

DaySequerra



iLC 2ST | User Manual

Welcome

Thanks for purchasing the DaySequerra ILC2ST. Differences in audio levels between TV programs, or between programs and commercials, are a constant annoyance to viewers. ILC2STST permits broadcasters to establish a consistent 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 ILC2ST 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 ILC2ST, 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 +1-856-719-9900. Our office hours are from 9 to 5 ET, Monday through Friday; or you can email your questions to: info@daysequerra.com.

Also, please remember to visit our website **www.daysequerra.com** for warranty registration and the latest DaySequerra product information.

We have worked hard to ensure that your DaySequerra ILC2ST 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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ILC2ST Key Features

- Real-time adaptive loudness control delivers ITU BS.1770 compliant loudness without “squashing” the sound
- Two independent stereo loudness controllers each with full-featured ITU.BS1770 loudness meter
- Exclusive look-ahead technology makes gain corrections imperceptible
- Optional analog I-O, HD-SDI I-O and redundant auto-switching power supply
- GPI-switched user presets perfect for DayPart programming
- 10/100 Base-T Ethernet interface for long-term logging and field software updates

Important Safety Information

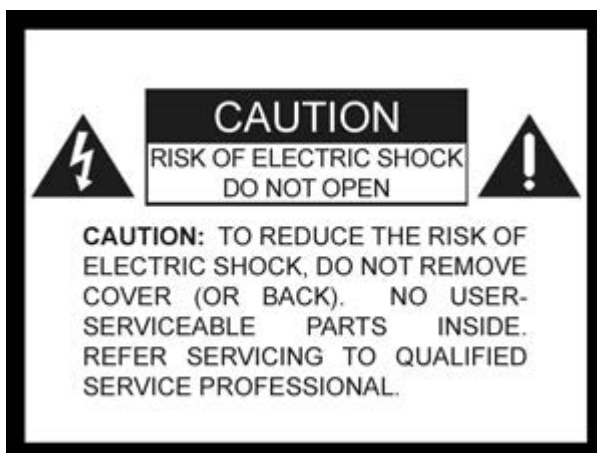
- Indoor use only. Not for use in wet or damp environments.
- Maximum Relative Humidity: <80%
- Class I Equipment (grounded type)
- Electrical rating: 100-120/220-240V~50-60Hz 18W
- Internal circuit breaker for continuous short circuit protection
- AC Mains supply voltage fluctuations are not to exceed +10% of the nominal voltage
- Operations temperature range -40°C to 70°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 ILC2ST to an uninterruptible power supply (UPS) to provide other protection against power surges and brownouts.

The DaySequerra ILC2ST is subjected to a strong RFI field, such as those emitted from portable two way radios, the front panel display may “blank out”. To restore the display without rebooting the unit, turn the rotary encoder to activate the main menu, and then press HOME. If the keylock is enabled, you will have to deactivate it by pressing the ENTER key followed by BACK.

Service Information

The DaySequerra ILC2ST 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 and register your new ILC2ST 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

Inputs	2 AES-3 Stereo Inputs Optional HD/SDI Input and pass-through
Outputs	2 Transformer-isolated AES-3 Stereo Outputs
Audio Input and Output Interface	AES/EBU, 75ohm, unbalanced BNC Optional HD/SDI Input and pass-through Optional Analog I/O
Loudness Measurement and Correction	ITU-R BS.1770/1 Industry Standard Loudness Measurement DTS Neural Loudness Measure DTS Neural Loudness Control
Sample Rate	48 kHz
Latency [1]	16 ms
GPI Alarms	DB-9 female connector, 0-5VDC TTL 2 DayPart Inputs per channel; Alarm at fault Outputs
Ethernet/Remote Dashboard	10/100-BASE-T for field software updates, logging and remote control Remote Dashboard – Windows app for compliance logging and remote control
Dimensions and Weight	19" (482mm)W x 8" (203mm)L x 1.75" (44mm)H 7 lbs (3.2 kg)
Regulatory:	<i>North America:</i> Designed to Comply with FCC Class A part 15 <i>Europe:</i> LV Directive 73/23/EEC and EMC Directive 89/336/EEC; CE Mark (EN 55022 Class A, EN55024); RoHS and WEEE compliant
Power Supply	Optional - Dual redundant Auto-sensing 100-240V, 50-60Hz EMI suppressed male IEC320 C14 connectors
Warranty	One year, limited parts and labor



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 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

Broadcasters need a solution to effectively measure, and ultimately control the abrupt changes in loudness that sends viewers diving for their remote controls during commercial breaks and action scenes. The DaySequerra ILC2ST Intelligent Loudness Control delivers ATSC A/85 CALM, ARIB – B32 and EBU R128 loudness compliance for stereo broadcasts worldwide in a cost-effective feature-rich 1 RU package.

The iLC2ST's adaptive look-ahead loudness control eliminates viewer complaints without damaging the original mix; build-in ITU.BS1770 loudness meter ensures regulatory compliance. The iLC2ST's Remote Dashboard provides remote control, monitoring and logging.

ILC2ST then uses the proprietary DTS-Neural Loudness Control, an advanced loudness-leveling algorithm, to apply the appropriate gain or attenuation to maintain the broadcaster-defined loudness level. The resulting audio has a naturally open, dynamic quality without the annoying side-effects of traditional energy-based volume management solutions.

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 DTS NLM 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. This proprietary algorithm was developed by after extensive research into human hearing and perceived loudness.

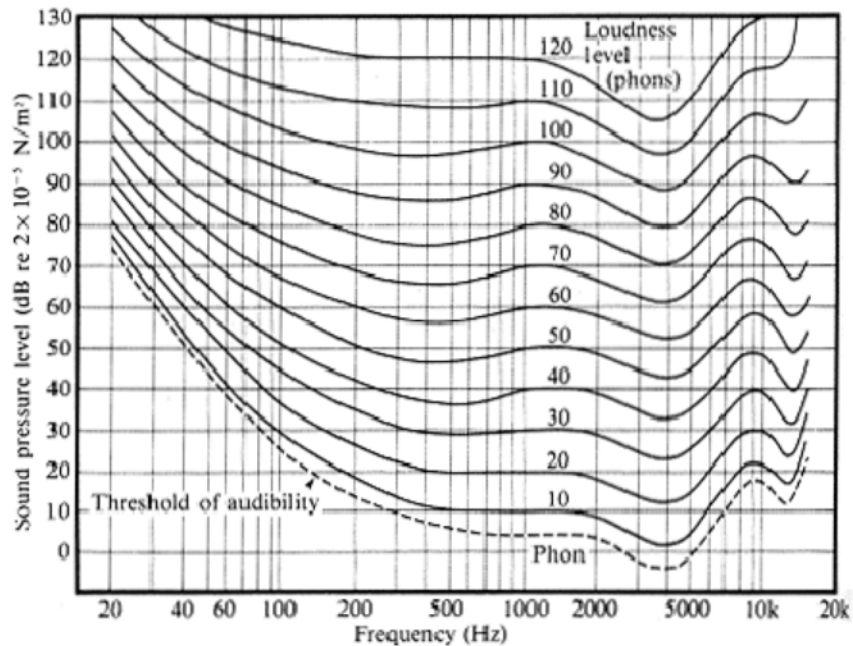
To improve system reliability and up-time, ILC2ST uses a robust DSP-based processing platform rather than a PC-based approach to completely avoid broadcast disruptions caused by operating system lockups. An Ethernet interface provides long-term logging and field software updates capability. An optional factory-installed HD/SDI module will allow for measurement of 8 channels of program audio from group 1 or group 2 with user specified mappings within the group. 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.

When ILC2ST is used ahead of an AC3 (Dolby Digital) transmission, the target loudness level will also match the Dialnorm metadata information, thus providing consistent, enjoyable audio for all viewers.

Whether pre-screening content at an ingest point or controlling the loudness of a broadcast air-chain, the DaySequerra ILC2ST is your key to reduce viewers complaints and improve audience satisfaction.

Measuring Loudness

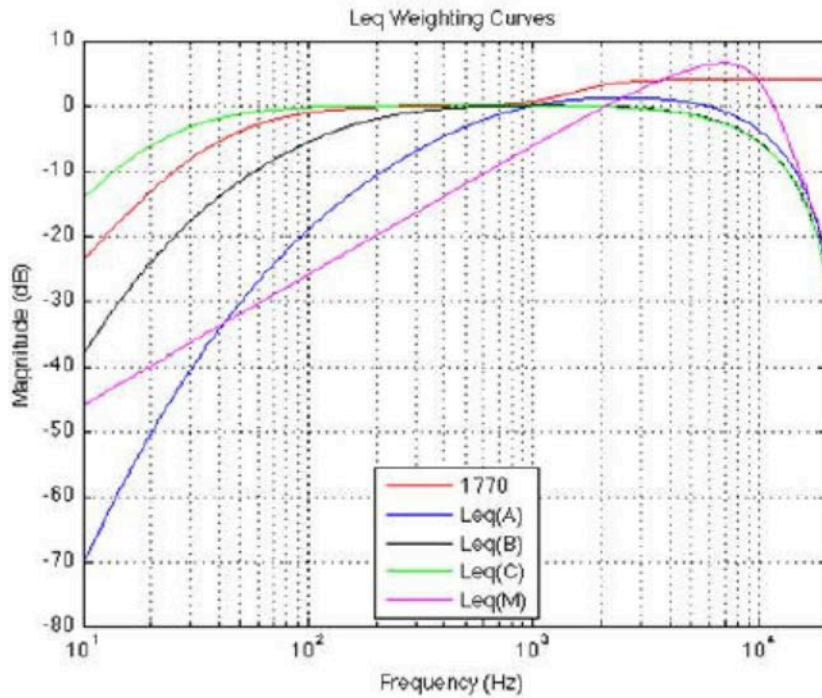
Human perception of the sensation of an audio signal is properly called “loudness”. As early as 1933, research by Fletcher and Munson showed that human hearing sensitivity is largely based upon the frequency of the sound, as well as the sound pressure level (SPL). As humans do not hear sound using standard 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

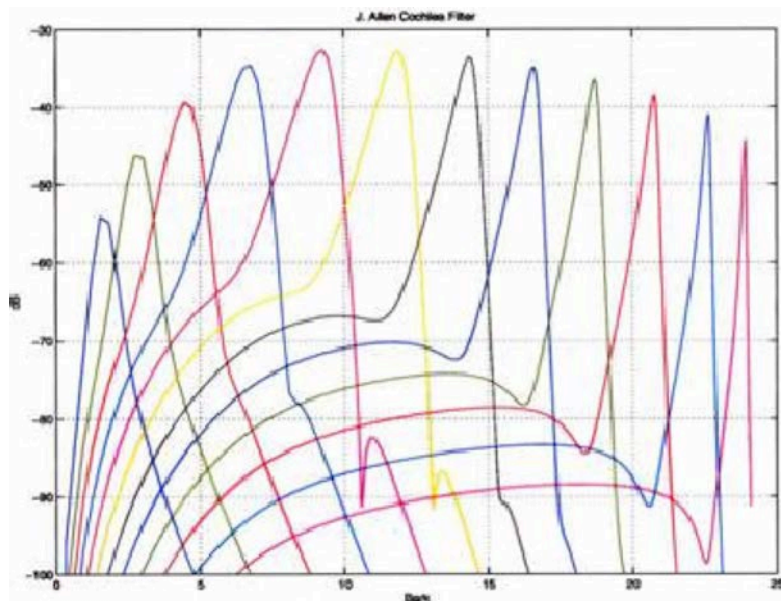
In order to create a loudness measure that more accurately represents the human perception of loudness, frequency weighting (or equalization curves) are placed ahead of power measurements. This introduces the measures Leq(A), Leq(B), Leq(C) and Leq(M) – with ‘Leq’ attempting to relate the ‘L’oudness 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

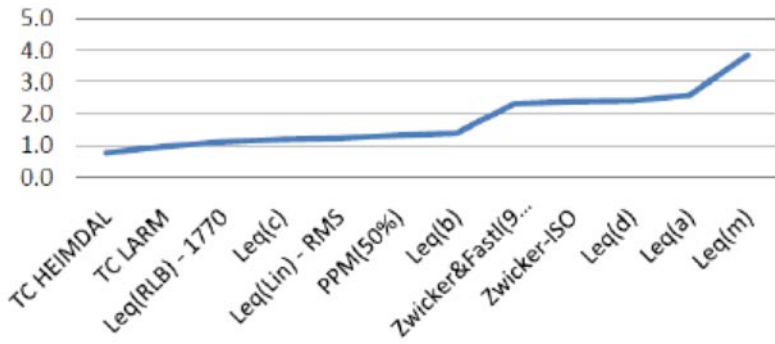
To achieve a more accurate loudness measurement, the method should include critical bands in the measurement. Critical bands describe auditory filters within the human cochlea. (J. Allen, 2010). To illustrate this, a subject is presented with a single tone of a certain energy level, and more tones are 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)

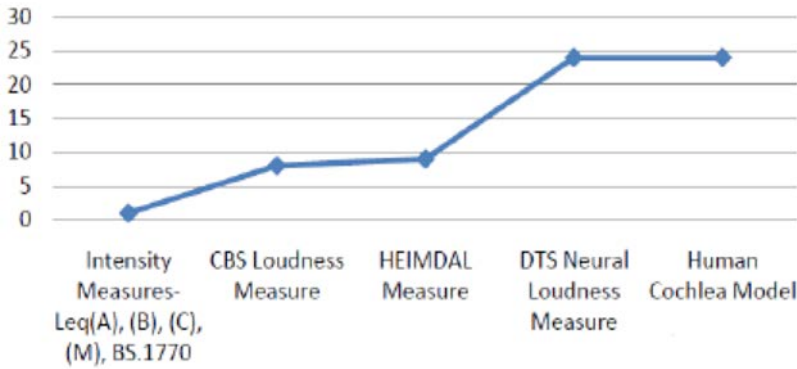
Bronwyn Jones and Emil Torick created a revised CBS loudness meter in the early 1980s that consisted of eight filters, each covering three critical bands. This approach did prove to deliver better subjective modeling than traditional SPL or RMS measurements (Jones & Torick, 1982).

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).

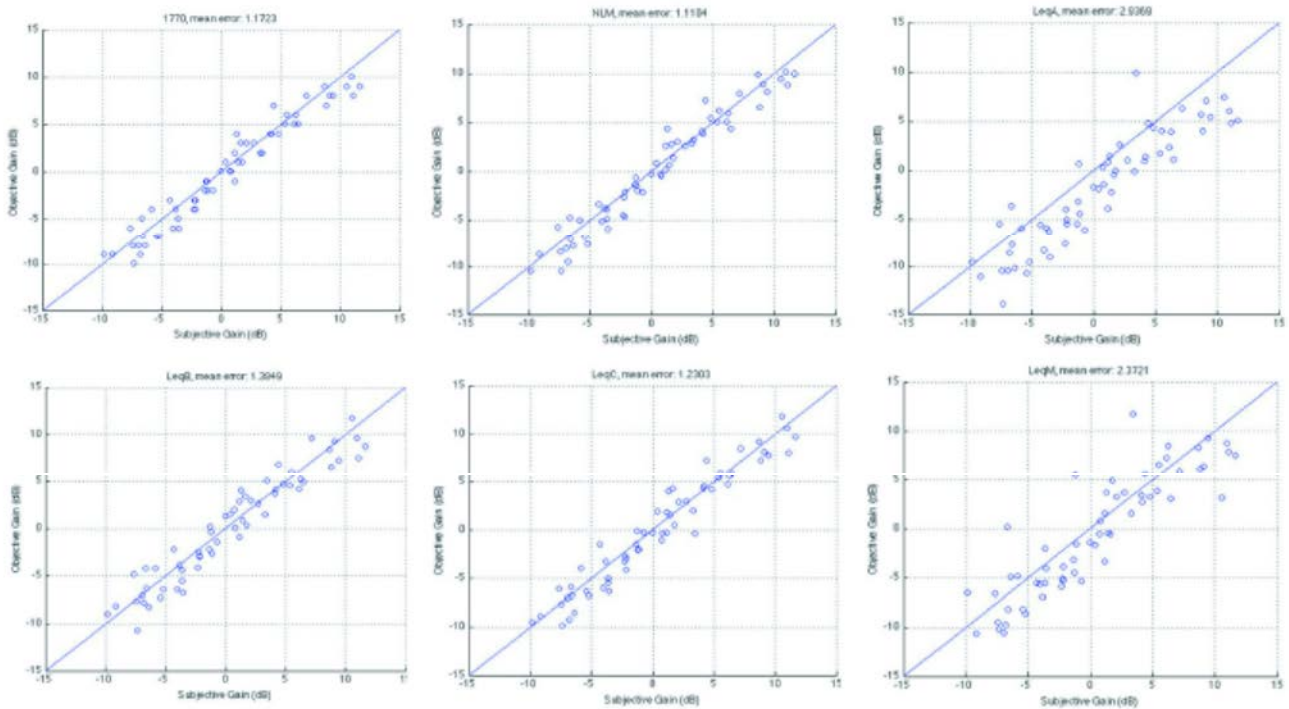


Absolute Error (dB) of various loudness measures

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. DTS Neural Loudness Measure is the first real-time perceptual loudness measurement product available that embraces this advanced approach to loudness measurement.



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

Work Cited

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.

Installation

Immediately upon receiving your ILC2ST, 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. ILC2ST is shipped in one carton, which contains: the ILC2ST unit and two NEMA5-15P to IEC320 C13 AC power cables.

We strongly encourage you to save the shipping carton and shipping materials supplied with your ILC2ST. They are specially designed to properly protect your ILC2ST, 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 1-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.

Rack Mount Installation

The ILC2ST 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 ILC2ST 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.

ILC2ST is designed with reliability in mind and contains two auto-switching power supplies. Please connect ILC2ST to an uninterruptible power supply (UPS) to protect against power surges and low-voltage conditions. For maximum redundancy, connect each power supply to a separate UPS on different power circuits. ILC2ST 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.

ILC2ST will automatically power up when AC power is applied. If AC line power is lost or momentarily interrupted, ILC2ST will revert to its previous state when the power is restored. Hard-bypass relays will pass through audio directly to the outputs when the unit is unpowered. However, audio cannot be de-embedded from the HD/SDI input and bypassed to the AES outputs while the unit is unpowered.

Front Panel Controls and Indicators



Status Indicators

Alarms - Red LED indicator illuminates when ILC2ST has an alarm notification.

Audio - Green LED indicator illuminates when a valid signal is present.

Network - Blue LED indicator illuminates when ILC2ST has a successful network connection.

Logging - Green LED indicator illuminates when the ILC2ST logging is enabled on the Remote Dashboard.

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.

SELECT KEY - Used to enter a menu or confirm a selection. To enter the main system menu, simply press ENTER while iLC2ST is on the HOME screen.

MAIN KEY - A press of this button will return iLC2ST to the home screen or enter home screen selection mode.

RETURN 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.

Rear Panel



AES INPUTS - Two 75 BNC connectors will accept the AES3 digital audio stream. For iLC2ST to work properly, the following channel inputs must be maintained:

- 1/2 - Left and Right Channel – Stereo A
- 3/4 - Left and Right Channel – Stereo B

AES OUTPUTS – Two 75 BNC connectors output the AES3 digital audio stream. All processed audio is output to these connectors regardless of the input source.

- 1/2 - Left and Right Channel – Stereo A
- 3/4 - Left and Right Channel – Stereo B

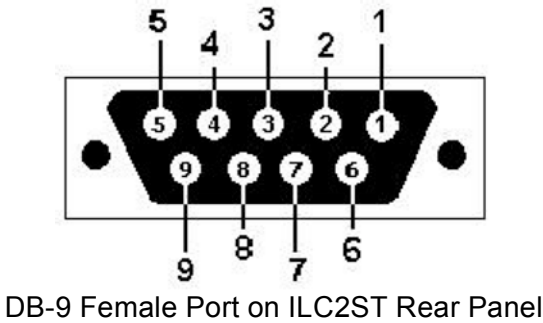
AES SYNC – One 75 BNC input and one 75 BNC passive output are present for an external clock signal. Clock recovery is possible from an AES-3, AES-11 or Word Clock signals.

HD/SDI I/O (option 01) - Two 75 BNC connectors handle HD/SDI I/O. One input port as well as one passive output is present when this option is installed. Supported formats include SMPTE 259M,

SMPTE 292M, and SMPTE 424M as well as ITU-R BT.656 and ITU-R BT.601. See the HD/SDI section of this manual for more details.

The AES-3id-1995/SMPTE 276M standard dictates a 75 ohm unbalanced connection and requires proper termination. The termination should occur at the destination of the signal (that is, on the inputs to ILC2ST). If the output BNC connectors are not feeding additional equipment, terminate each of these with a standard 75 terminator. Like other inputs, AES-11 external sync and HD/SDI input signals should also be terminated if the outputs are not feeding additional equipment. Proper termination of these signals will prevent reflections that may cause audio errors or clock problems.

GPIO – A Female DB-9 connection that allows ILC2ST to be monitored or controlled externally. Opto-isolated inputs will be triggered by a voltage of 5VDC.



Pin	Signal
	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

Output 1: Relay 1 is Normally Open. Upon an alarm condition, this relay will close. When the failure is remedied, the relay will open.

Output 2: Relay 2 is Normally Open. Upon a fault condition, the relay will close. When the failure is remedied, the relay will open.

Input 1: Momentary voltage detected on this port will cause ILC2ST to toggle a specific loudness control parameter preset that is defined in the I/O menu for Stereo A – input 1.

Input 2: Momentary voltage detected on this port will cause ILC2ST to toggle a specific loudness control parameter preset that is defined in the I/O menu for Stereo A – input 2.

Input 3: Momentary voltage detected on this port will cause ILC2ST to toggle a specific loudness control parameter preset that is defined in the I/O menu for Stereo B – input 1.

Input 4: Momentary voltage detected on this port will cause ILC2ST to toggle a specific loudness control parameter preset that is defined in the I/O menu for Stereo B – input 2.

NETWORK - Used for logging or to update the ILC2ST 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 ILC2ST 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 / PSU 2 (Option 2) – Two IEC320 C14 ports 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).

HD/SDI

ILC2ST can use an optional factory-installed HD/SDI I/O module to de-embed audio programs from a HD/SDI stream for loudness processing.

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 ILC2ST's output jacks.

Programming Menu – Loudness Meter/System

If AC line power is lost or momentarily interrupted, iLC2ST will revert to its previous state.

To enter the programming menu, press the SELECT button while on the HOME SCREEN. Use the ROTARY KNOB to navigate up and down. Press SELECT to select a sub-menu. Press ENTER to store/save a selection. Press the RETURN 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.

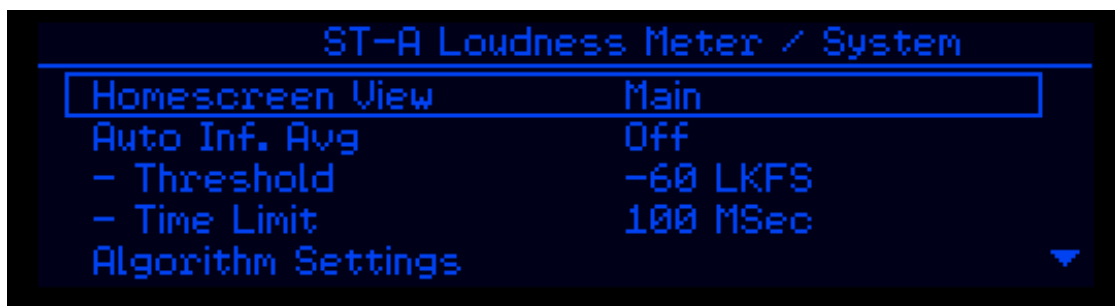
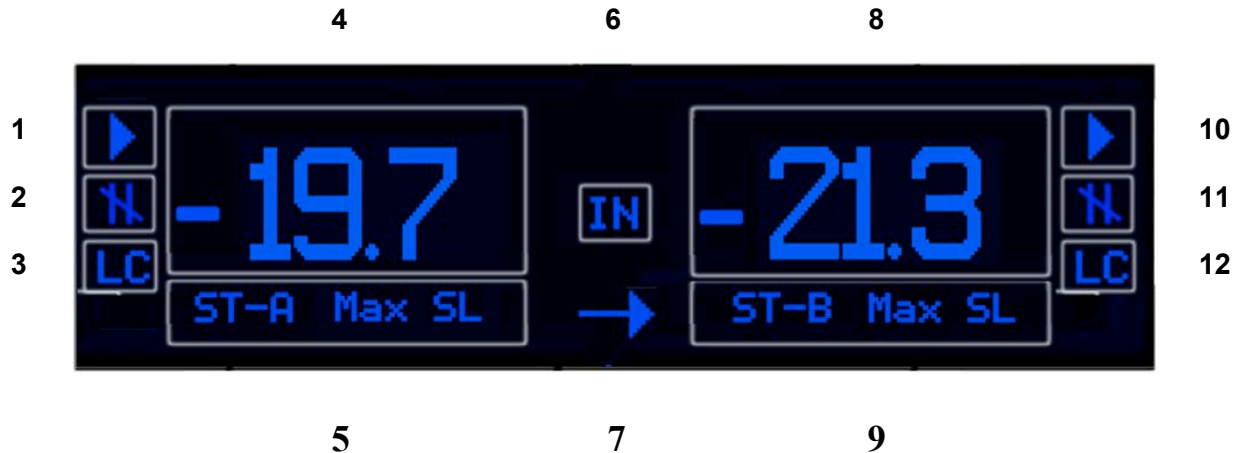


Figure 1. Loudness Meter / System Menu

Home screen View

iLC2ST offers 2 preset Home screen views and 4 custom to choose from. Preset: Main (default) and Standard. Main displays both channels on the VFD at the same time. Stereo – A on the left and Stereo – B on the right side. See figure xx. Standard displays only one channel with 2 dynamic fields to change. The user may save up to 4 different custom screens with custom names in User 1 - 4

Main View Home Screen - Default



1. 'Stereo A' - Play / Stop / Reset Infinite Average icon. Selecting this icon while on the Home screen and 'pressing' SELECT will 'stop' the Infinite Average. Pressing SELECT once again will 'reset' the Infinite Average. Pressing SELECT once more will 'play' and resume calculations for determining the Infinite Average for the selected display input.
2. 'Stereo A' - Pause / Resume Infinite Average icon. Selecting this icon while on the Home Screen and 'pressing' SELECT will 'pause' the Infinite Average. Pressing SELECT once more will 'resume' calculations for determining the Infinite Average for the selected display input.
3. 'Stereo A' - Loudness Control Icon. Select to enter Loudness control submenu.
4. Field #1 (Stereo A) measured value. This field can be customized by the user and saved in a preset.
5. Indicates the current measurement displayed in Field #1. Entering Channel selection mode in this field allows the user to toggle thru Max SL, Max ML, Infinite Average, True Peak, Max True Peak and LRA.
6. Indicates if the data on the home screen is representative of an inbound or outbound signal. Pressing SELECT while the cursor is over this field will toggle the display between IN and OUT.
7. Arrow indicating which direction to toggle over to. In the above example the user is in Stereo A and can toggle over to Stereo B by selecting the arrow and pressing SELECT.

The UI controls will then switch over to Stereo B. The arrow is only visible when the user scrolls over to it.

8. Field #2 (Stereo B) measured value. This field can be customized by the user and saved in a preset.
9. Indicates the current measurement displayed in Field #2. Entering Channel selection mode in this field allows the user to toggle thru Max SL, Max ML, Infinite Average, True Peak, Max True Peak and LRA.
10. 'Stereo B' - Play / Stop / Reset Infinite Average icon. Selecting this icon while on the Home screen and 'pressing' SELECT will 'stop' the Infinite Average. Pressing SELECT once again will 'reset' the Infinite Average. Pressing SELECT once more will 'play' and resume calculations for determining the Infinite Average for the selected display input.
11. 'Stereo B' - Pause / Resume Infinite Average icon. Selecting this icon while on the Home Screen and 'pressing' SELECT will 'pause' the Infinite Average. Pressing SELECT once more will 'resume' calculations for determining the Infinite Average for the selected display input.
12. 'Stereo B' - Loudness Control Icon. Select to enter Loudness control submenu.

Standard View



1. Field #1 (Stereo A or B) measured value. This field can be customized by the user and saved in a preset.
2. Indicates the current measurement displayed in Field #1. Entering Channel selection mode in this field allows the user to toggle thru Max SL, Max ML, Infinite Average, True Peak, Max True Peak and LRA.
3. Indicates if the data on the home screen is representative of an inbound or outbound signal. Pressing SELECT while the cursor is over this field will toggle the display between IN and OUT.
4. Field #2 (Stereo A or B) measured value. This field can be customized by the user and saved in a preset.

5. Indicates the current measurement displayed in Field #1. Entering Channel selection mode in this field allows the user to toggle thru Max SL, Max ML, Infinite Average, True Peak, Max True Peak and LRA.
6. 'Stereo A or B' - Play / Stop / Reset Infinite Average icon. Selecting this icon while on the Home screen and 'pressing' SELECT will 'stop' the Infinite Average. Pressing SELECT once again will 'reset' the Infinite Average. Pressing SELECT once more will 'play' and resume calculations for determining the Infinite Average for the selected display input.
7. 'Stereo A or B' - Pause / Resume Infinite Average icon. Selecting this icon while on the Home Screen and 'pressing' SELECT will 'pause' the Infinite Average. Pressing SELECT once more will 'resume' calculations for determining the Infinite Average for the selected display input.
8. 'Stereo A or B' - Loudness Control Icon. Select to enter Loudness control submenu.

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

Loudness Meter Algorithm Settings



Figure 2. Loudness Meter 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 (Default); 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

Meters

Additional meters can be displayed by selecting the 'Meters' sub-menu tab at the bottom which include:

ST In Short Average: The measured short term smoothed combined average of the auxiliary stereo signal input.

ST In True Peak: The measured instantaneous highest true peak value of the auxiliary stereo signal input during the current measurement period.

ST Out Short Average: The measured short term smoothed combined average of the auxiliary stereo signal output.

ST Out True Peak: The measured instantaneous highest true peak value of the auxiliary stereo signal output during the current measurement period.

ST Out Correction: The amount of attenuation or gain that was applied to the auxiliary stereo input signal in order to bring the loudness within the target.

ST Out Compression: The amount of dynamic range compression that was applied to the auxiliary stereo input signal in order to bring the loudness within the target.

ST-A Algorithm Meters		
2.0 Max SL	0.00	LKFS
2.0 Max ML	0.00	LKFS
2.0 Inf. Average	0.00	LKFS
2.0 In True Peak	-120.00	dBFS
2.0 In Max TP	-120.00	dBFS

Figure 3. Loudness Meters screen display

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.

ST-A Edit Homescreen	
User 1	User 1
User 2	User 2
User 3	User 3
User 4	User 4

Figure 4. Home screen edit display screen

System Settings

System	
I/O	
Network	
Diagnostics	
Alarms	
Keylock Settings	

Figure 5. System Settings menu display screen

A submenu for iLC2ST's system settings. Main system functions can be monitored and changed from within these submenus.

I/O Menu

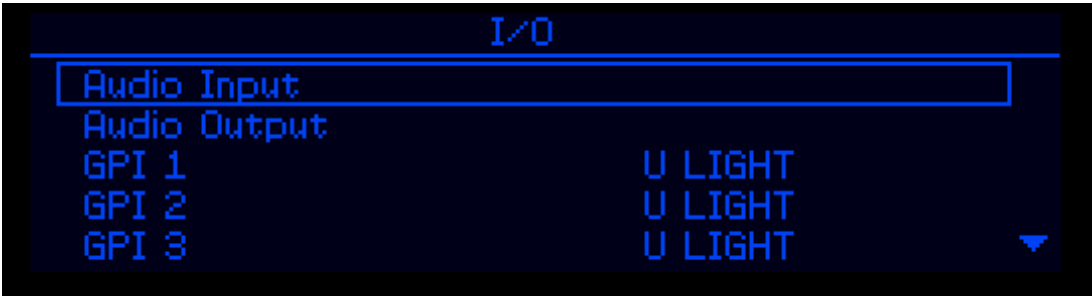


Figure 6. I/O Menu screen display

The I/O Menu will allow you to tailor iLC2ST to suit your specific application.

Audio Input: Submenu for selecting the audio source and channel mapping.
Audio Output: Submenu for defining enabling and disabling the final limiter.

GPI 1 – 4: Changes the DayPart preset for each the four general-purpose inputs.

Clock Source: Defines where iLC2ST gets the timing signal.

- a. Internal: iLC2ST's internal clock. Define using Sync Source.
- b. 1/2: iLC2ST will get timing from the 1/2 BNC Input.
- c. 3/4: iLC2ST will get timing from the 3/4 BNC Input.
- d. Internal: Processing is synchronized with the iLC2ST internal clock.
- e. External: Processing is synchronized with the clock recovered from the External AES Sync Input.

Sample Rate: If Clock Source is set to internal, defines what sample rate frequency 5 .15.1ST will use. (32.0, 44.1, 48.0, 88.2 or 96.0 kHz) Otherwise, the detected sample rate recovered from the configured clock source is shown.

Audio Input Menu

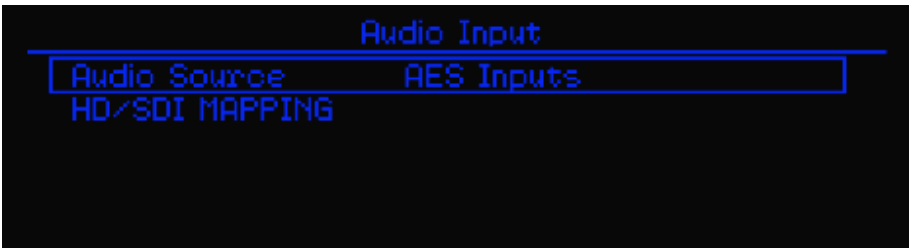


Figure 7. Audio Input Menu screen display

NOTE: Unless your iLC2ST 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 iLC2ST 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

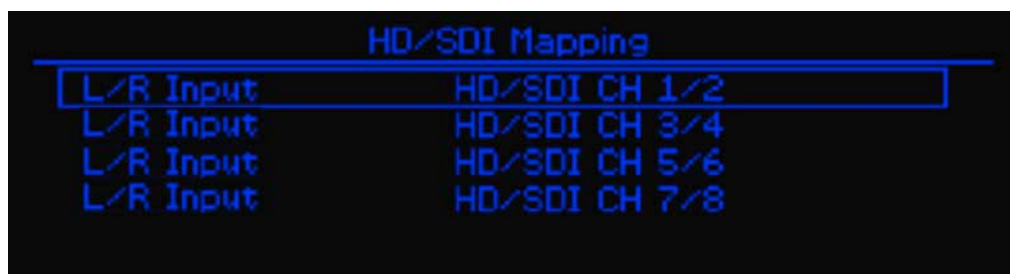


Figure 8. HD/SDI Mapping Menu Screen Display

For iLC2ST 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, iLC2ST 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.

Audio Output

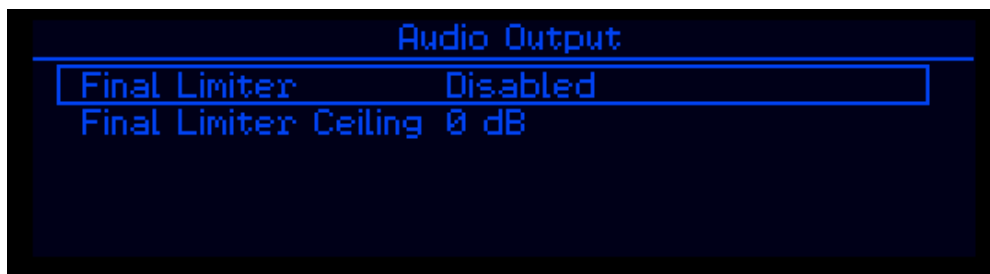


Figure 9. Audio Output display screen

Final Limiter: Enables and disables the final limiter. (Default: Enabled)

Final Limiter Ceiling: Allows ILC2ST to reduce the level of output stream (0dB to -20dB)

Network Menu



Network	
Device Name	iLC2ST
DHCP	Disabled
IP	192.168.0.110
MAC Address	00:60:2B:06:D0:6B

Figure 10. Network Menu Screen Display

The DaySequerra Eclipse iLC2ST has several configurable network settings. All of iLC2ST’s network settings are password protected. The password to change the network settings is ‘ds123’. Please take note when entering the password that the iLC2ST password is case sensitive. The DaySequerra iLC2ST is configured to take a DHCP address by default.

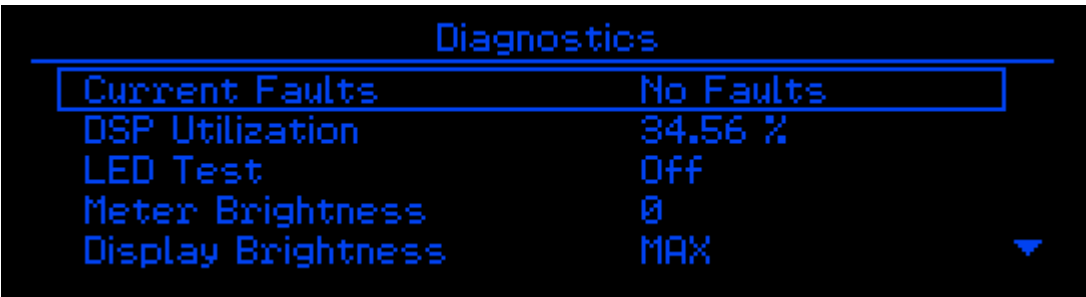
Device Name: Allows you to change iLC2ST’s name as reported to DNS. Press ENTER while the cursor is over this field to go into data entry mode. Turn the knob to scroll through the available choices of letters (A-Z, 0-9 and _ (underscore)) and press ENTER to move on to the next field. Turning the knob again will start to scroll through the choices for the next letter, or pressing ENTER accepts the name.

DHCP: Configures iLC2ST 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 iLC2ST’s MAC address if needed for firewalls or DHCP IP address assignments.

Diagnostics Menu



Diagnostics	
Current Faults	No Faults
DSP Utilization	34.56 %
LED Test	Off
Meter Brightness	0
Display Brightness	MAX

Figure 11. Diagnostics Menu Screen Display

Current Faults: Displays any error states that iLC2ST may be in.

DSP 1 Utilization: Shows the current load on iLC2ST’s DSP.

DSP 2 Utilization: Shows the current load on iLC2ST's secondary DSP.

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

Meter Brightness: Allows adjustment of iLC2ST's Input and Output meters. (Default: 0)

Display Brightness: Allows adjustment of iLC2ST'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 iLC2ST. 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

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

Channel Loss Alarms: When enabled, ILC2ST will monitor the configured channel pairs for audio loss. The sub-menu contains on/off controls for each channel pair and the ALARM DELAY TIME that is defaulted to 5 sec. (Default: Off for each channel pair)

AES Error: When enabled, ILC2ST will alert the operator on any AES errors. (Default: Off)

Power Supply: When enabled, ILC2ST will alert the operator for a power supply issue. (Default: Off)

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.

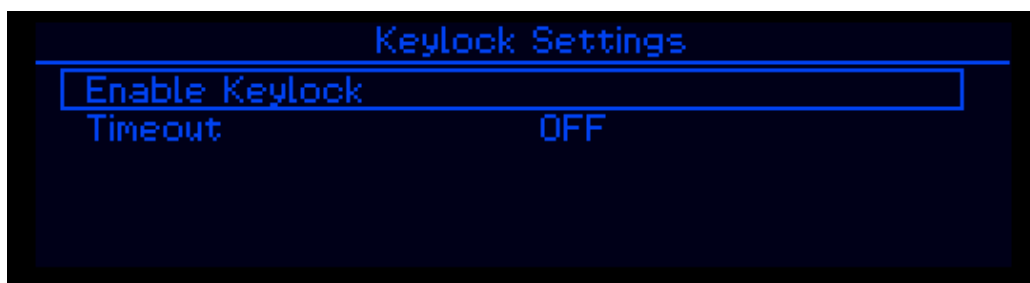


Figure 12. Keylock Settings display screen

About Menu

Model Number: Displays the model number of the unit.

Serial Number: Displays the serial number of this ILC2ST.

Build Number:

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:

Eclipse Algorithm Rev:

DTS Algorithm: Displays the specific DTS algorithm running.

DTS Algorithm Rev: Version of the DTS algorithm running on this unit.

Faults

Although your ILC2ST will provide you with years of trouble free service, occasionally problems may occur. Below is a listing of the most common fault conditions and some pointers about where to start your trouble-shooting before calling for support.

No Sync: AES sync has been lost. Please check the source equipment and all cable connections. Ensure that ILC2ST is operating in the proper input mode for your application and is configured for the correct input port.

CRC Error: ILC2ST has encountered a CRC mismatch error in the audio stream. This may be due to a corrupted or invalid channel status bit sent by the source equipment.

Validity Error: A problem has been encountered with the validity bit and audio output has been muted. Check that there are no errors on the source equipment preventing it from passing valid audio data.

Bi-phase Error: A bi-phase error in the audio stream could be caused by bad audio data coding or an un-recoverable clock rate in the bi-phase mark code. Check the source equipment is properly configured to output data in the correct format.

No Parity Error: A parity error is most likely caused by loose cables or a hardware AES interface malfunction. Check the source equipment and ILC2ST with known good equipment to determine if there is an equipment malfunction.

Clock Error: A valid clock signal was not found or could not be recovered from the biphasic mark code on the configured interface. Check your cable connections as well as the clock source input configuration under the I/O menu.

Loudness Control Parameter Presets

Parameters that define how loudness control is applied to the input audio can be set by way of presets. ILC2ST contains three factory defined presets as well as space to save 4 user-defined presets. The factory-defined presets have been designed as general starting points and may not be appropriate for all types of audio.

- Ultra Light
- Light
- Medium
- Aggressive
- User 1
- User 2
- User 3
- User 4

Editing Presets

Each preset contains the following parameters that can be modified and saved.

NLC Measure: Determines which loudness measurement scale is used by the loudness control process to measure the audio loudness.

ST Target Level: The desired target level for the auxiliary stereo signal flow.

Correction Ratio: Controls the amount of gain or attenuation that is applied when loudness differences are measured. For example: A setting of 1.00 indicates that for every dB of loudness difference measured between the input signal and the target level, 1 dB of gain or attenuation will be applied. A setting of 0.50 indicates that for every dB of loudness difference measured between the input signal and the target level, 0.5 dB of gain or attenuation will be applied.

Upper Threshold: Represents the allowable distance above the Target Level the input signal can range before attenuation is applied. If an input signal falls between the Upper Thresh and the Lower Thresh in reference to the Target Level, no correction will be applied. For example: A setting of +4dB indicates that audio content can range 4 dB above the Target Level before attenuation is applied. Content arriving louder than 4 dB above the Target will be appropriately attenuated. A setting of 0 dB indicates that attenuation will be applied to any input signal exceeding the Target Level. **Lower Threshold:** Represents the allowable distance below the Target Level the input signal can range before gain is applied. If an input signal falls between the Upper Thresh and the Lower Thresh in reference to the Target Level, no correction will be applied. For example: A setting of -5 dB indicates that audio content can range 5 dB below the target level before gain is applied. Content arriving quieter than 4 dB below the Target will be appropriately raised. A setting of 0 indicates that gain will be applied to any input signal falling below the Target Level.

Dead Band: Sets the size of a “band” in dB where small loudness differences that fall within this range are deemed allowable. When loudness differences fall outside of this allowable band then appropriate gain or attenuation is applied to control loudness. The Dead Band parameter can be effectively used to limit the amount of small range gain variability. For example: A window setting of 4 dB indicates that when the loudness level is measuring within ± 2 dB of the target level that no further correction is required. When the loudness level becomes further than ± 2 dB from the target level then appropriate gain or attenuation is applied.

Noise Floor: Controls the noise floor level. Input signals below the threshold are considered too low

and are not managed by the loudness processing to avoid bringing up the noise level. Input signals above the Noise Floor are considered valid and are managed by the loudness processing.

Attack / Rise: Controls how quickly the processing will respond to sharp onsets in loudness level. Note: A compressor is present after the attack time processing to catch any short-term loudness peaks, which may pass through.

Release / Fall: Controls how quickly the processing will respond to sharp drops in loudness level.

Frequency Shaping: Loudness studies dating have found that the human ear is more sensitive to different frequencies at different loudness levels. Frequency Shaping accounts for these differences by preserving the same perceptual frequency balance as the input signal while correcting the loudness to match a desired Target. With Frequency Compensation enabled at a medium level, signals that fall below the Target level have more gain added to middle frequencies than higher or lower frequencies to preserve the original spectral balance. Conversely, signals that fall above the Target level will have middle frequencies attenuated more than higher or lower frequencies. Because Frequency Shaping applies less gain to high and low frequencies, high or low frequency noise does not become over-emphasized.

Compressor Threshold: A compressor is present to catch any short-term loudness peaks, which aren't fully captured by the attack time processing. The compressor threshold parameter is set as the allowable short-term peak above the target level.

Compressor Ratio: The compressor ratio parameter controls the amount of attenuation that is applied when short-term peaks exceed the compressor threshold. See the Correction Ratio parameter for further detail.

Restore Defaults: Restores all parameters contained within the preset to the factory default settings.

Preset Name: Allows for custom names to be saved to the four user-definable presets.

Factory Defined Presets

Parameter	Default
Correction Ratio	0.80
Upper Threshold	0 dB
Lower Threshold	0 dB
Dead Band	5.0 dB
Noise Floor	-55.0 LKFS
Attack/Rise	80 ms
Release/Fall	300 ms
Frequency Shaping	0
Compressor Threshold	5.0 dB
Compressor Ration	0.5 dB
NLC Measure	NLM
Stereo Target Level	-24 dB

ULTRA LIGHT PRESET - This preset is designed for the least amount of loudness correction over longer periods of time. It characteristically has a lower Loudness Correction Ratio and a slower Attack and Release time. The secondary Compressor is set further away from the Target as to allow more transients. The goal of this preset is to fine-tune long-term loudness levels while preserving a majority of the original signal's dynamic range

Parameter	Default
Correction Ratio	0.95
Upper Threshold	0 dB
Lower Threshold	0 dB
Dead Band	4.0 dB
Noise Floor	-55.0 LKFS
Attack/Rise	50 ms
Release/Fall	220 ms
Frequency Shaping	0
Compressor Threshold	5.0 dB
Compressor Ration	0.5 dB
NLC Measure	NLM
Stereo Target Level	-24 dB

LIGHT PRESET - This preset is designed for very subtle loudness correction over longer periods of time. It characteristically has a lower Loudness Correction Ratio and a slower Attack and Release time. The secondary Compressor is set further away from the Target as to allow more transients. The goal of this preset is to fine-tune long-term loudness levels while preserving a majority of the original signal's dynamic range.

Parameter	Default
Correction Ratio	0.98
Upper Threshold	0 dB
Lower Threshold	0 dB
Dead Band	2.0 dB
Noise Floor	-55.0 LKFS
Attack/Rise	50 ms
Release/Fall	150 ms
Frequency Shaping	0
Compressor Threshold	5.0 dB
Compressor Ration	0.5 dB
NLC Measure	NLM
Stereo Target Level	-24 dB

MEDIUM PRESET - Medium preset has higher Ratios but slower release times. This allows for full correction to be applied but overcomes a 'nervous' or 'jumpy' sound of fast processing. The secondary Compressor is set further away from the Target as to allow more transients. The goal of this preset is to achieve a consistent output while preserving some of the original dynamics of the input signal.

Parameter	Default
Correction Ratio	0.01
Upper Threshold	0 dB
Lower Threshold	0 dB
Dead Band	1.0 dB
Noise Floor	-55.0 LKFS
Attack/Rise	50 ms
Release/Fall	100 ms
Frequency Shaping	0
Compressor Threshold	5.0 dB
Compressor Ration	0.5 dB
NLC Measure	NLM
Stereo Target Level	-24 dB

AGGRESSIVE PRESET – The Aggressive preset has 1:1 Ratios and short Attack / Release times. The secondary Compressor is set close to the target to reduce transients. Frequency compensation has been turned off to allow equal spectral gain to be applied to the lowest of input signals. The goal of this preset is to achieve very consistent outputs with limited dynamic range.

iLC2ST Remote Dashboard

Be sure that the iLC2ST 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 iLC2ST. 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 iLC2ST 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 iLC2ST. 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 iLC2ST. 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.

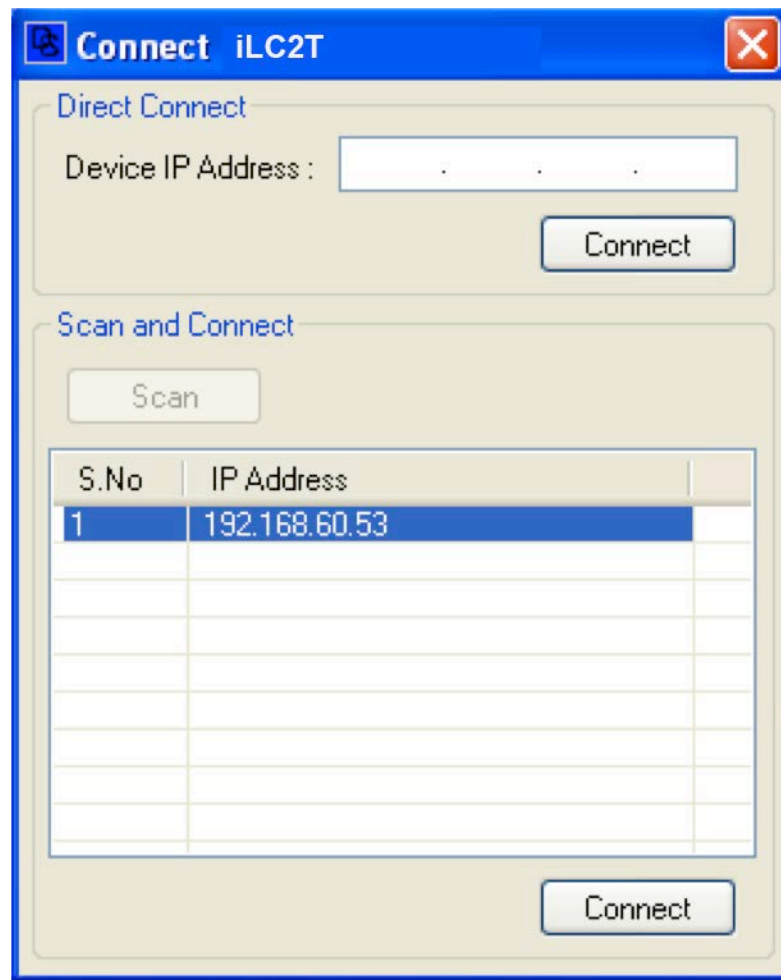


Figure 12. IP-Configure

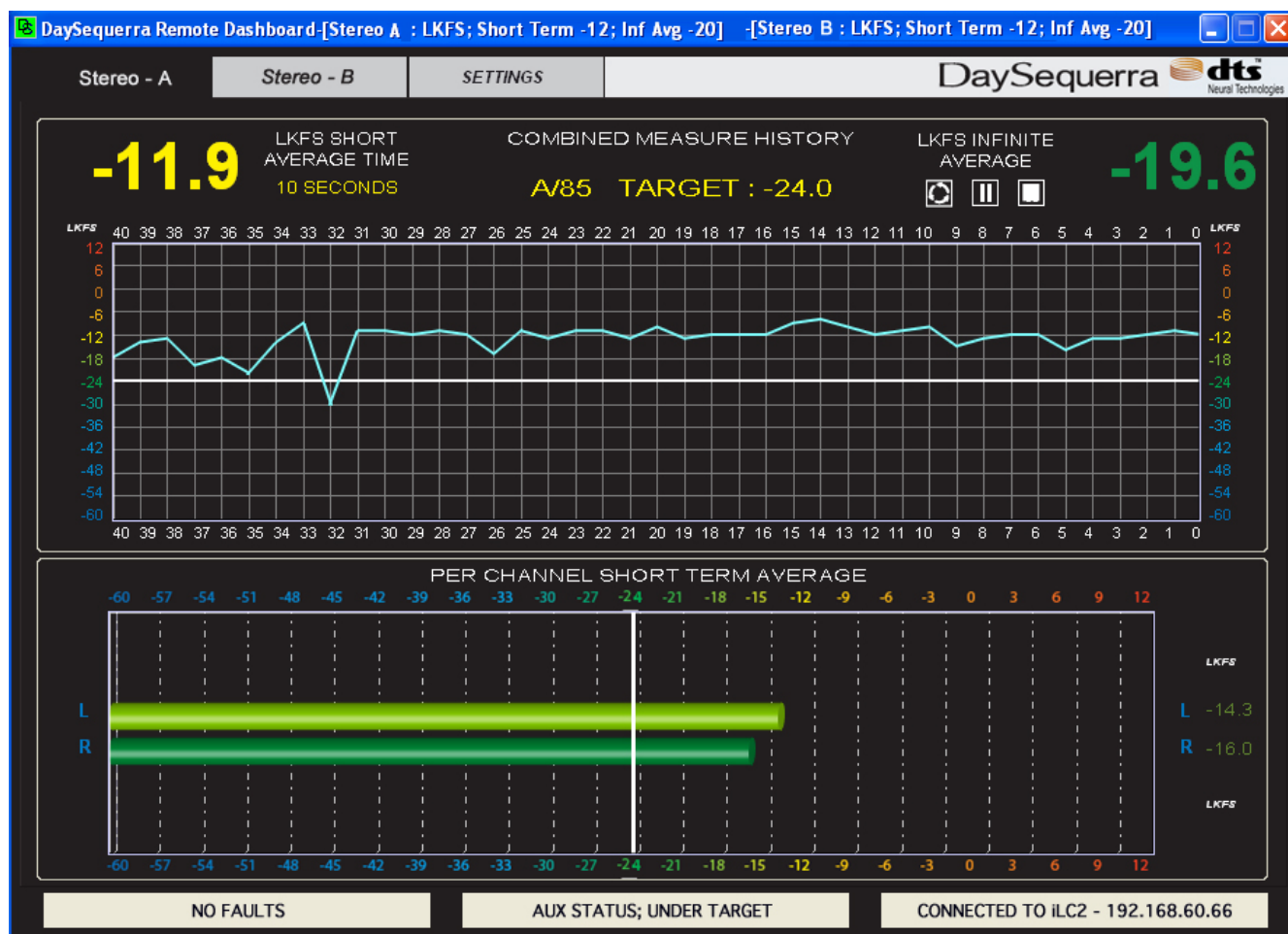


Figure 13. Un-configured Main viewer window

At the top of the window there are three navigation tabs: Stereo A, Stereo B and Settings. Click on the Settings tab in order to configure the program. After initial configuration, the application will start and resume communication with iLC2ST, if the network address previously set is still valid.

Remote Dashboard Configuration

DaySequerra Remote Dashboard [Stereo A : LKFS; Short Term -12; Inf Avg -20] - [Stereo B : LKFS; Short Term -12; Inf Avg -20]

Stereo - A Stereo - B SETTINGS DaySequerra dts

Network Settings

Device IP Address 192 . 168 . 60 . 66 Port 44600

Data Collection

Polling Freq. (ms) 1000

Data Logging

Log File Location C:\DOCUME~1\MICHAEL\LOCALS~1\Temp\Rar\$EX01.593\logfiles Browse

Communication Log

Enable Diagnostics Log ☐

Data Log Options

Stereo - A				Stereo - B			
ST-A Unit	<input checked="" type="checkbox"/>	ST-A LRA	<input checked="" type="checkbox"/>	ST-B Unit	<input checked="" type="checkbox"/>	ST-B LRA	<input checked="" type="checkbox"/>
ST-A Target	<input checked="" type="checkbox"/>	ST-A L Max SL	<input checked="" type="checkbox"/>	ST-B Target	<input checked="" type="checkbox"/>	ST-B L Max SL	<input checked="" type="checkbox"/>
ST-A MM Status	<input checked="" type="checkbox"/>	ST-A R Max SL	<input checked="" type="checkbox"/>	ST-B MM Status	<input checked="" type="checkbox"/>	ST-B R Max SL	<input checked="" type="checkbox"/>
ST-A Max SL	<input checked="" type="checkbox"/>	ST-A True Peak	<input checked="" type="checkbox"/>	ST-B Max SL	<input checked="" type="checkbox"/>	ST-B True Peak	<input checked="" type="checkbox"/>
ST-A Max ML	<input checked="" type="checkbox"/>	ST-A Max TP	<input checked="" type="checkbox"/>	ST-B Max ML	<input checked="" type="checkbox"/>	ST-B Max TP	<input checked="" type="checkbox"/>
ST-A Inf. Avg.	<input checked="" type="checkbox"/>	Device Faults	<input checked="" type="checkbox"/>	ST-B Inf. Avg.	<input checked="" type="checkbox"/>	Device Faults	<input checked="" type="checkbox"/>

Apply Cancel

NO FAULTS Stereo - A Status: Under Target Connected to iLC2ST - 192.168.60.66

Figure 14. Un-configured settings tab

Network Settings: Enter the IP address of the iLC2ST 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 iLC2ST 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:

Logging

Stereo Unit (A and B)	Loudness measure that is used for the stereo inputs.
Stereo Target (A and B)	Target value set for the AUX inputs.
Stereo Short Avg. (A and B)	Short combined average for the AUX inputs.
Stereo Peak (A and B)	Combined peak value of the AUX inputs.
ST-L Short Avg. (A and B)	Short average of the AUX Left input
ST-R Short Avg. (A and B)	Short average of the AUX Right input
Device Faults (A and B)	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
---	--------------

Error Codes

After the appropriate options have been set, press the APPLY button to save those settings and begin communications with the iLCST. The program icon should change from red to green after communication has been established with the unit, and the iLC2ST 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

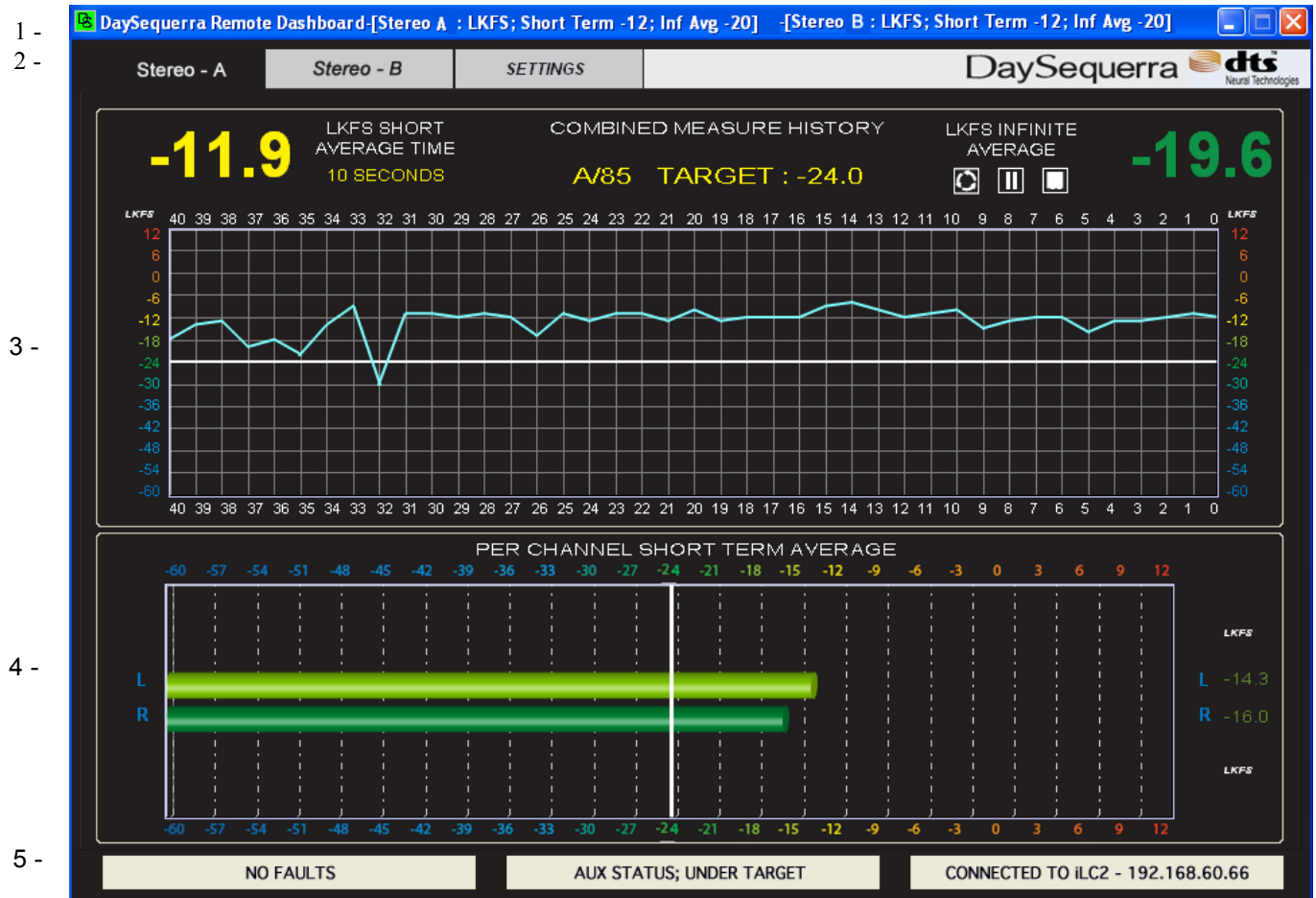


Figure 15. Main viewer window

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 iLC2ST. 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 / DTS 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 iLC2ST 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 iLC2ST.

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 iLC2ST 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 iLC2ST 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.

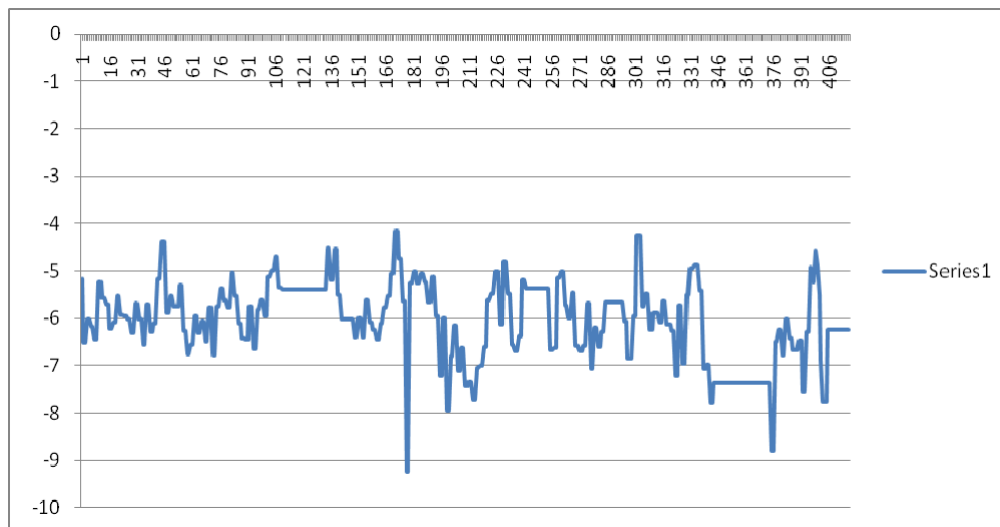
Log File Import Example

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.

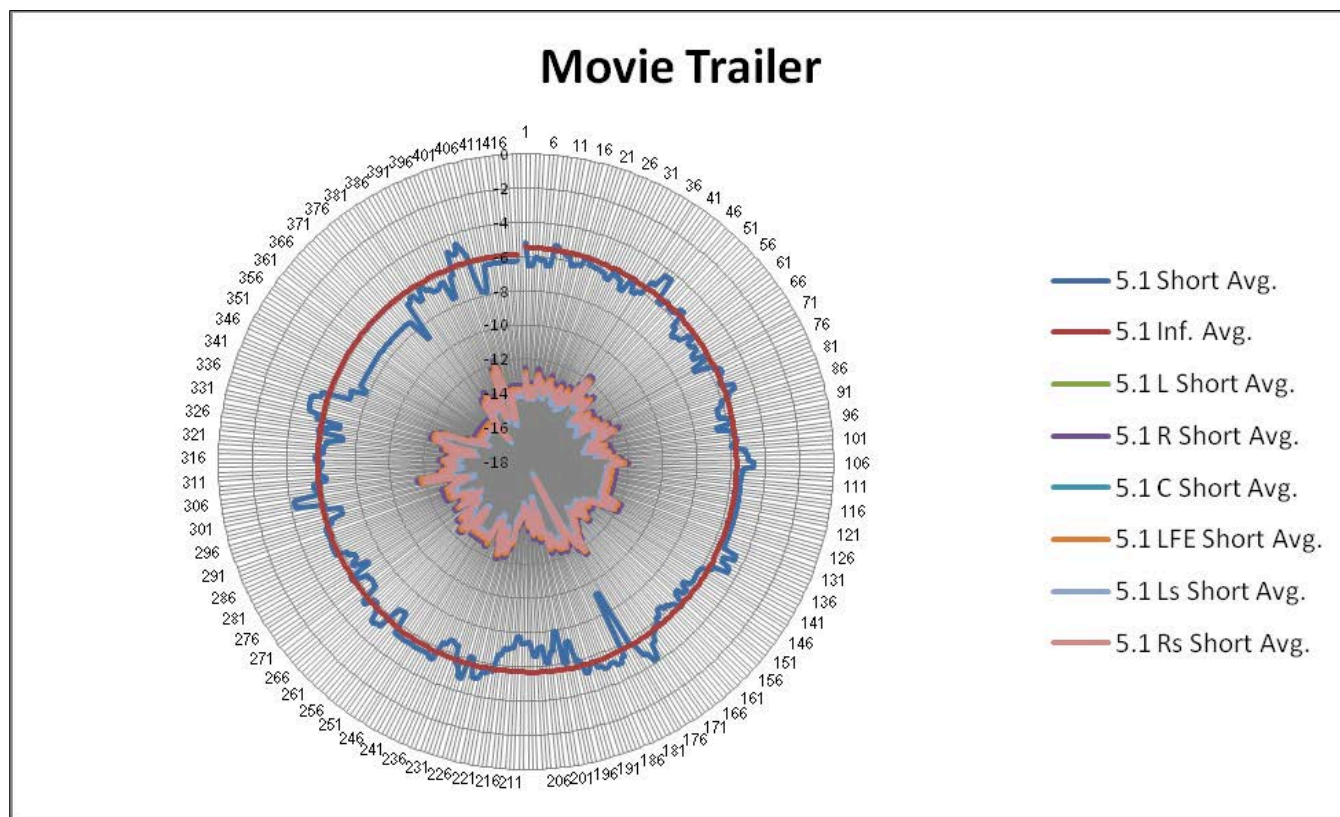


Figure 16. Output for radar graph

Firmware Update

Provided that you have completed warranty registration for your ILC2ST on our website, we will notify you as new firmware updates become available. The notification will contain the announcement of new firmware, issues corrected, and instructions on how to retrieve the update files.

Update packages will be available as a single .ZIP file for download. Compatible archive programs include Winzip (www.winzip.com) or WinRAR (www.rarlabs.com) and may be downloaded from their respective websites. The update package will contain four files; dsp2505.bin, firmdown_ds.exe, readme.txt and update.bat.

Firmware updating is accomplished via UDP Port 44600. At this time, updating is only supported by using a cross-over cable directly connected to one PC. If your PC has multiple network interface adapters, each additional adapter will need to be disabled before attempting to upgrade your unit. You may also wish to disable your firewall during the upgrade process. For additional support with networking, please contact your network administrator.

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, ILC2ST 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, unless directed otherwise from DaySequerra:

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, and then OK to close the properties box.
5. Power down ILC2ST and power up again while holding the ENTER key. ILC2ST will enter safe mode.
6. If ILC2ST 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.
7. Connect the ILC2ST to the PC using a crossover Ethernet cable.
8. When Windows has acknowledged the Ethernet connection, you may start the update progress by double clicking on upgrade.bat. ILC2ST should download the new firmware and reboot.
9. Disconnect the cross-over cable and return your PC and ILC2ST to their original network configurations.

ILC2ST Remote Dashboard

The DaySequerra ILC2ST Remote Dashboard software runs on a Windows computer on your network and will allow remote monitoring and logging of audio loudness data as it is measured by ILC2ST. The Remote Dashboard software's main objective is to log your program audio loudness and have those measurements available for compliance verification.

Logs are saved in Tab delimited format and can be imported into any database application that supports the importation of external data. The most common and easiest way to view Log files is by importing the data into Microsoft Excel or Microsoft Access.

Please contact your dealer for the remote dashboard user's guide.

Maintaining an Accurate PC 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 _LOCAL_MACHINETime Client.
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 DaySequerra technical support:

1. Is the ILC2ST 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 ILC2ST running the latest firmware? Older ILC2ST firmware versions (< 4.01.01) are not 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 – One Year Limited Warranty

DaySequerra warrants this product to be free from defects in materials and workmanship to its original owner for one (1) year 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 subject to conditions contained herein.

DaySequerra products are sold worldwide, through a network of authorized DaySequerra dealers and distributors. This Warranty is for the sole benefit of the original purchaser of a DaySequerra product, purchased directly from an authorized DaySequerra dealer or distributor, is restricted to such original purchaser, and shall not be transferred to a subsequent purchaser of the product. Proof of purchase in the form of a bill of sale or receipted invoice substantiating that the product was purchased directly from an authorized DaySequerra dealer or distributor and is within the warranty period must be presented to obtain warranty service. Removal or alteration of the original DaySequerra serial number from a product automatically renders that product warranty null and void.

A Return Authorization Number must be obtained from DaySequerra in advance of return. 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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