Photometric Solutions International℗
THE NEW GENERATION IN PHOTOMETRIC TECHNOLOGY

TLCS-300
Tuneable LED Colour Source

Operation and Control Software Manual

NIMT

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1. TABLE OF FIGURES

2. INTRODUCTION

The TLCS-300 is a tuneable LED colour source and also a variable luminance standard. The parts of the TLCS-300 are shown in the following sections.

2.1   OVERVIEW

An overview of the system is shown in Figure 1 below:
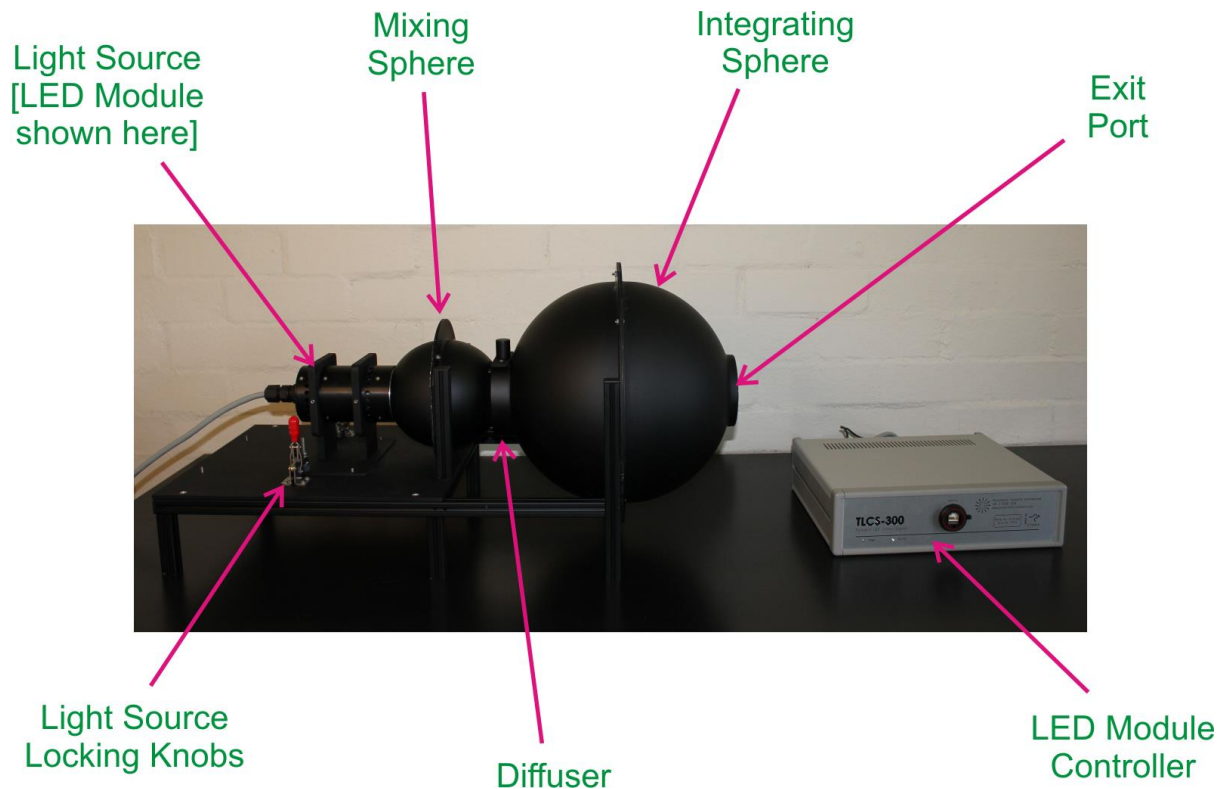
Figure 1: Overview of the TLCS-300 system

2.2   LIGHT SOURCE

There are two light sources supplied with the TLCS-300: an LED module and a QH source.

2.2.1   LED Module

The LED module is cylindrically shaped as shown in Figure 2 below.

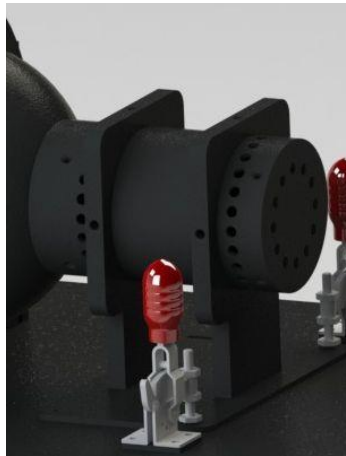

Figure 2: LED module

The LED chip is mounted on an aluminium substrate for efficient heat sinking. A cooling fan at the back comes on and regulates the temperature to a fixed reference point as the module self-heats. Ventilation holes for the fan cooling are placed around the side and on the back. The LED module is fixed to a mounting plate that locates into the entry port of the mixing sphere, and the locking knobs also shown in Figure 2 hold it firmly in place – this is described in Section 2.3.

2.2.2   QH Source

The QH source is housed in a rectangular enclosure as shown in Figure 3 below.

Figure 3: QH source

The QH lamp is located in a lamp holder on a platform on a rail. A winding handle at the back of the unit allows the lamp to be moved back and forth, thus adjusting the flux passing into the mixing sphere and therefore the luminance observed through the exit port of the integrating sphere.

2.3   LOCATING AND LOCKING THE LIGHT SOURCES

At the back of the mixing sphere are four locating pins. The LED module bracket has two slots and the QH source enclosure assembly has four slots. Locate the slots over the locating pins and slide the source forward. You may need to lift it slightly to mate the light-emitting part of the source with the entrance port of the mixing sphere. When it is in place, lever the two locking knobs forward to lock the source into place. This is shown in Figure 4 below.
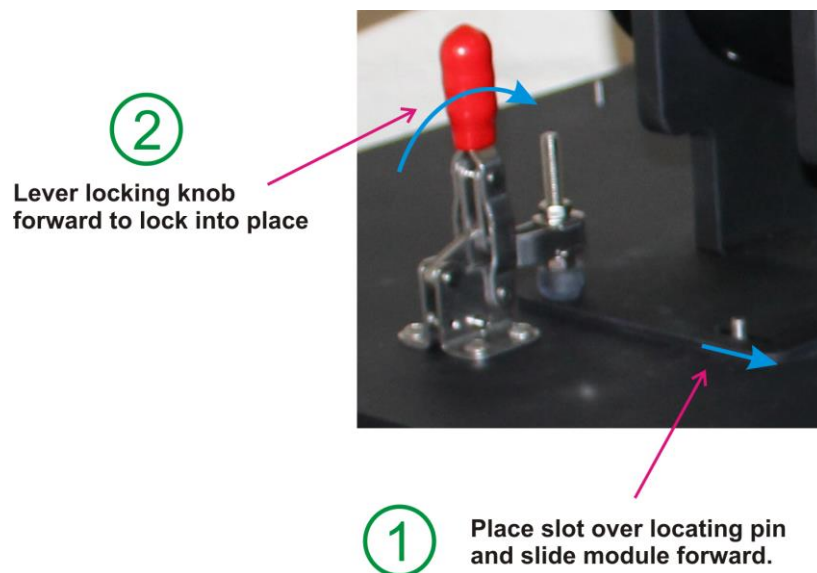
Figure 4: Locating and locking the light sources

2.4   MIXING SPHERE

The mixing sphere collects the light from the light source and ensures that it is well mixed before passing into the integrating sphere. This is particularly important for ensuring spectral homogeneity of the LED light in the integrating sphere.
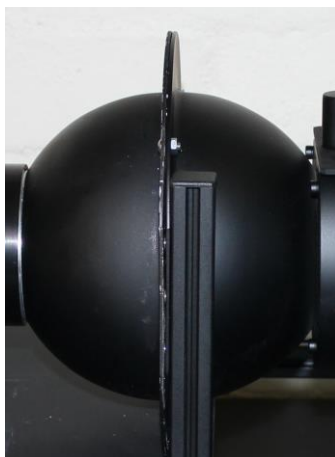
Figure 5: Mixing sphere

2.5   DIFFUSER

The diffuser assists the mixing sphere in ensuring the spectral homogeneity of the light passing through into the integrating sphere. It is situated between the mixing sphere and the integrating sphere.

Figure 6: DIffuser

The diffuser can be removed by lifting it vertically out of its slot and replacing it with an empty holder. This improves throughput but at the risk of reducing uniformity and homogeneity.

2.6   INTEGRATING SPHERE

The integrating sphere finally collects the light and inter-reflects it onto the front surface of an internal baffle. It is this baffle that is viewed from externally.

Figure 7: Integrating Sphere

2.7   EXIT PORT

The exit port on the front of the integrating sphere is the viewing port through which the front surface of the internal baffle is viewed in order to calibrate imaging colorimeters and luminance meters.

Figure 8: Exit port

On the front flange of the exit port are a series of tapped holes. These can be used to attach devices such as precision apertures and filters.

2.8   LED MODULE CONTROLLER

The LED module controller supplies power to the LED module. On its front panel it has an RJ-45 port for Ethernet communication with software in a PC. On its back panel it has a power input connector and a connector for an output cable that goes to the LED module.

Figure 9: LED module controller

More information on the operation of the control software for the LED module controller is given in Section 4.

3. INSTALLING THE LED MODULE CONTROLLER

The LED module controller uses an Ethernet port to communicate with software on the PC. It is straightforward to install in a few steps.

3.1   INSTALL GALILTOOLS

To start with, install the Galiltools software, either the 32-bit version or the 64-bit version depending on your operating system. Follow the prompts and install using all of the default settings.

3.2   INSTALL ETHERNET CABLE

Second, connect the Ethernet cable between the PC and the LED module controller. It will work fine though a hub if needed. Most modern PCs also will cope with either a patch cable or a crossover cable, but if you are using an older PC then you may need to use either:
- A crossover cable, if you are connecting directly from the PC to the controller without a hub; or
- A patch cable, if you are connecting via a hub.

3.3   SET THE IP NUMBER

The PC needs to have a dedicated IP number on the NIC that is connected to the LED module controller.   The LED module controller has a default IP number 192.168.10.86, so the PC will need to have an IP number 192.168.10.XXX, where XXX is a number between 0 and 255 other than 86 or the same number as any other device on the network.

A typical value is 192.168.10.72.

3.4   INSTALL THE SOFTWARE

You can install the control software TLCSControl by copying it directly to the PC. Normally it is installed in the C:\Program Files\PSI\TLCSControl folder.

3.5   DISABLE FIREWALL

We recommend disabling the Windows firewall, or at least making a special permission for the software when it is run. Most communication issues are caused by interference from the firewall.

4. TLCSCONTROL SOFTWARE

The main software that controls the LED module is called TLCSControl. It is installed as per Section 3.

4.1   FIRST RUN

Because the TLCSControl software uses the Ethernet port, the Windows firewall will normally try to block its operation. So when the TLCSControl software is first run, Windows may pop up a window asking if you would like to block or unblock the Ethernet communications for TLCSControl.   If so, choose to **unblock** the communications.

4.2   MAIN WINDOW

The TLCSControl main window is shown in Figure 10 below.
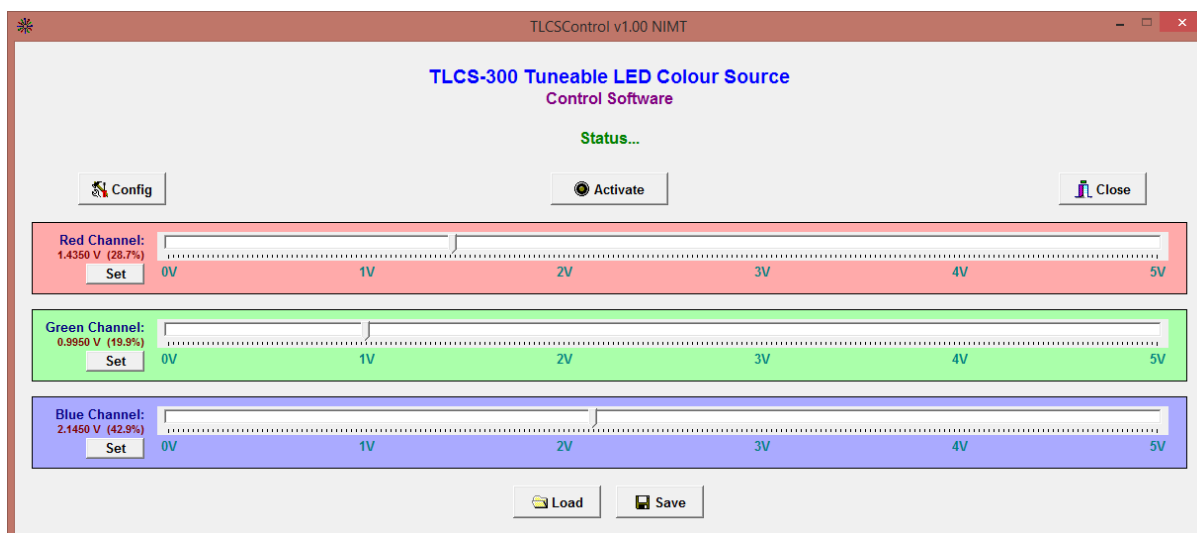

Figure 10: TLCSControl main window

Features of the window can be described as follows:

- Below the title lines is a **Status** line. This describes what the system status, eg: Initialising, Standby, Active, Closing...

- The **Config** button opens a configuration window, as shown in Section 4.3.

- The **Activate** button will activate or deactivate the LED module, i.e. switch the LEDs on or off.

- The **Close** button will exit the software, as described in Section 4.5.

- The **Red Channel** is used to adjust the output level of the red LEDs, between 0 and 5 V. You can adjust the level using the slider or using the Set button as described in Section 4.4.

- The **Green Channel** and **Blue Channel** is same as for the Red Channel, but for the other colours.

- The **Save** button can be used to save the output levels of the three channels to a file so that it can be retrieved later. This basically just saves the voltages for each of the channels.

- The **Load** button can be used to retrieve a saved programme of output levels.

4.3   CONFIG
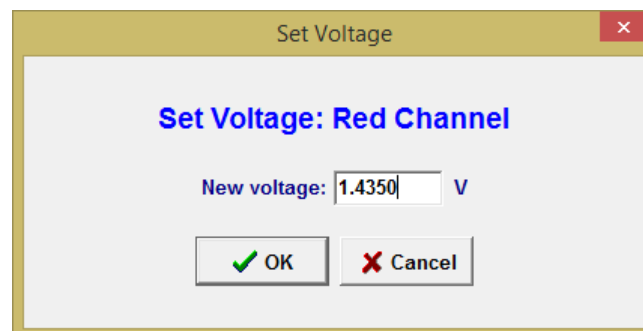
The Config window is shown in Figure 11 below.
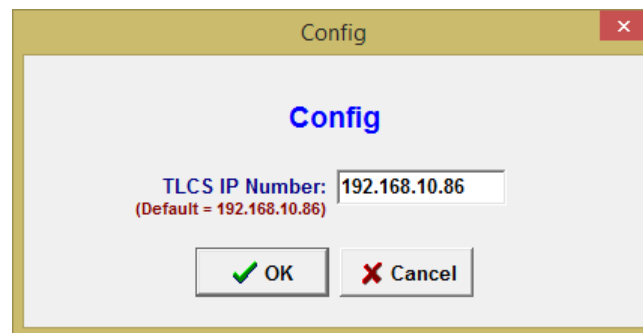
Figure 11: Config window

Enter in the IP number of the LED control module and click OK to save.

4.4   SET VOLTAGE

In addition to using the sliders to adjust the output voltage of the three channels, you can directly enter in programmed voltages as shown in Figure 12 below.
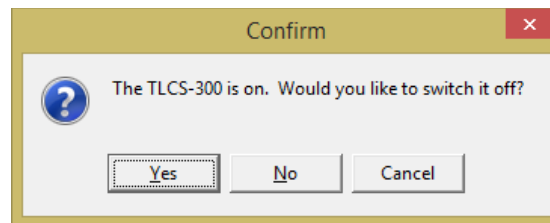

Figure 12: Set Voltage window

Type in the required voltage, between 0 and 5 V and click OK.

4.5   EXIT

When you exit the software, if the LED module is still active you will be shown a window asking if you would like to deactivate the module, as shown in Figure 13 below.

Figure 13: Deactivate on exit

There are three possibilities:

- If you click **Yes**, the software will deactivate the LED module and close.
- If you click **No**, the LED module will remain on and the software will close.
- If you click **Cancel**, no action will happen and you will return to the software without closing or deactivating.