

# DaySequerra

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## 8 Channel Intelligent Loudness Monitor Model 2542

**iLM8 - Live** | User Manual

## Welcome

Thanks for purchasing the DaySequerra iLM8 - Live. Differences in audio levels between TV programs, or between programs and commercials, are a constant annoyance to viewers. iLM8 - Live permits broadcasters to verify compliance of their desired loudness level across all audio programming and minimize viewer complaints.

We design and build all of our DaySequerra products to be completely reliable and easy to use, so you can concentrate on producing great sounding broadcasts, not struggling with complicated equipment or difficult to use product manuals.

While the iLM8 - Live has been designed to be straightforward to use, we do suggest that you spend a few minutes familiarizing yourself with the features and operational functions that are contained in this manual.

**DaySequerra has been building broadcast quality products since 1989. The technology developed for the iLM8 - Live, and all of our products, has evolved through a process of user feedback, extensive listening, field-testing and careful refinement.**

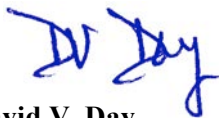
In the event that you encounter any technical or operational difficulties with this or any DaySequerra product, please feel free to contact us at 856-719-9900. Our office hours are from 9 to 5 ET, Monday through Friday. Or you can email your questions to: [info@daysequerra.com](mailto:info@daysequerra.com).

*If the model number on your iLM8 is 2531 a hardware upgrade is required to run the most recent version of the Remote Dashboard. Please contact DaySequerra at (856) 719.9900 to arrange for an upgrade.*

Also, please remember to visit our website [www.daysequerra.com](http://www.daysequerra.com) for warranty registration and the latest DaySequerra product information.

We have worked hard to ensure that your DaySequerra iLM8 - Live will reliably serve you for years to come. With a modular design and upgradeable firmware, your new unit is easy to install and use right out of the box.

We sincerely hope our products help you achieve a new level of excellence in your work!



**David V. Day**  
and the **DaySequerra Team**

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### iLM8 - Live Key Features

- Standalone operation – no external encoder is required
- Industry-standard ITU-R BS.1770-1 and BS.1770-2 with Eclipse algorithms; simultaneous measurement for 5.0 surround and auxiliary stereo inputs
- Robust DSP platform – no PC operating system to hang; no lengthy boot-ups
- Easy-to-read numerical Measured and Target readouts on vacuum fluorescent display; bar graph LED audio level meters
- Front panel headphone monitor
- Ethernet interface for long-term logging and field software updates
- Optional HD/SDI (SMPTE 292M/229M) with measurement and mapping of all 16 SDI audio channels

## Important Safety Information

- Indoor use only. Not for use in wet or damp environments.
- Maximum Relative Humidity: <80%
- Class I Equipment (grounded type)
- Electrical rating: 100-120/220-240V~50-60Hz 25W max
- AC Mains supply voltage fluctuations are not to exceed  $\pm 10\%$  of the nominal voltage
- Operations temperature range  $-40^{\circ}\text{C}$  to  $70^{\circ}\text{C}$
- Maximum altitude: 3000m (9843ft)
- Equipment suitable for continuous operation
- Weight: 3.6kg (8lbs) equipment only; 6.1kg (13.5lbs) shipping

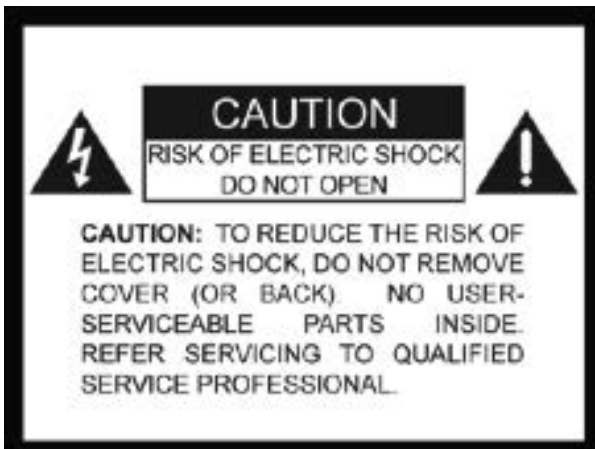
**Important Note: Please connect your iLM8 - Live to an uninterruptible power supply (UPS) to provide other protection against power surges and low-voltage conditions.**

## Service Information

The DaySequerra iLM8 - Live contains no user serviceable components inside the unit. Please contact DaySequerra for repair and upgrade information. In the event that your unit needs to be returned to the factory, contact us for a return authorization number. **Please visit [www.daysequerra.com](http://www.daysequerra.com) and register your new iLM8 - Live so we can keep you informed of the latest hardware and software updates.**

The lightning flash with arrowhead symbol is intended to alert the user to the presence of un-insulated “dangerous voltages” within the product’s enclosure that may be of a sufficient level to cause harm.

The exclamation point within a triangle is intended to alert the user to the presence of important operating and maintenance instructions within the product literature.



Exposed portions of the power supply assembly are electrically live. To reduce risk of electric shock, the power cord must be disconnected when the power supply assembly is removed. For continued protection against electric shock, a correctly wired and grounded (earthed) three-pin power outlet must be used. Do not use a ground-lifting adapter and never cut the ground pin on the three-prong plug. The ground terminal of the power plug is connected directly to the chassis of the unit.

## Technical Specifications

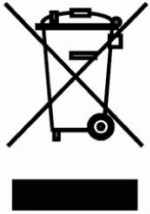
Latency of the Eclipse Algorithm:	<4ms at 48k sampling rate
Power Consumption:	25W Maximum
Dimensions:	Rack Mount; 1 RU (1.75" x 19" x 10.75")
Sample Rate:	32kHz – 96kHz, 24-bit
Loudness Algorithms:	ITU-R BS.1770/3 Eclipse Loudness Measure
Headphone Monitor:	3.5mm TRS connector, >150mW max into 32Ω load
Dynamic Range:	140dB, DR any input to any output
GPIO:	DB-9 Female, 0-5V TTL
Environmental:	Operating Temperature: +41 to +105° F (+5 to +40° C) Storage Temperature: -13 to +140° F (-25 to +60° C) Relative Humidity: Maximum 85%, non-condensing
Regulatory:	<i>North America:</i> Designed to Comply with FCC Class A part 15 requirements. <i>Europe:</i> Designed to comply with LV Directive 73/23/EEC and EMC Directive 89/336/EEC; CE Mark (EN 55022 Class A, EN55024); Designed for RoHS and WEEE compliance.

## FCC Part 15 Regulatory Statement

This equipment has been tested and found to comply with the limits for Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction's manual, may cause interference to radio communications. Operation of this equipment in a residential area is likely to cause interference in which case the user will be required to correct the interference at their own expense. The user is cautioned that changes and modifications made to the equipment without approval of the manufacturer could void the user's authority to operate this equipment. The user should use only shielded and/or grounded cables to combat sources of interference.

## Environmental Preservation Efforts

This equipment has been designed and built by DaySequerra corporation to give many years of trouble free service and is backed by our three year warranty and commitment of providing the best customer support. When the time comes to retire your product from service, it should be disposed of in accordance with local codes or ordinances. Do not discard with household or commercial waste.



DaySequerra products are only to be installed in an inside location where it is protected from inclement weather. Operate DaySequerra products in temperature range of +5 to +40°C (105°F), with relative humidity ranging from 5 to 85% *non-condensing*. Adequate cooling must be provided if units are to be operated in high temperature locations (greater than +40°C). Exposure to liquid and condensation must be avoided.



DaySequerra products are manufactured with the environment in mind. The directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment (2002/95/EC) restricts the use of six specific hazardous materials in the manufacture of various types of electronic and electrical equipment. Following this directive prevents these toxic substances from entering our environment after disposal.

## Introduction

DaySequerra's iLM8 – Live Intelligent Loudness Monitor measures perceived loudness of up to eight channels of program audio using the industry-standard ITU-R BS.1770-1, BS.1770-2, and BS1770-3 with Eclipse Loudness Measure algorithms. This proprietary algorithm was developed by after extensive research into human hearing and perceived loudness.

Loudness is a perceptual property of an audio signal when it is reproduced acoustically. It is a complex non-linear function of amplitude, frequency and bandwidth. Current audio level meters measure the level of audio signals expressed as the amplitude of the signal - either the RMS (root mean square) voltage of an electrical signal or the sound pressure of an acoustical signal. Neither of these measurements, although widely accepted, provides accurate indications of how viewers will *perceive* the loudness of the audio programming.

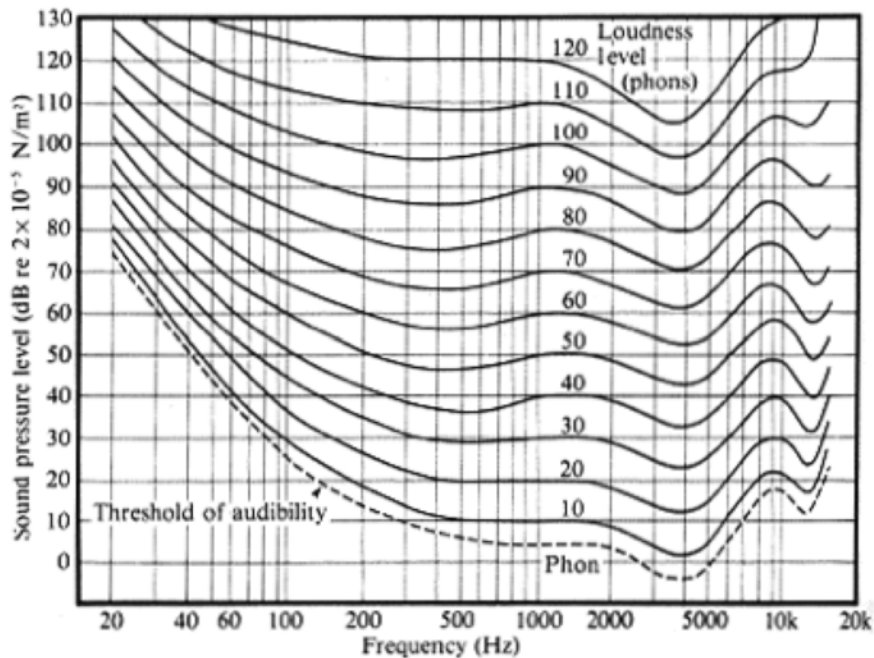
The Eclipse Loudness Measure algorithm uses a perceptual model of human hearing to more accurately detect spectral and density differences, inter-channel relationships and temporal overlaps in any audio content, resulting in a more accurate perceived loudness measurement over time.

The iLM8 - Live measures the perceived loudness of eight channels of program audio and displays the results in an easy-to-read numerical format with a moving average over time, eliminating the variations with engineers interpreting traditional VU or PPM indicators (neither of which can measure perceived loudness).

To improve system reliability and up-time, iLM8 - Live uses a robust DSP-based processing platform rather than the PC-based approach to completely avoid broadcast disruptions caused by operating system lockups. The iLM8 - Live's built-in high-performance headphone amplifier allows monitoring of any two user-selected outputs even in noisy background environments. A set of user-definable alarms can alert an operator of input loss, signal clipping and high or low signal levels referenced to the desired loudness level. An Ethernet interface provides long-term logging and field software updates capability. Whether pre-screening content at an ingest point or keeping tabs on the output of a broadcast air-chain, iLM8 is your key to reduce viewer complaints and improve audience satisfaction.

## Measuring Loudness

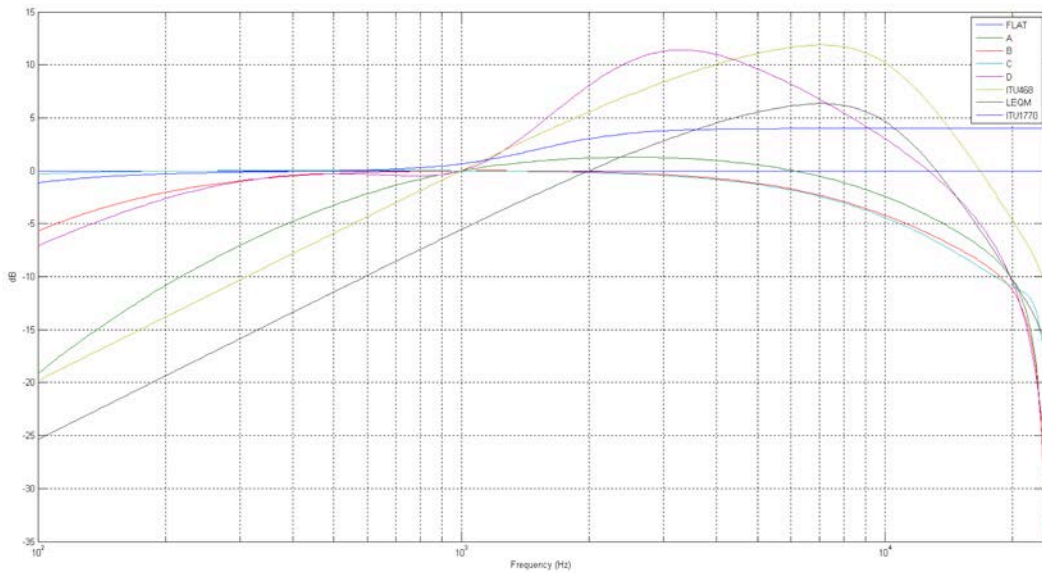
Human perception of the sensation of an audio signal is properly called “loudness”. As early as 1933, research by Fletcher and Munson showed that human hearing sensitivity is largely based upon the frequency of the sound, as well as the sound pressure level (SPL). As humans do not hear sound using standard measures of intensity, measuring loudness based upon SPL or the root mean square (RMS) voltage of the electrical signal will not agree with human perception. The Fletcher/Munson Equal Loudness Curves show the limits human sensitivity of certain frequencies, especially low frequencies (bass) at lower sound levels (Fletcher & Munson, 1933).



Fletcher/Munson Equal Loudness Curves

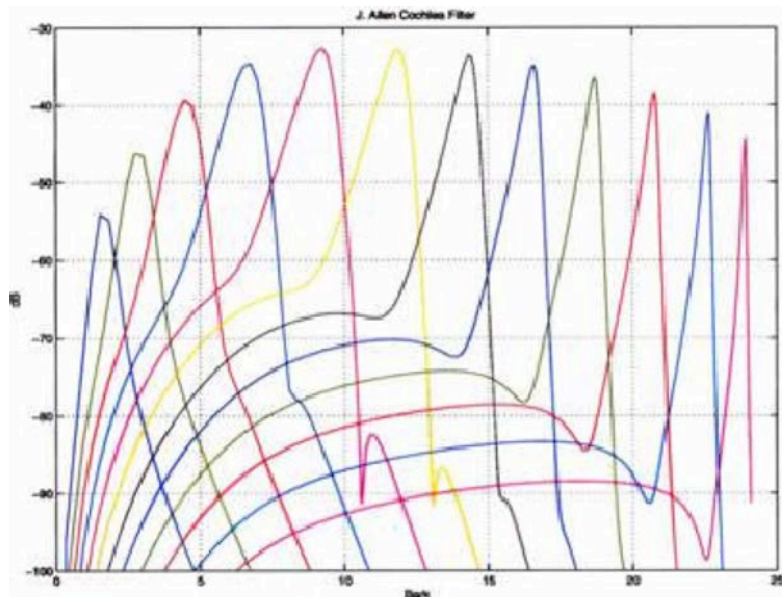
In order to create a loudness measure that more accurately represents the human perception of loudness, frequency weighting (or equalization curves) are placed ahead of power measurements. This introduces the measures Leq(A), Leq(B), Leq(C) and Leq(M) – with ‘Leq’ attempting to relate the ‘L’oudness of an ‘eq’uivalent amount of energy in a standard signal, typically a 1 kHz sine wave. The most current weighting standard, ITU-R BS.1770 produces results known as LKFS that are referenced to a dB FS scale. While certain Leq(x) measures match more closely to human loudness perception than traditional SPL or RMS measurements, there are still many broadcast content types that cannot be measured correctly with a Leq(x) or LKFS weighting method.

For example, a narrowband signal may be perceived to sound softer than an equally intense wideband sound, depending on the relationship between rendering level, absolute threshold and signal content. Additionally, content with large amounts of low-frequency energy is often inaccurately measured by BS.1770 due to heavy low-frequency roll off (see weighting curves). This measurement will often vary from a subjective measure, especially in the short term; however this variance is acceptable in a long term measurement, as the values are smoothed over many seconds, minutes or hours. Small deviations between the instantaneous perception of loudness is often acceptable when using a meter solution to measure the loudness, as the meters usually offer an audio visualization method that human operators can use. Combined with their ears, the operator can make any decisions about any corrective action required.



### Weighting Curves

To achieve a more accurate loudness measurement, the method should include critical bands in the measurement. Critical bands describe auditory filters within the human cochlea. (J. Allen, 2010). To illustrate this, a subject is presented with a single tone of a certain energy level, and more tones are added with equal energy in the critical bands – the total signal energy is kept constant regardless of the number of tones. If changing from one to two tones, the energy of each of the two tones is exactly half of that of the single tone. While the amount of audio energy never changes, the perceived loudness increases as the energy spectrum spreads out across more tones (Johnston, 2006).

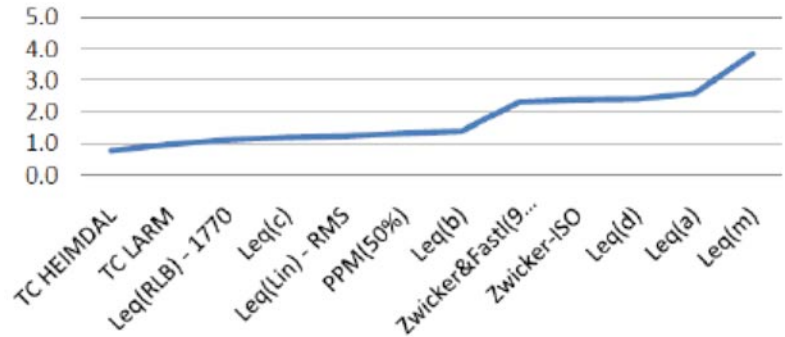


J. Allen Cochlea Filters (2010)



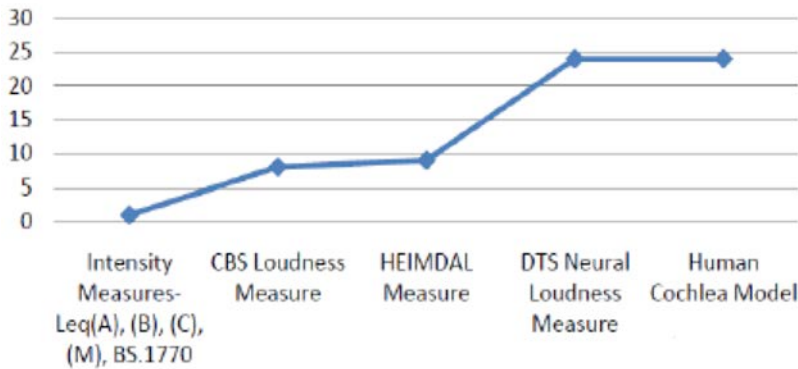
Bronwyn Jones and Emil Torick created a revised CBS loudness meter in the early 1980s that consisted of eight filters, each covering three critical bands. This approach did prove to deliver better subjective modeling than traditional SPL or RMS measurements (Jones & Torick, 1982).

In 2004, Nielsen and Skovenborg published an AES paper that expanded upon the ideas of critical band loudness measures. This paper introduced a method called HEIMDAL, which separated spectra into nine bands via an octave filter band. While the HEIMDAL multi-band model did not achieve the complexity of cochlear modeling as shown by J. Allen, the method had the lowest error compared to any preceding loudness models (Nielsen & Skovenborg, 2004).

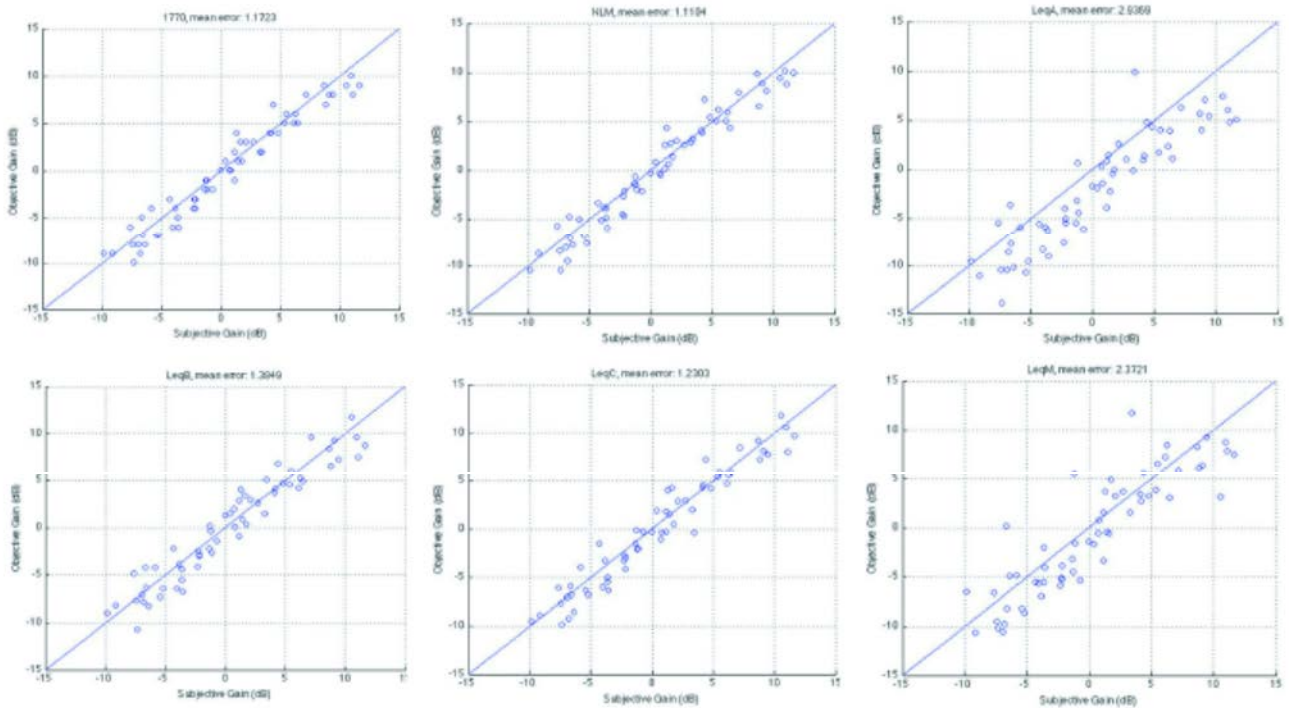


Absolute Error (dB) of various loudness measures

Despite the clear benefits of critical band analysis in loudness measurement, there are very few methods currently available to measure loudness this way in real-time for broadcast applications -- the extra processing required to accomplish it have prevented widespread adoption.



Critical band comparison between loudness measures



Each Leq(x) revision results in a different level of correlation between the objective measure and the human listener's assessment of loudness. The lowest mean error score was achieved by the Neural Loudness Measure

1. Fletcher, H. & Munson, W. A. (1933). *Loudness, its Definition, Measurement, and Calculation*.
2. Allen, J (2010 May 20). *Nonlinear Cochlear Signal Processing*.
3. Johnston, J. (2006). *Loudness Tutorial*.
4. Jones, B. L. & Torick, E. L. (1982). *A New Loudness Indicator for Use in Broadcasting*.
5. Nielsen, S. H. & Skovenborg, E. (2004). *Evaluation of Different Loudness Models with Music and Speech Material*.

## Using iLM8 - Live to Control Loudness

The most valuable tools in determining loudness in your program material include:

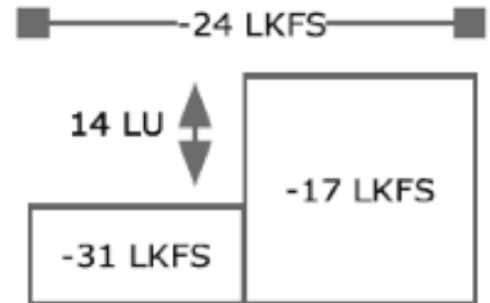
- *iLM8 - Live Intelligent Loudness Meter* – Operators should position iLM8 - Live at various places within the signal flow to objectively verify that audio loudness levels are within tolerance. Limited operator training is required to learn the basics of perceptual loudness measurement and management.
- *A Listening Ear* – No amount of metering can replace the value of active listening. Broadcasters should use trained technicians who work in listening environments that accurately represent the consumer's expected environment as a final line of defense against inappropriate loudness.

When measuring live content in real-time, operators can use short-term smoothed loudness measurements to confirm that the mix or overall program audio is adhering to broadcaster-established guidelines or a governing body's mandated target. However, when content is stored for playback at a later time, an opportunity is created for non-real-time loudness measurement.

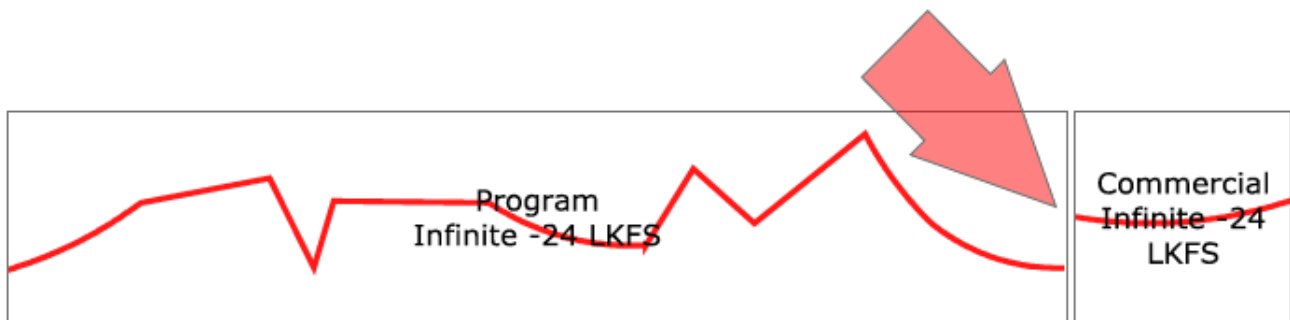
A long term loudness measurement of an entire clip is referred to as an *infinite average*. To achieve the desired loudness level, this value can be used to update the Dial Norm metadata, thus affecting the audio’s perceived loudness when processed at the point of consumption by way of the set top box or, more recently, digital television receiver.

Granted that not all viewers will have equipment capable of processing metadata or Dial Norm information, it is possible to control the perceived loudness by the application a fixed-offset to the audio content after the infinite average of an entire piece of content has been measured. While this may sound like the ideal loudness solution, it alone will never completely address loudness complaints.

For example, imagine that a movie starts with a dramatic scene where the first ten minutes consist of speech and sound effects measured at -31 LKFS. The second half of the scene includes a car chase measuring at -17 LKFS. The Dial Norm correctly describes the entire scene as -24 LKFS, however the viewer perceives the audio level as very low for the first half of the clip followed by audio that is significantly louder during the second half. While this extreme dynamic range may be acceptable in a movie theatre, it is typically not within the typical viewer’s home environment. The infinite average and fixed-offset approach has no way of addressing such intra-content issues.



Another challenge that fixed-offset correction cannot solve is how loudness is perceived in the context of playback. In this scenario, a TV program ends quietly followed by a high-energy commercial. Even if both pieces of content are properly prepared and played back at correct infinite average levels, an abruptly louder start to the commercial will create a jarring effect when played back immediately after the quiet ending.



Last century’s loudness solution was a fix-all audio processor that was situated at the end of the broadcast chain, controlling loudness by ‘squashing’ the audio and removing essential audio dynamics. With visual feedback presented from the iLM8 - Live, a new solution has emerged that enables engineers to measure perceived loudness correctly and take appropriate corrective action on the fly, imitating methods used by audio mix engineers who actively ride their faders. When coupled with a proficient listening ear, the solution is easily integrated with existing broadcasting workflows, delivering the flexibility engineers need to adjust loudness levels in real-time, without removing any signal dynamics.

## Installation

Immediately upon receiving your iLM8 - Live, please make a careful inspection for any shipping damage. If damage is found or suspected, please notify the carrier at once and then contact your dealer. iLM8 - Live is shipped in one carton, which contains: the iLM8 - Live unit, an AC power cable, and this Users Manual.

We strongly encourage you to save the shipping carton and shipping materials supplied with your iLM8 - Live. They are specially designed to properly protect your iLM8 - Live, and in the event that you need to return it for service, only these OEM shipping materials can ensure its safe return to our factory.

We provide a limited 3-year warranty on all of our products; however, if you don't register your unit, it is impossible for us to contact you to notify you when important software upgrades become available.

Please take a few minutes to complete the warranty registration form on our website, [www.daysequerra.com](http://www.daysequerra.com).

## Rack Mount Installation

The iLM8 - Live chassis has four rack mounting holes and has been designed to fit in a standard 1RU space. Plastic 'finishing' washers are recommended to protect the painted surface around the mounting holes. Locate the air vents on each side of the unit, and be sure to keep them clear so the unit may have adequate ventilation.

## Power Connection

The AC power cable supplied with iLM8 - Live must be connected from the IEC320 power entry module to an AC mains outlet with a functional earth ground connection. For protection against electric shock and electro-magnetic interference, do not plug the power cable into a ground lifting adapter or remove the cable's grounding pin. If in doubt, please consult a qualified electrician.

**Please connect iLM8 - Live to an uninterruptible power supply (UPS) to protect against power surges and low-voltage conditions.** iLM8 - Live may be combined with other devices on the output of the UPS as long as the total load is within the UPS' capacity. Consult your UPS manual for details.

**iLM8 - Live will automatically power up when AC power is applied. If AC line power is lost or momentarily interrupted, iLM8 - Live will revert to its previous state.**

# Menu Tree

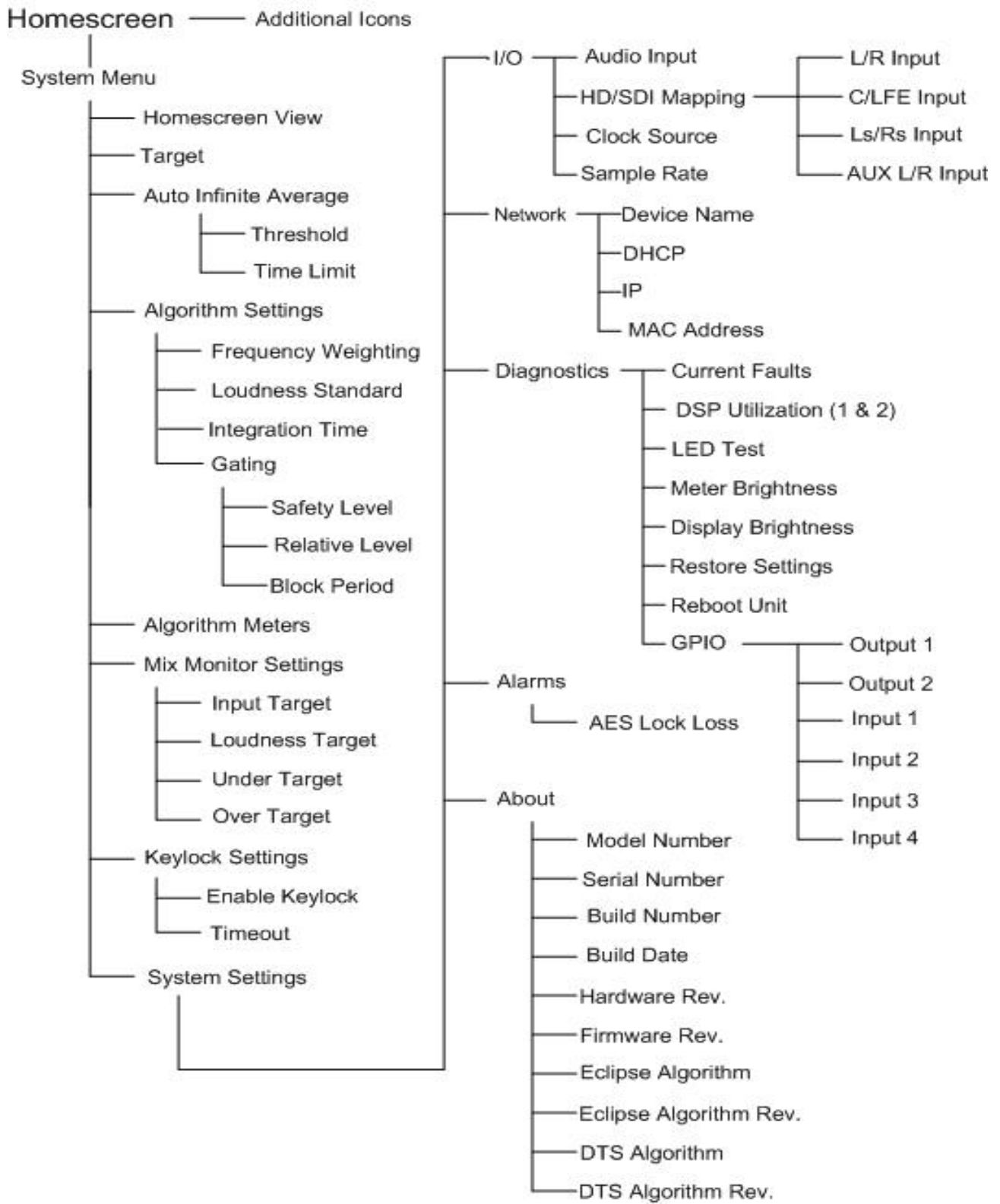


Figure 4. Visual Map of iLM8 - Live Menu System.

## Front Panel Controls and Indicators

### Bargraph Meters

**INPUT LEVELS** - Eight 10-segment multi-colored LED meters display the audio level for each channel of the inbound audio stream.

### Status Indicators / Mix Monitor



**OVER TARGET** - Red LED indicator illuminates when the short term combined average for the active input displayed on the home screen is over the user-specified target.

**ON TARGET** - Green LED indicator illuminates when the short term combined average for the active input displayed on the home screen is within the user-specified target.

**UNDER TARGET** - Blue LED indicator illuminates when the short term combined average for the active input displayed on the home screen is under the user-specified target.

**LOGGING** - Green LED indicator illuminates when iLM8 - Live has an established session with a PC running DaySequerra iLM8 - Live Remote Dashboard software

**Input Target** – Sets the Input Target to either 5.0 Surround or 2.0 Stereo for monitoring

**Loudness Target** – Sets the Loudness Target that is being monitored to either Max ML (Momentary Loudness) 100 Msec or Max SL (Short Loudness) 1 – 60 seconds.

### Display and Controls

**VACUUM FLUORESCENT DISPLAY** - A Multi-function display will indicate current status of the unit and programming menus.

**ROTARY ENCODER** - A stepping optical rotary encoder is used to select values or navigate the menu system.

**ENTER KEY** - Used to enter a menu or confirm a selection. To enter the main system menu, simply press ENTER while iLM8 - Live is on the HOME screen.

**HOME KEY** - A press of this button will return iLM8 - Live to the home screen or enter home screen selection mode.

**BACK KEY** – This key will return to a previous menu, or if you are entering a value, exit the field and return the value to the last programmed state.

**HEADPHONE JACK** – Accepts any headphone or monitor that has a 3.5mm stereo mini-jack connection. Volume control is software based, adjusted within the home screen selection mode.

## Rear Panel



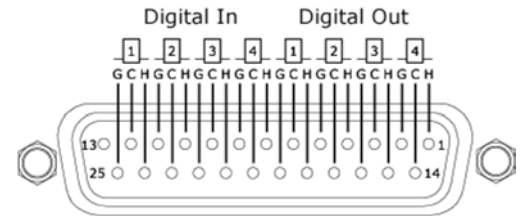
**AES INPUTS** - Four 75Ω BNC connectors will accept an AES3 digital audio stream.

- 1/2 - Left and Right Channel
- 3/4 - Center and LFE
- 5/6 – Left and Right Surround
- ST – Left and right STEREO

**AES OUTPUTS** - Four Passive 75Ω BNC connectors output the AES3 digital audio stream.

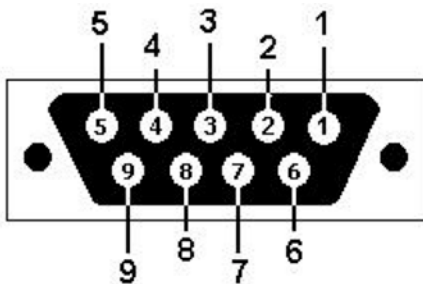
*The AES-3id-1995/SMPTE 276M standard dictates a 75Ω unbalanced connection and requires proper termination. The termination should occur at the destination of the signal (that is, on the inputs to iLM8 - Live). If the loop-through BNC connectors are not feeding additional equipment, terminate each of these with a standard 75Ω terminator. Like other inputs, HD/SDI signal should be terminated.*

**Balanced Digital AES I/O (option 01)** – One transformer Coupled 110Ω balanced I/O connector is provided as per AES3-1992 standard for using AES format digital audio over 110Ω twisted pair cable. A standard TASCAM format DB-25 female connector is included on iLM8 - Live and can interface directly with your existing equipment.



**HD/SDI** - Optional (SMPTE 292M/229M) with measurement and mapping of all 16 SDI audio channels.

**ALARM** – A Female DB-9 connection that allows iLM8 - Live to be monitored or controlled externally. Opto-isolated inputs will be triggered by a voltage of 5VDC



**DB-9 Female Port  
on iLM8 - Live Rear Panel**

Pin	Signal
1	Output Relay 1 N.O.
2	Relay 1 Common
3	Optical Input 1
4	Optical Input 2
5	Optical Input Common
6	Output Relay 2 N.O.
7	Relay 2 Common
8	Optical Input 3
9	Optical Input 4

**GPO** has two options to choose from within the I/O menu in System Settings. GPO 1 & 2 can be used for **Alarm conditions** or to monitor the 'OVER' and 'UNDER' target levels from the **Mix Monitor**.

**Output 1:** Relay 1 is Normally Open. **Alarm Option:** Upon an AES lock loss failure, this relay will close. When the failure is remedied, the relay will open. **Mix Monitor Option:** High – active for 'OVER' target loudness.

**Output 2:** Relay 2 is Normally Open. **Alarm Option:** Upon a hardware failure (i.e. Power Supply or Internal Communications Failure), the relay will close. When the failure is remedied, the relay will open. **Mix Monitor Option:** High – active for 'Under' target loudness.

**Input 1:** Momentary voltage detected on this port will cause iLM8 - Live to toggle stop then reset the infinite average for the surround and stereo inputs.

**Input 2:** Momentary voltage detected on this port will cause iLM8 - Live to toggle pause then resume calculating the infinite average for the surround and stereo inputs.

**NETWORK** - Used for logging or to update iLM8 - Live's firmware. To connect directly to a PC without use of a network switch or hub, a crossover cable is required. Firmware updating is accomplished via UDP Port 44600. Please refer to the iLM8 - Live Remote Dashboard section of this manual for more details on logging, or the Firmware Update section of this manual for the update procedure.

**PSU 1** - IEC320 port to connect to AC Mains. The internal power supply is auto switching and will work on 120VAC-60Hz or 240VAC-50Hz electrical power systems with a maximum total current draw of 25W (>.25A 120VAC or >.15A 240VAC).

**Please connect iLM8 - Live to a properly grounded uninterruptible power supply (UPS) to protect against power surges and low-voltage conditions.** iLM8 - Live may be combined with other devices on the output of the UPS as long as the total load is within the UPS' capacity. Consult your UPS manual for details.

## HD/SDI

iLM8 - Live can use an optional factory-installed HD/SDI I/O module to measure audio directly embedded into an SDI stream without any additional required equipment.

The HD/SDI module contains 3 Gb/s SDI technology and will auto-detect the signal, whether SD, HD or HD 3Gb/s format. Audio will be automatically extracted from popular video standards such as: NTSC 525/29.97, PAL 625/25, 1080i/59.94, 1080i/50, 1080PsF/23.98, 1080PsF24, 720p/59.94 and 720p/50. The sample rate of extracted audio is converted to 48 kHz, 24 bit resolution regardless of the source material and is available as AES audio at iLM8 - Live's output jacks



## Meter Display

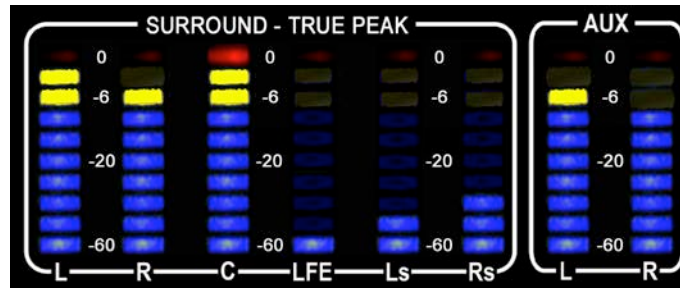


Figure 1. Metering display iLM8 - Live.

**INPUT LEVELS** – LED display shows current amplitude of input signal from -60dB to 0dB across all active channels. Unused channels will not light the display. The Meters are updated every 20ms.

L - Left (AES Input 1/2)

R - Right (AES Input 1/2)

C - Center (AES Input 3/4)

LFE - Low Frequency (AES Input 3/4)

Ls - Left Surround (AES Input 5/6)

Rs - Right Surround (AES Input 5/6)

ST-L – Stereo Left (AES Input 7/8)

ST-R - Stereo Right (AES Input 7/8)

*Note: “7.1 Back” channel meters are reserved for a future software version. Presently iLM8 - Live does not measure 7.1 surround*

## Programming Menu

If AC line power is lost or momentarily interrupted, iLM8 - Live will revert to its previous state.

To enter the programming menu, press the ENTER button while on the HOME SCREEN. Use the ROTARY KNOB to navigate up and down. Press ENTER to select a sub-menu. Press ENTER to store/save a selection. Press the BACK button to navigate to the previous menu level or revert the current value to its last stored state. From the HOME SCREEN pressing HOME will highlight additional icons. Turn the ROTARY KNOB to scroll and ENTER to select. Pressing HOME will always revert to the HOME SCREEN.

## Menu Functions and Descriptions

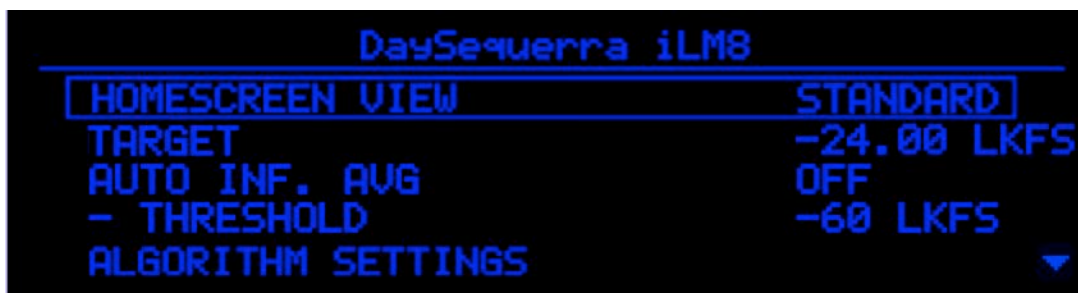


Figure 2. Main Menu Screen Display

The main menu display shown on iLM8 - Live when first entering the menu is demonstrated above in Figure 2. To enter the main menu, press the ENTER key from the home screen while the unit is unlocked. From the main menu screen you may use the ROTARY KNOB to navigate to the desired sub-menu and press ENTER to select.

## Home Screen View

The iLM8 - Live enables the user to select from 5 preset and 4 user definable Home Screen views.

**Standard View** – displays the Max Short Loudness Average of either the Surround or Stereo Channels selectable from field #1, Short Term Average of the Center Channel in field #2, and the Infinite Average of either the Surround or Stereo Channels, True Peak, Max TP, and LRA selectable from field #3 in a large font. (See Figure 3)

**Max SL View** – displays the Max Short Loudness Average combined for Surround 5.0, Max Short Loudness Average of the Center Channel, and Max Short Loudness Average combined for ST 2.0 in a large font (See Figure 3a)

**Infinite Average View** – displays the Infinite Average for Surround 5.0, Max Short Loudness Average of the Center Channel, and Infinite Average for ST 2.0 in a large font (See Figure 3b)

**Dual Field** - displays 2 dynamic fields of selectable measurements with an increased decimal place font for users who only wish to monitor 2 measurements on the home screen at a time.

**C > Effects** – displays the calculated value of the difference between the full 5.0 mix and the 4.0 stems L, R, Ls, Rs. This value is designed to ensure that the announcers level is always +6 to +10 LU above the effects during live events.

**User 1 thru 4** – enables the user to define each of the three fields on the Home Screen. A custom name can be given to each of the four user presets. Each of the three fields can be defined from the following measurements:

- **5.0 Max SL** – measures the Max Short Loudness average combined for all of the surround channels integrated to a selectable amount of time – the default integration time is 10 seconds for A/85 and 3 seconds for R128 and ARIB. The user can adjust this integration time from 1 to 60 seconds
- **2.0 Max SL** - measures the Max Short Loudness average combined for the Stereo channels integrated to a selectable amount of time – the default integration time is 10 seconds for A/85 and 3 seconds for R128 and ARIB. The user can adjust this integration time from 1 to 60 seconds
- **5.0 Max ML** – measures the Max Momentary Loudness average combined for all of the surround channels every 100 Msec
- **2.0 Max ML** - measures the Max Short Loudness average combined for the Stereo channels every 100 Msec

- **4.0 Max SL** - measures the Max Short Loudness average combined for the L, R, Ls and Rs channels integrated to a selectable amount of time – the default integration time is 10 seconds for A/85 and 3 seconds for R128 and ARIB. The user can adjust this integration time from 1 to 60 seconds
- **5.0 Infinite Avg.** – measures the infinite average for all of the surround channels. The infinite average calculation will continue until it is reset by the user.
- **2.0 Infinite Avg.** - measures the infinite average for all of the stereo channels. The infinite average calculation will continue until the user resets it.
- **Short Loudness Avg. for L, R, C, Ls, Rs Channels** – measures the Max Short Loudness average of an individual channel. (Left, Right, Center, Left Surround, Right Surround). The default integration time is set by the industry preset being used. The user can adjust this integration time from 1 to 60 seconds.
- **5.0 True Peak** – measures the true peak for the surround channels in dB relative to digital full scale in 100 Msec increments.
- **2.0 True Peak** – measures the true peak for the stereo channels in dB relative to digital full scale in 100 Msec increments.
- **Max – TP** – measures the maximum true peak in 100 Msec increments for the surround channels in dB relative to digital full scale. Max True Peak holds the maximum true peak in memory until it is reset by the user. Max – TP is reset by resetting the infinite average. (*select STOP/RESET/PLAY Inf. Avg. icon*)
- **2.0 Max – TP** - measures the maximum true peak in 100 Msec increments for the stereo channels in dB relative to digital full scale. Max True Peak holds the maximum true peak in memory until it is reset by the user. Max - TP is reset by resetting the infinite average. (*select STOP/RESET/PLAY Inf. Avg. icon*)
- **5.0 LRA** – measures the loudness range for the surround channels. ***To accurately measure using LRA the calculation should always start from 0 LU. Resetting the LRA is accomplished by Stopping/Resetting the infinite average.*** (select STOP/RESET/PLAY Inf. Avg. icon). LRA is derived from the Short-Term loudness using a relative gating process similar to that described above but with the gate set at -20. The LRA is the span from the 10% to 95% points on the distribution of Short- Term loudness values that pass the relative gate. The LRA is descriptive of the program material dynamic range. Using the 95% point allows occasional extremely loud events while the 10% point ignores modest silent intervals during the program. If the LRA exceeds about 15 it is likely that viewers will be unable to find a single volume control setting appropriate for the entire program.
- **2.0 LRA** - measures the loudness range for the stereo channels. ***To accurately measure using LRA the calculation should always start from 0 LU. Resetting the LRA is accomplished by Stopping/Resetting the infinite average.*** (select STOP/RESET/PLAY Inf. Avg. icon).

## Home Screen – Standard View

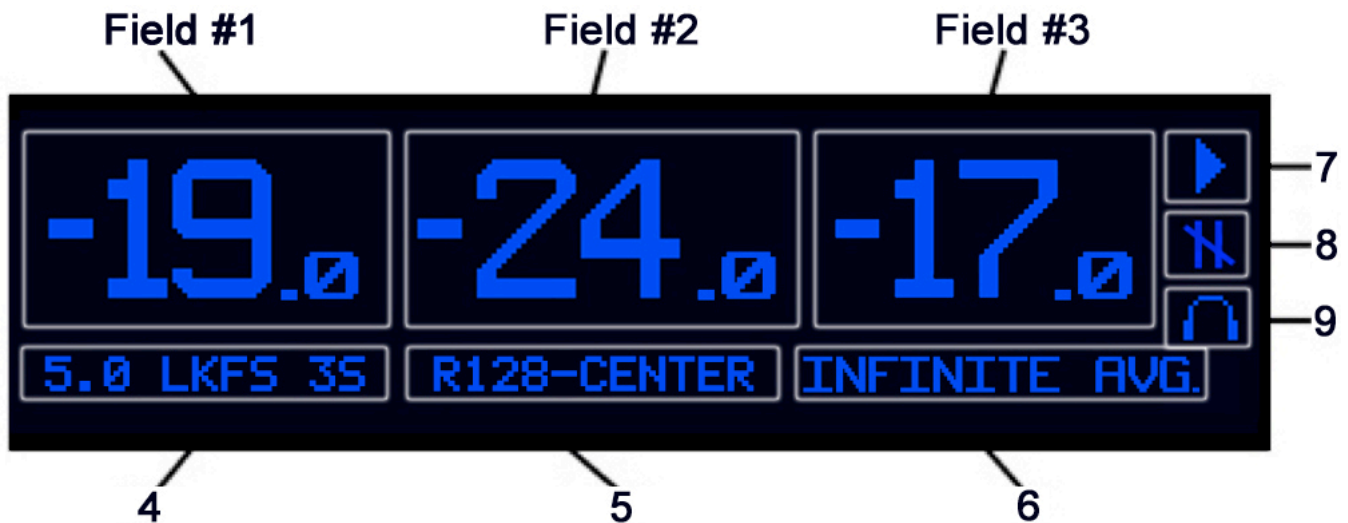


Figure 3. Standard View Home Screen on iLM8 - Live.

When you power on iLM8 - Live or select 'STANDARD' as the Home Screen view the display should look similar to the one pictured in Figure 3. Pressing the HOME key again while on this screen enters Home Screen selection mode that allows quick access to key functions.

1. The measured Max Short Loudness Average combined is displayed in a large font.
2. Displays the Max Short Loudness Average of the Center Channel in a large font.
3. The calculated Infinite Average or True Peak (standard peak for NLM) for the selected input.
4. Indicates which input measurements are being displayed (surround or ST) on the screen. Pressing ENTER will toggle between the 5.0 Surround and ST Stereo input display. The loudness units of measure and short averaging time are displayed here also.
5. A read only display of the selected Frequency Weight or preset ITU1770 Industry Standard and an indicator displaying the Center Channel measuring the Short Term Average
6. Indicator of the Infinite Average or True/Standard Peak that is displayed in field 3. Press ENTER to toggle between True and Standard Peak.
7. Play / Stop / Reset Infinite Average icon. Selecting this icon while on the Home screen and 'pressing' ENTER will 'stop' the Infinite Average. Pressing ENTER once again will 'reset' the Infinite Average. Pressing ENTER once more will 'play' and resume calculations for determining the Infinite Average for the selected display input.
8. Pause / Resume Infinite Average icon. Selecting this icon while on the Home Screen and 'pressing' ENTER will 'pause' the Infinite Average. Pressing ENTER once more will 'resume' calculations for determining the Infinite Average for the selected display input.
9. Headphone adjustment icon. Pressing ENTER while in Home Screen selection mode will display the HEADPHONE VOLUME menu.

## Home Screen – Max SL View

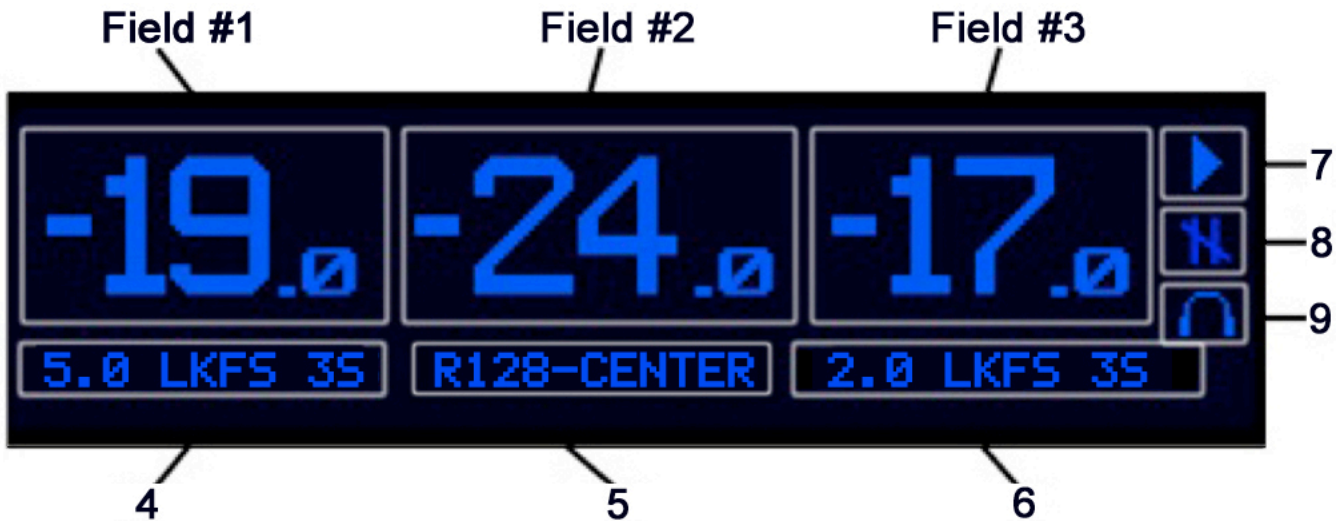


Figure 3a. Max SL Average View Home Screen on iLM8 - Live.

When you select 'Max SL for Home screen view the display should look similar to the one pictured in Figure 3a. Pressing the HOME key again while on this screen enters Home Screen selection mode that allows quick access to key functions.

1. The measured Max Short Loudness Average combined is displayed in a large font for 5.0 Surround.
2. Displays the Max Short Loudness Average of the Center Channel in a large font
3. The measured Max Short Loudness Average combined is displayed in a large font for 2.0 ST.
4. A read-only indicator that displays Surround, LKFS or dBeq, and the selected integration time.
5. A read only display of the selected Frequency Weight or preset ITU1770 Industry Standard and an indication of the Center Channel under the Short Term Combined Average of the Center Channel
6. A read-only indicator that displays 2.0 ST, LKFS or dBeq, and the selected integration time.
7. Play / Stop / Reset Infinite Average icon. Selecting this icon while on the Home Screen and Pressing ENTER will 'stop' the Infinite Average. Pressing ENTER once again will 'reset' the Infinite Average. Pressing ENTER once more will 'play' and resume calculations for determining the Infinite Average for the selected display input.
8. Pause / Resume Infinite Average icon. Selecting this icon while on the Home Screen and Pressing ENTER will 'pause' the Infinite Average. Pressing ENTER once more will 'resume' calculations for determining the Infinite Average for the selected display input.
9. Headphone adjustment icon. Pressing ENTER while in Home Screen selection mode will display the HEADPHONE VOLUME menu.

## Home Screen – Infinite Average View

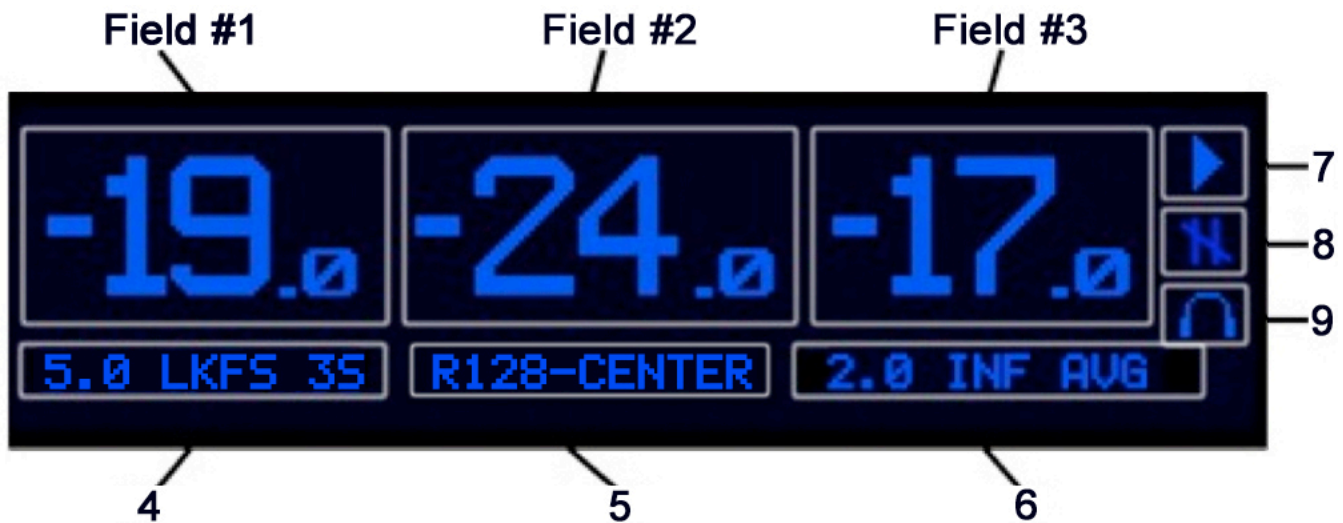


Figure 3b. Infinite Average View Home Screen on iLM8 - Live.

When you select 'Infinite Average' for Home Screen view the display should look similar to the one pictured in Figure 3b. Pressing the HOME key again while on this screen enters Home Screen selection mode that allows quick access to key functions.

1. The calculated Infinite Average for 5.0 Surround is displayed in a large font.
2. Displays the Max Short Loudness Average of the Center Channel in a large font
3. The calculated Infinite Average for 2.0 ST is displayed in a large font.
4. A read-only indicator that displays Surround, LKFS or dBeq, and the selected integration time.
5. A read only display of the selected Frequency Weight or preset ITU1770 Industry Standard and an indication of the Center Channel under the Short Term Combined Average of the Center Channel
6. A read-only indicator that displays ST, LKFS or dBeq, and the selected integration time.
7. Play / Stop / Reset Infinite Average icon. Selecting this icon while on the Home Screen and Pressing ENTER will 'stop' the Infinite Average. Pressing ENTER once again will 'reset' the Infinite Average. Pressing ENTER once more will 'play' and resume calculations for determining the Infinite Average for the selected display input.
8. Pause / Resume Infinite Average icon. Selecting this icon while on the Home Screen and Pressing ENTER will 'pause' the Infinite Average. Pressing ENTER once more will 'resume' calculations for determining the Infinite Average for the selected display input.
9. Headphone adjustment icon. Pressing ENTER while in Home Screen selection mode will display the HEADPHONE VOLUME menu.

## Home Screen – Dual Field

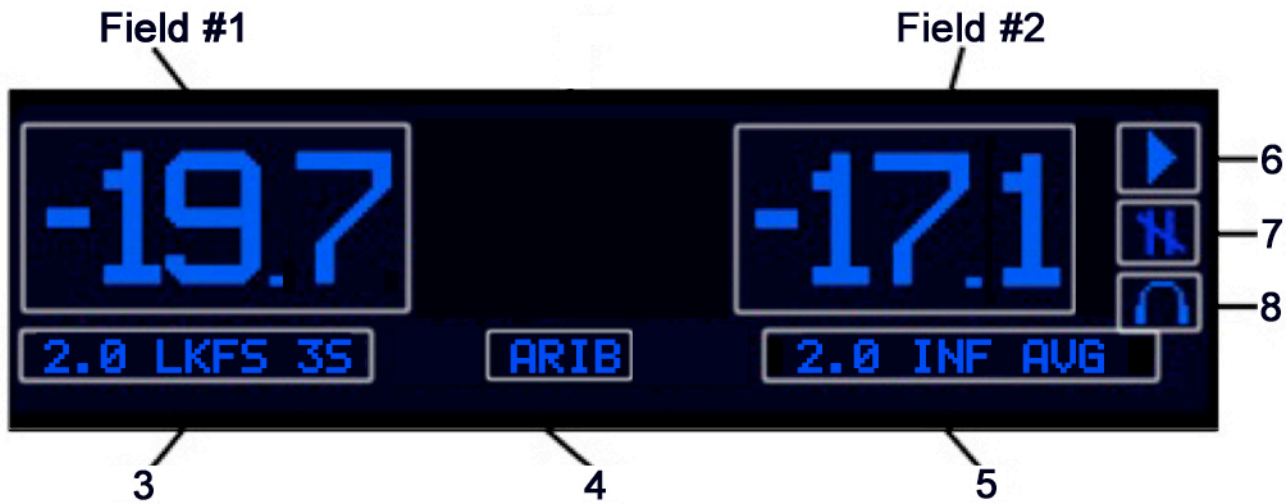


Figure 3c. Dual Field Home Screen on iLM8 - Live

The Dual Field home screen lets the user displays 2 measurements on the displays allowing for a larger decimal place font. This screen is useful for operators who are comparing two measurements and do not want the third field visible.

1. Field #1 is defined by the user from a list of measurements that include: Max Short and Momentary Loudness Avg. combined for 5.0 Surround and 2.0 Stereo, Infinite Avg. for Surround and Stereo, Short loudness Avg. of an individual Surround Channel (L, R, C, Ls, Rs), True Peak for Surround and Stereo, Max – TP for Surround and Stereo, LRA for Surround and Stereo.
2. Field #2 is defined by the user from a list of measurements that include: Max Short and Momentary Loudness Avg. combined for 5.0 Surround and 2.0 Stereo, Infinite Avg. for Surround and Stereo, Short loudness Avg. of an individual Surround Channel (L, R, C, Ls, Rs), True Peak for Surround and Stereo, Max – TP for Surround and Stereo, LRA for Surround and Stereo.
3. Indicates the current measurement that is displayed in Field #1.
4. Displays the Industry Standard Preset in use
5. Indicates the current measurement that is displayed in Field #2
6. Play / Stop / Reset Infinite Average icon. Selecting this icon while on the Home Screen and pressing ENTER will 'stop' the Infinite Average. Pressing ENTER once again will 'reset' the Infinite Average. Pressing ENTER once more will 'play' and resume calculations for determining the Infinite Average for the selected display input.
7. Pause / Resume Infinite Average icon. Selecting this icon while on the Home Screen and pressing ENTER will 'pause' the Infinite Average. Pressing ENTER once more will 'resume' calculations for determining the Infinite Average for the selected display input.
8. Headphone adjustment icon. Pressing ENTER while in Home Screen selection mode will display the HEADPHONE VOLUME menu.

## C > Effects

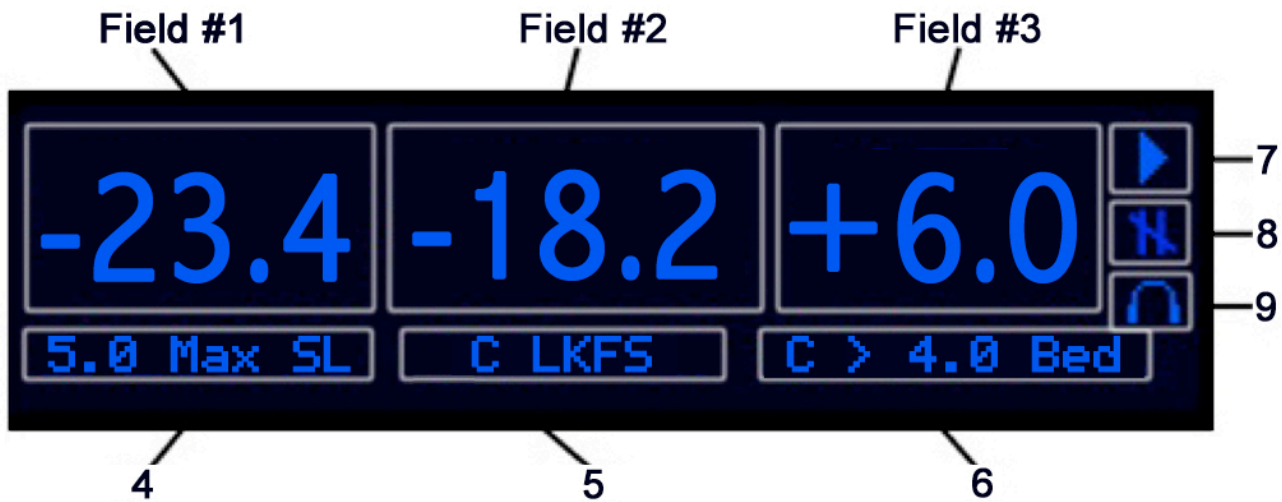


Figure 4d. Dialog vs. Effects Home Screen on iLM8 - Live

C > Effects simultaneously calculates the difference between the full 5.0 mix and 4.0 Bed (L, R, Ls, Rs) providing the user with a factor in LU that measures how much higher the announcer is (typically +6 to +10 LU) above the effects for live events. Each field can be customized to the users preference providing 3 fields of dynamic measurements. By default field# 1 displays the 5.0 Max SL, field# 2 the Center Channel and field# 3 the calculated value of the Center Channel > the 4.0 Bed

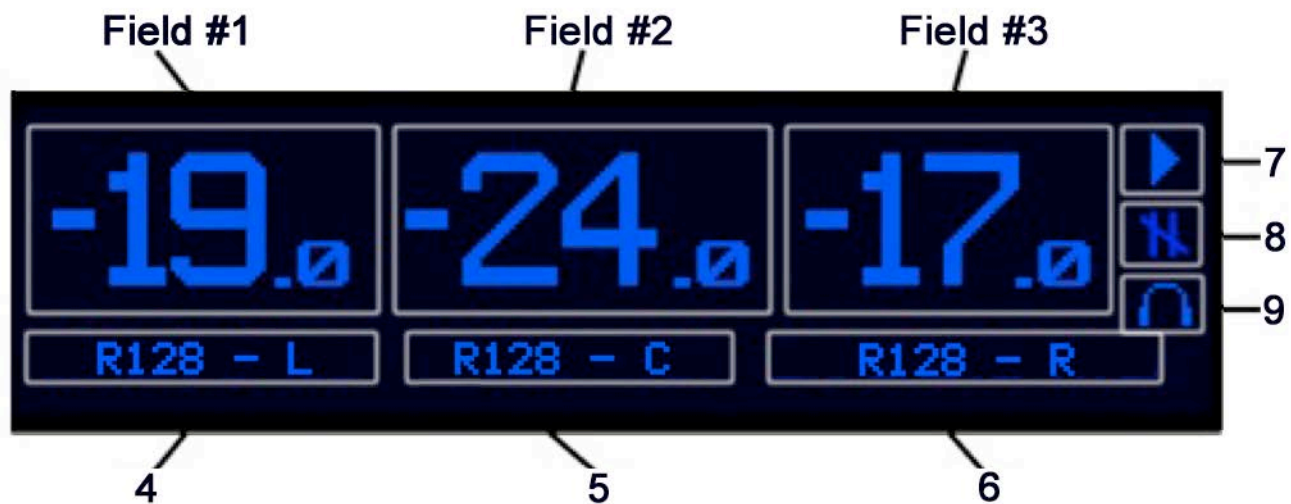
1. Field #1 is defined by the user from a list of measurements that include: Max Short and Momentary Loudness Avg. combined for 5.0 Surround, 4.0 Bed (Max SL only) and 2.0 Stereo, Infinite Avg. for Surround and Stereo, Measured value of C > 4.0 Bed, Short loudness Avg. of an individual Surround Channel (L, R, C, Ls, Rs), True Peak for Surround and Stereo, Max – TP for Surround and Stereo, LRA for Surround and Stereo.
2. Field #2 is defined by the user from a list of measurements that include: Max Short and Momentary Loudness Avg. combined for 5.0 Surround, 4.0 Bed (Max SL only) and 2.0 Stereo, Infinite Avg. for Surround and Stereo, Measured value of C > 4.0 Bed, Short loudness Avg. of an individual Surround Channel (L, R, C, Ls, Rs), True Peak for Surround and Stereo, Max – TP for Surround and Stereo, LRA for Surround and Stereo.
3. Field #3 is defined by the user from a list of measurements that include: Max Short and Momentary Loudness Avg. combined for 5.0 Surround, 4.0 Bed (Max SL only) and 2.0 Stereo, Infinite Avg. for Surround and Stereo, Measured value of C > 4.0 Bed, Short loudness Avg. of an individual Surround Channel (L, R, C, Ls, Rs), True Peak for Surround and Stereo, Max – TP for Surround and Stereo, LRA for Surround and Stereo.
4. Indicates the current measurement that is displayed in Field #1.
5. Indicates the current measurement that is displayed in Field #2
6. Indicates the current measurement that is displayed in Field #3
7. Play / Stop / Reset Infinite Average icon. Selecting this icon while on the Home Screen and pressing ENTER will 'stop' the Infinite Average. Pressing ENTER once again will 'reset' the



Infinite Average. Pressing ENTER once more will 'play' and resume calculations for determining the Infinite Average for the selected display input.

8. Pause / Resume Infinite Average icon. Selecting this icon while on the Home Screen and pressing ENTER will 'pause' the Infinite Average. Pressing ENTER once more will 'resume' calculations for determining the Infinite Average for the selected display input.
9. Headphone adjustment icon. Pressing ENTER while in Home Screen selection mode will display the HEADPHONE VOLUME menu.

## Home Screen – User 1 thru 4



**Figure 3e. User definable Home Screen display on iLM8 - Live**

When you select one of the four User definable Home Screen views the display should look similar to the one pictured in Figure 3c. This example displays the Max Short Loudness Avg. of the front three surround channels in a large font. Each field is dynamic and will show status or configured settings. Pressing the HOME key while on this screen enters the Home Screen selection mode that allows quick access to key functions.

1. Field #1 is defined by the user from a list of measurements that include: Max Short and Momentary Loudness Avg. combined for 5.0 Surround, 4.0 Bed (Max SL only) and 2.0 Stereo, Infinite Avg. for Surround and Stereo, Measured value of C > 4.0 Bed, Short loudness Avg. of an individual Surround Channel (L, R, C, Ls, Rs), True Peak for Surround and Stereo, Max – TP for Surround and Stereo, LRA for Surround and Stereo.
2. Field #2 is defined by the user from a list of measurements that include: Max Short and Momentary Loudness Avg. combined for 5.0 Surround, 4.0 Bed (Max SL only) and 2.0 Stereo, Infinite Avg. for Surround and Stereo, Measured value of C > 4.0 Bed, Short loudness Avg. of an individual Surround Channel (L, R, C, Ls, Rs), True Peak for Surround and Stereo, Max – TP for Surround and Stereo, LRA for Surround and Stereo.
3. Field #3 is defined by the user from a list of measurements that include: Max Short and Momentary Loudness Avg. combined for 5.0 Surround, 4.0 Bed (Max SL only) and 2.0 Stereo,

Infinite Avg. for Surround and Stereo, Measured value of C > 4.0 Bed, Short loudness Avg. of an individual Surround Channel (L, R, C, Ls, Rs), True Peak for Surround and Stereo, Max – TP for Surround and Stereo, LRA for Surround and Stereo.

4. Indicates the current measurement that is displayed in Field #1.
5. Indicates the current measurement that is displayed in Field #2
6. Indicates the current measurement that is displayed in Field #3
7. Play / Stop / Reset Infinite Average icon. Selecting this icon while on the Home Screen and pressing ENTER will 'stop' the Infinite Average. Pressing ENTER once again will 'reset' the Infinite Average. Pressing ENTER once more will 'play' and resume calculations for determining the Infinite Average for the selected display input.
8. Pause / Resume Infinite Average icon. Selecting this icon while on the Home Screen and pressing ENTER will 'pause' the Infinite Average. Pressing ENTER once more will 'resume' calculations for determining the Infinite Average for the selected display input.
9. Headphone adjustment icon. Pressing ENTER while in Home Screen selection mode will display the HEADPHONE VOLUME menu.

## Target

Defines the loudness level that the Mix Monitor uses to benchmark against. The default is +/- 2 LU. Inbound audio that is +2 LU over the set target level will illuminate 'OVER TARGET' on the Mix Monitor. Inbound audio that is -2 LU under the set target level will illuminate 'UNDER TARGET' on the Mix Monitor. Any inbound audio that is within +/- 2 LU of the target level is illuminated 'ON TARGET' on the Mix Monitor. The Mix Monitor is adjustable to +/- 4 LU.

Target Range is -31.0 LKFS to 0 LKFS

## Auto Infinite Average

Turns the infinite average on or off when an inbound audio signal is below the selected threshold. The default threshold is -60 LKFS. Any inbound audio below (-60 LKFS) for longer than 400 Msec will stop the Infinite Average. It will hold that calculation in memory and display it on the Home Screen until an inbound audio signal that is greater than the threshold (-60 LKFS) is detected for longer than 400 Msec. The 'STOP' icon is displayed when the Infinite Average is stopped. The infinite average will then reset itself and begin calculating again.

If Auto Infinite Average is enabled the Home Screen will display 'Auto Inf Avg' in place of 'Infinite Avg'.

The Threshold range can be set from 0 to -99 LKFS. If Auto Infinite Average is not enabled, Threshold is not selectable.

A Time Limit can be set to trigger the Auto Infinite Average 'ON' and 'OFF'. 100 – 3000 Msec. Defaulted to 100 Msec



Figure 5. Auto Infinite Average

## Algorithm Settings

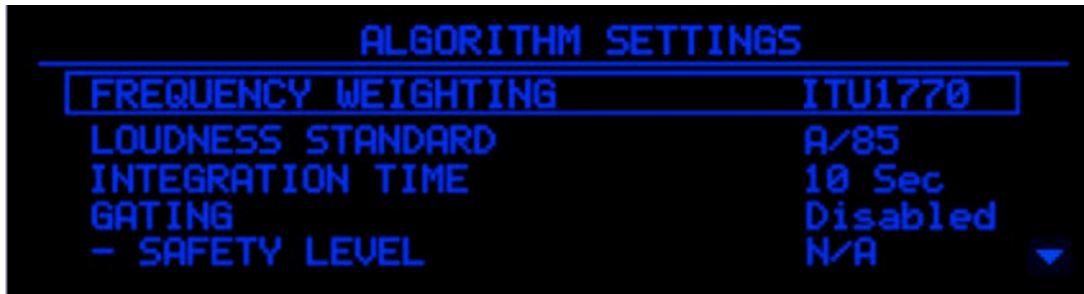


Figure 6. Algorithm Settings Menu Screen Display

The Algorithm Settings menu contains all the values required to tailor the loudness measurement functions for your specific purpose.

**Frequency Weighting:** ITU1770, Flat, Leq A, Leq B, Leq C, Leq D, ITU468, and Leq M measurements are selectable to relate the 'L'oudness of an 'eq'uivalent amount of energy in a standard signal

**Loudness Standard:** Three different loudness standards are selectable when ITU1770 is selected for Frequency Weighting: A/85 ATSC for USA; R128 EBU for Europe; and ARIB TR-B32 for Japan

**Integration Time:** Auto populates depending on which Loudness Standard is selected. A/85 ATSC = 10sec; R128 EBU = 3sec; ARIB TR-B32 = 3 sec. This can be set manually from 1 to 60 seconds.

**Loudness Gating:** is READ ONLY. For A/85 ATSC it is set to Disabled; R128 EBU and ARIB TR-B32 it is set to Relative

**Absolute Level:** is READ ONLY. For A/85 ATSC it is N/A; R128 EBU = -70 LUFS; ARIB TR-B32 = -70 LKFS

**Relative Level:** is READ ONLY. For A/85 ATSC it is N/A; R128 EBU = -10 LUFS; ARIB TR-B32 = -10 LKFS

**Block Period:** is READ ONLY. For A/85 ATSC it is N/A; R128 EBU and ARIB TR-B32 = 400ms

## Algorithm Meters Menu

The Algorithm Meters Menu contains all the real-time loudness readings that iLM8 - Live generates for the audio input. Each measurement is carried out to one decimal place for precision.

- 5.0 Max SL Average
- 5.0 Max ML Average
- 5.0 Inf. Average
- 5.0 True Peak
- 5.0 Max True Peak
- 5.0 LRA
- L Max SL Average
- R Max SL Average
- C Max SL Average
- LFE Max SL Average
- Ls Max SL Average
- Rs Max SL Average
- ST Max SL Average
- ST Max ML Average
- ST Inf. Average
- ST True Peak
- ST Max True Peak
- ST LRA
- ST-L Max SL Average
- ST-R Max SL Average

## Mix Monitor Settings

**Input Target** – Sets the Input Target to either 5.0 Surround or 2.0 Stereo ST for monitoring

**Loudness Target** – Sets the Loudness Target that is being monitored to either Max ML (Momentary Loudness) 100 Msec or Max SL (Short Loudness) 1 – 60 seconds.

**Over Target:** Defines how many LU the Max SL or Max ML Average combined for either Surround 5.0 or Stereo 2.0 is permitted to be over the Target before OVER TARGET is illuminated in red on the Mix Monitor panel. Range is 1 to 4 LU. Default for A/85 ATSC is 2 LU; For R128 EBU and ARIB TR-B32 is 1 LU

**On Target:** When the inbound audio signal is within the set range +/- LU, ON TARGET is illuminated in green on the Mix Monitor panel.

**Under Target:** Defines how many LU the Max SL or Max ML Average combined for either Surround 5.0 or Stereo 2.0 is permitted to be under the Target before UNDER TARGET is illuminated in green on the Mix Monitor panel. Range is 1 to 4 LU. Default for A/85 ATSC is 2 LU; For R128 EBU and ARIB TR-B32 is 1 LU

## Keylock Settings

Enter the Keylock Settings sub-menu to ENABLE KEYLOCK immediately or configure the keylock timeout setting. After the user specified period of inactivity, the keylock will automatically enable. (1 to 30 minutes and off, Default: OFF) To disable the keylock, press ENTER followed by the BACK key.

## Edit Home Screen Name

Creates and edits a custom name for each of the 4 user defined Home Screens. User 1, User 2, User 3 and User 4 are given by default. Each name can be up to 10 characters long using A – Z and 0 – 9. Press ENTER then use the rotary knob to scroll to the desired character. To select the character Press ENTER. When complete press ENTER again to save the entry. Press BACK or HOME to exit without saving.

## System Settings Menu

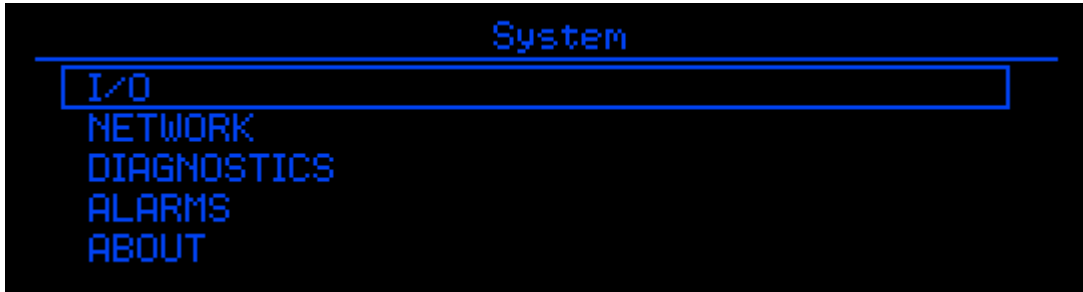


Figure 7. System Menu Screen Display

Navigating to the SYSTEM SETTINGS MENU from the Main Menu will allow additional values to be adjusted in order to fine tune the operation of your iLM8 - Live.

## I/O Menu

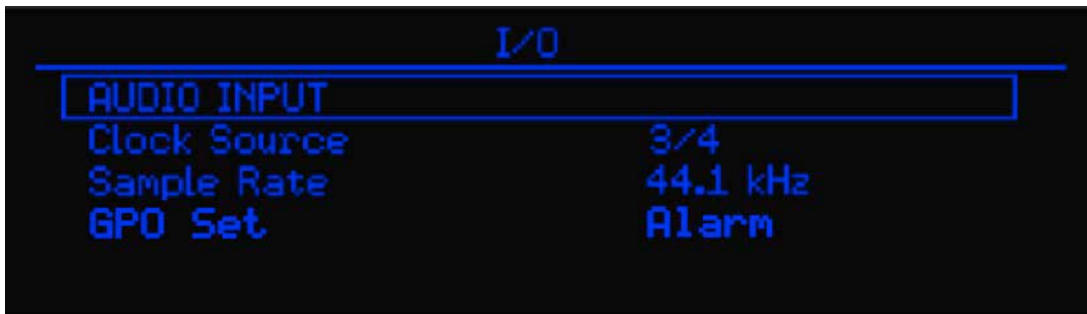


Figure 8. I/O Menu Screen Display

The I/O Menu will allow you to tailor iLM8 - Live to suit your specific application.

**Audio Input:** Navigates to the audio input configuration sub-menu.

**Clock Source:** Defines where iLM8 - Live gets the timing signal.

- a. Internal: iLM8 - Live's internal clock. Define using Sync Source.
- b. 1/2: iLM8 - Live will get timing from the 1/2 BNC Input.
- c. 3/4: iLM8 - Live will get timing from the 3/4 BNC Input.
- d. 5/6: iLM8 - Live will get timing from the 5/6 BNC Input.
- e. ST: iLM8 - Live will get timing from the ST BNC Input.

**Sample Rate:** If Clock Source is set to internal, defines what sample rate frequency iLM8 - Live will use.  
(32.0, 44.1, 48.0, 88.2 or 96.0 kHz)

## Audio Input Menu

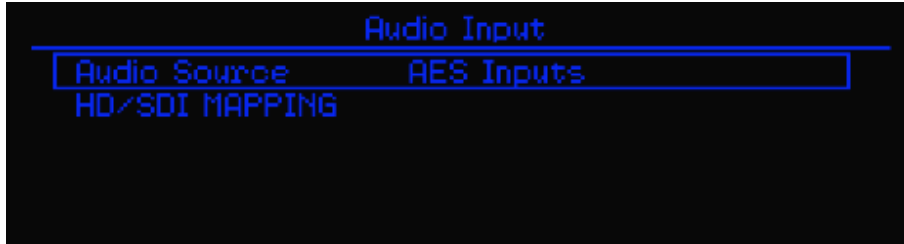


Figure 9. Audio Input Menu Screen Display

*NOTE: Unless your iLM8 - Live has the factory-installed HD/SDI I/O or Balanced Digital AES I/O modules installed, your screen will differ from that above.*

**Audio Source:** Determines which set of physical inputs iLM8 - Live will use to receive audio. Only the installed options will be available; only one input type may be used at a time:

- AES Inputs: Audio input is from the BNC AES input jacks. (Default)
- HD/SDI Inputs 1-8: Audio input is from the HD/SDI input jack, embedded audio channels 1-8
- HD/SDI Inputs 9-16: Audio input is from the HD/SDI input jack, embedded audio channels 9-16
- Balanced Digital: Audio input is from the Balanced Digital DB-25 I/O port

**HD/SDI Mapping:** Enters the HD/SDI mapping sub-menu to assign a custom channel configuration. Will only be present if the HD/SDI I/O module is installed.

## HD/SDI Mapping Menu

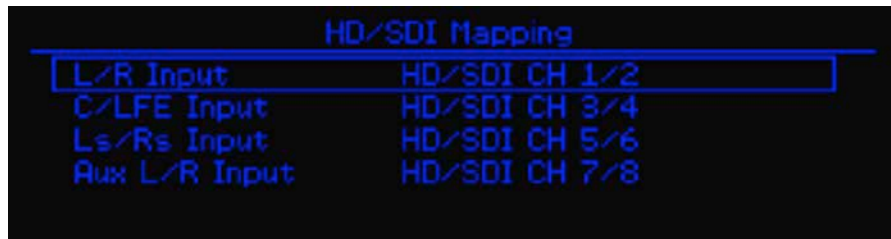


Figure 10. HD/SDI Mapping Menu Screen Display

For iLM8 - Live to make precise loudness measurements, the audio channel assignments need to be properly maintained. If your HD/SDI audio channels are embedded in a non-linear assignment, iLM8 - Live will need to be configured with the correct channel mappings.

Select the input channel pair to be modified and press ENTER. Scroll the rotary encoder to the desired HD/SDI channel pair and press ENTER to confirm. Repeat for the other channel pairs, as needed.

**GPO Set** allows the operator to use the GPO for either Alarm conditions or as a Mix Monitor.

**Alarm** sets GPO 1 & 2 to alert the user of AES Lock Loss and Hardware Failures

**Mix Monitor** sets GPO 1 & 2 to alert the user when the measured loudness is 'OVER' and 'UNDER' the selected target level.

## Network Menu



Figure 11. Network Menu Screen Display

The DaySequerra Eclipse iLM8 - Live has several configurable network settings. All of iLM8 - Live's network settings are password protected. The password to change the network settings is 'ds123'. Please take note when entering the password that the iLM8 - Live password is case sensitive. The DaySequerra iLM8 - Live is configured to take a DHCP address by default.

**Device Name:** Allows you to change iLM8 - Live's name as reported to DNS. Press ENTER while the cursor is over this field to go into data entry mode. Turn the knob to scroll through the available choices of letters (A-Z, 0-9 and \_ (underscore)) and press ENTER to move on to the next field. Turning the knob again will start to scroll through the choices for the next letter, or pressing ENTER accepts the name.

**DHCP:** Configures iLM8 - Live to look for a DHCP server for IP configuration. (Enabled or Disabled)

**IP Address:** disabling DHCP allows you to enter an IP address manually. Press ENTER while the cursor is over this field to go into data entry mode. Scroll through the available numbers (0-255) and press ENTER to move to the next octet.

**MAC Address:** Displays iLM8 - Live's MAC address if needed for firewalls or DHCP IP address assignments.

## Diagnostics Menu

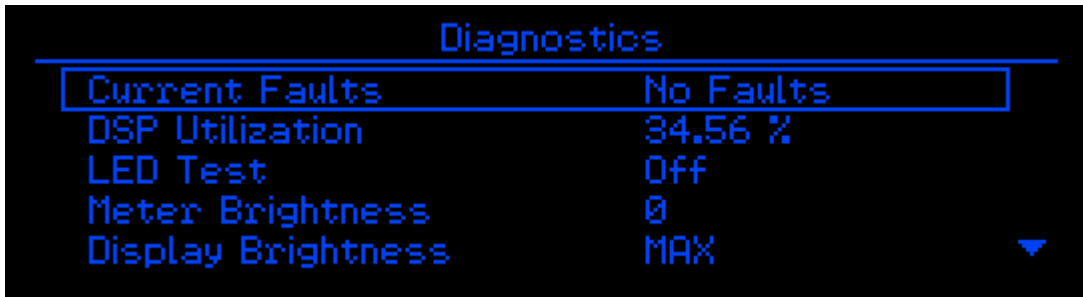


Figure 12. Diagnostics Menu Screen Display

**Current Faults:** Displays any error states that iLM8 - Live may be in.

**DSP 1 Utilization:** Shows the current load on iLM8 - Live's DSP.

**DSP 2 Utilization:** Shows the current load on iLM8 - Live's secondary DSP.

**LED Test:** Turns on all front-panel LED indicators to verify their functionality.

**Meter Brightness:** Allows adjustment of iLM8 - Live's Input and Output meters. (Default: 0)

**Display Brightness:** Allows adjustment of iLM8 - Live's display output. (Default: Max)

**Restore Settings:** Returns all settings to their factory default values and will reboot the unit. Network settings will not be lost.

**Reboot Unit:** Performs a warm boot. No settings are erased or restored to default

**GPIO Test:** A sub-menu that turns on the ALARM outputs for testing.

- **GPIO Output:** Allows for testing of the internal signaling circuit within iLM8 - Live. The two fields displayed represent each output, 1 and 2, respectively
- **GPIO Input:** Shows the current state of the GPIO inputs. The four fields of the displayed status represent each input, 1-4, respectively

## Alarms Menu

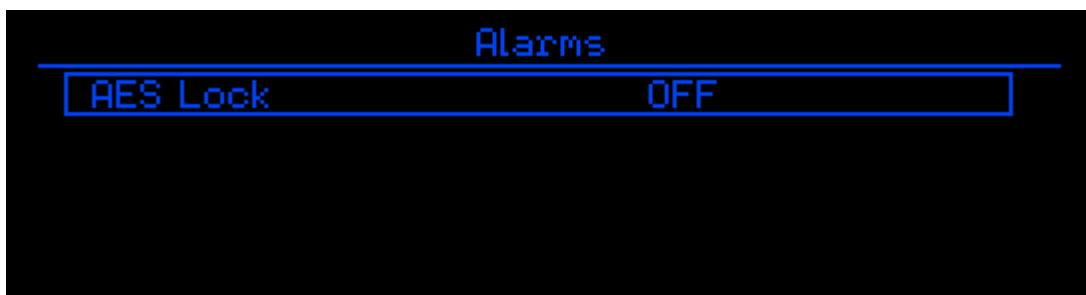


Figure 13. Alarms Menu Screen Display



iLM8 - Live may be configured to alert you to an AES lock loss condition.

**AES Lock:** Allows the AES Lock alarm to be suppressed or enabled. (Default: Off)

## About Menu

**Model Number:** Displays the model number of the unit.

**Serial Number:** Displays the serial number of this unit.

**Build Number:** Displays the firmware build number.

**Build Date:** Displays the firmware build date.

**Hardware Rev:** Displays the hardware revision level of this unit.

**Firmware Rev:** Displays the firmware revision level that is running on this unit.

**Eclipse Algorithm:** Versions of the Eclipse algorithm.

**Eclipse Algorithm Rev:** Version of the Eclipse algorithm.

## Faults

Although your iLM8 - Live will provide you with years of trouble free service, occasionally problems may occur. Below is a listing of the most common fault conditions.

**No Clock:** AES sync has been lost. Please check the source equipment and all cable connections. Ensure that iLM8 - Live is operating in the proper input mode for your application and is looking for the source audio on the correct port.

**CRC Error:** iLM8 - Live has encountered a CRC error in the audio stream. Check that equipment up-stream of iLM8 - Live is properly configured to output the correct audio stream.

**Validity Error:** iLM8 - Live has encountered a validity error with the audio stream. Check that equipment up-stream of iLM8 - Live is properly configured to output the correct audio stream.

**Bi-phase Error:** iLM8 - Live has encountered a bi-phase error with the audio stream. Check that equipment up-stream of iLM8 - Live is properly configured to output the correct audio stream.

**No Parity Error:** iLM8 - Live has encountered a parity error with the audio stream. Check that equipment up-stream of iLM8 - Live is properly configured to output the correct audio stream.



## Update using Manual IP Address Settings:

### **DO NOT UNPLUG THE UNIT OR TURN OFF YOUR PC WHILE THE FLASH IS IN PROGRESS.**

If the flash procedure is interrupted before it can complete, iLM8 - Live may be left in an un-usable state and will need to be returned for factory service.

Please follow these steps to upgrade your unit:

1. Un-Zip the files using a compatible utility that can handle ZIP archive file format into a new empty directory on your PC.
2. Disable any additional network interface adapters present on your PC. Go to Control Panel, then Network Connections. Right click on the adapter to be disabled and select Disable.
3. Unplug your PC from the network it is currently connected to.
4. If your PC's network interface is set up for DHCP, disable it and enter a static IP address. While in Network Connections under Control Panel, right click on the network interface and select Properties. Select "Internet Protocol (TCP/IP)" and press the Properties button. On the general tab of the dialogue box, select "Use the following IP address". Enter an IP address in the box "IP Address" within the local network range. (Example: 192.168.0.1) Click in the "Subnet mask" box and it should auto populate with 255.255.255.0. Select OK to close the dialog, then OK to close the properties box.
5. If iLM8 - Live is set up for DHCP, disable it and enter a static IP address within the local network range. (Example: 192.168.0.2) Details are available in the NETWORK section of this manual.
6. Connect the iLM8 - Live to the PC using an Ethernet cable. If not using a Network switch a Ethernet Crossover Cable is required.
7. When Windows has acknowledged the Ethernet connection, you may start the update progress by double clicking on upgrade.bat. iLM8 - Live should download the new firmware and reboot within 15 seconds.
8. Disconnect the Ethernet cable and return your PC and iLM8 - Live to their original configuration.

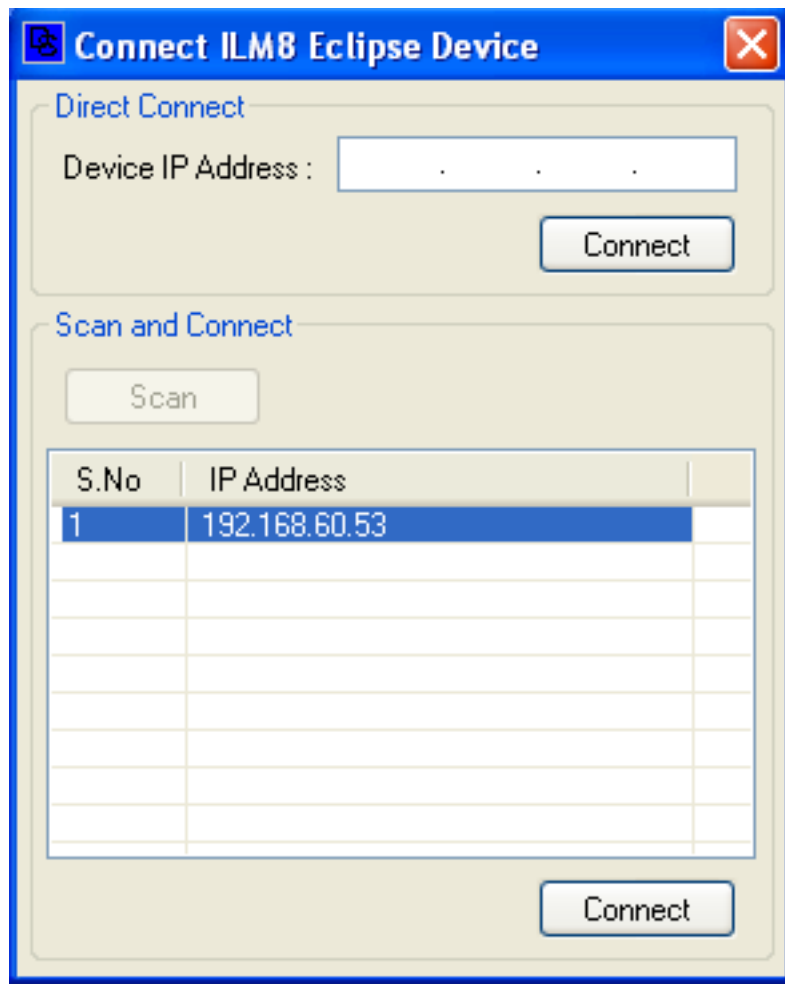
## iLM8 - Live Remote Dashboard

Be sure that the iLM8 - Live is connected to a network via the network port on the rear panel.

The DaySequerra Remote Dashboard software will allow remote monitoring and logging of audio loudness as it is measured by iLM8 - Live. Double click the installation icon to install the program. A shortcut

will be created on your desktop. If you wish the software to start automatically with the PC at login, place a copy of the shortcut into your Startup Windows program folder.

Double clicking on the .exe file will allow the Remote Dashboard to find the iLM8 - Live on the network and automatically configure the IP Address needed to establish a connection. Once open, click on 'Scan and Connect' to find the IP Address of the iLM8 - Live. After the IP Address populates, click on it then wait for the 'Connect' button at the bottom to light up (This may take a moment). You may then click on 'Connect' to establish a Remote Connection to your iLM8 - Live. The Remote Dashboard icon will then load automatically in the system tray. Double click on the icon in your system tray to open the application.



IP-Configure

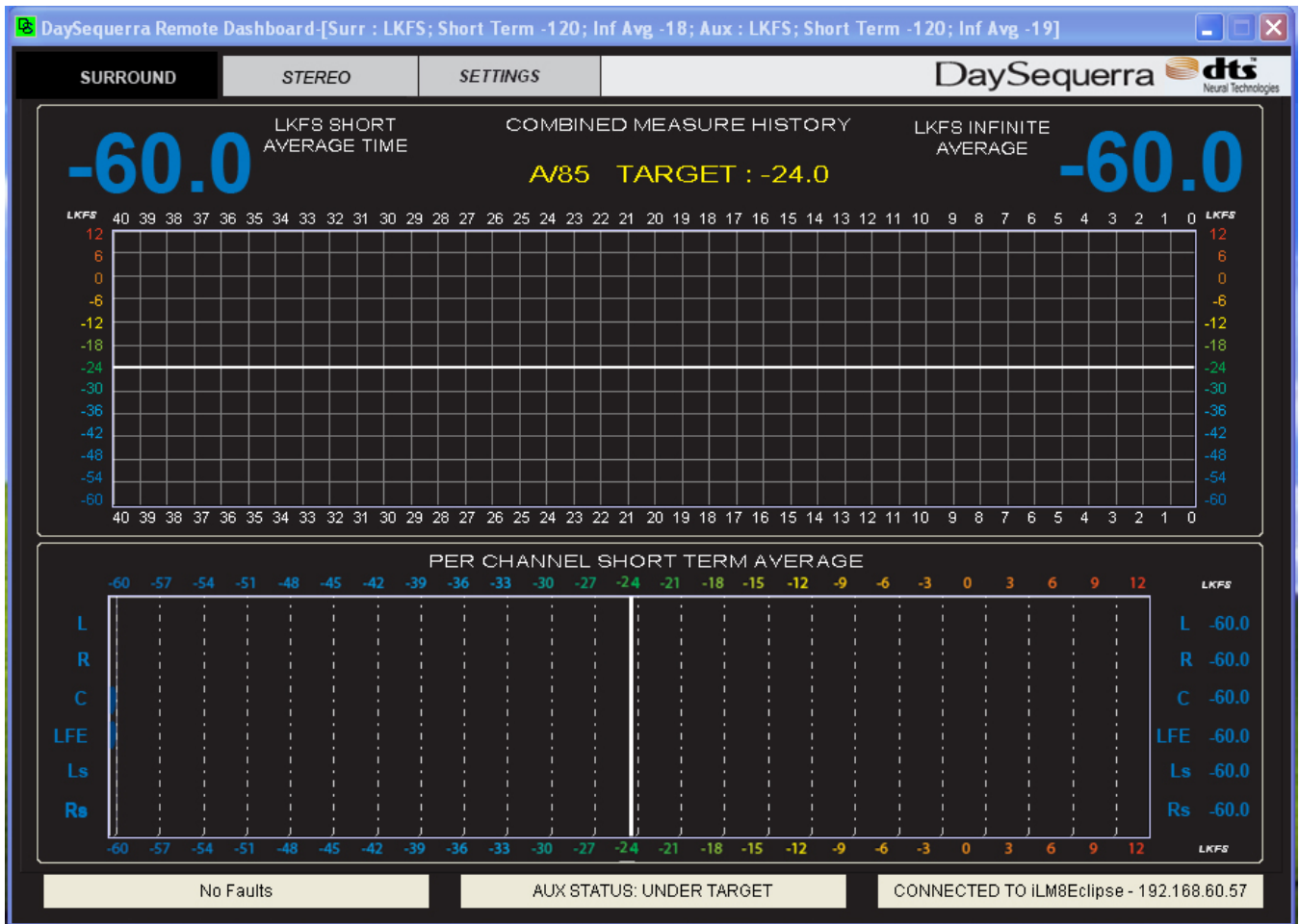


Figure 14. Un-configured Main Viewer Window

At the top of the window there are three navigation tabs: Surround, Stereo and Settings. Click on the Settings tab in order to configure the program. After initial configuration, the application will start and resume communication with iLM8 - Live, if the network address previously set is still valid.

# Remote Dashboard Configuration

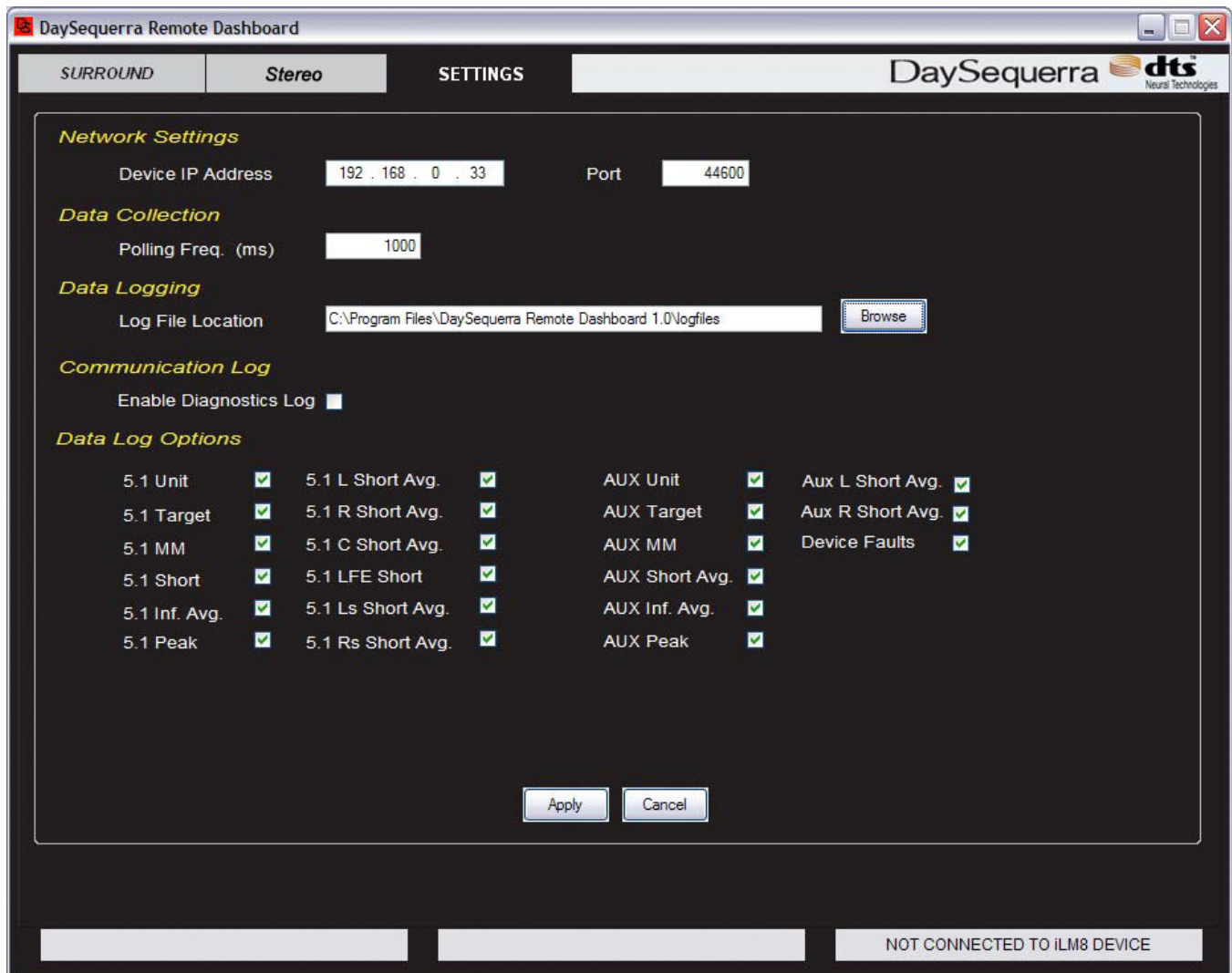


Figure 15. Un-configured Settings Tab

**Network Settings:** Enter the IP address of the iLM8 - Live unit to be monitored. The IP address can be found on the unit by navigating to the SYSTEM MENU, then NETWORK. For more details, see the networking section of this manual. The UDP port should remain set at 44600.

**Data Collection:** Configures how often, in milliseconds, the application will poll iLM8 - Live for its readings.

**Data Logging:** Specifies the location for storing log files. This path may be local or on a network share that the active Windows user has permission to write to.

**Communication Log:** Enables a diagnostics log to help troubleshoot any communication issues. This data will be helpful to DaySequerra support staff in diagnosing any communication problems.

**Data Log Options:** Allows certain data fields to be captured to the log file. If the log files grow too big, it may be helpful to disable any data that is not important to the immediate operation:

5.0 Unit	Loudness Measure that is used for the 5.0 (surround) inputs.
5.0 Target	Target value set for the 5.0 inputs.
5.0 MM	Mix Monitor status for the 5.0 inputs.
5.0 Short (Avg.)	Short combined average for the 5.0 inputs.
5.0 Inf. Avg.	Combined infinite average of the 5.0 inputs.
5.0 Peak	Combined peak value of the 5.0 inputs.
5.0 L Short Avg.	Short average of the Left 5.0 input.
5.0 R Short Avg.	Short average of the Right 5.0 input.
5.0 C Short Avg	Short average of the center 5.0 input.
5.0 LFE Short (Avg.)	Short average of the LFE 5.0 input.
5.0 Ls Short Avg.	Short average of the Left Surround 5.0 input.
5.0 Rs Short Avg.	Short average of the Right Surround 5.0 input.
ST Unit	Loudness measure that is used for the ST (stereo) inputs.
ST Target	Target value set for the ST inputs.
ST MM	Mix Monitor status for the ST inputs.
ST Short Avg.	Short combined average for the ST inputs.
ST Inf. Avg.	Combined infinite average of the ST inputs.
ST Peak	Combined peak value of the ST inputs.
ST-L Short Avg.	Short average of the ST Left input
ST-R Short Avg.	Short average of the ST Right input
Device Faults	Any faults reported by the unit. Refer to the error code table.

#### Data-logging Field Legend

0	No Faults
1:x	AES Lock Error
2:x	CRC Error
3:x	Validity Error
4:x	Bi-Phase Error
5:x	No Parity Error
6	No Clock Error
7	DSP Over Utilized

#### Channel Code (for X)

1	Left / Right
2	Center / LFE
3	L Sur / R Sur
4	ST-L / ST-R

#### Error Codes

After the appropriate options have been set, press the APPLY button to save those settings and begin communications with the iLM8 - Live. The program icon should change from red to green after communication has been established with the unit, and the iLM8 - Live unit will illuminate the LOGGING LED. Switch back to the Surround tab to view the program in operation. If a setting has been changed in error, press CANCEL to revert all settings to their previously saved state.

## Using Remote Dashboard



**Main Viewer Window**

The Main Viewer Window will appear as pictured above when the options have been set correctly and the program is communicating with a device.

1. **Title Bar:** Shows program name, along with short term and infinite average measurements for both the Surround and Stereo inputs of the iLM8 - Live. Pressing the minimize button will minimize the application to the Windows task bar, where as clicking the close button will minimize the application to the system tray. To close the application, right click on the tray icon and select EXIT.
2. **Navigation Tabs:** Clicking on the tab will change the current view of the program between Surround inputs, Stereo inputs, or the Remote Dashboard configuration page. Clicking on the DaySequerra Logo will display version and copyright information about the application.
3. **Combined Measure History:** The last 40 seconds of the short combined average is displayed on the graph. A heavy Horizontal line shows where the target value on the iLM8 - Live is set. Combined average and infinite average are shown in numerical form as well, with the colors changing to show the level of loudness. The scale on the side shows the range of the graph, as well as the current loudness unit. The short averaging time may also be set as well as performing a pause/resume or reset of the infinite average value in both the application and on iLM8 - Live.



4. **Per channel Short Term Average:** Shows the short average of each channel on the graph. A heavy vertical line shows where the target value on the iLM8 - Live is set. Each channel's reading is also shown in numerical form to the right of the graph, with the graph lines and the numerical value changing color to show the level of loudness.
5. **Status Bar:** Three status boxes show more data that is collected from the unit. The left box will display unit fault status. Clicking on the box will display the history of faults captured by the Remote Dashboard software. The center box shows Mix Monitor status of the selected tab. Clicking on the box will display the Mix Monitor history for that tab. The right box displays the Remote Dashboard communication status. Clicking on this box, while connected to an iLM8 - Live unit, will display additional information about that unit.

## Log Files

The Remote Dashboard software's main objective is to log your program audio loudness and have those measurements available for compliance verification. A new log file is created each hour and runs from x:00:00 to x:59:59. A new file will be created immediately if any data log options are changed.

By default, measurement data log files are saved in the "logfiles" folder under the main Remote Dashboard application installation folder. A full day of logging each available data field once per second will consume approximately 27MB of storage space. Storage of files onto flash drives or other *solid state storage* devices is not recommended due to very frequent data writes the application makes and the "write endurance" of these devices.

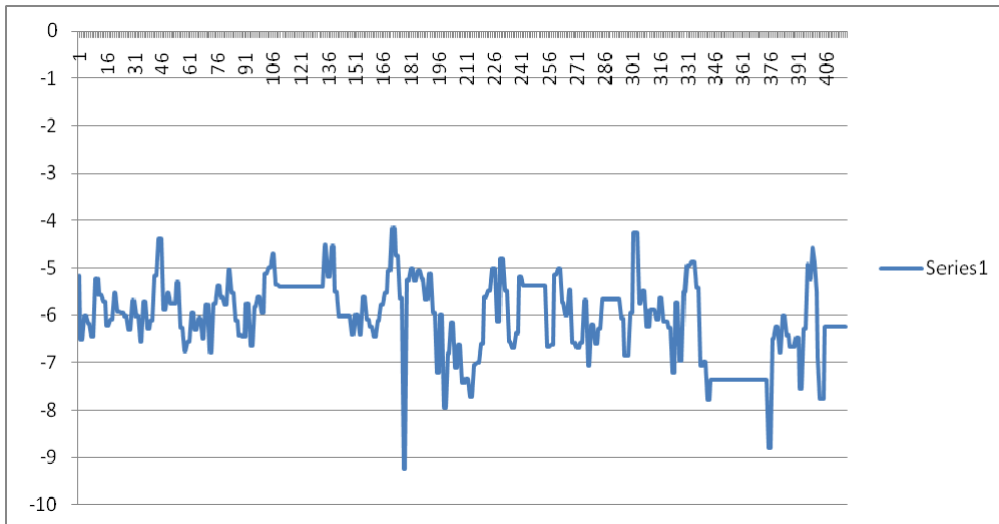
Logs are saved in Tab delimited format and can be imported into any database application that supports the importation of external data. Log files may also be imported into Microsoft Excel or Microsoft Access. The first line of each log file contains a column header that labels what data is contained within that column.

## Log File Import Example

This brief procedure will demonstrate how to import the log file data into Microsoft Excel and render some simple graphs of the data. This procedure has only been verified to work in Microsoft Excel versions 2000, 2003 or 2007.

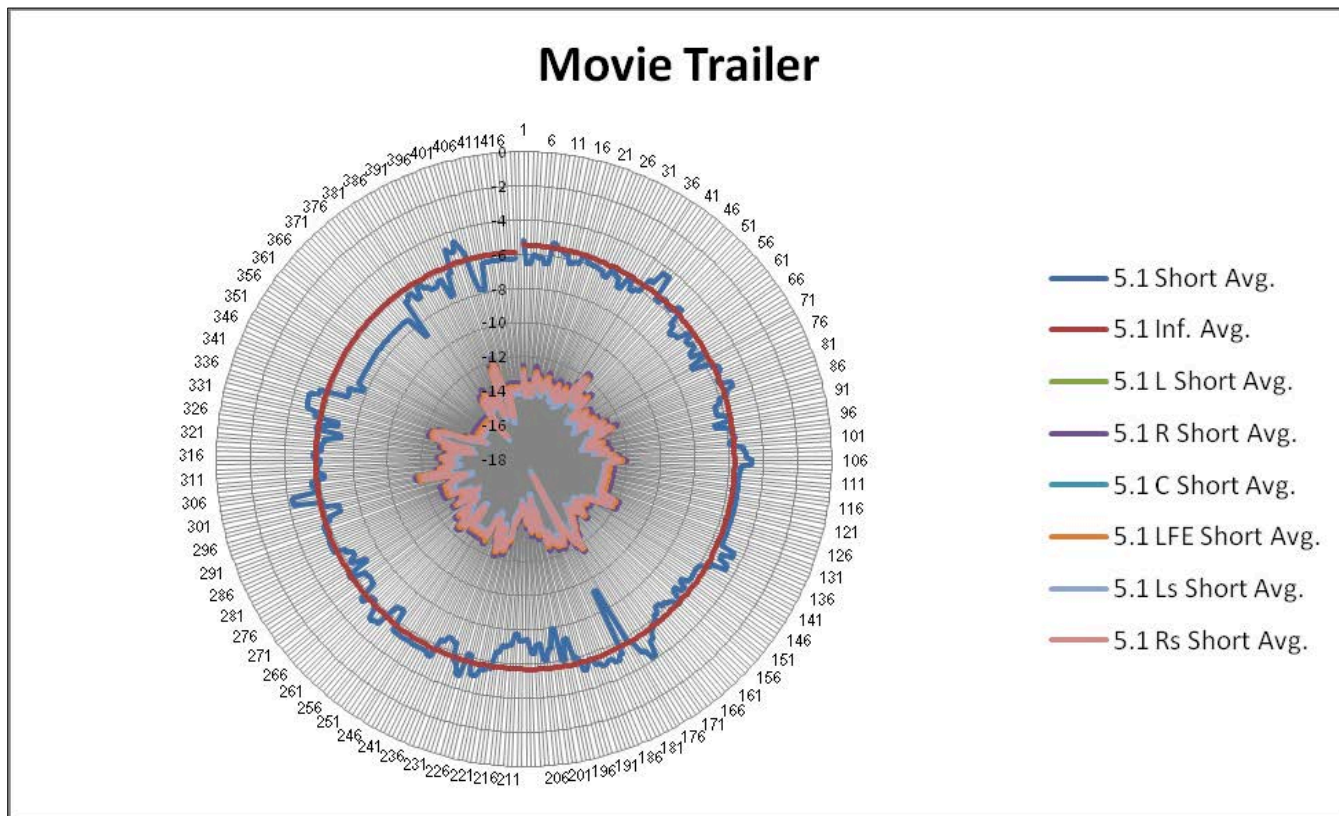
1. Open Microsoft Excel. In Excel 2007, click on the Data tab, and then click the Text button under the Get External Data group. In Excel 2000 or 2003, click on the Data menu, click Get External Data and then click Import Text File.
2. The Import Text File box will appear. On the bottom of the window, click the Files of type drop down box and select All Files (\*.\*). Then, navigate to the location that the log files are stored in and select the appropriate log file. Double click on the file name or select the file and press the Import button.
3. The Text Import Wizard will start. Press the Finish button, as no values on these pages will need to be modified.
4. The Import Data box will appear and ask where in the Excel sheet the data should be inserted. Press the OK button to select the default location (Cell A1) or select the alternate desired location and press the OK button.

- 5 The log file data is now displayed in Excel. Each column header contains the text description of the data that is displayed.
- 6 In order to make a line graph, first select the data that will be displayed in the graph. Hold down the control key and click on the column headers that contain the desired data. To only select a small portion of data from the log file, click the first value, hold the shift key, and then click on the last value.
- 7 In Excel 2007, click on the Insert tab. Click the Line button and then select Line under the 2-D Line group. In Excel 2000 or 2003, click on the Insert menu, and then click on Chart. The Chart Wizard will appear. Select Line from the list on the left side of the window and then Line from the icons on the right side of the window. Click the Finish button.



8. The Chart is created. It may be moved to another area of the spreadsheet or copied to memory and pasted in another application. The X axis (left edge of the graph) displays the loudness value and the Y axis (top edge of the graph) displays the sample number, in this example.

Following the same steps outlined above, a sample radar style graph was created. This graph type can be found in Excel 2007 by clicking on the Other Charts button and then selecting Radar or in Excel 2000/2003 by selecting Radar from the Chart Wizard.



**Output for Radar Graph**

## Maintaining an Accurate Clock

To have the data in log files correctly represent the program material measured during a particular time of day, the PC clock will need to be synchronized to a reliable clock or house source. Windows contains a NTP server client that will automatically set the PC clock to be the same as a remote clock.

1. Double click on the clock in the system tray.
2. Click on the 'Internet Time' tab.
3. Enter the time server address to be used, or use the public pool *time.nist.gov*.
4. Press APPLY then UPDATE now to ensure the server address can be contacted. A message will appear below the server address "The time has been successfully synchronized with (server) on (date) at (time). By default, Windows will typically synchronize the clock once per week. A message will be shown with the next scheduled update time.
5. To change the update frequency, open registry editor by selecting START then RUN and typing *regedit* at the prompt and pressing OK.
6. Navigate to the registry folder  
`\HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\W32Time\TimeProviders\NtpClient`.
7. If present, double click on the registry entry *SpecialPollInterval*. Change the BASE radio button to Decimal. The value data will show the update frequency, in seconds. This value may be modified to the required setting.
8. If the key is not present, select EDIT, NEW, then DWORD Value. Rename as *SpecialPollInterval*. Change the BASE radio button to Decimal. The value data will show the update frequency, in seconds. This value may be modified to the required setting.
9. Close registry editor.
10. Restart the time service by selecting START then RUN and typing *cmd* at the prompt and pressing OK. At the command prompt type *net stop w32time && net start w32time*. Type *exit* after confirmation that the service stopped and restarted successfully.

## Remote Dashboard Troubleshooting

If the Remote Dashboard software is not working, please check the following items before contacting technical support:

1. Is the iLM8 - Live on the same physical network and subnet as the PC running the application?  
*Make sure the subnet mask is configured to a broad enough scope.*
2. Is there a software firewall running blocking access to the UDP port 44600? *Make sure the port is open, or the Remote Dashboard software is in your firewall's exclusion or white list. Contact your firewall vendor for more support.*
3. Is the iLM8 - Live running the latest firmware? *Older iLM8 - Live firmware versions (< 4.01.00) aren't compatible with Remote Dashboard.*
4. Remote Dashboard is not creating any log files. *Make sure the active Windows user has the proper permissions to write to the location specified for log files to be saved.*

## DaySequerra – Three Year Limited Warranty

DaySequerra warrants this product to be free from defects in materials and workmanship to its original owner for three (3) years from the date of purchase. DaySequerra will repair or replace such product or part thereof that upon inspection by DaySequerra, is found to be defective in materials or workmanship.

A Return Authorization Number must be obtained from DaySequerra in advance of return. Call DaySequerra at (856) 719-9900 to receive the number to display on the outside of your shipping carton. A written statement with the name, address, and daytime telephone number of the original owner, together with receipt from the original purchase, and a brief description of any claimed defects, must accompany all returns. Parts or product for which replacement is made shall become the property of DaySequerra. The customer shall be responsible for all costs of transportation and insurance to and from the DaySequerra factory, and all such costs will be prepaid.

DaySequerra shall use reasonable efforts to repair or replace any product covered by this limited warranty within thirty days of receipt. In the event repair or replacement shall require more than thirty days, DaySequerra shall notify the customer accordingly. DaySequerra reserves the right to replace any product that has been discontinued from its product line with a new product of comparable value and function.

This warranty shall be void in the event a covered product has been damaged, or failure is caused by or attributable to acts of God, abuse, accident, misuse, improper or abnormal usage, failure to follow instructions, improper installation or maintenance, alteration, or lightning, power fluctuations and other incidental or environmental conditions. Further, product malfunction or deterioration due to normal wear is not covered by this warranty.

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