

### 1 Introduction

The RS422/RS485 HAT for the Raspberry Pi can be used for lighting controls via DMX512 bus. In DMX512 bus systems RS-485 is used as the physical layer.

Our RS422 / RS485 Serial HAT is a fully galvanic isolated serial communication HAT designed for use with the Raspberry Pi and the perfect choice for such kind of applications.

In this application note we show how to configure the HAT for DMX and what steps are necessary for the software installation under Raspberry Pi OS Bookworm.

### 2 Bill of Material

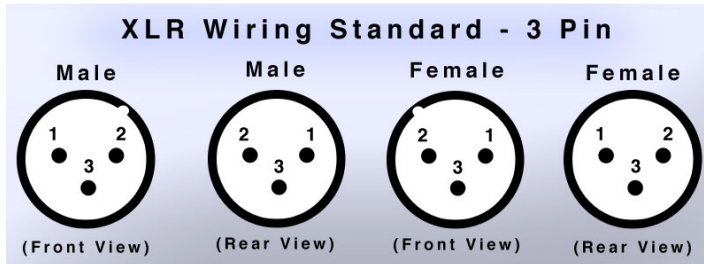
- Raspberry Pi 3, 4, or 5
- [RS422/RS485 serial HAT](#) (available in our webstore)
- 5pole XLR connectors (male & female) for professional use
- 3pole XLR connectors (male & female) for semi professional use
- hook-up wires

# RS422/RS485 HAT

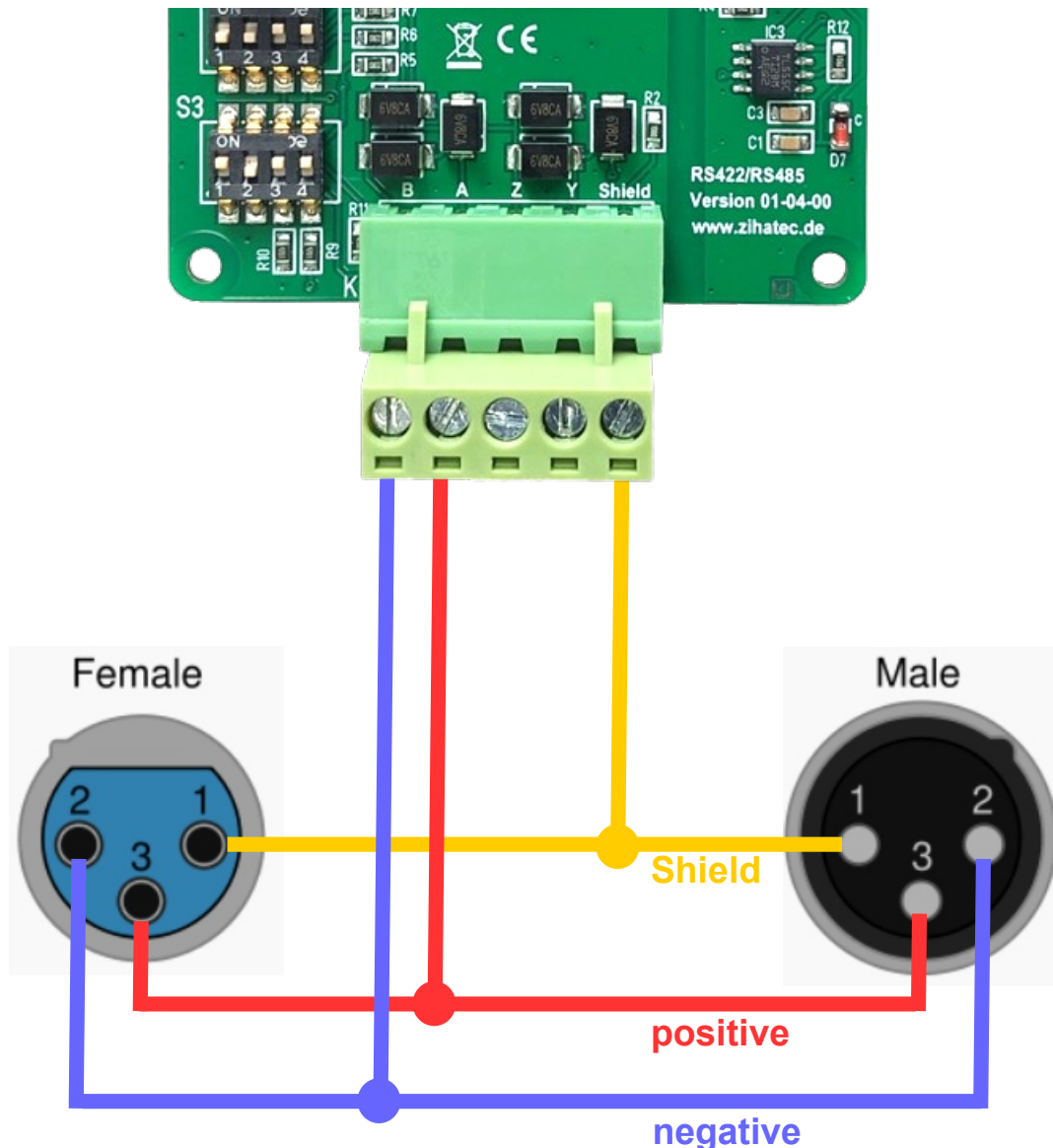


## Application Note: How to use DMX512/RDM

### 3 Wiring of RS422/RS485 HAT and 3pole XLR



- Pin 1: Shield / Ground
- Pin 2: Negative
- Pin 3: Positive

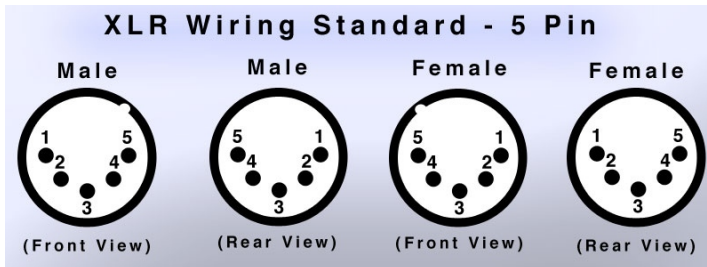


# RS422/RS485 HAT

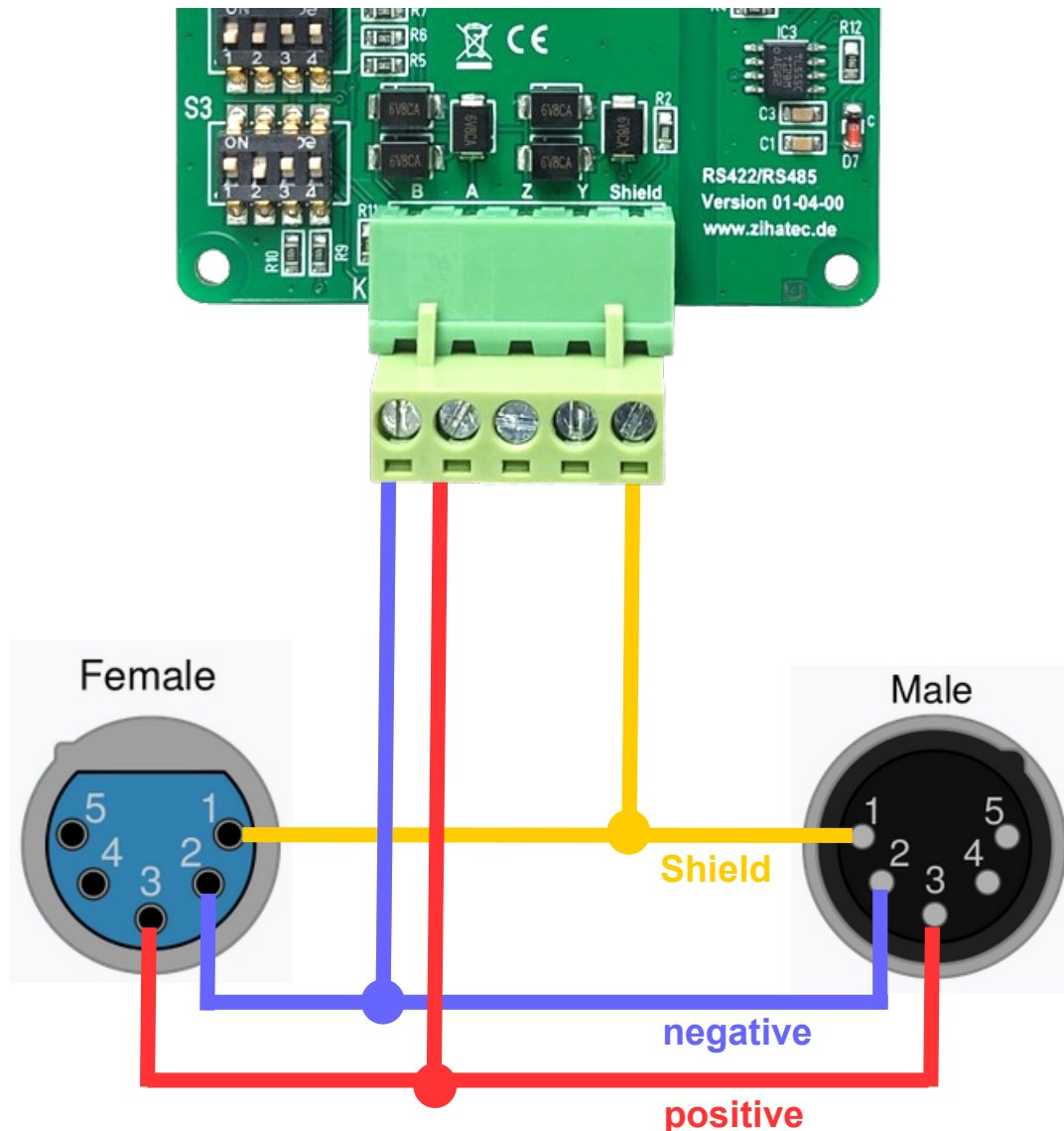


## Application Note: How to use DMX512/RDM

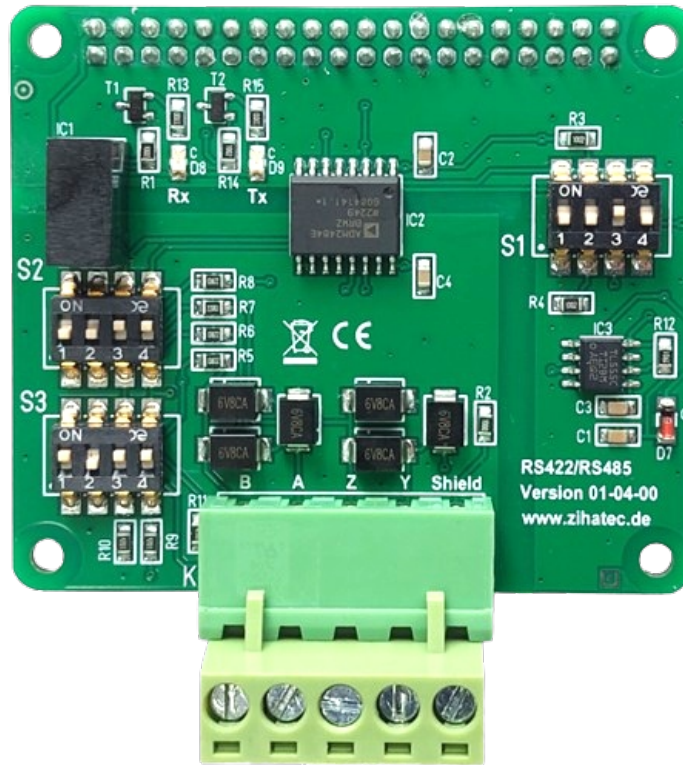
### 4 Wiring of RS422/RS485 HAT and 5pole XLR



- Pin 1: Shield (Common)
- Pin 2: DMX 1 Negative
- Pin 3: DMX 1 Positive
- Pin 4: DMX 2 Negative
- Pin 5: DMX 2 Positive



### 5 DIP Switch Settings



| SW1 |     |
|-----|-----|
| 1   | OFF |
| 2   | OFF |
| 3   | ON  |
| 4   | OFF |

| SW2 |     |
|-----|-----|
| 1   | OFF |
| 2   | OFF |
| 3   | ON  |
| 4   | ON  |

| SW3 |      |
|-----|------|
| 1   | ON * |
| 2   | OFF  |
| 3   | ON   |
| 4   | ON   |

\* Depending of the position of the RS422/RS485 HAT in the DMX512 bus line you have to switch the terminating resistor ON or OFF. Please switch the resistor to ON position only if the HAT is on one end of the bus line. In all other cases switch the terminating resistor OFF:

### 6 Configuration of Raspbian operating system

The easiest way is to use the raspi-config tool to enable the UART to the GPIO14/15 pins.

take a fresh Raspberry Pi OS „Bookworm“ image

```
sudo raspi-config
```

goto '3 Interface Options'

goto 'I5 Serial Port'

'Would you like a login shell to be accessible over serial?' --> NO

'Would you like the serial port hardware to be enabled?' --> YES

Finish raspi-config

reboot the Raspberry Pi

```
sudo nano /boot/firmware/config.txt
```

Add the following lines to the end of this file:

```
dtoverlay=disable-bt  
init_uart_clock=16000000
```

The value for `init_uart_clock` may need to be increased for fast systems such as the Pi5.

Now, we activate all other services that may use the UART:

```
sudo systemctl disable serial-getty@ttyAMA0.service  
sudo systemctl disable hciuart
```

## 7 Installation of OLA

```
sudo apt-get install ola
```

Now we can activate and configure the UART-DMX plugin for OLA:

```
sudo nano /etc/ola/ola-uartdmx.conf
```

Please copy the following lines into the file. Delete old contents!

```
/dev/ttyAMA0-break = 100  
/dev/ttyAMA0-malf = 24000  
device = /dev/ttyAMA0  
enabled = true
```

Finally, the users olad and pi must be assigned the necessary rights.

```
sudo adduser olad tty  
sudo adduser pi olad
```

Reboot the Pi!



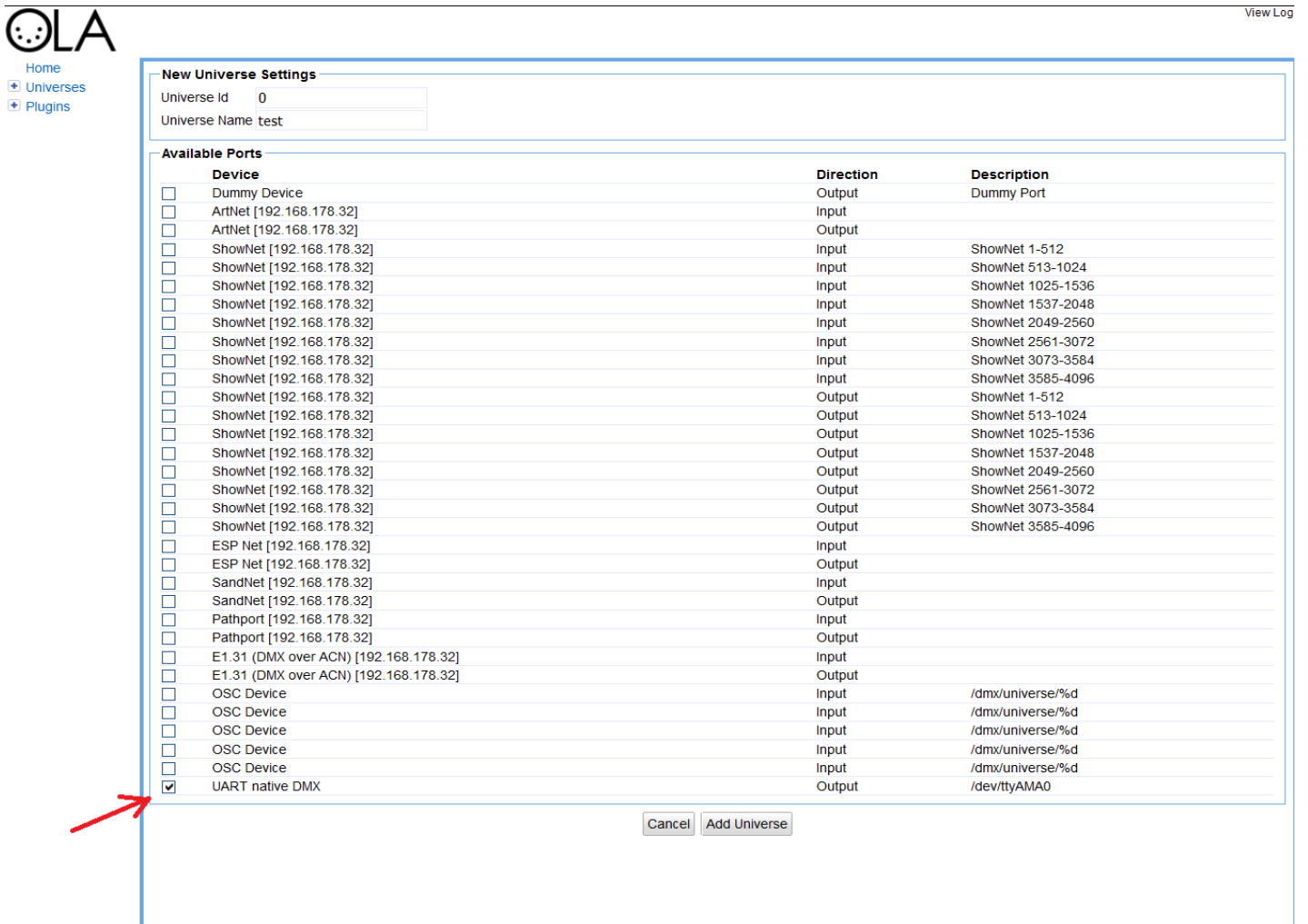
### 7 Use of OLA

OLA is now running as a DMX server on the Raspberry Pi. You can access the OLA web interface via the browser of another computer in your network.

To do this, enter the following IP address in the browser:

YourIP:9090/ola.htm

First we have to create a so-called Universe under OLA. To do this, click on the "Add Universe" button.



OLA View Log

Home  
Universes  
Plugins

#### New Universe Settings

Universe Id: 0  
Universe Name: test

| Available Ports                     | Device                                | Direction | Description       |
|-------------------------------------|---------------------------------------|-----------|-------------------|
| <input type="checkbox"/>            | Dummy Device                          | Output    | Dummy Port        |
| <input type="checkbox"/>            | ArtNet [192.168.178.32]               | Input     |                   |
| <input type="checkbox"/>            | ArtNet [192.168.178.32]               | Output    |                   |
| <input type="checkbox"/>            | ShowNet [192.168.178.32]              | Input     | ShowNet 1-512     |
| <input type="checkbox"/>            | ShowNet [192.168.178.32]              | Input     | ShowNet 513-1024  |
| <input type="checkbox"/>            | ShowNet [192.168.178.32]              | Input     | ShowNet 1025-1536 |
| <input type="checkbox"/>            | ShowNet [192.168.178.32]              | Input     | ShowNet 1537-2048 |
| <input type="checkbox"/>            | ShowNet [192.168.178.32]              | Input     | ShowNet 2049-2560 |
| <input type="checkbox"/>            | ShowNet [192.168.178.32]              | Input     | ShowNet 2561-3072 |
| <input type="checkbox"/>            | ShowNet [192.168.178.32]              | Input     | ShowNet 3073-3584 |
| <input type="checkbox"/>            | ShowNet [192.168.178.32]              | Input     | ShowNet 3585-4096 |
| <input type="checkbox"/>            | ShowNet [192.168.178.32]              | Output    | ShowNet 1-512     |
| <input type="checkbox"/>            | ShowNet [192.168.178.32]              | Output    | ShowNet 513-1024  |
| <input type="checkbox"/>            | ShowNet [192.168.178.32]              | Output    | ShowNet 1025-1536 |
| <input type="checkbox"/>            | ShowNet [192.168.178.32]              | Output    | ShowNet 1537-2048 |
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| <input type="checkbox"/>            | ShowNet [192.168.178.32]              | Output    | ShowNet 3585-4096 |
| <input type="checkbox"/>            | ESP Net [192.168.178.32]              | Input     |                   |
| <input type="checkbox"/>            | ESP Net [192.168.178.32]              | Output    |                   |
| <input type="checkbox"/>            | SandNet [192.168.178.32]              | Input     |                   |
| <input type="checkbox"/>            | SandNet [192.168.178.32]              | Output    |                   |
| <input type="checkbox"/>            | Pathport [192.168.178.32]             | Input     |                   |
| <input type="checkbox"/>            | Pathport [192.168.178.32]             | Output    |                   |
| <input type="checkbox"/>            | E1.31 (DMX over ACN) [192.168.178.32] | Input     |                   |
| <input type="checkbox"/>            | E1.31 (DMX over ACN) [192.168.178.32] | Output    |                   |
| <input type="checkbox"/>            | OSC Device                            | Input     | /dmx/universe/%d  |
| <input type="checkbox"/>            | OSC Device                            | Input     | /dmx/universe/%d  |
| <input type="checkbox"/>            | OSC Device                            | Input     | /dmx/universe/%d  |
| <input type="checkbox"/>            | OSC Device                            | Input     | /dmx/universe/%d  |
| <input type="checkbox"/>            | OSC Device                            | Input     | /dmx/universe/%d  |
| <input checked="" type="checkbox"/> | UART native DMX                       | Output    | /dev/ttyAMA0      |

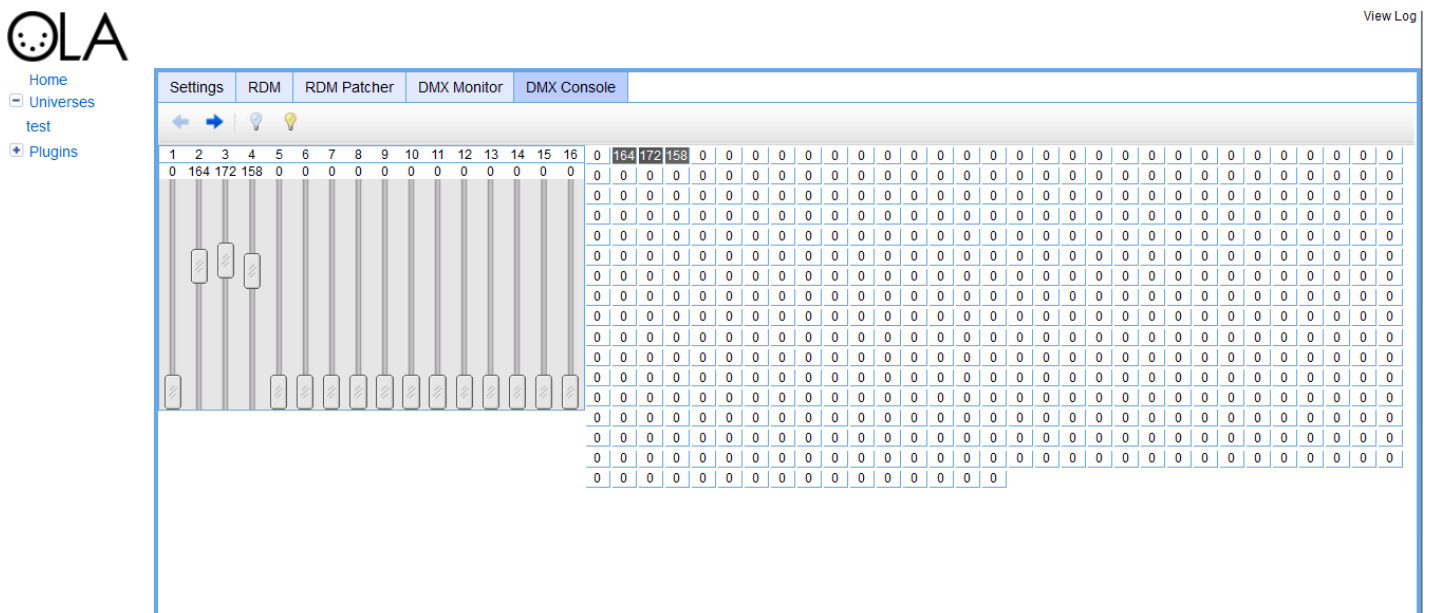
# RS422/RS485 HAT



## Application Note: How to use DMX512/RDM

You can now enter a Universe id e.g. 0 and a name for the Universe e.g. "Test". Then activate the "UART native DMX" port at the bottom.

You can access the new Universe via Universes --> Test:



Click on the "DMX Console" tab. You can now use the sliders to control your DMX device.