

ML Gateway

Installation and setting up guide for ML Gateway

English

ABO-CENTER V/HENRIKSENS ELEKTRONIK

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Introduction

General

ML Gateway is developed with the purpose to integrate Bang & Olufsen Master Link products with home automation systems (supported devices).

That provides a new world of opportunities for the customer to control comfortable home functions with, for example a Beo5 in his/her hand. But other scenarios are also possible such as giving the customer the opportunity to switch on several Bang & Olufsen products on a defined radio or tv channel by only pressing one switch of the home automation system.

This product is the gateway between Bang & Olufsen products and the home automation systems.

Information

There is no need for a special ServiceTool as known from other Bang & Olufsen products, when maintaining or servicing the ML Gateway. All types of service or adjustments take place from a web-based user interface.

Access

To access the web-based user interface, enter the IP address for ML Gateway. When ML Gateway is delivered, the IP address is set to a static value. The default IP address for ML Gateway is **192.168.1.10** (factory default). Depending on the customer's network settings, it may be necessary to change the IP address in order to fit the network range.

Please note

This installation guide is designed to let the installer the opportunity to understand and follow an installation process in the relevant situation. It will ensure a correct setup of ML Gateway and thereby a smooth operation.

This installation guide describes the setup procedure for the different supported devices, and the currently defined list contains:

- LK IHC (Intelligent House Control, Visual models only)
- Lutron Grafik Eye (GRX)
- Lutron Grafix QS (QSE)
- Lutron Radio RA
- Lutron Home Works Interactive
- KNX
- Conson Concept XP

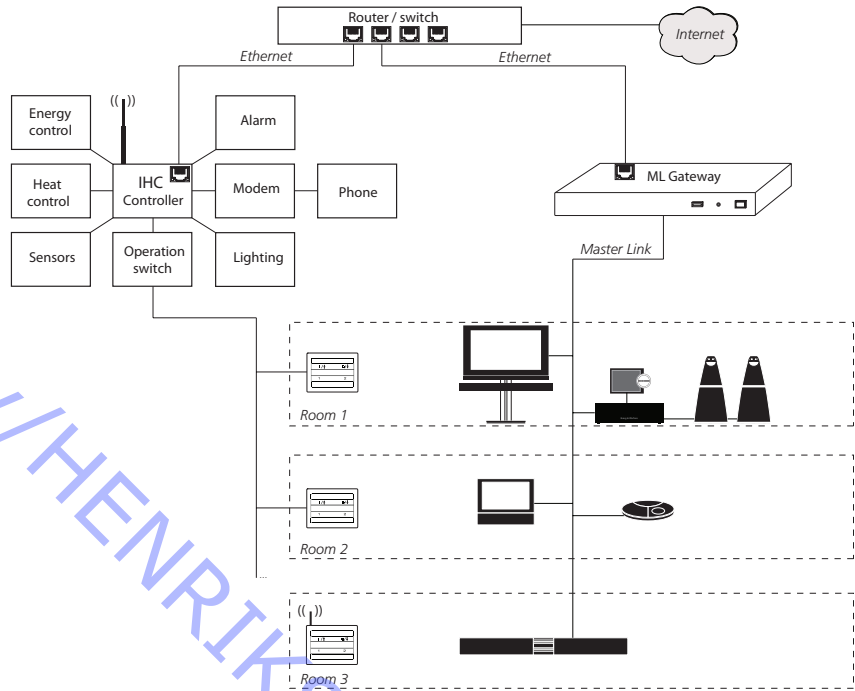
! When installing ML Gateway on the Chinese market, please read the information regarding RoHS directive (appendix -> technical specifications).

Installation overview

Basically there are two different types of connections between ML Gateway and the supported device (home automation systems). **Ethernet** or **RS232** connection. The connection types are illustrated in two examples below:

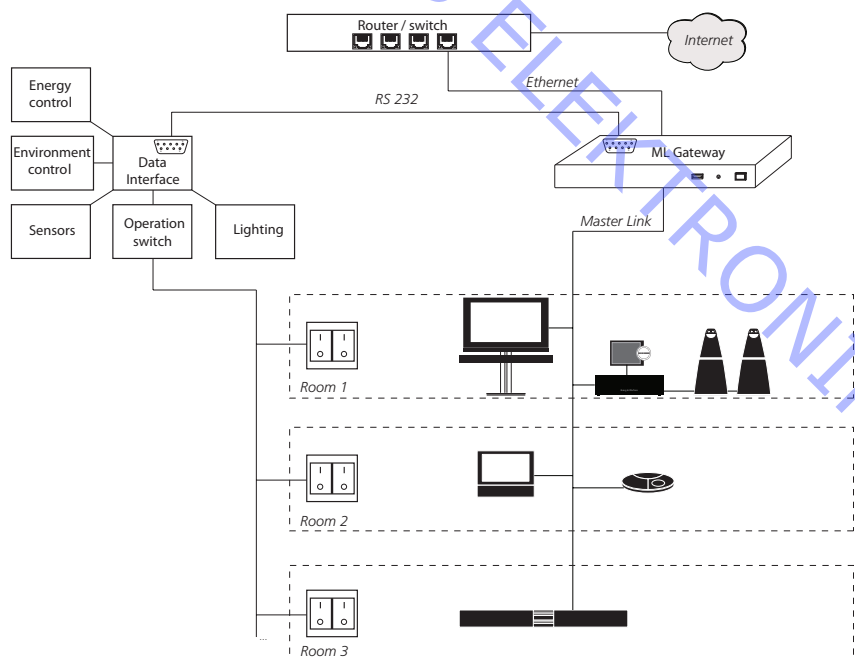
Ethernet connection

Example with ethernet connection (LK IHC)



RS232 connection

Example with RS232 connection (KNX)



Survey of connection types

Ethernet connection (RJ45)

- LK IHC (Intelligent House Control, Viewer models only)
- Lutron Grafik Eye (GRX)
- Lutron Grafix QS (QSE)
- Lutron Radio RA
- Lutron Home Works Interactive
- KNXnet (IP tunneling)
- Crestron

RS232 connection (D9SUB)

- Lutron Grafik Eye (GRX)
- Lutron Grafix QS (QSE)
- Lutron Radio RA
- Lutron Home Works Interactive
- KNX (FT 1.2)
- Conson Concept XP (converter from RS 485 to RS 232 is needed)
- Crestron

! For RS232 connectivity, check that the RS232 protocol is not already reserved by MLGW Protocol (see page 11) when setting up the product.

! Do not use RS232 cables that exceed a length of 10 meters. It is recommended to use a cable between 2-5 meters.

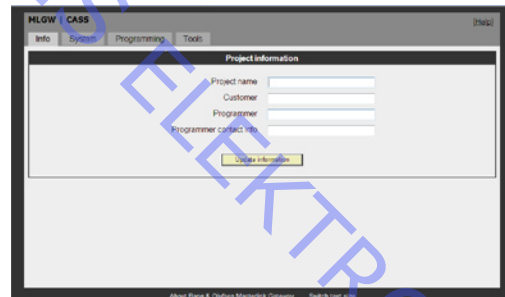
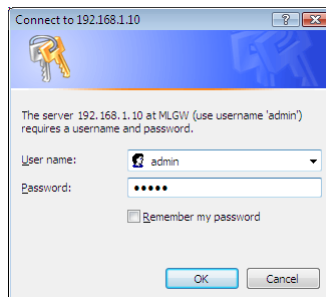
Preparing setup

Configuration of IP address

When ML Gateway is delivered, the IP address is set to a static value. The default IP address for ML Gateway is **192.168.1.10** (factory default).

Depending on the customer's network settings, it may be necessary to change the IP address in order to fit the network range. Follow the procedure below:

- The first step is to determine the network setup in the installation (IP address range, DHCP/non-DHCP). To do this it is necessary to access the customer's router.
- Connect the ML Gateway with an ethernet cable to a computer with ethernet connection and web browser. On old computer models, it might be necessary to use a ethernet crossover cable.
- Set the IP address on the computer to a static value in the same IP address range as the default value, eg. 192.168.1.11, and the subnet mask to 255.255.255.0.
- **Windows XP:**
Start -> Settings -> Network Connections -> right-click on Local Area Connections and choose Properties -> choose Internet Protocol (TCP/IP) and click **Properties**.
- **Windows Vista:**
Start -> right click on Network and choose **Properties** -> click Manage Network connections -> right click on Local Area Connection and choose Properties -> (if a security message appears choose continue) choose Internet Protocol Version 4 (TCP/IPv4) and click **Properties**.
- **MAC:**
Click on **System Preferences** -> click **Network** -> click **Advanced** -> click **TCP/IP**
- Open the web browser and enter http://192.168.1.10 in the address field.
- When the connection to the ML Gateway is established, the following login box appears on the screen:



- Type 'admin' in both fields and click 'OK'.
(Username is always 'admin', password can be changed)
- Click the tab **System** and then **Network**.

Now the web-based user interface appears on the screen

- In Network Settings it is possible to define the connection possibilities of ML Gateway. The aim here is to fit the network settings which was observed in the router before.
- If the network is a DHCP setup, this can be selected, but it is recommended to use a static IP address for ML Gateway.
- If the network is a non-DHCP setup, the IP address must be defined manually in order to fit the IP range in the router. This means that the first 3 'octets' must be the same as the router configuration.
- Choose **Static connection with** and fill in the fields for *IP address*, *Subnet mask*, *Gateway* and *DNS server*.
- Click **Apply settings** to apply settings immediately.

Network Settings

Connect using DHCP

Static connection with the settings below:

IP address: 192.168.1.10

Subnet mask: 255.255.255.0

Gateway: 192.168.1.1

DNS server: 10.6.5.16

Apply settings

Static connection with the settings below:

IP address: 192.168.1.10

Subnet mask: 255.255.255.0

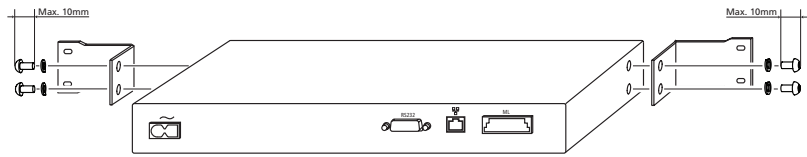
- ! After applying new settings, it is necessary to reconnect the web browser to the new address. In case of problems finding ML Gateway, the IP address can be reset to default using the setup button on the front panel (see page 26).

If the computer supports Multicast DNS (default on Mac/Linux, utility required for Windows), ML Gateway can be found by typing `mlgw.local` in the browser's address field.

The next step is to mount ML Gateway in the installation setup. It is recommended to use the angle bracket for a rack-mount solution.

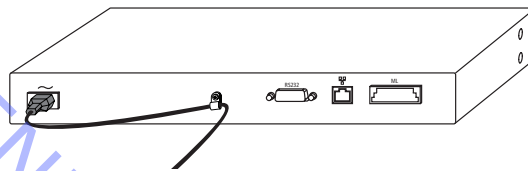
Installation and connection

- A rack-mount installation is preferred if possible. In this case mount the two angle brackets as shown.



Alternatively ML Gateway can be placed on its feet on a stable surface.

- Connect the Master Link cable from the installation to the ML socket on ML Gateway.
- Connect either the RS232 cable or the ethernet cable (depending on the communication type).
- Mount mains cable and the wire holder with screw to fasten the mains cable as illustrated below.



- Mount ML Gateway in the rack system or place it on a stable surface.
- Now ML Gateway is ready for further setup. Press the mains switch on the front to switch on the product.

Rack-mount warnings

- ! When installing ML Gateway in a rack installation, the following precautions must be considered:

Operating temperatures

The operating ambient temperature of the rack installation may be higher than room ambient temperature.

Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature specified for the product (see specifications on page 30).

Reduced air flow

Installation of the equipment in a rack should be such that the amount of airflow required for safe operation of the equipment is not compromised.

Setting up ML Gateway

Additional information

To setup ML Gateway it is necessary to access a web-based user interface. The web interface is organised into a series of screens which can be selected by means of the navigation bars.

Please avoid using the browser's back and forward navigation buttons, as you may lose the information you are entering.

Also note that changing to another screen does not save the modifications you have made. There are **Apply** or **Save** buttons next to most controls and data fields.

On-line help

All screens on the web interface have a link to the on-line help. Clicking on this link will open a new browser window showing the relevant section of the help file. At the top of each help page there is a link to the table of contents.

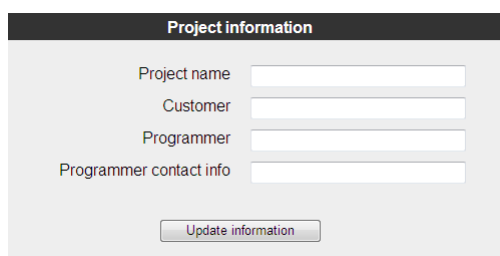
Login

- Switch the ML Gateway on by means of the switch on the front panel (information about the front panel indicator and the setup button can be found on page 26).
- Connect the service computer with an ethernet cable to the network connection (to a free port in the router/switch).
- Access the web-based user interface by typing the IP address defined earlier (during **Configure the IP address**) for ML Gateway in the address field of the web browser.
- When the connection to the ML Gateway is established, the login box appears on the screen. Type 'admin' in both fields and click 'OK'. (Username is always 'admin', the password can be changed by the user later).

Info

The first picture that appears on the screen after a successful login is the **Info** screen. This section, called **Project information**, provides the opportunity to enter information regarding the project.

It is recommended to fill in the fields in order to make it easier for future service. Follow the procedure below:



The screenshot shows a web interface titled "Project information". It contains four text input fields stacked vertically, labeled "Project name", "Customer", "Programmer", and "Programmer contact info". Below these fields is a button labeled "Update information".

- Fill in the four fields for Project name, Customer, Programmer and Programmer contact info.

Click **Update information** to save the information.

Date & Time

ML Gateway can get its system time from the BeoLink, and this is the recommended option. In this case the time will be constantly synchronised to the clock of the main BeoLink product.

Alternatively, the date and time can be set manually. Note that ML Gateway will lose its time setting if powered down for several hours.

System time is useful for monitoring events and for examining the system and error logs, but correct time setting is not critical to the system.

- Click on the tab *System* and then *Date & Time*.
- Choose the preferred option for time and date.
- Click *Apply date and time settings* to apply settings immediately.

Text size (optional)

The web-based user interface may be too wide for low resolution screens such as those of mobile Internet devices, subcompact laptop computers, or old laptop computers.

In this case, a more compact style for the user interface can be selected.

Note that most web browsers have text size and screen zoom options, which allow for further adjustment of the interface.

- Click *Switch to* to toggle between low and high screen resolution.

Password

The system password is used for accessing both the web user interface and the command line interface (CLI).

Logging in to the web interface requires entering 'admin' for both the user name, and the password. The factory default password is also 'admin'.

Logging into the CLI requires only entering the password.

This password can be changed here to avoid unwanted access.

If the modified password is forgotten, it can always be reset to the default value.

This requires an execution of service function 2 (described on page 26) .

- Fill in the fields and click *Update password* to save the new password.

Master Link Gateway Protocol settings

The ML Gateway protocol is available on RS232 connection and as TCP socket connections (ethernet RJ45). This is a proprietary protocol for communication with general-purpose home automation controllers.

Multiple simultaneous ML Gateway protocol connections are supported.

The options available are:

- Availability and bit rate on RS232 port.
- Availability and TCP port number on the network connection.

! *If the RS232 port is already configured for another device, a message is shown and selection is disabled.*

! *If RS232 is enabled for MLGW protocol, the product can not be used with eg. Conson and KNX installation.*

The default Master Link Gateway Protocol settings are:

- ✓ *Enable MLGW protocol over IP*
IP port 9000
- ✓ *Enable MLGW protocol over RS232*
RS232 bit rate 9600 bps

Basic setup done

The basic setup is now completed for ML Gateway, but before continuing to the programming part, it is recommended to check for software updates.

Please follow the procedure on the next page.

Software update

There are two methods for updating ML Gateway software. One for Internet access and one for no Internet access:

Internet access

When ML Gateway is configured to have Internet access, it provides the opportunity to check for new software on-line and download the most recent version.

Use the **Check available software on-line** button to check for the latest available software. The online version will be displayed together with the currently running version. Internet access of ML Gateway requires two conditions:

- The installation network has direct access to Internet (no proxies).
- The network settings for ML Gateway is correctly set up.

If the network has a DHCP server, connect via DHCP in order to get all these settings automatically. You can revert to static IP address later if needed, while keeping the other settings provided by the DHCP server. Most DSL routers nowadays are DHCP servers by default.

- Select the **Update** button to effectively download and install the new software.

No Internet access

If ML Gateway has no direct Internet access, it is possible to upload and install a software image file from a location stored on your computer.

- Navigate to the **Load configuration** section and click **Browse...** . When the navigation box appears, choose the destination and software file. Click Upload.

! **Do not switch off ML Gateway during the installation of new software, as this may result in a corrupted system.**

Restarting ML Gateway on factory-installed software

If a software update causes ML Gateway to fail (for example due to power failure during flash update), the unit can be restarted using the original factory-installed software.

To do this, switch ML Gateway off, and while pressing the setup button, switch it back on. Release the setup button after 5 seconds. This will start the system using the original factory software, but will not fix nor replace the "broken" software. You need to log into the system and perform a software upgrade to fix the broken software.

If you suspect that the failure is inherent to the latest software installed (and not a failure during the flash process), you can manually download an earlier software version from BeoWise to your computer, and perform a software update from that file.

Software update complete

When it is confirmed that ML Gateway has the latest software, the next step is to define devices and resources. Please follow the procedure on the next page.

Programming

Additional information

The programming section provides the opportunity to define how BeoLink products and the home automation systems interact.

The programming section in ML Gateway consists of three main elements:

- Devices
- Resources
- Macros

Below is a general description on how the home automation systems are connected to MLGW, and the corresponding configuration parameters.

Connection settings

Direct Ethernet connection:

Use this option for systems with a network interface, and provide the IP address of the system.

The IP address has to be of the form xxx.xxx.xxx.xxx (for example: 192.168.1.200).

Some systems requires a TCP port number on which it expects incoming connections. Port 23 (Telnet port) is the most usual default value.

Depending on the system, login and password information may be required.

Default values will be suggested when available.

Direct RS232 connection:

- ML Gateway has one RS232 interface for connecting to external systems. Only one system can be connected to the interface at a time, so when configuring ML Gateway only one system is allowed to be set up on RS232. A notice will appear if the interface has already been reserved for another system. (the message *RS232 port in use by MLGW Protocol* appears on the screen)
- Some devices may require hardware flow control. In this case, verify that you are using a fully wired cable. Examples are Lutron HomeWorks processors and Lutron Radio RA interface.
- Make sure to use high quality cables with proper shielding to avoid interference. If the distance to cover is excessive, use a lower bit rate, or use an RS232 to Ethernet interface next to the external system. This last recommendation also applies in case of interference or ground-loop problems.
- For information regarding the RS232 connector pin assignment, please refer to the appendix -> technical specification.

Using RS232 to Ethernet interfaces:

- For systems with an RS232 interface, it is also possible to use an RS232 to Ethernet interface. This way, the network installation can be used instead of having to run a long RS232 cable between the system and ML Gateway.
- You should configure the interface for the correct RS232 parameters (bit rate, flow control, etc.).
- Parameters to configure on ML Gateway are the IP address and TCP port number of the interface.

* IHC Control: Lauritz Knudsen (LK), Schneider, ELKO and LexControl

! If the selected device is an IHC-controller, it has to be a viewer version and it is necessary to patch new API firmware into the IHC-controller to ensure compatibility. To order the firmware please contact Lauritz Knudsen on phone (+45) 44207200 or kundeservice@lk.dk.

The following information must be included in the request:

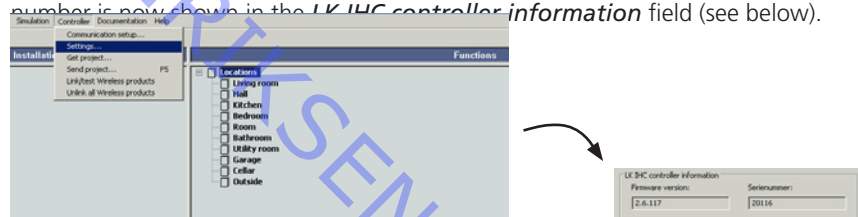
- Serial number on the IHC-controller
- Installation contractor (name and address)
- Bang & Olufsen store (name and address)
- Customer (name, address and e-mail)

When the above-mentioned information is given to the Lauritz Knudsen customer service, the API-patch is delivered to the customer by e-mail.

The serial number is easy to find on the barcode label placed on the front of the IHC-controller. If the serial number for some reason is difficult to find, the LK IHC Visual software can be a great help. Follow the procedure below:

Install the *IHC Visual* software.

- Connect the IHC-controller with an USB cable to a computer and access the *IHC Visual* software.
- Navigate to **Controller** -> **Settings** to open the information box. The serial number is now shown in the **LK IHC controller information** field (see below).



** Scheduler

A scheduler generates a timed sequence of events. It is possible to define more than one scheduler for the project.

On the resources screen a series of events for the scheduler must be defined with the following information:

- Event name:
This is the name of the event that will be generated. Use the same name more than once if you want the same event to be produced at different times.
- Wait time:
This is the number of seconds since the scheduler was started (it is not relative to the previous row).
- Schedulers accept 2 commands (start and stop):
Starting a scheduler will start to produce events at the set times. Once the last event is generated, the scheduler automatically restarts.

! Be careful to provide other way of stopping a scheduler. For example, events from Beo5 or from a keypad.

Resources

The resources screen is where you identify all the necessary components with which ML Gateway will interact. The aim is to define BeoLink rooms, BeoLink products, events for the schedulers, and keypads or buttons for external systems.

- Editing resources
All resources tables contain an empty last row. Use this row to define a new resource.
- An exception is IHC/LexComm, where adding new resources must be done from the list of all available resources.

Changes made to ML Gateway must be saved either by selecting the corresponding **Apply** button, or by pressing **Enter**.

For removing resources, select the Delete check boxes before applying changes.

BeoLink

For the BeoLink setup, you have to define the products and the rooms they are in. You can enter this information manually or by uploading a Beo5 configuration XML file to ML Gateway.

Rooms are needed for receiving LIGHT and CONTROL events from Beo4/Beo5. These events are associated with rooms, where more than one product could possible receive the same remote control command.

BeoLink products have no fixed address, so you provide an address yourself on the column MLN (Master Link Node). Once you finish addressing each product, you need to associate that address with the actual products. This procedure is called product assignment. It is recommended to use contiguous numbers starting with 1 (this will simplify the product assignment process).

During product assignment, you must to go through all products, activating them in order of MLN. Instructions are provided on-screen.

Product assignment must be made once. If BeoLink products are added or replaced, then the procedure must be repeated so that ML Gateway can identify the new products.

Note!

- There are limitations to BeoLink Wireless products. ML Gateway has no way of distinguishing between different units in a wireless setup, therefore you cannot identify them individually.
- ! *During product activation, main products in link rooms (i.e. in Options 5 or 6) must be activated using a source from the main room (not a source local to the product). Otherwise ML Gateway will not receive feedback from that product.*
- If more products are activated during product assignment than have been defined on the Resources screen, these are added as new resources automatically.
- Product assignment can be started from the front panel (see page 26), without using the web interface. This can be useful for ML Gateway protocol-only installations where no further setup is needed.

MLN configuration procedure

On ML Gateway, BeoLink products are identified by a number called MLN number (Master Link Node number).

The assignment of an MLN number to each particular product in the BeoLink network is done through the configuration procedure described below.

Assign all products in order:

- Navigate to *Programming* -> *Resources* -> *Beolink rooms*
- Click the *Perform product assignment...* button to assign all products in order.
- Go to the product corresponding to MLN 1, and switch it on (i.e. select a valid source). ML Gateway will respond by automatically switching that product to standby after 5 seconds. (If the product does not switch to standby by itself, please consult the troubleshooting section on page 29).
- Proceed with the product labelled MLN 2, and so on, until all products have been activated.

! Always allow 15 seconds after a product switch to standby, before activating the next product. ML Gateway automatically ends the configuration mode after a 5 minute timeout from the last product was activated. So, be sure you can always reach the next product in less than 5 minutes. For example, check you have access to all rooms.

Exit configuration mode:

Configuration mode terminates automatically 5 minutes after the last product was activated.

Configuration can also be finished by pressing the front panel button or from the web-based user interface.

Master Link Gateway returns to normal operation.

MLN configuration procedure completed

When the MLN configuration is completed please continue to configure the supported resources on the next page.

Supported resources

On the following 6 pages, resources for all supported systems are described. Please choose the relevant resource and after that continue to **Macros** (see page 24).

IHC Control: Lauritz Knudsen (LK), Schneider, ELKO and LexControl

IHC/LexControl programming model consists of physical input and output devices plus function blocks. Function blocks implement the programming of the system, and the interface between the programming and the actual components is made by linking physical input signals to function block inputs, and function block outputs to actuators (dimmers, shade controllers, etc.).

The web-based user interface for the controller (LK IHC Visual software) saves all programming and setup in an XML file with the extension .VIS.

This file must be provided to ML Gateway in order to define the list of resources. Once this file is loaded into ML Gateway, all relevant resources are selectable.

Resources available for generating events on ML Gateway are physical input signals and function block outputs.

Commands are always a logical pulse (True followed by False) on function block inputs. This way, all programming (scenarios, etc.) is implemented by means of function blocks that can be executed by ML Gateway.

The Visual project file is absolutely necessary, since there is no way to inspect all of the events occurring on the controller. Therefore, monitoring information will only be available for already defined resources.

Lutron HomeWorks Interactive

Connecting to a HomeWorks processor

Connections to a HomeWorks processor can be done directly on Ethernet, RS232, or indirectly with a RS232 to Ethernet interface. This last option is only relevant for older HomeWorks generations without network interface. For Ethernet connection, make sure that the HomeWorks project has a "telnet user" defined with username, password, and all permissions granted.

For RS232, hardware flow control is recommended. Be sure to use a fully wired RS232 cable in this case.

Defining HomeWorks resources

Resources on HomeWorks are keypads (both physical and phantom keypads). Keypads are identified by processor number, link number and keypad address. Use the monitor tool to verify keypad addresses and button numbering.

Events and commands

Events from HomeWorks include button activity and LED activity. Usually you should only use the keyboard button press. The other options are provided for advanced use and need special care.

Commands to HomeWorks are keypad button presses. This is general since all buttons on HomeWorks are completely programmable.

Setup on the HomeWorks project

For direct network access, a network account must be defined in the addressing section. This account is identified by a user/password. Be sure to enable the necessary permissions for interaction with ML Gateway. ML Gateway will need full keypad monitoring and executing button presses.

Define phantom keypads for integration with ML Gateway. ML Gateway can act on any keypad (physical or phantom), but it is recommended to channel commands from ML Gateway to HomeWorks via phantom keypads, so the special function for integration is not mixed with standard keypad function.

LED feedback

Advanced use only: ML Gateway can generate events from keypad LED state changes. This is provided only for advanced use, where you want to generate ML Gateway events as a consequence of conditional, time-clock, or other non-user generated actions on HomeWorks:

- Define a state variable (or True/False variable) which you will use in your conditions or time clock events to signal ML Gateway.
- Define a phantom keypad on the HomeWorks project, and choose a button for this purpose.
- Set the button type to conditional.
Set the LED behaviour to conditional, on (for example) preset 5, type scene.
- On Preset 5, add the state variable with a desired value.
- Configure ML Gateway to respond to the LED of that button going ON or OFF, which will be an indication that the state variable has the specified value.

For example, use the 'Time of Day' variable with value 'Day'. The LED going ON will generate an event on sunrise, and the LED going off will generate an event at sunset on ML Gateway.

Lutron Grafik Eye

Connecting to a Grafik Eye system

All Grafik Eye interfaces are supported: GRX-RS232, GRX-CI-RS232, and GRX-CI-NWK-E. Connection to the RS232 interfaces can be done directly using a 3-wire RS232 cable, or via an Ethernet to RS232 interface.

If you use an Ethernet to RS232 interface, set it up for 9600 bps, no parity, no flow control, 1 stop bit.

Connection parameters are TCP port and IP address in case of using a network interface.

The password is only needed if using a direct network connection to GRX-CI-NWK-E. The default password for this interface is 'nwk'.

- ! Make sure that you enable scene status feedback and raw feedback on the Lutron interfaces. This is done by setting the DIP switches 6 and 7 to ON on the interface itself.

Defining Grafik Eye resources

The resources you need to define are control units and accessory controls (e.g. keypads) with which you need to interact. Each is determined by an address in the range 1 to 8 for control units, or 1 to 16 for accessory controls.

You can use the monitoring facilities to identify addresses.

Grafik Eye events and commands

Events from a Grafik Eye system can be lighting scene changes or individual key presses.

Possible commands are scene changes on control units.

Lutron Grafik QS

Connecting to a Grafik QS system

Connection to a Grafik QS system is done via a QSE-CI-NWK-E interface, which allows for Ethernet and RS232 connect.

For RS232 communications, set the same bit rate on the QSE-CI-NWK-E interface and on ML Gateway connection settings.

Connection settings for Ethernet are the IP address of the interface and the password. The default password is 'nwk'.

Defining Grafik QS resources

The resources you need to define are control units and accessory controls (e.g. keypads) with which you need to interact. Each is defined by a serial number which can be found on a label on each product, or from the control units bus status information, or by inspecting ML Gateway monitoring information.

Grafik QS events and commands

Events from a Grafik QS system can be lighting scene changes on control units, or key presses.

Possible commands are scene changes on control units.

Lutron Radio RA

Connection to a Radio RA system

Communication with Radio RA is done via the Radio RA RS232 interface. Use a full RS232 cable between Radio RA and ML Gateway. Hardware flow control is used, so a 3-wire connection will not work.

Alternatively, you can use an Ethernet to RS232 interface and connect via the ML Gateway network port. In this case, it is important to configure the Ethernet to RS232 interface to use hardware flow control, 9600 bps, no parity, 1 stop bit.

The only connection setting available is the TCP port number and IP address in case you connect via Ethernet.

Defining Radio RA resources

On the resources screen, you must identify all of the buttons with which you need to interact. This includes:

- Buttons on Master Control units.
- Phantom buttons on the Radio RA RS232 interface.

Use the monitoring facilities or the display on the Radio RA interface to identify individual buttons.

- ! Master Control buttons that you intend only for integration (and not for lighting control) have a special behaviour. Until they have been activated once, they will not produce a radio event. Therefore, you may not find monitoring information for these buttons. Once you define them in the project (and Test the configuration), ML Gateway activates these buttons.
- ! Bridged installations are not supported. All interaction will be related to the section where the RS232 interface is located.

Radio RA events and commands

You can define events for button presses on Master Control buttons.

For commands you can execute a button press on a Phantom button.

Also, you can set the LED state on a Master Control button. Note that setting the LED state only works if that button has not been assigned to lighting control. If the button has lighting assigned to it, the LED will always show the lighting scene status regardless of any state change command sent by ML Gateway. Use this feature to provide feedback on Master Control keypads.

KNX

ML Gateway can interact with KNX systems by means of shared variables (group addresses). The KNX bus supported is twisted pair.

Connection to a KNX system

ML Gateway can connect to a KNX system by means of KNX data interfaces.

The supported interfaces are:

- PEI type 10 (BCU2, with FT 1.2 protocol) over RS232 connection
- IP tunneling over Ethernet connection

PEI type 16 serial interfacing is not supported. PEI 10 bit rate is fixed at the default 19200 bps. The IP tunneling interface must provide bus monitor mode.

- ! Note on IP tunnelling: It is usually necessary to disconnect the ETS software from the IP tunnelling interface before ML Gateway can connect to the system. Also, after disconnecting ETS, the interface can take several minutes before it accepts a new connection from ML Gateway. The same considerations apply when switching back to ETS.

Group addresses

All interactions between KNX and ML Gateway take place by means of group addresses. Group addresses have an associated datapoint type which identifies the type of data it holds (e.g. boolean, signed integer, etc.).

It is therefore necessary to define all the necessary group addresses required for integration with ML Gateway.

If this information is not readily available, the monitoring tools can be used to track for events.

KNX resources

On the resources definition screen, you must add all necessary group addresses. Group addresses have the form a/b/c (3 level address) or a/b (2 level). The default is the 3 level addresses, but both formats are accepted.

Select one of the supported datapoint types for each group address:

<u>Datapoint type:</u>	<u>Range:</u>
Boolean	0 .. 1
1 Byte unsigned integer	0 .. 255
1 Byte signed integer	-128 .. 127
2 Bytes unsigned integer	0 .. 65535
2 Bytes signed integer	-32768 .. 32767
3 bit Controlled	0 .. 15

Boolean values are coded as 0 for FALSE and 1 for TRUE.

3-bit Controlled values are coded from 0 (corresponding to 0000b) to 15 (corresponding to 1111b).

Continues on the next page ...

continued ...

For datapoint type 3.007 (Control Dimmer), the coding is:

- 0: Decrease break.
- 1 .. 7: Decrease with step 1 to 7.
- 8: Increase break.
- 9 .. 15: Increase with step 1 to 7.

For datapoint type 3.008 (Control Blinds), the coding is similar but with Up and Down instead of Decrease and Increase.

KNX events and commands

ML Gateway generates an event whenever a group address is written to, provided the datapoint type written is 2 Bytes or less in size.

If any of the bits is 1, then a TRUE event will be generated. Otherwise, a FALSE event will be issued. For the common datapoint types:

- Boolean: TRUE or FALSE event, depending on the value received.
- Integer (1 or 2 Bytes): TRUE event if the value received is not 0, FALSE if 0.

! Commands can write any of the possible values to a group address.

Conson XP

Connection to a Conson system is made via an XP130 gateway module. This module provides an RS485 interface, so a RS232 to RS485 converter is needed for connecting to ML Gateway.

Conson resources

On the resource screen, define the modules you need to interact with. A module is identified by a module type and a link number. Use the monitoring tool to analyse the events on the bus.

Events and commands

Events occurring on the Conson bus are changes on a module's input. This is signalled as a circuit make or break event.

Similarly, ML Gateway can send circuit make, break, or pulse (make followed by break) to any input of a module.

Macros

Macro programming

The interaction between the different devices connected to ML Gateway is defined by means of macros.

A macro consists of a set of events and a list of commands.

Whenever any of the events defined in a macro occurs (for example, a key press on a keypad, or a Control command on Beo5), the macro is triggered. This means that all the commands in that macro will be executed in order.

To define a new macro, select the **Add macro** button appearing on the macro list.

Copying macro definitions

A complete macro can be duplicated using the **Clone** button. This will make an exact new copy of a macro.

Also, selected events or commands can be copied from one macro to another. Select a group of events or commands using the check boxes, and use the **Copy** buttons. These copied events or commands can later be pasted into another macro.

Copied events and commands are stored independently, so you can copy both events and commands and then paste them into another macro.

Orphan commands and events

If commands and events are already defined for a resource, and that resource is modified to another address, the events and commands become orphan (without an associated resource).

Orphan events or commands still works, and refers to the original addressing of the resource.

The macro screen signals the presence of orphan commands or events, and a report is available listing them all.

Testing and accepting a configuration

ML Gateway keeps three independent versions of the configuration. Each configuration consists of the set of devices, connection settings, resources and macros.

At all times, the active configuration is running. The user cannot modify this configuration directly, as it could disrupt the behaviour of the installation.

Instead the user can change the 'edit' configuration from the user interface. All device settings, resources and macros modified by the user do not become active, but only change this edited configuration.

The user can test if the modifications being made work as expected by selecting the **Test** button in the web-based user interface. This will momentarily stop the active configuration and run a copy of the edited configuration.

If everything runs as expected during the test, the configuration can be accepted by selecting the **Save** button. This way the configuration being tested becomes the active configuration. Otherwise the **Cancel** button restarts the original active configuration.

During testing the monitor and system log screens are useful to check if the new modifications are working as expected.

When accepting a configuration, the previously active configuration is not lost, but saved as the previous configuration. Use the **Previous** button to return to this saved configuration.

All three versions of the configuration can be downloaded from ML Gateway for reference, backup, or uploading to another ML Gateway unit.

Note that the edit configuration may not be recovered in the latest version in case of a power failure. The active and previous configurations are always stored in permanent memory. It is strongly recommended that you accept changes to the configuration after testing, so that these changes are not lost.

Done

When the test is successful, the installation of ML Gateway is completed!

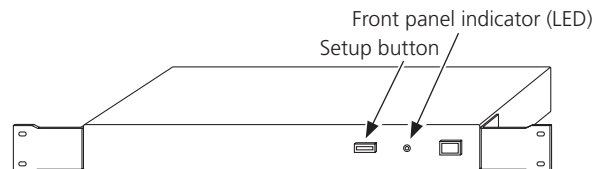
Appendix

Service functions

General

This section describes the front panel indicator and the service functions of the setup button on ML Gateway.

Front panel indicator



The front panel indicator provides feedback on the state of the system, and is also used for setup button operation and BeoLink product assignment.

The normal start-up sequence displays like this:

- GREEN: System power up, approx. 2 seconds.
- RED: System boot, approx. 1 minute.
- Blinking RED: Application running, and BeoLink products detection in progress, approx. 1 minute.
- GREEN: ML Gateway application is now running.

If ML Gateway encounters an unrecoverable internal error, it will signal a critical error condition. In this case, the front panel indicator will keep flashing alternating RED and GREEN. The application is still running, but the error and system logs must be checked for diagnosis.

During software update of any of the two processor modules, the front panel indicator will flash GREEN.

Setup button

The setup button on the front panel provides several functions. Each function is dedicated a specific number of blinks. These can be accessed by choice through a cycle of available functions. One blink = function 1, two blinks = function 2, etc.

Survey of functions:

Function 1: Does nothing.

Function 2: Reset password to factory default.

Function 3: Reset network settings to factory default.

Function 4: Erase entire configuration, network and password to factory defaults.

Function 5: BeoLink product assignment on the active configuration.

To select a function, press and hold the setup button. This will cycle through all available functions, and the front panel indicator blinks RED showing the current function. Release the button at the desired function number in order to execute it.

Holding the button past the last function to return to normal operation.

Also the setup button can be used during system power up to recall the original factory-installed software as described in the section 'Troubleshooting'.

Troubleshooting

Previous checks

Before setting up Master Link Gateway, it is necessary to have all of Master Link installation working and correctly configured.

Setting up and troubleshooting a Master Link network is covered in the Master Link Handbook.

Below is a brief checklist for basic troubleshooting of Master Link:

- Before connecting any products to Master Link, verify electrical conductivity using the Master Link Tester. In particular, check the ML outlet dedicated to ML Gateway as probably you never used this outlet before.
- Connect all products to Master Link and set the correct option programming. It is particularly important not to have more than one Video Master, and no more than one Audio Master in the network (Master products are configured in Options 0, 1 or 2). The rest of the products must be configured as link products (Options 4, 5 or 6, possibly 0). ML Gateway itself has no Option programming.
- Check that all products are working, and that you can get audio from the Master products to all link products, and between the Master products.
- Connect ML Gateway to the network, switch it on and wait for startup (this takes less than 2 minutes).
- Switch some products on. Issue an **ALL STANDBY** command on ML Gateway using the **CLI** command **ALLSTANDBY**. Check that the products switch to standby.

Product assignment

A product does not switch on:

If you are unable to switch a product on using Beo4, be aware that some products can be configured in Option 0, 1, 4 or 5, so selecting a source on Beo4 will not necessarily activate such products.

Refer to the comments on page 10 for more information.

A product does not switch back to standby

If, during product assignment, a product does not automatically switch back to standby, there may be an internal address conflict between two products, although this is highly unlikely.

- First of all, double check that all products are working properly, respond to Beo4, and can access sources through BeoLink.
- Then, repeat the configuration procedure, and verify that this same product still does not switch back to standby.
- In order to determine which other product is involved in the addressing conflict, power down other products one by one and repeat the configuration. Start with Link products (BL Passive, BL Active), and then proceed to new products.
- Once the two conflicting products are identified, take note of type number, item number and serial number of each, and contact your national Service Center for assistance.

System error

ML Gateway may report a system error by alternately flashing red / green on the front panel LED.

Possible causes of system error include:

- Software fault
- Internal communication error
- H8 module error

! In case of system error, always try to solve the problem by updating the software. If this does not solve the problem, ML Gateway must be serviced. It is recommended to use the backup file (only if exists) for ML Gateway, so programmed data can be uploaded to the replaced module.

Software update

ML Gateway not working after software update:

- **Detecting if ML Gateway is running**

The following are signs that the ML Gateway application is not running:

- The front panel indicator does not turn green after approximately 1 minute after being switched on.
- Briefly pressing the setup button produces no visible feedback on the front panel indicator.
- The unit automatically reboots every minute or so (check for system boot indication on the front panel or critical error indication).

If the application seems to be running, but you cannot connect either via web or via telnet (command line interface), first check that the network is working as usual; then try resetting the network settings through the front panel.

For further details regarding network connection, please refer to the Network settings in the section 'Adjustment'.

- **Restarting ML Gateway with factory-installed software**

If a software update causes ML Gateway to fail (for example due to power failure during flash update), the unit can be restarted using the original factory-installed software.

To do this, switch ML Gateway off, and while pressing the setup button, switch it back on. Release the setup button after 5 seconds. This will start the system using the original factory software, but will not fix or replace the 'broken' software. You must log into the system and perform a software upgrade to 'repair' the software.

If you suspect that the failure is inherent to the latest software installed (and not a failure during the flash process), you can manually download an earlier software version from BeoWise to your computer, and perform a software update from that file.

- **Erasing entire configuration before application start**

If the application fails to start even if restarting on factory-installed software, there is a method for erasing the entire configuration from ML Gateway before the application starts up. This may be useful in case of a corrupt configuration, or a configuration which causes the factory-installed software to fail.

The entire configuration is erased if the setup button is pressed when the application starts (front panel indicator goes from RED to GREEN) and is released within 1 second. The procedure for this is to power up ML Gateway with the setup button pressed, and release it as soon as the front panel indicator goes from RED to GREEN (approximately 40 seconds after power-up).

Technical specifications

Master Link Gateway

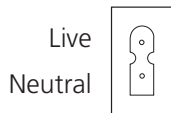
Type survey

Market	Variant	Type number
Albania, Argentina, Australia, Austria, Azerbaijan, Bahrain, Belgium, Botswana, Brazil, Bulgaria, Caribbean Islands of the Dominican Repub., Canada, Chile, Croatia, Czech Repub., Denmark, Dubai, Egypt, Estonia, Faroe Islands, Finland, France, Georgia, Germany, Ghana, Greece, Greenland, Holland, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Japan, Jordan, Kazakhstan, Korea, Kuwait, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, Malaysia, Mexico, Morocco, New Zealand, Nigeria, Norway, Oman, Pakistan, Panama, Peru, Philippines, Poland, Portugal, Qatar, Romania, Russia, Saudi Arabia, Serbia, Singapore, Slovak Rep., Slovenia, South Africa, Spain, St. Martin, Sweden, Switzerland, Taiwan, Thailand, Turkey, UK, Ukraine, Uruguay, United Arab Emirates, USA, Uzbekistan, Vietnam	All	1799
China (for information regarding RoHS directive please see next page)*	CN	1798

Power supply	100 ~ 230 V AC, 50/60 Hz
Power consumption	Typical 2.5 Watts, standby not possible
Operating conditions	-10 to +50 degrees celcius
Dimensions	35.5 x 4.5 x 15 cm (W x H x D) 48.3 x 4.5 x 15 cm (W x H x D - including bracket for rack-mount)
Weight	1.63 kg

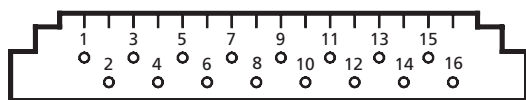
Connections

Mains inlet



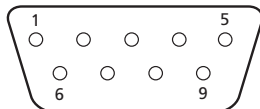
To see the different types of mains leads see exploded view in the Retail Ordering System

MASTER LINK



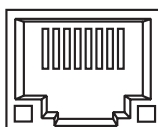
Pin 1	Data- -0.4V ±0.1V
Pin 2	Data+ +0.4V ±0.1V
Pin 3	ML sense
Pin 4-8	N.C.
Pin 9	ATI transmit (N.C.)
Pin 10	ATI receive (N.C.)
Pin 11	N.C.
Pin 12	+supply voltage +7V to +15V (in St By +3V to +15V)
Pin 13	N.C.
Pin 14	N.C.
Pin 15	N.C.
Pin 16	N.C.

RS232 port, DSUB9 male



Pin 1	DCD (Data Carrier Detect - input)
Pin 2	RXD (Received Data - input)
Pin 3	TXD (Transmitted Data - output)
Pin 4	DTR (Data Terminal Ready - output)
Pin 5	GND (signal ground)
Pin 6	DSR (Data Set Ready - input)
Pin 7	RTS (Request To Send - output)
Pin 8	CTS (Clear To Send - input)
Pin 9	RI (Ring Indicator - input)

Ethernet , RJ45 socket, 10/100 Mbit/s



Pin 1	TX_D1+
Pin 2	TX_D1-
Pin 3	RX_D2+
Pin 4	BI_D3+
Pin 5	BI_D3-
Pin 6	RX_D2-
Pin 7	BI_D4+
Pin 8	BI_D4-

Subject to change without notice

* Information regarding RoHS directive

Component name	Hazardous Substance					
	Lead Pb	Mercury Hg	Cadmium Cd	Chrome VI Cr(VI)	Polybrominated Biphenyl PBB	Polybrominated Diphenyl Ether PBDE
PCBA	X	O	O	O	O	O

Legend:

- O Indicates all homogeneous materials' hazardous substances content are below ST/T 11363-2006 MCV limit.
- X Indicates that the hazardous substance content contained in any of the homogeneous materials of the part exceeded the MCV limits specified in the standard SJ/T 11363-2006.

APO-CENTER V/HENRIKSENS ELEKTRONIK