ProfiLux Expansion Box 2

Instruction Manual

Valid from firmware-version 2.02

as of 2016-10-22

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Congratulations on your Purchase

Thank you for purchasing our product and allowing us to help you support your path to successful fishkeeping!

With a GHL *Expansion Box 2*, you have a highly professional piece of equipment at your fingertips. In connection with your *ProfiLux Computer*, our EXB 2 will assist in your daily monitoring and maintenance routine.

We are confident that our product will help make your hobby more effective, safe, and help you spend more time enjoying your aquarium, terrarium or pond.

With this in mind -

Enjoy Your Passion!

GHL Takes Care of the Rest.

1 Safety Instructions

Please read these instructions carefully before operating the Expansion Box 2.

GHL products are built with maximum security and safety in mind. However, product safety for this device can only be guaranteed if you follow these guidelines.

Anyone who uses this device must become familiar with the following safety instructions and the operation of the device.

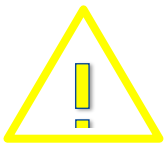
Failure to follow these instructions will invalidate any warranty claims to follow.

Be sure to also observe the safety instructions in the ProfiLux manual and the respective manuals of other equipment manufacturers.

In this manual, the following symbols are used:

TIP

General note, tip or advice.



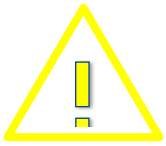
WARNING

Important note for operation, to avoid damage to the equipment, and for your safety.

DANGER

Warning that non-compliance can result in injury or damage to the device.

1.1 Safety of Children and Vulnerable Persons



WARNING

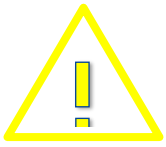
This equipment must not be used:

- By small children and vulnerable persons with limited physical, sensory or mental capabilities.
- By people who are unfamiliar with the functions of this product.

1.2 Intended Use

The *Expansion Box 2* is intended exclusively for use in the domestic area. *The Expansion Box 2* may only be operated with GHL accessories.

Make sure to place the device away from splashing water, moisture or other liquids.



WARNING

Moisture indicators are placed inside the unit and will change color when exposed to excessive moisture.

Removing these indicators will void all warranty claims.

DANGER

- Make sure that the power cord is plugged into a grounded outlet; otherwise you could get an electric shock or cause a fire.
- Protect the power cable from damage (For example, twisting, kinking, clamping). Please also pay attention to the joints and connections to the device.
- Disconnect the power plug by pulling the plug, not the cable.
- Never attempt to disassemble, repair or alter the equipment by yourself.
- Do not insert sharp objects into the electrical contacts and ports.

DANGER

- If the unit falls into the aquarium or has been exposed to moisture or humidity, first turn off the power to the device via the fuse or circuit breaker, then pull the power cord.
- Never touch the power plug with wet hands.

- If the device has gone wet or dirty, thoroughly dry or clean it with a dry cloth.

DANGER

- The device may not be operated if it has been damaged in any way (e.g. damaged power cord or plug, liquids or objects have gotten into the interior, device has been exposed to excessive moisture, the normal operation is disturbed, or the device has been dropped.)

For your own safety, please look at the hazard prevention and safety instructions in the chapters that follow.

2 General

2.1 About this Manual

These instructions apply to the *Expansion Box 2*. The functionality of your *Expansion Box 2* is determined by existing expansion cards, sensors, *PAB* devices and LED lights.

2.2 Features / Resources

The Expansion Box 2 is an extension of your aquarium computer beginning from *ProfiLux 3*. This extension box allows you to expand your *ProfiLux Aquarium Computer System* with further resources such as sensor connections, 1-10 V interfaces and switching outputs. The total of all available inputs and outputs in the *ProfiLux System* is referred to as resources.

Features overview:

- 4 x 1-10V interfaces (Yellow Western sockets, double allocation)
- 2 x Universal inputs for pH or ORP sensors (Switchable), BNC connectors
- 1 x Universal input for fresh or seawater conductance sensor (Switchable), BNC connector
- 1 x input for digital temperature sensor, BNC connector
- 1 x *Mitras Lightbar Interface* (Mitras Western socket)
- 2 x *ProfiLux Aquatic Bus* (*PAB* Western sockets)
- 2 x *Level sensor* inputs (Green PS / 2 connector, double allocation)

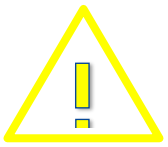
Furthermore, the *Expansion Box 2* provides 4 additional expansion slots for adding more *ProfiLux Expansion Cards*.

2.3 Scope of Delivery

Please check the contents of this box. The following items should be included:
• Expansion Box 2
• Power supply
• Supplementary sheet

PAB connection cables and sensors are not supplied with the *Expansion Box 2*. They are available online in our shop *GHL Store (GHL Store USA for US-Customers)*.

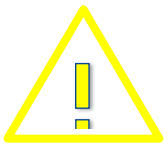
Please check to make sure all items are in perfect condition. In case of damage, immediately contact the dealer from whom you purchased the *Expansion Box 2.*



WARNING

Damaged Expansion Boxes or components may not be put into operation under any circumstances.

2.4 Important Operating Instructions



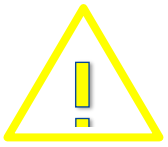
WARNING

To ensure safe operation, the provisions referred here must be followed.
Disregarding these safety guidelines, will result in voiding your warranty.
The manufacturer rejects any responsibility or liability for damage!

3 Connections of the Expansion Box 2

3.1 General

Applies to all connections:



WARNING

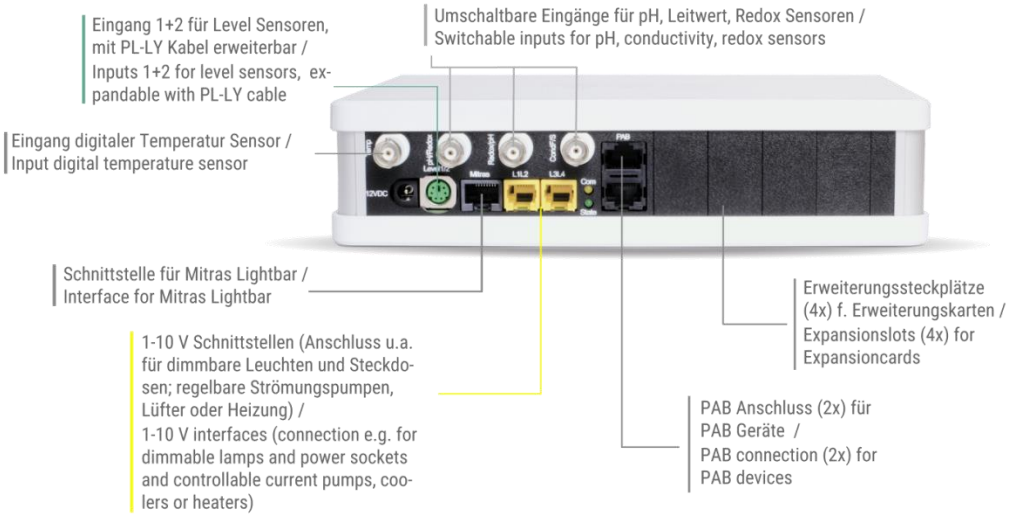
- Connect only original accessories from GHL.
- Do not use force when plugging connectors. If a plug contact does not fit, it is imperative to check that you have chosen the correct socket.

DANGER

- Incorrect connection (For example, plugging a lighting unit plug into a *PAB* connection) can lead to destruction of the *Expansion Box 2* and/or the light bar!
- A repair caused by this, is not covered under warranty and will therefore incur repair charges.

3.2 Connection Overview

The *Expansion Box 2* standard equipment includes the following connectors:



3.2.1 1-10 V Interfaces

Equipment with 1-10 V interfaces can be connected to the yellow RJ12 Western modular jacks L1 / L2 or L3 / L4 by using the control cables that are included with that piece of equipment.

These are:

- Dimmable tubular *Lightbar ALB*
- Effect-LED-Light *Mitras-Simu-Stick*
- Dimmable *Powerbars*
- Controlled heating or cooling (e.g. *Propeller Breeze)*
- Controllable flow pumps

Each of these jacks include two independent 1-10V interfaces and associated relay control outputs. If necessary, each jack can be extended with the splitter cable *-YL2*, available in different lengths.

3.2.2 Interface for Mitras Lightbar

A *Mitras Lightbar* with its digital interface, can be connected to the black Mitras RJ45 Western modular jack.

3.2.3 Level Sensor Inputs

Level Sensors can be used for water level control and can be connected to the green level connection. Since this is a socket with double allocation, you also can use a splitter cable (Y-cable *PL-LY*; not included) to connect two level sensors and control them independently.

3.2.4 Sensor Inputs

The following sensors can be connected to the “White“ BNC Sockets:

- Digital Temperature Sensor (Only)
- pH-, Conductivity-, ORP Sensors

The inputs for pH, Conductivity and ORP can be switched and adapted to the desired measuring range. The default function of each sensor input corresponds to the first-mentioned sensor input label at the back of the *Expansion Box 2*. For example, if an input is labeled, pH / redox, the sensor input is adjusted to pH. If it is labeled, Redox / pH, the sensor input is set to Redox, etc.

TIP

- Place the sensors in an area where water can constantly circulate around them.
- To prevent algae growth, it is best to place the sensors in a dark spot. For mounting, an open external filter would be a good place.
- To ensure proper sensor measurement, attach the sensors perpendicular to the water surface.
- Make sure that the cable connection of the sensor is not immersed in water under any circumstances.
- Many sensors are very susceptible to interference due to their low level signals. To provide the most accurate measurements, please have enough distance between the sensors/cables and sources of interference. These can include: Electronic ballasts, power lines, pumps, consumer electronics, etc. False readings can be avoided by following these precautions.
- Please also refer to the instruction manual for the individual sensors.

3.2.5 PAB-Inputs

PAB devices can be connected to the black RJ45 western modular jacks. Please also refer to subsection "*Connection to PAB".*

4 Hardware Modules

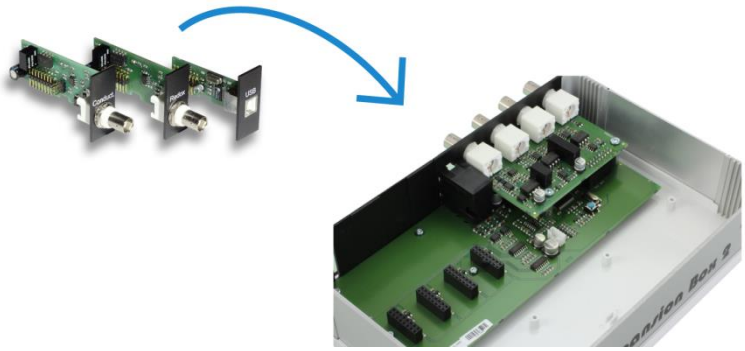
4.1 General

The *Expansion Box 2* is modular and can be expanded as such. In order to use additional sensors, power strips, dimmable lamps etc., you must first install the appropriate *ProfiLux Expansion Card*; up to 4 additional *ProfiLux Expansion Cards* can be added.

Before adding *ProfiLux Expansion Cards* to the *Expansion Box 2,* a firmware update may be required. Please follow the accompanying notes of the *Expansion Cards* to check if an update is required.

Firmware 2.01 supports the following expansion cards:

Interfaces		Sensor Inputs	
PLM-4L	*PLM-CondF*	*PLM-pH-Redox*	*PLM-CondF-Redox*
PLM-2L4S	*PLM-Oxygen*	*PLM-pH/Redox-Cond*	*PLM-pH-Redox-2Level*
PLM-ADIN	*PLM-Humidity-Temp*	*PLM-CondS-pH*	*PLM-4Level*
PLM-DALI	*PLM-pH/Redox*	*PLM-CondF-pH*	*PLM-pH-Redox-DigTemp*



ProfiLux Expansion Cards can be inserted easily into the provided expansion slots. They are automatically detected by the *ProfiLux Computer* and can be combined with other *expansion cards* as desired.

If you wish to add an *expansion card*, please read the following instructions before you start:

WARNING

- If the *Expansion Box 2* is already in operation, pull the power plug and remove all sensors and *PAB* cables.
- Please prevent damage to internal electronics by avoiding static charges.
- Please do not wear clothing or shoes that may quickly become electrostatically charged.
- Please do not walk or stand on a carpet while working on electronic components.
- If possible, work on a grounded place.
- Before touching sensitive electronic components of the *Expansion cards* or the *Expansion Box* 2, please discharge yourself from static charges by touching unpainted metal or a grounded surface.

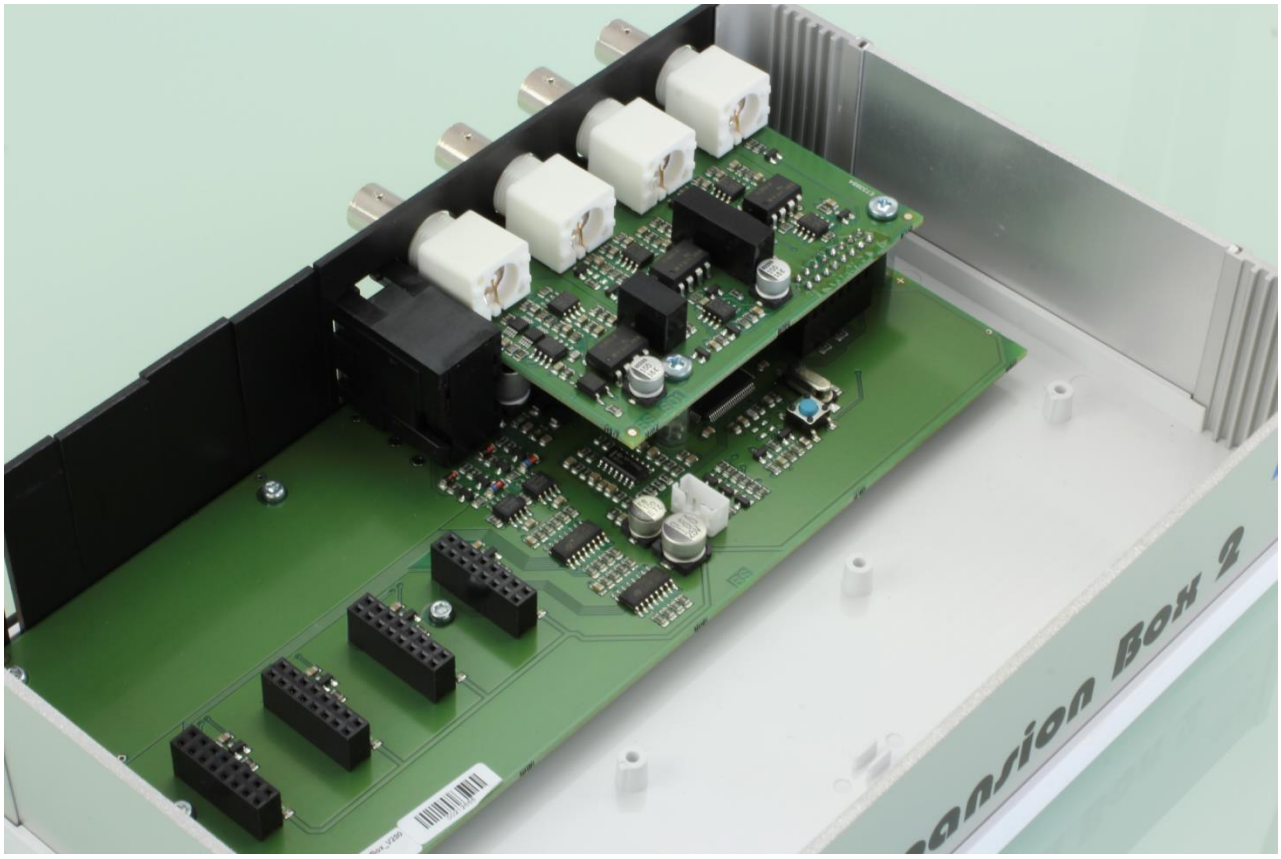
4.2 Installation

4.2.1 How to Open the Housing

Turn the Expansion Box 2 upside down and carefully loosen the 4 Allen screws in the 4 corners of the housing bottom plate. Pull the screws out and reverse the housing together with the bottom plate again.

Best grip bottom plate and housing cover on the right and left housing edge simultaneously and exert slight pressure while turning. Set the housing down again and lift the cover carefully.

Side panels, housing front as well as the black module cover plates on the rear panel are now loose.

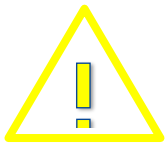


For every expansion slot, a module cover plate is provided as a placeholder on the rear panel

On the right, the empty slots for plugging in the modules are seen in the illustration above. On the left, you see the ex-works built-in Expansion Cards.

4.2.2 How to Insert Modules

Remove unneeded module cover plates and plug in a new module in any slot.



WARNING

- Never insert modules by using excessive force!
- All *Expansion Cards* are designed to fit with their pins right into the sockets of the slots.
- Insert the card into the slot. All of the *Expansion Card* contact pins must be seated in a socket.
- The front side of the *Expansion Card* must– as the factory pre-built modules - fit exactly in the housing rear wall.

4.2.3 How to Close the Housing

Now the housing can be closed again.

First, carefully attach the housing cover. Make sure the front panel, side panels, and the module plates as well as module cover plates slide exactly into the grooves of the lid. If necessary, slightly correct their position. Please do not use excessive force!

Thereafter, turn the box with gentle pressure and drive the screws back in again.

If you took the *Expansion Box 2* into operation completely new, continue with section *"Activation".* If not, restart the Expansion Box 2 in compliance with the following instructions.

4.2.4 Restart

Connect the sensors as well as the *PAB* cables to the *Expansion Box 2* and restore the power supply again.

Before restarting please observe the following precautions:

DANGER

- If you change resources (add, remove, or exchange of modules) you always must newly assign the *Expansion Box 2* to the *ProfiLux Computer* again, so that all sensor inputs and interfaces can be recognized and accepted by the *ProfiLux*.
- The previously allocated resources may have been shifted through the newly added modules. To avoid damage you must control the

assignments of the interfaces (i.e. level sensors, pumps and valves for water change or dosing pumps) before recommissioning and adjust them if necessary.

5 Activation

5.1 Best Practice

Depending on the desired features of the Expansion Box 2 the following procedure is useful:

TIP

Before you assign your new *Expansion Box 2* to *ProfiLux:*

- Build in your *Expansion Cards* as described under point 4 *"Hardware Modules"*
- Find an appropriate place for the Expansion Box 2
- Connect all sensors
- Connect all *PAB* cables
- Start-up *GHL Control Center (GCC)*
- Assign the *Expansion Box 2* to your *ProfiLux Computer*
- Determine the range of your sensor inputs. Ex works, the sensor occupancy corresponds to the first designation printed on the sensor e.g. pH / ORP is adjusted to pH measurement.

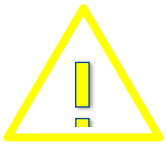
With the *Expansion Box 2* fitted, all modules will now be immediately recognized and activated by the *ProfiLux Computer* during the assignment phase.

5.2 Installing the Expansion Box 2

The device must be protected from water at all times!

TIP

- Please ensure good access to the connections of the device
- Please consider the maximum cable lengths of the connected *PAB* cables, sensors, *Light Bar* etc. when selecting the installation site
- Additional sensor cable extensions (*BNC2* or *VTN cables*) and PAB cables in different lengths to fit your needs are available online in our *GHL Store* (For US customers, *GHL Store USA*).



WARNING

- To ensure proper operation, the connection cables should never be kinked, crimped, or positioned in an unsuitable way.

DANGER

Products that are already powered should never be pulled by the cable. This may cause malfunction or damage the connected products and the *Expansion Box 2*.
They should only be pulled by the plug connected to the power socket.

5.3 Connection to the Power Supply

Connect the *Expansion Box 2* using the supplied power adapter to the power supply. Insert the DC plug into the designated 12 V DC hollow socket on the rear panel and connect the power connection cable with the plug to the power outlet.

DANGER

- Ensure that the mains voltage matches the voltage specified on the identification plate located on the bottom of the device.
- Connect the device only to a properly installed and grounded outlet with a minimum rating of 10A.
- Never use a different voltage supply. Incorrect polarity or voltage can destroy the device.
- Use only the supplied AC adapter.

5.4 Connection to PAB

The Expansion Box 2 includes two PAB-ports for connecting additional *ProfiLux Aquatic Bus* compatible devices.

5.4.1 What is the PAB

PAB is a CAN-Bus-System which allows for extremely secure data transfer between all PAB devices such as *ProfiLux Controllers*, or additional *Expansion Boxes 2*. The range can be up to 100 m (300 FT).

PAB cables are not included and must be purchased.

TIP

- Be sure to obtain suitable PAB cables in the appropriate lengths to meet your needs.
- *PAB*-cables are available online at *GHL Store (USA)* in different lengths from 0.5 m up to 50 m.

5.4.2 How does the ProfiLux Aquatic Bus work

The system works according to the master-slave principle. The master unit is always a *ProfiLux Controller* (starting from model ProfiLux 3), to which all other bus participants can be subordinated as a slave unit.

PAB devices are always connected in series. This means that all *PAB* devices must be connected to the *PAB* cables linearly with each other. The first *PAB* device is connected via a *PAB* connection cable with one of the *PAB* ports of the next party. The *PAB* works bidirectional; this means every *PAB* jack can be used for input or output. The next participant is connected again at the free *PAB* port of the previous participant, and so on.

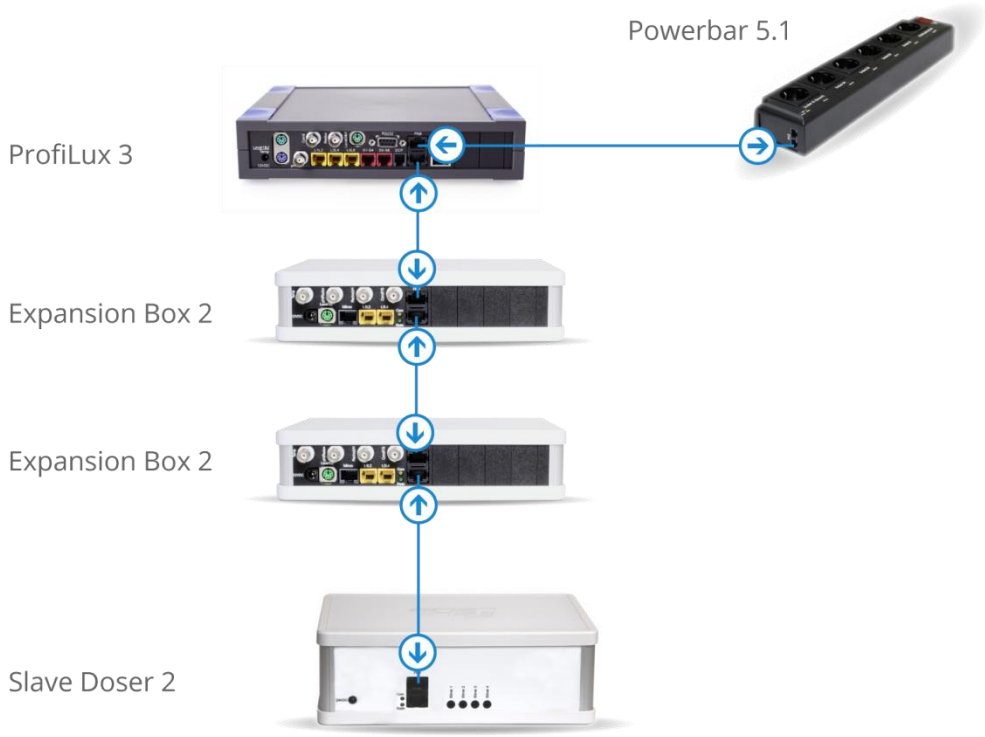
The last device of the PAB therefore always has an unoccupied *PAB* connection.

The order of the devices can be freely selected. Also several *ProfiLux Controllers* can be connected to the bus.
The PAB provides a line connection via the single PAB participants from one end to the other. A ring or star topology of the *PAB* bus is not allowed.

DANGER

- *PAB* devices must always be linearly connected to each other.
- The last device on the PAB must always provide a free *PAB* port.
- Never connect the last two PAB devices through an additional PAB connection cable.
- Such a ring connection leads to malfunctioning and is not allowed.

5.4.3 Exemplary Connection of Expansion Box 2 with PAB Devices



5.5 Status Indicators of the Expansion Box 2

The *Expansion Box 2* is equipped with two status indicators, located in the housing cover and on the rear panel.

5.5.1 System Status LED in the Housing Cover

The LED-backlit GHL Logo in the housing cover of the *Expansion Box 2* lights up in different colors.

The various colors show you at a glance, the condition of your aquarium.

The color and blink codes shown depend on the particular *ProfiLux* Firmware.

DANGER

- Never leave your aquarium, terrarium, or your pond unsupervised for an extended amount of time.
- The *ProfiLux-System* can assist you with many tasks and can inform you about error conditions (For example, via email or SMS) - it can in no case replace regular personal supervision and on-site checks-ins.
- The maximum amount of time without personal view depends on how long your aquarium, terrarium, or pond can survive without significant damage even when errors occur.
- Always remember that each technology can fail and malfunctions can never be ruled out!
  Power failures, incorrect settings, damage (For example, by water or overvoltage) or simply an unexpected operating situation can lead to fatal damage.
- The manufacturer disclaims any liability for (consequential) damages or losses which might arise in connection with the use of the *ProfiLux System* extent legally permissible.

5.5.2 PAB Status LEDs on the Rear Panel

On the back of the *Expansion Box 2* are two status LEDs that provide information about the PAB communication.

The upper yellow LED indicates the proper communication within the PAB connection. The lower green LED indicates the status of the PAB communication.

Display	Meaning
Yellow communication LED flashes	*Expansion Box 2* receives *PAB*-commands
Green status LED lights	*Expansion Box 2* is ready for operation

Green status LED blinks quickly	*Expansion Box 2* starts; firmware update
Green status LED flashes every second, yellow LED is OFF	*Expansion Box 2* receives for more than 30 seconds no PAB commands from *ProfiLux*
Both LEDs are off	*Expansion Box 2* has no power supply

6 Assigning the Expansion Box to the ProfiLux

6.1 Requirements

If the Expansion Box 2 is fully equipped, it can be integrated in the *ProfiLux System*. The totality of all the available inputs and outputs is also referred to as resources. For proper operation, it is important that the *ProfiLux Controller* can recognize and assign all the resources unambiguously.

Please refer to Section “Activation“ for these instructions and please proceed exactly the same way. Make sure that the Expansion Box 2 and all other PAB devices are powered. Download the free program *GHL Control Center GCC* in the download area on www.aquariumcomputer.com. Then connect your *ProfiLux* to *GCC.*

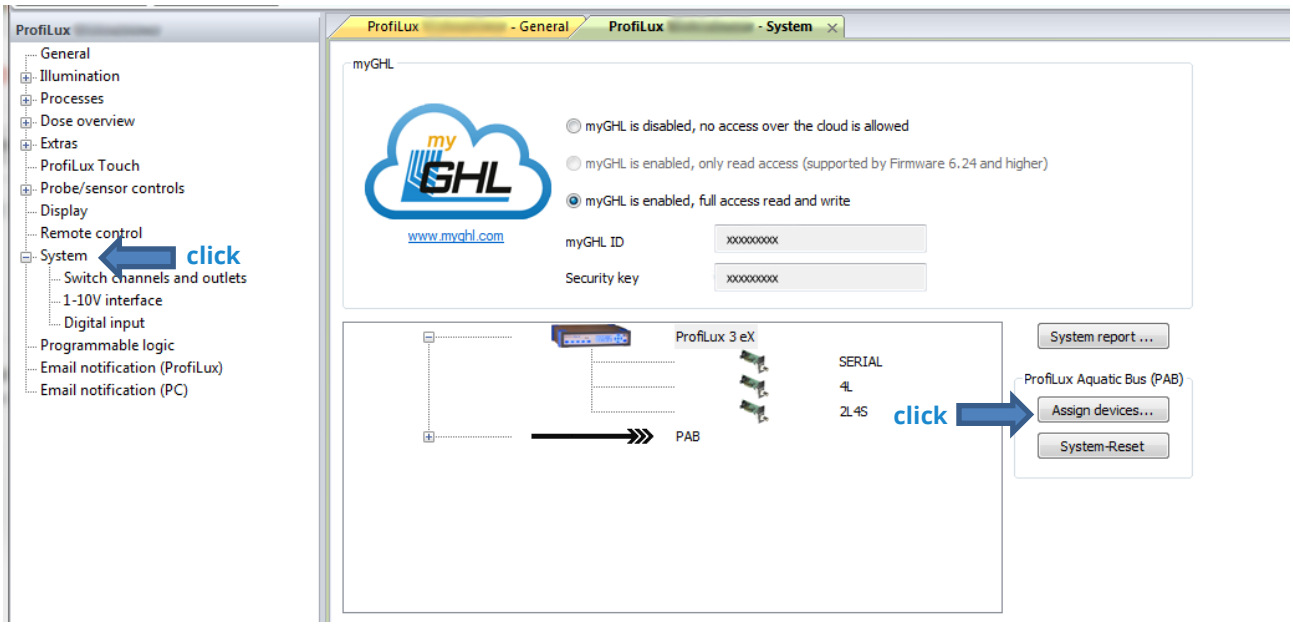
DANGER

- If devices are assigned to an already existing system, the previous numbering of the resources may have changed (For example by a conversion of the order of the PAB devices, reposition the PAB cable in another port etcetera).
- For this reason, please ensure that critical devices and functions are disabled before the new assignment (such as pumps for the automatic water change, dosing pumps) by removing the control cable for example.
- Only if all sensors and interfaces were again properly assigned and controlled -see also**Fehler! Verweisquelle konnte nicht gefunden werden.** “*Resource Numbering and Display*“ - the disabled devices may be put into operation again.

6.2 Assigning the Expansion Box 2

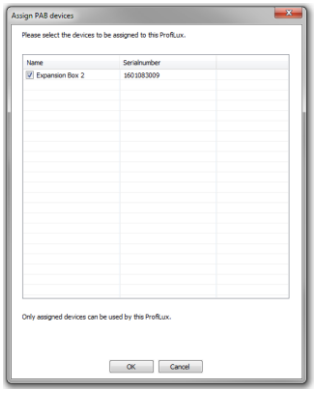
Make sure that all devices are connected to *PAB* and power supply.

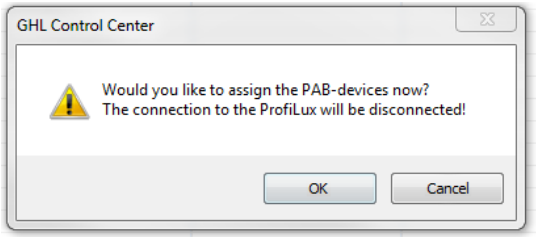
To assign the Expansion Box 2 click *System* in the *GCC* menu and select *Assign devices*.



The *ProfiLux* scans all devices connected to PAB and then displays the serial number of the found devices. Select then the serial numbers of **all** devices that are to be assigned to this *ProfiLux* and click *OK*.

The order of the devices determines the numbering of the resources.



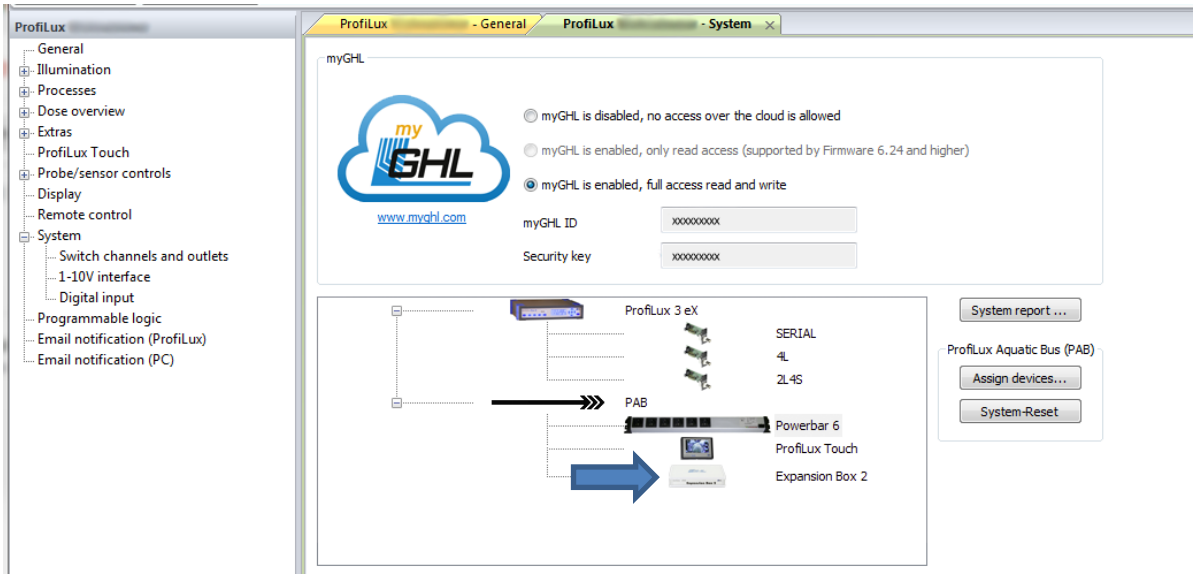


To complete the assignment, the connection of the *ProfiLux* with the *GCC* must be disconnected.

Confirm the disconnection with *Yes*.

After that, connect the *ProfiLux* again with *GCC* and navigate to the System settings page.

You will see that the *Expansion Box 2* has been added to the System.



The resources of the *Expansion Box 2* are now available in the system.

6.3 Numbering and Display of Resources

All resources of the system are serially numbered by the *ProfiLux Controller* and this is always carried out the same way.

The resources of the *ProfiLux* are numbered firstly, followed by the respective *PAB* devices in order of their assignment such as *Power Bars*, *Expansion Boxes,* etc.

The numbering always starts with the internal resources of the *ProfiLux*, followed by the resources of the module cards in the expansion slots according to their order in the slots of the *ProfiLux*.
Then the resources of the first found and assigned PAB device will follow, after that the resources of the second PAB device, etc.

The resources of the *Expansion Box 2* are numbered analogous to the *ProfiLux*: At first the internal resources of the *Expansion Box 2* are numbered followed by the resources of the expansion cards according to their order in the slots.

7 Warranty/Liability

You have a 2-year warranty beginning from invoice date. This applies to material and manufacturing defects.

We guarantee that the supplied products correspond to the specifications and that the products do not have material resp. manufacturing defects. For the accuracy of the manuals, we do not guarantee damages of any kind which result from improper operation or from an unsuitable environment. Furthermore, we do not take over warranty for damages that are caused by a false connection or excessive humidity. We assume no liability for direct damages, indirect damages, consequential damages and third party damages as far as it is legally permitted. We do not take over guarantee that our product package corresponds to the requirements of the buyer. Our warranty expires if the delivered original product is damaged or modified.

8 Additional Information

For help or further information, please visit our *Support Forum* at www.aquariumcomputer.com or contact your retailer.

9 Technical Data

The device and its accessories may only be used indoors. Moisture or excessive humidity can lead to malfunctions or damage.

Power supply	Wide range power supply 100 – 240 VAC (50 – 60 Hz), < 0,6 A RMS
Input voltage	12 VDC
Current consumption	1200 mA
Environmental conditions	Operating temperature: 0°C - 40°C / 32°F – 104°F Humidity: Max 80% rel. Humidity non-condensing
pH-measurement	BNC input for pH sensor, accuracy 0.1 pH, pH range 3.0 to 10.5 pH
Temperature measurement	BNC input for the supplied digital temperature sensor, accuracy 0.1°C (33.8°F), Measuring range 0.0°C to 40°C (32°F – 104°F)

Conductivity	BNC input for conductivity sensor, the fresh water accuracy 1 µS, measurement range 0 to 2000 microseconds µS, at saltwater accuracy 0.1 mS, measurement range 0 mS to 100 mS
ORP measurement	BNC input for ORP sensor, accurate to 1 mV, measurement range -1000 mV to 1000 mV
Level inputs	Mini-DIN socket for 2 level sensors
Mitras Lightbar port	RJ45 socket
L-ports	2 RJ12 sockets with 2x 1-10 V-interfaces and 2 relay signals each
Dimensions	B x W x H = 220 mm (8,66”) x 150 mm (5,9”) x 55 mm (2,17”)
Module slots	4

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