SPL-6mk2

Multiband limiter
&
Sound level recorder

Manual
Manuel
Handleiding
Handbuch

DATEQ
audio technologies

Safety instructions

1. All safety instructions, warnings and operating instructions must be read first.
2. All warnings on the equipment must be heeded.
3. The operating instructions must be followed.
4. Keep the operating instructions for future reference.
5. The equipment may never be used in the immediate vicinity of water; make sure that water and damp cannot get into the equipment.
6. The equipment may only be installed or fitted in accordance with the manufacturers recommendations.
7. The equipment must be installed or fitted such that good ventilation is not obstructed in any way.
8. The equipment may never be installed in the immediate vicinity of sources of heat, such as parts of heating units, boilers, and other equipment that generates heat (including amplifiers).
9. Connect the equipment to a power supply of the correct voltage, using only the cables recommended by the manufacturer, as specified in the operating instructions and/or shown on the connection side of the equipment.
10. The equipment may only be connected to a legally approved earthed mains power supply.
11. The power cable or power cord must be positioned such that it cannot be walked on in normal use, and objects that might damage the cable or cord cannot be placed on it or against it. Special attention must be paid to the point at which the cable is attached to the equipment and where the cable is connected to the power supply.
12. Ensure that foreign objects and liquids cannot get into the equipment.
13. The equipment must be cleaned using the method recommended by the manufacturer.
14. If the equipment is not being used for a prolonged period, the power cable or power cord should be disconnected from the power supply.
15. In all cases where there is a risk, following an incident, that the equipment could be unsafe, such as:
    - if the power cable or power cord has been damaged
    - if foreign objects or liquids (including water) have entered the equipment
    - if the equipment has suffered a fall or the casing has been damaged
      if a change in the performance of the equipment is noticed

    Appropriately qualified technical staff must check it.
16. The user may not carry out any work on the equipment other than that specified in the operating instructions.

DATEQ audio technologies

Index

Introduction

The SPL-6mk2 is an advanced audio level limiter that stores the sound level samples for at least twelve months. The sound level samples can be viewed using the internal web pages or externally stored through automatic email. Other important data is also stored like powering up, sanctions or possible fraud attempts.

Using the web interface the SPL-6mk2 can be read out and adjusted. There is no separate platform depended software required. All users can only view settings and logging. To adjust configuration settings an additional password and license file is required. TO connect to the SPL-6mk2 a computer or tablet must be equipped with a network connection. When connected to a network or the Internet, the SPL-6mk2 can be remotely monitored.

The SPL-6mk2 uses a measurement microphone to determine the actual sound level. When measurement shows the sound level exceeding the maximum set level, it will reduce slowly the full sound spectrum to the maximum allowed level. In multiband mode the SPL-6mk2 will slightly reduce the single frequency band before adjusting the full spectrum.
With the special correlation detection the SPL-6mk2 detects external noise pollution and can ignore for example applauding or screaming audience. This way the maximum sound level is always insured.

The special calender functions allow for different sound levels during the day and year.

Installation

The limiter is installed in between the audio source (a mixing desk for example) and the speaker amplifier.

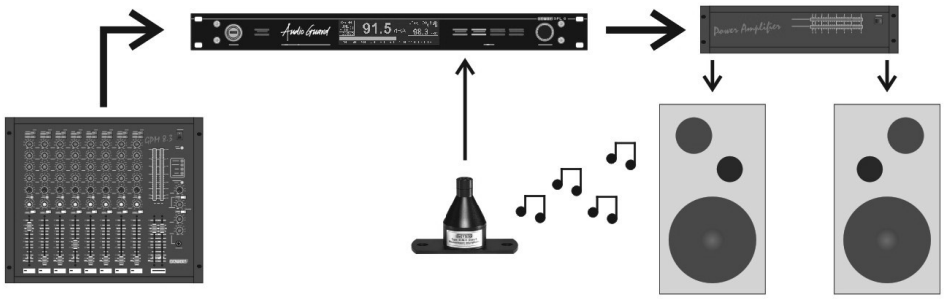


Image 1: Connecting the SPL-6mk2

When calibrating the system, the power amplifier has to be set to maximum output level. The limiter will reduce the signal as much as needed. When used at nominal level the established sound pressure limit will not be exceeded after configuring the limiter. However if in any case this should happen, e.g. When the mixer is used above the nominal level, the limiter will automatically adjust the signal to ensure the sound pressure level remains below the maximum allowed level.

Connections

The SPL-6mk2 is equipped with balanced audio in,- and outputs. This type of connection guarantees a solid sound quality, even when long audio cables are used. After the limiter is installed the audio connectors are covered to prevent later adjustments. Removal of this cover will be registered by the SPL-6mk2. To re-activate the limiter the key on the front is needed.

Microphone input; XLR 3-pin female

Pin	Function	Description
1	Ground	Audio ground
2	Audio +	Supply and audio
3	Audio -	Supply and audio

Table 1: microphone connections

Audio input left and right; XLR 3-pin female

Pin	Function	Description
1	Ground	Audio ground
2	Audio +	Audio in phase
3	Audio -	Audio out of phase

Table 2: Audio-input connections

Audio outputs left and right; XLR 3-pin male

Pin	Function	Description
1	Ground	Audio ground
2	Audio +	Audio in phase
3	Audio -	Audio out of phase

Table 3: audio-output connections

Signaling connector;
DB-25 female

Pin	Function	In/ output
1	External attenuator	In
2	Reduction signal	Out; 15V/ 5mA max.
3	Overload signal	Out; 15V/ 5mA max.
4	Live OK signal	Out; 15V/ 5mA max.
5	Warning signal	Out; 15V/ 5mA max.
6	Level OK signal	Out; 15V/ 5mA max.
7	Safe level signal	Out; 15V/ 5mA max.
8	External VU unit	In/ Out
9	Microphone +	In
10	Left audio in +	In
11	Right audio in +	In
12	Left audio out +	Out
13	Right audio out +	Out
14...17	Digital ground (to be used with the signaling outputs)	
18...20	Analogue ground (to be used with the audio in and outputs)	
21	Microphone -	In
22	Left audio in -	In
23	Right audio in -	In
24	Left audio out -	Out
25	Right audio out -	Out

Table 4: DB25 connections

Network port; RJ45 female

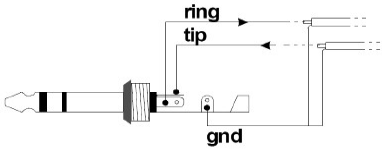
Pin	Function	Description
1	TX-D +	Data
2	TX-D –	Data
3	RX-D +	Data
4		Not in use
5		Not in use
6	RX-D –	Data
7		Not in use
8		Not in use

Table 6: Network connections

External display;
Jack 3-pens female

Pin	Function	Description
SL	Ground	Data ground
Tip	Data TX	Data send
Ring	Data RX	Data receive

Table 7: External display connections



Microphone input

Connect the supplied measuring microphone here. The wiring of the microphone can be lengthened with standard microphone cable. Pay attention to the polarity of the wiring. If the microphone is wrongly connected it won't work. The limiter will give an error message, and the volume will be extremely reduced.
The microphone should be installed so that it 'hears' both sound from the speakers as well as the sound from the crowd in the room. The microphone can be placed closer to the speakers when the maximum allowed level is very low. This reduces the effects of background noises.

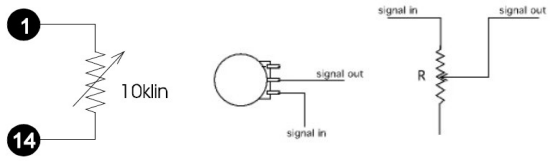
Audio inputs

Balanced audio inputs. Pin 1 and 3 of the XLR connector should be linked together when the mixer only has unbalanced outputs. The mixers' signal can be connected to pin 2, and the ground to pin 1.

Audio outputs

Connect the power amplifiers here. Connect pin 2 (signal) and pin 1 (ground) when the power amplifier does not have balanced inputs.

External attenuator



This input can be used to reduce the maximum sound pressure level with an external potentiometer. The maximum sound pressure level can be reduced by connecting a linear 10kOhm potentiometer between pin1 and pin 14.
This can be useful to reduce the sound pressure level from behind the bar. It is also possible to automatically reduce the sound pressure level, for instance when in the summer some doors are opened.

Signaling

Reduction signaling
An indicator to show that the limiter has reduced the sound pressure level can be connected to this output. This output has the same function as the reduction LED on the front of the limiter (Audio reduction).

Overload signaling
This output indicates an overload somewhere in the limiter. This can be the measuring microphone or the audio input. This output has the same function as the overload LED on the front.

Live OK signaling
This output is active as long as the limiter is not in sanction mode. A solid-state relay, to turn off the power supply of the live band, can be connected to this output. If the maximum sound pressure level is exceeded by a band, the limiter will go into sanction mode and cut off the power supply automatically. After a pre-set duration the sanction will be dissolved.

Warning signaling
Level OK
Safe sound pressure
These outputs give an impression of the actual sound pressure level with respect to the maximum allowed level:

- The warning signaling output becomes active, as soon as the maximum sound pressure level is exceeded.
- Level OK indicates that the sound pressure level is below the maximum allowed level, but is getting close (0...12dB span).
- Safe sound pressure indicates that the sound pressure level is well below the maximum allowed limit (12dB or more).

These indicators can be placed near the disc-jockey, or the live band, to give them an impression of the sound pressure level.

External VU unit
This is the data connection with the optional SPL-D2 MKII display. The external display can also directly be connected to the SPL-6mk2. For this a stereo 6.3mm jack cable is required.

Operation

1 2 3 4

1. Key switch:
   After removing the cover lid, the key needs to be set to the blue position to reactivate the limiter. After reactivating the key needs to be returned to the red position. The key switch also resets sanction.

2. Display:
   The display shows all important values like system time, current sound level in different values (dBA, dBC, Leq and peak level) and the current reduction. The display can also show the sound level history, sound spectrum, configuration settings and calibration date.

3. Status LED's:
   - DETECT LED the SPL-6mk2 detected audio signal on the line input (-24dB or more),
   - REDUCE LED shows the audio level is above the set maximum. The SPL-6mk2 reduces the output level,
   - OVERLOAD LED shows an overloaded signal present at the line or microphone input (12dB above threshold level),
   - SANCTION LED shows the limiter in sanction state. On fraud detection the limiter will also go into sanction state. The sanction LED will blink. Reset by timer or reset key.

4. Control:
   The control knob allows to switch between the different display views.

Technical specifications

Inputs

Mic (Measurement microphone).....XLR-3 female. Use only the original DCM-5 microphone
Line (left and right).....XLR-3 female. Electronically balanced.
Maximum input level.....+18dBu
Input impedance.....50kOhm
Commom-mode rejection.....>86dB

Outputs

Line (left and right).....XLR-3 male. Electronically balanced.
Output impedance.....50Ohm

Common

Audio

Frequency response.....5Hz...22kHz @ -1dB
Signal/ noise ratio.....>80dB
THD+N (IEC-A).....<0.06%

Limiter

Threshold.....70...120dBA (resolution 1dB)
Output correction.....-50...+18dB (resolution 0,5dB)
Microphone correction.....-40...+18dB (resolution 0,5dB)
Maximum attenuation adjustment.....-6...-50dB (resolution 0,5dB)

Memory

4GB SDHC
365 days * sound pressure information (resolution 1 second)
365 days* event memory
1GB live recording

External connections

External attenuation.....0...-20dB (10kOhm lin. potentiometer)
Signaling and switching outputs.....24V/ 5mA max.

Power supply

Supply voltage.....100...240V_{AC}/ 50Hz
Power usage.....15W

Dimensions and weight

Front.....483mm x 45mm (B x H) = 19inch/ 1HE
Depth.....175mm
Weight.....2.7kg

**Soundlevel data and event logging are stored for maximal 365 days or less when memory is full. The memory system will delete and override oldest data first.*

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&

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Configuration

Introduction configuration

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Installation

The SPL-6mk2 configuration pages are tested for use with the following Internet browsers:

- Mozilla Firefox version 140
- Google Chrome version 138

Configuration

In this chapter the configuration and system settings for the SPL-6mk2 are explained. These settings normally are made once on installation. All made settings can be stored in a backup file for later use or restoring the original settings after changing.

Connecting the computer

The computer is connected to the limiter using an UTP cable. The limiter can also be integrated into an existing network. Connect the ethernet plug into the network.

Directly connected to the computer, a straight or cross wire cable can be connected.

The limiter can now be accessed using: http://SPL-6mk2/ or by entering the default IP address: http://192.168.1.101/. When not using the default IP address, like in a custom network environment, the IP address can be viewed in the settings view on the front panel display.

If the limiter needs to be accessed from the internet, the router in the network must also be configured in such a way that requests from the internet are routed to the SPL-6mk2. The exact settings depend on the make and model of the router.

Settings to connect the SPL-6mk2 to the internet

To be able to access the limiter from the internet, port 80 (HTTP) must be forwarded to the SPL-6.

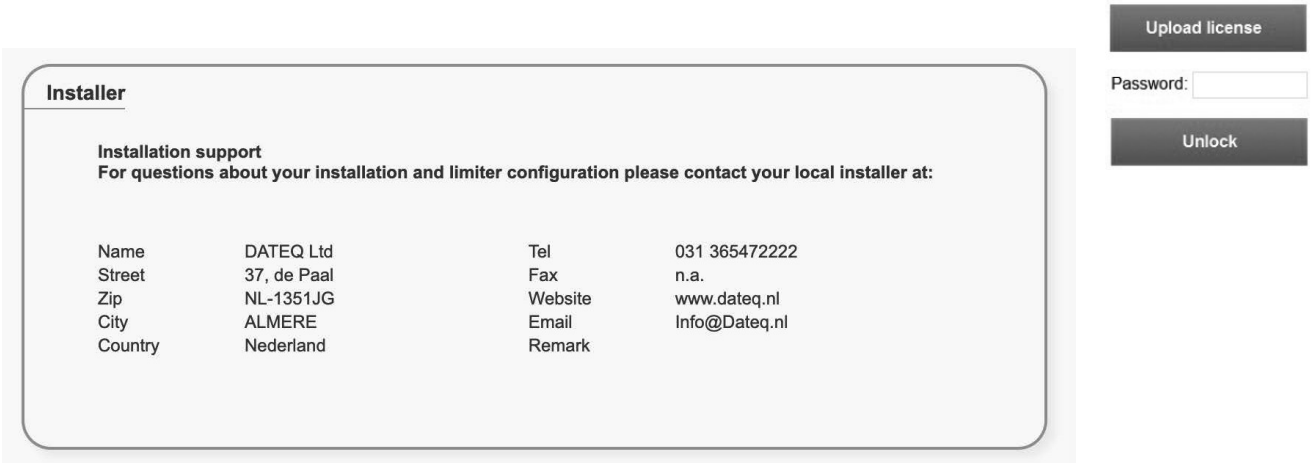
Important:

- Always ask your system administrators' permission to make these type of adjustments. If you doubt, or are not familiar with network settings, ask your network administrator for assistance!
- Your connection to the internet needs to have a static IP address to make the SPL-6mk2 available over the internet. Some providers use dynamic IP addresses. This means your IP address can change after some time. This makes it impossible to connect to the SPL-6mk2.
- Opening a port to the internet is always a security risk, therefore check for updates regularly, and do not make the limiter available on the internet is not really needed.

Configuration license

The configuration pages are commonly only used to view settings and sound sample logging. For viewing or exporting no license or password is needed. Changing settings, including first installation an installer license and password is needed.

The installer license is only granted to certified professional audio installers. When you own an SPL limiter and settings need to be changed, you need to contact your local distributor or installer. The closest supplier can be found at the Dateq selling points part of the website: www.dateq.nl.

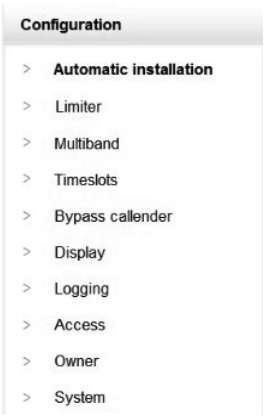


Changes made during configuration are saved in the limiter and linked to the license in use.

Unlocking the limiter

Before any settings can be adjusted, a password must be entered.
After logging in to the limiter, the password associated with the software registration must be entered.
Once the user is successfully logged in, all settings can be modified.

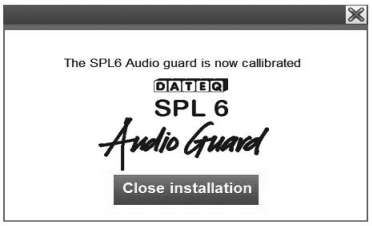
Automatic installation



Through the automatic installation process the basic sound level settings for the SPL-6mk2 can be made. On starting the installation the different popup windows will guide the installation.
Make sure popup blockers in your browser are disabled before starting.

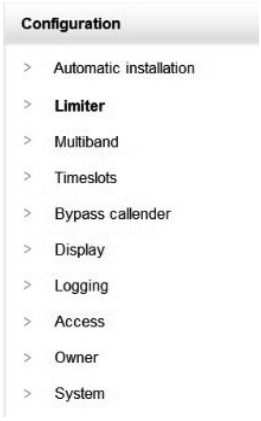
The limiter will automatically set all audio values during the installation process. Before starting the complete audio system must be connected and powered on. It is best to use an audio-source with less dynamics to perform the installation; this makes it easier for the computer to calculate the levels. Select the menu-item 'Automatic install'. The software will perform a step-by-step installation:

- Set the output-level to nominal. This means that all the green LEDs on the VU-meter light up, and every now and then some red light will blink,
- Set the output level of the amplifiers to the maximum,
- Enter the maximum dB values,
- The limiter will adjust the output-volume, until the requested sound level is acquired. In the meantime read the sound level at the level-meter in the room,
- Once the level adjustment is complete, the measured sound pressure will be requested. This will be used to correct the measured microphone value.



The limiter is now calibrated. Check the settings by raising the volume of the mixer till the 'REDUCE' LED on the front panel lights up. The limiter will automatically lower the volume.
All the settings can be changed manually, if necessary.

Limiter configuration



The manual configuration of sound level parameters.

Mode

- Live Limiter and recorder
- Line Limiter and recorder

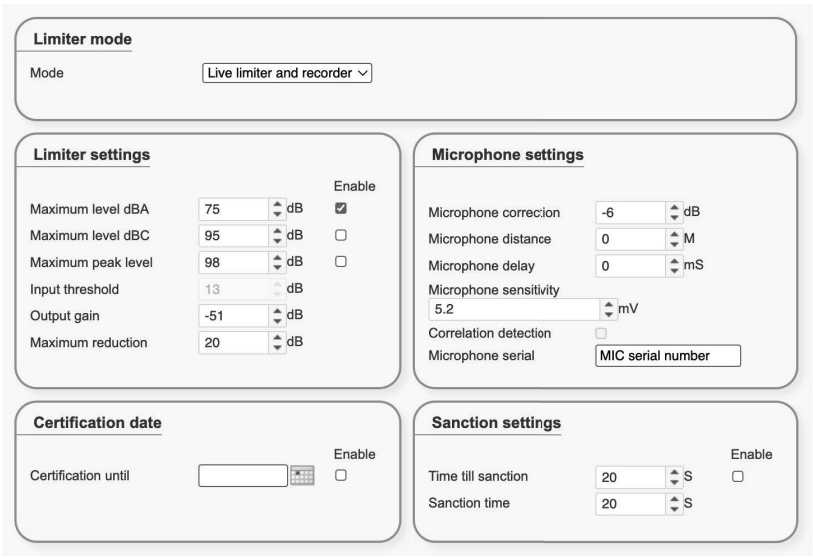
In Live mode, the limiter will use the measured microphone signal to control the output signal. In Line mode, the limiter will only register the microphone signal and will not use it to control the output. The control is based on the line signal.

Limiter settings
Maximum dBA: 50dB tot 125dB.
Maximum dBC: 50dB tot 125dB.
Maximum peak: 50dB tot 125dB.
Input threshold: -50dB tot +18dB.
Output gain: -60dB tot 0dB.
Maximum reduction: 60dB tot 0dB.

Certification date
The certification date is set to enable future inspection. Till the certification date the limiter will function as normal. On passing the selected date the limiter will reduce the output signal with an extra 18dB and display the 'certification invalid' message on the front panel display.
The limiter can only be unlocked and reset by a certified installer.

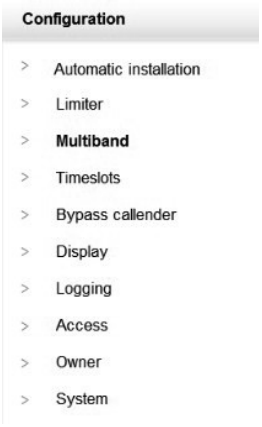
Microphone settings
Microphone correction: -30dB till +12dB.
Microphone distance: 0 till 30 meter.

Sanction settings
Time till sanction: 10 tot 360 seconds.
Sanction time: 10 tot 360 seconds.
As soon as overload will become active, the sanction timer will start running.
When overload becomes inactive, the sanction timer will decrees each counted second.



Note; Changes are effective immediately.

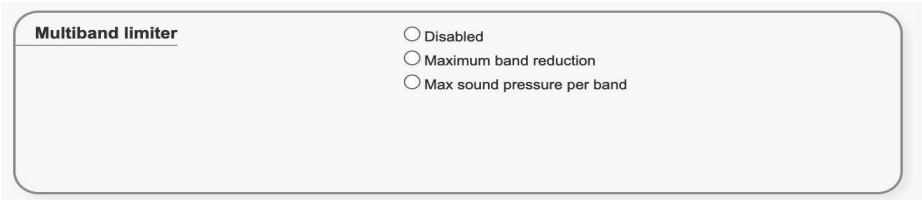
Multiband



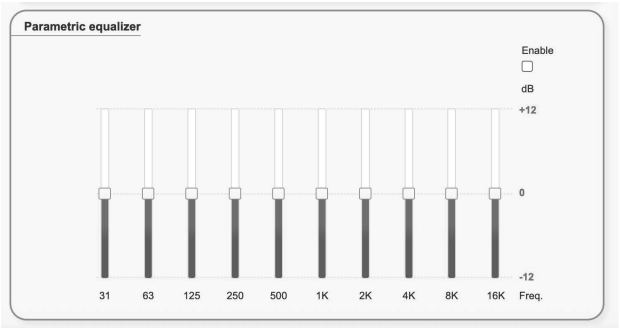
Here the settings for the multiband (octave) limiter and parametric equalizer are made. All settings are immediately active.

Multiband Limiter
The multiband limiter will act as an octave limiter before the complete audio level is reduced. Set the maximum allowed band reduction and enable the limiter to activate it. Using the multiband limiter a higher sound level output efficiency can be made without overshooting the maximum allowed dB values.

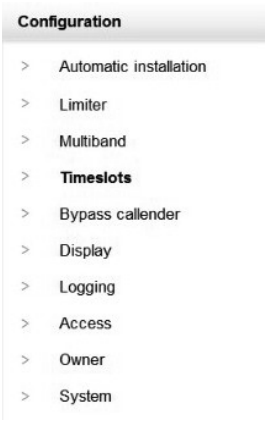
Each octave limiter can maximal reduce the octave band by 12dB before the general output reduction becomes active.



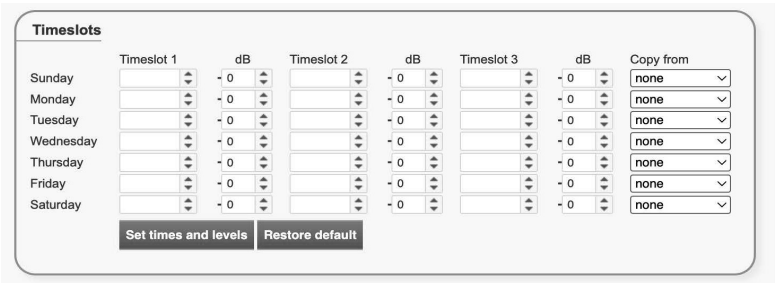
10 band parametric Equalizer
Using the 10 band parametric equalizer a speaker correction can be made. Disturbing frequencies can be corrected by 12dB. The equalizer settings do not affect the multiband limiter.



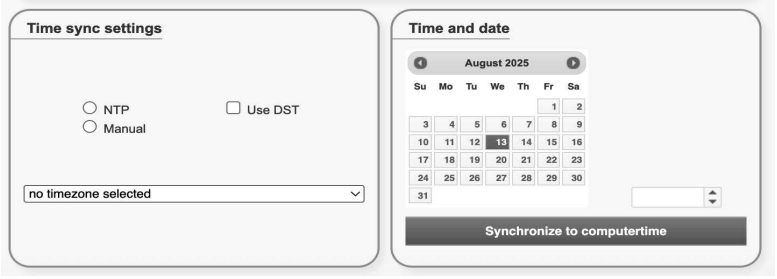
Time slots



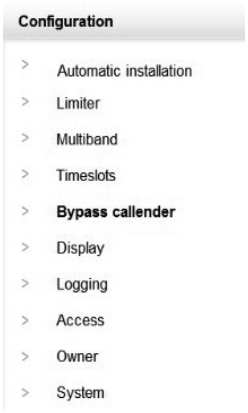
The time slots allow different dB values during the week. Three slot's a day are available. The slot reduces the maximum allowed value by the selected amount of dB.
Settings become active after storing.



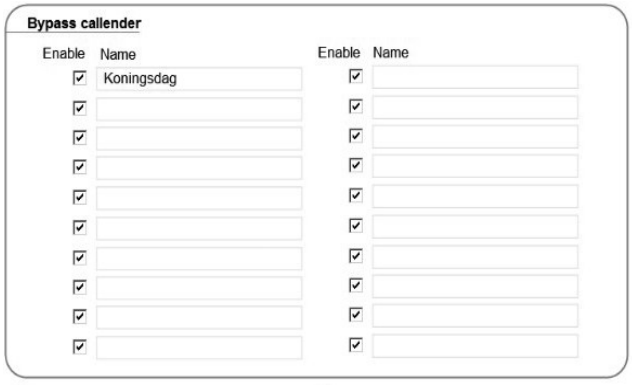
The internal clock of the limiter synchronizes via the internet (NTP). The time can also be set manually.

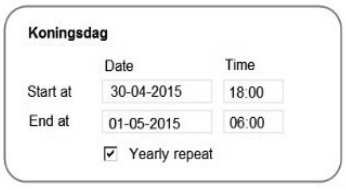


Bypass calender

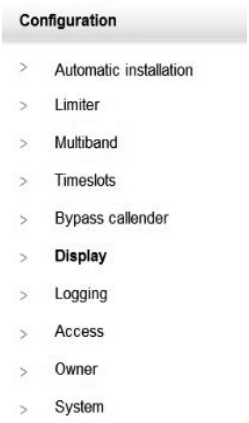


The bypass calender allows to set different times and dates to disable the limiter. The input signal will not be reduced during a bypass slot. The equalizer settings stay active during bypass.
A total of 20 independent bypass slots can be set.





Display



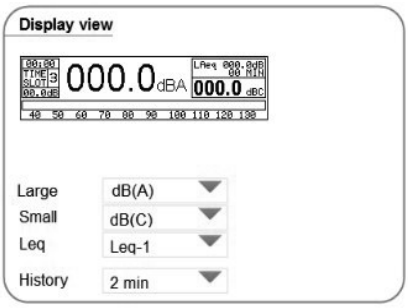
The front panel display allows to view different values.

Large:
- dB(A) (standard)
- dB(C)
- Leq-1
- Leq-2
- dB peak

Small:
- dB(A)
- dB(C) (standard)
- Leq-1
- Leq-2
- dB Peak

Leq:

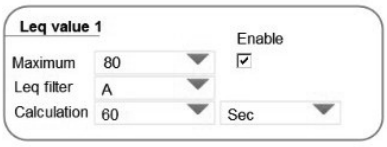
Leq:
- Leq-1 (standard)
- Leq-2

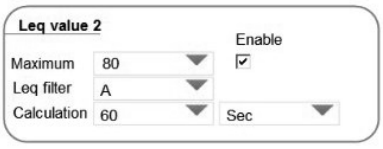


The bottom VU meter always shows fast VU.
Integrated fast VU: 0.125 seconds, Integrated slow VU: 1 second.

History screen: 2 till 60 minutes, standard 2 minutes. Screen divided into 120 markers.

Leq value 1:
Maximum: 50 tot 125dB, standard 85
Leq filter: A of C, standard A
Leq calculation: 1 tot 360 seconds and 1 tot 60 minutes, standard 2 minutes.
Enable: standard on

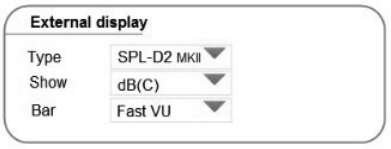




Leq value 2:
Maximum: 50 tot 125dB, standard 85
Leq filter: A of C, standard C
Leq calculation: 1 tot 360 seconds en 1 tot 60 minutes, standard 15 minutes
Enable: standard off

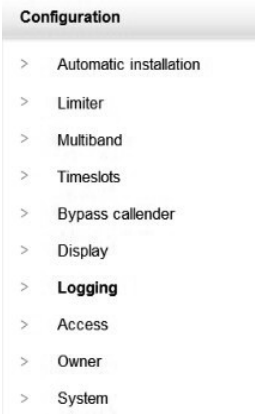
Leq-1 en 2 automatically change name in all views to the selected time and filter weight.
For example: Laeq2m or Lceq15m.

External Display:
Type: Off, SPL-D2 MK2, standard SPL-D2 MK2
Show: dB(A), dB(C), dB, Leq-1, Leq-2, standard dB(A)
Bar: fast VU, slow VU, reduction, standard fast VU.



SPL-D2, SPL-D3 and EXT-3 optional external display:

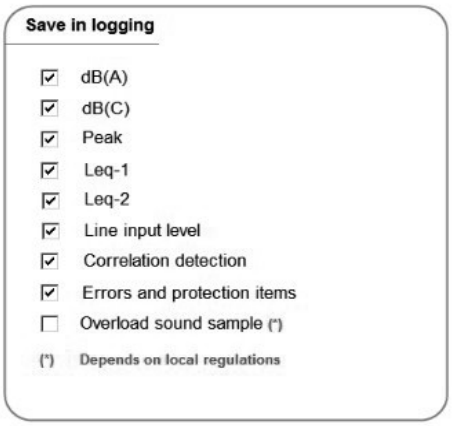
Logging



The SPL-6mk2 records all measured values into PDF and CSV file format. An independent file is generated for each day. Select the values that need to be implemented. By default all values are available.

Data that are not stored in the reports remain available in the limiter. An exception to this are the overload sound samples, which are subject to local privacy legislation.

The SPL-6mk2 stores measured values for each second. This way an historic record can be viewed at each point in time.

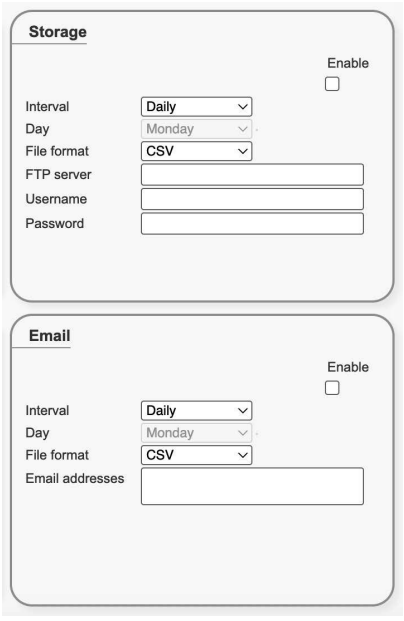


Reports are generated on the selected interval day or weekly. The reports are send out by FTP or email to an external server. Contact your local network administrator for the server details. After setting the server details the SPL-6mk2 will send out all day reports. These reports contain all selected information from the past full day or days.

When no connection to the servers can be made an error message will be stored. The SPL-6mk2 will not try to resend but add the not send reports to next planned.

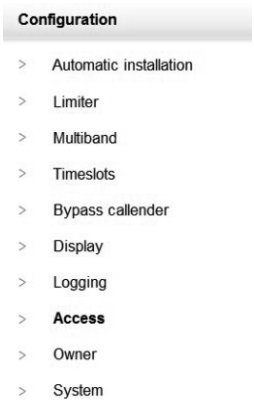
Multiple email recipients can be separated with a semicolon (;) as shown in the screenshot.

Note: When using an FTP server, it is not the limiter itself, but the external DATEQ server that connects to the FTP server. As a result, it is not possible to use a local FTP server (e.g., 192.168.1.100).
To whitelist the IP address of the DATEQ server, you can add the address associated with ftp.dateq.nl.
The generated .csv files are digitally signed.
The regulatory authority can verify the validity of the files by uploading them to https://www.dateq.nl/logChecker.

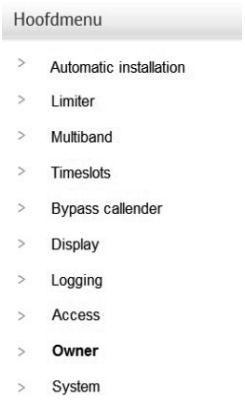


Remote access

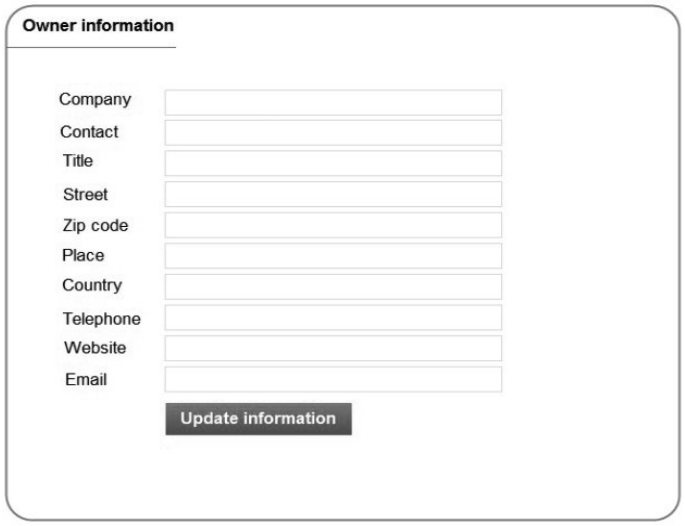
By default the SPL-6mk2 can only be reached within the local LAN network. The SPL-6mk2 automatically recognizes whether it is contacted through the local LAN or through the Internet. To enable remote internet control and readout, 'Allow internet access' must be enabled.



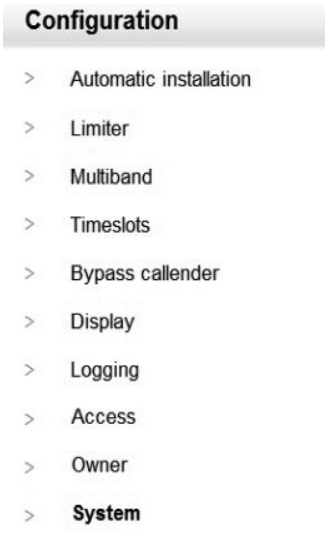
Owner information



The SPL-6mk2 will display the owner information in several reports and logging. To ensure the information is correctly displayed, it must be filled in as complete as possible.

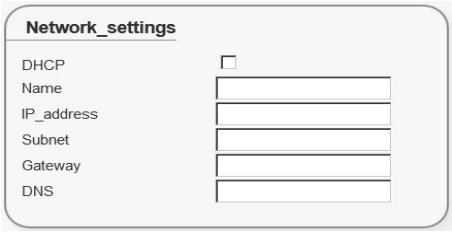


System settings



Below the SPL-6mk2 device settings are made.

IP settings
Enter the network settings for the SPL-6mk2 here.
By default, the SPL-6mk2 is configured to obtain an address via DHCP.
Please contact your network administrator for the correct settings for your network.



Language
The SPL-6mk2 can be set to five languages:
- English
- Dutch
- French
- German
- Portuguese

The language will be applied trough out the complete device.
When adjusting the system language the SPL-6mk2 will reload it's webpage.

User settings
All user settings can be stored to a backup file on your computer.
This backup file can be restored to any SPL-6mk2 device.
The SPL-6mk2 can also be restored into factory default.

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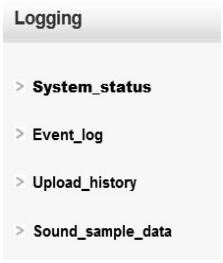
When restoring the SPL-6mk2 into factory default all settings, reports and log files are erased.

Device information
Displays the factory information of the device.
Factory calibration displays the last factory calibration and calibration code.

Logging



The SPL-6mk2 is equipped with an advanced logging and recording system. This system stores all system events, sound samples and optional records overload sound samples into it's memory. All system logging can automatically be send by email or remotely be stored through FTP.

Within the logging tab all statuses are displayed and can be exported or stored.

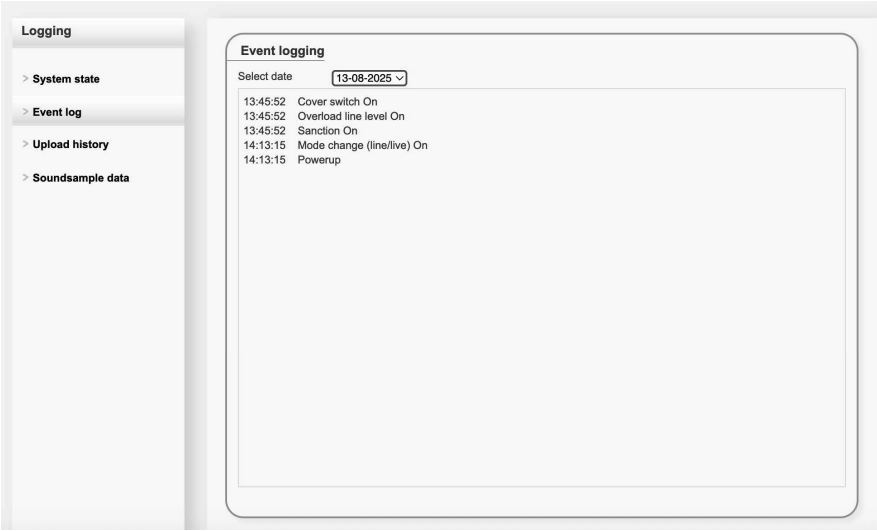
System status

The system status displays the current limiter status.

- Current measured line signal
- Current core and memory status
- Current reduction and multiband reduction

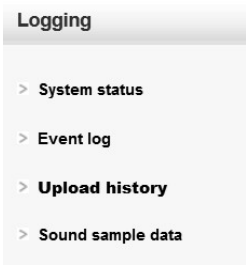
Event log

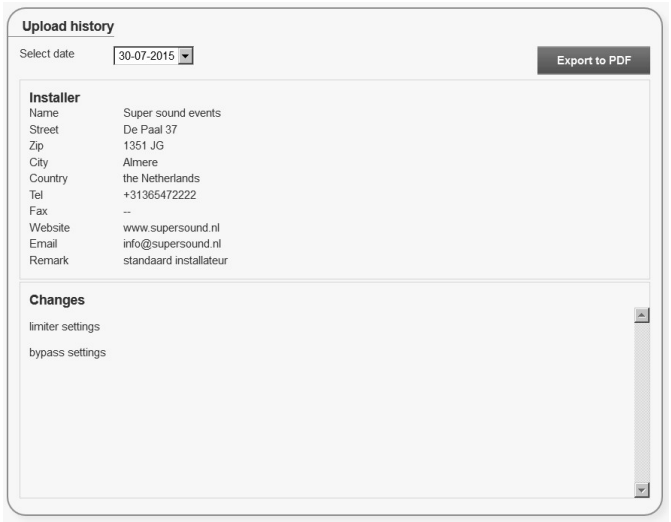
The event log shows all system events from the selected date.



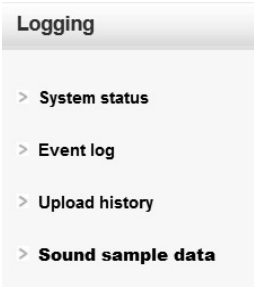
Upload history

The upload history shows all historic system and limiter settings changes. It allows to view when which installer made what limiter changes. The historic change log can be saved and exported into PDF file format.



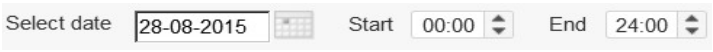


Sound sample data

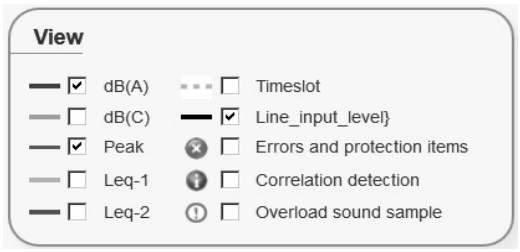


The SPL-6mk2 stores all selected sound sample data into the internal memory. Sound sample data can be read back for at least 12 months.

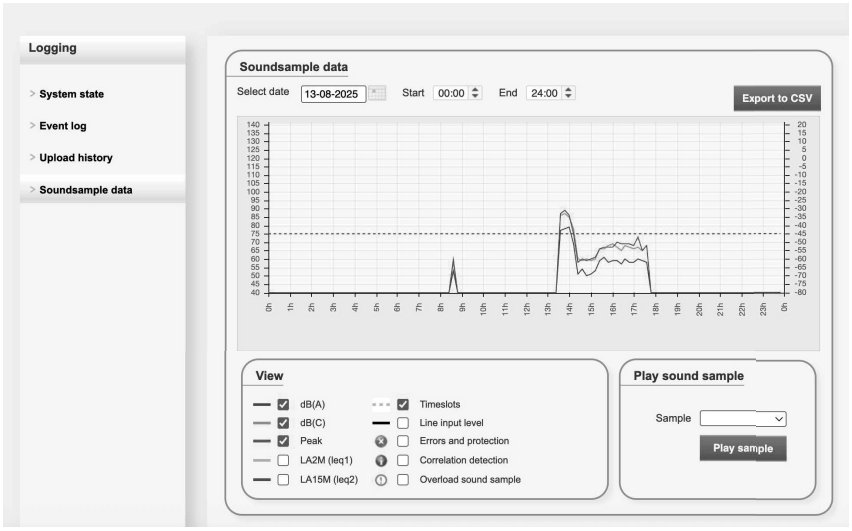
Select a date and time window to view the recorded samples.



Select the desired measurement value.



The sound pressure data can also be exported to CSV format for documentation or further analysis.



To view the exact measured data point the mouse onto the graphics. The graphic will show a small popup containing the selected measurement values.

When selected within configuration overload sound sample WAV files can be played. The WAV files will be stored over a maximum period of 12 months, deleting the oldest files first.