

LEDTrans

UNIFORM LIGHTING BOX



User Manual



Thousand Lights Lighting (Changzhou) Limited
Add: Room 3-410, 18thHuashan Road, Xinbei District,
Changzhou, Jiangsu, China, 213022
Tel: +86 (0519) 85289860
Fax: +86 (0519) 85289870
Email: service@thouslite.com
Web: www.thouslite.com

CONTENTS

1. INTRODUCTION	2
1.1 LEDTrans Features	2
2. OVERVIEW AND INSTALLATION	4
2.1 Unpacking	5
2.2 Specifications	6
2.3 Install the diffuser	7
3 PREPARATION WORK FOR LEDNAVIGATOR-LT	8
3.1 Measure Device and Driver Installation.....	8
3.2 LEDTrans Driver Installation.....	8
3.3 Software Environment Installation	9
3.4 Recommended Setup.....	10
4. LEDNAVIGATOR-LT	11
4.1 Menu	11
4.1.1 Menu/Options.....	11
4.1.2 Menu/Calculate	12
4.1.3 Menu/Tool.....	13
4.1.4 Menu/About	13
4.2 Graphics	14
4.3 Single-channel Control.....	15
4.4 Measurement.....	17
4.5 LED Database	18
4.6 Match	18
4.7 Lighting.....	24
4.8 Dynamic Lighting (HW).....	25
4.9 Loop Design (SW)	26
5. MATCH EXAMPLE.....	29
5.1 Auto anchored based match example	29
5.2 Manually intensity adjustment based match example	32
5.3 SPD file based match example.....	34
6. SOFTWARE UPGRADE.....	36

1. INTRODUCTION

THOUSLITE LEDTrans is an innovative transparent uniform lighting box based on the multi-channel LED technology, and it is a specially developed for test chart illumination and camera calibration. By using a set of carefully selected high power LED and our proprietary LEDNavigator-LT software, it can achieves the match to any desired SPD (Spectral Power Distribution) of light source just in one device, especially for standard daylight illuminant with highest light quality on the market. High power LEDs can easily achieve up to 18000lux of simulated source on the illumination surface. Excellent optical design guarantees >96% high uniform of illumination surface (280×210mm). Optimized heat management and feedback function ensure high stable light output, compensating light quality fluctuation for LED ages and variable environment. SDKs in different language are also available for customer to integrate to its own operating software.



Fig. 1.1 LEDTrans uniform lighting box

1.1 LEDTrans Features

- **Reproducing high quality daylight illuminant**
To reproduce any phase of daylight with highest quality on the market in terms of Color Rendering Index (CRI) 99 and Metamerism Index (MI) Grade A
- **Blackbody locus simulator**
To accurately produce a range of sources from tungsten and daylight 2000K-20000K with user-defined CIE Ra and Duv
- **SPD Match**
To accurately reproduce any measured or imported SPD to record or reproduce any light you want. It is easy to spread SPD files between different locations for light communication
- **High light intensity and luminance adjustable**
To achieve up to 18000lux of most simulated source, and the light is dimmable while keeping the same light quality
- **No warm up time**
It provides a uniform and flicker free lighting environment
- **Single channel control**
Arbitrarily control the intensity of each LED channel to design any light you want
- **Dynamic lighting**
Programmable illuminant light sequence and interval

- **User-friendly software**
Provide an easy and user-friendly software LEDNavigator-LT, and can be further customized
- **Fast & accurate feedback**
Maintain the same light quality, compensating for age and variable environments with compact microspectrometer and LEDNavigator-LT software. It is much more consistent over fluorescent, and dramatically enhances the stability and lifetime of LEDTrans
- **No flicking and high uniformity**
It provides a >96% uniform and absolutely flicker free light output
- **Longer life time and excellent long term stability**
Much longer lifetime compared to fluorescent technology, and optimized heat management resulting in excellent long term stability
- **LED wavelength selection service**
Provide LED channel wavelength selection service from UV, VIS to NIR
- **36 hours customer response**
If customers report any problems or issues related to the products in working day, we will response in 36 hours for both domestic and international customers

2. OVERVIEW AND INSTALLATION

The structure of THOUSLITE LEDTrans uniform lighting box is shown below.

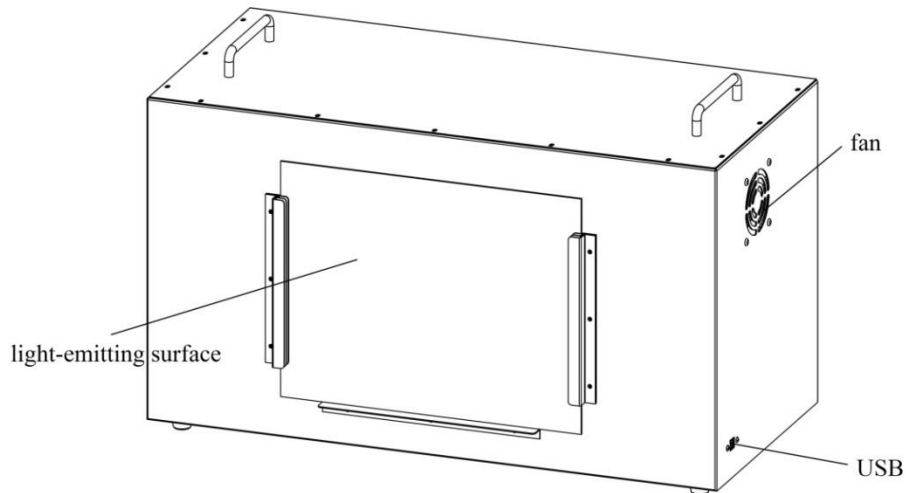


Fig. 2.1 LEDTrans front view

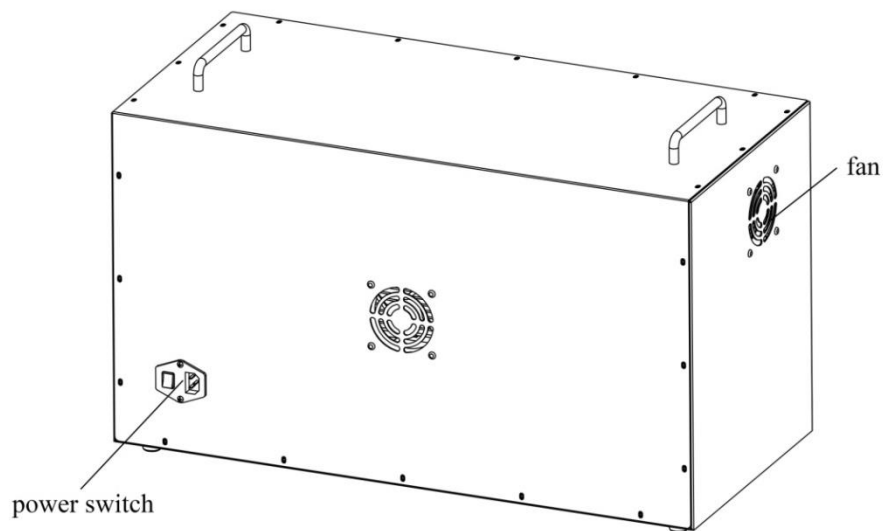


Fig. 2.2 LEDTrans back view

2.1 Unpacking

The items in the package are listed below. If any items are missing or damaged, contact THOUSLITE or local authorized distributors.

- LEDTrans lighting box ×1
- Diffuser ×1
- Power cable ×1
- User manual ×1
- USB cable ×1
- LEDNavigator-LT software with a dongle ×1
- THOUSLITE FS Spectrometer(Optional) ×1

2.2 Specifications

LED channels	Multi channels (colors + whites), AM driven
Spectral range	400-700 nm
Resolution	10 bit (1024 steps dimmable for each channel)
Warm up time	No
Lifetime	>10,000 hours
Predefined illuminants	D75, D65, D50, A CIE Ra 99, Mlvis: Grade A (<0.25)
Tunable range	CCT: 2000~20000K CIE Ra:0~100 Duv: -0.02~+0.02
Illumination level	Max. up to 18000lux, min down to 180lux, depending on illuminant, can be combined with a neutral density filter
Uniformity	Illumination surface (D280, 280×210mm), >96%
Short-term stability	D65 <±10K, D50<±5K; illuminance <±0.5%
Long-term stability	D65 <±25K, D50<±15K; illuminance <±1.5%
Software instrument compatibility	X-Rite i1 Pro 2, Konica Minolta CL500A, THOUSLITE FS spectrometer
Electrical	230V/110V 50/60Hz, 150W Maximum
Operating ambient temperature	0-30 °C
Connection	USB cable
External dimensions(W/D/H)	690×325×400 mm
Weight	24 kg
Scope of delivery	LEDTrans lighting box, diffuser, power cord, USB cable, software LEDNavigator-LT with dongle, THOUSLITE FS spectrometer, Neutral density filter (optional), SDK available on request
Software	Modules in software LEDNavigator-LT: 1. Blackbody locus simulator 2. SPD Match 3. Single channel control 4. Dynamic lighting 5. Fast & accurate feedback

2.3 Install the diffuser

Please follow Fig. 2.3 to install the diffuser before using LEDTrans. Please note that the diffuser should be inserted to the slot close to the emitting surface.

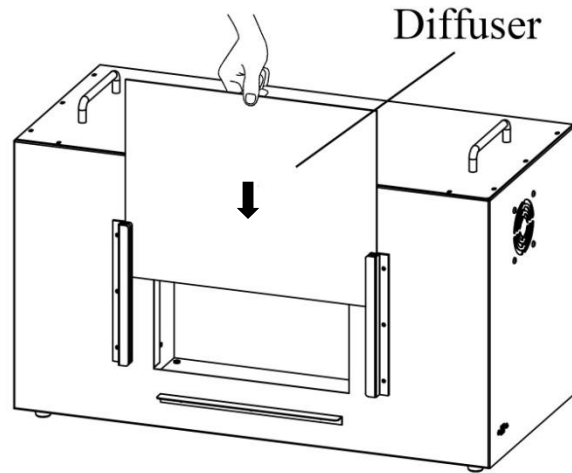


Fig. 2.3. Install the diffuser on LEDTrans

3 PREPARATION WORK FOR LEDNAVIGATOR-LT

3.1 Measure Device and Driver Installation

Currently, LEDNavigator-LT software is compatible with two spectral measure devices, including THOUSLITE FS Spectrometer, and Konica Minolta CL500A.



Fig. 3.1 THOUSLITE FS (middle) and Konica Minolta CL500A (right)

When the Konica Minolta CL500A is connected with PC via USB cable in first use, the driver will be installed automatically after several seconds. In terms of THOUSLITE FS spectrometer, it requires manually driver installation in first use, and the procedures are listed below:

- Please open the folder *Prerequisites/Drivers/FS Spectrometer Driver*. If the OS is 32 bit, please install DPInst.exe. If your system is 64 bit, then DPInst64.exe should be installed. As shown in Fig. 3.2.
- Follow the instructions until the installation is succeeded.

If you need to integrate other spectral measure device, please contact us.

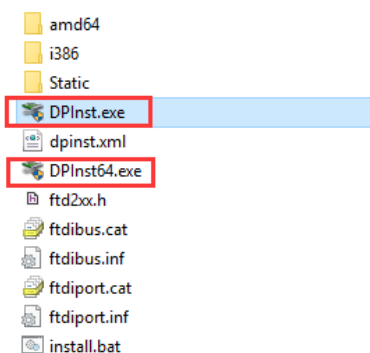


Fig. 3.2 Install DPInst.exe or DPInst64.exe

3.2 LEDTrans Driver Installation

When a LEDTrans is connected to PC via USB cable in first use, a yellow symbol can be found in Device Manager of the PC, as indicated in Fig. 3.3.

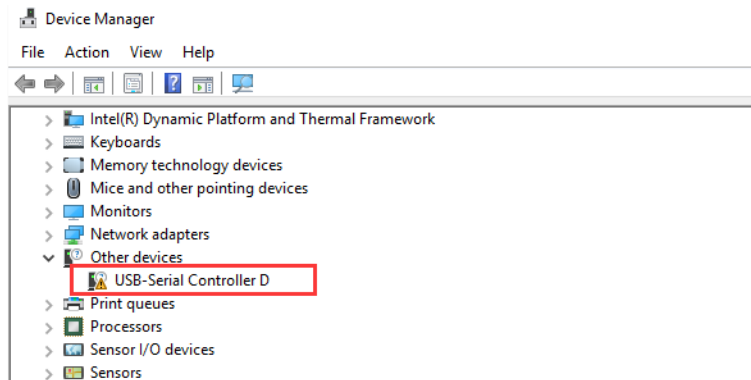


Fig. 3.3 LEDTrans driver installation yellow symbol

Please install the LEDTrans driver after antivirus software closed. The driver file “USBDriverInstaller.exe” is provided by THOUSLITE in the folder *Prerequisites\Drivers* for Windows Vista/7/Windows8/8.1/10. After driver installation, the yellow symbol disappears in device manager, which indicates the LEDTrans driver is successfully installed, as shown in Fig. 3.4.

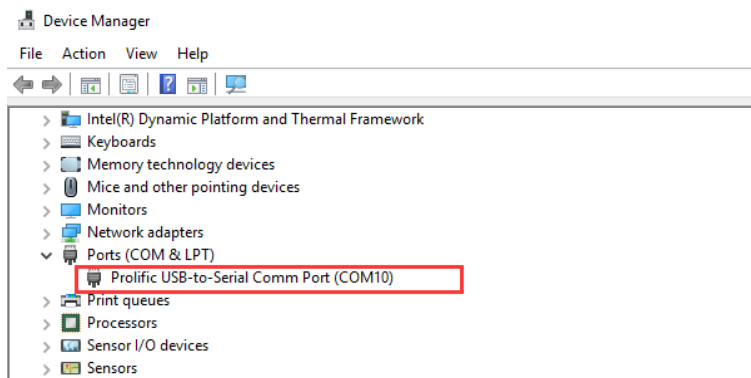







Fig. 3.4 LEDView driver installation success

3.3 Software Environment Installation

Software LEDNavigator requires NETFrameWork environment and VC library. If the software cannot be properly opened in the first use, it will pop up a message about missing Dll file, say **Unable to load DLL ‘SDCM.dll’**. Please install all the 4 environment files in *Prerequisites\Environment* folder provided by THOUSLITE before running the software again. If the OS reminds the environment files are already installed or cannot be installed, ignore these environment files installation.

- Microsoft.NETFrameWork4.0.exe <- most of win 7 & win 10 PC already has installed this file
- vcredist_2010.exe
- vcredist_2012_a.exe
- vcredist_2012_b.exe

-  Microsoft.NETFrameWork4.0.exe
-  Please install all the 4 files.txt
-  vcredist_2010.exe
-  vcredist_2012_a.exe
-  vcredist_2012_b.exe

3.4 Recommended Setup

Preparation work before LEDNavigator-LT control is listed below:

- Connect the LEDTrans with electric supply through the power cable. The default voltage and frequency is 110V/230V and 50-60Hz, depending on the country;
- Connect LEDTrans with PC through USB cable;
- Turn on the LEDTrans;
- Plug in the software dongle in the PC;
- Connect measure device with PC through USB cable if measurement is necessary.
- Double click to open the software LEDNavigator.

There are total three connections in the PC as shown in Fig. 3.5, including measure device, LEDTrans USB cable and dongle. Please refer Fig. 3.5 to setup LEDTrans system. The measure device in Fig.3.5 is CL500A, the setup is also applicable for THOUSLITE FS spectrometer. **Please note that the measure head should be close to the emitting surface of LEDTrans.** When conducting measurement, please turn off the artificial light and draw the curtains to reduce the environment light influence.

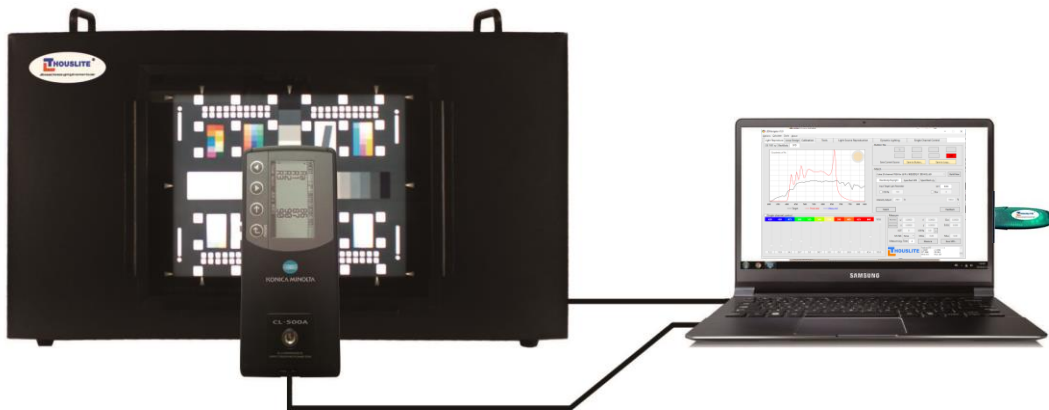


Fig. 3.5 Recommended setup

4. LEDNAVIGATOR-LT

LEDNavigator-LT software interface is shown below, including Menu, Graphics, Single channel control, Database, Match, Lighting, Measure, Dynamic lighting.

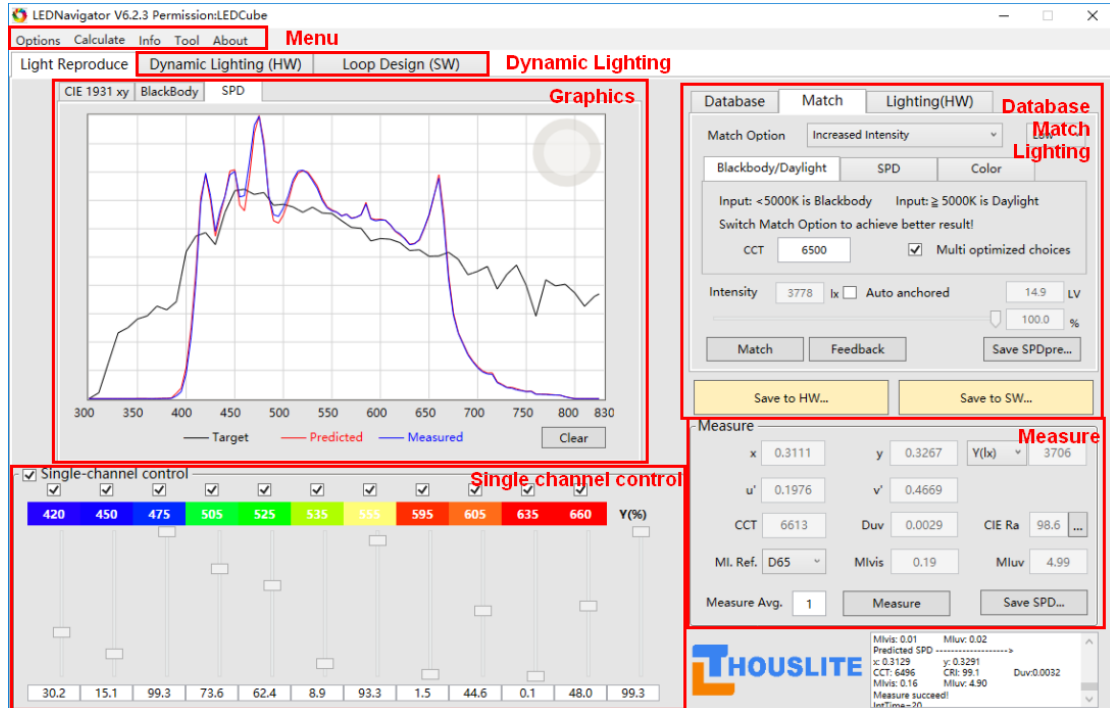


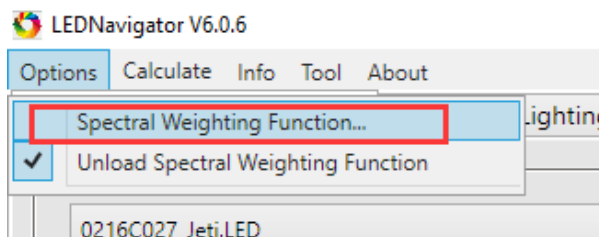
Fig. 4.1 LEDNavigator-LT software interface

4.1 Menu

LEDNavigator-LT has four submenu in Menu bar, which will be introduced as follow.

4.1.1 Menu/Options

This function is for the *Spectral Weighting Function(SWF)*.



If an **illuminance measure device (unit: lux)** adopted, then *SWF* is unnecessary, please switch to *Unload Spectral Weighting Function*. If users adopt the THOUSLITE FS spectrometer and Konica Minolta CL500A, select this option.

If a **luminance measure device (unit: cd/m²)** adopted, then it would be necessary to use *SWF* to compensate the standard white tile's reflectance from the measured data. The standard white tile needs to be purchased separately, as shown in Fig. 4.2. Fig. 4.3 shows the typical *SWF* curve of a white tile. The *SWF* is the reciprocal of the spectral reflectance(1/Ref). Load the *SWF* by clicking the *Menu/Options/Spectral Weighting Function...*



Fig. 4.2 An example of THOUSLITE standard white tile

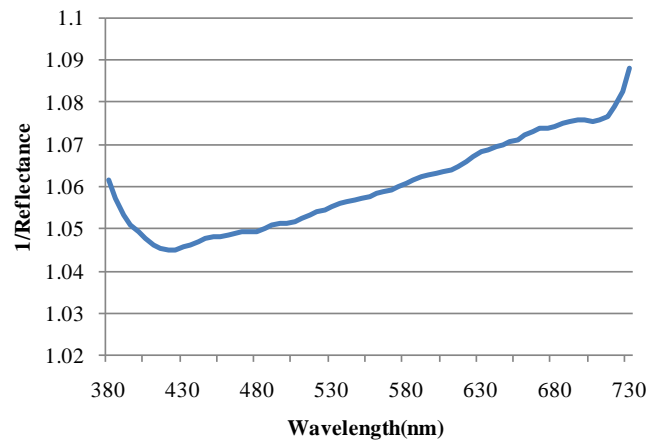


Fig. 4.3 Spectral weighting function curve

4.1.2 Menu/Calculate



a) ColorChecker(Classic) Simulating

Target SPD Source: **CCT match**

The Color difference when illuminated by Measured Light and Target Light
White Point is White Patch (No.19).

The color of all the 24 patches are simulated under Target SPD source.

NaN	NaN	NaN	NaN	NaN	NaN
NaN	NaN	NaN	NaN	NaN	NaN
NaN	NaN	NaN	NaN	NaN	NaN
NaN	NaN	NaN	NaN	NaN	NaN

Average CIELAB color difference: NaN

Match Option: CIE R1-15

Blackbody/Daylight | SPD | Color

Input: <5000K is Blackbody | Input: ≥ 5000K is Daylight

A/D50/D55/D65/D75 will take more time to optimize

CCT: 5000

Intensity: 3342 cd/m²

Match | Feedback | Save to HW... | Save t

Fig. 4.4 ColorChecker(Classic) Simulating

The software will simulate the 24 color checker (X-Rite color checker/Classic) viewed under the simulated illuminant and target illuminant. The CIELAB color difference will be shown on the upper corner of each color patch. The average color difference will be shown on the bottom of the window.

b) CESCRI Rf/Rg

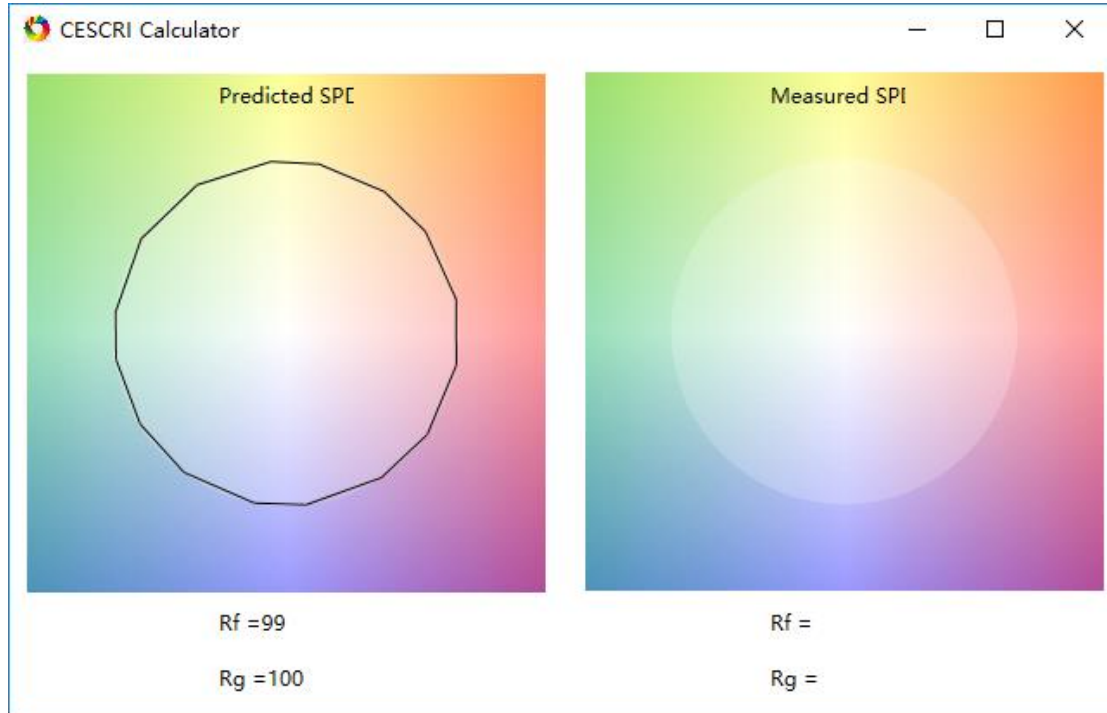
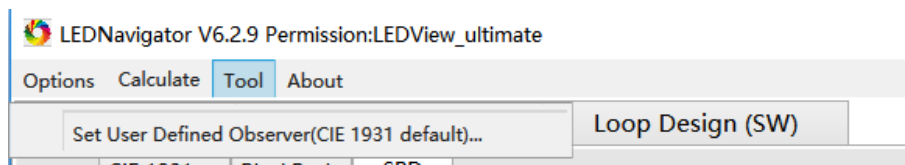


Fig. 4.5 CES CRI Parameters

This button shows the CES Color Rendering Index (CES CRI) defined in TM-30-15, including Fidelity index R_f and Gamut index R_g . For the details, please refer to https://energy.gov/sites/prod/files/2015/12/f27/tm-30_fact-sheet.pdf. The CES CRI parameters R_f/R_g will be calculated respectively for the predicted and measured SPD.

4.1.3 Menu/Tool



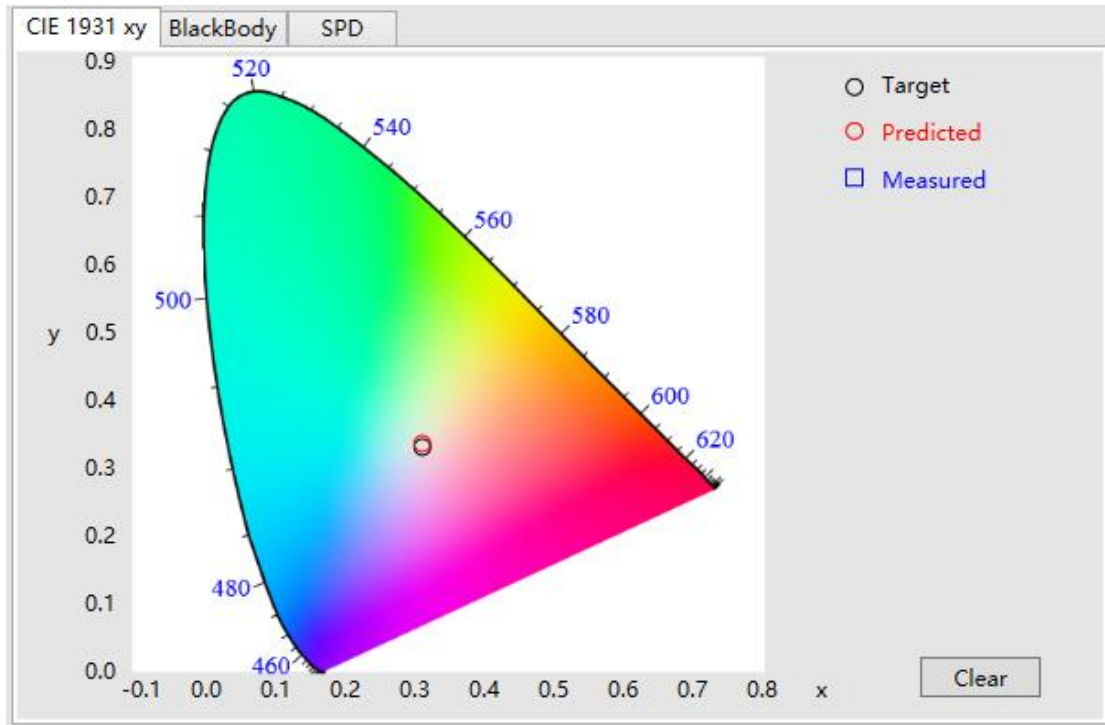
Set User Defined Observer (CIE 1931 default): the default setting is CIE 1931 standard color matching functions. Users can choose CIE 1964 standard color matching functions, spectral sensitivity curves of one typical camera sensor, or customized curves. The file is located in *Data/system*.

4.1.4 Menu/About

This option shows the general information about the software.

4.2 Graphics

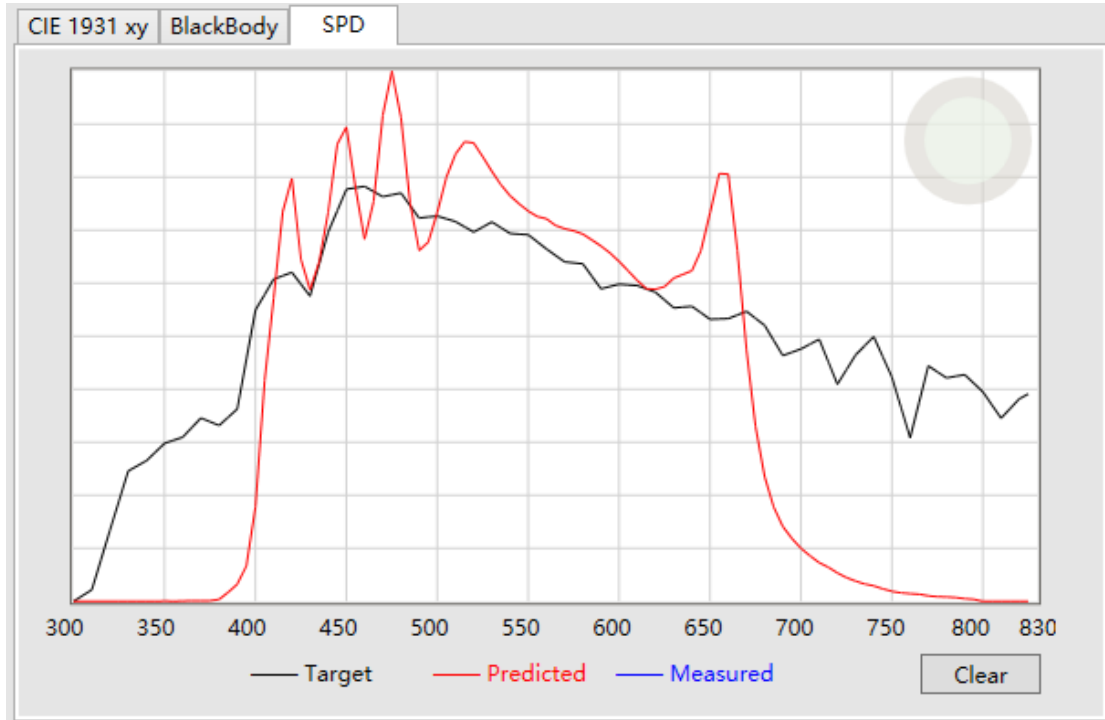
Graphics area in Fig. 4.6(a) ~ (c) demonstrates the target, predicted and measured light data. It has 3 tabs, i.e. CIE1931 chromaticiy diagram, blackbody locus area enlarged CIE1931 chromaticiy diagram and SPD diagram. Button *Clear* can clear the curve and points in the Graphic area..



(a) CIE1931 chromaticiy diagram



(b). Blackbody locus area enlarged CIE1931 chromaticiy diagram



(c). SPD diagram

Fig. 4.6 Graphics area

4.3 Single-channel Control

Single Channel Control allows users to set the intensity drive current of each LED channel in LEDTrans, as shown in Fig.4.7. Users could adjust the drive current of each channel by sliding the bars or input the drive value directly. The corresponding SPD curves and color will change correspondingly. The range is from 0-100 with resolution 0.1.

The slider $Y\%$ is used to adjust the drive current of each LED channel simultaneously at the percentage of Y . The left & right arrow keys on the keyboard are used to fine adjust the drive value. **Please note that the light quality of the output light will shift due to the nonlinearity between the LED intensity and its drive current.**

In section 4.6 lightness adjustment, we will introduce the way to linearly adjust the LED intensity.

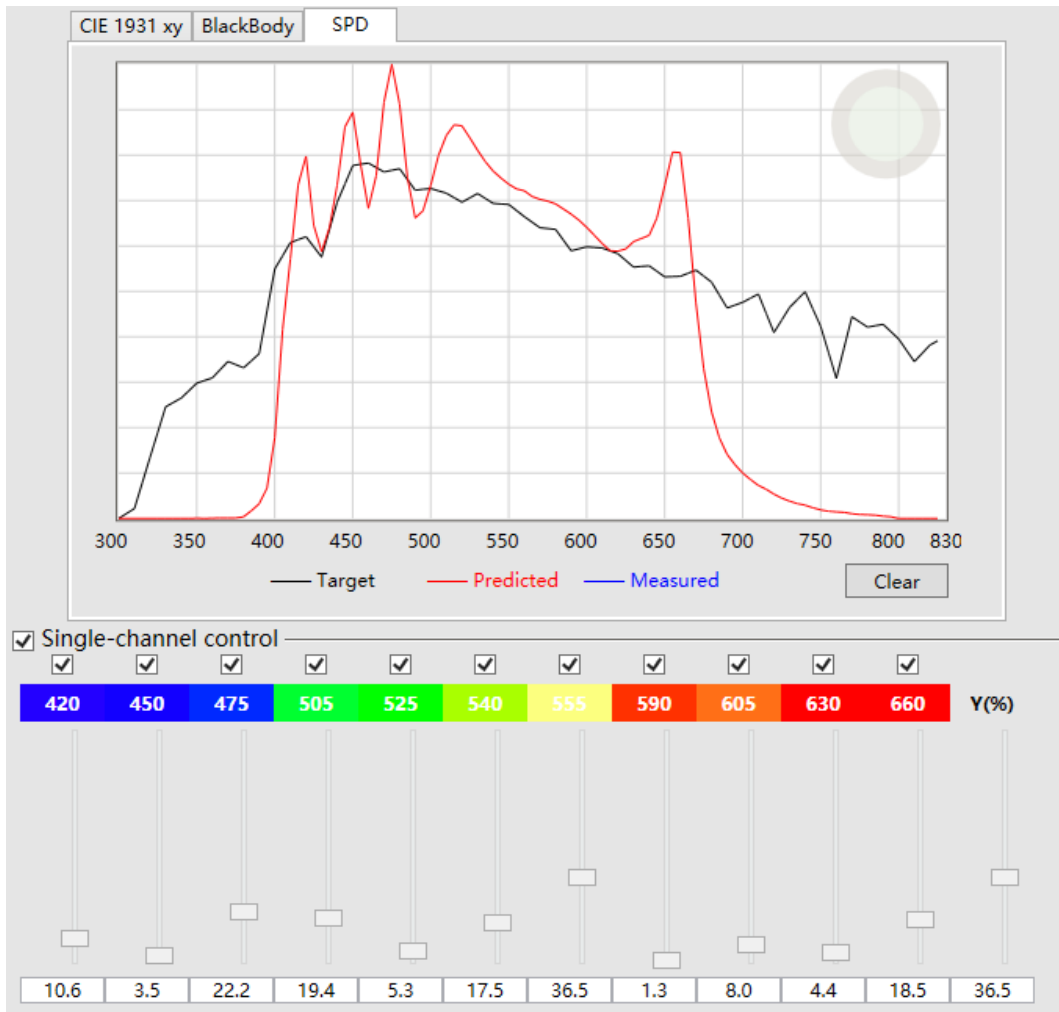


Fig. 4.7 Interface of Single-channel Control Module

The Single-channel control can be activated by ticking the check box near the words “Single-channel control”. User can choose LED channels included or excluded in the optimization algorithm by ticking the check box above corresponding LED channel. The excluded channel will be set 0 during optimization. However, users can still adjust the intensity of excluded channels manually, as show in Fig. 4.8.

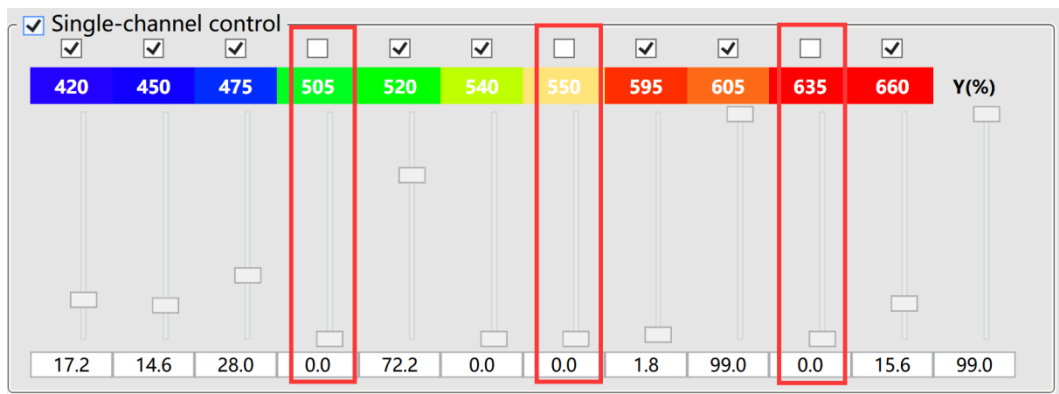


Fig. 4.8 LED channel selection in optimization algorithms

4.4 Measurement

Currently, LEDNavigator-LT software is compatible with two spectral measure devices, including THOUSLITE FS, and Konica Minolta CL500A. The device calibration and setup geometry are described separately as follows:

- When the **THOUSLITE FS** is connected, it requires dark calibration before first measurement. Firstly please screw the protection head as shown in Fig. 4.9, and then start the calibration. After calibration, typical measurement geometry is shown in Fig. 3.5. It is not necessary to load the white tile *SWF* in this setup, and the data measured by THOUSLITE FS spectrometer is illuminance (lx).

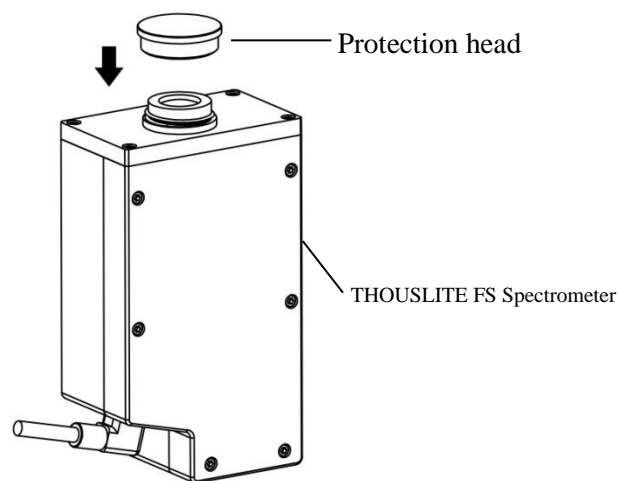
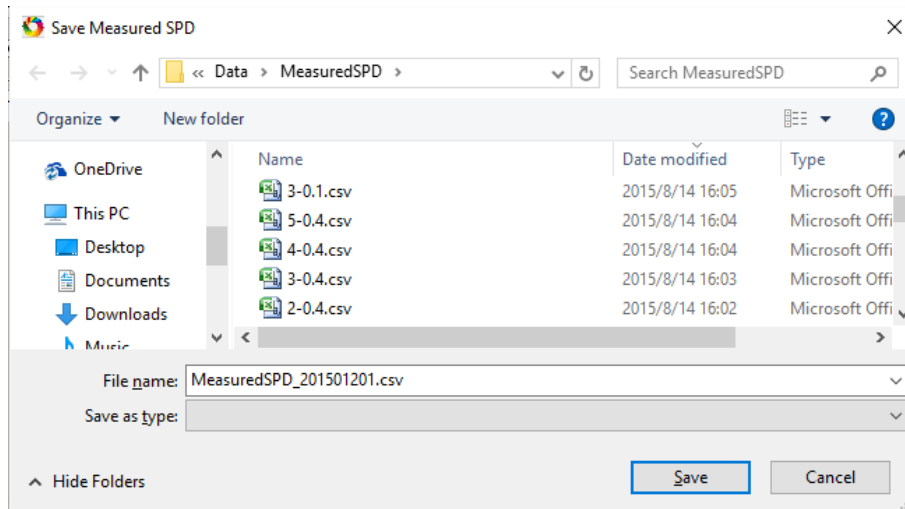


Fig. 4.9. Screw THOUSLITE FS spectrometer protection head before dark calibration

- When the **Konica Minolta CL500A** is connected, no calibration is required before first measure. Please place the CL500A at any user desired position to measure, same as Fig. 3.5. Once the measure device is calibrated and setup, measurement could be conducted by pressing *Measure*. The result will be shown in the below image. Meanwhile, the SPD curve will be illustrated in the Graphics area. The detailed R1 ~ R15 parameters can be shown after pressing the button ... near to *CIE Ra*. To calculate the metamerism index, the corresponding reference illuminant should be chosen firstly.

Measure					
x	0.0000	y	0.0000	Y(lx)	0.000
u'	0.0000	v'	0.0000		
CCT	0	Duv	0.0000	CIE Ra	0.0 ...
MI. Ref.	None	MIvis	0.00	MIuv	0.00
Measure Avg.	1	Measure		Save SPD...	

The measured SPD data, which could be loaded as SPD source file in *Match* in section 4.6, could be saved by pressing *Save SPD...*, as shown in the below image.



4.5 LED Database

LED database file stores the characteristic of each LED in LEDTrans in specified environment. The database file is located in the folder *Data/Database*, the suffix name is LED. It is the foundation to perform the optimization algorithm. Users can select the database built previously or build new database (Fig. 4.10). The new database rebuild requires 15~30 minutes (depends on the measure device and setup). During database rebuild, the software will light the each channel at drive value from 5%-100% with 5% interval sequentially, and the measure device will record the SPD and intensity at each drive value. Users can customize the name of new database after rebuild. **Make sure the whole procedure conducted in the dark environment.** The LED Database is located in folder *Data/Database*.

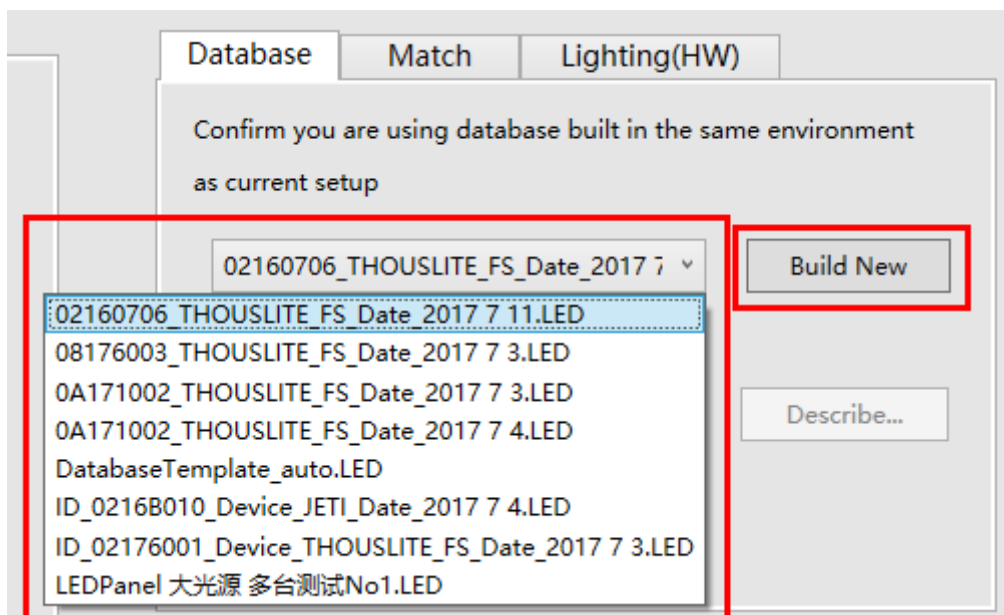


Fig. 4.10 LED Database selection or Build new database

4.6 Match

Match is the key feature for optimization algorithm, including *Blackbody/Daylight*, *SPD*, and

Color.

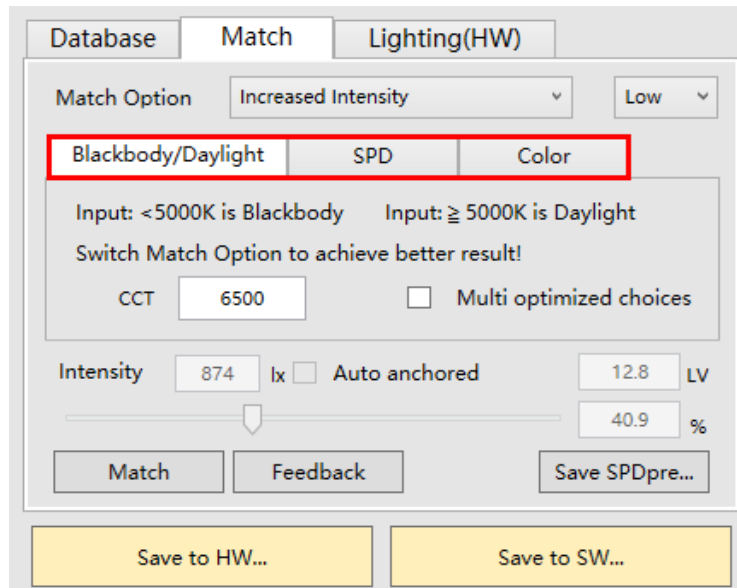
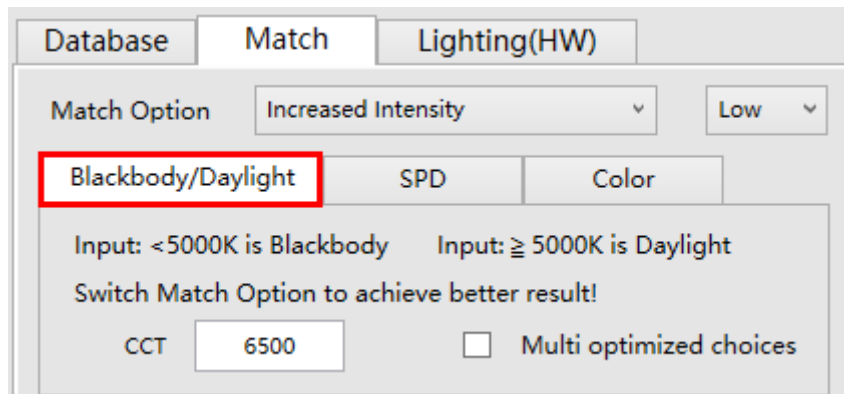
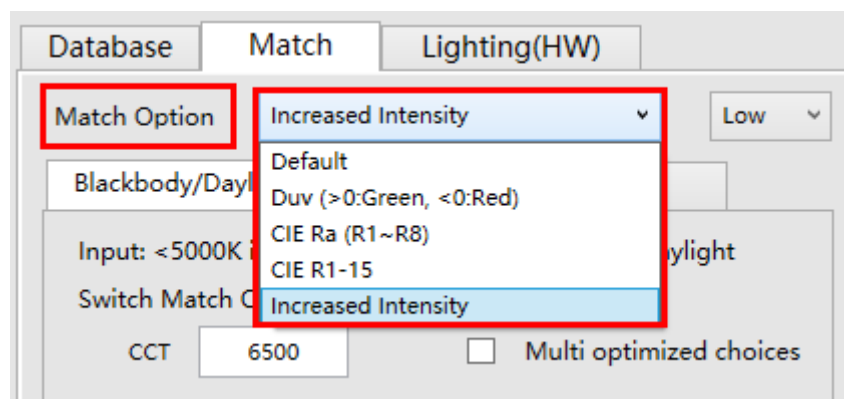


Fig. 4.11 Match interface

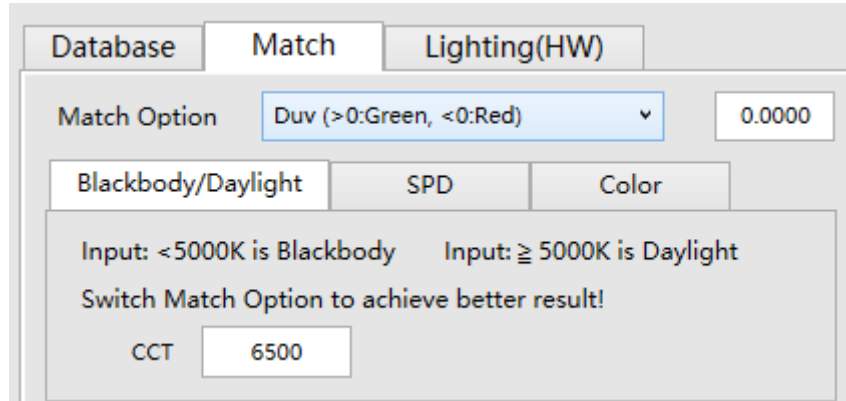
- **Module *Blackbody/Daylight*.** The software will optimize the output SPD to match Blackbody (<5000K) or CIE Daylight (\geq 5000K) standard SPD. When **5000/5500/6500/7500** is input, the software will consider the target SPD as **D50/D55/D65/D75** and optimize the output light. The input CCT range is from 2000K to 20000K.



In this module, users could choose one of the 5 match options according to applications. In general, the *CIE R1-R15* and *Increased Intensity Low* options.

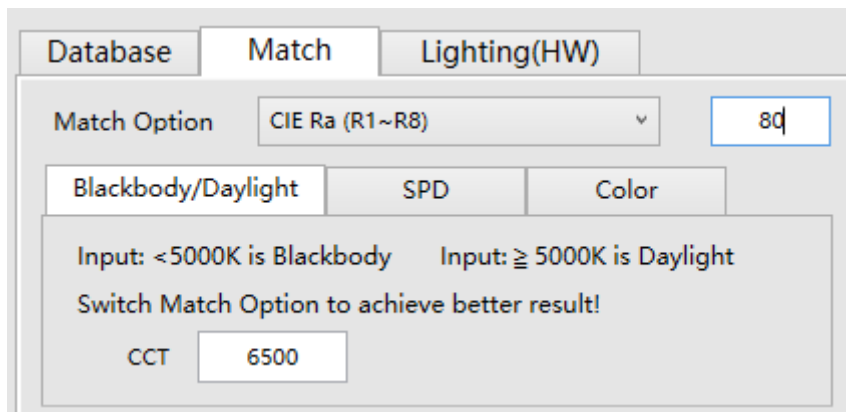


- ✓ When *Default* is chosen, balanced weights of SPD/CCT/xy/CIE Ra will be assigned during optimization.
- ✓ When *Duv* is chosen, users can set Duv value from -0.02 to +0.02. For example when 0.01 was input, then a greenish light will be output while the CCT will remain the same.



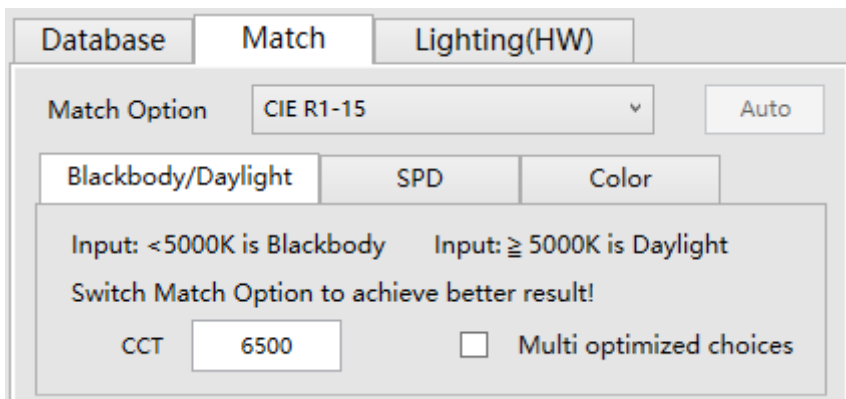
The screenshot shows the 'Match' tab of the software interface. The 'Match Option' dropdown is set to 'Duv (>0:Green, <0:Red)'. A text input field next to it contains '0.0000'. Below this, there are three tabs: 'Blackbody/Daylight', 'SPD', and 'Color'. The 'Blackbody/Daylight' tab is active, showing instructions: 'Input: <5000K is Blackbody' and 'Input: ≥ 5000K is Daylight', followed by 'Switch Match Option to achieve better result!'. At the bottom, the 'CCT' is set to '6500'.

- ✓ If *CIE Ra* is chosen, users can set CIE Ra value from 0 to 100.



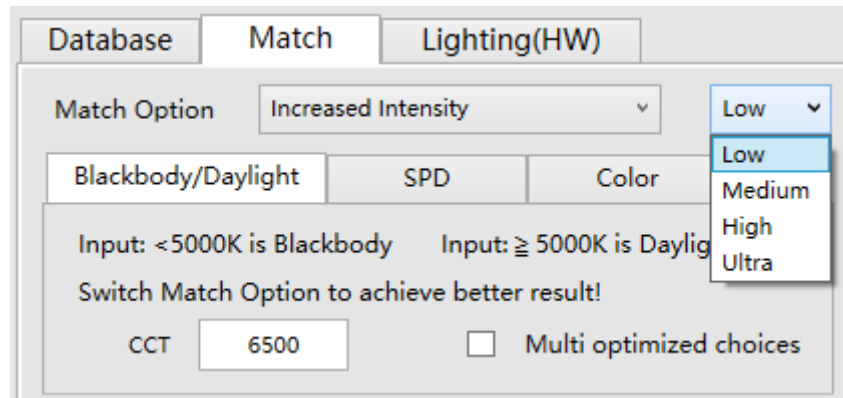
The screenshot shows the 'Match' tab of the software interface. The 'Match Option' dropdown is set to 'CIE Ra (R1~R8)'. A text input field next to it contains '80'. Below this, there are three tabs: 'Blackbody/Daylight', 'SPD', and 'Color'. The 'Blackbody/Daylight' tab is active, showing instructions: 'Input: <5000K is Blackbody' and 'Input: ≥ 5000K is Daylight', followed by 'Switch Match Option to achieve better result!'. At the bottom, the 'CCT' is set to '6500'.

- ✓ If *CIE R1-15* is chosen, balanced weights among SPD/CCT/CIE R1~R15 will be assigned during optimization.

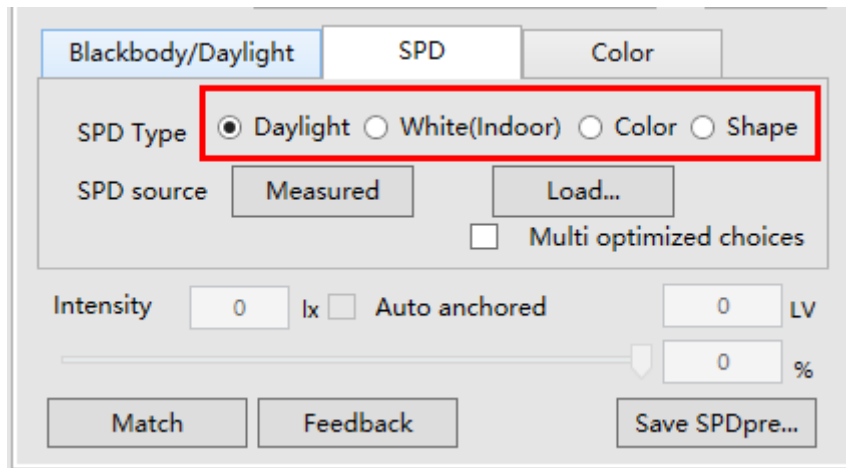


The screenshot shows the 'Match' tab of the software interface. The 'Match Option' dropdown is set to 'CIE R1-15'. A button labeled 'Auto' is next to it. Below this, there are three tabs: 'Blackbody/Daylight', 'SPD', and 'Color'. The 'Blackbody/Daylight' tab is active, showing instructions: 'Input: <5000K is Blackbody' and 'Input: ≥ 5000K is Daylight', followed by 'Switch Match Option to achieve better result!'. At the bottom, the 'CCT' is set to '6500' and there is an unchecked checkbox labeled 'Multi optimized choices'.

- ✓ If *Increased Intensity* is chosen, the software will optimize the output SPD based on *CIE R1~R15* method but at the same time increase the output intensity at the cost of potential degradation of light quality. There are 4 levels available for the intensity increase degree.



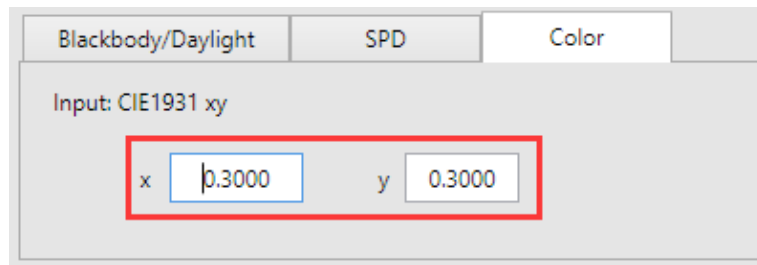
- **Module SPD.** The software will optimize the output light according to the target SPD. Users need to set the *SPD type* for the target SPD, and load in the SPD by *Measure* or *Load...* buttons.



- ✓ **Type Daylight:** the input SPD is assumed daylight, balanced weights of SPD/CCT/xy/CIE Ra will be assigned during optimization. However, the algorithm will give more weights to CCT and CIE Ra during optimization compared to “White(Indoor)”
- ✓ **Type White(Indoor):** The input SPD will be considered as indoor white light, which means parameters like CCT, CIE Ra, together with input SPD Curve, will be considered during optimization.
- ✓ **Type Color.** The input SPD will be considered as colorful, the parameters like CCT or Ra will be ignored. The software only considers CIE 1931 chromaticity coordinates x/y and SPD curve during optimization.
- ✓ **Type Shape.** The output light will minimize the root mean square error (RMSE) for the SPD curve through 380nm-730nm.

After setting the *SPD Type*, press *Measured* or *Load...* to load in the target SPD. Press *Measured* to get the target SPD by measurement. Press *Load...* to get it from presaved SPD file. The SPD file is located in folder *Data/MeasuredSPD*, and the SPD file could be created by button *Save SPD...* in section 4.4 Measure.

- **Module Color.** Users could set CIE 1931 x, y coordinates as target parameters. The LEDNavigator-LT will optimize the output light to match the x, y value.



● **Multi optimized choices**

Before pressing *Match*, users can choose “Multi optimized choices” by ticking the check box. If the “Multi optimized choices” is selects, the software will offer 8 candidate results for user to select. The option is available for both module *Blackbody/Daylight* and *SPD*.

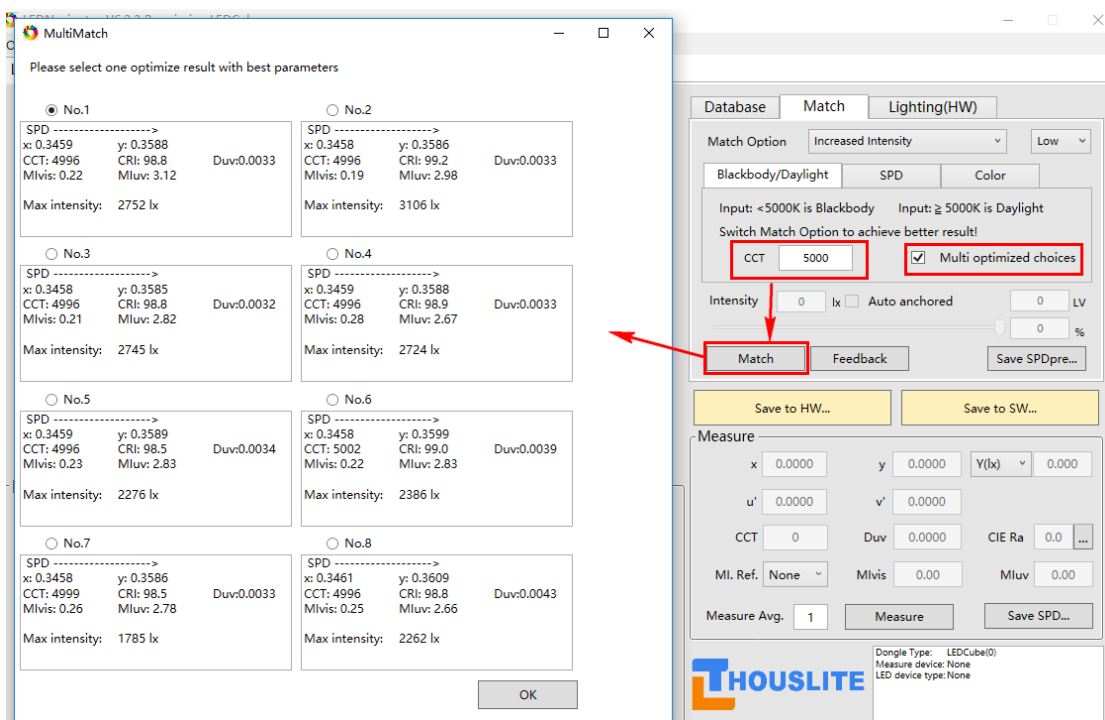
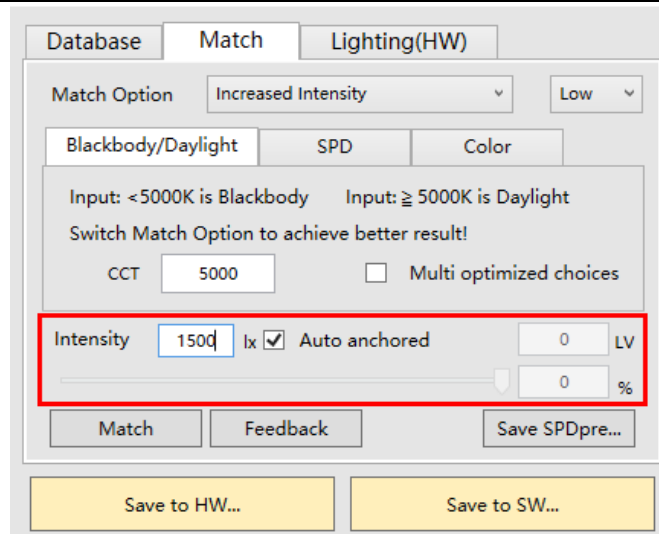


Fig. 4.21. Multi optimized choices

● **Lightness adjustment**

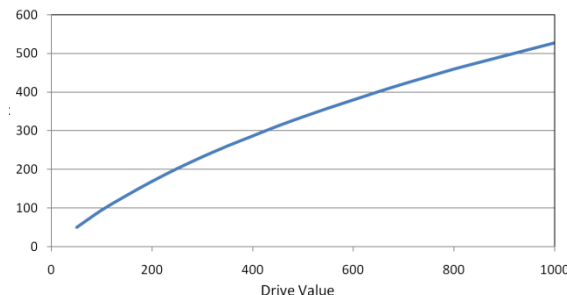
After pressing *Match*, users could adjust the intensity slider as shown in below image. The adjust range is 0%-100% and the minimum resolution is 0.1%, which could also be fine adjusted by pressing the left & right arrow keys on the keyboard. During the adjustment, the software will also show the predicted intensity and the LV value.

In addition, users can set target light intensity by enabling the “Auto anchored” feature. By ticking the check box of “Auto anchored”, user can input the target light intensity, say 1500lux, and then the software will optimize the result to achieve the target intensity. If the final measured result has a large difference compared to the predicted one, *Feedback* can be used to compensate the difference. The option is available for both module *Blackbody/Daylight* and *SPD*.



Please note the slider in this module is different from Y% in section 4.3.

- In section 4.3, the slider Y% is used to adjust the **drive current** of each LED channel simultaneously at the percentage of Y%, but the relationship between the LED intensity and its drive current are non-linear. The below image show a typical relationship between drive value of LED channel and its intensity. Obviously, it is non-linear.



- The slider in this module will adjust the light intensity at the specified percentage rather than drive value, and the software will calculate the drive value for the specified percentage of the light intensity based on the data in the database.

- **Match and Feedback button**



Press *Match* button to simulate the target light. The software will generate optimized result, and then press *Measure* button to obtain the measured result. If there is a considerable difference (say $\Delta\text{CCT} > 100\text{K}$) between measured result and target light, the *Feedback* button could be performed to compensate the difference. After *Feedback*, the lightness percentage will remain the same, while the absolute intensity will slightly change. In general, 1-2 *Feedback* process is enough to compensate the difference. If more than 3 *Feedback* process cannot close to the target, different “Match Options” selection or database rebuild is

recommended. In addition, **make sure press *Measure* to obtain the difference between predicted and measured result before using *Feedback*.**

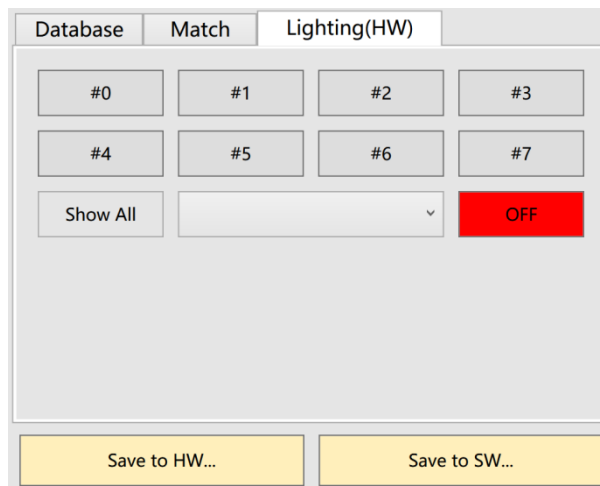
- **Save to HW... and Save to SW...**



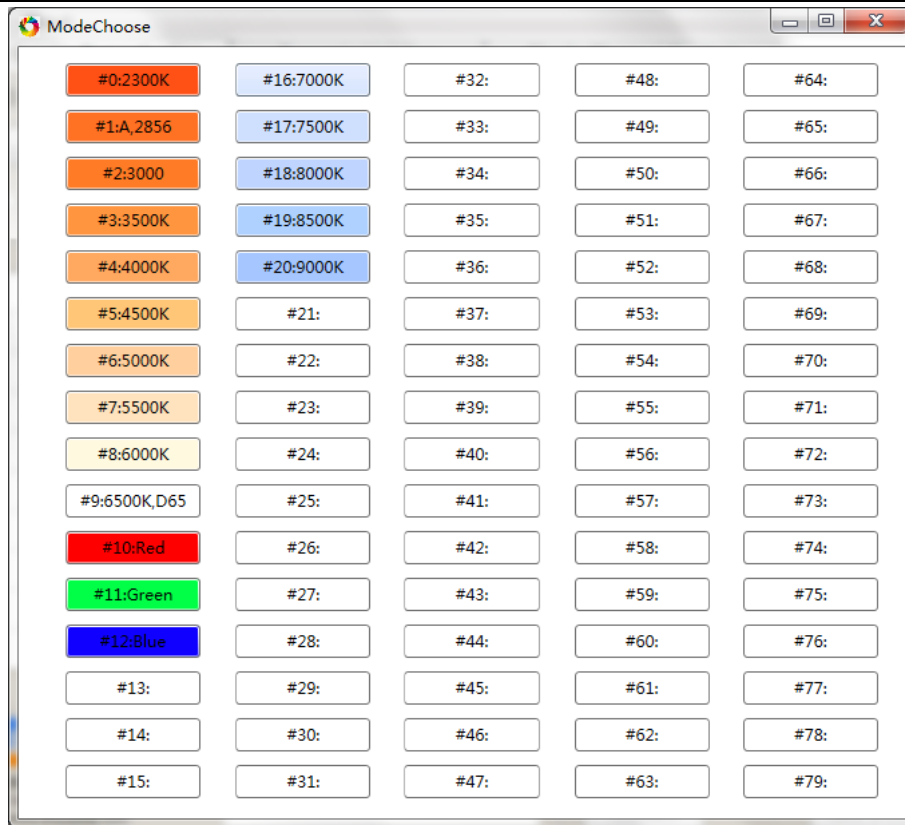
Press *Save to HW...* to save the current light into LEDTrans hardware. Press *Save to SW...* to save the light into software local loop file. Please refer to section 4.9 for details. The saved light sources are easy for users to recall the light source in the future or to design the dynamic lighting.

4.7 Lighting

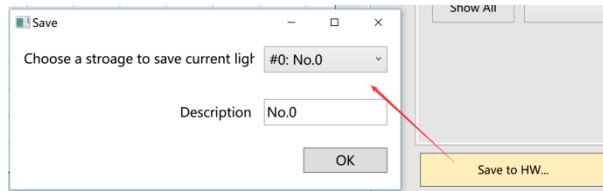
LEDTrans can save up to 80 light sources in its hardware. The Lighting interface is shown below.



The above interface has 8 buttons which is the shortcuts for light number 0 ~ 7. Users could also select the light source from drop-list button, or just click the *Show All* button. The light source name should be defined by users when save the light. The background color of each button is color of the saved light.



If user want to save a new light source, user can click *Save to HW...* , type the source name, and press *OK*. The source name will be stored in the software local file *Data/ModeDetails_00000000*.



4.8 Dynamic Lighting (HW)

Fig. 4.13 shows the interface of *Dynamic Lighting (HW)*. Totally, users can select max 24 presaved light sources within one loop. Users can set the switch interval between light sources in the loop. The minimum interval is 1 second. If the time is set to 0, the corresponding light source will be skipped in the loop. Press *Start* or *Stop* button to start or stop a loop. In addition, users could save the current setting into a loop by pressing *Save to Loop* as shown in Fig. 4.14.

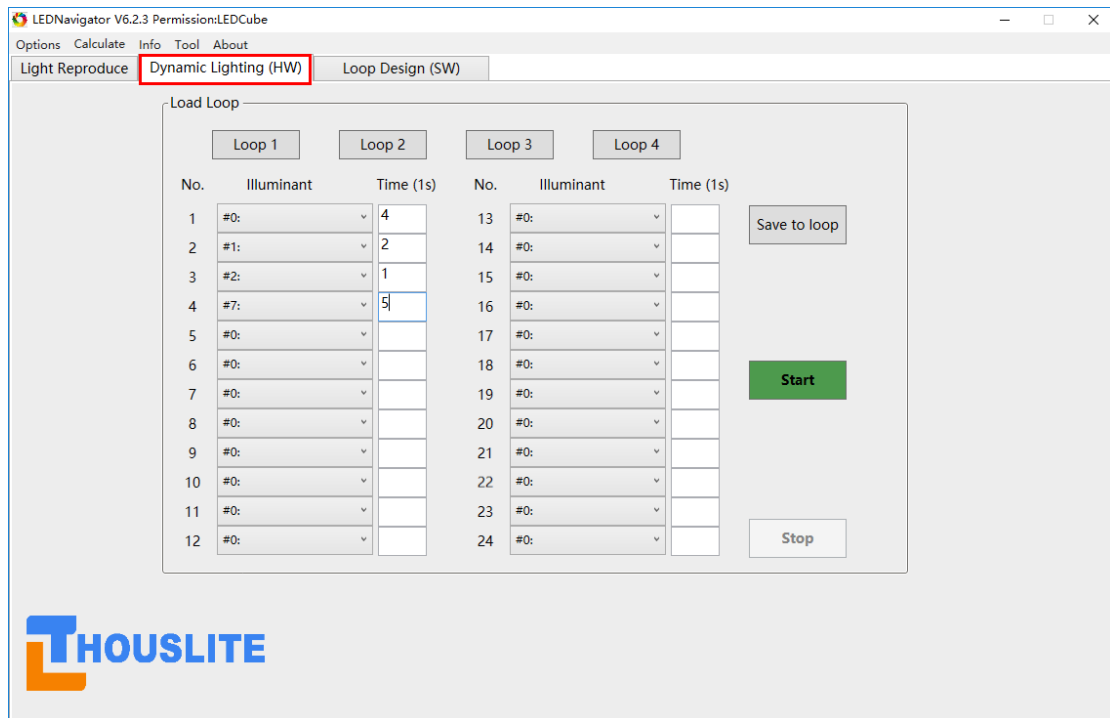


Fig. 4.13 Interface of Dynamic Lighting

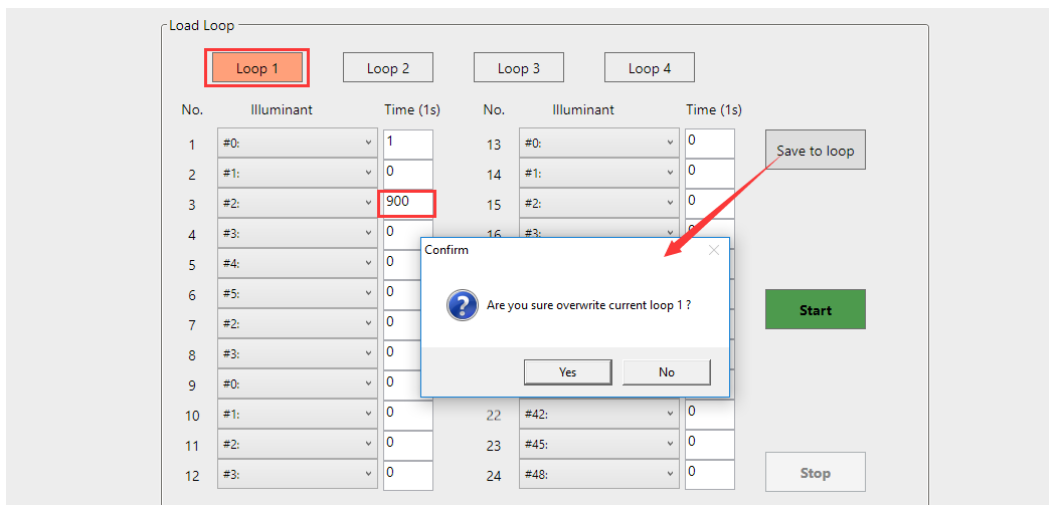


Fig. 4.14 Save changes to current loop

4.9 Loop Design (SW)

The saved light sources via *Save to SW...* in section 4.6 is shown in the *Loop Design (SW)* page. In the *Loop Design (SW)*, users could save unlimited light sources into software. Press *Load...* button to open a history Loop file, as shown in Fig. 4.15. Press *Clear* to clear previously loaded loop file.

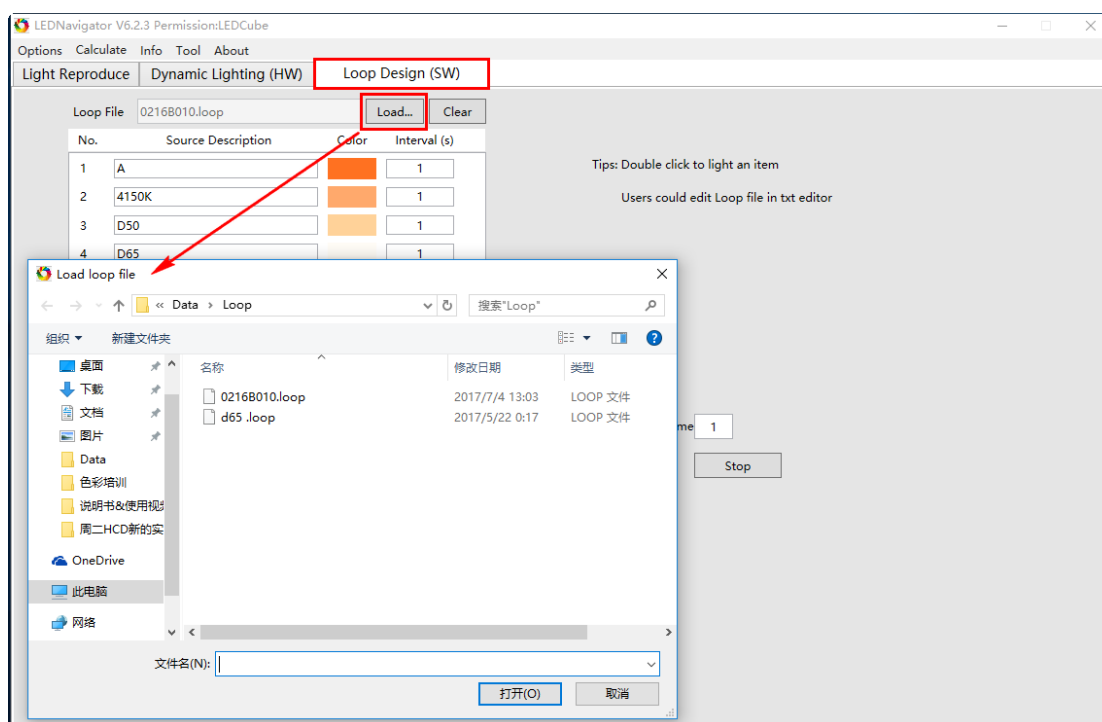


Fig. 4.15 Load in a history loop file

After the loop file is loaded, users could edit the *Source Description* and the *Interval* parameter, as shown in Fig. 4.16. Up and down arrow button allows user to modify the sequence of light source in the loop. Press *Delete* to remove a light source.

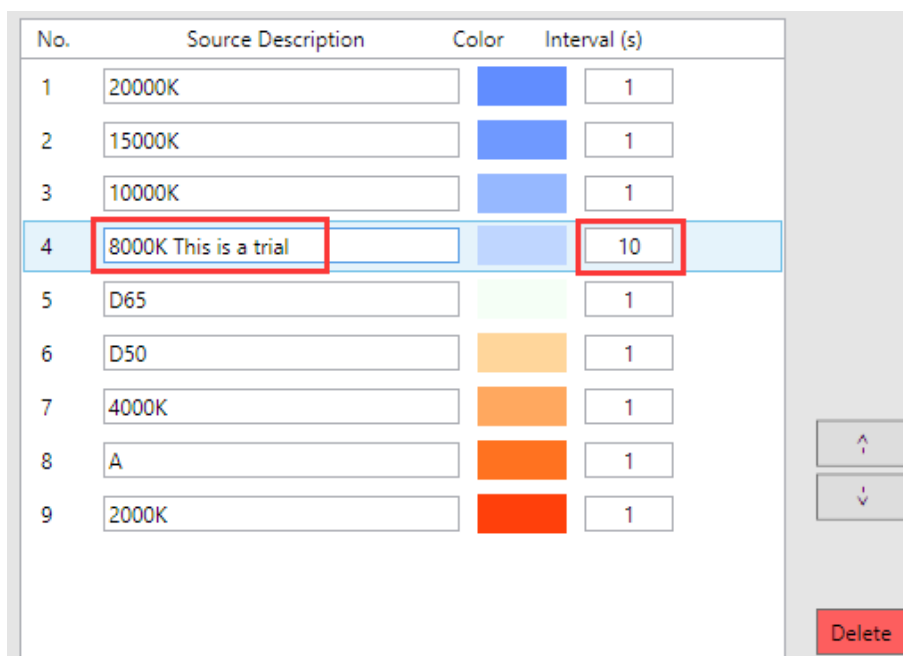


Fig. 4.16 Edit a light source in a loop

It should be noticed that all the changes will not be saved unless users press the *save* button. Press *Save As...* to save the current working loop as a new loop file.

Save

Save As...

Set the *Loop Repeat Times* to change the loop times for the entire loop.

Loop Repeat Times

5. MATCH EXAMPLE

5.1 Auto anchored based match example

In this auto anchored based match example, we will take the CIE D65, 1000lux as an example. As shown in Fig. 5.1, the procedure is described below:

- 1) Select the LED channels used in the optimization;
- 2) Select *Match Option*, we use *Increased Intensity Low* in this example;
- 3) Set *CCT* 6500;
- 4) Tick the check box of *Multi optimized choice*, user can decide to enable or disable this function;
- 5) Tick the check box of *Auto anchored*, set the target intensity 1000lux;
- 6) Press *Match*, the software will provide 8 candidate results, choose no. 1 result, because its excellent predicted performance (CCT=6496K, CIE Ra=99.1, MI=0.16, Max intensity=3778lx, see Fig. 5.2 for detail);
- 7) Press *Measure*, the measured result is shown in Fig. 5.3, CCT=6118K, CIE Ra=97.8, which is relatively far from predict performance;
- 8) Press *Feedback*, Fig. 5.4 shows the measured CCT=6502K, CIE Ra=98.9, MI=0.18, Intensity=1001lx, which is really excellent light quality;
- 9) Press *Save to HW...* or *Save to SW...* to save the light source to the software or LEDView hardware, as shown in Fig. 5.5.

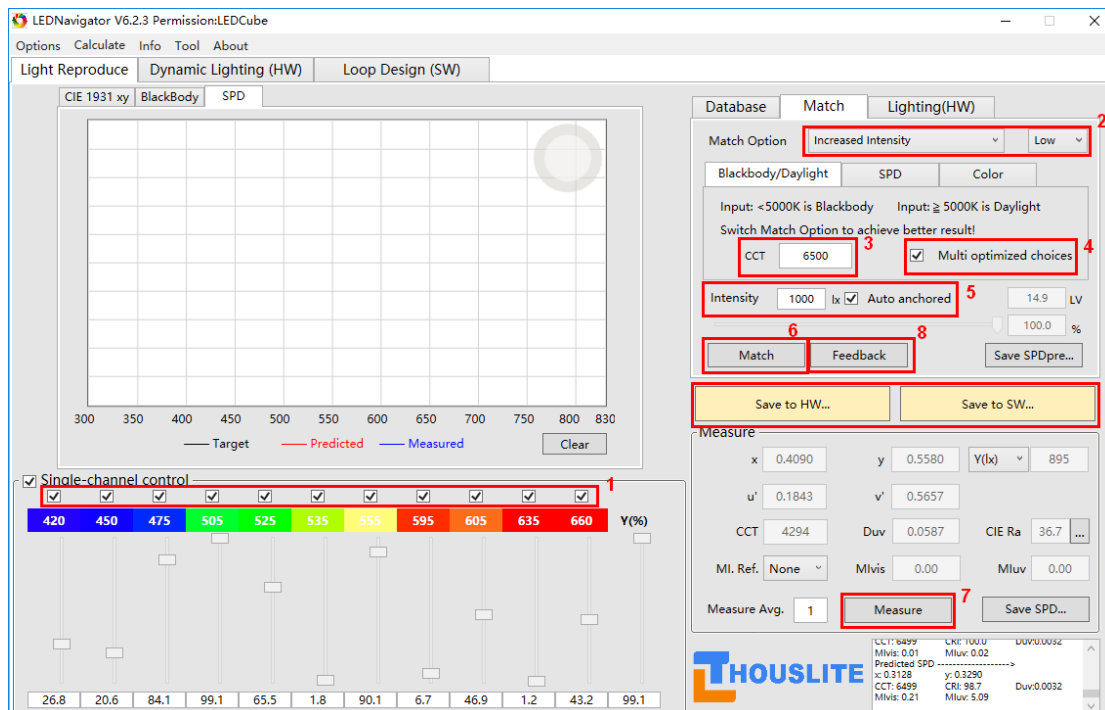


Fig. 5.1 Auto anchored based match procedure

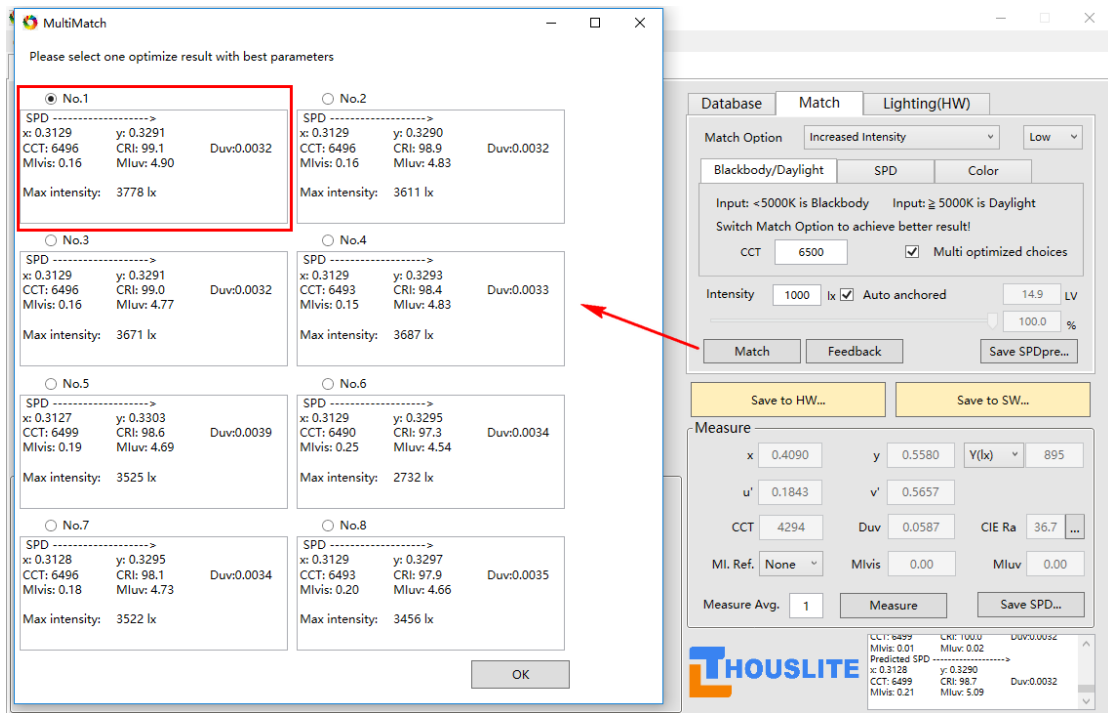
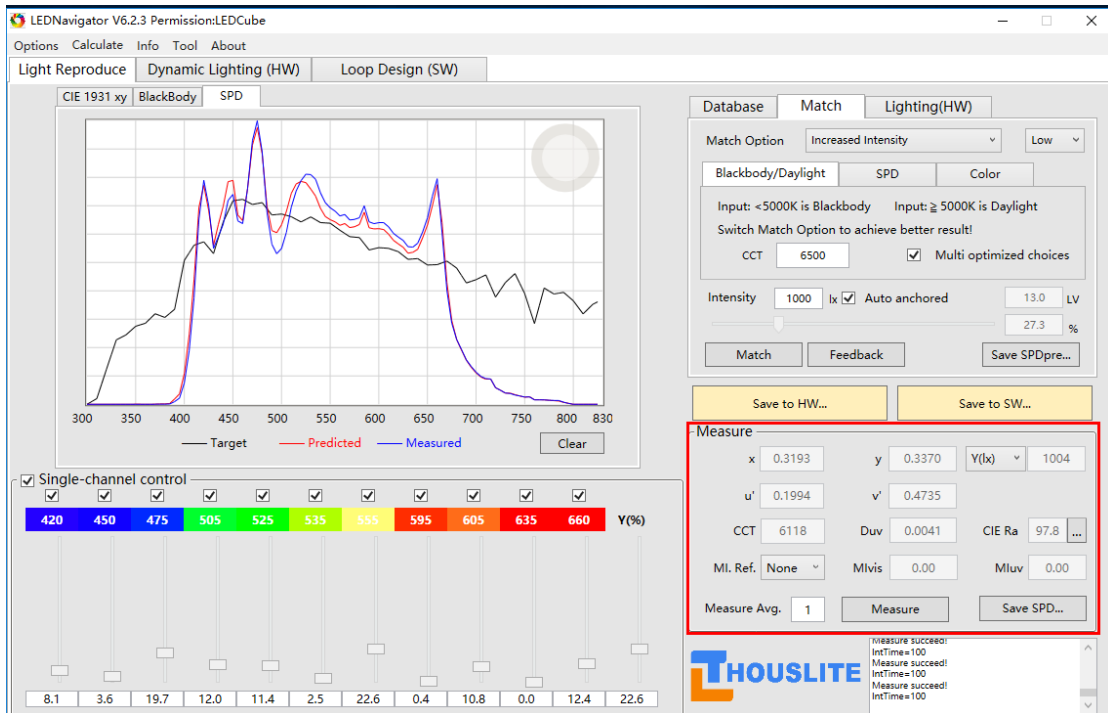


Fig. 5.2 8 candidate results



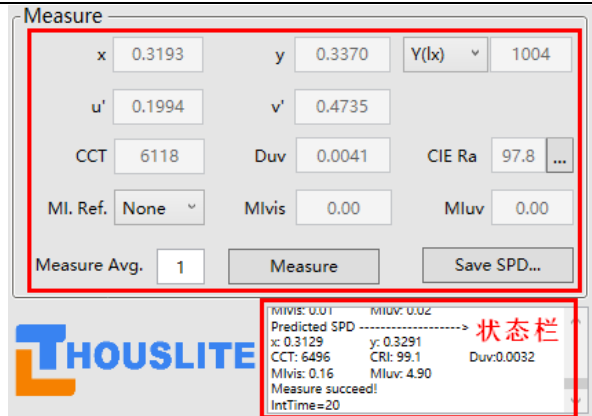


Fig. 5.3 Measured result after first measurement

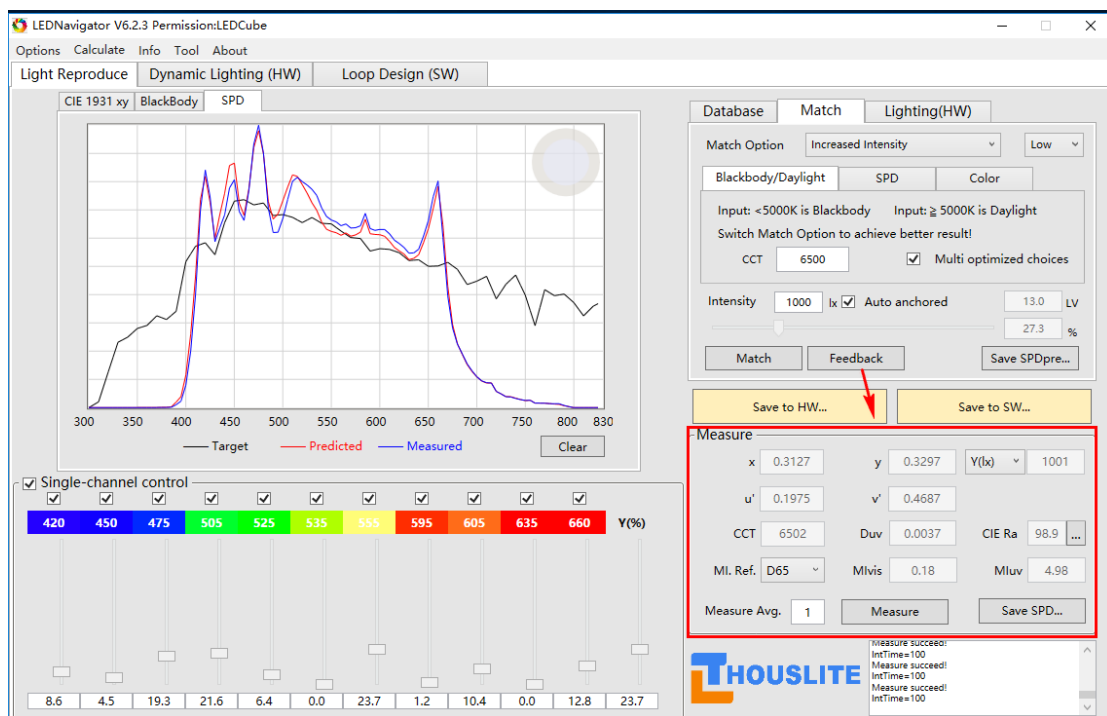


Fig. 5.4 Measured result after first *Feedback*

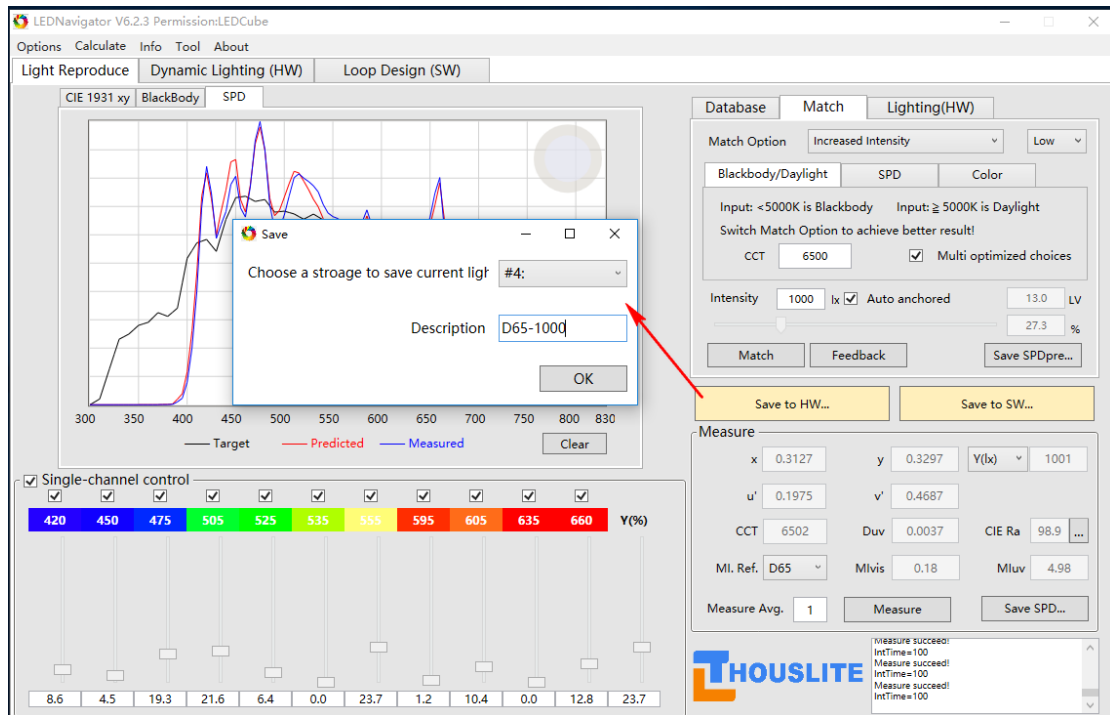


Fig. 5.5 Save the light source

5.2 Manually intensity adjustment based match example

In this manually intensity adjustment based match example, we will take the CIE D65, 1000lux as an example. As shown in Fig. 5.6, the procedure is described below:

- 1) Select the LED channels used in the optimization;
- 2) Select *Match Option*, we use *Increased Intensity Low* in this example;
- 3) Set *CCT* 6500;
- 4) Tick the check box of *Multi optimized choice*, user can decide enable or disable this function;
- 5) Press *Match*, the software will provide 8 candidate results, choose no. 1 result, because its excellent predicted performance (CCT=6496K, CIE Ra=99.1, MI=0.16, Max intensity=3778lx, see Fig. 5.2 for detail);
- 6) Press *Measure*, the first measured result is shown in Fig. 5.6, CCT=6613K, CIE Ra=98.6, Y(lx)=3706; adjust the intensity bar to the predicted intensity close to 1000lux (986lx in Fig. 5.7), and then Press *Measure*, the measured result after first intensity adjustment is shown in Fig. 5.7, CCT=6115K, CIE Ra=97.8, Y(lx)=958lx;
- 7) Press *Feedback*, Fig. 5.8 shows the measured CCT=6415K, CIE Ra=99.1, Y(lx)=707lx; and adjust the intensity bar again to the predicted intensity close to 1000lux (1002 lx in Fig. 5.9); Press *Measure*, Fig. 5.9 shows the measured result after second intensity adjustment, CCT=6481K, CIE Ra=98.7, Y(lx)=979lx; and then increase the intensity bar (1027lx in Fig. 5.10); Press *Measure*, Fig. 5.10 shows the measured result after third intensity adjustment, CCT=6502K, CIE Ra=98.7, MI=0.19, Y(lx)=1000lx, which is really excellent light quality; If the measured CCT is far from the target after third intensity adjustment, use *Feedback* again, and adjust the intensity until the target is achieved.
- 8) Press *Save to HW...* or *Save to SW...* to save the light source to the software or LEDView

hardware.

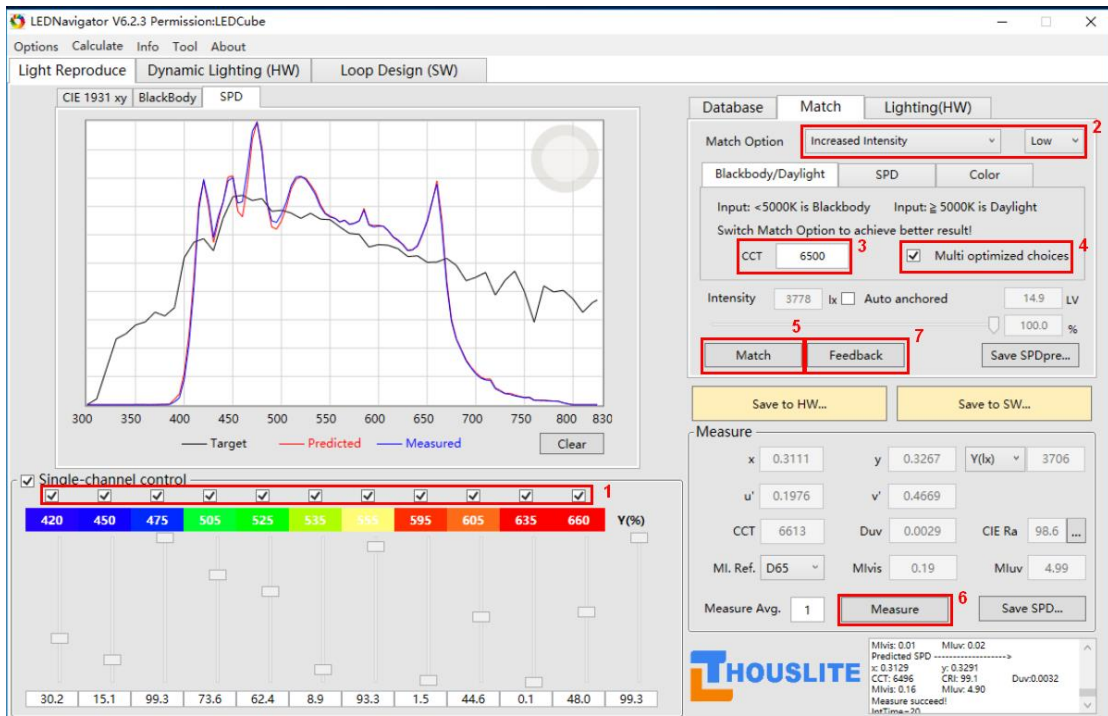


Fig. 5.6 manually intensity adjustment based match procedure

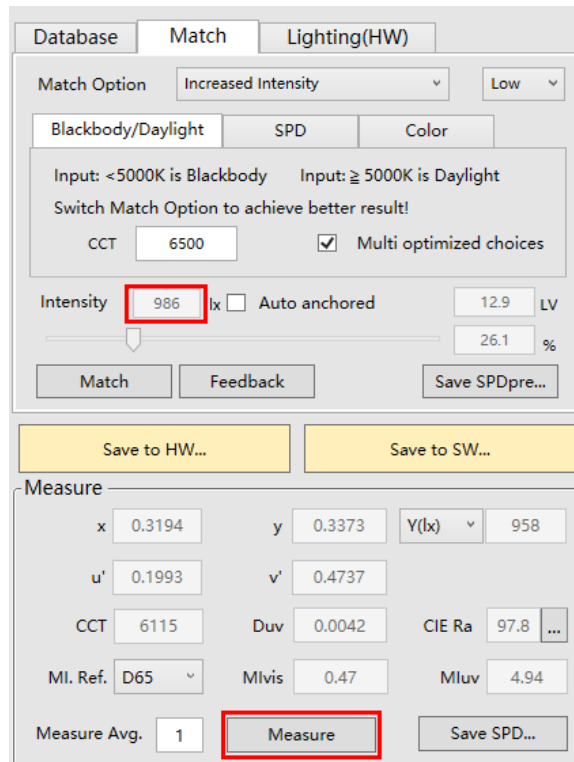


Fig. 5.7 the measured result after first intensity adjustment

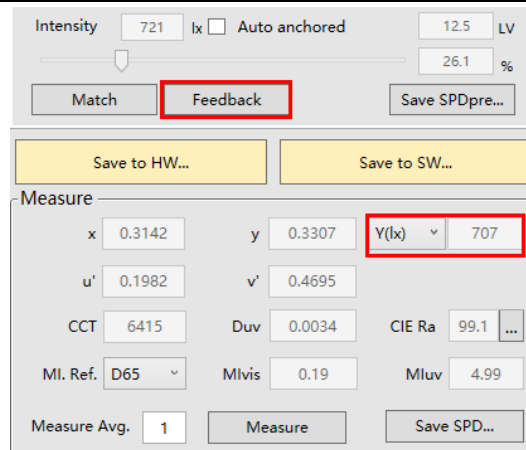


Fig. 5.8 the measured result after first *Feedback*

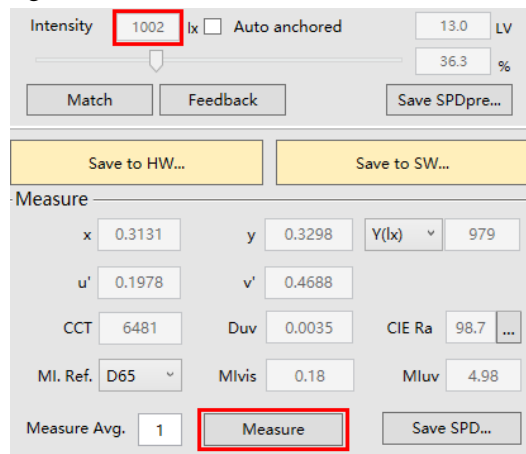


Fig. 5.9 the measured result after second intensity adjustment

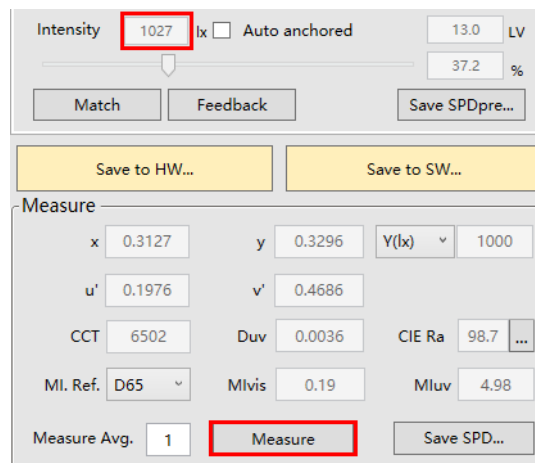


Fig. 5.10 the measured result after third intensity adjustment

5.3 SPD file based match example

In this SPD file based match example, we will take *Load* SPD file as an example. As shown in Fig. 5.11, the procedure is described below:

- 1) Select the LED channels used in the optimization;
- 2) Select *SPD Type*, each option is detailed in section 4.6;
- 3) Press *Load...* to load the SPD file, or Press *Measured* to measure the target light.

- 4) Tick the check box of *Multi optimized choice*, user can decide to enable or disable this function;
 - 5) Tick the check box of *Auto anchored*, user can decide enable or disable this function;
 - 6) Press *Measure*;
- Other steps refer to section 5.1 and 5.2.

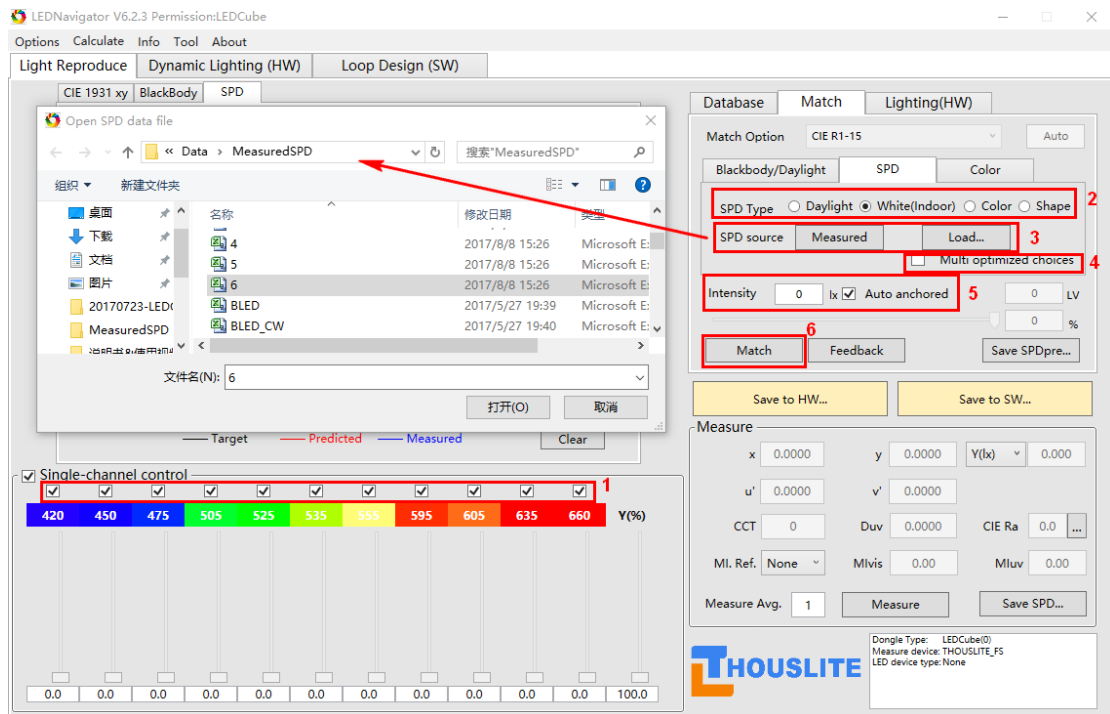


Fig. 5.11 SPD file based match procedure

6. SOFTWARE UPGRADE

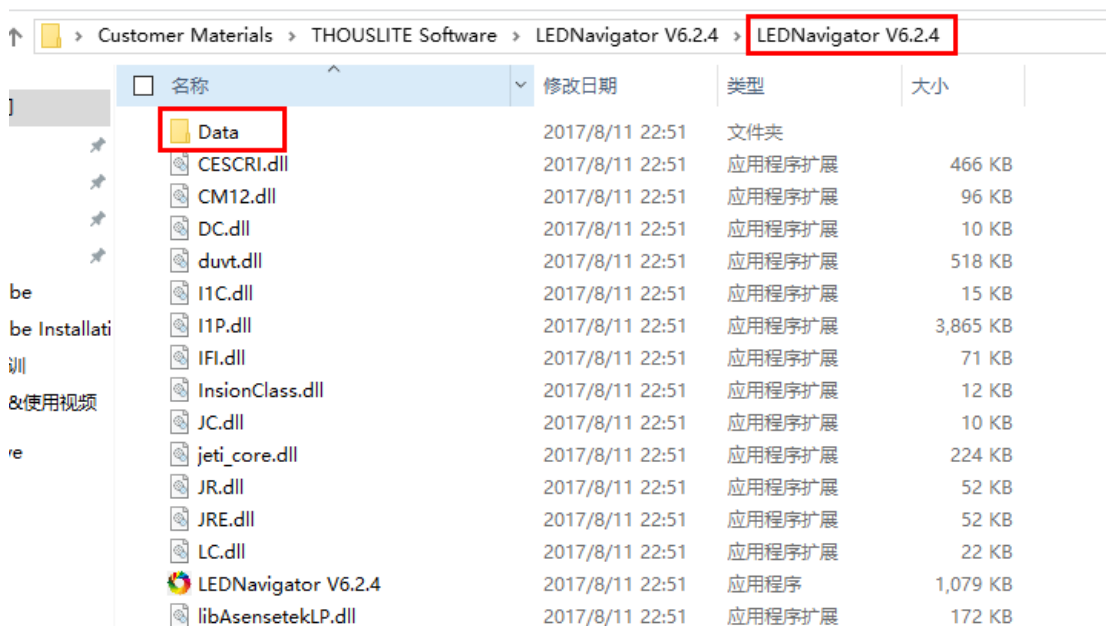
In future, the software LEDNavigator-LT will be upgraded, THOUSLITE will provide the updated version of software to customers. We take the LEDNavigator V6.1.2 (current version) and LEDNavigator V6.2.4 (new version) as an example.

When users receive the new version software LEDNavigator V6.2.4, Copy all the files in the *Data* folder in the current version software LEDNavigator V6.1.2, and then replace the all files in the *Data* folder in the new version software LEDNavigator V6.2.4, resulting in the same setting as the current software (same Database, same light source name, etc).



名称	修改日期	类型	大小
Data	2017/7/5 20:29	文件夹	
CESCRI.dll	2017/6/2 10:14	应用程序扩展	466 KB
CM12.dll	2017/6/2 10:14	应用程序扩展	96 KB
DC.dll	2017/6/2 10:14	应用程序扩展	10 KB
duvt.dll	2017/6/2 10:14	应用程序扩展	518 KB
I1C.dll	2017/6/2 10:14	应用程序扩展	15 KB
I1P.dll	2017/6/2 10:14	应用程序扩展	3,865 KB
IFI.dll	2017/6/2 10:14	应用程序扩展	71 KB
InsionClass.dll	2017/6/2 10:14	应用程序扩展	12 KB
JC.dll	2017/6/2 10:14	应用程序扩展	10 KB
jeti_core.dll	2017/6/2 10:14	应用程序扩展	224 KB
JR.dll	2017/6/2 10:14	应用程序扩展	52 KB
JRE.dll	2017/6/2 10:14	应用程序扩展	52 KB
LC.dll	2017/6/2 10:14	应用程序扩展	21 KB
LEDNavigator V6.1.2	2017/6/2 10:14	应用程序	1,095 KB
libAsensetekLP.dll	2017/6/2 10:14	应用程序扩展	172 KB

Fig. 6.1 LEDNavigator V6.1.2 folder



名称	修改日期	类型	大小
Data	2017/8/11 22:51	文件夹	
CESCRI.dll	2017/8/11 22:51	应用程序扩展	466 KB
CM12.dll	2017/8/11 22:51	应用程序扩展	96 KB
DC.dll	2017/8/11 22:51	应用程序扩展	10 KB
duvt.dll	2017/8/11 22:51	应用程序扩展	518 KB
I1C.dll	2017/8/11 22:51	应用程序扩展	15 KB
I1P.dll	2017/8/11 22:51	应用程序扩展	3,865 KB
IFI.dll	2017/8/11 22:51	应用程序扩展	71 KB
InsionClass.dll	2017/8/11 22:51	应用程序扩展	12 KB
JC.dll	2017/8/11 22:51	应用程序扩展	10 KB
jeti_core.dll	2017/8/11 22:51	应用程序扩展	224 KB
JR.dll	2017/8/11 22:51	应用程序扩展	52 KB
JRE.dll	2017/8/11 22:51	应用程序扩展	52 KB
LC.dll	2017/8/11 22:51	应用程序扩展	22 KB
LEDNavigator V6.2.4	2017/8/11 22:51	应用程序	1,079 KB
libAsensetekLP.dll	2017/8/11 22:51	应用程序扩展	172 KB

Fig. 6.2 LEDNavigator V6.2.4 folder