

Data Logging Software

Software User Manual

Manual constructed using Software version v1_1b
ABOUT THIS MANUAL

PSMComm2 is a self contained executable software program for use with the N4L PSM17 and PSM37 series Phase Sensitive Multimeters.

Accordingly, this manual first describes the general features and specification of the software as a whole; and then describes the individual functions in detail.

Each function is described in turn, in its own chapter, with details of the principles on which it is based, how to use it, the options available, display options etc.
# Table of Contents

1 **Introduction** .................................................................................................................. 5
   1.1 Introduction to PSMComm2 ...................................................................................... 5
   1.2 Minimum Requirements ......................................................................................... 5

2 **Getting Started** ............................................................................................................. 6
   2.1 Download .................................................................................................................. 6
   2.2 Installation ............................................................................................................... 6
   2.3 Software Settings ...................................................................................................... 6
   2.4 Debug Mode ............................................................................................................ 8

3 **Connecting** ................................................................................................................... 9
   3.1 Preparing the PSM .................................................................................................... 9
   3.2 Connecting to your PSM ........................................................................................ 10

4 **Configuration Panel** ................................................................................................... 12
   4.1 Using the Configuration Panel .............................................................................. 12

5 **The Display Menu** ....................................................................................................... 13
   5.1 Using the Display Menu ........................................................................................ 13
   5.2 Save to Bitmap ....................................................................................................... 15
   5.3 Copy to Clipboard .................................................................................................... 15

6 **FRA Mode** .................................................................................................................... 16
   6.1 Real Time FRA Measurements .............................................................................. 16
   6.2 Performing an FRA Sweep .................................................................................... 17
   6.3 Exporting an FRA Sweep to CSV ........................................................................ 19
   6.4 Exporting an FRA Sweep to Excel ...................................................................... 20

7 **LCR Mode** .................................................................................................................... 21
   7.1 Real Time LCR Measurements .............................................................................. 21
   7.2 Performing an LCR Sweep .................................................................................... 22
   7.3 Graph Settings ....................................................................................................... 23
   7.4 Exporting LCR to CSV ........................................................................................ 25
   7.5 Exporting LCR to Excel ......................................................................................... 26

8 **Piezo Mode** .................................................................................................................. 27
   8.1 Introduction to Piezo Mode .................................................................................... 27
8.2 Performing a Piezo Sweep ........................................... 27
8.3 Exporting Piezo Data to CSV ....................................... 28
8.4 Exporting Piezo Data to Excel ..................................... 29
8.5 Importing into Piezo mode ......................................... 32

9 EIS Mode .......................................................................... 33
  9.1 Introduction to EIS Mode ............................................ 33
  9.2 Performing an EIS Sweep .......................................... 33
  9.3 Graph Settings .......................................................... 34
  9.4 Exporting EIS Data to CSV ........................................ 36
  9.5 Exporting EIS Data to Excel ....................................... 37

10 PSMComm2 Database .................................................... 40
  10.1 Introduction to the PSMComm2 Database ................. 40
  10.2 Adding a Session to the database ............................ 41
  10.3 Adding a Test to the Database ................................... 42
  10.4 Removing a Test from the Database .......................... 43
  10.5 Exporting a Database Test to CSV ............................ 44
  10.6 Exporting a Database Test to Excel ........................ 46
  10.7 Graphing a Database Test ......................................... 47
  10.8 Database Graph Settings .......................................... 48
  10.9 Finding the Gain/Phase Margins ............................... 51
  10.10 Calculating Multiple Feedback Loop Response ....... 52

11 Capture Mode .................................................................... 55
  11.1 Downloading a screenshot from a PSM. ................. 55

12 Using PSMComm2 CSV Files .......................................... 57
  12.1 Importing CSV Files into Excel ............................... 57

Appendices

Appendix A: Contact Details
1 Introduction

1.1 Introduction to PSMComm2

PSMComm2 is a self contained executable software program written in C++ using the Microsoft win32 graphics set.

PSMComm2 has the ability to connect to the PSM series of instruments via RS232, USB and LAN. The software includes all measurement modes to reflect instrument operation.

PSMComm2 supports the ability to export text files in CSV format as well as export directly to Microsoft Excel.

This guide was written using a PSM3750 with Firmware version V1.27

1.2 Minimum Requirements

The minimum requirements to run the PSMComm2 Software are as follows:

- Windows XP (Service Pack 3) or later
- At least 1Ghz Processor
- Minimum of 1GB RAM
- 10MB of Hard Drive space.
2 Getting Started

2.1 Download

As with all N4L Software, it is available for free download from our website. See www.newtons4th.com/support for more details. Once registered and your account has been activated you will have access to the software downloads section.

2.2 Installation

Wherever possible, at N4L we try to develop software that enables the engineer to be ready and performing tests as soon as possible. With this in mind we have made PSMComm2’s installation method as simple as possible.

To install PSMComm2, simply download the .exe file onto your PC’s hard drive or an external drive such as a USB memory stick and run it straight away.

2.3 Software Settings

To access the Settings window go to Configure and click “Settings...” from the dropdown menu.

This brings up the Software Options window which allows you to change settings that affect everything in PSMComm2.
The Software Options window:

Export Number Format allows you to change the format in which PSMComm2 will export numbers to CSV and to Excel. This is initially set to “Default”, which will take the number format settings for your PC’s locale settings.

The other options are:
- UK/US (forced) which attempts to export with the UK/US number format which uses ‘.’ as a decimal separator and ‘,’ as a thousand separator
- France (forced) which attempts to export with the French number format which uses ‘,’ as a decimal separator and ‘ ’ as a thousand separator
- Germany (forced) which attempts to export with the German number format which uses ‘,’ as a decimal separator and ‘.’ as a thousand separator
- Custom which allows you to set your own decimal and thousand separator

For most cases, this should be left as “Default”. 
2.4 Debug Mode

PSMComm2’s Debug mode can be accessed from the Configure Menu:

When entering Debug Mode, PSMComm2 will ask for a location to store the debug log file, select a file location and press OK to enter Debug Mode.

While in Debug Mode, PSMComm2 will create a log of all communication with the connected PSM in a log file.
3 Connecting
3.1 Preparing the PSM

Before the software can connect, the PSM must be ready to accept the connection. To prepare your PSM for connection with PSMComm2, ensure the unit is powered on and the cables are connected.

Next you must ensure the Instrument is correctly set up to reflect the type of connection you are using. To do this, access the COMMS menu on the unit; navigate to the Interface option and select the interface you are using to connect to the software: RS232, USB, LAN or GPIB.

If you select RS232, you will need to additionally set the Baud Rate of the cable you intend to use:

<table>
<thead>
<tr>
<th>interface</th>
<th>RS232</th>
</tr>
</thead>
<tbody>
<tr>
<td>baud rate</td>
<td>19200</td>
</tr>
</tbody>
</table>

For LAN you’ll need to set an IP Address for the Instrument:

<table>
<thead>
<tr>
<th>interface</th>
<th>LAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP address</td>
<td>192.168.0.134</td>
</tr>
</tbody>
</table>

And for GPIB you will need to set an address:

<table>
<thead>
<tr>
<th>interface</th>
<th>GPIB</th>
</tr>
</thead>
<tbody>
<tr>
<td>address (1-30)</td>
<td>23</td>
</tr>
</tbody>
</table>
3.2 Connecting to your PSM

To begin connecting to an instrument, click on Configure and select “Connection…” from the dropdown menu.

This brings up the communications window where you’ll set up how you’re connecting to the instrument.

Enter the PSM’s communication details by selecting the communication method (Serial, USB or LAN).

If you selected LAN you’ll need to enter the same IP as you set your unit to.
If you selected USB or Serial you’ll need to select the COM port that windows assigned to your cable. Additionally if you select Serial you’ll need to set your cable’s Baud Rate.

To check the connection settings are correct, press the Test button to attempt a connection. This will then bring up a message telling you if the connection was successful.
If you failed to connect, it will bring up a message telling you the connection failed.

If the connection was successful, the message will tell you the details of the instrument you are connected to, such as its model, serial number and firmware level.

If you want PSMComm2 to remember your current connection settings and reload every time you open the connection window, you can do so by pressing the Save as Default button.

If this is the first time you’ve used PSMComm2, you will need to enter an Unlock Code, if you haven’t received an Unlock Code contact your local Newtons4th Distributer or our support team.

Once you press Connect (or Unlock) the software will then connect to and download the Configuration settings for each instrument it is able to connect to.
4 Configuration Panel
4.1 Using the Configuration Panel

The connected instrument’s settings are stored in the configuration panel and can be edited and sent back to the instrument.

Before changing any settings in the Control Panel you should always press READ PSM this enables the software to download that PSM’s settings to ensure the software is configured with any changes that have been made to the PSM’s settings on the instrument’s front panel.

Then choose which settings menu to look at and edit, the individual instruments settings can be modified in the Configuration Control Panel.

The menus in PSMComm2 are designed to mimic the Instrument’s settings panels. For more information on what each setting does, check the respective Instrument’s User Manual.

Finally, the changes you made need to be communicated to the Instrument; any amended settings are sent by pressing the SET UP PSM button. The changes must be sent to the instrument for the instrument to be configured correctly.

Additionally, you can hide and show the Configuration Panel by pressing the Hide Settings and Show Settings button.
5 The Display Menu
5.1 Using the Display Menu

The Display menu is used to save the displayed screen as a picture.

The following screens can be saved:

**FRA’s Real Time display**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Magnitude 1</th>
<th>Magnitude 2</th>
<th>Gain 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>10000 Hz</td>
<td>550.00 nV</td>
<td>1326.5 uV</td>
<td>7.647 dB</td>
</tr>
<tr>
<td>Phase 1</td>
<td>Delay 1</td>
<td>Magnitude 3</td>
<td>Gain 2</td>
</tr>
<tr>
<td>-101.72°</td>
<td>28.256 ms</td>
<td>1677.0 uV</td>
<td>9.6835 dB</td>
</tr>
<tr>
<td>Phase 2</td>
<td>Delay 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-114.45°</td>
<td>31.791 ms</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**FRA’s Graph**

![FRA's Graph Diagram]

**LCR’s Real Time display**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Magnitude 1</th>
<th>Magnitude 2</th>
<th>Impedance</th>
<th>Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>10000 Hz</td>
<td>656.61 nV</td>
<td>2495.4 uA</td>
<td>263.13 mΩ</td>
<td>159.4 °</td>
</tr>
<tr>
<td>Series R</td>
<td>Series L</td>
<td>Series C</td>
<td>Parallel R</td>
<td>Parallel L</td>
</tr>
<tr>
<td>-246.31 mΩ</td>
<td>1.4732 mH</td>
<td>-171.94 mF</td>
<td>-281.09 mΩ</td>
<td>11.905 mΩ</td>
</tr>
<tr>
<td>Parallel C</td>
<td>Tanδ</td>
<td>Q</td>
<td>Reactance</td>
<td></td>
</tr>
<tr>
<td>-21.278 mF</td>
<td>2.6610</td>
<td>375.80 m</td>
<td>92.562 mΩ</td>
<td></td>
</tr>
</tbody>
</table>

**LCR’s Bode graph**

![LCR's Bode Graph Diagram]
LCR and EIS’s Nyquist Graph

Piezo’s Graph

Capture Mode’s Screenshot

<table>
<thead>
<tr>
<th>OUTPUT- ON</th>
<th>LCR METER</th>
<th>10:24:19</th>
</tr>
</thead>
<tbody>
<tr>
<td>magnitude</td>
<td>CH1: 30mV</td>
<td>CH2: 10mV</td>
</tr>
<tr>
<td>resistance</td>
<td>767.29mV</td>
<td>463.61mA</td>
</tr>
<tr>
<td>reactance</td>
<td>1.537Ω</td>
<td>1.655Ω</td>
</tr>
<tr>
<td>impedance</td>
<td>2.510</td>
<td></td>
</tr>
<tr>
<td>phase</td>
<td>+158.275°</td>
<td></td>
</tr>
<tr>
<td>frequency</td>
<td>10.00kHz</td>
<td></td>
</tr>
</tbody>
</table>
5.2 Save to Bitmap

Save to Bitmap allows you to save the current screen as a .bmp image. After the Save to Bitmap menu item has been clicked, PSMComm2 will need a file location to save the image to.

Note: to save your .bmp file, remove the * and replace with your file name before clicking on save.

Once a location has been selected, press the Save button to save the screenshot.

5.3 Copy to Clipboard

Copy to clipboard saves the image in your windows clipboard. The screenshot can then be pasted anywhere that you’d normally use an image such as an Email, a Picture Editor (eg. MS Paint, Microsoft Word, Microsoft Excel, etc.)
6 FRA Mode

6.1 Real Time FRA Measurements

To see the real-time data gathered by the PSM, ensure you’re in FRA Mode by pressing the FRA button at the top of PSMComm2.

PSMComm2 will reload all the settings from the connected PSM.

To read in data from the PSM in real-time, change the view mode to REALTIME.

And press START to begin logging and PSMComm2’s data display will update with the latest values from the connected PSM.
6.2 Performing an FRA Sweep

To perform an FRA sweep, ensure you’re in FRA Mode by pressing the FRA button at the top of PSMComm2.

PSMComm2 will reload all the settings from the connected PSM.

To start a sweep, change the view mode to GRAPH or TABLE.

And press SWEEP button to bring up the Test Details window which allows you to set up an FRA sweep.
You can select to perform a **Single Test** or a **Repeating Test**.

Selecting a **Repeating Test** brings up some additional options where you can set the number of **Tests to run** and the **Interval** between sweeps starting.

FRA Sweeps can be **Saved to the Database**; to get a sweep to be **Saved to the Database** it will need a **Session**, **Winding** and (optionally) a **description**. You can start a create a session by pressing the **New Session Button** which will bring up this window.

Enter the session details and press the Create Session button to save the sessions to the database.

Once the sweep has been set up, press the **Start Sweep button** and PSMComm2 will start get the connected PSM to sweep.
6.3 Exporting an FRA Sweep to CSV

To export to CSV, once the sweep is completed press the Export button. And select Export to .CSV

Press OK and PSMComm2 will ask for a file location:

Select a file location for the data to be stored in and set a file name; finally press Save.
6.4 Exporting an FRA Sweep to Excel

To export to Excel, once the sweep is completed press the Export button.

And ensure Export to Excel is selected and press OK.

Excel will open with the step count and all the FRA data from the sweep.
7 LCR Mode

7.1 Real Time LCR Measurements

To see the real-time data gathered by the PSM, ensure you’re in LCR Mode by pressing the LCR button at the top of PSMComm2.

PSMComm2 will reload all the settings from the connected PSM.

To read in data from the PSM in real-time, change the view mode to REALTIME.

And press **START** to begin logging and PSMComm2’s data display will update with the latest values from the connected PSM.
7.2 Performing an LCR Sweep

To perform an LCR sweep, ensure you’re in LCR Mode by pressing the LCR button at the top of PSMComm2.

PSMComm2 will reload all the settings from the connected PSM.

To start a sweep change the View mode to BODE, NYQUIST or TABLE.

And then press SWEEP to bring up the Test Details window.

Selecting a Repeating Test brings up some additional options where you can set the number of Tests to run and the Interval between sweeps starting.

Once the sweep has been set up, press the Start Sweep button and PSMComm2 will start get the connected PSM to sweep.
7.3 Graph Settings

To change the visual settings of LCR Graphs, press the Graph Settings button while the View Mode is either Bode or Nyquist.

This brings up the Graph Settings window

All the options in the graph settings window are available by right-clicking the graph

The Graph Settings window allows you to choose the style of both Y Axis Plots, the X Axis, and the general Graph style. Plot A controls the left Y-Axis and Plot B controls the right Y-Axis.
Data allows you to select which data the plot will graph. Range will allow you to change the Range of the both left and right Y-Axis as well as the X-Axis, while Padding allows you to change how much relief there is between the plot and the edge of the graph in both X and Y directions. The X axis additionally allows you to edit the scale of the axis between Linear and Logarithmic.

For additional customisation you can change the colour (including selecting a custom colour) and weight of both of the Y plots as well as being able to turn the plot cursors on and off for both Y plots.

The background colour of the graph can be changed in the Graph settings.

Preview allows you to view the changes on the LCR Graph, and once you’re happy you can either save it as a new default, reload the current default, press OK or cancel to leave the graph as it was.
7.4 Exporting LCR to CSV

To export to CSV, once the sweep is completed press the Export button.

And select Export to .CSV

Press OK and PSMComm2 will ask for a file location:

Select a file location for the data to be stored in and set a file name; finally press Save.
7.5 Exporting LCR to Excel

To export to Excel, once the sweep is completed press the Export button.

And ensure Export to Excel is selected and press OK.

Excel will open with the step count and all the LCR data from the sweep.
8 Piezo Mode

8.1 Introduction to Piezo Mode

Piezo mode is PSMComm2’s mode for modelling a Piezoelectric Equivalent Circuit. PSMComm2 runs an LCR sweep and will calculate the values of $L_s$, $R_s$, $C_s$, and $C_p$.

8.2 Performing a Piezo Sweep

To perform an LCR sweep, ensure you’re in LCR Mode by pressing the LCR button at the top of PSMComm2. PSMComm2 will reload all the settings from the connected PSM.

Pressing Start Sweep will begin the LCR sweep.
Once the Sweep has been performed and downloaded, PSMComm2 will show the L, R, C, and Cp values as well as the Impedance and Phase graphed over frequency.

8.3 Exporting Piezo Data to CSV

To export to CSV, once the sweep is completed press the Export button.

And select Export to .CSV
Press OK and PSMComm2 will ask for a file location:

Select a file location for the data to be stored in and set a file name; finally press Save.

8.4 Exporting Piezo Data to Excel

To export to Excel, once the sweep is completed press the Export button.

And ensure Export to Excel is selected and press OK.
Excel will open with a report spread over 3 tabs: The first tab is a report with a circuit diagram and the calculated values of $L_s$, $R_s$, $C_s$ and $C_p$. The second page is the LCR sweep data.
And the third tab is the graph
8.5 Importing into Piezo mode

To import LCR data into Piezo mode press the Import button.

PSMComm2 will then ask for a CSV file, select an LCR CSV, EIS CSV or Piezo CSV exported from PSMComm2 to load in as a Piezo sweep.

And PSMComm2 will import it and calculate the Piezo Equivalent Circuit values.

This data can be re-exported to Excel or CSV.
9 EIS Mode

9.1 Introduction to EIS Mode

EIS mode is PSMComm2’s Electrochemical Impedance Spectroscopy mode that is used to model a Randles Cell equivalent circuit values: $R_s$, $R_p$, $C_p$.

9.2 Performing an EIS Sweep

To perform an EIS sweep, ensure you’re in EIS Mode by pressing the EIS button at the top of PSMComm2.

PSMComm2 will reload all the settings from the connected PSM.

Press SWEEP to bring up the Test Details window.
Once the sweep has been set up, press the Start Sweep button and PSMComm2 will start to sweep.

With the Sweep downloaded, PSMComm2 will display the Nyquist plot of the LCR data and the $R_s$, $R_p$, and $C_p$ values.

9.3 Graph Settings

To change the visual settings of the EIS Graph, press the Graph Settings button.
This brings up the Graph Settings window

All the options in the graph settings window are available by right-clicking the graph.

The Graph Settings window allows you to choose the style of both Y Axis Plots, the X Axis, and the general Graph style, Plot A controls the left Y-Axis and Plot B controls the right Y-Axis. Data allows you to select which data the plot will graph. Range will allow you to change the Range of the both left and right Y-Axis as well as the X-Axis, while Padding allows you to change how much relief there is between the plot and the edge of the graph in both X and Y directions.

For additional customisation you can change the colour (including selecting a custom colour) and weight of both of the Y plots as well as being able to turn the plot cursors on and off for both Y plots.
The background colour of the graph can be changed in the Graph settings.

Preview allows you to view the changes on the LCR Graph, and once you’re happy you can either save it as a new default, reload the current default, press OK or cancel to leave the graph as it was.

9.4 Exporting EIS Data to CSV

To export to CSV, once the sweep is completed press the Export button.

And select Export to .CSV

Press OK and PSMComm2 will ask for a file location:
Select a file location for the data to be stored in and set a file name; finally press Save.

9.5 Exporting EIS Data to Excel

To export to Excel, once the sweep is completed press the Export button.

And ensure Export to Excel is selected and press OK.
Excel will open with a report spread over 4 tabs:
The first tab is a report with a circuit diagram and the Cs, Cp, and Rp values on it.

The second tab is a page with the LCR sweep results on it.

The third tab is a page with the Imaginary and Real data used to create the nyquist plot.
And the final tab is a page with the Nyquist graph on
10 PSMComm2 Database
10.1 Introduction to the PSMComm2 Database

PSMComm2’s database is used for storing FRA plots in a reliable and reusable way. The plots can be exported to CSV and Excel as well as graphed. Multiple FRA sweeps can be graphed together and calculations can be run on database FRA plots.

To Access the PSMComm2’s database system, press the DATABASE button just under the menu.

![Database Access](image)

This will show you the PSMComm2 database view

![Database View](image)

When you first open PSMComm2 it will create a new database for you called “default.db” and place this in the same location as PSMComm2’s .exe file, however if you want to make a new database you can with the Create Database button.

Open Database Allows you to swap the database you’re editing to another database created by PSMComm2.
10.2 Adding a Session to the database

All tests added to a PSMComm2 database must be part of a session.

The Add Session button allows you to create a new testing session for tests to be added to. When Add Sessions is pressed, the Add Session window is displayed:

Fill in the details and press Create Session to add the new session to the database.

Sessions and all related tests can be deleted by using the Remove Session button.
10.3 Adding a Test to the Database

To Add a test to the PSMComm2 database, an FRA sweep must be performed, to do this we will need to enter Measure mode again:

And we’ll need to be in FRA mode:

And start a SWEEP in Graph or Table View:

And enable **Save sweep to Database**:

You’ll then need to select a session or create a new session for this test to be added to.

Fill in the rest of the details as necessary and press Start Sweep.

Once the sweep has finished, returning to the database
And selecting the Session you added the sweep to:

<table>
<thead>
<tr>
<th>Session Name</th>
<th>Unit</th>
<th>Test Date</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example Session</td>
<td>PSM3750</td>
<td>23/2/2016</td>
<td>N4L</td>
</tr>
</tbody>
</table>

You’ll see the sweep has been added to the database

10.4 Removing a Test from the Database

To delete a test from the PSMComm2 Database, select the test you want to remove:

And press the **Delete Test** button:

You will be asked to confirm you want to delete the test. Press “Yes” to delete the test.
And the test is then deleted from the database.

10.5 Exporting a Database Test to CSV

To export tests from the PSMComm2 Database to CSV files, first you’ll need to select the tests you want to export. This can be done by clicking the test you want to select, and pressing the Add Test to Selection button:

Or simply by double-clicking the test you want to add, and you can select and export multiple tests at once.

Once all the tests to be exported have been selected, press the Export Selected Tests button.

Select CSV and press OK.
PSMComm2 will then ask for a folder to place the exported tests into, navigate to the place you want the CSV files and press OK:

The exported CSV files will be placed in the selected folder, and will be named the same as the Test Name field entered when running the sweep.
10.6 Exporting a Database Test to Excel

To export tests from the PSMComm2 Database to Excel, first you’ll need to select the tests you want to export. This can be done by clicking the test you want to select, and pressing the Add Test to Selection button:

Or simply by double-clicking the test you want to add; you can select and export multiple tests at once.

Once all the tests to be exported have been selected, press the Export Selected Tests button.

Select Excel and press OK.

PSMComm2 will then export each of the tests into a single excel document, with the tests placed side by side to each other.
10.7 Graphing a Database Test

To graph tests from the database add one or more graphs to the selection by clicking on the test and pressing the Add Test to Selection button:

Or simply by double-clicking the test you want to add.

Once all the tests to be exported have been selected, press the Graph Tests button bringing up the Database Graph window:
10.8 Database Graph Settings

The Database Graph can be customized by using the menu in the Graph Window.

Graph Appearance lets you change the X-Axis Scaling:

The Gain Range:
The Frequency Range:

Graph background colour:

And the Cursor Visibility:

The Plot Appearance menu lets you customize the look of each individual plot

Including the visibility of the gain and plot lines:

The thickness of the gain and phase lines:
The visibility of the gain/phase margins and if the suboptimal gain/phase points should be displayed:

The colour of the Gain/Phase margins:

And the colour of the Gain and Phase plot lines:
10.9 Finding the Gain/Phase Margins

To get PSMComm2’s Database graph to find and display the Gain/Phase margins, go to Analyze and select Find Gain/Phase Margins from the dropdown menu.

PSMComm2 will then find all the Gain/Phase points on each of the plots in the graph, and display the best pair for each plot. The gain crossover points are represented with a square, the phase crossover points are represented with a rhomboid.

and the cursors are placed in the optimal gain/phase points for the currently selected plot.
All the gain/phase points can be drawn by making the “hidden” gain/phase margin points visible in the Plot Appearance menu.

10.10 Calculating Multiple Feedback Loop Response

PSMComm2’s can calculate the feedback loop response from 2 or 3 loops. With 2 or more plots selected to graph from the database, go to the Analyze menu on PSMComm2’s database graph and select “Calculate Multiple Feedback Loop Response”:

This will bring up the Loop selection window which asks you which of the plots should be used for the calculation:
To change which plots will be used, click in the text boxes beside “Response 1”, “Response 2” and the optional “Response 3” and this window will appear showing you which plots you have to choose from:

Select the plot you want to use and press “OK” to confirm.

Once the correct plots have been selected, you can have the calculation be performed as if it were an open loop by ticking the Open Loop tick box.

When all the settings are correct, press OK to have PSMComm2 calculate the Multiple Feedback Loop Response.

There will be 2 new dashed lines on the graph, this is the gain and phase for the calculated response.

This is a graph of the gain of the two selected plots and the calculated response:
And the phase of the two selected plots and the calculated response:
11 Capture Mode
11.1 Downloading a screenshot from a PSM.

To switch PSMComm2 to Capture Mode, press the Capture menu item at the top of PSMComm2.

This puts PSMComm2 into Capture Mode.

To download a screenshot from the PSM display screen, press the Download button.

PSMComm2 will show the download within a Progress Window.

Once the download is complete, the screenshot from the PSM will be placed on the Canvas.
Now the screenshot can be copied to Clipboard for pasting into emails, image editors or anywhere else using **Copy to Clipboard**, and Saved as a bitmap image using **Export to Bitmap**,
12 Using PSMComm2 CSV Files
12.1 Importing CSV Files into Excel

CSV Files exported from any mode in PSMComm2 can be loaded into Excel as data, creating a spreadsheet from the CSV.

To load the data into Excel, open Excel and select the first cell to enter the data into:

Then go to the Data Tab and click the From Text button.

After navigating to and selecting the file to be loaded into Excel, press the Import button.
Excel will then ask if the data should be imported as Delimited file or Fixed Width. Ensure Delimited is selected and press Next.
Excel will then ask what the data in the file is delimited by. Ensure that Tab is selected and press Next.

Finally, if you set a custom locale, go to Advanced, and tell Excel what it should use as Decimal and Thousand separators.
Press the Finish button then press OK on the next window, or set a new location for the data to be imported to.

Excel will place the CSV into the spreadsheet separated by column.
Contact Details

If you require any further assistance with the operation of PSMComm2 please do not hesitate to contact your local distributor or N4L on support@newtons4th.com