



LA-1T LED ANALYSER  
EVALUATION KIT  
INSTRUCTION MANUAL



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## GENERAL INFORMATION

### Application

LA-1t LED Analyser is oriented for initial experiments with different substances and enables defining the absorption properties of the analysed sample in 1.3 – 2.3  $\mu\text{m}$  spectral range.

### Design

LA-1t is formed in a single body that includes optical and electronic modules.

Optical module utilises a single pass transmittance scheme and includes:

- ✓ 8-element LED array with peak emission wavelengths about 1.3, 1.4, 1.6, 1.7, 1.9, 2.1, 2.2 and 2.3  $\mu\text{m}$ ;
- ✓ Wideband photodiode with 2.4  $\mu\text{m}$  cut-off wavelength.

Distance between the LED array and the photodiode is fixed and is about 15 mm (slit thickness is 4 mm).

Simple microscope slides can be used for liquid sample placing.

LEDs light up sequentially, photodiode detects the emission passing through the analysed sample and the obtained signal values are displayed on the main diagram of the program included in the Analyser set.

Electronic module enables:

- ✓ LED array power supply;
- ✓ detection and amplification of the photodiode signal;
- ✓ further signal conversion, processing and output to a PC via DAQ device through ZigBee wireless protocol.



LA-1t Analyser

### Features

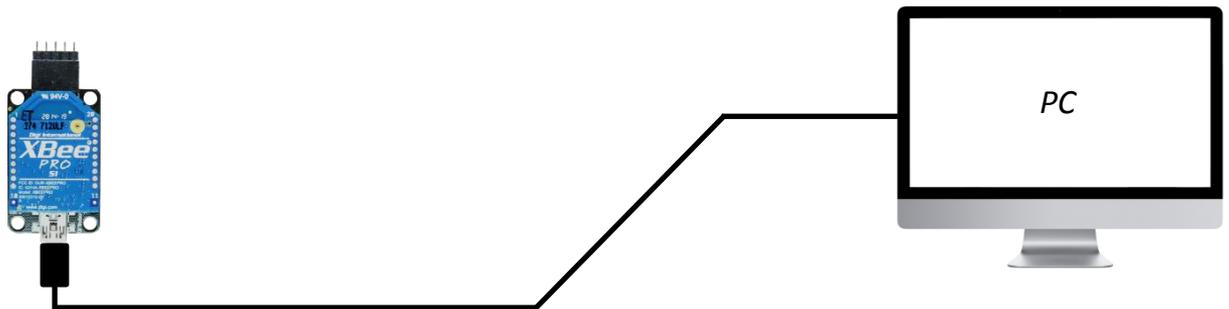
- ❖ 1.3 – 2.3  $\mu\text{m}$  scanning spectral range;
- ❖ Battery power supply with up to 30 hours of autonomous operation;
- ❖ Two modes of operation: single scan mode and cyclic scan mode;
- ❖ Two ways of cyclic scan operation: low (power saving) and high refresh rate;
- ❖ Wireless data transfer with ZigBee protocol;
- ❖ Included software for Windows OS.

### Operation conditions

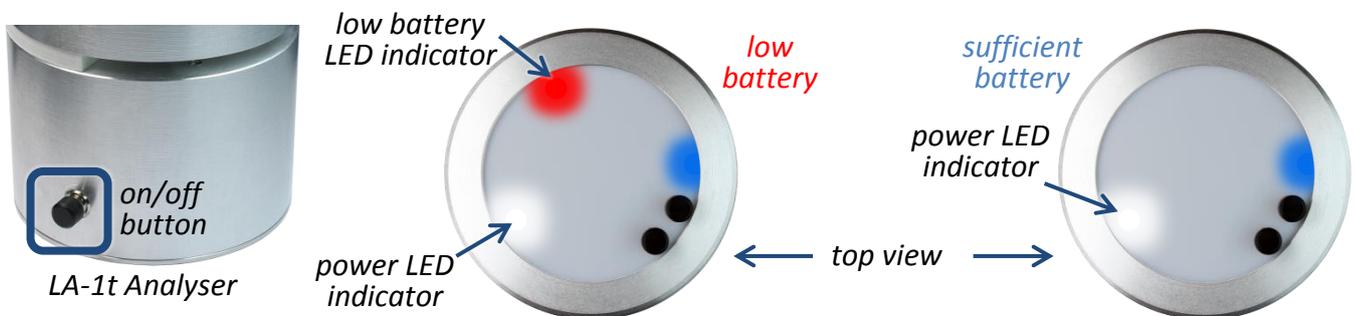
Indoor operation only. Ingress Protection Rating IP40.

## OPERATION INSTRUCTIONS

1. Install the LED Analyser Software, following the installer instruction. After the installation there will be:
  - “LED Analyser v.3.5.2.” program;
  - “LED Analyser v.3.5.” folder in the “User Documents” folder (default path: C:\Users\\*username\*\Documents\), which will contain configuration files (see p. 9) and user data files.
2. Connect the ZigBee adapter to a PC via USB port.



3. Make sure that LA-1t Analyser is charged; press the on/off button. If it doesn't turn on, charge it using the charger (included). If it turns on with three LED indicators glowing (white – power indicator, blue – mode indicator, red – low battery indicator), then the device is about to turn off and needs to be charged. In case of sufficient battery charge only two LED indicators (white and blue) will glow.



4. Run the installed Analyser program using the desktop shortcut.



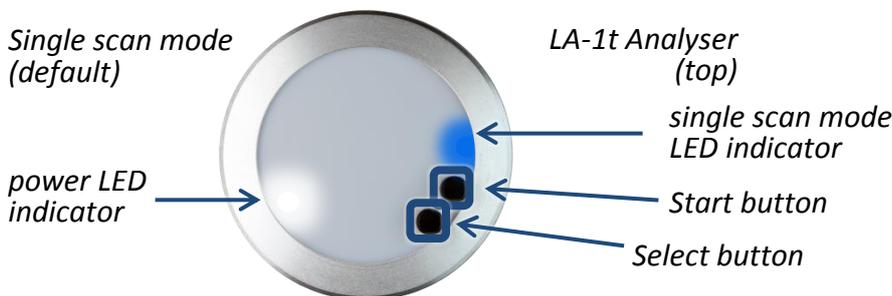
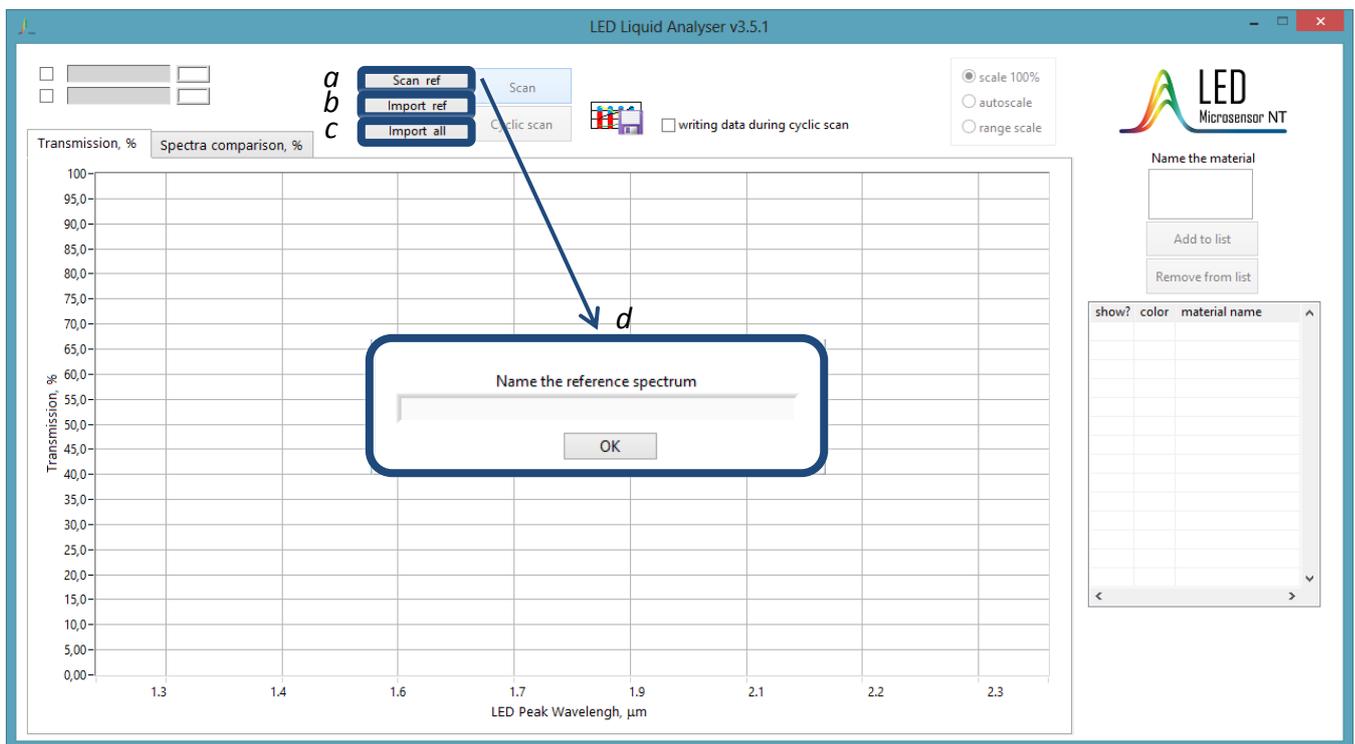
5. The program detects the device automatically. If the program doesn't manage to do it, device selection screen will pop up and you will have to choose it manually.



## OPERATION INSTRUCTIONS

6. To start scanning procedure, insert a reference sample into the cuvette and scan the reference spectrum by clicking the “Scan ref” button (a) in the program interface, then press the “Start” button on the top of the LA-1t device. “Name the reference spectrum” window (d) will popup; insert the desired reference spectrum name. If you have an already existing .xls file previously created by the LED Analyser program, you may import it using “Import ref” button (b, imports the reference spectrum only) or “Import all” button (c, imports the reference and other measured spectra).

**⚠** The measured/imported spectrum will be displayed on the main diagram as a row of blue columns.

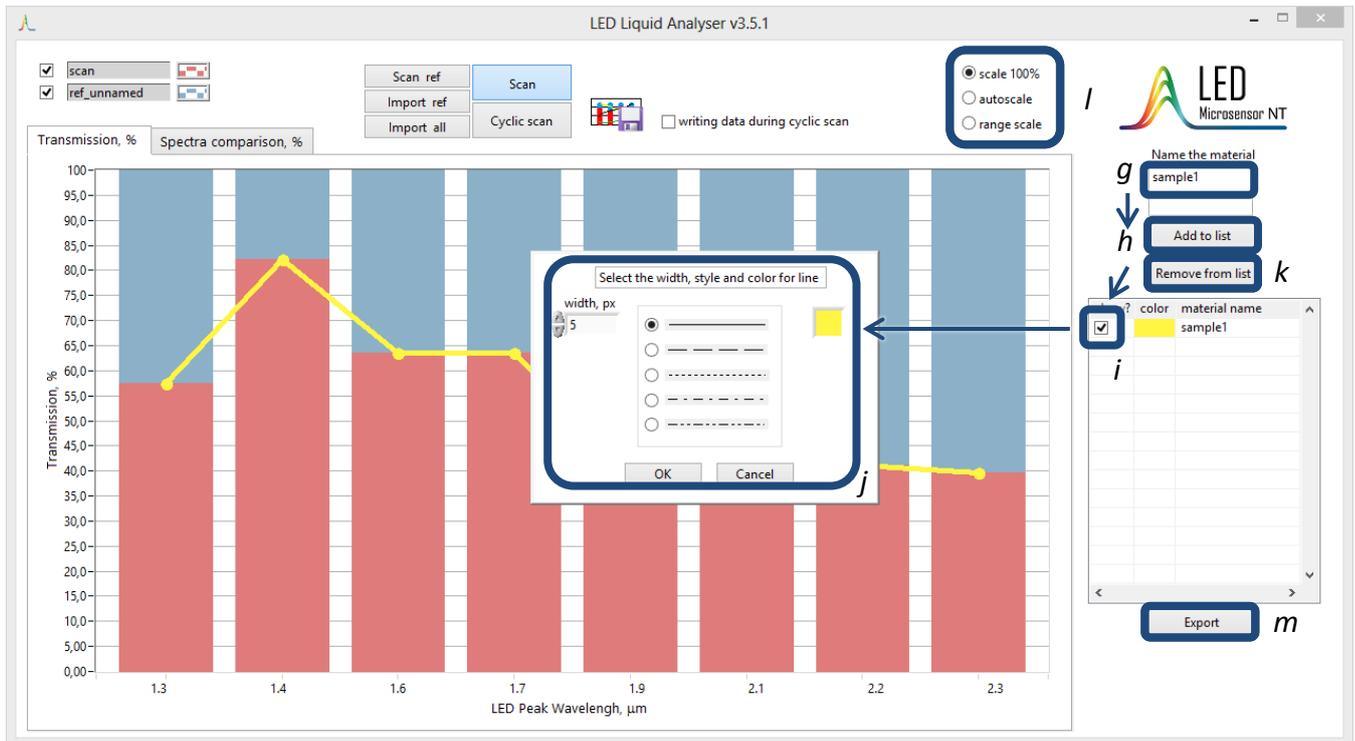


7. Insert a sample to be analysed into the cuvette and scan it. There are two scan modes: single scan and cyclic (repeated) scan. To perform single scan press start button on the top of the LA-1t device; to select cyclic scan mode press the select button. Single scan LED indicator will turn off and pulsing cyclic scan LED indicator will turn on.



## OPERATION INSTRUCTIONS

8. To be able to display different measured spectra on the main diagram and to export them to .xls file it is necessary to add the scanned spectrum of a sample to the list on the right side of the window. Insert the name of the spectrum in the “Name the material” box (g) and press the “Add to list” button (h). The spectra added to the list will be displayed in the main diagram as a row of dots connected with lines.



⚠ The spectra list box is easily customisable. By checking/unchecking the “show?” checkbox (i) of a spectrum you can add/remove the spectrum on the main diagram, by clicking right mouse button you can adjust width, style and color of the spectrum (j).

⚠ To remove the spectrum from the list, click the material name in the “material” column (it will become marked with blue) and press the “Remove from list” button (k). Several spectra can be selected and removed at once. **Spectra removed from the list cannot be restored.**

9. Scale adjustment on the main diagram is performed by three radio buttons (l). Three options are available:

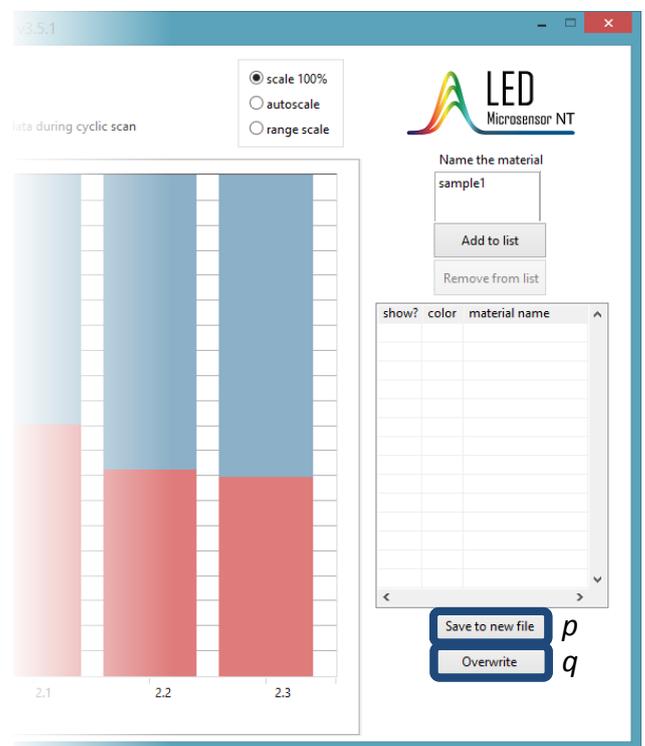
- scale 100% – full scale view from 0 to 100%;
- autoscale – view from 0% to maximal value of the shown scans;
- range scale – view from minimal to maximal value of the shown scans.

10. To export the measured spectra to .xls file press “Export” button (m).

## OPERATION INSTRUCTIONS

⚠ The program exports reference spectrum and all the spectra added to the list, so make sure that all the needed spectra are added to the list before export.

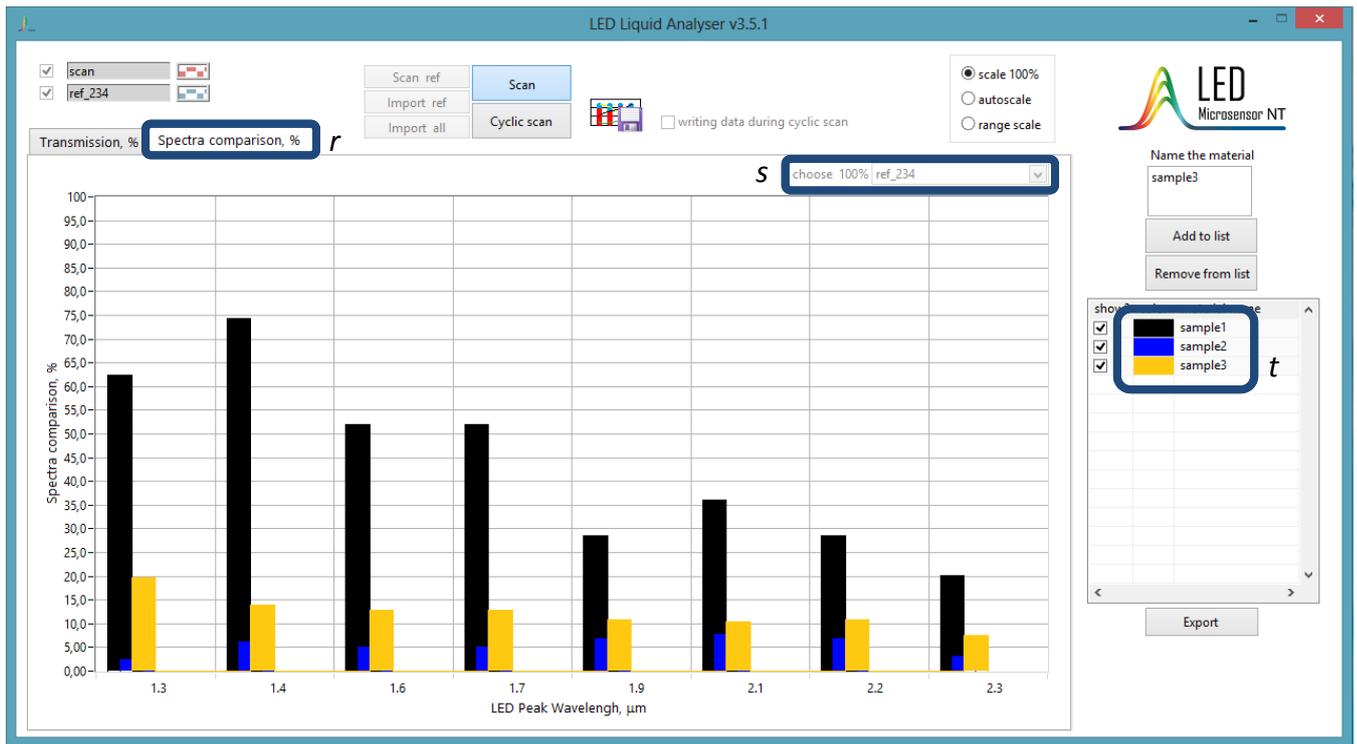
⚠ There are different ways to export the file. If the reference spectrum is scanned the new file will be created (name syntax: ref\_refname\_yy.mm.dd\_hh.mm.xls) in the “UserData” folder. If the reference spectrum is imported from a file (“Import ref” button), the program will ask to make the choice between creating a new file (“Save to new file” button, n) and adding the newly measured spectra to the file (“Add to existing file” button, o). If the “Import all” button is initially used, there are two options available: overwrite the imported file (“Overwrite” button, p) or create a new file (“Save to new file” button, q).



⚠ You may also save the graphs plotted in the main diagram as a graphical .jpg file pressing the  button

11. To compare the measured spectra please switch to the tab “Spectra comparison, %” (r). You can choose the spectra to compare (s) and choose the spectrum, which the other spectra will be compared to (t). The reference spectrum is chosen as a 100% by default. It is possible to choose up to 7 spectra for comparison.

# OPERATION INSTRUCTIONS



12. If the channels of the system are modified it is necessary to change the parameters in the configuration file “Channel.ini” (the location of file is “C:\Users\\*username\*\LED Analyser v.3.5.\MConfig”) in accordance with your configuration. The “[channel]” option represents the number of channel and “[led]” shows the wavelength of the LED. The default values are presented below.

```

Liquid_v3.0_Channel — Блокнот
Файл Правка Формат Вид Справка
[[channel]
Device Path = "hid#vid_20a0&pid_4173#781d514ae1&0&0000#{4d1e55b2-f16f-11cf-88cb-001111000030}"
Device Name = "USB MP-730 Dev0"
handle = 14736

[led]
Channel 1 = "1.3"
Channel 2 = "1.4"
Channel 3 = "1.6"
Channel 4 = "1.7"
Channel 5 = "1.9"
Channel 6 = "2.1"
Channel 7 = "2.2"
Channel 8 = "2.3"
    
```

- ⚠ Do not change the syntax of the “AdjCoeff.ini” file; otherwise errors in the program will occur.
- ⚠ Do not modify “Channel.ini” file without need; otherwise errors in the program will occur.
- ⚠ If one of the “Channel.ini” and “AdjCoeff.ini” files is causing the program errors, delete it and the program will create it again.