

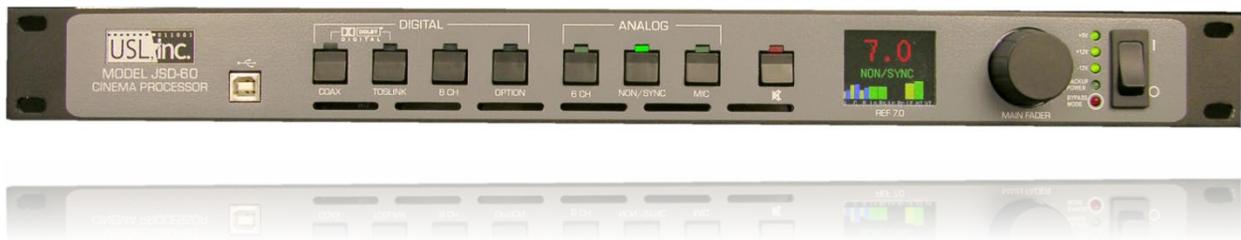


# USL JSD-60 User Manual

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Cinema Processor





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**WARNING! TO PREVENT FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE.**

**ATTENTION! AFIN D'ÉVITER TOUT INCENDIE OU UN CHOC ÉLECTRIQUE, N'EXPOSEZ PAS CET ÉQUIPEMENT À LA PLUIE OU À L'HUMIDITÉ.**

**WARNUNG! SETZEN SIE DIESES GERÄT WEDER REGEN NOCH FEUCHTIGKEIT AUS, UM BRÄNDE ODER STROMSCHLÄGE ZU VERMEIDEN.**

## 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 the correct power cable.** Use only the power cable provided. Make sure that the AC power outlet is located near the product and is easily accessible.
- **Use a correctly grounded power source.** The safety ground is established through the ground conductor in the power cable. To prevent electric shock, the ground conductor must be intact.
- **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 recommended operating temperature range is between 0° C and 40° C. The allowable 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.
- **The appliance coupler (IEC connection) or the AC mains plug is the AC mains disconnect and shall remain readily accessible after installation.**

## 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 chaleur proches. Ce produit ne devrait pas être localisé des sources de la chaleur proches tel que radiateurs, registres de la chaleur, poêles, ou amplificateurs.
- Fournissez ventilation adéquate. La température du fonctionnement devrait être entre 0° C et 40° C.
- L'humidité devrait être 20% et 80%. La méthode refroidissante 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 coupleur d'appareil (connexion CEI) ou la fiche secteur est la déconnexion du secteur et doit rester facilement accessible après l'installation.**

## Allgemeine Europäische Sicherheitszusammenfassung

Beachten Sie die folgenden Sicherheitshinweise um Verletzungen zu vermeiden und Schaden an diesem Produkt zu verhindern. Um potentielle Risiken zu vermeiden, benutzen Sie dieses Produkt nur wie beschrieben und nur für den in der Bedienungsanleitung identifizierten Zweck.

### Um Feuer und Verletzung zu vermeiden:

- Benutzen Sie das korrekte Netzkabel. Nur das bereitgestellte Netzkabel soll benutzt werden. Stellen Sie sicher, daß die Wechselstromsteckdose in der Nähe des Produktes und leicht zugänglich ist.
- Benutzen Sie eine korrekt geerdete Stromquelle. Die Erdung des Netzteils wird durch den Erdleiter im Stromkabel hergestellt. Um das elektrische Schockrisiko zu vermeiden muß der Erdleiter korrekt sein.
- Beachten Sie die Nennwerte der Stromquelle. Um das Risiko von Feuer oder elektrischem Schock zu vermeiden muß eine 100-240 VAC 50-60 Hz Stromquelle benutzt werden.
- Betreiben Sie das Gerät nicht wenn Fehlverdacht besteht. Wenn Sie vermuten, daß das Gerät defekt oder beschädigt ist, kontaktieren Sie den Hersteller.
- Versuchen Sie keine Reparatur. Nur ein vom Hersteller ausgebildeter Servicetechniker ist befugt dieses Produkt zu reparieren.
- Betreiben Sie dieses Produkt nicht in der Nähe von Wärmequellen. Dieses Produkt sollte nicht in die Nähe von Wärmequellen, wie zum Beispiel Heizungen, Herden und Warmluftöffnungen gestellt werden.
- Erlauben Sie für ausreichende Belüftung. Die Betriebstemperatur sollte zwischen 0° C und 40° C sein, die Luftfeuchtigkeit sollte 20% bis 80% nicht kondensierend, betragen. Luftzufuhr erfolgt durch Umluft und ein internes Gebläse.
- Halten Sie die Produktoberflächen sauber und trocken. Ziehen Sie das Netzkabel aus der Steckdose vor der Reinigung. Benutzen Sie keine flüssigen oder Druckluft Reinigungsmittel. Benutzen Sie ein feuchtes Tuch zum Reinigen.
- Schieben Sie keine Gegenstände in die Öffnungen dieses Produktes.
- Betreiben Sie dieses Produkt nicht in nassen oder feuchten Bereichen.
- Betreiben Sie dieses Produkt nicht in explosiven Bereichen.
- Inspizieren Sie das Netzkabel und all anderen Kabel vor Benutzung. Bestätigen Sie, daß das Netzkabel und andere Kabel unbeschädigt sind.
- Betreiben Sie dieses Produkt nicht wenn es geöffnet oder Abdeckungen entfernt worden sind.
- Vermeiden Sie ungeschützte Schaltkreise. Öffnen Sie das Netzteil nicht, da sonst die Sicherheitszulassung ungültig würde. Das Netzteil ist ein unreparierbares luftdicht verschlossenes Gerät.
- Verhindern Sie das Verschütten von Flüssigkeiten auf die Systembestandteile.
- **Der Gerätestecker (IEC-Anschluss) oder der Netzstecker ist der Netztrenner und muss nach der Installation frei zugänglich bleiben.**

## **2. Legal Notices**

Manufactured under license from Dolby Laboratories®. Dolby® and the Double-D symbol are trademarks of Dolby Laboratories®.

Manufactured under license under U.S. Patent Nos: 5,956,674; 5,974,380; 6,487,535 & other U.S. and worldwide patents issued & pending. DTS, the Symbol, & DTS and the Symbol together are registered trademarks & DTS Digital Surround and the DTS® logos are trademarks of DTS, Inc. Product includes software. © DTS®, Inc. All Rights Reserved. The JSD-60 includes technology used under license from Harman International Industries.

## **3. Regulatory Compliance**

### **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 the user's own expense.

### **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.

### **Lifetime**

This product can be expected to operate for 10 years.

### **Storage**

-20 to 70°C, 5% to 95% relative humidity (non-condensing).

## RoHS

这些产品 均符合“中国 RoHS”指令。 以下图表适用于在中国及其各地区使用的产品：

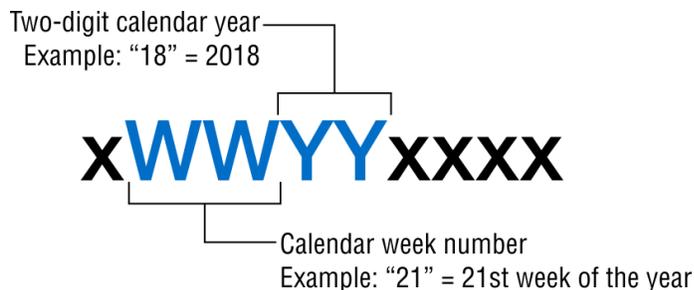
部件名称 (Part Name)	These products 这些产品					
	有害物质 (Hazardous Substances)					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(vi))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
电路板组件 (PCB Assemblies)	X	0	0	0	0	0
机壳装配件 (Chassis Assemblies)	X	0	0	0	0	0

本表格依据 SJ/T 11364 的规定编制。(This table is prepared following the requirement of SJ/T 11364.)  
 0: 表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 规定的限量要求以下。  
 0: Indicates that the concentration of the substance in all homogeneous materials of the part is below the relevant threshold specified in GB/T 26572.  
 X: 表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 规定的限量要求。  
 X: Indicates that the concentration of the substance in at least one of all homogeneous materials of the part is above the relevant threshold specified in GB/T 26572.  
 (目前由于技术或经济的原因暂时无法实现替代或减量化) (Replacement and reduction of content cannot be achieved currently because of the technical or economic reason.)

NOTE: The JSD-60 Cinema Processor is manufactured in the USA.

## Serial Number Date Code Explanation

The product's serial number includes information that identifies the week of manufacture. Use the diagram below to interpret the date code.



## 4. Warranty

For a copy of the QSC Limited Warranty, visit the QSC website at [www.qsc.com](http://www.qsc.com).

Para una copia de la garantía limitada de QSC, visite el sitio web de QSC, en [www.qsc.com](http://www.qsc.com)

Pour obtenir une copie de la garantie limitée de QSC, visitez le site de QSC à [www.qsc.com](http://www.qsc.com)

Eine Kopie der beschränkten QSC-Garantie finden Sie auf der QSC Webseite unter [www.qsc.com](http://www.qsc.com).

如果您想要QSC有限保修的複印本，请造访QSC音频产品的网站[www.qsc.com](http://www.qsc.com)

Для получения копии ограниченной гарантии QSC посетите веб-сайт QSC, расположенный по адресу [www.qsc.com](http://www.qsc.com).

الضمان من نسخة على للحصول QSC، ت لك إ الموقع بزيارة قم \_ ني و ش ل كة QSC على الصوتية للمنتجات [www.qsc.com](http://www.qsc.com) الخاص المحدود

## 5. System Overview

### 5.1 SYSTEM DESCRIPTION

The JSD-60 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 six standard formats. A user-configurable format button can be configured to support a variety of existing and future formats. It 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 audio level on each audio output. The built-in bypass audio circuitry ensures that the presentation goes on in the unlikely event of a system failure.

The JSD-60 is “automation friendly.” It features the standard DB25 parallel automation interface, an RS-232 (EIA232) interface, and Ethernet. The Ethernet interface accepts five 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 (GUI) runs on Windows XP®, Windows 7®, Windows 8®, and Windows 10® operating systems. It allows for complete system configuration, monitoring, and firmware updates over USB, Ethernet, or RS-232. The JSD-60 graphical user interface simplifies installation by including sound pressure level measurement and automatic equalization. System monitoring, control, and firmware update functions are also available on a standard web browser.

The JSD-60 includes a precision 1/3 octave RTA that uses the filters specified in ANSI S1.11-1986. The JSD-60 also does sound pressure measurements using the C-weighted filter specified in ANSI S1.4-1983. The RTA and SPL meter can be used to equalize an auditorium manually or automatically.

The JSD-60 includes an automatic equalization feature (auto-EQ). Auto-EQ uses user-defined microphone calibration files and standard or user-defined equalization curves to automatically adjust the graphic equalizer on each channel.

The JSD-60 supports graphic and parametric equalization methods with bass management.

The JSD-60 is also “diagnostic friendly.” The system logs the last 15,000 events (format changes, level changes, internal temperature, loss of AES/EBU 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).

An optional plug-in module decodes Dolby Digital® and DTS® encoded content.

The HI and VI-N outputs are configurable on a per-format basis.

An optional crossover card supports bi-amp of three screen channels and provides two LFE outputs.

An optional AES/EBU output card provides 12 channels of AES/EBU. The AES/EBU outputs are on two RJ45 connectors and provide full range or bi-amp screen channels plus the surround channels and two LFE outputs.

An optional BLU link output card provides 12 channels on a Harman BLU link loop. The BLU link loop is driven by two RJ45 connectors and provides full range or bi-amp screen channels plus the surround channels and two LFE outputs. Note that the JSD-60 is the BLU link loop clock master and runs the loop at 96 kHz.

A user configurable mixer routes audio as required for the specific auditorium. Supported auditorium configurations include 5.1, 7.1DS, 7.1SDDS, and drive-in.

## 5.2 MODEL NUMBERS

An optional output board is part of the unit's assembly that supports a variety of output configurations. These are listed in the table below.

The various JSD-60 options are identified by model number suffixes as shown in the tables below. The first letter identifies input options such as the presence or absence of Dolby Digital® and DTS® decoding. The second letter indicates the type of output. Note that all units have analog HI/VI-N in addition to the outputs listed in the following tables:

First Suffix Letter	Description	USL Module Part Number
L	8 channel AES/EBU input, no Dolby Digital® or DTS® decode	N/A
D	8 channel AES/EBU input, Dolby Digital® and DTS® decode for alternative content	DI-84

Second Suffix Letter	Description	USL Module Part Number
None	8 channel analog output	N/A
N	BLU link output	JSDN-60
S	AES/EBU output	JSDS-60
X	8 channel analog output with bi-amp for three screen channels and two LFE outputs	XTD-60

A JSD-60DX has eight AES/EBU input channels, Dolby Digital® and DTS® decoding for alternative content with bi-amp analog outputs.

## 6. Specifications

### Features

A processor specially designed for Digital Cinema applications. Low noise and low distortion processing ensures superb presentations. In addition to six standard formats, the JSD-60 offers a fully configurable optional format to address such details as audio level changes and three or five stage channels. Built-in bypass audio circuitry ensures that the presentation goes on.

### Audio Inputs

- PA/Cal Microphone – XLR and ¼", 0.7 mV sensitivity. Switchable phantom power: 12 V balanced, 9V unbalanced, or off.
- Non-Sync analog input – RCA 75 mV to 4.775 V.
- Six Channel analog input – DB25F 300 mV.
- COAX – RCA: PCM with optional Dolby Digital® and DTS® decoding.
- TOSLINK – Optical PCM with optional Dolby Digital® and DTS® decoding.
- AES/EBU – eight Channel 48-96 kHz sample rates.

### Analog Audio Outputs – Accessibility

- Hearing Impaired – User selectable input channel mix. 300 mV mono balanced.
- Visually Impaired - Narrative– User selectable input channel mix. 300 mV mono balanced.

### Eight Channel Analog Audio Outputs (JSD-60L and JSD-60D)

Eight Channels Balanced 300 mV adjustable (L, C, R, Ls, Rs, LFE 1, Lc/Lrs, Rc/Rrs).

### Nine Channel Bi-amp Analog Audio Outputs (JSD-60LX and JSD-60DX)

- 12 outputs, Balanced 300 mV adjustable (L, C, R, Ls, Rs, LFE 1, LFE 2, Lc/Lrs, Rc/Rrs, Lh, Rh, Ch). Configurable as 5.1, 7.1 broadband, or bi-amp three screen channels.

### Nine Channel Bi-amp AES/EBU Audio Outputs (JSD-60LS and JSD-60DS)

- 12 outputs, on six AES/EBU pairs on two RJ45 connectors (L, C, R, Ls, Rs, LFE 1, LFE 2, Lc/Lrs, Rc/Rrs, Lh, Rh, Ch). 96 kHz sample rate. Configurable as 5.1, 7.1 broadband, or bi-amp three screen channels.

### Nine Channel Bi-amp BLU link Audio Outputs (JSD-60LN and JSD-60DN)

- 12 outputs, on two RJ45 connectors (L, C, R, Ls, Rs, LFE 1, LFE 2, Lc/Lrs, Rc/Rrs, Lh, Rh, Ch). 96 kHz sample rate. Configurable as 5.1, 7.1 broadband, or bi-amp three screen channels.

### Communication Ports

- DB25F pulse automation.
- Serial control – RS-232.
- USB for laptop setup.
- Ethernet 10/100 - RJ45.

### **Front Panel Interface**

- Eight buttons: COAX, TOSLINK, DIGITAL 8 CH, OPTION, ANALOG 6 CH, NON/SYNC, MIC, and MUTE.
- Main Fader – 0–10 used for main audio and bypass audio.
- Front panel displays fader level and selected format. Bar graph displays output levels including high and low bands when operating in bi-amp.
- USB connector.
- Power switch and power supply status LEDs. Turning power off activates bypass mode.

### **Format Selection**

- Digital (COAX, TOSLINK, eight Channel AES/EBU).
- Analog (6 channel, Non-Sync, and Microphone).
- Option (Configurable in software, e.g., digital 8 channel, COAX, TOSLINK, analog six channel, Non/Sync, and microphone).

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

- PA/Calibration Microphone – XLR / ¼" phone jack.
- Six Channel Analog – DB25F.
- Non/Sync – two RCA jacks.
- Hearing Impaired and Visually Impaired - Narrative – pluggable Phoenix connector.
- COAX – RCA jack with transformer input
- TOSLINK – Optical.
- 8 Channel Digital AES/EBU – DB25F and RJ45.
- Removable Memory Card – SD compatible.
- Serial Control – RS-232 on DB9F.
- Pulse Automation – DB25F.
- 10/100M Ethernet – RJ45.
- DC 12V Power Connector – 5 mm with 2.5 mm pin.
- AC Power – IEC socket. 100-240 VAC, 50/60 Hz, 18 W typical.
- Eight Channel Audio Output - DB25M. Eight balanced outputs for full range or low band (if crossover option installed).
- Crossover Audio Output - DB25M (crossover option only). Balanced outputs for left, center, and right high band plus LFE2.
- AES/EBU Audio Output – Two RJ45 connectors (AES/EBU output option only). Six AES/EBU pairs: left low, left high, center low, center high, right low, right high, Ls, Rs, Lrs, Rrs, LFE, LFE2. When bi-amp mode not selected, low band outputs become full range.
- BLU link Audio Output – Two RJ45 connectors (BLU link option only). Drives 96 kHz BLU link loop as master providing left low, left high, center low, center high, right low, right high, Ls, Rs, Lrs, Rrs, LFE, LFE2. When bi-amp mode not selected, low band outputs become full range.

## **Processing**

- 96 kHz processing.
- One-third octave and eight parametric equalization bands on all channels except LFE 1, LFE 2, HI, and VI-N.
- Parametric equalizers on LFE.
- Synchronization delays for all inputs.
- Surround delays for all surround channels.
- Optional Internal crossovers. Crossovers support bi-amp with three screen channels plus individual parametric equalization and two LFE outputs. Crossover includes a speaker library and allows for user defined speaker systems.

## **Bypass Mode**

In an emergency situation, the JSD-60 can be switched off, automatically enabling the bypass circuitry. Front panel buttons, LEDs, display, and fader will still function, allowing the operation of the unit in various analog and digital formats. Final output is a monophonic signal fed to the left and right channels. Bypass circuitry only drives analog outputs, not AES/EBU or BLU link outputs. Note: The 12 VDC bypass power supply must be connected for this functionality.

## **Graphical User Interface**

The JSD-60 Graphical User Interface (GUI) operates under Windows XP, Windows 7, Windows 8, and Windows 10. It communicates with one or more JSD-60 systems simultaneously over USB, Ethernet, or RS232. The GUI is used for system configuration including auditorium equalization (both manual and automatic equalization).

**Dynamic Range:** Typically 105 dB.

**Power Requirements:** 100–240 VAC, 50/60 Hz, 30 watts maximum (18 watts typical).

**Dimensions:** Standard 1U rack-mount chassis.

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

## 7. Installation

### 7.1 INITIAL POWER UP

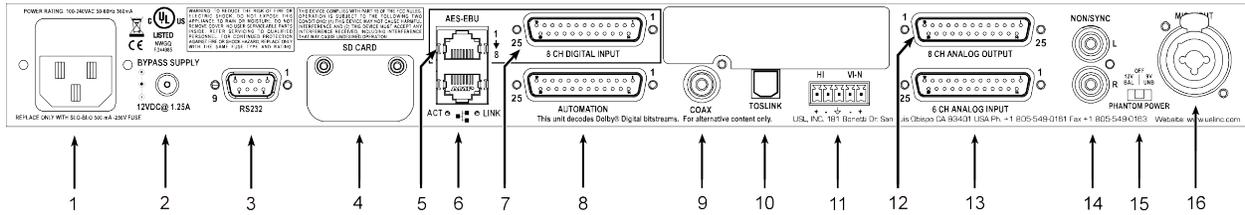
A quick power-up test of the JSD-60 is suggested before mounting it in the equipment rack and wiring it up. This test can quickly detect shipping or other damage.

- Turn the AC power switch off.
- 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-60 to the AC mains.
- Connect the supplied 12 VDC bypass power supply to the bypass power input on the rear panel of the JSD-60 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.
- Rotate the fader in each direction and verify that the fader level on the display changes.
- Turn on the AC power switch. All the green power LEDs on the bottom right of the front panel should light. The “Bypass Mode” LED should stop flashing.
- Press each of the format buttons and the mute button, one after another. The appropriate button should light and the display should show the selected format. 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

### 7.2 SYSTEM HARDWARE MOUNTING, GROUNDING AND VENTILATION

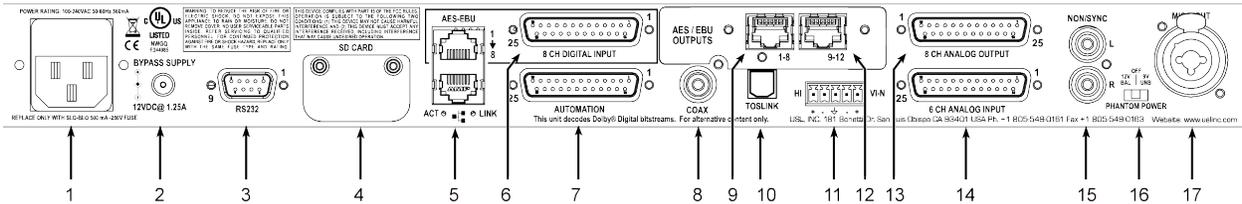
The JSD-60 is designed to mount in a standard 19 inch (482.6 mm) rack and is one rack unit high (1.75 inches, 44.45 mm). The JSD-60 should be mounted at about eye level in the equipment rack for optimum display contrast and visibility. We recommend vented panels (USL part number VP-1) above and below the JSD-60 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-60 should not be more than 9 inches (225 mm) deep to ensure adequate airflow through the top cover ventilation holes on the JSD-60. The JSD-60 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.

## 7.3 EIGHT CHANNEL ANALOG OUTPUT



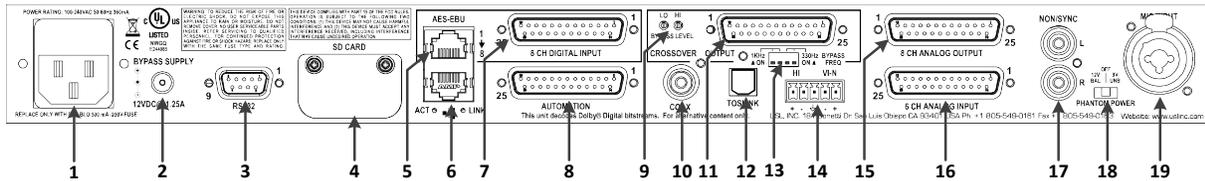
1. Power entry Module – Accepts IEC-type line cord from 100–240 VAC power source. Also contains a 500 mA Slo-Blow 5×20 mm fuse.
2. Bypass Power Supply – 12 VDC at 1.25 A.
3. RS-232 on a DE9F connector for communications with GUI or automation.
4. SD Card – Stores a backup copy of unit configuration. Can also be used to transfer settings to another unit or read by the GUI to download to a connected unit.
5. AES/EBU input connector (RJ45) – parallel connections to the DB25F to the right.
6. Ethernet connector (RJ45) – Network communications with GUI, web browsers, automation, etc.
7. AES/EBU input connector (DB25F) – Eight channels, DMA8 pin out.
8. Automation DB25F Connector – Receives automation pulses from other system components. Ten Control input lines with ground and 5 V power provided to support a standard pulse to ground system. The 5 V output can power a JSDV-80 remote volume control that pulses control lines 9 and 10.
9. COAX - RCA connector for S/PDIF PCM or optional DTS® and Dolby Digital® decoding.
10. TOSLINK Port – Optical Fiber input (PCM) with optional DTS® and Dolby Digital® decoding.
11. Hearing Impaired/Visually Impaired-Narrative outputs.
12. Eight Channel Analog output provides six fixed outputs (L, C, R, LFE, Ls, Rs) and two that can be set up as either Lc/Rc or Lrs/Rrs. Other output configurations, such as drive in, are supported.
13. Six Channel Analog Input on DB25F – Balanced line inputs.
14. Non Sync (N/S) connectors – L and R analog inputs, RCA type connectors.
15. Public Address and Real Time Analyzer microphone phantom power supply selector, 12 V balanced, 9 V unbalanced, and off.
16. Public Address and Real Time Analyzer microphone – XLR and ¼ stereo jack with configurable phantom power.

## 7.4 AES/EBU OUTPUT REAR PANEL CONNECTIONS (JSD-60LS OR JSD-60DS)



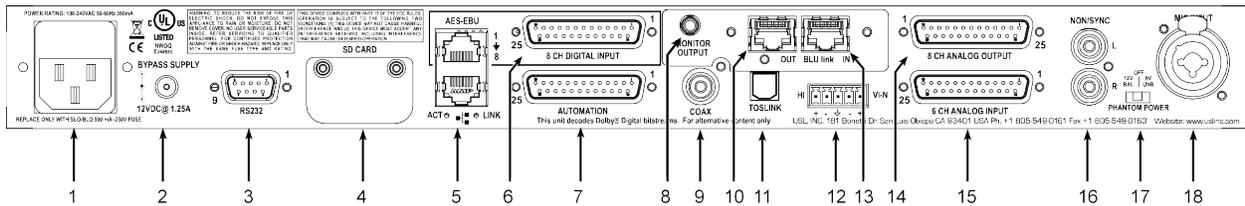
1. Power entry Module – Accepts IEC-type line cord from 100–240 VAC power source. Also contains a 500 mA Slo-Blow 5×20 mm fuse.
2. Bypass Power Supply – 12 VDC at 1.25 A.
3. RS-232 on a DE9F connector for communications with GUI or automation.
4. SD Card – Stores a backup copy of unit configuration. Can also be used to transfer settings to another unit or read by the GUI to download to a connected unit.
5. AES/EBU input connector (top RJ45) – parallel connections to the DB25F to the right. Ethernet connector (bottom RJ45) – Network communications with GUI, web browsers, automation, etc.
6. AES/EBU input connector (DB25F) – Eight channels, DMA8 pin out.
7. Automation DB25F Connector – Receives automation pulses from other system components. Ten control input lines with ground and 5 V power provided to support a standard pulse to ground system. The 5V output can power a JSDV-80 remote volume control that pulses control lines 9 and 10.
8. COAX - RCA type connector (PCM) with optional DTS® and Dolby Digital® decoding.
9. AES/EBU Outputs 1-8
10. TOSLINK Port – Optical Fiber input (PCM) with optional DTS® and Dolby Digital® decoding.
11. Hearing Impaired/Visually Impaired-Narrative outputs.
12. AES/EBU Outputs 9-12
13. Eight channel analog outputs. These outputs are active whether the AES/EBU output card is present or not. If the JSD-60 is configured for bi-amp, the screen channel outputs will be the low band.
14. Six channel analog input on DB25F – Balanced line inputs.
15. Non Sync (N/S) connectors – L and R analog inputs, RCA type connectors.
16. Public address and real time analyzer microphone phantom power supply selector, 12 V balanced, 9 V unbalanced, and off.
17. Public address and real time analyzer microphone – XLR and ¼” stereo jack with configurable phantom power.

## 7.5 EIGHT CHANNEL ANALOG CROSSOVER OUTPUT (JSD-60LX OR JSD-60DX)



1. Power entry Module – Accepts IEC-type line cord from 100–240 VAC power source. Also contains a 500 mA Slo-Blow 5×20 mm fuse.
2. Bypass Power Supply – 12 VDC at 1.25 A.
3. RS-232 on a DE9F connector for communications with GUI or automation.
4. SD Card – Stores a backup copy of unit configuration. Can also be used to transfer settings to another unit or read by the GUI to download to a connected unit.
5. AES/EBU input connector (RJ45) – parallel connections to the DB25F to the right.
6. Ethernet connector (RJ45) – Network communications with GUI, web browsers, automation, etc.
7. AES/EBU input connector (DB25F) – Eight channels, DMA8 pin out.
8. Automation DB25F Connector – Receives automation pulses from other system components. Ten Control input lines with ground and 5 V power provided to support a standard pulse to ground system. The 5 V output can power a JSDV-80 remote volume control that pulses control lines 9 and 10.
9. Crossover bypass output levels for high and low bands.
10. COAX - RCA type connector (PCM) with optional DTS® and Dolby Digital® decoding.
11. Crossover balanced stage high band (L, C, R) and LFE 2 outputs.
12. TOSLINK Port – Optical Fiber input (PCM) with optional DTS® and Dolby Digital® decoding.
13. Crossover bypass frequency and mode selection switches.
14. Hearing Impaired/Visually Impaired-Narrative outputs.
15. Eight channel analog outputs. Low band on screen channels, full range on surround channels.
16. Six channel analog input on DB25F – Balanced line inputs.
17. Non Sync (N/S) connectors – L and R analog inputs, RCA type connectors.
18. Public Address and Real Time Analyzer microphone phantom power supply selector, 12 V balanced, 9 V unbalanced, and off.
19. Public Address and Real Time Analyzer microphone – XLR and ¼” stereo jack with configurable phantom power.

## 7.6 BLU LINK OUTPUT REAR PANEL CONNECTIONS (JSD-60LN OR JSD-60DN)



1. Power entry module – Accepts IEC-type line cord from 100–240 VAC power source. Also contains a 500 mA Slo-Blow 5×20 mm fuse.
2. Bypass Power Supply – 12 VDC at 1.25 A.
3. RS-232 on a DE9F connector for communications with GUI or automation.
4. SD Card – Stores a backup copy of unit configuration. Can also be used to transfer settings to another unit or read by the GUI to download to a connected unit.
5. AES/EBU input connector (Top RJ45) – parallel connections to the DB25F to the right. Ethernet connector (Bottom RJ45) – Network communications with GUI, web browsers, automation, etc.
6. AES/EBU input connector (DB25F) – Eight channels, DMA8 pin out.
7. Automation DB25F Connector – Receives automation pulses from other system components. Ten control input lines with ground and 5 V power provided to support a standard pulse to to ground system. The 5 V output can power a JSDV-80 remote volume control that pulses control lines 9 and 10.
8. Monitor analog output – Balanced analog audio of a user selected BLU link channel.
9. COAX - RCA type connector (PCM) with optional DTS® and Dolby Digital® decoding.
10. BLU link output connector – Drives the input of the next device in the BLU link loop.
11. Toslink Port – Optical Fiber input (PCM) with optional DTS® and Dolby Digital® decoding.
12. Hearing Impaired/Visually Impaired-Narrative outputs.
13. BLU link input connector – Driven by the output of the previous device in the BLU link loop.
14. Eight channel analog outputs. Low band on screen channels, full range on surround channels.
15. Six channel analog input on DB25F – Balanced line inputs.
16. Non Sync (N/S) connectors – L and R analog inputs, RCA type connectors.
17. Public address and real time analyzer microphone phantom power supply selector, 12 V balanced, 9 V unbalanced, and off.
18. Public address and real time analyzer microphone – XLR and ¼” stereo jack with configurable phantom power.

### **Eight Channel AES/EBU Input**

The JSD-60 accepts eight-channel AES/EBU audio, typically from the digital cinema server (DCS). The JSD-60 includes a DB25F connector using the Dolby® DMA8 pin out and an RJ-45 connectors using the StudioHub<sup>[2]</sup> pin out. The first six channels are loudspeakers assigned 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.

### **Six Channel Analog Input**

The JSD-60 six 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. The DB25F connector uses the THX® pin out as specified in the table in Appendix A.

### **Two Channel Analog Input**

The JSD-60 has a stereo analog input (Non/Sync) on two RCA connectors. Connect these to an appropriate source using RCA cables. Various stereo decode methods are available in the system. These allow direct driving of the left and right speakers, adding a synthesized center channel, surround, and custom mix for all output channels.

### **Two Channel Digital Inputs**

The JSD-60 has an S/PDIF input and a TOSLINK input.

- **S/PDIF Input.** A stereo digital input on an RCA connector marked COAX. It is a standard S/PDIF (Sony Philips Digital Interface) input. Connect 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.
- **TOSLINK Input.** A TOSLINK optical digital stereo input is included on the JSD-60. 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-60 has a public address (PA) and real time analyzer (RTA) microphone input.

- **PA/RTA Microphone Input.** Plug a PA microphone in to the combination XLR / ¼" stereo (TRS) 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. The jack is a combination XLR and ¼" TRS (stereo) connector. The XLR input is

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<sup>[2]</sup> Please see the Studio Hub website: [www.StudioHub.com](http://www.StudioHub.com)

balanced. The 1/4 inch connector can be used either balanced or unbalanced. Phantom power can drive both sides of a balanced line with +12 V through 1 k $\Omega$  on each line. It can also drive an unbalanced input (typically on the 1/4 inch connector) with +9 V through 1.8 k $\Omega$ . When using unbalanced phantom power, the signal is on the tip and the phantom power voltage is on the ring. The phantom power is designed to provide low current bias to electret microphones. Condenser microphone preamps may draw more current than the phantom power can supply.

## 7.8 ANALOG AUDIO OUTPUT CONNECTIONS

The JSD-60 provides eight 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-60 output to the low side of the unbalanced load at the load instead of at the JSD-60 to minimize ground loop noise.

### Main Audio Outputs

The eight channel analog output connector provides eight balanced analog outputs. These are full-range outputs if no crossover board is installed. If a crossover board is installed, this connector provides the low band outputs of the screen channels, the full range surround channels, and the LFE1 output. The crossover output connector provides three crossover high band outputs plus the LFE2 output. On systems with the crossover, four DIP switches set the crossover frequency for the bypass passive crossover. If the crossover is not to be used, set all the switches to off. Adjust the low trim pot to yield the desired bypass output level. Remember that the front panel fader also affects the output level when in bypass. For more information on bypass operation with crossovers, see Section 8.11.1. The connector pin outs are listed in Appendix A

### HI/VI-N Outputs

The JSD-60 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-60 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/EBU input 8. The HI audio output can be driven from AES/EBU input 7 or from an audio mix via the channel mixer located in the **Advanced** tab in the Windows GUI. Note that since the JSD-60 has only eight channels of AES/EBU, the HI/VI-N tracks in a DCP cannot be used by the JSD-60 in a 7.1DS auditorium. In such auditoriums, the LCR mix is generally used and a USL DAX-202 is used to convert AES/EBU VI-N from the media block output to analog to drive the HI/VI system.

## 7.9 AUTOMATION INTERFACE

The JSD-60 includes the traditional parallel automation interface plus RS-232 and Ethernet. This interface will accept the JSD-100 automation commands to simplify the installation and setup.

### **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 and to control the main fader. To change the selected format, the corresponding pin, 1 through 7 is pulsed. Pulsing pin 8 low toggles the mute state. Pins 1 through 10 are internally pulled up to +8.4 V. They each source 400 uA when grounded. An automation input control pin needs to be pulled below 2.6 V for 50 ms or more for the JSD-60 to recognize it as low. A +5 V source with up to 100 mA is available on pin 13 to drive an external remote fader control (JSDV-80). Pin 12 is the “automation return.” Use this as the low side of switches and indicators instead of using chassis ground. A series 10-ohm resistor limits ground loop current.

### **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 38.4 kbps, 8N1 (8 data bits, no parity, 1 stop bit), no handshake. RTS/CTS and DTR/DSR are looped back.

### **Ethernet Interface**

The JSD-60 includes a standard 10/100 Mbps Ethernet interface. The same automation commands (described in Appendix B) are available on TCP connections to port 10001 on the Ethernet interface. The JSD-60 accepts up to five 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-60 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-60 to the control network.

## **8. Graphical User Interface Configuration**

### **System Configuration using the Graphical User Interface**

The graphical user interface (GUI) allows for configuration and monitoring of the JSD-60.

## 8.1 GUI INSTALLATION

The GUI runs under Windows® XP, Windows® 7, Windows® 8, or Windows® 10 operating systems. Run the JSD-60 GUI installation program and follow the on-screen instructions. See the JSD-60 Software User Manual for additional information on GUI usage.

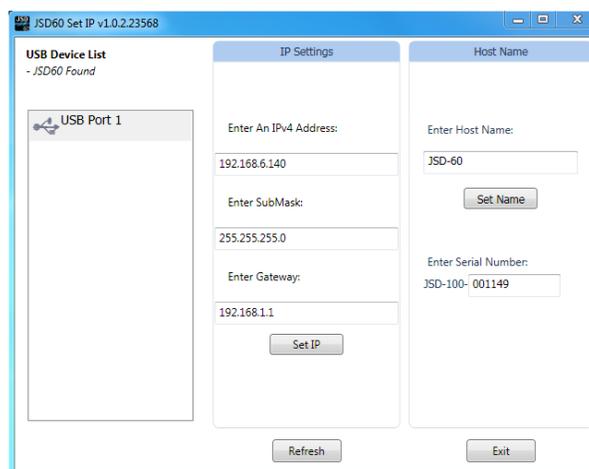
**Note:** The USB driver needs to be installed after the GUI is installed. Follow the USB Driver Installation instructions that are included in the JSD-60 Software User Manual.

**Note:** Windows XP installs a driver for a particular USB port and when connected to a different port, the user must repeat the installation process. We suggest executing the install process on all USB ports.

## 8.2 SET IP UTILITY

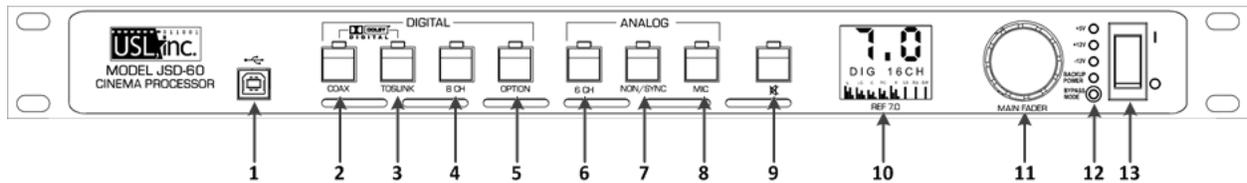
The Set IP utility allows the user to configure the network and host name settings on the JSD-60. To run the utility go to **USL > JSD-60 Cinema Processor > JSD60SetIP** in the Windows Start Menu.

- Connect the host computer to the USB port on the front of the JSD-60. The JSD-60 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-60 on the found list.
- Fill in the IP address, subnet mask, and gateway as dotted decimal values. Click **Set IP** to save the values in the JSD-60.
- Fill in the network hostname for the JSD-60. The hostname can be up to 15 characters long and cannot contain spaces. The hostname will be converted to upper case before being saved. Click **Set Name** to save the value to the JSD-60.



## 9. System Operation

The JSD-60 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 – Rear Panel RCA type connector for PCM or optional Dolby Digital® or DTS® decoding.
3. TOSLINK – An optical fiber connection for PCM or optional Dolby Digital® or DTS® decoding.
4. 8 CHANNEL DIGITAL – AES/EBU balanced line inputs.
5. Option – allows the selection and configuration of any input and any settings.
6. 6 CHANNEL ANALOG – Balanced line inputs. Six channels (L, C, R, LFE, Ls, Rs) are fed through the unit with appropriate delays and EQ.
7. NON-SYNC – Two channel analog unbalanced line input. Input sensitivity may be adjusted.
8. MIC – Public address balanced or unbalanced input. Input sensitivity and level may be adjusted.
9. MUTE – Mutes all outputs.
10. Display – Indicates the fader level, format input and bar graph display of the output signal levels.
11. Fader – Controls the overall volume of all the channels.
12. Power Indicator LEDs – Displays status of power supply voltages.
13. Power Switch – On for normal operation, off for bypass operation.

## 9.1 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 audio levels on each output. The number of bars and the labels under the bars varies with speaker configuration. When the speaker configuration includes use of the JSD-60 internal crossovers, the bar graph shows the low band in yellow, and the high band in blue. Full range outputs (such as the surround channels, HI, VI-N) are shown in green.

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.

The main power switch turns the JSD-60 on and off. When the power is off, the JSD-60 enters bypass mode if the bypass power supply is plugged in. The bypass system in the JSD-60 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.

## 9.2 AUTOMATION

The JSD-60 accepts external control (such as automation) over Ethernet, RS-232, and a parallel automation port.

- The JSD-60 accepts up to five simultaneous TCP connections on port 10001. A digital cinema server can send commands to the JSD-60 through a TCP connection. The command structure is described in Appendix B.
- The JSD-60 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-60 accepts 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 7.9.

## 9.3 SYSTEM MONITORING

Many JSD-60 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 as well. The web interface duplicates the front panel controls, allowing selection of input, setting fader level, and muting the system. In the GUI overview, each auditorium or

screen for a given theater can be grouped for easier management of different locations (theaters). Simple Network Management Protocol (SNMP) is available for monitoring multiple units. The SNMP settings are available in the Global tab view.

### **GUI View of Multiple JSD-60s**

The GUI main screen provides an overview of several JSD-60 systems. Systems are normally broken into groups representing theaters. Each group contains the individual JSD-60 systems for each auditorium. To setup the management of multiple units, they will need to be configured with Theater Name or location and a screen number. Matching Theater Names will be used to group the units for a location. The screen number is used for identifying a JSD-60 within a Theater or location (complex). See the JSD-60 Software User Manual for additional information on viewing multiple JSDs in the GUI.

### **JSD-60 Web Interface**

The JSD-60 includes a web server. The web server can be used to control the JSD-60, view the current status of the JSD-60, view the log, and upload new firmware. See the JSD-60 Software User Manual for additional information on the JSD-60 Web Interface.

### **SNMP Monitoring**

The JSD-60 includes an SNMP agent that can be used with an SNMP network manager or MIB browser to monitor the status of the JSD-60. The MIB describing the JSD-60 is located at <http://JSD-60/JSD60.MIB>. Substitute the IP address of the JSD-60 for JSD-60 in the preceding URL. At this time, the status of the JSD-60 can be polled using SNMP. View the MIB for the details of what is currently supported.

### **JSDV-80 Remote Volume Control**

The JSDV-80 remote volume control can be installed in an auditorium or other location. The JSDV-80 includes a fader control knob that can be used to adjust the main fader level and an interface wiring terminal that is used for fader up, down and power (+5 V and ground). The up is connected to Automation Connector pin 9 and down on in 10. The +5 V is connected to pin 13 with the ground at pin 12. There is no need to use an external power source since it is available on the DB25F connector on the rear of the JSD-60.

## Appendix A – Connector Pinouts

### Connector Pin Outs

For convenience, all connector pinouts are located in this appendix.

### DB25F AES/EBU Input.

The JSD-60 uses the Dolby DMA8 standard pin out for the multi-channel AES digital audio input. Cable should be twisted pairs with individual shields and 110 ohm characteristic impedance.

### Signals Listed By Channels

Audio Channels	AES/EBU Pair	JSD-60 Pin out ( +, -, shield )	Speakers
1, 2	1	14, 2, 1	L, R
3, 4	2	3, 16, 15	C, LFE
5, 6	3	17, 5, 4	Ls, Rs
7, 8	4	6, 19, 18	(Lc/Rc), (Lrs/Rrs), (HI/VI-N)

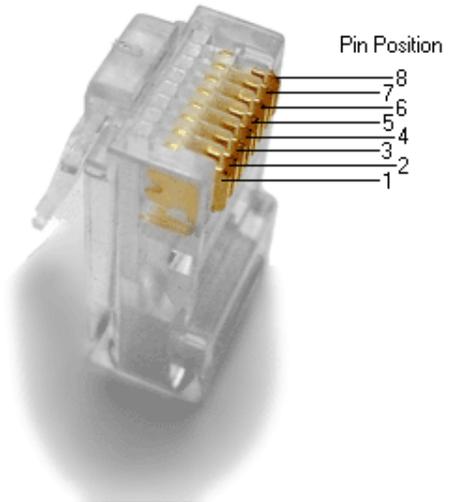
### Signals Listed By Connector Pins

DB25F Pin	AES/EBU Signal Name	Channel Name
1	GND	
2	1/2-	Left/Right-
3	3/4+	Center/LFE+
4	GND	
5	5/6-	Left Surround/Right Surround -
6	7/8+	Lc/Rc+ , Lrs/Rrs+ , HI/VI-N
7	GND	
8		
9	GND	
10		
11		
12	GND	
13		
14	1/2+	Left/Right+
15	GND	
16	3/4-	Center/LFE-
17	5/6+	Left Surround/Right Surround+
18	GND	
19	7/8-	Lc/Rc- , Lrs/Rrs- , HI/VI-N-
20	GND	

21		
22		
23	GND	
24		
25		

### RJ-45 AES/EBU Input

The JSD-60 uses the StudioHub pin out for AES/EBU over CAT5 or CAT6 Ethernet cable. These cables are twisted pair and have the required characteristic impedance.



### Signals Listed By Channels

Audio Channels	AES/EBU U Pair	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	(Lc/Rc), (Lrs/Rrs), (HI/VN)

### Signals Listed By Connector Pins

RJ-45	AES/EBU Signal Name	Channel Name
1	1/2+	Left/Right+
2	1/2-	Left/Right-
3	3/4+	Center/LFE+
4	5/6+	Left Surround/Right Surround+
5	5/6-	Left Surround/Right Surround-
6	3/4-	Center/LFE-
7	7/8+	Lc/Rc+ , Lrs/Rrs+ , HI/VI-N+
8	7/8-	Lc/Rc- , Lrs/Rrs- , HI/VI-N-

### Six Channel Analog Input

The JSD-60 six 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. The DB25F connector uses the THX® pin out as specified in the table below.

### Signals Listed By Channels

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

### Signals Listed By Connector Pins

DB25F Pin	Signal Name	Channel Name
1	GND	
2	L+	Left+
3		
4	GND	
5	C+	Center+
6		
7	GND	
8	R+	Right+
9	GND	
10	Ls-	Left Surround-
11	Rs-	Right Surround-
12	LFE-	Low Frequency Effects-
13	GND	
14	L-	Left-
15	GND	
16		
17	C-	Center-
18	GND	
19		
20	R-	Right-
21	GND	
22	GND	
23	Ls+	Left Surround+
24	Rs+	Right Surround+
25	LFE+	Low Frequency Effects+

### Eight Channel Analog Main Audio Outputs

The main outputs drive a DB25M that is marked "8 Channel Analog Output" for full range audio and the low band stage outputs for bi-amp.

### Audio Channels Full Range and Crossover

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

When the channel configuration is “Drive In,” the outputs and their use are listed in the following table.

### Audio Channels Drive In

Audio Channel	DB25M Main Output Pins (+, -, shield)
Left Transmit	2, 14, 1
Right Transmit	8, 20, 7
Field	23, 10, 22
Snack Bar	24, 11, 9
Monitor	16, 3, 15

### Signals Listed By Connector Pins

DB25M Pin	Signal Name	Channel Name
1	GND	
2	L+	Left+
3	Lrs-	Left Rear Surround-
4	GND	
5	C+	Center+
6	Rrs-	Right Rear Surround-
7	GND	
8	R+	Right+
9	GND	
10	Ls-	Left Surround-
11	Rs-	Right Surround-
12	LFE-	Low Frequency Effects-
13	GND	
14	L-	Left-
15	GND	
16	Lrs+	Left Rear Surround+
17	C-	Center-
18	GND	

19	Rrs+	Right Rear Surround+
20	R-	Right-
21		
22	GND	
23	Ls+	Left Surround+
24	Rs+	Right Surround+
25	LFE+	Low Frequency Effects+

### Crossover Analog Audio Outputs

With the crossover option board installed, additional outputs are available on an additional DB25M connector. This connector has the high band and a LFE2 outputs. The low bands and surround channels are on the main audio output connector.

### Signals Listed By Channels

Audio Channel	DB25M Crossover Output Pins (+, -, shield)
Left High	2, 14, 1
Center High	5, 17, 4
Right High	8, 20, 7
LFE 2	25, 12, 13

### Signals Listed By Connector Pins

DB25F Pin Out	Signal Name	Channel Name
1	GND	
2	Lh+	Left High+
3		
4	GND	
5	Ch+	Center High+
6		
7	GND	
8	Rh+	Right High+
9	GND	
10		
11		
12	LFE2-	Low Frequency Effects 2-
13	GND	
14	Lh-	Left High-
15	GND	
16		

17	Ch-	Center High-
18	GND	
19		
20	Rh-	Right High-
21		
22	GND	
23		
24		
25	LFE2+	Low Frequency Effects 2+

### AES/EBU Outputs

If the JSD-60 has an AES/EBU output board (JSD-60S, JSD-60DS), AES/EBU audio output is available on a pair of RJ-45 connectors. The pin out is described in the tables below.

#### Left AES/EBU Output Jack Signals Listed By Channels

Audio Channels	AES/EBU Pair	RJ-45 Pins (+, -)	Speakers
1, 2	1	1, 2	Left/Right (low band if bi-amp)
3, 4	2	3, 6	Center/LFE1
5, 6	3	4, 5	Left High Band/Right High Band+ if bi-amp
7, 8	4	7, 8	Center High Band/LFE2+ if bi-amp

#### Left AES/EBU Output Jack Signals Listed By Connector Pins

RJ-45	AES/EBU Signal Name	Channel Name
1	1/2+	Left/Right+ (low band if bi-amp)
2	1/2-	Left/Right- (low band if bi-amp)
3	3/4+	Center/LFE1+
4	5/6+	Left High Band/Right High Band+ if bi-amp
5	5/6-	Left High Band/Right High Band- if bi-amp
6	3/4-	Center/LFE1-
7	7/8+	Center High Band/LFE2+ if bi-amp
8	7/8-	Center High Band/LFE2- if bi-amp

#### Right AES/EBU Output Jack Signals Listed By Channels

Audio Channels	AES/EBU Pair	RJ-45 Pins (+, -)	Speakers
9,10	1	1, 2	Ls/Rs
11,12	2	3, 6	Not Used
13,14	3	4, 5	Lrs/Rrs
15,16	4	7, 8	Not Used

### Right AES/EBU Output Jack Signals Listed By Connector Pins

RJ-45	AES/EBU Signal Name	Channel Name
1	9/10+	Ls/Rs+
2	9/10-	Ls/Rs-
3	11/12+	Not Used
4	13/14+	Lrs/Rrs+
5	13/14-	Lrs/Rrs-
6	11/12-	Not Used
7	15/16+	Not Used
8	15/16-	Not Used

### BLU link Outputs

The JSD-60xN has BLU link IN and OUT RJ45 connectors. The OUT connector should be wired to the next device in the BLU link loop. The IN connector to be wired to the previous device in the BLU link loop. When the JSD-60xN is in a BLU link loop, the loop must have all equipment set for a 96kHz sample rate and must allow the JSD-60xN to be the clock master for the loop. NOTE that the IN connector is on the right, and the OUT connector on the left.

### BLU link Monitor

The JSD-60xN has a 3.5 mm TRS monitor jack. This connector has balanced analog audio on the tip and ring. The sleeve should connect to a cable shield. If an unbalanced load is being driven, the ring connection should connect to the shield at the load end of the cable to minimize ground loop noise. The monitor output is designed to drive a powered speaker. Various channels on the BLU link loop can be monitored by selecting what to monitor using the web interface.

### HI/VI-N Outputs

The JSD-60 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-60 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/EBU input 8. The HI audio output is typically driven from a main audio mix.

### Signals Listed By Channels

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

## Signals Listed By Connector Pins

Phoenix Pin	Signal Name	Channel Name
1	HI+	Hearing Impaired+
2	HI-	Hearing Impaired -
3	GND	
4	VI-N-	Visually Impaired – Narrative-
5	VI-N+	Visually Impaired – Narrative+

## Parallel Automation Interface

Pins 1 through 7 of the DB25F automation connector are “control” pins that accept contact closure or open collector pulses to ground to select formats. Pulsing pin 8 low toggles the mute state. Pins 9 and 10 are used for remote fader operation. Each input sources up to 400 uA when grounded. A pin needs to be pulled below 2.6 V for 50 ms or longer for the JSD-60 to recognize it as low. On pin 13, a +5 V, 100 mA supply is available to power the JSDV-80 Remote Fader. An automation return is on Pin 12.

DB25F Pin	Signal Name	Control Name
1	CTL1	COAX
2	CTL2	TOSLINK
3	CTL3	8 Channel Digital
4	CTL4	Option
5	CTL5	6 Channel Analog
6	CTL6	Non/Sync
7	CTL7	MIC
8	CTL8	System Mute
9	CTL9	Main Fader Up
10	CTL10	Main Fader Down
11		
12	RTN	Automation Return
13	PWR	+5V at 100mA Power
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		

### 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 38.4 kbps, 8N1 (8 data bits, no parity, 1 stop bit), with no handshake.

Pin	Description
1	DCD – Internally connected to pins 4 and 6. Does not need to be connected in most cases.
2	TXD – The JSD-60 transmits data on this pin.
3	RXD – The JSD-60 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	Internally connected to pin 8. Does not need to be connected in most cases.
8	Internally connected to pin 7. Does not need to be connected in most cases.
9	RI – The JSD-60 provides a current limited (900mA) +5V to drive external equipment on this pin.

## Appendix B – Automation Commands

These commands are used to query the status of the JSD-60 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-60. 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-60 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-60 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-60 is a DCE device that transmits on pin 2 of the 9 pin D connector. The JSD-60 receives data on pin 3. Communications is at 38.4kbps, 8N1 (8 data bits, no parity, 1 stop bit).

### Ethernet

The JSD-60 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. Remember that commands are tab delimited and terminated with a carriage return. In the table below, the required tab characters are shown as "\t", and the required carriage return characters are shown as "\r". Consult the next table to determine how to insert a tab or carriage return in the command string.

The JSD-60 accepts a small number of JSD-100 commands. It interprets the command such that the ending result is similar to that of a JSD-100. For example, the command to select either COAX1 or COAX2 on a JSD-100 will result in the COAX input of the JSD-60 being selected.

NOTE that commands are case sensitive and all lower case. Also consult the table on the next page or the server manual as to how to encode tab and carriage return characters.

Command	Response	Description
jsd60.sys.fader\t700\r or jsd100.sys.fader\t700\r	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.
jsd60.sys.fader_previous\r		Changes the fader setting back to the level before the last jsd60.sys.fader or jsd60.sys.fader_rel . Frequently used to restore the fader setting after an LSS-100P test show.
jsd60.sys.fader_rel\t-10\r	-10	Makes a relative adjustment of the fader. If the fader is set to 7.0 (reported as 700 in the jsd60.sys.fader command), and the command jsd60.sys.fader_rel\t-10\r is sent, the level decreases to 6.9 (and is reported by the jsd60.sys.fader command as 690).
jsd60.sys.input_mode\t0\r or jsd100.sys.input_mode\t1\r	0 1	Selects or reads the input format. If a parameter is supplied, the JSD-60 is switched to this input. In the example, input mode 0, corresponding to button 1 on the front panel (COAX) 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.
jsd60.sys.mute\t1\r or jsd100.sys.mute\t1\r	1	Sets or reads the current mute status of the JSD-60. 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.

## DCS Configuration

A Digital Cinema Server is normally configured to send commands to the JSD-60 over Ethernet or RS-232 at appropriate times during content play out. The user needs to configure macros to send commands to the JSD-60.

The automation commands for a JSD-100 are accepted and processed accordingly. 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.

<b>DCS Manufacturer</b>	<b>Control Code Entry</b>
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. Use "\w" to insert a short wait in a command.

## **Appendix C – System Restore and Power-Up Buttons**

### **System Restore**

The JSD-60 has several methods of recovering from an unlikely failure, which are detailed below.

### **Bypass Mode**

When the JSD-60 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-60 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-60, then hold down buttons 4 and 6 (Option and Non/Sync) while turning the power back on. The message "Firmware Update Running" gets displayed and when completed the JSD-60 will restart with the original firmware. The interrupted firmware update can then be repeated. This only restores the PIC firmware, not the DSP or Front Panel firmware. Ensure the versions for each are from the same code package.

### **Load Configuration from SD Card**

The SD card is used as a "personality module" in the JSD-60. Should a JSD-60 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 SD Card Backup button on the GUI. To restore the settings to a new JSD-60, insert the card from the old unit (behind the removable cover on the rear panel) in the new unit. With the JSD-60 off, hold down buttons 6 and 7 (Non/Sync and MIC) down while turning on the power. Continue to hold the buttons about 30 seconds until the bypass LED stops flashing. The configuration will be loaded and copied to the internal non-volatile memory. The JSD-60 is now configured the same as the previous unit. The configuration data is written as a text file that can be opened using a text editor like Note Pad. The file can also be opened with the GUI and then transferring the settings to the connected unit, or just read to review settings.

### **Power-Up Buttons**

The JSD-60 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-60 when buttons are held down during power up.

<b>Buttons</b>	<b>Action</b>
Option, Non/Sync	Restores factory installed PIC firmware and configuration. Hold buttons until the display reads "Firmware Update Running". Does not restore DSP or front panel firmware.
Non/Sync, MIC	Loads configuration from SD card and saves to external flash. This is usually used when swapping out a JSD-60, as described above.

## Appendix D – JSD-60 Accessories

### AES/EBU RJ45 Adapters for various servers

The JSD-60 can use CAT5 cable with RJ45 connectors to carry AES/EBU audio from the digital cinema server to the JSD-60. Use of CAT5 cabling reduces cost and simplifies the installation. EBU Tech. 3250-E, third edition, states that AES/EBU may be carried over CAT5 cable for 400 meters.

To simplify the use of CAT5 cable for AES wiring, USL makes the following adapters available. These plug into the DB25 connector on the server. CAT5 cables can then be run to the JSD-60.

Doremi DCP2000 , GDC IMB (25 pin D)

USL JSD-RJMI

Adapter has DB25M wired as per SMPTE EG DC28.307-3103B DRAFT (2004, never adopted) and RJ-45 jack.

Sony SRXR320P

USL JSD-RJM8

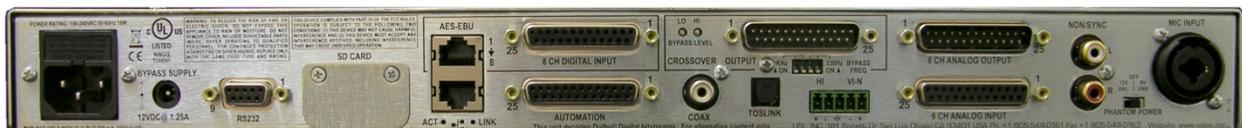
Adapter has DB25M wired with DMA8 pin out and RJ-45 jacks.

### JSDV-80 Remote Volume Control

The JSDV-80 remote volume control is connected to the JSD-60 using the automation interface. The JSDV-80 is typically located in the auditorium.



JSD-60L and JSD-60D rear view



JSD-60LX and JSD-60DX rear view





## **QSC, LLC**

Mailing Address: 1675 MacArthur Boulevard Costa Mesa, CA 92626-1468 U.S.  
Main Number: +1.714.754.6175  
World Wide Web: [www.qsc.com](http://www.qsc.com)

## **Sales & Marketing:**

Voice: +1.714.957.7100 or 1.800.854.4079 toll free (U.S. only)  
FAX: +1.714.754.6174  
E-mail: [info@qsc.com](mailto:info@qsc.com)

## **QSC Customer Support**

### **Application Engineering and Technical Services**

Monday - Friday 7 AM to 5 PM PT +1.714.957.7150  
(Excludes Holidays) 1.800.772.2834 toll free (U.S. only)

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[CinemaTechSupport@qsc.com](mailto:CinemaTechSupport@qsc.com)  
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