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# **DTS XD10P Cinema Audio Processor**

**Installation and Operation**

**Release Version 1.0**

**Effective Date: December 2004  
Document # 9301E855001.0**

**Digital Theater Systems, Inc.  
Cinema Products Division  
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USA**



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DTS XD10P Cinema Audio Processor, Installation and Operation

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### Record of Changes

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**WARRANTY**

**DTS MARQUEE SIGN ORDER FORM**

## **Regulatory Notices**

### **EMI Notice**

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 his own expense.

### **Canadian Department of Communications compliance statement:**

This equipment does not exceed Class A limits per radio noise emissions for digital apparatus set in the Radio Interference Regulation of the Canadian Department of Communications. Operation in a residential area may cause unacceptable interference to radio and TV reception, requiring the owner or operator to take whatever steps are necessary to correct the interference.

### **"Avis de conformité aux normes du ministère des Communications du Canada:**

Cet équipement ne dépasse pas les limites de Classe A d'émission de bruits radioélectriques pour les appareils numériques telles que prescrites par le règlement sur le brouillage radioélectrique établi par le ministère des Communications du Canada. L'exploitation faite en milieu résidentiel peut entraîner le brouillage des réceptions radio et télévision, ce qui obligerait le propriétaire ou l'opérateur à prendre les dispositions nécessaires pour en éliminer les causes."

### **CE**

"Warning" This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

## **Unpacking and Inspection**

The packaging is designed for typical shipping and handling. Upon receipt of shipment, check for signs of damage and report all damage to the carrier. All shipments made from DTS are the customer's responsibility once they leave our premises.

Before installation it is suggested that a complete inventory be taken to minimize problems or questions during installation. Additionally, save all packing material until installation is complete in the unlikely event that a component(s) requires return to the factory. Use the packing slip that came with your unit to verify received inventory.

The box should include the following items. If anything is missing, notify your dealer or the factory:

- XD10P Cinema Audio Processor
- Power cord
- Backup (AUX) Power Supply
- Screw-terminal plugs (4), attached to XD10P rear panel (Phoenix connectors)
- XD10P Connector Hardware Kit 9003E95000
- XD10P System Software Disc 9311E92200V1.0
- This manual

## **Warranty Information**

Please complete and submit the Warranty form within 30 days of purchase. It is located near the back of this manual.

Equipment manufactured by DTS, Inc. is warranted against defects in materials and workmanship for three (3) years from date of purchase. There are no other expressed or implied warranties.

DTS, Inc. obligation is restricted to repair and/or replacement of defective parts. Under no circumstances will DTS, Inc. be liable for any other damage, either direct or consequential.

Failure to abide by the safety procedures and practices identified in this manual may void any warranty or obligation DTS may have to you with respect to this product.

All requests for repairs or information should include the unit serial number to ensure rapid service.

## **DTS Offices and Technical Support**

DTS engineers are available to assist you. If you have an emergency after business hours, please leave a message with the Answering Service and a technician will return your call as soon as possible.

### **DTS Headquarters**

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## **DTS Promotional Support**

Let your audience know that your cinema is equipped with DTS digital surround sound technology. DTS provides the following promotional items for your theatres:

- DTS Cinema Plaques
- DTS 35mm Trailers (flat and scope)
- DTS Marquee Signs
- DTS Theatre Promo Kits (includes posters, buttons, pins, window clings and even a flashlight!)

Please use the Marquee Sign Order Form at the back of this manual, or contact DTS Customer Service for ordering information at +1 (818) 706-3525 or write to: cinemainfo@dtsonline.com.

## **Returning Units for Service**

Before sending any item back to DTS for warranty, repair, exchange or replacement parts, please call DTS Customer Service at +1 (818) 706-3525 or USA toll free +1 (800) 959-4109 to provide the serial number of the equipment to be returned and to obtain a **Return Authorization** number. No replacement units will be sent and no shipments will be accepted without a Return Authorization number.

Ship returns (clearly marked with the Return Authorization number on the outside of the package) to:

**Digital Theater Systems**  
**Attn: Customer Service**  
**5171 Clareton Drive**  
**Agoura Hills, California 91301 USA**

Telephone and FAX numbers are listed above under DTS Customer Service.

## **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 this installation and operation manual.

### **To Avoid Fire and Personal Injury:**

- Use Correct Power Cable. 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.
- Avoid Exposed Circuitry. Do not attempt to open the Power Supply Transformer because its safety certification would be invalidated. The Power Supply Transformer is a non-repairable sealed device.
- 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 by 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 Opening 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.
- Prevent the Spilling of Liquids onto the System Components.
- Inspect the power cable and all cables prior to use. Confirm that the power cable and other interconnecting cables are free from damage.

### **Safety Standard**

The EN 60950 standard specifies 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 (The Standard for Information Technology Equipment Including Electrical Business Equipment).

## **Agency Conformance**

### **EC Declaration of Conformity**

Meets 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 Conducted Emissions, EN 55022 Radiated Emissions:

Class A Limits

EN 55024 Immunity:

EN 61000-4-2 Electrostatic Discharge Immunity

EN 61000-4-3 RF Electromagnetic Field Immunity

EN 61000-4-4 Electrical Fast Transient/Burst Immunity

EN 61000-4-5 Power Line Surge Immunity

EN 61000-4-6 Conducted RF Immunity

EN 61000-4-7 Voltage Dips, Short interruptions and Variations

### **Certifications**

Low Voltage Directive 73/23/EEC:

EN 60950 Information Technology, Video and Similar Electronic Apparatus

CE, UL, cUL Safety and Overall Compliance.

### **VDE Certified Power Cords**

Pollution:

Not intended for environments where conductive pollutants may be present.

### **Equipment Class**

**Class III Equipment:**

Equipment in which protection against electrical shock relies upon supply from SELV circuits (Safety

Transformer) and in which hazardous voltages are not generated. Insulation and protective fusing are used in addition to these criteria. Equipment Type A: Equipment that is intended for connection to the building power supply wiring via non-industrial plugs and sockets or via appliance couplers or both.

### **FCC Class A Instructions to the User**

Note: This equipment has been tested and found to comply with the limits for class A digital device pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference within 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 instructions manual, may cause interference to radio communications. Operation of this equipment in a residential area is likely to cause interference in which case the user will be required to correct the interference at his own expense.

The user is cautioned that changes and modifications made to the equipment without approval of manufacturer could void the user's warranty and authority to operate this equipment.

It is suggested that the user use only shielded and grounded cables to ensure compliance with FCC rules.

## Installation Checklist

Use this checklist to ensure important settings are completed before showing film to an audience.

**Table 0-1. XD10P Installation and Setup**

Completed	Task	Refer to:
<input type="checkbox"/>	Install XD10P in equipment rack	System Hardware Mounting and Grounding, p. 1-1
<b>CONNECT CABLING:</b>		
<input type="checkbox"/>	Cable(s) from Projector 1 (Projector 2) to Optical #1 (Optical #2) connectors	Connectors are supplied, cables are not supplied by DTS. See Appendix A, <i>Connector Pinouts</i> .
<input type="checkbox"/>	(If connected to XD10) Cable from XD10 Automation to XD10P	DB25 connector (supplied). See Appendix A, <i>Connector Pinouts</i> . See Appendix B, <i>Drawings</i> .
<input type="checkbox"/>	Cable from theatre automation system to XD10P	Phoenix connector (supplied). See Appendix A, <i>Connector Pinouts</i> .
<input type="checkbox"/>	(If connected to XD10) Audio (analog output) cable from XD10 Analog Out to XD10P EXT1 Analog Audio IN, and/or from XD10 Digital Out to XD10P EXT2 Digital Audio IN	See Appendix A, <i>Connector Pinouts</i> . See Appendix B, <i>Drawings</i> .
<input type="checkbox"/>	Analog Audio Out to amplifiers	Phoenix connector (supplied). See Appendix A, <i>Connector Pinouts</i> .
<input type="checkbox"/>	Connect main power cable and bypass power supply	
<b>PROGRAMMING STEPS</b>		
<input type="checkbox"/>	Install XD10P Setup Software	See <i>Installing the Software</i> , p. 3-1. Chapter 4 is a description of the software interface screens.
<input type="checkbox"/>	Mechanical Optical Alignment of Projector	See Appendix E.
<input type="checkbox"/>	A-Chain calibration	See Preamp Calibration (A-Chain or Optical Setup), p. 3-3.
<input type="checkbox"/>	B-Chain alignment	See B Chain Alignment, p. 3-7.
<input type="checkbox"/>	(If connected to XD10) Setup XD10 to interface with XD10P.	See instructions on drawing “ <i>XD10 Analog 6 &amp; 8 Track Out to XD10P Analog In</i> ”, or “ <i>XD10 Digital Audio Out to XD10P Digital Audio In</i> ” in Appendix B.
<b>ADJUST AND TEST</b>		
<input type="checkbox"/>	Listening test	See Listening Test, p. 3-16.
<input type="checkbox"/>	If an XD10 or other external equipment is connected to XD10P, test that external equipment for proper operation.	



# 1. XD10P Overview

## 1.1. Scope of this manual

This manual contains information on the installation, set-up, and operation of the XD10P Cinema Audio Processor. Also included is fundamental information on alignment of projector sound heads.

Please read the entire manual before beginning your installation.

## 1.2. XD10P Features


- Dual stereo projector inputs with low-noise preamplifiers, individual gain and high-frequency boost controls, and emergency backup circuitry.
- Dual stereo line level inputs for 2 separate Non-Sync inputs. Non-Sync 1 has fade-in/fade-out capability.
- Microphone input for public address.
- 100% digital, “A” and “SR” type noise reduction that emulates the analog standards.
- Eight “discrete” analog inputs for interfacing to existing digital-format film decoders.
- Direct 8 channel AES-EBU digital inputs for interfacing to digital sources.
- 1/3 octave equalization on ALL channels except subwoofer.
- Advanced automation features including level settings for each format.
- Removable memory module contains a backup of the system’s settings.

The XD10P unit includes all of the above features in every unit. All units come with an international power supply.

## 1.3. System Hardware Mounting and Grounding

The XD10P is designed to mount in a standard 19-inch (483 mm) rack, and is two standard rack spaces high (2U = 3.5 inches or 89 mm). We recommend blank panels above and below whenever space permits. Mounting the unit immediately above a major heat-producing component (like a power amplifier) is not recommended. The XD10P 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. The equipment rack itself should be properly grounded. We also recommend using a surge protector to protect sensitive equipment from electrical fluctuations.

## 1.4. System Cooling and Ventilation

 **Caution:** Provide the XD10P with adequate ventilation for cooling during operation.

It is recommended that one rack space above and one below the XD10P be left open to allow outside air circulation through the unit. A ventilation panel is recommended for projection booths where the normal ambient temperature exceeds specified equipment operating temperatures listed in the safety section of this manual (page viii). Also, it is recommended that equipment with no more than a 9-inch (23 cm) depth be mounted directly above the XD10P to ensure adequate airflow. Keep all vents clear.

## 1.5. Front panel

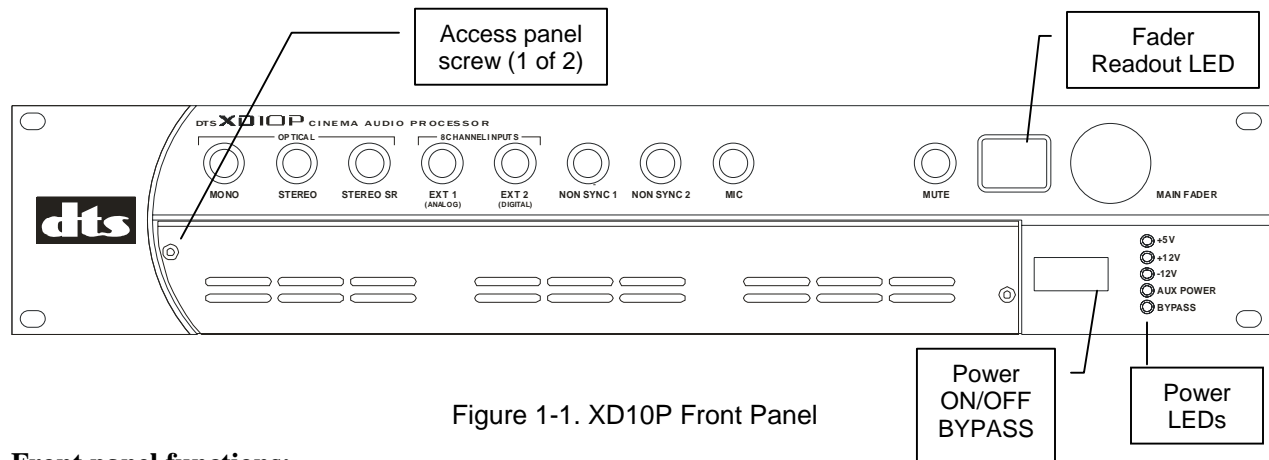


Figure 1-1. XD10P Front Panel

### Front panel functions:

- Manually select formats and adjust the main fader.
- Numerical readout LED indicates fader level.
- Status LEDs indicate presence of power supplies.
- Turn off main power switch to place the unit into the bypass mode.

Each format has a preset level. During system setup, these presets can be set using a laptop computer connected to the XD10P. (See chapter 3, *Using XD10P Setup*.) During normal operations, the presets may be set directly on the front panel. See *Changing a Format Level Preset*, in chapter 2, *Operations*.

## 1.6. Modules

A removable panel allows access in order to service or replace internal modules. Two screws (left and right) secure the panel in place.

- ☑ Be careful to retain the panel and screws for re-installation.

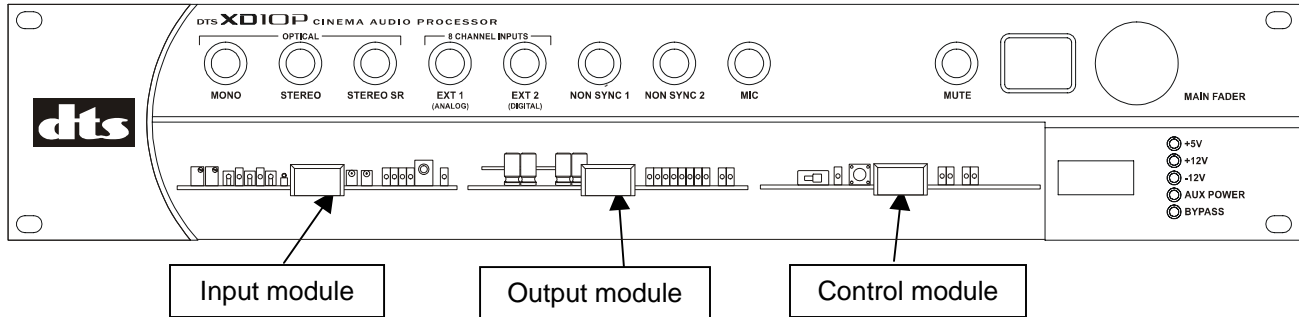
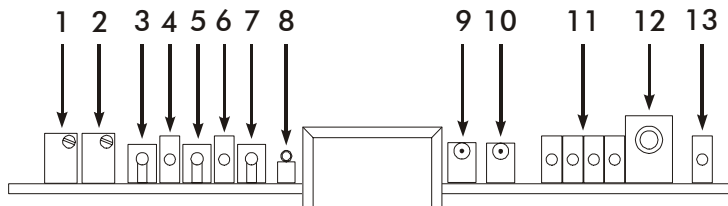


Figure 1-2. Front access panel has been removed. Modules are visible.

### 1.6.1. Input Module

The Input Module contains the projector preamps plus non-sync and MIC inputs. It also contains the bypass circuitry. Two high power DSPs implement A type and SR noise reduction. A third DSP is used for the matrix decoder, slit EQ analyzer, and pink noise generator. Test points permit connection of an oscilloscope to align the film projector's analog reader. Level LEDs indicate the presence of left, center, right and surround signals. Status LEDs indicate the module is "active" or in a "fault" condition.

#### INPUT MODULE



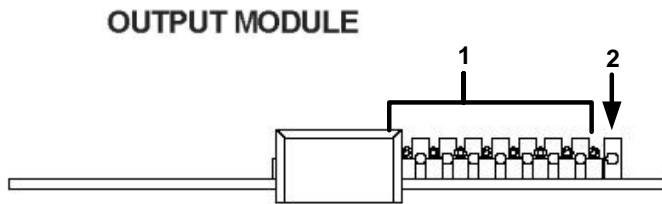
1. Projector 1 Bypass Level Adjust
2. Projector 2 Bypass Level Adjust
3. Left Channel Test Point
4. Projector 1 Indicator LED
5. Right Channel Test Point
6. Projector 2 Indicator LED
7. Ground Test Point
8. Bypass Level Test Point
9. Left Channel Level Indicator LED
10. Right Channel Level Indicator LED
11. Signal Presence LEDs, left to right: L, C, R, S
12. THX Pink Noise Enable Jack (see THX RT60 Reverberation Time Test, page 3-17)
- 13: Fault LED (DSP error)

### 1.6.2. Output Module

The Output EQ Module contains the eight-channel analog and AES-EBU input circuitry. It also contains the balanced output circuitry. Two high power DSPs implement seven channels of 1/3 octave equalization, plus a parametric subwoofer equalizer. Test points on each channel permit connection of



diagnostic instruments. Level LEDs indicate the presence of signals. A status LED indicates the module is “active” or in a “fault” condition.



1. Immediately shown to the right of the pull handle in sequence are both Signal Present LED and Test Points:

**L, C, R, Sw, Ls, Rs, Lc, Rc**

2. The last LED on the right is **Fault** (Lighted = DSP error).

### 1.6.3. Control Module

The Control Module manages all the communication in the unit. It also contains the automation interface, bypass volume and remote volume circuitry. A removable memory module stores all settings.

The **memory module** is a smartcard that resides in a small slot on the Control Module. It can be ejected and installed in a different XD10P to move the configuration information from one unit to another. But normally the memory module should remain installed in the Control Module.

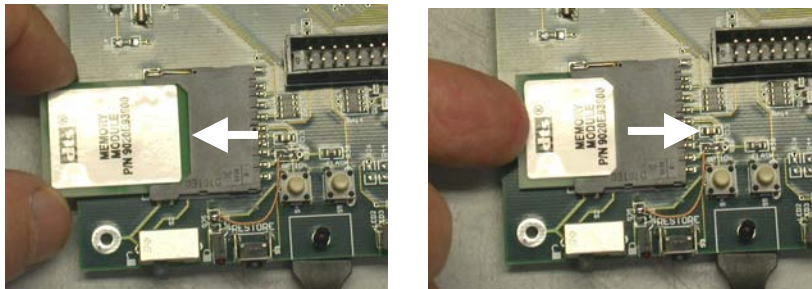
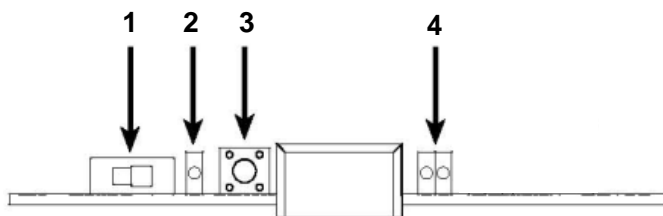


Figure 1-3. Removing and inserting memory module from Control Module.

To remove the memory module, grasp it gently and pull outward. To install it, gently press inward until it stops firmly into place.

### CONTROL MODULE



<p>1. Write Protect Switch</p>	<p>The installer sets this switch OFF (to the left) during setup. After all site configuration settings have been finalized, and a back-up of all the settings to the memory module has been invoked from the XD10P</p>
--------------------------------	---

	Setup program, the installer must move the Write Protect switch to the ON position (to the right), which write protects the memory module.
2. Write Protect Indicator LED	When lighted, Write Protect is ON.
3. Default Restore Switch	Press and hold the Restore Switch during system power up until Restore LED begins to flash, to restore the unit's DSP Flash memory with the settings obtained from the memory module. The memory module is intended as a “fallback” restoration method, without need for a laptop. The DSP Flash memory consists of 5 total ICs located throughout the unit.
4. Status LEDs	Left (Green) = Restore: when flashing, indicates the unit’s DSP Flash memory is being restored. Right (Red) = Loss of AES

## 1.7. Rear Panel

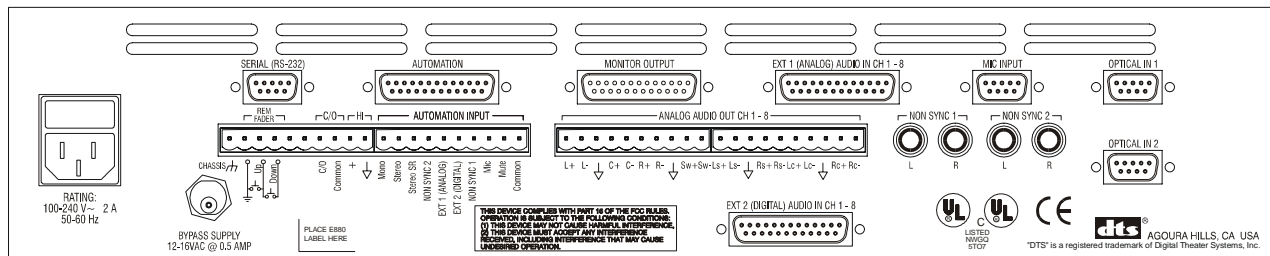


Figure 1-4. Rear Panel, XD10P

## 1.8. Input Connectors

### 1.8.1. Projector Inputs

The projector inputs are connected through standard 9-pin D-type connectors. See Appendix A for pinout data.

### 1.8.2. NON SYNC 1, NON SYNC 2 Inputs

Two sets of RCA connectors facilitate easy connection to standard CD players. A software fade in/fade out algorithm (only in NON SYNC 1) allows smooth transition between intermission music and the main program. See the wiring diagram, drawing F207 in Appendix B.

### 1.8.3. MIC Input

The public address balanced microphone inputs are available on a standard 9-pin D-type connector. See Appendix A for pinout specifications. Also see the wiring diagram, drawing F207 in Appendix B.

The “Mic in +” and “Mic in -” terminals are for the balanced medium-low impedance microphone inputs. The shield of the microphone cable should be connected to chassis ground on pin 5. A 9V power pin allows easy connection of electret (powered) microphones.

### 1.8.4. EXT 1 (Analog) Input

The Analog input is eight-channel analog audio input from an analog source. The 25 pin D-type connector is compatible with most decoders. Input level should be 300 mV RMS for all channels. See Appendix A for connector pinout specifications.

For XD10 Analog 8-track OUT to XD10P Analog IN, see drawing F210 in Appendix B.

For DTS-6D Analog OUT to XD10P Analog IN, see drawing F204 in Appendix B.

### 1.8.5. EXT 2 (Digital) Input

The digital domain input is configured for eight channels (four differential AES3 PCM data pairs @ 48 kHz sample rate). See Appendix A for connector pinout specifications.

Any AES3 PCM channel format ID bits (such as Pro/Consumer, Pre-Emphasis, etc.) are ignored. Upon any anomalies of the AES/EBU data stream, an emergency default mode has been implemented (see *Digital Link Default*, page 4-15). Upon any occurrence of the loss of AES/EBU word clock, or “non-PCM data” being delivered, an instantaneous “soft mute” is performed and the unit will automatically switch to the format chosen by the installer.

For XD10 Digital Audio OUT to XD10P Digital Audio IN, see drawing F206 in Appendix B.

## 1.9. Audio Signal Output Connections

### 1.9.1. ANALOG AUDIO OUT CH 1-8

These are the main processor outputs to connect to the power amplifiers. The outputs are balanced, and all have a corresponding ground terminal. Use two-conductor shielded cable for each channel. The shield should usually be connected to ground at the power amplifier end only.

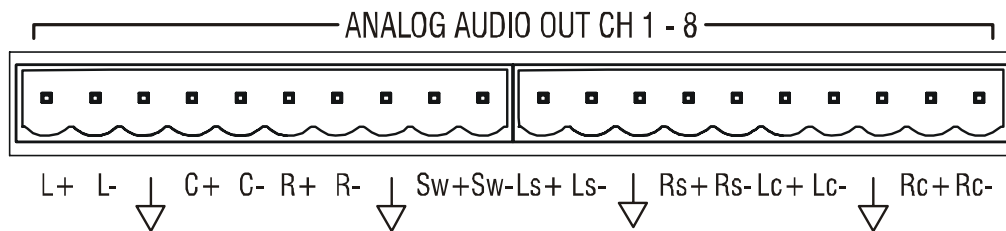


Figure 1-5. Analog Audio Out connector

See drawing F208 , “XD10P Analog Audio (Phoenix Connectors)” in Appendix B.

### 1.9.2. MONITOR Output

This is a 25 pin D-type connector containing the line output signals for all eight channels. These outputs are in parallel with those of the Analog Audio Out connector (above). It can be connected directly to most booth monitors. (See your booth monitor manual for connection details.) The Monitor Output connector is also pin-compatible to THX-type systems. See Appendix A for the pinout specification for this connector. See Appendix B, drawing F209, for an example of this connector used with a THX-type system.

### 1.9.3. HI (Hearing Impaired) Output

This line level output is the sum of the left, center, and right channels. It can be connected to a hearing impaired system. Output level is 300 mV RMS.

See drawing F205 “XD10P Logic, Hearing Impaired, External Inputs” in Appendix B.

## 1.10. Automation Connections

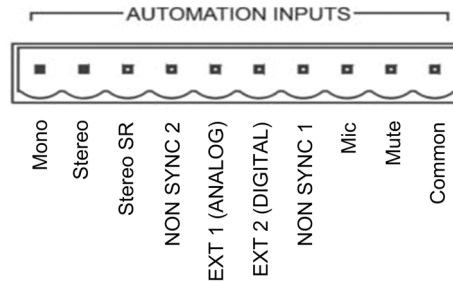


Figure 1-6. Automation Inputs

### 1.10.1. AUTOMATION INPUTS

These are contact closure inputs to remotely control the XD10P. There are automation inputs for each of the eight XD10P operating modes, and a “Mute” input. These are intended to be momentary (or “pulsed”) contact closures. The “Mute” function is released by selecting (or re-selecting) one of the main input modes. The Automation common terminal is isolated from the system ground through a 10-ohm resistor to minimize ground loop problems.

Do not connect circuit ground to chassis (earth) ground.

### 1.10.2. AUTOMATION

This 25 pin D-type connector contains most of the automation input and output signals. The pinout specification for this connector is in Appendix A.

### 1.10.3. Automation LED Outputs

These are active-low outputs that can directly drive remote LEDs for monitoring the status of the XD10P. The outputs are current limited, however an additional 1 kilohm resistor in series with each LED (at the LED) is recommended in case of wiring faults. See the pinout specification for the Automation connector in Appendix A.

## 1.11. Other Connections and Controls

### 1.11.1. Power Input

The XD10P uses an external 16 VAC @500mA power supply to power the bypass circuit.

### 1.11.2. REM FADER (Remote Fader)

The XD10P features a Remote Fader connection on the rear. The two-button remote fader device is not supplied by DTS. (It can easily be obtained from any electronics supply store.)

Each tap on the UP button will increment 0.1 level. So starting at 7.0, one tap will increment to 7.1. A tap on the DOWN button will decrement to 6.9. The Remote Fader level range is from 4 to 9. The front panel will display the level increment/decrement as it occurs.

See the wiring diagrams in Appendix B for identification of the XD10P Remote Fader connection.

### 1.11.3. C/O (Changeover)

The XD10P includes dual preamplifiers for use in two projector changeover systems. Grounding the “C/O” terminal mutes the Projector 1 input and selects Projector 2. This must be a maintained closure.


See the wiring diagram F205 in Appendix B for identification of the C/O connection.

#### **1.11.4. RS-232 Port**

A standard 9-pin D-type connector connects to a host PC computer, allowing you to control, configure, and/or automate the XD10P via this interface. The cable should be a standard male to female serial-to-USB adapter, to interface with the USB port of a laptop computer.

The pinout information for the RS-232 serial port is in Appendix A. See wiring diagram F205 in Appendix B for identification of the connection.

## 2. Operations

 **Caution:** Do not make any changes to internal potentiometers (pots) or switches without the guidance of DTS or your service technician.

### 2.1. Select Format

Normally, automation will be programmed to select format during the show. You may also manually change formats via the front panel. Press the appropriate format button to select a format.

Available formats:

Mono

Stereo (A-type NR<sup>1</sup>)

Stereo SR (SR-type NR) Use this format only if the audio was recorded in SR. The analog format should be marked on the print.

EXT1 analog

EXT2 digital

Non-Sync 1

Non-Sync 2

Mic

### 2.2. Adjust Fader

Set the level for the selected format by turning the Main Fader knob on the front panel. The LED display on the front panel will indicate the change.

### 2.3. Changing a Format Level Preset

Format presets are set during the setup procedure using a computer. If you need to change the setting during the show without a computer, press and hold the appropriate format button on the front panel for two seconds and, while continuing to press it, rotate the main fader to the desired level. Then release the button.

This will change the preset level for that format. No other format levels will change. The LED display will indicate the preset level. Each format can be set for a different level, if necessary.

### 2.4. Operation in Bypass Mode

Bypass mode is triggered automatically in case the XD10P fails, or you can intentionally put the unit into Bypass mode due to an audio emergency. You might do this if the sound in the auditorium has noticeable defects, such as scratchy, garbled, or crackling sounds. The cause of the problem may not be apparent – it may be a speaker problem or a processor problem.

The auxiliary power supply **must** be connected and working before you manually switch into Bypass mode by turning the front panel power switch off.

In Bypass mode, the audio will be providing basic optical mode – Left, Center, and Right (no Surrounds or Subwoofer).

Aux power supply must be connected to XD10P.

1. Turn the Power switch OFF on the front panel.
2. The red Bypass indicator will flash.

---

<sup>1</sup> NR = Noise Reduction

- The Main Fader on the unit is active while the system is in Bypass mode, because Aux power is available. However, there is no Main Fader display.
3. If needed, set the level using the Main Fader knob on the front of the XD10P.  
As you turn it, the sound level gradually changes. Continue turning it until the sound level is good. If you do not have success, contact your service technician.

## 2.5. Remote Fader

The remote fader function can be accomplished two ways, either through RS-232 commands or with a simple pair of push buttons (see REM FADER on page 1-7). One button increases levels and the other decreases levels. The LED display on the XD10P will indicate the change.

DTS does not provide a remote fader pushbutton device. But an RS-232 interface with a laptop computer enables the XD10P Setup software to control the fader remotely. See the drawing F205 “*XD10P Logic, Hearing Impaired, External Inputs*” in Appendix B.

### 3. Using XD10P Setup

#### 3.1. Installing the Software

Begin by placing the XD10P Setup software CD into the CD-ROM drive of your computer. The installation program should start automatically within a few seconds.

- Note:** If it does not start automatically, you will need to run “Setup.exe” from the root directory of your CD-ROM drive. Either double click the “Setup.exe” icon or click the Windows “Start” button and select “Run...”. Type “X:\setup.exe”(where X: is your CD-ROM drive), then click the “OK” button.

Follow the instructions in the installation software.

Remove the CD-ROM when the software installation process is complete.

#### 3.2. Starting the Program

A computer must be attached to the XD10P via the RS-232 port in order for the system setup to proceed. A serial cable is used to connect the serial port of the computer to the XD10P RS-232 port, or a serial-to-USB adapter connects the USB port of the computer to the XD10P RS-232 port.

- Note:** When the computer is connected to the XD10P, the Setup software takes total control, and the buttons and fader knob on the front panel of the XD10P will not respond to user interaction.

Click the **XD10P Setup** icon on the desktop.



The opening screen appears. (See page 4-1 for detailed description of this screen.)

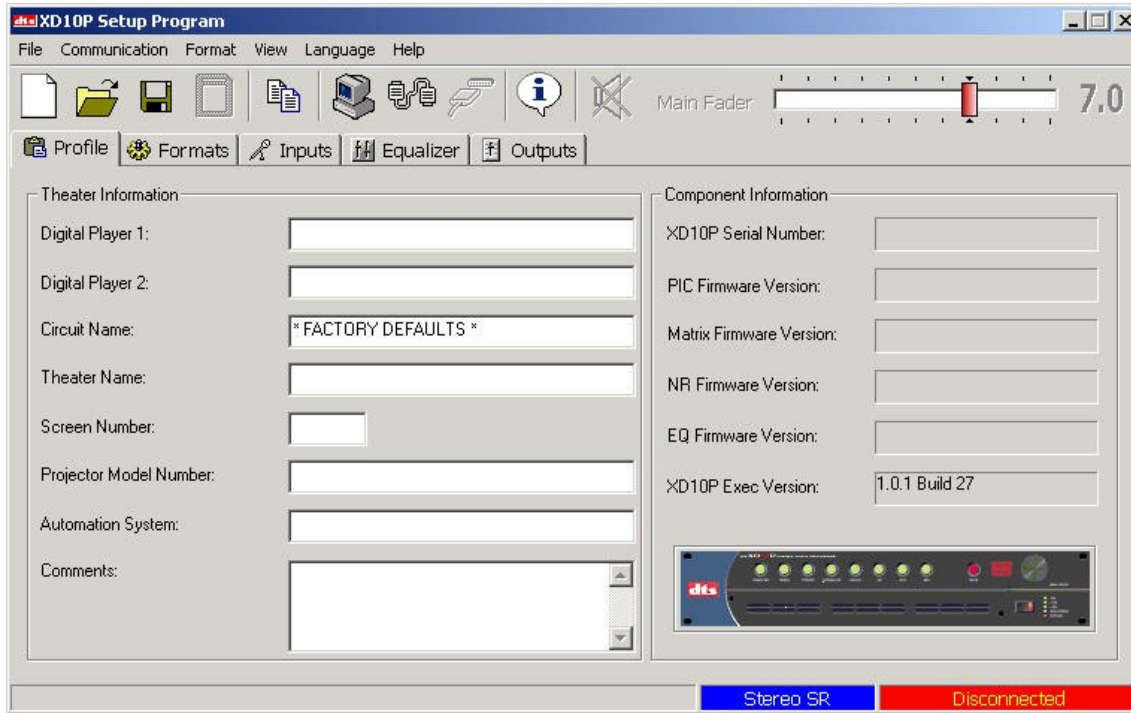


Figure 3-1. Initial screen, XD10P Software

If you are setting up the XD10P for the first time, you may want to fill in the particulars of the venue in the “Theatre Information” boxes provided in the Profile tab. For details, see the description of the Profile tab on page 4-6.



### 3.3. How to Connect

The next step is to establish communication with the XD10P. Press the **F2** key or click the **Connect** icon on the toolbar (or select **Connect** from the **Communication** menu) and the computer will connect with the XD10P.



Figure 3-2. Select **Connect** from the Communication menu or click the **Connect** icon.

The connection status bar in the lower right hand corner of the main screen will change from “Disconnected” to “Connected” (Figure 3-3).

When you connect to the XD10P, the computer will download all the data stored on the XD10P to the computer’s memory. This data includes Preamp parameters, EQ parameters, Front Panel parameters and Profile information. The Component Information display area of the initial screen will no longer be empty; it will show serial number and version information.

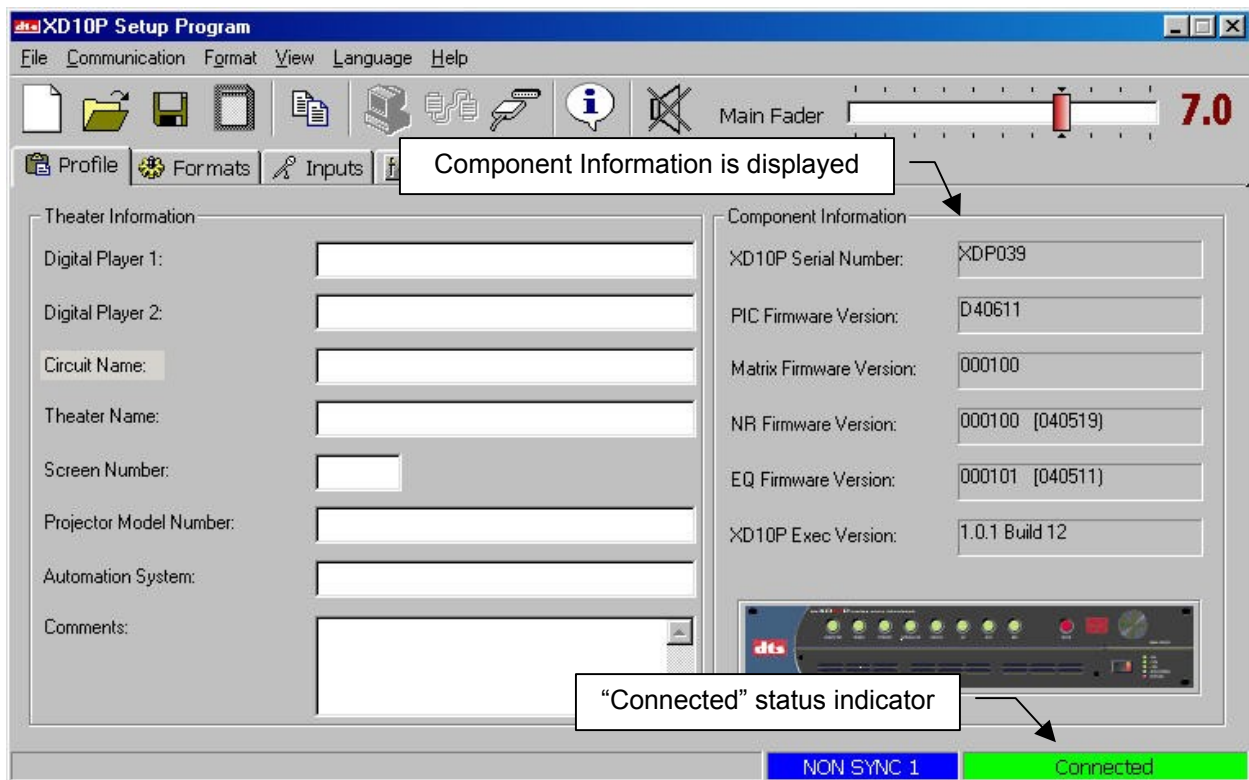


Figure 3-3. Profile tab after connecting to XD10P

### 3.4. Preamp Calibration (A-Chain or Optical Setup)

This procedure calibrates the processor to the optics of the projector.

- ☑ This procedure assumes that optical alignment of the projector has already been done. For alignment of the projector optics (mechanical alignment of the head), see *Appendix E*.

**Test Materials Required:**

- 50% Modulation Tone test film
- ☑ Before doing A-Chain calibration, be sure to mute all channels. Click the **Mute All Channels** button at the top of the screen (or press **Ctrl+M** keys).



1. Select the **Inputs** tab.
- ☑ You must be connected to the XD10P and the XD10P must have a signal source connected to either Projector 1 and/or Projector 2.
2. Select the appropriate **Projector** button (for the projector that is the source for the soundtrack input).
3. Turn ON the projector (with the “50% Modulation Tone” film loop loaded).
4. Select an optical **format**: Stereo, or Stereo SR, from the Format buttons.

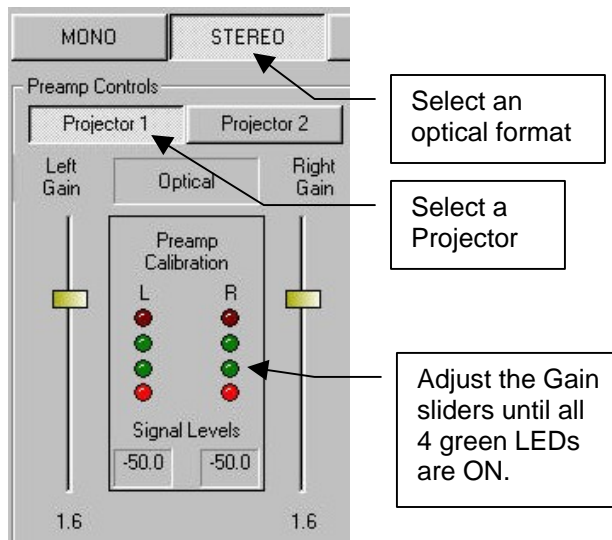


Figure 3-4. Preamp Controls on Inputs tab

5. Use the Left Gain or Right Gain slider to adjust the gain to align the left and right. (You can also use the UP/DOWN arrow keys on the keyboard.)

All four green Preamp Calibration LEDs (shown above) should be lighted steady (not flickering). The green LEDs on the Input module (shown below) should also be lighted green.



Figure 3-5. The two green LEDs will illuminate when level is correct.

### 3.4.1. Slit EQ Adjustment

#### Test Materials Required:

- Pink noise test film

This procedure compensates for any deficiencies or imperfections that may be present in the mechanical alignment (in the projector). Prior to this adjustment, the installer should have physically moved the optical reader lens of the projector for the best focus and azimuth, which will result in better outcomes in slit loss. See *Appendix E*.

Select the **Inputs** tab.

1. Confirm that all channels are muted.
2. Load the Pink Noise test film into the projector and start the projector.
3. Click the **Power On** button and a bar graph (or line graph) will display across the Analyzer screen.
4. Select the **Bars** or **Lines** option button to select the type of graph to display on the spectrum analyzer (SA).
5. Select **Left** and/or **Right channel**. (In this example, both Left Ch and Right Ch are selected.)
6. The interval for the Y-axis defaults to 10 dB/div. We recommend you not change this.

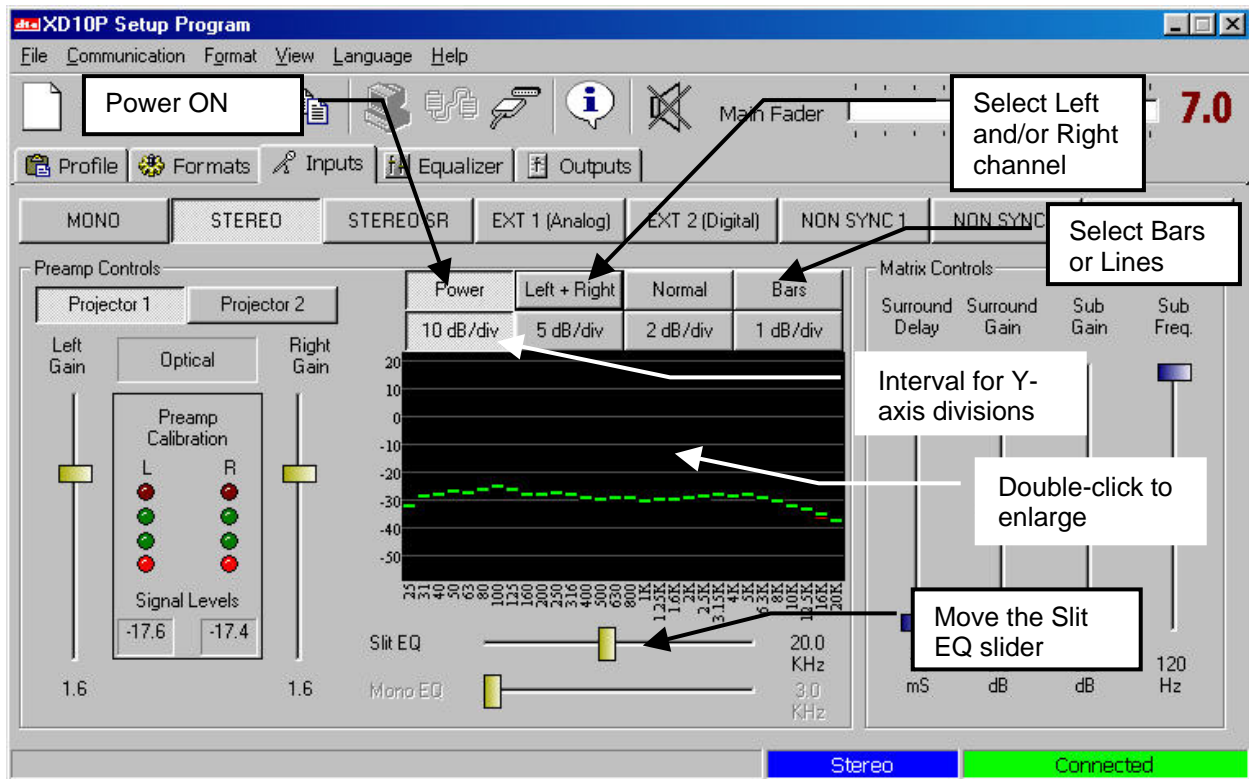


Figure 3-6. Inputs screen, showing bar graph on SA.

7. Double-click on the equalizer screen to enlarge it for a better view.

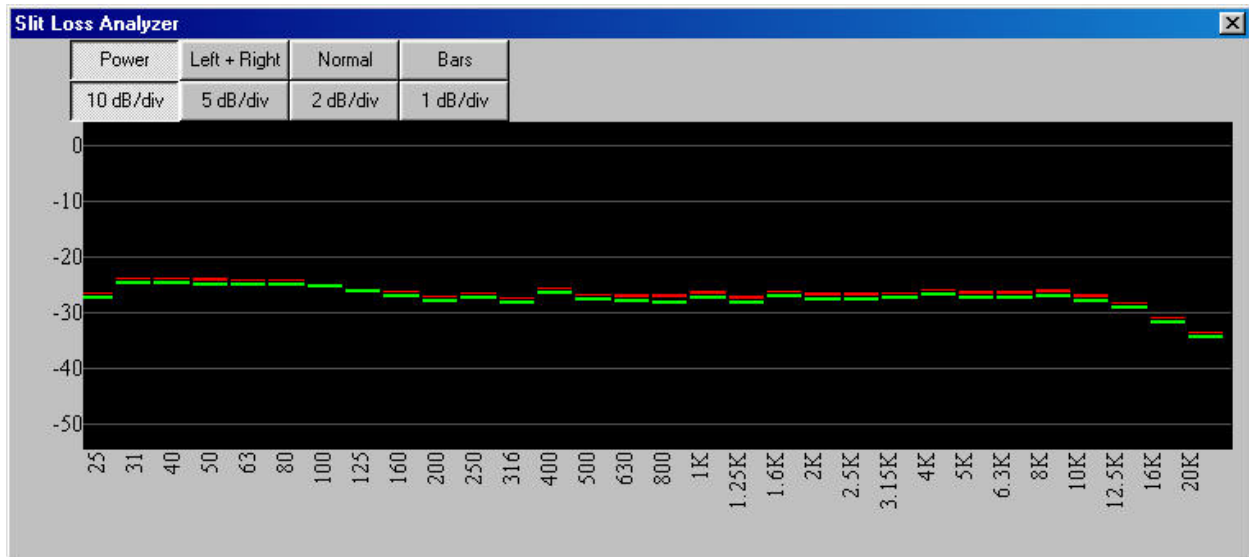


Figure 3-7. Slit Loss Analyzer, enlarged view (bar graph) showing relatively flat pattern.

8. **Move the Slit EQ slider** to adjust the equalizer until a response similar to that shown above (Figure 3-7) is obtained – that is, the graph is relatively “flat” from left to right, without significant upward or downward sloping on the right-hand end of the graph.

**Note:** Move the Slit EQ slider left or right and observe the effect on the graph in the Analyzer window. Movement of the slider all the way to the right causes the graph to turn downwards on the right end. Movement all the way to the left causes the graph to turn upwards on the right end. Use the slider for large adjustments; use the UP/DOWN arrow keys for fine-tuning.

If the bars (or lines) in the graph are not overlaying each other after fine-tuning, check your projector’s mechanical optical alignment. See *Appendix E*.

### 3.4.2. Mono EQ

Select the **Inputs** tab, and **mute** all channels.

1. Select the **Mono** format.
2. Thread a Pink Noise film loop into the projector and turn ON the projector.

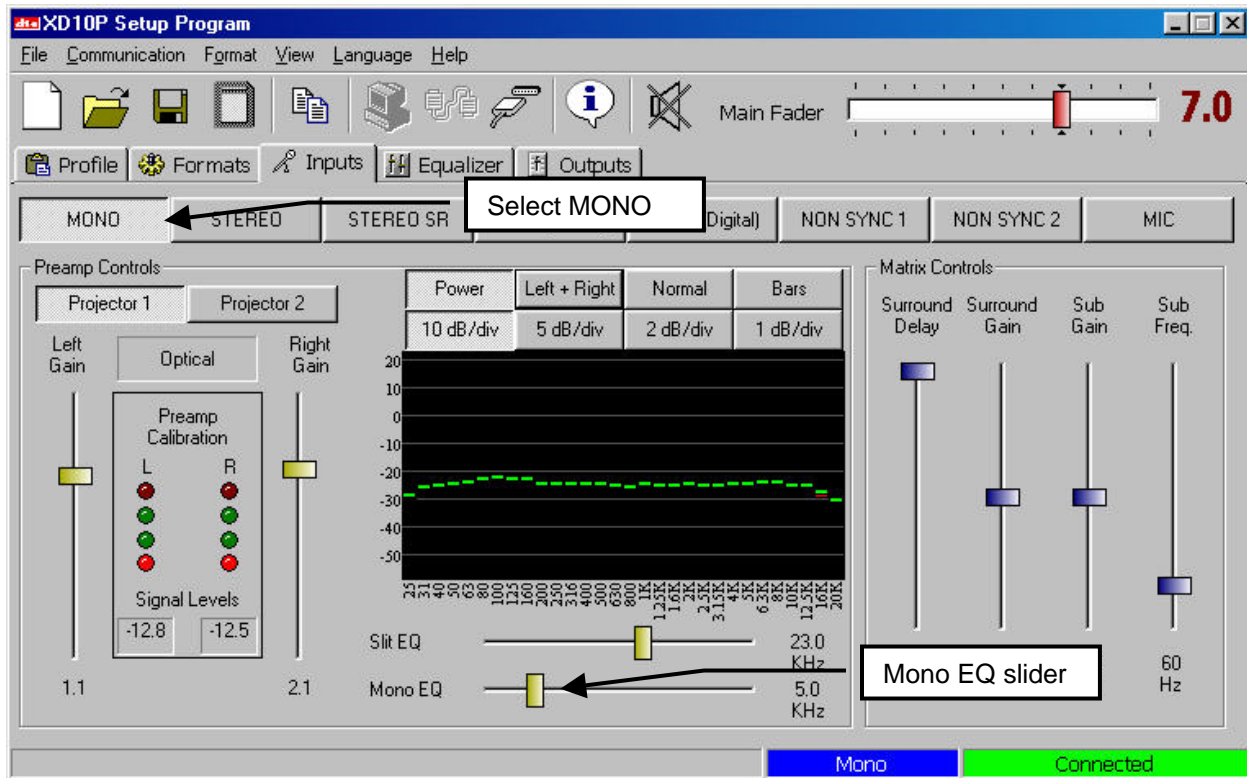


Figure 3-8. Input tab, Mono EQ adjustment

- Using the **Mono EQ** analyzer adjust the MONO EQ until the following curve is achieved.

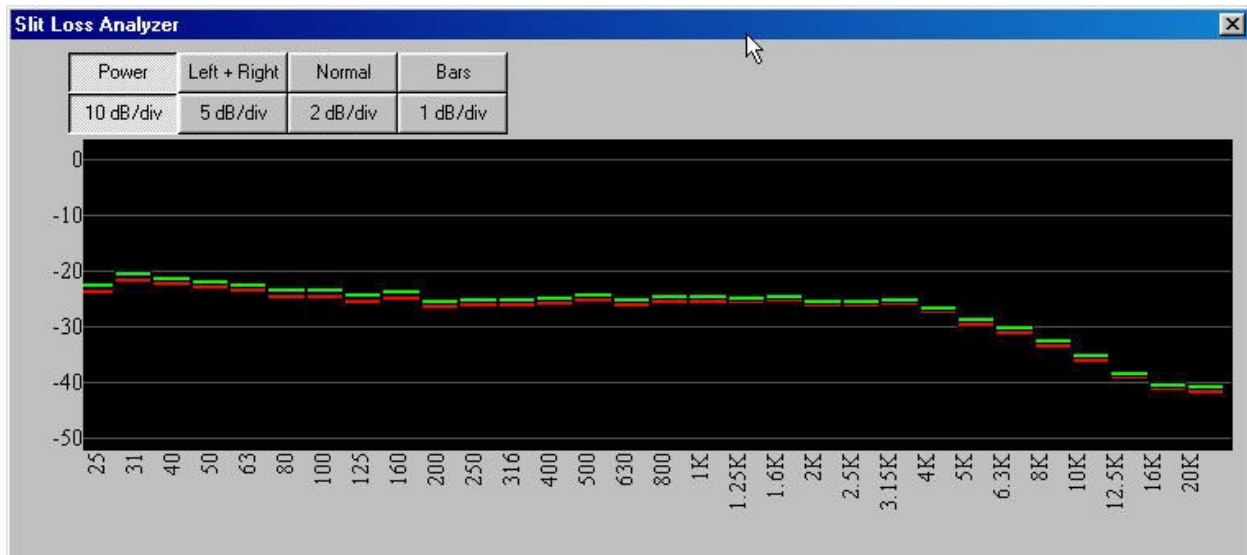


Figure 3-9. SA screen during Mono EQ adjustment

The curve shown, plus the auditorium roll-off, approximately equals the standard Academy Curve.

A-Chain Alignment is now complete.

### 3.5. B Chain Alignment

#### Left, Left Center, Center, Right Center, Right, Left Surround, Right Surround

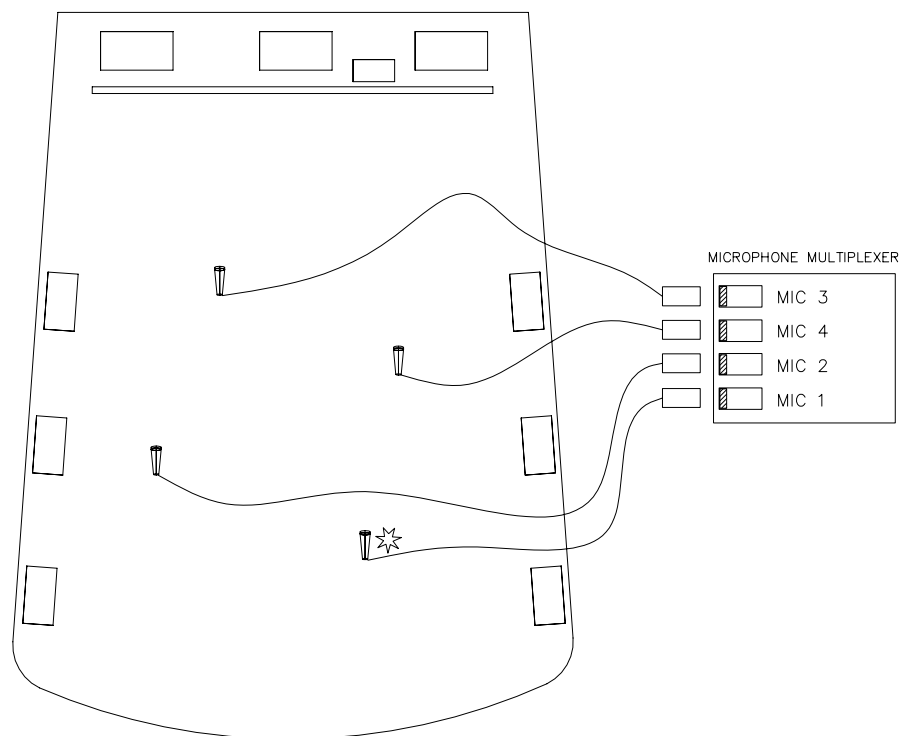
You will be adjusting the alignment of each individual channel. There are various approaches to B-chain alignment, and the procedure presented below is offered as an example, not a requirement. The intent is to show the XD10P functions that are relevant to B-chain alignment.

#### Equipment Required:

- Real Time Analyzer (RTA) with microphone (see the topic *Built-in RTA Function*, page 3-17).
- (optional) multiple microphone system
- SPL meter

**⚠ Caution:** Before proceeding with the room equalization it is imperative that the loudspeaker and crossover systems be properly aligned. Issues like speaker phasing and horn tilt need to be checked. When using crossovers the low, mid and high frequency drivers must be balanced to produce a relatively even response from 100 Hz to 5 Hz.

#### SUGGESTED MICROPHONE PLACEMENT



★ MAKE ALL SPL READINGS AT THIS LOCATION.  
IF USING A SINGLE CALIBRATED MICROPHONE FOR  
ADJUSTING EQ, LOCATE THE MIC AT THIS LOCATION.

THEATER 2.DWG

Figure 3-10. Suggested Microphone placement in theatre



**Note:** With a bi-amp system, during the B-chain adjustment you would adjust the amps or the crossover for flattest response on the RTA and make sure the setting is the same for all screen speakers. After the adjustment is complete, proceed with normal EQ adjustments with the XD10P Setup software, as described in the steps that follow.

1. Set up a Real Time Analyzer (RTA) with the microphone two-thirds (2/3) of the way back and one-third (1/3) of the way in from the side of the auditorium (that is, slightly off-center).

**Note:** Be sure to open the curtains (if any) at the front of the auditorium.

If using a multiple microphone system set up the microphones according to the instructions provided with that system.

2. In the XD10P Setup software, set the **Main Fader** to “7.0”. Verify on the XD10P front panel, that the fader setting matches (7.0).
3. Select the **Equalizer** tab and choose a channel. The screen channels (L, LC, C, RC, R) are always done before the surround channels. In this example – Figure 3-11 – we begin with the center channel.
4. Using the **Channel Gain** slider, adjust to –16 dB (recommended), to avoid damaging the speakers.
5. Select **Pink Noise**.

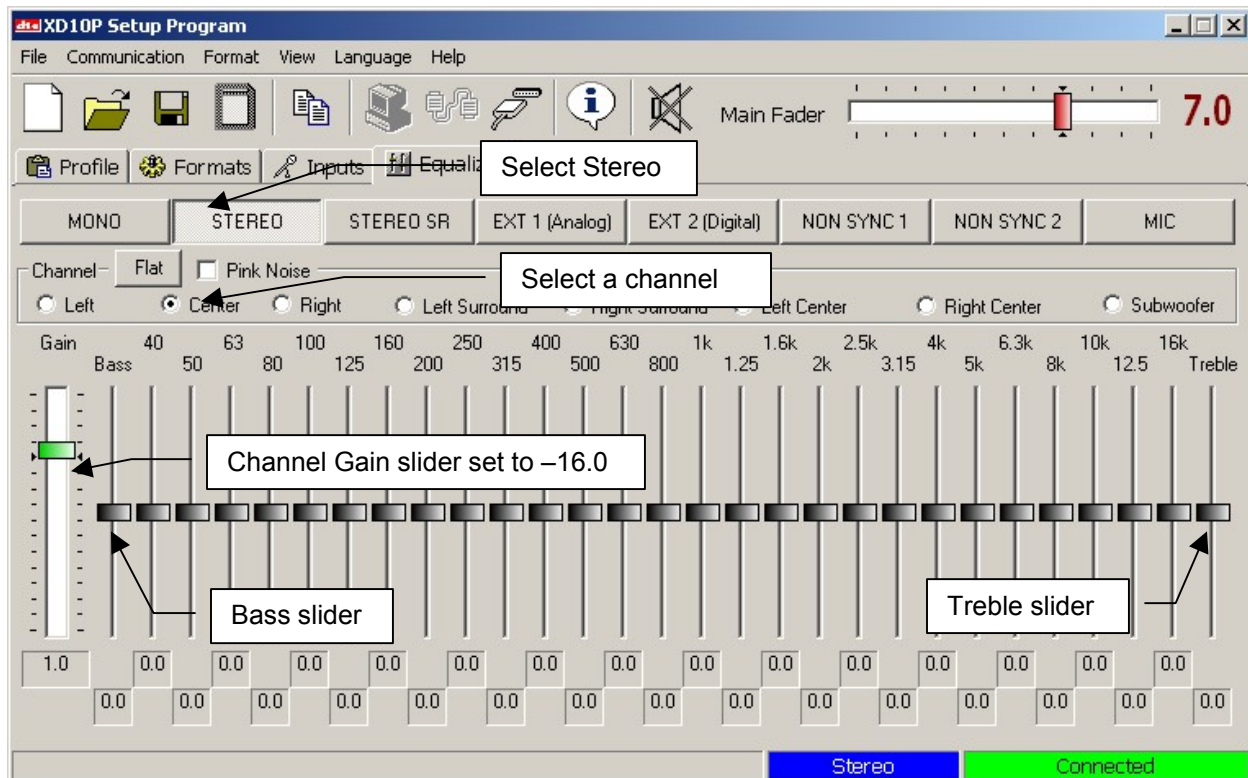
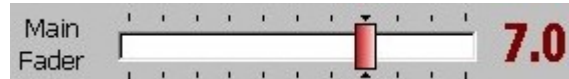


Figure 3-11. Equalizer tab

**Note:** Muted channels are highlighted in **RED** in the Equalizer Tab.

6. Raise the **Channel Gain** slider slowly until proper level is reached on RTA.
7. Using the RTA, observe the curve and make adjustments.
8. Use the **Bass** and **Treble** sliders to make overall adjustments.

The goal is to achieve a 3 dB roll off at 2 kHz, on every channel except Subwoofer, as shown in this example. (Subwoofer equalization is detailed in *B Chain Alignment - Subwoofer Equalization*, page 3-10.)

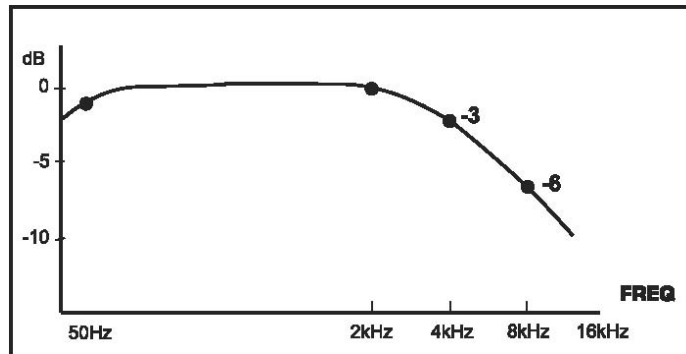


Figure 3-12. RTA example. Try to obtain this pattern for ALL channels except Subwoofer.

- Use the individual sliders for fine-tuning.


**Note:** Once a slider is selected with a mouse click, the keyboard UP/DOWN keys will adjust the slider. The left/right keys will switch to the adjacent 1/3 octave slider. Use the Bass and Treble sliders to achieve the overall shape of the auditorium response. After making the EQ adjustments, it may be necessary to fine-tune the level setting (in the **Outputs** tab).

- Repeat the tuning procedure (steps 4 through 9) for the left, right, left center, right center and surround channels. You may use the Copy feature to simplify this procedure (see next topic).

### 3.5.1. Use the Copy Feature

The XD10P includes a **Copy** feature that minimizes the time required for re-equalizing similar channels (see Figure 3-13, below).

After equalizing the center channel, copy these settings to the left, left center, right center, and right channels. Since all three front speakers are usually similar, if not identical, the EQ settings will be a close starting point. Similarly, after equalizing the left surround, copy these settings to the right surround channel.

To access Copy, select **Copy** from the **File** menu, click the **Copy EQ** icon in the toolbar,  or press key combination **Ctrl+Shift+C**.

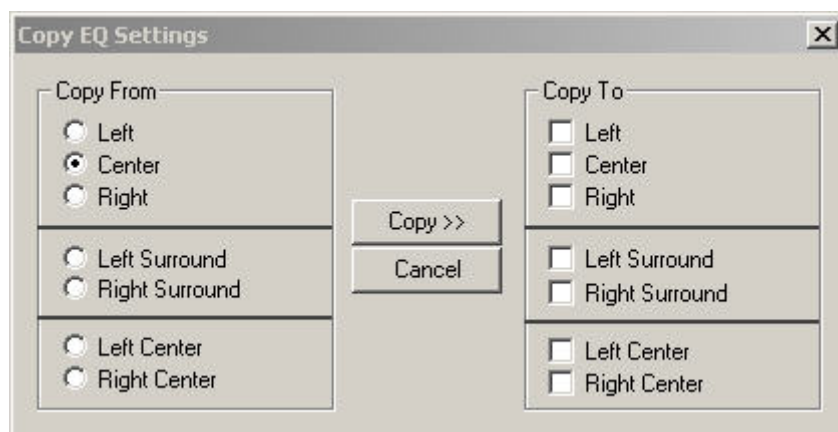


Figure 3-13. Copy EQ settings

- Select the **Copy From** channel, then select the **Copy To** channel, then click the **Copy>>** button.



### 3.6. B Chain Alignment - Subwoofer Equalization

#### Equipment Required:

- Real Time Analyzer (RTA) with microphone
- (optional) multiple microphone system
- SPL meter

1. Verify Subwoofer amplifier is OFF and level control of amp is at minimum.
2. Select the **Equalizer** tab and select **Subwoofer** in the Channel array.

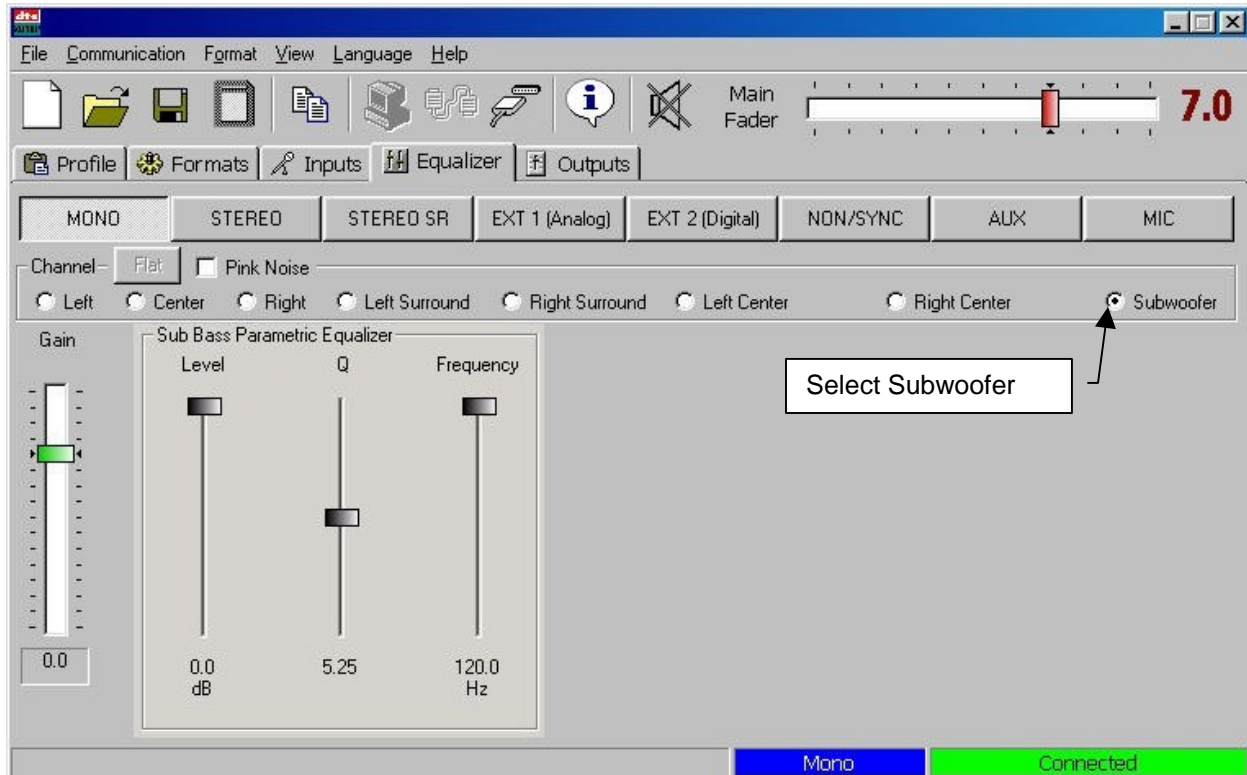


Figure 3-14. Equalizer tab, Subwoofer selected

3. In **Sub Bass Parametric Equalizer** section, adjust **Gain** slider to top 0.0, adjust **Q** to midpoint or 5.25, and adjust **Frequency** to 120 Hz.
4. Power ON the Subwoofer amp. Raise gain on amp until sub frequency response is seen on the RTA.
5. Note the highest peak on the RTA. Move the Frequency slider until center of dip is at the highest peak frequency.
6. Adjust Gain slider to flatten the dip.
7. Adjust Q slider to flatten overall response.

The subwoofer should fill in the lowest frequencies and create a smooth overall response on the RTA from 25Hz to 1 KHz.

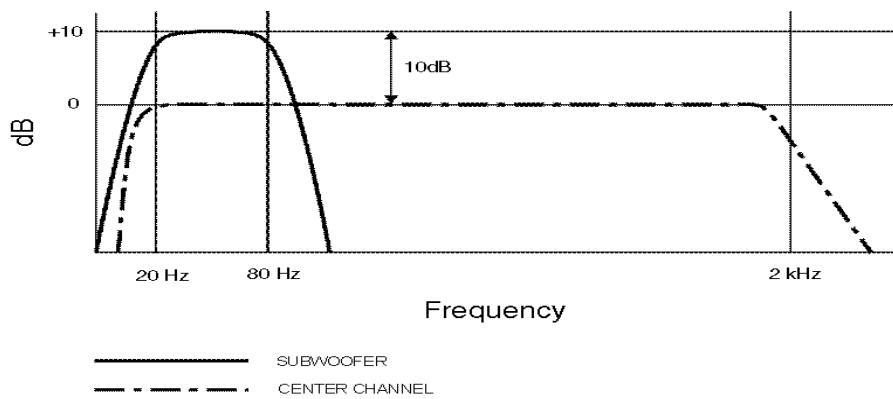


Figure 3-15. The expected pattern on the RTA when the subwoofer pink noise is playing in the theatre.

It may be necessary to adjust the subwoofer channel gain. It may also be necessary to click to phase invert on the subwoofer to be sure that the low frequencies of the center and subwoofer are adding, rather than subtracting.

### 3.7. Final Adjustments, B-Chain

Adjust all the levels to the proper setting, using the SPL meter. (If equipped with ES – Extended Surround – please refer to the ES manual for instructions to adjust channels.)

In the **Outputs** tab:

- Set levels for “screen channels” L, LC, C, RC, R at 85 dBC with an SPL meter.
- Set levels for surround channels LS, RS at 82 dBC with an SPL meter.
- Digital Subwoofer gain setting (from XD10 digital out or other digital source) – The digital Sub must be set for +10dB in-band gain as compared to the Center channel. See *Digital Subwoofer Gain Setting*, below.

In the **Inputs** tab:

- Optical (analog) surround and sub level (see *Optical Surround Gain and Delay* on page 3-12 and *Subwoofer Optical Gain* on page 3-13).

#### 3.7.1. Digital Subwoofer Gain Setting

1. Select **Outputs** tab.
2. Select Pink Noise Center channel, adjust to 85 dBC, and note average frequency response level.
3. Select Pink Noise Subwoofer, adjust level 10 dBC (in-band gain) more than the average frequency level noted above for the Center channel.

#### 3.7.2. Bypass Level (B-Chain) Calibration

Calibrating the Bypass Level is to be performed by a technician, not by an operator.

**Note:** Aux power supply must be connected to XD10P for bypass to work.

The Bypass Level setting adjusts the sound level in case the XD10P fails or is intentionally put into bypass mode. The operator can put the XD10P into bypass mode and can adjust the sound level using the Main Fader (see page 2-1) but should NOT attempt to calibrate the bypass level.

### Equipment Required:

- SPL meter
- Aux power supply (connected to XD10P)

### Alignment Procedure:

1. Run an optical Pink Noise source (film) on the projector.
2. Set the Main Fader on XD10P to 7.0.
3. Place SPL meter in auditorium. Note the auditorium reading (for example, 85 dB) and record it.
4. Turn the Power switch OFF on the XD10P. This switches the unit to bypass mode and the **Bypass** indicator will flash.
5. Read the new level on the SPL. For example, it might be up to 90 dB. It needs to be adjusted to about 3 dB lower than the level recorded in step 3, above.
6. If necessary, adjust the trim pots on the Input module (Figure 3-16, below) for an SPL level that is 3 dB lower than the level that was noted when the power switch was ON (step 3, above). For example, turn Projector 1 potentiometer (on the left) to 82.

You will need to remove the front access panel to gain access to the Input module, which is on the left side.

Do not rotate the Main Fader knob at this time or the bypass level will change.

#### INPUT MODULE

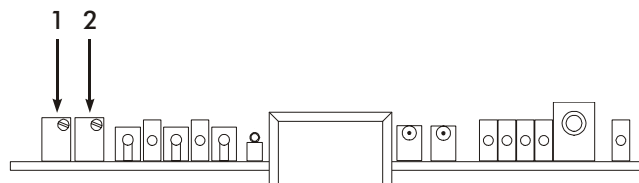


Figure 3-16. Input module, Bypass Level trim pots (1 and 2)

1. Projector 1 Bypass Level Adjust
2. Projector 2 Bypass Level Adjust

This completes the calibration of the bypass level.

- Note:** When in bypass mode, the operator can change the bypass level by adjusting the Main Fader. However, the Main Fader knob must be rotated many more turns, compared to non-bypass mode, to achieve changes in level.

### 3.7.3. Optical Surround Gain and Delay

Depending on the size of the auditorium, there may be a delay between the screen channels and the surround channels, to avoid an echo effect. This delay is to ensure that the sound from the back of the theatre arrives at the listener's ears approximately 20 milliseconds after the arrival of the front speaker sound.

1. Calculate the surround delay by using the following formula:
  - a. Measure the distance from a selected **rear seat** to the nearest **surround speaker** (in feet). If you are calculating in meters, multiply by 3 (m X 3) to convert to feet.
  - b. Measure the distance from the **same rear seat** to the nearest **screen speaker** (in feet).
  - c. Subtract the two measurements to find the difference, then add 20 to that number. The result is the Surround Delay in milliseconds (mS).

- d. In the **Inputs** tab, set the Surround Delay control accordingly.

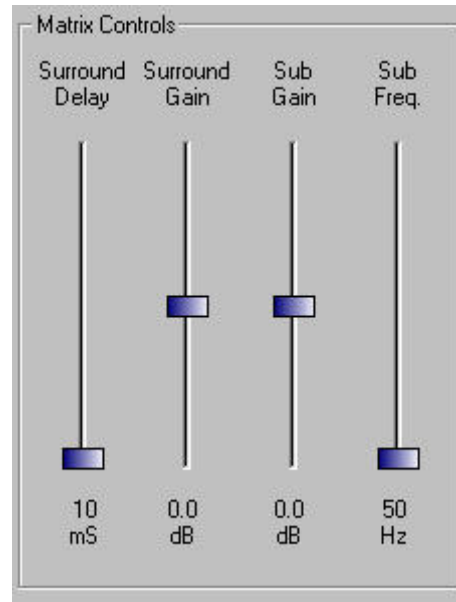


Figure 3-17. Matrix Controls (on Inputs tab)

**Example:** Rear seat is 12 feet from nearest surround speaker.  
 Rear seat is 82 feet from nearest screen speaker.  
 The surround delay is set to  $82 - 12 + 20 = 90$  mS.

- Using an RTA or SPL meter, adjust the **Surround Gain** in the Matrix Controls so that the pressure level in the back matches the pressure level in the front.

### 3.7.4. Subwoofer Optical Gain

#### Equipment Required:

- RTA
  - Pink Noise test film
- Thread the Pink Noise test film into projector.
  - Turn off Subwoofer amplifier.
  - Select the **Inputs** tab and start projector.
  - Note average frequency response level on RTA display and the lower frequency roll-off.
  - Turn off Center channel amplifier and turn on Subwoofer amplifier.
  - Adjust **Sub Gain** under Matrix Controls in the **Inputs** tab, to match the same level of frequency response. Adjust **Sub Freq** to match the roll-off of Center channel (noted in step 4).
  - Turn on Center channel amp. Make any final adjustments so that Sub response is flat matching average of Center channel response.

### 3.7.5. NON SYNC 1, NON SYNC 2, MIC Levels

- Note:** The operator can adjust these levels if the sound level is not right, using the controls on the XD10P front panel. See *Changing a Format Level Preset* in chapter 2, page 2-1.

#### NON SYNC1

1. Connect the sound source to the NON SYNC 1 “L” and “R” RCA jacks.
2. Select the **Inputs** tab. Select the NON SYNC 1 format. The non-sync gain on the Preamp Controls panel becomes active.

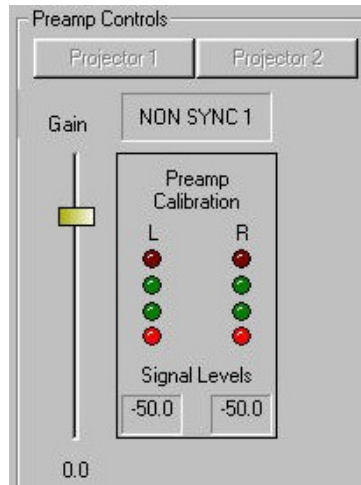


Figure 3-18. NON SYNC 1 adjustment (Preamp Controls)

3. Adjust the **Left Gain** slide pot. The master fader should be set at 7.0.
4. In the theatre, listen to the non-sync 1 audio, and then adjust the gain to a comfortable level.

#### NON SYNC2

1. Connect the sound source to the NON SYNC 2 “L” and “R” RCA jacks.
2. Click on the **Inputs** tab. Select the NON SYNC 2 format. Use the Left Gain slider to set the NON SYNC 2 level.

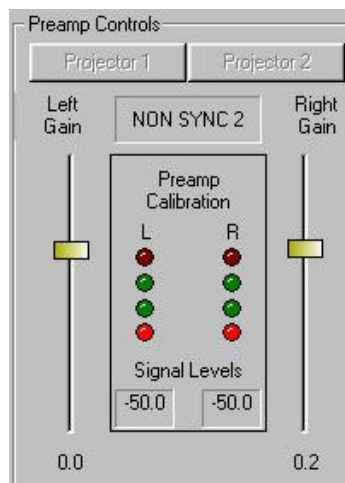


Figure 3-19. NON SYNC 2 adjustment (Preamp Controls)

- Note:** In this format the two sliders move together.

3. In the theatre, listen to the non-sync 2 audio, and then adjust the gain to a comfortable level.

## MIC

1. Connect a microphone to the DB9 connector (pins 1+ and 2- with shield on 5). If the microphone is an electret type that requires 5 to 9 Volts DC you may use pin 7 on the DB9 for that power (see *Appendix A* for pinout specifications).
2. Click on the **Inputs** tab and select the MIC format. Use the Left Gain slider to set the MIC level.

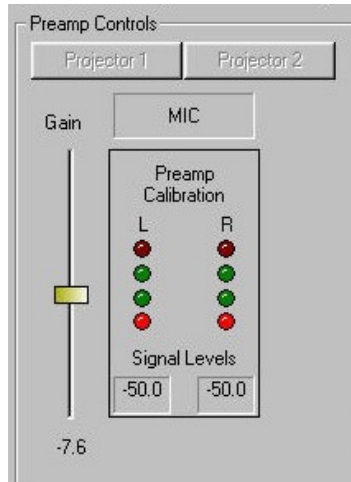


Figure 3-20. MIC adjustment (Preamp Controls)

3. In the theatre, listen to the mic audio, and then adjust the gain to a comfortable level.

### 3.7.6. Preset Levels and Startup Mode

1. Select the **Formats** tab and then choose a format.
2. Adjust the format level on this screen to an appropriate setting.
  - Note:** The main fader moves as you adjust this.

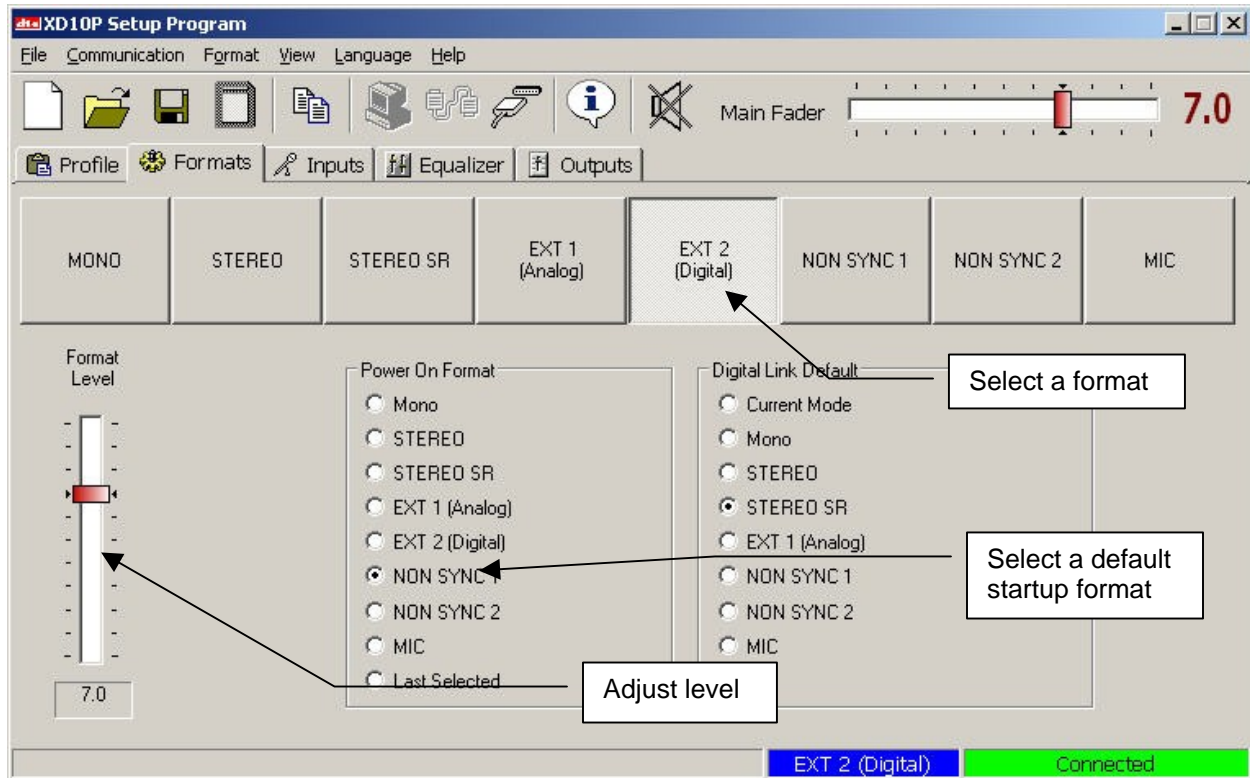


Figure 3-21. Formats tab, EXT 2 selected

3. Select the default startup format (**Power On Format**) from the list shown.

**Examples:**

Selecting **NON SYNC** will cause the XD10P to start in non sync every time it is powered.

Selecting **Last Selected** will cause the XD10P to resume its last format before it was powered down.

4. For **EXT 2 (Digital)** format, select the **Digital Link Default** format, in case there is a failure of the digital link. For more information, see page 4-15.

### Operator can adjust presets

The operator can change the setting during the show (without a computer), if necessary. Press and hold the appropriate format button on the front panel for two seconds and, while continuing to press it, rotate the main fader to the desired level. Then release the button.

This will change the preset level for that format. No other format levels will change. The LED display will indicate the preset level. Each format can be set for a different level, if necessary.

### 3.7.7. Listening Test

**Equipment Required:**

- Buzz and Bill Show test film (DTS PN 6800000100)
- For digital sound testing, connect to an XD10 and play its built-in Buzz and Bill soundtrack.

1. After adjusting the EQ and SPL, play the Buzz and Bill Show test film.
2. Walk through the auditorium and listen to the sound quality from the speakers at different locations. Be sure to listen in both optical and digital sound formats.

Press the **EXT 2 Digital** button on the front panel, to switch to digital format. Press the **Mono**, **Stereo**, or **Stereo SR** button to switch to an optical format.

3. Verify there is uniformly good sound quality throughout the auditorium. If there are large differences from one area to another, the EQ and SPL process should be repeated.

### 3.8. THX RT60 Reverberation Time Test

RT60 (Reverberation Time) is the test name for the measurement of the reverberation within a room. It is defined as the time required (in seconds) for an average sound pressure level to decrease 60 decibels after the source stops generating in a room. This and other tests are required for THX certification of a theatre. Located on the XD10P Input module is a THX Pink Noise Enable jack that is used to perform RT60 and other tests.

To execute tests, you must have the XD10P software running and connected.

1. Select **Outputs** tab.
2. Press and hold the **Ctrl** key on your laptop and select the pink noise box of each channel.
3. Once all boxes are selected connect your test equipment to the THX pink noise trigger jack on the Input module of the XD10P.

Your test equipment will now activate all channels with pink noise during the test.

For further information refer to your test equipment instructions.

### 3.9. Built-in RTA Function

The XD10P Setup software features a built-in RTA function. However, the XD10P is not supplied with a calibrated microphone, so DTS recommends that this built-in RTA only be used for quick checks. Initial setup and adjustment should use a fully calibrated external RTA device.

Place a microphone in the auditorium and connect to the MIC IN connector on the XD10P. In the Setup software, click the **Inputs** tab and double-click on the Slit EQ. It becomes a real-time analyzer (RTA).





## 4. Software Description

This chapter presents descriptive information about the XD10P Setup program screens. Detailed field definitions are included. However, for instructions to install XD10P Setup program and for using the program, see chapter 3.

- ☑ Note: When the computer is connected to the XD10P unit, then the Setup software takes total control, and the buttons and fader knob on the front panel of the unit will not respond to user interaction.

### 4.1. The Opening Screen

Activate the **XD10P Setup** icon on the desktop.



The opening screen appears.

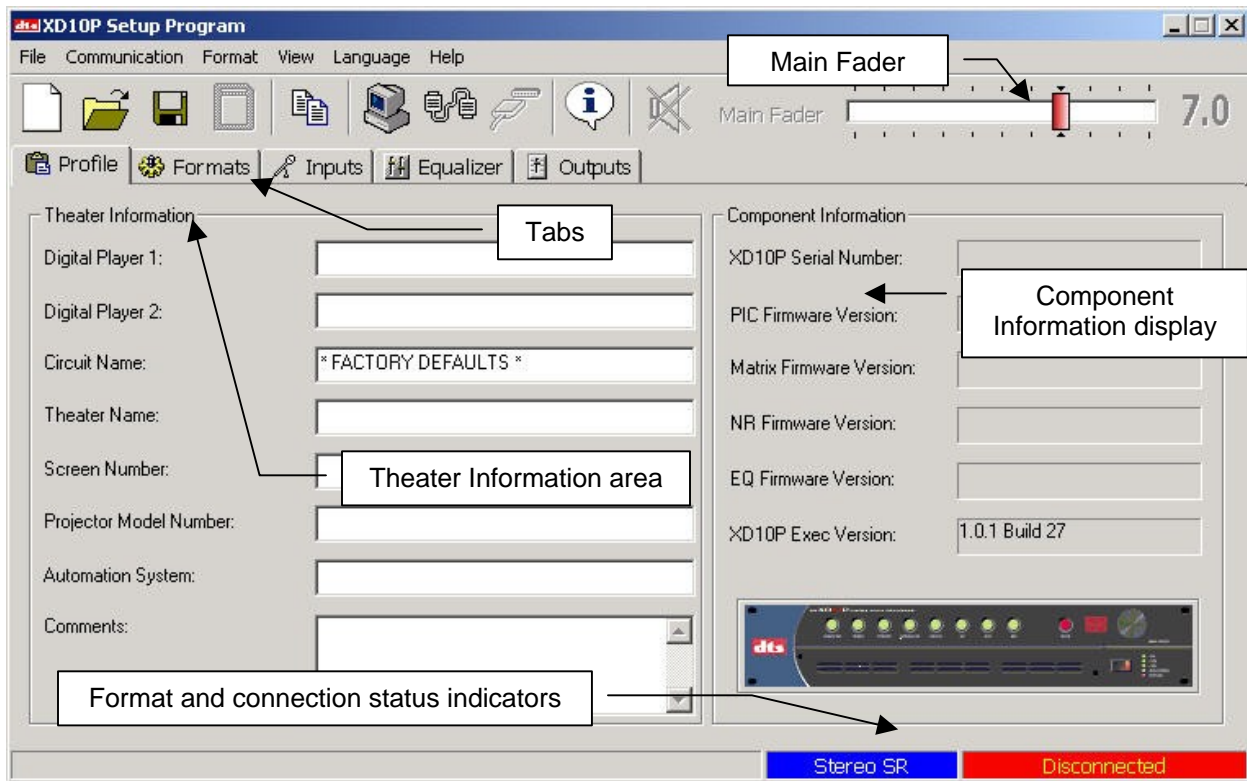


Figure 4-1. Initial screen, XD10P Software

The opening screen has a Menu Bar, Toolbar, tabs for accessing software functions and, on the Profile tab, a Theater Information entry area. There is also a Main Fader slider control, a Component Information display area, and two indicators for Format and Connection status. These features will be described in the paragraphs that follow.

#### 4.1.1. Menu Bar

The menu bar gives access to various functions. These functions are duplicated on the Toolbar and through keyboard hot-key combinations.

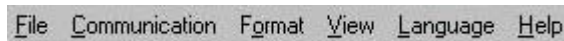


Figure 4-2. Menu bar

## File Menu

The standard Windows functionality for New, Open, Save, Save As, and Exit are found in the XD10P File menu. In addition, there are these unique functions:

Save to Personality Module – Save the current unit configuration to the Personality (or Memory) module. See description of the *Control Module*, page 1-4.

Copy EQ Settings – (See 3.5.1 *Use the Copy Feature*, page 3-9.)

System Mute – Toggle to mute or Unmute all output channels.

## Communication Menu

The Comm menu functions are available from the toolbar, as well.

Communication Settings – Make changes to the serial communication parameters. When selected, a dialog box will display.



Figure 4-5. Configure Communications dialog

Select from the pull-down list of COM ports. This will be the communications port (of the computer) used for communicating with the XD10P.

Connect – Establish a connection with a XD10P unit.

Disconnect – Disconnect from the XD10P unit.

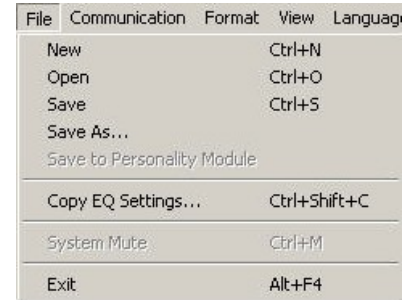


Figure 4-3. File menu



Figure 4-4. Communication menu

## Format Menu

The Format menu selections are duplicated in the Format tab. See *Formats Tab*, page 4-14.

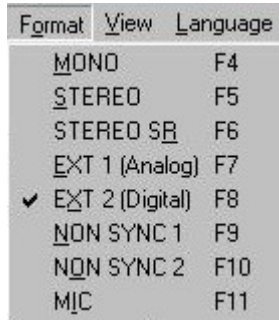


Figure 4-6. Format menu

## View Menu

The View menu duplicates the functionality of the tabs. See *Tabs*, page 4-4.

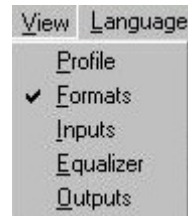


Figure 4-7. View menu

## Language Menu

The Language menu allows you to choose the language of the XD10P Setup interface. The default setting is your user language (your log-on setting) or the system language, but you can change the language by selecting from this list.

Reset – This resets to the system default. The software reads your user-selected language, looks for it and, if not found, then looks for your system language and, if that is also not found, it defaults to English.

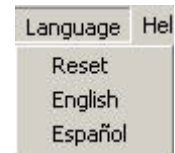


Figure 4-8. Language menu

## Help Menu

From the Help menu, select **About** to display version information for the XD10P Setup program. The **Unlock Diagnostics** selection permits privileged access to diagnostic features (using a password).

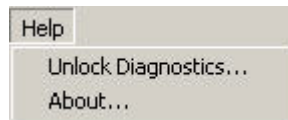


Figure 4-9. Help menu

The diagnostic features are intended for use only by a trained technician. After entering the password, three tabs will display: a Terminal tab for issuing commands for direct interface with the XD10P; a Log Files tab for viewing log entries; and a PIC Download tab for loading new Programmable Interface Controller firmware to the XD10P.

### 4.1.2. Toolbar

The toolbar consists of graphic icons that give access to various functions. Placing the cursor over any of the icons for a few moments will display a “tool tip” describing the function of the icon.



Figure 4-10. Toolbar

	New – create a new parameter file
	Open (an existing parameter file)
	Save (the parameter file)
	Save Personality Module – save the current unit configuration to the Personality Module
	Copy EQ – copy settings from channel to channel (See 3.5.1 <i>Use the Copy Feature</i> , page 3-9.)
	Communication Settings – make changes to the serial communication parameters
	Connect – establish a connection with a XD10P unit
	Disconnect (from the XD10P unit)
	About – displays program information and how to contact Technical Support
	Mute – or unmute all output channels

### 4.1.3. Tabs

(See Figure 4-1, page 4-1) Below the toolbar are tabs for accessing various operational modes. These tabs will be described in order (left to right), beginning with the Profile tab on page 4-6.

### 4.1.4. Main Fader

(See Figure 4-1, page 4-1) The slider at the upper right is the main level control for the XD10P. It works in conjunction with the fader knob on the front panel of the unit and will follow it, just as the level indicator on the front panel will follow any movement of this fader control.

The level may be changed from the main screen by placing the cursor over the slider, holding down the left button on the mouse, and moving the mouse left or right.

## 4.2. After Connecting to the XD10P

- Note:** When the computer is connected to the XD10P (see Figure 4-11) the Setup software takes total control, and the buttons and fader knob on the front panel of the unit will not respond to user interaction.

After the computer establishes connection to the XD10P, the connection status bar in the lower right hand corner of the main screen will change from “Disconnected” to “Connected” (Figure 4-11).

When you connect to the XD10P, the computer will download all the data stored on the XD10P to the computer's memory. This data can consist of Preamp parameters, EQ parameters, Front Panel parameters and Profile information. The Component Information display area of the initial screen will no longer be empty; it will show serial number and version information.

- ☑ Note: The serial number and version information are important when contacting DTS Customer Service.

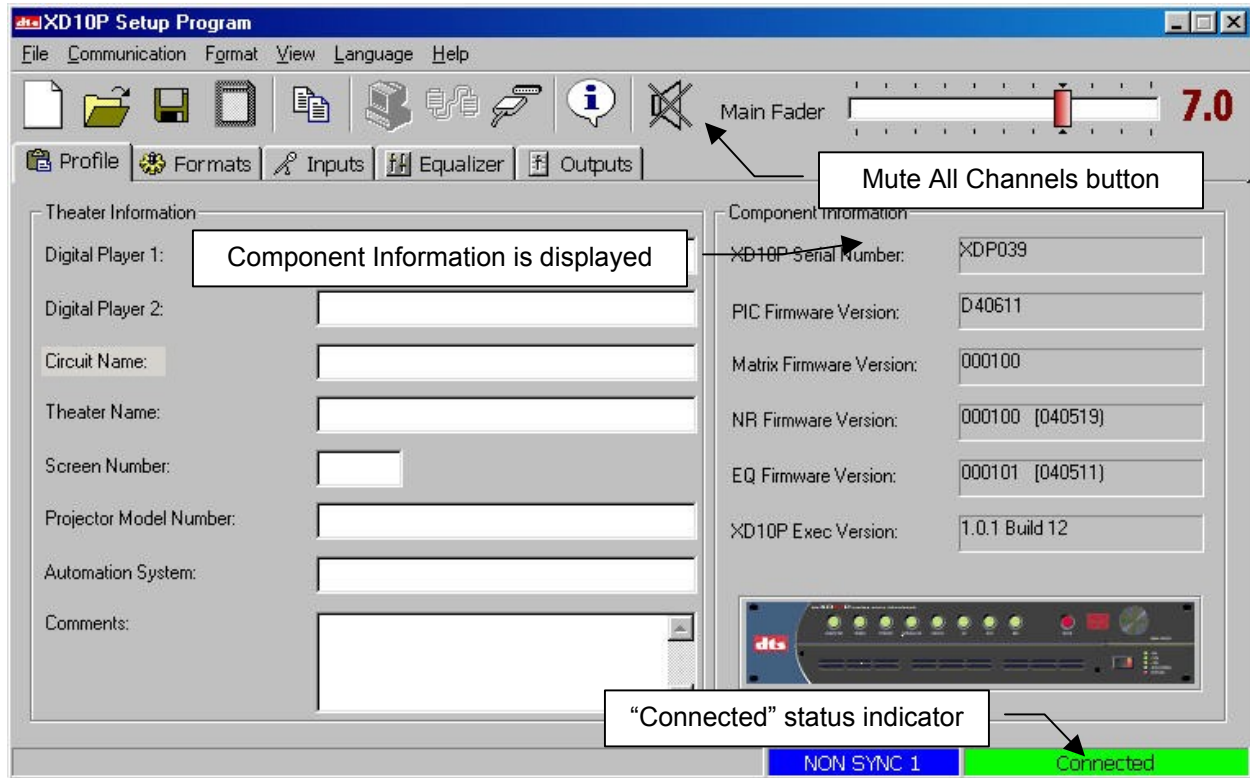


Figure 4-11. Initial screen (Profile tab) after connecting to XD10P.

### 4.3. Profile Tab

On the Profile tab, in the Theater Information area, there are several fields for entering information about the projection room configuration.

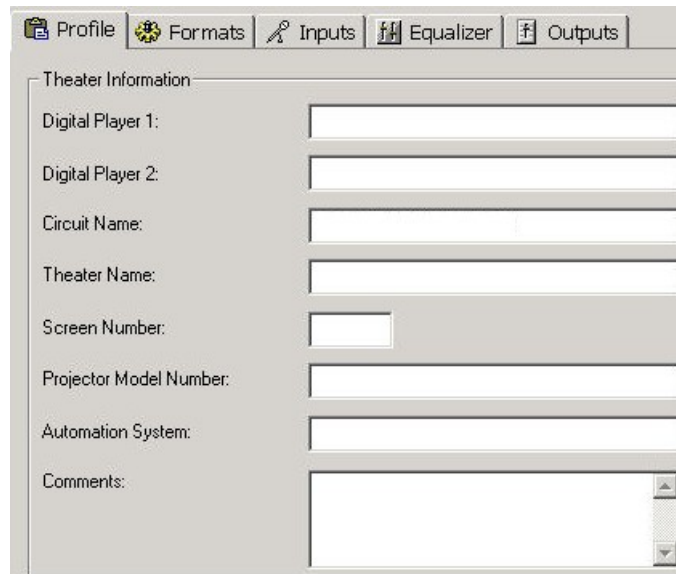


Figure 4-12. Theater Information area, Profile tab

This information is stored in the XD10P and can also be stored as a file on the computer you use to set up the unit.

- Note:** You can enter this information at any time, whether connected to the XD10P or not, and you can save it to disk for later loading onto the XD10P.

This information is not used by any functions of the unit but can be extremely valuable to a technician performing repair and realignment or in case factory repair is needed.

You may fill in these fields in **Theater Information**:

Digital Player 1 – what digital system is connected to the XD10P? Examples: DTS XD10, SDDS, Dolby Digital.

Digital Player 2 – identify a second digital system, if any.

Circuit Name – enter the theatre circuit or company name

Theater Name – enter the name of this theatre

Screen Number –

Projector Model Number –

Automation System – Manufacturer and model number

Comments – add any additional descriptive comments

The **Component Information** fields are read from the XD10P and cannot be changed by the user. At the bottom right of the screen is the connection status bar and the format status bar (look back at Figure 4-11). These will display in all tab views. The format status bar will always indicate the format that the processor is currently operating.



## 4.4. Inputs Tab

The **Inputs** tab is used for A-Chain setup. (See *Preamp Calibration (A-Chain or Optical Setup)*, page 3-3.)

There are two sections to the Inputs tab. On the left, **Preamp Controls** is where the alignment is accomplished for the optical preamp and it is vital for accurate optical performance. It contains buttons to select either Projector 1 or 2, level settings for the Left and Right preamps (with accompanying level indicators), Slit EQ and Mono EQ sliders and the spectrum analyzer (SA) screen.

The spectrum analyzer has annotations on the bottom and left side and option buttons at the top.

- You must be connected to the XD10P and it must have a signal source from Projector 1 and/or Projector 2 before it can become functional. You must also choose an **Optical** format: Stereo or Stereo SR. The projector must be running and connected to the optical input on the XD10P.

On the right, **Matrix Controls** is used for setting surround delay and gain, subwoofer gain and frequency and non-sync gain. (See *Matrix Controls*, page 4-11.)

### How to adjust levels (using sliders)

To adjust a level, place the cursor over the desired slider's button and hold down the left mouse button while moving the mouse.

The sliders (once they are selected) may also be manipulated by using the UP or DOWN arrow keys on the keyboard. The LEFT/RIGHT arrow keys will select the sliders to the left or right of the one initially chosen. At the bottom of the slider is a box that displays numerically in dB the position of the slider.

The figure below shows the Inputs screen when the connection is active to the XD10P.

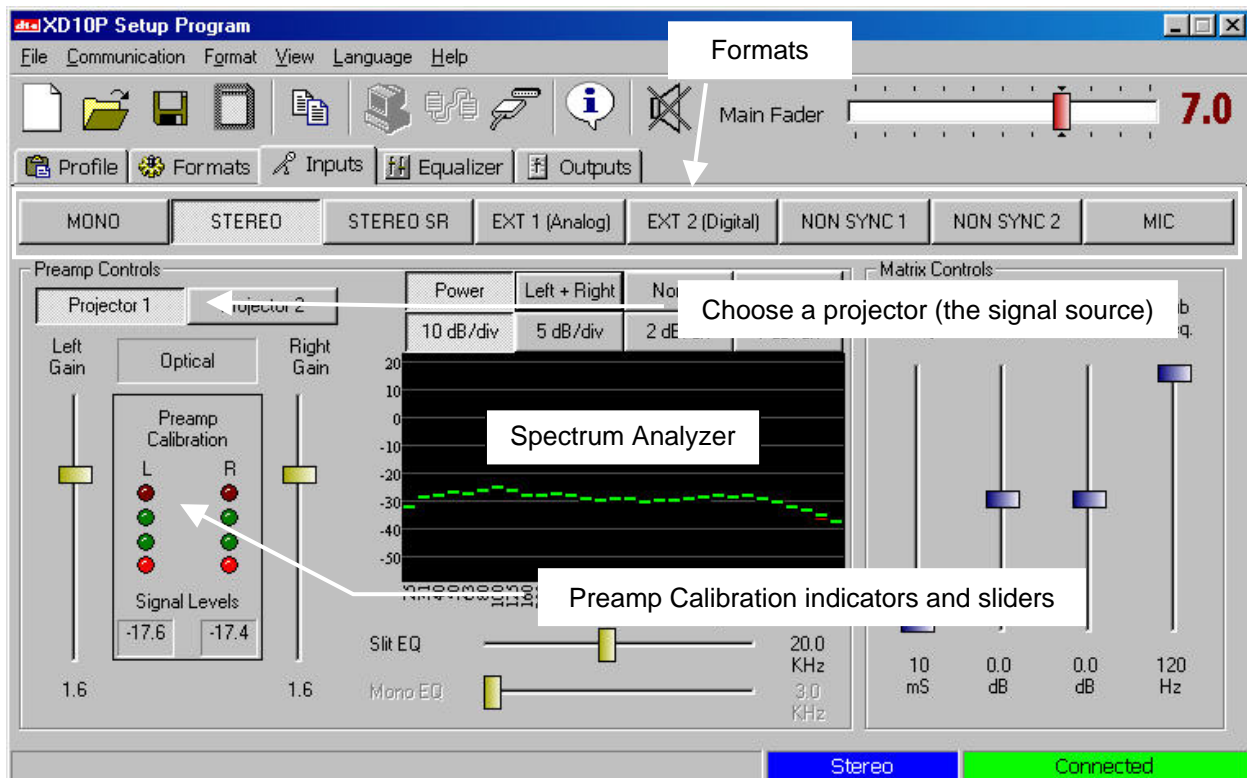


Figure 4-13. Inputs tab, connection is active (1 of 2)



**Formats** – Optical formats include Mono, Stereo or Stereo SR. The Preamp Controls area of the screen will change depending on the selected format. See 4.4.1 through 4.4.3, pages 4-9 and 4-10.

**Preamp Calibration** indicators – these green and red indicators and the **Left Gain / Right Gain** sliders are used in Preamp Calibration (see page 3-3).

Power	Left + Right	Normal	Bars
10 dB/div	5 dB/div	2 dB/div	1 dB/div

Figure 4-14. Spectrum Analyzer controls

**Power On/Off** button – causes a bar graph (or line graph) to display across the SA screen.

**Left / Right / Left+Right** – click to toggle between select one or both channels to display in the analyzer. (In this example, both Left and Right channels are selected. The SA displays the performance for both channels.)

**Normal / Summ + Diff** – click to toggle between the two. If Summ + Diff is selected with this button, the Left/Right button will also display Summ + Diff.

**Bars or Lines** –select the type of graph to display on the SA.

In the example above, Bars was selected. The two channels are aligned and appear as one set of bars.

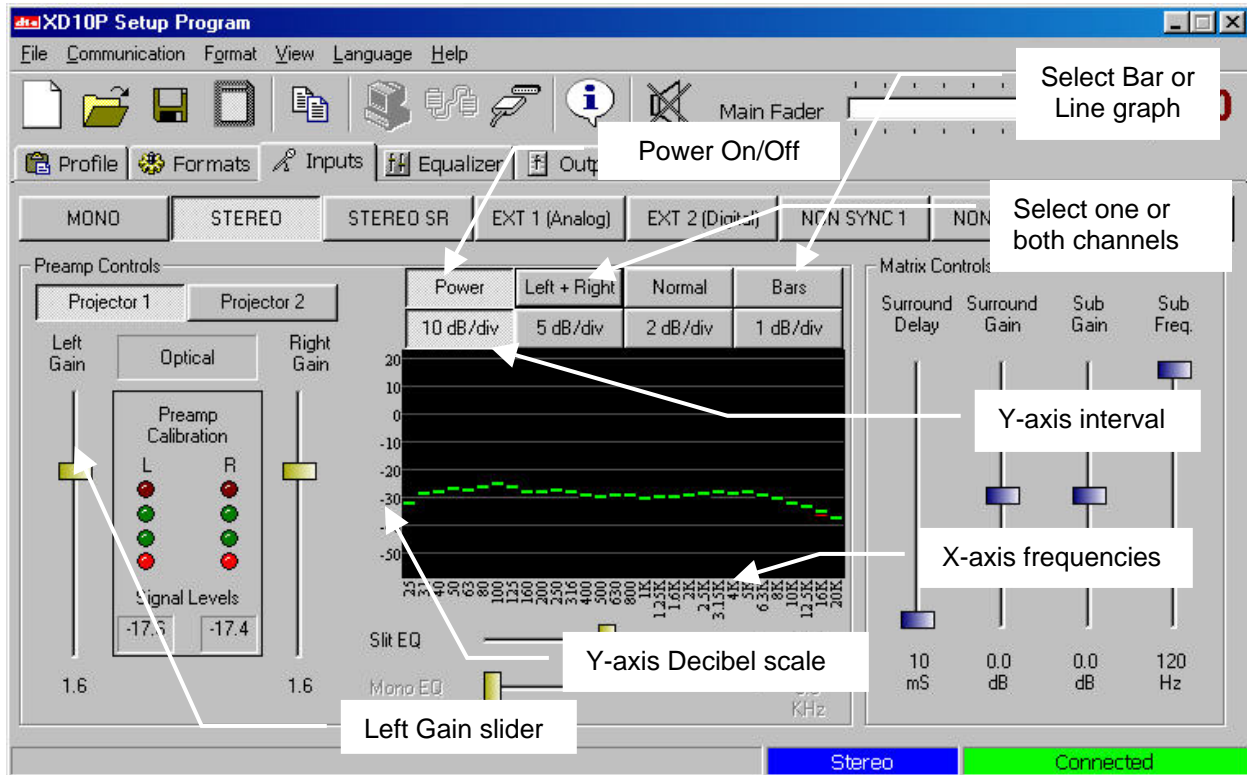


Figure 4-15. Inputs screen (2 of 2)

**Y-axis interval** – above the SA, click a button to select the interval for the Y-axis divisions of the SA display. In the example above, “10dB/div” is selected.

Along the left hand side of the SA screen (the Y-axis) is a scale with gradations measured in Decibels (see above). These gradations will extend below the level of the screen if smaller intervals are selected. (For example, if you choose 2 dB/div, the Y-axis scale will be longer and will extend downwards below the bottom of the SA screen.)

You can then move (drag) the SA display (the graph) upward or downward, to view the signal down to a level of 50 dB.

To do this, place the cursor inside the SA screen (on the graph) and, while holding down the left mouse button, move the cursor up or down. The graph will move and the Decibel scale (Y-axis) will also move.

**Zoom** – With the cursor inside the SA, double-click the left mouse button and the SA will expand to a larger view.

**Built-in RTA** – When a microphone is connected to the XD10P MIC IN connector, double-click the SA and it will become a built-in RTA. For details see 3.9 *Built-in RTA Function*, page 3-17.

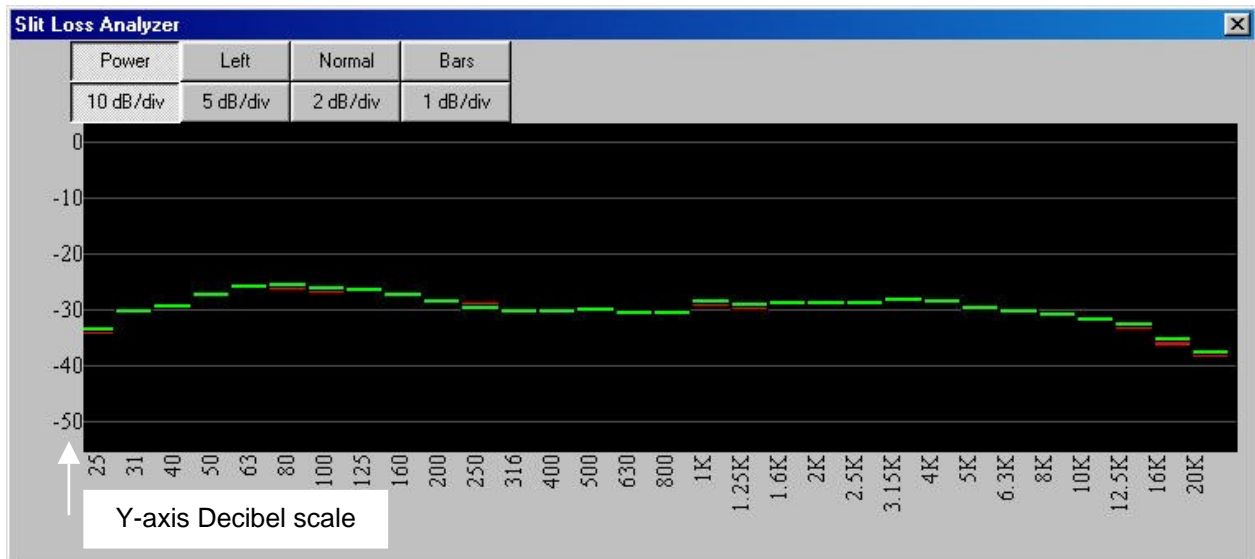


Figure 4-16. Slit Loss Analyzer, enlarged view.

#### 4.4.1. Inputs tab, MIC selected

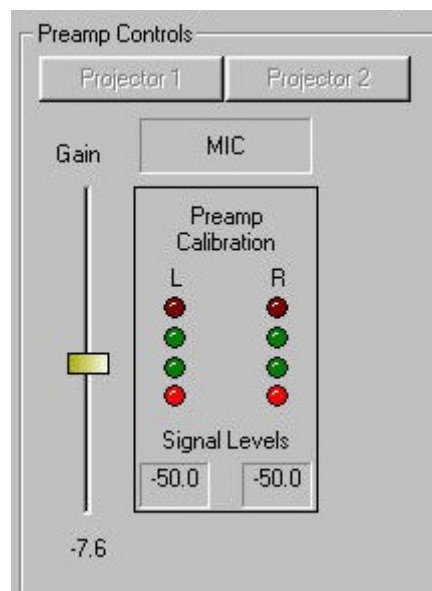


Figure 4-17. These Preamp controls will display when MIC is selected.

#### 4.4.2. Inputs tab, NON SYNC 1 selected

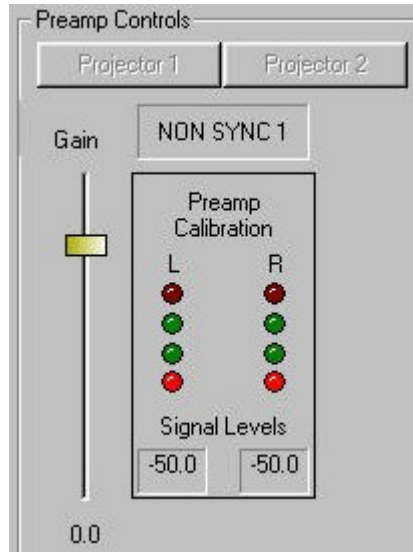


Figure 4-18. These Preamp controls will display when NON SYNC 1 is selected.

#### 4.4.3. Inputs tab, NON SYNC 2 selected

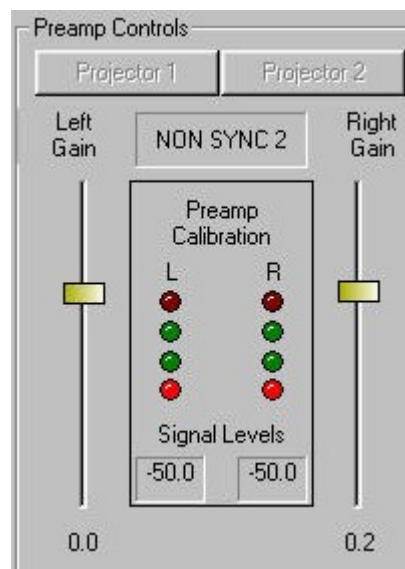


Figure 4-19. These Preamp controls will display when NON SYNC 2 is selected.

#### 4.4.4. Matrix Controls

Matrix Controls is used for setting **optical surround delay and gain**, and **subwoofer gain and frequency**. See *Optical Surround Gain and Delay* in chapter 3 (page 3-12) for instructions for setting these parameters.

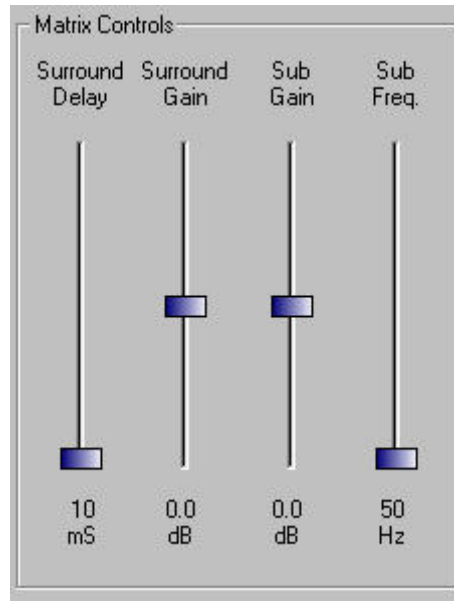


Figure 4-20. Matrix Controls (on Inputs tab)

## 4.5. Equalizer Tab

The third tab is the **Equalizer** tab. This is used for all equalization of the auditorium.

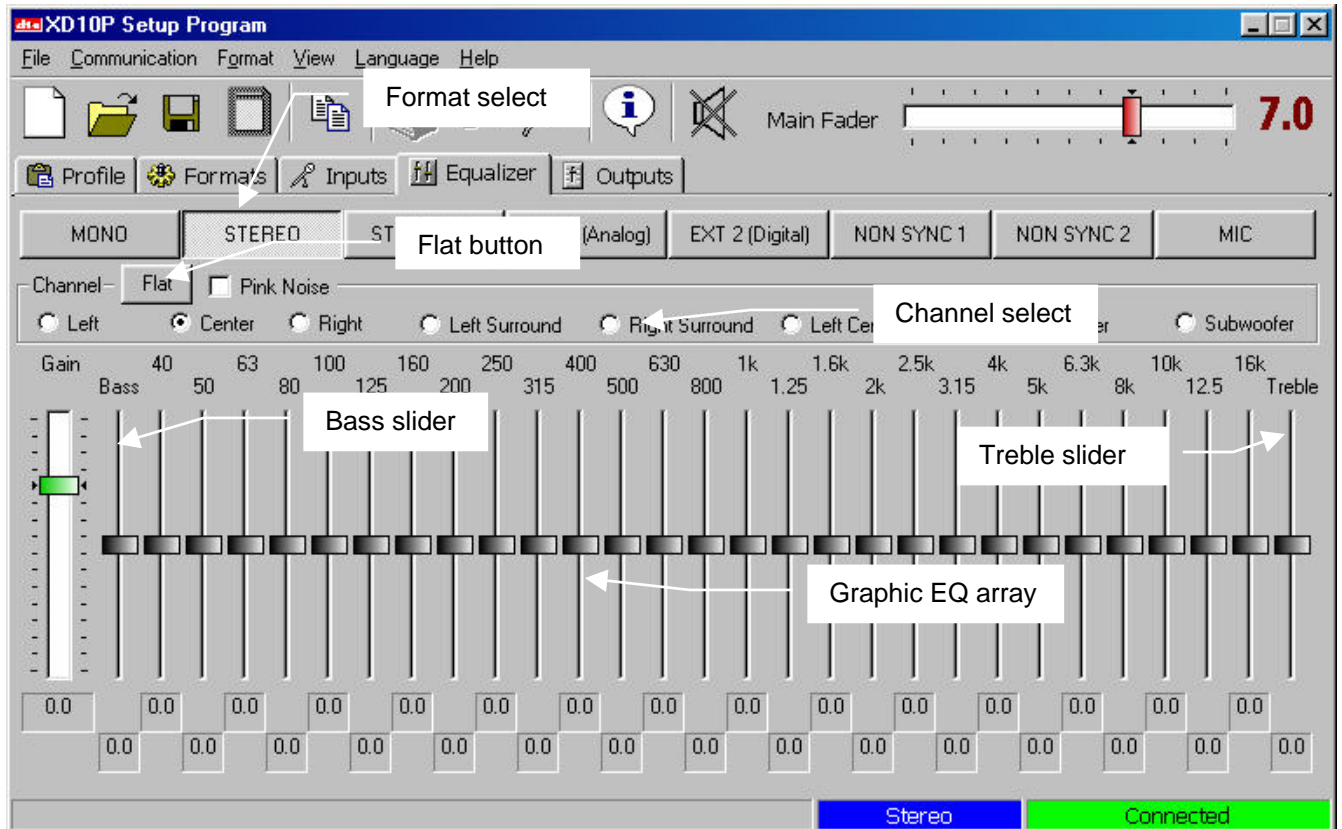


Figure 4-21. Equalizer tab

**Bass** and **Treble** sliders – used for rough equalization of the very top and bottom of the audio spectrum.

**Channel** – select the channel to be equalized. The channels consist of Left, Center, Right, Left Surround, Right Surround, Left Center, Right Center, and Subwoofer.

When you select **Subwoofer**, a separate screen appears containing a Sub Bass Parametric EQ (Figure 4-22).

There are three separate subwoofer signals in the XD10P:

- One subwoofer signal is created by summing the Lt and Rt channels on the two-channel input card. This signal has its own adjustable low pass filter and +/- 6 dB gain trim.
- The second subwoofer signal is a discrete input on the analog eight-channel connector.
- The third subwoofer signal is a discrete input on one of the digital AES-EBU pairs.

All the above signals pass through the main subwoofer parametric equalizer and channel gain.

**Graphic EQ** – used for fine adjustments. The slider buttons may be accessed in the same manner as the sliders on the Preamp tab. The slider will change the level 0.1dB for every push of an up/down arrow key.

**Flat** button – restores all graphic EQ slider settings to midpoint. The system will warn you (in case you accidentally select it), before acting on the command.

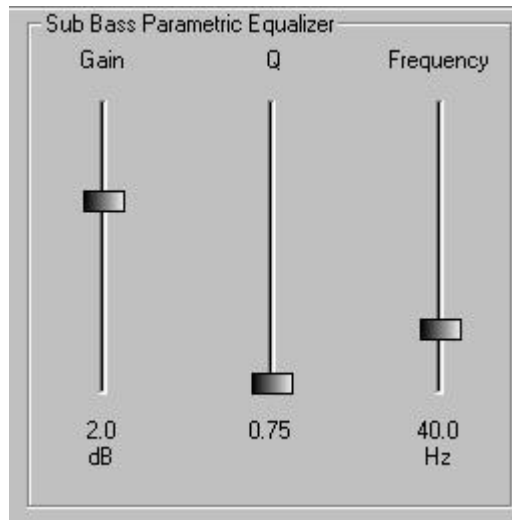


Figure 4-22. Subwoofer EQ controls

- Note:** Muted channels are highlighted in **RED** in the Equalizer Tab. This means the channel has been muted in the Outputs tab.



Figure 4-23. Muted channels are highlighted in red.

## 4.6. Formats Tab

The Formats tab is where you set the processor's format of operation.

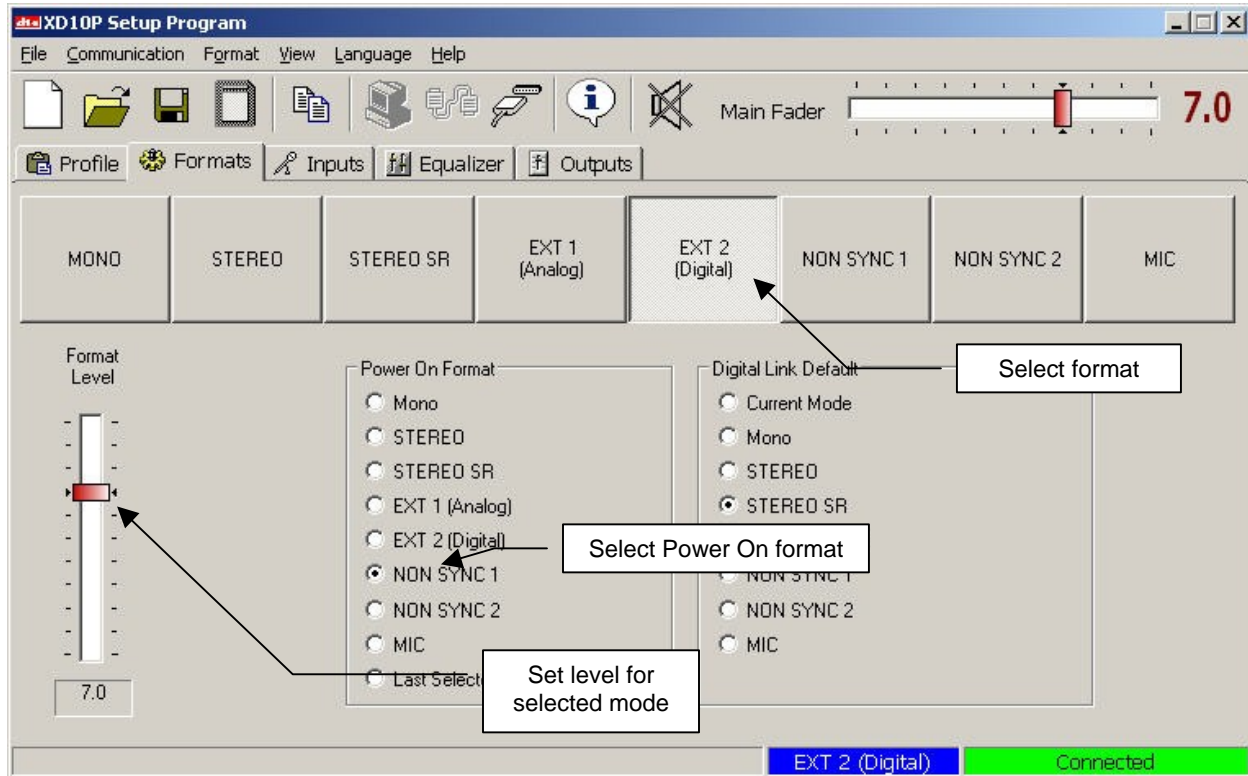


Figure 4-24. Formats tab

Available formats:

- Mono
  - Stereo
  - Stereo SR (Spectral Recording, for greater noise reduction)
  - EXT 1 analog
  - EXT 2 digital (you must configure the Digital Link Default – see next page)
  - Non-Sync 1
  - Non-Sync 2
  - Mic
- Note:** The format can be selected here, as well as from the XD10P front panel, the Inputs tab or the Equalizer tab, from the format section of the Menu Bar, by a function key, or by an automation unit of your choice. Individual level, however, can only be accessed on this tab.

**Format Level** –The fader at the left allows you to pre-set the level of a particular format. The master level will follow that setting. The system will retain your settings for the different formats until you change them.

The Fader Level is typically set to 7 for all modes. But you may have an optical trailer or something in Stereo mode that is too loud (at 7). You can adjust the setting here, for Stereo, and the system will remember that setting.

**Power On Format** – Any of the formats may be designated the “Power On” format, which means that when the power is turned on, the processor will “wake up” in that mode.

**Last Selected** (When the unit is powered on, it will resume the mode that was selected when the unit was last turned off.)



When **Ext 2 (Digital)** format is selected, the **Digital Link Default** control will display on the screen (shown right). When using the XD10P digital IN this additional setting that must be configured. You can preset the format to switch to, in case the digital link fails.

When using the XD10 and XD10P, in most cases the audio connection will be from the XD10 “analog OUT” to the XD10P “analog IN”. However, if the XD10 has the digital output card installed, the connection can be from the XD10 “digital OUT” to the XD10P “digital IN”.

- Note:** If you are not sure whether the XD10 has the optional digital output card and audio connection is made to the XD10P digital input, then when you select the EXT 2 format on the XD10P, the EXT 2 button will flash, indicating there is no digital link (because no digital card is installed in the XD10). If this happens you must use the analog input on the XD10P. Contact DTS for further information if you wish to upgrade to a digital output card in the XD10.

Traditionally with DTS products if timecode is lost, the DTS player will pulse the cinema processor to a default sound format. This is still true, but when using the digital input there is a chance for a digital link failure. If the digital link between the DTS player and XD10P is broken, but the DTS player is still receiving good timecode, the player will not trigger a fallback format, so the XD10P will experience a loss of audio. Therefore, it is necessary to set a fallback option in case of digital link failure. This is the Digital Link Default.

Configure the default to one of the choices. In most cases, Stereo SR is correct. Also, the standard fallback must be set (on the external DTS player) for timecode failure. This is done on the XD10 through menu selection, or through logic interface board on the DTS-6 and -6D. Refer to those product manuals for more information.

When **Mic** format is selected, the Mic input can be routed to either the center or the surround channels.

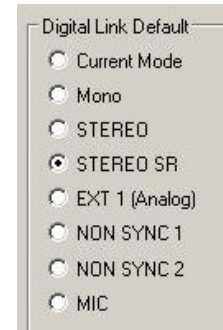


Figure 4-25.  
Digital Link  
Default control



Figure 4-26.  
Mic Channel  
control



## 4.7. Outputs Tab

During the alignment process, the **Outputs** tab is where the output levels are set for the various channels.

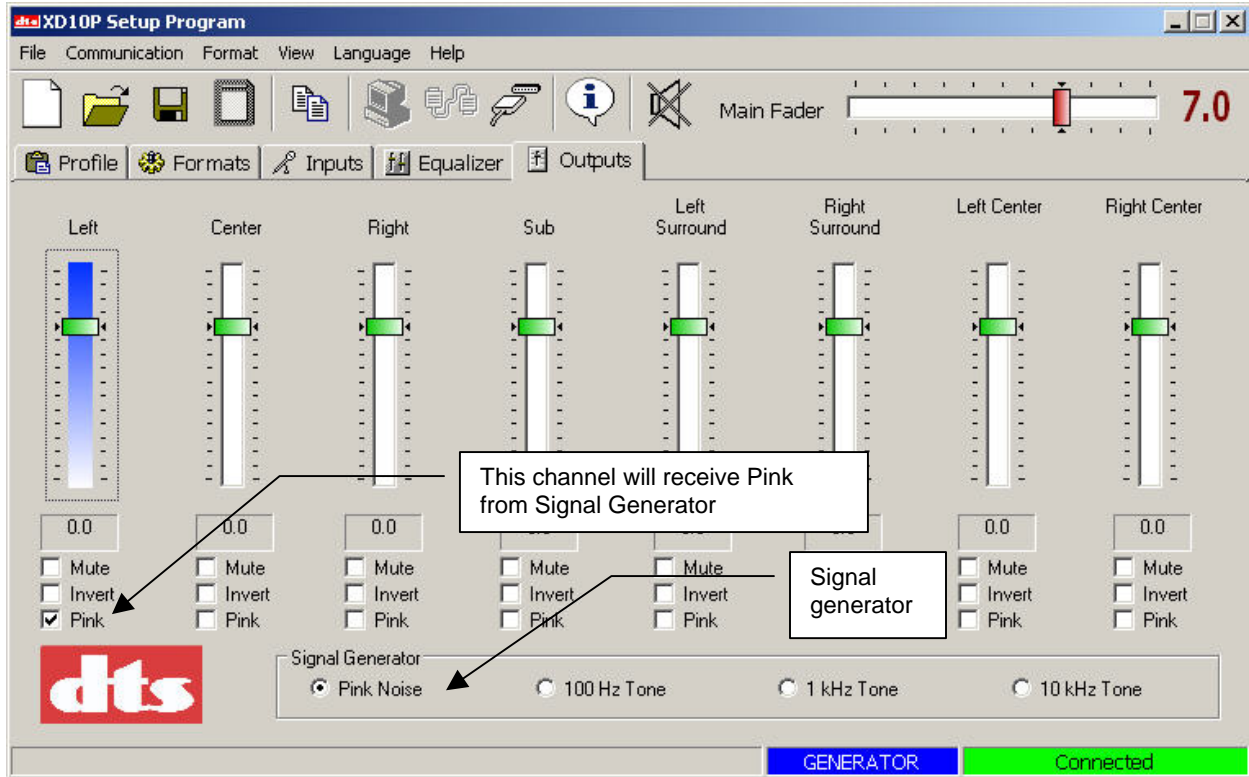


Figure 4-27. Outputs screen

**Signal Generator** –at the bottom of the screen, it can be set to four different modes. To assign a particular channel to receive generator output, a checkbox is available below the slider. These checkboxes may also be utilized to **Mute** or **Invert** the channel.

If a channel is muted in the Outputs tab, it will be highlighted in **RED** in the Equalizer tab. A channel can be unmuted only in the Outputs tab.



Figure 4-28. When channel is muted in Outputs, it will be highlighted in red in Equalizer.

The generator output assignment will carry over from one channel to the next. This saves time and effort because you do not have to turn it on and off for each channel.

This is how it works:

1. Choose a Signal Generator mode (such as Pink Noise).
2. Select a channel (such as “Left”, shown in Figure Figure 4-27,above).
3. Below the channel selection, click the Pink checkbox to assign Pink Noise to that channel.
4. Next, select the Center channel. Pink Noise is automatically enabled for the Center channel, and is now unchecked (turned off) for the Left channel.



## 5. Specifications

### 5.1. Construction

- 2U 19-inch rack-mount standard chassis
- Removable front panel for access to plug-in modules.
- Hardware dimensions:
- Height / Width / Depth: 3.5 inches x 19 inches x 10.5 inches

### 5.2. Signal Connections

- Standard 9-pin D-type female connectors:  
Projector1, Projector 2, Microphone, RS-232
- Standard 25-pin D-type female connectors:  
Analog 8-channel input, Digital 8-channel input, Automation I/O
- Standard 25-pin D-type male connector:  
Monitor output
- Detachable screw terminal connectors:  
Automation input, Hearing impaired output, Line outputs, Changeover pulse
- RCA jacks: Non-sync input

### 5.3. Signal Inputs

- Projector Inputs (2):  
Voltage Sensitivity: 5 mV RMS nominal  
Impedance: 360 ohms  
Input level adjustment: -23.9 to +11.9 dB  
(.35 mV to 20 mV)  
Adjustable High Frequency Slit Loss EQ: 10 kHz to 32 kHz (Mono EQ = 3 kHz to 15 kHz)
- NON SYNC 1 Input:  
Voltage Sensitivity: 300 mV RMS nominal, unbalanced  
Impedance: 30k ohms  
Input level adjustment: -23.9 to +11.9 dB in 0.1 dB steps  
(150 to 750 mV)
- NON SYNC 2 Input:  
Voltage (Line) Sensitivity: 300 mV RMS nominal, unbalanced  
Impedance: (Line) 30k ohms  
Input level adjustment: -23.9 to +11.9 dB in 0.1 dB steps
- Microphone Input:  
Impedance: 2k ohms, balanced  
+9V phantom power supply  
40 dB gain preamp  
Input level adjustment: -23.9 to +11.9 dB in 0.1 dB steps  
Sensitivity: Nominal 3.18 mVRMS = 0 dBSF
- Analog 8 channel Input:  
Voltage (line): 300 mV RMS nominal, unbalanced  
Impedance: 30k ohms  
Input level adjustment: none

- Digital 8-channel Input:  
Four AES-EBU digital pairs  
32 kHz to 96 kHz sample rate  
Ref = -20 dBFS

## 5.4. Signal Outputs

- Analog 8-channel Line Outputs:  
Balanced  
Voltage: 300 mV RMS nominal, balanced  
Impedance: < 500 ohms  
Gain Adjustment: -22 to 8 dB
- Hearing Impaired Output:  
Output Impedance: 200 ohms  
Output Voltage: LCR = 512 mV  
                  L R = 300 mV  
                  L = 150 mV  
                  C = 210 mV  
                  R = 150 mV

## 5.5. Audio Signal Paths

- Headroom:  
26 dB (EQ flat)  
20 dB typical (with full EQ boost)
- S/N Ratio:  
80 dB minimum A weighted

## 5.6. Equalization

- Subwoofer:  
Parametric: adjustable from 25 Hz to 100 Hz  
SW level adjustment 0 to -12 dB
- All other:  
27 1/3-octave bands from 40 Hz to 20 kHz
- Level adjustment: -6/+6 dB
- Bass and Treble: adjustable -6/+6 dB

## 5.7. Automation I/O

### Automation Inputs (DB25 and terminal strip)

- Active low, momentary dry contact closures. Automation common is connected to signal ground inside the XD10P through a 15-ohm resistor (to minimize ground loop problems). Contacts may be maintained, but must release before another automation signal can be activated.

### Automation Outputs (DB25 and terminal strip)

- Active low. Recommended indicator circuit is a standard LED with an additional (external) 1 kilohm series resistor. Tied to +5 VAC at pin 13.

## 5.8. Power Input

- Internal, fused, universal power supply
- 100-240 VAC, 50-60 Hz @ 360 mA auto-switching
- Optional back-up power supply connection available

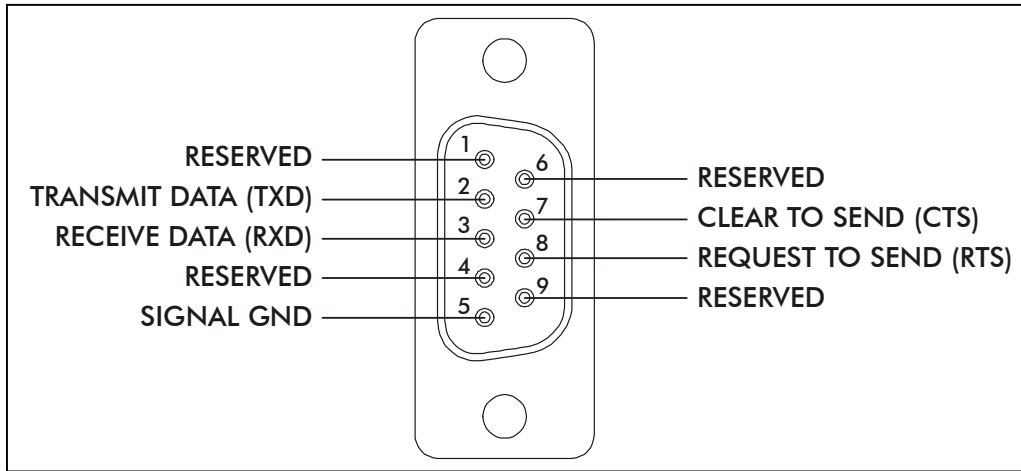
## 5.9. Laptop Computer

- RS232 serial port
- Windows 98SE, Windows 2000, or Windows XP
- 800x600 display
- 4 MB or more disk space



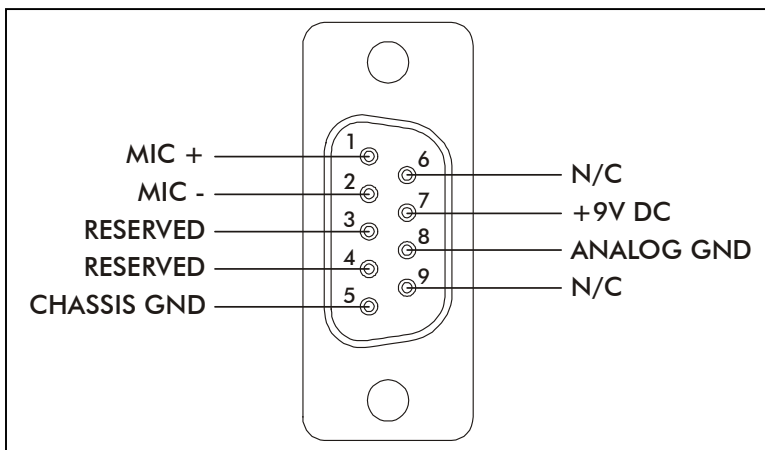
## Appendix A. Connector Pinouts

### SERIAL (RS-232)



DB9F	Description
1	Reserved
2	Transmit Data (TXD)
3	Receive Data (RXD)
4	Reserved
5	Signal Ground
6	Reserved
7	Clear To Send (CTS)
8	Request To Send (RTS)
9	Reserved

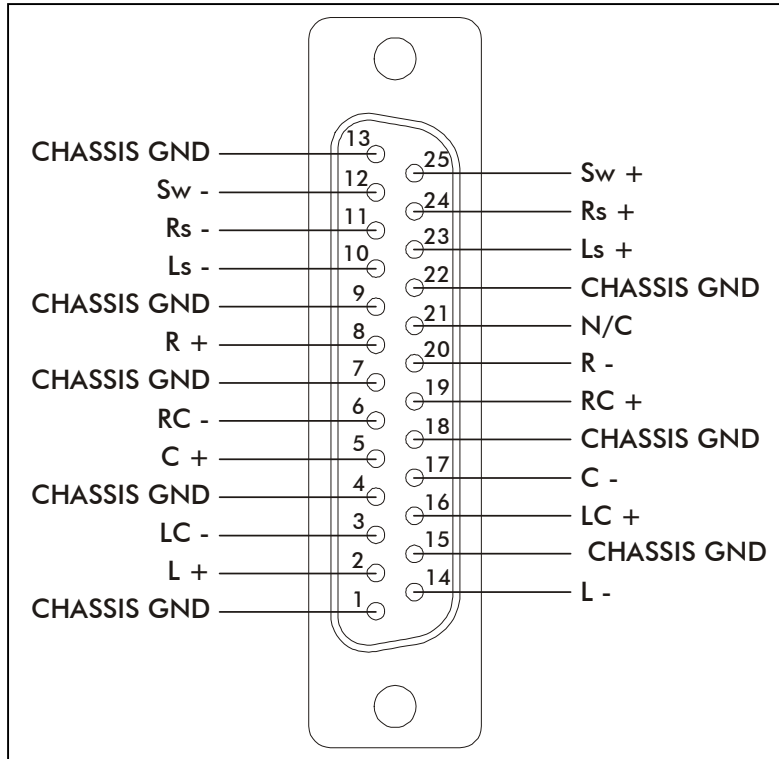
### MIC INPUT



DB9F	Description
1	Mic +
2	Mic -
3	Reserved
4	Reserved
5	Chassis Ground
6	N.C.
7	+9VDC
8	Analog Ground
9	N.C.



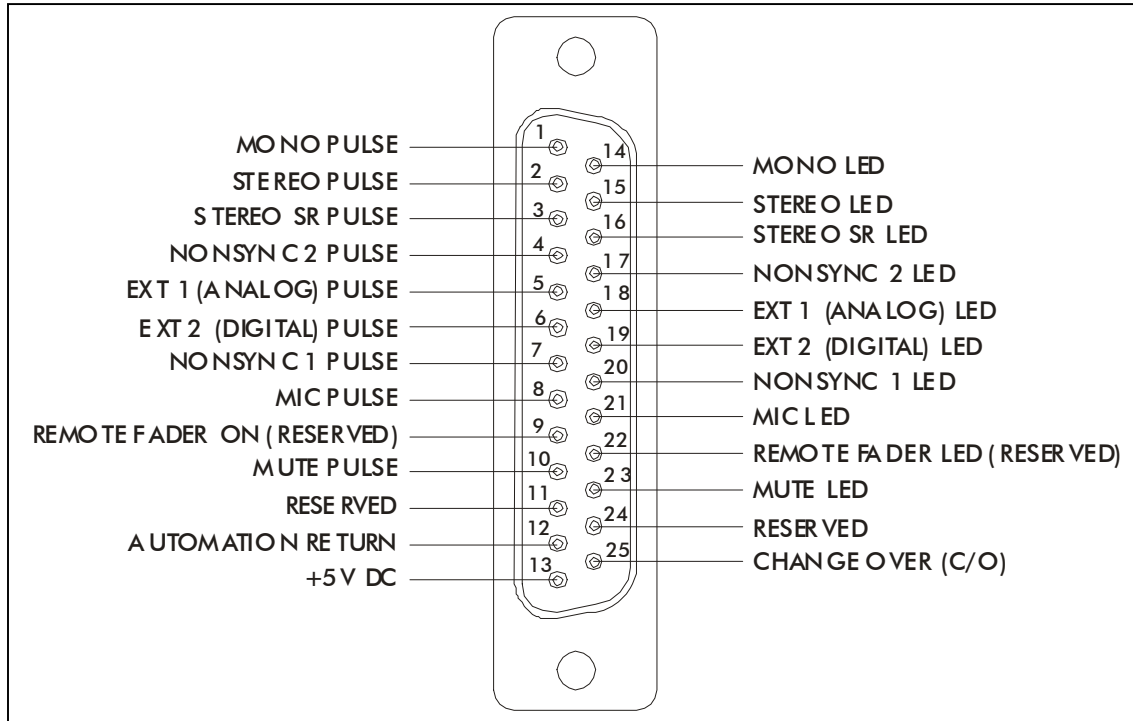
## MONITOR OUTPUT



DB25M	Description
1	Chassis Ground
2	L+
3	Lc-
4	Chassis Ground
5	C+
6	Rc-
7	Chassis Ground
8	R+
9	Chassis Ground
10	Ls-
11	Rs-
12	Sw-
13	Chassis Ground
14	L-
15	Chassis Ground
16	Lc+
17	C-
18	Chassis Ground
19	Rc+
20	R-
21	N.C.
22	Chassis Ground
23	Ls+
24	Rs+
25	Sw+

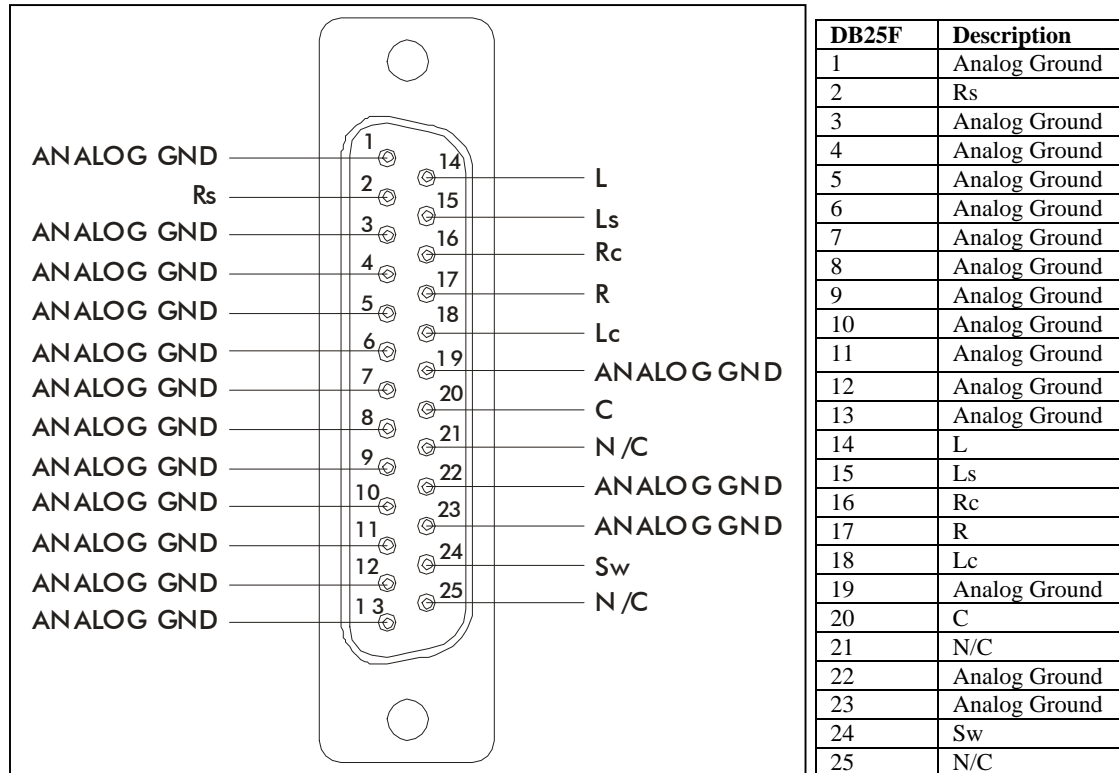
**Note:** The Monitor Output connector is pin-compatible with THX-type systems.

# AUTOMATION

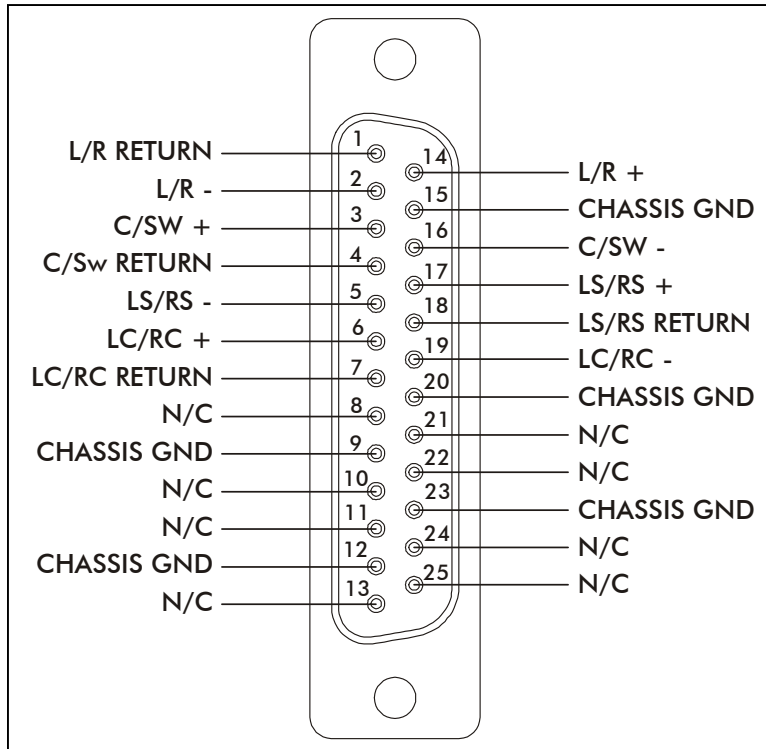


DB25F	Description
1	Mono Pulse
2	Stereo Pulse
3	Stereo SR Pulse
4	NON SYNC 2 Pulse
5	EXT 1 (Analog) Pulse
6	EXT 2 (Digital) Pulse
7	NON SYNC 1 Pulse
8	Mic Pulse
9	Remote Fader On (Reserved)
10	Mute Pulse
11	Reserved
12	Automation Return
13	+5VDC
14	Mono LED
15	Stereo LED
16	Stereo SR LED
17	NON SYNC 2 LED
18	EXT 1 (Analog) LED
19	EXT 2 (Digital) LED
20	NON SYNC 1 LED
21	Mic LED
22	Remote Fader LED (Reserved)
23	Mute LED
24	Reserved
25	Change Over (C/O)

## EXT 1 (ANALOG) AUDIO IN CH 1-8

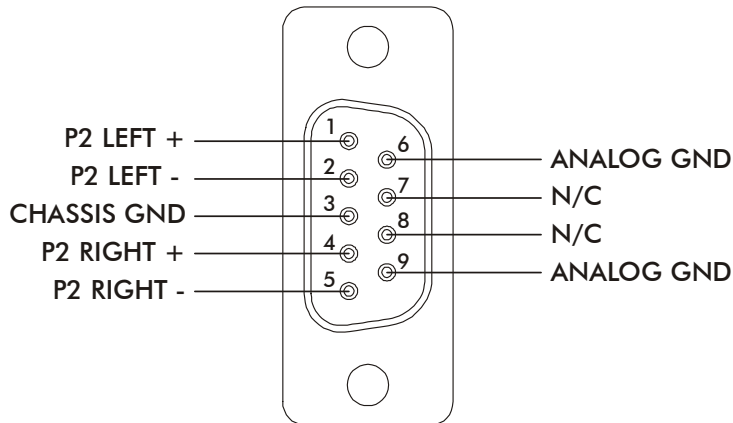


## EXT 2 (DIGITAL) AUDIO IN CH 1-8



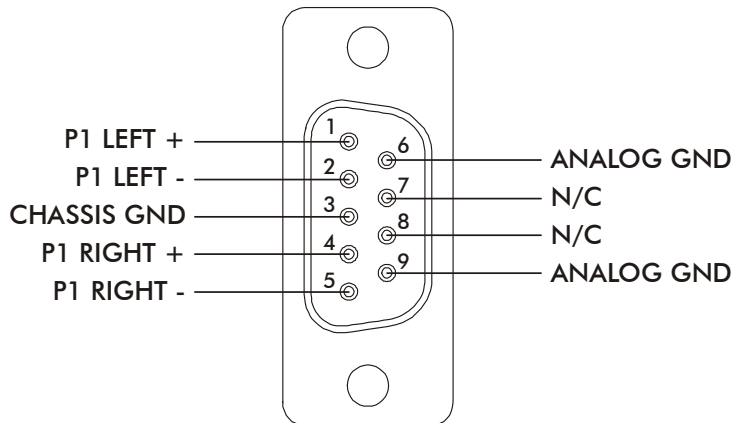
B25F	Name	Description
1	CH1/2_ret	L/R Return
2	CH1/2-	L/R -
3	CH3/4+	C/SW+
4	CH3/4_ret	C/Sw Return
5	CH5/6-	LS/RS-
6	CH7/8+	LC/RC+
7	CH7/8_ret	LC/RC Return
8		N.C.
9		Chassis Ground
10		N.C.
11		N.C.
12		Chassis Ground
13		N.C.
14	CH1/2+	L/R +
15		Chassis Ground
16	CH3/4-	C/SW-
17	CH5/6+	LS/RS+
18	CH5/6_ret	LS/RS Return
19	CH7/8-	LC/RC-
20		Chassis Ground
21		N.C.
22		N.C.
23		Chassis Ground
24		N.C.
25		N.C.

## OPTICAL IN 2



DB9F	Description
1	P2 Left +
2	P2 Left -
3	Chassis Gnd
4	P2 Right +
5	P2 Right -
6	Analog Ground
7	N/C
8	N/C
8	Analog Ground

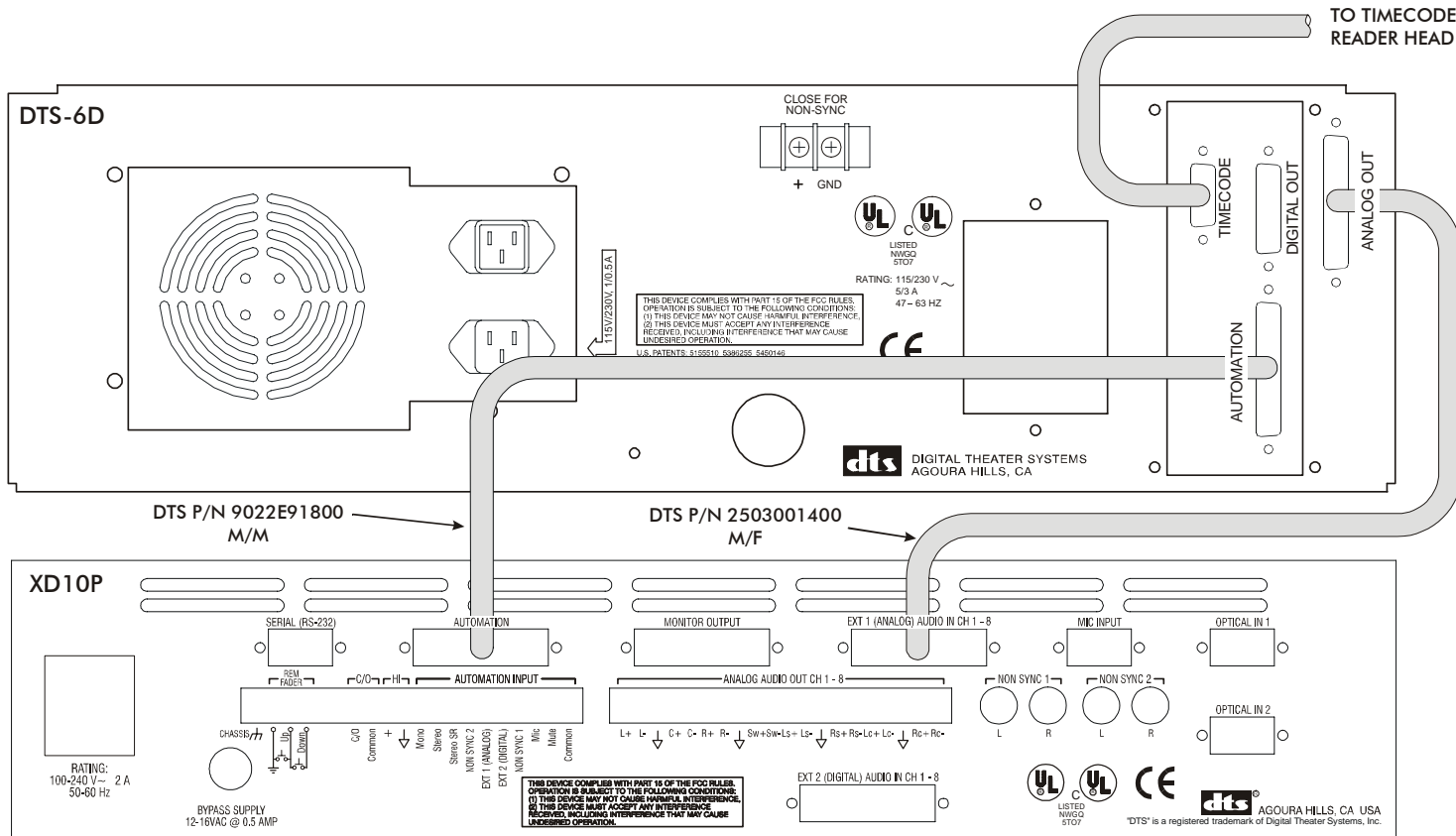
## OPTICAL IN 1



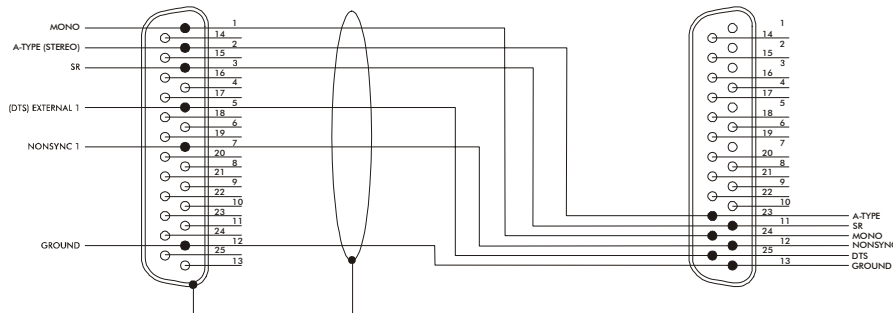
DB9F	Description
1	P1 Left +
2	P1 Left -
3	Chassis Gnd
4	P1 Right +
5	P1 Right -
6	Analog Ground
7	N/C
8	N/C
8	Analog Ground







TO XD10P  
DB25 M



E918 CABLE

TO DTS-6D  
DB25 M

DTS-6D ANALOG OUT CONNECTOR

PIN	FUNCTION
1	AUDIO RETURN
2	Q (RIGHT SURROUND)
3-13	AUDIO RETURN
14	LEFT
15	P (LEFT SURROUND)
16	RIGHT CENTER SUBW
17	RIGHT
18	LEFT CENTER SUBW
19,23,25	N/C
20	CENTER
21	S (MONO SURROUND)
22	SUBWOOF INPUT
24	SUBWOOF OUTPUT

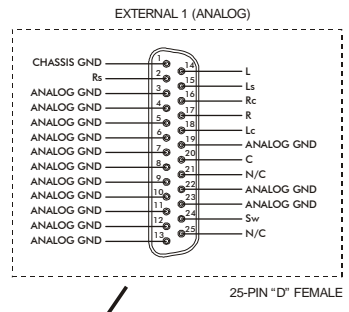
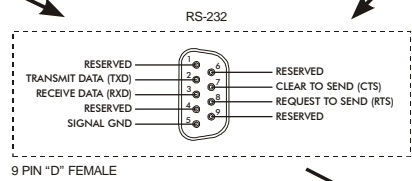
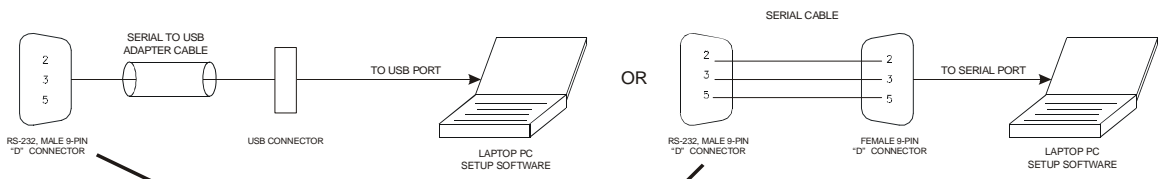
DTS-6D AUTOMATION CONNECTOR

PIN	FUNCTION
1	PROJECTOR # 1 MOTOR +
2	PROJECTOR # 1 DOUSER +
3	PROJECTOR # 2 MOTOR +
4	PROJECTOR # 2 DOUSER +
5	FORCE A-TYPE +
6	FORCE SR +
7	FUTURE
8	FUTURE
9	+ 5V
10	GND WHEN DTS IN DIGITAL
11	LOGIC SR(05)
12	LOGIC NON-SYNC
13	LOGIC COMMON
14	PROJECTOR # 1 MOTOR -
15	PROJECTOR # 1 DOUSER -
16	PROJECTOR # 2 MOTOR -
17	PROJECTOR # 2 DOUSER -
18	FORCE A-TYPE -
19	FORCE SR -
20	FUTURE
21	FUTURE
22	5V GND
23	LOGIC A-TYPE(04)
24	LOGIC MONO(01)
25	LOGIC DTS

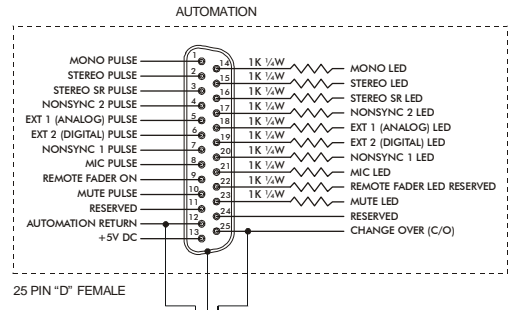
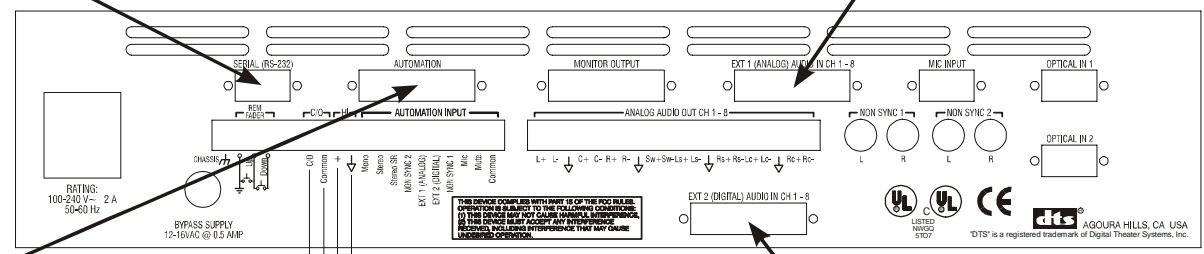
XD10P AUTOMATION CONNECTOR

PIN	FUNCTION
1	MONO PULSE
2	STEREO PULSE
3	STEREO SR PULSE
4	NONSYNC 2 PULSE
5	EXT 1 (ANALOG) PULSE
6	EXT 2 (DIGITAL) PULSE
7	NONSYNC 1 PULSE
8	MIC PULSE
9	REMOTE FADER ON
10	MUTE PULSE
11	RESERVED
12	AUTOMATION RETURN
13	+ 5V DC
14	MONO LED
15	STEREO LED
16	STEREO SR LED
17	NONSYNC 2 LED
18	EXT 1 (ANALOG) LED
19	EXT 2 (DIGITAL) LED
20	NONSYNC 1 LED
21	MIC LED
22	REMOTE FADER LED RESERVED
23	MUTE LED
24	RESERVED
25	CHANGE OVER (C/O)



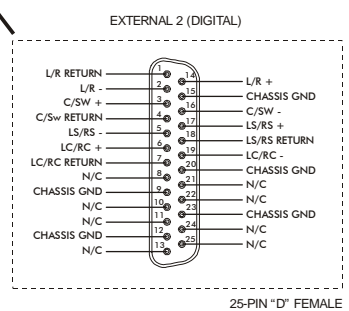


DA20/10 OR ANY OTHER  
6 TO 8-TRACK  
ANALOG INPUT  
AT 300mV RMS

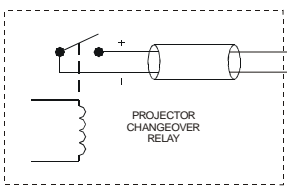
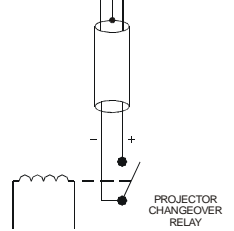


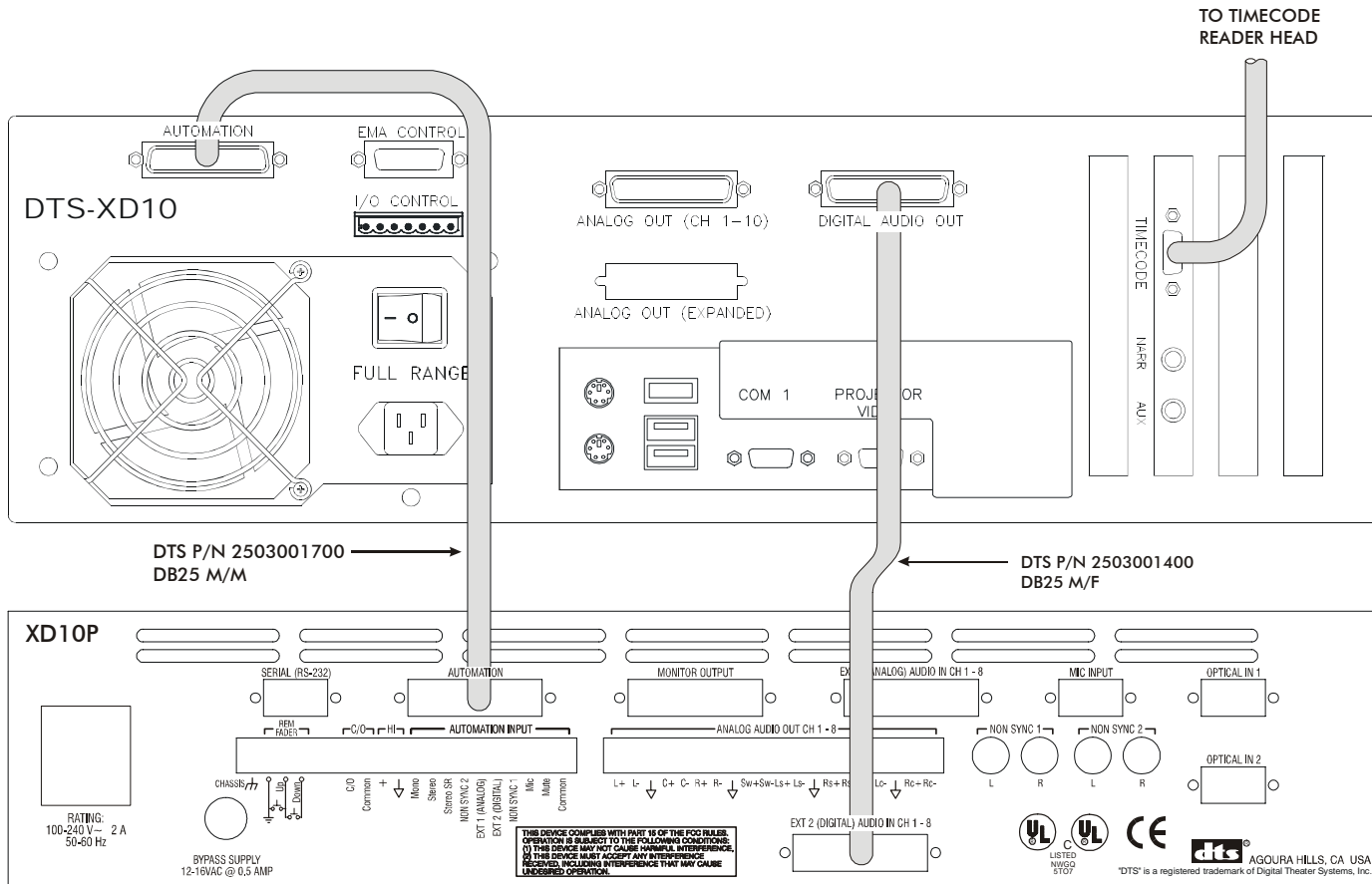
TO THEATER  
AUTOMATION  
SWITCH CONTACTS

TO THEATER  
AUTOMATION  
LED STATUS  
INDICATORS



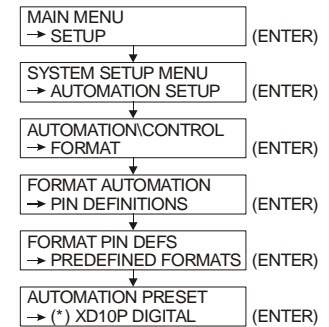
FROM XD10 DIGITAL  
AUDIO OUTPUT





**NOTE:**  
THE XD10 MUST HAVE THE DIGITAL OPTION INSTALLED WHEN CONNECTING TO THE XD10P DIGITAL CONNECTOR.

TO PROGRAM THE XD10 AUTOMATION CONNECTOR, CHOOSE THE XD10P DIGITAL AUTOMATION PRESET VIA THE FOLLOWING MENU SEQUENCE:

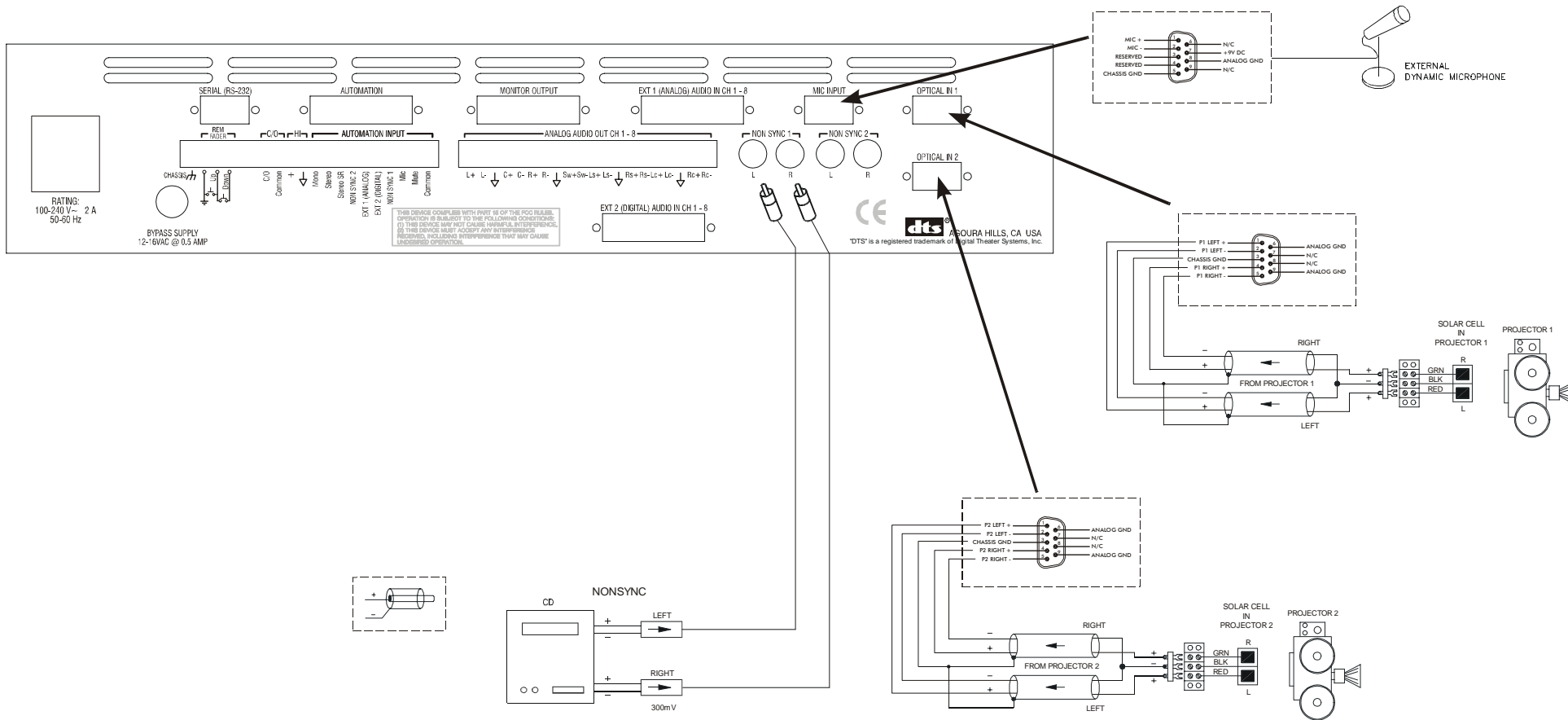


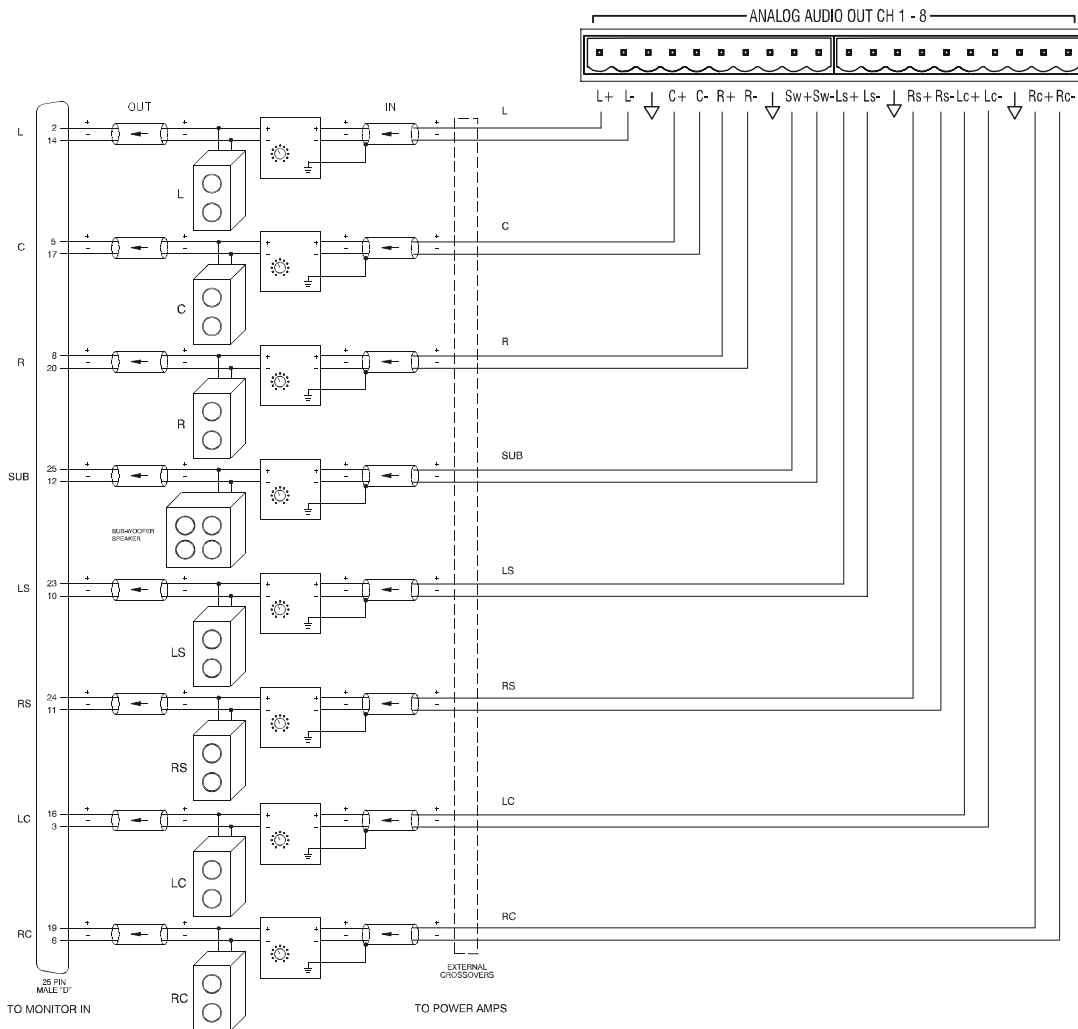
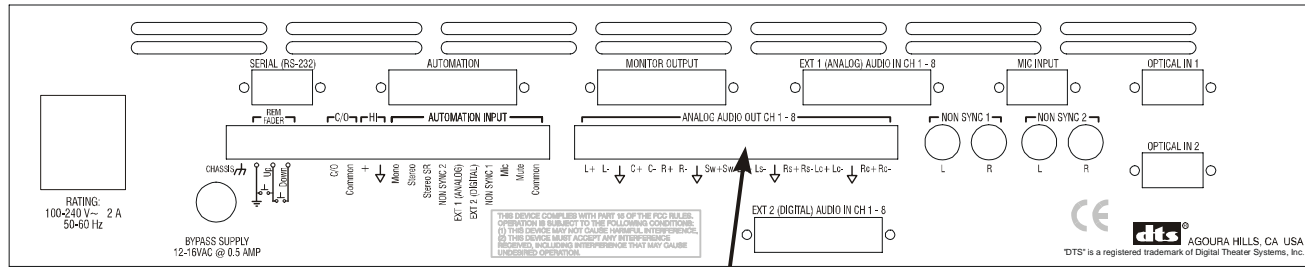
**XD10 DIGITAL OUT CONNECTOR (CH1-10)**

PIN	FUNCTION
1	AES GND
2	AES 1/2 -
3	AES 3/4 +
4	AES GND
5	AES 5/6 -
6	AES 7/8 +
7	AES GND
8	
9	AES GND
10	
11	
12	AES GND
13	
14	AES 1/2 +
15	AES GND
16	AES 3/4 -
17	AES 5/6 +
18	AES GND
19	AES 7/8 -
20	AES GND
21	
22	
23	AES GND
24	
25	

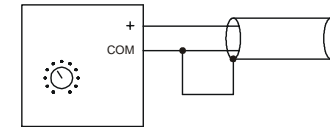
**XD10 AUTOMATION CONNECTOR**

PIN	FUNCTION	PRESET (6D EMULATION)
1	FORMAT 0	MONO
2	FORMAT 1	A-TYPE
3	FORMAT 2	SR
4	FORMAT 3	
5	FORMAT 4	DTS
6	FORMAT 5	
7	FORMAT 6	NON-SYNC
8	FORMAT 7	
9-11	N/C	
12	USER GND	DTS COMMON
13	USER SUPPLY	
14-25	N/C	





UNBALANCED

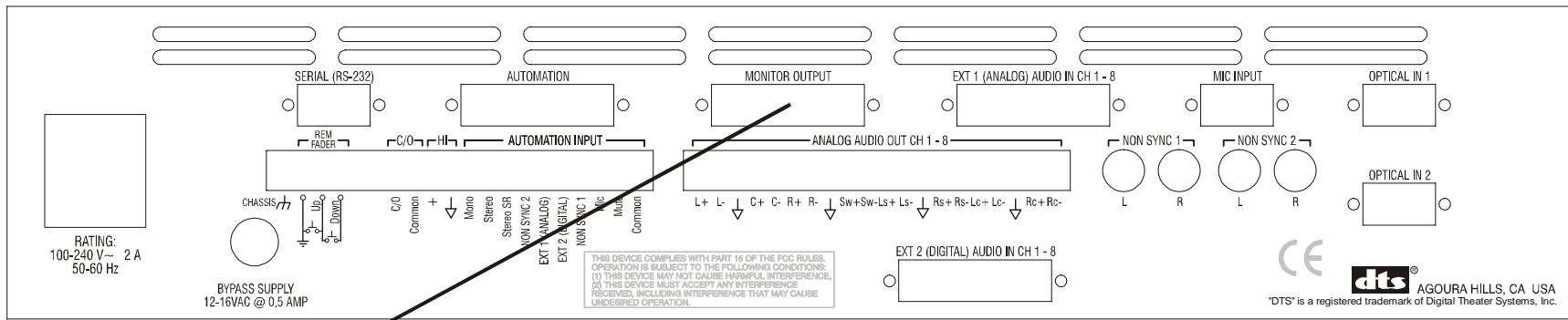


898\*

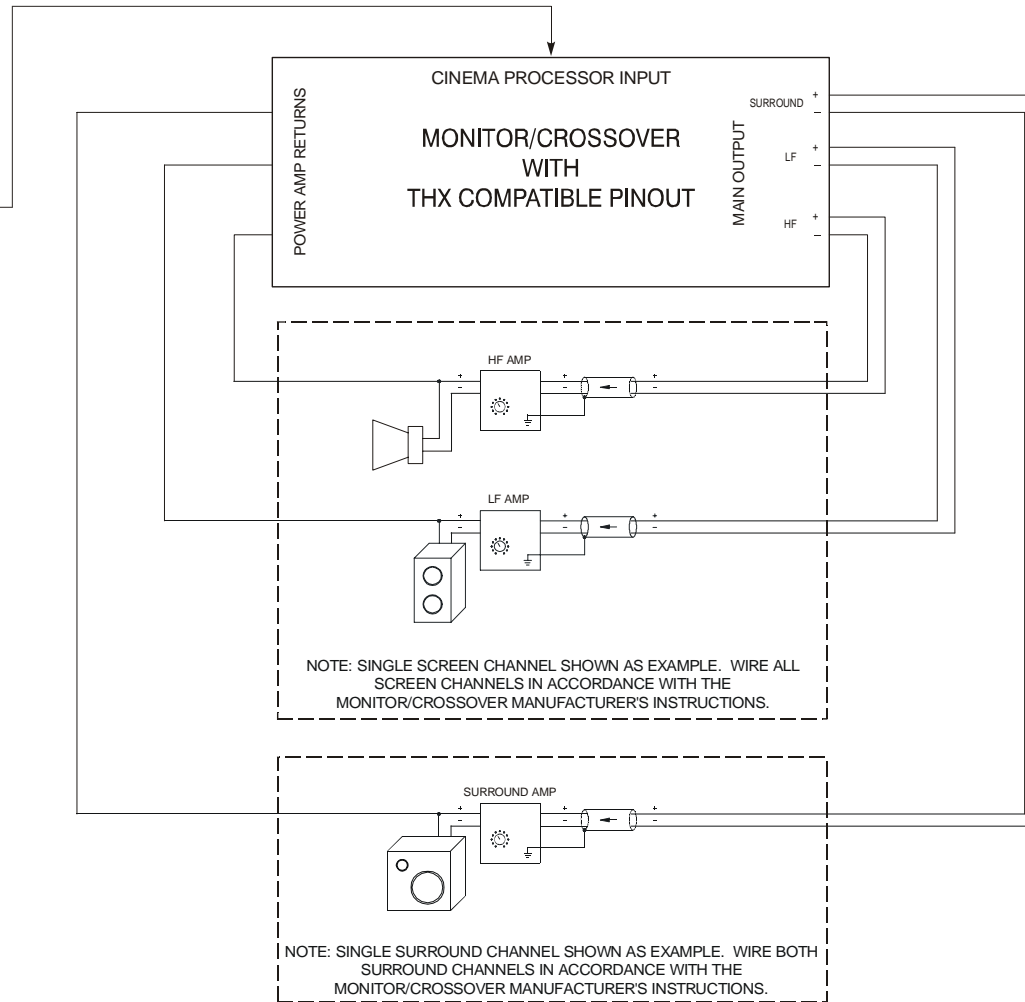
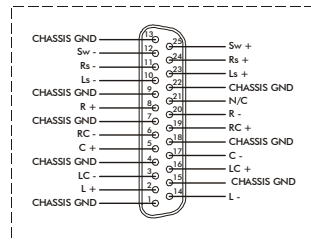
XD10P ANALOG AUDIO (PHOENIX CONNECTORS)

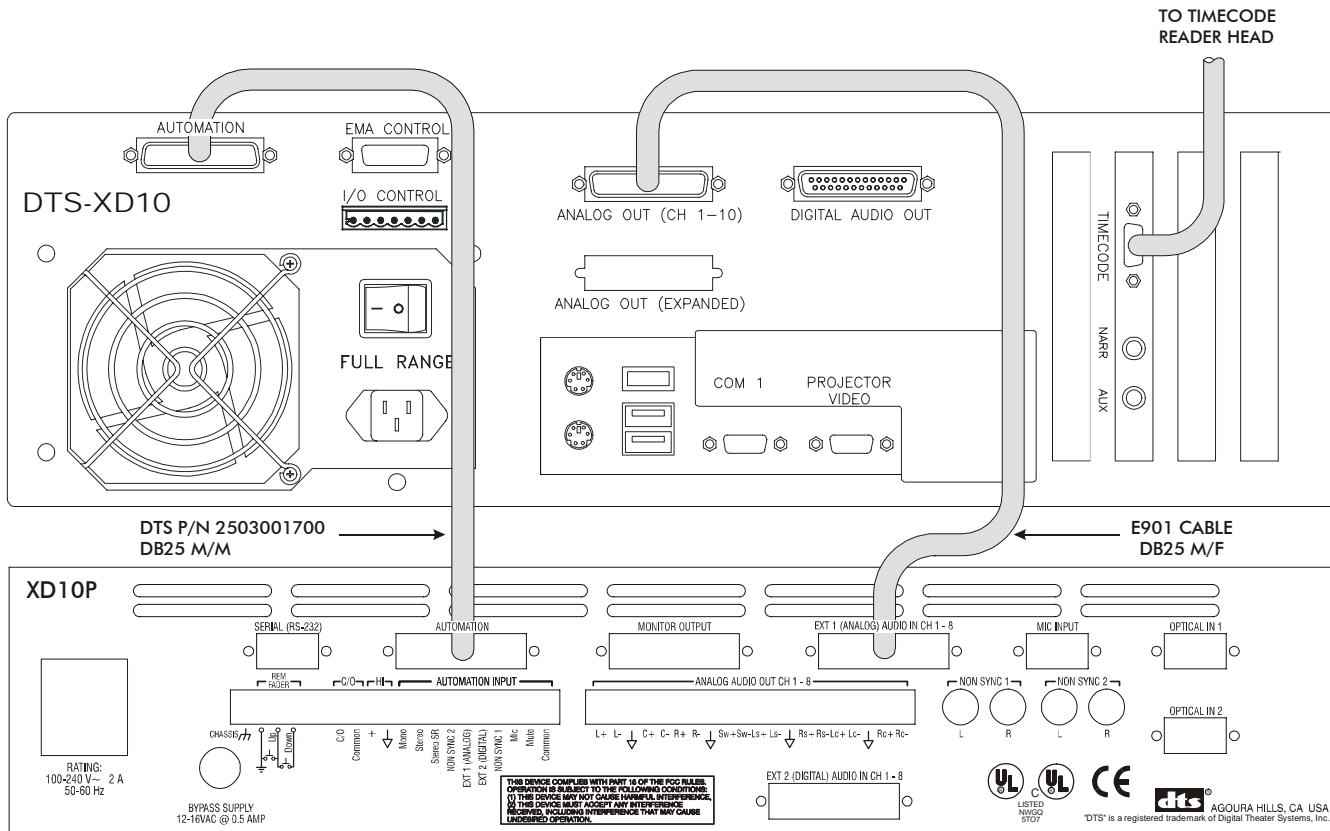
DRAWING NO. F208

REV.



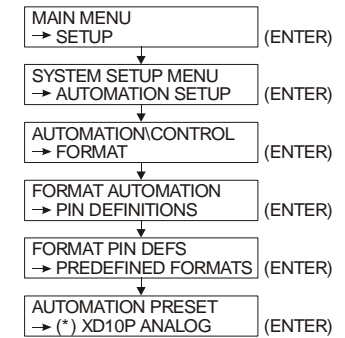
MONITOR OUT





TO TIMECODE  
READER HEAD

TO PROGRAM THE XD10 AUTOMATION CONNECTOR,  
CHOOSE THE DTS-XD10P ANALOG AUTOMATION  
PRESET VIA THE FOLLOWING MENU SEQUENCE:

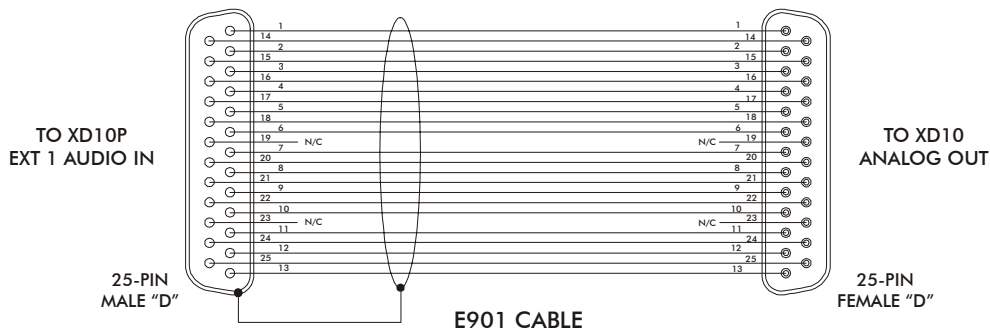


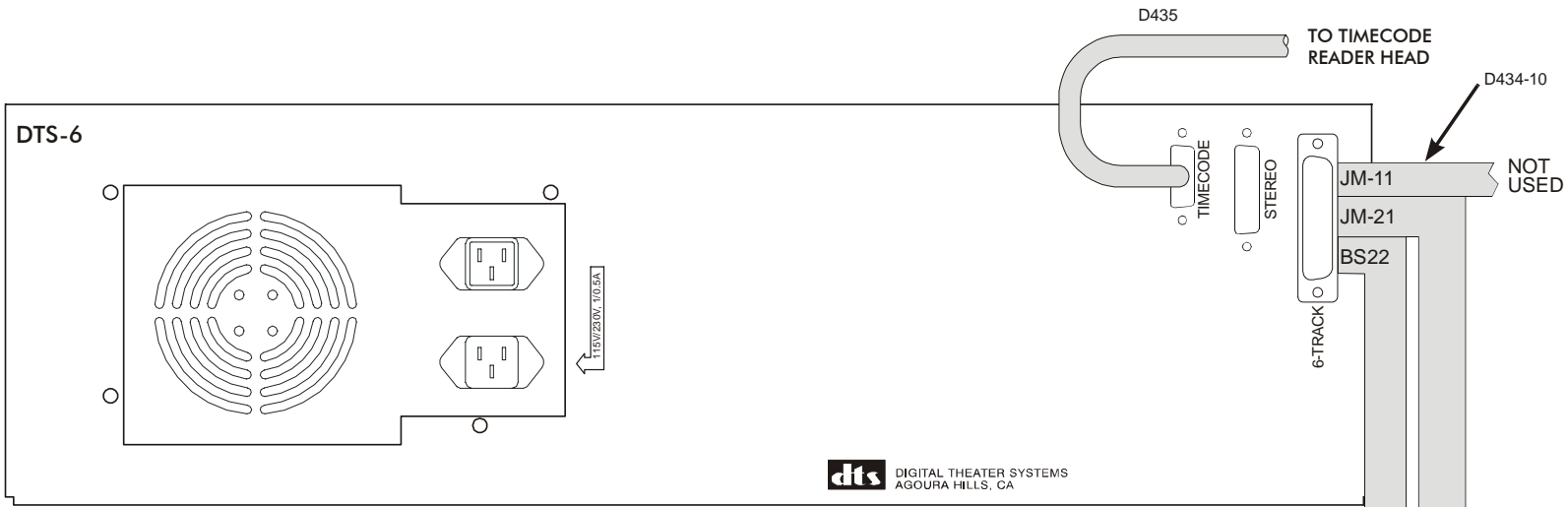
**XD10 ANALOG OUT CONNECTOR (CH1-10)**

PIN	FUNCTION
1	AUDIO COMMON
2	RIGHT SURROUND
3-13	AUDIO COMMON
14	LEFT
15	LEFT SURROUND
16	RIGHT CENTER
17	RIGHT
18	LEFT CENTER
19	CH 9
20	CENTER
21	MONO SURROUND
23	CH 10
24	SUBWOOFER
22,25	N/C

**XD10 AUTOMATION CONNECTOR**

PIN	FUNCTION	PRESET (6D EMULATION)
1	FORMAT 0	MONO
2	FORMAT 1	A-TYPE
3	FORMAT 2	SR
4	FORMAT 3	DTS
5	FORMAT 4	DTS
6	FORMAT 5	NON-SYNC
7	FORMAT 6	NON-SYNC
8	FORMAT 7	NON-SYNC
9-11	N/C	
12	USER GND	DTS COMMON
13	USER SUPPLY	
14-25	N/C	

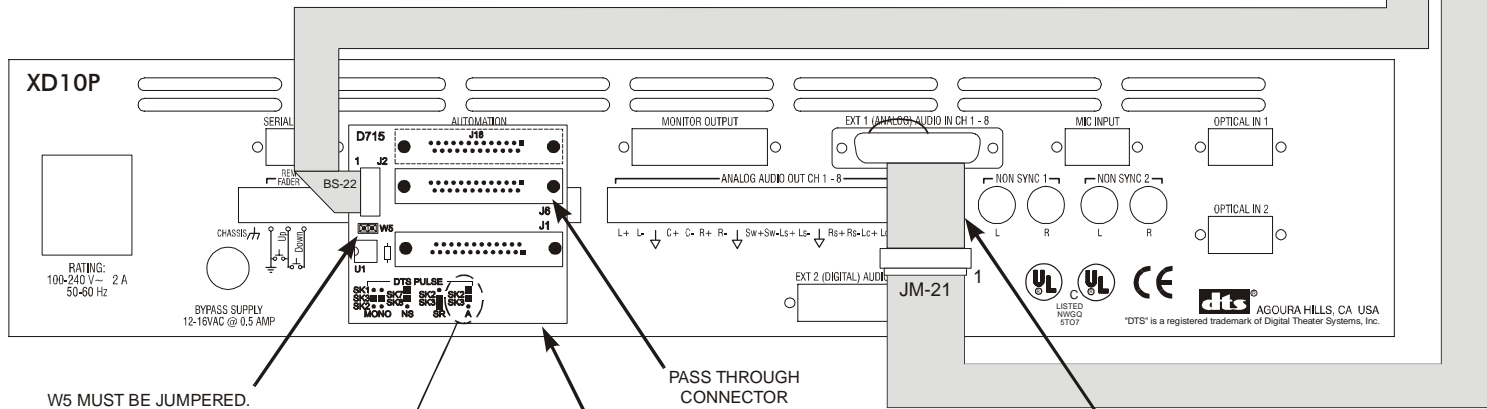




**dts** DIGITAL THEATER SYSTEMS  
AGOURA HILLS, CA

**JM11 INPUT, JM21 OUTPUT PINOUTS**

PIN	FUNCTION
1	AUDIO RETURN
2	Q (RIGHT SURROUND)
3-10,16,19,20	NOT USED
11	LEFT
12	P (LEFT SURROUND)
13	RIGHT EXTRA
14	RIGHT
15	LEFT EXTRA (DTS SUB-W)
17	CENTER
18	S (MONO SURROUND)



**BS22 AUTOMATION**

PIN	FUNCTION
1	GO
2	PROJ 2
3	LOGIC V+
4	PROJ 1
5	NOT CONNECTED
6	OUT COMMON
7	IN N.O.
8	IN N.C.
9	OUT N.O.
10	IN COMMON

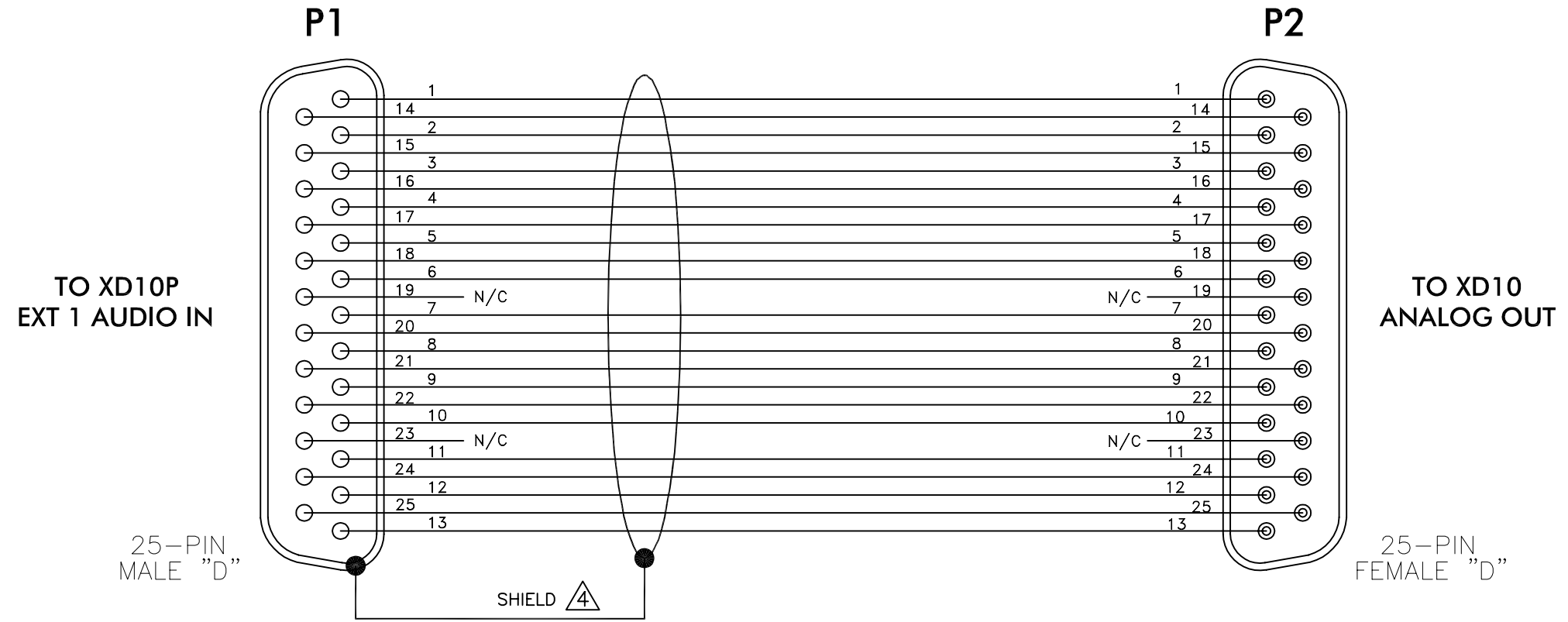
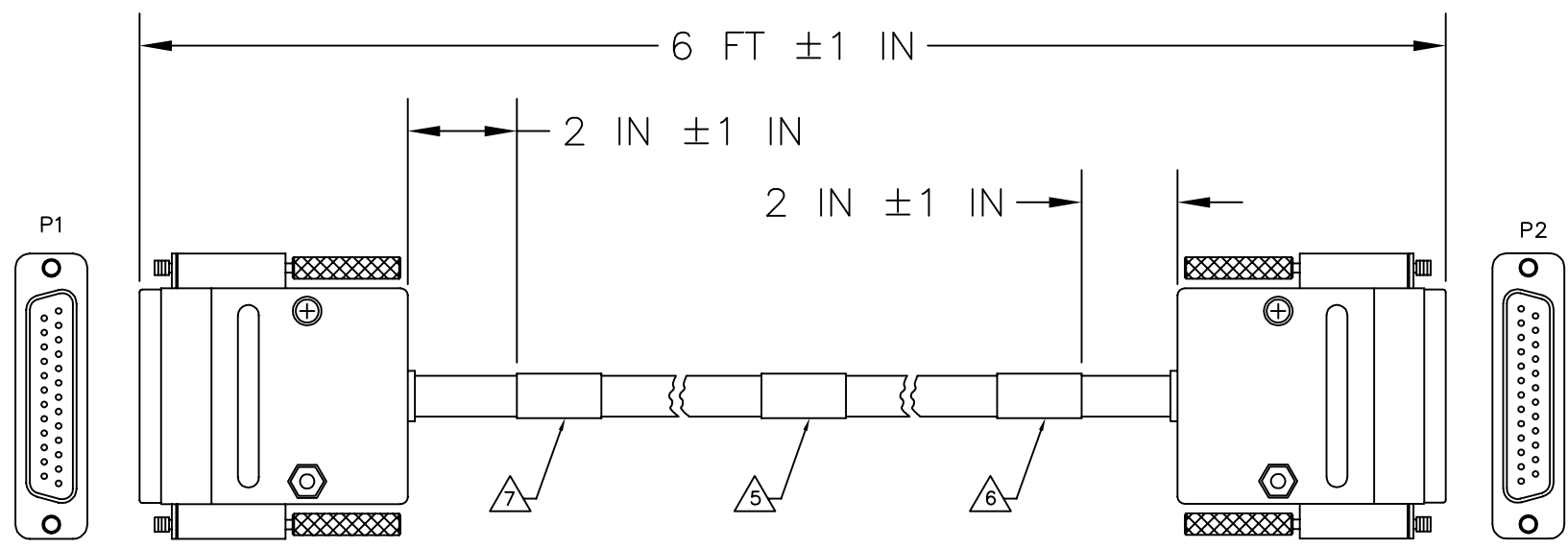
**XD10P AUTOMATION CONNECTOR**

PIN	FUNCTION
1	MONO PULSE
2	STEREO PULSE
3	STEREO SR PULSE
4	NONSYNC 2 PULSE
5	EXT 1 (ANALOG) PULSE
6	EXT 2 (DIGITAL) PULSE
7	NONSYNC 1 PULSE
8	MIC PULSE
9	REMOTE FADER ON
10	MUTE PULSE
11	RESERVED
12	AUTOMATION RETURN
13	+ 5V DC
14	MONO LED
15	STEREO LED
16	STEREO SR LED
17	NONSYNC 2 LED
18	EXT 1 (ANALOG) LED
19	EXT 2 (DIGITAL) LED
20	NONSYNC 1 LED
21	MIC LED
22	REMOTE FADER LED RESERVED
23	MUTE LED
24	RESERVED
25	CHANGE OVER (C/O)

PLUG J18 OF THE D715 PCA INTO  
AUTOMATION CONNECTOR OF XD10P  
NOTE: USE AN EXTENDER IF ACCESS TO  
THE AUTOMATION INPUT PHOENIX  
CONNECTOR IS NEEDED.



REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	A			



TO XD10P  
EXT 1 AUDIO IN

TO XD10  
ANALOG OUT

25-PIN  
MALE "D"

25-PIN  
FEMALE "D"

SHIELD 4

NOTES:

- CABLE IS 25 CONDUCTOR BELDEN #9543, OR EQUIV.
- P1 IS A 25-PIN MALE "D" CONNECTOR. CONNECTOR SHELL TO BE METAL OR METALIZED PLASTIC WITH THUMBSCREWS.
- P2 IS A 25-PIN FEMALE "D" CONNECTOR. CONNECTOR SHELL TO BE METAL OR METALIZED PLASTIC WITH THUMBSCREWS.

- 4 LABEL CABLE "TO XD10 ANALOG OUT"
- 5 LABEL CABLE "TO XD10P EXT1 (ANALOG) AUDIO IN"
- 8. ALL PARTS MUST BE UL/CE RECOGNIZED.
- 9. N/C=NO CONNECTION

- 4 CONNECT SHIELD DRAIN WIRE TO SHELL OF P1 ONLY.
- 5 LABEL CABLE "DTS P/N E901"

UNLESS OTHERWISE SPECIFIED  
REMOVE ALL BURRS & BREAK SHARP EDGES  
HOLE TOLERANCES PER  
ANSI B94.11-1967, R1972  
DIMENSIONS ARE IN  
TOLERANCES ARE:  
FRACTIONS ARE:  
±1/16      DECIMALS      ANGLES  
                 .X ±.1                   ±30'  
                 .XX ±.01  
                 .XXX ±.005

CONTRACT NO.		<b>dts</b> <i>DIGITAL THEATER SYSTEMS</i>			
APPROVALS	DATE				
DRAWN F. PANARO	4/8/04	CABLE ASS'Y, XD10 ANALOG OUT TO XD10P EXT1 (ANALOG) AUDIO IN			
CHECKED		SIZE	FSCM NO.	DWG NO.	REV
ISSUED		B		E901	
MATERIAL		SCALE N/A		SHEET 1 of 1	
FINISH					

4

4

3

3

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2

1

1





## Appendix C. DTS XD10P System Parts List

Parts for the DTS XD10P can be ordered from DTS Customer Service.

Part Number	Description
9001E94900	XD10P 110V Packing Kit
9001E94901	XD10P 220V Packing Kit
MD10X10P00	XD10P Cinema Audio Processor
9311E92200V1.0	Software Disc, XD10P System (E922 V1.0)
2202160A02	Power supply, plug in adapter,230 VAC in,16 VAC out, 500mA, 50Hz, (A41160500A0X0G) Ault
9003E95000	Hardware kit, XD10P Connectors (E950)
9301E855001.0	Manual, XD10P Installation and Operation (this manual)
5108004500A	Input Module PCA
5108004600C	Output Module PCA
5108004700A	Control Module PCA
9020E93900A	Memory Module
2800005004	Fuse 1/2 amp, slo blo, 5x20mm (218.500)



## Appendix D. XD10P Troubleshooting

### D.1. User Troubleshooting Tips

The best practice is to go into the theater and listen to the first few minutes of the film, especially new shows. Listen to the level and general quality of the sound. The soundtrack should be in sync with the picture and played at a comfortable level. Even though not every scene will have surround audio material, listen for the surround speakers. Most opening musical sequences have surround audio material. Contact DTS whenever you need to ask for help (see page vii near the front of this manual).

#### Volume too loud/soft

Adjust XD10P master fader as needed. If auditorium sound level jumps between sound format changes, contact service technician and request an alignment. The goal is to set the master fader once (usually at 7.0) and then not touch it again.

#### Bypass anomalies

##### No volume while in Bypass mode

- The front panel master fader is enabled while unit is in Bypass mode. Rotate the master fader clockwise many times and the volume should slowly increase.
- Verify projector exciter lamp is on and that the lamp power supply is operating. Solar cell connections may be loose or damaged.
- Verify settings of Bypass pots (one per projector). See Section 3.7.2 *Bypass Level (B-Chain) Calibration*, page 3-11.
- Verify power amps are on.

#### Noise, distortion, and other sound anomalies

##### Distortion

- Verify that the power supply LED indicators on the XD10P front panel are both illuminated.
- Verify A-chain alignment.
- Using the XD10P setup software, run tone sweeps through each channel to check for speaker distortion or rattling.
- Verify that each speaker amplifier is running within tolerance. If your amplifier has an “overdrive” indicator, be sure it is not illuminated. If it is, you will need to check the XD10P levels and the B-chain.

##### Hum

- If the subwoofer is a **Kintek KT-90**, try lifting the signal ground to the cinema processor. Because this speaker is self-powered, grounding is critical. Be sure the power cord has a ground prong that is connected to the AC ground. Never remove the ground prong.
- Keep signal cable runs as short as possible. Use only shielded cable and route away from power sources, fluorescent lights, and the projector motor. Verify wiring of grounds.

**RF interference**

- Verify wiring of grounds. Do not tie circuit ground and chassis (earth) grounds together.
- Verify output cables are shielded and that one end of the shield is **earth** grounded. Never route DTS audio cables next to power lines, fluorescent light, or projector motors.

**Dual Projectors, change-over problems**

- Sound does not change with picture. If in analog, verify change-over relay is OK.
- If in DTS Digital, the DTS digital player will automatically make a sound change-over when first frame of picture timecode is read on the upcoming projector. DTS digital sound changes independent of the projector's dower position. Adjustment of **roll-down** on upcoming projector may be necessary to obtain a "seamless" change-over.
- Using the XD10P software, verify the levels and calibration for projectors 1 and 2. Verify both are connected to the XD10P. Each projector has its own input connector.

**Thumping noise heard in auditorium while playing in analog**

- Sound head is picking up DTS timecode track. Sound head needs lateral adjustment. Thread up Buzz track film and make adjustments. A complete A-chain alignment is recommended. (See 3.4 *Preamp Calibration (A-Chain or Optical Setup)*, page 3-3.)

**Sound "WOWs"**

- Check projector speed and platter/reel alignment/adjustments – including balance of intake versus output. Check the projector motor belts.

**Channels are missing or channels do not sound balanced**

- Are all power amps on? Are their volume controls turned up?
- Switch unit to BYPASS and wait until there is time to troubleshoot.
- Using the XD10P setup software on a PC, use internal pink noise generator to verify output settings for all 8 channels.
- Perform A-chain alignment for (projector) stereo optical output. (See 3.4 *Preamp Calibration (A-Chain or Optical Setup)*, page 3-3.)
- Verify connections from XD10P to amplifiers/solar cells.
- Verify amplifier/solar cell output.
- Verify the exciter lamp power and solar cell alignment (A-chain).
- Try changing the Input Module.

**Channels are mixed together or coming out the wrong speakers**

- Using the XD10P setup software, run the pink noise for each channel one-by-one while listening in the theater to verify pink noise is coming out the correct speakers.
- Verify that the A-chain has not become misaligned.
- Verify output at XD10P connectors. If OK, check wiring – check for shorts. Verify ground connection is good and that the correct ground is being used
- If output not OK, try swapping out the Output Module.

**Volume suddenly increases and decreases during movie**

- Sound format is probably changing. Check volume level on display. You may realign the volume for each format, if desired. (See 3.7.6 *Preset Levels and Startup Mode*, page 3-15.)

## Automation anomalies

- Check connection from XD10P to the automation system.
- Verify the Logic Module's "fault" light is not on.
- Verify the automation system's programming.

## Moving settings from one unit to another

After exchanging one XD10P with another, you may download (restore) settings in one of two ways:

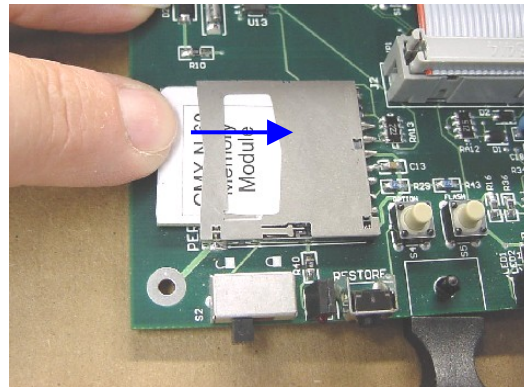
- Download settings from a saved file on your computer.
- Download settings stored on the Memory Module to the flash DSP on the Control Module.

When changing a Control Module board, it easiest to move the memory module from the old board to new:

1. Turn off power to the XD10P.
2. Replace the control module board.
3. Move the memory module from the old board to the new board.



Remove memory module from old card



Insert memory module into new card

Figure D-1. Move memory module

4. On the new board, set the write protect switch to OFF (to the right).
5. Load the memory module into the new board by pressing down and holding the RESTORE button while powering on the XD10P. Continue to hold down the RESTORE button until the front panel LEDs and level indicator fully boot.
6. Once the front panel is fully booted, release the RESTORE button.
7. Retain the memory module in the new board. **(Do not remove it.)**
8. Turn ON the write protect switch (to the left) and leave it in the ON (left) position. When write protection is ON, the LED next to the toggle switch will light.
9. Your B-chain adjustments should now be transferred to the new board. You will still need to make A-chain adjustments. (See 3.4 *Preamp Calibration (A-Chain or Optical Setup)*, page 3-3.)

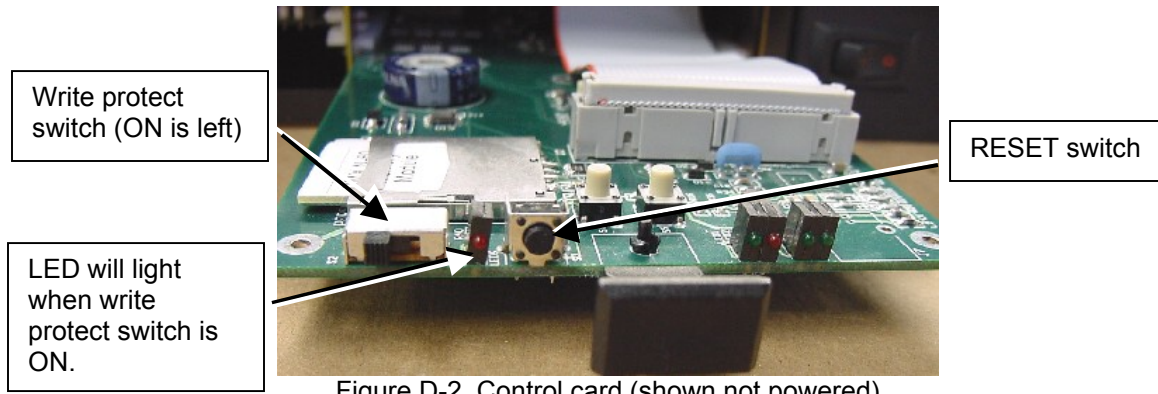


Figure D-2. Control card (shown not powered)

### Contact DTS Technical Support

See page vii near the front of this manual.


## Appendix E. Mechanical Optical Alignment of Projector

- Note:** Follow recommended manufacturer's procedures for your projector. These are general guidelines.

### Equipment Required:

- 1 kHz Cross-Talk Cell Alignment film
- 50% Modulation Tone film
- SMPTE Buss track film
- Pink Noise track film
- Oscilloscope with Pomona<sup>1</sup> 3901 or 3221 dual end leads
- RTA (Real Time Analyzer)
- Voltmeter

Connect the oscilloscope and RTA into the XD10P Input module (the module on the left). See Figure E-3 on page E-3.

-  **Caution:** These test points on the Input card are ONLY for the mechanical alignment of the optics. Do **not** refer to these test points when the software is connected.

For mechanical alignment on the projector, refer to the manufacturer's manual for your projector.

1. Clean the sound head optics thoroughly. If the film guide rollers are worn, replace them. Excessive side-to-side weave will cause severe problems for the stereo circuitry and must be corrected prior to installation.
2. If the exciter lamp is old or blackened inside, replace it. Make sure the lamp is operating at a voltage greater than 60% of its rating (refer to the manufacturer's instructions).
3. For stereo installations, remove the mono solar cell and place a white card about an inch away from the sound lens. The image of the exciter lamp filament should look like that shown in Figure E-1, next page.

If necessary, raise or lower the lamp and move it in and out until the filament is centered in the spot of light. This will ensure that the slit is evenly illuminated, thereby producing the least distortion in playback.

- Note:** If your projector is equipped with a red LED reader, refer to the manufacturer's manual for adjustment instructions.

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<sup>1</sup> These are cables that convert a BNC connector to two 0.08-inch diameter pin tip plugs. The 3901 cable has a male BNC and the 3221 has a female BNC.

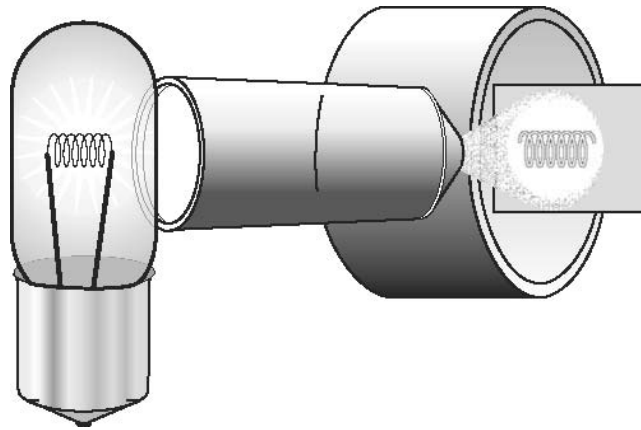


Figure E-1. Image of exciter lamp filament on white card

## E.1. Alignment of Solar Cell and Preamplifier (“A” Chain)

1. Mount the stereo solar cell on the projector and position the bracket so that the slit image hits the upper part of the cell. The cell should be approximately 0.04 inch (1 mm) behind the film so that the slit image just fills the cell width, but does NOT spill over.

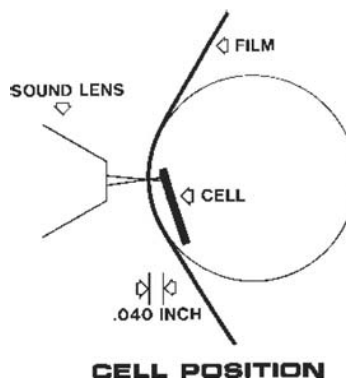
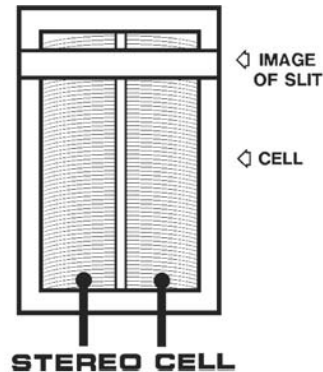


Figure E-2. Stereo Solar Cell mounting position

2. Install the audio line from the cell to the XD10P.
  - a. Use Belden N° 8404 or equivalent four-conductor twin-shielded cable, or a pair of two-conductor shielded cables such as Belden N° 8451. (A single two-conductor or three-conductor shielded cable is not recommended.) (This cable is not supplied by DTS.)
  - b. Connect the lines to a 9 pin male D-type connector (supplied by DTS). The pinout for this connector is in Appendix A (see Optical IN 1).



- c. Be sure that the RED lead of the cell is connected to the “L” input terminal marked “+” and the GREEN lead of the cell is connected to the “R” input terminal marked “+”.
  - d. The BLACK cell leads connect to the low “-” input terminals of BOTH Left and Right channels respectively.
  - e. Connect the shielding of the cable to the “GND” terminal. Do not connect the shielding at the projector end.
  - f. The D-9 connector should be plugged into the Optical IN 1 input connector of the XD10P.
  - g. Repeat step 2 for Projector #2, if needed.
3. Film readers with active circuits, such as a line amplifier or a reverse scan reader, will require a ground connection at the reader.

Good results can be achieved using the drain (shield) wire of the cables listed above, however, some agencies (such as CE) prohibit using the drain conductor for this purpose. In that case, use two three-conductor shielded cables (such as Belden N° 9939), three-pair cable (such as Belden N° 8777) or a five-or-six-conductor shielded cable (such as Belden N° 9941 or 9942).

4. If there are two projectors, the changeover is accomplished by grounding the “C/O” terminal on the rear of the XD10P.
  - a. Connect a latching relay with the appropriate rating, so that one coil is powered by the dowser circuit of projector 1 and the other coil is powered by the dowser circuit of projector 2. The relay contacts must be connected to the “C/O” and “Common” terminals so that the contacts are closed when Projector 2 is operational. (The projector changeover relay is shown in the drawing *XD10P – Logic, Hearing Impaired, External Inputs* in Appendix B.)
5. Connect oscilloscope and RTA to XD10P Input module as shown:

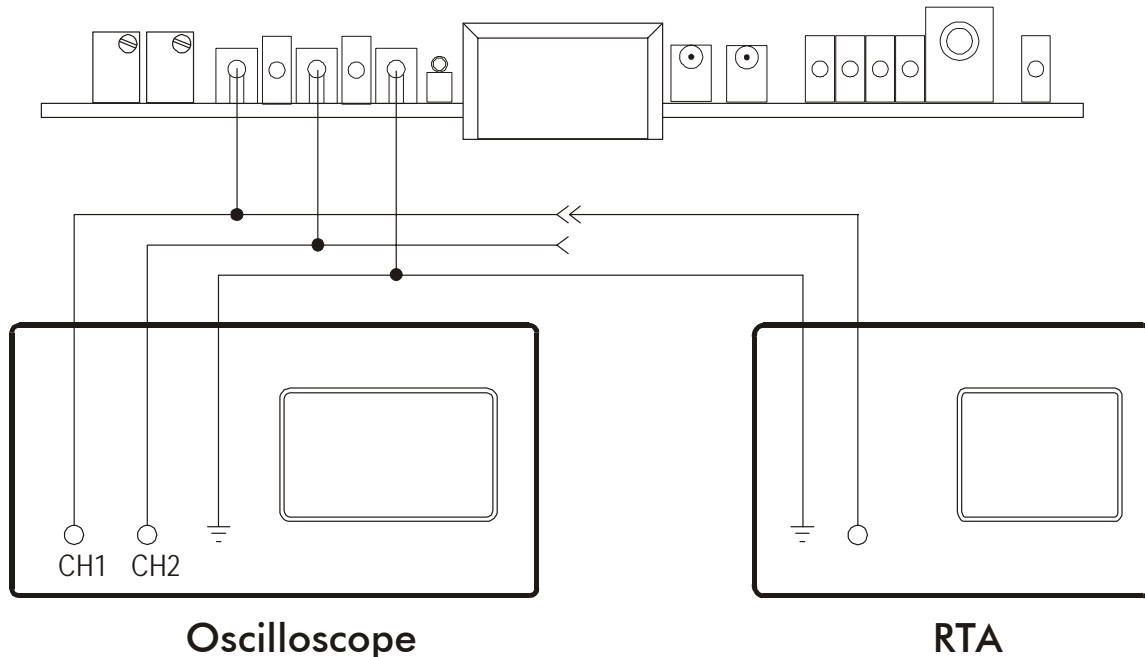


Figure E-3. Connect Scope and RTA to Input module

### E.1.1. Film Path Alignment Check

The purpose of this test is to check for proper lateral alignment of the projector's solar cell. The (cell) slit must be properly aligned so that the light illuminates only the optical soundtracks.

- Load the **SMPTE Buzz Track** test film. Observe the scope.

Make sure both left and right channels are null – there should be no signal output while the film is running. See diagram below (Figure E-4). If adjustment is necessary, refer to projector manufacturer for proper alignment procedure.

On older slits, it may not be possible to adjust for a null. In such cases, adjust for a minimum and equal signal on left and right.

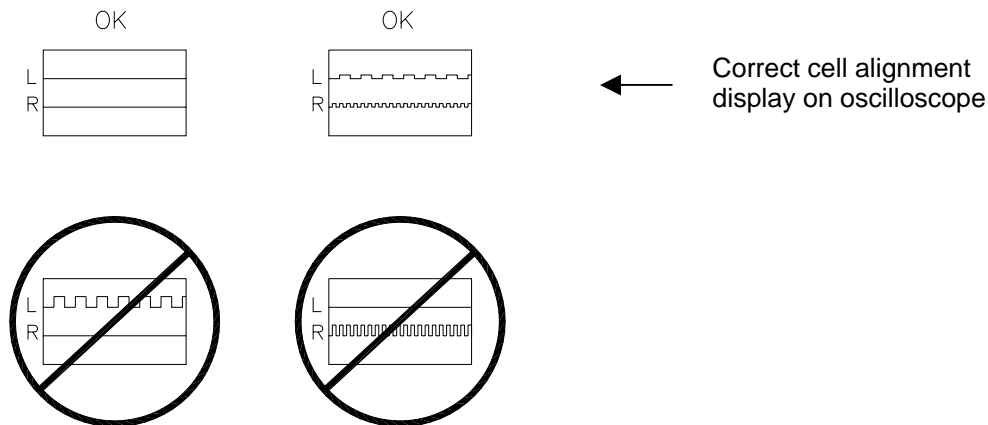


Figure E-4. Cell alignment on oscilloscope

### E.1.2. Cross-talk Alignment

- Run the **1 kHz Cross-Talk Cell Alignment** film. Observe the scope.

The objective is to obtain a reading like that shown in Figure E-5.

If adjustment is necessary, move the lens or move the pickup back and forth to achieve balance.

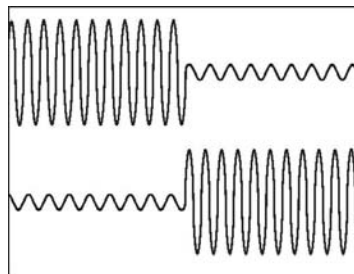


Figure E-5. Crosstalk is minimum on both channels

### E.1.3. Azimuth Check and Focus Check

The focus and azimuth adjustments interact, so it will be necessary to keep adjusting both until the best combination is achieved. The objective is to achieve a “good azimuth” pattern, like that shown in Figure E-6 and the flattest response on the RTA, like that shown in Figure E-7.

- Load the **Pink Noise** test film. Observe both the RTA and the scope.

- Set the scope to the X-Y mode.
- Adjust the focus of the soundtrack lens for the best high frequency response on both left and right channels, as shown on the RTA. At the same time, adjust the azimuth for the thinnest display on the oscilloscope.

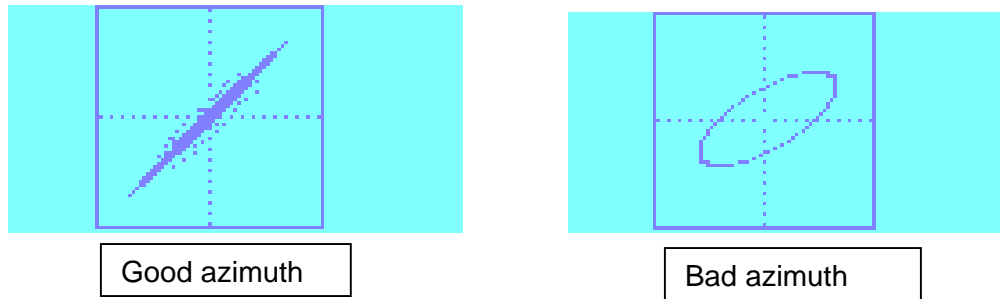


Figure E-6. Azimuth adjustment

- Rotate the lens to achieve the good azimuth pattern.
- To adjust the high frequency (HF) response, move the lens in and out and observe the pattern on the RTA (Figure E-7). The example shown may not be typical of your results. Try to obtain the best response possible. Final HF adjustment is done using the XD10P Setup software. See chapter 3, page 3-4, *Slit EQ Adjustment*.

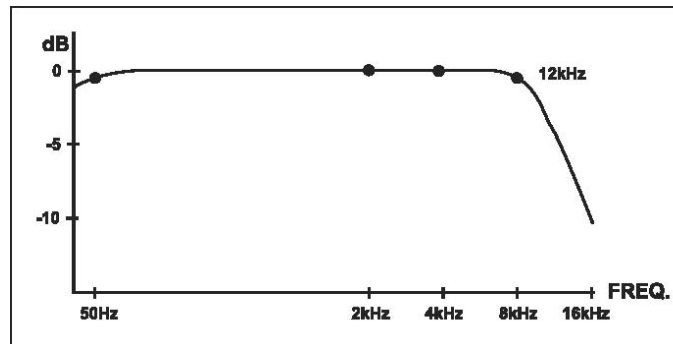


Figure E-7. Slit EQ analyzer screen (typical)

The pattern will either turn up or down on the right hand side. You want to achieve a pattern that is as flat as possible, while keeping the good azimuth pattern.

- This procedure is complete. Go back to Buzz track again (step E.1.1) to make sure you have not thrown it out of alignment during the subsequent adjustments. Then lock down the projector's soundhead optics. Repeat the procedure for Projector 2, if applicable.





# WARRANTY

Equipment manufactured by Digital Theater Systems, Inc. is warranted against defects in materials and workmanship for three (3) years from the date of purchase. There are no other express or implied warranties. Digital Theater Systems, Inc.'s obligation is restricted to repair and replacement of defective parts. Under no circumstances will Digital Theater Systems, Inc. be liable for any other damage, either direct or consequential.

### NOTE

**Warranty void unless the following Factory Warranty Information is provided to DTS within thirty (30) days of purchase.**

#### FACTORY WARRANTY INFORMATION

Complete this form for **each** DTS XD10P installation

THEATRE NAME/CIRCUIT: \_\_\_\_\_

THEATRE LOCATION: \_\_\_\_\_

SCREEN NUMBER \_\_\_\_\_

THEATRE CONTACT: Name: \_\_\_\_\_

Telephone: \_\_\_\_\_

LOCAL TECH: Name: \_\_\_\_\_

Telephone: \_\_\_\_\_

DTS XD10P SERIAL #: \_\_\_\_\_

Date of Purchase \_\_\_\_\_

PROJECTOR TYPE: \_\_\_\_\_

SOUND AMPLIFIER: \_\_\_\_\_

SPEAKER SYSTEM: \_\_\_\_\_

Screen (model): \_\_\_\_\_

Surrounds (model): \_\_\_\_\_

Split: \_\_\_\_\_ Mono: \_\_\_\_\_

Subwoofer: \_\_\_\_\_

Self-powered? Yes  No

Subwoofer Amp (model): \_\_\_\_\_

Are the Left Extra and Right Extra being used for Subwoofer? Yes  No

**Return complete form via Fax to: +1 (818) 879-2476; Att: Customer Service, Or via mail to: DTS Customer Service – 5171 Clareton Drive – Agoura Hills, CA 91301 – USA.**



## DTS PROMOTIONAL ITEMS - ORDER FORM

For every DTS unit installed in a theatre, we will provide one-sheet posters, cinema plaques, theatre promo kits, and either 4-inch mini-marquee, 8-, 10-, or 12-inch marquee signs. Simply complete and submit the following information. Marquees and posters can be sent directly to the theatre or dealer for distribution. If the marquees are directly sent to the dealer, the name(s) and location(s) of the theatre(s) is needed for our records.

Materials will be shipped within 2 to 3 weeks upon receipt of this completed order form.

Dealer: \_\_\_\_\_

Theatre: \_\_\_\_\_

Address: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Contact: \_\_\_\_\_

Contact: \_\_\_\_\_

Phone: \_\_\_\_\_

Phone: \_\_\_\_\_

### FOR DTS-EQUIPPED THEATRES

- 4-inch mini marquee Qty. \_\_\_\_\_
- 8-inch panel Qty. \_\_\_\_\_
- 10-inch panel Qty. \_\_\_\_\_
- 12-inch panel Qty. \_\_\_\_\_
- Posters ("one sheets") Qty. \_\_\_\_\_
- DTS Cinema Plaque Qty. \_\_\_\_\_
- DTS Promotional Kit Qty. \_\_\_\_\_

**Return this form to:** Customer Service  
DTS  
5171 Clareton Drive  
Agoura Hills, CA 91301 USA

Telephone: +1 (818) 706-3525  
                  +1 (800) 959-4109 (US only)  
Fax: +1 (818) 879-2746