

# JSD-100 Manual

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## Cinema Processor



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**Additional JSD-100 Manuals may be viewed / downloaded at:**  
[www.uslinc.com](http://www.uslinc.com)

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### **One-Year Limited Warranty**

USL, Inc. warrants that each product manufactured by it will be free from defects in material and workmanship under normal usage for a period of one (1) year after its purchase new from an authorized dealer. Our obligation under this warranty is limited to repairing or replacing any product or component which we are satisfied does not conform to the foregoing warranty and which is returned to our factory, freight paid, or serviced by one of our authorized contractors. The foregoing warranty is exclusive and in lieu of all other warranties, whether expressed or implied. Such warranty shall not apply to any product or component (A) repaired or altered by anyone other than USL, Inc. or an authorized service contractor; (B) tampered with or altered in any way or subjected to misuse, negligence or accident or (C) which has been improperly connected installed or adjusted other than in accordance with USL, Inc.'s instruction.

## 1. Safety Notice

### Safety Notices

Review the following safety precautions to avoid injury and prevent damage to this product. To avoid potential risk, use this product only as specified and only for the purpose described in the instruction manual.

#### To Avoid Fire and Personal Injury:

- **Use correct power cable.** Use only the power cable provided. Ensure that the AC power outlet is located near the product and is easily accessible.
- **Use a correctly grounded power source.** The power supply earth ground is established through the ground conductor in the power cable. To avoid the potential of electric shock, the ground conductor must be correct.
- **Observe source ratings.** To avoid risk of fire or electric shock, the power source must be 100 – 240 VAC, 50 – 60 Hz.
- **Do not operate with suspected failures.** If you suspect there is damage or malfunction with this product, call the factory.
- **Do not attempt repair.** Only a trained factory service person is authorized to repair this product.
- **Do not operate this product near heat sources.** This product should not be located near heat sources such as radiators, heat registers, or stoves.
- **Provide proper ventilation.** The operating temperature range is between 0° C and 40° C. The humidity range is between 20% and 80%, non-condensing. The cooling method is convection.
- **Keep product surfaces clean and dry.** Disconnect the power cable from the power source before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
- **Do not push objects into openings of this product.** Never insert objects into the product through openings.
- **Do not operate in wet or damp conditions.**
- **Do not operate in an explosive atmosphere.**
- **Inspect the power cable and all cables prior to use.** Confirm that the power cable and other interconnecting cables are free from damage.

## 2. Regulatory Compliance

### EN 60950-1

The EN 60950-1 standard specifies the safety design requirements that reduce or eliminate the risk of personal injury to both the product user and service personnel. This product is designed and tested to meet the standards of the International Electrotechnical Commission (IEC) European Norm EN 60950-1, IEC 60950-1 (the standard for information technology equipment including electrical business equipment).

### Le Résumé de la Sécurité general Européen

Examinez les précautions de la sécurité suivantes éviter la blessure et prévenir le dégât à ce produit. Éviter le risque potentiel, utilisez ce produit seulement comme a spécifié et seulement car le but a décrit dans le manuel d'instructions.

#### Éviter Feu et Blessure Personnelle

- Utilisez le Câble du Pouvoir Correct. Utilisez seulement le câble du pouvoir fourni. Assurez que les AC font fonctionner le débouché est localisé près le produit et est accessible facilement.
- Utilisez une Source du Pouvoir Correctement Fondée.
- La terre du monde de la Provision du Pouvoir est établie à travers le conducteur moulu dans le câble du pouvoir. Éviter le potentiel de choc électrique, le conducteur moulu doit être correct.
- Observez des Estimations de la Source. Pour éviter risque de feu ou choc électrique, la source du pouvoir doit être 220-240 VAC 50 Hz.
- N'opérez pas ce Produit avec Toutes Clôtures Ouvertes ou Enlevez.
- Évitez l'Ensemble de circuits Exposé. N'entreprenez pas ouvrir la Provision du Pouvoir parce que sa certification de la sécurité serait invalidée. La Provision du Pouvoir est un appareil scellé non-réparable.

- N'opérez pas avec les Échecs Suspects. Si vous suspectez il y a le dégât ou mal fonctionner avec ce produit, appelez l'usine.
- N'entreprenez pas Réparation. Seulement une personne du service de l'usine compétente est autorisée pour réparer ce produit.
- N'opérez pas ce Produit Sources de la ChaleurProches. Ce produit ne devrait pas être localisé desources de la chaleur proches tel que radiateurs, registres de la chaleur, poêles, ou amplificateurs.
- Fournissez Ventilation Adéquate. La température dufonctionnement devrait être entre 0° C et 40° C.
- L'humidité devrait être 20% et 80%. La méthoderedroidissante est par convection et un ventilateur interne.
- Gardez les Surfaces du Produit Nettoient et Sec.
- Déconnectez le câble du pouvoir de la source du pouvoir avant de nettoyer. N'utilisez pas de nettoyeurs liquides ou de nettoyeurs de l'aérosol Utilisez un tissu humide pour nettoyer.
- Ne poussez pas d'Objets Dans Ouvrir de ce Produit.
- Jamais objets de l'encart dans le produit à travers ouvertures.
- N'opérez pas Dans les Conditions Mouillées ou humides.
- N'opérez pas Dans une Atmosphère Explosive.
- Prévenez le Répandre des Liquides sur les Composants du Système.
- Inspectez le câble du pouvoir et tous les câbles antérieur à usage. Confirmez que le câble du pouvoir et autres interconnectant câbles sont libres de dégât.

#### **Le Niveau de la sécurité**

L'EN 60065 niveau spécifie exigences du dessin de la sécurité qui réduisent ou éliminent le risque de blessure personnelle à l'utilisateur du produit et personnel du service. Ce produit est conçu et est testé pour satisfaire aux niveaux de l'Electrotechnical Commission Interna-tional (IEC) Norm Européen (EN) 60065 (Le Niveau pour Matériel de la Technologie de l'Information qui Inclut le Matériel de l'Affaire Électrique).

#### **Allgemeine Sicherheit-Zusammenfassung Europäisch**

Überprüfen Sie die folgend Sicherheit-Vorkehrungen, Verletzung zu vermeiden und Schaden zu diesem Produkt zu verhindern. Um potentielles Risiko zu vermeiden, benutzen Sie dieses Produkt nur als vorgeschrieben hat und nur denn der Zweck beschrieb in der Bedienungsanleitung.

#### **Um Feuer und Persönliche Verletzung zu vermeiden:**

- Benutzen Sie Korrektes Macht-Kabel. Benutzen Sie nur das Macht-Kabel, das bereitgestellt wurde. Stellen Sie sicher, daß der WECHSELSTROM-Macht-Abfluß in der Nähe vom Produkt gefunden wird und leicht zugänglich ist.
- Benutzen Sie eine Korrekt geerdet Macht-Quelle. Der Macht Versorgung Erde Boden wird durch den Boden-Schaffner im Macht-Kabel gegründet. Das Po-tential elektrischen Schocks zu vermeiden muß der Boden-Schaffner korrekt sein.
- Beobachten Sie Quelle-Klassen. Risiko von Feuer oder elektrischem Schock zu vermeiden muß de Macht-Quelle 100 sein-240 VAC 50-60 Hz.
- Operieren Sie dieses Produkt mit Irgendwelchen Gehegen nicht, die geöffnet wurden, oder entfernen Sie.
- Vermeiden Sie Ungeschützten Schaltkreise. Versuchen Sie, die Macht-Versorgung zu öffnen nicht, weil seine Sicherheit-Zulassung ungültig gemacht werden würde. Die Macht-Versorgung ist ein nicht-reparierbares luftdicht verschlossene Gerät.
- Operieren Sie mit verdächtigt Mißerfolgen nicht. Wenn Sie verdächtigen, gibt es Schaden oder Funktionsstörung mit diesem Produkt, rufen Sie die Fabrik.
- Versuchen Sie keine Reparatur. Nur eine erzogen Fabrik-Dienst-Person wird ermächtigt, dieses Produkt zu reparieren.
- Operieren Sie dieses Produkt Nahe Hitze-Quellen nicht. Dieses Produkt sollte keine nahe Hitze-Quellen wie Heizkörper, Hitze-Register, Herde, oder Verstärker gefunden werden.

- Stellen Sie Richtige Belüftung bereit. Die operierend Temperatur sollte zwischen 0° C und 40° C. Die Luftfeuchtigkeit sollte sein 20% und 80%. Die erfrischend Methode ist durch Konvektion und einen innereren Fächer.
- Bleiben Sie, Produkt-Oberflächen reinigen und Trocken. Trennen Sie das Macht-Kabel von der Macht-Quelle vor dem Reinigen. Benutzen Sie keine flüssige Reiniger oder Aerosol-Reiniger. Benutzen Sie einen klammen Stoff für das Reinigen.
- Schieben Sie keine Gegenstände Ins Öffnen von diesem Produkt. Nie Beifügung-Gegenstände ins Produkt durch Öffnungen.
- Operieren Sie In Nassen oder Klammen Zuständen nicht.
- Operieren Sie In einer Explosiven Atmosphäre nicht.
- Verhindern Sie das Verschütten von Flüssigkeiten auf die System-Bestandteile.
- Inspizieren Sie das Macht-Kabel und alle Kabel vorausgehend zu Verwendung. Bestätigen Sie, daß das Macht-Kabel und andere verbindend Kabel frei von Schaden sind.

### **Sicherheit-Standard**

Der EN 60065 Standard schreibt Sicherheit-Entwurf-Anforderungenvor, der reduzieren oder das Risiko persönlicher Verletzung zu sowohl dem Produkt-Benutzer als auch Dienst-Personal ausschließen. Dieses Produkt wird entworfen und wird geprüft, um den Standards vom Internationalen Electrotechnical Commission zu entsprechen (IEC) europäischer Norm (EN) 60065 (Der Standard für Informationen-Technologie-Ausrüstung, die Elektrische Unternehmen-Ausrüstung einschließt).

### **2.1 Declaration of Conformity**

The JSD-100 meets the intent of Directive 89/336/EEC for Electromagnetic Compatibility and Low Voltage Directive 73/23/EEC for Product Safety. Compliance was demonstrated to the following specifications as listed in the Official Journal of the European Communities:

#### **EN 55022: 2006 Conducted and Radiated Emissions**

- Conducted Emissions
- Radiated Emissions, Class A Limits

#### **EN 55024: 1998 + A1: 2001 & A2: 2003 Immunity**

- Electrostatic Discharge Immunity
- RF Electromagnetic Field Immunity
- Power Line Surge Immunity
- Conducted RF immunity
- Power Frequency Magnetic Field Susceptibility
- Voltage Dips, Short Interruptions and Variations
- EN 61000-3-3: 1995 +A1: 2001 & A2: 2005 Voltage Fluctuation and Flicker

#### **FCC Part 15, Subpart B**

This equipment has been tested and found to comply with the limits for a 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 manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at user's own expense.

#### **Certifications**

- Low Voltage Directive 73/23/EEC.
- EN 60950 Information Technology, Video, and similar Electronic Apparatus.
- IEC 60950 Safety Requirements.
- CE, UL, cUL Safety and Overall Compliance.

- VDE Certified Power Cords.
- Pollution: Not intended for environments where conductive pollutants may be present.

## 2.2 Equipment Class

Type A: Equipment that is intended for connection to the building power supply wiring via nonindustrial plugs and sockets or via appliance couplers, or both.

## 2.3 Disposal and Recycling

### Wheelie-Bin Symbol



The Wheelie-Bin symbol is attached to this product in compliance with the EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE). Its purpose is to deter the improper disposal of this product and to promote reuse and recycling.

### Proper Disposal

In conformance with the Directive, at end of life this product should be either sent to an appropriate recycling facility for disassembly and recycling or returned to the supplier. Under no circumstances should this product be deposited in a landfill for disposal.

### Hazards of Noncompliance

Electrical and electronic products may contain chemicals which can leach into the groundwater and cause health concerns through contaminated drinking water. Failure to dispose of this product in compliance with the WEEE Directive may result in penalties as determined by local ordinance.

Please contact your dealer or USL, Inc., with questions regarding the proper disposal of this or any other USL product. USL, Inc. contact information: USL, Inc., 181 Bonetti Drive, San Luis Obispo, CA 93401-7397, USA. Phone: +1 805 549 0161 Fax: +1 805 549 0163 [www.uslinc.com](http://www.uslinc.com)

## 3. System Version

The JSD-100 is continuously being improved. New features are added through software/firmware updates and replacement of plug-in modules. This manual describes the JSD-100 versions available at this writing. Upcoming features that are mentioned here but not yet implemented include internal crossovers and 32 channel AES output module. Contact USL for the availability of these features.

Firmware/software versions for the systems described in this manual are listed in the table below:

Component	Version
Graphical User Interface (GUI)	2.1.7.16374
Main PIC	110630
DSP 1	1110525
DSP 2	2110525

## 4. System Overview

### 4.1 System Description

The JSD-100 cinema sound processor is specially designed for digital cinema applications. Low noise and low distortion 96 kHz processing ensures superb presentations. In addition to the eight standard formats, the JSD-100 offers two fully configurable formats. The two user-configurable buttons can be configured to support a variety of existing and future formats. They may also be used to duplicate an existing format but at a different fader level to simplify desired volume changes between content types. The front panel display shows the current fader level, the format name (which is user configurable), and the measured audio level on each channel of the main audio output. The built-in bypass audio circuitry insures that the presentation goes on in the unlikely event of a system failure.

The JSD-100 is “automation friendly.” It features the standard DB25 parallel automation interface, an RS-232 (EIA232) interface, and Ethernet. The Ethernet interface accepts 5 simultaneous TCP connections to allow control by a digital cinema server and other equipment while simultaneously being monitored over another TCP connection.

The Graphical User Interface runs on Windows XP® and Windows 7® operating systems. It allows for complete system configuration, monitoring, and firmware updates over USB, Ethernet, or RS-232. System monitoring, control, and firmware update functions are also available on a standard web browser.

The JSD-100 is also “diagnostic friendly.” The system logs the last 32,000 events (format changes, level changes, internal temperature, loss of AES audio, etc.) to internal flash memory. Log data can be reviewed on the GUI or the web interface. Current operational status, including selected format, fader level, and measured audio output levels, is available on the GUI and on the web interface. The current status of the system is also available over SNMP (Simple Network Management Protocol).

A plug-in module expands the standard 8 channel digital input (4 AES pairs) to a 16 channel digital input (8 AES pairs). Another plug-in module decodes Dolby® Digital<sup>1</sup> and alternate content inputs.

The HI and VI-N outputs are configurable on a per-format basis. Rear panel output modules are available to output eight or sixteen analog signals (servo balanced outputs that can drive balanced or unbalanced loads), or 32 AES channels (16 AES pairs). The model number (described below) determines which output module is installed.

#### 4.2 Model Numbers

The output module is field replaceable to allow a variety of output configurations. Available output configurations include 8 analog outputs, 16 analog outputs, or 32 channels of AES/EBU audio. When more than 8 outputs are available, the outputs can be used for additional auditorium channels (such as 13.1), or as outputs for the internal crossovers.

The various JSD-100 options are identified by model number suffixes as shown in the tables below. The first letter identifies input options, such as the number of AES inputs or decode options. The second letter indicates the number and type of outputs, such as whether they are analog or AES. Note that all units also have analog HI/VI-N outputs in addition to the outputs listed in the tables below.

First Suffix Letter	Description	USL Module Part Number
L	8 channel AES input, no Dolby Digital® decode	N/A
D	8 channel AES input, Dolby Digital® decode on alternate content	DI-84
M	16 channel AES input, Dolby Digital® decode on alternate content	DI-80 & DI-84

Second Suffix Letter	Description	USL Module Part Number
None	8 channel analog output	JSDR-100
A	16 channel analog output	JSDR-123
D	32 channel AES output	JSDR-110

A JSD-100MA has 16 AES input channels, Dolby Digital® and decoding for alternate content and 16 analog outputs.

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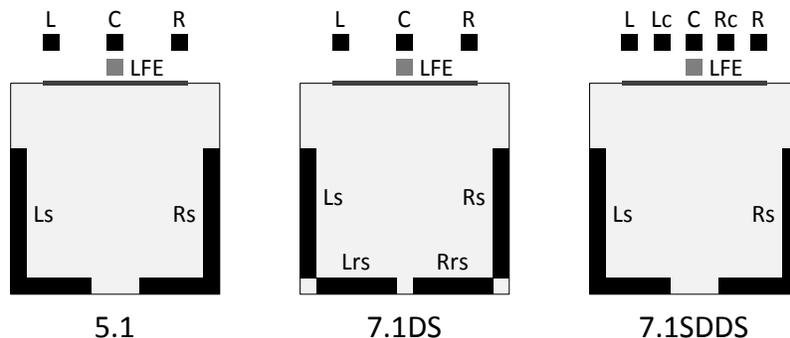
<sup>1</sup> Manufactured under license from Dolby Laboratories. Dolby and the double-D symbol are trademarks of Dolby Laboratories.

In the transition to digital cinema, the industry is adopting new names and abbreviations for speaker locations. Generally, the first letter is capitalized and either L for left, C for center or R for right. The second and third letters, if present, are lower case and further define the position.

New Name (abbreviation)	Description	Previous Name (abbreviation)
Left (L)	Typically positioned behind the screen to the far left edge, horizontally, of the screen center as viewed from the seating area.	Left (L)
Right (R)	Typically positioned behind the screen to the far right edge, horizontally, of the screen center as viewed from the seating area.	Right (R)
Center (C)	This loudspeaker position is typically behind the screen corresponding to the horizontal center of the screen as viewed from the seating area. Also the intended speaker position for mono reproduction	Center (C)
Low Frequency Effects (LFE)	Screen low frequency effects subwoofer loudspeaker(s). This is typically one or more band-limited low frequency only loudspeakers at the screen end of the room.	Subwoofer (SW)
Left surround (Ls)	Typically an array of loudspeakers positioned along the left side of the room starting approximately 1/3 of the distance from the screen to the back wall and the left side of the rear wall. Left surround may not extend to the back wall of the auditorium in some soundfield configurations, particularly when Left rear surround is present.	Left Surround (LS)
Right surround (Rs)	Typically an array of loudspeakers positioned along the right side of the room starting approximately 1/3 of the distance from the screen to the back wall and the right side of the rear wall. Right surround may not extend to the back of the auditorium in some soundfield configurations, particularly when Right rear surround is present.	Right Surround (RS)
Left rear surround (Lrs)	One or more loudspeakers typically on the back wall of the room to the left horizontally.	Back Surround Left (BSL)
Right rear surround (Rrs)	One or more loudspeakers typically on the back wall of the room to the right horizontally.	Back Surround Right (BSR)
Left center (Lc)	Mid left to center screen loudspeaker. This loudspeaker position is typically between the center of the screen and the left edge of the screen, usually closer to the left.	Left Center (LC)
Right center (Rc)	Mid right to center screen loudspeaker. This loudspeaker position is typically between the center of the screen and the right edge of the screen, usually closer to the right.	Right Center (RC)

#### 4.4 Soundfield Configurations

The standard soundfield configurations (or speaker configurations) as defined by SMPTE are shown in the diagram below. Note there are two defined 7.1 configurations. One (7.1DS) has rear surround speakers, while the other (7.1SDDS) extends the side surround speakers to the rear wall and adds left center and right center speakers.



#### 4.5 Processing Channels

The JSD-100 has 14 “processing channels.” Each of these receives audio from a variety of sources. The “processing channel” includes the main fader control, equalization, synchronization or input delay, surround delay (on the surround channels), and, as an option, crossovers on the screen channels. Outputs on the rear panel are identified by the channel usage (i.e., L for left). The table below describes the processing channels, their inputs, and how their outputs are identified on the rear panel. Two channel inputs (COAX1, COAX2, TOSLINK, NON/SYNC, and AUX) are identified as “stereo” inputs. If the USL DI-84 card is installed (first suffix of the model number is D or M), stereo inputs can be decoded to several other channels. Without the DI-84 card, stereo inputs can drive left and right directly or left, center, and right with the center being derived from left and right. These are identified as “decoded stereo” in the table below. The rear surround channels may be driven by several AES sources plus a rear surround derived from the side surround signals. When derived from side surrounds, the input is identified as “decoded 5.1.”

Inputs	Processing Channel	Output Panel Identifier
AES 1, Analog 1, Stereo, Mic	Left	L
AES 2, Analog 2, Stereo, Mic	Right	R
AES 3, Analog 3, Decoded Stereo, Mic	Center	C
AES 4, Analog 4, Stereo, Mic	Low Frequency Effects	LFE
AES 7	Left center	Lc
AES 8	Right center	Rc
AES 5, Analog 5, Decoded Stereo, Mic	Left surround	Ls
AES 6, Analog 6, Decoded Stereo, Mic	Right surround	Rs
Ls, AES 7, AES 11, Decoded 5.1	Left rear surround	Lrs
Rs, AES 8, AES 12, Decoded 5.1	Right rear surround	Rrs
AES 9	Unassigned	CH9
AES 10	Unassigned	CH10
AES 13	Unassigned	CH13
AES 14	Unassigned	CH14

#### 5. Specifications

##### Features

A processor specially designed for Digital Cinema applications. Low noise and low distortion processing ensures superb presentations. In addition to eight standard formats, the JSD-100 offers two fully configurable optional formats to address such details as audio level changes and 3 or 5 stage channels. Built-in bypass audio circuitry ensures that the presentation goes on.

##### Audio Inputs

- PA Microphone – XLR 0.7mV sensitivity.
- Calibration Microphone – 3.5mm stereo jack 0.7mV sensitivity with 10V power.
- Non-Sync analog input – RCA 75mV to 4.775V.
- Auxiliary analog input – RCA 300mV.
- Eight Channel analog input – DB25 300mV.
- COAX1 – RCA PCM and optional Dolby Digital® decoding.
- COAX2 – RCA PCM and optional Dolby Digital® decoding.
- TOSLINK – Optical PCM and optional Dolby Digital® decoding.
- AES-EBU 8 Channel 48-96KHz sample rates (16 channel with DI-80 optional card).

##### Analog Audio Outputs – Accessibility

- Hearing Impaired – User selectable input channel or LCR mix. 300mV mono balanced.
- Visual Narration – User selectable input channel (8 or 16). 300 mV mono balanced.

### **Eight Channel Analog Audio Output (JSD-100x)**

- Eight Channels Balanced 300mV adjustable (L, C, R, Ls, Rs, LFE, Lc/Lrs, Rc/Rrs).

### **Sixteen Channel Analog Audio Output (JSD-100xA)**

- Sixteen Channels Balanced 300mV adjustable. Configurable as 13.1 broadband, biamp three or five screen channels, triamp three screen channels.

### **Communication Ports**

- DB25 pulse automation.
- Serial control – RS-232.
- USB for laptop setup.
- Ethernet 10/100 - RJ45.

### **Front Panel Interface**

- Eleven buttons: COAX1, COAX2, TOSLINK, DIGITAL 16 CH, USER 1, USER 2, ANALOG 8 CH, NON/SYNC, AUX, MIC, and MUTE.
- Main Fader – 0-10 used for main audio and bypass audio.
- Front panel displays fader level and selected format. Bar graphs display output levels.
- USB connector.
- Power switch and power supply status LEDs. Turning power off activates bypass mode.

### **Format Selection**

- Digital (COAX1, COAX2, TOSLINK, 8 to 16 Channel AES-EBU).
- Analog (8 channel, Non-Sync, Auxiliary, Microphone).
- User 1, User 2 (Configurable in software, e.g., digital 16 channel at lower level, 7.1, 13.1, etc.).

### **Rear Panel Connectors – Main Chassis**

- PA Microphone – XLR / ¼" phone jack.
- Calibration Microphone – 3.5mm stereo jack.
- Eight Channel Analog – DB25.
- Non/Sync – two RCA jacks.
- AUX – two RCA jacks.
- Hearing Impaired and Visual Narration – pluggable Phoenix connector.
- COAX1 and COAX2 – RCA Jacks with transformer input
- TOSLINK – Optical.
- 16 Channel Digital AES-EBU – DB25 and Dual RJ45.
- Removable Memory Card – SD compatible.
- Serial Control – RS-232.
- Pulse Automation – DB25.
- 10/100M Ethernet – RJ45.
- DC 12V Power Connector – 5mm with 2.5mm pin.
- AC Power – IEC socket. 100-240VAC, 50/60Hz, 18W typical, 7.5W sleep.

### **Rear Panel Interface Module**

- All rear panel interface modules include an RJ25 connector for "USL-Link." This IEEE 485 bus is used for remote volume controls and other control functions.
- JSD-100x (no second suffix letter) – Eight channel analog, one DB25 and one Phoenix connector (20 pins).
- JSD-100xA – 16 channel analog output module – Two DB25 and two Phoenix connectors. Main DB25 and Option DB25. Outputs configurable as crossover outputs or additional channels.
- JSD-100xD – AES/EBU digital output module - 16 to 32 output channels.

## Processing

- 96 kHz processing.
- One-third octave equalization on all channels except LFE, HI, and VI-N.
- Parametric equalizers on LFE.
- Synchronization delays for all inputs.
- Surround delays for all surround channels.

## Sleep Mode

With an Ethernet command or preset timeout, the unit can go into a sleep mode. Another Ethernet command, “button press,” or automation pulse will wake up the unit.

## Bypass Mode

In an emergency situation, the JSD-100 can be switched off, automatically enabling the bypass circuitry. Front panel buttons, LEDs and fader will still function, allowing the operation of the unit in various analog and digital formats. Final output is a monophonic signal feed to the left and right channels. Note: The 12 VDC bypass supply must be connected for this functionality.

**Dynamic Range:** Typically 105dB.

**Power Requirements:** 100-240VAC, 50/60Hz, 30 watts.

**Dimensions:** Standard 2U rack-mount chassis.

**Agency Approvals:** UL, cUL, CE and FCC.

## 6. Installation

### 6.1 Initial Power Up

A quick power-up test of the JSD-100 is suggested before mounting it in the equipment rack and wiring it up. This test can quickly detect shipping or other damage.

- Turn the AC power switch to the off position.
- Using the supplied AC line cord or one appropriate for the installation location (the power supply is a universal input supply 100-240 VAC, 50/60 Hz), connect the JSD-100 to the AC line.
- Connect the supplied 12 VDC bypass power supply to the bypass power input on the rear panel of the JSD-100 and plug it in to the AC line. The front panel “Bypass Mode” LED should flash, the bypass power LED should light, and one of the format buttons should light.
- Press each of the format buttons and the mute button, one after another. The appropriate button should light.
- Turn on the AC power switch. The display should immediately light, but be blank. All the green power LEDs on the bottom right of the front panel should light. The “Bypass Mode” LED should stop flashing.
- After approximately 25 seconds, the format buttons will flash and then a single format LED will light. The display should show the fader level and the selected format.
- Press each of the format buttons, verifying that the corresponding LED lights and that the display changes accordingly. Note that the format button LEDs for digital formats will flash when no digital input is provided.
- Press the mute button verifying that its LED toggles each time the button is pressed.
- Rotate the fader in each direction verifying that the fader numbers on the display change.

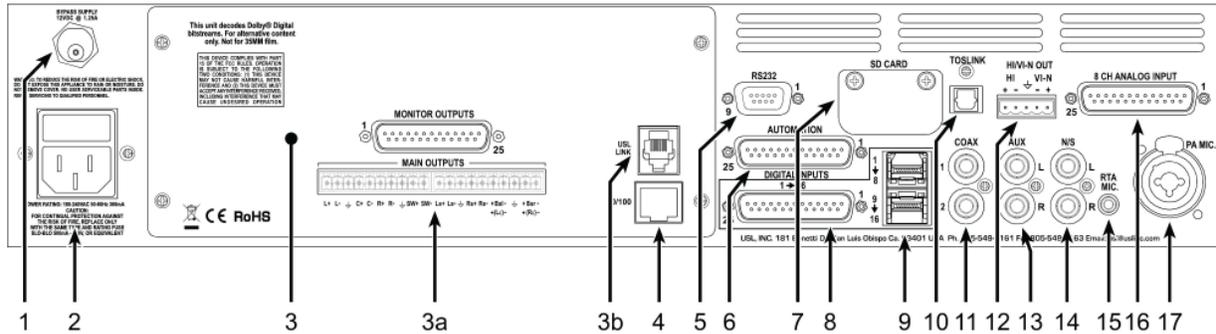
### 6.2 System Hardware Mounting, Grounding and Ventilation

The JSD-100 is designed to mount in a standard 19 inch (482.6mm) rack and is two rack units high (3.5 inches, 137.8mm). The JSD-100 should be mounted at “eye level” in the equipment rack for optimum display contrast and visibility. We recommend vented panels (USL part number VP-1) above and below the JSD-100 whenever space permits. Mounting the unit immediately above a major heat-producing component, such as a power amplifier, is not recommended. Equipment mounted immediately above the JSD-100 should not be more than 9 inches (225mm) deep to insure adequate airflow through the rear ventilation slots on the JSD-100. The JSD-100 includes

a three-prong grounding plug and a three-wire power cord to accommodate a safe ground path from the chassis to the electrical system ground. Defeating this ground by removing the ground prong is not recommended.

### 6.3 Eight Channel Analog Output Rear Panel Connections

A set of clip-on ferrite “beads” is supplied with the JSD-100. To insure the JSD-100 continues to meet FCC and CE radio emissions requirements, one of these beads should be clipped around each cable connected to the rear panel of the JSD-100 except for the TOSLINK, AC Power, and Bypass Power connection.



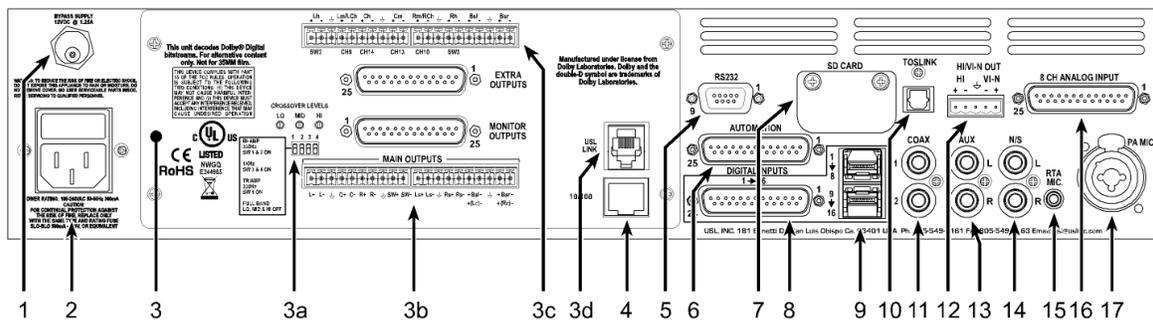
1. Bypass Power Supply – 12VDC at 1.25A.
2. Power entry Module – Accepts IEC-type line cord from 100-240VAC power source. Also contains a 500mA Slo-Blo 5x20mm fuse.
3. Eight Channel Analog Output Module – Other modules include 16 channel analog and 32 channel AES.
  - a. 8 Channel Analog Module provides six fixed outputs (L, C, R, LFE, Ls, Rs) and two that can be set up as either Lc/Rc or Lrs/Rrs. Balanced line Phoenix and DB25 connectors are provided. The Phoenix connector normally drives auditorium amplifiers and the DB25 connector normally drives a booth monitor.
  - b. USL Link - An RJ25 connector that provides an RS-485 interface for remote volume control and other functions.
4. Ethernet – Network communications with GUI, web browsers, automation, etc.
5. RS-232 Connector for communications with GUI or automation.
6. Automation Connector – A bidirectional port for receiving and sending automation pulses between the JSD-100 and other system components. 12 Control lines, 11 Status lines and +5V are provided. Standard pulse to ground system.
7. SD Card - stores the settings of the unit. Can also be used to transfer settings to another unit.
8. AES connector (DB25) – Channels 1-8 are standard. Channels 9-16 require the optional DI-80 module.
9. AES connectors (Dual RJ45s) – parallel connections to the DB25 above.
10. TOSLINK Port – Optical Fiber input for SPDIF (PCM) or optional Dolby Digital<sup>® 2</sup> decoding.
11. COAX 1, COAX 2 - RCA type connectors for SPDIF (PCM) or optional Dolby Digital<sup>®</sup> decoding.
12. Hearing Impaired/Visual Narration Outputs.
13. AUX connectors – L and R analog inputs, 300mV sensitivity.
14. Non Sync (N/S) connectors – L and R analog inputs.
15. RTA microphone – 3.5mm stereo jack with +10V on the ring, designed for use with a powered electret microphone.

<sup>2</sup> Manufactured under license from Dolby Laboratories. Dolby and the double-D symbol are trademarks of Dolby Laboratories.

16. 8 Channel Analog Input – Balanced line inputs. Six channels are fixed (L, C, R, LFE, Ls, Rs) and two can be set up as either Lc/Rc or Lrs/Rrs.
17. Public Address Microphone – Dual connector with XLR and ¼” phone jack in the center.

#### 6.4 Sixteen Channel Analog Output Connections (JSD-100xA)

A set of clip-on ferrite “beads” is supplied with the JSD-100. To insure the JSD-100 continues to meet FCC and CE radio emissions requirements, one of these beads should be clipped around each cable connected to the rear panel of the JSD-100 except for the TOSLINK, AC Power, and Bypass Power connection.



1. Bypass Power Supply – 12VDC at 1.25A.
2. Power entry Module – Accepts IEC-type line cord from 100-240VAC power source. Also contains a 500mA Slo-Blo 5x20mm fuse.
3. Sixteen Channel Analog Output Module – Other modules include 8 channel analog and 32 channel AES.
  - a. Bypass crossover adjustments.
  - b. Main outputs cover the first 8 output channels. The Phoenix connector normally drives the power amplifiers, and the D connector drives the booth monitor.
  - c. Extra outputs cover the second 8 output channels.
  - d. USL Link - An RJ25 connector that provides an RS-485 interface for remote volume control and other functions.
4. Ethernet – Network communications with GUI, web browsers, automation, etc.
5. RS-232 Connector for communications with GUI or automation.
6. Automation Connector – A bidirectional port for receiving and sending automation pulses between the JSD-100 and other system components. 12 Control lines, 11 Status lines and +5V are provided. Standard pulse to ground system.
7. SD Card - stores the settings of the unit. Can also be used to transfer settings to another unit.
8. AES connector (DB25) – Channels 1-8 are standard. Channels 9-16 require the optional DI-80 module.
9. AES connectors (Dual RJ45s) – parallel connections to the DB25 above.
10. TOSLINK Port – Optical Fiber input for SPDIF (PCM) or optional Dolby Digital<sup>3</sup> decoding.
11. COAX 1, COAX 2 - RCA type connectors for SPDIF (PCM) or optional Dolby Digital<sup>3</sup> decoding.
12. Hearing Impaired/Visual Narration Outputs.
13. AUX connectors – L and R analog inputs, 300mV sensitivity.
14. Non Sync (N/S) connectors – L and R analog inputs.
15. RTA microphone – 3.5mm stereo jack with +10V on the ring, designed for use with a powered electret microphone.

<sup>3</sup> Manufactured under license from Dolby Laboratories. Dolby and the double-D symbol are trademarks of Dolby Laboratories.

16. 8 Channel Analog Input – Balanced line inputs. Six channels are fixed (L, C, R, LFE, Ls, Rs) and two can be set up as either Lc/Rc or Lrs/Rrs.
17. Public Address Microphone – Dual connector with XLR and ¼" phone jack in the center.

## 6.5 Audio Input Connections

### 8/16 Channel AES Input

The JSD-100 accepts 16 channel AES audio if the optional DI-80 card is installed. Otherwise, the JSD-100 accepts 8 channel AES audio. This input is typically driven by the digital cinema server (DCS). The JSD-100 includes a DB25F connector using an industry standard<sup>4</sup> pin out and a pair of RJ-45 connectors using the StudioHub<sup>5</sup> pin out. The first six channels are assigned speakers by industry convention. The remaining channels can be configured by the user (i.e., sources for HI/VI-N, Lrs, Rrs, etc.). For convenience, all connector pin outs are listed in Appendix A.

### Eight Channel Analog Input

The JSD-100 eight channel analog input is on a DB25F connector. The analog inputs are active balanced (differential) inputs. They may be driven by balanced or unbalanced sources. When driven by an unbalanced source, the negative input should be connected to the low side of the source at the source equipment to minimize ground loop noise. The cable should be twisted pair with individual shields, even when driven by an unbalanced source. A USL supplied ferrite block should be clipped around the cable to insure FCC and CE EMI requirements are met. The DB25F connector uses the THX<sup>®</sup> pin out as specified in the table in Appendix A.

### Two Channel Analog Inputs

The JSD-100 has two stereo (two channel) analog inputs (AUX and NS) on RCA connectors. Connect these to appropriate sources using RCA cables. Various stereo decode methods are available in the system configuration. These allow direct driving of the left and right speakers, adding a synthesized center channel, and adding surround channels.

### Two Channel Digital Inputs

The JSD-100 has two S/PDIF inputs and one TOSLINK input.

- **S/PDIF Inputs.** Two stereo digital inputs on RCA connectors. These are marked COAX1 and COAX2 on the JSD-100 rear panel. These are standard S/PDIF (Sony Philips Digital Interface) inputs. Connect these to appropriate sources with 75 ohm coaxial cable with RCA connectors on each end. As with the other stereo inputs, various decode methods are available. The USL supplied ferrite block should be clipped on to the cables adjacent to the connectors to comply with FCC and CE emission requirements.
- **TOSLINK Input.** A TOSLINK optical digital stereo input is included on the JSD-100. Connect this input to an appropriate source with a standard TOSLINK cable. As with other stereo inputs, various decode methods are available.

### Single Channel Audio Inputs

The JSD-100 has a PA microphone input and an RTA microphone input. The USL supplied ferrite block should be clipped on to the cables adjacent to the connectors to comply with FCC and CE emission requirements.

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<sup>4</sup> The JSD-100 DB25 AES input uses a de-facto industry standard pin out. The pin out was the subject of a draft SMPTE Engineering Guideline in 2004. Though SMPTE never adopted the guideline, much of the industry adopted the pin out specified in this draft.

<sup>5</sup> Please see the Studio Hub website: [www.StudioHub.com](http://www.StudioHub.com)

- **PA Microphone Input.** Plug a PA microphone in to the combination XLR / ¼" phone jack. The microphone input may be configured to drive the main or the surround speakers. In addition, the PA microphone input can drive the RTA for room equalization.
- **RTA Microphone Input.** The RTA microphone input can drive the real time analyzer for room equalization. The jack is a 3.5mm stereo jack with the high side of the microphone connected to tip and the low side to sleeve. The connector ring is driven with +10V through 2.2k to power a preamp in the microphone.

## 6.6 Analog Audio Output Connections

Depending on which analog output module is installed, the JSD-100 provides eight or sixteen main channel outputs plus HI and VI-N outputs. All outputs are balanced and may drive balanced or unbalanced loads. When driving unbalanced loads, run two conductor shielded cable and connect the " – " terminal of the JSD-100 output to the low side of the unbalanced load at the load instead of at the JSD-100 to minimize ground loop noise.

### Main Audio Outputs

The main audio outputs are on a module that can be replaced from the rear. A variety of output modules are available, including 8 channel analog, 16 channel analog, and 32 channel AES. Note that the 16 channel analog output module supports crossovers. To allow for proper bypass operation, a passive crossover is included. For full band operation (crossovers not currently implemented), set all four DIP switches to OFF and set the MID and HIGH trim pots to full counter-clockwise. Adjust the LOW trim pot for the desired full range bypass audio level. Remember that the front panel fader also affects output level when in bypass. The connections for these output modules are detailed in Appendix A.

### HI/VI-N Outputs

The JSD-100 has balanced HI and VI-N outputs that can drive balanced or unbalanced loads. As with other outputs, the use of twisted pair shielded cable is suggested whether the load is balanced or unbalanced. When driving an unbalanced load, connect the " – " output of the JSD-100 to low side of the unbalanced input at the destination end of the cable to minimize ground loop noise. The source of audio to drive the HI and VI-N outputs is configurable on a per-format basis. The VI-N audio output is typically driven by AES input 16. The HI audio output can be driven from AES inputs 7 or 15, or from a main audio mix. The USL supplied ferrite block should be clipped on to the cables adjacent to the connectors to comply with FCC and CE emission requirements. See Appendix A for pin out information.

## 6.7 Automation Interface

The JSD-100 includes the traditional parallel automation interface plus RS-232 and Ethernet.

### Parallel Interface

Pins 1 through 10 of the DB25F automation connector are "control" pins that accept contact closure or open collector pulses to ground to select formats. On a format change, the corresponding pin is also pulsed low allowing this interface to drive other equipment. Pulsing pin 11 low toggles the mute state. Pins 14 through 24 are "status" pins. One of the pins 14 through 23 is pulled low continuously by the JSD-100 to indicate the selected format. These pins could drive LEDs with a 470 ohm series resistor to provide a remote format indication. The JSD-100 pulls pin 24 low when the system is muted. Pins 1 through 11 are internally pulled up to +8.4V. They each source 400uA when grounded. A pin needs to be pulled below 2.6V for 10ms or more for the JSD-100 to recognize it as low. On a format change, the JSD-100 pulls the appropriate pin low for 500ms. +5V at 100mA is available on pin 13 to drive external LEDs or relays. The individual control and status outputs can sink up to 150mA with an open circuit voltage of +12VDC for inductive loads like relays or +24V for non-inductive loads (indicator lamps, etc.). Pin 12 is the "automation return." Use this as the low side of switches and indicators instead of using chassis ground. It is ground through a 10 ohm resistor to limit ground loop current. The USL supplied ferrite block should be clipped on to the cables adjacent to the connectors to comply with FCC and CE emission requirements. See Appendix A for pin out information.

## RS-232 Interface

The RS-232 interface appears on a DE9F connector on the rear panel. The connector is wired as a DCE device. A command interpreter accepts ASCII commands (described in Appendix B) over the RS-232 and Ethernet interfaces. The RS-232 port operates at 38.4kbps, 8N1 (8 data bits, no parity, 1 stop bit), hardware handshake. In most situations, no handshake is required, and the RTS and CTS pins can be left open. The USL supplied ferrite block should be clipped on to the cables adjacent to the connectors to comply with FCC and CE emission requirements. See Appendix A for the connector pin out.

## Ethernet Interface

The JSD-100 includes a standard 10/100Mbps Ethernet interface. The same automation commands (described in Appendix B) are available on TCP connections to port 10001 on the Ethernet interface. The JSD-100 accepts up to 5 simultaneous TCP connections, allowing multiple control and monitor devices to be used. The Ethernet interface also includes a web server. System status and basic control are available on internally generated web pages. System status is also available over SNMP. The JSD-100 also includes a Network Time Protocol (NTP) client that can be used to keep the internal real time clock accurate. Use a CAT5 or better Ethernet cable to connect the JSD-100 to the control network. The USL supplied ferrite block should be clipped on to the cable adjacent to the connector to comply with FCC and CE emission requirements.

## USL Link

The USL Link is an RS-485 bus used to interface the JSD-100 to other USL devices such as the JSDV-100 remote volume control (discussed later in this manual). The USL supplied ferrite block should be clipped on to the cables adjacent to the connectors to comply with FCC and CE emission requirements. See Appendix A for the connector pin out.

## 7. Graphical User Interface Configuration

### System Configuration using the Graphical User Interface

The graphical user interface (GUI) allows for configuration and monitoring of the JSD-100.

#### 7.1 GUI Installation

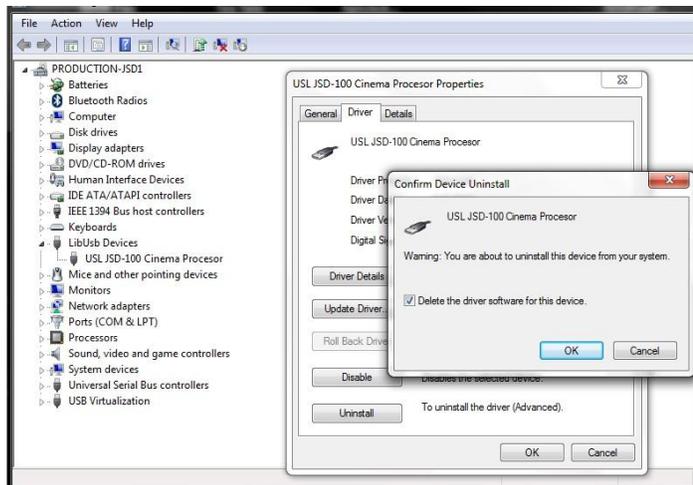
The GUI runs under Windows® XP or Windows® 7 operating systems. Insert the supplied CD and follow the on-screen instructions.

**Note:** The first release of the driver package will not work on Windows 7. The new WinUSB driver is a native USB interface that is being used in this GUI application release.

#### USB Driver Removal

To remove the previous JSD-100 USB driver installation, the JSD-100 must be connected to the computer and by using Device Manager, the driver will be uninstalled using the following steps below:

- Power on the JSD-100 and when startup is complete, connect the USB cable to the computer.
- Run device manager and locate the “LibUsb Devices” entry and select the USL JSD-100 Cinema Processor.
- Right click the mouse to open the properties dialog and then activate the “Uninstall” button.
- On Windows 7, check the delete option, and then proceed by activating the “OK” button.

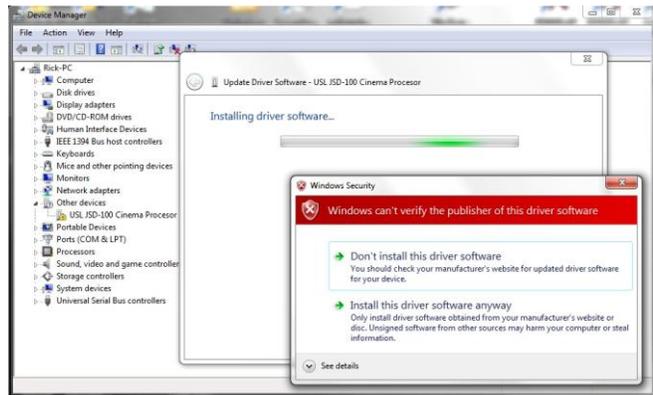
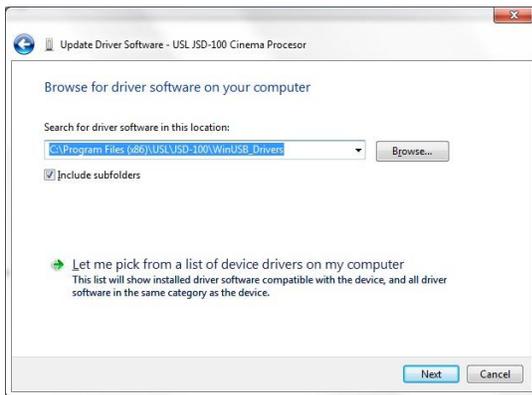
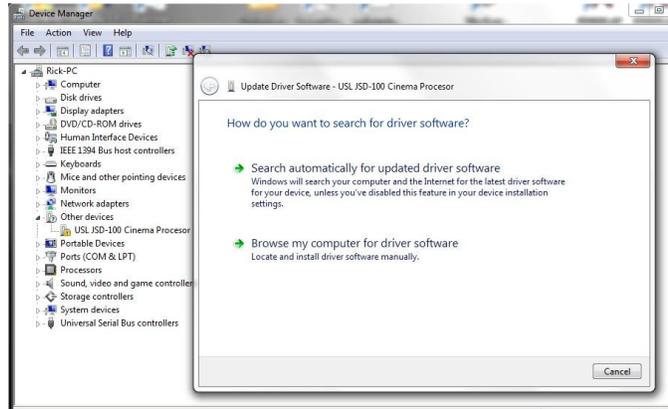


- Unplug the USB cable and proceed to driver installation.

### USB Driver Installation

The JSD-100 Installation (Setup) program creates a subfolder called “WinUSB\_Drivers” that will be used for loading the new WinUSB driver.

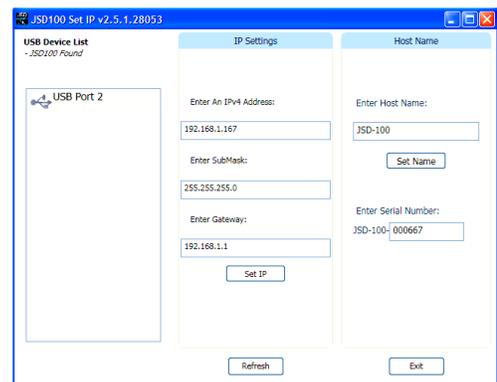
- Start device manager and then connect the USB cable to a powered on JSD-100.
- Select the USL JSD-100 Cinema Processor from the device list and right click and select “Properties.”
- Use the “Browse my Computer for the driver software” option to load the WinUSB driver. Note that the search automatically option will reload the old version and will need to repeat the driver removal process.
- Browse to “C:\Program Files\USL\JSD-100\WinUSB\_Drivers” and then proceed to load the selected driver by activation of the Next button.
- Proceed to load the selected driver by selecting the “Install this driver software anyway.”
- When the installation completes, the device manager will now display the USL JSD-100 Cinema Processor under the libusb (WinUSB) devices. From the GUI the JSD USB device will appear in the Communications Settings dialog.



## 7.2 Set IP Utility

The Set IP utility allows the user to configure the network settings on the JSD-100.

- Connect the host computer to the USB port on the front of the JSD-100. The JSD-100 should appear under the USB Device List. It is identified by which USB port it is connected to on the host computer. Click the JSD-100 on the found list.
- Fill in the IP address, subnet mask, and gateway as dotted decimal values. Press “Set IP” to save the values in the JSD-100.
- Fill in the network hostname for the JSD-100. The hostname can be up to 15 characters long and cannot contain spaces. The hostname will be converted to upper case before being saved. Press “Set Name” to save the value to the JSD-100.



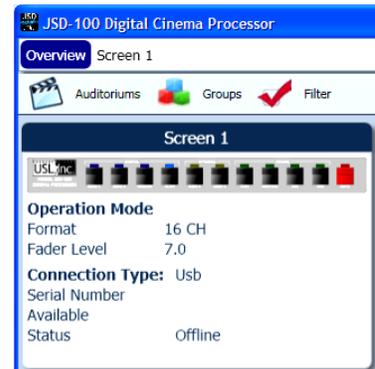
### 7.3 JSD-100 Configuration

The JSD-100 is configured using the graphical user interface (Shown in start menu as: JSD-100 Digital Cinema Processor). The GUI may connect to the JSD-100 over USB, RS-232, or Ethernet. In most installations, configuration is done over USB. With USB, it is very clear which JSD-100 you are configuring (the one that the USB cable is plugged in to). Note that you can import existing JSD-80 settings to the JSD-100. See File Management – Open, below.

The GUI and the JSD-100 provide two sets of controls and two displays. For example, you can change the format on either the JSD-100 unit or on the GUI and both will reflect the new value. If you open a configuration file when connected to the JSD-100, all the settings in that configuration file are sent to the JSD-100. When you connect to a JSD-100, all the configuration settings in that unit are loaded into the GUI. It is quite possible to operate the GUI and create configuration files without the JSD-100 being connected. Make sure the new file is saved before connecting the JSD-100 since the connection will cause the current values in the JSD-100 to be overwritten with the values in the JSD-100. When the JSD-100 is connected to the GUI and a new configuration file opened, that configuration data is copied out to the connected JSD-100.

When the GUI is started, the “Overview Screen” will be visible. This screen can show the status of multiple JSD-100 systems on a network. Click “Screen 1” to bring up the details of the first (and only, at this point) JSD-100.

Click “Comm Settings” and then the “USB” tab. Make sure “Connect to first available USB device” is checked and then press OK. Press the “Connect” button to connect to the JSD-100. Current settings will be downloaded from the JSD-100 and displayed on the GUI. Detailed below are the several buttons that are visible along the top of the GUI.



#### File Management

This group of buttons detailed below deals with loading and saving configuration files from the host computer.

- **New.** Pressing “New” creates a new configuration file with all settings at their default values. It does not change the settings in the JSD-100 or in the GUI view of the JSD-100. You can use this as a starting point for configuring a new system (you could also use open Default.j100, as described below). You will be presented with a “save as” dialog asking you to name the new configuration file.
- **Open.** Pressing “Open” allows you to load an existing configuration file. Use Default.j100 to load the factory defaults. You can then revise the settings and save them under another filename. Note that you may specify either a JSD-100 or JSD-80 configuration file under “file type.” If the JSD-100 is replacing an existing JSD-80, use the JSD-80 GUI to save the configuration file if it is not available on the computer you’re using. Then, with the JSD-100 GUI, open the JSD-80 configuration file. Common data, such as equalization, will be loaded into the JSD-100.
- **Save.** The “Save” button prompts you for the filename under which the configuration data is to be saved. Data can be restored to this or another unit using the Open button.

#### Communications

This group of buttons sets communications parameters between the GUI and the JSD-100 and allows connections to be set up and taken down.

- **Connect.** The GUI connects to the JSD-100 specified in the Comm Settings dialog over the specified link.
- **Disconnect.** The GUI disconnects from the currently viewed JSD-100.

## Comm Settings

Press this button to configure the communications link to the JSD-100. The JSD-100 GUI can communicate with the JSD-100 over Ethernet (TCP/IP), USB, or RS-232. Click on the appropriate tab for this unit. If you find the GUI on occasion disconnects from the JSD-100, try clicking the Advanced button and increase each of the timeout values. This may be required on a slow network.

## TCP/IP

Check "Display automatically detected network devices" to get a list of JSD-100 units the GUI can find on the network. Any device ever found is listed (they do not disappear if they have not been heard from in a while). Select the appropriate unit from the list or click "Manual Add" to specify an IP address for a JSD-100. Use the "Remove" button to remove a displayed unit from the list. Once the desired unit is selected, press OK to exit the dialog.

## USB

Select this tab to connect to the JSD-100 using USB. When the host computer is connected to the JSD-100 USB port, the JSD-100 should be listed under the device list. If the "Connect to first available USB device" is checked, the first device (and probably the only device) on the list will be selected. If it is not checked, select the appropriate device, and then click OK.

## RS-232

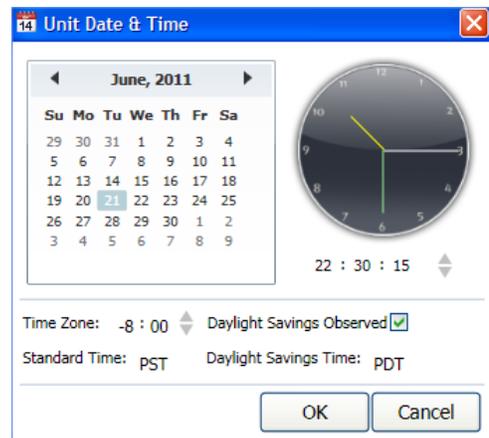
Select the COM port the JSD-100 is connected to, and then click OK.

## Unit Settings

This group of buttons handles a few "system wide" system configuration settings and backing up those settings.

### Date and Time

This button sets the time and time zone information in the JSD-100. The JSD-100 itself only uses time of day in logging. Further, all log entries are made in UTC. When viewed through the GUI, log data includes the time in UTC, the time at the JSD-100 (JSD Time), and the time at the GUI (GUI Time). The use of these three time zones allows for simple comparison of device logs, even when the devices are in multiple time zones. The Date and Time dialog allows setting of date and time data for the JSD-100. Since the JSD-100 uses UTC time, the displayed time is UTC. If the system is using an NTP server, you do not need to set the date and time. If no NTP server is available, set the date and time to the current UTC time. The bottom portion of the dialog box deals with the date and time at the JSD-100 itself. Set the Time Zone field to the offset from UTC for *standard time* in the time zone where the JSD-100 is located. If daylight saving time (summer time) is observed at the JSD-100 location, check the corresponding checkbox. Note that this checkbox indicates whether daylight saving time is *ever* observed at this location, not whether it is currently in effect. For example, you would check the checkbox in California, but uncheck it in Arizona. Fill the next two fields with the abbreviations for standard time and daylight saving time in the time zone where the JSD-100 is located. The daylight saving time abbreviation will not be used if the daylight saving time observed checkbox is unchecked, but you may want to fill it in anyway. Clicking OK transmits the data to the JSD-100.



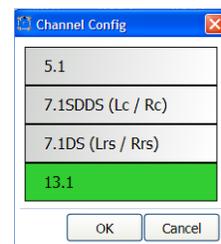
US Time Zone	UTC Offset	Standard Time Abbreviation	Daylight Saving Time Abbreviation
Hawaii-Aleutian	-10:00	HAST	HADT
Alaska	-9:00	AKST	AKDT
Pacific	-8:00	PST	PDT
Mountain	-7:00	MST	MDT
Central	-6:00	CST	CDT
Eastern	-5:00	EST	EDT

Note: Worldwide time zones may be viewed at the following websites:

- <http://www.timeanddate.com/library/abbreviations/timezones/>
- [http://en.wikipedia.org/wiki/List\\_of\\_time\\_zones\\_by\\_UTC\\_offset](http://en.wikipedia.org/wiki/List_of_time_zones_by_UTC_offset)

### Channel Config

Use Channel Config to configure the JSD-100 based on the speaker configuration in the auditorium. Note that 13.1 will not be available on systems with the 8 channel output card. On these 8 channel output systems, the last pair of channels can be configured for a 7.1SDDS installation, which has Lc and Rc speakers. These last two channels could alternatively drive rear surround speakers (Lrs and Rrs) by choosing 7.1DS. With the 16 channel analog or 32 channel AES output boards, biamp, triamp, and 13.1 speaker configurations are available. See section 4.4 for a speaker location chart for various “soundfield configurations”.



### Headroom

The headroom setting adjusts the system gain so the nominal level is a specified number of dB below the digital clipping level (0 dBFS). Generally, headroom is set at 26dB. If several bands of equalization are set to high levels of boost, you may wish to increase the headroom to avoid clipping.

### Backup

Pressing this button writes the current configuration to the SD or MMC card plugged in behind the removable panel on the rear of the JSD-100. If the cover is removed, you will see a red LED to the left of the card light as the card is written. A backup to the SD card can fail if no card is present, if the card is write protected, or if the card is not formatted correctly (FAT16 or FAT32). The data written on the card is a series of commands in a text file (JSD100.CFG). If a JSD-100 needs to be swapped out, the SD/MMC card can be moved from the old unit to the new unit to copy all the old settings to the new unit. To load data from the SD/MMC card, hold down buttons 9 and 10 (AUX and MIC) when turning the JSD-100 main power switch on. Continue to hold the buttons down until the display says “Loading From SD Card”. The display will show the progress of the load and then return to the normal display.

### Main Fader

The current main fader level can be viewed and changed using the slider. These are equivalent to the front panel main fader knob and display. The fader level display also shows a small bar graph that displays the measured output level on each channel.

### Front Panel View

Below the above-described buttons is a view of the JSD-100 front panel. When connected to the JSD-100, this view duplicates the look of the front panel. In addition, the buttons can be pressed to change format or mute the system, just as on the front panel. The LED above the format button lights when that format is selected. It flashes if the format is a digital format and no digital signal is present on the selected input.

## Tabs

The remainder of the GUI window contains tabs that divide the remaining configuration data into logical groups. Each tab will be discussed in sequence.

### Summary Tab

The “Summary” tab (view shown right) gives a broad view of the JSD-100 and its installation. The Theater Information fields may be changed as needed. The other sections of this screen cannot be changed through the summary tab.

### Component Information

The PIC firmware version identifies the firmware version in two of the microcontrollers and the circuit board revision of the main circuit board. In the sample screen above, the first E indicates this is board revision E. The 110630 is the revision of the main processor firmware. The 110512 is the revision of the rear panel processor firmware. This tab also shows the versions of the firmware for each of the two digital signal processors and the version for the GUI software itself. Each of these version numbers can be compared with later updates to determine if the latest firmware is already installed.

### Network Information

This is the network information that was set with the JSD-100 Set IP Utility, discussed previously.

### Formats Tab

The “Formats” tab allows the setting of “Per-Format” configuration. These settings apply only to a specific format. The type of settings available varies by format type. The available settings for each format are listed below. Select the format that is to be configured using the format buttons on the GUI or the JSD-100 front panel.

Format	Settings
Coax 1	Input Name, Enable Preset, Preset Level, Input Delay, Rear Surround Source, EQ Set, Decode Options
Coax 2	Input Name, Enable Preset, Preset Level, Input Delay, Rear Surround Source, EQ Set, Decode Options
TOSLINK	Input Name, Enable Preset, Preset Level, Input Delay, Rear Surround Source, EQ Set, Decode Options
Digital 16 Channel	Input Name, Enable Preset, Preset Level, Input Delay, Rear Surround Source, EQ Set, HI/VI Source
User 1	Input Name, Enable Preset, Preset Level, Input Delay, Rear Surround Source, EQ Set, Input Select, HI/VI Source, Decode Options
User 2	Input Name, Enable Preset, Preset Level, Input Delay, Rear Surround Source, EQ Set, Input Select, HI/VI Source, Decode Options
Analog 8 Channel	Input Name, Enable Preset, Preset Level, Rear Surround Source, EQ Set, HI/VI Source
Non/Sync	Input Name, Enable Preset, Preset Level, Rear Surround Source, EQ Set, Input Trim, Decode Options
AUX	Input Name, Enable Preset, Preset Level, Rear Surround Source, EQ Set, Input Trim, Decode Options
Mic	Input Name, Enable Preset, Preset Level, Rear Surround Source, EQ Set, Input Trim, Mic Phase

### Input Name

The name that is shown on the display and logged when a particular format is selected can be set by the user. Type a meaningful name for the format in the Input Name field.

### Preset Level

If preset is enabled, the JSD-100 will adjust the main fader level to the preset level set here. If the preset is not enabled, the JSD-100 will adjust the main fader to the level last used on this format. With a preset, levels can be adjusted during normal operation using the front panel fader, but will return to the preset level when the format is selected again. Without the preset, the level will return to the level that particular format was last adjusted to.

### Input Delay

A separate input delay setting is available for each format to enable precise synchronization of the audio with the projected image.

### Rear Surround Source

The audio source for the rear surround speakers can be configured independently for each format. These settings provide a source of audio for the rear surround speakers when playing 7.1DS audio as well as when playing sources that do not have discrete channels to drive these speakers. (See Section 4.4 for details on soundfield configurations). These sources are further described in the table below.

Rear Surround Source	Description
Ls/Rs	The rear surround speakers are driven by the surround speakers. Lrs is driven by Ls. Rrs is driven by Rs. This setting results in an L-shaped surround where the left surround continues down the left wall to the left side of the rear wall of the auditorium. This is often the choice for 5.1 content.
EX	Both rear surround speakers are driven with 0.5 (Ls+Rs). This is similar to a derived center speaker.
CH 7/8	The rear surround speakers are driven by discrete channels 7 and 8 from the digital 16 channel or analog 8 channel source. Channel 7 drives Lrs. Channel 8 drives Rrs.
AES 11/12	The rear surround speakers are driven by AES channels 11 and 12 from the 16 channel digital input. Note that these inputs are only available if the optional DI-80 board is installed in the JSD-100. AES 11 drives Lrs. AES 12 drives Rrs.

### EQ Set

The JSD-100 allows different formats to use different equalization curves. Four EQ sets are available. Each set allows full equalization of all the audio channels. Choose which equalization set to use for this format.

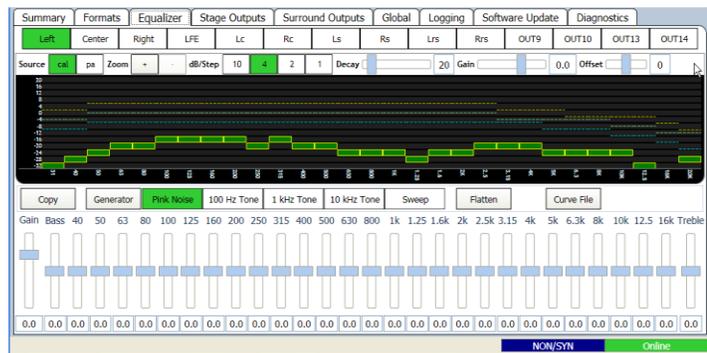
### Decode Options

Two channel sources can be decoded out to several channels. These options are available on digital and analog two channel formats, such as COAX1, COAX2, TOSLINK, NON/SYNC, and AUX. **Dolby Digital® (AC-3) alternative content can only be played if a DI-84 board is present and Active Matrix is selected. Attempting to play AC-3 material without the DI-84 board will mute the audio.**

Decode Option	Description
L_R	The two channel source drives just the left and right speakers.
L_C_R	The left and right channels of the source drive the left and right speakers. The center speaker is driven with 0.707 times the sum of the left and right channels. The LFE channel is driven with the center channel after passing through an 80Hz low pass filter.
Simple Matrix	The front speakers are driven with the same signals as L_C_R, described above. The surround speakers are driven with 0.707 times the difference between left and right (0.707(L-R)).
Active Matrix	This option is only available if a DI-84 board is installed in the JSD-100. If the input is digital and encoded with Dolby Digital® (AC-3), the signal is decoded to 5.1. If the signal is two-channel analog or PCM (not encoded with Dolby Digital®), the signal is decoded to 5.1 using an active matrix. If no DI-84 board is installed, the signal is decoded as L_R.

### Equalizer

The JSD-100 equalizer allows the frequency response of the JSD-100 to be adjusted for the acoustics of the room. The RTA screen shows the measured level in each spectrum band along with the limit lines for the X-Curve for a 500 seat auditorium as defined by SMPTE 202M-1998. Using the internal pink noise generator and the internal real-time analyzer (RTA), the equalizer is adjusted so the RTA shows the response specified between the limit lines.



### RTA Channel Select Buttons

Channel select buttons are along the top of the RTA window. These select which speaker the pink noise generator is driving and which channel the equalizer controls are adjusting.

### RTA Settings

When the mouse cursor is over the display area of the RTA, another row of settings becomes visible (as shown above). Use the Source button to select whether the calibrate or PA microphone input is being used to drive the RTA. The calibrate microphone input is on the 3.5mm TRS connector on the rear panel. The PA microphone input is on the combination XLR ¼ inch TRS connector. Use the Zoom buttons to enlarge or reduce the text within the RTA display area. Use the dB/step selector to adjust the vertical resolution as required to get all bands on screen while providing the best vertical resolution. Make initial adjustments with a fast decay time. The fast decay time provides a faster update, but a less stable display. As you close in on the final adjustment of the equalizer, increase the decay time towards maximum to provide a stable display and precise indication of the equalization. Adjust the gain control as required to place the mid-band signal level at 0dB.

### Generator

Use the Generator button to turn the internal generator on and off. Use the adjacent buttons to select the type of generator output: pink noise, various frequency tones, or a tone sweep.

### Flatten

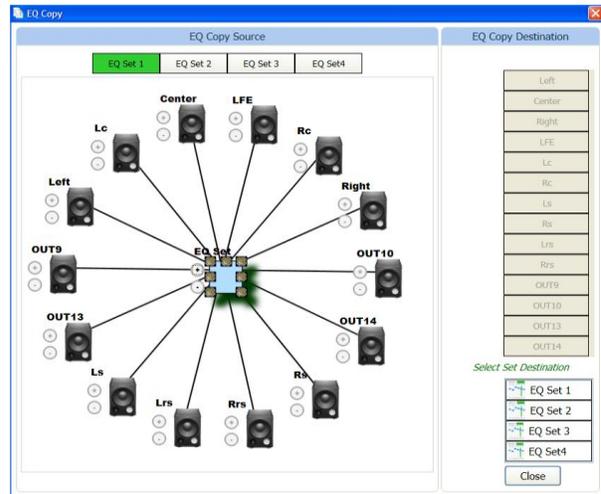
Pressing this button returns all the equalizer adjustments to 0.0dB.

### Curve File

Press this button to load a curve file from the “My Documents” directory. The installer placed a file called “x-curve.txt” there. It can be used as a template to create curve other limit curve files.

## EQ Copy

Note that the equalizer adjustments adjust the EQ set that is selected for the currently selected format. You can hit the format tab to quickly view which EQ set is currently being controlled. The Copy button copies the EQ settings for a particular audio channel in any EQ set to another channel in any EQ set. Since the different audio channels typically require approximately the same equalization, one channel can be set up and then copied to other channels as a starting point. Those channels are then fine tuned as required.



- Press the “Copy” button. The EQ Copy dialog opens.
- Select the Source “EQ Set”.
- Click the “+” button to the left of the EQ Set symbol in the lower left portion of the window. The icon will explode to the view shown above where each audio channel is visible.
- Click on the speaker corresponding to the channel that is the source of the EQ copy. For example, if you want to copy the left channel equalization to the right channel, click the left speaker. “Select Channel Destination” will appear in the destination area of the window.
- Select the “EQ Set” destination (often the same as the source) and the channel destination. A Copy button will appear. Click the Copy button to copy the equalization from the source channel to the destination channel. Note that you cannot copy a channel to itself and you cannot copy a full band channel to the LFE (Low Frequency Effects or subwoofer) channel.
- Press “Close” to close the copy window.

## Channel Equalization Procedure

A suggested procedure of equalizing a channel is listed below. Your theater may use a modified or different procedure.

- Position the RTA microphone in the auditorium as specified by SMPTE 202M-1998 (about 2/3 of the way back from the screen and 2/3 of the way from a side wall of the auditorium). The microphone is normally 1.0 to 1.2 meters (3.3 to 4.0 feet) from the floor, or “ear level” for a typical audience member.
- Plug the microphone in to the PA or CAL microphone input of the JSD-100. Set the RTA input to the appropriate microphone input.
- Press the Curve File button and select the appropriate curve file (such as x-curve.txt). This sets the limit lines on the RTA display.
- Set the front panel fader level to 7.0.
- Turn amplifier gains all the way down. Move the gain control on the equalizer all the way down. This adjusts the “output trim” on the channel that is being adjusted. There are separate output trims for each audio output. Note, however, that the individual channel output trims are in common to all the equalizer sets. Adjusting the gain control on equalizer set 2 also adjusts it on equalizer set 1.
- Select the channel to be equalized, pink noise, and generator to send pink noise out the appropriate output of the JSD-100.
- Slowly increase the power amplifier gain to full while watching an SPL meter at the RTA microphone position. Do not increase the level above 85dB SPL.
- Adjust the gain control (output trim) on the equalizer until a measured sound level of 85dB SPL or 82dB SPL for surround channels is present.
- Adjust the RTA gain to put the mid-band level at 0dB.
- Adjust the equalizer controls to put each frequency band within the curve limits As discussed above, the decay time should be increased for more stable and precise measurement as you close in on the final equalization.

- Turn off the generator.
- Copy the equalizer settings to the next channel to be equalized using the Copy button, as described above. Then repeat the process for the next channel.

### **LFE Equalization Procedure**

The LFE or subwoofer channel uses a parametric equalizer instead of a graphic equalizer. When the LFE is selected in the Equalizer window, the parametric equalizer adjustments become visible.

- As with the other channels, start with the amplifier gain all the way down and the equalizer gain all the way down.
- Slowly bring up the amplifier gain control to full without exceeding 85dB SPL.
- Adjust the equalizer gain control up until the RTA shows the subwoofer at the same level as the mid-band frequencies (0dB).
- Adjust the parametric filter frequency to the center of the worst peak or dip in the frequency response.
- Set the Q to 4, and then adjust the level control to take out the dip or peak. The Q can be increased to narrow the correction or reduced to make the correction wider. Adjust the level, frequency, and Q for the best low frequency response.
- Select the output tab and click Generator under the center channel slider. At this point, the pink noise generator should be driving both the LFE and center channels. Select the equalizer tab again.
- Adjust the LFE gain and make minor adjustments to the LFE parametric filter to get a smooth frequency response over the transition into the LFE frequency range. It may be necessary to flip the phase of the LFE speaker. The phase can be changed on the Outputs tab using the Invert button under the LFE output level control.
- Finally, on the equalizer tab, adjust the LFE gain so the LFE is 10dB above the mid-range frequencies.

### **Stage Outputs Tab**

The stage outputs tab provides a method of trimming the output level of each audio channel, muting the channel, inverting the phase, or driving it with a generator (pink noise, tone, or a tone sweep). These controls are generally set one by one from the Equalizer tab. This tab makes all the settings visible at once. In addition, this output tab allows the user to name each of the channels. The name above each control can be changed as desired. This information is saved in the JSD-100 and will be restored to the GUI the next time this particular unit is connected to.

### **Surround Outputs Tab**

The surround outputs tab provides a method of trimming the output level of each audio channel, muting the channel, inverting the phase, or driving it with a generator (pink noise, tone, or a tone sweep). These controls are generally set one by one from the Equalizer tab. This tab makes all the settings visible at once. The surround delay for each channel pair can be adjusted on this screen. In addition, this tab allows the user to name each of the channels. The name above each control can be changed as desired. This information is saved in the JSD-100 and will be restored to the GUI the next time this particular unit is connected to.

The surround delay is set usually based on the length and width of the auditorium. Formulas to determine the surround delay with auditorium Length and Width in meters and feet are provided.

#### **Surround Delay Using Meters**

With Length and Width of the auditorium in meters, the surround delay, in ms, should be  $(L/3)-(W/6)+20$ .

#### **Surround Delay Using Feet**

With Length and Width of the auditorium in feet, the surround delay, in ms, should be set to  $L-(W/2)+20$ .

## Global Tab

Global settings, those that do not change with format or EQ set, are set or displayed here.

## Unit Time

The time settings in the unit can be observed in this section of the tab. These settings are set using the Date & Time button at the top of the screen. The Unit Time data includes the current UTC value in the JSD-100 real time clock, the time zone offset from UTC for standard time, the abbreviations for standard and daylight saving time, and whether daylight saving time is observed at this location.

This section also allows the IP address of the Network Time Protocol server to be set and enabled or disabled. If an NTP server is available on the network, enter its IP address, check NTP Enable, and press the Set IP button.

## Sleep Settings

The JSD-100 includes a sleep timer. The timer is reset to its timeout value on any format change, any fader level change, or any audio output above -20dB (referenced to 300mV RMS). If, for example, the sleep timeout is set to 1 hour, the system will go to sleep 1 hour after the last format change, level change, or audio. When the system goes to sleep, power consumption is decreased from about 18W to about 7.5W. The system wakes up on a format change, a level change or a specific command over Ethernet (See Appendix B). Audio presence will not wake the system up since the audio circuitry is shut down during sleep. The current sleep timer value is shown. The unit will go to sleep in the displayed number of hours and minutes. To set the sleep timeout, key in the number of hours and minutes or use the arrows to change the Sleep Timeout value. Once the value is entered, press Set Timeout to save the value in the JSD-100. If sleep is not to be used, check Disable Sleep Timer and press Set Timeout.

## Remote Fader Settings

This section allows the display timeout on remote volume controls to be set. Use the slider to set the number of seconds after an adjustment that the remote volume display will blank. Setting the timeout value to zero prevents the display from blanking.

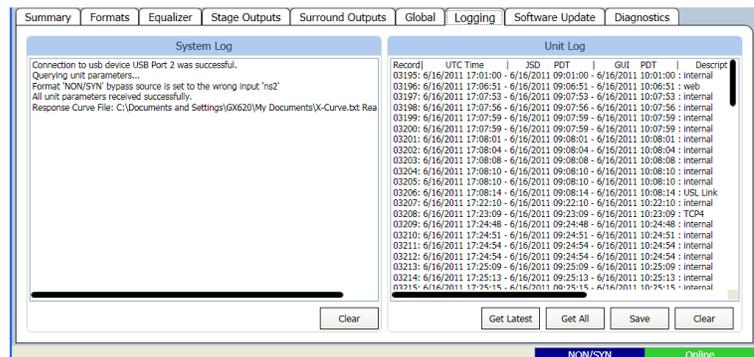
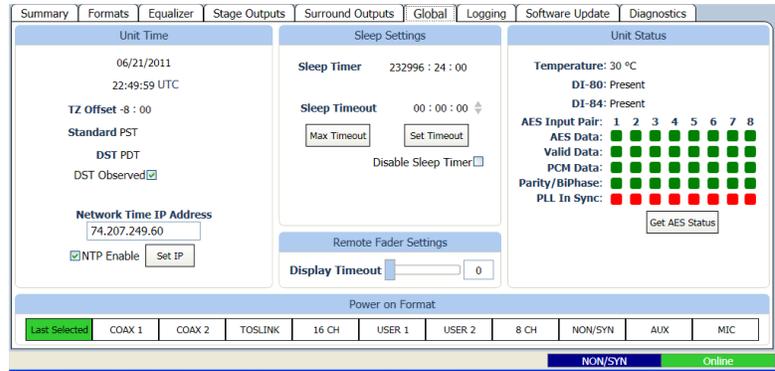
## Unit Status

This portion of the global tab shows the temperature within the JSD-100, whether the optional DI-80 and DI-84 board are present, and the status of AES inputs. The DI-80 board is required for 16 channel digital input. Without it, the AES input is 8 channels. The DI-84 board is required to decode Dolby Digital® from two channel inputs. When the Get AES Status button is pressed, the AES Channel Status indicators are updated. Green indicates the parameter is true. Red indicates it is false. Gray indicates it cannot be determined.

## Logging Tab

The JSD-100 includes extensive logging. The left side of the screen shows the GUI log. It shows GUI activity, such as connections to JSD-100 units and other activities. The right side of the screen shows the Unit Log for the specific JSD-100.

The JSD-100 holds a log of the last 32,768 events. Events include level changes, format changes, remote connections by



the GUI or other devices, etc. Press the Get Latest button to get the 100 most recent log entries. Press the Get All button to get the full log from the JSD-100.

The log shows the record number in the JSD-100 log, the UTC time of the event, the “JSD Time” of the event, and the “GUI Time” of the event. The JSD-100 stores all log events in UTC time. When the log events are displayed by the GUI, the time at the JSD-100 is calculated based on the settings entered using the “Date & Time” button on the GUI. The GUI applies the time zone offset for where the JSD-100 is located, determines if the daylight saving time is observed where the JSD-100 is located, and whether daylight saving time is currently in effect. Based on this data, the GUI calculates and displays the time of the event at the JSD-100. The name of the time zone (PDT in the sample) is shown in the column header to help identify the time. The GUI also does a similar calculation to display “GUI time.” That is the time the event occurred at the GUI location, which may be several time zones away from where the JSD-100 is located.

The log shows the source of the event (internal, USB Port, front panel, TCP4, etc.). When a device connects to the JSD-100 over Ethernet, the connection and the IP address are logged. Later actions can be tied to a specific IP address by looking back through the log for the last connection to that TCP port. The JSD-100 supports 5 simultaneous TCP connections on TCP4 through TCP0.

Pressing the Save button saves the currently displayed log data as a tab delimited text file. This file can be imported into a spreadsheet or viewed with a text editor.

### Software Update Tab

The firmware in the main processor and the Digital Signal Processors (DSPs) in the JSD-100 can be updated through the GUI over Ethernet or USB. The right side of the screen shows the current firmware versions. The left side of the screen contains controls to do a firmware update.

Firmware is usually delivered in a Software Package that includes new versions of the code for each DSP and the main processor (PIC). We suggest making the updates in this order: DSP2, DSP1, PIC. Look at the versions of each piece of code in the software package. If one of the versions is already installed in the JSD-100, that portion of the JSD-100 does not need to be updated.

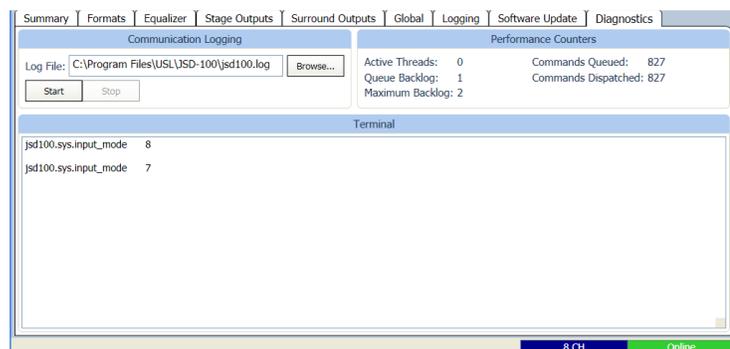
Select the device to be updated: DSP2, DSP1, or the PIC. Press the Browse button to select the file to be downloaded to the JSD-100. Press the Download button. During the download, the front panel LEDs on the JSD-100 will flash. After a download of the PIC (the main processor), the JSD-100 will reset to start executing the new code. The GUI will disconnect at that time.

### PIC Firmware Restore

If a download of the PIC firmware to the JSD-100 is interrupted, the JSD-100 may be left inoperable. To restore the original firmware, turn off the JSD-100, press buttons 4 and 6 on the front panel (Digital 16 Channel and User 2), then turn the power on while continuing to hold the buttons down until the front panel LEDs start flashing. When they stop flashing, the factory installed firmware has been restored, and the JSD-100 will restart.

### Diagnostics Tab

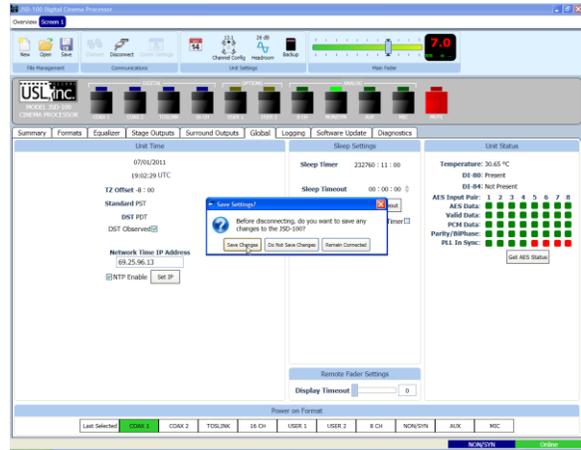
This tab provides diagnostics that help USL personnel in debugging the system. You may be instructed by USL to perform various functions on this tab to debug problems in the installation. The terminal section of this screen can be used to test JSD-100 commands, such as those an automation could send. The image to the right shows a couple automation commands being sent to the JSD-100. Click the mouse cursor in the



terminal area, and then type commands (tab delimited and terminated with a carriage return). See Appendix B for more information on automation commands.

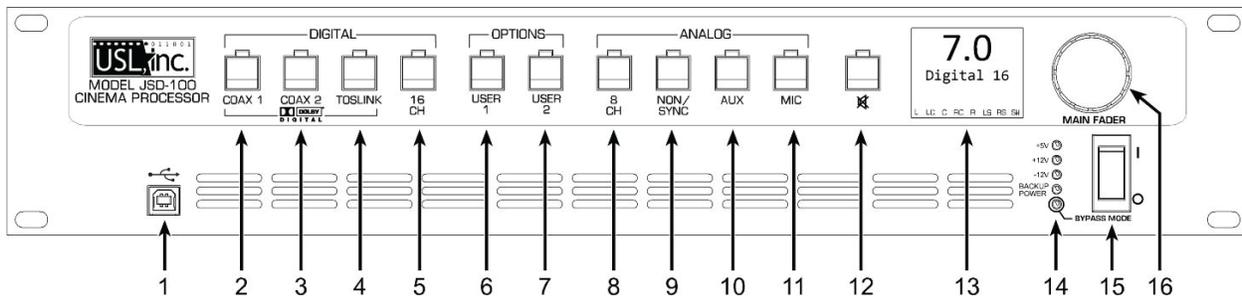
### Disconnect And Save

All the settings that have been made up to this point are currently determining how the JSD-100 operates. However, these settings will not be restored on a power cycle unless the disconnect button is pressed and a save is requested. It is VERY IMPORTANT that the changes you've just made are saved in the JSD-100. In the dialog box that appears after pressing Disconnect, press Save Changes to save these changes to non-volatile memory in the JSD-100. If you do not save the changes, they will remain in the JSD-100 until the power is turned off. The previously saved settings will then be restored. At this point (prior to disconnecting), you may also want to back the settings up to the SD card by pressing Backup, as described previously.



### System Operation

The JSD-100 is controlled by the digital cinema server in most installations. Control is also available from the front panel.



1. USB Connector for communications. Select on the user interface
2. COAX 1 – Rear Panel RCA type connector for PCM or optional Dolby Digital<sup>6</sup> decoding.
3. COAX 2 – Rear Panel RCA type connector for PCM or optional Dolby Digital<sup>6</sup> decoding.
4. TOSLINK – An optical fiber connection for PCM or optional Dolby Digital<sup>6</sup> decoding.
5. 16 CHANNEL DIGITAL – AES Balanced line inputs. The channels 1-8 are standard. Channels 9-16 require the optional DI-80 module.
6. USER 1 – allows the selection and configuration of any input and any settings.
7. USER 2 – allows the selection and configuration of any input and any settings.
8. 8 CHANNEL ANALOG – Balanced line inputs. Six channels (L, C, R, LFE, Ls, Rs) are fed through the unit with appropriate delays and EQ. The two remaining channels may be configured as Lc/Rc (7.1SDDS) or Lrs/Rrs (7.1DS).
9. NON-SYNC – 2 Channel Analog Balanced Line Input. Input sensitivity and level may be adjusted.
10. AUX – 2 Channel Analog Balanced Line Input. Input sensitivity is fixed but input level may be adjusted.
11. MIC – Public Address Balanced line input. Input sensitivity and level may be adjusted.
12. MUTE – mutes all outputs.

<sup>6</sup> Manufactured under license from Dolby Laboratories. Dolby and the double-D symbol are trademarks of Dolby Laboratories.

13. Display – indicates the Fader level, format input and bar graph display of the output signal levels.
14. Power Indicator LEDs – displays status of power supply voltages.
15. Power Switch – On for normal operation, off for bypass operation.
16. Fader – Controls the overall volume of all the channels.

### Front Panel

The input select buttons choose which input is to drive the auditorium speakers. The LED above the button will light when that input is selected. If the selected input is digital, but no digital signal is available, the LED will flash.

Pressing the “mute” button controls muting of the auditorium speakers. The LED above the button is lit when the system is muted.

The display shows the current main fader level, the user defined name of the currently selected format, and a bar graph showing the measured audio levels on each output. The number of bars and the labels under the bars varies with speaker configuration.

The Main Fader adjusts the output volume. As it is adjusted, the display is updated to show the new fader level. Note that the fader level will generally change on a format change. If the format has a preset fader level, the fader will change to that level when the format is selected. If the format does not have a preset fader level, the fader will change to the level last used on that format. The *last used* fader level memorizes “on the fly” fader adjustments. If the operator turns down the fader during the trailers and then switches to Digital 16 for the movie, the fader level will return to the newly set level for trailers the next time that format is selected.

The main power switch turns the JSD-100 on and off. When the power is off, the JSD-100 enters bypass mode if the bypass power supply is plugged in. The bypass system in the JSD-100 uses completely separate electronics to generate a monaural signal that drives the left and right main audio outputs. The front panel switches and fader operate the same in bypass and normal modes. All inputs except microphone are available in bypass mode.

### 7.4 Automation

The JSD-100 accepts external control (such as automation) over Ethernet, RS-232, and a parallel automation port.

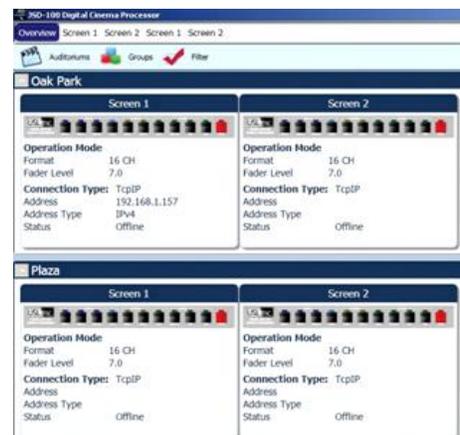
- The JSD-100 accepts up to 5 simultaneous TCP connections on port 10001. A digital cinema server can send commands to the JSD-100 through a TCP connection. The command structure is described in Appendix B.
- The JSD-100 accepts commands over the RS-232 port. The hardware interface is described in the installation section. The commands are described in Appendix B.
- The JSD-100 accepts and generates parallel automation pulses on the DB25F rear panel automation connector. Pulsing pin 1 to ground is the same as pushing the first button on the front panel (COAX 1). Pulsing pin 2 to ground is the same as pushing the second button. The parallel automation interface is described in more detail in Section 6.7.

### 7.5 System Monitoring

A large number of JSD-100 systems can be monitored simultaneously over Ethernet. Multiple units can be monitored and controlled using the GUI. Multiple units can be monitored and controlled using a web browser. The web interface duplicates the front panel controls, allowing selection of input, setting fader level, and muting the system. Multiple units can be monitored using SNMP.

### 7.6 GUI View of Multiple JSD-100s

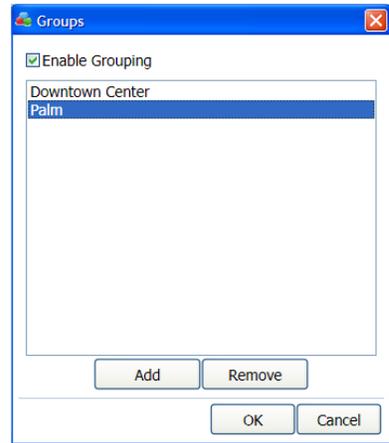
The GUI main screen provides an overview of several JSD-100 systems. Systems are normally broken into groups representing theaters. Each group contains the individual JSD-100 systems for each auditorium.



### Adding Groups

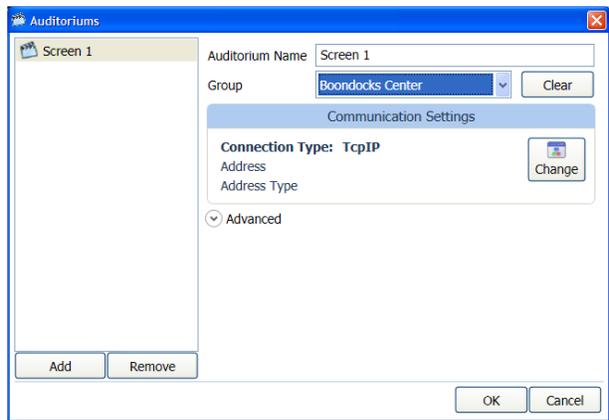
Create a group for each theater. The group is a collection of JSD-100s, one in each auditorium.

- Click the “Groups” button at the top of the screen.
- Click “Add”. You will be prompted to enter the name of the new group.
- Click “OK” when you have finished adding groups.

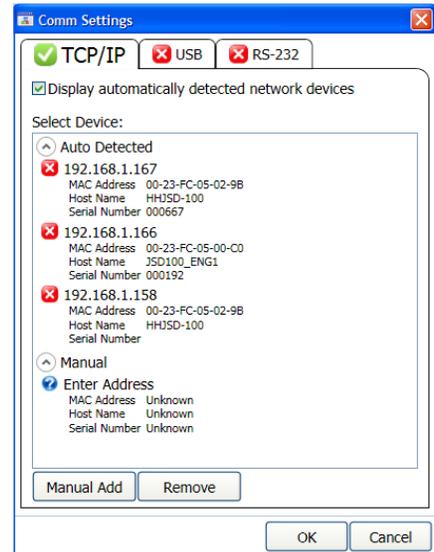


### Adding Auditoriums

- Click the “Auditoriums” button. The Add Auditorium dialog box will appear.
- Click “Add” to add an auditorium.
- The name of the auditorium can be changed as desired.
- Select the group from the previously defined list of groups.
- Click “Change” under Communications Settings to set the IP address of the JSD-100 in this auditorium.
- Select the IP address of the JSD-100 from the auto-detected device list if it is present. If not, press “Manual Add” and then key in the IP address of the JSD-100 in this auditorium.
- Press “OK” to exit Comm Settings and OK to exit Auditoriums.

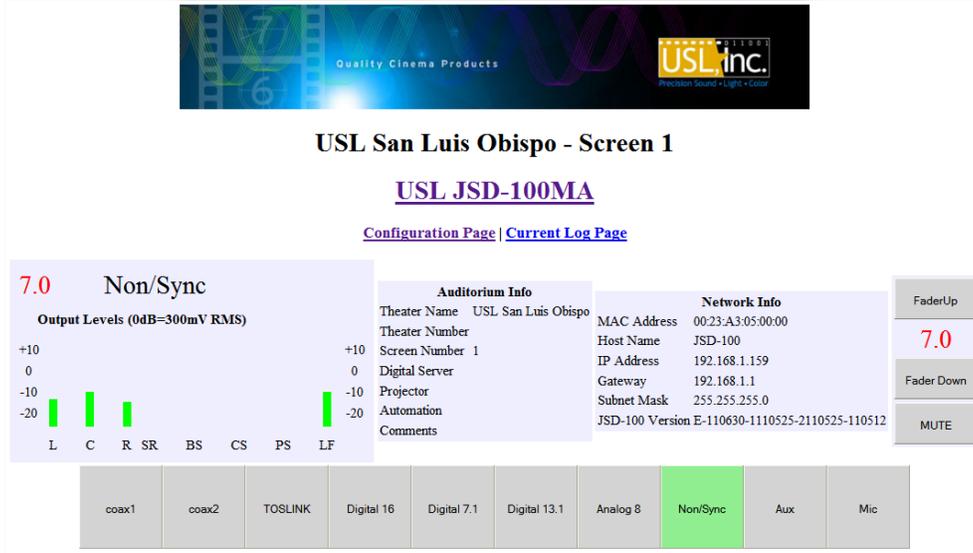


Once groups and auditoriums are defined, the GUI shows a summary view of each JSD-100 on the network. The summary view includes the selected format, the fader level, and communications settings. Clicking on the summary view box brings up the detailed view of that particular JSD-100 where all controls are available.



## 8. JSD-100 Web Interface

The JSD-100 includes a web server. The web server can be used to view the current status of the JSD-100, view the JSD-100 log, and upload new firmware.



The Status Page shows the current fader level, the current format, and a bar graph showing the audio output levels, auditorium information, and network information. It also has buttons to select input format, adjust fader level, and mute or unmute the system.

The Log Page shows the JSD-100 system log. A portion of a typical log page is shown below. Note that three time zones are listed: UTC Time, GUI Time, and JSD Time. JSD Time and GUI time make adjustments for daylight saving time based on whether daylight saving time is currently in effect at the GUI location. Since the observation of daylight saving time varies, there is no guarantee that this setting will also be correct at the JSD-100 location. Clicking the time zone abbreviation at the top of the JSD time column will reload the log page toggling whether daylight saving time is used in the JSD time column. Click this as necessary for proper display of the time at the JSD-100.

Record Number	UTC Time	GUI Time Pacific Daylight Time	JSD Time PDT	Source	Event	Details
3236	Thu Jun 16 17:27:57 2011	Thu Jun 16 10:27:57 2011	Thu Jun 16 10:27:57 2011	internal	Reset	Reset due to power on, hardware reset,
3237	Thu Jun 16 17:28:00 2011	Thu Jun 16 10:28:00 2011	Thu Jun 16 10:28:00 2011	internal	Loaded config	Config loaded from flash
3238	Thu Jun 16 17:28:03 2011	Thu Jun 16 10:28:03 2011	Thu Jun 16 10:28:03 2011	internal	Loaded config	Extended config loaded from flash
3239	Thu Jun 16 17:28:08 2011	Thu Jun 16 10:28:08 2011	Thu Jun 16 10:28:08 2011	internal	Temperature change	Temperature now 30.77° C
3240	Thu Jun 16 17:28:10 2011	Thu Jun 16 10:28:10 2011	Thu Jun 16 10:28:10 2011	internal	Fader change	Format change reloaded last fader of 7.0
3241	Thu Jun 16 17:28:10 2011	Thu Jun 16 10:28:10 2011	Thu Jun 16 10:28:10 2011	internal	ERROR	No digital input signal
3242	Thu Jun 16 17:28:14 2011	Thu Jun 16 10:28:14 2011	Thu Jun 16 10:28:14 2011	USL Link	Discovery	Discovered remote fader #37
3243	Thu Jun 16 17:28:23 2011	Thu Jun 16 10:28:23 2011	Thu Jun 16 10:28:23 2011	TCP4	TCP connected	192.168.1.33 connected to TCP4
3244	Thu Jun 16 17:39:59 2011	Thu Jun 16 10:39:59 2011	Thu Jun 16 10:39:59 2011	TCP4	TCP disconnected	
3245	Thu Jun 16 17:40:07 2011	Thu Jun 16 10:40:07 2011	Thu Jun 16 10:40:07 2011	front panel	Input change	input mode changed to Digital 7.1
3246	Thu Jun 16 17:40:07 2011	Thu Jun 16 10:40:07 2011	Thu Jun 16 10:40:07 2011	internal	Fader change	Format change reloaded last fader of 7.0
3247	Thu Jun 16 17:40:07 2011	Thu Jun 16 10:40:07 2011	Thu Jun 16 10:40:07 2011	internal	ERROR	No digital input signal

The Configuration Page shows the same auditorium data and network data as the status page. When first accessing the configuration page, you will be asked for a username and password. The username is admin. The default password is ultra. To change the password, enter it twice at the bottom of the configuration page, then press the "Save New Password" button. The Configuration Page has a link to the Update Firmware page.

The Update Firmware Page allows the firmware in the two DSPs and the main processor (PIC) to be updated.

Firmware is usually delivered in a Software Package that includes new versions of the code for each DSP and the main processor (PIC). We suggest making the updates in this order: DSP2, DSP1, PIC. Look at the versions of each piece of code in the software package. If one of the versions is already installed in the JSD-100, that portion of the JSD-100 does not need to be updated. The currently installed firmware version is shown on the Update button for each processor.

Select the device to be updated: DSP2, DSP1, or the main processor (PIC). Press the "Browse" button to select the file to be downloaded to the JSD-100. Press the "Update" button. During the update, the front panel LEDs on the JSD-100 will flash. After an update of the main processor, the JSD-100 will reset to start executing the new code. The browser will disconnect at that time.

## 9. SNMP Monitoring

The JSD-100 includes an SNMP agent that can be used with an SNMP network manager or MIB browser to monitor the status of the JSD-100. The MIB describing the JSD-100 is located at <http://JSD-100/JSD100.MIB>. Substitute the IP address of the JSD-100 for JSD-100 in the preceding URL. At this time, the status of the JSD-100 can be polled using SNMP. View the MIB for the details of what is currently supported. Control through SNMP and SNMP traps are not currently supported. Below is a portion of an SNMP walk of a system.

```
C:>snmpwalk -v 1 -c public 192.168.1.159 iso
SNMPv2-MIB::sysDescr.0 = STRING: digital cinema sound processor
SNMPv2-MIB::sysObjectID.0 = OID: SNMPv2-SMI::enterprises.38012
DISMAN-EVENT-MIB::sysUpTimeInstance = Timeticks: (267754) 0:44:37.54
SNMPv2-MIB::sysContact.0 = STRING: support@uslinc.com
SNMPv2-MIB::sysName.0 = STRING: USL JSD-100MA, HW ver E, Main PIC ver 110630, DSP 1 ver 1110525,
DSP 2 ver 2110525, Rear Panel ver 110512
SNMPv2-MIB::sysLocation.0 = STRING: San Luis Obispo, CA USA
SNMPv2-MIB::sysServices.0 = INTEGER: 7
SNMPv2-SMI::enterprises.38012.1.1.0 = STRING: "USL JSD-100MA"
SNMPv2-SMI::enterprises.38012.1.2.0 = STRING: "12345"
SNMPv2-SMI::enterprises.38012.1.3.0 = STRING: "E"
SNMPv2-SMI::enterprises.38012.1.4.0 = STRING: "110630"
SNMPv2-SMI::enterprises.38012.1.5.0 = STRING: "1110525"
SNMPv2-SMI::enterprises.38012.1.6.0 = STRING: "2110525"
SNMPv2-SMI::enterprises.38012.1.7.0 = STRING: "Analog 16"
SNMPv2-SMI::enterprises.38012.1.8.0 = STRING: "110512"
SNMPv2-SMI::enterprises.38012.2.1.0 = STRING: "JSD-100"
SNMPv2-SMI::enterprises.38012.2.2.0 = IpAddress: 192.168.1.159
SNMPv2-SMI::enterprises.38012.2.3.0 = IpAddress: 255.255.255.0
SNMPv2-SMI::enterprises.38012.2.4.0 = IpAddress: 192.168.1.1
SNMPv2-SMI::enterprises.38012.2.5.0 = STRING: "69.25.96.13"
SNMPv2-SMI::enterprises.38012.3.1.0 = STRING: "USL San Luis Obispo"
SNMPv2-SMI::enterprises.38012.3.2.0 = INTEGER: 0
SNMPv2-SMI::enterprises.38012.3.3.0 = INTEGER: 1
SNMPv2-SMI::enterprises.38012.4.1.0 = INTEGER: 8
SNMPv2-SMI::enterprises.38012.4.2.0 = STRING: "Non/Sync"
```

SNMPv2-SMI::enterprises.38012.4.3.0 = INTEGER: 70  
SNMPv2-SMI::enterprises.38012.4.4.0 = INTEGER: 0  
SNMPv2-SMI::enterprises.38012.4.5.1.0 = INTEGER: 14  
SNMPv2-SMI::enterprises.38012.4.5.2.0 = INTEGER: 0  
SNMPv2-SMI::enterprises.38012.4.5.2.1 = INTEGER: 1  
SNMPv2-SMI::enterprises.38012.4.5.2.2 = INTEGER: 2  
SNMPv2-SMI::enterprises.38012.4.5.2.3 = INTEGER: 3  
SNMPv2-SMI::enterprises.38012.4.5.2.4 = INTEGER: 4  
SNMPv2-SMI::enterprises.38012.4.5.2.5 = INTEGER: 5  
SNMPv2-SMI::enterprises.38012.4.5.2.6 = INTEGER: 6  
SNMPv2-SMI::enterprises.38012.4.5.2.7 = INTEGER: 7  
SNMPv2-SMI::enterprises.38012.4.5.2.8 = INTEGER: 8  
SNMPv2-SMI::enterprises.38012.4.5.2.9 = INTEGER: 9  
SNMPv2-SMI::enterprises.38012.4.5.2.10 = INTEGER: 10  
SNMPv2-SMI::enterprises.38012.4.5.2.11 = INTEGER: 11  
SNMPv2-SMI::enterprises.38012.4.5.2.12 = INTEGER: 12  
SNMPv2-SMI::enterprises.38012.4.5.2.13 = INTEGER: 13  
SNMPv2-SMI::enterprises.38012.4.5.2.14 = INTEGER: 14  
SNMPv2-SMI::enterprises.38012.4.5.2.15 = INTEGER: 15  
SNMPv2-SMI::enterprises.38012.4.5.2.16 = INTEGER: 16  
SNMPv2-SMI::enterprises.38012.4.5.2.17 = INTEGER: 17  
SNMPv2-SMI::enterprises.38012.4.5.2.18 = INTEGER: 18  
SNMPv2-SMI::enterprises.38012.4.5.2.19 = INTEGER: 19  
SNMPv2-SMI::enterprises.38012.4.5.2.20 = INTEGER: 20  
SNMPv2-SMI::enterprises.38012.4.5.2.21 = INTEGER: 21  
SNMPv2-SMI::enterprises.38012.4.5.2.22 = INTEGER: 22  
SNMPv2-SMI::enterprises.38012.4.5.2.23 = INTEGER: 23  
SNMPv2-SMI::enterprises.38012.4.5.2.24 = INTEGER: 24  
SNMPv2-SMI::enterprises.38012.4.5.2.25 = INTEGER: 25  
SNMPv2-SMI::enterprises.38012.4.5.2.26 = INTEGER: 26  
SNMPv2-SMI::enterprises.38012.4.5.2.27 = INTEGER: 27  
SNMPv2-SMI::enterprises.38012.4.5.2.28 = INTEGER: 28  
SNMPv2-SMI::enterprises.38012.4.5.2.29 = INTEGER: 29  
SNMPv2-SMI::enterprises.38012.4.5.2.30 = INTEGER: 30  
SNMPv2-SMI::enterprises.38012.4.5.2.31 = INTEGER: 31  
SNMPv2-SMI::enterprises.38012.4.5.3.0 = STRING: "L"  
SNMPv2-SMI::enterprises.38012.4.5.3.1 = STRING: ""  
SNMPv2-SMI::enterprises.38012.4.5.3.2 = STRING: "C"  
SNMPv2-SMI::enterprises.38012.4.5.3.3 = STRING: ""  
SNMPv2-SMI::enterprises.38012.4.5.3.4 = STRING: "R"  
SNMPv2-SMI::enterprises.38012.4.5.3.5 = STRING: "SR"  
SNMPv2-SMI::enterprises.38012.4.5.3.6 = STRING: ""  
SNMPv2-SMI::enterprises.38012.4.5.3.7 = STRING: "BS"  
SNMPv2-SMI::enterprises.38012.4.5.3.8 = STRING: ""  
SNMPv2-SMI::enterprises.38012.4.5.3.9 = STRING: "CS"  
SNMPv2-SMI::enterprises.38012.4.5.3.10 = STRING: ""  
SNMPv2-SMI::enterprises.38012.4.5.3.11 = STRING: "PS"  
SNMPv2-SMI::enterprises.38012.4.5.3.12 = STRING: ""  
SNMPv2-SMI::enterprises.38012.4.5.3.13 = STRING: "LF"  
SNMPv2-SMI::enterprises.38012.4.5.3.14 = Hex-STRING: 00  
SNMPv2-SMI::enterprises.38012.4.5.3.15 = Hex-STRING: 00

## JSDV-100 Remote Volume Control

The JSDV-100 remote volume control can be installed in an auditorium or other location. It is wired to the JSD-100 USL Link using CAT-5 cable with an RJ 25 connector on each end. The JSDV-100 includes a two digit seven segment display that shows the current output level. It also includes a fader control knob that can be used to adjust the main fader level. After making an adjustment, the JSDV-100 display blanks in the number of seconds specified under the global tab (as described above) unless the timeout is set to zero seconds. In that case, the display is lit continuously.

When the JSDV-100 is first connected or the JSD-100 is powered up, the JSD-100 “discovers” the JSDV-100 units on the USL Link. Each JSD-100 supports up to 256 JSDV-100 units on its USL Link. As the devices are discovered, their discovery is logged. Adjustments to the main fader level by a JSDV-100 are also logged, including which JSDV-100 made the adjustment.

For further information on the installation of the JSDV-100, consult the instructions that are included with the JSDV-100.

The image below (from the web log) shows discovery of a JSDV-100 and a fader adjustment.

Record Number	UTC Time	GUI Time Pacific Daylight Time	JSD Time PDT	Source	Event	Details
4279	Fri Jul 1 19:20:01 2011	Fri Jul 1 12:20:01 2011	Fri Jul 1 12:20:01 2011	USL Link	Discovery	Discovered remote fader #228
4280	Fri Jul 1 19:20:29 2011	Fri Jul 1 12:20:29 2011	Fri Jul 1 12:20:29 2011	front panel	Input change	input mode changed to Non/Sync
4281	Fri Jul 1 19:20:30 2011	Fri Jul 1 12:20:30 2011	Fri Jul 1 12:20:30 2011	internal	Fader change	Format change reloaded last fader of 7.0
4282	Fri Jul 1 19:20:30 2011	Fri Jul 1 12:20:30 2011	Fri Jul 1 12:20:30 2011	internal	status	Digital input OK or unselected
4283	Fri Jul 1 19:20:43 2011	Fri Jul 1 12:20:43 2011	Fri Jul 1 12:20:43 2011	USL Link	Fader change	Remote fader #228 changed level to 7.1

## 10. Product Support

USL proudly stands behind its products. We are ready to answer questions about the installation or operation of the JSD-100. Application notes, manuals, and other documents are available on our website. You may contact us by:

- Phone: +1 805 549 0161
- E-mail: [support@uslinc.com](mailto:support@uslinc.com)
- You may file a support ticket at: [www.uslinc.com/support](http://www.uslinc.com/support)

USL is interested in your comments. Please feel free to contact us with any comments or suggestions.

## Appendix A – Connector Pin Outs

### Connector Pin Outs

For convenience, all connector pin outs are located in this appendix.

**DB25F AES Input.** The JSD-100 uses an industry standard pin out for the multi-channel AES digital audio input. Cable should be twisted pairs with individual shields and 110 ohm characteristic impedance. The USL supplied ferrite block should be clipped on to the cable adjacent to the connector to comply with FCC and CE emission requirements.

Audio Channels	AES Pair	JSD-100 Pin out ( +, -, shield )	Speakers
1,2	1	24, 12, 25	L, R
3, 4	2	10, 23, 11	C, LFE
5, 6	3	21, 9, 22	Ls, Rs
7, 8	4	7, 20, 8	
9, 10	5	18, 6, 19	
11, 12	6	4, 17, 5	
13, 14	7	15, 3, 16	
15, 16	8	1, 14, 2	

### RJ-45 AES Input

The JSD-100 uses the StudioHub pin out for AES over CAT5 or CAT6 Ethernet cable. These cables are twisted pair and have the required characteristic impedance. The USL supplied ferrite block should be clipped on to the cables adjacent to the connectors to comply with FCC and CE emission requirements. The top RJ-45 connector connects to audio channels 1 through 8. The bottom RJ-45 connector connects to audio channels 9 through 16 if the optional DI-80 board is installed.

Audio Channels	AES Pair	Top RJ-45 Pins ( +, - )	Speakers
1, 2	1	1, 2	L, R
3, 4	2	3, 6	C, LFE
5, 6	3	4, 5	Ls, Rs
7, 8	4	7, 8	

Audio Channels	AES Pair	Bottom RJ-45 Pins ( +, - )
9, 10	5	1, 2
11, 12	6	3, 6
13, 14	7	4, 5
15, 16	8	7, 8

### Eight Channel Analog Input

The JSD-100 eight channel analog input is on a DB25F connector. The analog inputs are active balanced (differential) inputs. They may be driven by balanced or unbalanced sources. When driven by an unbalanced source, the negative input should be connected to the low side of the source at the source equipment to minimize ground loop noise. The cable should be twisted pair with individual shields, even when driven by an unbalanced source. A USL supplied ferrite block should be clipped around the cable to insure FCC and CE EMI requirements are met. The DB25F connector uses the THX® pin out as specified in the table below.

Channel Number	DB25F PINS ( +, -, shield )	Speakers
1	2, 14, 1	Left
2	8, 20, 7	Right
3	5, 17, 4	Center
4	25, 12, 13	LFE
5	23, 10, 22	Ls
6	24, 11, 9	Rs
7	16, 3, 15	Lc/Lrs
8	19, 6, 18	Rc/Rrs

### **Eight Channel Module Main Audio Outputs**

The main outputs drive a Phoenix connector and a DB25M. The Phoenix output terminals are marked “Main Outputs,” and the DB25M connector is marked “Monitor Outputs.” The DB25M typically drives a booth monitor (such as the USL CM-680), while the Phoenix terminals drive the auditorium amplifiers or crossover. These outputs are connected together within the JSD-100. The final two channels can be configured in the GUI as either Lrs/Rrs or Lc/Rc. The DB25M connector uses the same THX® pin out as the eight channel analog input. The USL supplied ferrite block should be clipped on to the cables adjacent to the connectors to comply with FCC and CE emission requirements.

Audio Channel	Phoenix Main Output Pins (+, -, shield)	DB25M Monitor Output Pins (+, -, shield)
Left	1, 2, 3	2, 14, 1
Center	4, 5, 3	5, 17, 4
Right	6, 7, 8	8, 20, 7
LFE	9, 10, 8	25, 12, 13
Ls	11, 12, 13	23, 10, 22
Rs	14, 15, 13	24, 11, 9
Lrs/Lc	16, 17, 18	16, 3, 15
Rrs/Rc	19, 20, 18	19, 6, 18

### **Sixteen Channel Module Main Audio Outputs**

The main outputs drive a pair of Phoenix connectors, and a pair of DB25 connectors. The Phoenix output terminals are marked “Main Outputs” and “Optional Outputs.” The DB25M is marked “Monitor 1 Outputs,” and the DB25F connector is marked “Monitor 2 Outputs.” The DB25 connectors typically drive a booth monitor, while the Phoenix terminals drive the auditorium amplifiers or crossover. The corresponding Phoenix strips and DB25 connectors are connected together within the JSD-100.

The final two channels on the “main outputs” can be configured in the GUI as either Lrs/Rrs or Lc/Rc except if the speaker configuration is 13.1. When the speaker configuration is 13.1, these two channels are always Lc/Rc. The DB25M connector uses the same THX® pin out as the eight channel analog input. The USL supplied ferrite block should be clipped on to the cables adjacent to the connectors to comply with FCC and CE emission requirements.

The “optional outputs” can be configured as additional full range channels (for example, for 13.1 sound), or may be configured as the outputs of the internal crossovers.

Note that the 16 channel analog output module supports crossovers. To allow for proper bypass operation, a passive crossover is included. For full band operation (crossovers not currently implemented), set all four DIP switches to OFF and set the MID and HIGH trim pots to full counter-clockwise. Adjust the LOW trim pot for the desired full range bypass audio level. Remember that the front panel fader also affects output level when in bypass.

Full Range Audio Channel	Biamp Audio Channel	Triamp Audio Channel	Phoenix Main Output Pins (+, -, shield)	DB25M Monitor 1 Output Pins (+, -, shield)
Left	Left Low	Left Low	1, 2, 3	2, 14, 1
Center	Center Low	Center Low	4, 5, 3	5, 17, 4
Right	Right Low	Right Low	6, 7, 8	8, 20, 7
LFE	LFE1	LFE1	9, 10, 8	25, 12, 13
Ls	Ls	Ls	11, 12, 13	23, 10, 22
Rs	Rs	Rs	14, 15, 13	24, 11, 9
Lrs/Lc (Lc only in 13.1)	Lc Low	Lc Low	16, 17, 18	16, 3, 15
Rrs/Rc (Rc only in 13.1)	Rc Low	Rc Low	19, 20, 18	19, 6, 18

Full Range Audio Channel	Biamp Audio Channel	Triamp Audio Channel	Phoenix Optional Output Pins (+, -, shield)	DB25F Monitor 2 Output Pins (+, -), shield on pin 7
LFE2	Left High	Left High	1, 2, 3	13, 12
OUT 9	Lc High	Left Mid	4, 5, 3	14, 15
OUT 13	Unused	Center Mid	6, 7, 8	4, 18
OUT 14	Center High	Center High	9, 10, 8	5, 17
OUT 10	Rc High	Rc High	11, 12, 13	9, 22
LFE3	Right High	Right High	14, 15, 13	8, 20
Lrs	Lrs	Lrs	16, 17, 18	16, 3
Rrs	Rrs	Rrs	19, 20, 18	19, 6

### HI/VI-N Outputs

The JSD-100 has balanced HI and VI-N outputs that can drive balanced or unbalanced loads. As with other outputs, the use of twisted pair shielded cable is suggested whether the load is balanced or unbalanced. When driving an unbalanced load, connect the “ - ” output of the JSD-100 to low side of the unbalanced input at the destination end of the cable to minimize ground loop noise. The source of audio to drive the HI and VI-N outputs is configurable on a per-format basis. The VI-N audio output is typically driven by AES input 16. The HI audio output can be driven from AES inputs 7 or 15, or from a main audio mix. The USL supplied ferrite block should be clipped on to the cables adjacent to the connectors to comply with FCC and CE emission requirements.

Audio Channel	HI/VI-N Phoenix Connector Pins (+, -, shield)
HI	1, 2, 3
VI-N	4, 5, 3

### Parallel Automation Interface

Pins 1 through 10 of the DB25F automation connector are “control” pins that accept contact closure or open collector pulses to ground to select formats. On a format change, the corresponding pin is also pulsed low allowing this interface to drive other equipment. Pulsing pin 11 low toggles the mute state. Pins 14 through 24 are “status” pins. One of the pins 14 through 23 is pulled low continuously by the JSD-100 to indicate the selected format. These pins could drive LEDs with a 470 ohm series resistor to provide a remote format indication. The JSD-100 pulls pin 24 low when the system is muted. Pins 1 through 11 are internally pulled up to +8.4V. They each source 400uA when grounded. A pin needs to be pulled below 2.6V for 10ms or more for the JSD-100 to recognize it as low. On a format change, the JSD-100 pulls the appropriate pin low for 500ms. +5V at 100mA is available on pin 13 to drive external LEDs or relays. The individual control and status outputs can sink up to 150mA with an open circuit voltage of +12VDC for inductive loads like relays or +24V for non-inductive loads (indicator lamps, etc.). Pin 12 is the “automation return.” Use this as the low side of switches and indicators instead of using chassis ground. It is ground through a 10 ohm resistor to limit ground loop current. The USL supplied ferrite block should be clipped on to the cables adjacent to the connectors to comply with FCC and CE emission requirements.

Pin	Description
1	Control 1. Pulse low to select format 1 (COAX1). Pulses low when format 1 selected.
2	Control 2. Pulse low to select format 2 (COAX2). Pulses low when format 2 selected.
3	Control 3. Pulse low to select format 3 (TOSLINK). Pulses low when format 3 selected.
4	Control 4. Pulse low to select format 4 (16 Channel Digital). Pulses low when format 4 selected.
5	Control 5. Pulse low to select format 5 (User 1). Pulses low when format 5 selected.
6	Control 6. Pulse low to select format 6 (User 2). Pulses low when format 6 selected.
7	Control 7. Pulse low to select format 7 (8 Channel Analog). Pulses low when format 7 selected.
8	Control 8. Pulse low to select format 8 (Non/Sync). Pulses low when format 8 selected.
9	Control 9. Pulse low to select format 9 (AUX). Pulses low when format 9 selected.
10	Control 10. Pulse low to select format 10 (MIC). Pulses low when format 10 selected.
11	Mute. Pulse low to toggle the mute state of the system.
12	Automation Return. Return control and status signals here.
13	+5V at 100mA to drive external indicators.
14	Status 1. Low when format 1 (COAX1) is selected.
15	Status 2. Low when format 2 (COAX2) is selected.
16	Status 3. Low when format 3 (TOSLINK) is selected.
17	Status 4. Low when format 4 (16 Channel Digital) is selected.
18	Status 5. Low when format 5 (USER 1) is selected.
19	Status 6. Low when format 6 (USER 2) is selected.
20	Status 7. Low when format 7 (8 Channel Analog) is selected.
21	Status 8. Low when format 8 (NON/SYNC) is selected.
22	Status 9. Low when format 9 (AUX) is selected.
23	Status 10. Low when format 10 (MIC) is selected.
24	Mute Status. Low when the system is muted.
25	Unused. Make no connection to this pin.

### RS-232 Interface

The RS-232 interface appears on a DE9F connector on the rear panel. The connector is wired as a DCE device. A command interpreter accepts ASCII commands (described in Appendix B) over the RS-232 and Ethernet interfaces. The RS-232 port operates at 38.4kbps, 8N1 (8 data bits, no parity, 1 stop bit), hardware handshake. In most situations, no handshake is required, and the RTS and CTS pins can be left open. The USL supplied ferrite block should be clipped on to the cables adjacent to the connectors to comply with FCC and CE emission requirements.

Pin	Description
1	DCD – Internally connected to pins 4 and 6. Does not need to be connected in most cases.
2	TXD – The JSD-100 transmits data on this pin.
3	RXD – The JSD-100 receives data on this pin.
4	DTR – Internally connected to pins 1 and 6. Does not need to be connected in most cases.
5	GND – Signal ground.
6	DSR – Internally connected to pins 1 and 4. Does not need to be connected in most cases.
7	CTS – The JSD-100 holds off transmitting data if the device connected to the JSD-100 drives this pin low. Data transmission is resumed when this pin is driven high. The pin is pulled high in the JSD-100 so the pin can be left open in most cases.
8	RTS – The JSD-100 drives this pin low when it is not ready to receive data and drives it high when it is ready to receive data. In most cases this pin can be left open.
9	RI – The JSD-100 provides a current limited (900mA) +5V to drive external equipment on this pin.

**USL Link**

The USL Link is an RS485 bus used to interface the JSD-100 to other USL devices such as the JSDV-100 remote volume control (discussed earlier in this manual). The USL supplied ferrite block should be clipped on to the cables adjacent to the connectors to comply with FCC and CE emission requirements.

<b>Pin</b>	<b>Description</b>
1	Current limited (100mA) +5V to drive external devices.
2	RS485 Signal Ground.
3	RS485 Data.
4	RS485 Data Not.
5	No Connect.
6	No Connect.

## Appendix B – Automation Commands

These commands are used to query the status of the JSD-100 or change its operation (adjust level, select input, etc.). The commands are typically sent by an automation system. They may be sent over RS-232 or Ethernet. This is a subset of the full command set. The full command set includes commands for adjust equalization, etc. Commands are not echoed by the JSD-100. Commands are terminated by a carriage return (0x0d). Commands are tab delimited. There needs to be a tab character (0x09) between the command and the first parameter, then another tab before the second parameter, etc. The JSD-100 responds to every command. Responses are also tab delimited and are terminated with a carriage return. All commands are lower case and are case sensitive. **Note:** Every command generates some sort of response that must be picked up by the command sender. Failure to pick up these responses can cause buffers in the JSD-100 or the host to fill, possibly halting communications. If the response is not needed, a simple "eat garbage" routine that loops until the receive buffer is empty should be called before sending a command.

### RS-232

The JSD-100 is a DCE device that transmits on pin 2 of the 9 pin D connector. The JSD-100 receives data on pin 3. Communications is at 38.4kbps, 8N1 (8 databits, no parity, 1 stop bit).

### Ethernet

The JSD-100 listens on port 10001 for TCP connections from other equipment (typically a digital cinema server). Commands and responses are then exchanged in ASCII.

### Automation Command List

The Automation Command List shown in table below:

Command	Response	Description
jsd100.sys.fader 700	700	Sets or reads the current fader level. If a parameter is provided, the main fader is set to the corresponding level. The parameter is the fader level times 100. In this example, the fader is set to 7.0. If no parameter is supplied, the fader level is not changed. The command always returns the current fader level times 100. If the command changed the fader level, the new level is returned.
jsd100.sys.fader_rel -50	-50	Makes a relative adjustment to the current fader level. The parameter is the relative adjustment times 100. In the example, the fader level was decreased by 0.5 (perhaps from 7.0 to 6.5). The relative adjustment that was made is returned.
jsd100.sys.input_mode 4	4	Selects or reads the input format. If a parameter is supplied, the JSD-100 is switched to this input. In the example, input mode 4, corresponding to button 4 on the front panel (Digital 16 Channel) is selected. If no parameter is supplied, no change is made to the current input mode. The command always returns the currently selected input mode. If a parameter was provided, the new input mode is returned. If no parameter was provided, the currently selected input mode is returned.

Command	Response	Description
jsd100.sys.mute 1	1	Sets or reads the current mute status of the JSD-100. If the supplied parameter is 1, the system is muted. If the supplied parameter is 0, the system is unmuted. If no parameter is supplied, the mute status of the system remains unchanged. The command always returns the current mute status of the system. If the command includes a parameter, the new mute status is returned. If no parameter is supplied, the current mute status is returned.
jsd100.sys.sleep 120	120	Sets or reads the sleep timer. If no parameter is provided, the JSD-100 returns the number of minutes until it will go to sleep. This timer is reset to the sleep timeout value on output audio presence, format change, or fader level change. If a parameter is provided, the sleep timer is set to the specified number of minutes. If there is output audio, a format change, or a fader level change, the sleep timer is set to its timeout value. If the parameter to this command is non-zero and the system is sleeping, the system will wake up.

### DCS Configuration

A Digital Cinema Server is normally configured to send commands to the JSD-100 over Ethernet or RS-232 at appropriate times during content playout. The user needs to configure macros to send commands to the JSD-100. Servers vary in how control characters (such as tab and carriage return) are entered. The table below lists a few servers and how control characters are entered. Consult the Knowledge Base on the USL website for updates to this list.

DCS Manufacturer	Control Code Entry
Dolby	Automation commands are currently only supported over RS-232, not Ethernet. In Show Manager, on the "serial automation" system page, there is a "termination" field where you can put byte codes to be added to the end of each command. By default the system includes "\0A" (line feed) in this field, but you can change it "\0D" (carriage return) or any other sequence. This will terminate each automation string. To insert a tab in an automation string, use "\09".
Doremi	Use "\r" to send a carriage return at the end of a string defined for a raw device. Use "\t" to inset a tab in an automation string.

## Appendix C – System Restore and Power Up Buttons

### System Restore

The JSD-100 has several methods of recovering from an unlikely failure. These are detailed below.

### Bypass Mode

When the JSD-100 main power switch is off and the bypass power supply is plugged in, independent bypass circuitry creates a mono sum of the selected analog or digital input audio and routes it to the left and right outputs. A quick way of recovering from a system failure is to turn the JSD-100 off.

### Restore Factory Firmware

If a firmware update of the main (PIC) processor is interrupted, it is possible to leave the system inoperable. To restore the factory installed firmware, turn off the JSD-100, then hold down buttons 4 and 6 (Digital 16 Channel and User 2) while turning the power back on. The front panel LEDs will start flashing. Release the buttons when the LEDs start flashing. When the LEDs stop flashing, the system will restart with the original firmware. The interrupted firmware update can then be repeated.

### Load Configuration from SD Card

The SD card is used as a "personality module" in the JSD-100. Should a JSD-100 be replaced, all the saved settings from the old unit can be easily loaded in to the new unit without the use of a computer. These settings were saved during the initial configuration using the Backup button on the GUI. To restore the settings to a new JSD-100, insert the card from the old unit (behind the removable cover on the rear panel) in the new unit. With the JSD-100 off, hold down buttons 9 and 10 (AUX and MIC) down while turning on the power. Continue to hold the buttons about 30 seconds until the display says "Loading from SD card." The configuration will be loaded and copied to the internal non-volatile memory. The JSD-100 is now configured the same as the previous unit. Any errors (missing card, missing file, etc.) are reported on the display.

### Power Up Buttons

The JSD-100 checks the state of front panel buttons during power up to determine if some special action is required. During normal operation, no front panel buttons are down during power up. The table below describes the response of the JSD-100 when buttons are held down during power up.

Buttons	Action
DIGITAL 16, USER 2	Restores factory installed firmware and configuration. Hold buttons until front panel LEDs start flashing.
NON/SYNC, MIC	Skips load from external flash memory. All configuration settings are set to defaults. Hold buttons until normal display appears.
AUX, MIC	Loads configuration from SD card and saves to external flash. This is usually used when swapping out a JSD-100, as described above.
MUTE	Hold the mute button down to suspend the boot process so boot data on display can be read. Boot process continues when button is released.

### **JSD-100 Manual Revision History**

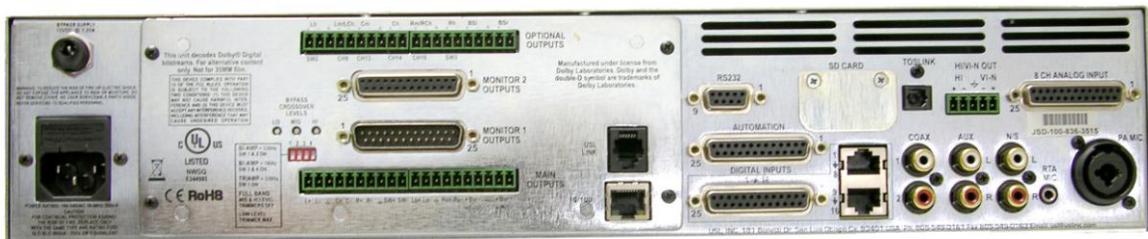
1. April 2010 – First Edition (preliminary).
2. October 2010 - Second Edition.
3. July 12, 2011 – Third Edition. Adds support for 16 channel output module, changes speaker names, documents additional features. Some structure changes.



**Additional JSD-100 Manuals may be viewed / downloaded at:**  
[www.uslinc.com](http://www.uslinc.com)



JSD-100x with 8 analog channel output module



JSD-100xA with 16 analog channel output module



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