

MANUAL FOR TEST SOFTWARE

Version 1.1

DOCUMENT INFORMATION

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DHN	Holger Nahrstaedt	Creator	

VERSION HISTORY

Version <i>Version</i>	Date <i>Datum</i>	Author <i>Autor</i>	State ² <i>Status</i>	Change description <i>Änderungsbeschreibung</i>
1.0	2022-04-13	DHN	D	Initial Document
1.1	2023-10-05	DHN	C	Update of SMPT Version and I24

¹ Creator, Reviewer, Approval

² D – Draft, C – Reviewed, A – Approved, R – Reworked

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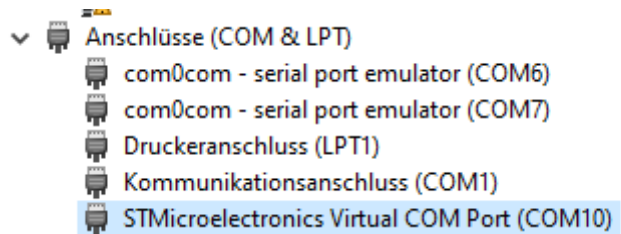
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1 SCIENCEMODE TEST-SOFTWARE

1.1 CONNECTING THE P24/I24 DEVICE

After connecting the device to the PC through the USB3 cable, a new COM port should be listed in the device manager. The device manager can be opened by pressing Windows+X and clicking on Device Manager.

The Com & LPT section should have a new entry STMicroelectronics Virtual COM Port



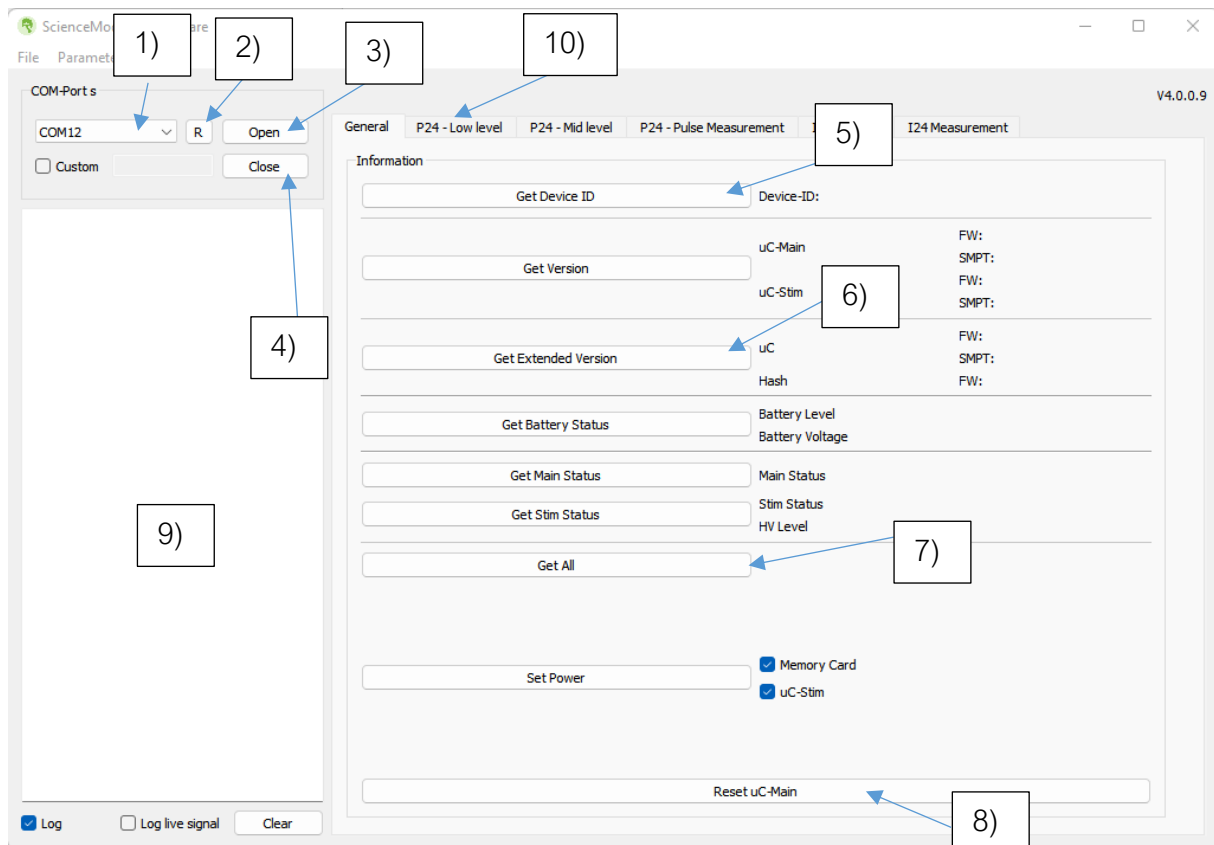
1.2 STARTING THE TEST-SOFTWARE

Double click on smpt_pc_software.exe



1.3 GENERAL OPERATION

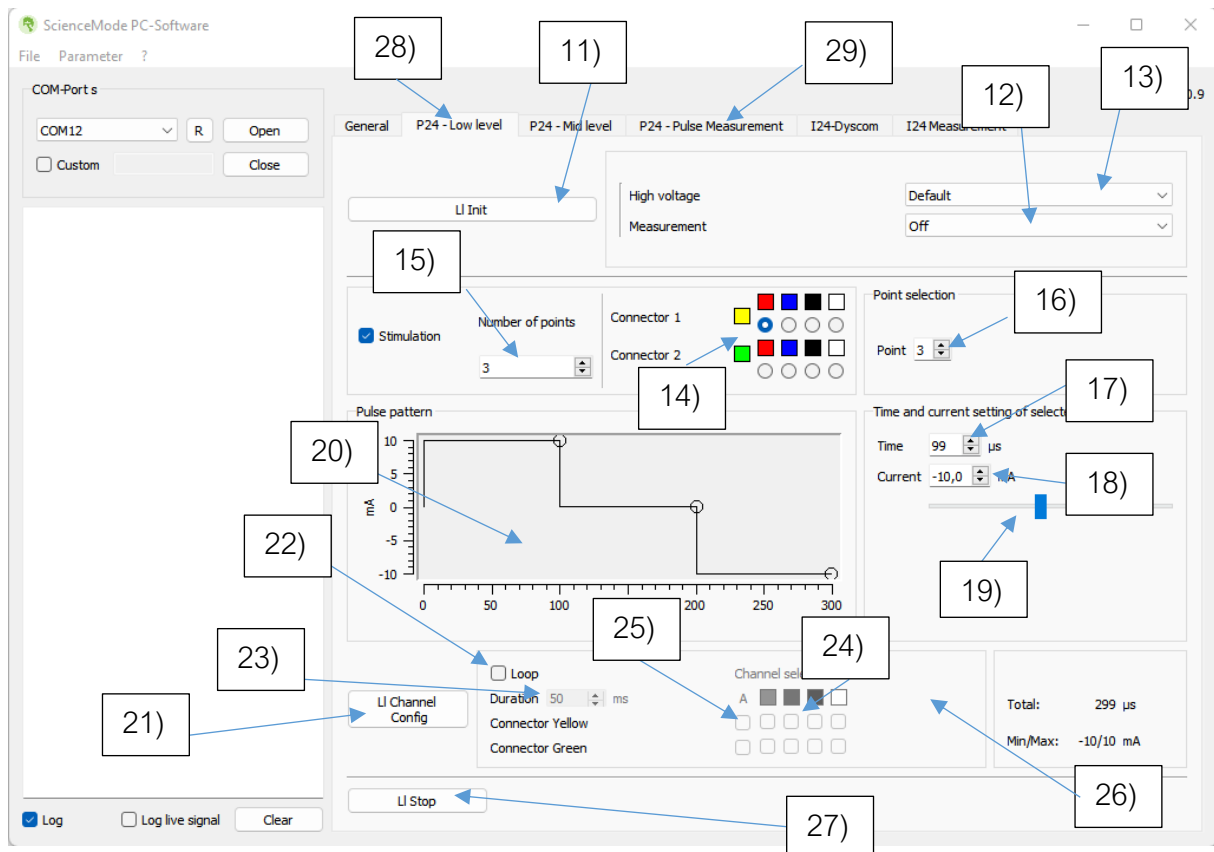
The general tab on the ScienceMode Test-Software can be used to receive information about the device_id, the firmware version and the device status.



- 1) Click to select the correct com port, the number which is shown in the device manager has to be entered here
- 2) Click to refresh the listed com ports, should be done after connecting the P24 device
- 3) Click to open the comport of the P24 device
- 4) Click to close the comport of the P24 device
- 5) Click to read the set Device-ID from the P24
- 6) Click to read the firmware version and hash
- 7) Click to read the current P24 state, can be
 - a. Uninitialized (High voltage is switched off)
 - b. LI_Initialized / 150 V – High voltage is switched on and the device is in Low level Mode
 - c. MI_Initialized / 150 V - High voltage is switched on and the device is in Mid level Mode
- 8) Click to reset the P24
- 9) Log messages during operation are printed here
- 10) Click to switch the current screen

1.4 LOW-LEVEL OPERATION (P24-DEVICE)

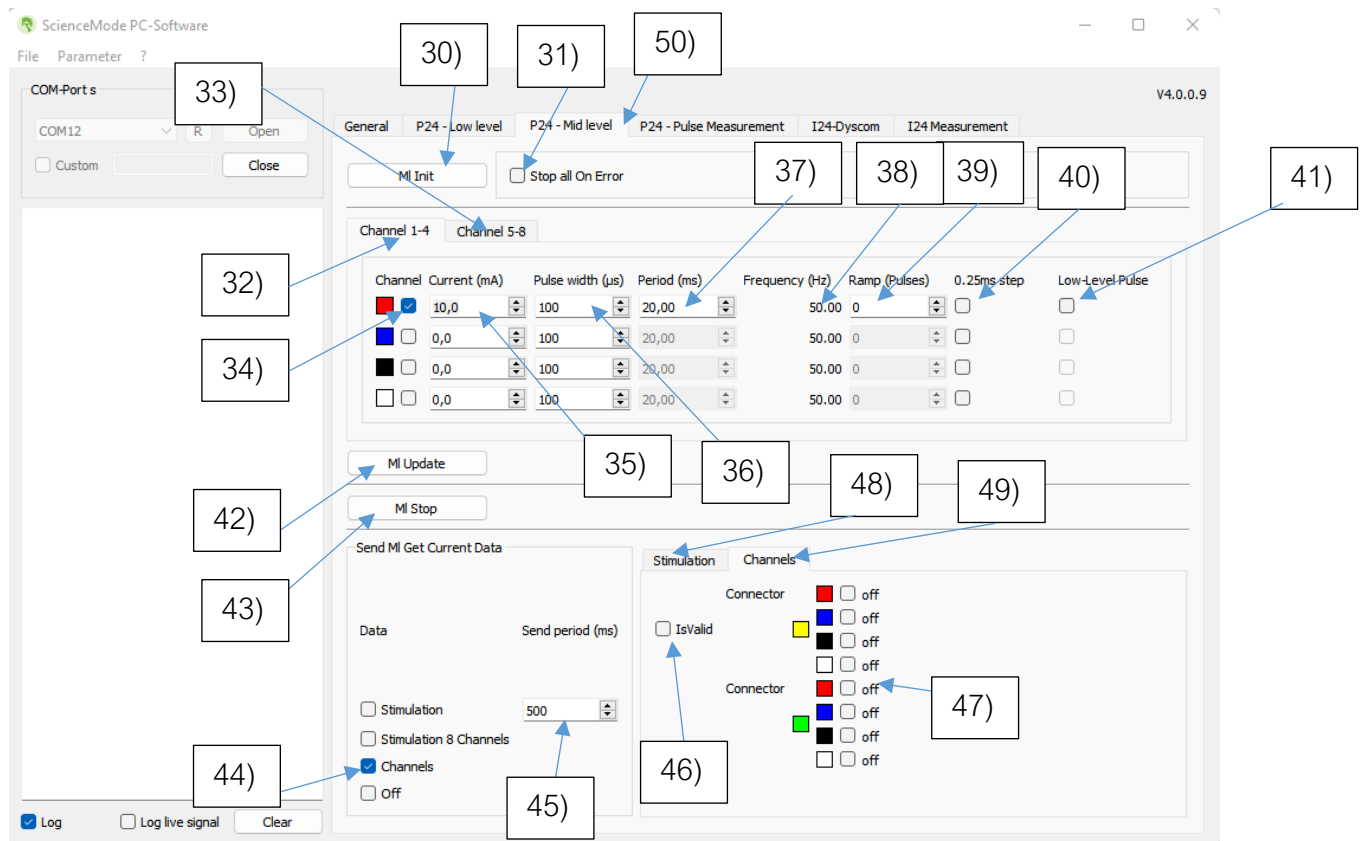
The low-level screen can for used for defining a custom shaped pulse. Each stimulation pulse needs to triggered from the PC.



- 11) Click to initialize the P24 for Low level operation (This switches on the high voltage source)
- 12) Click to enable pulse measurement (current, voltage or high voltage source), result is shown in 29)
- 13) Click to set high voltage source to off or 150 V (Normally not needed)
- 14) Click to set output channel (when stimulation is activated by 21))
- 15) Click and enter amount of pulse points (default 1)
- 16) Click and enter current point to edit
- 17) Click and set duration in microseconds
- 18) Click on the arrow to increase/decrease the current by 0.5mA (mouse wheel works also)
- 19) Click to increase/decrease the current by 1 mA (hold and drag works also)
- 20) This plot window shows the current pulse
- 21) Click to stimulate the channel selected at 15) by the pulse shown in 20)
- 22) Click to enable/disable, when enabled the selected channels in 24) are stimulated every 23) milliseconds
- 23) Click and enter stimulation period in milliseconds
- 24) Click to enable all channels that should be stimulating
- 25) Click to enable all channels at once
- 26) Click and enter time multiplier, e.g. 1.5 multiplies all times by 1.5 (Normally not visible, can be enabled by STRG+ALT+L)
- 27) Disables the high voltage source and set state to uninitialized
- 28) Click to switch to the low level configuration screen
- 29) Click to switch to pulse measurement

1.5 MID-LEVEL OPERATION (P24-DEVICE)

The mid-level screen can be used for defining a stimulation pattern, which is executed at the P24 device

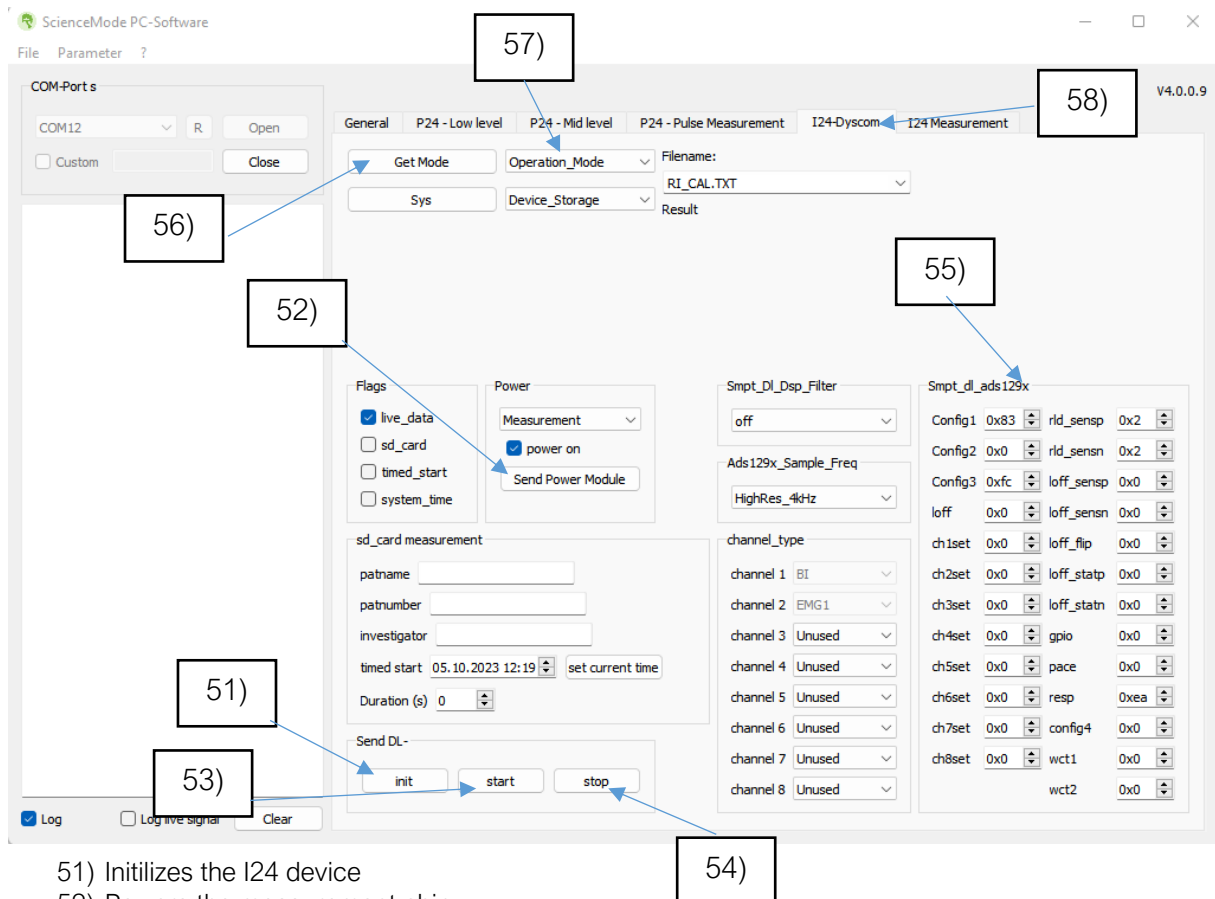


- 30) Click to initialize the P24 for Mid level operation (This switches on the high voltage source)
- 31) Click to enable/disable Stop on all errors (when active, the stimulation is stopped for all channels when an error in any channel occurs)
- 32) Click to select Channels 1-4 (Yellow connector) for editing (Points 35) to 41) are valid for each channel 1-4)
- 33) Click to select Channels 5-8 (Green connector) for editing (Points 35) to 41) are valid for each channel 5-8)
- 34) Click to enable/disable a channel for stimulation
- 35) Click the arrow to increase/decrease the stimulation current by 0.5 mA (mouse wheel can also be used)
- 36) Click and enter pulse width in microseconds
- 37) Click and enter stimulation period in milliseconds (Step size 0,5 milliseconds, when 40) is enabled, the step size is 0,25 milliseconds)
- 38) Shows the Stimulation frequency
- 39) Click and enter the number of pulses, which should be used to ramp up the current, a number between 0-15 is valid
- 40) Click to enable/disable period step size of 0,25 milliseconds
- 41) Click to enable/disable the usage of the low-level pulse which is set in 15) to 19), when enabled 35) and 36) is not used
- 42) Click to activate/update the mid-level pulse configuration. Stimulation is started when not active before, otherwise the parameters are updated.
- 43) Click to stop the stimulation and to disables the high voltage source and set state to uninitialized
- 44) Click to set the type of the returned MI Get current Data
 - a. Stimulation: only information about the first 4 channels is shown in 48)
 - b. Stimulation 8 Channels: information about all 8 channels is shown in 48)
 - c. Channels: More information about all 8 channels is shown in 49)
 - d. Off: MI Get current Data is not send out, which means that the stimulation is stopped due to the missing keeping live signal
- 45) Set the send period of the MI Get current Data package
- 46) Is set to enabled with the correct view is selected (see also 44))
- 47) Shows which channel is active and when an error has occurred on the channel. Ok means no error at all

- 48) Information widget for Stimulation and Stimulation 8 Channels (see 44))
- 49) Information widget for Channels (see 44))
- 50) Click to switch to the mid level configuration screen

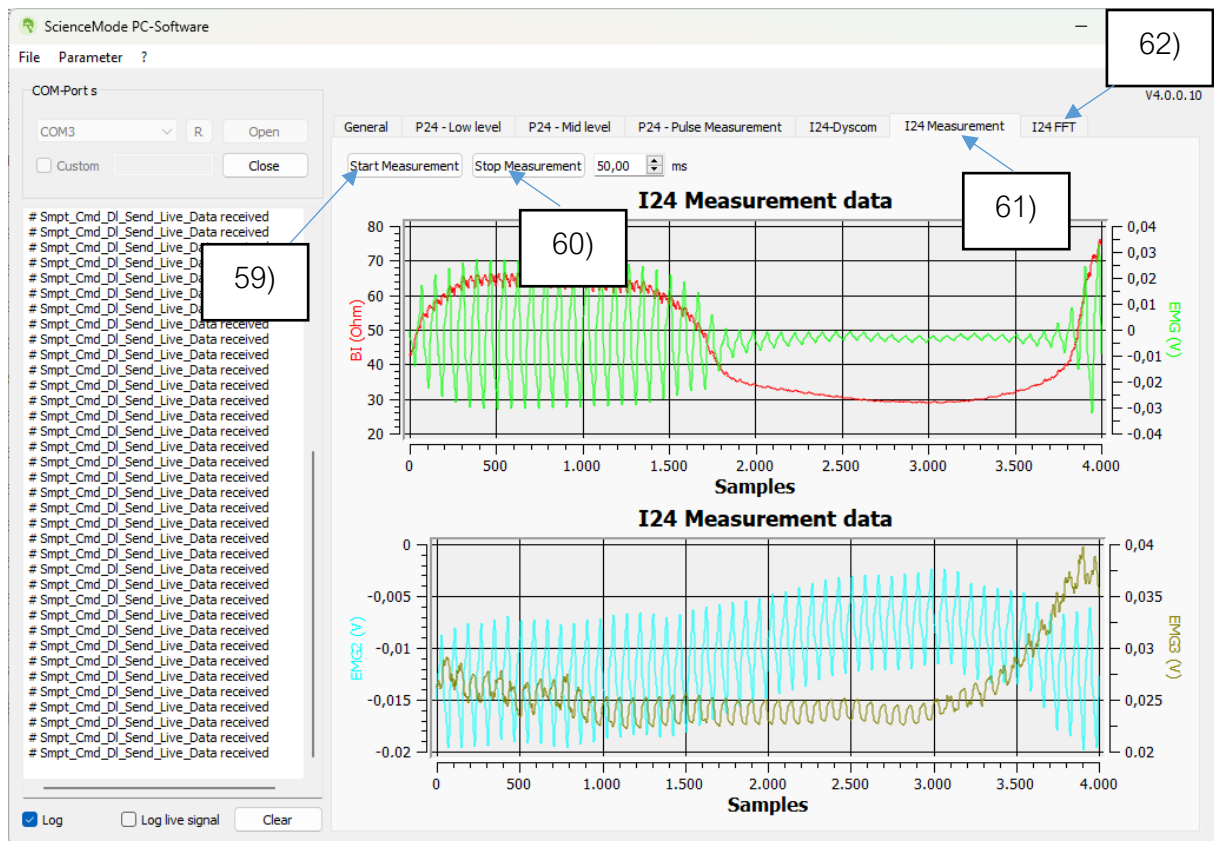
1.6 DYSKOM OPERATION (I24-DEVICE)

The dyskom screens (I24-Dyskom and I24 Measurement tabs) cannot be used together with the P24 device.



- 51) Initializes the I24 device
- 52) Powers the measurement chip
- 53) Starts a measurement.
- 54) Stops the currently running measurement.
- 55) See the ADS1294R chip manual for a detailed description of registry values. The registry values are transmitted to the chip when pressing init (51))
- 56) Returns the operation mode, when 57) is set to Operation_Mode
- 57) Defines what Button 56) will return. Default is Operation Mode
- 58) I24 Tab

1.7 MEASUREMENT OPERATION (I24-DEVICE)



- 59) Starts a measurement by doing an initialization (51), powering up the measurement chip (52) and starting a measurement (53)
- 60) Stops the currently running measurement.
- 61) I24 Measurement tab

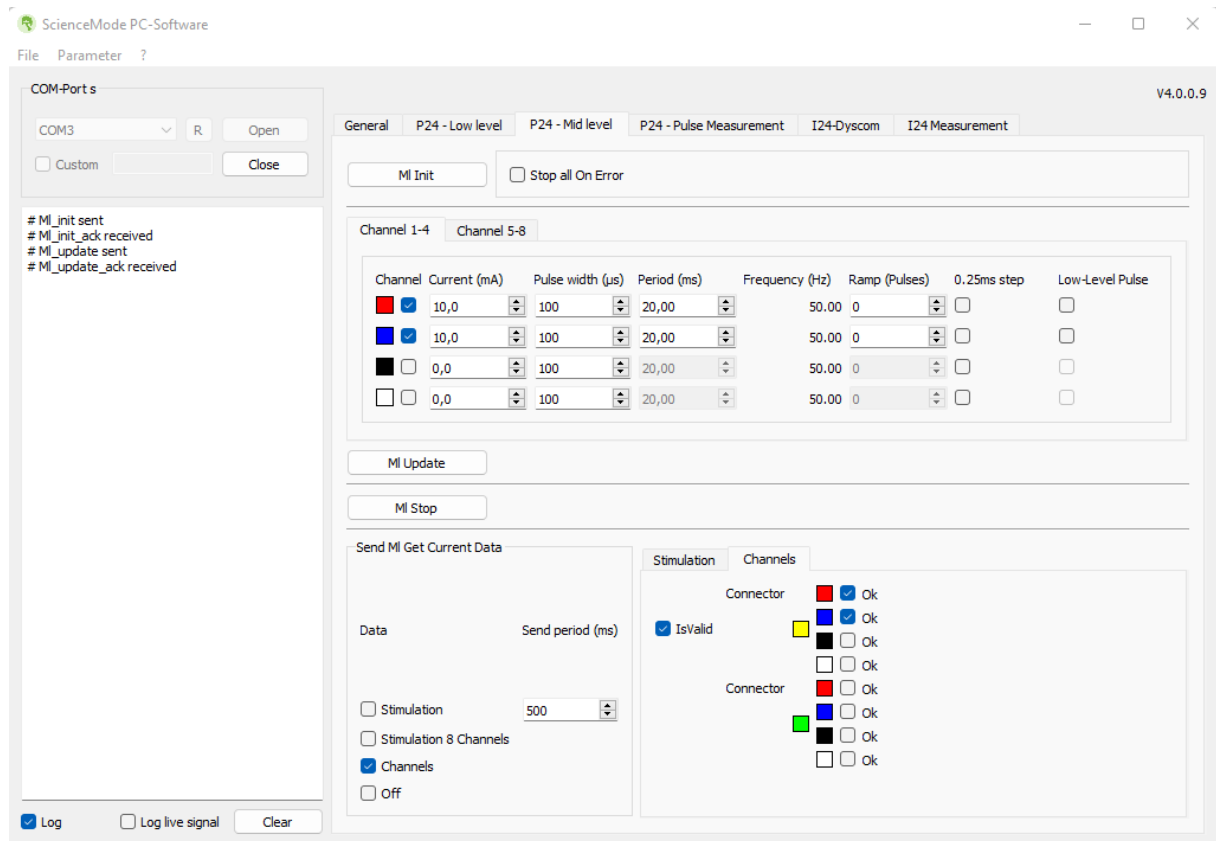
2 P24 USE CASES

2.1 STIMULATING CHANNEL 1 AND 2 WITH A BI-PHASIC PULSE (10 mA AND 100 MICROSECONDS)

- The P24 needs to be connected to the PC
- The com port needs to be checked in the device manager
- The ScienceMode PC-Software needs to be opened
- Enter the correct com port in 1), when not there refresh with 2)
- Open the com port by clicking 3)
- Go the mid-level tab 50)
- Initialize the mid-level by clicking 30)
- Enable channel 1 and 2 by clicking on the red and blue checkbox 34)
- Increase the current to 10 mA by pressing the up-arrow 35) or by turning the mouse wheel
- Set the pulse width in 36) for both channels
- Press MI-Update 42)

The setting can also be seen in the screenshot below.

Stimulation can be stopped by pressing MI stop 43)

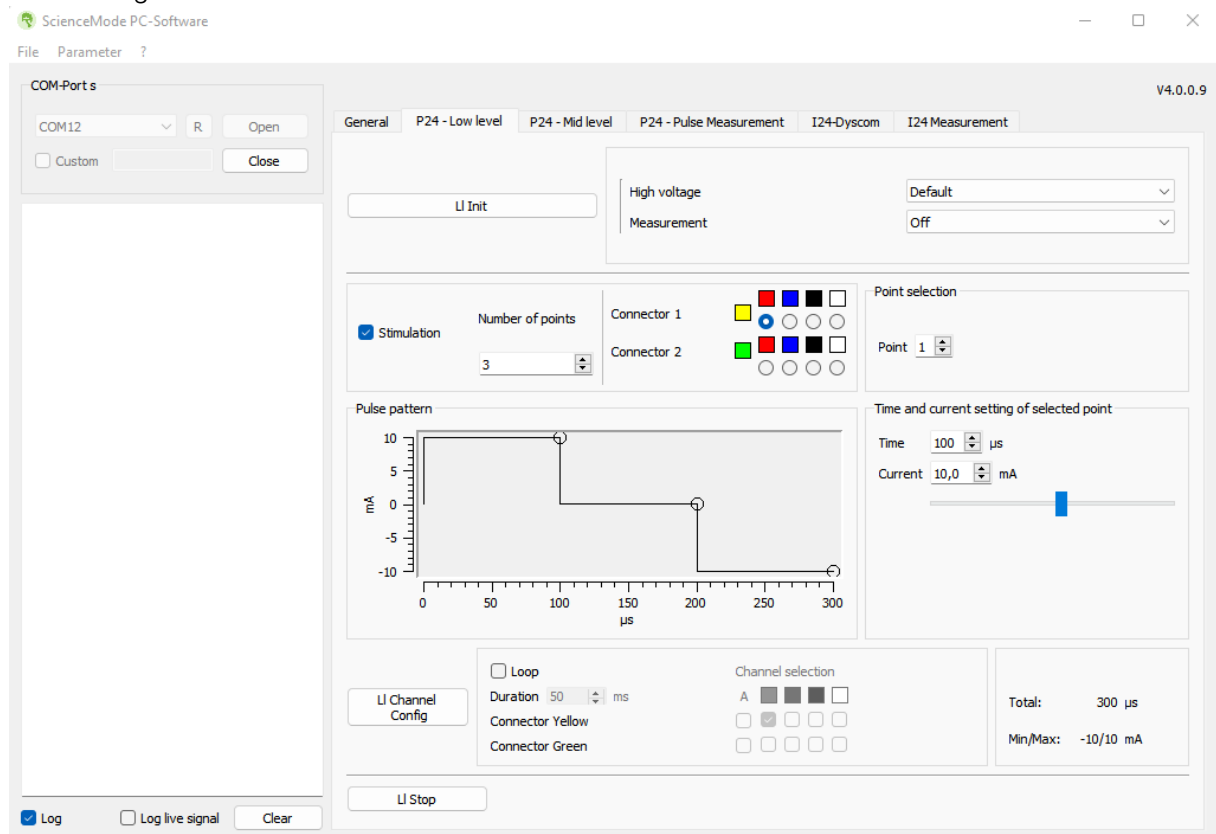


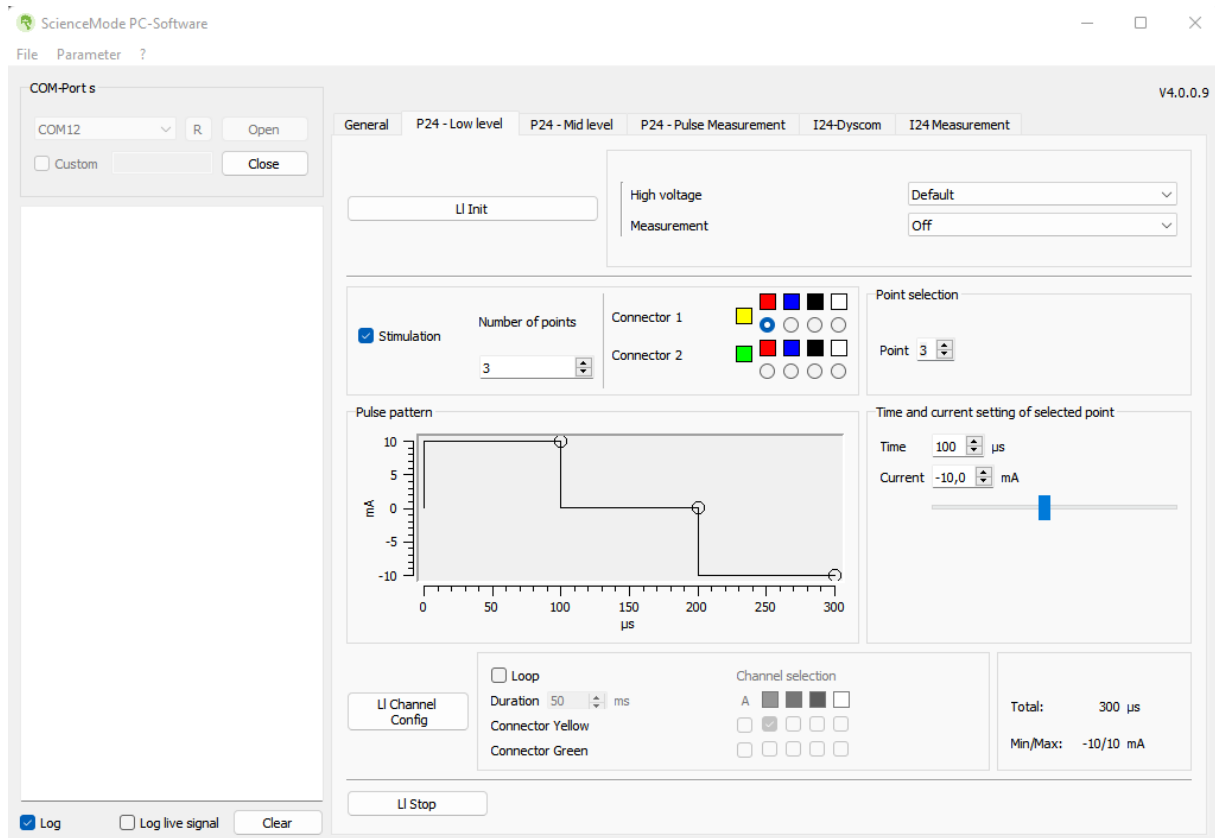
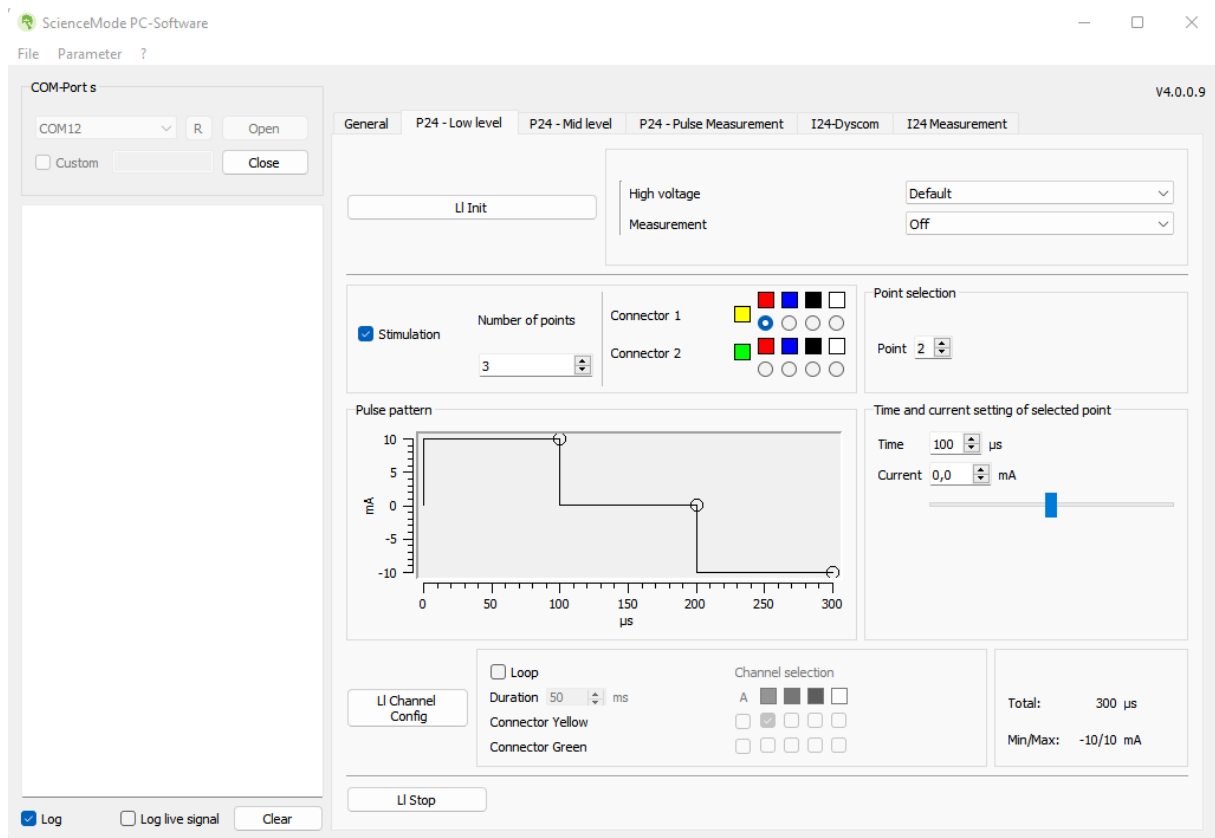
2.2 STIMULATING CHANNEL 1 AND 2 WITH A LOW-LEVEL PULSE IN MID-LEVEL

- The P24 needs to be connected to the PC
- The com port needs to be checked in the device manager
- The ScienceMode PC-Software needs to be opened
- Enter the correct com port in 1), when not there refresh with 2)
- Open the com port by clicking 3)
- Go the low-level tab 28)

- Initialize the low-level by clicking 11)
- Set 15) to 3 points
- Set the 1 point for editing 16)
- Set time to 100 microseconds 17)
- Set current to 10 mA 18) / 19)
- Set the 2 point for editing 16)
- Set time to 100 microseconds 17)
- Set current to 0 mA 18) / 19)
- Set the 3 point for editing 16)
- Set time to 100 microseconds 17)
- Set current to -10 mA 18) / 19)
- Activate loop setting 22)
- Select the first channel at 24)
- Activate stimulation by pressing LI Channel Config 21)

The settings can be seen in the three screenshots below:



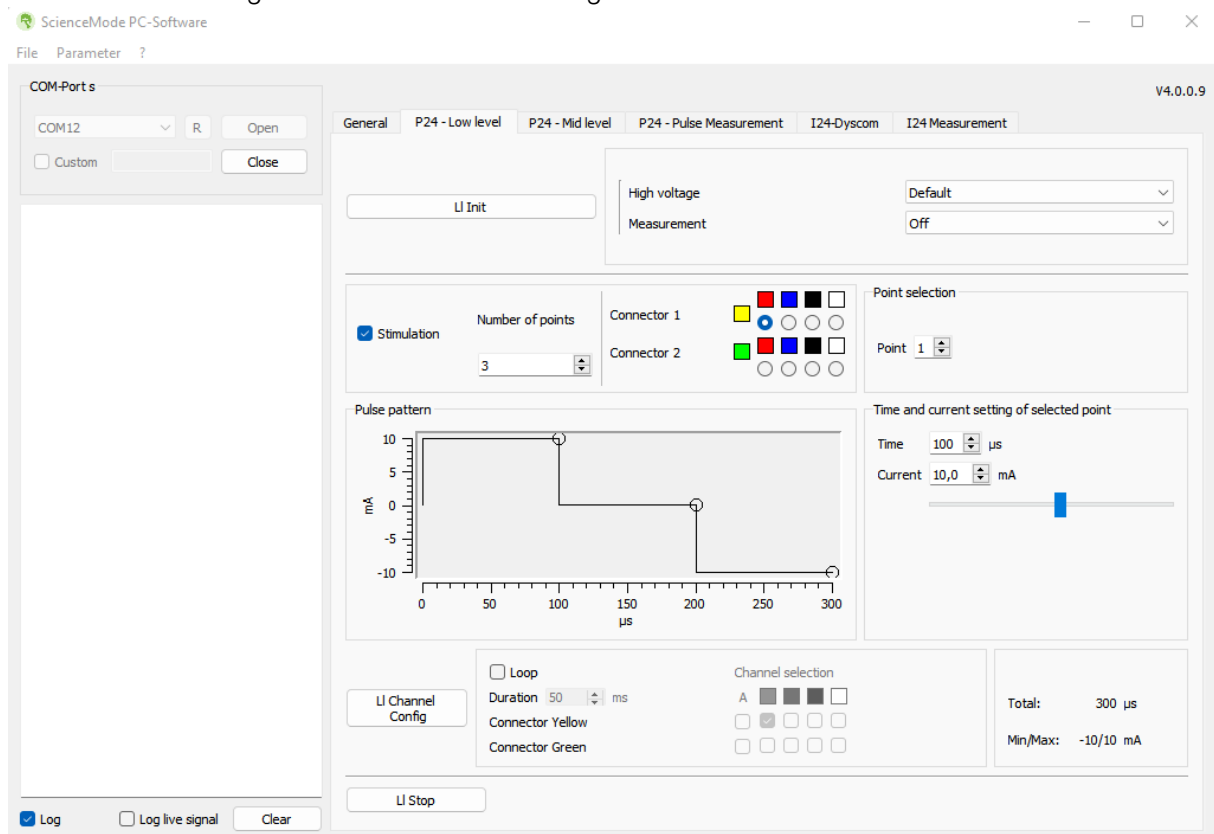


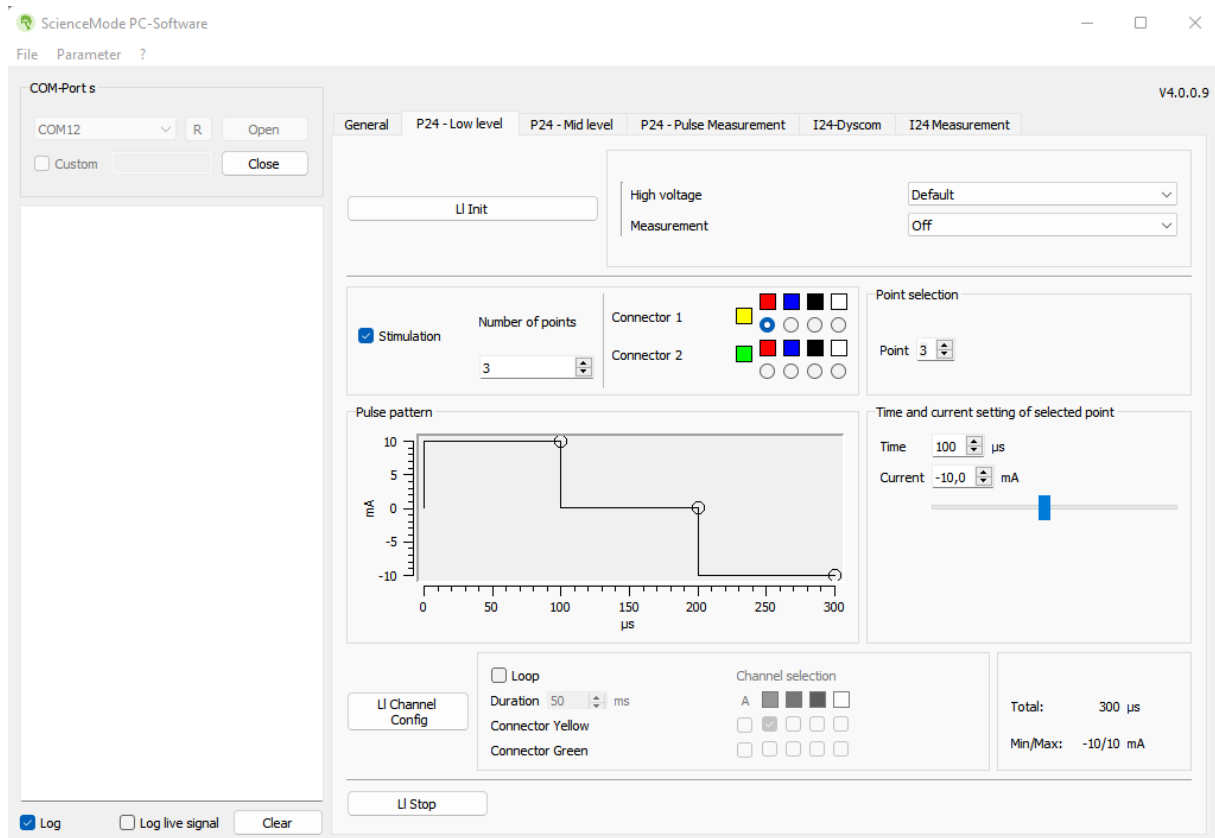
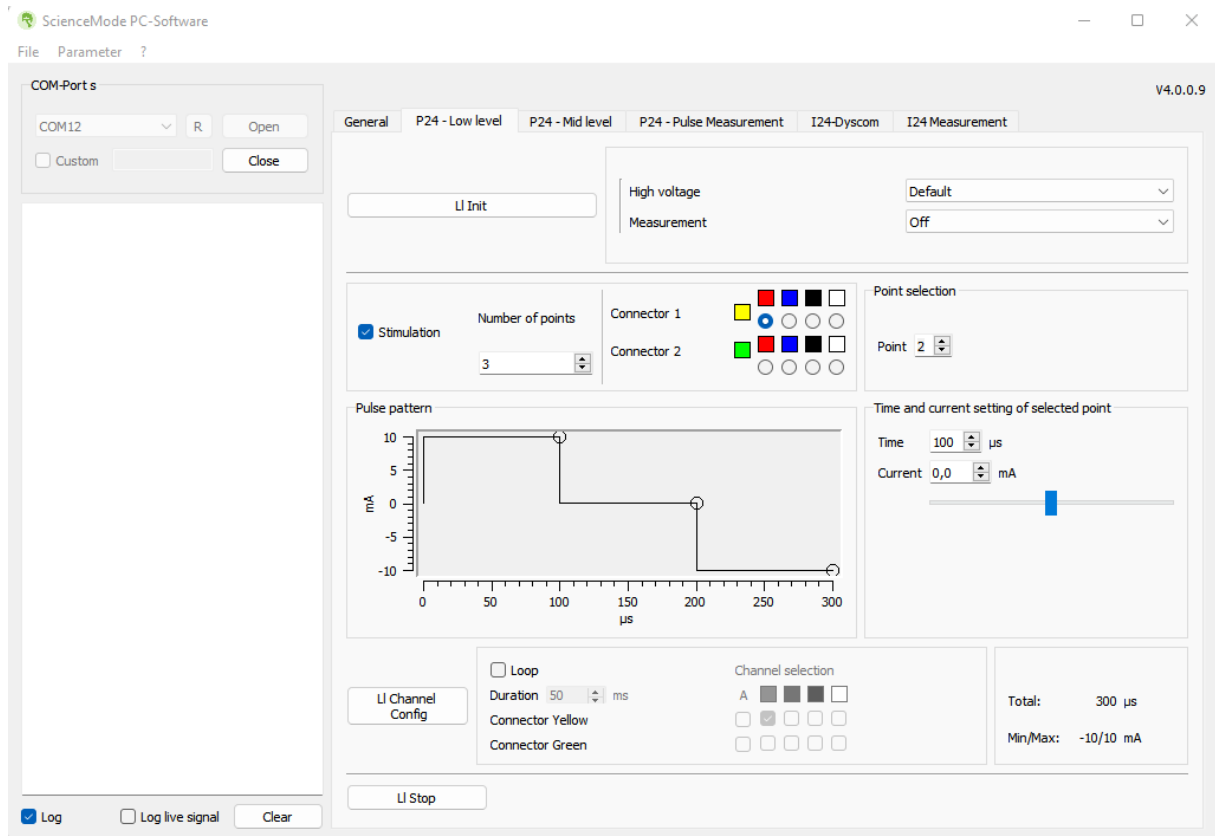
Stimulation can be stopped by pressing LI stop 27)

2.3 STIMULATING CHANNEL 1 AND 2 WITH A LOW-LEVEL PULSE IN MID-LEVEL

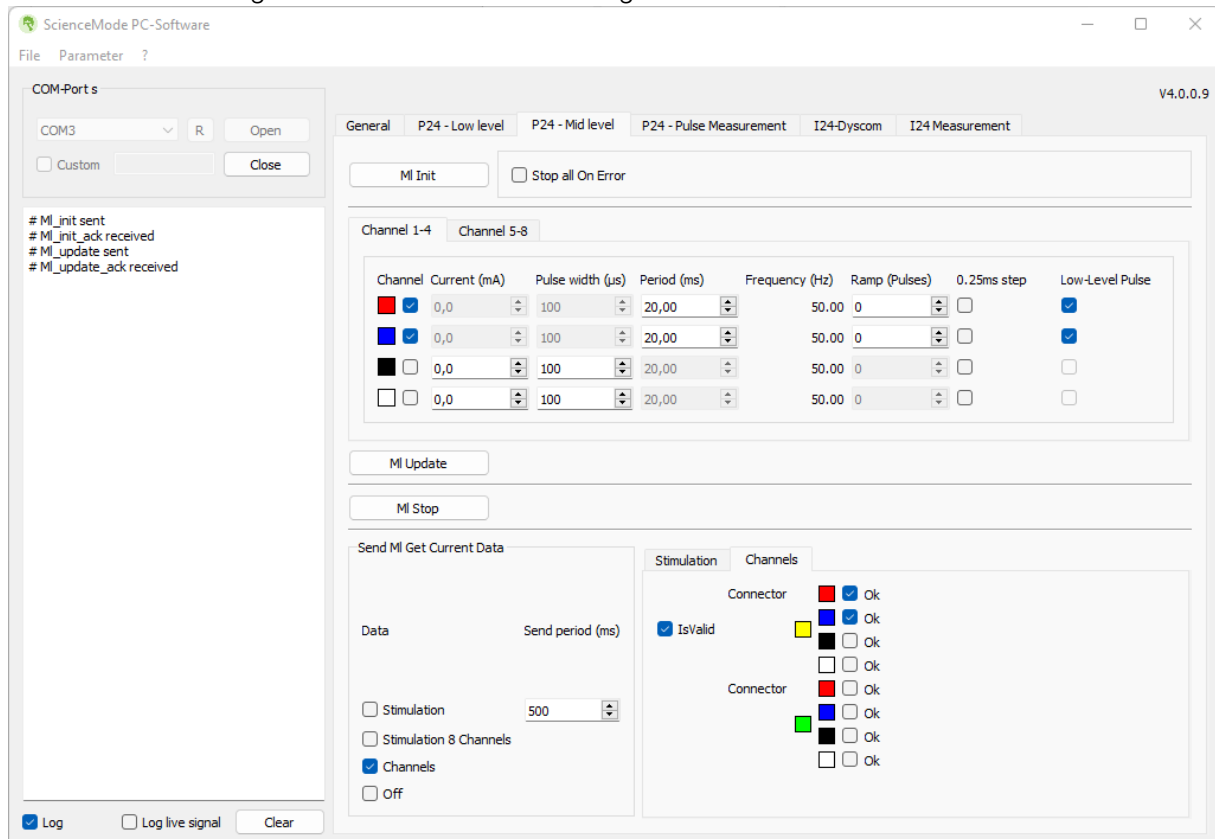
- The P24 needs to be connected to the PC
- The com port needs to be checked in the device manager
- The ScienceMode PC-Software needs to be opened
- Enter the correct com port in 1), when not there refresh with 2)
- Open the com port by clicking 3)
- Go the mid-level tab 50)
- Initialize the mid-level by clicking 30)
- Enable channel 1 and 2 by clicking on the red and blue checkbox 34)
- Enable low-level for both channels 41)
- Go to the low-level tab 28)
- Set 15) to 3 points
- Set the 1 point for editing 16)
- Set time to 100 microseconds 17)
- Set current to 10 mA 18) / 19)
- Set the 2 point for editing 16)
- Set time to 100 microseconds 17)
- Set current to 0 mA 18) / 19)
- Set the 3 point for editing 16)
- Set time to 100 microseconds 17)
- Set current to -10 mA 18) / 19)
- Go to the mid-level tab 50)
- Press MI-Update 42)

The low level settings can be seen the following three screen shots:





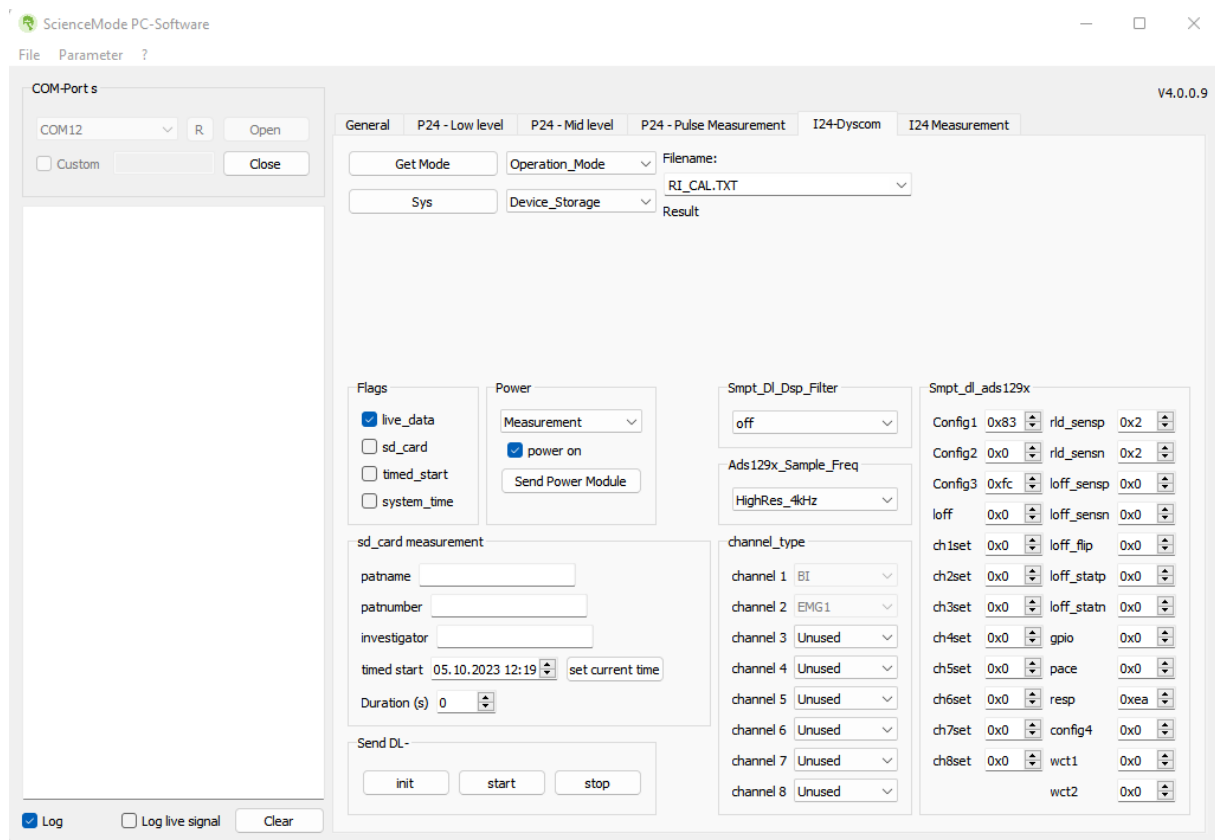
The mid level settings can be seen in the following screenshot:



Stimulation can be stopped by pressing MI stop 43)

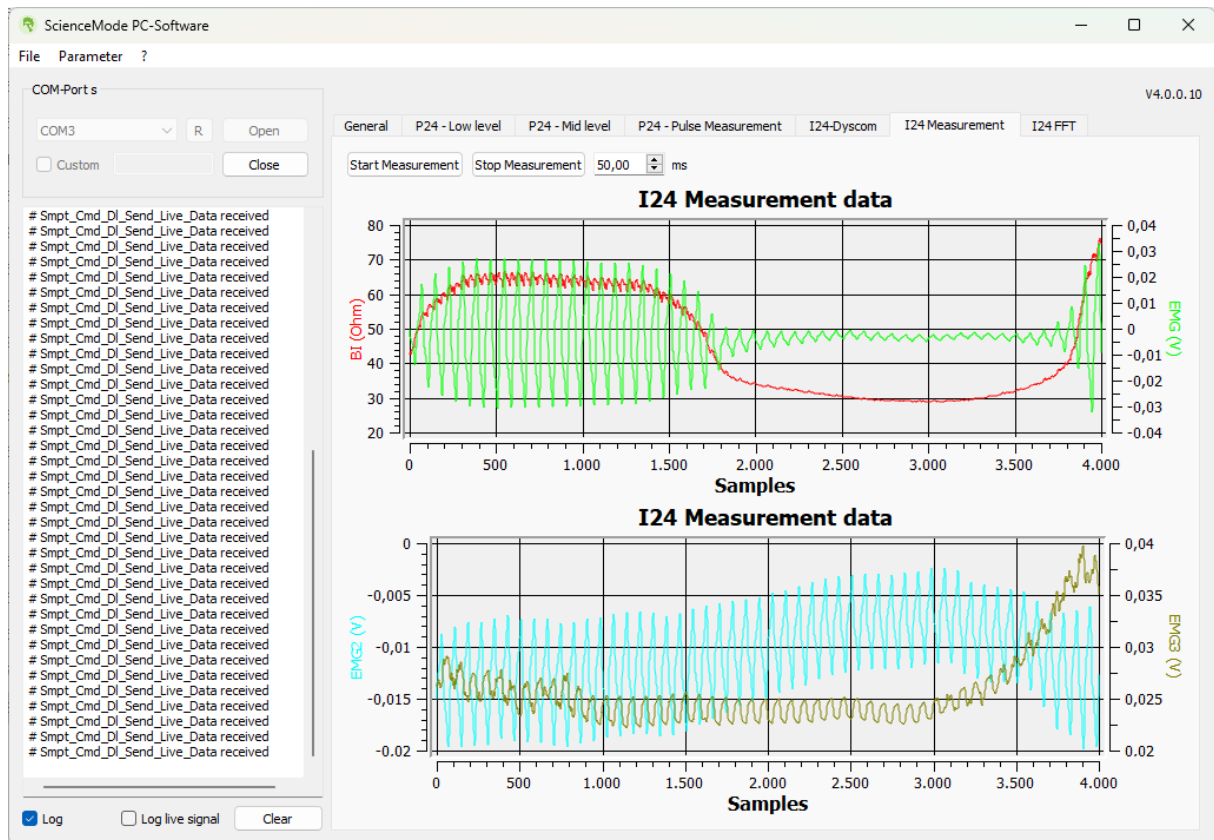
3 I24 USE CASES

3.1 STARTING A EMG/BI MEASUREMENT ON THE I24 DEVICE



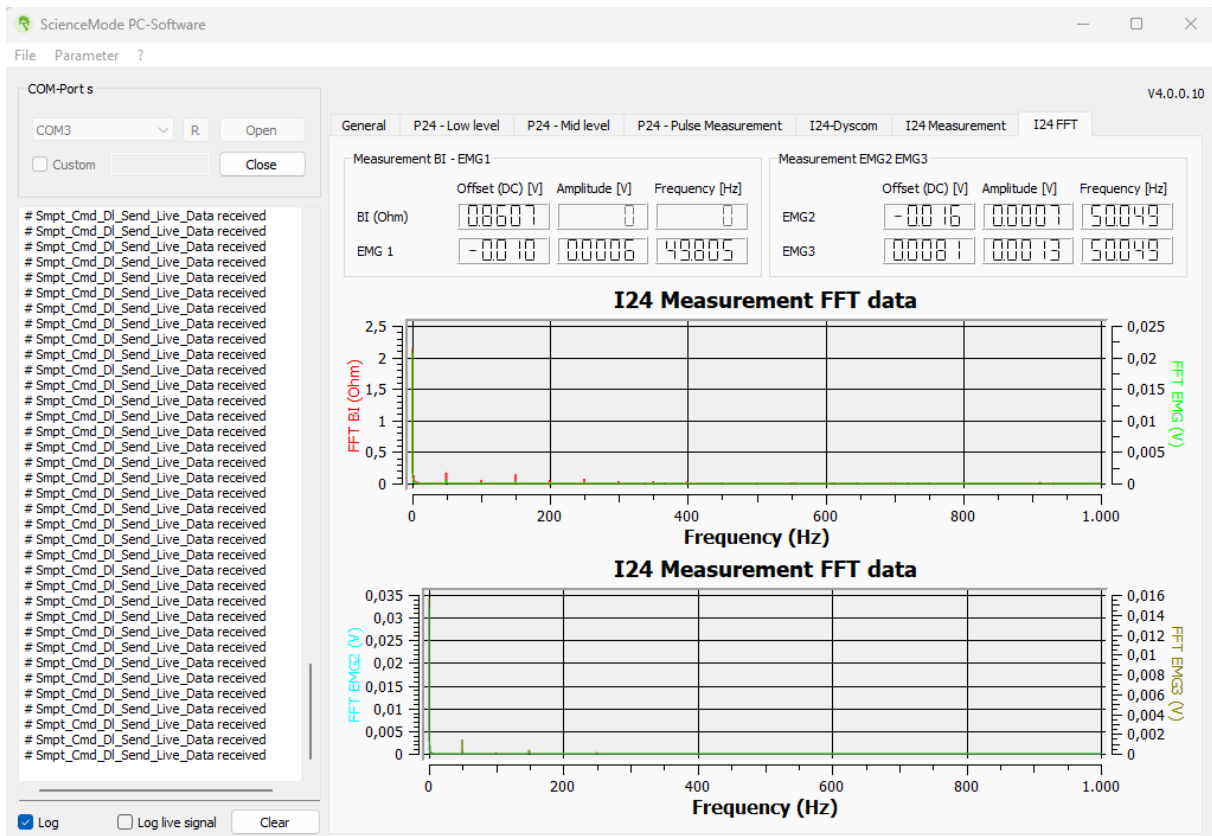
- The I24 needs to be connected to the PC
- The com port needs to be checked in the device manager
- The ScienceMode PC-Software needs to be opened
- Enter the correct com port in 1), when not there refresh with 2)
- Open the com port by clicking 3)
- Go the I24 tab 58)
- Initialize the measurement by clicking 51)
- Enable Power by clicking 52)
- Start the measurement by clicking 53)
- The measurement can be viewed in the measurement tab 61)

3.2 MEASUREMENT OPERATION (I24-DEVICE)



- The I24 needs to be connected to the PC
- The com port needs to be checked in the device manager
- The ScienceMode PC-Software needs to be opened
- Enter the correct com port in 1), when not there refresh with 2)
- Open the com port by clicking 3)
- Go the I24 Measurement tab (61)
- Start the measurement by clicking Start Measurement (59)

3.3 MEASUREMENT OPERATION FFT (I24-DEVICE)



- The I24 needs to be connected to the PC
- The com port needs to be checked in the device manager
- The ScienceMode PC-Software needs to be opened
- Enter the correct com port in 1), when not there refresh with 2)
- Open the com port by clicking 3)
- Go the I24 Measurement tab (61)
- Start the measurement by clicking Start Measurement (59)
- Go the I24 FFT tab (62)