beDSP

User Manual

ALMx 5.1

VERSION 2

ALMx 5.1

Loudness and True Peak metering at your hand

Audio Loudness and True Peak Meter application, BS1770 (rev.3) , EBU R128, ATSC A/85 and ARIB TR-B32 compliant. Ideal for Mono, Stereo and 5.1 channel formats featuring measurements for Momentary, Short Term and Integrated Loudness, with Loudness Range and Max True Peak Level.

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1. ALMx 5.1 - Loudness and True Peak Meter

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Loudness and True Peak metering at your hand

Taking the idea behind the ALM 5.1 plugin a step further, we have developed a standalone application, with extended features, that offers more control and power, allowing you to use it in more complex situations: the ALMx 5.1 (stands for Audio Loudness and True Peak Meter with extended features).

The application was created as an aid for television networks and media services providers. Just like the ALM 5.1 plugin, the driving forces behind the application are the algorithms developed according to the international broadcast standards (BS-1770, EBU R128, ATSC A/85 and ARIB TR - B32), based on research and perception tests. With the help of the log feature, you can pinpoint the time and the duration of the loudness disturbance.

ALMx 5.1 offers you full Loudness and True Peak Metering for Mono, Stereo and 5.1 channel formats featuring measurements for Momentary, Short Term and Integrated Loudness, with Loudness Range and Max True Peak Level. Additionally, the application offers you a general or a more detailed overview of your measured material, any time you want. Two kind of files are used to store different information, in .csv and .XML format .

ALMx 5.1 will help you control the loudness of your audio material, whether your target is -23 LUFS (according to EBU specifications), -24 LUFS (according to ATSC/ARIB specifications) or you want to use the relative gate of -10 LU. Both LU and LUFS scales are available, you can set the start and the stop of your measurements.

For the Integrated Loudness and Short Term Loudness values ALMx 5.1 uses a color coding. This way, you will know how your program loudness fares compared to the accepted tolerance of each standard.

For a higher resolution in the target zone you can use the +9 LU scale. For a higher dynamic range use the + 18 LU scale. Both a value and a bar indicator are available for Loudness Range, so you can decide if your audio needs more dynamic compression.

Two scales with different reference levels (-18 dBTP and -20 dBTP) are available for the True Peak Meter. ALMx 5.1 takes into account all the inter-samples that can be missed in quantization.. The application features a timecode counter of the measurements and you can reset the measurements anytime you want.

The application allows you to have more control over your loudness by recording all the values measured in .csv and .XML files. Using ALMx 5.1 Log feature you can see the graphical representation of the Short Term Loudness and Momentary Loudness, for all the logs files saved.

ALMx 5.1 offers you a True Peak Vectorscope, a Momentary Loudness Vectorscope, Sound Field Display and Correlation Meters for L/R, L/C, R/C, Ls/Rs, L/Ls and R/Rs. Also available is a 5.1 to Stereo downmixing option.

For your convenience, there are also a lock and kiosk mode options available. You have access to all the loudness descriptors and you can view the application settings.

Features

- Standalone Loudness and True Peak Metering for Windows and OSX
- Channel Formats: mono, stereo and 5.1;
- Full compliance with Loudness standards : BS-1770 (rev.3), EBU R128, ATSC A/85 and ARIB TR-B32 specifications;
- Complete loudness measurements using universal descriptors: Integrated Loudness/ Program Loudness, Momentary Loudness, Short Term Loudness, Loudness Range;
- Real-time metering for Momentary Loudness, Short Term Loudness and Loudness Range;
- True Peak Level Metering with peak hold;
- Real-time vectorscope for True Peak and Momentary Loudness;
- Sound Field view
- Correlation meters for L/R, L/C, R/C, Ls/Rs, L/Ls and R/Rs channels;
- Downmixing from 5.1 to stereo;
- Max True Peak Level (calculated using inter-sample peaks that can be missed in quantization);
- Accurate measurements for all the usual sample rates: 44.1 kHz, 48 kHz and multiples;
- Low CPU usage due application optimization;
- Logging files in .csv and .XML format;
- Variable colors for loudness descriptors, according to the comfort zone;
- Variable thresholds for True Peak and Short Term Loudness ;
- Variable threshold for Short Term Loudness;
- Lock option
- Kiosk mode option

Figure 1: ALMx 5.1

Loudness Descriptors

- **Integrated Loudness or Program Loudness** (in LUFS[1], LU[2] and LKFS[3]) – describes the long-term integrated loudness of an audio material from 'start' to 'stop'. This is measured using the specifications of international standards: for Europe – ITU-R BS.1770 (with no gate) or ITU-R BS.1770-3 (with gate at -10 LU), for America – ATSC A/85 and for Japan – ARIB TR – B32. The gate is used to exclude blocks of audio signal 10 LU below the absolute-gated loudness level (for Settings see page 26). This ensures that an audio material with long periods of silence will not be too loud after a possible loudness normalization.

- **Momentary Loudness** (in LUFS, LU or LKFS) – calculated with a time window of 400 ms;

- **Short Term Loudness** (in LUFS, LU or LKFS) – calculated with a time window of 3 s;

- **Loudness Range** (in LU) – loudness dynamic range from 'start' to 'stop' that helps you decide if dynamic compression is necessary;

- **True Peak Max Level** (in dBTP[4]) – indicates the maximum value of the signal waveform in the continuous time domain (this value is calculated using inter-sample peaks that can be missed in quantization).

1. LUFS - Loudness Level, K-Weighting, referenced to digital Full Scale
2. LU - Loudness Units: 1 LU ≡ 1 dB
3. LKFS - Loudness Level, K- weighted
4. dBTP - deciBel referenced to digital Full Scale measured with a True Peak meter

2. Installation and Authentication

beDSP

Loudness and True Peak metering at your hand

Minimum System Requirements

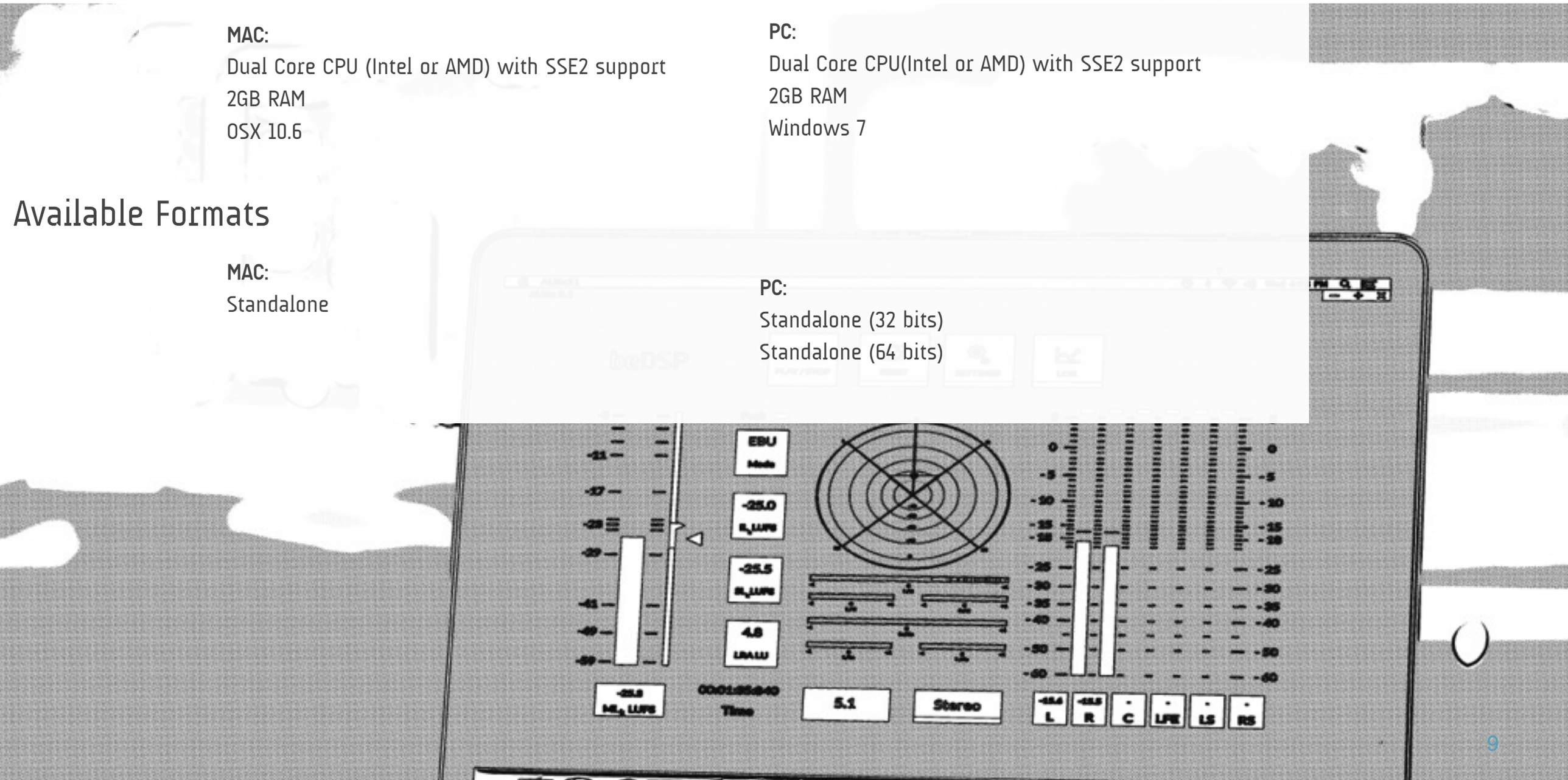
MAC:
Dual Core CPU (Intel or AMD) with SSE2 support
2GB RAM
OSX 10.6

PC:
Dual Core CPU(Intel or AMD) with SSE2 support
2GB RAM
Windows 7

Available Formats

MAC:
Standalone

PC:
Standalone (32 bits)
Standalone (64 bits)



Thank you for choosing ALMx 5.1!
Once you have downloaded the package **ALMx51Installer** and you own a serial number, please follow the next steps for the installation (for OSX or Windows) and authentication of your product.

OSX Installation

1. Double click on the ALMX51Installer 2.mpkg and an installation window will appear (see Figure 2). Press the **Continue** button to **start** the installation;

Figure 2: Destination of the installation

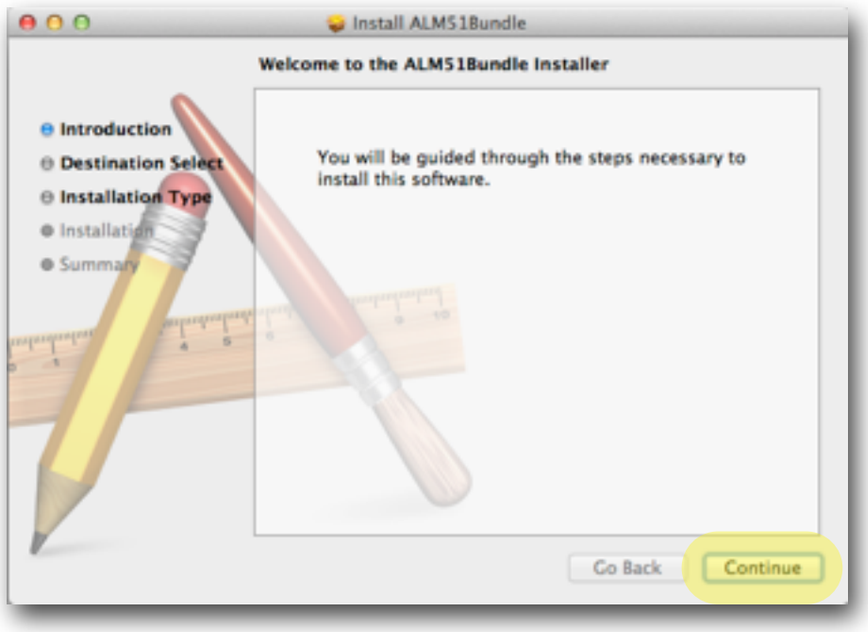


Figure 3: Installation window

2. **Select a Destination** for the installation (see Figure 3) and then press the **Continue** button;

3. Select the **Installation type** you want and then press the **Continue** button (see Figure 4);

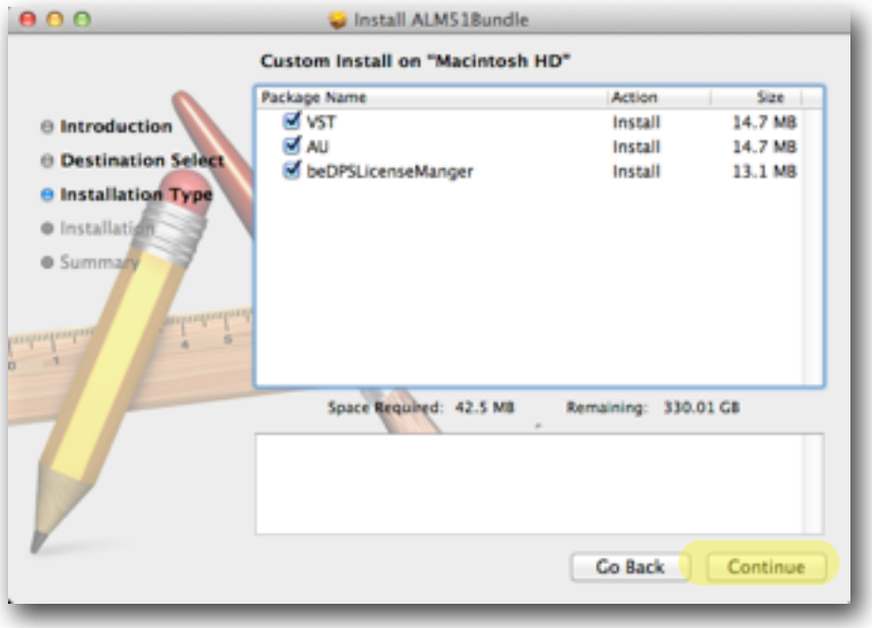


Figure 4: Installation Type

4. An information message will appear. Press the **Install** button if you have the necessary free **space** for a proper installation (see Figure 5);
5. Wait until the installation is completed and a confirmation window appears (see Figure 6). Press the **Close** button and pass to the **Authentication** part.

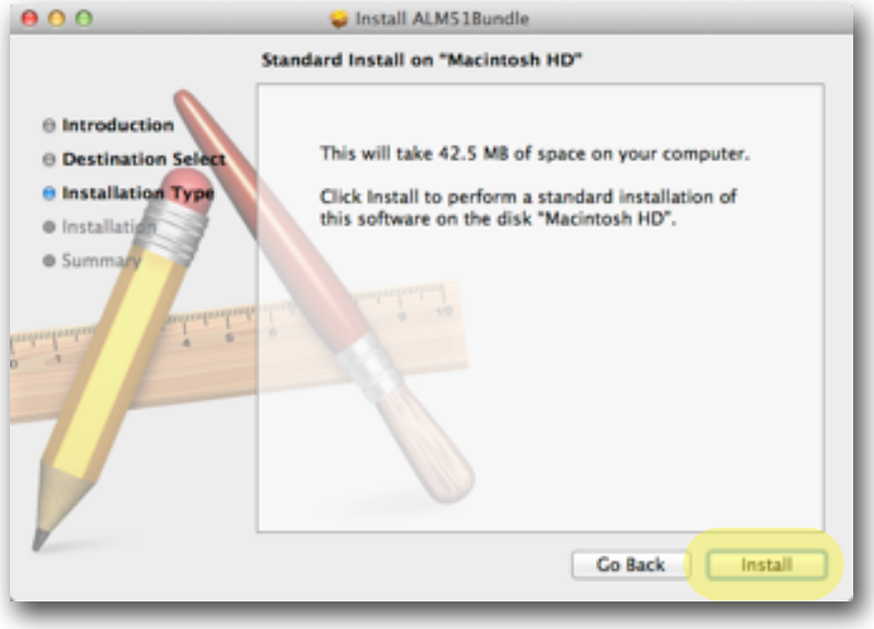


Figure 5: Free space necessary for the installation

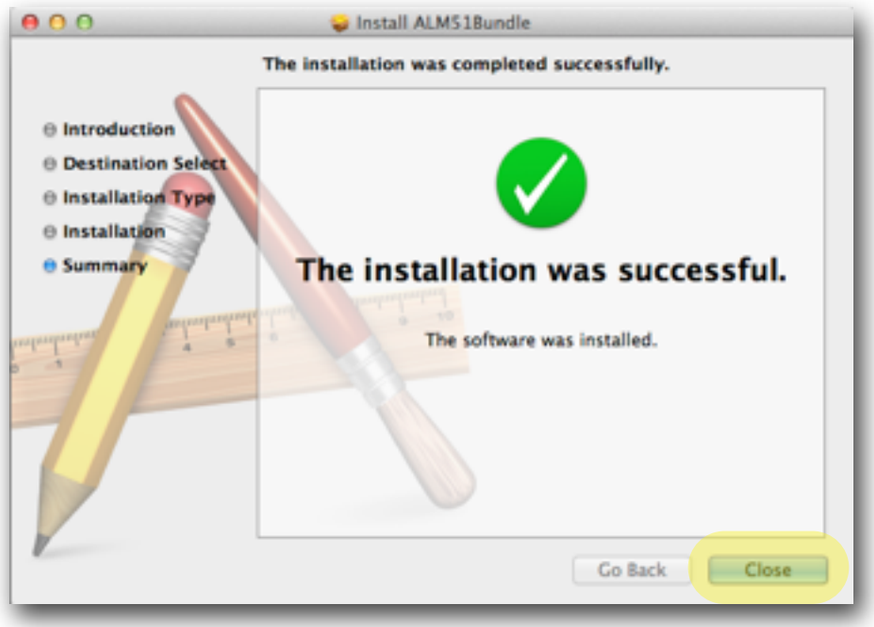


Figure 6: Installation completed

Windows Installation

Figure 7: Setup window

1. Double click on the ALMXInstaller 2.Bundle and a setup window will appear (see Figure 7). Press the **Next** button to continue the setup;

2. When the setup is ready to begin installing ALMx 5.1 on your computer (see Figure 8), press the **Install** button.

3. Press the **Finish** button to exit the Setup. You have the possibility to automatically launch the ALMx 5.1 application (see Figure 9).

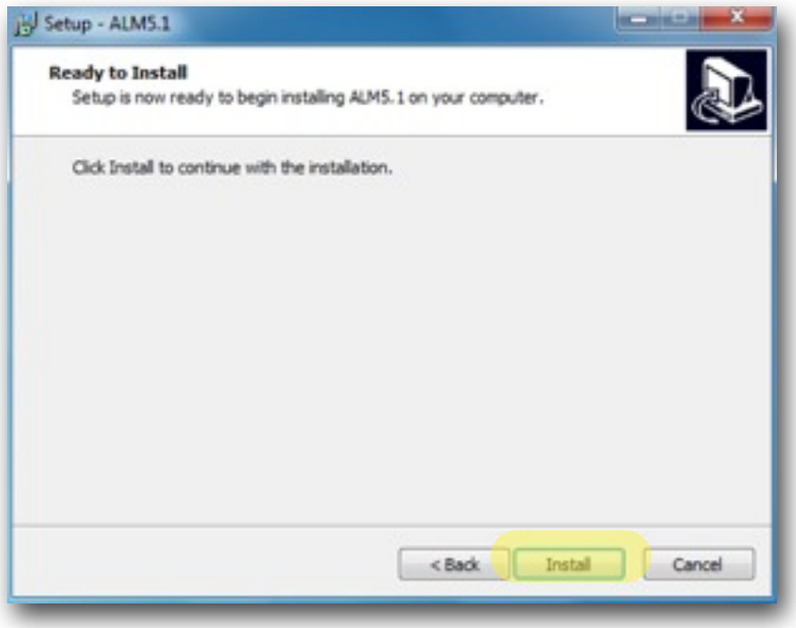


Figure 8: Installation start

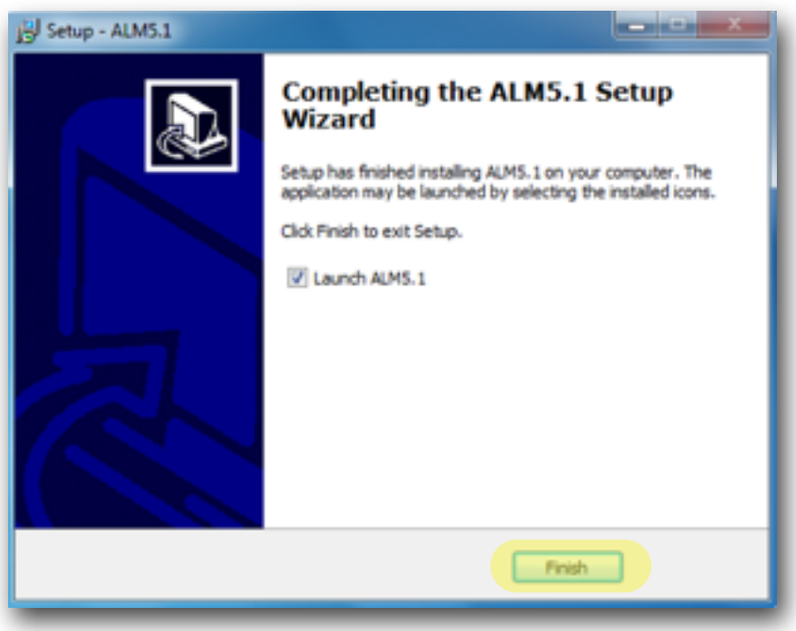


Figure 9: Installation start

Authentication

Go to the **Applications/ProgramFiles** where you will find the **beDSP** folder.
Double click on the beDPSLicenseManager icon and the main menu window will appear (see Figure 10) with three available options: **Online Activation**, **Offline Activation** and **Trial Request**. For any type of activation you must have a beDSP account.
If you don't have one, go to *www.bedsp.net/sign-up* and create your account. The username will be the same as the e-mail you used for registration.

Online Activation

1. If you have an internet connection, select **Online Activation**, otherwise you will have to select **Offline Activation** (see Figure 10).
2. If you want to activate the application on your computer, select **For this computer** (see Figure 11).

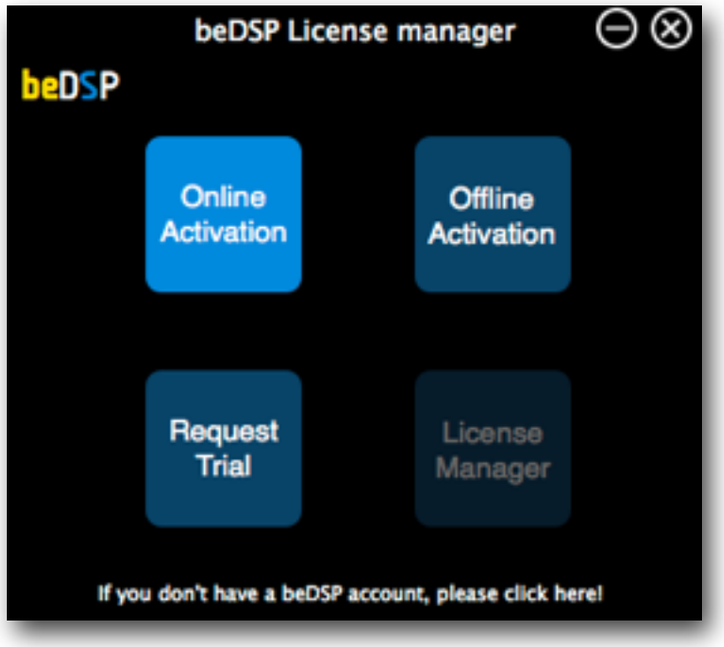


Figure 10: Main menu

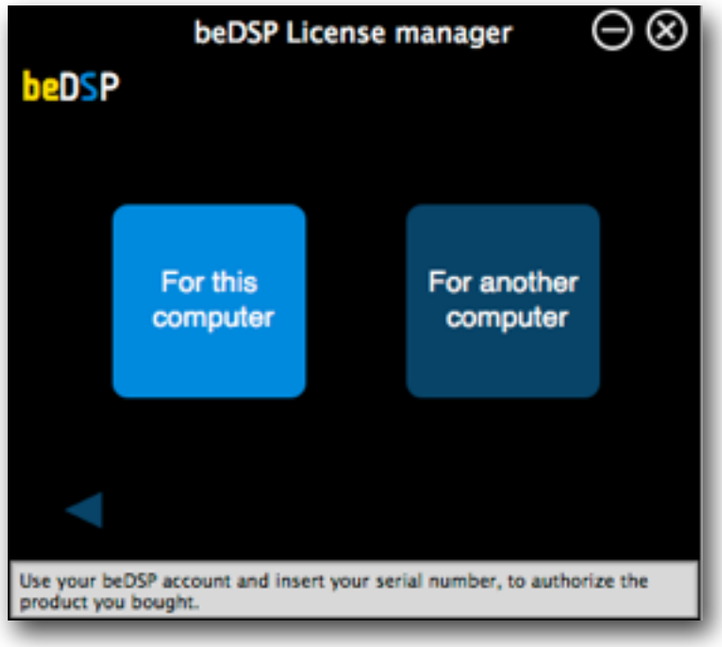


Figure 11: Online Activation options

3. An authentication window will appear (see Figure 12) .
Insert your beDSP username (same as your e-mail), password and serial number.

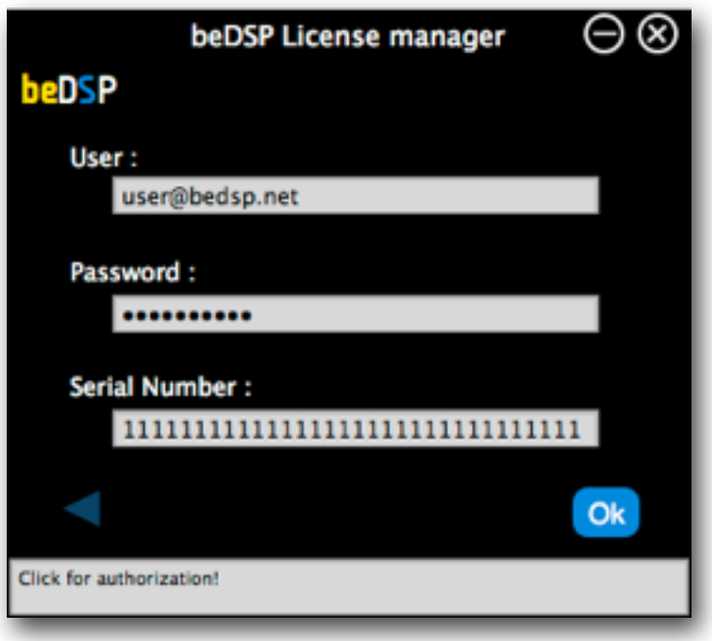


Figure 12: Authentication window

Figure 13: Confirmation window

4. A confirmation window will appear, that specifies the name of the product you have just activated and the type of license (see Figure 13).
Press **OK** and enjoy your product!

Offline Activation

If you don't have an internet connection, select **Offline Activation** from the main menu (see Figure 10), then **Generate Request** (see Figure 14).

1. Insert your serial number and select the folder where you want to save your license request (see Figure 15).
2. After clicking ok, your license request will be saved. A window containing the license request will be revealed.
3. Copy your license request on a flash drive or any data storage device and move it on the online computer (this second computer must have the beDSP license manager installed and an internet connection so you can continue your activation).

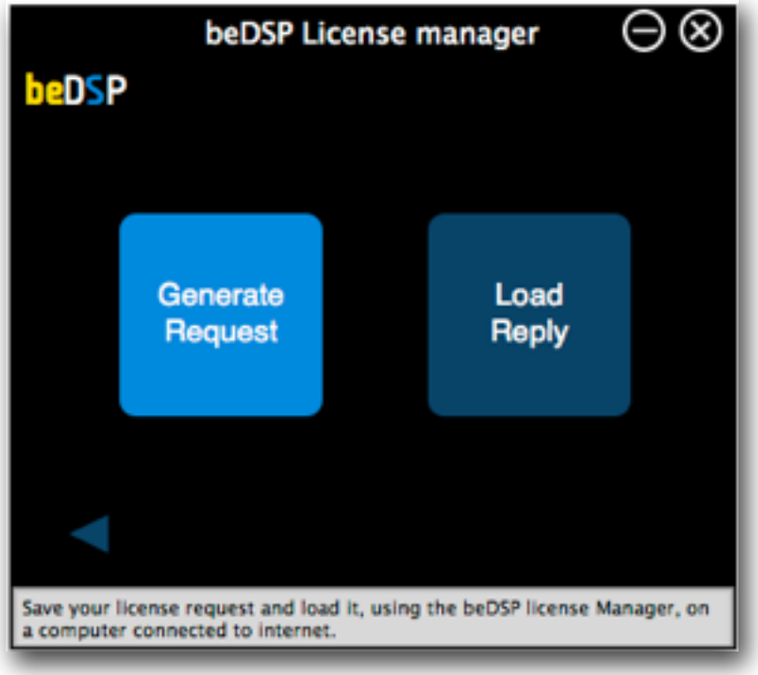


Figure 14: Offline Activation options

Figure 15: Generating the license request

4. From the **Online Activation** menu, pick **For Another Computer** (see Figure 11).

5. In the authentication window (see Figure 16), insert your beDSP username (same as your e-mail), password and load your license request. Click ok for authorization.

6. A folder with the license reply will be revealed, named “LicensesToMove”. This folder is saved in the same place you’ve copied your license request. Now move your license reply on the computer you wish to authorize.

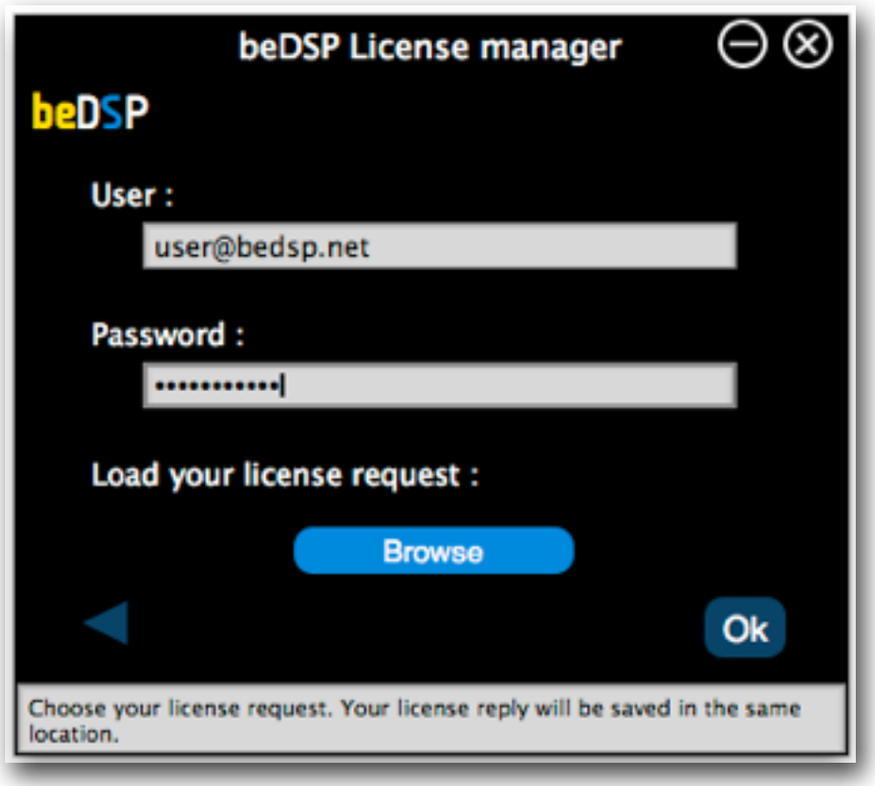


Figure 16: Authorizing your license request

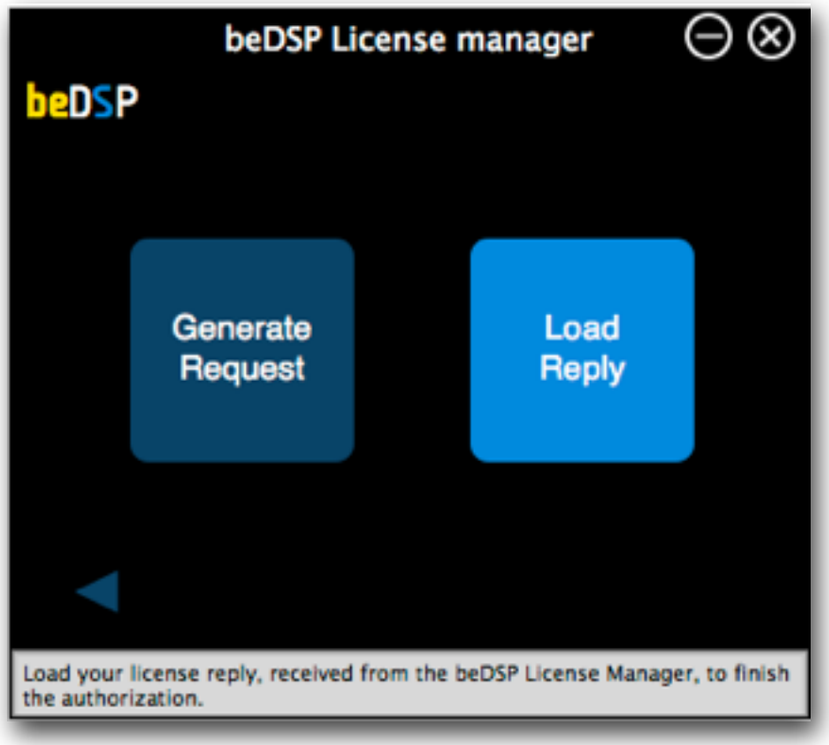


Figure 17: Loading your reply

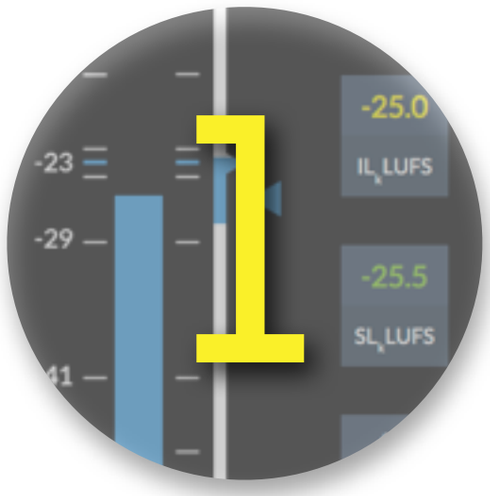
7. Back on your computer, from the main menu (see Figure 10), pick **Offline Activation**, then choose **Load Reply** (see Figure 17).
   A browser window will open and you have to select your reply.

8. After loading your reply, a confirmation window will appear, like the one from Figure 13. Press **Ok** and enjoy your product!

3. How it works?

beDSP

Loudness and True Peak metering at your hand



ALMx 5.1 application has a simple interface with 7 main parts:

- Loudness metering (1 – see Page 19);
- True Peak metering (2 – see Page 22);
- Vectorscope, Correlation Meters, Sound Field and 5.1 to Stereo downmixing (3 – see Page 23);
- Application Settings (4 – see Page 26);
- Audio Settings (5 – see Page 27);
- Logging (6 – see Page 28).

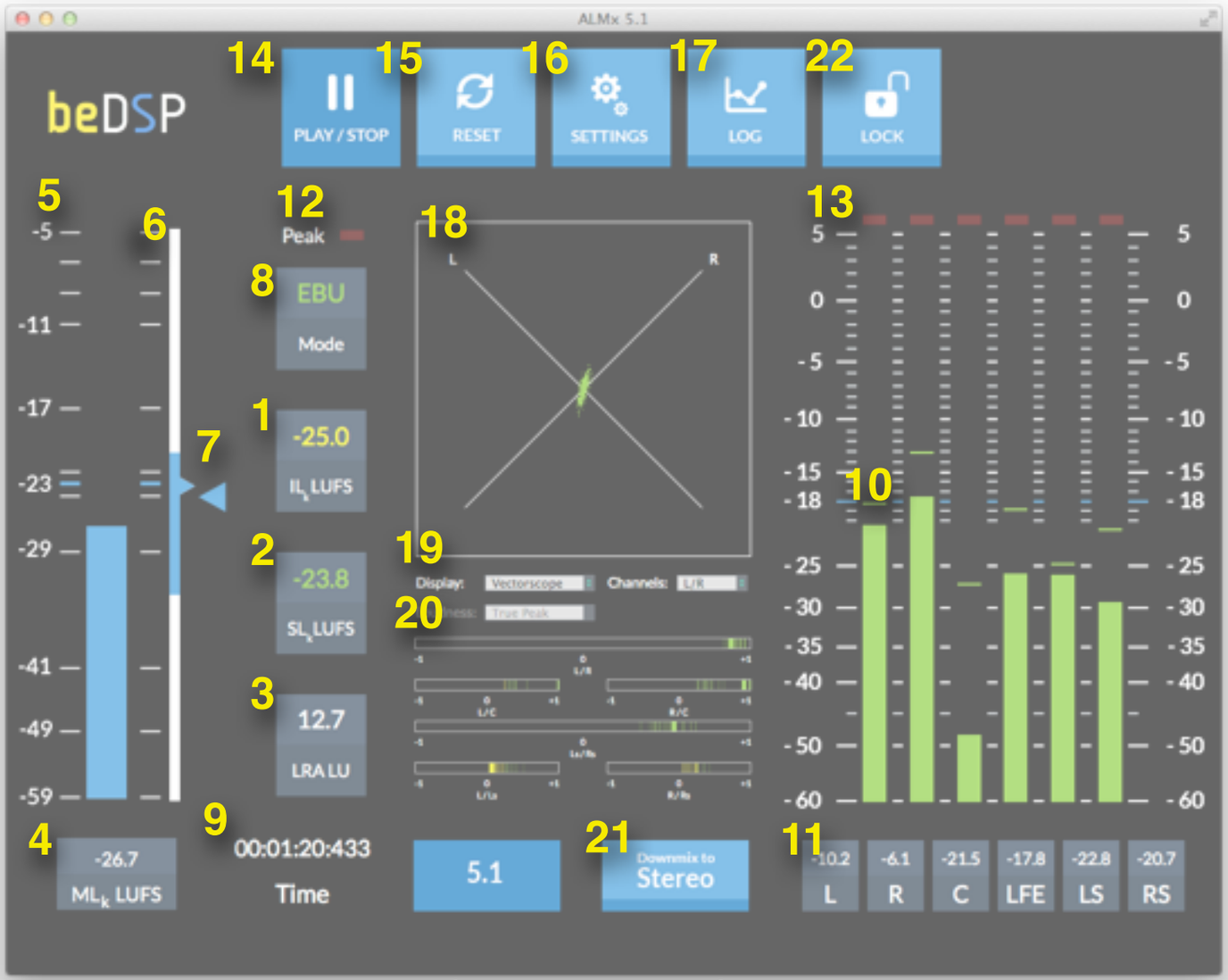


Figure 18: ALMx 5.1 – Interface

Interface

1. **Integrated Loudness or Program Loudness** (in LUFS, LU or LKFS);
2. **Short Term Loudness** (in LUFS, LU or LKFS);
3. **Loudness Range** (in LU);
4. **Momentary Loudness** (in LUFS, LU or LKFS);
5. Real time **Moment Loudness Meter;**
6. **Loudness Range** bar Indicator;
7. **Short Term Loudness** indicator;
8. Measurements can be done according with **EBU**, **ATSC** or **ARIB** specifications;
9. **Time counter** for the duration of Integrated Loudness and Loudness Range measurements;
10. Real time **True Peak Meter;**
11. **Max True Peak Level** (in dBTP) for each channel;
12. **Peak Led** indicator;
13. **Peak Led** indicators;
14. **Play/Stop** the measurements for Integrated Loudness and Loudness Range. When the Play button is pressed, a new log file is made.
15. **RESET** all the measurements;
16. **Settings Window;**
17. **Log Window;**
18. **True Peak or Momentary Loudness SoundField/ Vectoroscope;**
19. **True Peak or Momentary Loudness selector;**
20. **Channels corellation meters;**
21. **Downmixing from 5.1 to stereo.**
22. **Lock** option.

Loudness Metering

Descriptors values

The values for all the main descriptors (Integrated Loudness/Program Loudness, Momentary Loudness, Short Time Loudness, Loudness Range) are available. (see Figure 19).

If you are in the Play mode all the parameters are measured. If you press the Stop button, the Integrated Loudness and Loudness Range remain unchanged till the next Play. When the Reset button is pressed all the measurement are restarted.

Whenever you are in the Play mode, the time will be counted in hh:mm:ss:ms.

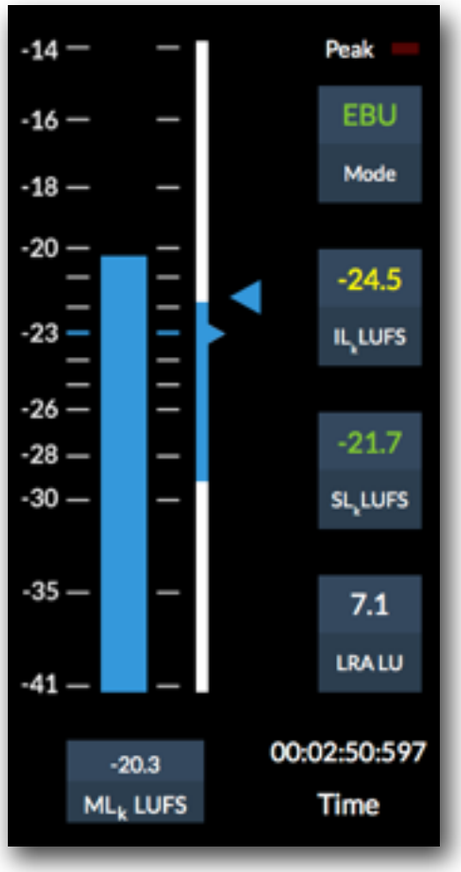


Figure 19: ALMx 5.1 - Loudness Metering

Scales

1. ALM 5.1 calculates the values for the most important descriptors specified by the standards (Integrated Loudness - Program Loudness, Momentary Loudness, Short Time Loudness, Loudness Range) and provides real time metering for Momentary Loudness. You can also **choose the scale** for Momentary Loudness according to your needs. There are two options that can be accessed in the Settings window (see Page 24):

- The **standard**: **EBU** with reference level at **-23 LUFS**, **ATSC** and **ARIB** with reference level at **-24 LUFS** (see Figure 20 and Figure 21).
- The **scale**: **+9 LU** for a good resolution in the reference level zone (see Figure 20) and **+18 LU** for a bigger dynamic range (see Figure 21).

Figure 20: ALMx 5.1 - EBU, ATSC, and ARIB scales for +18LU

Figure 21: ALMx 5.1 - EBU, ATSC and ARIB scales for +9LU

2. You can use the relative scales, with the reference level of **0 LU** (see Figure 22). In this case the scales are the same for all the standards EBU, ATSC and ARIB.

3. The measurements for Integrated Loudness and Loudness Range can be done taking or not into account the relative gate of 10 LU below the absolute-gated loudness level. When the gate is on the name of the standard is green and when it's off, the name is red (see Figure 23).

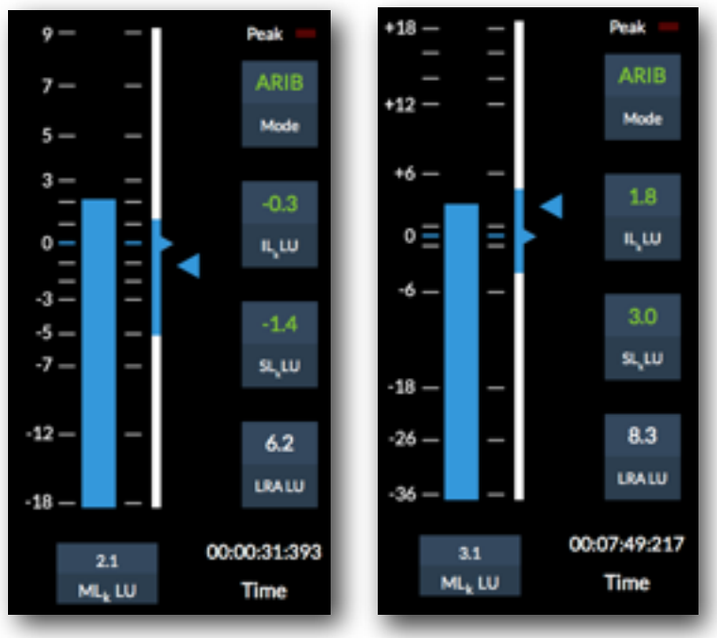


Figure 22: ALMx 5.1 - Relative scales for +9 LU (left) and +18 LU (right)

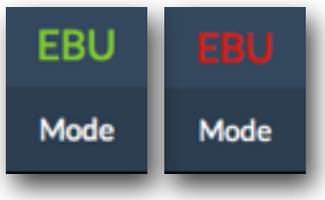


Figure 23: ALMx 5.1 - with (left) and without (right) relative gate

Color Code

For the Integrated Loudness, ALMx 5.1 uses a color code. This way, you will know how your program loudness fares compared to the accepted tolerance of each standard (Figure 24).

The color of Integrated Loudness parameter is:

- green, if the Integrated Loudness matches the standard's specifications;
- yellow, if it's around the standard's specification, but you still have to turn the volume up/down
- red, if the material is annoyingly loud/soft.

The **accepted tolerance zone** is the range of loudness that is comfortable to a listener. Note that the Integrated Loudness may not be constant through the program. It can vary within a specific zone according to the content requirements.

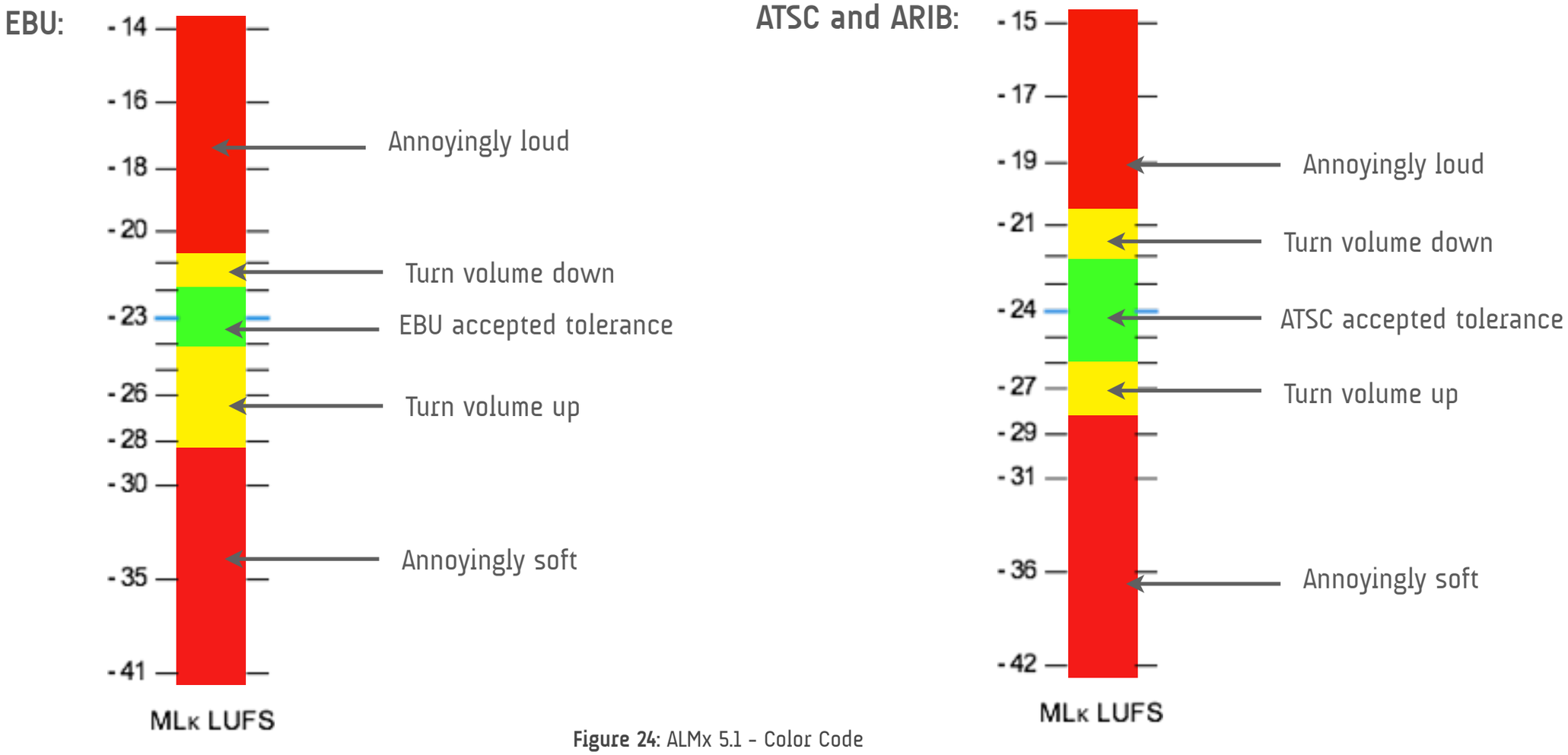


Figure 24: ALMx 5.1 - Color Code

True Peak Metering

ALMx 5.1 offers you real time True Peak Metering with peak hold for mono, stereo and 5.1 channels. Beside this, the application gives you the possibility to configure your measurements by accessing the Settings window (see Page 26).

You can choose the True Peak reference level -18 dBTP or -20 dBTP (see Figure 25), the Peak Holding Time and the Overload Hold Time.

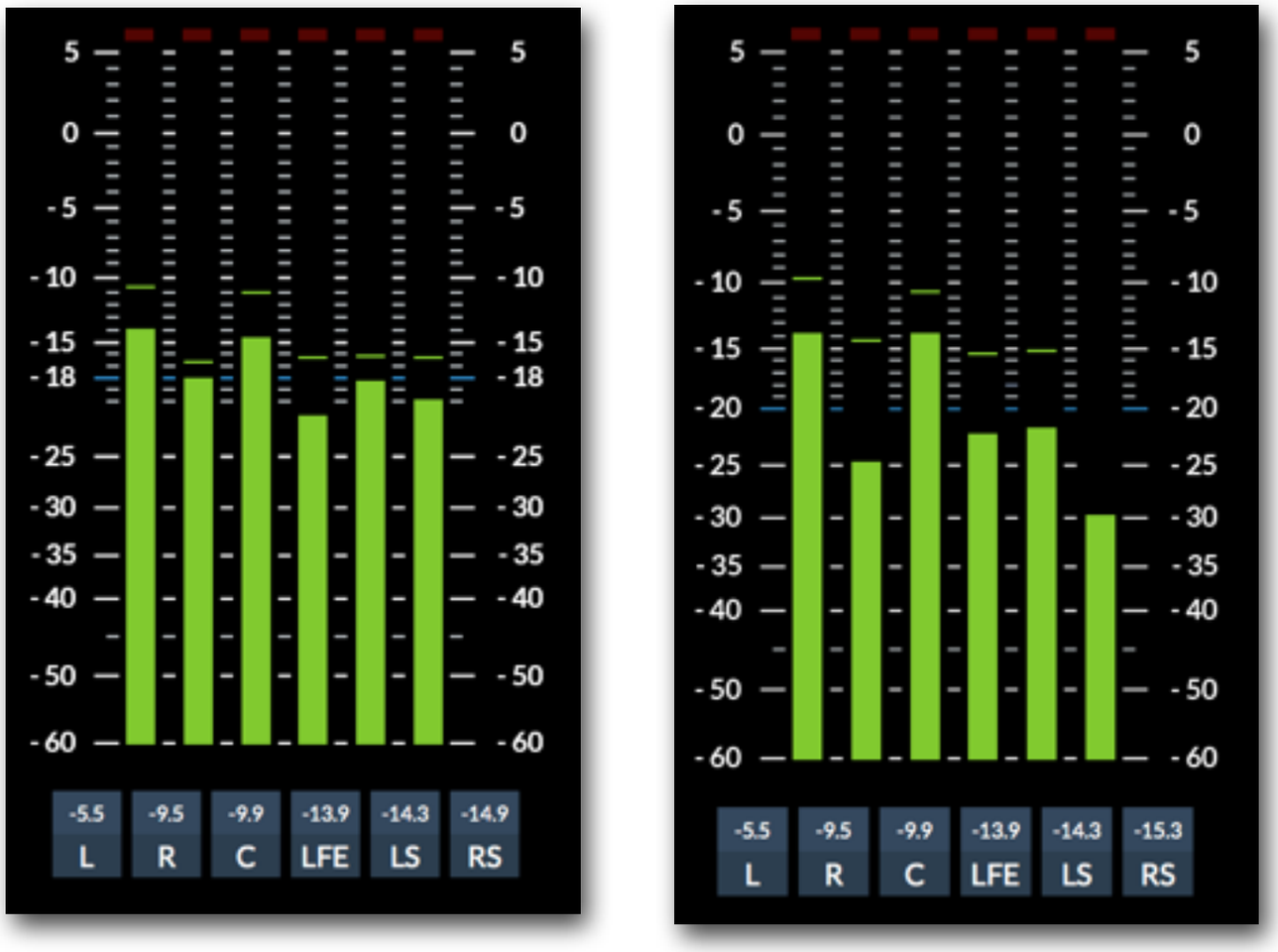


Figure 25: ALMx 5.1 - True Peak Metering ref. lev -18 dBTP (left) and ref. lev -20 dBTP

Sound Field, Vectorscope, Correlation Meters and Downmixing

ALMx 5.1 offers you a Vectorscope , a Sound Field Display (either True Peak or Momentary Loudness) and Correlation Meters for L/R, L/C, R/C, Ls/Rs, L/Ls and R/Rs. There is also available a 5.1 to Stereo downmixing option.

Vectorscope

The main purpose of the vectorscope is to display a stereo image of the audio signal. The channels can be changed from the dropbox, you can switch between L/R, L/Ls and R/Rs (see Figure 26).

The history of the Vectorscope will fade out slowly, providing you with the information needed to determine if the stereo separation is according to your needs.

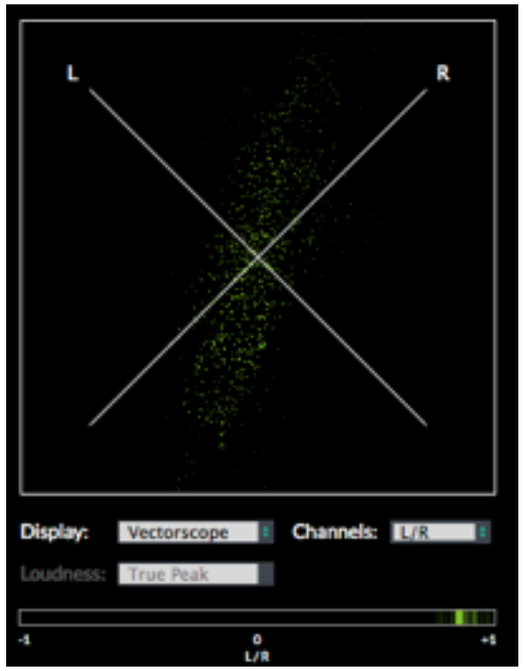


Figure 26: ALMx 5.1 - Vectorscope

Momentary Loudness Sound Field

The Sound Field Display can use the Momentary Loudness values to create a real time view of the surround image of the signal. The axes are the same as for the Loudness Meter Indicator (see Figure 27).

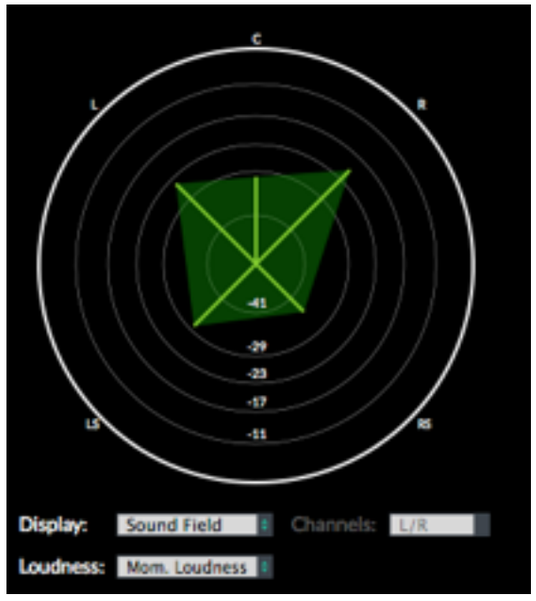


Figure 27: ALMx 5.1 - Momentary Loudness Sound Field

Sound field for True Peak Loudness

Using the same scale (either -20 dBTP or -18 dBTP) as the True Peak Meter, the True Peak Vectorscope provides a real time view of the surround image of the signal, representation of LFE channel included (see Figure 28).

1. The surround image of the sound : green - if the true peak values are below the max true peak threshold (set in the settings tab) and red - if the values are above the threshold.
2. The blue circle - the LFE channel.
3. The red zone - True Peak Max. Level Limit.

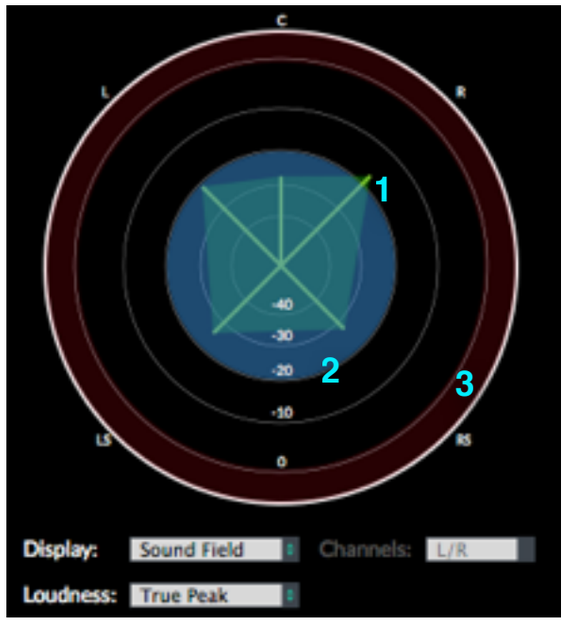


Figure 28: ALMx 5.1 - True Peak Sound Field

In this particular case, the Sound Field is created using the True Peak Loudness Values. Naturally, the limit set for True Peak Max. Level (from Settings - see Page 26), will also be used in the Sound Field display. The bar will become red starting from the point where the value is above the threshold (see Figure 29).

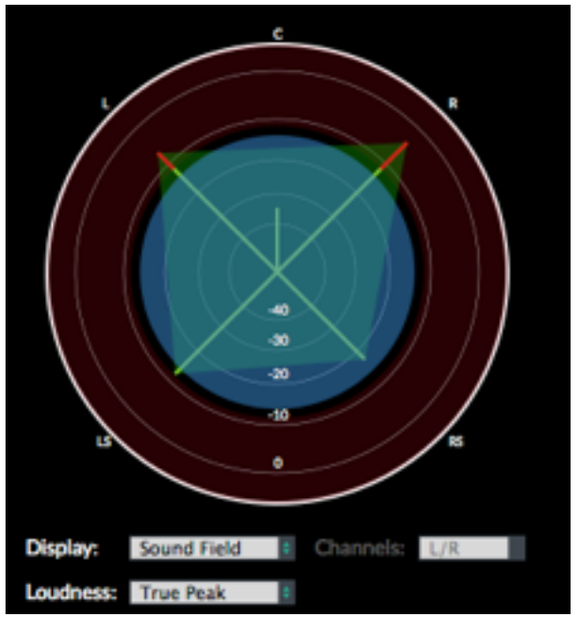


Figure 29: ALMx 5.1 - True Peak Loudness values above the threshold

Correlation Meters

The correlation meters indicate the degree of similarity between the channels: L/R, L/C, R/C, Ls/Rs, L/Ls and R/Rs (see Figure 30).

If the audio of the channels is similar, the drawn values will be in the **+1 zone** and if it's considerably different, the values will be in the **0 zone**. When two channels are out of phase, the meter draws in the **-1 zone**. ALMx 5.1 uses a color code: green tones for the +1 zone, yellow tones for the 0 zone and red tones for the -1 zone (see Figure 31).

For a correct mix, the main purpose would be to have the correlation values near the **+1 zone**.

The meters also have a display history, the brightest colored value is the most recent one.

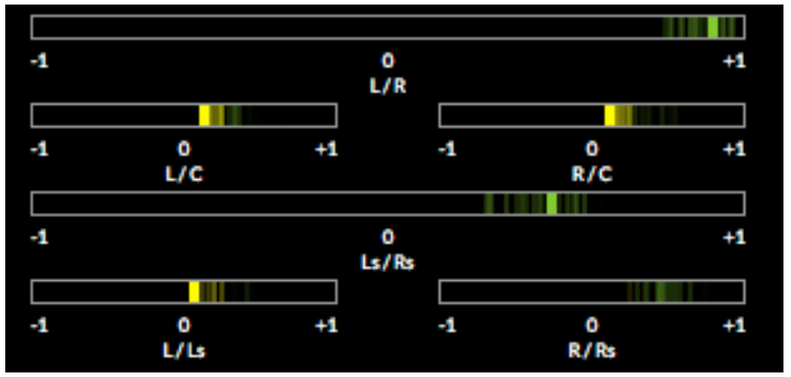


Figure 30: ALMx 5.1 - Correlation Meters

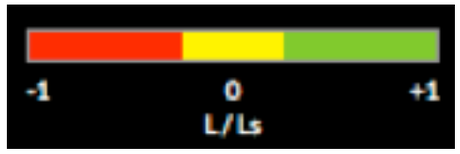


Figure 31: Color zones for Correlation Meters

Downmixing

The ALMx 5.1 Downmixing algorithm is in concordance with ITU specifications. This way you can be sure that your program material is compatible with sound systems which are provided with a lower number of channels (see Figure 32).

Note that the Downmixing it is used only for metering, the audio material isn't actually changed.

Figure 32: Downmixing option

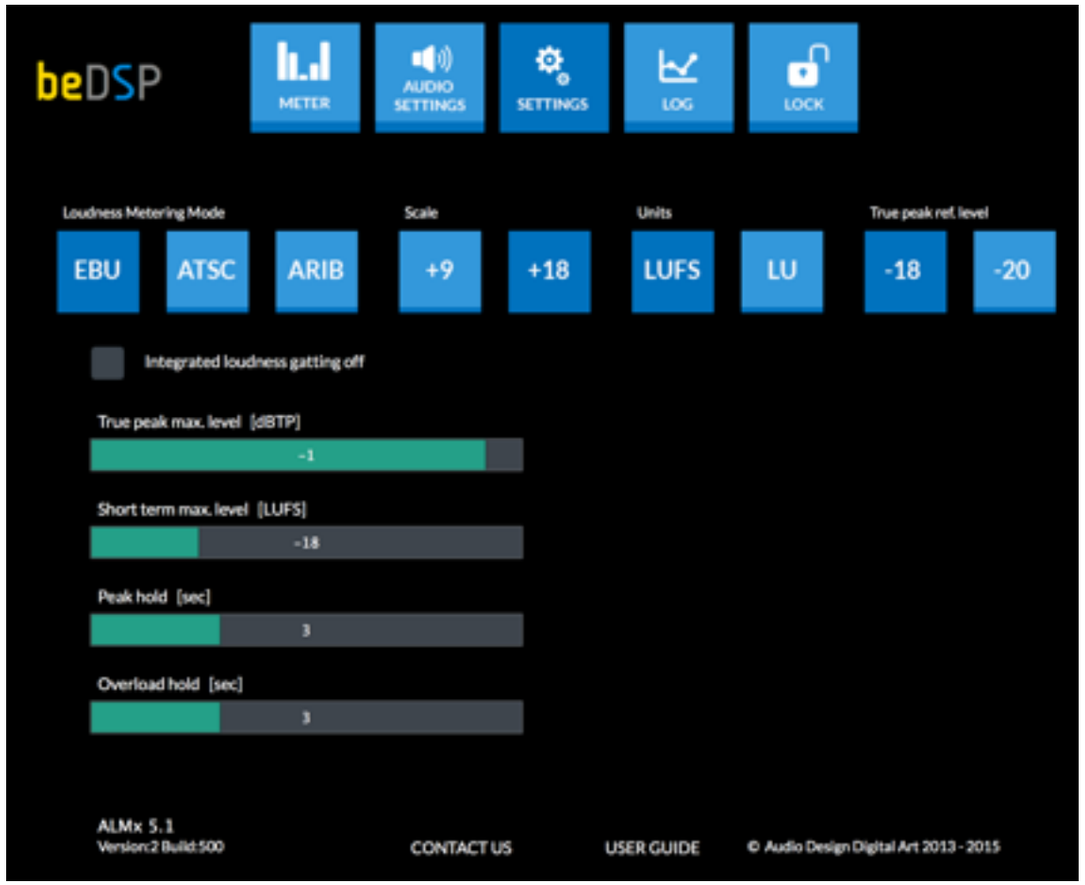


Figure 33: ALMx 5.1 – Application Settings

Application Settings

- **Loudness Standards: EBU**, **ARIB** and **ATSC** ;
- **Loudness Scale** : **+9** LU and **+18** LU;
- **Loudness Units** : **LUFS**, **LKFS** and **LU**;
- **True Peak ref. level** : **-18** dBTP and **-20** dBTP;
- **Integrated Loudness gating off** : the gate isn't used and the Integrated Loudness and Loudness Range values are calculated for the entire audio material;
- **True Peak max. level** : from **-12 dBTP** to **0 dBTP**. Sets the maximum value for the signal waveform calculated using inter-sample peaks that can be missed in quantization. Above this value the peak led indicators are red (the level is the same for all the channels);
- **Short Term max. level** : from **-24** to **0**, if the unit is set to LUFS or LKFS and from **0** to **24**, if the unit is set to LU. If the threshold is reached, then the value of the short term loudness will become red;
- **Peak hold** : from **0 s** to **10 s**. Represents the period of time the Peak holders are on;
- **Overload hold** : from **0 s** to **10 s**. Represents the period of time the Peak Led indicators are on.

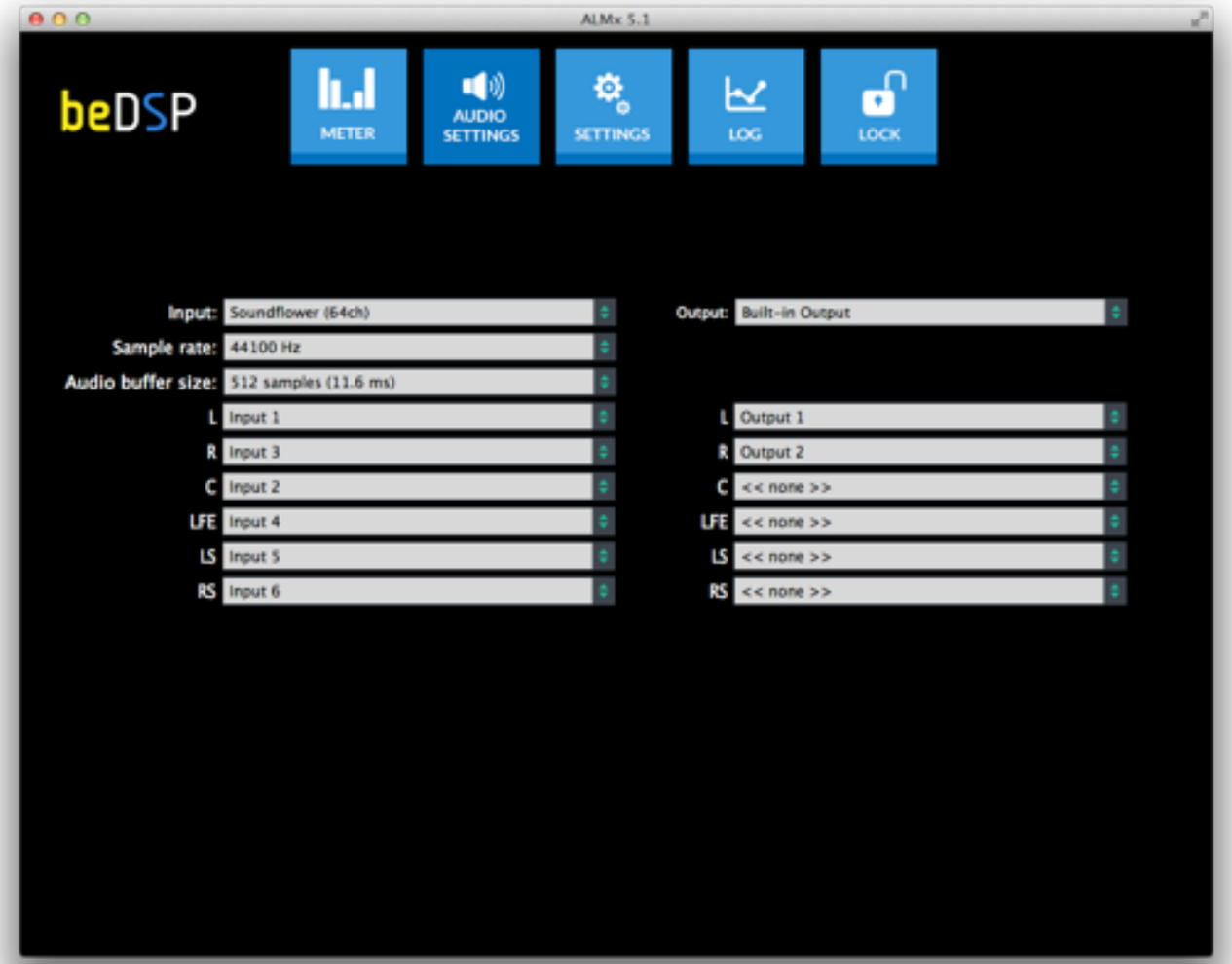


Figure 34: ALM5.1 - Audio Settings

Audio Settings

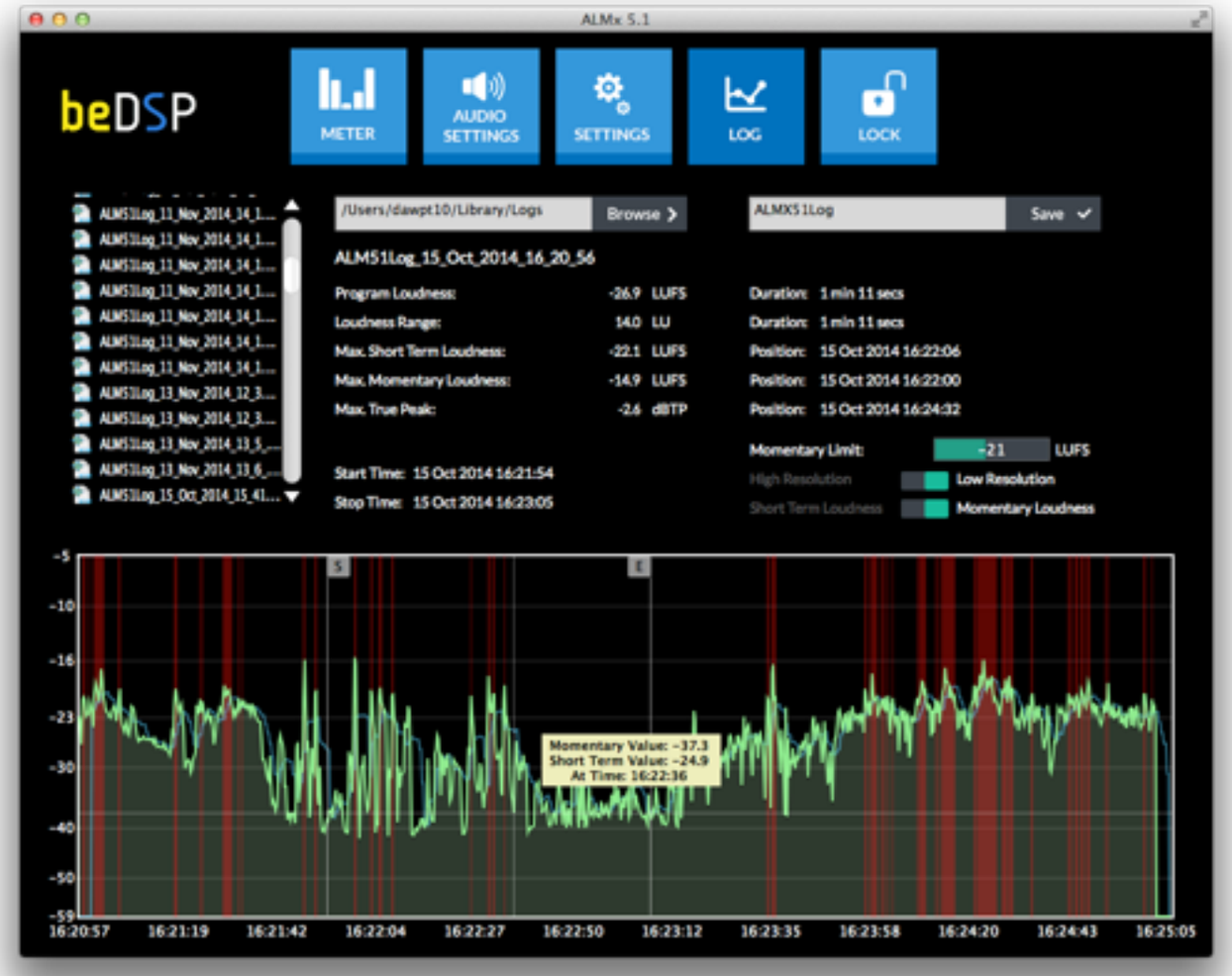
The flexible and intuitive audio routing interface makes it easy for you to configure the inputs and outputs according to your needs. Also, you have:

- Configurable Audio Input and Output;
- Variable sample rate;
- Variable audio buffer size;
- Every possible channel routing combination available.

Logging

An important feature of the ALMx 5.1 is the log option, which allows you to view a loudness graph (for short time loudness and momentary loudness) at all times and some useful descriptors:

- Program Loudness;
- Markers for "**Start**" and "**End**", allowing you to see the statistics for a specific portion of the graph;
- Loudness Range;
- **Max. Short Term Loudness** value with time position, calculated from the values selected between the markers;
- **Max. Momentary Loudness** value with time position, calculated from the values selected between the markers;
- **Max. True Peak value** with time position, calculated from all the values;
- The start time, stop time and the duration of the measurements;
- On the graph, you can view either the short term value or the momentary value and the timestamp;
- Variable short term loudness limit;
- Variable momentary loudness limit;
- Zoom in/out option;
- Option for high/low resolution.



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ALMx 5.1

Audio Loudness and True Peak Meter application, BS1770 (rev.3) and EBU R128 compliant.

Contact

web: www.bedsp.net

e-mail: contact@bedsp.net