2015

Next-LCD

User Manual

Multifunctional Portative Spectrum Analyzer

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20.02.2015

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General Information

The Next-LCD is a completely autonomous, all-purpose measuring device. All measured characteristics are displayed as digits and graphs on-screen. The closed software environment of the device eliminates inaccurate readings. The device has two Lab-Bus digital bus ports to which the pressure sensors, microphones or power sensors can be connected. All this makes Next-LCD an all-purpose and completely cascadable tool. When a user purchases, for example, the set for measuring sound pressure, in the future, they can supplement it with the microphone for measuring AFC or with the power sensor for measuring current and voltage. Simultaneous work with two signal sources is possible. The internal sound signal generator of different waveforms (sine, white noise, pink noise) works in background mode alongside the process of measuring. The Next-LCD can be connected to a PC for controlling the device and transmitting data via USB, for example, when it is necessary to display the measurement results on a big screen. The device can be fitted with the built-in Wi-Fi module for connecting to Wireless networks which allows transmitting the measurement data for long distances via the Internet in real time mode.

Ergonomics

The Next-LCD device is performed as a monoblock that has graphic display with back light, 8 control buttons, USB port for connecting to a PC and charging the device, two Lab-Bus ports for connecting sensors, two RCA type outputs of the sound signal generator, feed switch and three-coloured LED for indicating status and extent of battery charge. The device can be supplied with the built-in Wi-Fi module for connecting and managing via the local network. The case of the device is made of shockproof plastic material.

Package Contents

- Main unit
- USB connection cable for charging and connecting it to a PC
- Spl-Lab Measuring Center software for Windows
- Audio-CD with audio tracks for tuning (sine, sweep-tones, noise)
- Case for carrying around and storing (optional)

Working with the device

Important safety information:

- ! The manufacturer does not bear responsibility for damage caused directly or indirectly as a result of improper device use.
- ! Before using the device, examine its case for cracks and splits, because any depressurization of the device will result in it's possible failure.
- ! To avoid the risk of electric shock, all the connector cables should not have insulation defects.
- ! Avoid measuring load beyond the maximum limit.
- ! All operations of connecting and disconnecting connection cables should be performed with equipment switched off.
- ! Do not use or store the device in areas with high humidity or heat, as well as, close to the devices, generating strong magnetic field.
- ! During preventive maintenance of the device, do not use synthetic detergents and do not apply solvents. Using wet wipes is more preferable.
- ! Before starting the device and a system on the whole, ensure that all the connection cables are switched correctly.

Identifying the functional parts of the device:

No.	Element	Assignment
1	Display	Graphic display with automatic dimming of display backlight
2	Power indicator	three-coloured LED for indicating status of the device
3	Feed switch	the slide switch for switching the device on/off.
4	MODE button	for switching the device operation modes
6	LIGHT button	switching the display backlight on/off. Using the display backlight decreases the device running time.
5 7 8 9 10 11	OPTION button FUCTION button Up button Down button Right button Left button	The button assignment depends on the mode.
12 15	Lab-Bus port 2 Lab-Bus port 1	input jacks for connecting the external sensors
13 14	Output #1 and Output #2 of the generator	RCA jacks for connecting the internal generator.
16	USB port	slot for connecting device to a PC or charging the device.

Charging the battery of the device

The device has an internal battery. The running time of the device depends on the intensity of use and the type of sensors connected. For charging, please connect the device via the USB port to the charger or PC. Consider that for full charge, the device should be switched off. Use the three-coloured LED for estimating the extent of battery charge and status of the device (according to the table below):

	Green	Orange	Red
Glows continuously	The device is on; battery charge above 80%. Charging complete or not connected	The device is on; battery charge above 80%. Charging is in process.	Device is off. Charging is in process.
Blinks slowly	The device is on; battery charge above 50%. Charging complete or not connected	The device is on; battery charge above 50%. Charging is in process.	
Blinks quickly	The device is on; battery charge above 20%. Charging complete or not connected	The device is on; battery charge above 20%. Charging is in process.	

Starting work and configuring the device

Perform the complete charging cycle until the LED goes out. If necessary, connect sensors to the Lab-Bus ports and generator outputs. Switch the device on using the slide switch. After it is switched on, user will enter the configuration mode - **“CFG”**. The name of mode is indicated in the upper left part of the display.

Use the **Up** and **Down** buttons for changing the menu entry. Use the **Left** and **Right** buttons for changing the value of selected menu entry.

- **Port 1** – selecting the type of sensor, connected to Lab-Bus 1 port
- **Port 2** – selecting the type of sensor, connected to Lab-Bus 2 port
- **Light off** - setting the time of automatic display backlight dimming in seconds. Backlight goes off after the defined period of time and switches on when any button is pressed. Please pay attention that running time decreases when the display backlight is used. It is recommended to use the automatic backlight dimming option for saving the battery state of charge.
- **Reset to default –** resets all settings including mode settings and calibrations. Confirm reset with **Left** button or cancel with **Right** button.

After configuring, press the **MODE** button for saving the settings.

Connecting to PC via the USB port

Switch the device on and wait until the **"CFG"** mode is loaded. Connect the device to a PC using USB port. Install drivers from the CD, which is included into the delivery set, or download them from the Support section at Spl-Lab web site **www.spl-lab.ru | www.spllabusa.com.** Install the drivers and start Spl-Lab Measuring Center for device connection. After connection is established, the device will automatically enter the **"CON"** mode.

Connecting to PC via Wireless network

The device can be supplied with the internal module for connecting to Wireless networks via Wi-Fi. For configuring connection settings, connect the device to a PC and start the Measuring Center. Once configured, the device will automatically connect to the selected Wireless network every time it is switched on. After connection is established, the device will automatically enter the **"CON"** mode.

Operation modes

In the Next-LCD device, several operation modes are provided. Current mode is indicated in the upper left part of the display. Modes are changed cyclically using the **MODE** button. Apart from the general operation modes, there are measuring modes. Each measuring mode has a unique algorithm for conducting measurements. Different measuring modes operate with different types of sensors. The measuring mode will be disabled in case the required equipment is unavailable.

- **"CFG"** is the configuration mode. The device automatically enters this mode after switched on.
- **"GEN"** is the generator mode. Note that the generator can work in a background mode alongside the process of measuring, even after exiting the mode.
- **"CON"** is the mode which switches on automatically after device establishes connection with a PC via USB or Wireless network. The type of current connection is displayed. Managing the device is unavailable in this mode. For exiting the mode, disable the connection on the PC.
- **"SPL"** is the mode used for measuring the peak value of sound pressure for signals with frequencies ranging from 10 to 120 Hz with resolution of 1 Hz. In this mode, the waveform, spectrum, level and distortion of the measured signal are displayed. It is possible to use two channels in this mode. The mode works with **Next-Lab SPL Sensor.**
- **"AVG"** is the mode used for measuring the time-average peak value of sound pressure of the signal with frequencies ranging from 10 to 120 Hz with resolution of 2 Hz. In this mode, the level of the measured signal is displayed. It is possible to use two channels in this mode. The mode works with **Next-Lab SPL Sensor.**
- **"RTA"** is the mode used for measuring the amplitude, distortion and frequency-response ripple of the sound signal with frequencies ranging from 10 to 20,000 Hz frequency with resolution of 1 octave, 1/3 or 1/6 of an octave. In this mode, the waveform, spectrum and amplitude of the measured signal are displayed. The mode works with **Next-Lab RTA Microphone.**
- **"PWR"** is the mode used for measuring power characteristics such as voltage, current, power, frequency, impedance and harmonic distortion coefficient. Measuring the characteristics of both direct and alternating current circuits with frequency up to 15,000 Hz is possible. It is possible to use two channels in this mode. The mode works with **Next-Lab SPL Sensor.**

The generator mode GEN

The generator mode is intended for playing back test signals of different waveforms. The generator can work in a background mode alongside the process of measuring, even after exiting the mode. For switching the background mode off, it is necessary to return to the "**GEN**" mode.

Use the **Up** and **Down** buttons for changing the menu entry. Use the **Left** and **Right** buttons for changing the value of selected menu entry.

- **Out** – selecting the type of generated signal: **SINE** – sine, **PINK** – pink noise, **WHITE** - white noise.
- **Level** – setting the level of the playback signal. Level of 100% corresponds to amplitude of 5 volt on the generator outputs.
- **Freq** – setting the frequency of the sine signal in Hz within the range from 1 up to 20,000 Hz.

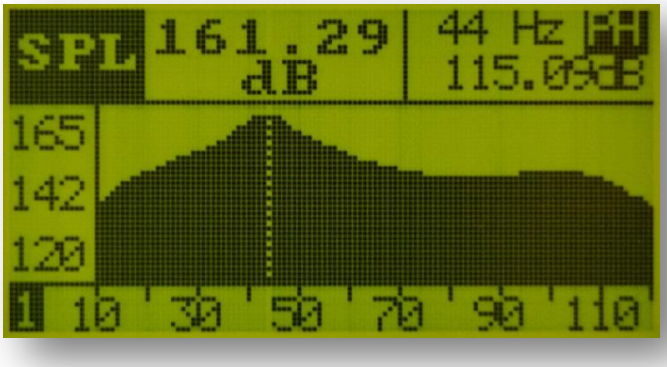
Use the **FUNCTION** button for starting/stopping the measurement. In doing so, the text at the upper part of the display will indicate **Stopped,** when the generator is stopped, or **Playing**, when the signal is being played back.

SPL Measuring Mode

The SPL mode is intended for measuring the sound pressure level of low frequency sound signals. The analysed length of the signal equals to one second. The resultant value of the sound pressure level is calculated from several spectral components for each analysed part of the signal separately.

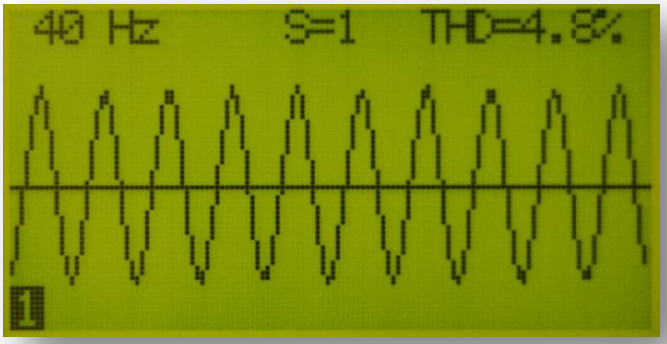
It is possible to view three types of information in SPL mode: spectrum, signal waveform and digitized data. Changing between the types of reflected information is performed using the **OPTION** button.

Spectrum



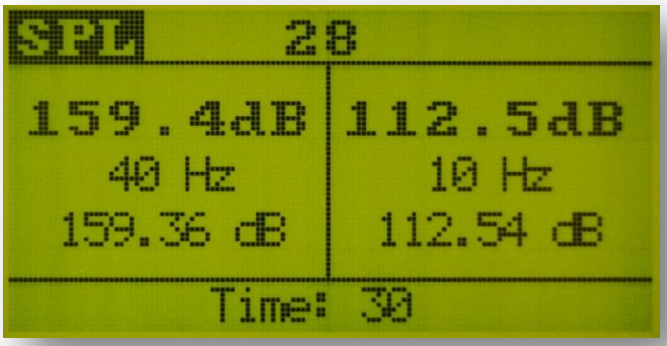
- **"161.29 dB"** is the section displaying the peak result
- **"44 Hz"** is the section displaying the frequency
- **"115.09 dB"** is the section displaying the current result
- **"PH"**– the indicator that is responsible for enabling/disabling the Peak hold mode. Use the **FUNCTION** button to enable/disable the Peak hold mode. The peak result section holds the maximum amplitude reached during the entire time of measurement and in the frequency area - the frequency at which the maximum amplitude value was reached. Only the peak component at the corresponding frequency is marked on the spectrum and the amplitude values for each frequency change only in case they exceed the previous maximum. Maximum amplitude is marked with a vertical, dashed line on the spectrum. Collected data is reset with the **Left** button or switching off the peak hold mode.
- **"120…165"** is the amplitude scale; It is zoomed automatically.
- **"10…110"** is the frequency scale
- **"1"** is the indicator of the currently displayed channel. The indicator is active only when two channels are used. Channels are changed using the **Up** button.

Signal waveform



- **"40 Hz"** is the section displaying the current frequency
- **"S=1"** shows the scale of the displayed signal. It shows the number of signal parts displayed. For changing the scale, use the **Right** and **Left** buttons.
- **"THD=4.8%"** is the harmonic distortion coefficient value of the signal
- **"1"** is the indicator of the currently displayed channel. The indicator is active only when two channels are used. Channels are changed using the **Up** button.

Digitized data



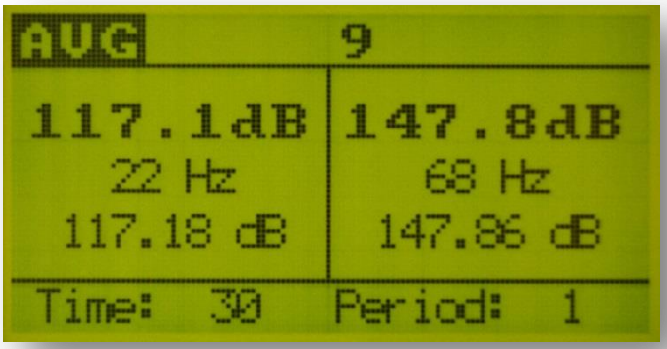
- **"28"** indicates duration of the current measurement in seconds. For starting/stopping the measurement, press the **FUNCTION** button. Before starting a measurement, a 5 second long countdown is provided.
- **"159.4dB"** is the section displaying the peak result for channel 1
- **"40 Hz"** is the section displaying the frequency for channel 1
- **"159.36 dB"** is the section displaying the current result for channel 1
- **"112.4 dB"** is the section displaying the peak result for channel 2
- **"10 Hz"** is the section displaying the frequency for channel 2
- **"159.36 dB"** is the section displaying the current result for channel 2

- **“Time: 30”** is the set duration of measurement. For changing the duration, use the **Up** and **Down** buttons.

Measurement is held in the peak hold mode.

AVG Measuring Mode

The AVG mode is intended for measuring the time-average sound pressure level of low frequency sound signals. The analysed length of the signal equals to 1/2 second. Current value of the sound pressure level is calculated from several spectral components separately for each analysed part of the signal. The resultant value is an arithmetic average of maximum values selected within the number of analysable parts of the signal specified in the **"Period"** parameter.



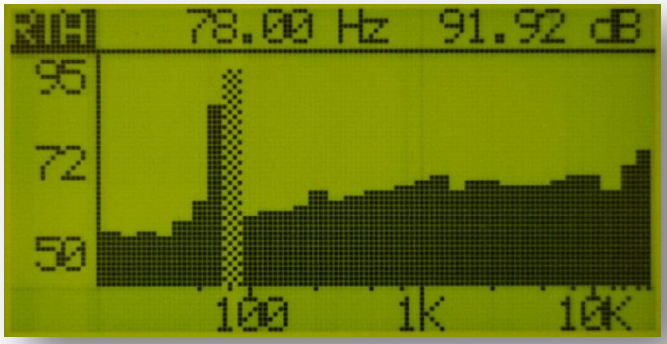
- **"9"** indicates duration of the current measurement in seconds. For starting/stopping the measurement, press the **FUNCTION** button. Before starting a measurement, a 5 second long countdown is provided.
- **"117.1dB"** is the section displaying the peak result for channel 1
- **"22 Hz"** is the section displaying the frequency for channel 1
- **"117.18 dB"** is the section displaying the current result for channel 1
- **"147.8 dB"** is the section displaying the peak result for channel 2
- **"68 Hz"** is the section displaying the frequency for channel 2
- **"147.86 dB"** is the section displaying the current result for channel 2
- **"Time: 30"** is the set duration of measurement. For changing the duration, use the **Up** and **Down** buttons.
- **"Period: 1"** is the defined period value. For changing period, use the **Left** and **Right** buttons.

RTA Measuring Mode

The RTA mode is intended for measuring different sound signal characteristics through the entire audible frequency range. The analysed length of the signal equals approximately to 1/5 second. In the RTA mode, the amplitude of the spectral peak component, coefficient of harmonic distortion and frequency-response ripple of the analysed signal can be measured.

It is possible to view two types of information in RTA mode: spectrum and signal waveform. Changing between the types of displayed information is performed by using the **OPTION** button.

Spectrum

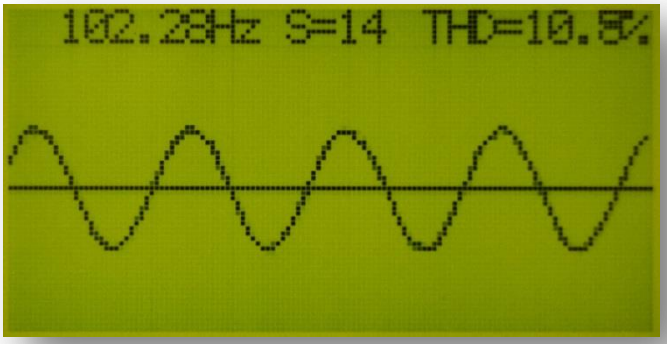


- **"78.00 Hz "** is the frequency of the peak values of the spectrum
- **"91.92 dB"** is the amplitude of the peak values of the spectrum
- **"50…95"** is the amplitude scale; It is zoomed automatically.
- **"100…10K"** is the frequency scale

The spectrum is displayed in octave view with resolution of 1, 1/3 or 1/6 of the octave. For changing the spectrum detailing, use the **Up** and **Down** buttons. When displaying the spectrum, smoothing in real-time is used. Each component of the spectrum displayed is an arithmetic average of 50 spectrum components taken earlier. Maximum amplitude is marked with a vertical dashed line on the spectrum.

Use the **FUNCTION** button for starting/stopping measurement and the **Left** button for resetting the collected data.

Signal waveform

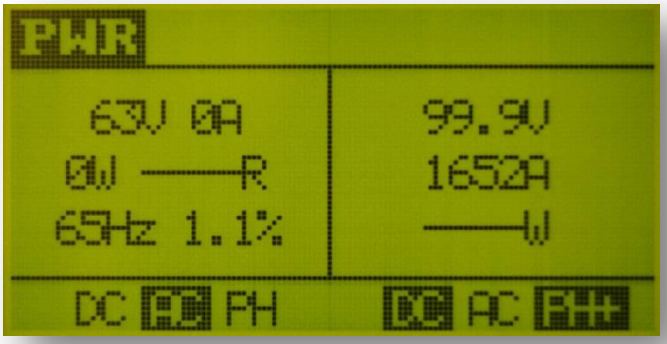


- **"102.08 Hz"** is the section displaying the current frequency
- **"S=14"** shows the scale of the displayed signal or number of parts of the signal displayed. For changing period, use **Left** and **Right** buttons.
- **"THD=10.8%"** – the harmonic distortion coefficient value of the signal

PWR Measuring Mode

The mode used for measuring power characteristics such as voltage, current, power, frequency, impedance and harmonic distortion coefficient. Measuring the characteristics of both direct and alternating current circuits with frequency up to 15,000 Hz is possible.

Before starting the measurement, calibrate the sensors by pressing the **FUNCTION** button. At the moment of calibration, values at the sensor input should equal to 0.



- **“63V”** is voltage value at channel 1
- **“0A”** is current value at channel 1
- **“0W”** is power value at channel 1
- **“-----R”** is impedance value at channel 1
- **“65HZ”** is frequency value at channel 1
- **“1.1%”** is harmonic distortion coefficient value at channel 1
- **“99.9V”** is voltage value at channel 2
- **“1652A”** is current value at channel 2
- “-----”**“W”** is power value at channel 2
- **“DC ”“AC”** is indicator of the signal type (direct/**alternating**) measured at channel 1. For changing, use the **Up** button.
- **“PH”** is the indicator for holding the peak value (**no**/min/max) at channel 1. For changing, use the **Down** button.
- **“DC ”“AC”** is indicator of the signal type (**direct**/alternating) measured at channel 2. For changing, use the **Right** button.
- **“PH+”** is the indicator for holding the peak value (no/min/**max**) at channel 2. For changing, use the **Left** button.

Description of the CD tracks

The CD included in the Spl-Lab equipment distribution kit alongside with software contains specialised audio tracks with test signals for adjusting a sound system. Consider that these tracks are recorded not in the file form but as tracks in Audio-CD format. For playing back the tracks from the CD, use specialised software or CD player. It is possible that some CD player models will not read the audio content of the CD. In such case, or if it is more convenient for you to use the audio files, download the archive with test signals from **"Support"** at Spl-Lab web site. Table with track description below:

No. of track	**Contents**
Track 1	Pink noise 20-20 000 Hz
Track 2	Pink noise 40-60 Hz
Track 3	Pink noise 60-80 Hz
Track 4	Pink noise 80-100 Hz
Track 5	Pink noise 100-120 Hz
Track 6	Pink noise 120-140 Hz
Track 7	Pink noise 140-160 Hz
Track 8	Pink noise 160-180 Hz
Track 9	Sweep-tone 30-20 Hz Level – 0 dB.
Track 10	Sweep-tone 35-25 Hz Level – 0 dB.
Track 11	Sweep-tone 40-30 Hz Level – 0 dB.
Track 12	Sweep-tone 45-35 Hz Level – 0 dB.
Track 13	Sweep-tone 50-40 Hz Level – 0 dB.
Track 14	Sweep-tone 55-45 Hz Level – 0 dB.
Track 15	Sweep-tone 60-50 Hz Level – 0 dB.
Track 16	Sweep-tone 65-55 Hz Level – 0 dB.
Track 17	Sweep-tone 70-60 Hz Level – 0 dB.
Track 18	Sweep-tone 75-65 Hz Level – 0 dB.
Track 19	Sweep-tone 80-70 Hz Level – 0 dB.
Track 20-80	Sine signal. The number of track corresponds to the signal frequency. Level – 0 dB.

Track 81	Sweep-tone: Sweep-tone 20-20,000 Hz Level – 0 dB.
Track 82	Sine signal with frequency of 100 Hz
Track 83	Sine signal with frequency of 200 Hz
Track 84	Sine signal with frequency of 1,000 Hz
Track 85	Sine signal with frequency of 2,000 Hz