

SPL-5 MKII

AUDIO LIMITER & SOUND LEVEL LOGGER

Manual



DATEQ
audio technologies

Due to the nature of this product and its designed functionalities it is considered to be used and installed solely by professional and certified installers and is not intended for consumer usage or resale. Consumer use is not supported by the manufacturer.

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.



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Introduction



The SPL-5 MK2 is a sound level limiter that records the sound pressure levels for at least 180 day's. Other events like power cycle, tamper detections or overload on sound level are also recorded.

Using the SPL-5 MK2 configuration software the unit can be configured and sound sample data can be read. On release of the SPL-5 MK2 the configuration software is supported by windows 7 and higher. In normal use the SPL-5 MK2 connected to the software is read only. Users can read all settings and decibel logging. To change any setting the installer license in combination with the installer password is required.

To connect to the SPL-5 MK2 a windows-computer with USB support is needed. When the SPL-5 MK2 is connected to a local area network or an internet connection, the software allows to connect remotely.

The limiter uses an external measurement microphone to determine the current sound level. When the sound level exceeds the maximum allowed level the limiter will reduce the output level to ensure the sound level stays within it's limits.

Using the time and bypass calendar the SPL-5 MK2 can adjust the maximum allowed sound level automatically during the day, week and year.

When connected, the special SRL-1 stage relay an external warning light can be connected and if needed the power of for example a DJ booth monitor can be cut. This way the sound level is secured without any compromises to the quality of sound.

Installation

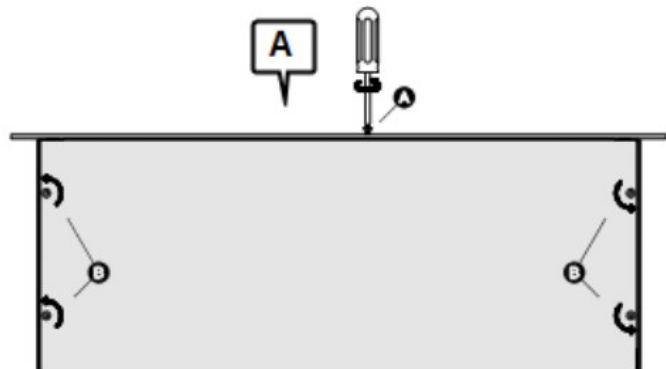
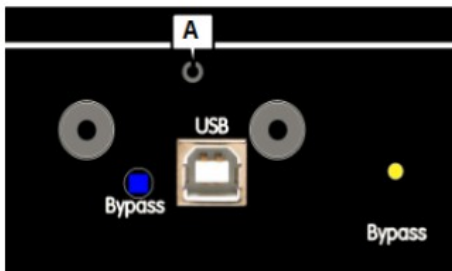
The limiter is installed in between the audio source (a mixing desk for example) and the speaker amplifier.



Image 1: Connecting the SPL-5 MK2

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



To prevent modification of the connections after calibration and sealing, the connectors of the limiter are inaccessible after sealing of the cover plates at the front. To access the connector board, remove the right cover plate at the front panel.

Unfasten screw (A) with a torx-screwdriver (see illustration). Now remove the 4 torx-screws (B) from the top lid. The top cover can be removed now. Gently lift the front side a little, and slowly shift the top lid to the rear. The connector board will become visible.

The SPL-5 MK2 is equipped with balanced in- and outputs ensuring premium sound quality over longer distance. After installing the limiter the cover plate can be replaced, locked and sealed, ensuring no changes to the installation can be made. If for some reason the seal is broken, the cover and the cover is removed, the limiter will store this action into it's memory and optionally lock the audio path. This sanction can only be reset using the reset key.

Microphone input; XLR 3-pin female

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

Table 1: microphone input connections

Audio inputs left and right; XLR 3-pin female

P1n	Function	Description
1	Ground	Audio ground
2	Audio +	Audio in phase +
3	Audio -	Audio out phase -

Table 2: Audio-input connections

Audio output left and right; XLR 3-pin male

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

Table 3: audio-output connections

USB port; USB-B female

Pin	Function	Description
1	VCC +	Power
2	Data -	Data
3	Data +	Data
4	GND	Ground

Table 4: USB connections

Network port; RJ45 female

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

Table 5: Network connections

Signaling connector; DB-25 female

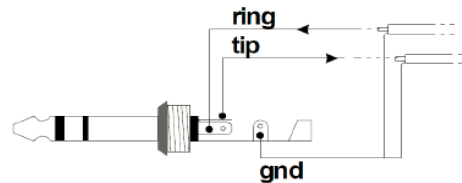
Pin	Function	In/ output
1	External attenuation	In
2	Reduction signaling	Out; 15V/ 5mA max.
3	Overload signaling	Out; 15V/ 5mA max.
4	Live OK signaling	Out; 15V/ 5mA max.
5	Warning signaling	Out; 15V/ 5mA max.
6	Level OK signaling	Out; 15V/ 5mA max.
7	Safe sound level signaling	Out; 15V/ 5mA max.
8	External display	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 (only for signaling connections)	
18...20	Analogue ground (only for audio connections)	
21	Microphone -	In
22	Left audio in -	In
23	Right audio in -	In
24	Left audio out -	Out
25	Right audio out -	Out

Table 6: DB25 connections

External display; Jack 3-pens female

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

Table 7: Extern 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.

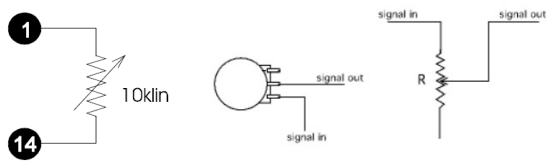
Audio inputs

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 signal 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:

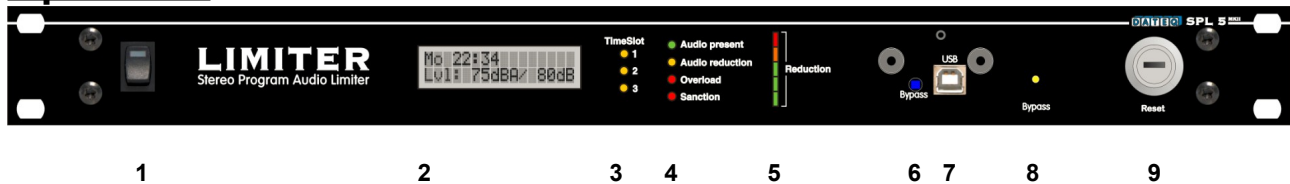
- The warning signaling output becomes active, as soon as the maximum sound pressure level is exceeded.
- Level OK indicates that the sound pressure level is below the maximum allowed level, but is getting close (0...12dB span).
- Safe sound pressure indicates that the sound pressure level is well below 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, SPL-D3 or SPL-EXT3 display. The external display can also directly be connected to the SPL-5. For this a stereo 6.3mm jack cable is required.

Operation



1. Power switch:
switches main AC power on or off for the limiter.
2. Display:
The display shows all important values like system time, current sound level in different values (dBA, dBC, Leq and line level) and the current reduction.
3. Timeslots:
these LED's indicate the current active timeslot. Each timeslot can be configured with it's own time and maximum sound pressure level.
4. Status LED's:
 - AUDIO PRESENT indicates active audio detected on the audio inputs of the limiter (detects at -24dB),
 - REDUCE LED indicates the limiter is actively reducing the audio signal,
 - OVERLOAD LED indicates an overloaded signal present at the line or microphone input (12dB above threshold level),
 - SANCTION LED indicates 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.
1. Reduction LED's:
The reduction is indicated in the percentage of the maximum allowed limiter reduction. Default this is set to 30dB that results in 6dB/LED.
 - All off: no reduction
 - 1 LED on: 1-20% reduction
 - 2 LED's on: 20-40% reduction
 - 3 LED's on: 40-60% reduction
 - 4 LED's on: 60-80% reduction
 - 5 LED's on: 80-100% reduction
2. Bypass switch:
This switch puts the limiter fully in bypass. The limiter will no longer act as limiter, but will only record measured sound levels.
3. USB:
USB connection for reading historic sound levels and changing the limiter settings.
4. Bypass LED:
Indicates the limiter is in bypass mode. The bypass switch or bypass callander is active.
5. 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.



10 11 12 13 14 15

10. Microphone:
3-pins XLR-connection for the standard DCM-5 microphone.
11. Audio input:
3-pins XLR-connection for left and right audio input.
12. Audio output:
3-pins XLR-connection for left and right audio output.
13. Signaling connector:
Sub-D 25 connector for connection external signaling, audio in- and outputs and the measurement microphone.
14. Link:
Link connection for an external display SPL-D2 MK2, SPL-D3 of SPL-EXT3.
15. Ethernet:
Ethernet connection for IP-link over a local network to the configuration software.

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
Input sensitivity.....	+18dBu maximum
Input resistance.....	50kOhm
Common-mode reduction.....	>86dB

Outputs

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

Common

Audio

Frequency response.....	20Hz...22kHz @ -1dB
Signal/ noise ratio.....	>100dB
THD+N (IEC-A).....	<0.02%

Limiters

Threshold.....	50...120dBA (resolution 1dB)
Output correction.....	-50...0dB (resolution 1dB)
Microphone correction.....	-30...+12dB (resolution 1dB)
Maximum attenuation adjustment.....	-6...-50dB (resolution 0,5dB)

Memory

180 days

**Soundlevel data and event logging are stored for maximal 180 days or less when memory is full. The memory system will delete and override oldest data first.*

Norm

- EU: Measurement chain designed to comply according specifications IEC-61672-1 class 2
- France: Measurement chain designed to comply according specifications NFS 31-122-1-2017 and décret 2017-1244
- BE: Measurement chain designed to comply according specifications VLAREM-II Cat.1, Cat.2 and Cat.3
- DE: Measurement chain designed to comply according specifications DIN-61672, DIN-60651 and DIN15905-5

External connections

External attenuation.....	0...-20dB (10kOhm lin. potentiometer)
Signaling and switching outputs.....	15V/ 5mA max.
Supply voltage.....	100...240V _{AC} / 50Hz
Power usage.....	15W

Dimensions and weight

Front.....	483mm x 45mm (B x H) = 19inch/ 1HE
Depth.....	175mm
Weight.....	3,2kg

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AUDIO LIMITER
&
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Configuration

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Introduction configuration



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When connected, the special SRL-1 stage relay an external warning light can be connected and if needed the power of for example a DJ booth monitor can be cut. This way the sound level is secured without any compromises to the quality of sound.

Installation

The SPL-5 MK2 configuration software is compliant with the following operating systems:

- Windows XP
- Windows 7
- Windows 8
- Windows 10

Apple OSX, Linux and other operating systems are not supported. Minimum display resolution 1400 * 1050 pixels.

Always use the latest software and firmware release that can be found at www.dateq.nl.

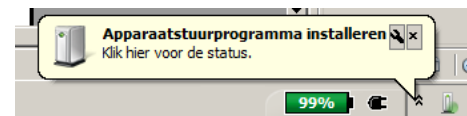
Configuration

In this chapter the configuration and system settings for the SPL-5 MK2 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 display using a a standard USB-A to USB-B cable. After connecting the SPL-D3 to your computer the standard windows drivers will be loaded. No extra drivers are needed, they are included in your windows operating system.

On first connection installation of the standard windows drivers can take several minutes depending on your operating system.



Configuration license

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

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.

This SPL-5 is last configured at:	29-01-2020 10:58
By certified installer:	Dateq B.V. - Almere - The Netherlands - www.dateq.nl

An installer license is linked and registered to the installing company and should not be transferred to third parties. The installer license contains all company and contact details, that will be stored into the SPL limiter during configuration.

Unlocking the limiter

Before changes can be made the license password must be entered. This password is linked and stored within the license file SPL5.DSR.

Password

UNLOCK

The license file SPL5.DSR must be copied into the folder that contains the software.

SPL5.DSR	1-7-2016 11:02	DSR-bestand	9 kB
SPL-5.exe	3-12-2020 16:08	Toepassing	7.032 kB

If no valid license is detected the software will display this.

Please note; a valid license file must be installed before starting the software.

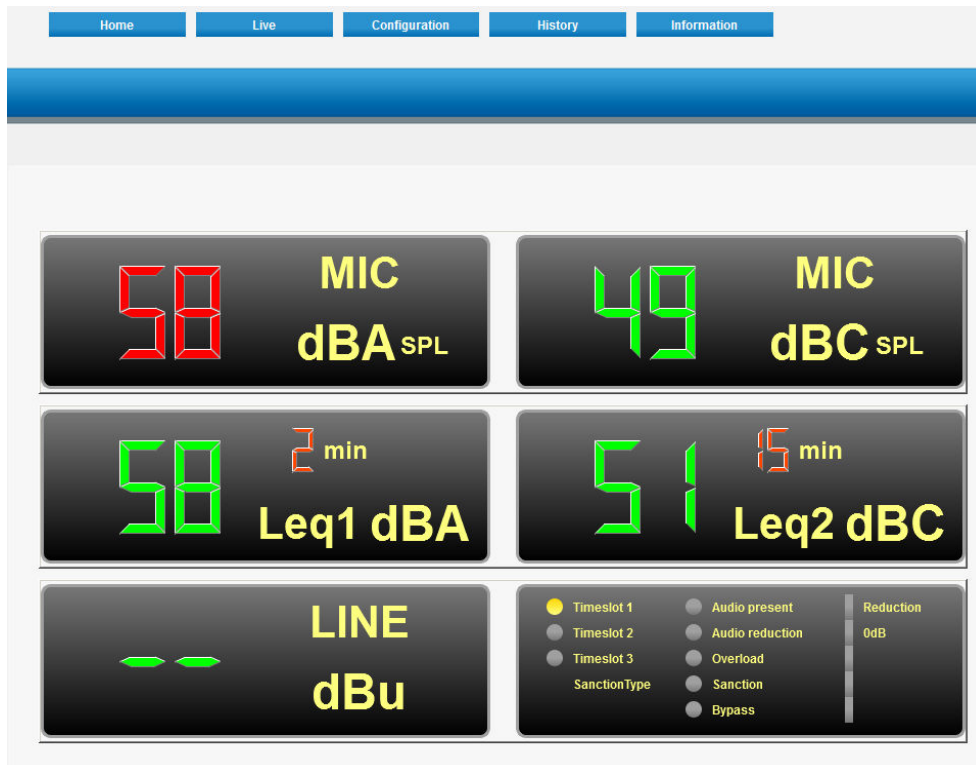
Password

UNLOCK

No license file found

Live

The live view of the software allows to monitor the SPL-5 MK2 current measurements. These displays follow in color of the actual display in green and red.



Along with the current SPL levels, the front panel status LED's are displayed. This gives a quick and insightful overview of the status of the limiter.

Limiter configuration

The manual configuration of sound level parameters.

The screenshot shows a web-based configuration interface for the DATEQ SPL-5 MK2. On the left is a navigation menu with 'Configuration' selected and sub-items: '> Limiter', 'TimeSlots', 'Bypass calendar', 'Display', and 'System'. The main content area is titled 'Configuration' and contains three panels:

- Limiter mode:** A dropdown menu currently set to 'Line limiter and recorder'.
- Limiter settings:** Five rows of controls:
 - Maximum level dBA: 85dB (with +/- buttons) and an 'Enabled' checkbox.
 - Maximum level dBC: 90dB (with +/- buttons) and an 'Enabled' checkbox.
 - Input threshold: 0dB (with +/- buttons).
 - Output attenuation: 0dB (with +/- buttons).
 - Maximum reduction: 30dB (with +/- buttons).
- Sanction settings:** Four rows of controls:
 - Time until sanction: 20sec (with +/- buttons) and an 'Enabled' checkbox.
 - Sanction time: 20sec (with +/- buttons).
 - Sanction after tamper: Enabled (dropdown menu).
 - Sanction when date is expired: 01/01/2020 (calendar icon) and a disabled 'Enabled' checkbox.
- Microphone settings:** Two rows of controls:
 - Microphone correction: 0dB (with +/- buttons).
 - Microphone sensitivity: 3,7 mV/Pa (with +/- buttons).

Mode

- Live Limiter and recorder
- Line Limiter and recorder

In live mode the limiter will use the SPL values measured by the microphone in its calculation to limit the outgoing audio signal.

In Line mode the limiter will ignore the microphone measurements and only use it to record sound sample data. The limiter function will react on the line signal only using the input threshold setting.

Limiter settings

Maximum dBA: 50dB till 125dB.

Maximum dBC: 50dB till 125dB.

Input threshold: -50dB till 0dB.

Output attenuation: -60dB till 0dB.

Maximum reduction: 60dB till 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 sensitivity: 3.7mV/Pa (default)

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.

!! Changed settings eliminately become active.

Display

The front panel display allows to view different values.

The screenshot shows the configuration interface for the DATEQ SPL-5 MK2. On the left is a navigation menu with options: Limiter, TimeSlots, Bypass calender, > Display (selected), and System. The main area is divided into four panels:

- Display view:**
 - Top left: Leq A-weighted
 - Top right: Leq C-weighted
 - Bottom left: Leq1
 - Bottom right: Time Caroussel
- External display:**
 - Type: SPL-D2 mkl
 - Display 1 (large): dB(A)
 - Bar: Reduction
 - Display 2 (small left): Leq1
 - Display 3 (small right): Leq2
- Leq value 1:**
 - Maximum: 85 dB
 - Leq filter: A-weighted
 - Leq window: 2 Minutes
- Leq value 2:**
 - Maximum: 85 dB
 - Leq filter: C-weighted
 - Leq window: 15 Minutes

Limiter display:

Top left, Top right, Bottom left, Bottom right. Display view can be adjusted.

Leq-1:

Maximum: 50 tot 125dB, default 85

Leq filter: ANSI A, ANSI C of Flat, default A

Leq calculation: 1 till 60 seconds and 1 till 60 minutes

Leq-2:

Maximum: 50 tot 125dB, default 85

Leq filter: ANSI A, ANSI C of Flat, default C

Leq calculation: 1 till 60 seconds and 1 till 60 minutes

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, SPL-D3 or SPL-EXT3.

Show: dB(A), dB(C), dB, Leq-1, Leq-2, default dB(A)

Bar: fast VU, slow VU, reduction, default fast VU.

Optional external display's:

SPL-D2, SPL-D3 en SPL-EXT3.



Firmware update

Select latest release firmware and click on update. The system will check for a valid update. When a valid firmware is found, the reduction bar will change into a chaser (bootloader-mode) and the firmware will be updated.

The screenshot shows a web-based configuration interface. On the left is a sidebar menu with 'System' selected. The main area is divided into three sections:

- Firmware:** Contains fields for 'Application' (2.3f), 'Bootloader', and 'Filename'. It includes a 'Reboot' button, a 'Select firmware file' button, a progress bar at 0%, and an 'Update' button.
- Network settings:** Includes a 'DHCP' checkbox, 'Mac Address' (9c-a5-25-8e-27-08), 'IP Address' (192.168.001.101), 'Subnet' (255.255.255.000), and 'Gateway Address' (192.168.001.001). It features 'Send TCP settings' and 'Connect to SPL5' buttons.
- Device:** Shows the 'Serial Number' as 670060.

Note:
Some windows builds do not fully support the bootloader mode. When the progress bar does not start; disconnect the USB cable and reconnect it again. The update starts running after reconnecting.

Settings

Save settings allows a backup of the current device settings.
Load settings allows to restore previous saved settings.
Restore to factory default allows to restore all settings to factory default. All previous settings will be lost.

The screenshot shows a 'Settings' panel with three rows and buttons:

- 'Save settings' with a 'Backup' button.
- 'Load settings' with a 'Restore' button.
- 'Default settings' with a 'Restore factory default' button.

Network settings

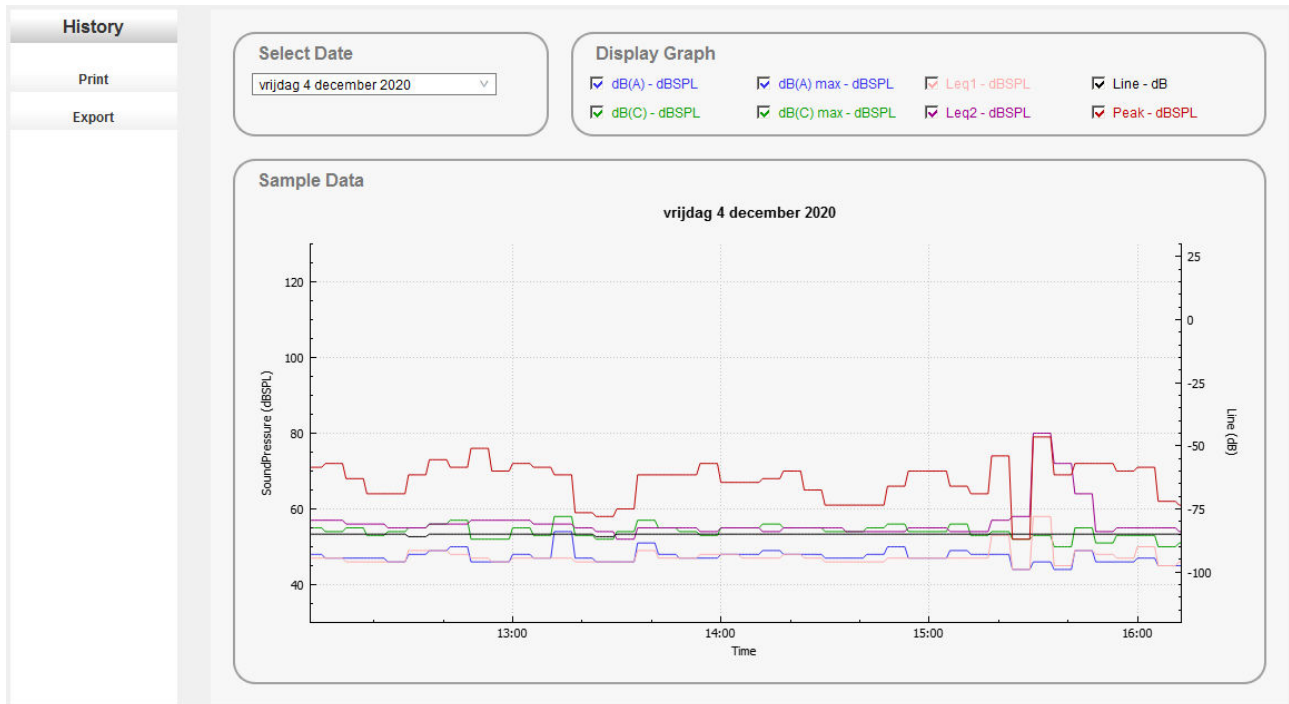
Displays the current network settings of the SPL5. On change the new settings will become active after sending them to the limiter. Care full! The SPL5 MK2 will reboot after sending the network settings. Uses TCP port 20108

Device

Shows the serial number of the limiter. The serial number can not be changed.

History

The SPL-5 MK2 logs all measured values and stores these encrypted into it's internal memory. Attempts to alter measured sound sample data within the SPL-5 MK2 is prevented and will result in a defective unit that can only be restored at the Dateq service desk.



Select date:

Select the date that needs to be inspected.

Display Graph:

Select the checkbox of measurement value(s) that needs to be displayed.

Zoom:

Use the scroll wheel of your mouse to zoom in and out of selected measurement areas.

Print:

Print the current graphic view (including zoom) to your printer.

Export:

Export all measurement data from the selected day to comma separated file.



Certificate of calibration

Calibrated equipment details

Instrument manufacturer:	Dateq B.V.
Instrument type:	SPL-5 MK2
Description:	Sound level limiter and recorder
Serial number:	_____
Production code:	_____
Calibration code:	_____

Calibration procedure

The instrument with above serial number has been calibrated using techniques were applicable for calibration procedures as described in the latest revision of International standards: IEC61672-1 - IEC61672-2 - IEC60651 - IEC60804 - IEC61260 - IEC60942 - IEC61252 - ANSIS1.4 - ANSIS1.11 - ANSIS1.43- AFNOR class 2a and 2b NFS 31-122 - décret 98-1143 and DDN45680_1997. All calibration procedures were carried out by substituting the microphone capsule with a suitable electrical generated acoustical signal, apart from the electric line level signal.

Calibration standard

The instrument with above serial number detailed in this document was calibrated to match the calibration and testing laboratory standard and design specifications as used by Dateq B.V.

Calibration equipment:	Audio precision portable one plus
Audio line signal source:	Audio precision portable one plus
Audio microphone signal source:	Brüel & Kjær sound level calibrator
Audio microphone signal source:	Type: 4230 sn:1102808
Audio microphone signal reference:	Brüel & Kjær Class 1 sound level meter
Microphone type:	Type: 2232 sn:1777899
Microphone reference type:	Dateq DCM-5
Microphone reference type:	Brüel & Kjær Class 1 measurement microphone
Microphone reference type:	Type: 4176 sn:1770346

Calibrated by: _____

Calibration date: Monday, 07 December 2020
 Certification: 7 December 2020

This calibration certification is valid for 12 months from the date above.

Calibration certification was granted in laboratory setup. Installed device may need independent manual recalibration depending on local environment, microphone placement or local law. This certificate may be used for reference purposes only.



DECLARATION OF CONFORMITY

acc.to art.10.1 EMC directive 89/336/EEC

We, **DATEQ Audio Technologies B.V.**
de Paal 37
1351 JG ALMERE
THE NETHERLANDS

hereby declare, exclusively to our responsibility, that this product

Type: SPL 5 MK2 **Serialnrs.: 49-XXXX**

to which this declaration applies, is in accordance with the following
harmonized European norms

EN 50081-1 and EN 50082-1

According to the regulations of the EMC-directive 89/336/EEG, amended by
directive 91/263/EEG, 92/31/EEG and 93/68/EEG.

EN 60065

According to the regulations of IEC 65: 1985 + A1: 1987 + A2: 1989 + A3:
1992, mod. Ratification: 1993-07-06

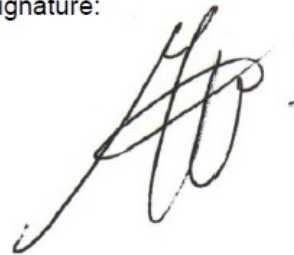
Almere, December 7th 2020

Managing director

stamp:

signature:

DATEQ
audio technologies
De Paal 37
1351 JG Almere
tel. 036-5472222, fax 036-5317776



Product support

For questions about the SPL series limiters, accessories or other products contact Dateq at:

Dateq Audio Technologies B.V.

De Paal 37

1351 JG Almere

The Netherlands

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E-mail: info@dateq.nl

Internet: www.dateq.nl