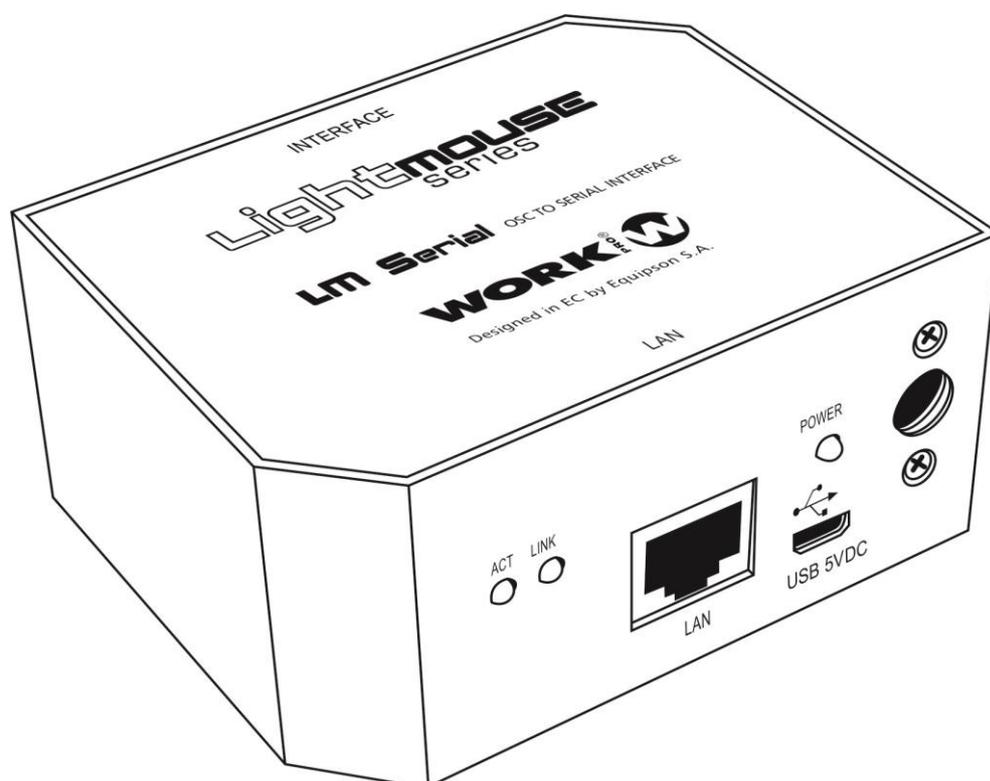


# **WORK<sup>PRO</sup> W**

## **LM Serial**



## **USER MANUAL**

Ver. 2017.1



# Contenido

- 1 Visión general
- 2 Conexiones
- 3 Conexión al software de control WorkCad
- 4 Configuración
- 5 Ejemplos de Uso
- 6 Tabla de comandos

# Overview

# 1

## LM Serial overview

LM Serial is a programmable UDP\_Serial (232\$485) interface with 4 GPIO ports and internal clock. This guide describes the LM Serial and its functionality.

It is possible to transmit control sentences, built-in in the own OSC command or external string saver that can be stores inside a memory bank.

The se memories can trigger the execution of one or several UDP/OSC commands or oen/close contacts through GPIO ports.

### **Ports:**

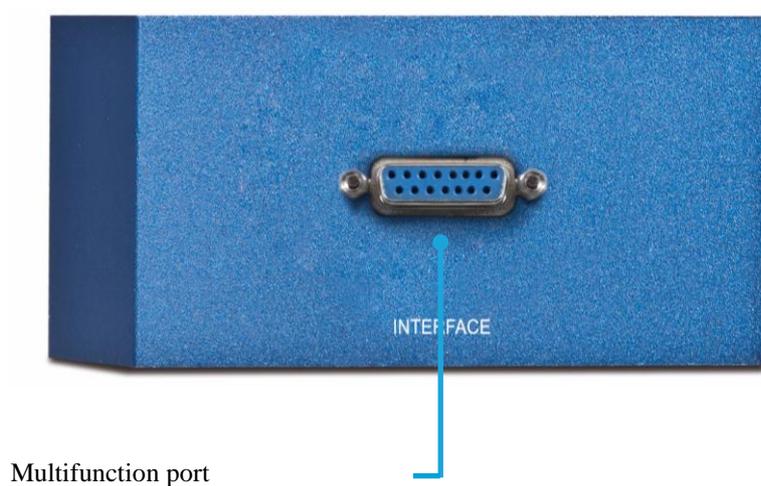
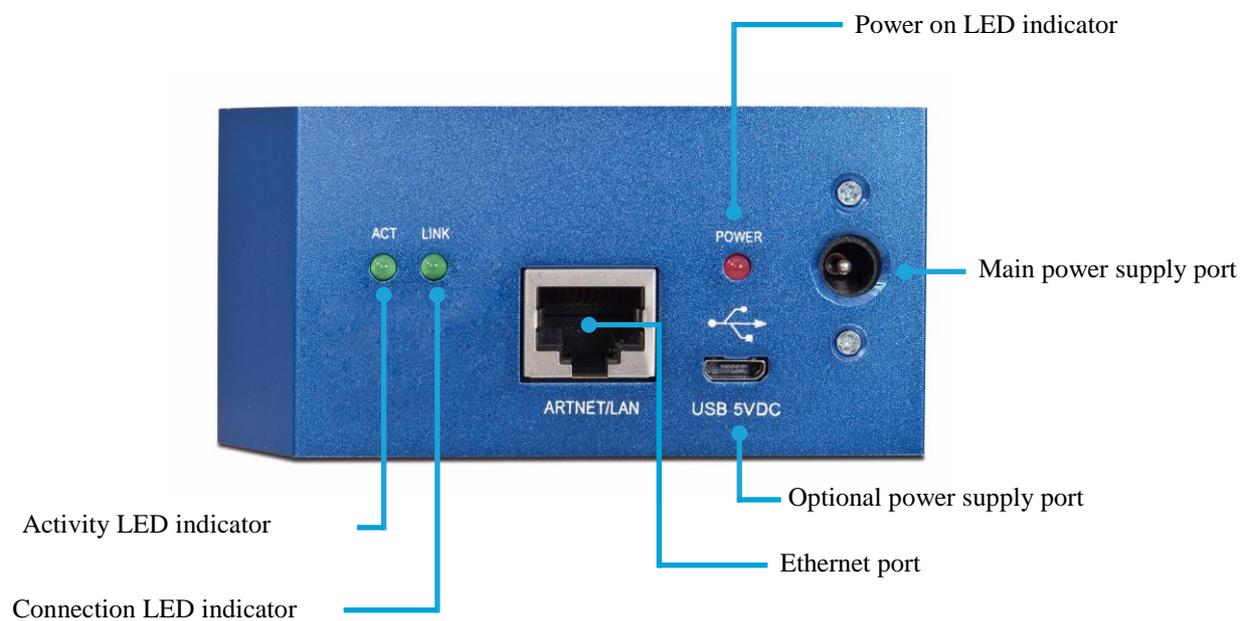
Port number 1: RS232

Port number 2: RS232 / RS485 ( configurable )

### **Contacts:**

4 GPIO contacts

# 2



# CONNECTIONS

## Device connection

**Ethernet port**, in order to connect the LM Serial to a lock network. The connection is made through RJ45.

Take into account that if you want to connect the device directly to a PC, IT IS NECESSARY a crossover cable (in case your PC is not AutoMDIX compatible).

Main power supply port, in order to connect the external power supply (+5VDC) included with the device.

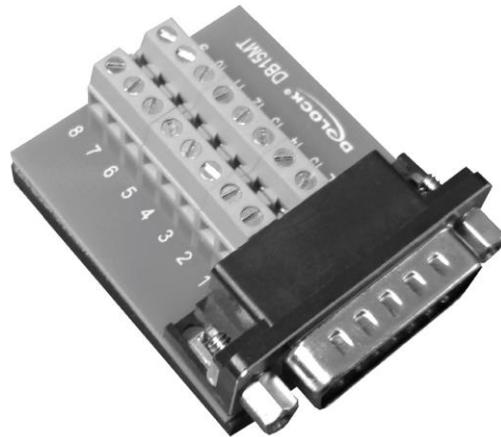
Optional power supply port, allows to supply the device through USB.

Multifunction connection port, is a port with SUB-D15 port used to connect it externally according to closed table or using the card which allows to connect in the terminal block

<b>PIN 1</b>	<b>RS232_1_TX</b>
<b>PIN 2</b>	<b>GND</b>
<b>PIN 3</b>	<b>RS232_2_RX</b>
<b>PIN 4</b>	<b>RS485_D+</b>
<b>PIN 5</b>	<b>GND</b>
<b>PIN 6</b>	<b>GPIO2</b>
<b>PIN 7</b>	<b>GPIO4</b>
<b>PIN 8</b>	<b>GND</b>
<b>PIN 9</b>	<b>RS232_1_RX</b>
<b>PIN 10</b>	<b>RS232_2_TX</b>
<b>PIN 11</b>	<b>GND</b>
<b>PIN 12</b>	<b>RS485_D-</b>
<b>PIN 13</b>	<b>GPIO1</b>
<b>PIN 14</b>	<b>GPIO3</b>
<b>PIN 15</b>	<b>GND</b>

## Adapter PCB

LM Serial includes an adapter. This adapter has a SUB-D15 male connector in order to connect to SUB-D15 female connector (labeled as "INTERFACE").



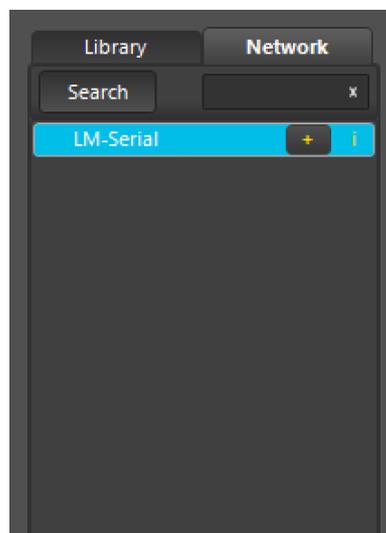
# CONEXIÓN A WORKCAD

## WORKCAD CONNECTION

All advanced control functions must be made through WorkCAD, it can be download from WorkPro website.

### LM Serial detection in WorkCAD

Start WorkCAD and select the "Network" tab to check all devices connected in the network.



Sliding the mouse over "LM GPIO" could be showed 3 different icons:

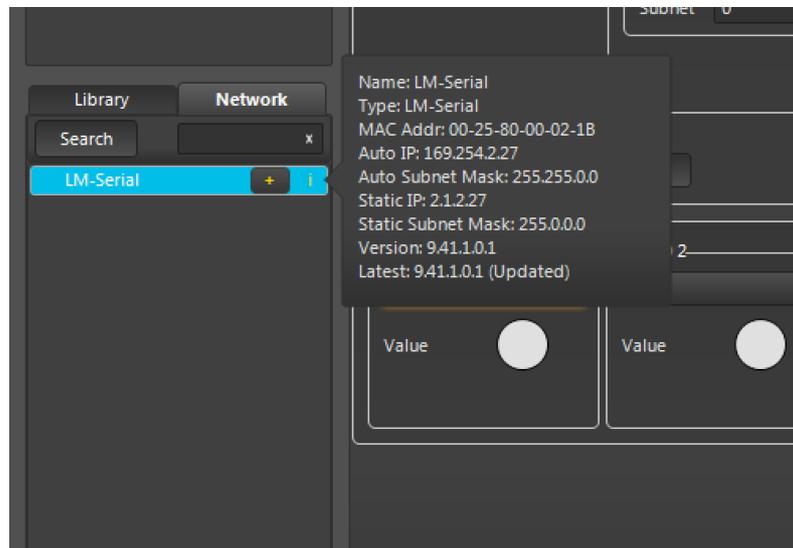
^ : It indicates that the device is not updated.

+ : Pushing on it, we add the device to the project. Take into account that if the device is not updated, we cannot add to the project.

i : Sliding the mouse over it, we can see the device information: (Static IP, Auto IP, Name, Version ...)

### Getting information about LM Serial in WorkCAD

To get information about any device, place the mouse pointer over “i” icon of each device



## Updating the LM Serial in WorkCAD

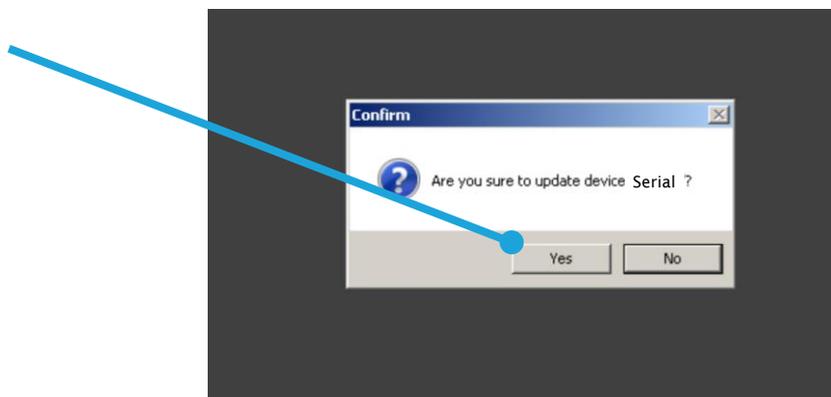
Before to install the LM devices is recommended to update all of them to a recent software version, they include bugs corrections and new functionalities. The steps for device updating are the following:

1. Start WorkCAD and press “Network” tab, there you can find all LM family devices available in the network.

2. Sliding the mouse pointer over the name of the device, you can see different icons, if it appear the ^ icon, it means we need to update the device.

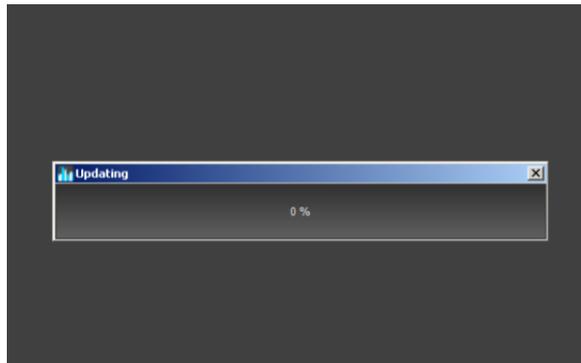


3. Click on ^ icon ( in case of it is showed ) to update the device.

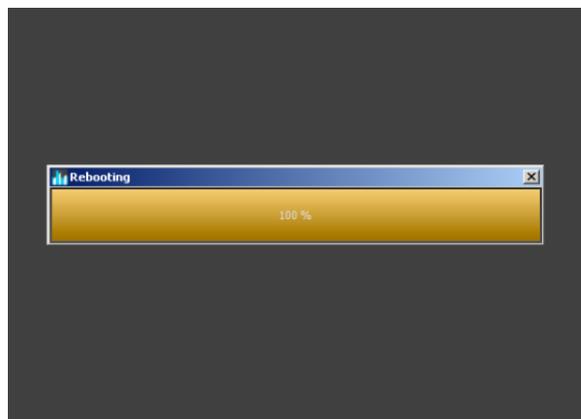


If an error mistake appears pressing “Yes”, please, check the IP range in the PC with WorkCAD, it must be the same as the LM device.

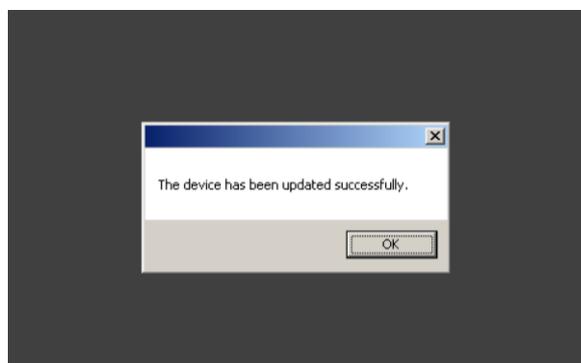
4. Click on "YES" and the updating process will start.



5. During the updating process the progress bar will stop some seconds during the auto-reset, please, keep some seconds and do not disconnect the device until the process finishes



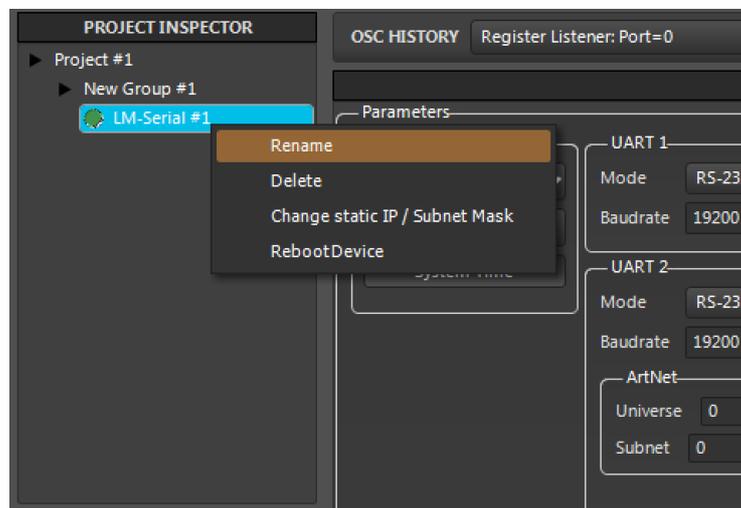
6. Once finished the updating process, WorkCAD will show a window indicating that the process must be finished successfully.



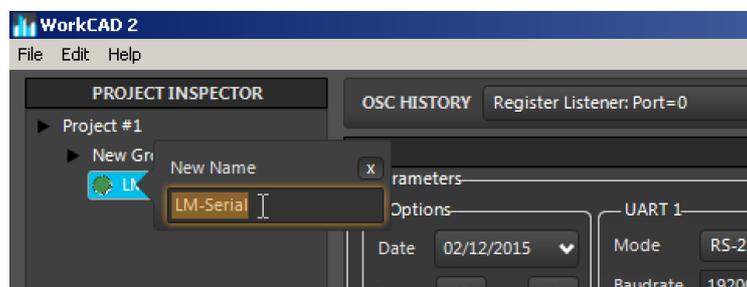
## Changing the LM Serial name in WorkCAD

1-In order to change the name of the device, it is necessary to add it to a project, therefore, press “+” icon in a device will be showed in “Network” tab. The device will be inside “Project inspector” (Upper/left side).

2-Over the device name, press “left click” and a dropdown menu will be showed, then, select “Rename” option.



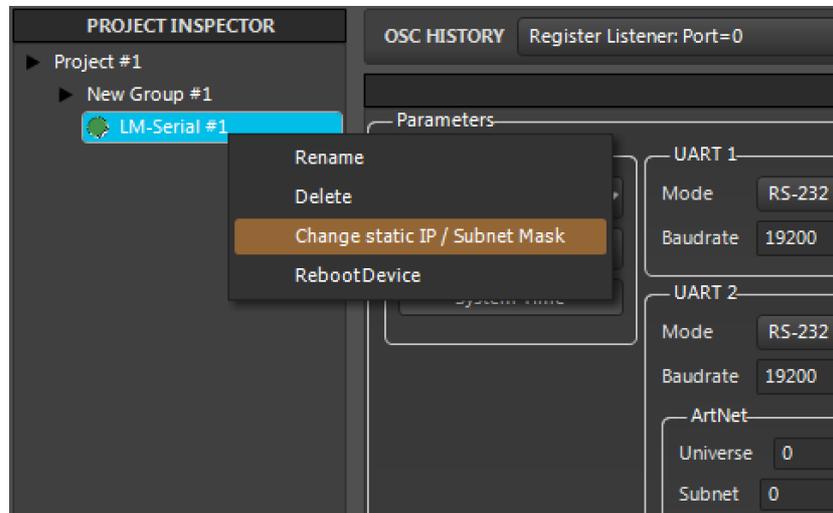
3-Assign a new name.



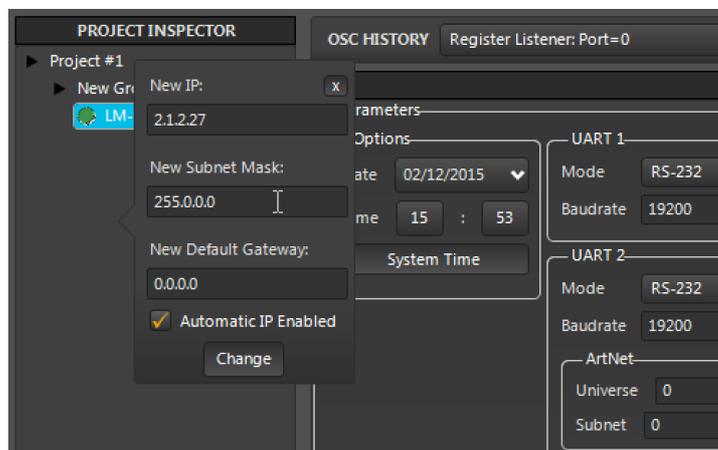
Once modified the name and IP address, it is advisable to reset the device in order to store the data correctly.

## Changing the IP address LM Serial using WorkCAD

1- Over the device name, press “left click” and a dropdown menu will be showed, then, select “Change static IP” option.



2-Assign a new IP address

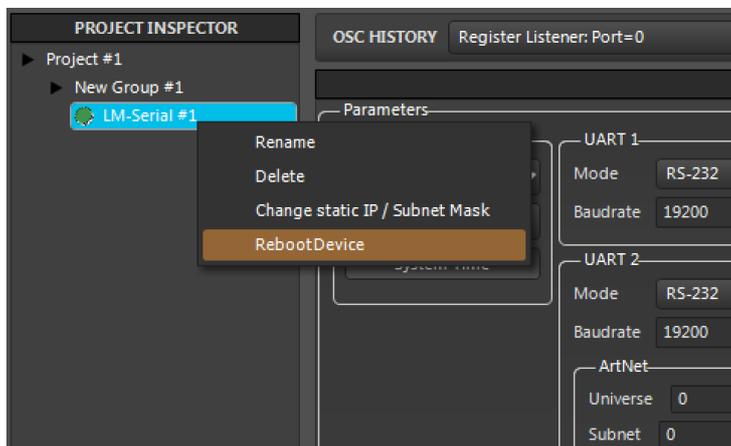


Once modified the name and IP address, it is advisable to reset the device in order to store the data correctly.

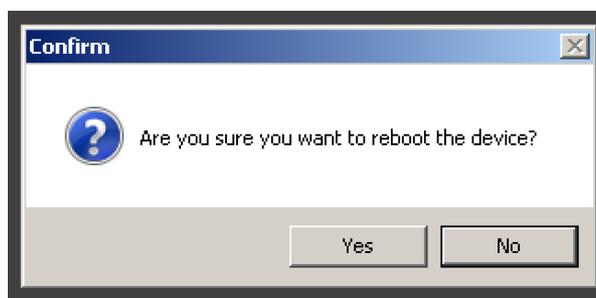
# 4

## Restart a LM Serial using WorkCAD

1- Over the device name, press “left click” and a dropdown menu will be showed, then, select “RebootDevice” option



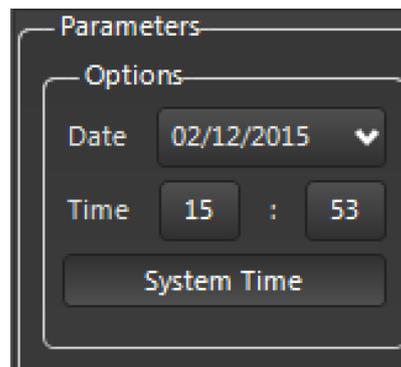
2-WorkCAD will require to us confirmation to restart the device.



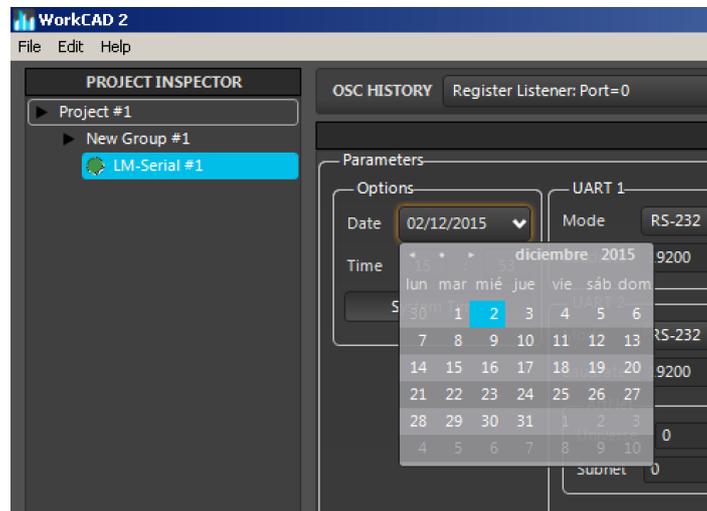
# CONFIGURATION

## CALENDAR ADJUSTMENT

LM Serial includes an internal clock with up to 7 days reservation for the trigger event.



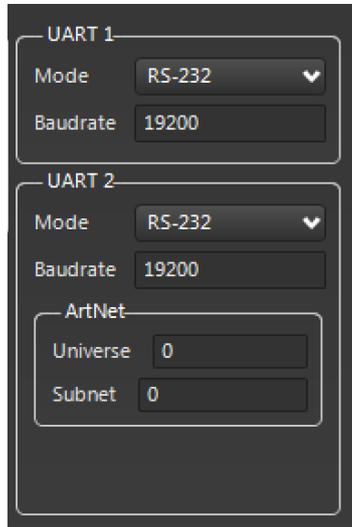
The time adjustment can be made automatically through “System Time” button, also can be made manually using the date and time adjustment unfolded menu.



**TO APPLY THE CHANGES, IT IS NECESSARY TO PRESS “SAVE”**

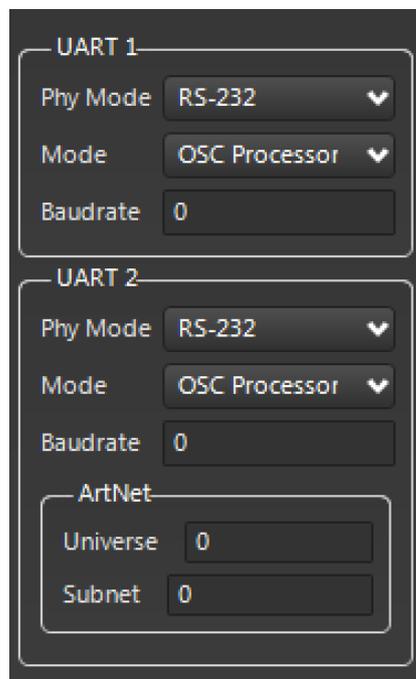
## Input/Output ports adjustment

It is possible to configure both ports independently. Take into account that the port 1 only can be configured as RS232, adjusting the baudrate for the UART1 according to installation necessities. By default, this value is 19200 baud.



The screenshot shows a configuration panel with three sections: UART 1, UART 2, and ArtNet. UART 1 has a Mode dropdown set to 'RS-232' and a Baudrate input field set to '19200'. UART 2 has a Mode dropdown set to 'RS-232' and a Baudrate input field set to '19200'. The ArtNet section contains two input fields: 'Universe' set to '0' and 'Subnet' set to '0'.

Port 2(UART 2) through dropdown menu, can be configured as RS232, RS485 and DMX (IN or OUT).



The screenshot shows a configuration panel with three sections: UART 1, UART 2, and ArtNet. UART 1 has a 'Phy Mode' dropdown set to 'RS-232', a 'Mode' dropdown set to 'OSC Processor', and a Baudrate input field set to '0'. UART 2 has a 'Phy Mode' dropdown set to 'RS-232', a 'Mode' dropdown set to 'OSC Processor', and a Baudrate input field set to '0'. The ArtNet section contains two input fields: 'Universe' set to '0' and 'Subnet' set to '0'.

**TO APPLY THE CHANGES, IT IS NECESSARY TO PRESS “SAVE”**

## Working modes

LM Serial disposes of 3 different operation modes according to the use that we want to dedicate the device:

**OSC Processor:** In this mode, LM Serial operates as emitter and receiver of OSC commands

When it sends a message, it is necessary to add the symbols “#” - “/”.

*Example: # message /*

When it receives a message, it is necessary to add the symbols “/” - “#”. *Example: / message #*

**Passthrough:** In this mode, LM Serial does not process any message, the received information is emitted exactly the same.

**Command Processor:** In this mode, LM Serial compares the commands received through series ports /They must be configured as “Command Processor”), and, in case of they are the same, it executes the commands stored in the Memory Banks

Commands

Bank Memory Bank 1

Command

IP 127.0.0.1 Port 9000

Command //serial1/out;s;"PWR OFF\$\$0Dh";

Add Replace Delete

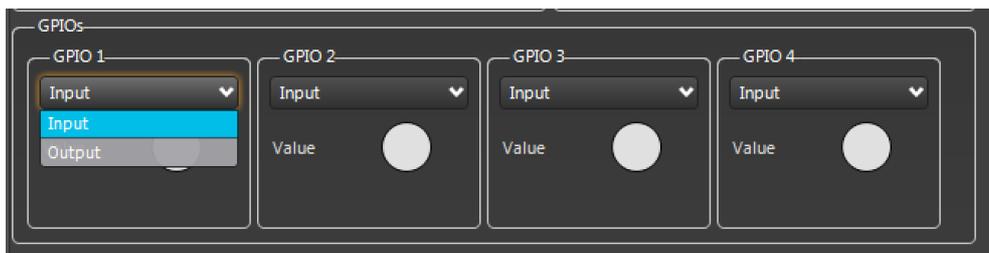
127.0.0.1:9000://serial1/out;s;"PWR OFF\$\$0Dh";

## Configuring GPIO ports

The 4 GPIO ports can be configured as much input as output.



Through dropdown menú, it is possible to select its behaviour (Input or output)



In the lower side, you can find a state indicator, if the contact is being used, it will lit in Green color. When it is configured as output, it is possible to act over the contact manually, making "click" over the indicator.



# USE EXAMPLES

## Using the device as Artnet Node

1°-Configure UART 2 as DMX OUT and store the change

2°-Connect the DMX cable from lighting devices to LM Serial, taking into account the follow:

XLR-5 CONNECTOR	LM Serial CONNECTOR
Pin 1	Pin 11
Pin 2	Pin 12
Pin 3	Pin 4
Pin 4	
Pin 5	

## Using the device as Artnet Emitter

1°. Configure the UART 2 like DMX OUT and store the changes.

2°- Connect the Ethernet cable from the control console/ PC to LM serial.

3°- Connect the DMX cable from lighting devices to LM Serial, taking into account the follow:

XLR-5 CONNECTOR	LM Serial CONNECTOR
Pin 1	Pin 11
Pin 2	Pin 12
Pin 3	Pin 4
Pin 4	
Pin 5	

## Using the device as UDP / RS 232 interface

1°- Configure the UART 1 in the adequate Baudrate according to the features of the device that you want to control and store the changes.

2°- Adjust the operating mode to “Passthrough”

3°- From the control device that sends the UDP message, type the command:  
*//serial1/out;;s;"data\_serie";*

Where:

**serial1** indicates the port from where the command is emitted (It could be serial1 or serial2)

**s** indicate that it is a string (in case of to bob, indicate it as b)

**data serie** indicate the emitted RS 232 or RS 485 command

### Example turning on a video-projector

Send UDP command: *//serial1/out;;s;"PWR ON";*

This command is converted by LM Serial from UDP to Serial port 1: PWR ON

## Using LM Serial as SERIAL / UDP interface

1°-Configure the UART 1 or 2 in the adequate Baudrate according to the control device features. Save the changes.

2°-Adjust the operating mode to “OSC Processor”

3°- Front he control device that send the serie messages, please, send the following:

```
#//udp/out,,siib;"iptarget";fport;lport;"datos_udp";\
```

Where:

*iptarget* indicates the IP device for device will receive the message.

*fport* indicates the destination port

*lport* indicates the local port from the message is sent.

*datos\_udp* indicates the command sent..

### **Example: to increase the gain on Output 1 at Digiline**

Command sent from a control device through serial port at LM\_Serial:

```
#//udp/out,,siib;"192.168.1.3";9000;9000;"//out1/gain;fFF;10.00;";\
```

Command converted by the LM\_Serial and sent through UDP to Digiline:

```
//out1/gain;fFF;10.00;
```

### **Exemple: to Increase the gain on Output 1 for all Digiline in the network.**

```
#//udp/out,,siib;"255.255.255.255";9000;9000;"//out1/gain;fFF;10.00;";\
```

### **Execute commands stored in the LM Serial memory though serial port:**

1°-Configure the UART 1 in the operating mode “OSC Processor” and the adequate Baudrate. Save the changes.

3°-In the "Commands" tab, select "Memory Bank 1"

4°-Write the command, ip destination and the port.

5°-Make click on “Add” and save the changes.

7°- From the control device, send the command:

```
##/memory1/exec;;\
```

(Parity None)

(Data size 8 )

When the command is received, LM Serial will execute memory 1

### **Execute commands stored in the LM Serial memory when a specific command is received**

1°- Configure the UART 1 in the operating mode ““Commands Processor” and the adequate Baudrate. Save the changes.

2°-In the "Commands" tab, select "Memory Bank 1” and in lower line “Command” write the command that you want to receive.

3°- Write the command to send, ip destination and the port.

4°- Make click on “Add” and save the changes.

5°-From the main control device through serial, send the command that we expect to receive ( previously defined in step 2° )

(Parity None)

(Data size 8 )

When the command is received, LM Serial will execute memory 1

## Adjust the levels of 3 or more DMX channels when a command through serial port is received.

1°- Configure the UART 1 in the operating mode "OSC Processor" and the adequate Baudrate. Save the changes.

2°-Configure the UART 2 like DMX OUT

3°-In "Commands" tab, select "Memory Bank 1"

4°-Write the command:

```
///dmx1/ch/1;;i;128;\
```

To adjust the channel 1 to a value 128

IP must be 127.0.0.1 and the port 9000

5°-Click on "Add" and save the changes.

6°-Repeat the steps 4° and 5° introducing the following commands:

```
///dmx1/ch/2;;i;255;\
```

```
///dmx1/ch/3;;i;192;\
```

7°-From the main control device, send the command:

```
///memory1/exec;;;\
```

(Parity None)

(Data size 8 )

When the command is received, LM Serial will execute memory 1

## Ejecución de comandos almacenados en la memoria del LM Serial al abrir o cerrar un contacto GPIO

1°- Configure the UART 1 in the operating mode "Passthrough" and the adequate Baudrate. Save the changes.

2°- In the downside of GPIOs zone, adjust the GPIO 1 as input. When the contact will be closed, the memory will be executed.

3°- In the "Command" tab. Select "GPIO1"

4°- Write the command to send, ip destination and the port.

5°- Make click on "Add" and save the changes.

5°- Close the GPIO 1 ( pines 13 & 15 ) and the command will be executed

## Use the device as SERIAL / OSC interface

1°- Configure the UART 1 in the operating mode "OSC Processor" and the adequate Baudrate. Save the changes.

3°- From the control device through serial, we send the following command:

```
#//udp/out,,siib;"iptarget";fport;lport;"datos_udp";\
```

Where:

*iptarget* indicates the IP device for device will receive the message.

*fport* indicates the destination port

*lport* indicates the local port from the message is sent.

*datos\_udp* indicates the command sent..

## Use the device as OSC / SERIAL interface

1°- Configure the UART 1 in the operating mode “OSC Processor” and the adequate Baudrate. Save the changes.

2°-From the OSC control device, send the following command to the LM Serial IP and port 9000:

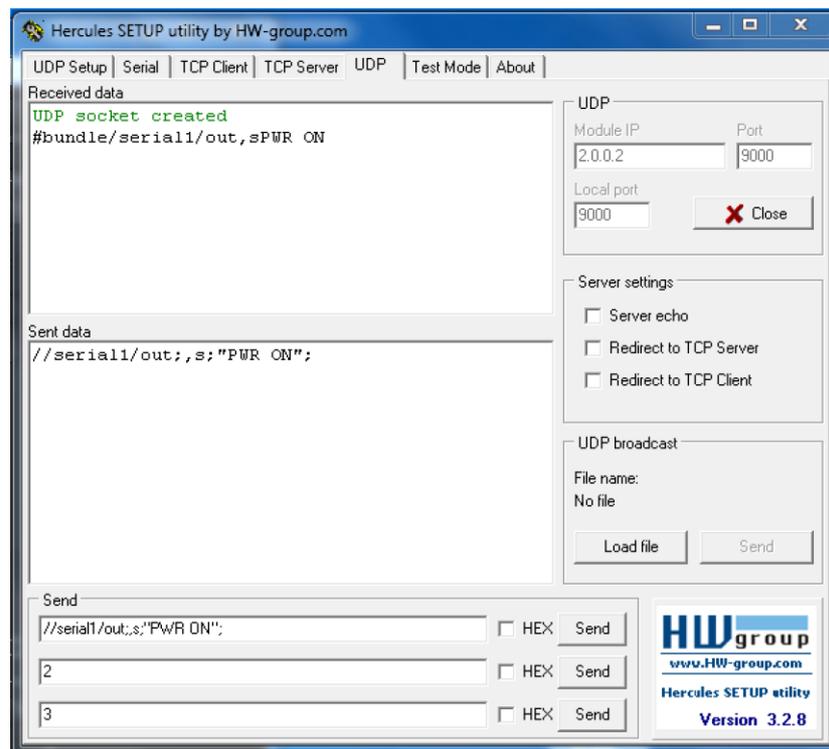
```
#//serial1/out;,s;"datos_serie";\
```

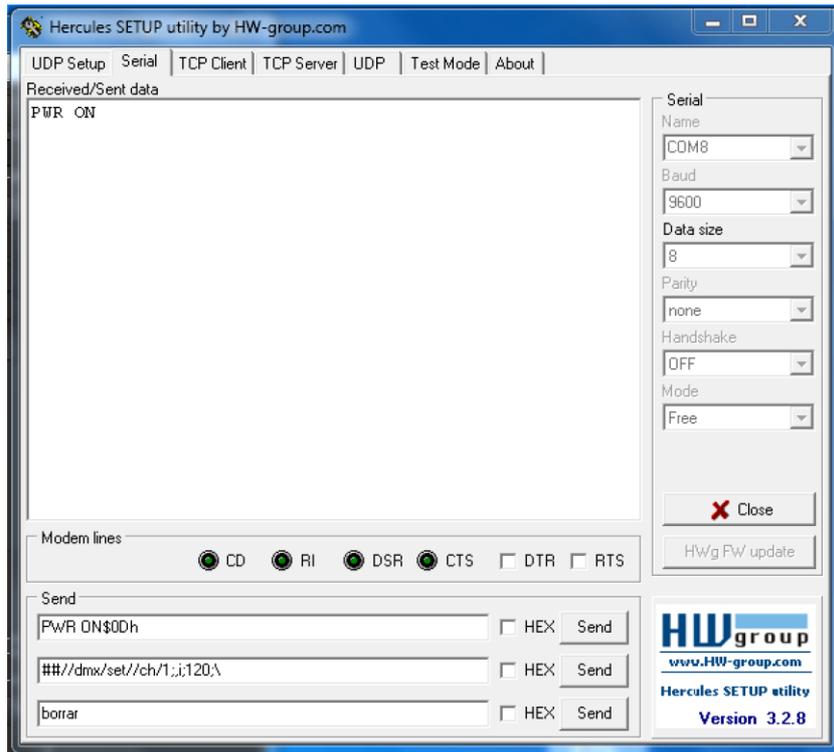
Where:

*datos\_serie* indicates the command that we want to send

## Use the device as Serial interface from Windows

Using software as Hercules, it is possible to use the LM\_Serial as UDP-Serial interface.





## COMMAND CHART

Execute a memory	<code>//memory3/exec;;</code>
Activate or deactivate a GPIO	<code>//gpio1/value;;i;1;</code>
To send data through ethernet	<code>//udp/out;;siib;"iptarget";fport;lport;"datos_udp";</code>
Time	<code>//config/date;;</code>
Output through serial	<code>//serial1/out;;s;"datos_serie";</code>
Adjust the master level by DMX	<code>//dmx1/ch/-1;;i;100;</code>

## NOTES

-To send hexadecimal messages, it is necessary to add \$\$ before each byte

-To type("), add \$\$ before “

-If you want to add dollar symbol (\$), add \$\$\$\$ before \$ symbol.

-The main difference between send strings (s) and blobs (b) is that the blob allows to send bytes with a value of \$00. In the other case, with the string this byte represents the final of the string (therefore, it cannot be sent).



EQUIPSON S.A | Avda El Saler,14 - Pol.Ind. L'Alteró, 46460 - Silla ( Valencia ) Spain  
Tel: +34 961 216 301 | Fax: +34 961 200 242 |  
[www.work.es](http://www.work.es) | [support@work.es](mailto:support@work.es)