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**DIGITAL CINEMA**

## **XD20 Media Player**

# **Installation and Operating Guide**

**Version 1.0**

**Effective Date: December 2008  
Document # 9301H264001.0**

**DTS Digital Cinema  
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## Appendixes

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- B. Cinema Processor Interface Wiring Diagrams
- C. XD20 Wiring and Block Diagrams
- D. Cable Assemblies and Breakout Boards
- E. Timecode Reader Head Mounting Brackets
- F. System Parts List
- G. Specifications
- H. Menu Structure
- I. Technical Maintenance
- J. Installing the CSS Option
- K. Using the ACV Playlist Generation Software
- L. Tech Notices
- M. H260 DVD Drive Unit

## Introduction

This manual explains the XD20 Media Player setup and operation. It contains full instructions for installing hardware and software, setting up audio playback, configuring the system, performing maintenance and troubleshooting, and setting up and operating optional functions: high definition video, CSS (subtitling, narration and captions), and digital audio out.

## How to Use this Guide

The guide is divided into three parts. The first part covers operations for the projectionist or “operator”. The second part covers the installation, setup and other theater technician functions. The appendixes provide detailed information for the theater technician.

### Part 1: Operation

1. Operating the XD20 Media Player
2. Loading and Playing Content
3. XD20 Playback Menus
4. Maintenance and Troubleshooting

### Part 2: Installation and Setup

5. Hardware Installation
6. Installing Licenses and Upgrading Software
7. System Setup Menus

### Appendices: Technician

- A. Connector Pin-outs
- B. Cinema Processor Interface Wiring Diagrams
- C. XD20 Wiring and Block Diagrams
- D. Cable Assemblies and Breakout Boards
- E. Timecode Reader Head Mounting Brackets
- F. System Parts List
- G. Specifications
- H. Menu Structure
- I. Technical Maintenance
- J. Installing the CSS Option
- K. Tech Notes
- L. Using the ACV Playlist Generation Software
- M. H260 DVD Drive Unit

## About XD20 Media Player

The XD20 Media Player is the latest audio/video playback system created by DTS Digital Cinema. It has been engineered to deliver eight channels of digital surround sound (plus a narration channel). It is a full-featured media solution with pre-show programming and networking capabilities.

Options that are enabled via licensing include:

- Soundtrack Playback (including playing 5.1 audio to timecode)
- HD Video
- CSS Cinema Subtitling System (subtitling, captions, and audio description).

A second hard drive (RAID) may optionally be installed into the XD20 chassis.

The XD20 Media Player has a large-capacity internal hard drive, which can store approximately 30 full-length feature soundtracks. XD20 connects directly or via network to an external DVD drive unit (see *Appendix M*).

To get the most out of your XD20, we suggest that you review this manual and keep it available during system installation and initial operation.

We publish the *Tech Talk* newsletter with tips and updates for Service Technicians. *Tech Talk* is published quarterly, and mailed. If you would like to be added to our mailing list, contact DTS Digital Cinema Technical Support. It is also posted on the free online Support Center located on our website at [www.dtsdcinema.com/Support/](http://www.dtsdcinema.com/Support/).

## Limited Warranty

DTS Digital Cinema software is warranted against defects for a period of 90 days from the date of the original purchase. XD20 hardware is warranted against defects in material and workmanship for a period of one year from the date of the original purchase. This warranty includes parts and labor. THIS WARRANTY EXCLUDES UNITS THAT HAVE BEEN MODIFIED, REPAIRED BY UNAUTHORIZED PERSONNEL, OR DAMAGED BY ABUSE, IMPROPER OPERATION, DIRT, MOISTURE OR STATIC ELECTRICITY. PROPER OPERATION OF THIS EQUIPMENT REQUIRES THE USE OF A SURGE PROTECTOR. SUPPLYING POWER TO THE XD20 UNIT WITHOUT THE USE OF A SURGE PROTECTOR WILL VOID THIS WARRANTY.

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DTS Digital Cinema  
Attn: RMA #  
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## Contact Information

To contact DTS Digital Cinema's Technical Support staff:

- - toll free telephone within USA and Canada (888)-428-2268
- - telephone worldwide +1-818-401-4253
- - fax +1-866-448-6802
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## Installation Checklist

Use these checklists to make sure that important settings are completed before playing content to an audience. There are separate checklists for installing XD20, the DTS Access™ option and the High Definition Video Playback option.

**Table 1: XD20 Installation and Setup (Soundtrack Option)**

Completed	Task	Refer to:
<input type="checkbox"/>	Install XD20 in Equipment Rack	Chassis Rack Mounting and Connection, page 52
<input type="checkbox"/>	Install D600 Timecode Reader Head onto Projector(s)	D600 Timecode Reader Head Installation, page 53
<b>CONNECT CABLING:</b>		
<input type="checkbox"/>	Power Cable	Appendix D, Cable Assemblies and Breakout Boards.
<input type="checkbox"/>	D600 Timecode Reader Head Interconnect Cable to XD20 Timecode Connector	Appendix D, Cable Assemblies and Breakout Boards.
<input type="checkbox"/>	Cable from XD20 Automation to Cinema Processor	Appendix B, Interface to Cinema Processors.
<input type="checkbox"/>	Audio (analog output) Cable from XD20 Analog Out to Cinema Processor	Appendix B, Interface to Cinema Processors.
<b>PROGRAMMING STEPS</b>		
<input type="checkbox"/>	Install License for Soundtrack Option (CD-ROM)	Installation of License Discs, page 61
<input type="checkbox"/>	Automation Setup: Pin Definitions, Fallback Formats, and Operating Modes	Automation / Control, page 80
<input type="checkbox"/>	I/O Control: Pin Definitions and Language Setups	I/O Control, page 85
<input type="checkbox"/>	Automation Test	Automation Test, page 93
<input type="checkbox"/>	Language Versions: Enable?	Language Versions, page 70
<input type="checkbox"/>	Use Automated Language Setups?	Language Setups, page 87
<input type="checkbox"/>	If Used, Enable/Disable Network Communication	Network Mode, page 103
<input type="checkbox"/>	Set System Clock: Set Time Zone, Date and Time.	System Clock, page 108
<input type="checkbox"/>	Set Password to Prevent Unauthorized Access, if Appropriate.	Set Password, page 101
<b>ADJUST AND TEST</b>		
<input type="checkbox"/>	Verify and, if needed, Adjust XD20 Sound Levels	Level Adjustment, on page 67
<input type="checkbox"/>	Set Timecode Reader Sync Adjustment	Timecode Reader Sync Adjustment, on page 56
<input type="checkbox"/>	Verify Sound Performance	Verify Sound Performance, page 58
<input type="checkbox"/>	Perform Audio Tests	Audio Tests, page 69
<input type="checkbox"/>	Load Cinema Feature / Trailer Disc(s)	Loading Content, on page 8
<input type="checkbox"/>	Check Automation Fail-Safe (Default) Operation	Check Automatic Fail-Safe (Default) Operation, page 59

If the DTS Access™ (CSS) option is to be installed, complete the steps in Table 2.

**Table 2: CSS Installation and Setup**

Completed	Task	
<input type="checkbox"/>	Install License for CSS Option (CD-ROM)	Installation of Licenses, page 61
<input type="checkbox"/>	Install Cable from EMA Control Connector to EMA	Appendix J. Installing the CSS Option.
<input type="checkbox"/>	Install Cable from Subtitle Projector to XD20 Media Player	Appendix J, Installing the CSS Option.
<input type="checkbox"/>	Set Up the Subtitle Projector	Cinema Subtitling System (CSS) Setup, page 77
<input type="checkbox"/>	Set CSS language	CSS Language, page 35
<input type="checkbox"/>	Set I/O control, if desired	I/O Control, page 85
<input type="checkbox"/>	Set up audio levels	Level Adjustment, page 67

If the Video option is to be installed, complete the steps in Table 3.

**Table 3: Video Option Installation and Setup**

Completed	Task	
<input type="checkbox"/>	Video Cabling	Appendix C, XD20 Wiring and Block Diagrams.
<input type="checkbox"/>	Install the license for Video Option (CD-ROM)	Installation of Licenses, page 61
<input type="checkbox"/>	Configure the Video Output	Video Setup, page 70
<input type="checkbox"/>	Load Video Disc(s)	Loading DTS Video Content Discs, page 11
<input type="checkbox"/>	Set Playlist Automation	Format Automation, page 80 and Playlist, page 90
<input type="checkbox"/>	Set I/O control, if desired	I/O Control, page 85
<input type="checkbox"/>	Play Test Images (Reset to Normal when Complete)	Video Test Contents, page 76
<input type="checkbox"/>	Set up audio levels	Level Adjustment, page 67

### Caution Notices

 **Lithium Battery for the XD20 Motherboard:** Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions. See *Appendix I, Technical Maintenance*.

 **Power Cord to the XD20 rear panel:** The power cord is the main disconnect device. It should be plugged into an easily accessible outlet. The power cord is to be used in a minimum type SVT 18/3 rated 250 Volts AC, 10 Amps with a maximum length of 4.5 M, with one end terminated in an IEC 320 attachment plug and the other end terminated in a NEMA 5-15P Plug.

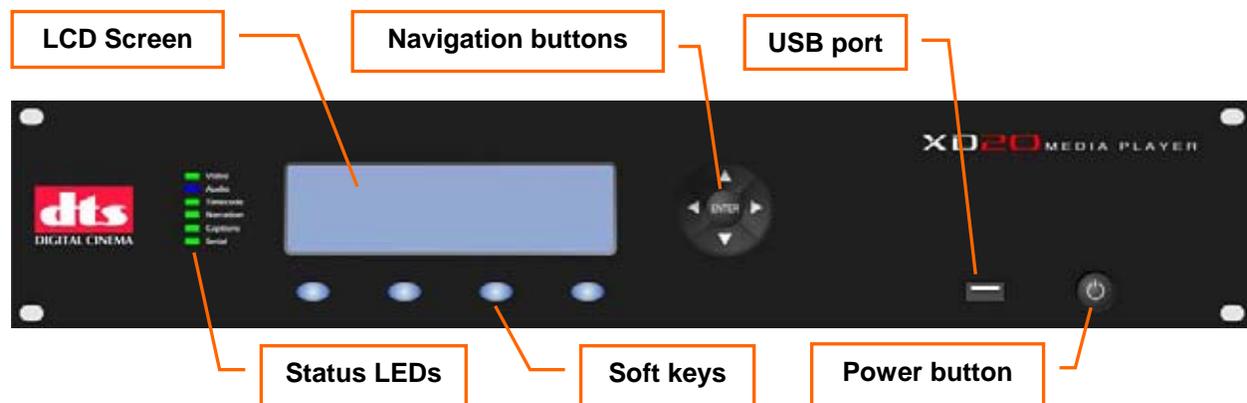
## Part 1: Operation

The first four chapters of this manual describe the information the projectionist needs to operate the XD20 Media Player on a day-to-day basis.

- Operating XD20
- Loading and Playing Content
- XD20 Playback Menus
- Maintenance and Troubleshooting

### 1. Operating XD20

#### 1.1. Front Panel Controls and Indicators



**Figure 1: Front Panel Controls and Indicators**

The front panel contains the following controls and indicators for operating XD20.

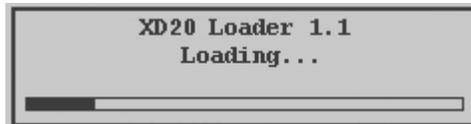
- **LCD Screen:** Four lines of text provide status messages and menus. Special characters for foreign languages are not displayed.
  - **Navigation buttons:** Four arrow keys and Enter are used to navigate menus and select options.
  - **Soft keys:** Four programmable buttons provide quick access to frequently used menus.
  - **Status LEDs:** Six LEDs provide status information during playback.
  - **Power button:** Turns the unit on and off.
  - **USB port:** A USB memory device can be used to save and restore XD20 configuration settings and load Preshow video content, ACV content, license files, and updates.
- Note: DVD drives:** An external DR-1 unit, containing two DVD drives is used to load soundtracks, license files, software updates, trailers and video content onto the XD20's hard drive. See Appendix M.

## 1.2. Powering ON the XD20 Media Player

Start by turning ON the front panel power button. It typically takes the system 90 seconds to initialize. The XD20 boots from the Flash drive that is connected (internally) to its motherboard. It may take an additional minute if the system is performing one of its periodic self diagnostics.

The Flash drive contains enough information to be able to check and repair the data on the hard drive. The application software runs from the hard drive. Built-in diagnostics will check the hard drive and software upon boot. A message appears on the display if a problem is found.

While the system is initializing, the following messages will appear on the LCD screen on the front panel of the XD20 chassis.



Wait until the screen displays the *Ready* message before using it.



- If no messages appear on the LCD screen after you have turned on the power switch, check the following:

**Is the power to the sound rack on? Has the sound rack breaker been tripped?**

**Is the power cable connected?**

**Are all internal cables connected and boards well seated?**

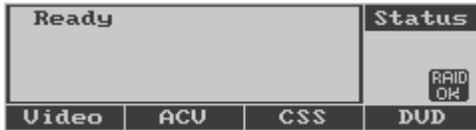
## 1.3. LED Indicators

The table below describes the LED functions on the XD20 front panel. The AUDIO LED lights **blue** when active. The other LEDs light **green** when active.

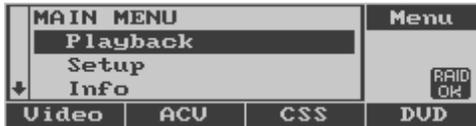
**Table 4: Front Panel LED Indicators**

LED	Color	Indication
VIDEO	Green	Playing video playlist or test material.
AUDIO	Blue	Playing audio playlist or test material.
TIMECODE	Green	Reading valid timecode from the reader head.
NARRATION	Green	Playing narration track to timecode.
CAPTIONS	Green	Playing CSS subtitles or captions.
SERIAL	Green	Serial text for data wall

## 1.4. LCD Screen



Status mode (status is “Ready”)



Menu mode

On the left of the liquid crystal display (LCD) screen on the front panel of XD20 is the menu display area. At times, there will be a scrollbar to its left to indicate additional choices off-screen. Use the up/down arrows on the navigation pad to bring unseen choices onto the screen. The small area to the right indicates what the left area is currently displaying, such as “Menu” or “Status”. It also contains iconic status messages such as “RAID OK” (only displayed when the optional 2<sup>nd</sup> HDD is installed), a network icon  indicating that a network connection has been established, or an icon of an exclamation mark (!) that indicates a problem.

Along the bottom of the LCD screen are labels for several selectable soft keys, which change function depending on what menu you are displaying. The soft keys themselves are located below the LCD screen.

The LCD screen operates in two modes:

- **Status mode.** During playback, the screen displays information about the content currently being played.
- **Menu mode.** In menu mode, the screen displays menus that can be used to view and adjust playback settings.

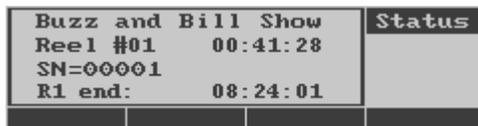
The XD20 navigation buttons may be used to switch the display between the status mode and menu mode.

### 1.4.1. Status Display

The XD20 status display reads “Ready” when XD20 is ready to play but not actively receiving timecode or playing content.

When XD20 receives timecode, the status display shows the following 4 lines:

- Line 1: Title of film or trailer
- Line 2: Serial number in the timecode that identifies the film.
- Line 3: Timecode reel number and elapsed timecode
- Line 4: Configurable information line



### 1.4.2. Configurable Information Line

Table 5 lists the options for Line 4. In the screen above, Line 4 displays *End of Reel time*. To select an option for Line 4 use the up or down navigation buttons.

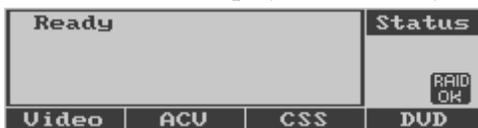
**Table 5: Configurable Information Options**

Option	Example	Indication
1		Blank. Bottom line does not display any information.
2		CSS Mode. This displays the current On/Off status of the CSS function. (See the section on <i>CSS Playback</i> on page 33.)
3		CSS Lang. This displays the current language selection for the CSS subtitles. (See the section on <i>CSS Playback</i> on page 33.)
4		End of Reel Time. This choice displays the timecode at which the audio for the current soundtrack reel terminates. In normal operation, the reel change occurs a few seconds before this time is reached.
5		Fmt. This choice displays the current format selected by XD20 to communicate with the external automation system or Cinema Processor. In some configurations XD20 may not recognize external format changes. In those cases, this line will display the last format selected by XD20.
6		DTS Lang. This choice displays the language code for the soundtrack currently playing. (See information on selecting a playback language in <i>Soundtrack Language</i> , page 32.)

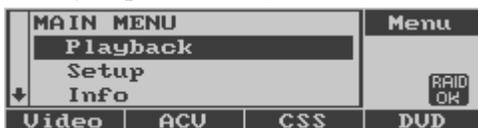
### 1.4.3. Navigating through the Menus

Use the navigation buttons (arrow keys and **Enter**) on the XD20 front panel to navigate through the XD20 menus. These are shown in figure 1 on page 1.

When the status display reads “Ready”, as shown below, press the **Enter** button to access the menus.



After you press **Enter**, the **Main Menu**, shown below, will appear on the LCD screen.



Use the **Up** and **Down** keys to scroll up and down the menu of commands. Note that the LCD only displays four lines of text at a time, but pressing the up and down buttons will cause the text to scroll up and down to reveal the other lines. The highlighted item is the current selection. Pressing the up and down keys causes the highlight to move.

To execute a command, highlight it and press the **Enter** button. Most menus contain an **Exit Menu** command which returns to the status display.

**Table 6: Navigation Keys**

Front Panel Key	Description
▶ (Right arrow)	Moves forward to the next menu. Used to move the cursor to the next field in some menus.
◀ (Left arrow)	Goes back to the previous menu. When the menu at the top level of the menu structure is reached, returns to the Status display. Used to move the cursor to the next field in some menus. Sometimes used as an Abort key
▲ (Up arrow)	Moves the cursor up one line. Used to increment a value in some menus.
▼ (Down arrow)	Moves the cursor down one line. Used to decrement a value in some menus.
Enter	Selects and executes the command at the cursor or goes back to the previous menu in some cases.

## 2. Loading and Playing Content

### 2.1. Types of Content

The XD20 Media Player plays these types of content:

- Soundtracks (Features and trailers)
- Preshow Video (Standard and High Definition)
- CSS (Cinema Subtitling System: Subtitling, Captioning and Audio Narration)
- ACV (Alternate Content video)

#### 2.1.1. Soundtrack Content

Soundtracks are DTS audio files for features and trailers. They are normally delivered on discs, which are inserted in the drives of the external DVD drive unit and saved on XD20s hard drive. If the XD20 is networked, soundtracks may be loaded via network using proprietary DTS Digital Cinema software.

#### 2.1.2. Preshow Video Content

DTS video content can be delivered in several ways: discs that can be downloaded to XD20 or content delivered via a network, or via USB hard drive or USB portable “memory stick”. The video content includes a configuration file that determines the video playlists, schedules and automatic start times.

The creation of content discs is not covered in this manual.

- XD20 will not play standard consumer DVD movies or music CDs. XD20 content DVDs for cinema must be created using proprietary DTS Digital Cinema software.

#### 2.1.3. Alternate Content Video

Playback of Alternate Content Video (ACV) is an XD20 capability that comes with the HD Video option. There is reserved disk space for ACV, which is separate from the space for Film and Preshow content. Multiple playlists can be loaded into the XD20. Unwanted playlists must be manually deleted.

*Appendix K* describes the process of creating ACV playlists and loading them onto XD20 using the ACV Playlist Generation software.

#### 2.1.4. CSS Content

The DTS Access™ system was designed to aid hearing impaired and visually impaired audiences. In addition, it is also capable of language translations.

In order to use the CSS system, your XD20 Media Player must have a license for the CSS Option. Three types of program content may be provided to a theater equipped with an XD20 that has the CSS option installed.

- Projected Subtitles or Captions
- Captions for rear data wall
- Narration

The CSS content is not delivered with the feature soundtrack disc(s). They are delivered separately. CSS discs will be labeled “DTS Access™” and with the same show title and serial number as the feature soundtrack disc. The disc label also shows what type of CSS content is included, as not all types of CSS content are included with all CSS discs.

- Not all features provide a DTS Access™ disc. Check with your distributor or contact DTS Digital Cinema for features that are available.

The CSS playback works the same as DTS feature audio playback, in the sense that the film contains timecode that must match the assigned film and audio serial numbers. This prevents playback of the wrong content with the wrong feature.

The projectionist threads the film through the D600 Timecode Reader Head on the projector, and when the show starts, the CSS will play automatically, synchronizing the content to the film. Some operational tasks can be performed by the projectionist. These are explained in more detail under *Playback Menu*, in Chapter 3.

### CSS Terminology

These are some of the terms associated with the CSS Option.

**Table 7: Definitions of Terms**

Term	Definition
CSS	Cinema Subtitling System. A system designed by DTS Digital Cinema that provides DTS Access™ content.
DTS Access™	Group of delivery playback files that include subtitles, narration, and Rear Window™. (Rear Window is a trademark of WGBH public broadcasting system in Boston.)
Subtitle	Projected text of on-screen dialog. Often this has been translated into a language different than the original version.
Caption	“front captions” – Projected text on screen that contains both film dialog and sound descriptions. This is also referred to as <b>Open Caption</b> .
Rear Window™	“rear captions” – This system consists of a LED reader board (display) mounted on the rear wall of the theater. It receives serial data from the CSS and displays caption text that is reflected on individual reflectors (rather than captions displayed on the screen).
Narration	This is an audio description of on screen action during feature playback. It is normally received via an IR (Infrared) or FM (Frequency Modulation) device to a head set worn by an audience member.
CSP	Cinema Subtitle Projector is a custom designed video projector for use only with the CSS Option.
EMA	External Masking Apparatus – A bracket that holds the CSP (cinema subtitling projector). Also contains a special douser and masking system

## 2.2. Content Delivery

Most content is delivered on discs. Customers who have XD20 with the HD Video Option may make arrangements with DTS Digital Cinema to receive video and ACV content via a network.

### 2.2.1. Types of DTS Discs

DTS theaters receive most content on CD-ROM discs. There are several types of discs.

- DTS Soundtrack discs for feature films.  
Soundtrack discs are issued by the film studios' distribution companies and must be returned with the prints. Feature film soundtrack discs sometimes include trailers.
  - DTS Trailer discs. These discs only contain trailer soundtracks. Trailer discs are distributed by DTS and do not have to be returned.
  - DTS Video discs. These discs contain XD20 video content, playlist and schedule information. These discs do not have to be returned.
  - DTS Access™ discs are issued by the film studios' distribution companies and must be returned with the prints. Access discs may include any or all of the following and will only play when the XD20 Media Player has the CSS option:
    - CSS subtitles or front captions (projected on the screen)
    - “Rear” Captions (captions displayed at the rear of the theater and onto a “Rear Window™” display)
    - Audio Description that describes action on screen (Narration).
- XD20 will only accept a disc made specifically for DTS cinema playback equipment. XD20 will reject consumer CD audio or DVD type discs.

## 2.3. Loading Content

Generally, any DTS feature soundtrack disc (film or trailer), DTS Access™ disc (with CSS content), or DTS video content disc will automatically load when inserted in the external DVD drive unit. The content will be copied onto the XD20 hard disc for playback at a later time. XD20 will store several soundtracks and/or DTS Access™ discs for multiple features and trailers.

XD20 will only accept a disc made specifically for cinema playback. XD20 will reject consumer CD audio or DVD type discs.

Please note that DTS soundtrack feature discs do not contain CSS files for the feature. CSS content for a feature is on a DTS Access™ disc, and must be loaded separately. It does not matter whether the DTS Access™ or soundtrack disc is loaded first. The CSS content for a feature can be loaded and played without the DTS soundtrack for the same feature.

### 2.3.1. DTS Soundtrack Discs

Soundtrack discs can be single discs or come as sets of double or triple discs.

- 1-disc soundtrack. DTS soundtrack for films running about 90 minutes or less may be delivered with one disc. These discs are labeled as "one disc only".
- 2-disc soundtrack. Films running 90 minutes but less than three hours will likely require two discs which are labeled “Disc A” and “Disc B”. These movie soundtracks discs must be loaded as a set.
- 3-disc soundtrack. In rare cases, a soundtrack may require three discs (“Disc A”, “Disc B” and “Disc C”) if it runs more than 3 hours. Loading a three disc soundtrack must be done in two separate load processes.
- DTS trailer soundtrack discs. Trailer discs are always single discs.

### 2.3.2. Loading Soundtrack Discs

The XD20 must be licensed to enable it to load specific types of content:

- CSS content will not play from any XD20 not licensed for CSS.
- An audio disc will not load if not licensed for soundtrack.
- A video/ACV disc will not load if not video enabled.

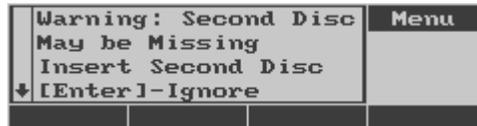
Note: An exception to this occurs when network transfer is enabled. The XD20 will then load any film (soundtrack or CSS) content so that it may be distributed to other units, but will not play back the content if not licensed.

Refer to the *Licenses Menu* in section 3.3.2 to see which licenses are loaded.

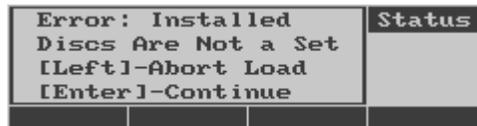
- 1 Start while XD20 is not playing content. The status display should read “Ready.”



- 2 Open the DVD drive (in the external DVD drive unit) by pressing the Open/Close button adjacent to the tray. Place the disc in the tray with the printed side up. For a two-disc or three-disc soundtrack, place disc A into drive A and disc B in drive B.
- 3 Close the tray by pressing the Open/Close button, and the external DVD drive unit will check the contents of the disc before loading. If it detects an error, it will display one of the following messages on the XD20 LCD display.



This warning message indicates that one disc of a two-disc set was not inserted. To add the second disc, first eject the one disc and start over with both discs. This warning may also occur for a three-disc set and can be ignored. Press **Enter** to ignore the warning and proceed to load the contents.



This error message indicates that the two-disc set inserted in the drives is not a matching set. This could be caused by any of the following:

- The discs are from different movies.
  - The discs are for the same movie but one is in a different language.
  - The discs are duplicates
  - One of the discs is not a cinema movie disc.
- 4 Eject the disc and start over with the matching discs. Pressing **Enter** will ignore the error, but the soundtrack loaded might be incomplete.

- When the load process begins XD20 displays information about the content currently being copied. For example:

Loading Drive A	Status
S4245 R4 ENG SND	

Typical load time is three minutes per disc. The following message appears when the load is complete.

Load Completed. [Enter]-Continue	Status

- Press **Enter** and the disc trays will open. Remove the disc(s) from the tray(s). Press the “open/close” button to close the tray(s).
- Repeat steps 1 through 6 for “Disc C” of a three-disc soundtrack.
- Place the DTS soundtrack discs back in the film canisters for return to the depot.

### 2.3.2.1. Compatibility with Legacy Soundtrack Discs

Old DTS soundtrack discs did not contain a language ID. If you load an older disc that does NOT contain a Language ID, and if Language Versions is **enabled**, XD20 will prompt you to identify the playback language desired. If you are prompted, you must identify the playback language of the disc. If Language Versions is **disabled**, XD20 will NOT prompt you to identify the language.

If you load a disc and are prompted for the language, you must select the language from the Languages menu. The only selection you make should match the language listed on the disc label.

Languages	Menu
Arabic	
Aramaic	
Basque	

See Table 15 on page 89 for a list of available soundtrack languages.

After selecting a language, a confirmation screen will display.

Confirm Selection	Menu
Basque	
Yes / Accept	
No / Reselect	

- Yes** – Confirm the language is correct and load disc.
- No** – Go back to the language menu and make a new selection.
- Abort** – Stop the load process and eject the disc.

### 2.3.3. Handling a CD-ROM Read Error

The following message may appear on the screen if an error occurs while XD20 is loading the soundtrack disc:



The options are:

- Press **Enter** to continue loading the incomplete material, or
- Press **◀** to **Abort** without loading any of the soundtrack.

If you press **Enter**, then a portion of the audio data will be missing. When the soundtrack is played, it will revert to the fallback format when it reaches the missing data. It will return to the DTS format when it sees valid data. If you load the disc again, it will only attempt to copy the missing data.

Pressing **◀** aborts the loading process. The drives will open and eject the discs. The data that was already copied from the hard drive will be deleted. Replacement discs for soundtracks can be requested from the film distributor. Replacement discs for trailers and special options can be requested from DTS.

### 2.3.4. Loading DTS Video Content Discs

DTS video content discs will only load on an XD20 that is equipped with the HD Video Option. The procedure for loading DTS Video Content discs is:

1. Start while XD20 is not playing content. The screen will display the following message.



2. Open the DVD drive (in the external drive unit). Place the disc in the tray with the printed side up.
3. Close the tray. The XD20 will check the contents of the disc before loading to ensure that it does not reload preexisting video content.

When the load process begins, the XD20 will display information about the content currently being copied. For example:



The following message will appear when the load is complete.

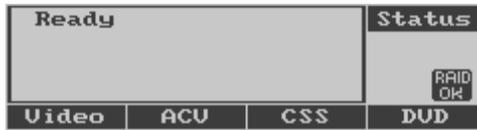


4. Press **Enter** and the disc trays will open. Remove the disc from the tray.

### 2.3.5. Loading a DTS Access™ Disc

DTS Access™ discs are always single discs labeled with the name of the feature film and the language of the content on the disc. To load a DTS Access™ disc, follow these steps:

1. Start when “Ready” is displayed on the LCD screen on the XD20 front panel.



2. Open the drive (in the external drive unit), place the disc in the tray with the printed side up, and close the tray. The XD20 will display information about the content being copied. For example:



The following message will appear when the load is complete.



3. Press **Enter** and the disc trays will open. Remove the disc from the tray and close the tray.
  - DTS Access™ discs will load onto the XD20 even if the unit is not licensed for the discs. However, they will only play back on XD20 units that have a CSS license.

### 2.3.6. Loading ACV

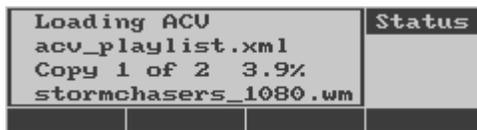
See *Appendix K* for information regarding creation of ACV playlists.

These menus apply whether the ACV is loaded from DVD or hard drive.

1. Start when “Ready” is displayed on the LCD screen on the XD20 front panel.



2. Open the drive (in the external drive unit), place the disc in the tray with the printed side up, and close the tray. The XD20 will display information about the content being copied. The message shown below displays while loading ACV content.



The following message appears if the Playlist already exists. Other playlists on the disc should be loaded.



The following message appears if the content cannot be loaded due to space limitations. In the example shown, the system ran out of disc space part-way through the playlist named

“Nahuala2”. Any clips loaded from the playlist prior to reaching the limits of disc space will be retained on the disc, but the playlist itself will not play. To load the new playlist in its entirety, you must delete sufficient nonessential ACV content.

<b>Insufficient Disk space Nahuala2 [Enter]-Continue</b>	<b>Menu</b>

The following message appears if the all content and playlists were loaded without errors.

<b>Loading ACU Configuration Disc Completed [Enter]-Continue</b>	<b>Status</b>

### 2.3.7. Loading Content via USB

A USB memory stick or a USB external drive can be used to load content into the XD20. See Section 3.2.5 *Load from USB*. Loading Film Content Using a Local Network

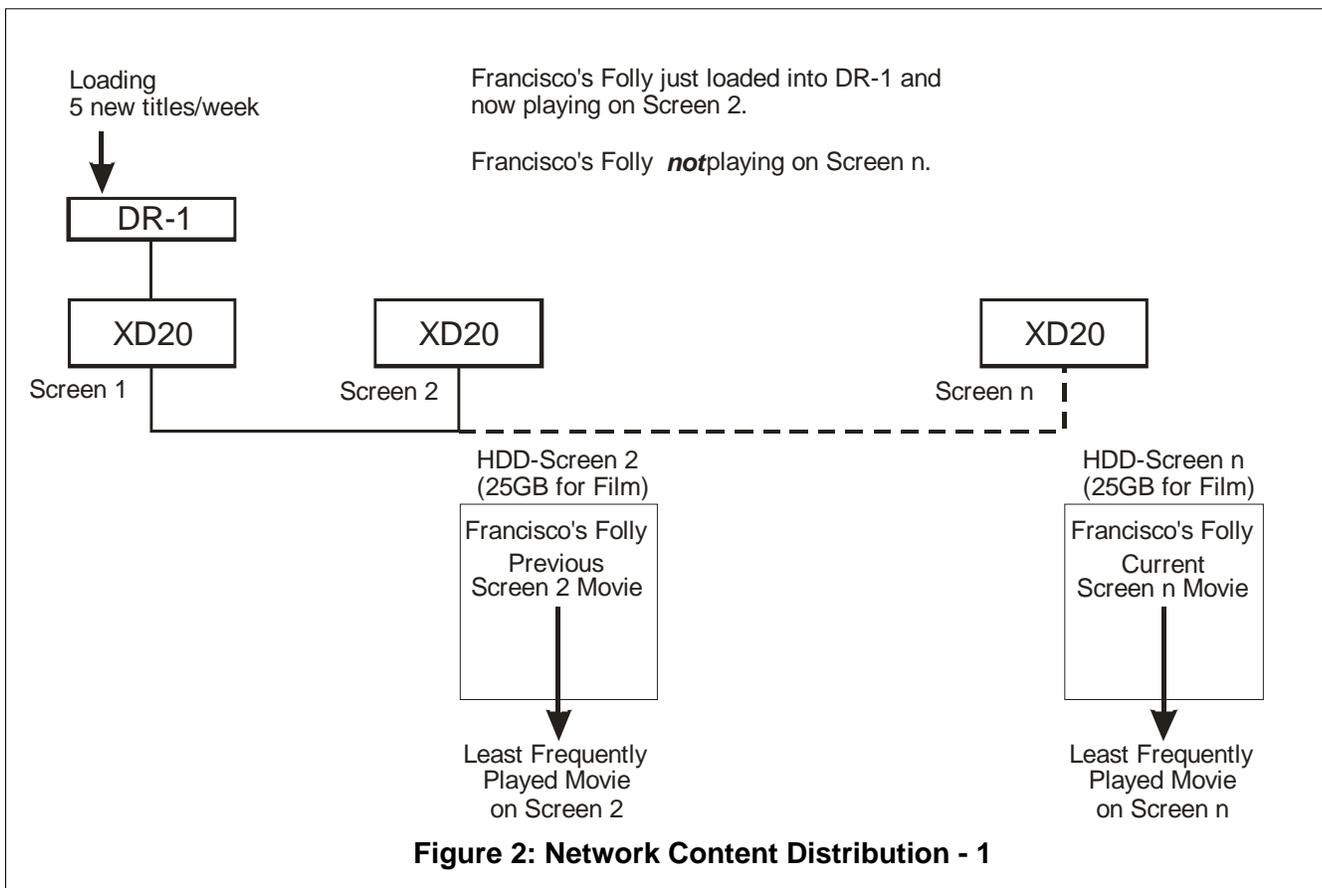
For a complete description of setting up and using your XD20 for Network loading, please see Section 7.8.5 *Network*.

For a local networked system, automated distribution of film content can be enabled (the default is OFF).

- Soundtrack and CSS content may be automatically distributed to all XD20s connected in a closed or local network. Content distribution is limited only to other XD20s on a local network and cannot be copied outside of the theatre.
- DVDs for Preshow or Alternate Content video will only load on the local XD20 unit and cannot be distributed through the network automatically.

When connecting XD20s in a stand-alone network, Language Versions must be set the same on all networked units. If this is not done, the soundtrack content loaded on a unit with Language Versions disabled will not play on a unit with Language Versions enabled.

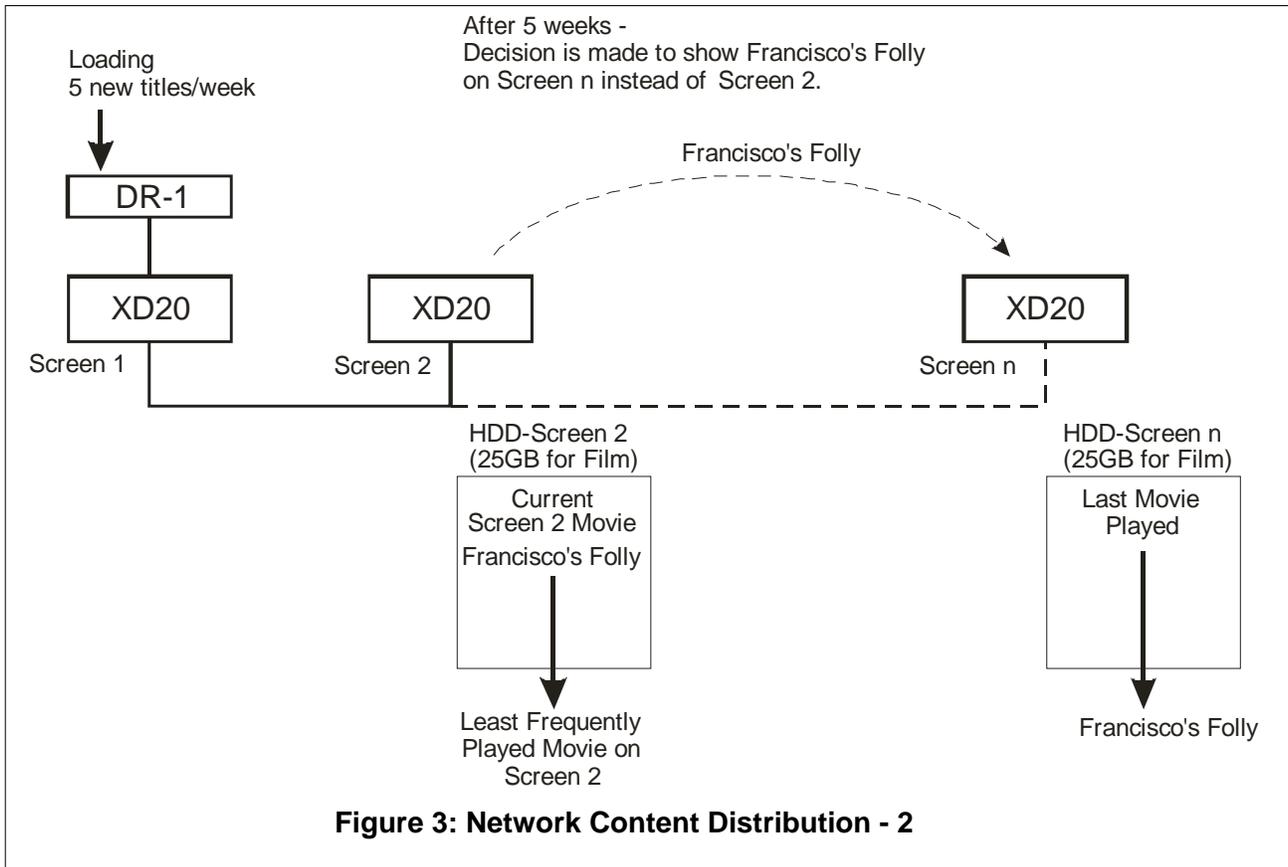
When content is loaded into a DR-1 that is connected to a network of XD20s, the content will be distributed to all the XD20 players. See Figure 2, below.



Due to the fact that the XD20 reserves 25GB of hard drive space for film content, a movie that plays for an extended period of time may get deleted from the drives of any units that have not played that movie for some time. For example, suppose that a busy multiplex loads 5 new titles per week into the DR-1/XD20 network. After approximately 5 weeks of loading 5 movies per week, the 25GB of available space on the hard drives will have been utilized. At this point, the least frequently shown movie on each

XD20 will be deleted from the drive in order to make room for the newly loaded movie. (Each XD20 maintains its own “Priority List” of content titles.)

In the case shown in Figure 3 below, after 5 weeks, the popularity of *Francisco's Folly* has tapered off such that the theater manager decides it should be shown on Screen “n” instead of Screen 2. Unfortunately, since *Francisco's Folly* has not been playing on Screen n for more than 5 weeks, it has been deleted from Screen n’s hard drive to make room for other content. In order to get *Francisco's Folly* back onto the hard drive of Screen n, it must be loaded back into the DR-1. (This also holds true if the content had been deleted manually rather than automatically.)



As an alternative to reloading the discs into the DR-1, it is possible to increase the space allocated on the hard drive of any XD20 so that it will hold more film content. The necessary increase in space would depend upon the rate of loading new titles and the number of weeks of play on a given screen. See - *Film Reserved*, under the Disc Space section on page 107, for specifics on increasing allocated space for film content.

## 2.4. Managing Disk Space

The XD20 250 gigabyte hard disk reserves 25 gigabytes of space by default for film soundtrack and CSS content. (See *Disc Space* in section 7.9 for information on changing the amount of reserved space.) XD20 uses about one G-byte of space for an average two-hour feature with soundtrack including DTS Access™ content, such as subtitles. Alternatively, one G-byte can also hold content for approximately 50 three-minute trailers.

XD20 automatically ensures there is enough storage space on the hard drive before loading new feature and trailer soundtracks. When necessary, it deletes old material to make room for new content. Old material consists of the features and trailers that have not been played for the longest duration of time. All content associated with the selected feature or trailer, such as different language versions, is deleted at the same time.

Content for features or trailers can be deleted manually as well. See *Delete Contents* on page 38 for more information.

For XD20 units with the Video Option, the hard disk space for the video content is separate from the space for the film content. Adding video content does not reduce the space for film content, and vice versa.

## 2.5. Playing Content with Film

Playback of content that is synchronized to the film is controlled by the signal from the D600 Timecode Reader Head as the film passes through. Additionally, DTS timecode from D-Cinema content can be fed into the XD20 “Timecode” connector. XD20 searches its internal hard drive for any soundtrack and/or CSS content that matches the feature reel or trailer that is currently playing. The LED indicators on the XD20 front panel show which content type is playing.

### 2.5.1. Playback Status Indicators

When film with DTS timecode passes through the D600 Reader head, the green light on the reader will illuminate and the Timecode LED on the XD20 front panel will illuminate. The Timecode LED on the XD20 will also light if valid DTS timecode is received from a D-Cinema player. At this point, the corresponding DTS content will automatically play.

If a DTS soundtrack is playing, the blue Audio LED will illuminate. If CSS content is playing, then the corresponding LED will illuminate (Narration, Serial or Captions).

### 2.5.2. Change-overs

When two projectors are used to run a film, the change-over from one projector to the other will be handled differently with DTS than when the audio and douser are controlled entirely by the projectionist. When timecode of the upcoming reel is read by the reader head, the DTS audio will change to the next reel independently from the douser or optical change-over. Knowing this, if the DTS sound is cut off prior to the end of the previous reel, it means that the upcoming reel was threaded too short – in other words, timecode began early, therefore the sound changed early. If this is happening, we suggest that you thread the incoming reel longer. If necessary, you may need to do some change-over tests to adjust your threading position.

For more information, see Guide for a Seamless Change-Over, page 49.

### 2.5.3. Handling Film Breaks and Edits

The XD20 will automatically track any length of edit. A 30-millisecond cross fade will make the edit transparent. In the unfortunate event of a film break, DTS playback can be started from that point after the film repair is made. After restarting the show, verify that the cinema processor has switched to the DTS digital format.

## 2.6. Playing Video Playlists

### 2.6.1. Video Playlists

Video playlists are defined by the video configuration disc, or its equivalent, if delivered through the network. The playlists loaded on the XD20 can only be changed by providing a new configuration file. The configuration may contain up to eight unique playlists.

#### 2.6.1.1. Slide-loop Playlist

The slide-loop is a special type of playlist that may be played before the Preshow playlist. The slide-loop is a series of images, video clips, and audio clips that continuously loop until the Preshow playlist starts. The Preshow playlist may be started by menu, automation, or an automated start time determined by the

video configuration. When the Preshow start is given, XD20 finishes the current clip of the slide-loop before beginning the Preshow playlist.

### **2.6.1.2. Preshow and Intermission Playlists**

The Preshow playlist is normally shown before the film starts. The Intermission Playlist is normally shown during the film intermission period. The timing of automation events may be programmed individually for both types of playlists.

### **2.6.1.3. Playlists C through G**

Playlists C through G do not have a predefined purpose. They are available if there is a need to have separate playlists. The timing of automation events may be programmed individually for each of these playlists.

### **2.6.1.4. End Slides**

In some cases, an “end slide” is used as the last clip in the playlist. When the end slide is used, the playlist does not automatically stop. Instead, the image continues to appear until XD20 receives the video Stop command, or the Video Inhibit signal.

## **2.6.2. Start and Stop Video Playlists**

There are two ways to start and stop video playlists: using menu commands or using automation.

### **Start and Stop Video with Menu Commands**

XD20 menus may be used to start or stop a video playlist. See *Playback Menu* on page 23, for details.

### **Start and Stop Video through Automation**

Functions to start and stop the video are also available through automation commands. The function must be assigned to one of the automation pins through the XD20 setup menus. See the section on *Pin Definitions* on page 81, for reference.

## **2.6.3. Preshow Playlist Schedules**

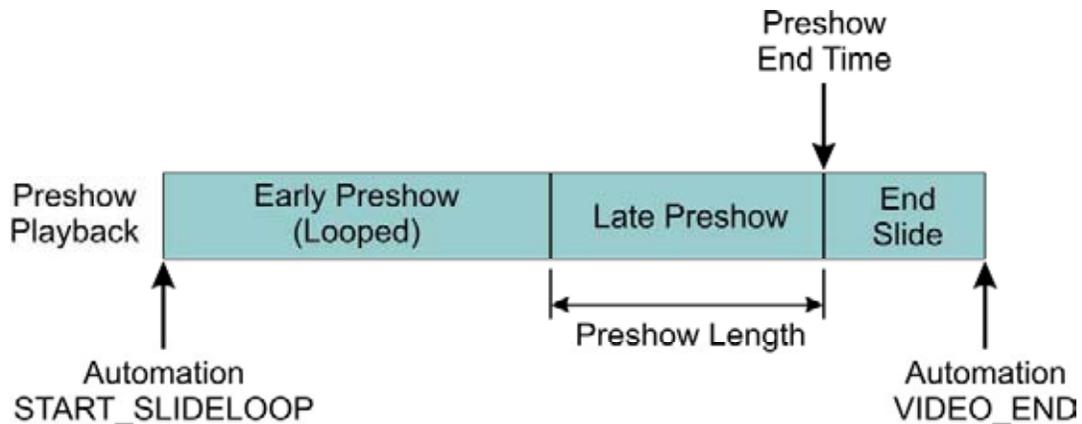
The Preshow playlist schedule is defined by the video configuration file. The playlist schedule determines which playlist will be shown, based on time and date. For example, the configuration file may define a different playlist for the Preshow playlist when the playlist starts at night than when it starts during the day. In order for the scheduling to be correct, the date and time for the XD20 clock must be set correctly. If the XD20 Media Player is connected through the network and has a network time server configured, then the clock is automatically set by the program. Otherwise, the clock must be set through the menus.

- The clock battery must be replaced every few years (and the system clock must be reset) if the XD20 unit is not connected to a network containing a Network Time Server.

## **2.6.4. Operation with Early/Late Preshow Presentations**

The XD20 can operate with an Early Preshow (EPS) presentation, followed by a Late Preshow (LPS) presentation, using a configurable Preshow End time to complete the LPS before the film starts.

The diagram below illustrates XD20 operation with an EPS followed by an LPS.



**Figure 4: Operation with EPS and LPS**

### 2.6.4.1. Configuration

A video configuration file is delivered to the XD20 that defines the EPS and LPS presentations, and an optional end slide. The video configuration file also contains a set of “Preshow End” times that define when the Preshow should complete and the film presentation begin. These definitions are created by the server software and delivered to the XD20 through the network, or in some cases on a DVD.

### 2.6.4.2. Operations

In the XD20, the EPS presentation is named “Slide loop”, and the LPS is named “Preshow”. An automation pulse on the START\_SLIDELOOP control input pin is used to start the EPS. The EPS is generally several minutes long and will loop as needed before the LPS starts.

The XD20 automatically starts the LPS so that it completes by the Preshow End time. Since the configuration file may have several Preshow End times, XD20 automatically selects the closest Preshow End time at the time that the slide loop began.

The XD20 completes the current clip of the EPS before transitioning to the LPS. This could delay the time that the LPS will complete by up to the length of the longest clip of the EPS.

The LPS ends at around the time that the film presentation is expected to start. The “End Slide” is projected in order to avoid a “dark” screen between the LPS and the start of the film presentation. The “End Slide” has no defined time period and will remain on the screen until a VIDEO\_END control pulse is detected. The VIDEO\_END pulse should be set to occur just before the film projector dowsers opens.

### 2.6.4.3. Manual Start/Stop

Although the automation should be used for starting and stopping the playlist, in some cases the menus can be used for testing. For details, refer to *Video Playback Functions*, on page 24.

To manually start the Slide loop (EPS):

**Playback → Video → Start → Slide Loop**

To advance to the LPS without waiting for the calculated LPS start time:

**Playback → Video → Start → Preshow**

Stop the End Slide (also stops EPS or LPS):

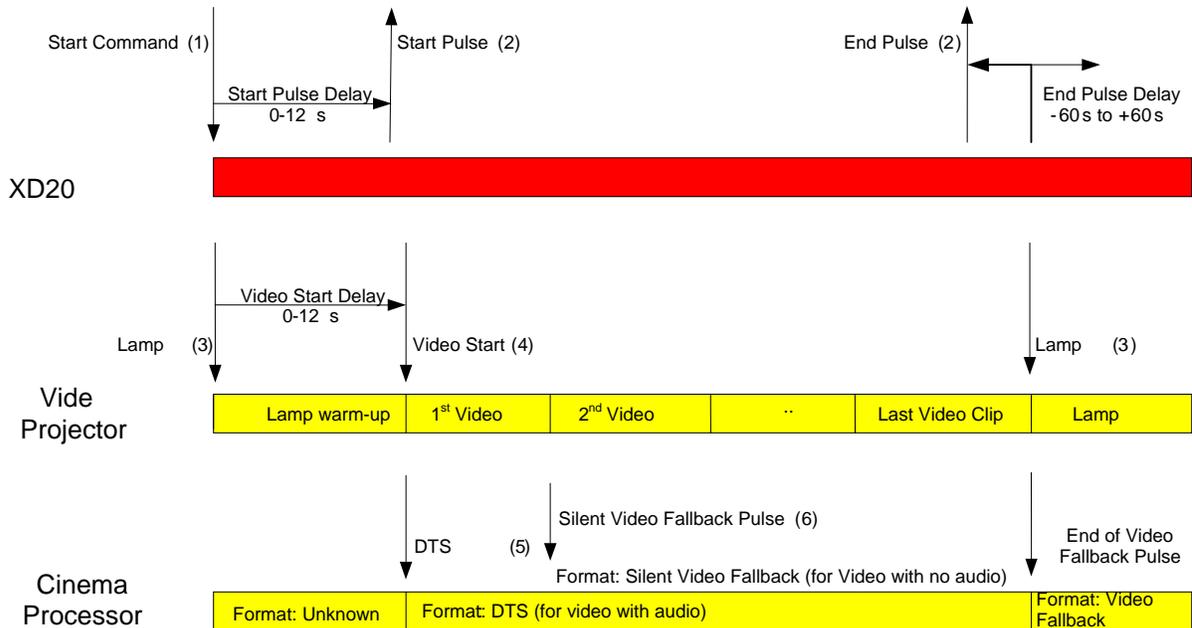
**Playback → Video → Stop → Stop**

### 2.6.5. Video Inhibit

The Video Inhibit function may be assigned to one of the automation pins through the XD20 setup menus. See the information on *Pin Definitions* on page 81, to define these pins.

The XD20 will not start video playback as long as the video inhibit signal is active. The XD20 will also stop video playback immediately if this signal becomes active during the video playback.

### 2.6.6. Video Playlist Automation Sequence



### 2.6.7. End of Playlist

At the start of the playlist, a “Lamp on” command is immediately sent to the video projector through the serial port. The first video clip can be delayed, programmable from 0 to 120 seconds after the start, to allow the lamp to warm-up. A start pulse output may be programmed to occur from 0 to 120 seconds after the “Playlist start” command.

For video clips with audio, the XD20 will trigger the cinema processor to switch to the DTS format. For video without audio, the XD20 triggers the cinema processor to switch to the silent video format. These formats are programmable through the XD20. The format pulse occurs only at the transition from audio to no audio, or vice versa.

The XD20 may be programmed to send an end pulse near the end of the playlist. The end pulse timing may be programmed to occur from between 60 seconds before to 60 seconds after the end of the playlist (negative end pulse). The negative end pulse is useful for triggering a film projector to ramp up before the playlist ends, so that the film starts immediately after the playlist ends. In cases where the playlist is shorter than the negative end pulse offset, then the end pulse will occur at the playlist end.

The XD20 may be programmed to turn off the video projector at the end of the playlist. The XD20 may also be programmed to switch the cinema processor to a predefined sound format at the end of the playlist.

## 2.7. XD20 Indicators and Display for Video

The Video LED is lit whenever the XD20 is in process of playing a video playlist or video test content. The Audio LED is lit whenever the Video playlist is currently playing audio. The XD20 pulses the cinema processor to the DTS format when the Audio LED goes on. The XD20 pulses the cinema processor to a specified Silent audio format or the end of the Preshow video when the XD20 Audio LED goes off.

### 2.7.1. Video LCD Display

The XD20 front display shows the current status during the video playback. It is possible to enter the XD20 menus and make adjustments while the video is playing.

- Note that any changes made with playlist automation setup menus do not take affect until the next playlist starts.

### 2.7.2. Projector Warming Up Display

The XD20 sends the Projector On command (to the video projector) as soon as the playlist starts. Then, it waits for the video start delay period before displaying any video. The following shows the display during that period.

Projector Warming up 53 Seconds Please wait...	Status
--	--------

### 2.7.3. Display when Playing Playlist

The following appears on the XD20 front display when the XD20 is playing video:

(Playlist Name) (Segment Name) XX of YY Fmt: (Format)	Status
--	--------

Display terms:

- Playlist Name** Name for the current playlist. The Playlist Name is assigned in the video configuration file.
- Segment Name** The name of the current playlist segment. The Segment Name is assigned in the video configuration file.
- XX of YY** XX is the current segment number, while YY is the total number of segments in the current playlist.
- Fmt: (Format)** Identifies the XD20 format pin selected by the XD20 or by an external automation system.

The following display text appears during the video playback when the XD20 is switching audio decoder formats (internal to XD20):

(Playlist Name) Audio Switching Please wait...	Status
--	--------

The following text displays briefly when the playlist is ending or has been stopped. Following this, the display returns to its normal state.

Playlist Complete Audio Switching	Status
--------------------------------------	--------

## 2.8. Video Projector Support

This software supports the following video projectors:

- Sanyo PLV-70
- Sanyo PLV-80
- Sanyo PLV-WF10

The software is designed to work in a fully automated fashion with these projectors. These projectors are controlled via the XD20 serial port to support the following functionality:

- Auto-detection of connected video projector.
- Read lamp and projector hours. These values are placed in the playlist log.
- Save video projector settings to XD20.
- Restore video projector settings. The projector settings are sent to the video projector whenever the playlist starts and the lamp is lit. The settings are not sent when the video is played through the video test menu. This allows you to use the test menu to adjust the projector settings on the video projector. You may then use the "Get Settings" menu command to save the video projector settings.
- Video projectors not listed can be used, but the XD20 will not have the functions listed above and will require an external automation controller to turn their lamps on and off.

### 2.8.1. Video Projector Settings

The following table lists the video projector settings that are saved by the menu command and restored for each playlist. Some settings are forced to a certain value on the projector.

**Table 8: Video Projector Settings**

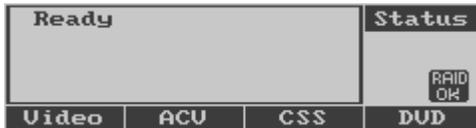
Option	Value	Comment
BRIGHT	Brightness 000-063	Save/Restore Settings
CONT	Contrast 000-063	Save/Restore Settings
COLOR	Color 000-063	Save/Restore Settings
TINT	Tint 000-063	Save/Restore Settings
SHARP	Sharpness 000-015	Save/Restore Settings
GAMMA	Gamma 000-015	Save/Restore Settings
WBAL-R	White balance, red 000-063	Save/Restore Settings
WBAL-G	White balance, green 000-063	Save/Restore Settings
WBAL-B	White balance, blue 000-063	Save/Restore Settings
COLORTEMP	Color temp 000-003	Save/Restore Settings
FANSPEED	Fan Control Speed	Save/Restore Settings
KEystone	Keystone setting	Save/Restore Settings
CEIL	When ON, image is top/bottom inverted	Save/Restore Settings
REAR	When Rear is ON, image is left/right reversed	Save/Restore Settings
NZRED	noise reduction ON/OFF	Force OFF
PROGV	progressive scan ON/OFF	Force ON
IMAGE	image mode (STAND, REAL, CINEMA, IMAGE1, IMAGE2, IMAGE3, IMAGE4)	Force STAND
INPUT	Select input 1-3	Save/restore
SOURCE	Select Input source DIGITAL, ANALOG, VIDEO, SVIDEO, YC, YPBPR, YCBPR, YCBCR, HD-SDI, SD-SDI	Force Digital
SYSTEM	SYSTEM OF CURRENT INPUT AUTO, NTSC, NTSC443, PAL, PAL, SECAM, PAL=M, PAL-N, 1080I60, 1080I60, 1035I, 720P, 575P, 480P, 575I, 480I	Force AUTO
SCREEN	NORMAL (4:3), FULL (16:9)	Force Full
TRUE	ON - Select TRUE, OFF - Cancels TRUE	Force ON
DISP	Set/Cancel Display	Force Off - Only on Projector 1
BBACK	Turn on/off Blue background	Force Off - Only on Projector 1
LOGO	Turn on/off Logo Display	Force Off - Only on Projector 1
LAMPMODE	Full or Half	Force Full, only works on WF-10.

### 3. XD20 Playback and Info Menus

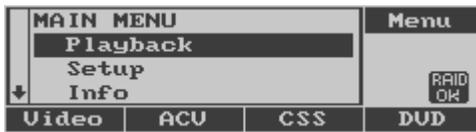
This chapter describes the Playback and Info menus, submenus and their functions.

#### 3.1. Main Menu

The Main menu is the top level menu in the XD20 menu structure. Access it at the LCD screen on the front panel when it is displaying the *Ready* state.



Press the **Enter** button and the Main Menu will display on the screen.

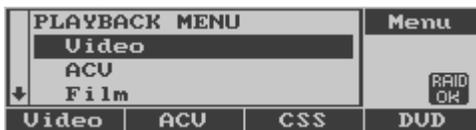


##### Main Menu

- Playback** Enter a sub menu to access all of the operator functions: playing soundtracks, videos and CSS content, checking Video Playlist, Soundtrack, CSS Playback, External S/PDIF, and Contents. See Section 3.2, *Playback Menu*.
- Setup** The menus included here are typically set in installation and are not used in normal operation. See *Setup Menus*, Page 63, for setup menu descriptions.  
Entry to the Setup menus may be password protected to protect the integrity of the configuration parameters.
- Info** Enter the Info menu to access information on the software version number, licenses installed, and the system's MAC address.
- Exit Menu** Return to the status display.

#### 3.2. Playback Menu

The **Playback Menu** contains the sub menus for the operator functions described below.



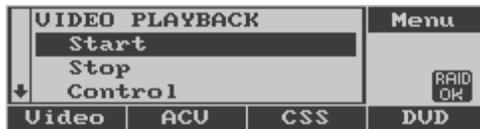
##### Main Menu → Playback

- Video** Use this menu to start, stop or control video playback; or to view video contents. This menu is locked out if the XD20 does not have the HD Video Option installed.
- ACV** Alternate Content Video. Use this menu to select and play the ACV playlist. Some control functions are included, such as skip to the next clip, start from a selected location, or resume playback. The user can also view playlists and contents, or delete playlists and their contents to make room for loading additional ACV content.

- Film** Use this menu to change playback parameters relating either to feature film and trailer soundtrack or CSS playback.
- External Input** Use this menu to allow the XD20 to route audio from the external digital or S/PDIF input on the rear panel through to the cinema processor.
- Load from USB** Enter this menu load XD20 Content (Video, ACV, CSS or Sountrack), or load an XD20 software update or License file from a USB storage device.
- Exit Menus** Return to the status display.

### 3.2.1. Video Playback Functions

The Video Playback menu, shown below, contains functions to start, stop and control video playback.



Playback → Video

- Start** Start playing one of the playlists currently installed on the XD20. See *Start Playlist Functions*, on page 25.
- Stop** Stop the playlist that is currently playing. See *Stop Playlist*, on page 25.
- Control** Control video using commands to fast forward, rewind, pause, resume, or seek to a specific position in the currently playing clip. See *Video Control*, on page 26.
- Contents** This menu displays information about videos and playlists installed on the XD20. **Note:** The XD20 will delete old content automatically when the hard drive is full. The user does not have the ability to selectively delete video content on the XD20 unit. See *Video Contents*, on page 27.
- Exit Menus** Return to the status display.

**Note:** Access is denied to this menu unless your XD20 has the Video Option installed. If the XD20 has no license for the HD Video Option, the message shown below will display when you try to access the Video Playlist.

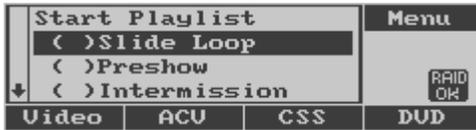


If the video card is not installed or does not work, the following message will appear.



In the case of an installed video card not working, contact DTS Digital Cinema Technical Support – see *Contact Information*, page xi.

### 3.2.1.1. Start Playlist Functions



Playback → Video → Start

<b>Slide Loop</b>	Start slide loop playlist.
<b>Preshow</b>	Start preshow playlist.
<b>Intermission</b>	Start intermission playlist.
<b>Playlist C</b>	Start playlist C.
<b>Playlist D, E, F, G</b>	Start playlist D, E, F, or G.
<b>Exit Menus</b>	Return to the status display.

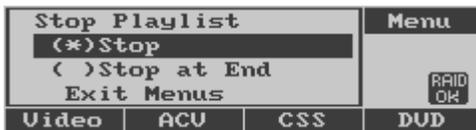
To start a playlist, scroll to the desired playlist type and press **Enter**. The selected playlist will begin and the asterisk will move to the left of the selection.

All of these playlist functions are also available as automation controls.

The playlist will not start while the XD20 is receiving timecode or the Video Inhibit signal is active. Provided that the start command has been given through automation, the XD20 will automatically start after timecode has stopped for 10 seconds as long as the timecode ends within one minute of the command being given.

- Note:** If no playlist is loaded, the XD20 executes the entire automation sequence (lamp on, start pulse, lamp warm-up delay) without playing any video.

### 3.2.1.2. Stop Playlist

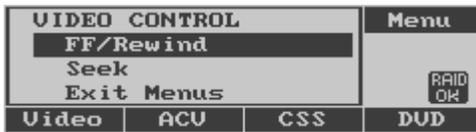


Playback → Video → Stop

<b>Stop</b>	Immediately stops the playlist that is currently playing.
<b>Stop at End</b>	Stops the playlist that is currently playing once it reaches the end of the current clip.
<b>Exit Menus</b>	Return to the status display.

These functions are also available as automation controls.

### 3.2.1.3. Video Control



**Playback → Video → Control**

- FF/Rewind** Enters a menu to control playback using commands to fast forward, rewind, pause, and play,
- Seek** Enters a menu to control playback by moving to a specific position in the current clip.
- Exit Menus** Return to the status display.

#### 3.2.1.3.1. FF/Rewind



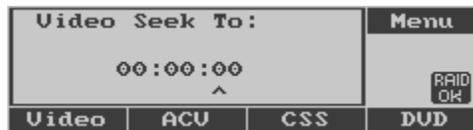
**Video → Control → FF/Rewind**

- Play (▲)** Restarts playback after pause command.
- Pause (▼)** Pause the video playback.
- Rew (◀)** Rewind. Play video in reverse direction. Press again to increase the **reverse speed**.
- FF (▶)** Fast forward the playback. Press again to increase the forward speed.
- Enter** Return to the previous menu.

#### 3.2.1.3.2. Seek

This menu allows you to seek to a specific point in the currently playing clip. It displays the seek position in terms of hours, minutes, and seconds. Use the keys to change the position and then start the playback at that position.

This will only seek to a point in the clip that is currently playing; it will not seek across clips in the playlist.



**Video → Control → Seek**

- Up (▲)** Increase the seek position by the amount at the cursor position.
- Down (▼)** Decrease the seek position by the amount at the cursor position.
- (◀) or (▶)** Move cursor, or exit menu if at the left-most position.
- Enter** Start the video playback at the position displayed.

### 3.2.1.4. Video Contents



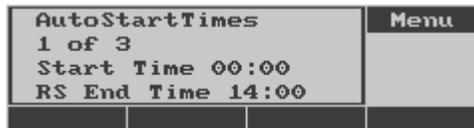
Playback → Video → Contents

These menus display information about the playlists that are currently installed on XD20.

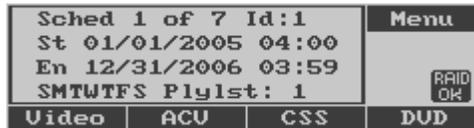
**Content Files** List of video clips/images.



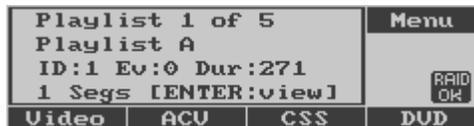
**Start Times** List of preshow start times. Press down/up to scroll through start times.



**Schedules** List of preshow schedules. Press down/up to scroll through schedules.



**Playlists** List of preshow video playlists. Press down/up to scroll through playlists. The example below shows the first of 5 Preshow playlists.



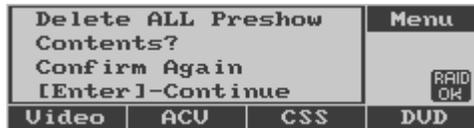
Press **Enter** to view the contents of the selected playlist.



**Delete All Preshow** Delete all preshow content, associated playlists and schedules.



Press **Enter** to continue with deletions. A confirmation screen will display.

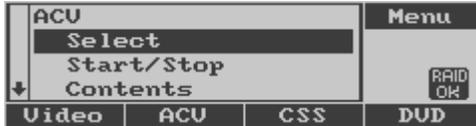


Press **Enter** to confirm deletion.

**Exit Menu**

Return to the status display.

### 3.2.2. ACV Playback



Main menu → Playback → ACV

- ☑ **Note:** You cannot gain access to this menu (Main menu → Playback → ACV) unless your XD20 has the Video Option installed. If XD20 has no license for HD Video Option, the message shown below will display when you try to access the ACV Playlist.



**Video license not installed**

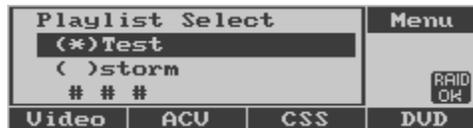
Playing the alternate content video is similar to the playback of a video playlist. Starting the ACV playback is a two-step process: 1) select the desired playlist and 2) start the selected playlist.

The expected use for the ACV Playlist is to show alternate content video, not trailers or preshow content, and not feature films. The ACV playback contains video clips with these supported audio formats: DTS-CA (Coherent Acoustics), Dolby Digital (3/2 and 2/0), WMA, and PCM audio. ACV also supports still images or audio wav files (PCM or CA), but not stills simultaneously with separate audio. See *Appendix K* for information regarding creation of ACV playlists.

There are no schedules or auto-start times associated with ACV.

**Select**

Select an ACV playlist.



Press up/down to view the list. Press **Enter** to select an ACV playlist.

**Start/Stop**

This enters the ACV control menu that allows you to start/stop the playlist, or other functions through the soft buttons. When the video is stopped, the soft button options are Start, Select, and From, as shown below.



**Resume video when video is stopped**

In order to resume, there must be a valid resume point. There is a valid resume point if the selected playlist has not completed its play-out and has been playing for at least 20 seconds before being stopped.

**Start** Start the selected ACV Playlist. The display changes after the start is selected to show the current playback state.

**Select** Select a new ACV playlist

**From** Start from a designated clip/position.

**Resume**

This option is available only when it is possible to resume playback after the playlists stops without finishing the playlist. That would include playback interruption due to a power failure. The Resume point would occur slightly before the playback was stopped---within 20 seconds. The button will not be present if the playlist completes, the playlist has changed, or if the playlist has not played for at least 20 seconds.

When ACV is playing the LCD shows the playlist name, clip name, clip number, and the last selected CP format. The soft button functions change to Stop or Skip.



**Stop** Stops any video playback

**Skip** Skip to the next video clip in the playlist.

**From**

The **From** function allows you to start the ACV playlist from a selected clip number and offset position.



**Seg** Clip number

**Offset** HH:MM:SS (SS in increments of 10)

**Start** Start from Start point.

**Cancel** Return to previous menu (do not Start)

(◀) Move cursor left.

(▶) Move cursor right.

(▲) Increment the value at the cursor.

(▼) Decrement the value at the cursor.

**Enter** Start from Start point.

**Contents**

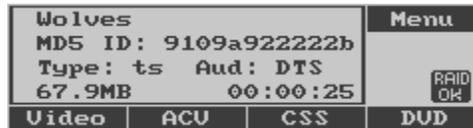
View list of ACV playlists. Press up/down to view the list and press **Enter** to select.



**Content Files** Select video contents. Press up/down to view the list and press **Enter** to select.



Press **Enter** to select. The video clip details will display.



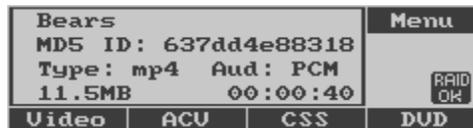
**Playlists** Displays ACV playlists. Press up/down to view the list and press **Enter** to select and display the clips within the playlist.



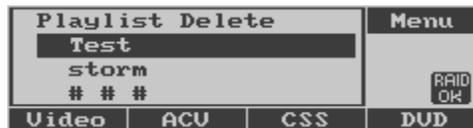
The contents of the selected playlist will display.



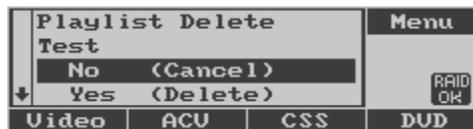
Press **Enter** to select and display the clip details.



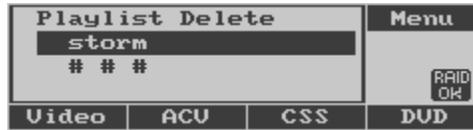
**Playlist Delete** Deletes ACV playlist and any content associated with the playlist provided that the content is not in use by another playlist. Press up/down to view the list and press **Enter** to select a playlist to delete.



A confirmation screen will display, to confirm deletion.

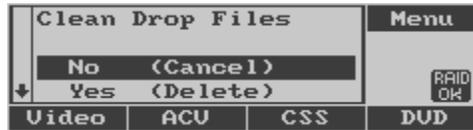


Select **Yes** and press **Enter** to delete.

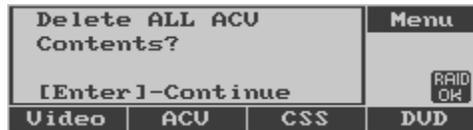


**Clean Drop Files** Deletes directory used for temporary storage for network download files.

**Warning:** Deleting the drop directory may interfere with partially transferred playlists.



**Delete All ACV** Press **Enter** to continue.



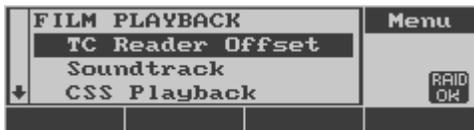
A confirmation screen will display.



Press **Enter** to continue deletion.

**Exit Menus** Return to the status display.

### 3.2.3. Film Playback



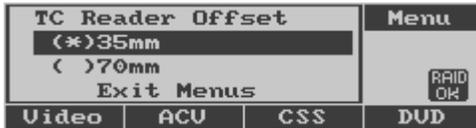
**Main menu → Playback → Film**

Use these menus to change parameters related to movie soundtrack and CSS playback.

- TC Reader Offset** Select the TCR offset to use.
- Soundtrack** Select the soundtrack language to play.
- CSS Playback** Select the CSS playback options.
- Contents** View film soundtrack and CSS content.
- Exit Menus** Return to the status display.

### 3.2.3.1. TC Reader Offset

This menu allows you to set the offset for either a 35mm or a 70mm timecode reader head.



Playback → Film → TC Reader Offset

- 35mm** Use the timecode reader offset value for 35mm film playback
- 70mm** Use the timecode reader offset value for 70mm film playback
- Exit Menus** Return to the status display.

This control is also available through automation.

### 3.2.3.2. Soundtrack Language

Some XD20 units may be configured to play different language versions (also known as dubs), provided the soundtrack disc in the selected language for that film has been loaded. This feature is available only when the Language Versions option is enabled during the XD20 setup.

If Language Versions is not enabled, then XD20 will only load and play one version of the soundtrack for the feature or trailer. Loading a second language for a soundtrack will overwrite the first language. To enable language versions see section 7.2.3.

The Soundtrack Language menu, shown below, is the second selection on the Playback menu. It is used to select the language to be used with a particular soundtrack.



Playback → Film → Soundtrack

- Automation** Automation will select the playback language. This option is applicable only if XD20 is setup to use automation for languages. See *Language Setups*, page 87, for more information.
- Last Installed** Selects the language version last installed for the feature soundtrack being played.
- English** English or other specific language. The feature soundtrack being played will be played in the language that was specifically selected, provided that soundtrack has been loaded.
- <Additional Languages>** Any language from loaded content.

**Note:** If the selected language does not exist on the hard drive, then the DTS soundtrack will not play, and XD20 will switch the cinema processor to analog.

### Language Versions Disabled

If Language Versions is not enabled, then the following message will appear when selecting **Soundtrack** from the Film Playback menu.



### Need Soundtrack License

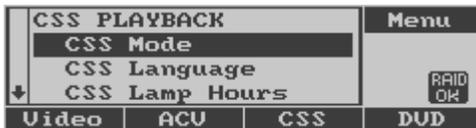
If no license for soundtrack audio is detected, this message will display.



### 3.2.3.3. CSS Playback

The CSS Playback menu allows you to set the CSS Mode, set the CSS language and view the CSS projector lamp hours. To access this menu, select **CSS Playback** from the Film Playback menu. The following menu will appear on the screen.

- Note:** You cannot gain access to this menu unless your XD20 has the CSS Option installed.



**Playback → Film → CSS Playback**

- CSS Mode** Specify whether to show subtitles.
- CSS Language** Select the subtitle and caption languages.
- CSS Lamp Hours** View CSS Projector Lamp hours (for InFocus projector only).
- Exit Menus** Return to the status display.

### Need CSS License

If no license for CSS is detected, this message will display.



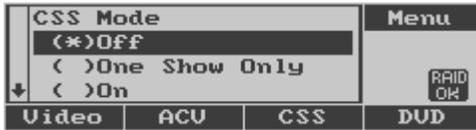
If XD20 is not equipped with the CSS Option, the CSS Playback menu will be locked.

In order to use the CSS option, you must obtain a CSS license from DTS Digital Cinema. The license will be “keyed” to your XD20 unit. CSS licenses cannot be shared with other XD20 units.

You can find out what licenses have been installed on your XD20 by selecting **Main Menu → Info → Licenses**. Once your XD20 unit is licensed for the CSS Option, the CSS Playback menu will be available to you.

### 3.2.3.3.1. CSS Mode

This menu allows enabling or disabling of CSS captions.



#### CSS Playback → CSS Mode

- Off** CSS is OFF. Do not show subtitles or captions.
- One Show Only** CSS is ON for one show only. This option turns the subtitle projector lamp on and plays back all available CSS files for one show only. After the show is over, the subtitle projector automatically turns off, after a short cool-down period, and the CSS system remains off.
- On** CSS is ON and remains ON. When this option is selected, the subtitle projector lamp stays on after every show and CSS files play back at every show.
- Exit Menu** Return to the status display.

### 3.2.3.3.2. Shortcut to CSS Mode

To select a CSS mode without navigating the menu structure, make sure you have first programmed a soft key for CSS Mode Toggle. (See section 7.8.1 for information on soft key programming.)

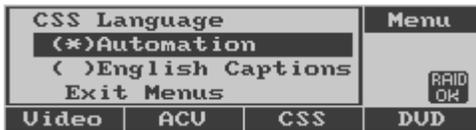
1. Use the “CSS:” soft key to scroll through the three options.
  - o Off
  - o One Show Only
  - o On



2. This selection has the same effect as entering a selection in the CSS mode menu.

### 3.2.3.3.3. CSS Language

This menu allows selection of the language for the subtitles and captions.



#### CSS Playback → CSS Language

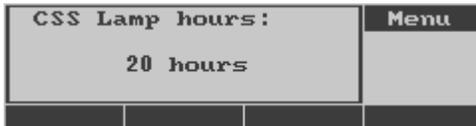
- Automation**            The language will be specified by Automation Controls. Use this selection when CSS has been set up to switch automatically between languages when controlled by the theater automation. See Appendix J, *Installing CSS*, for more information.
- English Captions**    Select English captions for subtitles and captions. As other languages are added, they will appear as selections. *English Captions* is the default in this system.
- Exit Menu**             Return to the status display.

**Note:** A soft key may be used for quick access to this menu, (See section 7.8.1 for information on soft key programming.)

### 3.2.3.3.4. CSS Lamp Hours

The CSS Lamp Hours feature works only for the original DTS-CSP *InFocus* projectors. If other projectors are used, an “Unavailable” message will display.

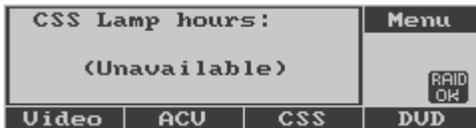
This menu displays the number of hours the cinema subtitling projector lamp has been used. This makes it easy to replace the lamp before it fails. For example, if a lamp has been used for 20 hours, the following message will appear on the screen.



#### CSS Playback → CSS Lamp Hours

**Note:** The DTS-CSP projector lamp must be replaced after 1,400 hours of use. If another projector is used, consult the manufacturer for lamp maintenance/replacement.

If the cinema subtitling projector lamp is damaged, has failed, or has been removed from the projector, the following message will appear on the screen.



Other reasons for receiving this message are:

- Power to the projector is not on.
- There are communication (cable) problems.
- The system is not connected to an *InFocus* projector.

### 3.2.3.4. Contents Menu

The film soundtrack and CSS content may be viewed and deleted through the Contents menus.

To access the contents menu, select **Contents** from the Film menu, and press **Enter**. The Contents menu, shown below, will display.

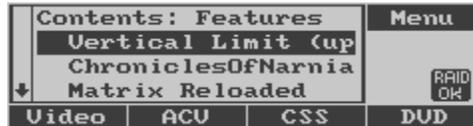


**Playback → Film → Contents**

- Features** Lists any feature films titles that have soundtrack or CSS content on the XD20.
- Trailers** List any trailers that have soundtrack or CSS content on XD20.
- Delete Contents** Delete selected contents from the XD20 hard drive. This includes the following contents available through DTS Access™: subtitling, captions, and narrations.
- Exit Menus** Return to the status display.

#### 3.2.3.4.1. Display Feature Contents

From the Contents menu, select **Features**. XD20 displays a list of features for which soundtrack, narration, CSS, or Rear Window content is loaded on XD20.



**Film → Contents → Features**

Feature films will be listed in the order of the last played or loaded onto XD20. Scroll up and down the menu to view the entire list. Put the cursor on the feature name and press **Enter** to view content loaded for that feature, as shown below. Use the **Up** and **Down** arrow buttons to scroll through all of the content files for that feature.



**Typical detail for soundtrack file**

- Line 1** Contains the feature name.
- Line 2** Contains the feature serial number.
- Line 3** File type: Subtitle, Captioning Text, Narrative, or Soundtrack.  
CSS Subtitles require a unique file for each text size. The Subtitle file size is listed on this line.
- Line 4** Shows the language for the soundtrack or Subtitle file.

### Subtitle File

The display status screen below shows an example of the display for a Subtitle file. Multiple subtitle files may exist for each feature title, each having a different subtitle size.



Typical detail for subtitle file

### Caption File

The display status screen below shows an example of the display for a Captioning Text file. There is only one Captioning Text file per feature title.



Typical detail for captioning file

### Narrative File

The display status screen below shows an example of the display for a Narrative file. Narrative files require one file for each reel. An “L” after the reel number indicates that it is the last reel of the film (so the fallback becomes nonsync near the end of the reel).



Typical detail for narrative file

### Soundtrack File

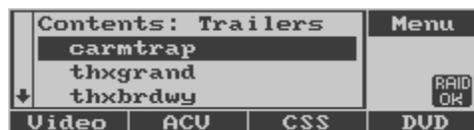
The display screen below shows an example of a Soundtrack File. Like Narrative files, Soundtrack files require one file for each reel. An “L” after the reel number indicates that it is the last reel of the film (so the fallback becomes nonsync format near the end of the reel).



Typical detail for soundtrack file

#### 3.2.3.4.2. Trailer Contents

From the Contents menu, select **Trailers** and XD20 displays a list of trailers for which soundtrack, narration, CSS or Rear Window content is loaded on XD20.



Film → Contents → Trailers

Position the cursor next to the trailer name and press **Enter** to view content loaded for that trailer, as shown above for features. Use the Up and Down arrow buttons to scroll through all of the content files for that trailer.

### Trailer File

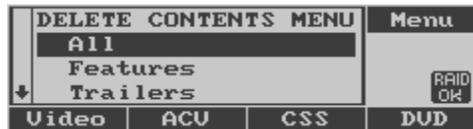
The display below shows an example of the contents for a trailer file. The abbreviated name of the trailer is shown, followed by the DTS serial number for that trailer, the type of content file, and the language.



Typical trailer file detail

### 3.2.3.4.3. Delete Contents

From the Contents menu, select **Delete Contents** to display the menu shown below. This menu allows deletion of selected soundtracks for features or trailers, or all soundtrack and CSS files.

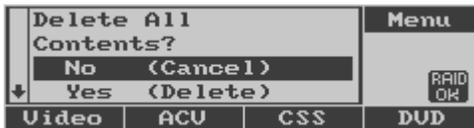


Film → Contents → Delete Contents

- Test content cannot be deleted through these menus, although video content can be deleted.

### Deleting All Contents

From the Delete Contents menu, select **All** to delete all feature and trailer contents loaded on XD20. The menu shown below will request confirmation that all of the content is to be deleted.



**No** Do not delete any contents. The following message will display:



**Yes** Delete all feature and trailer content loaded on XD20. The following message will be displayed while the content is being deleted.



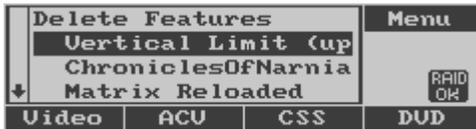
After several seconds (depending on the number of files), the following message will appear:



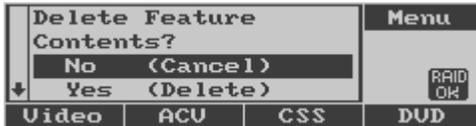
**Exit Menus** Do not delete any content and return directly to the status display.

### Delete Features

The Delete Features menu allows you to delete all soundtrack and CSS content associated with a selected feature. From the Delete Contents menu, select **Features** to display the menu below.



Move the cursor to the desired feature and press **Enter**. The following menu will display:

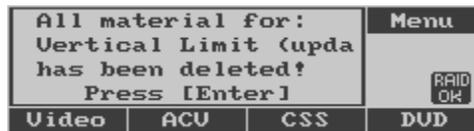


**No** Do not delete any contents. The following message will display:



**Yes** Delete all soundtrack and CSS content files for the selected feature. A *Delete in progress* message will be displayed while the content is being deleted.

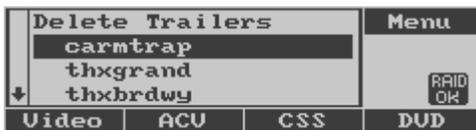
After a few seconds (depending on the number of files), the following message will appear:



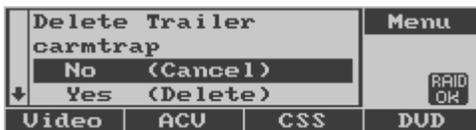
**Exit Menu** Do not delete any content and return directly to the status display.

### Delete Trailers

The Delete Trailers menu allows you to delete all soundtrack and CSS content associated with a selected trailer. From the Delete Contents menu, select **Trailers** to display the menu below.



Move the cursor to the desired trailer and press **Enter**. The following menu will display:

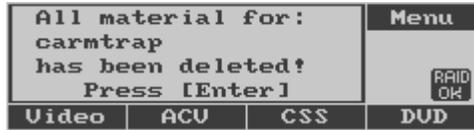


**No** Do not delete any contents. The following message will display:



**Yes** Delete all soundtrack and CSS content files for the selected trailer. A *Delete in progress* message will be displayed while the content is being deleted.

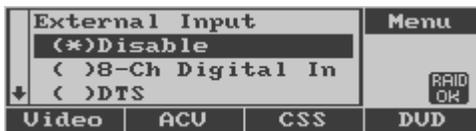
The following message will appear immediately afterwards:



**Exit Menu** Do not delete any content and return directly to the status display.

### 3.2.4. External Input Mode

This menu allows XD20 to route audio from the external digital or S/PDIF input to the cinema processor and select routing options for PCM audio. The selection will not be saved when XD20 restarts.



**Main Menu → Playback → External Input**

- Disable** Disables the S/PDIF or 8-Ch Digital In mode for normal operation.
- 8-Ch Digital In** Route 8 channel audio from Digital Audio In connector.
- DTS** Decodes DTS CA bit-stream from the S/PDIF input to 5.1 channels. (Will result in no audio if any other type of input is provided.)
- PCM: L/R** Accepts 2-channel PCM audio from the S/PDIF input and routes it to the front left and front right channels.
- PCM: LS/RS** Accepts 2-channel PCM audio from the S/PDIF input and routes it to the left surround and right surround channels.
- PCM:L+LS/R+RS** Accepts 2-channel PCM audio from the S/PDIF input and routes the left channel input to the left front and left surround channels, and the right channel input to the right front and right surround channels.
- PCM: NEO:6** Accepts 2-channel PCM audio from the S/PDIF input and uses NEO:6 decoding to route it to all 6 channel outputs.
- Exit Menu** Return to the status display.

When the mode you selected is enabled, the **Audio** indicator will illuminate and XD20 status display will indicate that the XD20 is processing audio from the external input.

The blue front panel LED goes on when selecting an external input.

- Note: If the XD20 does not receive a valid digital audio signal on the selected input, then there will be short blinks (25% off) on the blue audio LED until the signal appears.

### 3.2.5. Load from USB

This menu can be used to load the following from a USB device: Video playlists, video content, XD20 software updates, projector profiles, and XD20 option license(s).

From the **Main Menu**, select **Playback**, then select **Load from USB**.



#### Main Menu → Playback → Load from USB

This option allows content that is stored on a USB storage device to be uploaded to XD20. The USB device, which may be a drive or a memory device, must contain FAT32, EXT2, or NTFS file format. The content must be present on the USB device in the exact format as it appears on the equivalent disc (such as a video disc or software update disc). If the content contains folders, the top-level folder must be at the root of the USB device. Any files not delivered in folders, also should be placed at the root of the USB device.

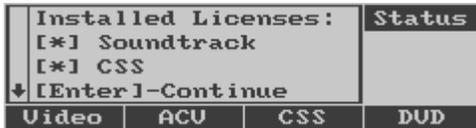
- Note:** A full installation of XD20 software (**not** an update) cannot be loaded via USB.

The above menu appears until XD20 detects the USB device connected. The procedure then occurs automatically with the same messages that appear when loading a disc.

- Note:** A soft key may be used for quick access to this menu, (See section 7.8.1 for information on soft key programming.)

#### License File

If license files are found on the USB, they will load automatically. When finished, a menu similar to this will display, listing all installed licenses.



#### Software Update

If a software update is found on the USB, a screen similar to this will display. It takes about five minutes to load the XD20, following which it reboots.



#### Load Projector

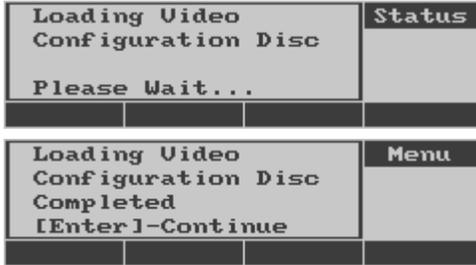
If a new projector profile file is found on the USB device, a screen similar to this will display:



Press **Enter**, and then remove the USB device.

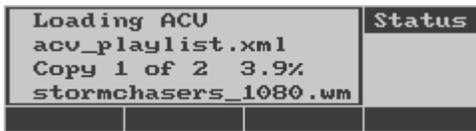
### Load Preshow Video

Any video files not already stored on the XD20 will be recognized as new, and loaded automatically.

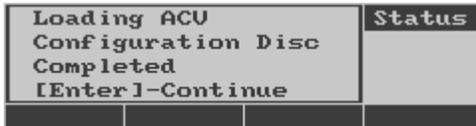


### Load ACV Video

If an ACV configuration file is found on the USB device, the system will begin loading automatically and display a screen similar to that shown below.



When the file has finished loading, the screen below will appear.

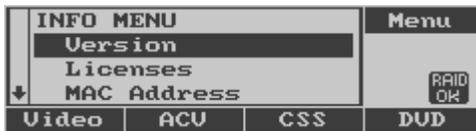


You may now remove the USB device.

- See section 2.3.6 “Loading ACV” for more information on loading ACV content.

## 3.3. Info Menu

The Info Menu contains information about the XD20 software, licenses and MAC address. The MAC address is used to uniquely identify the XD20 unit.

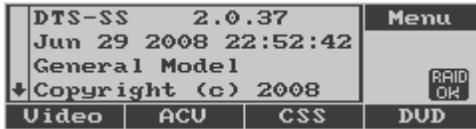


#### Main menu → Info

- Version** Displays XD20 software version information.
- Licenses** Shows which licenses are installed for this XD20.
- MAC Address** Displays the XD20 MAC address.
- System Monitor** Displays internal temperatures, fan speeds, voltages, etc.
- Exit Menus** Returns to the Status display.

### 3.3.1. Version

The **Version Menu** displays information about the software installed in the XD20 unit.



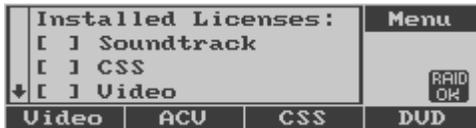
Main menu → Info → Version

- Line 1** Identifies the software version number.
- Line 2** Displays the software date and time.
- Line 3** If display is other than “General Model”, then there something unique in the software for loading specific video discs.
- Line 4, 5** Displays the copyright notice.
- Line 6** Displays hard drive information.
- Line 7** USB version
- Line 8** Serial number (of the XD20) (The serial number can also be read from the rear panel of the XD20 chassis.)

**Note:** The image above is for illustrative purposes only. Your version screen may differ.

### 3.3.2. Licenses Menu

This menu displays which licenses are installed in the XD20 unit. You must use the Up and Down arrow buttons to scroll to view all license options. An asterisk in the brackets indicates that the license type described on the line has been installed.



Main menu → Info → Licenses

- Soundtrack** License for playing film soundtracks.
- CSS** License for playing CSS or DTS Access™ content. This includes CSS subtitles or captions, Audio Description, and Rear Window™ captions. It is NOT necessary to have a Video license (described below) to play CSS subtitles or captions to a standard video projector.
- Video** High definition video license. This is part of the High Definition Video option that also includes a hardware upgrade. The soundtrack license is NOT required to play audio with the video playlist.

### 3.3.3. MAC Address

This menu displays the MAC address that uniquely identifies the XD20.



Main menu → Info → MAC Address

### 3.3.4. System Monitor

This menu displays system information for the XD20. The **Enter** key exits this screen and returns to the **Info** menu. See section 4.7 below, on page 49, for details.

CFan	5443	Ucr	1.37V	+15	15.27V
SFan	5532	12	12.14V	-15	-15.29V
CPU	56°C	U5	4.94V	+5	4.85V
Temp	31°C	U3	3.30V	SUSB	5.01V
HD1	41°C	SMT	OK/OK		
HD2	42°C	CPU	0%		

Main menu → Info → System Monitor

## 4. Maintenance and Troubleshooting

Check the DTS Digital Cinema Online Support site for the latest technical information at [www.dtsdcinema.com/Support/](http://www.dtsdcinema.com/Support/) for the latest information on maintenance, troubleshooting, and XD20 software versions.

### 4.1. Routine Maintenance

- **Every day:** Use compressed air to blow dust off the Timecode Reader's lens (on the projector).
- **Every six months – or as needed:** Clean the DVD drives in the external unit using a DVD cleaning disc.
- **After three months service – and every six months afterwards:** If your D600 Timecode Reader Head does not have an RoHS sticker on it, check and recalibrate the Timecode Reader Head's voltage using TN-E550. (You can see TN-E550 on the free DTS Digital Cinema Online Support site located on the DTS Digital Cinema website at [www.dtsdcinema.com/Support/](http://www.dtsdcinema.com/Support/).) Timecode Reader Heads with stickers indicating that they are RoHS compliant do not require this adjustment.
- **Every two years:** Have a technician change the battery on the motherboard. Instructions for the technician are listed in Appendix I, *Technical Maintenance*.

### 4.2. XD20 Playback Sound Check

After installing and setting up the unit—or doing a maintenance check—it is a good idea to play content and stand in the theater while listening to the first few minutes of the movie. Check for the following:

- The overall sound level is comfortable and balanced.
- The DTS soundtrack quality is excellent and does not include extraneous noise.
- The dialog is in sync with the picture being projected.
- The surround speakers are heard at the correct level. (Please note that not all scenes will have surround material.)

To adjust the overall sound level in the theater, adjust the main fader on the cinema processor.

- ☑  If you are having soundtrack playback problems, first check the contents to be sure the soundtrack that was loaded is the soundtrack for the film you are playing. Feel free to contact DTS Digital Cinema Technical Support for assistance. (See *Contact Information*, page xi.)

## 4.3. Frequently Asked Questions

### 4.3.1. I Have a DTS Print but No Discs

1. Check the hard drive to see if the movie soundtrack has already been loaded. From the Ready message on the LCD screen, press **Enter** → **Playback** → **Film** → **Contents** → **Features** to view the list of all soundtracks loaded in the XD20 hard drive.
2. If the soundtrack is not listed in the XD20 contents, find the feature's soundtrack disc and load it into the XD20. If you cannot find the soundtrack disc, contact the film distributor and request the disc.
  - Note:** Remember that a film that runs less than 90 minutes will have only one movie disc. It should be labeled “**one disc only**.” Movies running over 90 minutes will have two discs. Occasionally, you may encounter a 3+ hour long film and those normally have three discs, with special show instructions.

### 4.3.2. Film Is Not in Sync or Does Not Sound Right

-  **Caution:** Do not attempt to remedy these problems while playing in DTS.
1. Turn off the XD20 unit.
  2. Listen and verify that the movie is playing properly in the analog (usually SR) format.
  3. Let the film finish playing in analog.
  4. Ask the theater technician to perform a full DTS quality check and verify sync with the demo film. Give the technician at least one hour to complete the test and alignment. (See Sections 7.1, TC (Timecode) Reader Offset, for sync, and 7.2.2, Audio Setups, for channel calibration.)

### 4.3.3. Volume Is Too Loud

-  **Caution:** Do not adjust the XD20 audio level from the menu controls.
1. Turn down the fader on the cinema processor.
  2. If the sound level needs adjustment after the cinema processor has switched to DTS digital, contact your theater technician and request a DTS sound check.

### 4.3.4. XD20 Does Not Play Soundtrack Audio to Film

#### 4.3.4.1. Timecode LED Is Blinking

If the XD20 is not playing digital audio, first check to see if the timecode LED on the front panel is illuminated. If it is illuminated, but is blinking, then check the following:

1. If the reader's LED is dark, check to make sure that the film is threaded correctly through the D600 Timecode Reader and that the film has a timecode strip (located between picture and analog sound tracks).
2. If you do not see a timecode strip (dots & dashes) between the analog soundtrack and the picture, call the film distributor and request a DTS print.
3. If the film does have timecode and the soundtrack is seen on the hard drive, then verify that the timecode cable is connected from the reader to the XD20 TIMECODE rear panel connector. Also, check the reader's LED voltage using TN-E550. You can access the tech note via the online Support site at [www.dtsdcinema.com/support](http://www.dtsdcinema.com/support).

-  **Caution:** Never adjust the lens on the D600 Timecode Reader Head.

4. If the timecode LED is blinking, and the XD20 is dropping out of digital after the items listed above have been checked, call your theater technician for a system test. Ask the theater tech to refer to TN-E698, which is posted on the free online Support site at [www.dtsdcinema.com/support](http://www.dtsdcinema.com/support).

**Note:** Later versions of the reader head do not require adjustment. These heads can be identified by the “RoHS” sticker on them.

#### 4.3.4.2. Timecode LED is Solid, but Audio LED is not Lit

If the XD20 timecode LED is on solid, but the blue Audio LED is not lit, then check the following:

1. Verify that the soundtrack is loaded on the XD20 hard drive. From the Ready message on the LCD screen, press **Enter** → **Playback** → **Film** → **Contents** → **Features** to view the list of all soundtracks loaded in the XD20 hard drive
2. If it is not listed, find the disc and load it. The soundtrack must be loaded onto the hard drive before you can play in the DTS digital format.
3. Verify that the DTS soundtrack discs match the film by checking the feature title on the disc label and the feature language.

#### 4.3.4.3. Blue Audio LED is Flashing at Regular Intervals

If the Audio LED is flashing at regular intervals, then XD20 is reporting that it is not in the DTS format. This would occur in the following situations:

- The automation system may have selected a different audio format after XD20 had switched to the DTS optical formats before switching to the DTS format.
- If the automation mode is set to auto-switch, then XD20 expects that the automation system first selects one of the optical formats—Mono, A, SR(1) or SR (2)—before switching to the DTS format. If one of the optical formats is not selected, then XD20 does not pulse the DTS format, and the DTS Playback LED blinks.
- If the automation mode is set to pre-select, then XD20 expects that the automation system first selects the DTS format. If the DTS format is not selected first, then XD20 does not pulse the DTS format, and the Audio LED blinks.

#### 4.3.5. XD20 Switches Out of DTS Digital

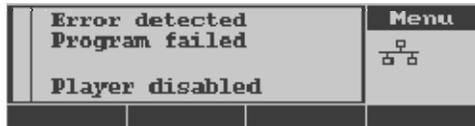
1. If XD20 does not see timecode for four seconds, XD20 automatically switches the Cinema Processor to the default analog (usually SR). Verify that the green LED on the D600 Timecode Reader Head is glowing brightly and steadily while the film is running.
2. If the Timecode LED on XD20 or on the reader head is blinking, check the reader’s voltage, using TN-E550. TN-E550 is posted on the online support site located at [www.dtsdcinema.com/Support/](http://www.dtsdcinema.com/Support/)
3. If the timecode light still does not illuminate steadily while film with timecode is running, use TN-E698 to troubleshoot the problem. TN-E550 is posted on the online support site located at [www.dtsdcinema.com/support](http://www.dtsdcinema.com/support).
4. Verify that all sound cues from automation are completed before timecode starts or after it ends. If the sound format switches back to SR after the feature starts, then it is possible that automation is switching the cinema processor and overriding the XD20 pulse to digital. To avoid this, add some black leader before the start of timecode for the feature. It will give automation time to pulse the cinema processor to SR. Then when DTS timecode is seen, XD20 will pulse the cinema processor to digital, and it will stay there as long as valid timecode is seen by XD20.

- 5 As a last resort, force the unit to play in optical mode. Turn off the XD20 unit and verify that the cinema processor switches to optical. If it does not, press the desired format button on the cinema processor. Contact your Theater Technician and request a DTS system check.

## 4.4. Display Error Messages

### 4.4.1. Program Fault

The following message will appear on the XD20 front panel display if the XD20 program stops running or gets “hung up” for any reason (an unspecified problem with the unit).



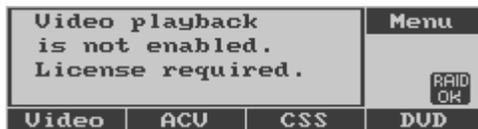
If this occurs when playing digital format, XD20 will switch the cinema processor to the predefined fallback format (usually SR).

The error may disappear or the XD20 unit may reset itself after power is cycled (power off, then on again). However, if the problem persists, contact DTS Digital Cinema Technical Support for assistance (See [Contact Information](#), page xi.)

### 4.4.2. Menus Do Not Function

Certain menus on XD20 are locked out because the functions are disabled, either due to a mode setting, or because a license is required.

1. The following message appears when Video Playlist is selected from the Playback menu—or Video is selected from the Setup menu—and the Video license is not installed on XD20.



**Main menu → Playback → Video**

2. The following message appears when Video Playlist is selected from the Playback menu—or Video is selected from the Setup menu—and the video hardware is either not installed or not working.



**Main menu → Playback → Video**

3. The following message appears when CSS Playback is selected from the Playback menu—or CSS is selected from the Setup menu—and a CSS license is not installed on XD20.



**Main menu → Playback → Film → CSS**

- Selected XD20 units with CSS or Video Options may be configured with the soundtrack audio capability disabled. When the soundtrack audio is disabled, XD20 will not play DTS audio soundtrack with film. However, the unit will still function for video sound playback or external S/PDIF input.

If an XD20 unit does NOT have soundtrack capability, the following message will display.



Main menu → Playback → Film → Soundtrack

## 4.5. Guide for a Seamless Change-Over

When you are running a DTS movie with dual projectors, the picture and sound may not change at the same time during a change-over. The reason is that as soon as the first frame of action reaches the picture aperture on the incoming projector, the DTS Digital Sound® will change over to that reel. DTS Digital Sound® changes independently of the projector’s douser position. Change-over anomalies are most evident on movies that have very tight editing / scene-change tolerances from the end of one reel to the start of the next reel.

When this occurs, perform one of the adjustment procedures below.

### 4.5.1. Sound Changes Before Picture

When threading the incoming projector, roll down the film to a greater number of feet. If you normally thread to “8”, try threading to “9” or “10.” Keep adjusting the roll-down setting until the picture changes with the sound. Also, try hesitating a second before starting the incoming projector on the first cue.

### 4.5.2. Determining Roll-Down

Adjusting the roll down setting is a judgment call. Base it on the time delay of the picture vs. sound. One second of delay equates to 24 frames, or 1.5 feet.

## 4.6. About the RAID Hard Drives

If the XD20 unit has within it a second (optional) hard drive (Raid1/mirroring) then the two operate in synchronized fashion. RAID status “Clean” means they are synchronized and active. Provided the drives are in sync to start with, synchronization is continuous and automatic.

If a drive fails, the behavior depends upon the failure mode. In the more likely case of a media problem, or an issue reading/writing data, then immediately a problem is reported by the drive. That drive will be put in a “fault” state, and XD20 operation continues with the other drive. If the drive electronics fail in such a way as it does not respond to commands on the SATA interface, then the system will appear to be non-operative or non-responsive as the driver waits for a response. Any playback will stop during this interval. When power is turned off and then on again, the system will boot up using the remaining active drive. Status message(s) will indicate the drive problem.

For details about monitoring the status of the hard drive(s), see RAID, on page 111.

## 4.7. System Monitor Information

The XD20 features built-in monitoring capability that will detect and report problems.

**Table 9: System Monitoring Information**

Monitored Component	Details
---------------------	---------

Motherboard sourced info	<p>Vcore: 0.85V-&gt;1.6V (nominal depends upon which CPU is used)</p> <p>12V: 10.2V-&gt;13.8V</p> <p>5V: 4.5V-&gt;5.5V</p> <p>3.3V: 3.0V-&gt;3.6V</p> <p>Failure on any of above would be caused by (a) bad power supply, (b) bad cabling or (c) bad motherboard.</p>
Cooling fans	<p>Chassis Fan: minimum RPM 4000</p> <p>CPU Fan: No limits set (fan is speed controlled and can stop if CPU is cool)</p>
CPU Temperature	<p>CPU temperature maximum is 60.4°C.</p> <p>Excess CPU temp would be caused by (a) CPU fan failure, (b) chassis fan failure, (c) power supply fan failure, (d) excessive ambient temperature, or (e) mechanical failure of thermal interface between CPU and heat sink.</p>
Hard disk drives	<p>Maximum temperature is 55°C.</p>
Front Panel Temperature	<p>Front panel temperature maximum is 50°C</p> <p>Excessive FP temp would be caused by (a) chassis fan failure, (b) PSU fan failure, (c) obstruction of ventilation holes, or (d) excessive ambient temperature.</p>
H222 sourced voltages	<p>+15V, -15V, 5V, 5VUSB</p> <p>All limits set to +- 9% of nominal</p> <p>Error in these voltages would be caused by (a) power supply failure, (b) failure of power cable to H222 board, or (c) internal failure of H222 board.</p>

**Note:** Maximum ambient air temperature is 40°C.

## Part 2: Installation and Setup

The remaining chapters in this manual describe the information the technician needs to install and configure XD20. The chapters are:

- Hardware Installation
- Installing Licenses and Upgrading Software
- System Setup Menus

### 5. Hardware Installation

This chapter covers the following:

- Unpacking XD20 components
- Mounting and Connecting Cinema Media Player
- Power Supply
- Installing D600 Timecode Reader Head
- Connecting to Other Cinema Processors

Additional information can be found in:

- Appendix A: Pin-out Connectors
- Appendix B: Cinema Processor Interface Wiring Diagrams
- Appendix C: XD20 Wiring and Block Diagrams
- Appendix D: Cable Assemblies and Breakout Boards
- Appendix E: TC Reader Head Mounting Brackets
- Appendix F: System Parts List
- Appendix G: Specifications
- Appendix H: Menu Structure
- Appendix I: Technical Maintenance
- Appendix J: Installing CSS
- Appendix K: ACV Playlist Generation Software
- Appendix L: Tech Notes
- Appendix M: H260 DVD Drive Unit

- Note:** You may also refer to the *Installation Checklist on page xiii* near the beginning of this guide.

## 5.1. Unpacking System Components

The following is a list of the standard components for an XD20 shipment. The exact contents will vary, depending on the options you have ordered.

- XD20 chassis and power cord
  - D600 Timecode Reader Head
  - Reader Head mounting bracket and screws
  - D600 Timecode Reader Head interconnect cable
  - Audio and automation cables (the exact model of cables and other interface components will vary, depending on the cinema processor the XD20 unit is connected to. See Appendix D, *Cable Assemblies and Breakout Boards* and Appendix E, *TC Reader Head Mounting Brackets*, for details.)
  - Digital Output Cable
  - Installation Hardware (screws, brackets)
  - XD20 Installation and Operation Guide
  - DTS trailer (logo) films, 2 scope and 2 flat
- Note:** Refer to the actual packing slip from your order to verify the contents of your shipment. Contact DTS Digital Cinema immediately if items listed on your packing slip are missing.

### 5.1.1. Preliminary Inspection

- Note:** Before installing the XD20 unit, take a complete inventory of system components to minimize problems or questions during installation. Additionally, save all packing materials until installation is complete in case you need to return parts to the factory.

## 5.2. Installation Procedures

The XD20 chassis is the main component of the XD20 system. Installation procedures include:

- Mounting the XD20 chassis in a rack
  - Connecting the XD20 unit to a cinema processor
  - Connecting the XD20 unit to a power supply
  - Installing the D600 Timecode Reader Head (for soundtrack or DTS Access™ content: subtitling, captions and narration).
- Note:** If you have a license for the CSS Option, follow the procedures in Appendix J, *Installing CSS*, after following the procedures in this chapter.

### 5.2.1. Chassis Rack Mounting and Connection

The XD20 unit is designed to integrate into your existing theater sound system without affecting normal theater operation. All interconnects are standalone and most systems require no cuts or jumpers.

The XD20 chassis requires 2U of standard rack space for proper mounting. Select a space in the sound rack within three feet of the cinema processor to which you are connecting.

1. Bolt the XD20 into the selected rack space.



- Caution:** Because the XD20, like any other computer-based system, can be damaged by power line surges, we recommend using a computer-grade surge/spike suppresser.
2. Connect the analog and logic cables/cards to your cinema sound processor. (See Appendix B for cinema processor interface wiring diagrams and Appendix D for cable assembly diagrams, including installation into sound racks with digital sound systems from Dolby and/or Sony.)

3. When connecting to a SMART cinema processor, contact SMART directly at (800) 45-SMART. DTS Digital Cinema does offer SMART interface cables: for MODVI or VII use DDE part #E709.
4. Connect the supplied power cable between the XD20 unit and your power source.

### 5.2.2. Rack Mount Recommendations

Follow these recommendations if the XD20 unit is installed in a closed or multi-unit rack assembly.

- Determine the maximum and ambient temperatures within the rack, since they may be greater than the maximum and ambient temperatures in the room. The maximum temperature for the equipment in a closed or multi-rack assembly is 40°C (104F°)
- Ensure adequate airflow for cooling purposes on all sides of rack-mounted equipment. Make sure that ventilation fans and louvers are not blocked.
- Check nameplate ratings to ensure there is no overloading of supply circuits that could have an effect on over-current protection and supply wiring.
- Maintain reliable grounding of the equipment. Give particular attention to supply connections when connecting to power strips, rather than direct connections to the branch circuit.
- Use a quality surge/spike suppresser power strip to protect the unit.

### 5.2.3. Power Supply

The XD20 power supply automatically switches itself to accommodate AC input between 110 VAC and 220 VAC.

The cooling fan in the power supply must be rotating after power is applied.

### 5.2.4. D600 Timecode Reader Head Installation

The D600 Timecode Reader Head is designed to be mounted onto most projectors with a single mounting bracket.

1. Position the appropriate mounting bracket on the same bolt pattern as the reel arm and bolt securely in place. (See Appendix E for reference.)
2. If both 35mm and 70mm reader heads are to be used on the same bracket, add spacer breakaway plates to the readers. (See Appendix E for reference.)
3. Install the D600 Timecode Reader Head onto the mounting bracket and bolt into place with supplied hardware.
4. Re-install the reel arm on the top bolt pattern of the mounting bracket.
5. Align the mounting bracket and the reel arm. Align the film along the path from the reel arm, through the mounted D600 Timecode Reader Head, to the projector.



- Caution:** The D600 timecode reader **MUST** have a straight film path (no angles or twists) and at least a small amount of tension. Use the auxiliary flanged roller on the D600 Timecode Reader Head to avoid film “walk out” and to stabilize the film. (See the section on *Installing or Changing Auxiliary Timecode Reader Head Roller* in Appendix I: *Technical Maintenance*, for reference.) Additional guide rollers may be added to ensure proper film tension. This is most critical on platter systems.
6. Connect the 9-pin timecode cable to the reader and route to the sound rack. Connect the other end to the XD20 rear panel “Timecode” connector.

### 5.2.5. Two Projector (Change-over) Theaters

Use a timecode “Y” cable to connect two readers to one XD20. Be sure to place each reader at the same location on each projector. This is to ensure the soundtrack plays in sync. The timecode offset values (distance from D600 reader to the projector’s picture gate) must be the same for each projector.

## 5.3. Connection to Cinema Processors

The following instructions are generic procedures intended to supplement the processor installation instructions for your specific manufacturer's system. Cinema processor interface wiring diagrams are located in Appendix B of this manual. They show connections and sub-connections.

- Refer to the *Installation Checklist* on page *xiii* near the beginning of this guide.

### 5.3.1. Dolby® CP45, CP55, CP65, CP500, CP650, UltraStereo JS Series, Panastereo and SMART Operation

The XD20 will automatically send one pulse to the cinema processor, changing the format to DTS. Whenever the XD20 drops out, a pulse will be sent to switch the cinema processor back to an analog format (usually SR).

Set the automation/cues on the film so they will not override the format change once the DTS has started to play, which can result in switching to an incorrect format. Be aware that after a film break, the cinema processor may drop out of digital format. In this case, the blue Audio LED on the XD20 will begin to blink and you may have to manually select the digital format (on the cinema processor) for DTS playback.

- **CP500:** Must have the Cat. 685 (analog input card) installed. DTS is accessed through Format 11.
- **SMART: Mod VI and VII** uses DDE interface cable E709.  
For other SMART cinema processors, contact SMART directly at (800) 45-SMART or +1.770.449.6698.

### 5.3.2. Dolby® DA20 SR-D® System

The XD20 can be connected to the Dolby SR-D® system without affecting performance of the Dolby system.

The DA20 connects to the appropriate XD20 breakout board. When the XD20 unit is off, the DA20 output is routed through the breakout board. When the XD20 system is on and playing in digital, the DA20 connection (to the cinema processor) is switched out on the breakout card and the DTS digital soundtrack is output to the cinema processor.

In most instances, the SR-D® system should be powered down when playing in DTS.

### 5.3.3. Sony SDDS®

The XD20 system cannot connect to the DFP-D2000 and DFP-D2500. It can connect to the DFP-D3000 and DCP1000. See the interface and cable and interface drawings in Appendixes B and D.

### 5.3.4. Panastereo CSP1200 and SMART

There is an Automation Preset for Panastereo CSP1200 and SMART CP. For information, see section 7.5.1.2 Predefined Formats, on page 81 of this guide.

### 5.3.5. Dolby® CP200 Operation

When the XD20 switches to digital, the normal signal paths are interrupted, and DTS signals are inserted just prior to the Dolby EQ cards, effectively taking over the cinema processor.

- Note:** For CP200, program the automation optical default format to either “04” A-TYPE or “05” SR, whichever the film requires.

When the XD20 switches out of digital, the cinema processor is released and reverts to the format previously selected.

Unless modified, these cinema processors do not have a subwoofer input. In this case, DTS inserts the subwoofer signal post-fader; the fader or mute will functions not affect the subwoofer level.

- Check diagrams for sub connection.

## 5.4. XD20 Calibration and Setup

This section describes procedures for XD20 audio level adjustment, timecode reader sync adjustment, sound performance verification, and fail-safe operation verification.

### 5.4.1. Equipment Requirements

Complete checkout and adjustment of the XD20 unit requires (as a minimum) a multimeter, an SPL meter, and the DTS Demo film (included in the DTS Technician's Kit).

- Note:** The "B-Chain" calibration must be completed prior to adjustment of the XD20.

### 5.4.2. Setting and Adjusting Audio Output Levels

Channel setup tests and tones are pre-recorded onto the XD20 hard drive.

The audio playback level of the XD20's built-in 1 kHz test tone has been fixed at 300mV RMS. This level should match the audio buss level on the cinema processor that the XD20 is connected to. Verify the buss level by consulting the manufacturer of your cinema processor.

The pink noise tests that are built into the XD20 are used *only* to make A-B comparisons to an alternate sound source, such as magnetic sound track or analog sound.

#### 5.4.2.1. Adjusting Levels

The XD20 contains several built-in audio tests described in Section 7.2.2. They can be accessed through the following menu path: **Setup** → **Audio** → **Audio Tests**. Level adjustment audio tests for SPL calibration are described in Section 7.2.1, which can be accessed through the following menu path: **Setup** → **Audio** → **Level Adjustment**.

The Level Adjustment menu provides two choices:

- Reference Tone:** This will play 1K tone @ 300mV RMS on all channels. The level can be adjusted between +6.4 to -6.2 dB using the up and down arrow buttons.
- Pink Noise:** The input buss level for most cinema processors is 300mV input, so in most cases it will be unnecessary to make any adjustments to the XD20 output level. When the level is set at +0.00 dB, the XD20 output is 300mV.

However, if necessary, each channel can be selected and adjusted individually using the arrow navigation buttons. The up and down arrow buttons will adjust the levels from +6.4 to -6.2 dB. The left and right arrow buttons will move back and forth among the channels.

When Pink Noise is selected, it will automatically start to play on the first channel (Left). This will be indicated on the status display screen. The blue Audio LED will also illuminate, indicating that Pink Noise is playing.

To adjust SPL settings, do the following:

1. Confirm that all amplifiers are on, mute is off, and masking and curtains are opened.
2. Before setting levels, confirm that SPL settings are completed on the cinema processor according to their recommendations. When setting levels, the cinema processor should be set to calibration level. In most cases, this is with the fader set to "7".
3. Using a high-quality, calibrated SPL meter set the SPL levels according to the chart below. Note that SPL readings for screen and surroundings should be measured un-weighted, or C-weighted,

with the meter set to slow. The proper level setting of the subwoofer should be calibrated with an RTA.

**Table 10: SPL levels**

Channel	Description	SPL
1	Left	85 dB
2	Right	85 dB
3	Center	85 dB
4	Sub bass	91 dB*
5	Left Surround	82 dB
6	Right Surround	82 dB
7	Left Center	85 dB
8	Right Center	85 dB

\* Subwoofer should be set to 10 dB of in-band gain (see SMPTE RP-200), which equates to approximately 91 dBC (slow).

- Note:** Any change made with either Reference Tone or Pink Noise will affect the other. For example, if you change the level of Reference Tone to +1.0 on Ch1, when you select Ch1 in the Pink Noise test section, it, will also be at +1.0.

### 5.4.3. A Note about DTS Subwoofer Output

The XD20 subwoofer output level ranges from 20 Hz to 80 Hz and 20 Hz to 120 Hz (Coherent Acoustics format), up to 27 dB above reference (85 dB).

 **Caution:** Check your subwoofer’s specifications to avoid damage to the speaker.

If a subwoofer is driven below its low frequency cutoff, its driver(s) may become unloaded. When unloaded, the voice coil can travel outside of the magnet’s gap, overheating and/or causing mechanical damage to the speaker. Contact your speaker manufacturer for more information.

#### 5.4.3.1. Subwoofer Signal in the Surround Channels

The subwoofer signal is derived by filtering the surround signals from 80 Hz and below, and then routing this signal to its own “subwoofer” output on the XD20.

You can verify this while performing a B-chain alignment of a theater as follows:

1. Play the internal pink noise generator Subwoofer test. (Refer to Section 7.2.2, Audio Tests, in Chapter 7, Setup Menus, in this guide.)
2. Turn off the subwoofer speaker and look at the pattern on the RTA.

You’ll see a dramatic roll-off at 80Hz. It is normal to see DTS subwoofer pink noise, above 80Hz, in the surround speakers..

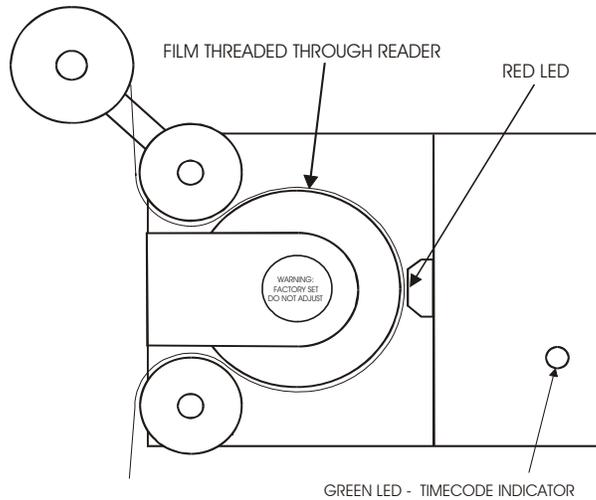
## 5.5. Timecode Reader Sync Adjustment

This adjustment is easily performed using the numbered leader in front of the DTS Demo Reel. (The demo reel is supplied with the *DTS Technician’s Kit*, which can be purchased from any DTS Digital Cinema dealer.) See the steps (below on this page). To aid in calibration, the offset leader is available separately (DDE part # 6800000201).

If you do not have a demo reel, the delay can be calculated by counting the number of picture frames from the D600 reader head red LED (lens) to the projector’s picture (“film”) aperture. Multiply the result by 1.25 and subtract 1. Round the resulting number to the closest ¼ (0.25). Set the OFFSET value in the XD20 timecode menu (“TC Reader Offset”) to this number.

**Example:** 27 frames x 1.25 = 33.75  
 33.75 - 1 = 32.75  
 Set the OFFSET to 32.75

- ☑ **Remember:** When using the counting frames method, frames are counted from the timecode reader lens to the picture aperture.



**Figure 5: DTS Timecode Reader Head, Threading**

### 5.5.1. Procedure Using Demo Reel

The Demo Reel has a specially printed leader for setting the timecode head offset.

1. Using the numbered leader, put the start mark 00 at the reader’s lens (red LED) and thread the film through the projector as normal.
2. After threading, look at the film and read the number at the projector’s sound head. This is the OFFSET value and that number should be entered into the XD20 timecode offset menu (“TC Reader Offset”).

**⚠ Caution:** Make the same size film loops inside the projector when measuring offset as when running a movie. Failure to do so will result in improper sync when the movie runs in DTS Digital mode. **For two-projector houses,** the reader at each projector must have the same OFFSET value.

### 5.5.2. DTS Special Venue Timecode Offset

Information on the delay setting for special venues is available in *Appendix L: Tech Notes*. There are two pages of information:

- DTS Special Venue Timecode Offset
- Timecode Printing Offset for 35MM and 70MM Film.

### 5.5.3. Verify Sound Performance

- 1 Thread the DTS Demo reel (Buzz and Bill) through the projector and D600 reader. Be sure XD20 is fully booted and ready to play. The soundtrack for Buzz and Bill is factory-loaded on the hard drive.
- 2 Start the projector. When the Audio LED lights, verify that the XD20 automatically switches the cinema processor to the (DTS) Digital format. Verify that sound is heard in the monitor speaker. Open the porthole (if possible) and verify that sound is heard in the auditorium.
- 3 While still in the booth, verify that the XD20 front panel display shows the film title, serial number, reel number and running timecode. (Information in the display's fourth line is configurable by the user. For more information on selecting the type of information to display in Line 4, see Chapter 1, Operating the XD20 Media Player, in this manual.)

Buzz and Bill Show	Status
Reel #01 00:41:28	
SN=00001	
Fmt: DTS	

- Line 1: Film title
  - Line 2: Film serial number
  - Line 3: Reel number and running time
  - Line 4: Can be selected by user. This example displays the format, which is DTS.
- 4 Go into the theater while the Demo reel is playing. Verify sound is in-sync, sounds well balanced and has excellent digital sound quality.  
  
If levels sound unbalanced, check the cinema processor's output levels. Then be sure that the XD20 output of 300mV RMS on all channels matches the buss level of your cinema processor.  
 XD20 MUST match the cinema processor's buss level. (The buss level of your cinema processor should be indicated in its manual, otherwise, consult the manufacturer.)
  - 5 If the theater has two projectors, repeat this procedure for Projector 2.

## 5.6. Check Automatic Fail-Safe (Default) Operation

This procedure will verify that, should the D600 timecode reader fail for any reason, the system will automatically switch to the predefined optical sound format.

1. While the demo film is running, block the timecode at the reader or unplug the 9-pin connector at the reader.

To block the timecode reader, insert a business card between the film and the lens of the D600 Timecode Reader Head and keep it there for at least six seconds.

2. Verify that after 4 to 5 seconds of not seeing timecode, the XD20 switches to the SR optical sound format.

There should not be a dramatic sound level difference when the cinema processor switches from digital to analog during **dialog scenes**. If there is a dramatic difference, check the cinema processor's levels first, then check the XD20 levels, and test again.

Remember, the XD20 output level must match the cinema processor's buss level.

3. Now, restore timecode and the XD20 should automatically switch the cinema processor to the DTS digital format after about two seconds.
4. For two-projector theaters, repeat this procedure for Projector 2.

## 5.7. Networking multiple XD20s

**Note:** It is always advisable to consult with an IT professional when networking the players.

The Network Transfer feature enables the XD20s distribute feature audio and CSS content to all players in the network. Video content will not be transferred. Content loaded into any of the XD20s using network transfer will automatically be distributed to all players on the network. To connect multiple XD20s in a local network, it is necessary to connect each XD20 using CAT 5e or CAT 6 Ethernet cable to a network switch or router, depending on the requirements of your system. Whether using a network switch, a router, or connecting to an existing LAN, it is necessary to make sure that Network Transfer is set to "Enable" for each XD20 on the network. (Full menu path is **Setup** → **System** → **Network** → **Network Transfer**) See section 7.8.5.4 for more details.

Notes –

1. When content is deleted from an XD20 (manually or automatically), then it is not copied from the other unit(s). It *will* be copied if it is reloaded from a disk.
2. Delete all film content before adding a unit to the network - *OR* - delete all film content before enabling the network. This will prevent all other units on the network from trying to update their content with content from the newly installed unit.

### 5.7.1. Stand-Alone System using Switches and Routers

Two methods of connections can be done when using network transfer feature. If you have a closed system and only the XD20s will be connected, a simple network switch (hub) can be used to allow all XD20s to communicate with each other. This method requires each unit to be manually issued an IP address.

You may also connect several XD20s in a closed system using a router. This method is simpler, and is also discussed below.

#### 5.7.1.1. Setup Procedure with a Network Switch

The following steps are done after Ethernet cables have been installed and connected to all XD20s and passed through a network switch. See drawing H319 in *Appendix B*.

- ☑ **Note:** When using a network switch only XD20s can be connected to each other. If other computers or connections to the internet are to be used, it will be necessary to use a router. See **Setup Procedure with Router** below for more information.

At each XD20 that is networked follow these menu setup steps:

1. Select **Enter**, then **Setup** → **System** → **Network**
2. Select **Network Mode**, then select **Static IP**.
3. Use left arrow button to go back to the **Network Menu**, scroll down and select **Set Static IP**
4. In the Static IP address menu **Select IP Address**.

- ☑ **Note:** In the Static IP Address menu, no changes are needed to the Subnet Mask, Default Gateway, Primary DNS, or Secondary DNS.

5. Using the navigation keys change the IP address to a unique number. Every XD20 connected must have a different number. See example below:

Screen #1 – IP address 010.090.010.020

Screen #2 – IP address: 010.090.010.030

6. Return to the **Network Mode** menu, scroll down and select **Network Transfer**, then choose **Enable**.
7. Reboot the XD20 for settings to take place. After reboot, if setup was successful, the network icon should appear in the status screen and the boxes in the icon should blink.



#### 5.7.1.2. Setup Procedure with Router

When connecting multiple XD20 units together using a router, all units within the local network must be set to use DHCP (Dynamic Host Configuration Protocol). This setting will allow the router to assign IP addresses to each XD20 unit without any user intervention. (The full menu path is **Setup** → **System** → **Network** → **Network Mode**).

The following steps must be completed for each XD20 that will be connected to the network:

1. Network Transfer must be set to “Enable”.
  2. Network Mode must be set to “DHCP”
- ☑ **Note:** DHCP automates the assignment of IP addresses, subnet masks, default gateway, and other IP parameters. See section 7.8.5.1, Network Mode, for more details.

No other steps are necessary.

#### 5.7.2. Connecting to an Existing LAN

When connecting an XD20 to an established local area network containing additional equipment, follow the same procedure as in section 5.7.2.2, **Setup Procedure with Router**, above.

## 6. Installing Licenses and Upgrading Software

### 6.1. Options

These options are enabled via specific licensing from DTS Digital Cinema:

- High Definition Video option: a card is added, which provides high definition digital video playback.
- CSS option provides subtitling and access options that include:
  - Projecting subtitles or captions directly onto the screen via a video projector.
  - Controlling WGBH Rear Window<sup>®</sup> Captioning, via serial connection to a light-emitting diode (LED) text display are mounted in rear of theater. Patrons use transparent acrylic panels attached to their seats to reflect the captions so they appear superimposed on or beneath the movie screen.
  - Output of descriptive audio narration for patrons who are visually impaired (via infrared or RF transmitter and headsets).
- Auxiliary equipment (data wall, reflective panels, transmitter and headphones) are not available from DTS Digital Cinema.

### 6.2. Options Setup and Testing

For instructions to install and configure the High Definition Video and CSS options, see the appropriate reference:

- HD Video Option – See Video Setup on page 70.
- Cinema Subtitling System (CSS) Option – See Appendix J, *Installing CSS*.

### 6.3. Installation of Licenses

1. Check that the MAC Address of the license matches the XD20 MAC Address. Licenses may be received via email and loaded using a USB memory stick. Using your PC, copy the license to the *root directory* of a blank USB memory stick. See section 7.8.2.1.2 for more details.
  - Licenses are unit-specific and cannot be used on multiple XD20 Media Players.
2. Turn on the XD20.
3. Insert the USB memory stick with the license into the XD20. On the XD20, press **Enter** → **Playback** → **Load From USB**, and the license will download. Once loaded, remove the USB stick.

When a license has been successfully installed, the list of currently installed (option) licenses will be displayed, as shown below. Use the up and down arrow buttons to scroll through the list. Press **Enter** to continue.



- You can also view the licenses currently installed on your unit at any time by going to **Enter** → **Info** → **Licenses**

The following message appears if the license did not install:

License file	Status
was not found	
[Enter]-Continue	

This message indicates that the license did not load in that specific XD20 unit.

 **Caution:** If an error message appears, check the following.

Does the MAC Address of the license match the MAC Address of the XD20? (Press **Enter** and select **Info** → **MAC address**).

If it matches but still does not load, contact DTS Digital Cinema Technical Service for assistance.4.

## 6.4. XD20 Software Updates

XD20 software updates may be distributed in several ways. They can be included on feature or trailer audio discs, on a separate software “update only” disc, or depending on the update, from the DTS Digital Cinema web site. Updates can be loaded into the XD20 through the DR-1 disc drive unit, from a USB drive, or directly from DTS Digital Cinema if the XD20’s are connected to a network. (To install an update from a USB device, see Section 3.2.5 Load from USB.

When updating with a software update disc, the update will occur automatically when the disc is installed in the XD20. The update will not affect any of the XD20 configuration or contents and there is no special action required after the install takes place. If the update is included on a feature or software disc, the update will load but not install while a show is playing. Only when no timecode is being received will the update install. This is to prevent show interruptions if the disc is inserted while a show is playing.

Depending upon which delivery method is used you may see the following display:

XD20 update found	Status

After a short time, the file will begin to copy from the disc. If a software “update only” disc is used, the following messages appear when finished loading. (If the update is on a feature or trailer disc, they will load as normal and prompt you to select Enter to eject the discs.)

Ejecting CD-ROM	Status

This message will appear when the update begins. To prevent show interruption, this will only happen when no timecode is being received by the XD20.

XD20 update May take 5 minutes	Status

XD20 Updating to 2.XX.XX Please wait...	Status

At this point the XD20 software resets:



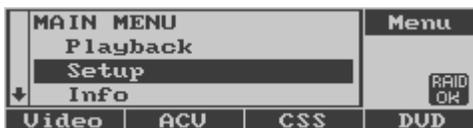
The software update is complete when the “Ready” message appears on the display.



## 7. Setup Menus

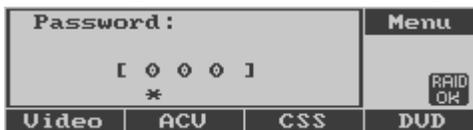
The Setup menu contains all configurable settings for XD20 that should be set by the technician and are not expected to change during day-to-day operations. The setup menu can be password protected to assure that the configuration does not change after the technician leaves.

Select **Setup** from the Main menu.



### Select Setup

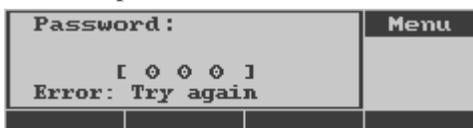
If the XD20 unit is password-protected, the menu shown below will appear. The default mode for XD20 is with the password disabled. If the password is disabled, this menu will not appear.



The cursor is the ‘\*’ underneath one of the three digits.

- ▶ Moves cursor to the right.
- ◀ Moves cursor to the left, or returns to the Main Menu if at the first position.
- ▲ Increments digit at cursor position. Wraps from 9 to 0.
- ▼ Decrements digit at cursor position. Wraps from 0 to 9.
- Enter** Press to enter the password.

If the correct password is entered and **Enter** is pressed, the System Setup menu will appear. If an incorrect password is entered, the following message will appear.



Press **Enter** to reenter the correct password. If you forget the password, contact DTS Digital Cinema Technical Support and a Technical Service Representative will help you to regain access to the XD20. (See *Contact Information*, page xi.)

The following menu displays once the System Setup password is entered:



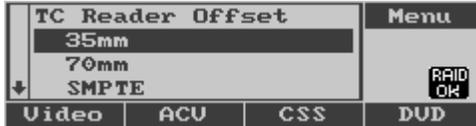
**Main Menu → Setup**

- TC Reader Offset** Sets the timecode reader offset. This must be set for playing Soundtrack and CSS content to properly synchronize the content to the film.
- Audio** Sets test audio levels, plays audio test files and enables/disables language selection. The *Language Versions* should be enabled in areas where different languages should be played. The audio levels and test files are used to set audio for either soundtrack or video with audio.
- Video** Sets the parameters for the Video projector. This menu is available only with the HD Video Option.
- CSS** Sets the parameters for the projected CSS subtitles or captions. There are no configurable items for narration and Rear Window™ in this menu. This menu is available only with a valid CSS license.
- Automation** Contains the following configuration items: 1) Format automation pin definitions and operating modes, 2) Define functions for general purpose input and output control pins, 3) Configure Video Playlist Automation parameters, 4) Test format automation signals and I/O control signals.
- System** Contains menus for the following system operations: 1) Assign functions to the 4 “soft key” buttons below the LCD, 2) USB memory device operations to save or restore configurations, or save log files, 3) Configure COM1 for use by the Video Projector or CSS Rear Window™, 4) Set the setup menu password, 5) Set system network parameters, 6) View or redefine the amount of reserved disc space for Film and Preshow content, 7) Set XD20 time and date, 8) Set the LCD contrast and brightness, 9) Identify drive A and drive B on the external DR-1 drive unit, 10) Check on the status of the RAID, 11) Revert to an earlier XD20 software version.
- Display Language** Change the language used on the XD20 LCD display screen to one of the following: English, French, German, Italian, or Spanish.

## 7.1. TC Reader Offset

This menu allows you to enter the offset required for your particular timecode reader location. See Chapter 5, Section 5.5, , for information on calculating the correct settings. Adjustments can be made while playing and will occur within two seconds.

To access this menu, select **TC Reader Offset** from the System Setup Menu, as shown below.



Setup → TC Reader Offset

<b>35mm</b>	Set TC reader offset for 35mm reader head.
<b>70mm</b>	Set TC reader offset for 70mm reader head.
<b>SMPTE</b>	Set Serial number, reel number and offset for playback to SMPTE timecode.
<b>Exit Menus</b>	Returns to the Status display.

### 7.1.1. 35mm or 70mm Timecode Reader Offset

This menu sets the timecode reader offset for 35mm or 70mm timecode reader heads. The operator may select between either 35mm or 70mm reader heads through a menu in the **Playback →Film** section.



Setup → TC Reader Offset → 35mm

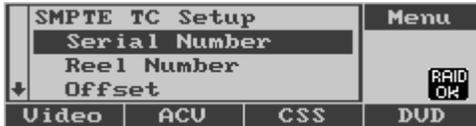


Setup → TC Reader Offset → 70mm

- Note:** The operation for setting the two offsets is identical.
- ▲ Press one time to increase offset by 0.25 frames. Press and hold down to repeat. Maximum possible number of frames is 100.
- ▼ Press one time to decrease offset by 0.25 frames. Press and hold down to repeat.
- Enter** Return to previous menu.
- Note:** If not using 70mm, set the 70mm offset to match the 35mm. This will prevent problems if the user selects 70mm by mistake.

### 7.1.2. SMPTE

- ☑ **Note:** For more information on XD20 operation with SMPTE timecode, please refer to TN-H171 in *Appendix L*. (It is also posted on the online support site located at [www.dtsdcinema.com/support](http://www.dtsdcinema.com/support).)

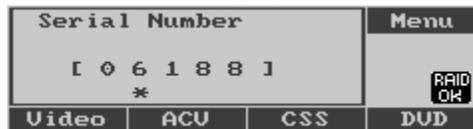


**Setup → TC Reader Offset → SMPTE**

- Serial Number** Assigns a serial number to the incoming SMPTE timecode.
- Reel Number** Assigns a reel number to the incoming SMPTE timecode.
- Offset** Apply a fixed offset to the incoming SMPTE timecode.
- Exit Menus** Returns to the Status display.

#### 7.1.2.1. SMPTE: Serial Number

This menu assigns a DTS serial number to the incoming SMPTE timecode. If the value is set to zero, then the serial number value comes from the user bits on the SMPTE timecode. The DTS serial number is used to determine which film soundtrack will be used for playback.



**TC Reader Offset → SMPTE → Serial Number**

- Right** Move cursor one position to the right.
- Left** Move cursor one position to the left, or return to previous menu if at the left-most position.
- Up** Increment serial number by 1 at \* cursor.
- Down** Decrease serial number by 1 at \* cursor.
- Enter** Return to previous menu.

#### 7.1.2.2. SMPTE: Reel Number

This menu assigns a DTS reel number to the incoming SMPTE timecode. If the value is set to zero, then the hours value from the incoming SMPTE timecode will be used for the reel number. The reel number must be set to 1 in order to play long audio files (greater than one hour in length).



**TC Reader Offset → SMPTE → Reel Number**

- Up** Increment reel number (max 15).
- Down** Decrement reel number.
- Enter** Return to previous menu.

### 7.1.2.3. SMPTE: Offset

This menu sets an offset to the incoming SMPTE timecode. It does not have any affect when playing DTS timecode. The offset can be set to plus or minus value.



**TC Reader Offset → SMPTE → Offset**

The fields set are [plus/minus] [Hours]:[Minutes]:[Seconds]:[Frames]. The cursor on the bottom line is positioned below the field that will be modified.

- Right** Move cursor right.
- Left** Move cursor left, or return to previous menu.
- Up** Increment value at cursor or toggle +/-.
- Down** Decrement value at cursor or toggle +/-.
- Enter** Return to the previous menu.

## 7.2. Audio Setup

This menu allows you to set up and test the XD20 audio. It also allows you to enable or disable the Language Versions function.



**Main menu → Setup → Audio**

- Level Adjustment** Adjust sound levels using audio generated by the XD20.
- Audio Tests** Play preloaded audio tests.
- Language Versions** Enable or Disable the language versions function.
- Exit Menus** Returns to the Status display.

### 7.2.1. Level Adjustment

This menu is the first in a series of menus for setting the XD20 audio output level.



**Setup → Audio → Level Adjustment**

- Reference Tone** Play 1 kHz reference tone on all channels for adjusting the level.
- Pink Noise** Play pink noise on the current channel for adjusting the level.

Select either Reference Tone or Pink Noise to use the level adjustment menu. Reference tone is a 1 kHz test tone that has been preset at 300mV RMS when the output is set to 0.0 dB. This is what most cinema processors suggest for input. Alternatively, Pink Noise may be used to verify level outputs on the XD20. It is played only on the channel chosen for adjustment. The level adjustments are made the same, regardless of whether you are using the reference tone or pink noise selection. The pink noise for the Sub bass channel is not bandwidth limited.

For example, if you select Reference Tone for the left channel (Ch. 1), the following message will appear on the XD20 status display.



**Setup → Audio → Reference Tone or Pink Noise**

- ▲ Increase level for selected channel. Maximum is +6.0 dB, except for Left Surr and Right Surr, which are +3.0 dB. Increments are 0.5 dB.
- ▼ Decrease level for selected channel. Minimum is -6.0 dB. Increments are 0.5 dB.
- ▶ or **Enter** Previous channel or return to Level Adjust menu. If playing pink noise, it will follow the current channel.
- ◀ Next channel or return to Level Adjust menu. If playing pink noise, it will follow the current channel.

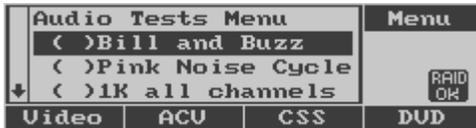
**Table 11: Channel Sequence**

Channel #	Channel Name
1	Left
2	Right
3	Center
4	Sub Bass
5	Left Surr
6	Right Surr
7	Left Center
8	Right Center
9	Narration

**Note:** When 1K tone is selected, all channels will play. When Pink Noise is selected, only the channel selected will play. Any adjustments made in either test menu will change the other.

### 7.2.2. Audio Tests

This menu allows you to play preloaded audio test content. See Table 8 for a description of the tests. Note that the Buzz and Bill test will also play CSS content (captions, subtitles, and narration) if the XD20 is licensed for CSS.



**Setup → Audio → Audio Tests**

Scroll up and down the menu to select a test. Position the cursor next to your selection and press the **Enter** button to start the test. Press **◀** to stop the test.

**Table 12: Audio Tests**

Name	Description
Bill and Buzz	Plays introduction track, but not movie clips, from DTS Demo reel <i>Buzz and Bill</i> . Contains soundtrack, narration, and captions/subtitles, which will play only with the CSS option.
Pink Noise Cycle	Plays pink noise on one channel for approx 5 seconds, then moves to next channel
1K all channels	Plays continuous tone on all channels, so analog output can be calibrated for 300Mv RMS
Pink: Left	Plays continuous pink noise on left channel
Pink: Left Surr	Plays continuous pink noise on left surround channel
Pink: Center	Plays continuous pink noise on center channel
Pink: Right Surr	Plays continuous pink noise on right surround channel
Pink: Right	Plays continuous pink noise on right channel
Pink: Sub Bass	Plays continuous pink noise on sub bass channel
Digital Silence	Plays continuous digital silence on all channels
Left Ch Sweep	Plays continuous tone sweep from 25 Hz to 20 kHz on left channel
Left Surr Sweep	Plays continuous tone sweep from 125 Hz to 20 kHz on the left surround channel
Center Ch Sweep	Plays continuous tone sweep 25 Hz to 20 kHz on center channel
Right Surr Sweep	Plays continuous tone sweep from 125 Hz to 20 kHz on the right surround channel
Right Ch Sweep	Plays continuous tone sweep 25 Hz to 20 kHz on right channel
Sub Bass Sweep	Plays continuous tone sweep from 20 Hz to 80 Hz on the sub bass channel
ES CS Pink	Plays continuous pink noise on back surround channel
ES CS 1K	Plays continuous 1 kHz tone on back surround channel
Flying Disc	plays <i>Flying Disc</i> DTS trailer
Sonic Landscape	plays <i>Sonic Landscape</i> DTS trailer
Sparks	Plays <i>Sparks</i> DTS trailer
Exit Menus	Returns to the Status display

### Pink Noise Cycle

- Track description: 5.1 channel
- Level: -20 dBFS level
- Duration: 10 seconds each
- Channel Sequence: L, C, R, LS, RS, SW

### Subwoofer Bandwidth

- “5.1” tracks: 20 Hz to 125 Hz
- “6.0” tracks (Special Venue): 20 Hz to 20 kHz (Full Range / F.R.)

## 7.2.3. Language Versions

This menu is used to either *enable* or *disable* the Language Versions function. Language Versions allows XD20 to play different soundtrack languages for the same film. XD20 may load several language versions of a feature or trailer soundtrack, and play the selected language. The playback language maybe entered by the projectionist or selected by automation.



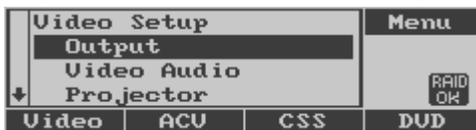
**Setup → Audio → Language Versions**

- Enabled** Enables Language Versions.
- Disabled** Disables language versions. If your theater only plays soundtracks in one language, it is a good idea to disable this option. XD20 only keeps the last soundtrack language loaded into the XD20.
- Exit Menu** Returns to the Status display.

- Note:** When changing the Language Versions feature from disabled to enabled, you must delete all soundtrack contents and reload in order for XD20 to identify the languages you select.

## 7.3. Video Setup

The Video Setup menu is used to set the video configuration, audio parameters specifically for the video playlists, and video projector settings.



**Main Menu → Setup → Video**

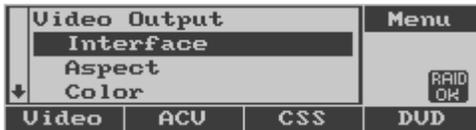
- Output** Select settings to create the optimal image for the installed digital video project or video monitor.
- Video Audio** Change the audio delay and the audio trim used when playing video content.
- Projector** Settings used to select a profile for the video projector serial control.
- Test Contents** Enter menu to play video test contents.
- Exit Menus** Returns to the Status display.

If no video license is detected, the following message will display. To correct this problem, you must install a valid video license. See *Section 6 Installing Licenses*, page 61.



### 7.3.1. Video Output Settings

The Video Output menu's submenus are used to select settings for the optimal image for the installed digital video projector system or monitor.

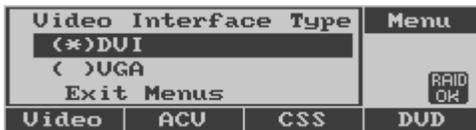


**Setup → Video → Output**

- Interface**                 Select cable type being used with video projector or monitor.
- Aspect**                    Select appropriate aspect ratio for video projector or monitor.
- Color**                     Select appropriate color space for video projector.
- Resolution**                Select optimal projector resolution.
- Frame Rate**                Select appropriate frame rate for selected resolution.
- Exit Menus**                Returns to the Status display.

#### 7.3.1.1. Video Interface

The Video Interface menu is used to select the appropriate cable for the video projector or monitor being used.

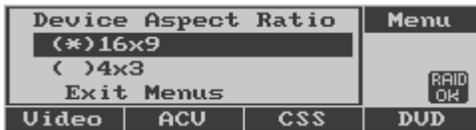


**Setup → Video → Output → Interface**

- DVI**                         Select if the video projector or monitor is connected using a DVI cable.
- VGA**                        Select if the video projector or monitor is connected using a VGA cable
- Exit Menus**                Returns to the Status display.

### 7.3.1.2. Video Aspect

This menu is used to select the appropriate aspect ratio for the video projector or monitor.



**Setup → Video → Output → Aspect**

**16x9** Select if the video projector or monitor has a 16 x 9 aspect ratio.

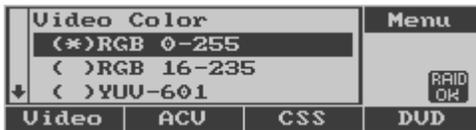
**4x3** Select if the video projector or monitor has a 4 x 3 aspect ratio.

**Exit Menus** Returns to the Status display.

**Note:** Other aspect ratios are not supported.

### 7.3.1.3. Video Color Setting

This menu is used to select the appropriate color space for the installation.



**Setup → Video → Output → Color**

RGB 0-255

RGB 16-235

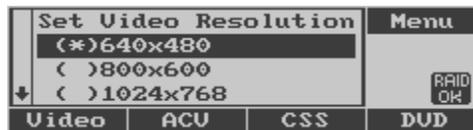
YUV 601

YUV 709

**Exit Menus** Returns to the Status display

### 7.3.1.4. Video Resolution

This menu is used to set the video output resolution. In most cases this should be set to the native resolution of the video projector. Changing the video output resolution requires that both a resolution and a frame rate be selected. For this reason, the frame rate menu will automatically appear after the resolution is changed and the user exits this menu with the left key. Table 13 on page 73 lists all available resolutions and frame rates.



**Setup → Video → Output → Resolution**

**Frame Rate** Go to Frame Rate menu.

### 7.3.1.5. Video Frame Rate Menu

This menu is used to set the video frame rate. The options are displayed in frames per second with an “i” indicating interlaced, and “p” indicating a progressive frame rate.

The frame rates available depend on the selected resolution, and the video resolution must be set before setting the frame rate. The frame rate menu displays the current resolution on the menu title. The menu below shows the default frame rate menu for the resolution of 640x480. Table 13 below lists all frame rates available for each resolution.



Setup → Video → Output → Frame Rate

**Table 13: Available Frame Rates for Each Resolution**

Resolution	Available Frame Rates	Resolution	Available Frame Rates
<b>640 x 480</b>	60p	<b>1280x1024</b>	60p
	72p		75p
	75p		85p
<b>800x600</b>	56p	<b>1360x768</b>	60p
	60p	<b>1366x768</b>	50p
	72p		59.94p
	75p		60p
	85p	<b>1600x1200</b>	60p
<b>1024x768</b>	43i	<b>1920x1080</b>	23p
	60p		24p
	70p		25p
	75p		29p
	85p		30p
	<b>1280x720</b>		23p
24p			48i
25p			50i
29p			50p
30p			59i
59p			59p
60p		60i	
<b>1280x768</b>	60p	60p	
	75p	<b>1920x1200</b>	60p
	85p		

### 7.3.2. Video Audio Setup

These settings affect the audio only when playing video content.



**Setup → Video → Video Audio**

- Audio Delay**            Delay the audio to adjust for any frame delay in the video projector.
- Audio Trim**            Attenuate the volume during playback of video content.
- Exit Menus**            Returns to the Status display

#### 7.3.2.1. Video Audio Delay

This setting adds a delay to the audio in order to adjust for any frame delay in the video projector. It can be changed in 10ms increments. The default value for this setting is 0. The minimum value for this setting is 0 (no additional delay is applied) and the maximum value for this setting is 2000ms.



**Video → Video Audio → Audio Delay**

- Up**    Increase Delay
- Down**    Decrease Delay
- Left**    Return to previous menu
- Enter**    Return to previous menu

#### 7.3.2.2. Video Audio Trim

This setting will attenuate the volume during the playback for video content. It has no affect on the volume for soundtrack. It can be set to a value between 0dB and -15dB.



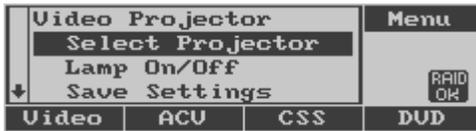
**Video → Video Audio → Audio Trim**

**Note:** Change takes affect only after rebooting XD20.

- Up**    Increase Trim
- Down**    Decrease Trim
- Left**    Return to previous menu
- Enter**    Return to previous menu

### 7.3.3. Video Projector Setup

This menu provides functions to setup the serial control for the video projector.



**Setup → Video → Projector**

- Select Projector**      Select a profile for the serial control of the video projector.
- Lamp On/Off**        Test the lamp on/lamp off serial control function.
- Save Settings**        Create a copy of the projector settings on the XD20. The settings are restored to the projector upon the start of any video playlist.
- Exit Menus**            Returns to the Status display.

- Note:** In order for XD20 to control the projector through the serial interface you also need to set the serial port for Video Projector (not Rear Window).
- Main Menu → Setup → System → Com1 Configuration = Video Projector.

#### 7.3.3.1. Select Projector

This menu selects the profile for the serial control of the video projector. By default **No Projector** is selected. If **no projector** is selected XD20 can still play video through the projector, but won't be able to do some things automatically like turn the lamp on and off, or restore the saved projector settings.

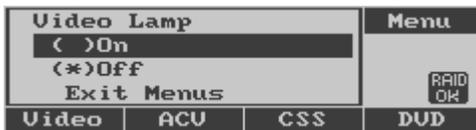
By default, the projector profiles for the **Sanyo PLV-70**, **PLV-80** and **PLV-WF10** projectors are included in the XD20 software. Additional projector profiles can be created and loaded onto XD20 through the CD-ROM or USB memory. Contact DTS Digital Cinema Customer Service for assistance with additional projector profiles.



**Video → Projector → Select Projector**

#### 7.3.3.2. Lamp On/Off Control

This menu may be used to turn the video projector lamp on and off during testing or setup.



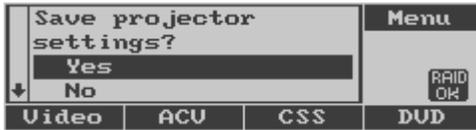
**Video → Projector → Lamp on/off**

- On**                        Select On to turn the projector lamp on.
- Off**                        Select Off to turn the projector lamp off.
- Exit Menus**            Returns to the Status display.

- Note 1:** The video projector may take one to two minutes to respond to the Lamp On command when the lamp is still warm from use.
- Note 2:** Only available for projectors supported by XD20 serial control.

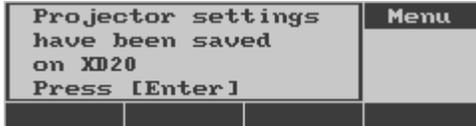
### 7.3.3.3. Save Video Projector Settings

The Save Settings menu is used to save or delete projector settings.



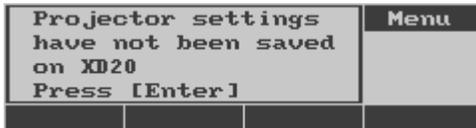
**Video → Projector → Save Settings**

To save the settings, select “Yes” and press **Enter**. The following message will appear if the operation is successful.



**Video → Projector → Save Settings → Yes**

The following message will appear if “No” is selected or if the communication to the projector was unsuccessful:



**Video → Projector → Save Settings → No**

**Note:** Only available for projectors supported by XD20 serial control.

### 7.3.3.4. Video Test Contents

The Test Contents menu is used to play or stop video test contents that have been preloaded on factory XD20 units with the HD Video Option.



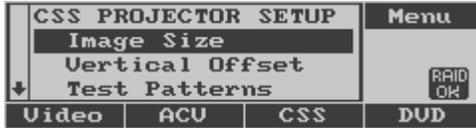
**Video → Test Contents**

- Stop** Stops the play of video test content. This command does NOT turn the lamp off---use lamp control to turn the lamp off when finished.
- Still Image** Displays a test pattern. The video projector lamp should go on immediately after executing this command. The image remains until the stop command is used.
- Motion Image** Plays a motion video clip with DTS audio. The video projector lamp should go on immediately after executing this command. The clip repeats until the stop command is used.
- Exit Menu** Returns to the Status display.

## 7.4. Cinema Subtitling System (CSS) Setup

This is the top level menu for all CSS projector setup menus and it is available only when XD20 has the CSS option. These menus apply for installations using either the CSS cinema subtitling projector or other video projectors for CSS projected subtitles.

For instructions on installing CSS, see Appendix J, *Installing the CSS Option*.



Main menu → Setup → CSS

<b>Image Size</b>	Select size of subtitles
<b>Vertical Offset</b>	Adjust vertical placement of subtitles
<b>Test Patterns</b>	Display CSS test patterns.
<b>Options</b>	Select projector or set text color.
<b>Exit Menus</b>	Returns to the Status display.

If your XD20 is not equipped with the CSS Option, you will be locked out of the CSS option on the Setup menu. When you try to access it, the following message will appear on the screen. To correct this problem, you must install a valid CSS Option license. See *Section 6 Installing Licenses*, page 61.



### 7.4.1. Image Size

This menu allows you to select the size of subtitles/captions from the available sizes supplied on the CSS subtitle or DTS Access™ disc. Check the disc label to see what sizes are available on the distributed subtitles/captions. If you select a smaller size, and it is not available, the system will assign the next smallest size available. (The CSS content delivered on the disc may not contain all sizes.)



Setup → CSS → Image Size

<b>Image Size</b>	From 50% to 100% of size available for text for subtitles/captions. (Sizes listed on the menu may not all be available in the CSS content delivered on the disc.)
<b>Exit Menus</b>	Returns to the Status display.

### 7.4.2. Vertical Offset

This menu allows you to make fine adjustments to the vertical placement (in pixels) of CSS subtitles. When you enter this menu, XD20 projects a subtitle area pattern to use to reference the position. When installing the projector, set the projector vertical offset to 0 and physically position the projector to project in the subtitle area. Then use this menu to make fine adjustments.

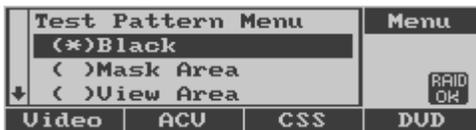


**Setup → CSS → Vertical Offset**

- ▲ Move subtitle area up one pixel. Press and hold ▲ to increase continuously.
- ▼ Move subtitle area down one pixel. Press and hold ▼ to increase continuously.
- Enter Return to CSS Setup menu.

### 7.4.3. Test Patterns

This menu allows you to select from an array of test patterns used for optimizing subtitle/caption display. The EMA dowser opens when this menu is entered.

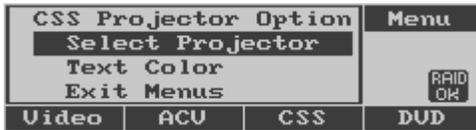


**Setup → CSS → Test Patterns**

- Black** All black, so minimum image level from projector can be checked.
- Mask Area** Subtitle area is all white. Size and location depend on the vertical offset and image size.
- View Area** Subtitle area is a grid pattern. Size and location depend on the vertical offset and image area.
- White** Entire projected area (not just subtitle area) is all white.
- Full Screen** Entire projected area (not just subtitle area) is a grid pattern.
- ◀ Close EMA dowser and return to the CSS Setup menu.
- Exit Menu Close EMA dowser and return to the Status display.

### 7.4.4. Options

This menu lets you select the background color of subtitles and front projected captions. It will also let you select between the two DTS supported CSS projectors



**Setup → CSS → Options**

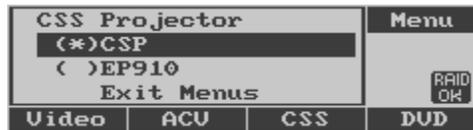
Select Projector

**Text Color** White or yellow

**Exit Menus** Returns to the Status display.

#### 7.4.4.1. Select Projector

This menu lets you select between the two DTS supported CSS projectors.



**CSS → Options → Select Projector**

#### 7.4.4.2. CSS Text Color

This menu lets you select the color of the text in subtitles and projected captions.



**CSS → Options → Text**

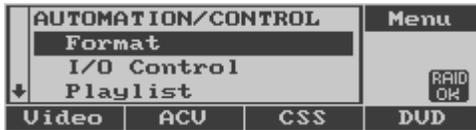
**White** White text will be used in subtitles and captions.

**Yellow** Yellow text will be used in subtitles and captions

**Exit Menus** Returns to the Status display.

## 7.5. Automation / Control

This is the top level menu in the Setup menu structure for setting format automation and I/O Control functions.

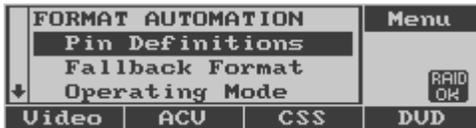


Main menu → Setup → Automation

<b>Format</b>	Menu to define format pins and operating modes.
<b>I/O Control</b>	Menu for defining functions for configuration of automation inputs and outputs.
<b>Playlist</b>	Menu for defining automation parameters for video playlist playback.
<b>Test</b>	Test the functionality of automation pins 1-8, I/O control pins 1-3, and the signal from the CINEMA SUBTITLING PROJECTOR fan.
<b>Exit Menus</b>	Returns to the Status display.

### 7.5.1. Format Automation

This menu is for defining format pins and operating modes.

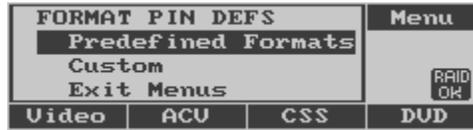


Setup → Automation → Format

<b>Pin Definitions</b>	Enter pin definitions for eight user-assignable format pins. Select predefined pin formats or create custom formats to meet specific installation requirements.
<b>Fallback Formats</b>	Select a fallback format for soundtrack.
<b>Operating Mode</b>	Test the functionality of the eight assignable automation pins, three I/O pins, and the signal from the CINEMA SUBTITLING PROJECTOR fan.
<b>Exit Menus</b>	Returns to the Status display.

### 7.5.1.1. Pin Definitions

The Format Pin Defs menu is used to select settings for eight user-assignable pins in the XD20 25-pin Automation connector.



**Automation → Format → Pin Definitions**

**Predefined Formats** Select predefined formats for commonly-used cinema processors.

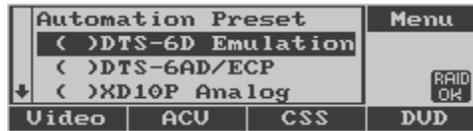
**Custom** Customize the pin formats by changing the pre-assigned format of one or more pins.

**Exit Menus** Returns to the Status display.

### 7.5.1.2. Predefined Formats

The Automation Preset menu is used to automatically configure pins for cinema processors listed on the menu.

- Note:** These presets are based on standard factory settings. If different formats are used, see Custom Formats on page 82.



**Format → Pin Definitions → Predefined Formats**

DTS-6D Emulation

DTS-6AD/ECP

XD10P Analog

XD10P Digital

CP-65

CP-200

CP-500

CP-650

CSP1200

Smart CP

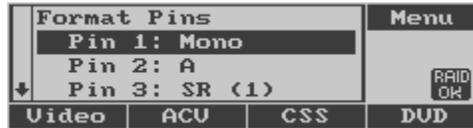
Sony D3000

UltraStereo JS

**Exit Menus** Returns to the Status display.

### 7.5.1.3. Custom Formats

The Format Pins menu is used to view or change the setting for any of the eight user-assignable format pins.

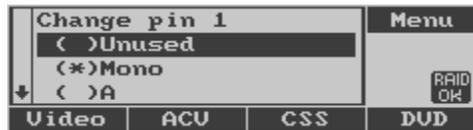


**Format → Pin Definitions → Custom**

▲ and ▼ Scroll to the desired pin number (1–8) and position the cursor next to it.

**Enter** Enter menu to change the definition of the selected pin, as shown below.

To change the pin assignment, move the cursor to the desired pin number and press **Enter** to change the value. A menu appears with all of the available input pin assignments, as shown below. The menu heading displays the pin number that is being changed. In the following example, Pin 1 is being changed.



The Custom Format options are described in Table 14, below.

**Table 14. Custom Format Options**

Name	Description
Unused	XD20 ignores any input pulse on a pin defined as "unused"
Mono	Switches CP to process mono signal from optical reader.
A	Switches CP to process Academy signal from optical reader.
SR (1)	Switches CP to process SR signal from optical reader.
SR (2)	Informative format definition – no special meaning for XD20
SR-D	Switches CP to the Dolby SR-D format.
External	Informative format definition – no special meaning for XD20
Nonsync (1)	The nonsync signal is used as the fallback format when the DTS soundtrack is interrupted within two minutes of the last reel of the feature.
Nonsync (2)	Informative format definition – no special meaning for XD20
Aux	Informative format definition – no special meaning for XD20
User 1	Informative format definition – no special meaning for XD20
User 2	Informative format definition – no special meaning for XD20
DTS Pulse	Use this definition to switch the CP to the XD20 input.
DTS Sustain	Use only for CP that requires a sustained contact to switch to the XD20 input.
DTS ES	Use this definition to switch the CP to the XD20 input and process as extended surround (ES). This should not be used to replace the DTS pulse signal, but as an alternate format used when XD20 detects that the soundtrack is encoded for extended surround. If XD20 does not have a DTS ES pin defined, then the DTS Pulse pin is used for both ES and non-ES soundtracks. A DTS-ES unit is required to decode the ES signal.

### 7.5.2. Fallback Format for Soundtrack

The Soundtrack Fallback menu is used to choose the “fallback” format selected by the XD20 when the DTS soundtrack stops playing.

When the XD20 starts playing in DTS playback, it pulses the cinema processor to the DTS format. When the XD20 stops playing in DTS playback—either due to loss of timecode, missing audio file, or another unexpected error—it pulses the cinema processor to switch to an optical format. In many cases, it switches to the SR optical format on the film, but this menu can be used to set it to different fallback formats.

The pulse to the DTS format occurs when the Audio LED becomes illuminated, provided that the conditions of the format automation mode are met (See Section 7.5.3). The pulse to the fallback format occurs when the Audio LED goes off, and is dependent on the conditions of the Soundtrack Fallback mode, shown below.

- Note:** XD20 fallback format is always Nonsync (1) at the end of a feature film. The end of the film is defined as the last two minutes of the last reel of film for the feature.



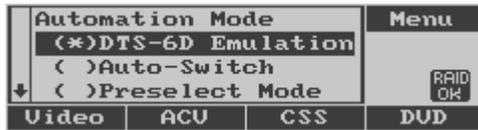
**Setup → Automation → Format → Fallback Format.**

- Automatic**                      The fallback format is selected by the header information in the DTS audio file that is playing. Possible definitions are **SR**, **A**, or **MONO**. These definitions are intended to reflect the optical format on the film. Almost all DTS audio files will have SR defined as the fallback format. XD20 pulses the SR (1) pin for the SR signal – not SR (2).
- None**                              There will be no fallback format pulse when the DTS audio stops.
- Others**                            The fallback format will be the selected pin. Table 14, above, provides options for a selected pin.

- Note:** If the fallback format is set to SR (1) and that pin is not defined as one of the format pins in the Pin Format menu, then XD20 will pulse the A format pin. If there is not an A format pin, then it will pulse the MONO format pin.

### 7.5.3. Automation Operating Mode

This menu allows the operating mode of the format switching to be set to one of three ways. The default setting is DTS-6D Emulation. The operating mode defines the conditions that need to be met for XD20 to switch the CP to the DTS format. The operating mode applies only to format switching for film soundtrack playback. It does not affect format switching for the video playlists soundtrack.



**Setup → Automation → Format → Operating Mode**

- DTS-6D Emulation** XD20 emulates the 6D. (See DTS-6D Emulation, below, for a detailed explanation.)
- Auto-Switch** XD20 switches to DTS format only if it is in an optical format. (See AutoSwitch (Optical Formats), below, for a detailed explanation.)
- Preselect Mode** The automation system must select the DTS format. (See Preselect Mode (SRD compatible) below, for a detailed explanation.)

#### 7.5.3.1. DTS-6D Emulation

XD20 pulses the CP to DTS format whenever it starts playing audio, regardless of the format previously selected from the automation system. When XD20 audio completes or is interrupted, XD20 pulses the fallback format. This format switching operation is the same as that of the DTS-6/6D products.

XD20 also pulses the fallback format when the audio stops and pulses the nonsync format when the end of the feature is reached.

In the DTS-6D Emulation mode, XD20 will not react to format changes in the cinema processor. If a projectionist—or the automation system—changes the format, XD20 ignores this. XD20 will not react or attempt to pulse the format back to DTS. However, when this happens, the blue Audio LED on the front panel will begin to blink. This is to alert the projectionist that DTS is playing, but XD20 is not in DTS format.

#### 7.5.3.2. AutoSwitch (Optical Formats)

XD20 pulses the cinema processor to the DTS format when it starts playing audio, provided that the automation system has already selected either DTS or any of the optical formats—Mono, A, SR (1) or SR (2). If any other format has been selected by the automation system, then XD20 will not switch the cinema processor when audio starts.

If DTS format is selected by the automation system while XD20 is NOT playing audio, then XD20 pulses the cinema processor to the SR (1) format—or A or mono, if SR (1) is not available.

If any of the optical formats—Mono, A, SR (1), or SR (2)—are selected while XD20 is playing audio, then XD20 ignores the selection and immediately sends a DTS format pulse to the cinema processor.

When the audio completes or is interrupted, XD20 pulses the cinema processor to the assigned fallback format or nonsync if the end of the feature is reached. If the automation system selects a different format while the audio is playing (other than DTS or any optical format), XD20 will not output the fallback pulse when the audio stops. This assures that XD20 will not override the user’s automation choice.

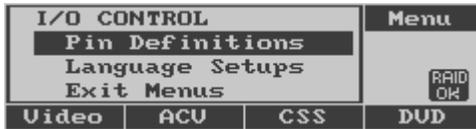
#### 7.5.3.3. Preselect Mode (SRD compatible)

This mode allows the automation system to have more control over format switching on the cinema processor. In this mode, the automation system must select the DTS format to activate XD20 automation.

The automation system should first pulse the DTS format before XD20 audio starts playing. In response, XD20 will immediately pulse the SR (1) format—or A or mono, if SR (1) is not available. XD20 will pulse the DTS format upon playing the XD20 audio. XD20 pulses the fallback format when the audio stops, or pulses the nonsync format if the end of the feature is reached. The fallback pulse will not occur if the automation system switched formats before the XD20 audio stopped.

## 7.6. I/O Control

The I/O CONTROL menu is used to configure the pin definitions, and to automate soundtrack and CSS languages using the AUX I/O connector. (This is NOT the same as cinema processor automation control.)

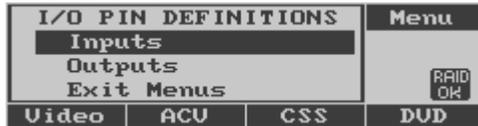


Setup → Automation → I/O Control

- Pin Definitions** Enters menu to assign I/O pins to functions.
- Language Setups** Enters menu to define the soundtrack and subtitle languages for any of the three language setups and the default languages.

### 7.6.1. I/O Pin Definitions

The I/O Pin Definitions menu is used to configure the auxiliary control input and output signals on the AUX I/O connector..

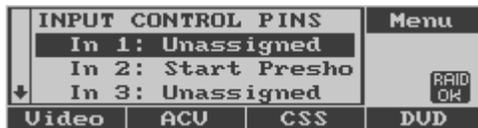


Automation → I/O Control → Pin Definitions

- Inputs** Menu to assign functions to the input pins.
- Outputs** Menu to assign functions to the output pins.
- Exit Menu** Returns to the Status display.

#### 7.6.1.1. Input Control Pins

This menu is used to assign functions to input control pins. The assigned function is executed when a low level pulse is detected on the corresponding input pin. There are three separate input pins that can be assigned. When entering this menu, the current assigned values are displayed next to the pin number, as shown below.



I/O Control → Pin Definitions → Inputs

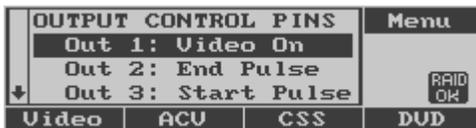
To change the pin assignment, move the cursor to the desired pin number and press **Enter**. A menu appears with all of the available input pin assignments, as shown below:



<b>Unassigned</b>	A pulse on this pin is ignored by XD20.
<b>Stop Video</b>	Stops the video playlist.
<b>Stop at End</b>	Stops the video playlist after reaching the end of the current clip.
<b>Slide Loop</b>	Starts the video slide loop playlist.
<b>Start Preshow</b>	Starts the video Preshow.
<b>Intermission</b>	Starts the intermission video playlist.
<b>Playlist C</b>	Starts Video Playlist C
<b>Playlist D</b>	Starts Video Playlist D
<b>Playlist E</b>	Starts Video Playlist E
<b>Playlist F</b>	Starts Video Playlist F
<b>Playlist G</b>	Starts Video Playlist G
<b>ACV</b>	Play alternate content show.
<b>Video Lmp on</b>	Turns on video projector lamp (if using serial control)
<b>Video Inh</b>	A low signal on this pin stops video playback immediately, and inhibits the video playlist from starting while the signal is low.
<b>Lang Setup</b>	Activates a specified soundtrack language and subtitle language. Refer to Section 7.6.2.1 in order to select a desired language. This pin must be held low in order to activate the assigned language.
<b>Ext. S/PDIF</b>	Select input from external S/PDIF input.
<b>Ext. Input</b>	Select 8-channel digital input.
<b>Ext. Off</b>	Disables the external input, whether from external S/PDIF or digital input (8-channel).
<b>70mm TCR</b>	Selects 70mm timecode reader offset setting whenever pin is low.

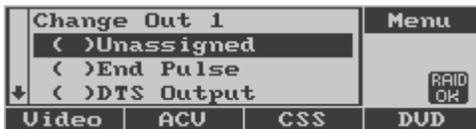
### 7.6.1.2. Output Control Pins

This menu is used to assign functions to output control pins. When entering this menu the current assignments are displayed next to the pin number, as shown below.



#### I/O Control → Pin Definitions → Outputs

To change the pin assignment, move the cursor to the desired pin number and press **Enter**. A menu will appear with a list of all of the available output pin assignments, as shown below.



<b>Unassigned</b>	Unused by XD20.
<b>End Pulse</b>	Used for the end pulse during the video playlist automation sequence.
<b>DTS Output</b>	Output will be low whenever the XD20 is playing audio (or the Blue Audio light is on).

<b>ES Output</b>	Output will be low whenever the XD20 is playing audio for extended surround (soundtrack audio only).
<b>Start Pulse</b>	Used for the start pulse during the video playlist automation sequence.
<b>CSS Enabled</b>	Output will be low when the CSS mode is either ON or ONE SHOW and a subtitle language is selected. If the subtitle language were set to Automation ( <i>Language Setup</i> ), then this signal would be disabled if the selected automation subtitle language is set to CSS OFF.
<b>Video On</b>	Output will be low when playing video.
<b>Exit Menus</b>	Returns to the Status display.

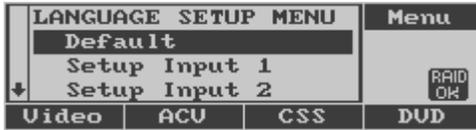
### 7.6.2. Language Setups

The Language Setups menu allows you to automate the soundtrack and/or CSS subtitle language using one or more input control pin(s). The following describes the use of the language setups:

1. **Language Versions** must be enabled in order to automate soundtrack languages. (See **Setup → Audio → Language Versions** on page 70).
2. Assign input pin 1 as “Lang Setup”. A low signal on this pin will then select the soundtrack and CSS subtitle language defined by “Setup Input 1”. Alternately, input 2 and input 3 may be used for “Setup Input 2” and “Setup Input 3”, respectively. A low signal on any of these pins selects the corresponding language setup definition. This allows for a total of 4 possible language combinations (Default, and Setup 1-3) based on the input control signal. Only one language setup pin should be held low at a time.  
 **Note:** These language setups are only active if the corresponding Aux control Input pins are set to “Lang Setup”.
3. Define the soundtrack and/or CSS subtitle language for the “Default” setup. This selects the language that will be used when none of the language setup input pins are held low.
4. Define the soundtrack and/or CSS subtitle language for any of the input pins that are assigned “Lang Setup”. “Lang Setup 1-3” will be used for Pins 1-3, respectively.
5. The selected soundtrack language or subtitle language plays only if the content for that language has been loaded on XD20. Each feature soundtrack dub is normally a separate set of discs. Also, each CSS subtitle language for a feature may be on separate discs. Check the disc label for the contents language.

When playing soundtrack or audio, the status display may be used to monitor which soundtrack and or subtitle language is playing.

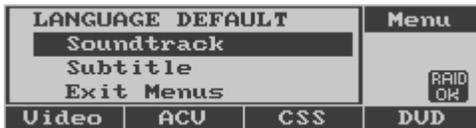
To set the language setup, first select the submenu for “Default” or “Setup Input 1-3”.



**Automation Setup → I/O Control → Language Setups**

- Default** Select the default soundtrack and CSS subtitle languages.
- Setup Input 1** Select the soundtrack and CSS subtitle languages when Pin 1 (Lang Setup) is enabled.
- Setup Input 2** Select the soundtrack and CSS subtitle languages when Pin 2 (Lang Setup) is enabled.
- Setup Input 3** Select the soundtrack and CSS subtitle languages when Pin 3 (Lang Setup) is enabled.
- Exit Menus** Returns to the Status display.

The menu shown below appears when one of the selections is made. The setup title describes which selection is being modified.

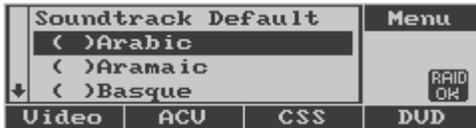


**Language Setups → Default**

- Soundtrack** Menu to select the soundtrack language for the default or corresponding language setup pin.
- Subtitle** Menu to select soundtrack and CSS subtitle languages when Pin 1 (Lang Setup) is enabled.
- Exit Menus** Returns to the Status display.

**7.6.2.1. Soundtrack Language Setups**

When **Soundtrack** is selected from the Language Default menu, the list of available languages appears on the screen. Scroll down and press **Enter** to select the soundtrack language that is desired for the language setup.



**Language Setups → Default → Soundtrack**

**Table 15 Soundtrack Language List**

Arabic	Aramaic	Basque	Braz. Portuguese	Bulgarian
Cantonese	Catalan	Croatian	Czech	Danish
Dutch	Estonian	English	Farsi	Finnish
Flemish	French	Fr. Canadian	German	German (Austria)
Greek	Hebrew	Hindi	Hungarian	Icelandic
Indonesian	Italian	Japanese	Kannada	Khmer
Korean	Latvian	Lithuanian	Malay	Malayalam
Spanish (Castilian)	Latin Spanish	Mexican Spanish	Mandarin	Masai
Norwegian	Polish	Portuguese	Russian	Serbian
Slovak	Slovenian	Swedish	Swiss German	Tamil
Teluga	Thai	Turkish	Urdu	Vietnamese
Zulu				

**7.6.2.2. Subtitle Language Setups**

When **Subtitle** is selected from the language setup (Default of Language setup 1-3), the list of 48 available languages appears on the screen. Select the subtitle language that is desired for the language setup.



Language Setups → Default → Subtitle

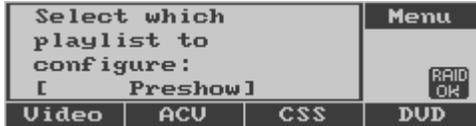
**Table 16 Subtitle Language List**

CSS Off	Arabic	Basque	Bulgarian	Catalan
Chinese (Simpl)	Chinese (Trad)	Croatian	Czech	Danish
Dutch	English	English Captions	Farsi	Finnish
Flemish	French	German	Greek	Hebrew
Hindi	Hungarian	Icelandic	Indonesian	Italian
Japanese	Kannada	Khmer	Korean Horizontal	Korean Vertical
Mandarin	Malay	Malayalam	Masai	Norwegian
Polish	Portuguese	Russian	Serbian	Slovak
Slovenian	Spanish	Swedish	Tamil	Teluga
Thai	Turkish	Urdu	Vietnamese	Zulu

## 7.7. Playlist

The playlist setup is a series of menus used to set the delays and options for the video playlist. To access the Playlist menu, select **Playlist** from the **Automation /Control** menu, as shown below:

The Select Playlist menu, shown below, appears on the screen.



**Setup → Automation → Playlist (Select Playlist)**

- Preshow**                      Select to edit the automation options for the Preshow playlist.
- Intermission**                Select to edit the automation options for the Intermission playlist.
- Playlist C-G**                 Select to edit the automation options for Playlists C - G.
- ACV**                            Select to edit Alternate Content Video.

Use the ▲ and ▼ buttons to display the desired playlist and then press **Enter** or ► to edit the Playlist Automation option. Press ◀ to return to previous menu.

Edit the option with the correct selection for that playlist. The following values may be set for each type of playlist:

- Video Start Delay (0 to 120 seconds)
- Output Start Pulse (Enable/Disable)
- Start Pulse Delay (0 to 120 seconds)
- Output End Pulse (Enable/Disable)
- End Pulse Delay (-60 to +60 seconds)
- Lamp off command at end of playlist
- End of playlist format
- Format for silent video clips
- Loop at end of playlist

### 7.7.1. Video Start Delay

The Video Start delay is the amount of time XD20 waits after receiving the “start” command (to start playing videos from the playlist). This is used to allow the video projector lamp time to warm up.



**Automation → Playlist (Option 1)**

- 0 to 120**                      Number of seconds XD20 waits for the projector to warm up.

### 7.7.2. Output Start Pulse

This menu defines whether the start pulse will be used for this playlist type. The start pulse must also be defined as one of the XD20 Control Output Pins. See Section 7.6.1.2, Output Control Pins.



#### Automation → Playlist (Option 2)

- Enable**                      Start pulse is enabled. Pulse timing is determined by the start pulse delay.
- Disable**                    Start pulse is not used for this playlist.

### 7.7.3. Start Pulse Delay

This menu allows you to select the start pulse delay time to any time within the first 120 seconds after the start of the playlist.



#### Automation → Playlist (Option 3)

- 0 - 120**                      Number of seconds delay after the playlist starts before the start pulse occurs.

### 7.7.4. Output End Pulse

This menu allows the end pulse to be enabled or disabled for the selected playlist type. The End Pulse must also be defined as one of the XD20 Control Output Pins. See Section 7.6.1.2, Output Control Pins.



#### Automation → Playlist (Option 4)

- Enable**                      End pulse is enabled. Pulse timing is determined by the end pulse delay.
- Disable**                    End pulse is not used for this playlist type.

### 7.7.5. End Pulse Delay

This menu allows the control of the end pulse timing anywhere within 60 seconds before to 60 seconds after the end of the playlist. A negative value is used to indicate that the pulse occurs before the end of the playlist.

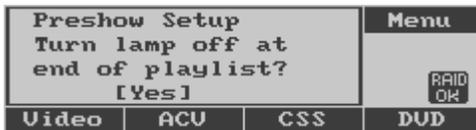


Automation → Playlist (Option 5)

**-60 to 60**                      Number of seconds offset between the end pulse and the end of the playlist.

### 7.7.6. Lamp off

This menu defines if the video projector lamp will be turned off when the playlist completes.



Automation → Playlist (Option 6)

**Yes**                                The projector lamp remains on at the end of the playlist.  
**No**                                 The projector lamp is turned off at the end of the playlist.

### 7.7.7. Silent Video Format

This menu selects what sound format will be selected during the playback of a silent video clip.



Automation → Playlist (Option 7)

**None**                                No sound format is pulsed for silent video clips.  
**[Format]**                            Any sound format that has been assigned to one of the eight automation format pins may be selected.

### 7.7.8. End of Playlist Format

This menu defines what sound format will be selected at the end of the playlist.



Automation → Playlist (Option 8)

**None**                                No sound format will be pulsed at the end of the playlist.  
**[Format]**                            Any sound format that has been assigned to one of the eight automation format pins may be selected.

### 7.7.9. Loop at End of Playlist

This menu allows the playlist to be in a loop (play repeats over and over). The loop will continue until a playlist stop command occurs.

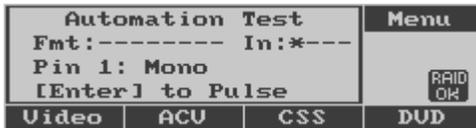


#### Automation → Playlist (Option 9)

- Yes**                      When the end of the playlist is reached it will loop back to the first clip.
- No**                        Looping not enabled.

### 7.7.10. Automation Test

This menu is used to confirm the assignments already made to automation pins 1-8, I/O Control pins 1-3, and pin 4, and the signal from the Cinema Subtitling Projector fan.



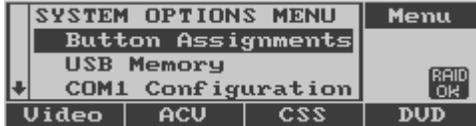
#### Automation → Test

- ▲ or ▼**                      Select between automation format pins 1-8 and (I/O) output 1-4 on line 3.
- ◀**                              Return to previous menu.
- Enter**                        Pulse the format or I/O output pin as identified by line 3 of the display.

Line 2 of the display is a status indicator for the sound format and (I/O) input control pins. An active, or low, status, is indicated by the '\*' character. Otherwise the '-' character is displayed. The status of automation (sound) format pins 1-8 are displayed in order following the text "FMT:". The first character after the text "IN:" is the EMA fan sense input, followed by (I/O) outputs 1 through 3 in numerical order.

## 7.8. System Settings

To access the System Options menu, select **System** from the System Setup Menu, as shown below.

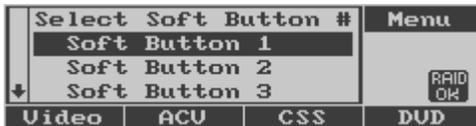


Main Menu → Setup → System

<b>Button Assignments</b>	Configure the soft keys on the front panel.
<b>USB Memory</b>	Store and load configuration or files to USB memory device.
<b>COM1 Config</b>	Select use for COM1.
<b>Set Password</b>	Set the password to enter the Setup menus.
<b>Network</b>	Set network parameters.
<b>Disk Space</b>	Allocate disk space for film, video and ACV.
<b>System Clock</b>	View or change the XD20 time and date.
<b>LCD Setup</b>	Adjust brightness and contrast of display.
<b>DVD Drives</b>	Open drive trays of external DVD drive unit.
<b>RAID</b>	View status and details of hard drive(s).
<b>Revert</b>	Revert to the previous software version.
<b>Exit Menus</b>	Return to the Status display.

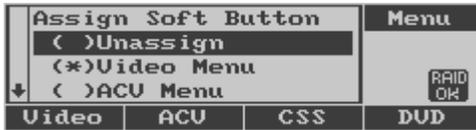
### 7.8.1. Button Assignments

When Button Assignments is selected from the Setup System menu, the Select Soft Button menu displays, to enable configuration of the four soft keys (or buttons) on the front panel of XD20 (below the LCD display).



Setup → System → Button Assignments

Select a Soft Button (1-4) and press **Enter**. The following menu will display.



Scroll through the list of assignable functions, and press **Enter** to select one to be assigned to this button.

- Unassign**                      Return button to blank state.
- Video Menu**                      Open the Video Menu.
- ACV Menu**                      Open the ACV Menu.
- CSS Menu**                      Open the CSS Menu.
- CSS Mode Toggle**              Toggle between CSS modes: Off/On Once/On Always
- TCR Selection**                      Open the TCR Selection Menu.
- Open/Close DVD**                      Open or close the DVD drive(s) on the external DVD drive unit.
- Soundtrack Lang**                      Open the Soundtrack Language menu.
- CSS Language**                      Open the CSS language menu.
- External Input**                      Open the External Input menu.
- Load from USB**                      Open the Load from USB menu.
- Audio Tests**                      Open the Audio Tests menu.
- SMPTE TC**                      Open the SMPTE Timecode menu.

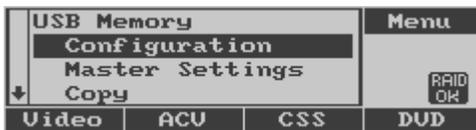
**Exit Menus**                      Return to the Status display.

- Soft keys will illuminate only if they are assigned. If unassigned, the button will remain dark with no functionality.

### 7.8.2. USB Memory

The USB memory menu allows you to save configuration settings from the XD20 hard drive onto a memory device inserted into the USB port.

The memory device (commonly called a “memory stick”) can hold settings for several XD20 units. The number of units depends on the size of the memory device. The configuration file size of one XD20 unit is approximately 12K.



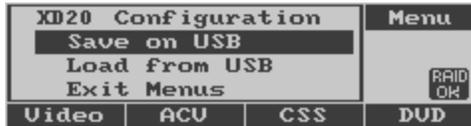
**Setup → System → USB Memory**

- Configuration**                      Save or load XD20 configuration files and licenses.
- Master Settings**                      Save or load XD20 master configuration settings.
- Copy**                      Copy files to a USB memory device and restore them at a later time.
- Log Files**                      Copy the XD20 log files to a USB memory device.
- Exit Menus**                      Return to the Status display

### 7.8.2.1. XD20 Configuration

This menu allows you to save the XD20 configuration and licenses on a USB memory device. A folder is created on the USB memory device when saving the configuration. The folder is given the name “XD20-xxxxxxxxxx”, where “xxxxxxxxxx” is the MAC address specific to that XD20 unit.

The configuration for several machines may be saved on the USB, each one in the folder named with its unique MAC address. When loading the Configuration through the USB, the XD20 will load only the configuration from the folder named with that XD20’s MAC address.



#### System → USB Memory → Configuration

- Note:** If you want to save settings from one XD20 and load them into a different XD20, see Master Settings on page 97.

**Save on USB** Save XD20 configuration files on a USB memory device.

**Load from USB** Load configuration files from a USB memory device to the XD20.

**Exit Menus** Return to the Status display

#### 7.8.2.1.1. Save on USB

When you select Save on USB from the XD20 Configuration menu, the following confirmation message appears on the screen.



Insert the USB memory device into the USB port on the XD20 and press **Enter** to start. Press **◀** to abort. If there is no USB memory device connected to the XD20, a message appears and asks you to insert one.

After the settings are saved, the following message appears on the screen. You can remove the USB memory device.



Press **Enter** to return to previous menu.

If the XD20 is unable to save the settings onto the USB memory device, an error message appears on the screen. Check the USB for free space if this occurs.

#### 7.8.2.1.2. Load from USB

When you select **Load from USB** from the XD20 Configuration menu, the following confirmation message appears on the screen.



Insert the USB memory device that contains the settings for your XD20 into the USB port and press **Enter** to copy the settings onto the XD20’s hard drive. Press **◀** to abort. If there is no USB memory device, a message appears, asking you to insert one.

After the settings are loaded, the following message appears on the screen.



When you press **Enter**, the following message appears on the screen. You must restart the XD20 before continuing to use it. (Turn XD20 off and then on again to restart.)



If the XD20 is unable to load the configuration files to the USB memory device, an error message appears on the screen. This will occur if you try to download settings from one XD20 to another unit. This function will only download settings saved from the same unit.



### 7.8.2.2. Master Settings

This menu allows you to save the XD20 configuration and transfer it to a different XD20. Saving the Master Settings creates a folder on the USB device named “XD20-Master”. There can only be one Master configuration saved on the USB device. Any XD20 can load that Master setting. The license files cannot be transferred from one XD20 to another.



**System → USB Memory → Master Setting**

**Save on USB** Save XD20 Master Settings from XD20 onto a USB memory device.

**Load from USB** Load Master Settings from one XD20 to another.

**Exit Menus** Return to the Status display.

#### Save on USB

Select **Save on USB** from the Master Settings menu and the following message appears.



**Enter** Start the Save process.

◀ Cancel.

Insert the USB memory device into the XD20 and press **Enter** to start the Save process. If there is no USB memory device, a message appears, asking you to insert one.

The following message appears if the operation finishes without errors.



**Enter** Return to previous menu.

If an error occurs, the following message appears.



### Load from USB

Select **Load from USB** from the Master Settings menu and the following message appears.



**Enter** Start the Load process.

◀ Cancel.

Insert the USB memory device that contains the Master settings into the XD20 and press **Enter** to start the process. If there is no USB memory device, a message appears, asking you to insert one.

After the Master settings are loaded onto the hard drive, the following message appears.



**Enter** Continue.

When you press **Enter**, the following message appears on the screen. Restart the XD20 before continuing to use it. (Turn XD20 off and then on again, to restart.)



If an error occurs, the following message appears. Check that the Master settings have been saved on the USB device.



### 7.8.2.3. Copy

Use this menu to load the configuration files from a USB memory device that may contain configuration files for several XD20 units. The configuration files on the USB memory device are those that have been stored by using the Configuration/Store function (see *XD20 Configuration*, on page 96).

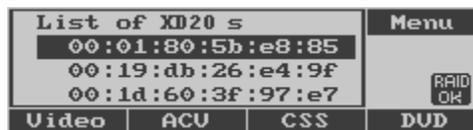
Each XD20 configuration is identified by the MAC address. Use the MAC address to identify the XD20 unit to copy the configuration from.

This function may be used if an XD20 is being replaced, and the new unit requires the configuration of the one being replaced.

1. First you need to determine the MAC address of the XD20 being replaced, or copied. From the **Ready** message on the LCD status display, press **Enter** and select **Menu** → **Info** → **Mac Address** to view the MAC address. Write down the MAC address that is displayed.
2. Then select **Copy** from the **USB Memory** menu.

If you have not inserted a USB memory device into the USB port, a message will appear, prompting you to do so.

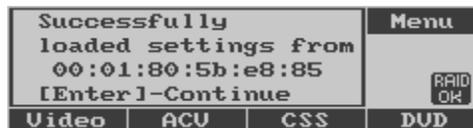
3. Insert the memory device into the USB port. A list of the MAC addresses on the memory device will display, as shown here.



#### System → USB Memory → Copy

4. Scroll through the list to find the MAC address that matches the address of your XD20. Position the cursor next to it.
5. Press **Enter** to copy (load) the settings associated with the selected MAC address onto the replacement XD20.

The following message displays if the XD20 configuration successfully loads.



6. When you press **Enter**, the following message appears on the screen. Restart the XD20 before continuing to use it. (Turn XD20 off and then on again, to restart.)



- The following message displays if an error occurred.



### 7.8.2.4. Log Files

This menu allows you to copy XD20 log files onto a USB memory device. You may use this if the XD20 is having playback problems and a DTS Digital Cinema representative asks you copy the log files and send them to DTS Digital Cinema for analysis in order to determine the cause of the problem.

The log files are stored in a subdirectory on the USB device with the name \XD20-[MACaddress]\log, where [MACaddress] is the MAC address for the XD20.

1. Connect the USB memory device to the XD20. Then select **Log Files** from the **USB Memory** menu.

The following confirmation message will appear.



**System → USB Memory → Log Files**

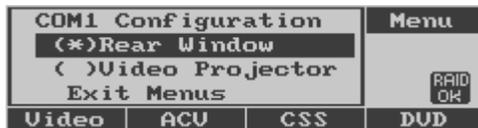
2. Press **Enter** to activate the process of copying the Log Files from the XD20 to the USB memory device.



3. Then remove the USB memory device, copy the “log” files to a PC, zip them, and email them to the DTS Digital Cinema representative.

### 7.8.3. COM1 Configuration

The COM1 Configuration menu, shown below, is used to assign a function to the COM1 port. To access the menu, select COM1 Configuration on the System menu and press **Enter**.

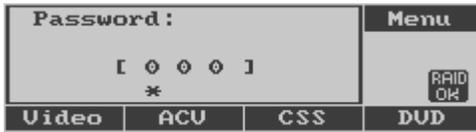


**System → COM1 Configuration**

- |                        |  |
|------------------------|--|
| <b>Rear Window</b>     | COM1 outputs text for Rear Window display.   |
| <b>Video Projector</b> | COM1 is used to control the video projector. |
| <b>Exit Menus</b>      | Return to the Status display.                |

### 7.8.4. Set Password

The Set Password dialog box allows you to assign a three-digit password to protect access to the setup menus. To disable the password, set it to 0 0 0.



**System → Set Password**

- ▶ ◀ Move the cursor to next/previous digit.
- ▲ ▼ Change the digit.
- Enter** Continue to confirmation.

When you set up a password, such as 110, to protect access, the following message will appear. Scroll up/down to select **Cancel** or **OK**.



**Enter** Continue.

To cancel the password, select **Cancel**. The following message will appear. Press **Enter** to return to the set password form.



To confirm the password, select **OK**. The following message will appear. Press **Enter** to return to the set password form.



If you forget your password, contact DTS Digital Cinema Technical Support to receive help regaining access to the XD20.

#### 7.8.4.1. Disable Password

The Password menu also allows you to provide full access to the setup menus by disabling the password. To disable it, set the password to the default setting: 000.

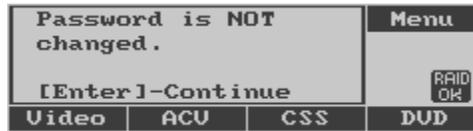


**System → Set Password**

When you set the password to 000, the following message will appear.



To cancel this action, select **Cancel** and the following message will appear. Press **Enter** to return to the set password form.

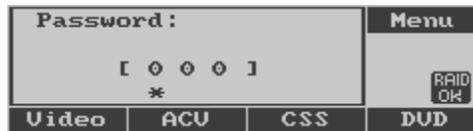


To confirm, select **OK** from the previous menu and the following message will appear. Press **Enter** to return to the set password form.



### 7.8.4.2. Change Password

To change the password, use the Set Password menu (to set a new password).

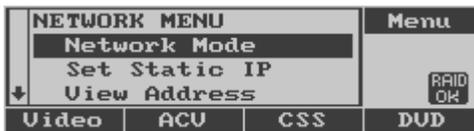


**System → Set Password**

### 7.8.5. Network

In a networked system the XD20 can play using remote data. However, the remote data must be downloaded to become local, before it can be played.

The network is used for connection to the MediaLink XD. This menu is used to set the network parameters to allow remote access to the XD20.



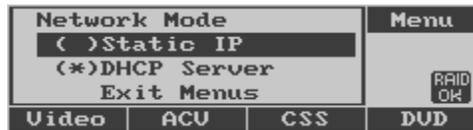
**Setup → System → Network**

- Network Mode**      Select between Static and DHCP server.
- Set Static IP**      Set the Static IP address.
- View Address**      Display the IP address, if connected.
- Network Transfer**    Soundtrack and CSS content that is loaded in one XD20 can be automatically loaded to the other XD20 units on the network.
- Notify Server**      Test function to help the server identify an XD20 connected to the network.
- Exit Menus**        Return to the Status display.

**Note:** If you change any network setting you must restart the XD20 for the changes to take affect.

### 7.8.5.1. Network Mode

This menu allows to you disable your connection to the network or select Static IP or DHCP mode.



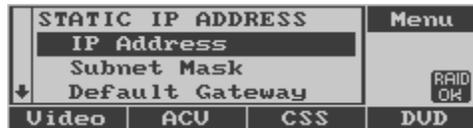
**System → Network → Network Mode**

**Static IP** Select a specific IP to connect to the network.

**DHCP Server** XD20 makes a request to a DHCP server on the network to automatically be assigned a dynamic IP address.

### 7.8.5.2. Static IP Address

This menu allows you to select a **Static IP Address**, along with other network addressing parameters.

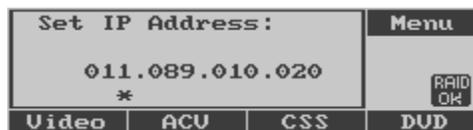


**System → Network → Set Static IP**

- IP Address** Set Static IP Address
- Subnet Mask** Set Static Subnet Mask Address
- Default Gateway** Set Static Default Gateway Address
- Primary DNS** Set Static Primary DNS Address
- Secondary DNS** Set Static Secondary DNS Address
- Set Defaults** Set all IP Addresses to defaults

#### 7.8.5.2.1. Set Static IP Address

This menu allows you to select and enter a Static IP Address.



**Network → Set Static IP → IP Address**

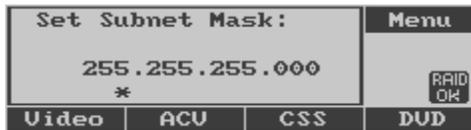
The cursor ('\*') is below one of the four three-digit fields. Each field has a value between 000 and 255.

- ▲ Increases field by 1. Wraps from 255 to 000.
- ▼ Decreases field by 1. Wraps from 000 to 255.
- ◀ Moves cursor to the left, or, if at the first position, returns to the *Static IP Address* menu.
- ▶ Moves cursor to the right.

**Enter** Selects value and returns to *Static IP Address* menu.

### 7.8.5.2.2. Set Subnet Mask

This menu allows you to select and enter a static Subnet Mask IP Address.



#### Network → Set Static IP → Subnet Mask

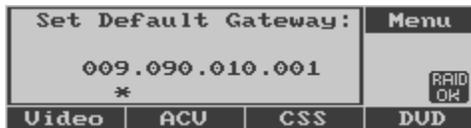
The cursor ('\*') is below one of the four three-digit fields. Each field has a value between 000 and 255.

- ▲ Increases field by 1. Wraps from 255 to 000.
- ▼ Decreases field by 1. Wraps from 000 to 255.
- ◀ Moves cursor to the left, or, if at the first position, returns to the *Static IP Address* menu.
- ▶ Moves cursor to the right.

**Enter** Selects value and returns to *Static IP Address* menu.

### 7.8.5.2.3. Set Default Gateway

This menu allows you to select and enter a static Default Gateway IP Address.



#### Network → Set Static IP → Default Gateway

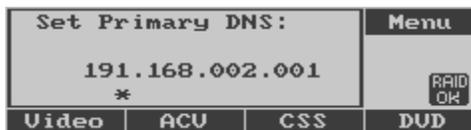
The cursor ('\*') is below one of the four three-digit fields. Each field has a value between 000 and 255.

- ▲ Increases field by 1. Wraps from 255 to 000.
- ▼ Decreases field by 1. Wraps from 000 to 255.
- ◀ Moves cursor to the left, or, if at the first position, returns to the *Static IP Address* menu.
- ▶ Moves cursor to the right.

**Enter** Selects value and returns to *Static IP Address* menu.

### 7.8.5.2.4. Set Primary DNS

This menu allows you to enter a static Primary Domain Name Server's (DNS) IP Address.



#### Network → Set Static IP → Primary DNS

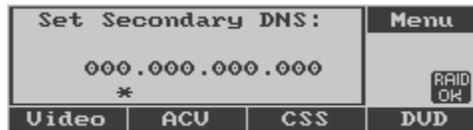
The cursor ('\*') is below one of the four three-digit fields. Each field has a value between 000 and 255.

- ▲ Increases field by 1. Wraps from 255 to 000.
- ▼ Decreases field by 1. Wraps from 000 to 255.
- ◀ Moves cursor to the left, or, if at the first position, returns to the *Static IP Address* menu.
- ▶ Moves cursor to the right.

**Enter** Selects value and returns to *Static IP Address* menu.

### 7.8.5.2.5. Set Secondary DNS

This menu allows you to enter a static Secondary DNS IP Address.



#### Network → Set Static IP → Secondary DNS

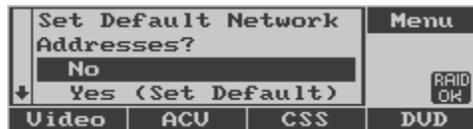
The cursor (“\*”) is below one of the four three-digit fields. Each field has a value between 000 and 255.

- ▲ Increases field by 1, range is 0 to 255.
- ▼ Decreases field by 1, range is 255 to 0.
- ◀ Moves cursor to the left, or, if at the first position, returns to the *Static IP Address* menu.
- ▶ Moves cursor to the right.

**Enter** Selects value and returns to *Static IP Address* menu.

### 7.8.5.2.6. Set Defaults

This menu allows you to set all the IP Addresses to defaults. These include the system's IP Address, Subnet Mask, Default Gateway, Primary DNS, and Secondary DNS addresses.



#### Network → Set Static IP → Set Defaults

If you select **No**, this screen will display. Press **Enter** to exit.

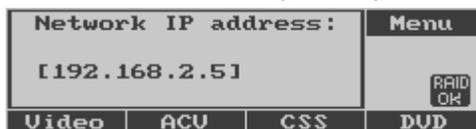


If you select **Yes (Set Default)** from the Set Defaults menu, this screen will display. Press **Enter** to exit.



### 7.8.5.3. View Network IP Address

This menu allows you to see your XD20 Network IP Address. If your XD20 is connected to a network, a message similar to the following message will display on the screen.



#### Network → View Address

If your XD20 is not connected to a network, a message will appear on the screen indicating lack of connection. Press **Enter** to exit.

### 7.8.5.4. Network Transfer

This command enables/disables Network Transfer, which can only be used when multiple XD20 units are connected together in a local network.

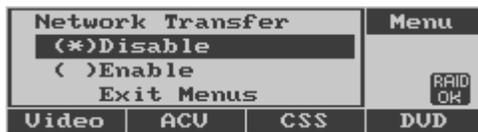
When enabled, soundtrack and CSS content that is loaded in one XD20 is automatically loaded to the other XD20 units on the network.

- The network transfer of content does not apply to Video and ACV content.

Maintenance of file contents on the remote XD20 units works the same as if the content were loaded locally on the XD20 through the connected DVD drives.

The advantages of the Network Transfer feature are:

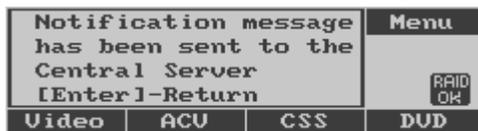
- There is no need to have a DVD drive unit with every XD20.
- Soundtrack/CSS load-in is simplified because the user only needs to load discs once in a cinema complex.



**Network → Network Transfer**

### 7.8.5.5. Notify Server

This command sends a notification message to the server to identify the XD20 on the network.

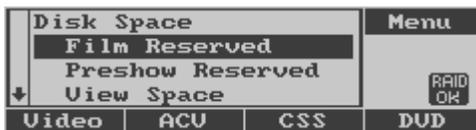


**Network → Notify Server**

Press **Enter** to return to the *Network* menu.

## 7.9. Disk Space

Use this menu to allocate disk space to film, preshow video, and ACV. ACV is allocated whatever space is not allocated by film and preshow.



**Main Menu → Setup → System → Disk Space**

- Film Reserved**      Set the amount of disk space to reserve for film.
- Preshow Reserved**    Set the amount of disk space to reserve for preshow.
- View Space**            View the disk space allocation.
- Exit Menu**             Return to Status display.

- Note:** ACV space = total space – film space – preshow space.  
You cannot set either preshow video or film so that video space + film space = total space.

### 7.9.1. Film Reserved

Use this command to set the amount of disk space (in Gigabytes) to reserve for film.



**System → Disk Space → Film Reserved**

**Note:** You cannot set either preshow video or film so that video space + film space = total space.

- ▲ Increase reserved space.
- ▼ Decrease reserved space.
- ◀ Return to Disk Space menu.
- Enter** Return to Disk Space menu.

### 7.9.2. Preshow Reserved

Use this command to set the amount of disk space (in Gigabytes) to reserve for preshow video. The controls are the same as the Film Reserved screen, above.

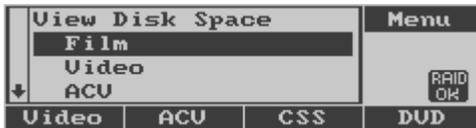


**System → Disk Space → Preshow Reserved**

**Note:** You cannot set either preshow video or film so that video space + film space = total space.

### 7.9.3. View Space

Use this menu to view the current allocation of disk space reserved for film, video, and ACV.



**System → Disk Space → View Space**

- Film** View film disk space details.
- Video** View preshow video disk space details.
- ACV** View ACV disk space details.
- Exit Menus** Return to Status display.

**Note:** ACV space = total space – film space – preshow space.  
It is possible to set either video or film so that video space + film space = total space (so there is no ACV space).

### 7.9.3.1. View Space Film

Select Film in the **View Space** menu, to open this screen which details the film disk space used and available.

Film Disk Space			Menu
Allowed	25.0 GB		RAID OK
Used	22.4 GB		
Available	2.6 GB		
Video	ACU	CSS	DUD

### 7.9.3.2. View Space Video

Select Video in the **View Space** menu, to open this screen which details the video disk space used and available.

Video Disk Space			Menu
Allowed	72.0 GB		RAID OK
Used	0.0 GB		
Available	72.0 GB		
Video	ACU	CSS	DUD

### 7.9.3.3. View Space ACV

Select ACV in the **View Space** menu, to open this screen which details the ACV disk space used and available.

ACV Disk Space			Menu
Allowed	117.6 GB		RAID OK
Used	0.5 GB		
Available	117.1 GB		
Video	ACU	CSS	DUD

**Note:** ACV space = total space – film space – preshow space.

## 7.10. System Clock

The System Clock menus allow you to set and view the date, time and Time Zone for your XD20. These settings are needed for logging information and for playing video playlists with auto-start times.

Setting the Time Zone also allows the XD20 to automatically accommodate Daylight Savings Time.

**Note:** If you are using a NTP server, the date and time are set on a regular basis. But the Time Zone must be properly set.

SYSTEM CLOCK MENU			Menu
Set Time Zone			RAID OK
Set System Date			
Set System Time			
Video	ACU	CSS	DUD

**Main Menu → Setup → System → System Clock**

Set Time Zone

Set System Date

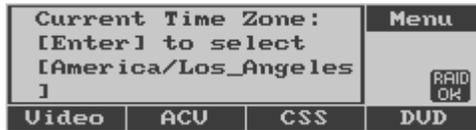
Set System Time

**Exit Menus**

Return to Status display.

### 7.10.1. Set Time Zone

The Time Zone menu shows the current Time Zone set for the XD20. The following message displays when the Time Zone menu is selected:



**System → System Clock → Set Time Zone**

- ◀ Return to *System Clock* menu.
- Enter** Change Time Zone, go to Select Location menu.

To change the Time Zone, it is necessary to enter a location, a country, and then finally a Time Zone. The following menu displays after pressing **Enter** to change the Time Zone.



- ▲ or ▼ Cycle through list of locations (regions): Americas, Africa, Pacific Ocean, Indian Ocean, Europe, Australia, Atlantic Ocean, Asia, Arctic Ocean, Antarctica.
- ◀ Return to the Current Time Zone menu.
- Enter** Select location (region) listed.

If you select Americas and press **Enter**, the following menu will appear.



Use the ▲ and ▼ buttons to cycle through the list of countries.

When the country you want to select appears on the screen, press **Enter**. If you select United States, the following menu will appear.

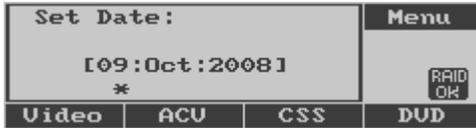


Scroll through the menu to see a list of cities. When you see the city you want to select, press **Enter**. This will activate your selection and take you back to the **System Clock** menu.

### 7.10.2. Set System Date

From the Main Menu, select **Setup** → **System** → **System Clock**. Scroll to **Set System Date** and press **Enter**.

The Set Date menu, shown below, appears. Enter the date in day-month-year (DD:Month:YYYY) format, as shown below. Press **Enter** to confirm the entry.



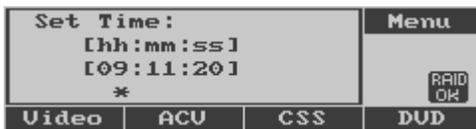
**Setup** → **System** → **Set System Date**

- ▲ Increase value.
- ▼ Decrease value.
- ▶ Next field.
- ◀ Previous field, or return to System Clock menu.
- Enter** Set new date and return to System Clock menu.

### 7.10.3. Set System Time

From the Main Menu, select **Setup** → **System** → **System Clock**. Scroll to **Set System Date** and press **Enter**.

Scroll to the third line and enter the time in hours:minutes:seconds (hh:mm:ss) format, as shown below and press **Enter** to confirm your entry.



**Setup** → **System** → **Set System Time**

- ▲ Increase value.
- ▼ Decrease value.
- ▶ Next field.
- ◀ Previous field, or return to System Clock menu.
- Enter** Set new time and return to System Clock menu.

## 7.11. LCD Setup

Use the LCD Setup screen to adjust brightness and contrast of the LCD display. Use the buttons below the LCD display to make changes, and then press **Enter** when finished.



**Setup** → **System** → **LCD Setup**

- Soft button 1 Decrease brightness
- Soft button 2 Increase brightness
- Soft button 3 Decrease contrast
- Soft button 4 Increase contrast
- Enter** or ◀ Return to System menu.

## 7.12. DVD Drives

When this screen is displayed, use the buttons below the LCD display to eject the DVD drives on the external DVD drive unit. The purpose is to identify which is drive A and which is drive B. When you click **IdentA** or **IdentB**, the drive tray will eject (open) for a brief time, then close again.

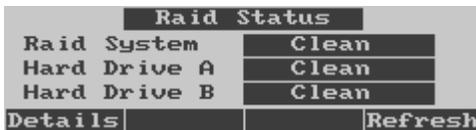


**Setup** → **System** → **DVD Drives**

- IdentA                      Eject drive A
- IdentB                      Eject drive B
- Enter** or ◀              Return to System menu.

## 7.13. RAID

The Raid Status screen provides status information about the XD20 hard drives. Use the buttons below the LCD display to access the **Details** screen or to **Refresh** the status screen. If one of the drives is faulted, an additional button selection is available (**Re-Add**) to attempt to bring the drive back online.



**Setup** → **System** ↘ **Raid**

- Details                      Continue to the Details screen.
- Refresh                      Refresh (update) the information on this screen.
- Re-Add                      Bring a faulted drive back online.
- Enter** or ◀              Return to System menu.

The Raid Details screen looks like this example.



### Raid Details

- Refresh                      Refresh (update) the information on this screen.
- Enter** or ◀              Return to Raid Status screen.

## 7.14. Software Revert

The Revert operation allows the XD20 you are using to revert back to the previous version of XD20 software. It will only allow one step back (It will not revert back further than the previous version).

- Note:** If the XD20 has been updated using a full install disc, it will not revert to a previous version.

Start by accessing the System Options menu. From the Main menu, select **Setup** → **System** → **Revert**, as shown below. Scroll to **Revert** and press **Enter**.

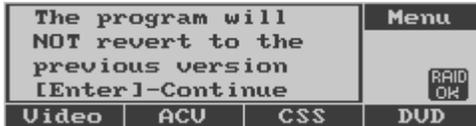
After you select **Revert**, the following menu will appear, asking for confirmation.



**Setup → System → Revert**

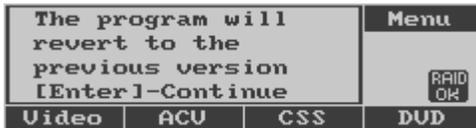
- No** System will continue to use current version of software
- Yes** System will revert to previous version of software installed in the unit
- Exit Menus** Return to Status display.

If you select **No**, the following message will appear on the screen and the software will not revert to a previous version.



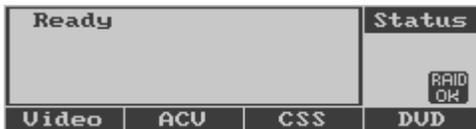
**Enter** Return to the System Options menu.

If you select **Yes**, the message shown below will appear on the screen.



**Enter** Activate the software revert.

When the Revert process is completed, the *Ready* message will appear on the XD20. This indicates the unit is ready for loading, playback or setup.



## 7.15. Display Language

This menu allows you to select the language displayed on the XD20 front panel LCD screen. English is the default.



**Main Menu → Setup → Display Language**

The standard language options are:

- English
- French
- German
- Italian
- Spanish

## Appendix A. Connector Pin-outs

This appendix lists the pin-out of all of the connectors on the back panel of the XD20 Media Player.

### Connectors

For installation drawings and information about parts, refer to Appendix B: Cinema Processor Interface Wiring Diagrams, Appendix C: CSS and HD Video Option Wiring Diagrams, Appendix D: Cable Assemblies and Breakout Cards, and Appendix E: Timecode Reader Head Mounting Brackets.

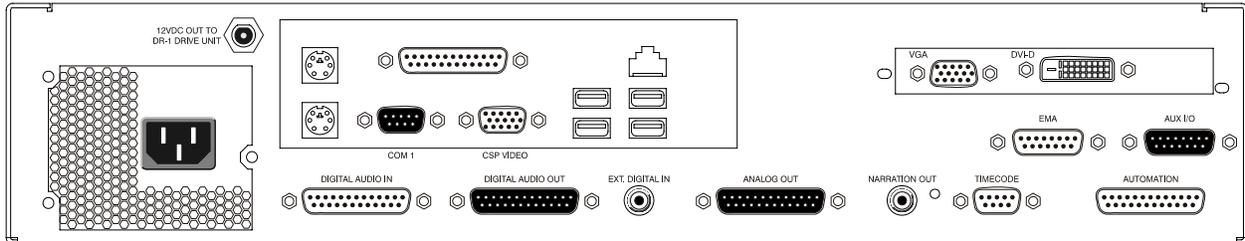


Figure 1. XD20 Rear Panel

On the left side

12VDC Out to H260 Drive Unit (the external DVD drive unit)

Power cord connector, 100-240V 5A 50-60Hz

In the center-left connector panel

PC Mouse and Keyboard connectors

Printer connector

COM 1 – DB9M

CSP Video – HD15F

1GB Ethernet network RJ45 and four USB 2.0 connectors

Along the bottom

Digital Audio IN – DB25F

Digital Audio OUT – DB25M

EXT. Digital IN – RCA

ANALOG OUT (CH 1 – 10) DB25M

Narration OUT – 300Mv RMS mono output, RCA

TIMECODE – DB9M

AUTOMATION – DB25F

Center right

EMA CONTROL - DB15F

AUX I/O DB15M

Upper right

VGA OUT HD15F

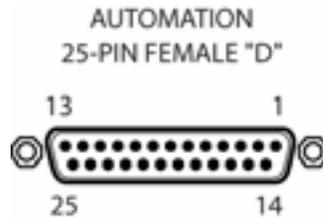
DVI-D (Digital Video Interface) OUT – DVI 29F

S/PDIF I/O for HD Video

## Pinout Connectors for Current Version of XD20

### AUTOMATION - DB25F

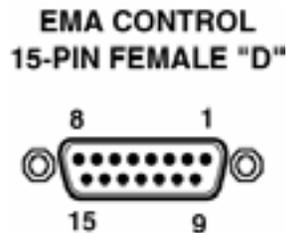
AUTOMATION – DB25F	
Pin	Description
1	FORMAT 0
2	FORMAT 1
3	FORMAT 2
4	FORMAT 3
5	FORMAT 4
6	FORMAT 5
7	FORMAT 6
8	FORMAT 7
9	N/C
10	N/C
11	N/C
12	USER GND
13	USER SUPPLY +5V to +15V @ 40mA (required for status feedback)
14	N/C
15	N/C
16	N/C
17	N/C
18	N/C
19	N/C
20	N/C
21	N/C
22	N/C
23	N/C
24	N/C
25	N/C




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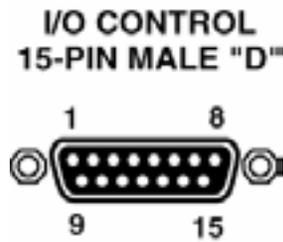
### EMA CONTROL - DB15F

EMA CONTROL – DB15F	
Pin	Description
1	N/C
2	N/C
3	EMA FAN SENSE
4	COM 2 RX
5	COM 2 TX
6	COM 2 GND
7	N/C
8	EMA DOUSER CONTROL
9	+12V
10	+12V
11	+12V
12	+12V
13	GND
14	GND
15	GND



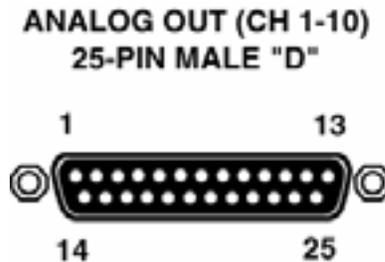
## I/O CONTROL

I/OCONTROL – 15-PIN MALE "D"	
Pin	Description
1	INPUT 1(+)
2	INPUT 2(+)
3	INPUT 3(+)
4	OUTPUT 1(+)
5	OUTPUT 2(+)
6	OUTPUT 3(+)
7	SIGNAL GND
8	+5V
9	INPUT 1(-)
10	INPUT 2(-)
11	INPUT 3(-)
12	OUTPUT 1(-)
13	OUTPUT 2(-)
14	OUTPUT 3(-)
15	+12V



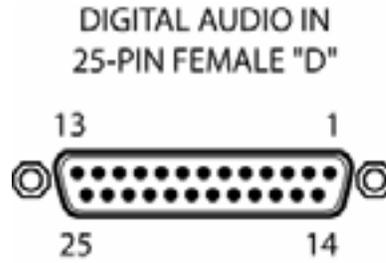
## ANALOG OUT (CH 1 – 8) DB25M

ANALOG OUT (CH 1 – 8) DB25M	
Pin	Description
1	AUDIO GND
2	RIGHT SURROUND
3	AUDIO GND
4	AUDIO GND
5	AUDIO GND
6	AUDIO GND
7	AUDIO GND
8	AUDIO GND
9	AUDIO GND
10	AUDIO GND
11	AUDIO GND
12	AUDIO GND
13	AUDIO GND
14	LEFT
15	LEFT SURROUND
16	RIGHT CENTER
17	RIGHT
18	LEFT CENTER
19	N/C
20	CENTER
21	MONO SURROUND
22	N/C
23	N/C
24	SUBWOOFER
25	N/C



### Digital Audio IN – DB25F

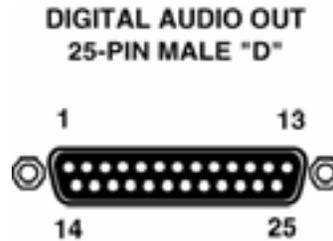
DIGITAL AUDIO IN (CH 1 – 8) E632 AES/EBU PCA		
Pin	Description	Standard Ch Assignment
1	Chassis Ground	
2	AES 1/2 -	L/R
3	AES 3/4 +	C/LFE
4	Chassis Ground	
5	AES 5/6 -	LS/RS
6	AES 7/8 +	LC/RC
7	Chassis Ground	
8	N/C	
9	Chassis Ground	
10	N/C	
11	N/C	
12	Chassis Ground	
13	N/C	
14	AES 1/2 +	L/R
15	Chassis Ground	
16	AES 3/4 -	C/LFE
17	AES 5/6 +	LS/RS
18	Chassis Ground	
19	AES 7/8 -	LC/RC
20	Chassis Ground	
21	N/C	
22	N/C	
23	Chassis Ground	
24	N/C	
25	N/C	



### Digital Audio OUT – DB25M

DIGITAL AUDIO OUT (CH 1 – 8) E632 AES/EBU PCA		
Pin	Description	Standard Ch Assignment
1	Chassis Ground	
2	AES 1/2 -	L/R
3	AES 3/4 +	C/LFE
4	Chassis Ground	
5	AES 5/6 -	LS/RS
6	AES 7/8 +	LC/RC
7	Chassis Ground	
8	N/C	
9	Chassis Ground	
10	N/C	
11	N/C	
12	Chassis Ground	
13	N/C	
14	AES 1/2 +	L/R
15	Chassis Ground	
16	AES 3/4 -	C/LFE
17	AES 5/6 +	LS/RS
18	Chassis Ground	
19	AES 7/8 -	LC/RC
20	Chassis Ground	
21	N/C	
22	N/C	
23	Chassis Ground	
24	N/C	
25	N/C	

N/C = No connection



The digital audio output pinout is compatible with the XD10P Cinema Audio Processor as well as with the Ultra Stereo JSD-80 cinema processor. The pin-out also matches the Dolby DMA8.

DTS Digital Cinema offers a DB25 male to female cable, 3-feet long, for hook-up (DDE P/N 2503004100). If wiring your own cable, the following criteria must be met:

1. Cable must be double shielded to conform to FCC\CE RF radiation emission limits.
2. Cable length should be no longer than 1 meter.
3. Conductors must be no smaller than 28-AWG

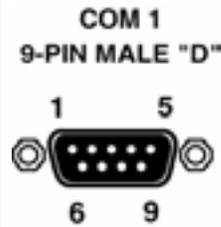
### Narration OUT and EXT Digital IN – RCA

RCA	
Conductor	Description
Center	Signal
Outer	Ground



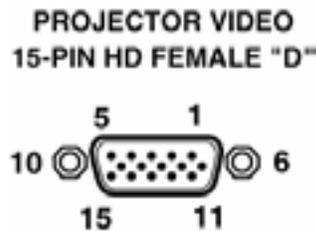
### COM 1 – DB9M

COM 1 – DB9M	
Pin	Description
1	DCD IN
2	RD IN
3	TD OUT
4	DTR OUT
5	SIG GND
6	DSR IN
7	RTS OUT
8	CTS IN
9	RI IN



### CSP VIDEO – HD15F

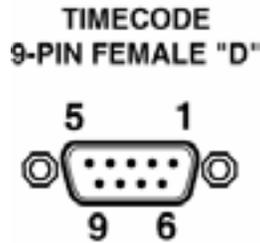
Pin	Description
1	Red Video
2	Green Video
3	Blue Video
4	Monitor ID, Bit #2
5	Ground
6	Red Ground
7	Green Ground
8	Blue Ground
9	No pin installed
10	Sync Ground
11	Monitor ID Bit #0
12	Monitor ID Bit #1
13	Horizontal Sync
14	Vertical Sync
15	Monitor ID Bit #3



- XD20 requires the optional CSS license to be enabled, for this connector to be functional.**

### TIMECODE - DB9M

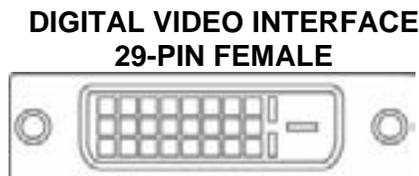
TIMECODE – DB9M	
Pin	Description
1	TIMECODE SIGNAL - Projector 1
2	TIMECODE SIGNAL - Projector 2*
3	N/C
4	N/C
5	+5VDC @ 250mA OUT
6	GND
7	GND
8	GND
9	LED DRIVE SIGNAL TO TCRH ("Timecode Valid" – active low)



**Note:** Pin 2 is only connected if a second projector is used (with a Y cable)

### DIGITAL VIDEO INTERFACE PIN-OUT – DVI29F

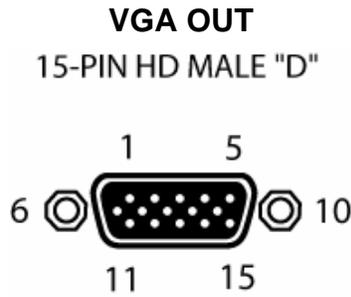
DIGITAL VIDEO INTERFACE – DVI29F	
Pin	Description
1	TMDS Data2-
2	TMDS Data2+
3	TMDS Data2/4 Shield
4	
5	
6	DDC Clock [SCL]
7	DDC Data [SDA]
8	
9	TMDS Data1-
10	TMDS Data1+
11	TMDS Data1/3 Shield
12	
13	
14	+5 V Power
15	Ground (for +5 V)
16	Hot Plug Defect
17	TMDS Data0-
18	TMDS Data0+
19	TMDS Data0/5 Shield
20	
21	
22	TMDS Clock Shield
23	TMDS Clock+
24	TMDS Clock-
25	
26	
27	
28	
29	
<b>C1</b>	
<b>C2</b>	
<b>C3</b>	
<b>C4</b>	
<b>C5</b>	Analog GND Return: (analog R, G, B)



**XD20 requires the optional HD Video license to be enabled, for this connector to be functional.**

### VGA OUT – 15-PIN M

Pin	Description
1	Red
2	Green
3	Blue
4	No Connect
5	Ground
6	Ground
7	Ground
8	Ground
9	No Connect
10	Ground
11	No Connect
12	DDC DAT
13	Horizontal Synchronization
14	Vertical Synchronization
15	DDC Clock



- XD20 requires the optional HD Video license to be enabled, for this connector to be functional.**

## Appendix B. Cinema Processor Interface Wiring Diagrams

Cinema Processor	DTS Part No.	Rev
XD20 Analog to XD10P	H268	A1
XD20 Dig Audio Out to XD10P Dig Audio In	H269	A1
XD20 to CP45 Cabling	H271	A1
XD20 to CP55 with Cat. 241 Mono Surrounds	H272	A1
XD20 to CP55 with Cat. 441 Stereo Surrounds	H273	A1
XD20 to CP65 Cabling	H274	A1
XD20 to CP65 with DA20	H275	A1
XD20 to CP200 with Cat. 160 Mono Surrounds	H276	A1
XD20 to CP200 with Cat. 560 Stereo Surrounds	H277	A1
XD20 to CP200 with SRD & DA20	H278	A1
XD20 to CP500 Cabling	H279	A1
XD20 to CP650 Cabling	H280	A1
XD20 to Ultra Stereo JS series	H281	A1
XD20 to Panastereo CSP1200	H282	A1
XD20 to Sony DCP-D1000	H283	A1
XD20 to Sony DFP-D3000	H284	A1
XD20 to Smart MOD VI & VII	H285	A1
XD20 to Ultra Stereo DSP-60	H287	A1
XD20 with CSS & HD Video Options	H288	A1
XD10P to XD20 and Doremi DCP-2000	H312	A1
Multiple XD20s in Stand-Alone network	H319	A1

TO PROGRAM THE XD20 AUTOMATION CONNECTOR, CHOOSE THE DTS-XD10P ANALOG AUTOMATION PRESET VIA THE FOLLOWING MENU SEQUENCE:

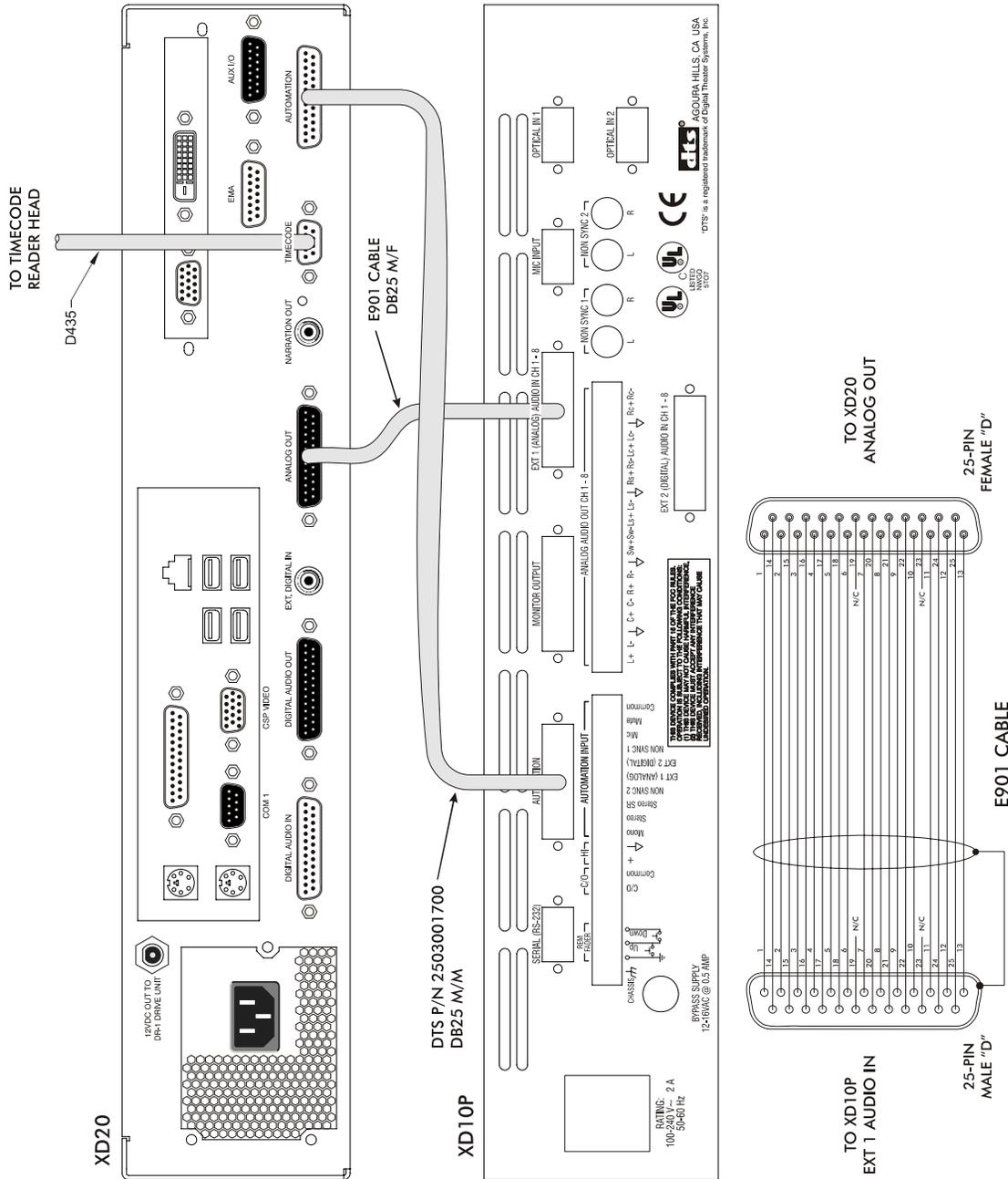
- MAIN MENU → SETUP (ENTER)
- SYSTEM SETUP MENU → AUTOMATION (ENTER)
- AUTOMATION/CONTROL → FORMAT (ENTER)
- FORMAT AUTOMATION → PIN DEFINITIONS (ENTER)
- FORMAT PIN DEFS → PREDEFINED FORMATS (ENTER)
- AUTOMATION PRESET → (\*) XD10P ANALOG (ENTER)

XD20 ANALOG OUT CONNECTOR (CH1-10)

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

XD20 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	NON-SYNC
7	FORMAT 6	
8	FORMAT 7	
9-11	N/C	
12	USER GND	DTS COMMON
13	USER SUPPLY	
14-25	N/C	



**DTS**  
DIGITAL CINEMA

TITLE XD20 "ANALOG" 6 & 8 TRACK OUT TO XD10P ANALOG IN

DRAWING NO. H268

REV. DATE  
A1 25JUN08

TO PROGRAM THE XD20 AUTOMATION CONNECTOR, CHOOSE THE XD10P DIGITAL AUTOMATION PRESET VIA THE FOLLOWING MENU SEQUENCE:

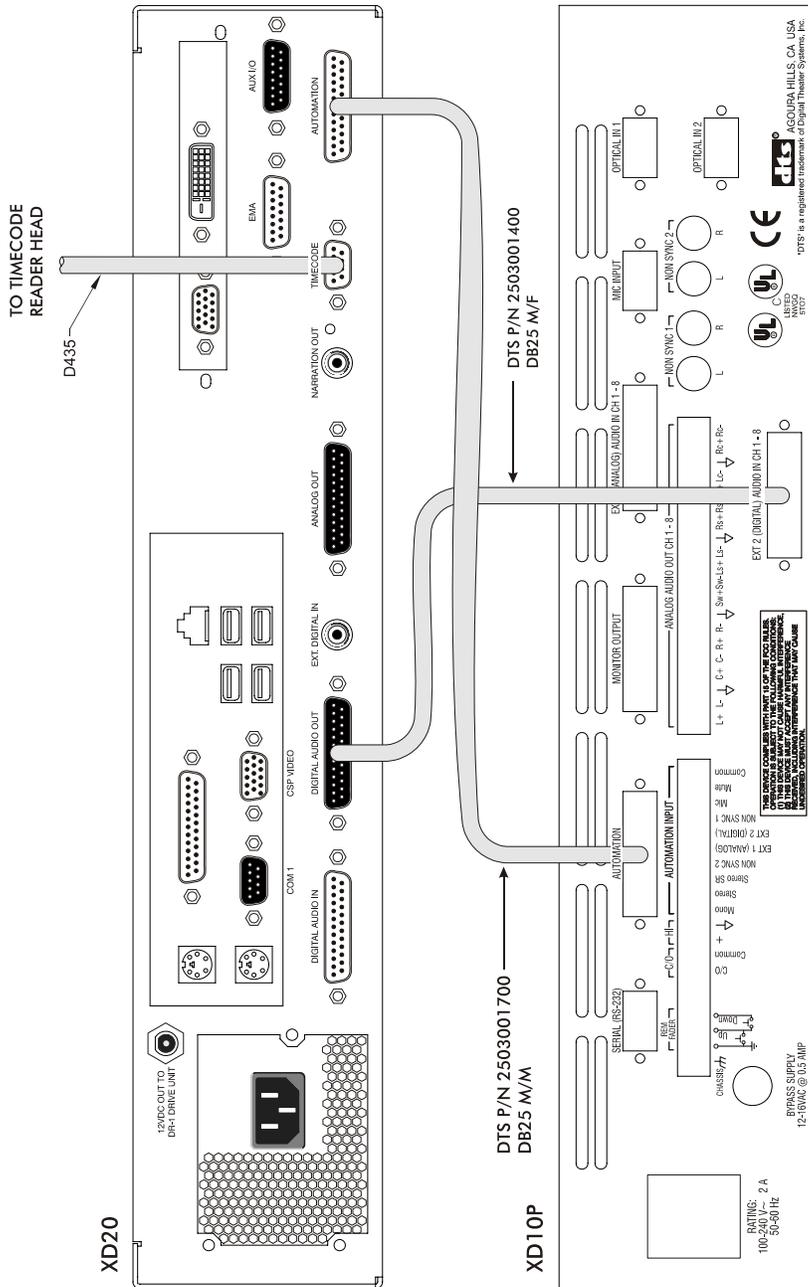
- MAIN MENU → SETUP (ENTER)
- SYSTEM SETUP MENU → AUTOMATION (ENTER)
- AUTOMATION/CONTROL → FORMAT (ENTER)
- FORMAT AUTOMATION → PIN DEFINITIONS (ENTER)
- FORMAT PIN DEFS → PREDEFINED FORMATS (ENTER)
- AUTOMATION PRESET → (\*) XD10P DIGITAL (ENTER)

XD20 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	AES_GND
9	AES_GND
10	AES_GND
11	AES_GND
12	AES_GND
13	AES 1/2 +
14	AES_GND
15	AES 3/4 -
16	AES 5/6 +
17	AES_GND
18	AES 7/8 -
19	AES_GND
20	AES_GND
21	AES_GND
22	AES_GND
23	AES_GND
24	AES_GND
25	AES_GND

XD20 AUTOMATION CONNECTOR

PIN	FUNCTION
1	FORMAT 0
2	FORMAT 1
3	FORMAT 2
4	FORMAT 3
5	FORMAT 4
6	FORMAT 5
7	FORMAT 6
8	FORMAT 7
9-11	N/C
12	USER_GND
13	USER_SUPPLY
14-25	N/C



**dts**  
DIGITAL CINEMA

RATING:  
100-240 V- 2 A  
50-60 Hz

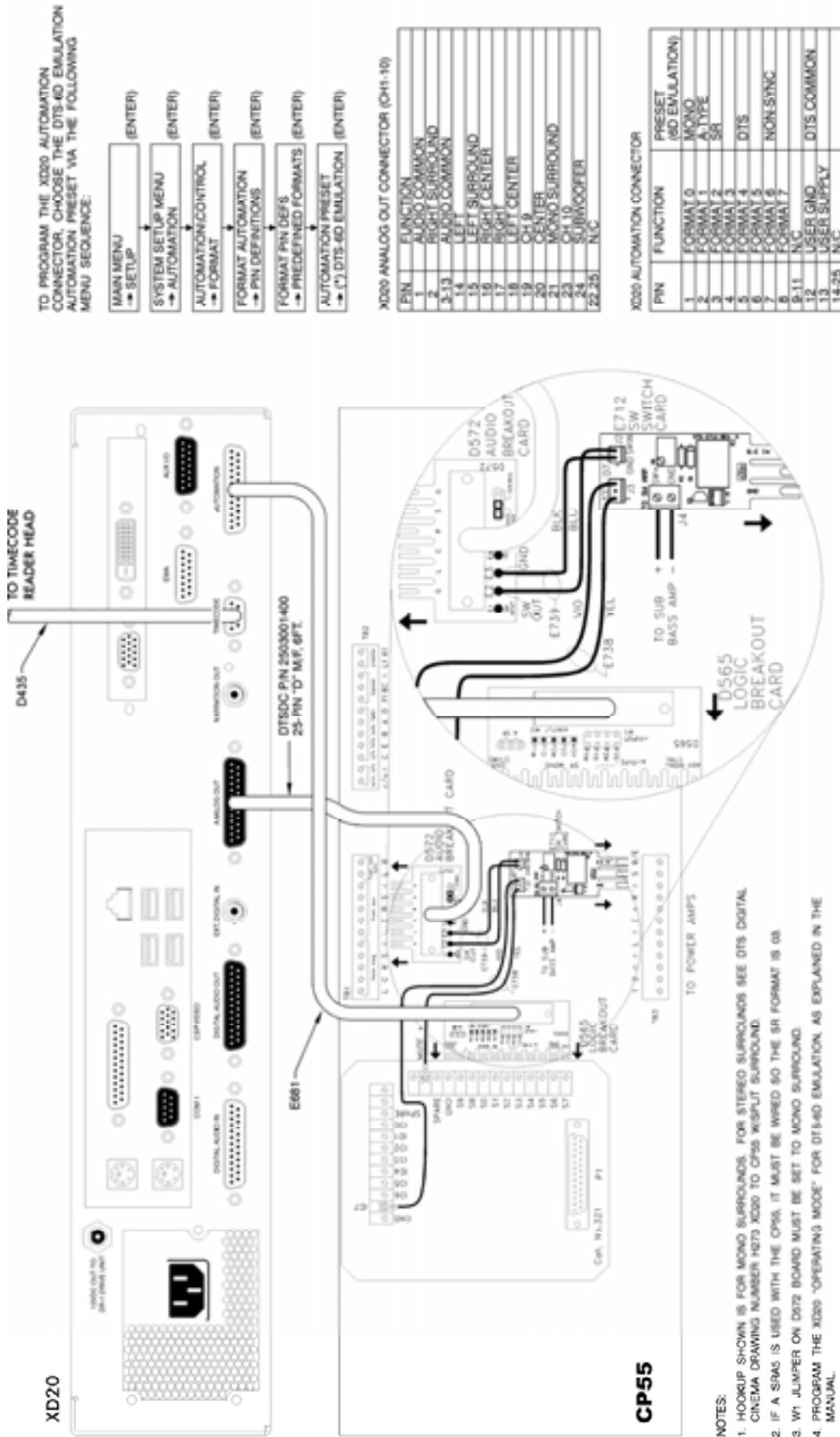
BRASS SUPPLY  
12-TRAP @ 0.5 AMP

DTS is a registered trademark of Digital Theater Systems, Inc.

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TITLE: XD20 "DIGITAL" AUDIO OUT TO XD10P "DIGITAL" AUDIO IN  
DRAWING NO.: H269  
REV.: A1  
DATE: 07/AUG08





- TO PROGRAM THE XD20 AUTOMATION CONNECTOR, CHOOSE THE DTS 40 EMULATION AUTOMATION PRESET VIA THE FOLLOWING MENU SEQUENCE:
- MAIN MENU (ENTER)
  - SETUP (ENTER)
  - SYSTEM SETUP MENU (ENTER)
  - AUTOMATION (ENTER)
  - AUTOMATION/CONTROL (ENTER)
  - FORMAT (ENTER)
  - FORMAT AUTOMATION (ENTER)
  - PIN DEFINITIONS (ENTER)
  - FORMAT PIN DEFS (ENTER)
  - PREDEFINED FORMATS (ENTER)
  - AUTOMATION PRESET (ENTER)
  - (\*) DTS 40 EMULATION (ENTER)

XD20 ANALOG OUT CONNECTOR (OH-10)

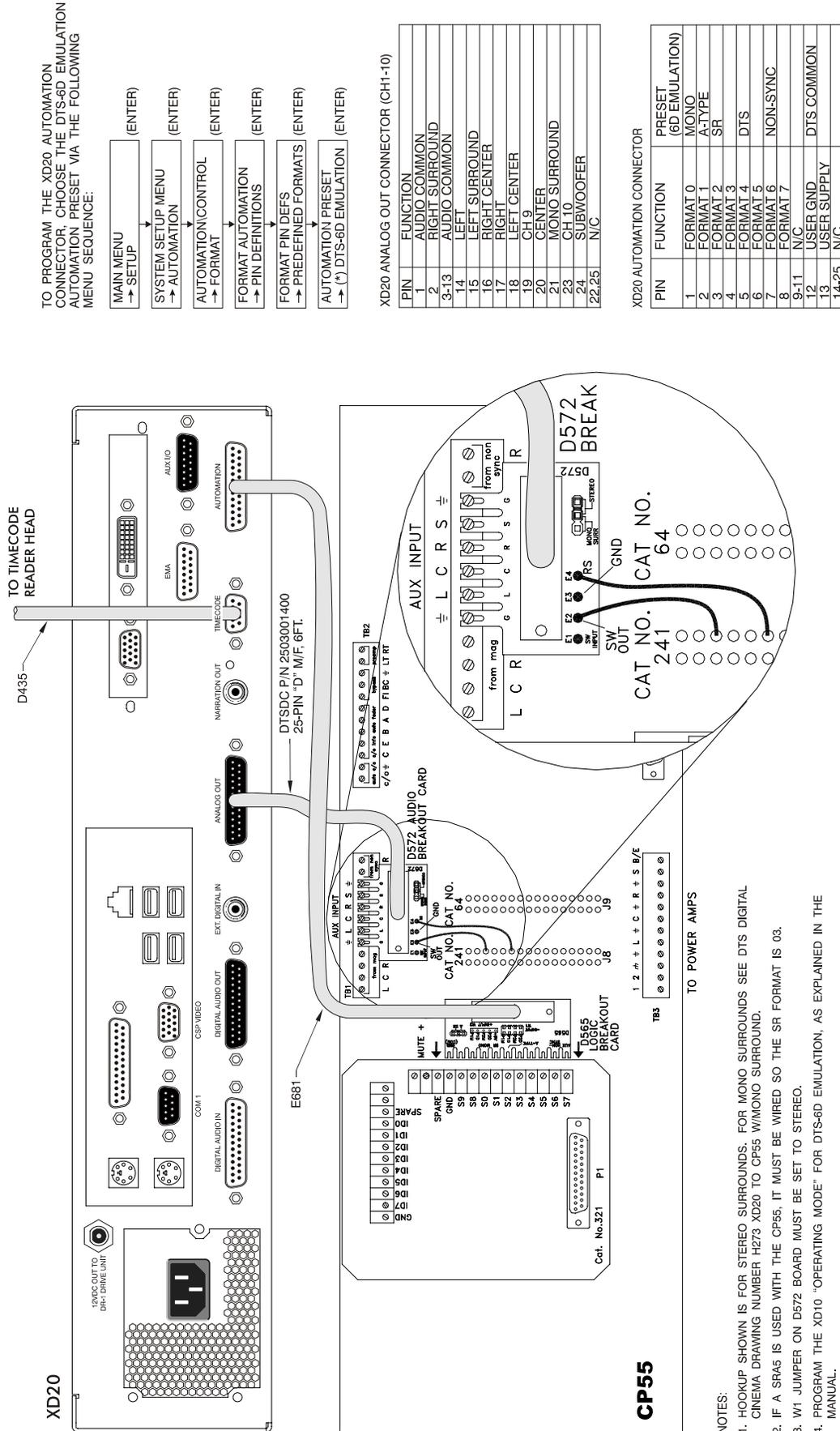
PIN	FUNCTION
1	AUDIO COMMON
2	RIGHT SURROUND
3-13	AUDIO COMMON
14	LEFT SURROUND
15	LEFT SURROUND
16	RIGHT CENTER
17	RIGHT CENTER
18	LEFT CENTER
19	CH-19
20	CENTER
21	MONO SURROUND
22	CH-10
23	MONO SURROUND
24	SUBWOOFER
25	N/C

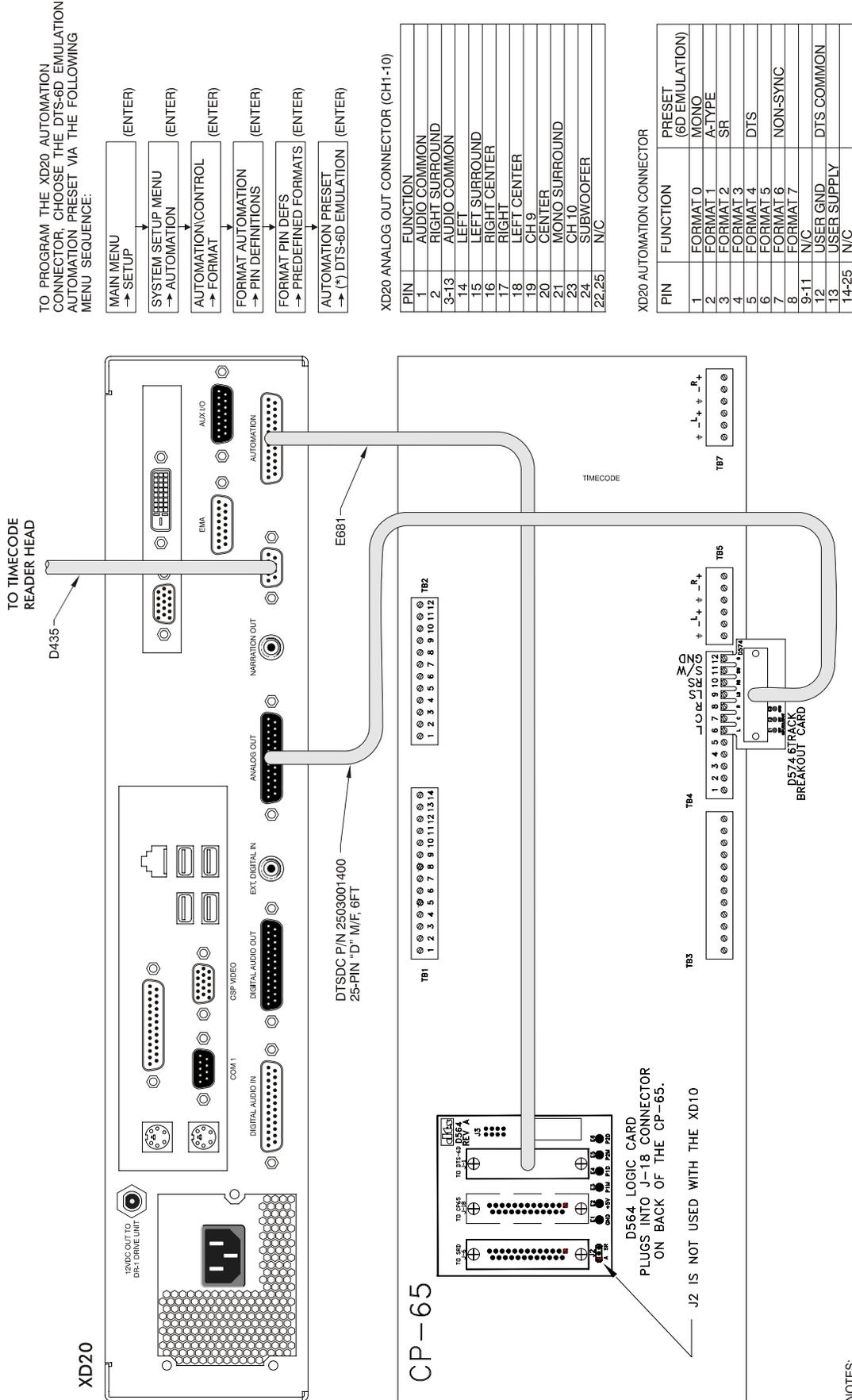
XD20 AUTOMATION CONNECTOR

PIN	FUNCTION	PRESET (40 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-STRC
8	FORMAT 7	
9-11	N/C	
12	USER GND	DTS COMMON
13	USER SUPPLY	
14-25	N/C	

- NOTES:
- HOOKUP SHOWN IS FOR MONO SURROUNDS. FOR STEREO SURROUNDS SEE DTS DIGITAL CINEMA DRAWING NUMBER H273 XD20 TO CP55 W/SPILT SURROUND.
  - IF A SRAS IS USED WITH THE CP55, IT MUST BE WIRED SO THE SR FORMAT IS 08.
  - W/ JUMPER ON D572 BOARD MUST BE SET TO MONO SURROUND.
  - PROGRAM THE XD20 "OPERATING MODE" FOR DTS-40 EMULATION, AS EXPLAINED IN THE MANUAL.
  - 2-503001-400 CABLE IS WIRED 1 TO 1.
  - IF SR CARDS ARE NOT INSTALLED, PROGRAM THE XD20 FALLBACK MODE FOR "A TYPE" AS DESCRIBED IN THE MANUAL.

TITLE: XD20 TO CP55 WITH CAT 241 MONO SURROUNDS  
 DRAWING NO: H272  
 REV: 001  
 A1 07AL008





TO PROGRAM THE XD20 AUTOMATION CONNECTOR, CHOOSE THE DTS-6D EMULATION AUTOMATION PRESET VIA THE FOLLOWING MENU SEQUENCE:

- MAIN MENU (ENTER)
- SETUP (ENTER)
- SYSTEM SETUP MENU (ENTER)
- AUTOMATION (ENTER)
- AUTOMATION/CONTROL (ENTER)
- FORMAT (ENTER)
- FORMAT AUTOMATIONS (ENTER)
- PIN DEFINITIONS (ENTER)
- FORMAT PIN DEFS (ENTER)
- PREDEFINED FORMATS (ENTER)
- AUTOMATION PRESET (ENTER)
- (\*) DTS-6D EMULATION (ENTER)

XD20 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

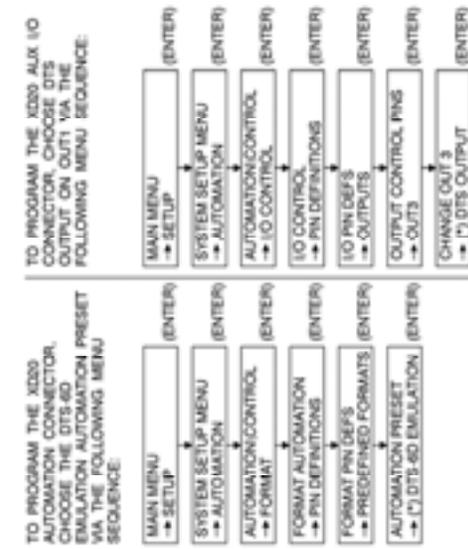
XD20 AUTOMATION CONNECTOR

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	
13	USER SUPPLY	DTS COMMON
14-25	N/C	

NOTES:

1. THE SUBWOOFER SWITCH ON THE CAT. 441 CARD MUST BE IN THE AUTO POSITION.

TITLE XD20 TO CP65 CABLING  
 DRAWING NO. H274  
 REV. A1  
 DATE 23JUN08

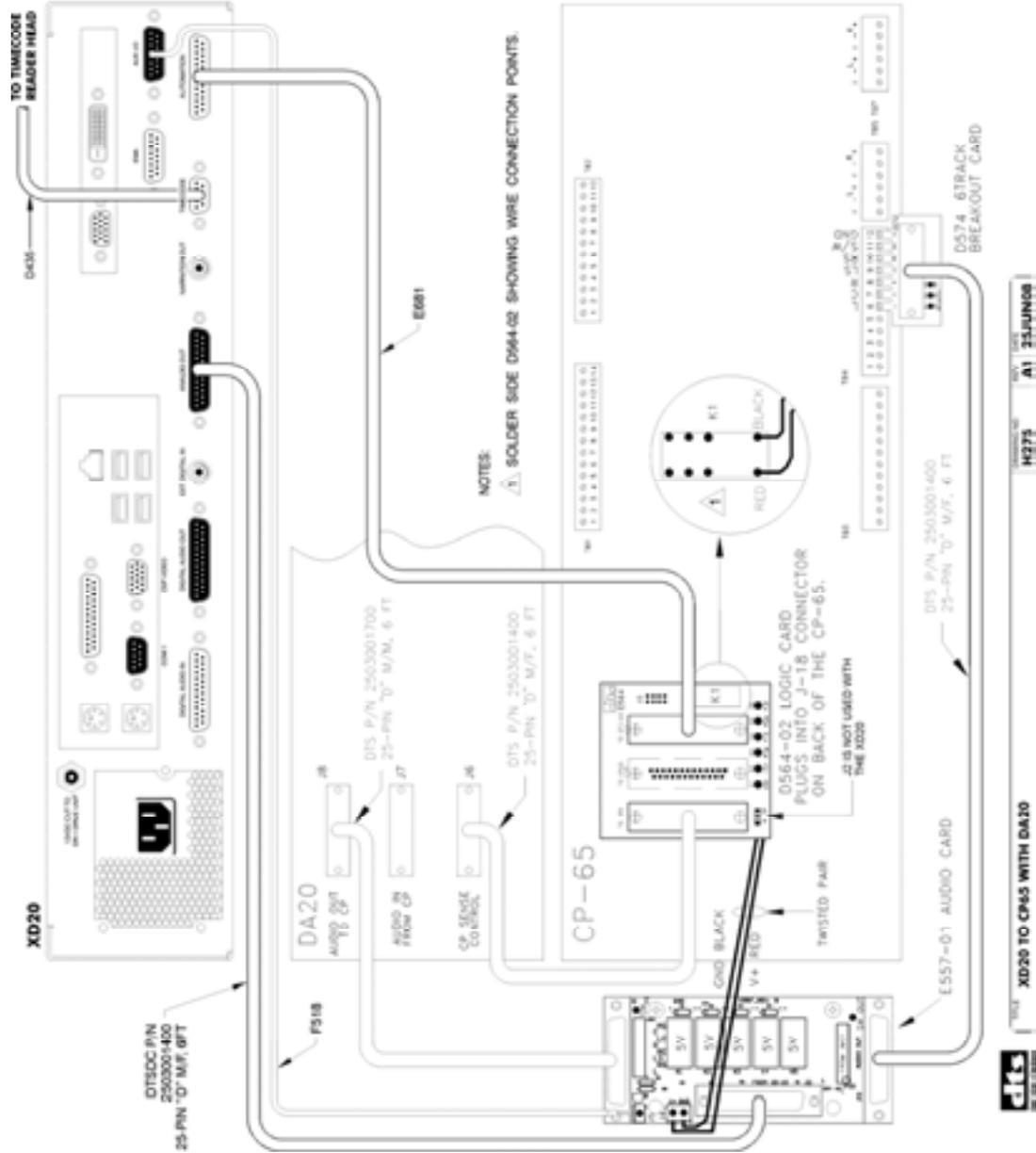


XD20 ANALOG OUT CONNECTOR (CH1-10)

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

XD20 AUTOMATION CONNECTOR

PIN	FUNCTION	PRESET (6D EMULATION)
1	FORMAT 0	MONO
2	FORMAT 1	A LTR
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 BND	DTS COMMON
13	USER SUPPLY	
14-25	N/C	



TO PROGRAM THE XD20 AUTOMATION CONNECTOR, CHOOSE THE CP200 AUTOMATION PRESET VIA THE FOLLOWING MENU SEQUENCE:

- MAIN MENU (ENTER)
- SETUP (ENTER)
- SYSTEM SETUP MENU (ENTER)
- AUTOMATION (ENTER)
- AUTOMATION/CONTROL (ENTER)
- FORMAT (ENTER)
- FORMAT AUTOMATION (ENTER)
- PIN DEFINITIONS (ENTER)
- FORMAT PIN DEFS (ENTER)
- PREDEFINED FORMATS (ENTER)
- AUTOMATION PRESET (ENTER)
- ("), CP200 (ENTER)

XD20 ANALOG OUT CONNECTOR (JH1-10)

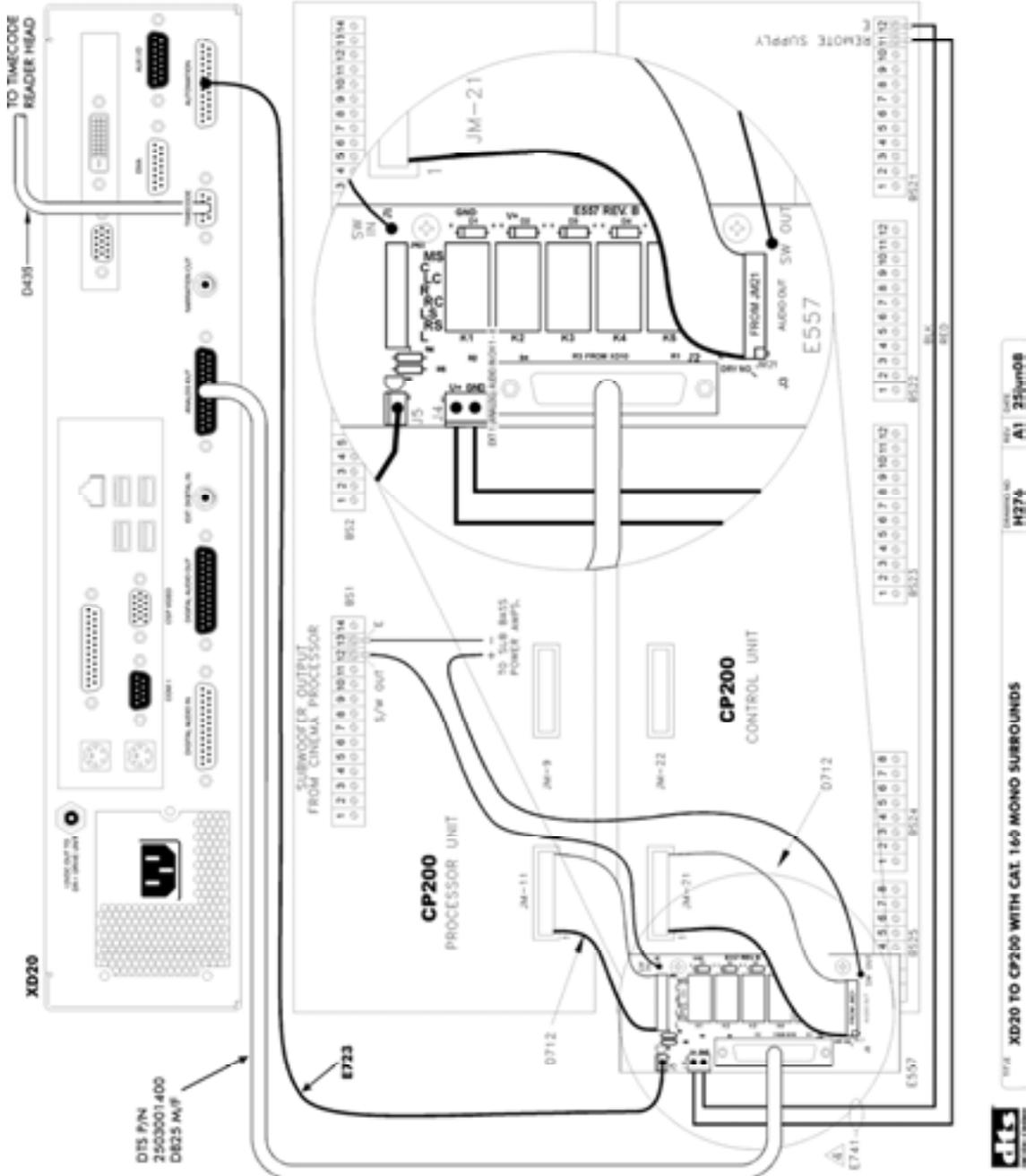
PIN	FUNCTION
1	AUDIO COMMON
2	RIGHT SURROUND
3,13	AUDIO COMMON
14	LEFT
15	LEFT SURROUND
16	RIGHT CENTER
17	RIGHT
18	LEFT CENTER
19	CH 9
20	CENTER
21	MONO SURROUND
22	CH 10
23	CH 11
24	SUBWOOFER
25,251	N/C

XD20 AUTOMATION CONNECTOR

PIN	FUNCTION	PRESET CP200
1	FORMAT 0	SUSTAINED CLSURE
2	FORMAT 1	
3	FORMAT 2	
4	FORMAT 3	
5	FORMAT 4	
6	FORMAT 5	
7	FORMAT 6	
8	FORMAT 7	
9-11	N/C	
12	USER UND	
13	USER SUPPLY	
14-20	N/C	

NOTES:

- 1 MOUNT E557 BOARD TO HOLES ON CP200 SIDE RAIL.
- 2 PROGRAM THE XD20 "OPERATING MODE" FOR DTS-60 EMULATION, AS EXPLAINED IN THE MANUAL.
- 3 ANALOG CABLE IS 25-PIN D, MALE TO FEMALE, 1 TO 1. AN ALTERNATIVE POWER SOURCE (12VDC @ 300mA MINIMUM) MAY BE CONNECTED TO THE E557 INSTEAD OF THE CABLE SHOWN.



TO PROGRAM THE XD20 AUTOMATION CONNECTOR, CHOOSE THE CP200 AUTOMATION PRESET VIA THE FOLLOWING MENU SEQUENCE:

- MAIN MENU (ENTER)
- SYSTEM SETUP MENU (ENTER)
- AUTOMATION (ENTER)
- AUTOMATION CONTROL (ENTER)
- FORMAT (ENTER)
- FORMAT AUTOMATION (ENTER)
- FORMAT DEFINITIONS (ENTER)
- FORMAT PIN DEFS (ENTER)
- PREDEFINED FORMATS (ENTER)
- AUTOMATION PRESET (ENTER)

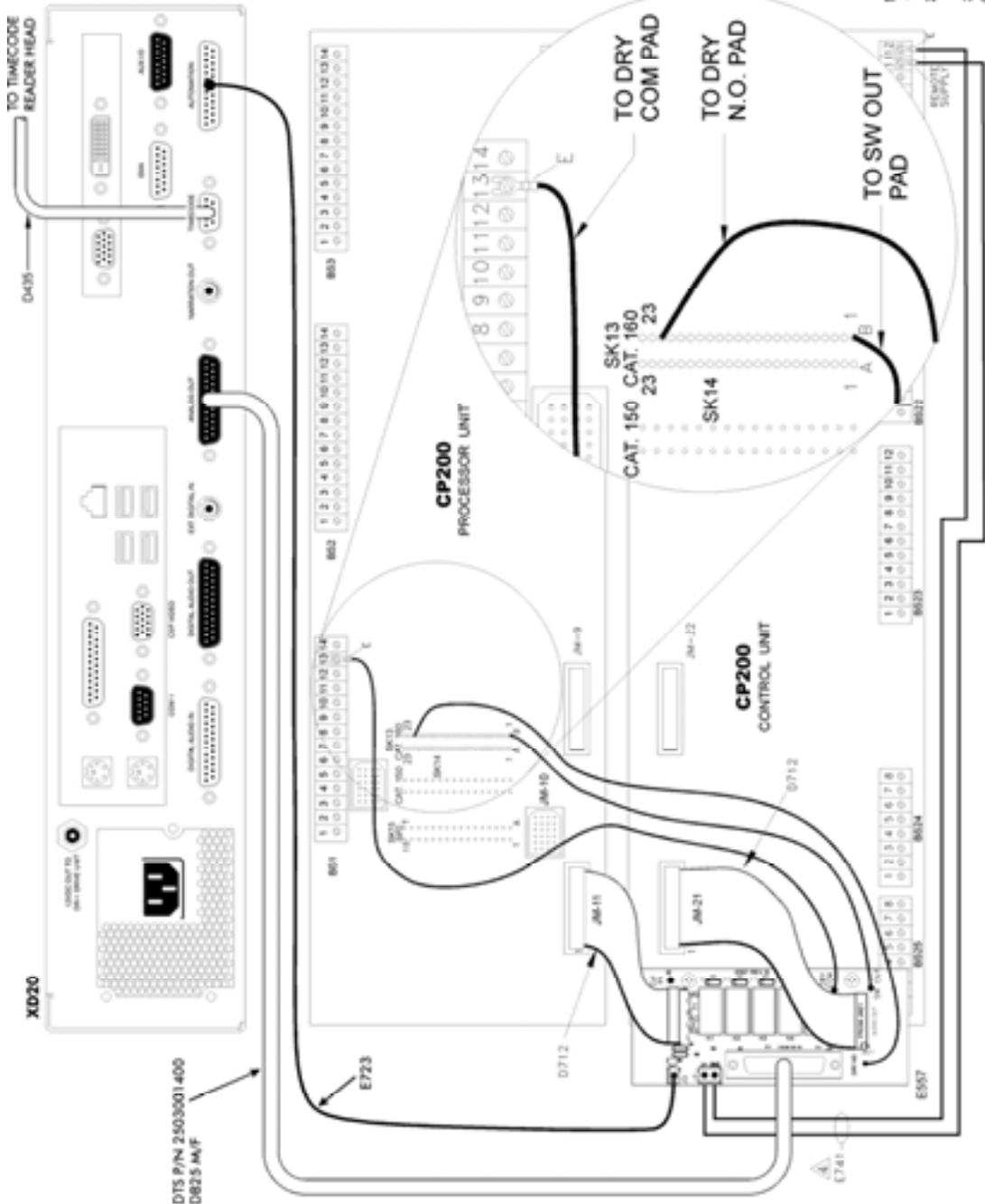
XD20 ANALOG OUT CONNECTOR (CH1-10)

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
22	CH 10
23	SURROOFER
24	NC
25	NC

XD20 AUTOMATION CONNECTOR

PIN	FUNCTION	PRESET CP200
1	FORMAT 0	SUSTAINED CLOSURE
2	FORMAT 1	
3	FORMAT 2	
4	FORMAT 3	
5	FORMAT 4	
6	FORMAT 5	
7	FORMAT 6	
8	FORMAT 7	
9-11	NC	
12	USER GND	
13	USER SUPPLY	
14-25	NC	

- NOTES:
- 1 MOUNT ES57 BOARD TO HOLES ON CP-200 SIDE RAIL.
  - 2 PROGRAM THE XD20 "OPERATING MODE" FOR DTS-60 EMULATION, AS EXPLAINED IN THE MANUAL.
  - 3 ANALOG CABLE IS 25-PIN D, MALE TO FEMALE, 1 TO 1. AN ALTERNATIVE POWER SOURCE (12VDC @ 300mA MINIMUM) MAY BE CONNECTED TO THE ES57 INSTEAD OF THE CABLE SHOWN.



REV. DATE: H277 A1 25JUN09  
 P/N: XD20 TO CP200 WITH CAT. 560 STEREO SURROUNDS

TO PROGRAM THE XD20 AUTOMATION CONNECTOR, CHOOSE THE CP200 AUTOMATION PRESET VIA THE FOLLOWING MENU SEQUENCE:

- MAIN MENU (ENTER)
- SETUP (ENTER)
- SYSTEM SETUP MENU (ENTER)
- AUTOMATION (ENTER)
- AUTOMATION/CONTROL (ENTER)
- FORMAT (ENTER)
- FORMAT AUTOMATIONS (ENTER)
- PIN DEFINITIONS (ENTER)
- FORMAT PIN DEFS (ENTER)
- PREDEFINED FORMATS (ENTER)
- AUTOMATION PRESET (ENTER)
- CP200 (ENTER)

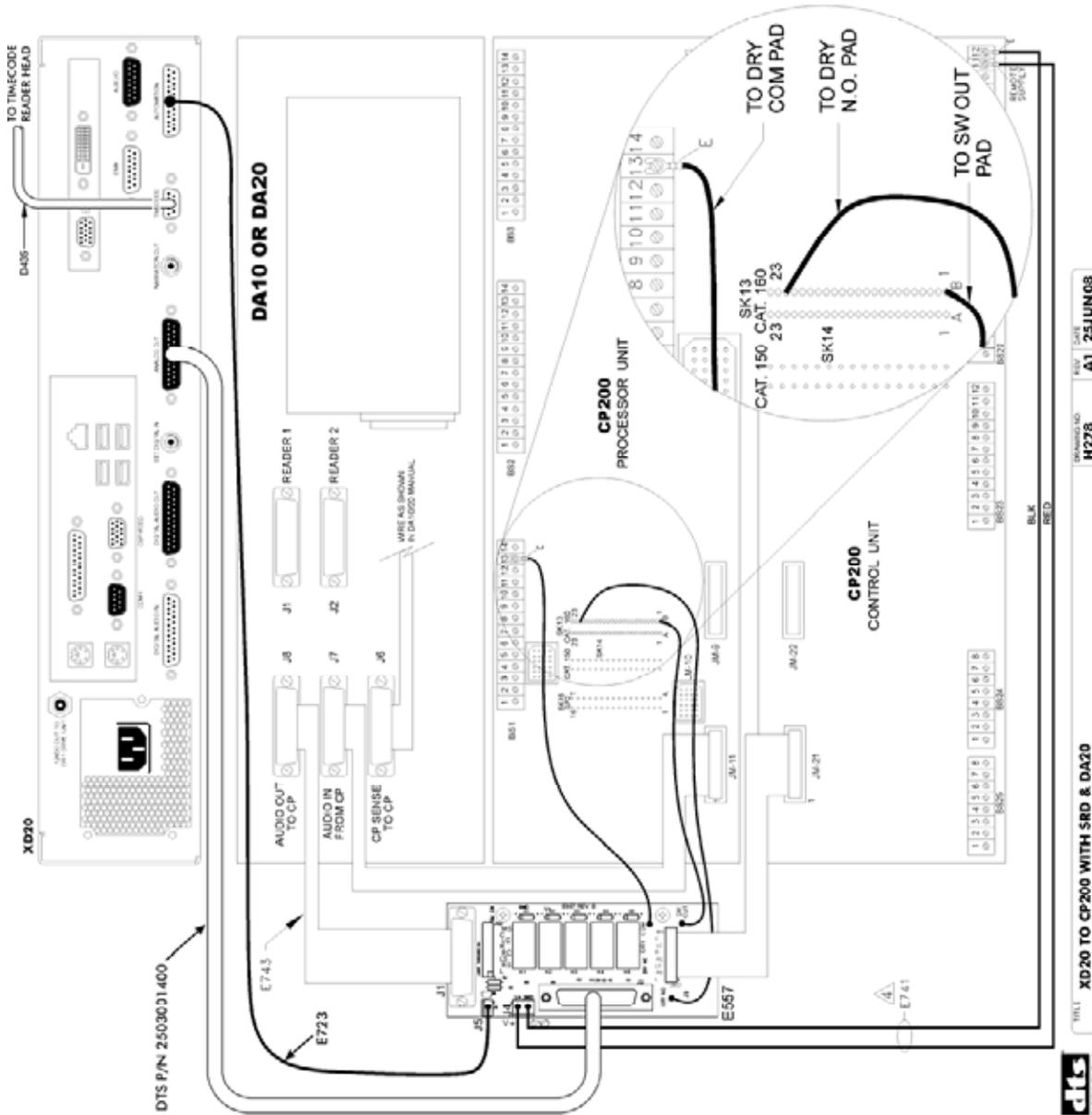
XD20 ANALOG OUT CONNECTOR (CH1-10)

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

XD20 AUTOMATION CONNECTOR

PIN	FUNCTION	PRESET CP200
1	FORMAT 0	SUSTAINED CLOSURE
2	FORMAT 1	
3	FORMAT 2	
4	FORMAT 3	
5	FORMAT 4	
6	FORMAT 5	
7	FORMAT 6	
8	FORMAT 7	
9-11	N/C	
12	USER GND	
13	USER SUPPLY	
14-25	N/C	

- NOTES:
- PROGRAM THE XD20 "OPERATING MODE" FOR DTS-6D EMULATION.
  - CP200 MUST HAVE SRD UPDATE.
  - MOUNT E557 BOARD TO SIDE RAILS OF CP200.
  - AN ALTERNATIVE POWER SOURCE (12VDC @ 300mA MINIMUM) MAY BE CONNECTED TO THE E557 INSTEAD OF THE CABLE SHOWN.
  - ANALOG CABLE IS 25-PIN "D", MALE TO FEMALE, 1 TO 1.



TO PROGRAM THE XD20 AUTOMATION CONNECTOR, CHOOSE THE CP500 AUTOMATION PRESET VIA THE FOLLOWING MENU SEQUENCE:

- MAIN MENU → SETUP (ENTER)
- SYSTEM SETUP MENU → AUTOMATION (ENTER)
- AUTOMATION/CONTROL → FORMAT (ENTER)
- FORMAT AUTOMATION → PIN DEFINITIONS (ENTER)
- FORMAT PIN DEFS → PREDEFINED FORMATS (ENTER)
- AUTOMATION PRESET → (\*) CP500 (ENTER)

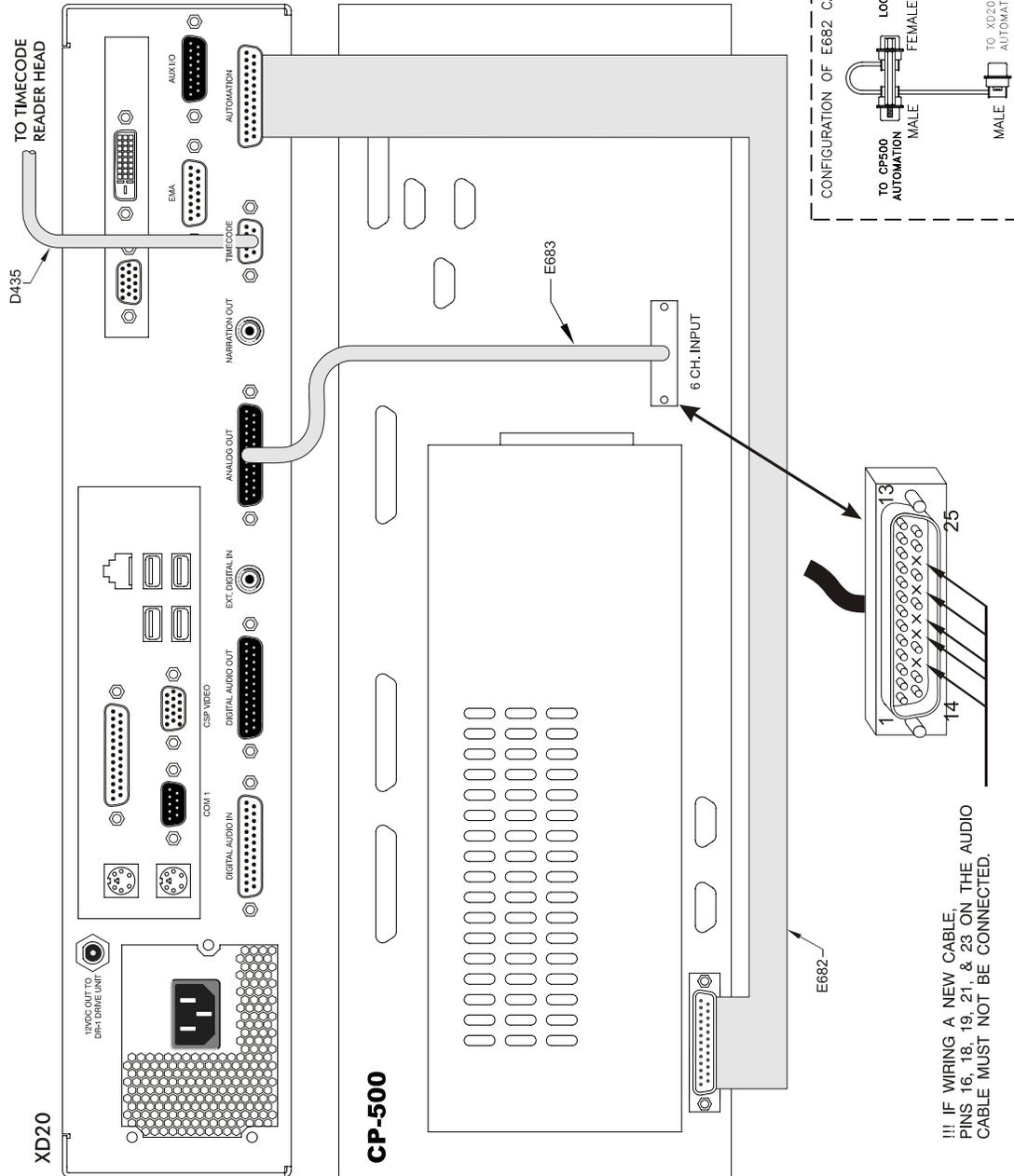
XD20 ANALOG OUT CONNECTOR (CH1-10)

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

XD20 AUTOMATION CONNECTOR

PIN	FUNCTION	PRESET CP500
1	FORMAT 0	MONO
2	FORMAT 1	A-TYPE
3	FORMAT 2	SR
4	FORMAT 3	SR-D
5	FORMAT 4	DTS (FORMAT 11)
6	FORMAT 5	NON-SYNC 1
7	FORMAT 6	NON-SYNC 2
8	FORMAT 7	
9-11	N/C	
12	USER GND	
13	USER SUPPLY	
14-25	N/C	

NOTES:  
1. THE CP500 MUST HAVE THE CAT. 685 CARD INSTALLED.



TITLE: XD20 TO CP500 CABLING  
 DRAWING NO. H279  
 REV. DATE: A1 25JUN08

TO PROGRAM THE XD20 AUTOMATION CONNECTOR, CHOOSE THE CP650 AUTOMATION PRESET VIA THE FOLLOWING MENU SEQUENCE:

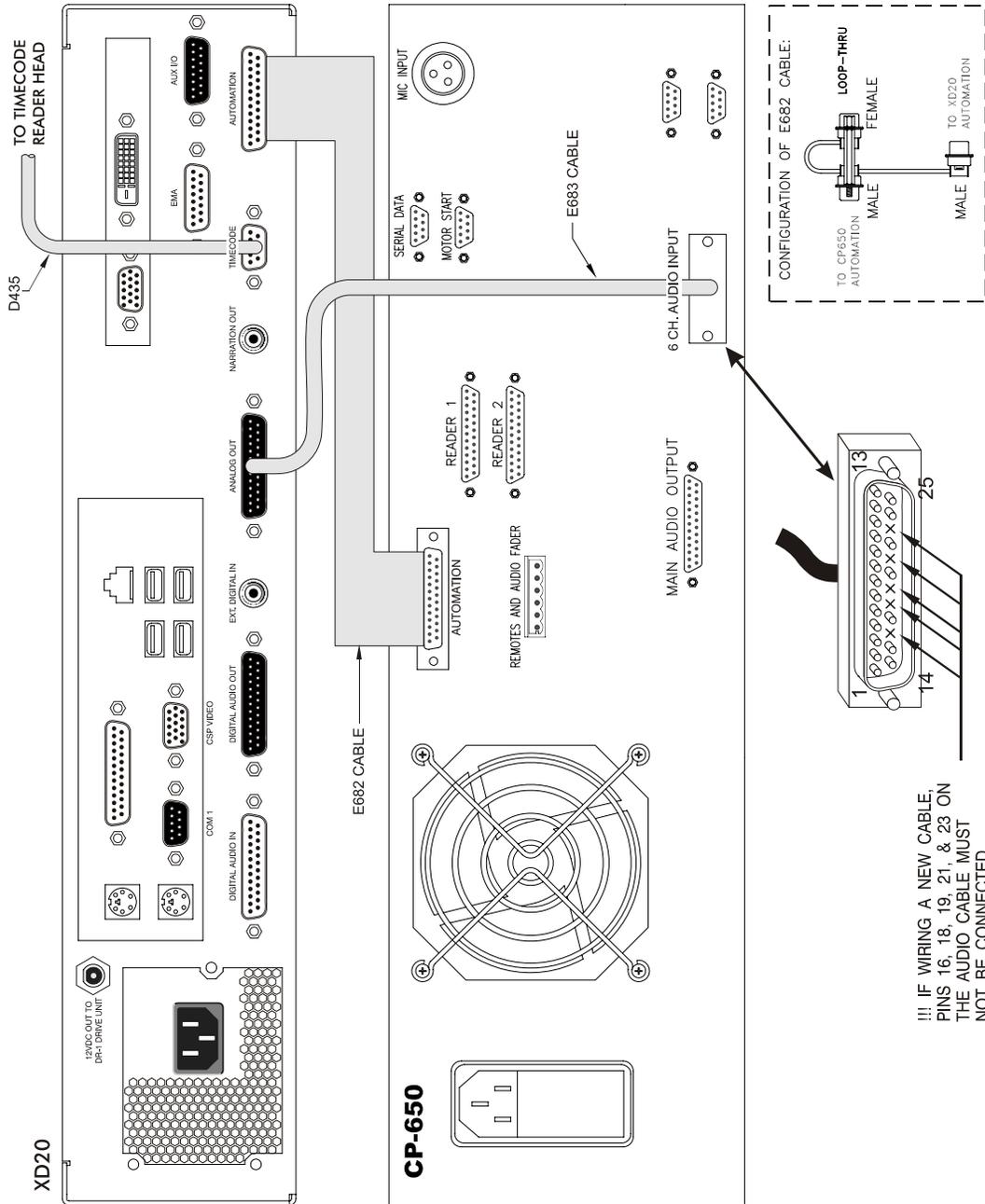
- MAIN MENU → SETUP (ENTER)
- SYSTEM SETUP MENU → AUTOMATION (ENTER)
- AUTOMATION/CONTROL → FORMAT (ENTER)
- FORMAT AUTOMATION → PIN DEFINITIONS (ENTER)
- FORMAT PIN DEFS → PREDEFINED FORMATS (ENTER)
- AUTOMATION PRESET → (\*) CP650 (ENTER)

XD20 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

XD20 AUTOMATION CONNECTOR

PIN	FUNCTION	PRESET (CP650)
1	FORMAT 0	MONO
2	FORMAT 1	A-TYPE
3	FORMAT 2	SR
4	FORMAT 3	SR-D
5	FORMAT 4	DTS (FORMAT 11)
6	FORMAT 5	USER 1
7	FORMAT 6	NON-SYNC 1
8	FORMAT 7	USER 2
9-11	N/C	
12	USER GND	
13	USER SUPPLY	
14-25	N/C	



!!! IF WIRING A NEW CABLE, PINS 16, 18, 19, 21, & 23 ON THE AUDIO CABLE MUST NOT BE CONNECTED.

TITLE: XD20 TO CP650 CABLING  
 DRAWING NO.: H280  
 REV: A1 | DATE: 25JUN08

TO PROGRAM THE XD20 AUTOMATION CONNECTOR, CHOOSE THE DTS-6D EMULATION AUTOMATION PRESET VIA THE FOLLOWING MENU SEQUENCE:

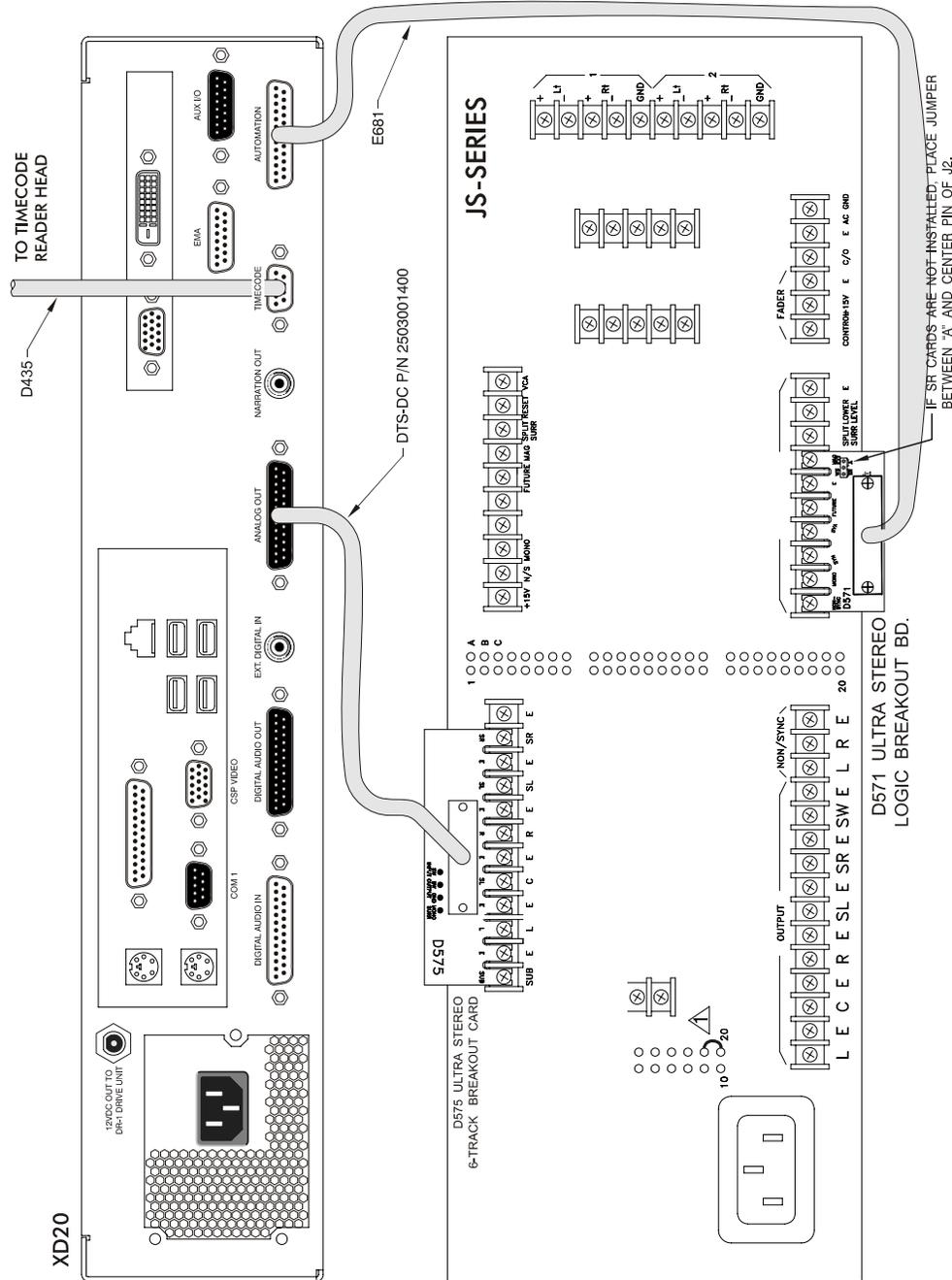
- MAIN MENU → SETUP (ENTER)
- SYSTEM SETUP MENU → AUTOMATION (ENTER)
- AUTOMATION CONTROL → FORMAT (ENTER)
- FORMAT AUTOMATION → PIN DEFINITIONS (ENTER)
- FORMAT PIN DEFS → PREDEFINED FORMATS (ENTER)
- AUTOMATION PRESET → (\*) DTS-6D EMULATION (ENTER)

XD20 ANALOG OUT CONNECTOR (CH1-10)

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

XD20 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	



NOTES:

- 1 IF THE JSE-05 OR JSE-10 MODULE IS IN THIS SLOT, SOLDER A JUMPER BETWEEN PIN 19 & 20 TO ENABLE SURROUND RIGHT CHANNEL. IF A JSE-20 STEREO SURROUND MODULE IS IN THIS SLOT, NO JUMPER IS NECESSARY.
- 2 ON PROCESSORS WITHOUT SUBWOOFER INPUT, CONTACT DTS DIGITAL CINEMA FOR HOOK-UP INFORMATION.

TO PROGRAM THE XD20 AUTOMATION CONNECTOR, CHOOSE THE CSP1200 AUTOMATION PRESET VIA THE FOLLOWING MENU SEQUENCE:

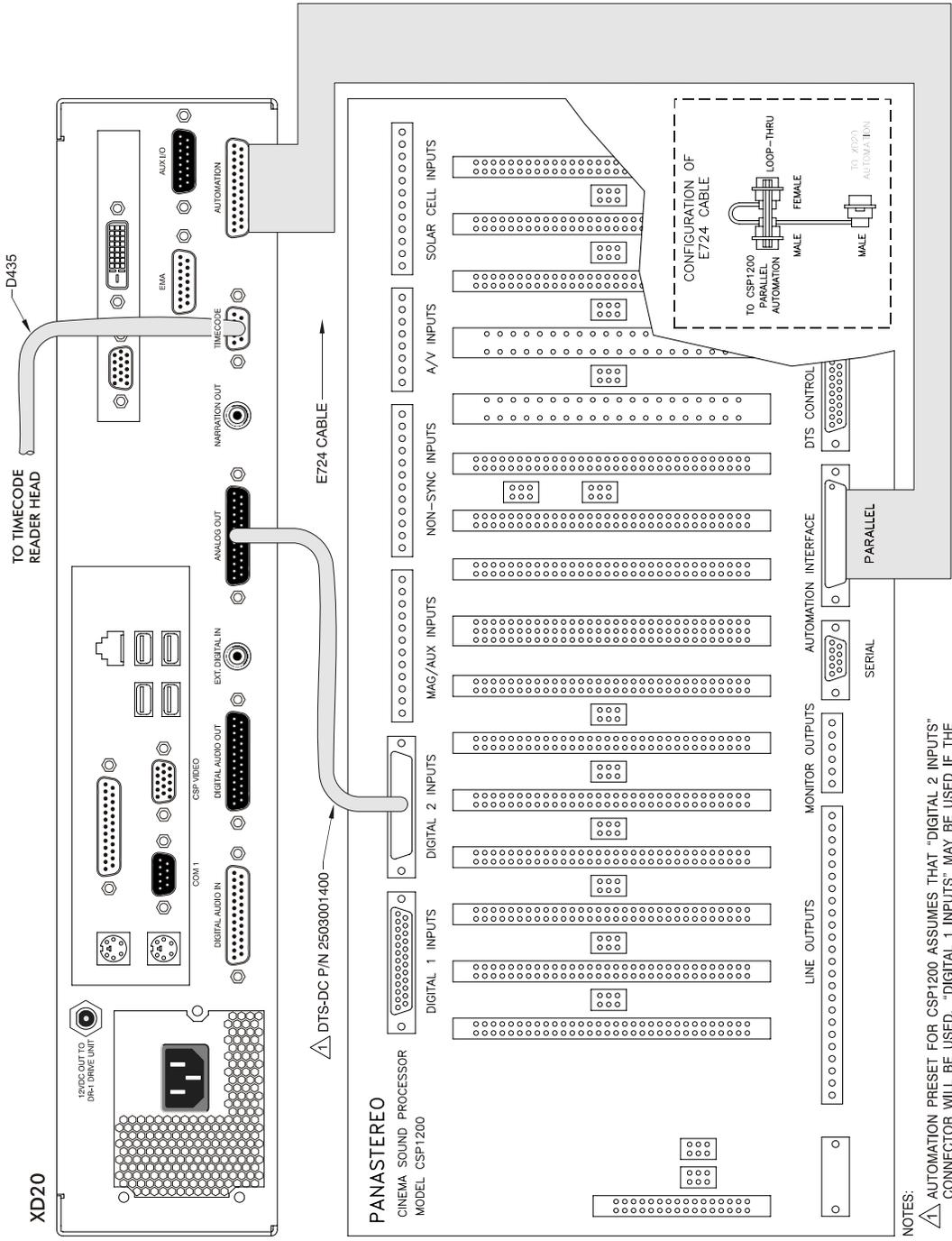
- MAIN MENU (ENTER)
- SYSTEM SETUP MENU (ENTER)
- AUTOMATION (ENTER)
- AUTOMATION/CONTROL (ENTER)
- FORMAT (ENTER)
- FORMAT AUTOMATION (ENTER)
- FORMAT PIN DEFS (ENTER)
- FORMAT PIN DEFS (ENTER)
- PREDEFINED FORMATS (ENTER)
- AUTOMATION PRESET (ENTER)
- (\*) CSP1200 (ENTER)

XD20 ANALOG OUT CONNECTOR (CH1-10)

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

XD20 AUTOMATION CONNECTOR

PIN	FUNCTION	PRESET (CSP1200)
1	FORMAT 0	MONO
2	FORMAT 1	A-TYPE
3	FORMAT 2	SR (1)
4	FORMAT 3	
5	FORMAT 4	DTS (PULSE)
6	FORMAT 5	
7	FORMAT 6	NON-SYNC (1)
8	FORMAT 7	
9-11	N/C	
12	USER GND	
13	USER SUPPLY	
14-25	N/C	



NOTES:  
 ⚠️ AUTOMATION PRESET FOR CSP1200 ASSUMES THAT "DIGITAL 2 INPUTS" CONNECTOR WILL BE USED. "DIGITAL 1 INPUTS" MAY BE USED IF THE XD20 IS RE-PROGRAMMED FOR PIN 5 DTS (PULSE) AND PIN 6 SRD.

TITLE: XD20 TO PANASTEREO CSP1200  
 DRAWING NO. HZ82  
 REV. AI  
 DATE 25JUN08



XD20 ANALOG OUT CONNECTOR (CH1-10)

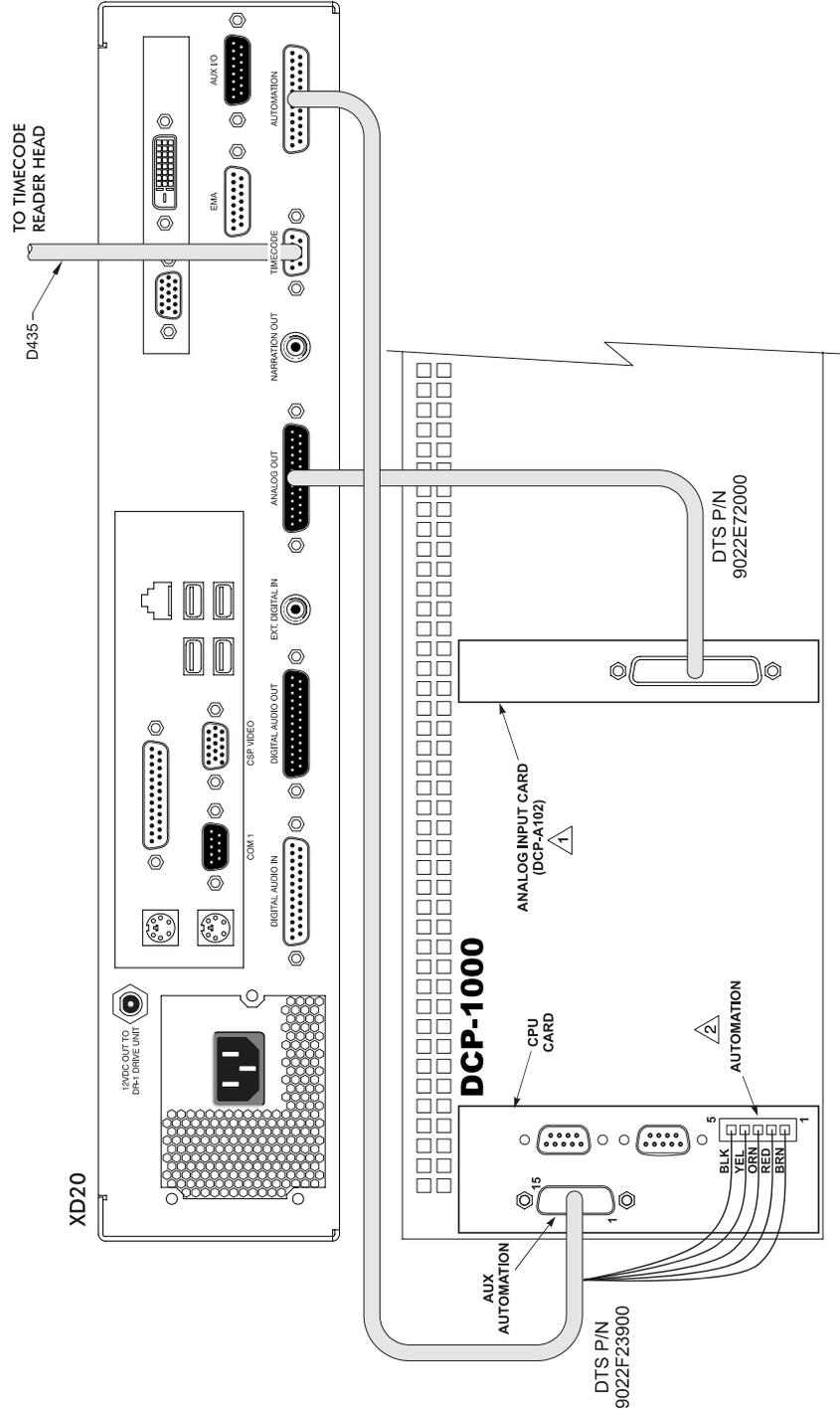
PIN	FUNCTION
1	AUDIO COMMON
2	RIGHT SURROUND
3-13	AUDIO COMMON
14	LEFT
15	LEFT SURROUND
16	RIGHT SURROUND
17	RIGHT
18	LEFT CENTER
19	CH 9
20	CENTER
21	MONO SURROUND
23	CH 10
24	SUBWOOFER
22,25	N/C

XD20 AUTOMATION CONNECTOR

PIN	FUNCTION
1	FORMAT 0
2	FORMAT 1
3	FORMAT 1
4	FORMAT 2
5	FORMAT 3
6	FORMAT 4
7	FORMAT 5
8	FORMAT 6
9	FORMAT 7
9-11	N/C
12	USER GND
13	USER SUPPLY
14-25	N/C

DCP-1000 CPU BOARD AUTOMATION CONNECTORS

PIN	5-PIN PHOENIX	15-PIN "D" CONNECTOR
1	PRESET 1	PRESET 5
2	PRESET 2	PRESET 6
3	PRESET 3	PRESET 7
4	PRESET 4	PRESET 8
5	GROUND	FUTURE
6		CHANGE-OVER
7		FUTURE
8		MUTE
9-15		GROUND



- DCP1000 FACTORY PRESETS
- PRESET 1 = NON-SYNC
  - PRESET 2 = MONO
  - PRESET 3 = A-TYPE
  - PRESET 4 = SR
  - PRESET 5 = SDDS DIGITAL
  - PRESET 6 = NON-SYNC W/A-TYPE N.R.
  - PRESET 7 = NON-SYNC W/SR N.R.
  - PRESET 8 = THIS PRESET SHOULD BE REPROGRAMMED FOR A-IN (EXTERNAL MULTI-TRACK AUDIO) (DTS)

- NOTES:
1. THE OPTIONAL DCP-A102 ANALOG-INPUT CARD MUST BE INSTALLED IN THE DCP-1000.
  2. AUTOMATION CONNECTOR IS SUPPLIED WITH THE DCP-1000. CONNECTOR IS PHOENIX # 1803604.
  3. ALL PRESETS ARE PROGRAMMABLE. PLEASE REFER TO THE DCP-1000 & XD20 MANUALS FOR PROGRAMMING INFORMATION.

TITLE	DRAWING NO.	REV. / DATE
XD20 TO SONY DCP-1000	H283	A1 / 25JUN08

TO PROGRAM THE XD20 AUTOMATION CONNECTOR, CHOOSE THE DFP-D3000 AUTOMATION PRESET VIA THE FOLLOWING MENU SEQUENCE:

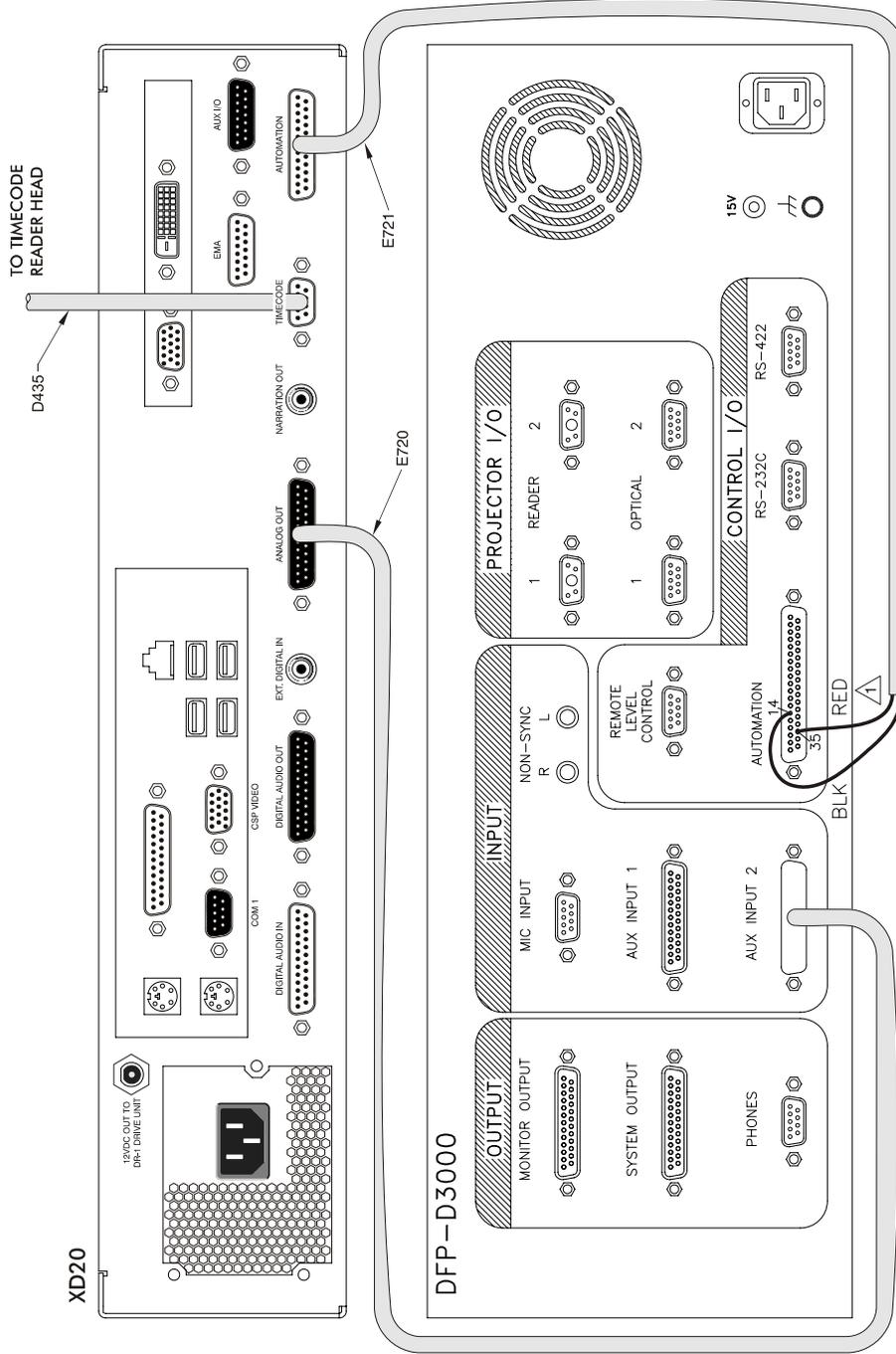
- MAIN MENU → SETUP (ENTER)
- SYSTEM SETUP MENU → AUTOMATION (ENTER)
- AUTOMATION CONTROL → FORMAT (ENTER)
- FORMAT AUTOMATION → PIN DEFINITIONS (ENTER)
- FORMAT PIN DEFS → PREDEFINED FORMATS (ENTER)
- AUTOMATION PRESET → (\*) SONY D3000 (ENTER)

XD20 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

XD20 AUTOMATION CONNECTOR

PIN	FUNCTION	PRESET (DFP-D3000)
1	FORMAT 0	SUSTAINED CLOSURE
2	FORMAT 1	
3	FORMAT 2	
4	FORMAT 3	
5	FORMAT 4	
6	FORMAT 5	
7	FORMAT 6	
8	FORMAT 7	
9-11	N/C	
12	USER GND	
13	USER SUPPLY	
14-25	N/C	



NOTES:

1. IF E720 IS CONNECTED TO AUX INPUT 1, THEN AUTOMATION CONNECTOR PIN 35 WIRE MUST BE MOVED TO PIN 34.
2. PROGRAM THE XD20 "OPERATING MODE" FOR DTS-6D EMULATION AS EXPLAINED IN THE MANUAL.

TITLE	DRAWING NO.	REV.	DATE
XD20 TO SONY DFP-D3000	H284	A1	25JUN08

TO PROGRAM THE XD20 AUTOMATION CONNECTOR, CHOOSE THE DTS-6D EMULATION AUTOMATION PRESET VIA THE FOLLOWING MENU SEQUENCE:

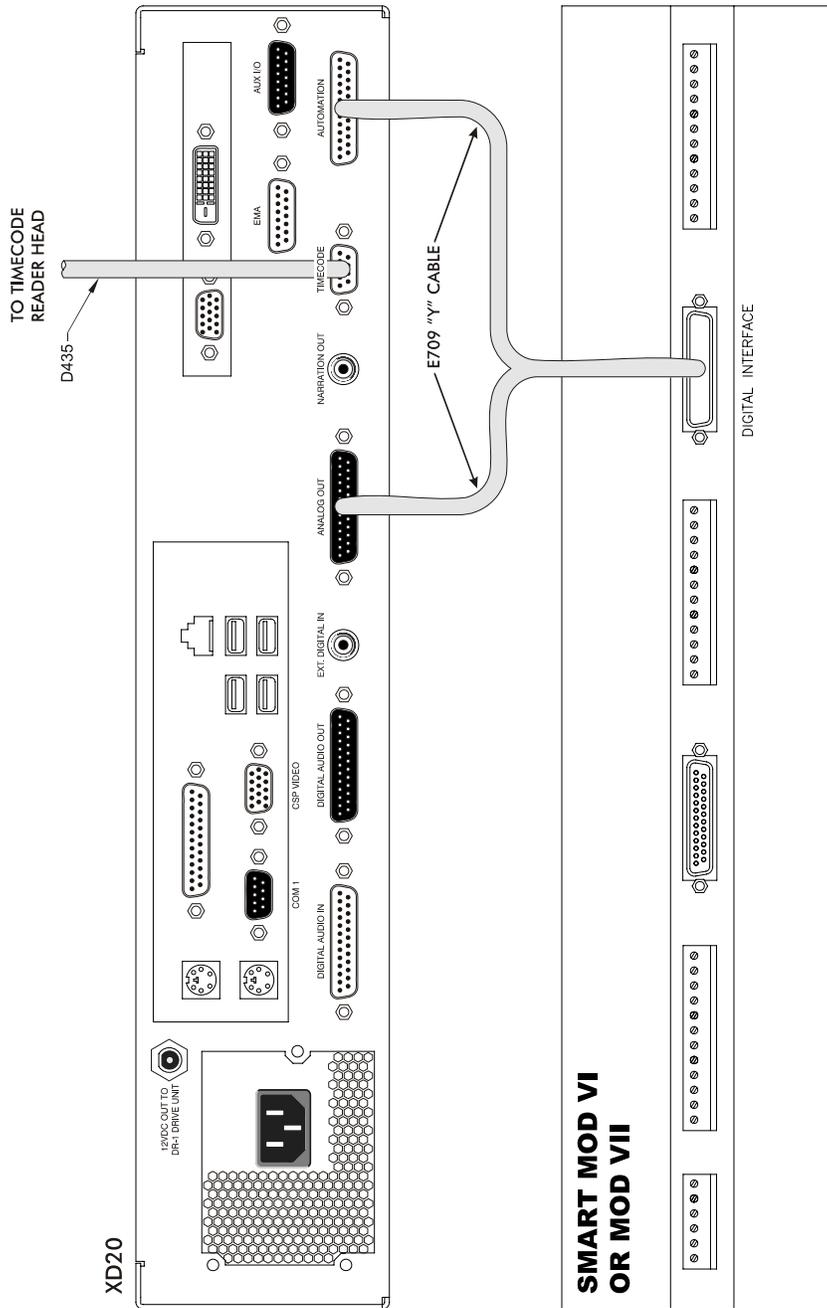
- MAIN MENU → SETUP (ENTER)
- SYSTEM SETUP MENU → AUTOMATION (ENTER)
- AUTOMATION CONTROL → FORMAT (ENTER)
- FORMAT AUTOMATION → PIN DEFINITIONS (ENTER)
- FORMAT PIN DEFS → PREDEFINED FORMATS (ENTER)
- AUTOMATION PRESET → (\*) DTS-6D EMULATION (ENTER)

XD20 ANALOG OUT CONNECTOR (CH1-10)

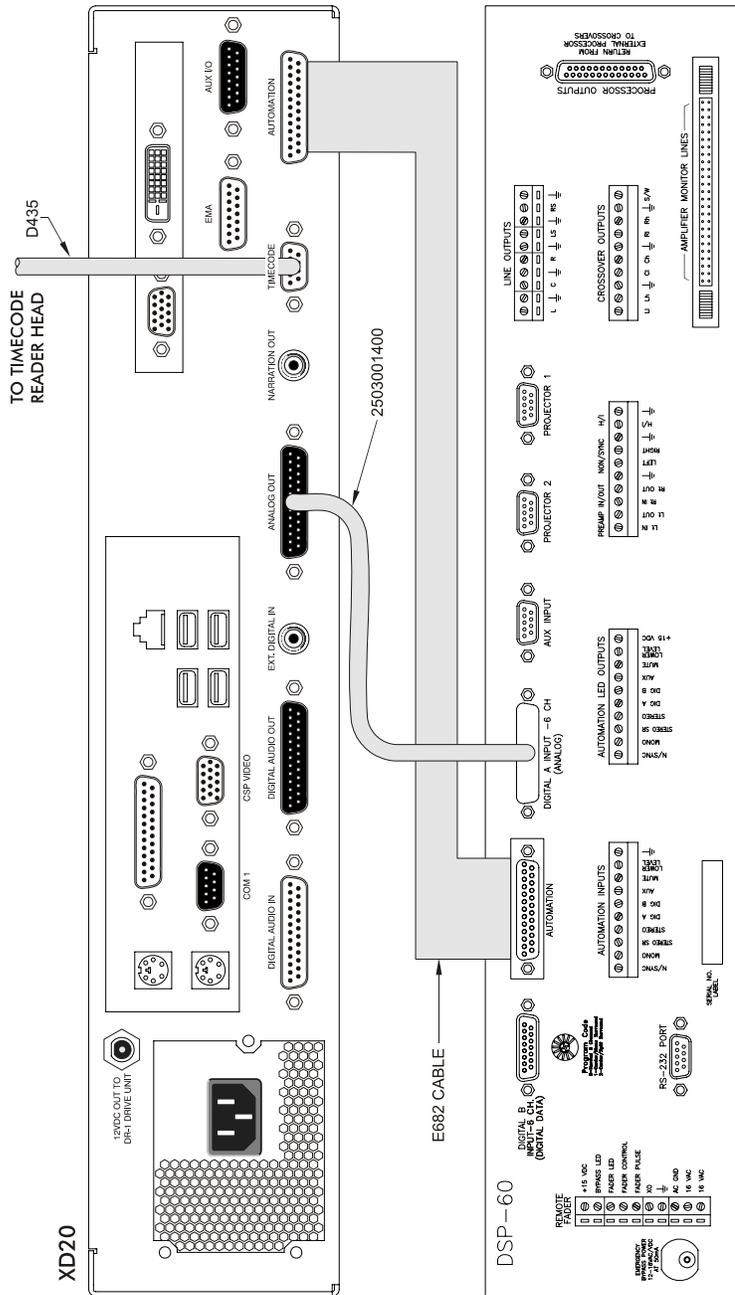
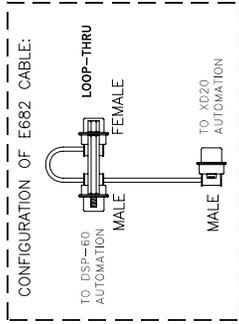
PIN	FUNCTION
1	AUDIO COMMON
2	RIGHT SURROUND
3-13	AUDIO COMMON
14	LEFT
15	LEFT SURROUND
16	RIGHT SURROUND
17	RIGHT
18	LEFT CENTER
19	CH.9
20	CENTER
21	MONO SURROUND
23	CH.10
24	SUBWOOFER
22,25	N/C

XD20 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	
13	USER SUPPLY	DTS COMMON
14-25	N/C	



TITLE: XD20 TO SMART MOD VI & VII  
 REVISION NO.: H285  
 SHEET: A1  
 DATE: 25JUN08



XD20 ANALOG OUT CONNECTOR (CH1-10)

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

XD20 AUTOMATION CONNECTOR

PIN	FUNCTION	PRESET
1	FORMAT 0	MONO
2	FORMAT 1	A-TYPE
3	FORMAT 2	SR
4	FORMAT 3	UNUSED
5	FORMAT 4	DTS
6	FORMAT 5	AUX
7	FORMAT 6	NON-SYNC
8	FORMAT 7	NON-SYNC 2
9-11	N/C	
12	USER GND	DTS COMMON
13	USER SUPPLY	5-24 VDC
14-25	N/C	

NOTES:

1 TO PROGRAM THE XD20 AUTOMATION CONNECTOR, SEE THE XD20 INSTALLATION AND OPERATION GUIDE.

A) FIRST PROGRAM PIN DEFINITIONS USING PREDEFINED FORMAT "DTS-6D EMULATION".

B) PROGRAM PINS 6 (AUX) & 8 (NON-SYNC 2) PIN DEFINITIONS USING "CUSTOM".

2 AUTOMATION & ANALOG CABLES ARE WIRED PIN-TO-PIN.

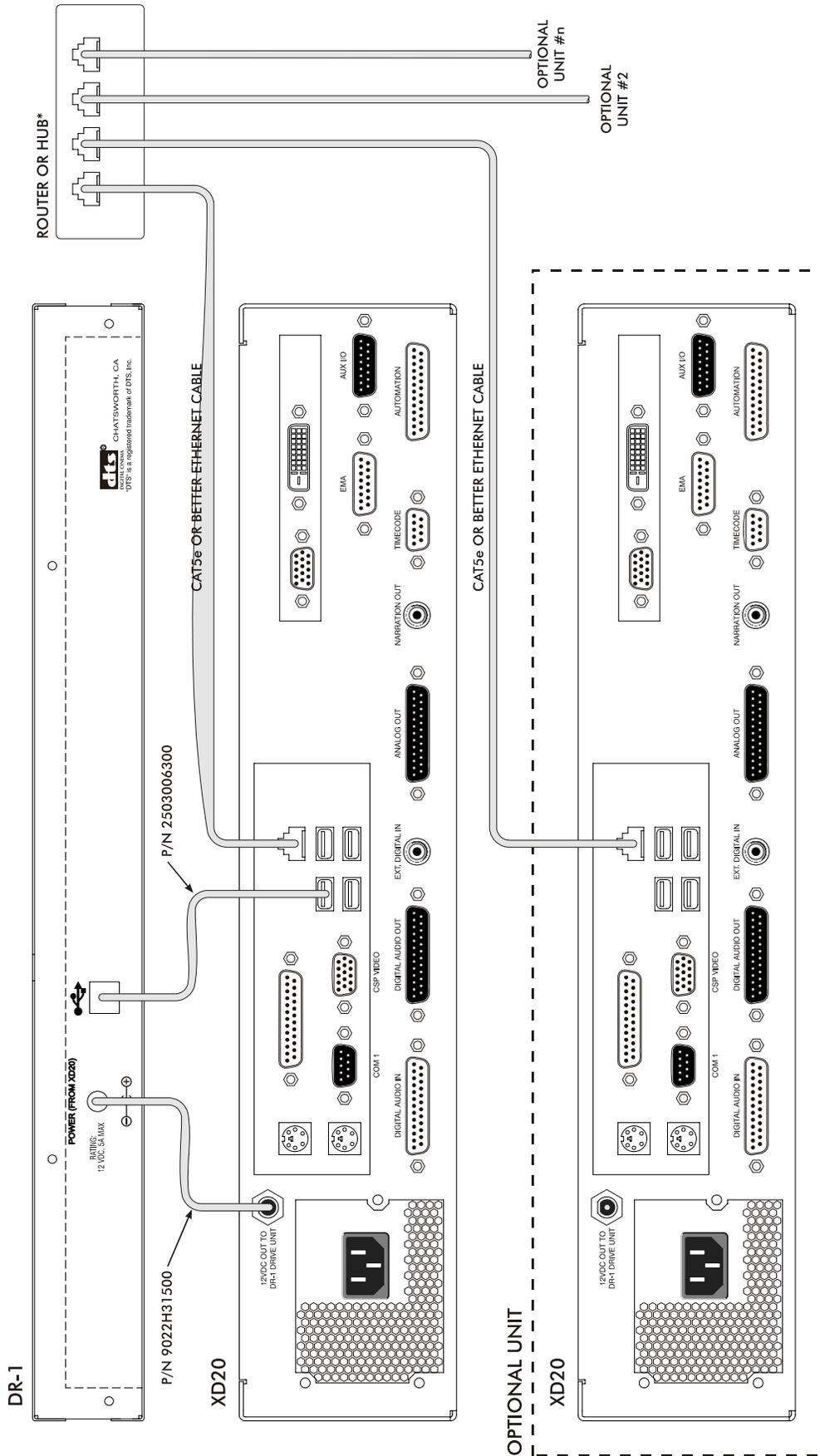
TITLE: XD20 TO ULTRA\*STEREO DSP-60

REV: A1 DATE: 25JUN08

DRAWING NO.: H287







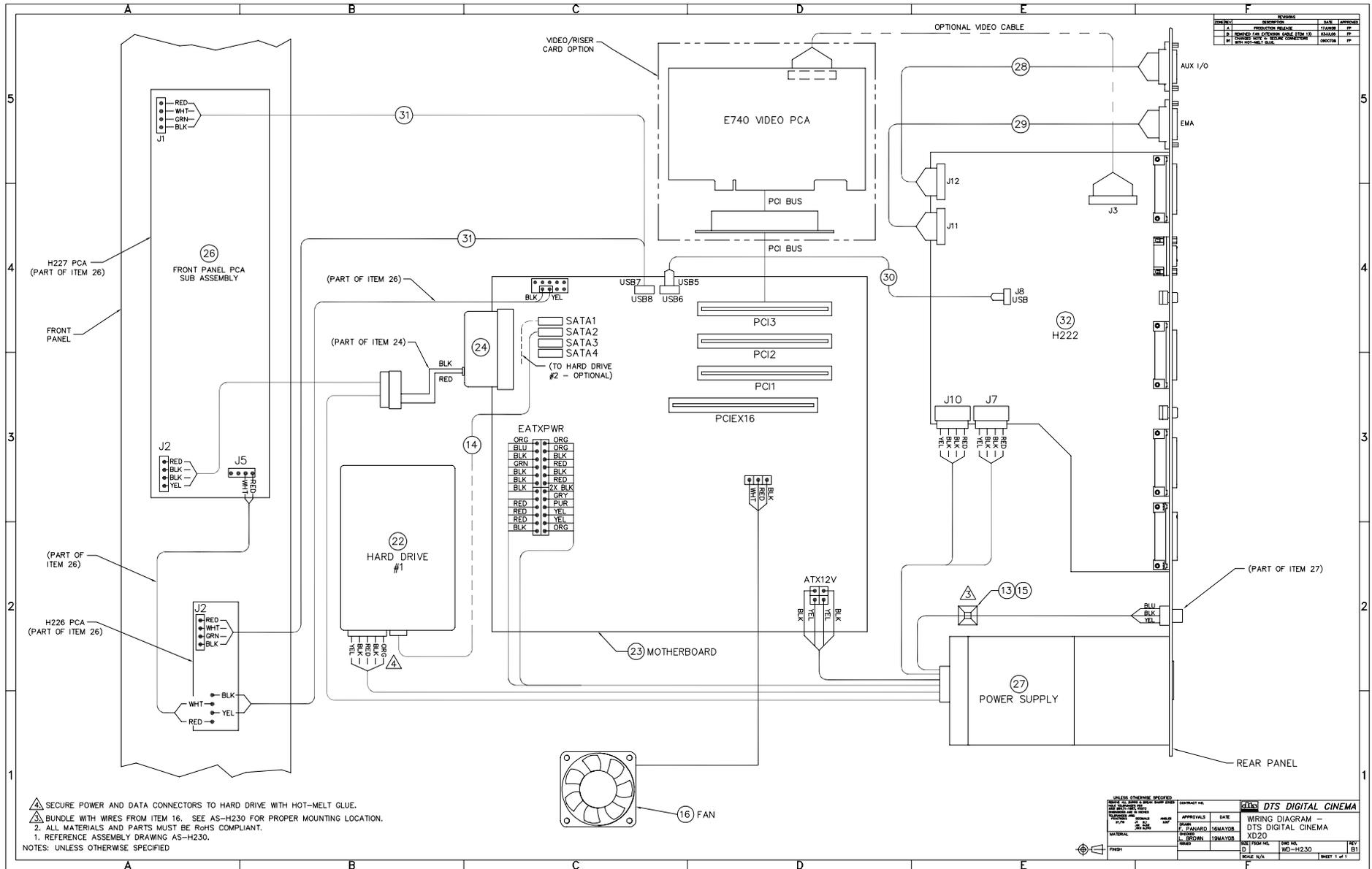
\* NOTE: IF USING A ROUTER, IP ADDRESSES WILL BE AUTOMATICALLY ASSIGNED.  
IF USING A HUB, IP ADDRESSES WILL HAVE TO BE MANUALLY ASSIGNED TO EACH XD20.

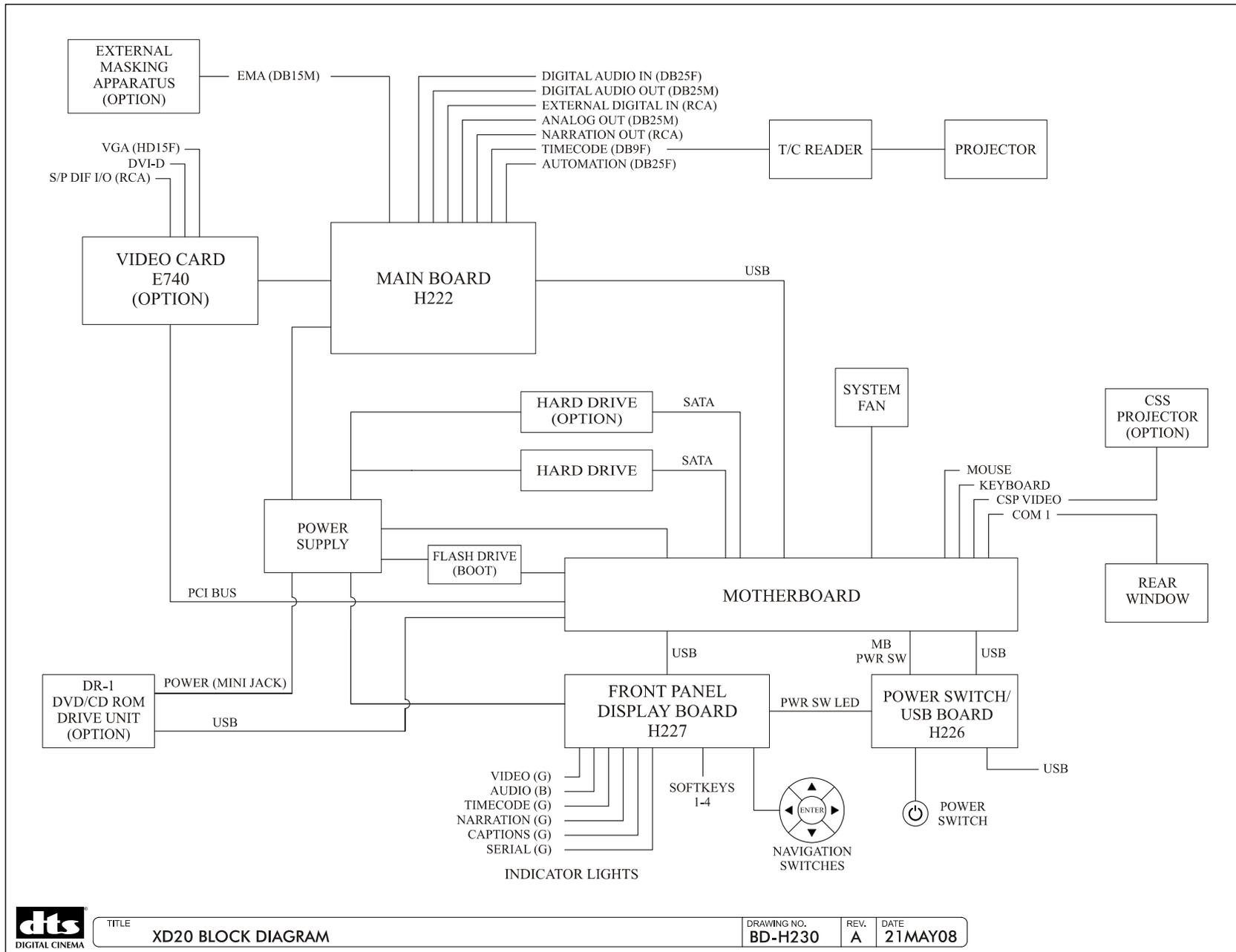
TITLE	STAND-ALONE NETWORK: DR-1 DRIVE UNIT + MULTIPLE XD20s
DRAWING NO.	H319
REV.	A1
DATE	21NOV08



## Appendix C. XD20 Wiring and Block Diagrams

Description	DTS Part No.	Rev	Page
Wiring Diagram, XD20	WD-H230	B1	C-2
XD20 Block Diagram	BD-H230	A	C-3





## Appendix D. Cable Assemblies & Breakout Boards

### Audio and Automation Cables

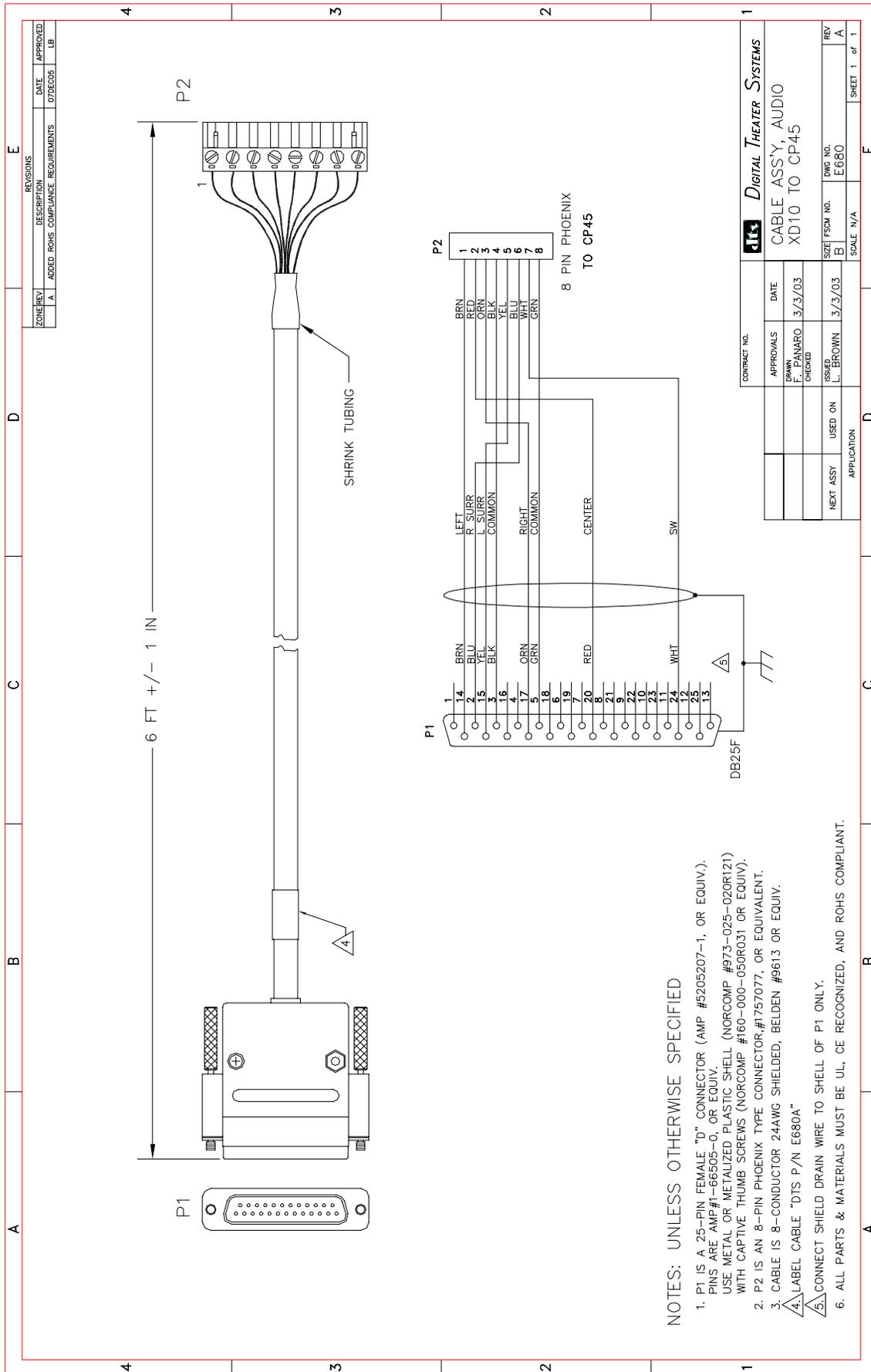
Description	Part No.	Rev.
<b>Audio Cables</b>		
Audio XD10 to CP45	E680	A
CP200, JM11/21 Jumper	D712	A
XD10 E557 to DA10/20 Audio	E743	A
XD10 to CP650/CP500 Audio	E683	B
XD10 to DFP-D3000 or DCP-1000 Analog	E720	B
XD10 to Smart MOD VI	E709	A
XD10 Analog Out to XD10P EXT1 (Analog) Audio In	E901	A
<b>Automation Cables</b>		
Automation, XD10/DTS-6D Translation	E681	A
Automation, XD10/CP200 E557 Relay Interface	E723	A
XD10 E557 to CP200 V+	E741	A
XD10 to CP650, CP500 & CP65 Automation	E682	C
XD10 to Panastereo CSP1200 Automation	E724	A
XD10 to DFP-D3000 Fallback Automation	E721	C
XD10 to Smart MOD VI	E709	A

### Audio and Automation Breakout Boards

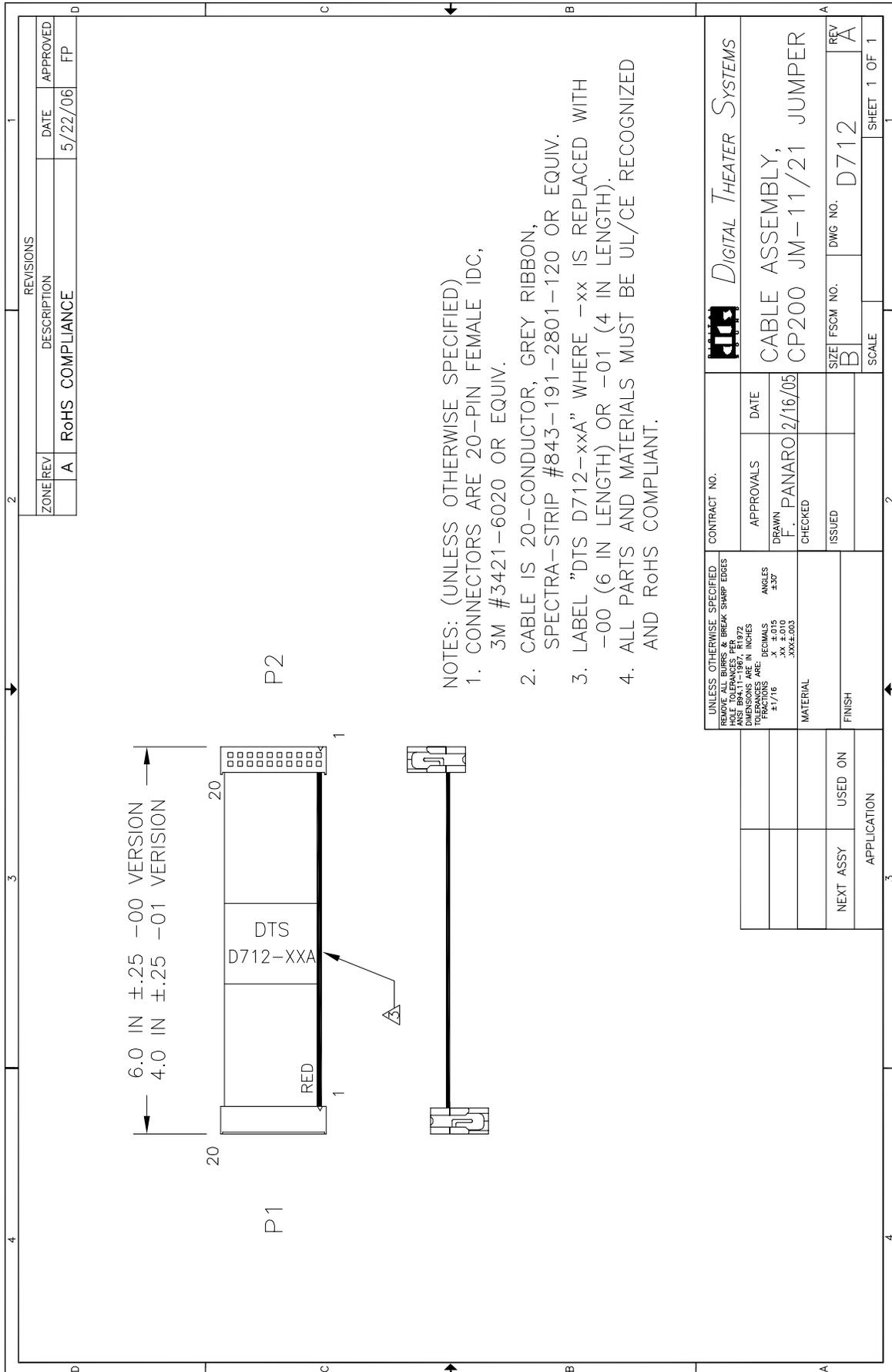
Description	Part No.	Rev
<b>Audio Breakout Boards</b>		
CP55	D572	A1
CP55, Subwoofer switch card	E712	A1
CP65, CP45	D574	1
CP50, CP100 and CP200	E557	B1
Ultra Stereo JS series	D575	A1
<b>Automation Breakout Boards</b>		
CP45	D716	1
CP55	D565	1
CP65	D564	B1
Ultra Stereo JS series	D571	1

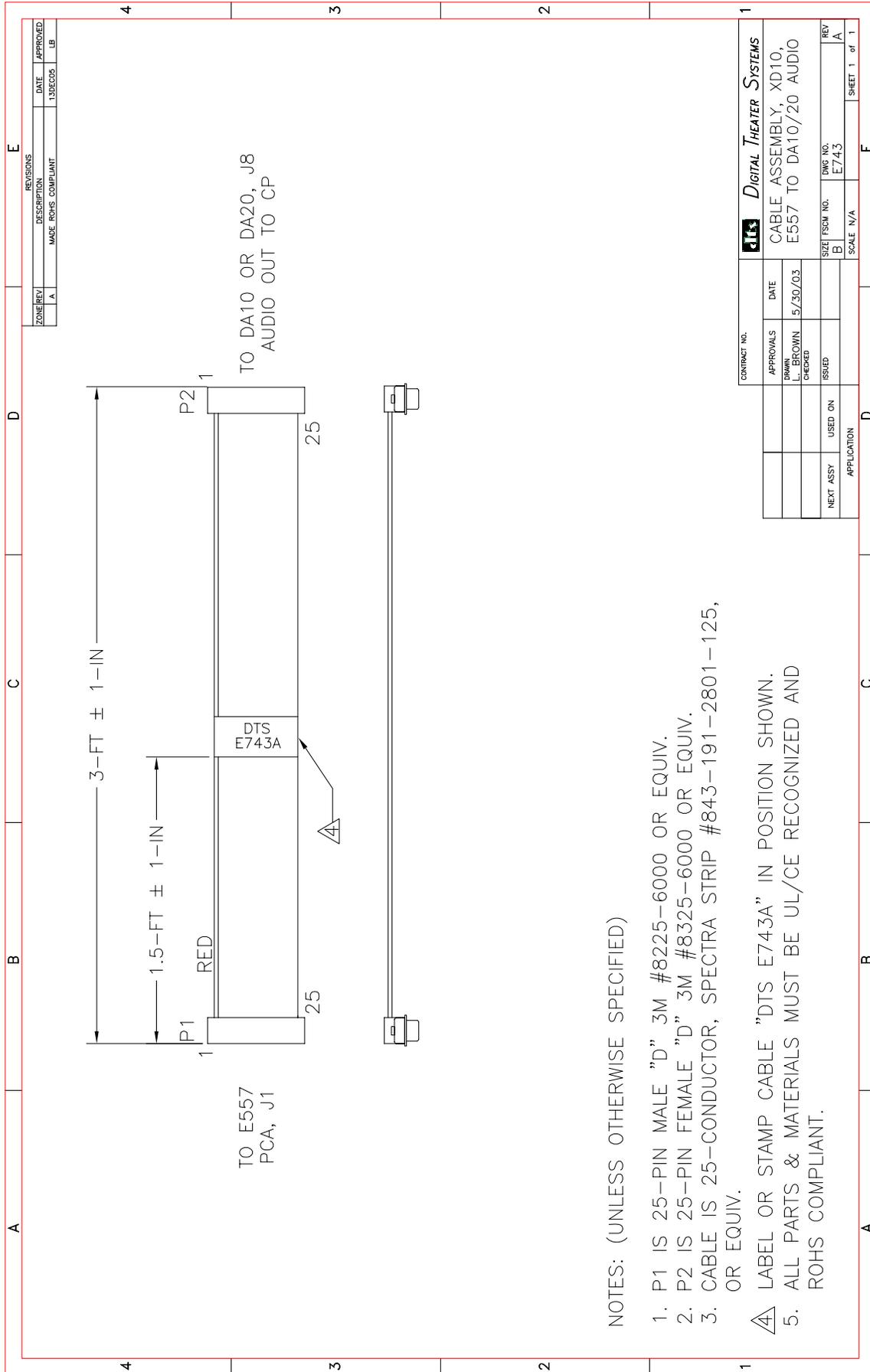
### Timecode Cables

Description	Part No.	Rev
<b>Time Code Cables</b>		
Standard, Single Projector	D435	B
Y Cable, Dual Projector	D435	B



- NOTES: UNLESS OTHERWISE SPECIFIED**
- P1 IS A 25-PIN FEMALE "D" CONNECTOR (AMP #5205207-1, OR EQUIV.). PINS ARE AMP#1-66505-0, OR EQUIV. USE METAL OR METALIZED PLASTIC SHELL (NORCOMP #973-025-020R121) WITH CAPTIVE THUMB SCREWS (NORCOMP #160-000-050R031 OR EQUIV).
  - P2 IS AN 8-PIN PHOENIX TYPE CONNECTOR, #1757077, OR EQUIVALENT.
  - CABLE IS 8-CONDUCTOR 24AWG SHIELDED, BELDEN #9613 OR EQUIV.
  - △ LABEL CABLE "DTS P/N E680A"
  - △ CONNECT SHIELD DRAIN WIRE TO SHELL OF P1 ONLY.
  - △ ALL PARTS & MATERIALS MUST BE UL, CE RECOGNIZED, AND ROHS COMPLIANT.





NOTES: (UNLESS OTHERWISE SPECIFIED)

1. P1 IS 25-PIN MALE "D" 3M #8225-6000 OR EQUIV.
2. P2 IS 25-PIN FEMALE "D" 3M #8325-6000 OR EQUIV.
3. CABLE IS 25-CONDUCTOR, SPECTRA STRIP #843-191-2801-125, OR EQUIV.
- △ LABEL OR STAMP CABLE "DTS E743A" IN POSITION SHOWN.
5. ALL PARTS & MATERIALS MUST BE UL/CE RECOGNIZED AND ROHS COMPLIANT.

ZONE	REV	DESCRIPTION	DATE	APPROVED
A		MADE ROHS COMPLIANT	13/06/05	LB

REVISIONS	
DESCRIPTION	DATE
MADE ROHS COMPLIANT	13/06/05

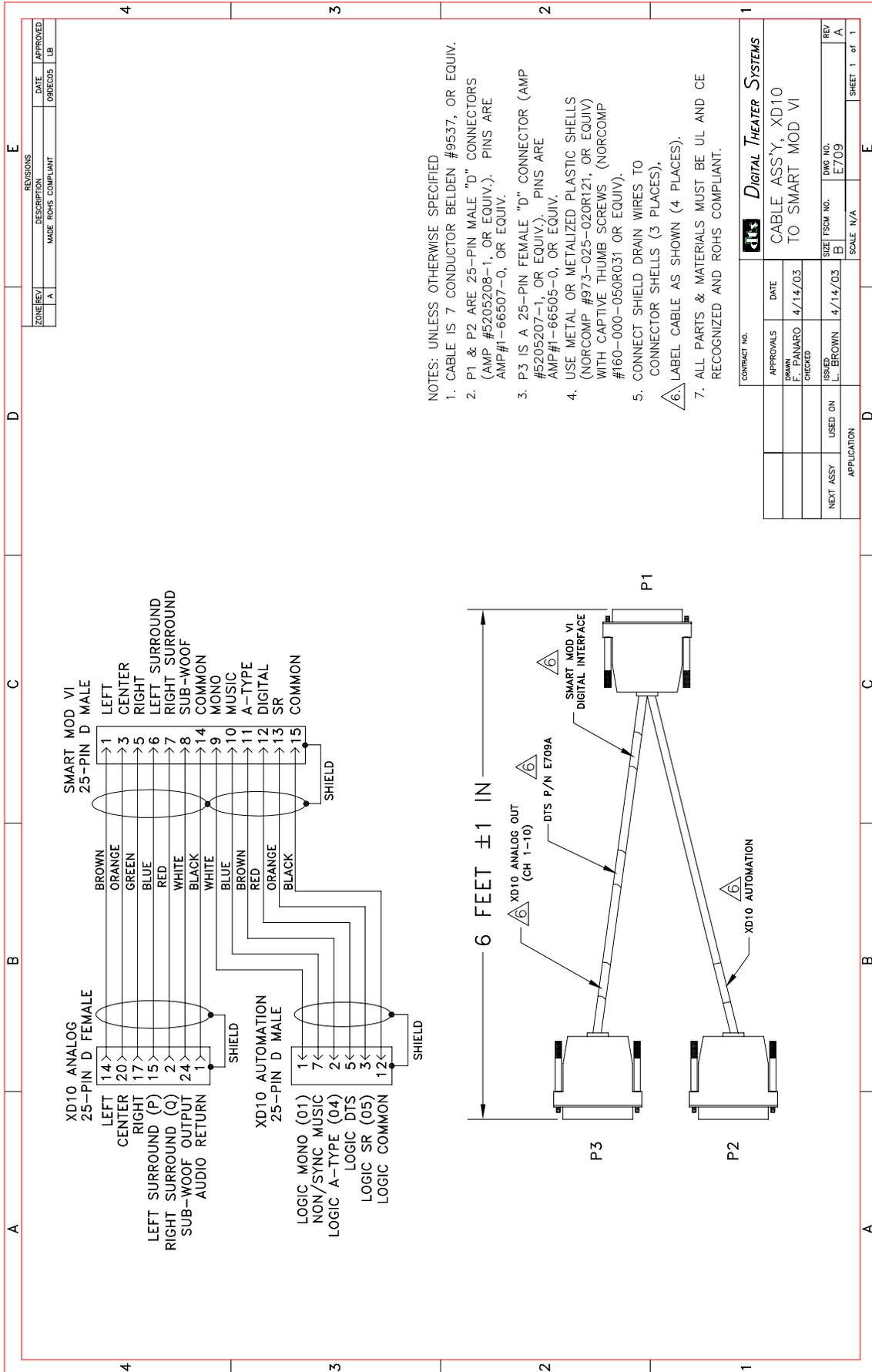
CONTRACT NO.		APPROVALS		DATE	
		DRAWN	L. BROWN	15/30/03	
		CHECKED			
		ISSUED			
NEXT ASSY	USED ON				
APPLICATION					

DTS Digital Theater Systems	
CABLE ASSEMBLY, XD10, E557 TO DA10/20 AUDIO	
SIZE	FSCM NO.
B	E743
REV	DWG NO.
A	E743
SCALE N/A	
SHEET 1 of 1	







REVISIONS		DATE	APPROVED
ZONE/REV	DESCRIPTION		
A	MADE ROHS COMPLIANT		

- NOTES: UNLESS OTHERWISE SPECIFIED
- CABLE IS 7 CONDUCTOR BELDEN #9537, OR EQUIV.
  - P1 & P2 ARE 25-PIN MALE "D" CONNECTORS (AMP #5205208-1, OR EQUIV.). PINS ARE AMP#1-66507-0, OR EQUIV.
  - P3 IS A 25-PIN FEMALE "D" CONNECTOR (AMP #5205207-1, OR EQUIV.). PINS ARE AMP#1-66505-0, OR EQUIV.
  - USE METAL OR METALIZED PLASTIC SHELLS (NORCOMP #973-025-020R121, OR EQUIV) WITH CAPTIVE THUMB SCREWS (NORCOMP #160-000-050R031 OR EQUIV).
  - CONNECT SHIELD DRAIN WIRES TO CONNECTOR SHELLS (3 PLACES), LABEL CABLE AS SHOWN (4 PLACES).
  - ALL PARTS & MATERIALS MUST BE UL AND CE RECOGNIZED AND ROHS COMPLIANT.

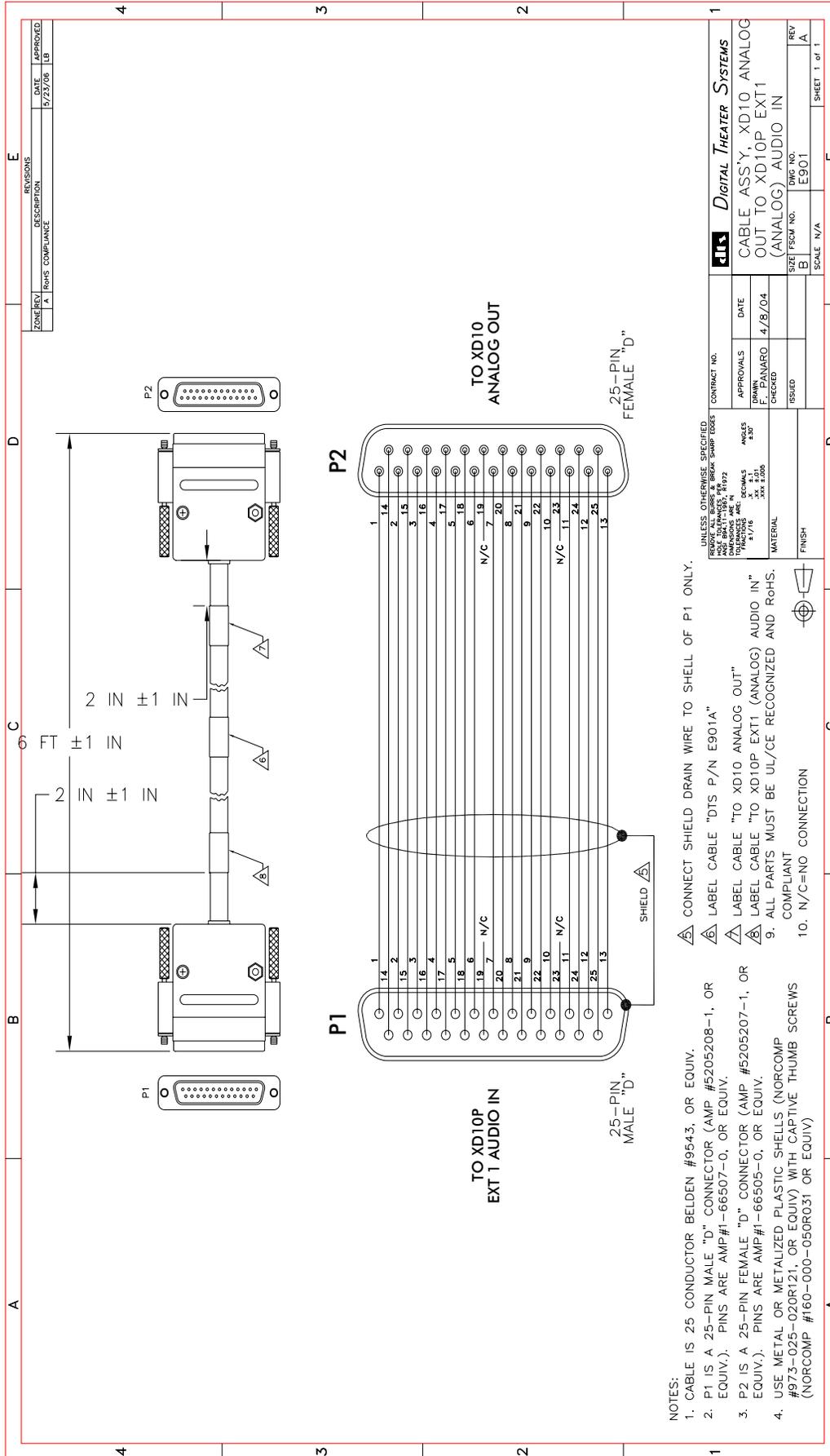
CONTRACT NO.		APPROVALS		DATE
		DRAWN	CHECKED	4/14/03
		ISSUED		
NEXT ASSY	USED ON	SCALE	N/A	
APPLICATION		SIZE	FSGM NO.	REV
		L. BROWN	E709	A
				A
				B
				C
				D
				E

CONTRACT NO.		APPROVALS		DATE
		DRAWN	CHECKED	4/14/03
		ISSUED		
NEXT ASSY	USED ON	SCALE	N/A	
APPLICATION		SIZE	FSGM NO.	REV
		L. BROWN	E709	A
				A
				B
				C
				D
				E

CONTRACT NO.		APPROVALS		DATE
		DRAWN	CHECKED	4/14/03
		ISSUED		
NEXT ASSY	USED ON	SCALE	N/A	
APPLICATION		SIZE	FSGM NO.	REV
		L. BROWN	E709	A
				A
				B
				C
				D
				E

Digital Theater Systems  
CABLE ASSY, XD10  
TO SMART MOD VI

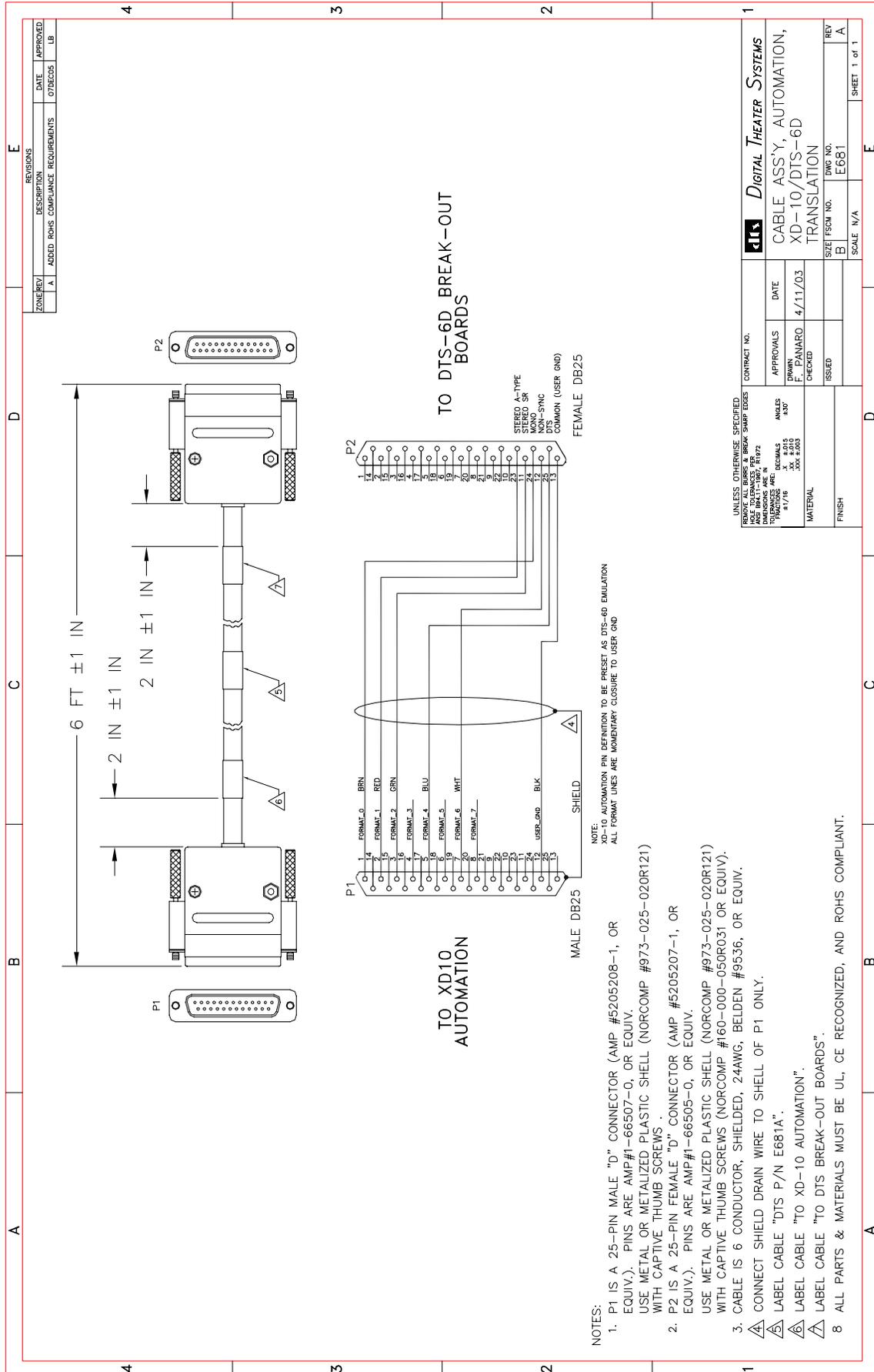
CONTRACT NO.	APPROVALS	DATE
	DRAWN	4/14/03
	CHECKED	
	ISSUED	
NEXT ASSY	USED ON	SCALE
	L. BROWN	N/A



ZONE/REV	A	ROHS COMPLIANCE	DATE	APPROVED
			5/23/06	LB

REVISIONS	DESCRIPTION	DATE	APPROVED

CONTRACT NO.	
APPROVALS	DATE
DESIGNED BY	4/8/04
CHECKED BY	F. PANARO
ISSUED	
SIZE	FSCM NO.
B	E901
SCALE	N/A
DWG. NO.	
REV	
A	
SHEET 1 of 1	

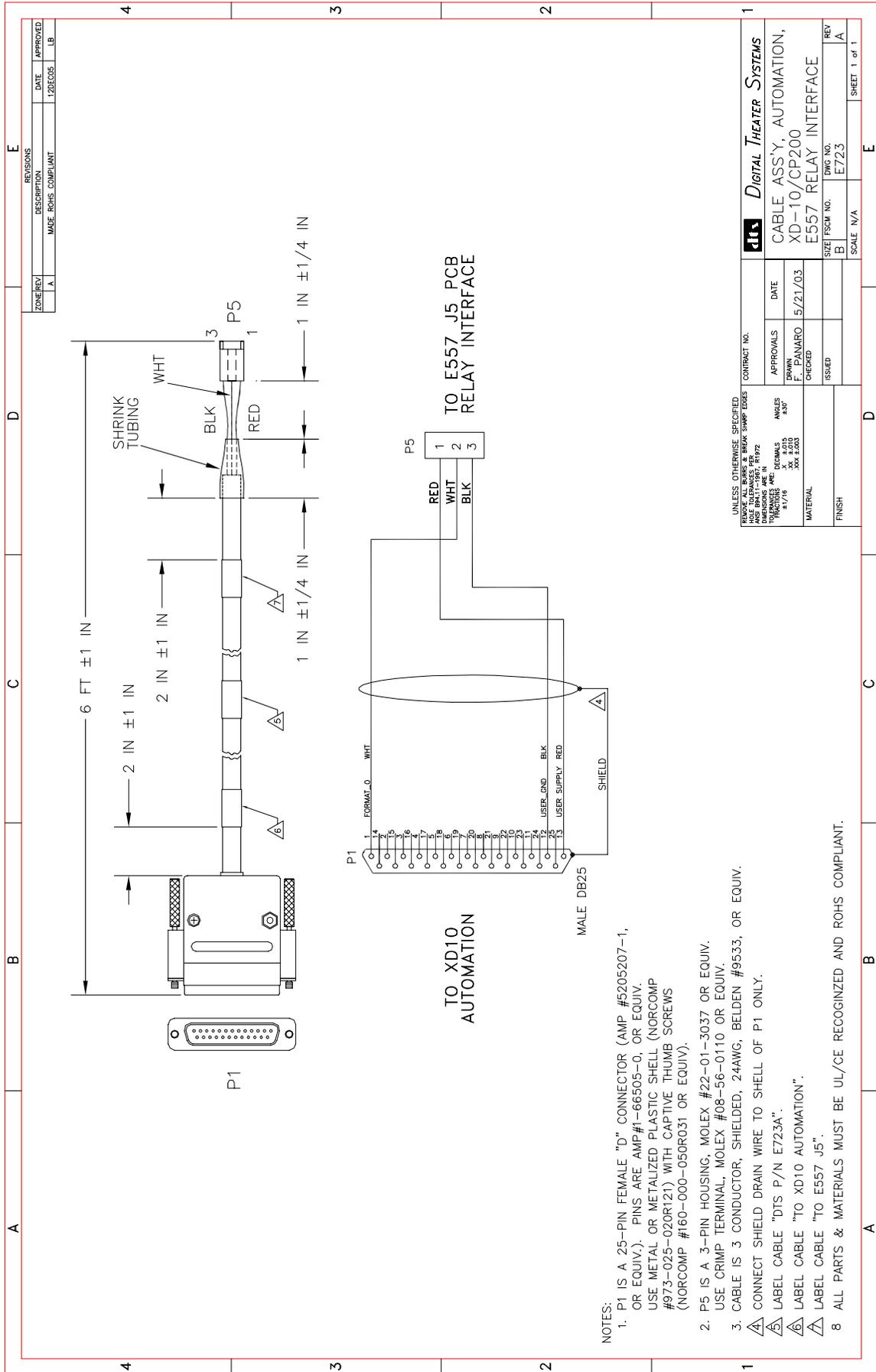


ZONE/REV	DESCRIPTION	DATE	APPROVED
A	ADDED ROHS COMPLIANCE REQUIREMENTS	07/06/03	LB

		CONTRACT NO.	
APPROVALS DRAWN CHECKED ISSUED	DATE 4/11/03	CABLE ASS'Y, AUTOMATION; XD-10/DTS-6D TRANSLATION	
MATERIAL FINISH		SIZE FSCM NO. B E681	DWG NO. E681
SCALE N/A		SHEET 1 of 1	

NOTE:  
 XD-10 AUTOMATION PIN DEFINITION TO BE PRESET AS DTS-6D EMULATION  
 ALL FORMAT LINES ARE MOMENTARY CLOSURE TO USER GND

- NOTES:
- P1 IS A 25-PIN MALE "D" CONNECTOR (AMP #5205208-1, OR EQUIV.). PINS ARE AMP#1-66507-0, OR EQUIV. USE METAL OR METALIZED PLASTIC SHELL (NORCOMP #973-025-020R121) WITH CAPTIVE THUMB SCREWS.
  - P2 IS A 25-PIN FEMALE "D" CONNECTOR (AMP #5205207-1, OR EQUIV.). PINS ARE AMP#1-66505-0, OR EQUIV. USE METAL OR METALIZED PLASTIC SHELL (NORCOMP #973-025-020R121) WITH CAPTIVE THUMB SCREWS (NORCOMP #160-000-050R031 OR EQUIV).
  - CABLE IS 6 CONDUCTOR, SHIELDED, 24AWG, BELDEN #9536, OR EQUIV.
    - △ CONNECT SHIELD DRAIN WIRE TO SHELL OF P1 ONLY.
    - △ LABEL CABLE "DTS P/N E681A".
    - △ LABEL CABLE "TO XD-10 AUTOMATION".
    - △ LABEL CABLE "TO DTS BREAK-OUT BOARDS".
  - ALL PARTS & MATERIALS MUST BE UL, CE RECOGNIZED, AND ROHS COMPLIANT.

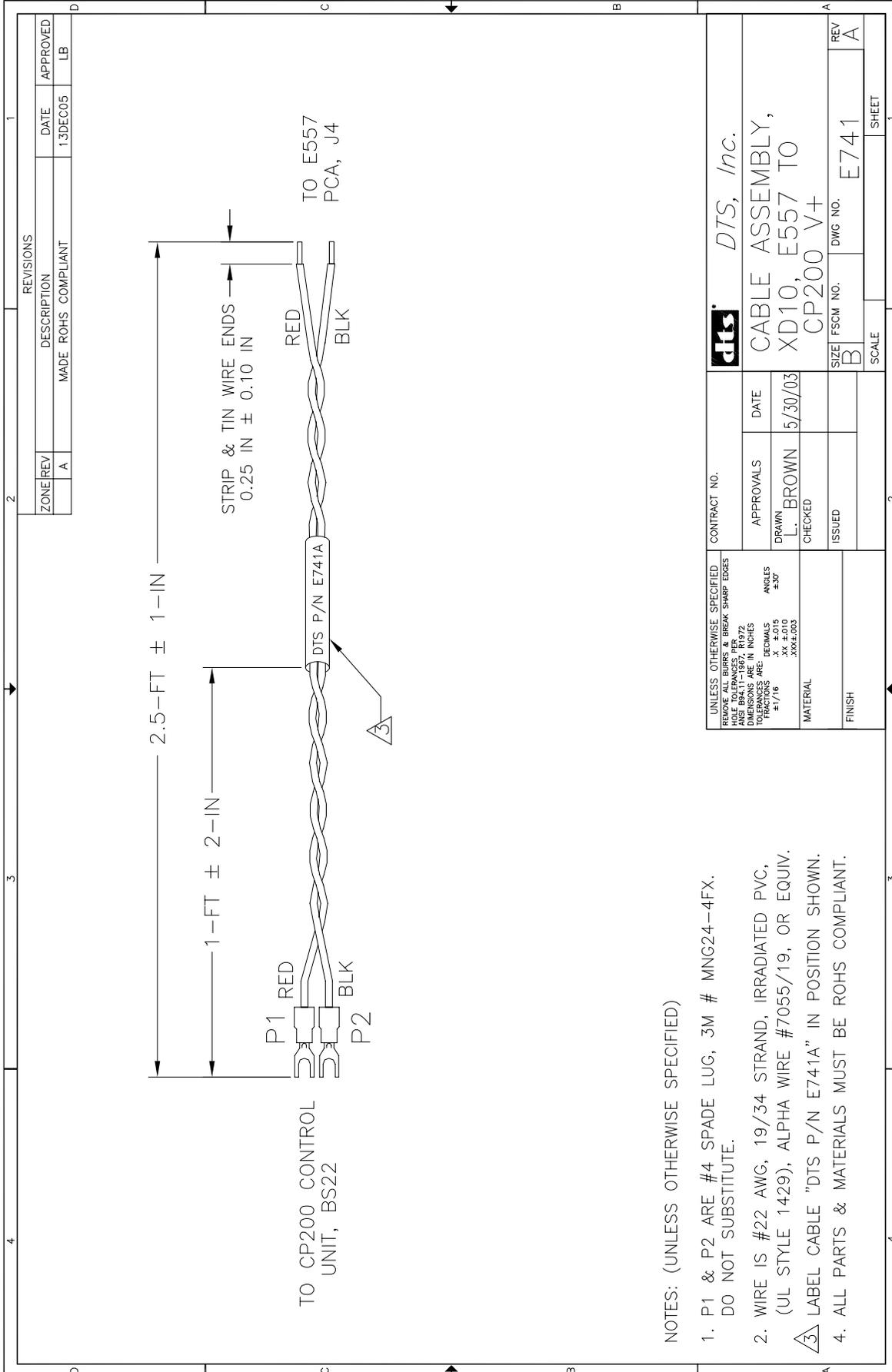


ZONE/REV	DESCRIPTION	REVISIONS	DATE	APPROVED
A	MADE ROHS COMPLIANT		12/26/05	LB

		CONTRACT NO.
APPROVALS	DATE	
DRAWN F. PANARO	15/21/03	
CHECKED		
ISSUED		
SIZE	ESCM NO.	REV
B	E723	A
SCALE: N/A		SHEET 1 of 1

UNLESS OTHERWISE SPECIFIED, USE THE FOLLOWING DIMENSIONS PER THE FOLLOWING TABLE:	
ANGLE	DECIMALS
± 1/16	± 0.01
± 1/32	± 0.005
± 1/64	± 0.0025
± 1/128	± 0.0015
± 1/256	± 0.0009
MATERIAL	
FINISH	

- NOTES:
- P1 IS A 25-PIN FEMALE "D" CONNECTOR (AMP #5205207-1, OR EQUIV.). PINS ARE AMP#1-66505-0, OR EQUIV. USE METAL OR METALIZED PLASTIC SHELL (NORCOMP #973-025-020R121) WITH CAPTIVE THUMB SCREWS (NORCOMP #160-000-050R031 OR EQUIV).
  - P5 IS A 3-PIN HOUSING, MOLEX #22-01-3037 OR EQUIV. USE CRIMP TERMINAL, MOLEX #08-56-0110 OR EQUIV.
  - CABLE IS 3 CONDUCTOR, SHIELDED, 24AWG, BELDEN #9553, OR EQUIV.
    - CONNECT SHIELD DRAIN WIRE TO SHELL OF P1 ONLY.
    - LABEL CABLE "DTS P/N E723A".
    - LABEL CABLE "TO XD10 AUTOMATION".
    - LABEL CABLE "TO E557 J5".
  - ALL PARTS & MATERIALS MUST BE UL/CE RECOGNIZED AND ROHS COMPLIANT.



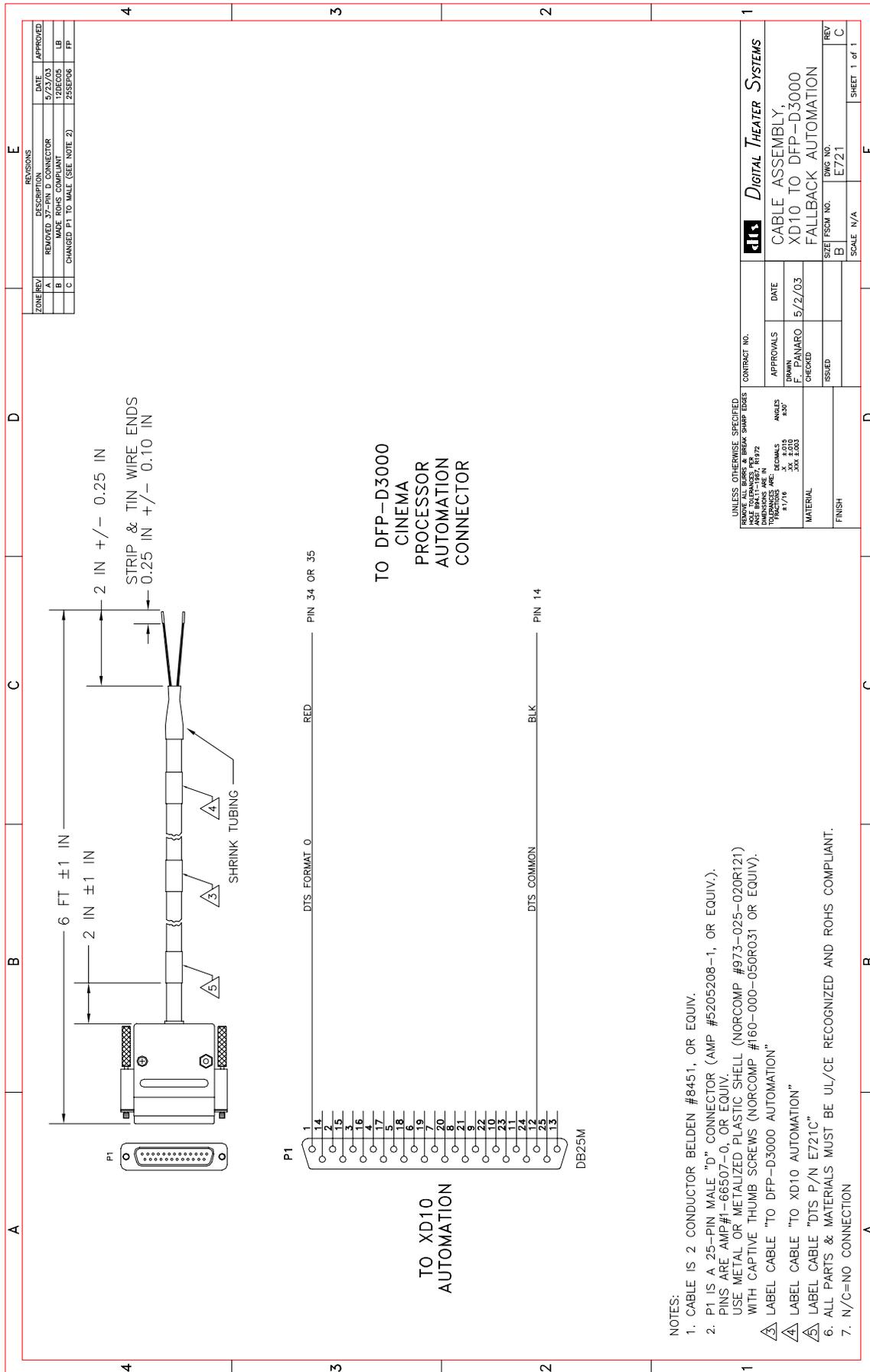
REVISIONS		DATE	APPROVED
ZONE/REV	DESCRIPTION		
A	MADE ROHS COMPLIANT	13DEC05	LB

UNLESS OTHERWISE SPECIFIED REMOVE ALL BURRS & BREAK SHARP EDGES PER ANSI B94.1-1967, R1972 DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS ARE: X ±.015 .XX ±.010 ANGLES ±.30° DECIMALS X ±.015 X ±.010 X ±.005		CONTRACT NO.	
APPROVALS	DATE	DTS, Inc.	
DRAWN L. BROWN	5/30/03	CABLE ASSEMBLY, XD10, E557 TO CP200 V+	
CHECKED		SIZE	REV
ISSUED		B	A
MATERIAL		DWG NO.	E741
FINISH		SCALE	SHEET
			A

- NOTES: (UNLESS OTHERWISE SPECIFIED)
- P1 & P2 ARE #4 SPADE LUG, 3M # MNG24-4FX. DO NOT SUBSTITUTE.
  - WIRE IS #22 AWG, 19/34 STRAND, IRRADIATED PVC, (UL STYLE 1429), ALPHA WIRE #7055/19, OR EQUIV.
  - ⚠ LABEL CABLE "DTS P/N E741A" IN POSITION SHOWN.
  - ALL PARTS & MATERIALS MUST BE ROHS COMPLIANT.







ZONE/REV	DESCRIPTION	DATE	APPROVED
A	REMOVED 37-PIN D CONNECTOR	5/23/03	LB
B	MADE ROHS COMPLIANT	12/26/05	LB
C	CHANGED P1 TO MALE (SEE NOTE 2)	2/25/06	FP

CONTRACT NO.		DATE	
APPROVALS			
DRAWN	F. PANARO	5/2/03	
CHECKED			
ISSUED			
MATERIAL		DECIMALS	
FINISH		ANGLES	
		± 0.10	
		± 0.05	
		± 0.03	
		± 0.02	
		± 0.01	
		± 0.005	
		± 0.002	
		± 0.001	
		± 0.0005	
		± 0.0002	
		± 0.0001	

UNLESS OTHERWISE SPECIFIED, DRAW ALL DIMENSIONS PER ASSEMBLY DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED

**DTS Digital Theater Systems**  
**CABLE ASSEMBLY**  
 XD10 TO DFP-D3000  
 FALLBACK AUTOMATION

SIZE/FCOM NO. E721C  
 DWG NO. E721  
 SCALE N/A  
 SHEET 1 of 1

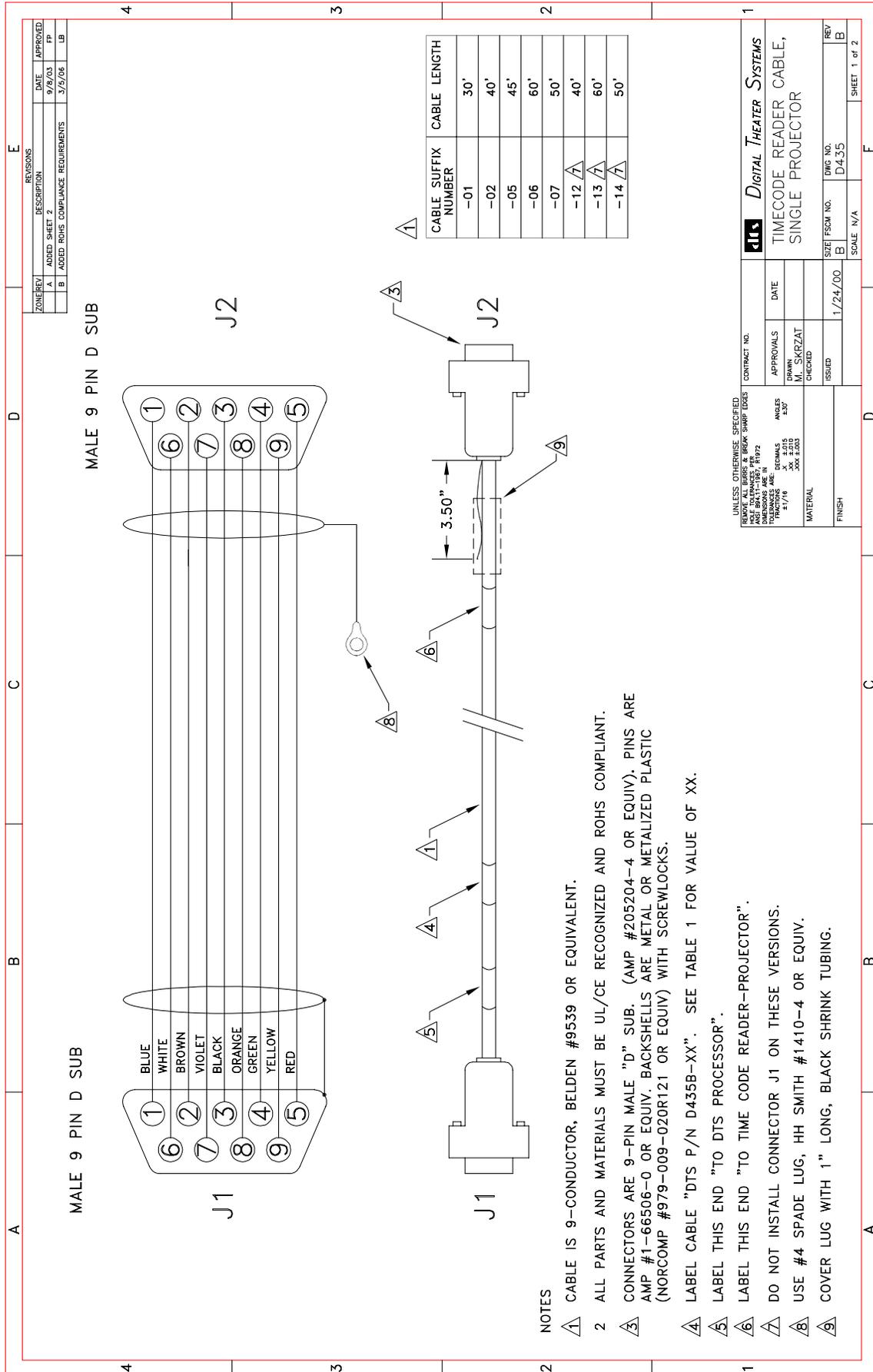
- NOTES:
- CABLE IS 2 CONDUCTOR BELDEN #8451, OR EQUIV.
  - P1 IS A 25-PIN MALE "D" CONNECTOR (AMP #5205208-1, OR EQUIV.). PINS ARE AMP#1-66507-0, OR EQUIV. USE METAL OR METALIZED PLASTIC SHELL (NORCOMP #973-025-020R121) WITH CAPTIVE THUMB SCREWS (NORCOMP #160-000-050R031 OR EQUIV.)
  - LABEL CABLE "TO DFP-D3000 AUTOMATION"
  - LABEL CABLE "TO XD10 AUTOMATION"
  - LABEL CABLE "DTS P/N E721C"
  - ALL PARTS & MATERIALS MUST BE UL/CE RECOGNIZED AND ROHS COMPLIANT.
  - N/C=NO CONNECTION

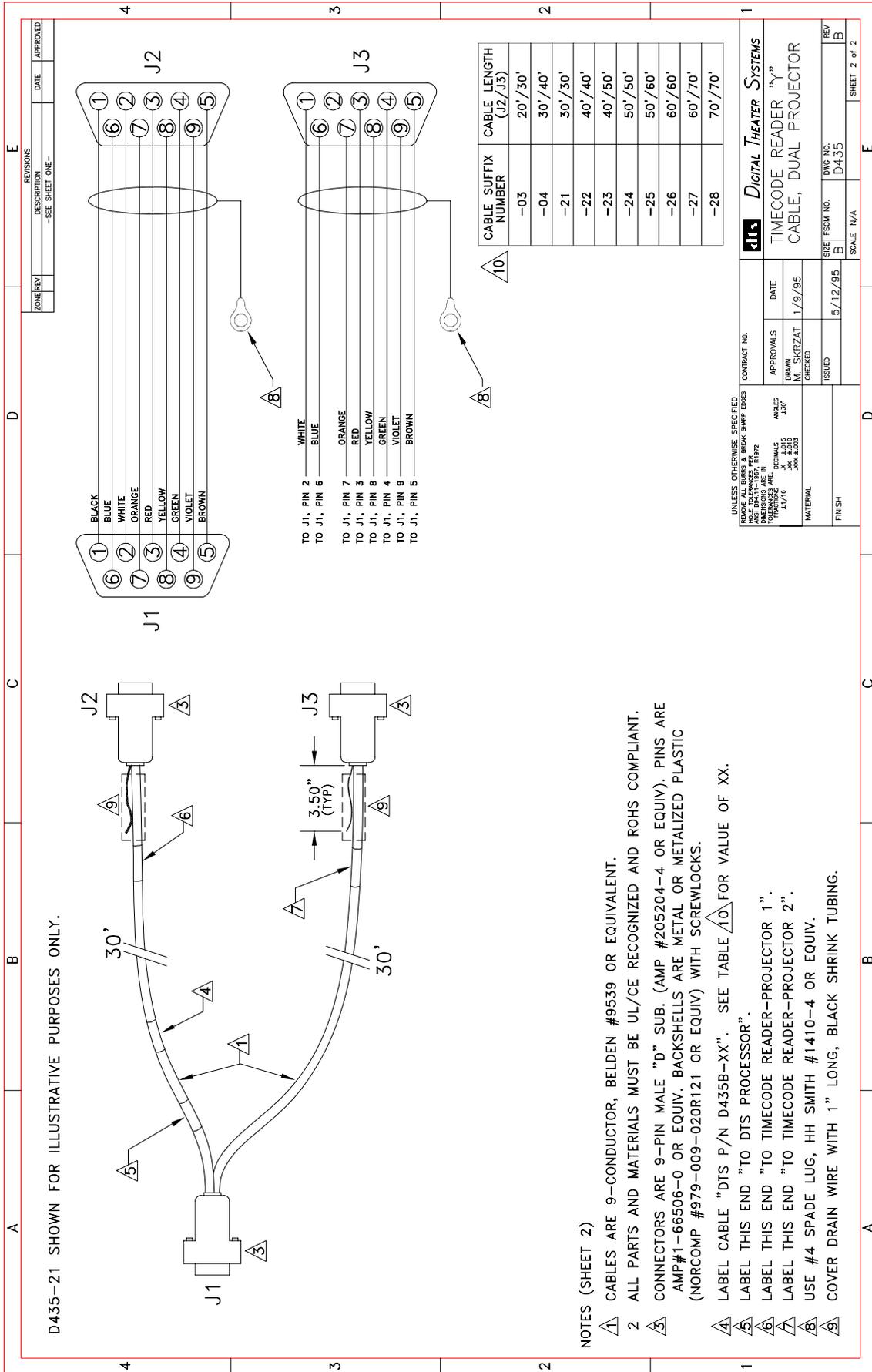
## **E709 Cable Assembly, XD10 to SMART Mod VI**

**See page D-7**









## Appendix E. Timecode Reader Head Mounting Brackets

### Timecode Reader Head Mounting Brackets – Parts List

Description	Part No.	Page
Standard Bracket	D614C	E-3
Universal Bracket	D615A	E-3
Phillips AA Bracket (Norelco DP70)	D616B	E-4
“L” Bracket (Kinoton DP75)	D617A	E-4
Cinemeccanica Bracket / adaptor plate (35 mm only)	5006 001 00	E-5
Front-Mount “L” Bracket	D622B	E-5
“Bracket, Phillips AA (Norelco) 70mm (Not shown)	D632A	E-6
“Bracket, “L” AA2, 70mm (Not shown)	D633A	E-7
Projector bracket, 70mm “C” (E650 Rev. A) (Not shown)	E650A	E-8
Breakaway Version of Standard Bracket for 35/70mm	D625B	E-9
35mm TC Head Breakaway Adapter Plate (use w/ D625)	D626A	E-10
70mm TC Head Breakaway Adapter Plate (use w/ D625)	D627A	E-10
Breakaway Mounting Plate for D615 Universal Bracket (use w/ D626 & D627 Adapter Plates)	D628B	E-11

### Timecode Reader Head Mounting Brackets - Description

- **D614 - Standard Bracket (35mm only)** – cannot be used with breakaway plates

For projectors: Century, Simplex, and Cinemeccanica with Kelmar bracket (below). Intended to fit between the projector and reel arm. We have produced the bracket with the American standard size hole to accommodate 2 inch center spacing 3/8 - 16 tap, that is utilized to mount the American-made upper reel arms. Comes with the following hardware:

Qty	Description
2	10 x 24 x 1/2" long screw
2	3/4 x 16 x 1" long hex bolt nut
2	3/8" lock washer

- **D615 - DP70 Universal Bracket (35mm only)**

Used for American projectors with a penthouse. Comes with tap and drill bit 8-32, and the following hardware:

Qty	Description
2	10 x 24 x 1/2 in. long screw
2	3/4 x 16 x 1 in. long hex bolt nut
2	3/8 in. lock washer

## Timecode Reader Head Mounting Brackets - Description

- **D616 - AA2 bracket (35mm only)**

For Norelco AA projectors. Comes with the following hardware:

Qty	Description
2	#10 lock washers
3	5/16 in. x 18 x 5 in. long screws
3	3/8 in. split ring lock
2	10 x 24 x ½ in. long screw

- **D617 - DP75 Bracket (35mm only)**

Used to mount the DTS timecode reader head to the side of the projector. Comes with same hardware as the D614. See also D628 - “L” adapter panel, below.

- **D622 - Front Mount Bracket (35mm only)**

Used when installing multiple digital sound heads or when there is not enough room to lift the projector arm. Used with Dolby SR-D™ and Sony SDDS™ reader heads.

- **D625 - 35mm / 70mm Standard Bracket – used with breakaway plates.**

For projectors: Century, Simplex, and Cinemeccanica with Kelmar bracket (see below). Intended to fit between the projector and reel arm. We have produced the bracket with the American standard size hole to accommodate 2” center spacing 3/8 - 16 tap, that is utilized to mount the American made upper reel arms. Comes with the following hardware:

Head	Qty	Description
35mm	2	10 x 24 x ½ in. long screw
35mm	2	¾ x 16 x 1 in. long hex bolt nut
35mm / 70mm	2	3/8 in. lock washer
70mm	2	3/8 x 1-1/2 in. long cap screws
70mm	2	3/8 in. flat washers
70mm	2	3/8 in. hex nuts

- **D626 - Spacer Breakaway Plate – used to mount 35mm DTS reader to 35/70 brackets**

- **D627 - Spacer Breakaway Plate – used to mount 70mm DTS readers to 35/70 brackets**

- **D628 - “L” adapter panel (35mm / 70mm) – used with D617 and breakaway plates**

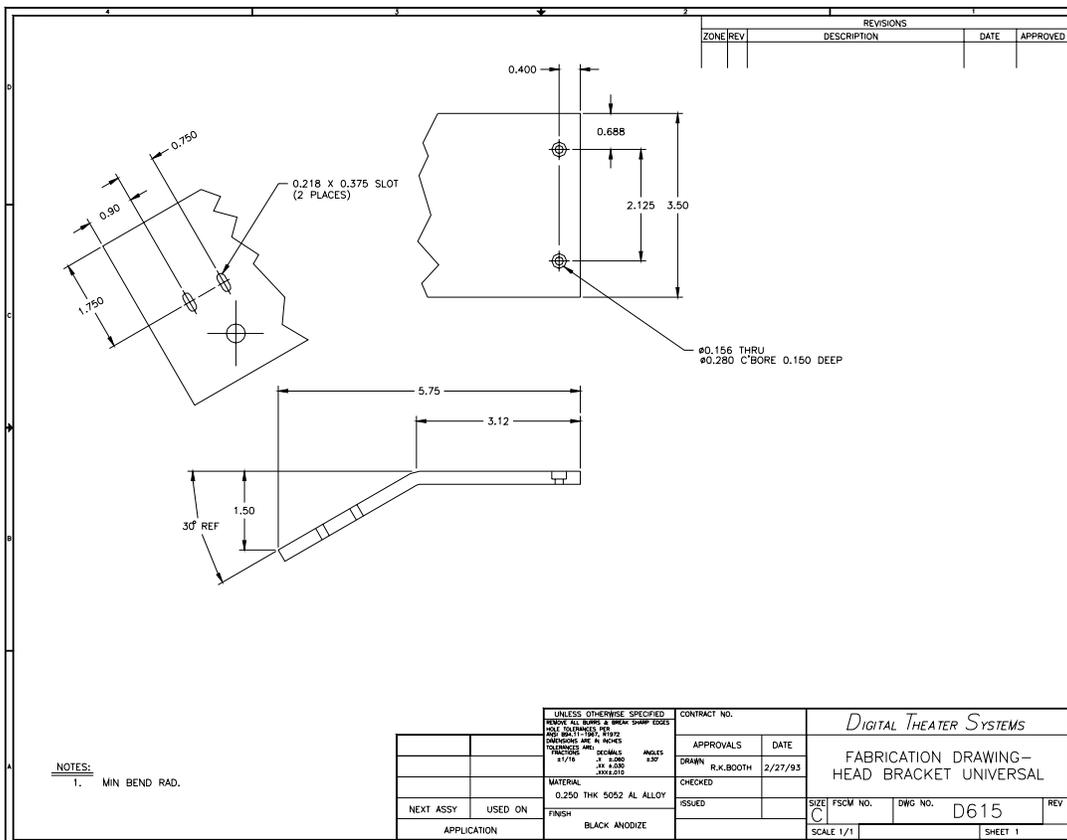
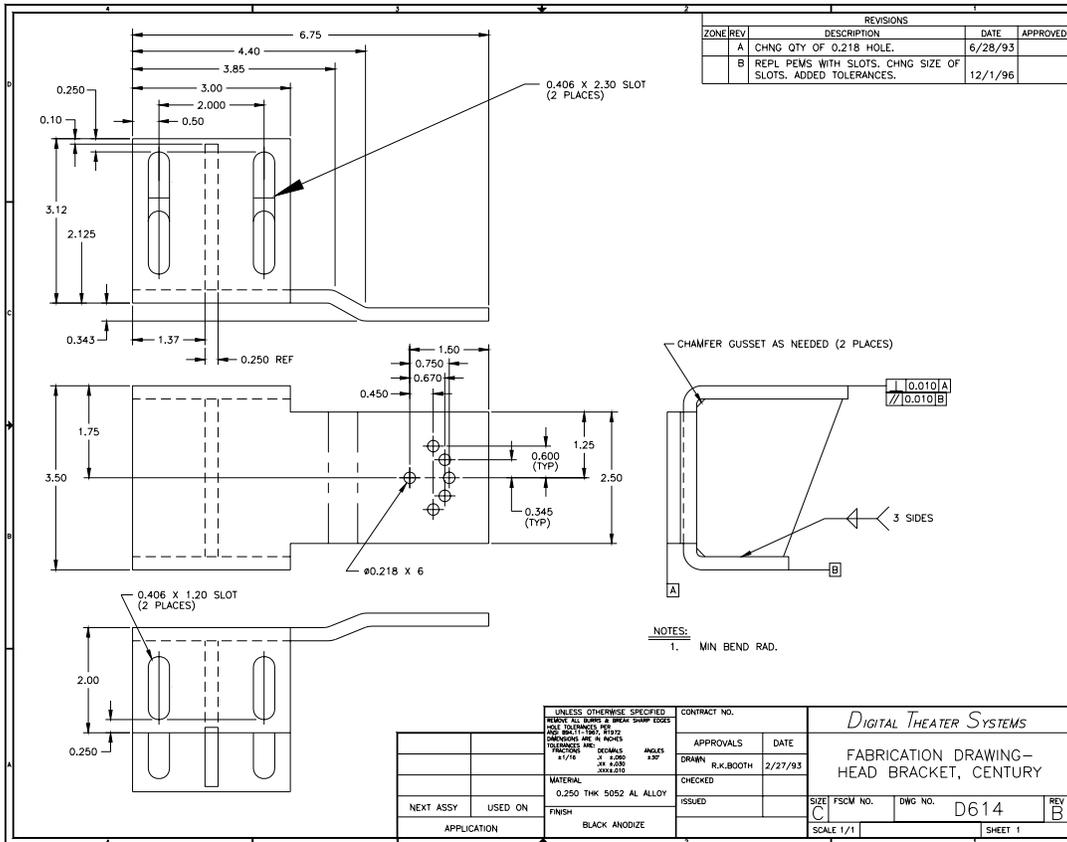
Used to mount the DTS timecode reader head to the side of the projector. Comes with same hardware as the D614. D628 is used to adapt the D617 for use with the breakaway plates (D628 attaches to D617).

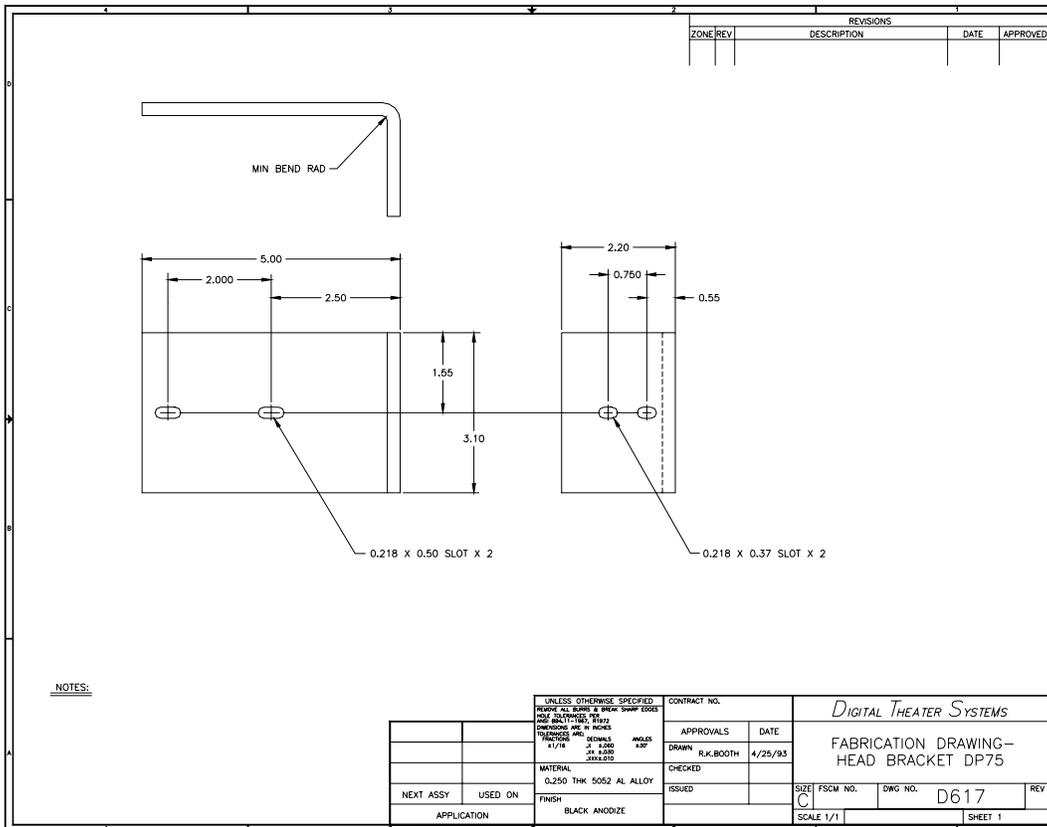
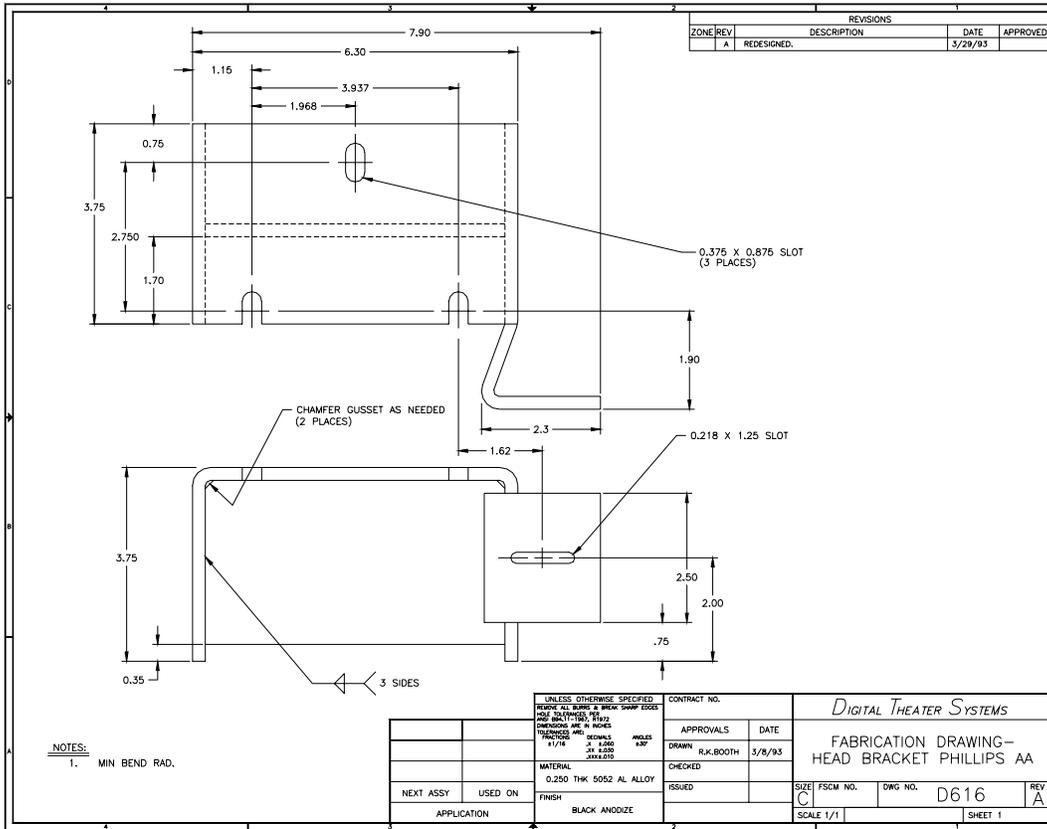
- **5006 0001 00 - Cinemeccanica Bracket / adapter plate (35mm only)**

For Cinemeccanica projectors. Must be used with the D164 standard bracket for mounting the DTS timecode reader head. If the reel arm needs to be remounted, two plates are required.

**Note:** Cinemeccanica also provides its own brackets. Contact them directly.

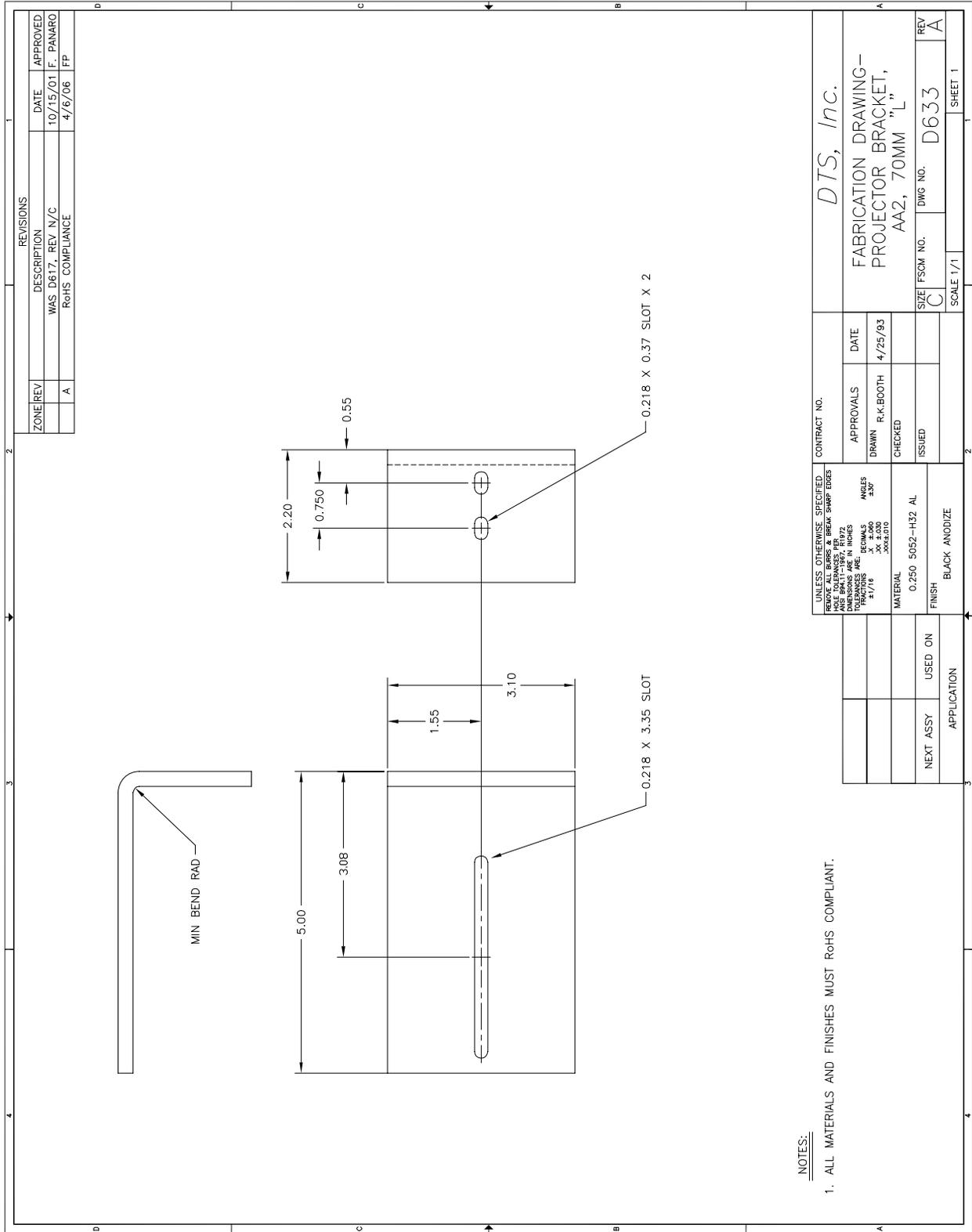
Timecode Reader Standard Mounting Brackets (next 3 pages)









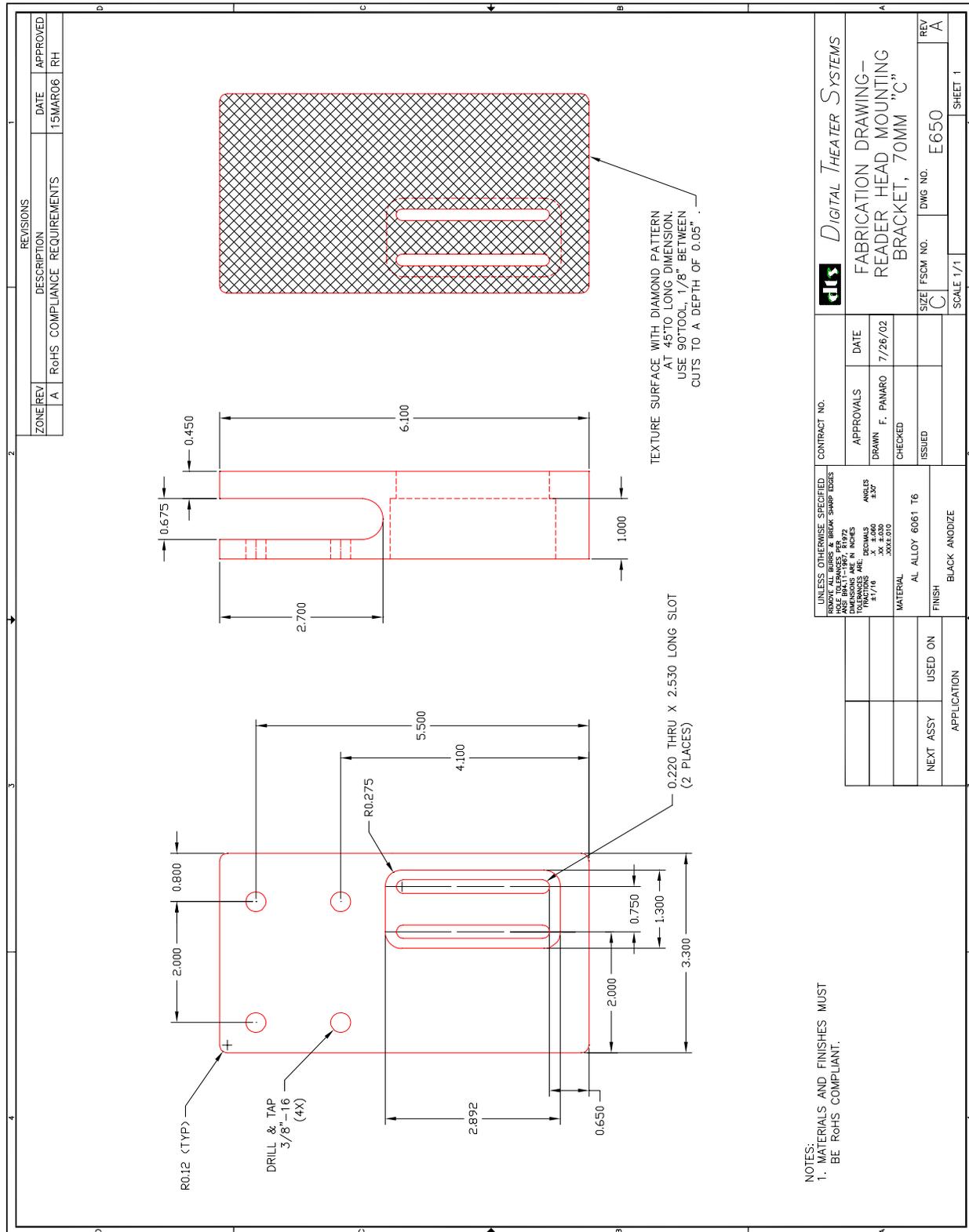


REVISIONS			
ZONE/REV	DESCRIPTION	DATE	APPROVED
A	WAS D617, REV N/C RoHS COMPLIANCE	10/15/01 F. PANARO 4/16/06 TFP	

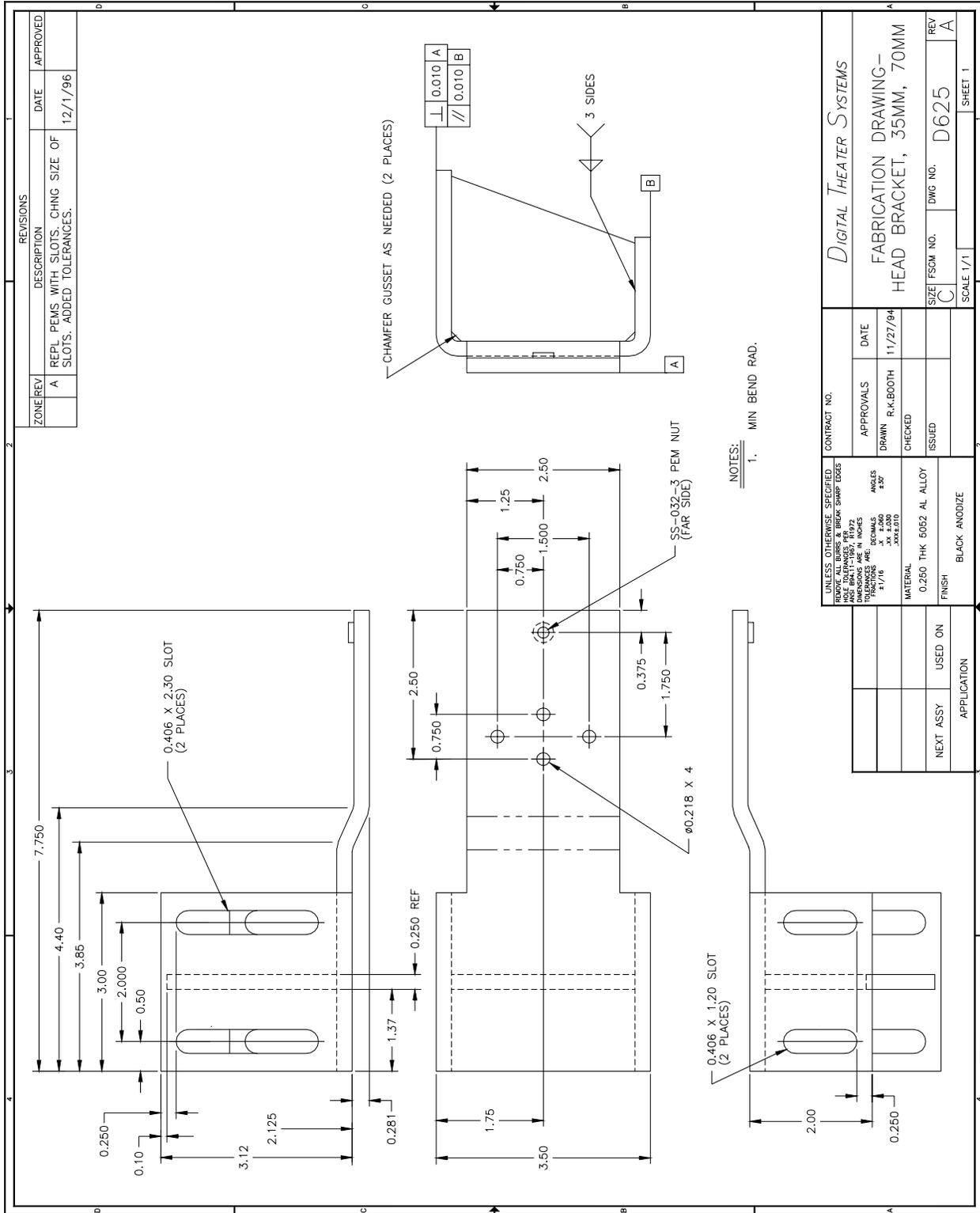
NOTES:

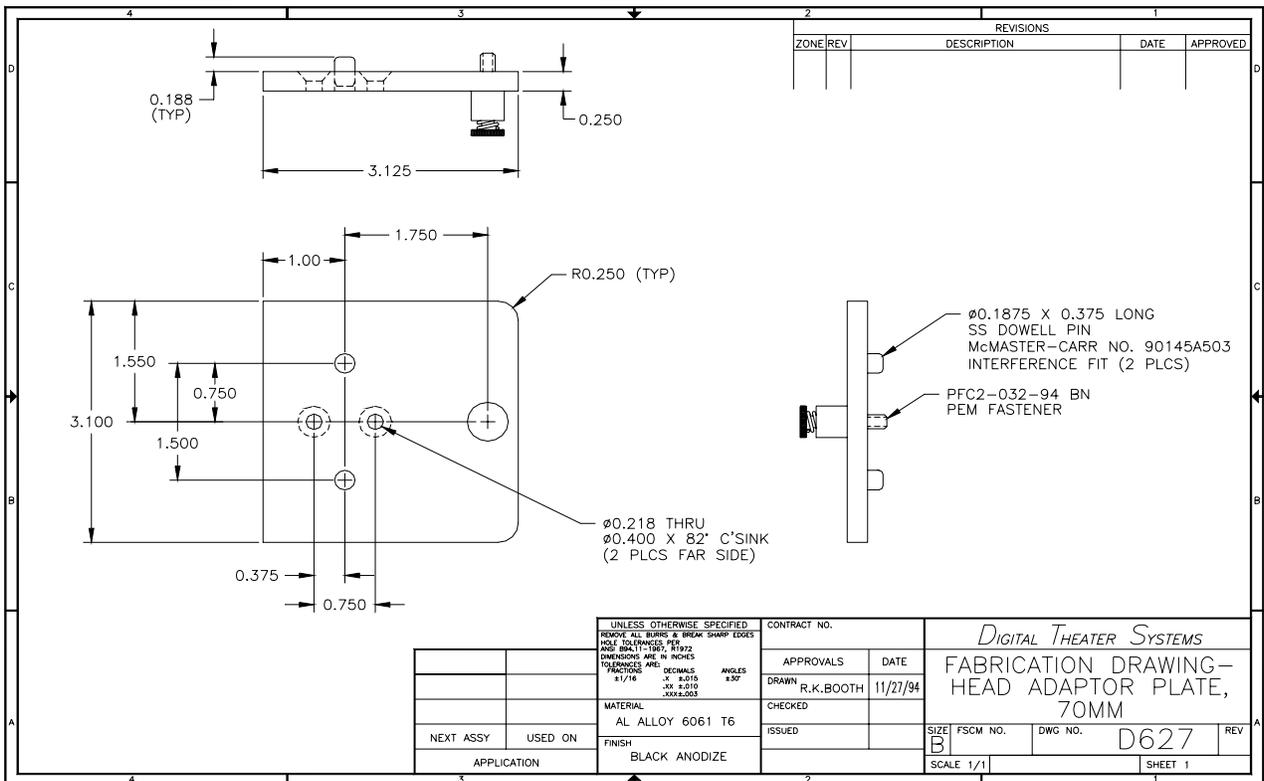
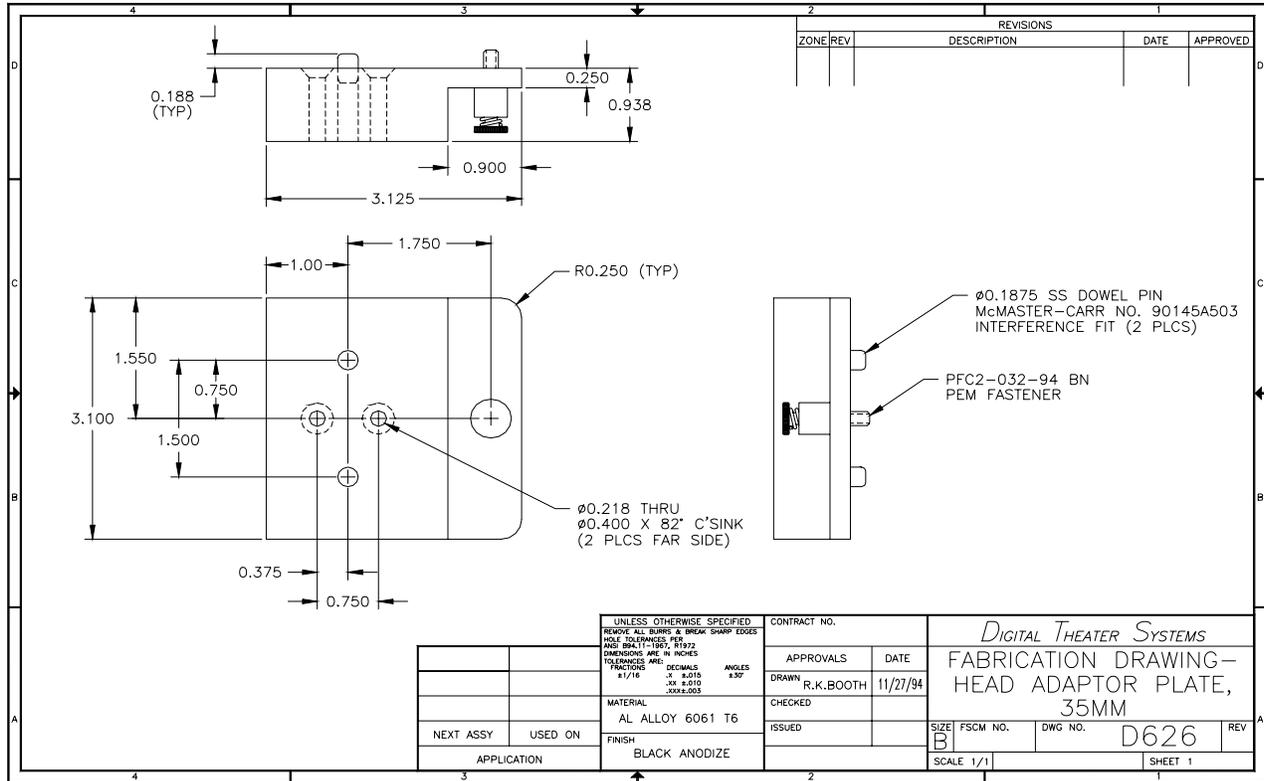
1. ALL MATERIALS AND FINISHES MUST BE RoHS COMPLIANT.

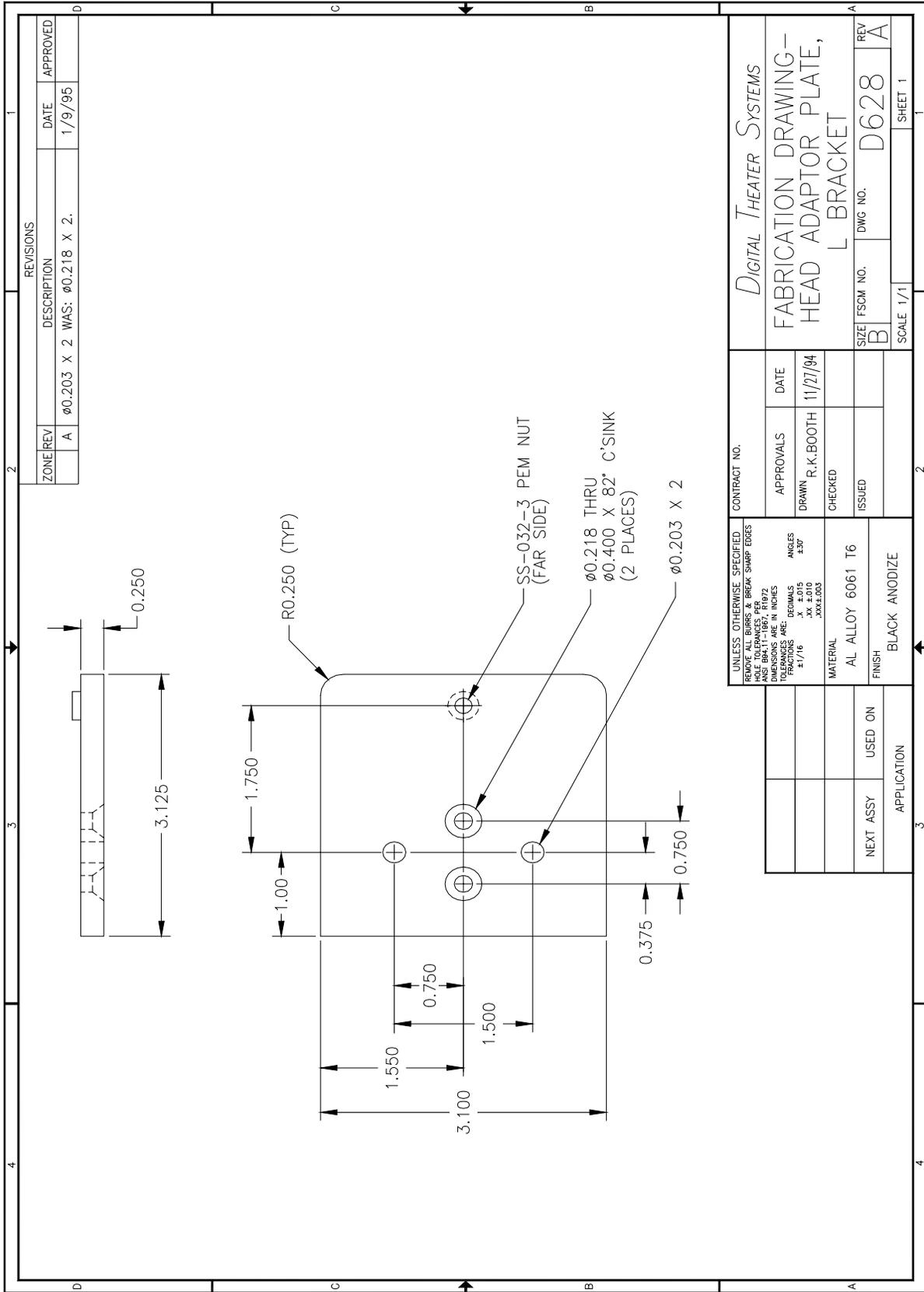
UNLESS OTHERWISE SPECIFIED: MATERIALS SHALL BE AS SHOWN OR BREAK SHARP EDGES DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED TOLERANCES ARE: FRACTIONS DECIMALS X ±.000 XX ±.002 XXX ±.005		CONTRACT NO.	
APPROVALS	DATE	DTS, Inc.	
DRAWN R.K. BOOTH	4/25/93	FABRICATION DRAWING— PROJECTOR BRACKET, AA2, 70MM "L"	
CHECKED		SIZE	FSCM NO.
ISSUED		C	D633
MATERIAL		DWG NO.	
0.250 5052-H32 AL		D633	
FINISH		SCALE 1/1	
BLACK ANODIZE		SHEET 1	
NEXT ASSY	USED ON		
APPLICATION			



### Mounting adapters used when switching between 35mm & 70mm readers (next 3 pages)



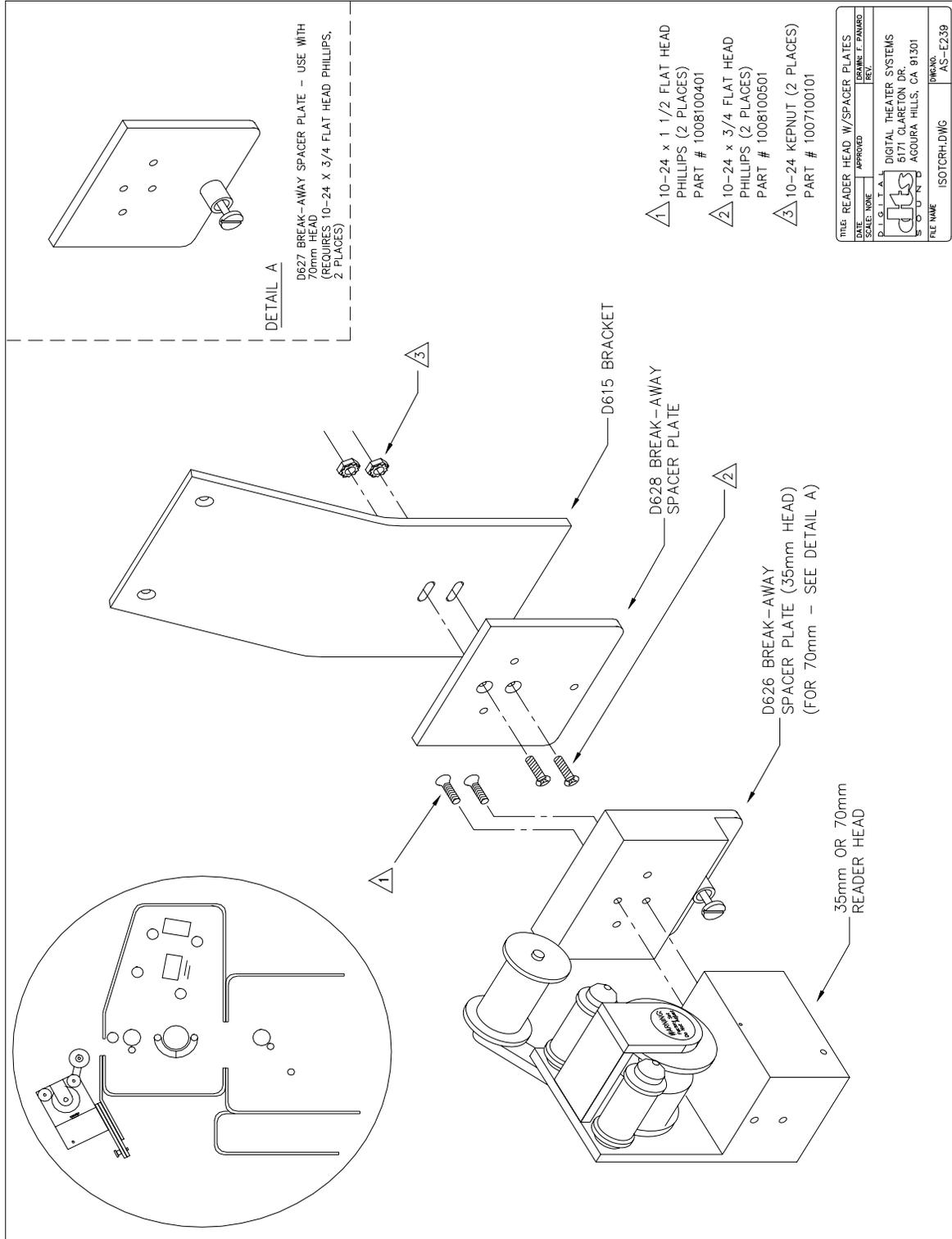




UNLESS OTHERWISE SPECIFIED REMOVE ALL BURRS & BREAK SHARP EDGES AND FILE ALL ANGLES TO R0.125 PER 927 DIMENSIONS ARE IN INCHES TOLERANCES ARE DECIMALS		CONTRACT NO.	
±1/16	±0.015	APPROVALS	DATE
.XX ±0.10	° ±30'	DRAWN R.K. BOOTH	11/27/94
.XXX ±0.03		CHECKED	
		ISSUED	
MATERIAL	AL ALLOY 6061 T6	SIZE	FSCM NO. DWG NO.
FINISH	BLACK ANODIZE	B	D628
NEXT ASSY	USED ON	REV	A
APPLICATION		SCALE	1/1
		SHEET	1

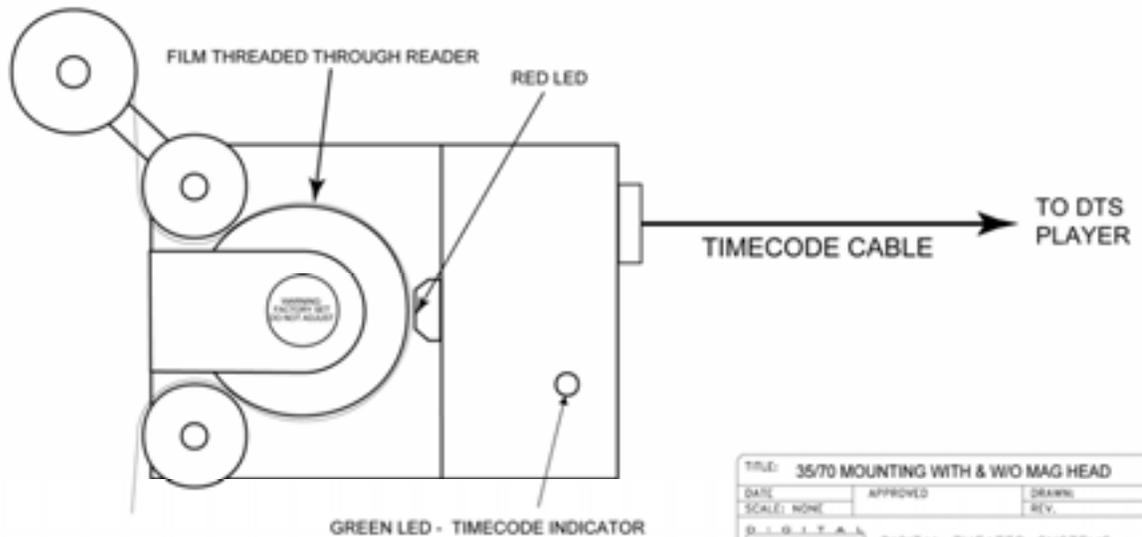
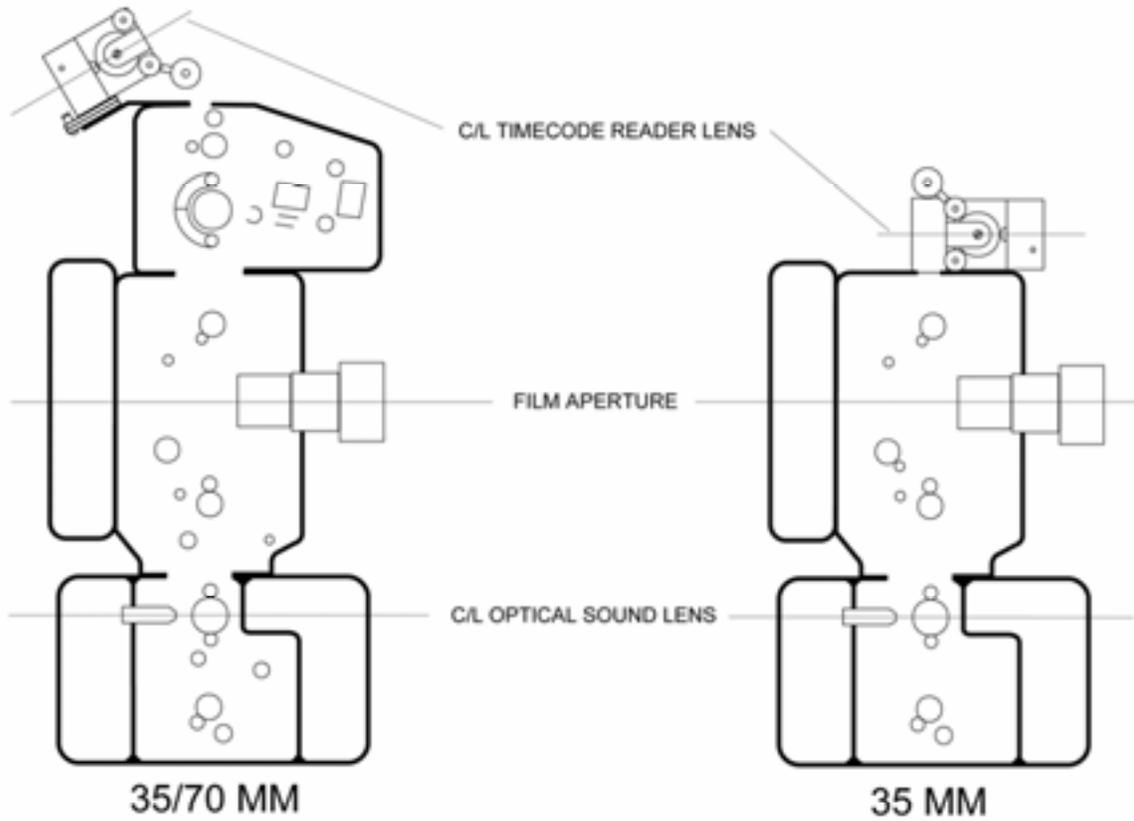
Digital Theater Systems  
 FABRICATION DRAWING--  
 HEAD ADAPTOR PLATE,  
 L BRACKET

**Installing DTS Timecode Reader with spacer plates on a projector with a “mag” (magnetic) head.**



### Timecode Reader Head Drawings

☑ These drawings are to be used to help installers determine Timecode offset (delay) only.



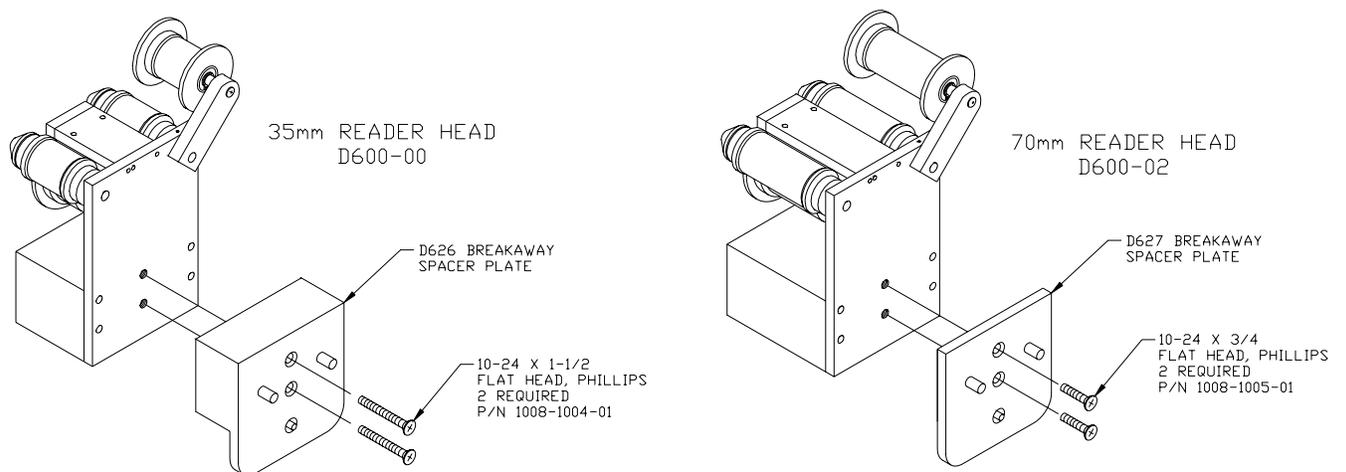
TITLE: 35/70 MOUNTING WITH & W/O MAG HEAD		
DATE	APPROVED	DRAWN
SCALE: NONE		REV.
DIGITAL THEATER SYSTEMS 5171 CLARETON DR. AGOURA HILLS, CA 91301		
FILE NAME	DWG. NO.	
TIE245A (3570MAG).AI	TI-E245	

## ***DTS 35mm and 70mm Readers, Switchable, Using the Same Bracket***

If both 35mm and 70mm reader heads are to be used on the same bracket, add spacer breakaway plates to the readers. They are added to allow quick changes between the two. Keep the plates attached to the readers and maintain them as a set once the projector alignments are finished. See below.

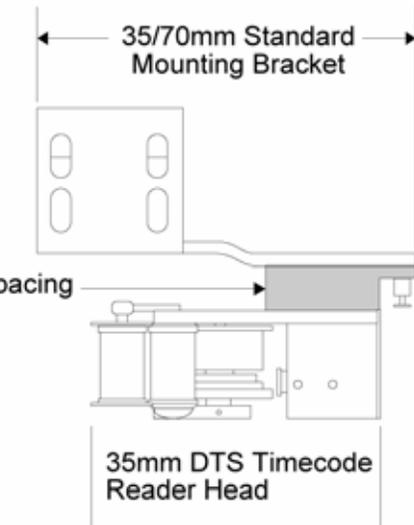
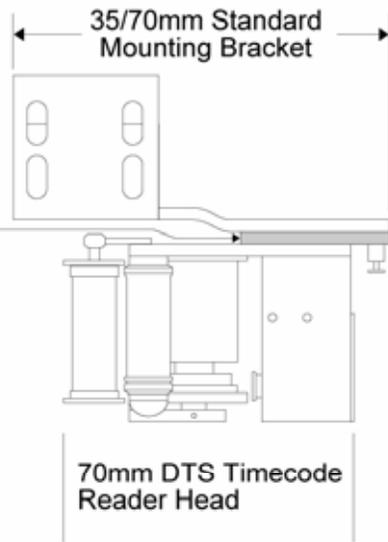
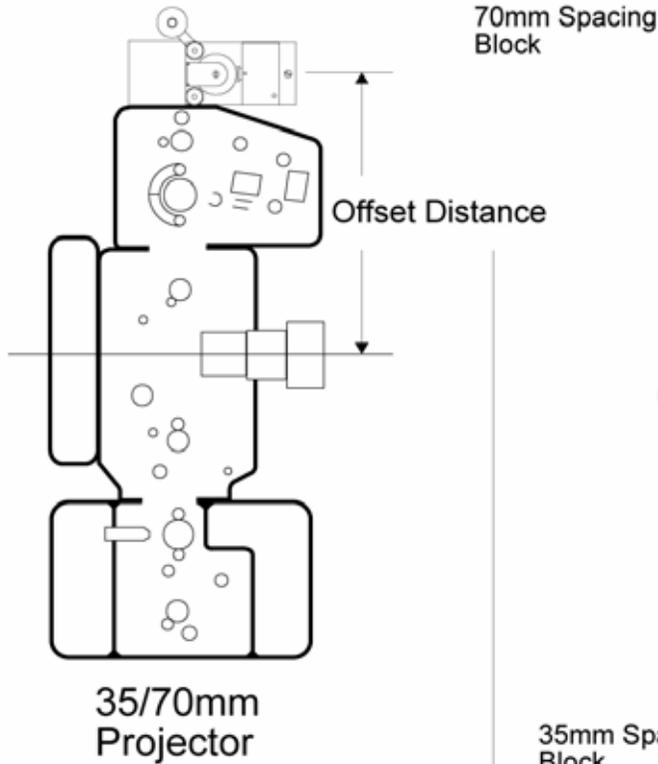
1. Start by mounting the 70mm reader (with its breakaway plate attached) to the bracket.
2. Use 70mm film to align the reader. Once aligned, tighten bracket screws.
3. Loosen the thumbscrew on the breakaway plate so that the 70mm reader detaches from the bracket.
4. Next, attach the 35mm reader (with its breakaway plate attached) to the bracket.
5. Use 35mm film to verify the alignment path is correct -- no corrections should be necessary.

The goal is to have one alignment for both readers so that no projector adjustments are needed when the readers are exchanged.



**Attach Breakaway Spacer Plates to Reader Heads**

# DTS - 70mm Timecode Reader and Mounting Brackets



In order to properly set the offset for 70mm film on the DTS unit, count the number of frames between the picture aperture and the timecode reader head. Multiply by 1.25 and subtract one.

For example,

Distance between (70mm) Picture Aperture & Timecode Reader Head	24 Frame/Sec Offset Setting
(24 frames X 1.25) - 1	=29
(12 frames X 1.25) - 1	=14

TITLE: 70MM TCRH MOUNTING & BRACKETS			
DATE	APPROVED	DRAWN: J. DELLARIA	
SCALE: NONE		REV. A	
		DIGITAL THEATER SYSTEMS 5171 CLARETON DR. AGOURA HILLS, CA 91301	
FILE NAME	TIE241A (70MM-MNT).AI	DWG. NO.	TI-E241A

PH: 818-706-3525 Fax: 818-706-1868  
 Web: www.dtsonline.com

Mounting adapters when switching between 35mm and 70mm Readers

## Appendix F. System Parts List

- Note: There are different configurations for XD20 installations, depending on cinema processor interface, cable length, and whether there are single or dual projectors.

### XD20 Master Parts List

Part Number	Description
2501000100	Power cord, straight, detachable, standard
2501000200	Power cord, right angle, detachable
MD10D60000	Timecode reader head, 35mm, auxiliary roller attached
9005E10800	Auxiliary roller assembly kit, 35mm
9003E11901	Screw kit, rack, truss head screw and washer
<b>Timecode Cable for single projectors</b>	
9022D43501	30 ft. Timecode cable, standard
9022D43502	40 ft. Timecode cable
9022D43505	45 ft. Timecode cable
9022D43506	60 ft. Timecode cable
<b>Timecode Cable for dual projectors</b>	
9022D43504	Timecode Y cable, 30 ft. / 40 ft.
9022D43521	Timecode Y cable, 30 ft. / 30 ft. standard
9022D43523	Timecode Y cable, 40 ft. / 50 ft.
9022D43526	Timecode Y cable, 60 ft. / 60 ft.
<b>Mounting brackets (to projector) for 35mm timecode reader heads (hardware included)</b>	
5006000100	Cinemeccanica bracket (use with D614 standard bracket)
9003E10000	Screw kit, bracket, standard
9003E10200	70mm spacer kit (used to fit a 35mm reader in a 70mm space)
9061D61400	Projector bracket, 35mm standard (for Century, Simplex, Ballantyne)
9061D61500	Universal bracket
9061D61600	Phillips AA bracket (Norelco)
9061D61700	"L" bracket (Kinton)
9061D62200	Front mount bracket (use with Dolby SR-D or Sony SDDS readers)
<b>Mounting brackets, switchable 35mm / 70 mm timecode reader heads (hardware included)</b>	
9061D62500	35mm/70mm standard bracket used with breakaway plates
9061D62600	Breakaway (spacing block) plates for 35mm D600 reader head
9061D62700	Breakaway (spacing block) plates for 70mm D600 reader head
9061D62800	Adapter panel for D617 "L" bracket (so breakaway plates can be used)
<b>Publicity supplies and film</b>	
6800653100	Film, DTS Trailer, Sparks Suite, flat
6800653101	Film, DTS Trailer, Sparks Sprite, scope
<b>Cables and Breakout Boards (for connecting to cinema processor)</b>	
2503001400	Cable Assy, 25-pin "D" M/F, 6 ft long for DTS-6AD, DTS-ECP, CP65, UltraStereo JS series, Panastereo CSP1200
2503001700	Cable Assy, 25-pin "D" M/M 6 ft long for DTS-6AD or DTS-ECP
9022E17300	Cable Assy, fem"D" pin, 2 inches long for CP65
9022E68000	Cable Assy, Audio XD10 to CP45
9022E68100	Cable Assy, Automation, XD10/DTS-6D Translation
9022E68200	Cable Assy, XD10 to CP650, CP500 & CP65 Automation
9022E68300	Cable Assy, XD10 to CP650/CP500 Audio
9022E68400	Cable Assy, XD10 to CP65/SRD Audio
9022E70900	Cable Assy, XD10 to Smart Mod VI
9022E72000	Cable Assy, XD10 to DFP-D3000 or DCP-1000 Analog



9022E72100	Cable Assy, XD10 to DFP-D3000 Fallback Automation
9022E72300	Cable Assy, Automation, XD10/CP200 E557 Relay Interface
9022E72400	Cable Assy, XD10 to Panastereo CSP1200 Automation
9030D56400	Breakout board PCA, DTS-6D to CP-55 Logic Interface (for CP65)
9022E73800	Cable Assy, XD10 E712 ID7/V+
9022E73900	Cable Assy, E712 to D572 SW
9022E74100	Cable Assy, XD10 E557 to CP200 V+
9022E74300	Cable Assy, XD10 E557 to DA10/20 Audio
9022E82300	Cable Assy, XD10 to SmartMod 2B,V,SRS3,SRS5,DM6
9022E90100	Cable Assy, XD10 Analog Out to XD10P EXT1 (Analog) Audio In
9022E92100	Cable Assy, XD10 I/O
9022E93400	Cable Assy, 15 Pin "D" Male/Female
9022F23900	Cable Assy, XD10 to DCP-1000 Automation
9022F51800	Cable Assy, XD10 I/O to E557 (CP65/DA20)
9030D56500	Breakout board PCA, DTS-6D to CP55 Logic
9030D57100	Breakout board PCA, DTS-6D to UltraStereo Logic Interface
9030D57200	Breakout board PCA, DTS-6D to CP55 Audio
9030D57400	Breakout board PCA, DTS-6D to CP-65 Audio Interface
9030D57500	Breakout board PCA, DTS-6D to UltraStereo Audio Interface
9030D71600	Breakout board PCA, DTS-6D to CP45 Logic Interface
9030D72500	Dual input interface board, studio application (DTS XD10-CP65-dubber)
9030E55700	Breakout board PCA, XD10 to CP200 (12V Relay)
9030E55701	Breakout board PCA, XD10 to CP65/DA20 (5V Relay)
9030E71200	Breakout board PCA, XD10 to CP55 SW Switch
<b>Audio Output Testing</b>	
9030E31300	DTS tester board, for testing outputs at the XD10 Analog Output connector

## Replacement Parts

Part Number	Description
<b>Timecode Readers</b>	
MD10D60000	D600 Timecode reader head, 35mm, auxiliary roller attached
9005E10800	Auxiliary roller assembly kit, 35mm
MD10D60002	D600-02 Timecode Reader Head, 70mm
9005E16300	Auxiliary Roller, 70mm

## Appendix G. Specifications

### Optional Features

- DTS Access™ technology for subtitling, captioning, and narration (audio description)
- Standard and High Definition Video Playback
- Second (back-up) hard drive
- External DVD Drives

### Inputs

#### Time code (Projector 1 and Projector 2)

- Auto sensing of timecode type
- Connector: Rear Panel DB9F
- Power (+5V) and Return for D600 reader head
- DTS
- SMPTE (24, 25, 29.97, 30 ndf)

**Note:** Theater uses 30fnd referenced to NTSC video (29.97) and D-Cinema uses 24 frame referenced to NTSC video (23.976)

Timecode signal (DTS and SMPTE formats), “standard DTS timecode signal captive range 1 – 5V”

#### Automation

- Connector: Rear Panel DB25F
- 8 “format” (switch closure) inputs or outputs, 24V max, optically isolated
- DB15M connector for 3 additional inputs and 3 additional outputs

## Audio Outputs

### Analog (Main)

Connectors: Rear Panel DB25M Channels 1- 8

Output Impedance: 100 Ohm (load > 600 Ohms)

Output Level: unbalanced 300 mV<sub>RMS</sub> @ -20dBFS (reference level)

Frequency Response: 20 – 20 kHz +/- 0.5 dB @ reference level

Dynamic Range: 100 dB, 20 – 20 kHz (A-Weighted)

S/N: >85 dB

THD+N: < 0.01%, 20 – 20 kHz

Crosstalk: > 85 dB, 20 - 20 kHz

Table 1. Analog Output Channel Assignments

Channel Number	Channel
1 (DB25) A	Left
2 A	Right
3 A	Center
4 A	Sub
5 A	Left Surround
6 A	Right Surround
7 A	Left Center
8 A	Right Center

### Analog (Descriptive Narration)

Designed to support audio description (enabled with CSS option)

Connectors: Rear panel RCA, mono output

Output Impedance: 100 Ohm (load > 600 Ohms)

Output Level: unbalanced 300 mV<sub>RMS</sub> @ -20dBFS (reference level)

Dynamic Range: 100 dB, 20 - 20 kHz, unweighted

S/N: > 85 dB

THD+N: < 0.01%, 20 – 20 kHz

Crosstalk: > 85 dB, 20 Hz - 20 kHz

### Digital Audio Out

Connector: Rear Panel DB25M

Electrical Format: AES/EBU

Coding Format: AES/EBU

Pin-out: compatible with DMA™8

Sample Rates: 48, 96 kHz

8-channels



## **Audio Inputs**

### **Digital Audio In**

Connector: Rear Panel DB25F

Electrical Format: AES/EBU

8-channels

### **S/PDIF Input**

Connector: Rear panel RCA

## **Image Formats (with video option)**

Video: HD-MPEG2, MPEG4, WM9, VOB

Still: JPEG, TIFF, Bitmap

## **Video Outputs (with video option)**

### **Analog**

VGA via HD15F for CSS

VGA via HD15F for standard definition video

### **Digital**

DVI-D for high definition video

## **Other Connectors**

### **EMA Control Outputs**

Rear Panel DB15F; connections compatible to CSS

### **Cinema Processor Automation Outputs**

Rear Panel DB25F

### **Ethernet**

Rear Panel RJ45

Conforms to IEEE 802.3

### **USB**

4 Rear Panel USB 2.0

1 Front Panel USB 2.0

### **RS-232**

RS-232 (for serial control of Rear Window™ or HD Video projector only)

Rear Panel DB9M COM1

## **DVD-ROM (optional 1U unit – H260)**

Two (2) 16X DVD-ROM drives

## Hard Drive

Capacity: 250 GB  
 MTBF 1 million operational hours  
 Second hard drive is an option

## User Interface

Status LEDs (Front Panel)  
 Menu Navigation and Control Buttons

## LCD (Front Panel)

A graphic blue/white LCD display, 240 x 64 pixels, backlit.  
 LCD brightness and contrast adjustable through menus.

## Hardware

### Dimensions

HWD 3.5 X 19.0 X 15.75 inches (2U 19-inch rack-mount standard)

### Weight

Shipping weight for standard configuration (no video module, one hard drive, one TC reader head): 13.2 kg (29 lbs).  
 Shipping weight for fully loaded configuration (with video module, two hard drives, two TC reader heads): 14.7 kg (32.4 lbs).

## Environmental

Table 2. Operating Conditions and Reliability

Parameter	Conditions	Min	Nominal	Max	Unit
Low line voltage		85	100/120	135	V
High line voltage		200	220/240	270	V
Line Frequency	Low line =60 / High line = 50	47	60/50	63	Hz
Input cooling airflow	Power Supply fan	3.5			CFM
	Chassis fan		20.64		CFM
Operating ambient temperature range	At 0 ft elevation	0		40	°C
Operating ambient elevation range	At 35 °C	0		10,000	Ft
Storage temperature range		-20		+70	°C
Operating humidity range	Non-condensing	10/10		95/40	%°C
Storage elevation range	2000 ft/min max rate to climb	0		20	Kft

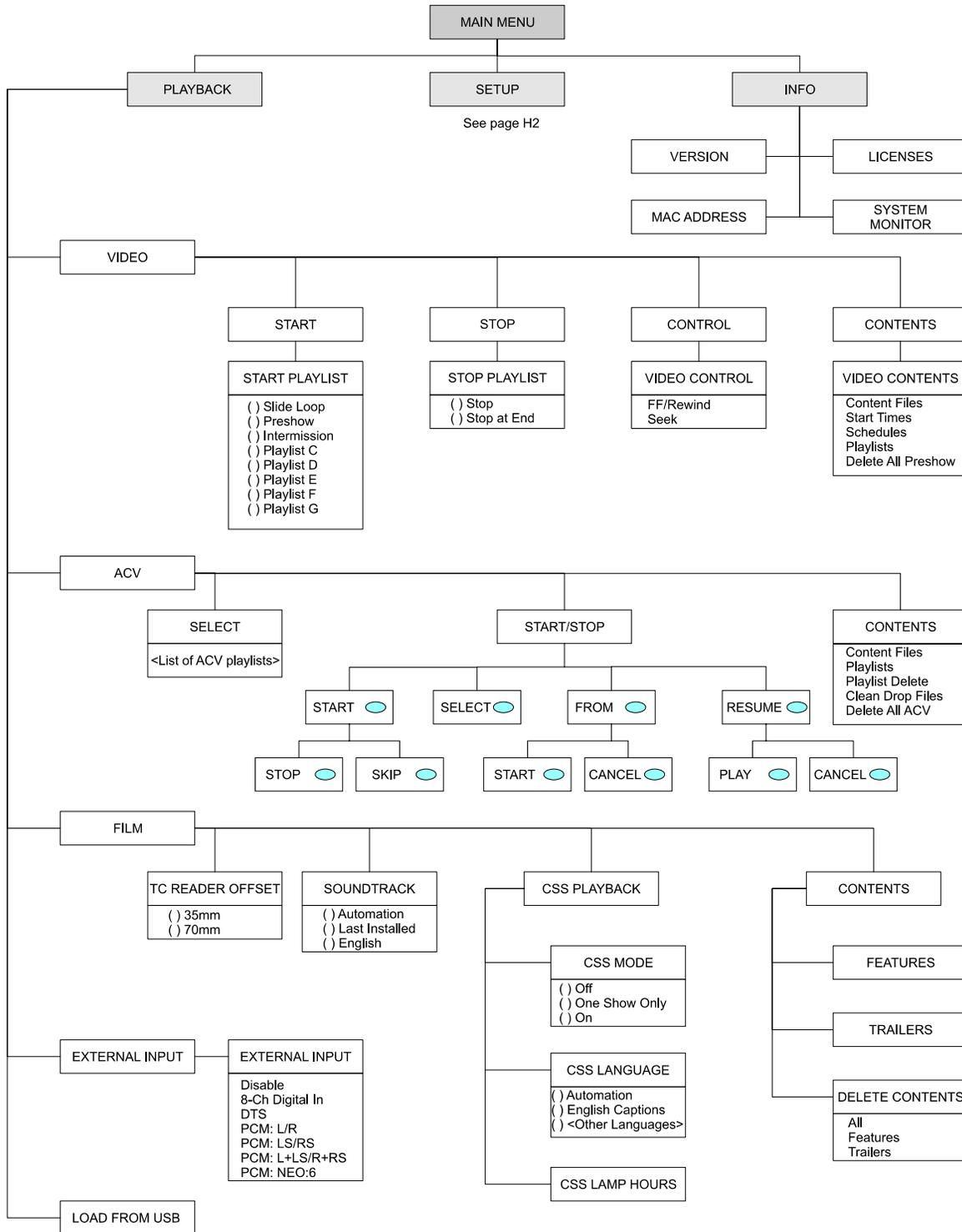
## Regulatory – Safety, Emissions, and Susceptibility Specifications

Table 3. Regulatory, Safety, EMI/EMC, Environmental

Safety	ANSI UL60950-1 (USA) CAN/CSA-C22.2 NO.60950.95 3 <sup>rd</sup> edition (USA) c-UL (Canada)
Radiated and Conducted Emissions	Class A limits of CISPR 22 per FCC CFR Title 47, part 15 Subpart B, (USA) Class A limits of EN 55022: 2006 (EU) EN 55024: 1998 + A1: 2001 & A2: 2003
Harmonic Current Emissions	EN 61000-3-2: 2006
Voltage Flicker	EN 61000-3-3: 1995 +A1: 2001
Power Factor Correction	Ref. IEC 1000-3-2
Required Regulatory Marks	FCC- Class A CE UL & CUL CCC (pending) K Mark – Korea (pending)
RoHS (6)	2002/95/EC

# Appendix H. Menu Structure

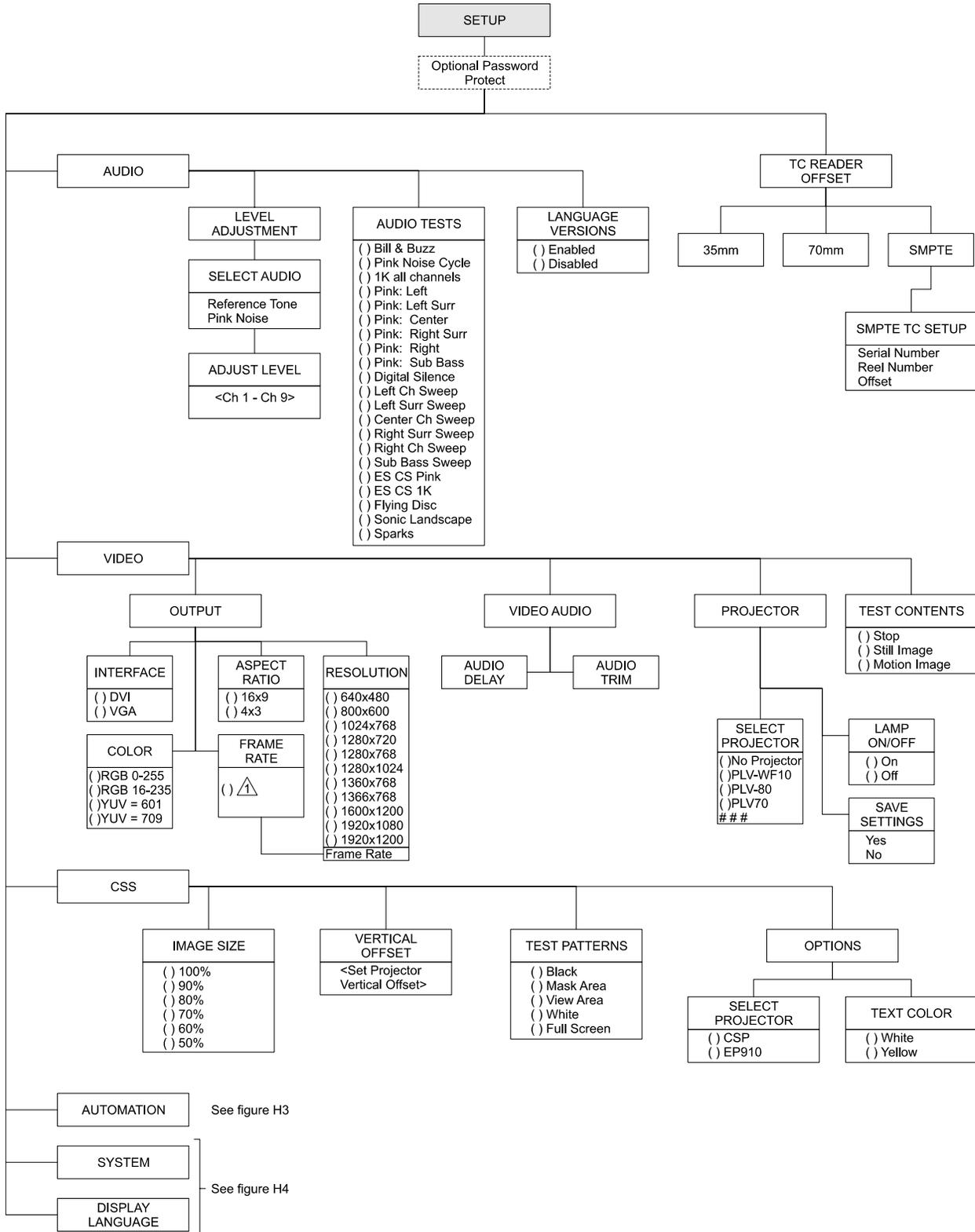
XD20 Menu Structure - Figure H1



NOTES:

1. = Soft key.
2. Menus shown may not be active on all units. Some menus appear only when the unit is licensed for that option. Some menus are dependent on selections in other menus.

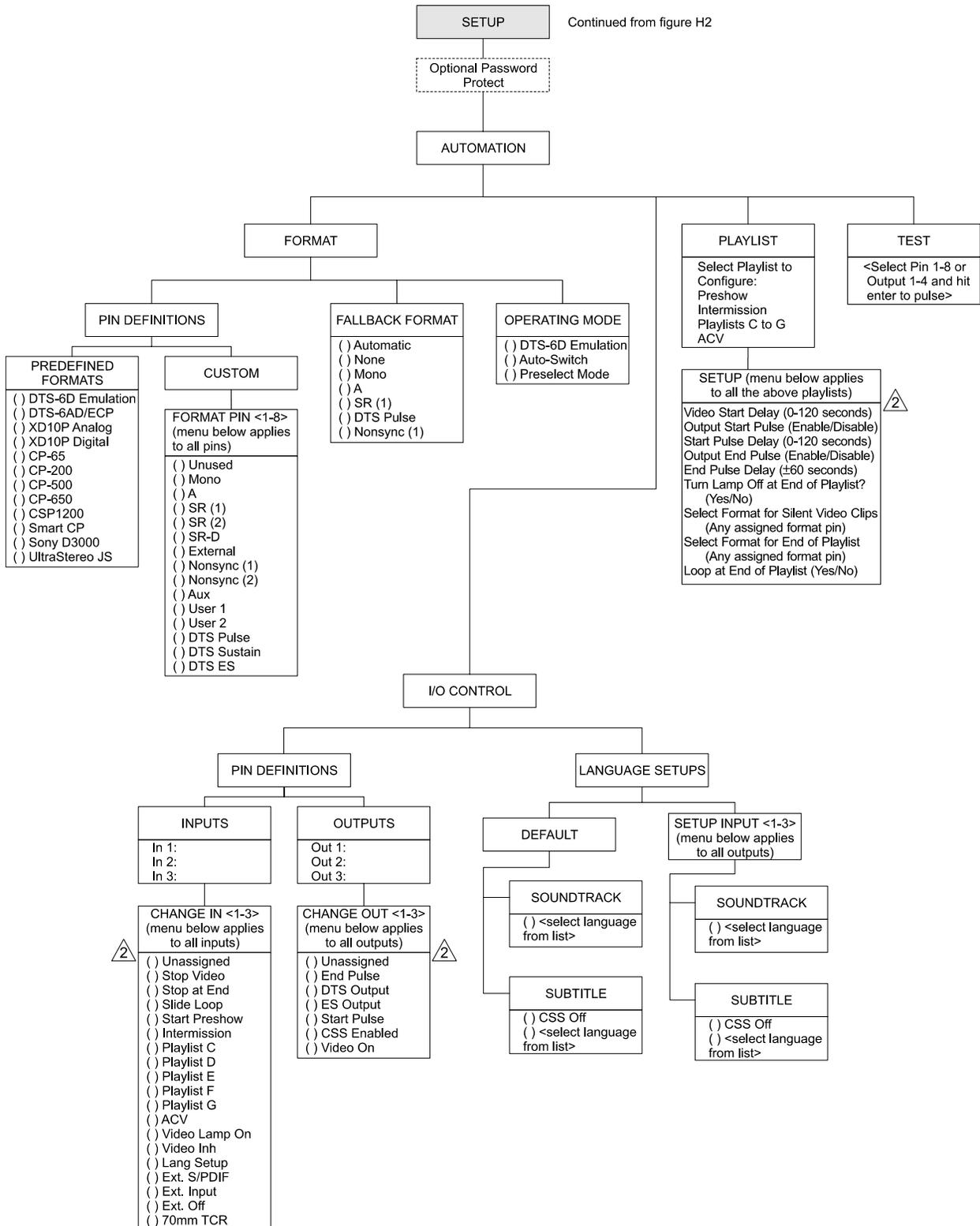
### XD20 Menu Structure - Figure H2



NOTES:

1. ⚠ Frame rate selection list is dependant upon resolution selected.
2. Menus shown may not be active on all units. Some menus appear only when the unit is licensed for that option. Some menus are dependent on selections in other menus.

### XD20 Menu Structure - Figure H3

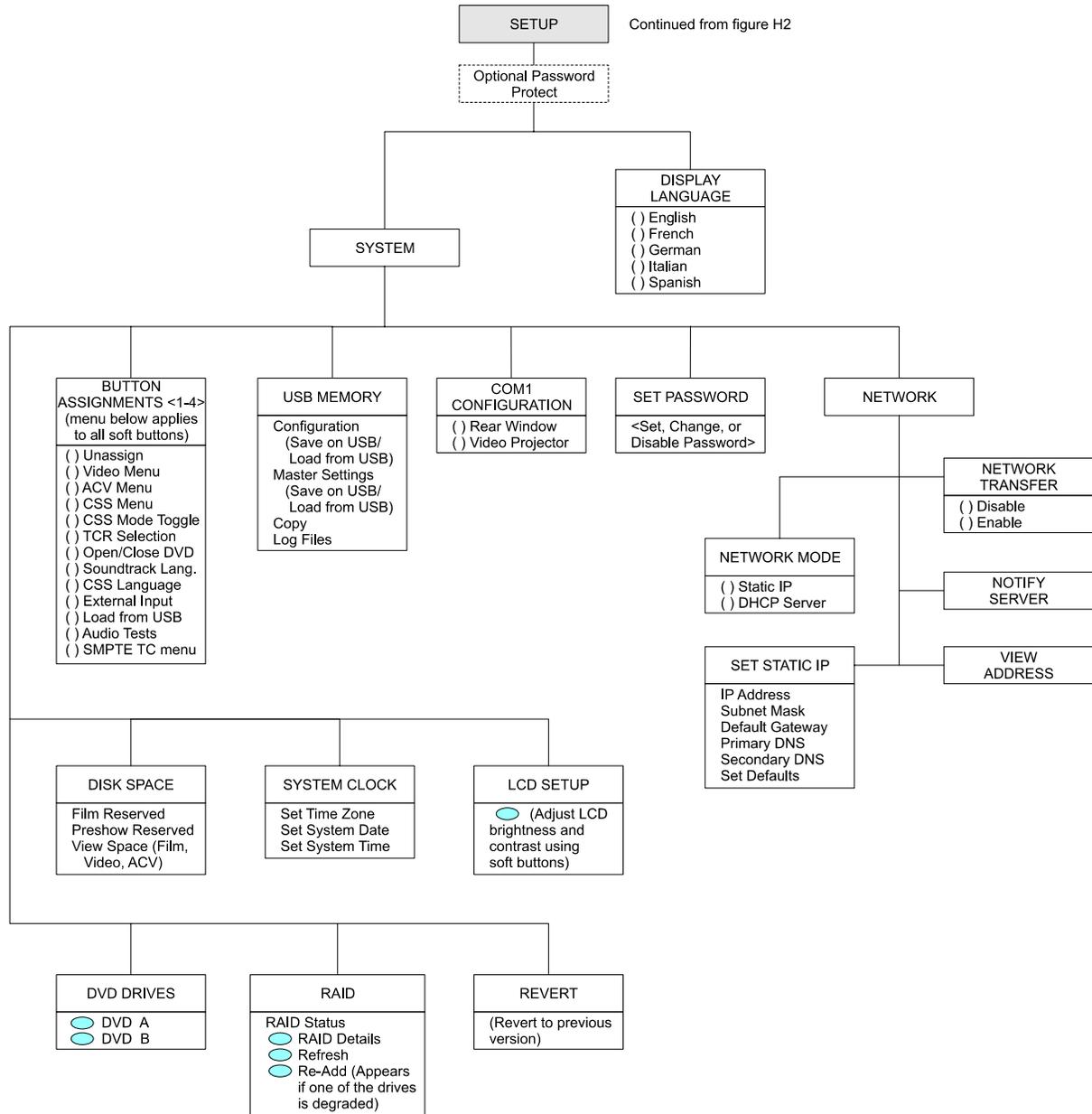


**NOTES:**

1. Menus shown may not be active on all units. Some menus appear only when the unit is licensed for that option. Some menus are dependent on selections in other menus.

Use right arrow key to cycle through menu choices.

### XD20 Menu Structure - Figure H4



**NOTES:**

1. = Soft key.
2. Menus shown may not be active on all units. Some menus appear only when the unit is licensed for that option. Some menus are dependent on selections in other menus.

## Appendix I: Technical Maintenance

This appendix provides instructions on how to change the battery on the motherboard and how to install or change the auxiliary roller for the D600 Timecode Reader Head. The information on installing the auxiliary roller applies to Timecode Reader Heads that do not have an RoHS sticker.

This appendix also has reference material for the technician servicing the product. This includes:

- Description of the components inside the unit
- Drawings of the inside of the unit
- Drawing of the back panel

### Change the Battery on the Motherboard

- To avoid damage to equipment or injury to personnel, read this procedure completely before beginning work. Be sure to observe all cautions and warnings.

A coin-cell battery (CR2032) powers the real-time clock and CMOS memory when the XD20 is disconnected from AC power. The battery has an estimated life of two years. When the XD20 is connected to AC power, the standby current from the power supply extends the life of the battery.

This battery is not necessary for proper playback of audio, and has no effect on playback. The battery enables the XD20 to maintain accurate date and time settings. Replace the battery on the ASUS motherboard with one of the following approved batteries:

- Newsum CR2032
- Duracell DL2032
- Sony CR2032
- Hitachi LTD CR2032

### Instructions

Please note that the motherboard model can change without notice so the instructions and location shown for the battery may change.

-  **Caution:** Risk of explosion if the battery is replaced with an incorrect type. Batteries should be recycled where possible. Disposal of used batteries must comply with local environmental regulations.

Follow these steps to replace the battery.

1. Turn off the XD20 and disconnect the power cord from the AC power source.
  - Note:** It may be necessary to disconnect all cabling and take the XD20 to a workbench to perform this procedure. In that case, record the cabling connections so they can be reconnected later.

-  **Caution:** Wear an anti-static wrist strap to prevent electro-static damage to the XD20.

2. Remove the cover of the XD20.



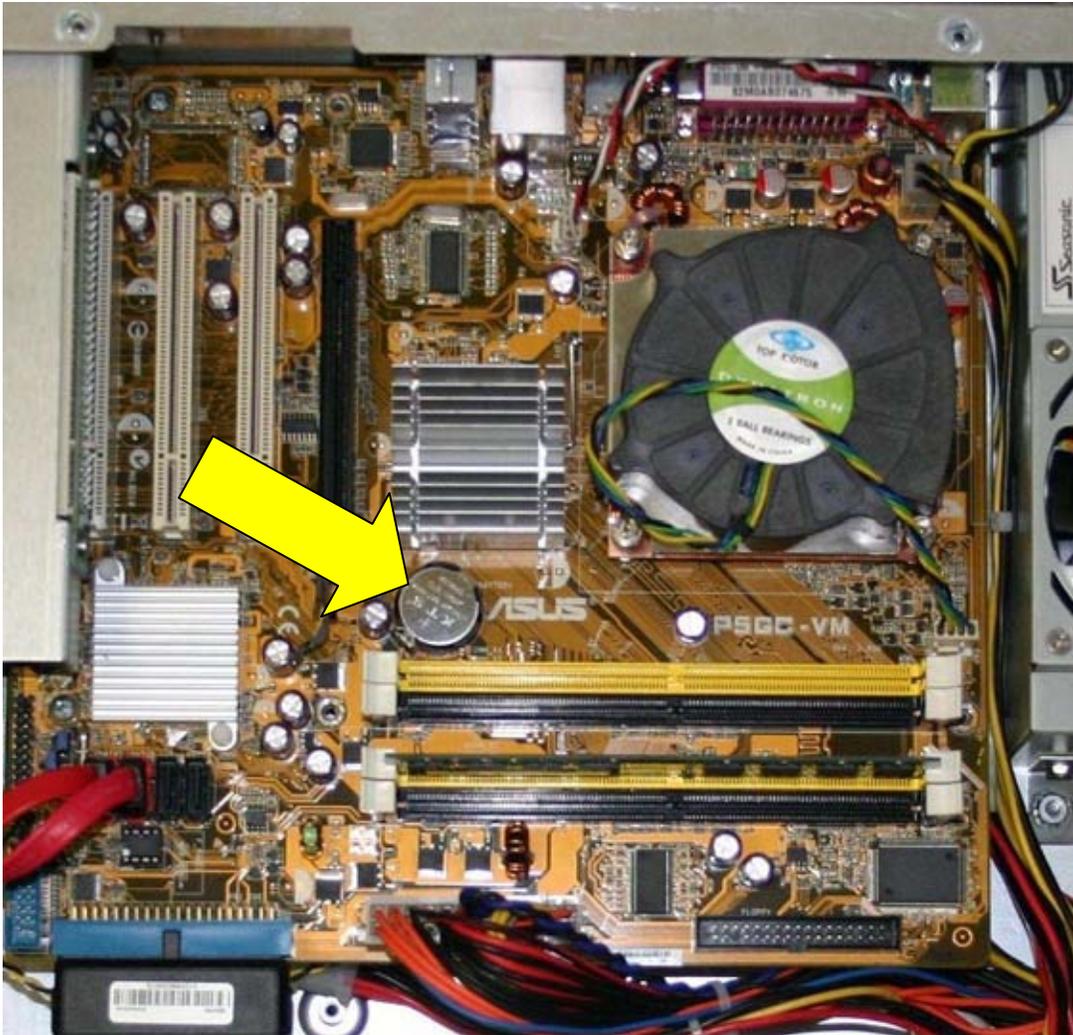


Figure 1. Motherboard Battery Location

3. Press the battery clip to the side (away from the battery). The battery will spring upward from its seating.
4. Replace the old battery with a new one of the same type (CR2032). Make sure the top of the battery is facing upward.
5. Press downward on the new battery until the battery clip engages and holds the battery in place.
6. Reinstall the top cover of the XD20.
7. If you removed the XD20 from the rack, replace it into the rack and reconnect all cabling.
8. Connect the power cord to the AC source.
9. Turn on the XD20 and enter the date and time. See the XD20 Installation and Operation Guide section on the System Clock for details.
10. Turn the XD20 off, then on again, to verify the date and time are saved.

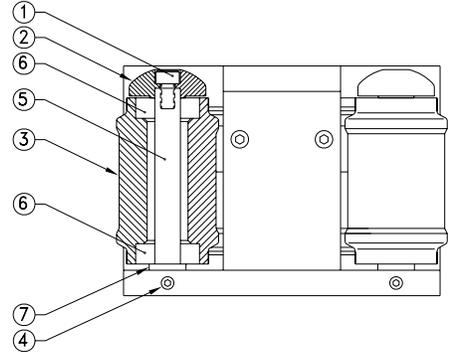
## Installing or Changing Auxiliary Roller for Timecode Reader Head

The Auxiliary Roller is designed to mount at either end of the reader's small secondary rollers. The following instructions and diagrams provide step-by-step instructions for installing or changing an auxiliary roller.

### Prepare for Installation

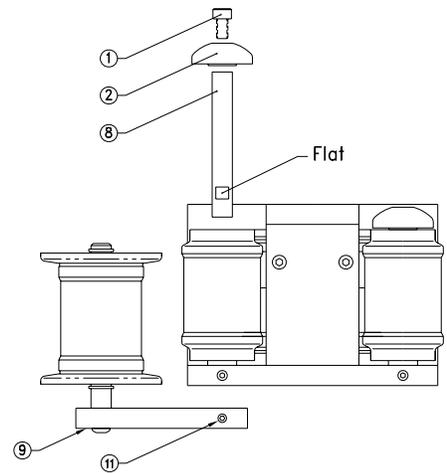
- 1 Remove the screw (1) from the end cap (2) of the desired secondary roller (3) and remove the end cap (2).
- 2 Loosen the set screw (4), which holds the roller shaft (5) of the secondary roller (3).
- 3 Gently push the roller shaft (5) out of the secondary roller (3). Be careful not to lose the washer (7) or the bearings (6) that mount on the roller shaft (5).

**Caution:** Excessive force may damage the bearings.



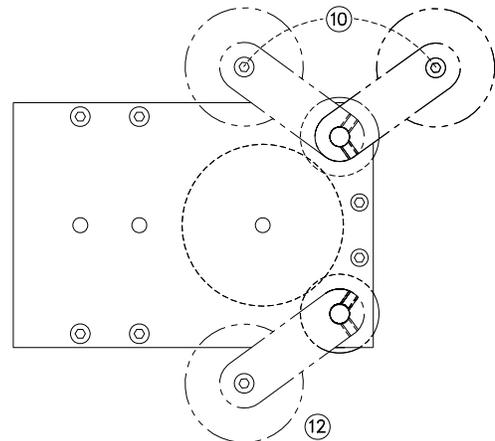
### Install Roller Head

- 1 Install the longer roller shaft (8) provided. The flat section on the roller shaft (8) should face the set screw (4) in the Reader Head. About 1/4" of the longer roller shaft (8) will protrude from the bottom of the Reader Head.
- 2 Tighten the set screw (4) and replace the secondary roller (3) and end cap (2).



### Adjust Roller Head

- 1 Make sure that the secondary roller (3) spins freely. If not, loosen the set screw (4) and adjust the roller shaft (5) up slightly. This should free the secondary roller (3). If, after adjustment, the secondary roller still does not spin, double check that all parts have been properly replaced onto the roller shaft (5).
- 2 Place the auxiliary roller (9) on the protruding section of the roller shaft (8) in the desired position (10), and tighten the screw cap (11). For most installations, keeping the auxiliary roller close to the large center roller achieves the best results.
- 3 Add a secondary auxiliary roller (12), if necessary, to stabilize the film



## Inside the XD20

Refer to **Error! Reference source not found.** for location of components within the XD20 chassis.

- The Main board (H222) contains all timecode and audio processing circuitry.
- The front panel contains the front panel power button and USB connector, display screen, LEDs, and four soft keys, in addition to the navigation buttons.

The Timecode Offset is set in the software according to the timecode reader location. This setting is different depending on type of projector or location of the timecode reader. See the XD20 Installation and Operation Guide for instructions to determine the OFFSET setting.

The status LEDs on the front panel include:

**Table 1. Front Panel LED Indicators**

LED	Color	Indication
VIDEO	Green	Playing video playlist or test material.
AUDIO	Blue	Playing audio playlist or test material.
TIMECODE	Green	Reading valid timecode from the reader head.
NARRATION	Green	Playing narration track to timecode.
CAPTIONS	Green	Playing CSS subtitles or captions.
SERIAL	Green	Serial text for data wall

A circuit breaker protects the power going to the D600 Timecode Reader Head (through the 9-pin connector) against short circuits. The breaker is self-resetting so replacement is unnecessary.

The 9-pin connector (accessed on the XD20 rear panel) is used to connect the timecode cable to the Timecode Reader on the projector.

### Power Supply

This unit supplies power to the XD20. This supply is switchable between 110 VAC and 220 VAC and adjusts automatically.

The cooling fan in the power supply should be rotating when the power switch on the front panel is switched on.

-  To prevent dirt from being pulled into the interior, do not block the ventilation holes at the side of the XD20 chassis.

**Cutaway View**

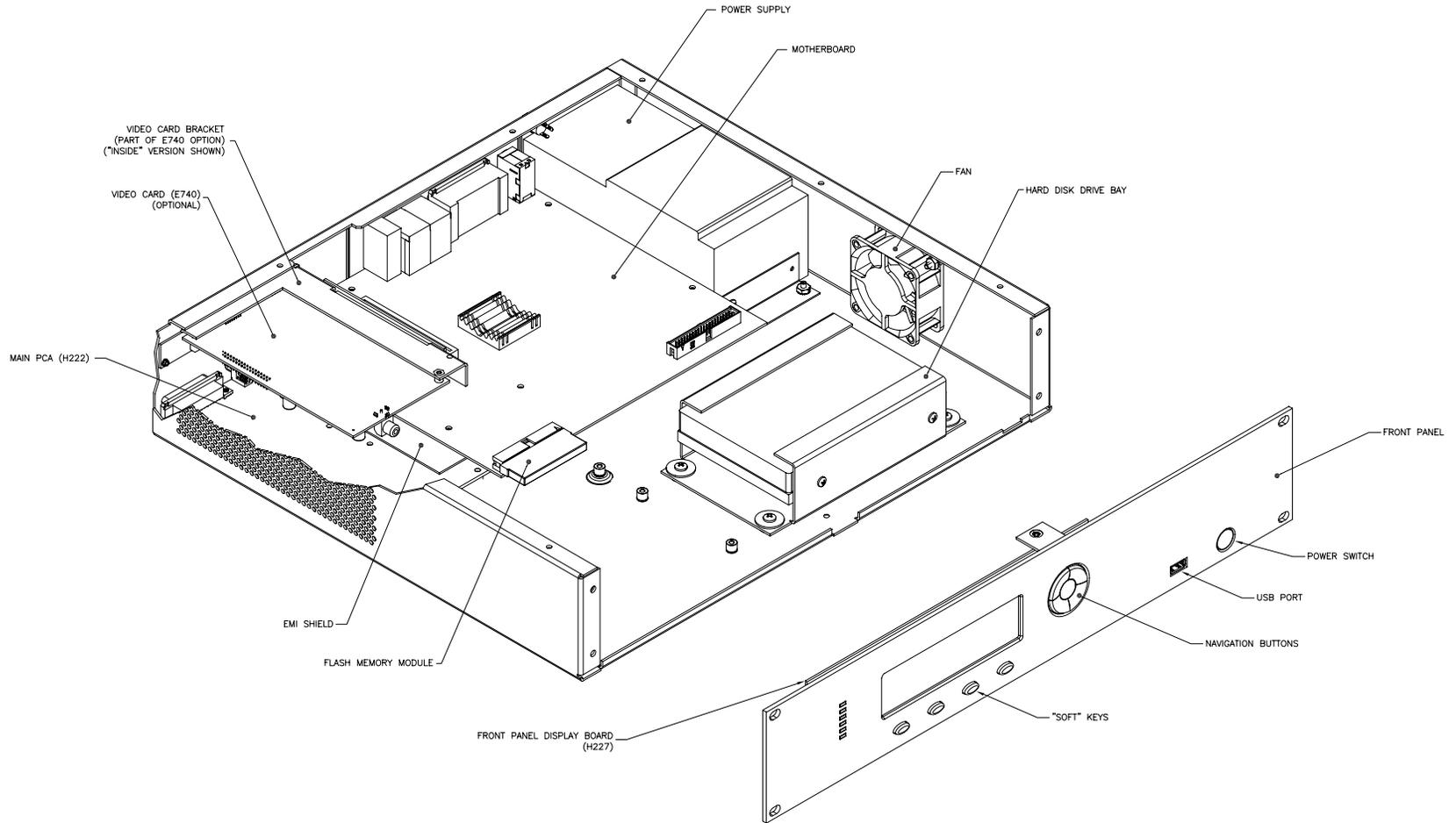


Figure 2. XD20 Cutaway View

### Back Panel Diagram

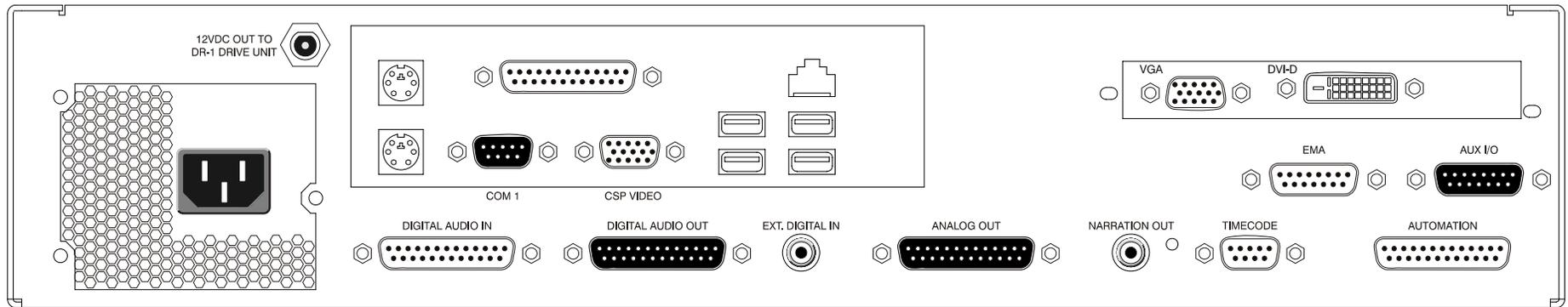


Figure 3. XD20 Back Panel Diagram

## Appendix J. Installing CSS

This section describes the installation, setup and alignment of the Cinema Subtitling System. For information on other CSS topics, refer to the following parts of this guide.

- Operation: Chapter 2, *Loading and Playing Content*
- Playback Menus: Chapter 3, *XD20 Playback and Info Menus*
- License: Chapter 5, *Hardware Installation*
- Configuration: Chapter 7, Section 7.4, *CSS Setup*
- Cabling: Diagram H288, *XD20 with CSS and HD Video Options*, in appendix C.

This appendix is divided up into the following sections:

- CSS Overview
- XD20 CSS Rear Panel connections
- EMA (External masking Apparatus) Description.
- CSS Cinema Subtitle Projector & EMA Installation.
- Alignment of the CSP
- Rear Window™ & Narration
- Menus
- Testing CSS
- Maintenance and Lamp replacement
- Trouble Shooting CSS
- Connection Diagram

### CSS Overview

The CSS Option for the XD20 can include the following features:

- Projected subtitles and projected or “open” captions
- Rear Window™ captions display (for use by patrons with hearing impairments). See *Connecting to Captions Display (Rear Window™)* in this appendix
- Narration – descriptive audio (for use by patrons with visual impairments). See *Connecting to Narration Transmitter* in this appendix

Note: DTS Digital Cinema does not supply the external equipment necessary for any of these features. Narration requires a transmitter and headsets. Rear Window requires a data wall for displaying scrolling captions, and Plexiglas reflector panels for audience use. CSS projected subtitles and captions requires a cinema subtitling projector. See *Connecting to Captions Display (Rear Window™)* and *Connecting to Narration Transmitter* in this appendix.

### CSS Content

A cinema subtitling projector (CSP) can be mounted in a projection booth or in an auditorium. In most theaters, it will be in the projection booth. It is used to project subtitles that are supplied by the XD20 software. The subtitle content is loaded directly into the XD20 from a DTS Access disc, or into multiple XD20s through the network

CSS content is delivered on a DTS Access disc rather than a feature disc. When a film starts, the subtitles are projected in sync with the action on-screen. For more information on operation of the CSS system see Chapter 2, *Loading and Playing Content*.

## Requirements and Supplies

Requirements for operating the CSS option include a CSS license disc, provided by DTS Digital Cinema. See Chapter 6, *Installing Licenses and Upgrading Software*, for more information.

DTS Digital Cinema does not supply equipment for Subtitling and/or Projected Captions.

DTS Digital Cinema also does not supply the LED data wall or reflector panels for Rear Window™ Captioning. Nor does DTS Digital Cinema supply the narration delivery system (FM or IR).

## Installation Process

The basic sequence of actions for installation is:

- Setup XD20 Audio and Timecode (refer to Chapter 7, Section 7.1 *TC Reader Offset* and Section 7.2, *Audio Setup*)
- Load CSS Option Upgrade disc (refer to Chapter 6, *Installing Licenses and Upgrading Software*)
- Install cinema subtitling projector
- Connect associated cables
- Set up appropriate menus

## Menus

When licensed for the CSS option, you can access menus for CSS by selecting **Playback** or **Setup** from the **Main** menu.

The CSS Playback menu provides selections for the projectionist. The CSS Setup menu is designed for the technician. It provides selections for the setup and alignment of the CSS system. Note the setup section can be password protected after all settings have been completed. This helps prevent unauthorized changes.

## Installation of XD20

These instructions assume that your XD20 has already been installed and calibrated for audio playback, the Timecode reader head has been installed, and the cabling has been connected. If not, these steps must be completed prior to installing and aligning CSS. See Chapters 5-7 for installation and setup of the XD20 unit.

## XD20 Rear Panel Connector Descriptions

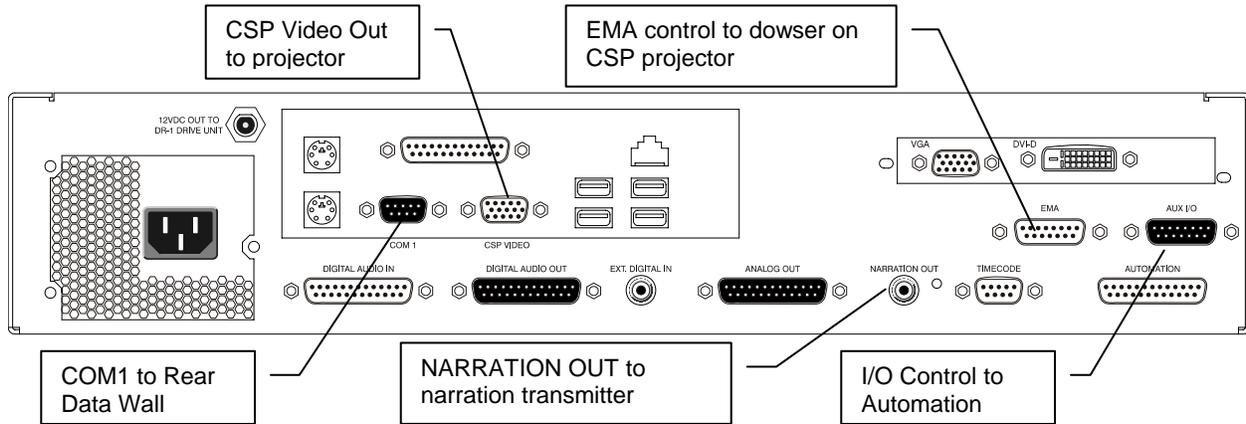


Figure 1. XD20 Rear Panel

For information on cabling, see diagram H288, *XD20 with CSS and HD Video Options*, in Appendix C. For connector pinout details, see Appendix A.

**COM 1** is the data to the Rear Window™ Data Wall.

**EMA Control** output controls the dowser on the External Masking Apparatus, as well as providing RS-232 communications with the CSP.

**CSP Video Out** to the cinema subtitling projector (CSP)

**NARR** = 300mV RMS audio out, in mono, to transmitter used for narration.

**I/O Control** – Can be used to allow automation to select playback language and/or operate certain video playback and projector functions.

For pin out assignments, see Appendix A: *Connector Pinouts*.

## Align the Subtitle Projector with the Screen

This procedure assumes that you have installed the cinema subtitling projector (CSP) and it is connected to the XD20 with the Cinema Subtitling System (CSS) option installed.

DTS Digital Cinema recommends you use the test film SMPTE RP40 (flat), which is represented by the gray (or light blue) background in Figure 2, next page.

- If you don't have the test film, you'll have to approximate the alignment of the subtitles projection with the horizontal and vertical centerlines of the screen.

1. Remove masking on the CSP projector's EMA (if present) and set it aside. (You will reinstall it later.)
2. Turn on the CSP using the XD20 menu (Playback → Film → CSS Playback → CSS Mode). (In the CSS Mode menu, choose ON.)
3. Turn on the film projector and run the RP40 test film.
4. Set the RP40 test film so that the target image is correct on the screen for the format that is playing (flat).
5. Turn on the alignment pattern in the CSP. The image size should be 100%. (In the XD20 menu system, select **Setup** → **CSS Projector Setup** → **Image Size** and choose 100%.) The alignment pattern will project onto the screen.
6. Adjust the Vertical Offset to "0" (zero).

From the XD20 **CSS Projector Setup** menu, select **Vertical Offset** and use the up/down arrows to adjust the setting to "0". Press **Enter** to activate the setting. The alignment pattern will move to the new position when **Enter** is pressed.

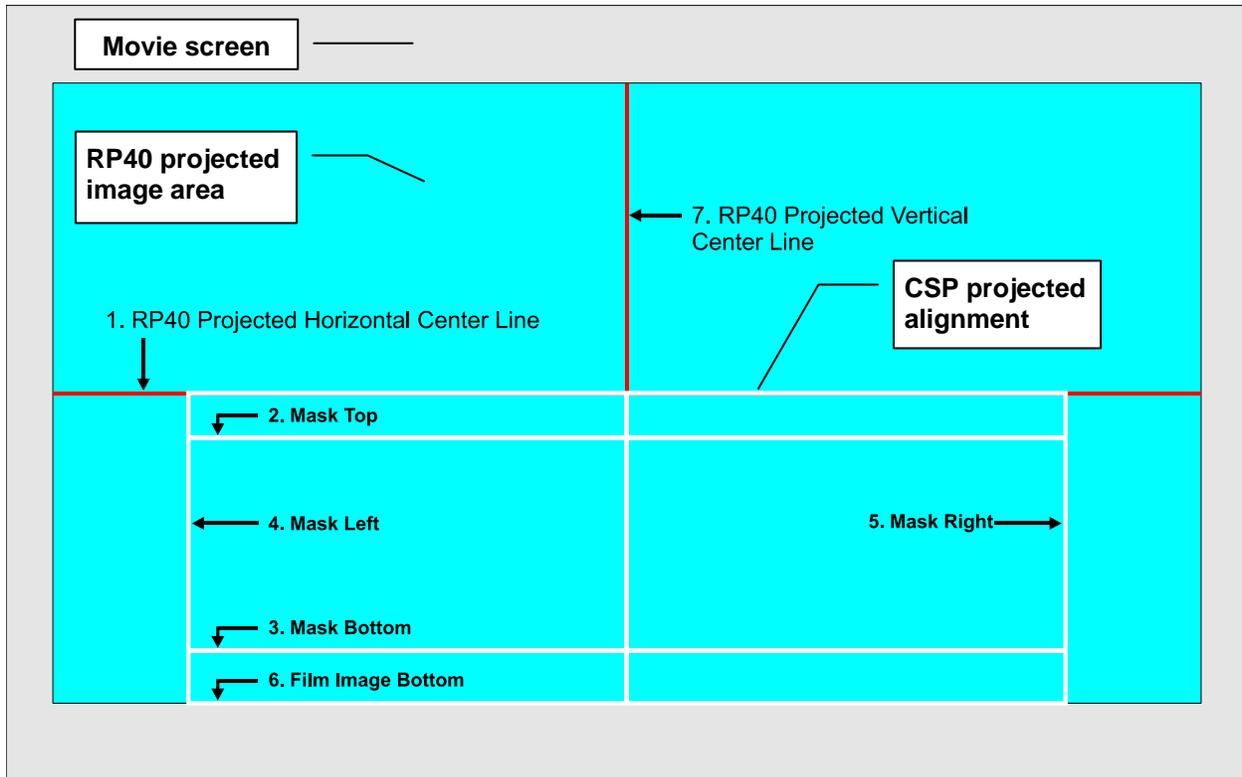
7. Adjust the zoom lens on the CSP to project the largest possible image. Focus this image. Then adjust the zoom lens to make the image smaller, if needed, to fit inside the lower half of the RP40 projected image area (between line 1 and line 6 in Figure 2, below).

If the image is still too large when zoomed to its smallest size, adjust the image size to 90% or 80% using the Image Size menu (See step 5, above). If the resulting image is still too small, adjust the zoom again to get the correct size.

8. Manually adjust the position of the CSP so that the upper horizontal line (of the alignment pattern) aligns with the horizontal centerline of the screen (line 1 in Figure 2).

The alignment pattern can be smaller, but not larger than the area bounded by lines 1 and 6. Make sure the top line of the alignment pattern is exactly horizontal, not tilted.

9. Manually adjust the CSP so that the vertical centerline of the alignment pattern aligns with the vertical centerline of the screen (line 7).



**Figure 2.** Align the projected pattern (white) with Line 1, Line 6, and Line 7

10. If the alignment pattern is somewhat smaller than the area bounded by lines 1 and 6, use the CSS menu to fine-tune the vertical placement of this pattern so that it is approximately centered between lines 1 and 6.

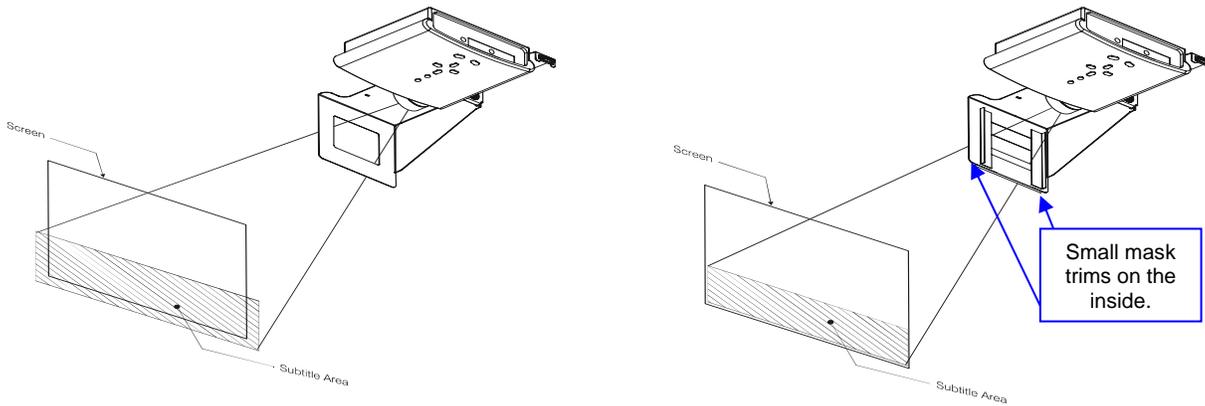
To fine-tune the alignment, use the **Vertical Offset** menu (See step 6, on previous page). Use the up/down arrows to increment the setting, then press **Enter** to activate the setting.

11. From the **CSS Projector Setup** menu, select **Test Patterns**→ **Mask Area**. The CSP will project the subtitles area (only), which corresponds to the area within lines 2, 3, 4, and 5 in Figure 2.
12. Reinstall the masking on the CSP (EMA), if present. When a mask is placed, its shadow should not obscure any of the viewing area of the subtitles. (See *Position the EMA Mast Trims* on the next page of this appendix.)

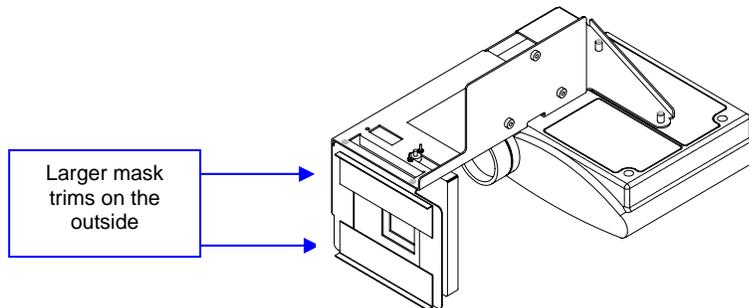
## Position the EMA Mask Trims

The magnetic trims are used to block out any extraneous light at the EMA. Position them as needed so that only the intended “subtitle area” is lit by the test pattern.

1. Adjust the EMA magnetic trims so that white box test pattern fits in the horizontal subtitle area.



**Before** (left) and **after** (right) positioning magnetic trims. View is looking upward at bottom of projector.



View is looking downward at top of projector.

2. Play the *Buzz and Bill Show* from the XD20 (**Setup** → **Audio Setup** → **Audio Tests** → **Buzz and Bill Show**). The RP40 is still running at this point, providing a background image. Check to see if the subtitles are correctly placed. If they are not, repeat the appropriate alignment steps, above.
3. Turn off the film projector and store the test film.



4. Turn off the CSP in one of two ways:

- If you have configured a softbutton for CSS simply press that button, to program this button see section 7.8.1 of TM-H264 (XD20 Installation and Operating Guide).
- From the *Ready* screen, select **Playback** → **CSS Playback** → **CSS Mode** → **CSP Off**.

The CSP lamp should turn off. The fan will run for a short time to cool the lamp before it completely shuts down.

For information on operating the CSS Option, see Chapter 2, *Loading and Playing Content*. For information on installing the CSS license, see Chapter 6, *Installing Licenses and Upgrading Software*. For information on configuring CSS, see Chapter 7, Section 7.4, *CSS Setup*.

## Connecting to Captions Display (Rear Window™)

This procedure is for the Rear Window™ Captioning System that displays mirror-reverse image captions on a data wall or scrolling message board on the rear wall of the theater.

Three steps must have been taken in order for the XD20 Rear Window™ option to function.

- Licensing disc (for CSS option) has been loaded into the XD20.
- External Rear Window™ equipment (data wall or scrolling message display) has been acquired and set up.
- Program material for Rear Window™ captions has been loaded into the XD20.

Whenever a program is selected for playing, and a Rear Window™ track for that program has been loaded, it will automatically output the Rear Window™ track via the COM1 connector.

Two wires connect the XD20 COM1 connector to the captions display system. See the wiring diagram at the end of this appendix for more details.

CSS COM1 (9-pin)	Captions Display (Rear Window™) System
Pin 3	Receive
Pin 5	Ground

## Connecting to Narration Transmitter

The XD20 narration audio has a mono, fixed output of 300mV RMS nominal from the NARRATION connector. The narration track is normally placed between dialogue tracks, and describes the action on-screen.

The transmitters below have successfully connected to the narration output:

- Williams Sound TX10 or TX800 Balanced input to a 1/4-inch jack, 100k Ohm, 21mV – 10V, 212mV nominal
- Phonic Ear PE60E Unbalanced input to a phono plug, 18k Ohm, 100Mv (550mV – 7V automatic level control)
- Sennheiser SI1015 Balanced input to a XLR connector, 600 ohms, 50Mv – 5V
- UltraStereo UPC-1/UPC-2 Balanced input to screw terminals, 100mV - 30mV RMS

Please consult DTS Digital Cinema about other transmitters that may be used.

## Narration Option Setup

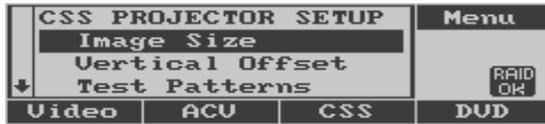
Three things are necessary for the XD20 Narration option to function:

- Licensing disc (for CSS option) has been loaded into the XD20.
- External Narration equipment (transmitter and headsets) has been acquired and set up.
- Program material for Narration has been loaded into the XD20.

Whenever a program is selected for playing, and a Narration track for that program has been loaded, it will automatically output the Narration track via the NARRATION connector.

See *Testing Narration* in this chapter.

## CSS SETUP MENU Selections and Descriptions



Main menu → Setup → CSS

<b>Image Size</b>	Select size of subtitles
<b>Vertical Offset</b>	Adjust vertical placement of subtitles
<b>Test Patterns</b>	Display CSS test patterns.
<b>Options</b>	Set color options.

### Image Size

This changes the size of the text being projected. Although choices of 50, 60, 70, 80, 90, and 100 % are listed in the menu, not all sizes are available on every disc. See the label on the DTS Access disc for listed sizes. Higher numbers create bigger subtitles, while smaller numbers create smaller subtitles. Note: the mostly commonly used sizes are 70 and 100%.

### Vertical Offset

This adjusts the subtitle image from -256 to +256 pixels. It is normally set to “0,” but if it is not possible to adjust the projector mounting to the proper position, this setting is used for adjustment.

### Test Patterns

The patterns available for test purposes are:

BLACK: Projects black on the screen.

MASK AREA: Projects a white box to aid in the proper placement of magnetic trims.

VIEW AREA: Projects just the subtitle area

WHITE: Projects white on the screen

FULL SCREEN: Projects a white-on-black grid test pattern

### Options

Background color: Normal or Black.

Most projectors use Black.

Text Color: White or Yellow.

White is the regular setting. Certain projectors may need to be set for yellow for brighter subtitles.

## Testing Subtitles

1. Play the test film *Buzz and Bill*.
2. Verify the subtitles are synchronized with the film. If NOT, the most likely problem is the timecode reader offset is incorrect. (If adjustment is needed, see *TC Reader Offset* in Chapter 7, Section 7.1.)
3. Verify the subtitles are positioned correctly on the screen. (If adjustment is needed, see Chapter 7, Section 7.4 *CSS Setup*.)

## Testing Narration

### Equipment needed: Voltmeter

1. Disconnect the Narration cable from the rear of the XD20.
2. Run the *Alignment Tones* audio test. This is accessible from the **Setup → Audio Setup → Audio Tests** menu. The XD20 should output a 1 kHz reference tone on the narration output.
3. Use a voltmeter to verify 300 mV RMS  $\pm$  10 mV at the NARRATION connector on the XD20 rear panel.
4. Reconnect the NARRATION connector on the rear panel of the XD20.
5. Play the test film *Buzz and Bill*.
6. The test narrative should be heard clearly in the narration headsets. Verify that the narration is synchronized with the projected image. If NOT, the most likely problem is that the timecode reader offset is incorrect. (If adjustment is needed, see Chapter 7, Section 7.1, *TC Reader Offset*.)

## Testing Rear Window Captions

1. Verify that the COM 1 cable is securely connecting the XD20 to the caption system.
2. Confirm that the power to the Data Wall inside the theater is ON. When both the XD20 and the Data Wall are ON, the following message should display: *Please adjust your reflectors*. (This image will be reversed).
3. If the *Buzz and Bill* demo film is not available, check the system by selecting *Buzz and Bill* in the Audio Test section of the XD20 menu. The subtitles and audio should begin to play.
4. For a complete test of the system, run the test demo film *Buzz and Bill*. Captions should appear on the display at the rear of the theater.
5. Using the Plexiglas viewer, sit in the theater and verify that the captions are clear and easy to read. Verify that the captions are synchronized with the projected image. If NOT, the most likely problem is that the timecode reader offset is incorrect. (If adjustment is needed, see Chapter 7, Section 7.1, *TC Reader Offset* for details.)

## Troubleshooting the CSS Option

### General:

The CSS option requires a license to operate. To confirm your XD20 has this license, select **Enter**, then scroll down to licenses and select **Enter** again. There should be a [ \* ] next to CSS, if not contact DTS Digital Cinema or your dealer to obtain a CSS license. CSS content or Access media is not included on feature discs; this information is sent on a separate disc. Contact your film distributor to receive these discs. If you are experiencing difficulties in playing CSS follow the troubleshooting suggestions below.

### No subtitles

**Note:** Begin with the basics, confirm all cables are connected as per your particular setup, refer to diagram in manual. Confirm the title of access media content is loaded and matches the feature your are playing.

1. Verify that the **CAPTIONS** indicator (the green LED on the front panel of the XD20) is illuminated.  
YES: Go to step 5.  
NO: Go to step 2.
2. In the XD20 Status Display, note the title of the currently playing film soundtrack. Is this the correct film?  
YES: Go to step 3.  
NO: Load the correct file.
3. In the XD20 Status Display, note the running timecode for the currently playing film. Is the timecode incrementing?  
YES: Go to step 4.  
NO: Check for timecode on the film. Make sure the Timecode Reader Head LED is illuminated.
4. In the XD20 Status Display, use the ▲ or ▼ buttons to display **CSP LANG** on the fourth line of the window. This shows the language that the subtitling projector is currently using. Is the language correct?  
YES: Go to step 5.  
NO: Select the correct language.
5. Verify that the subtitle projector is powered on.  
YES: Check that the lamp is brightly lighted, and go to step 6.  
NO: Then power ON and press the green button.
6. Verify that the cabling is securely connecting the XD20 to the EMA and Cinema Subtitle Projector. Check both cables for proper connection and continuity.  
YES: Go to step 9.  
NO: Fix or replace the cables.
7. Go into the **Playback → Film → CSS Playback → CSS Lamp Hours** menu and verify that the number of lamp hours has not exceeded 1400. **The projector lamp must be replaced after 1400 hours of use.** Note this feature is not available on all projector models.

YES: Go to step 8.

NO: Replace the lamp.

8. Is the **CSS Lamp Hours** status indicates “unavailable”, the projector lamp may be burned out and must be replaced, or your projector is not one of the listed selections in the XD20 menu.

YES: Replace the lamp.

NO: Go to step 9.

9. During intermission, select audio tests in the setup menu section and enable the test “*Buzz and Bill*”. Verify that the subtitles are synchronized with the projected film. While the test is playing, verify the function of the EMA douser. It should open when it gets the command to open, which is when subtitles are playing. Is the douser working properly?

YES: This is the end of this troubleshooting procedure.

NO: Call DTS Digital Cinema Customer Support.

### Subtitle text is distorted on-screen

1. Clean the lens on the subtitle projector. Clean the projection port window. Clean the electronic shutter (LCD) on the EMA.
2. If the image is fuzzy, recheck/adjust the projector focus adjustment.
3. Verify that the PROJECTOR VIDEO cable is type SVGA 15-pin HD shielded with ferrite beads on each end.



**Caution:** Do NOT make your own video cable. The cable requires special shielding and ferrite protection.

### Subtitle text is dim on-screen

1. Access the XD20 menu **CSS Lamp Hours** and verify that the number of lamp hours has not exceeded 1400. If using a different projector consult its manual for lamp hour life.

**Note:** The CSP lamp must be replaced after 1400 hours of use.

### Subtitle text is not the correct size on-screen

Access the XD20 menu **Setup CSS → Image Size** and select the appropriate image size. A higher number will make the subtitles bigger and a smaller number will make them smaller.

### Wrong subtitles are playing

Access the XD20 menu **CSS Playback → CSS Language** and verify that the show language is available and selected for play.

**Note:** The XD20 will always play the last language version loaded, unless another one is selected from this menu.

### I've just replaced the projector lamp but it will not light

**Note:** If using a projector not approved by DDE, check its manual for troubleshooting this issue. For CSP check the following:

1. Go into the **CSS Lamp Hours** display in the XD20 **CSS Playback** menu and verify that the lamp counter has been reset to “0”. If not at zero, see the topic *Reset the Lamp Hour Counter* in this appendix to reset the counter.

2. Verify that the projector is powered on.
3. Verify that the cabling is securely connecting the XD20 to the EMA and CSP. Check all three cables for broken wires.
4. Verify that the EMA fan is turning. The fan cools the projector. If the fan is not rotating, replace it.

### **Light is leaking out around the subtitles on-screen**

Reset the position of the magnetic trims on the EMA mask assembly. Use the test patterns in the XD20 menu **Setup → CSS → Test Patterns**.

### **Light is seen in subtitle area when no subtitles are supposed to play**

1. The EMA douser is probably open. Be sure the “Douser Control” cable is plugged in. Check the cable for broken wires
2. Verify that the XD20 menu **Setup → CSS → Test Patterns** menu has been correctly exited. All test patterns should be turned off.
3. Power off the subtitle projector until there is time to troubleshoot the problem.

### **Subtitles are cut off on the screen**

1. Verify the physical positioning of the subtitle projector.
2. Verify the positioning of the EMA magnetic trims. Use the test patterns in XD20 menu **Setup → CSS → Test Patterns**.

### **Subtitles are cut off on left side of screen**

1. Make sure the background color is set to normal when using the original DTS projector.

## Troubleshooting Rear Window™ (Captions) Option

### No Rear Window™ captions

1. In XD20, verify that the correct content that has been loaded contains the captions for the show you are playing. Remember, captions are not included on feature discs, they are received on a separate access disc. Check the listing on this disc to confirm it contains captions; not all access discs may have captions.
2. The Rear Window™ captions equipment must be connected to the COM1 connector on the rear panel of the XD20.
3. Verify that the captioning equipment is powered on.
4. Verify that the XD20 TIMECODE indicator is illuminated when playing the film.
5. Verify that the XD20 SERIAL indicator is illuminated.
6. Verify that the COM 1 cable is securely connecting the XD20 to the caption system. Check the cabling for broken wires.
7. To test select “Bill & Buzz “ in the Audio test section in the setup menu of the XD20, when this test is played the front panel should have the “serial” LED illuminated. If this is on and no titles are being displayed problem is most likely with the caption display equipment.
8. Refer to the caption playback equipment manufacturer for test procedures and troubleshooting guidelines.

## Troubleshooting Narration Option

### No narration audio

1. In XD20, verify that the correct content has been loaded which contains the narration for the show you are playing, remember narration audio is not included on feature discs, they are received on a separate access disc, check the listing on this disc to confirm it contains narration, not all access discs may have narration.
2. Verify that the narration transmitter is powered on.
3. Verify that the narration headsets are connected and their volume is turned up.
4. In XD20, verify that the Narration show is loaded on the hard drive and is enabled.

The Narration audio output connector on the rear of the XD20 must be connected to the narration transmission equipment.

5. Verify that the XD20 TIMECODE indicator is illuminated when film is playing.
6. Verify that the XD20 NARRATION indicator is illuminated.
7. Enable the CSS self-play test “1K @ -20dB FS” (found under **Setup → Audio → Level Adjustment → Reference Tone**). Use the right arrow button to select Ch 9 (Narration). Verify 300mV RMS ( $\pm 10\text{mv}$ ) output at NARRATION OUT. If there is no output, replace the H222 board. If there is output, refer to the transmitter manufacturer for the test procedure.

### Narration sounds too loud/soft

- Note:** Volume controls are usually on each individual headset.

Enable XD20 self-play test “1K all channels” (**Setup → Audio → Audio Tests**). Verify 300mV RMS ( $\pm 10\text{mv}$ ) output at NARRATION OUT. If no output, replace the H222 board. If there is output, refer to the transmitter manufacturer for test procedure.

### Narration sounds distorted

1. Enable the XD20 self-play test “1K all channels” (**Setup → Audio → Audio Tests**). Verify that there is 300mV RMS ( $\pm 10\text{mv}$ ) output at NARRATION OUT.
2. Enable the XD20 self-play test *Buzz and Bill* and listen with the narration headsets.
3. Try replacing the internal H222 board.
4. Refer to the transmitter manufacturer for test procedures.

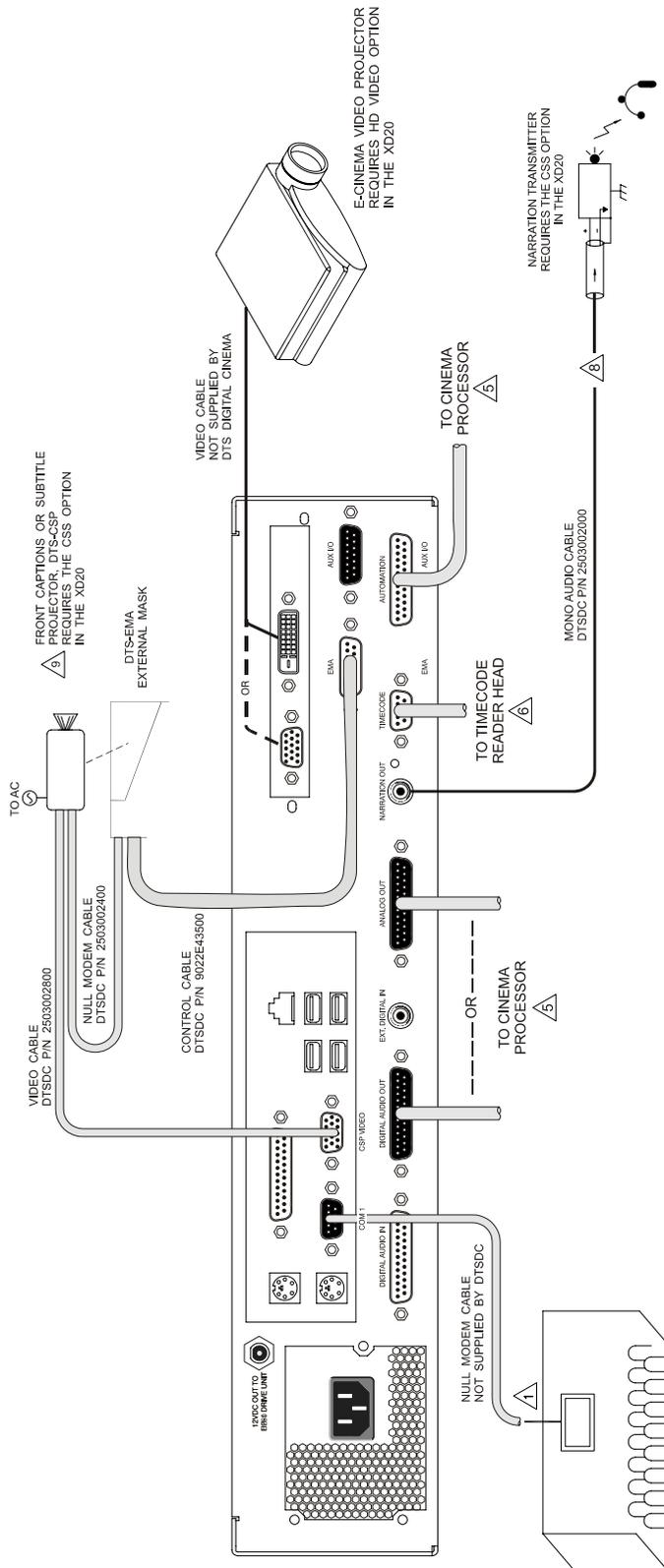
### Noise in narration track

1. Verify that the NARRATION OUT cables are not routed next to power lines, film projector motors, or fluorescent lights.
2. If there is RF interference, contact DTS Digital Cinema for ferrite bead suppressors that attach to the audio output cables.

### The narration is NOT playing in sync with the sound track or action on-screen

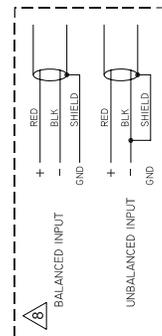
Go to the XD20 **Setup → TC Reader Offset** menu to verify that the offset value has been correctly set.

# Connection Diagram



NOTES: UNLESS OTHERWISE SPECIFIED

- 1 FOR REAR WINDOW APPLICATION, COM 1 MUST BE PROGRAMMED VIA MENU FOR REAR WINDOW CAPTIONS. PIN 3 = TO REAR WINDOW DISPLAY RECEIVE. PIN 5 = TO REAR WINDOW DISPLAY GROUND. NO OTHER PINS SHOULD BE CONNECTED.
- 2 EXT. SIP-DIF = COHERENT ACOUSTICS AUDIO I/O.
- 3 DVI REPEATER MAY BE REQUIRED DUE TO CABLE LENGTH.
- 4 WHEN THE CSS OPTION IS ENABLED IN THE XD20, COM1 CAN ONLY BE USED FOR REAR WINDOW AND CANNOT CONTROL THE HD VIDEO PROJECTOR.
- 5 AUTOMATION, ANALOG OUT, AND DIGITAL AUDIO OUT ARE USED FOR SOUNDTRACK PLAYBACK. SEE WIRING DIAGRAMS IN THE XD20 MANUAL FOR CONNECTION DETAILS.
- 6 TIMECODE READER IS USED WITH FILM PLAYBACK ONLY. SEE WIRING DIAGRAM IN THE XD20 MANUAL FOR CONNECTION DETAILS.
- 7 WIRING INFORMATION.
- 8 FOR FRONT CAPTIONS OR SUBTITLES, COM1 MUST BE PROGRAMMED VIA XD20 MENU FOR VIDEO PROJECTOR.



DRAWING NO.	H288
	REV. DATE
TITLE	XD20 WITH CSS & HD VIDEO OPTIONS
REV.	A1
DATE	30JUN08

## Appendix K. Using the ACV Playlist Generation Software

### K.1. ACV Playlist Generation Software

The ACV Playlist Generation Software (ACV GUI) is used to create ACV playlists for playback on an XD20 with the video option installed. It provides a convenient means to perform these functions:

- Create and edit playlists.
- Copy playlists and contents directly to XD20 through a network.
- Copy playlists and contents in a folder used to create DVD or USB media for content delivery.

#### K.1.1. Installation

The ACV Playlist Generation Software (ACV GUI) is delivered as a self-extracting file called **setup\_acv.exe**. To install, copy the file to the desired computer and then double-click on the file icon. Follow the on-screen instructions until the process is complete. The installer will then create a launch icon which can be found by going to **Start → Programs → DTS Digital Cinema → DTS-DC ACV Loader → ACV Loader**.

#### K.1.2. Rules.

1. Playlists may be a combination of any valid XD20 video files, still images, and audio files.
2. Valid video files are described in Section 3.2.2 (ACV Playback) of TM-H264.
3. Still images are jpg, tiff or bmp and are automatically given a 6 second duration.
4. Audio files are WAV format with either 2-channel PCM or DTS 5.1 audio.
5. Multiple playlists may be placed on the same USB drive or DVD, however each playlist must have a unique playlist name.
6. The XD20 will not accept 2 playlists with the same playlist name. When loading a playlist with the same name it will delete the old playlist (including its content) before loading the new one.

#### K.1.3. Creating the Playlist.

1. Use the mouse to drag ACV content files into the list,
2. By default, the displayed name field is given the file name. Double-click on the displayed name in order to change it. The name can be up to 16 characters. This is the clip name that is displayed on the XD20 while playing the playlist.
3. Enter a name in “Playlist Name” field at the bottom of the form.

#### K.1.4. Modify/Edit the Playlist.

<b>Change list order</b>	Use the mouse to clips from one position to another. Note: The clip being dragged will not be highlight.
<b>Change Clip Name</b>	Double clip on the “Displayed Name” field for the clip and edit the name. Press Enter when done
<b>Delete Clip from List</b>	Click on the clip to highlight the line, and press the right mouse button. Press the Yes button to confirm.
<b>Change Playlist Name</b>	Double click on the Playlist Name field at the bottom of the form, and then edit the playlist name.
<b>Clear the Playlist</b>	Press the “Clear All” button to clear all clips and playlist name.

#### K.1.5. Delivering ACV to locally networked XD20.

If the XD20 Media Player and computer running the software are is connected on a local network, then the ACV playlist (content and XML file) may be sent to directly to the XD20.

1. Create the playlist as described above.
2. The ACV GUI polls the network for all available XD20 units and creates a list upon startup. If the XD20 is not online when the program starts, press “Scan for Players” to recreate the list.
3. Select which XD20 to receive the playlist.
4. Press “Send” to begin transferring the content and playlist to the XD20.

The software will not send content if it is already on the XD20. It determines this by first calculating the MD5 checksum, then checking if that content is already available on the XD20.

The software will check for available space before sending the content. If space is not available it will ask the user to make space by deleting old playlists on the XD20. The software does not handle deletion – the XD20 user interface must be used for deleting content.

The software will check if the Playlist name already exists on the XD20. If the XD20 already has that playlist name, then it will ask the user whether to overwrite the old playlist, or to abort the operation.

#### K.1.6. Creating a USB Disc with ACV playlist.

The software can be used to copy the ACV contents and playlist to a USB drive. The USB drive may then be inserted into the XD20 USB port to ingest the ACV content and playlist.

1. Create the playlist as described above.
2. Select “Create a Disk” under the files menu (or select Ctrl-D). Then in the browse window select the USB drive under “My Computer”.

Note: Do not select a subdirectory in the USB drive or it cannot be loaded on the XD20.

3. Repeat to add more playlists to the USB drive, but be sure to use unique playlist name for each playlist.

### **K.1.7. Creating a DVD with ACV playlist.**

The software can be used to create a DVD with ACV contents and playlist. The DVD may then be inserted into the XD20 with DR-1 to ingest the ACV content and playlist.

1. Create the playlist as described above.
2. Create a designated folder on your computer for temporarily holding the contents of the DVD.
3. Select “Create a Disk” under the Files menu (or select Ctrl-D). In the browse window select the temporary holding folder. All content files included in the playlist are copied to the holding folder.
4. Repeat to add additional playlists to the DVD holding folder. Be sure to use unique playlist name for each playlist.
5. Use your favorite DVD burning program to burn a DVD with a copy DVD holding folder.

Note: Be sure the ACV files are placed in the root directory of the DVD or it cannot be ingested by the XD20.

### **K.1.8. ACV Projects.**

An ACV project may be saved and reopened at a later time. The project contains the following:

- ACV Playlist name
- Source path/filenames for all content
- Destination path/filename (or XD20)

Note: Clip names are not stored with the project file, but are stored in a subdirectory of the program.

To save a project, select Save under the Files menu. A popup window allows you to select the location and filename for the project. The software assigns the project the extension: “acv”.

Open an existing project by selecting “Open” under the Files menu. A popup window allows you to find the location and filename for the project. After it is opened you may edit the playlist and use the “Create A Disk” function, as described in section K.1.7.

Use the “Save” command under the Files menu to save the playlist changes, or select “Save As” to save the project under a different name.

Note: If a project is opened and the content has moved, then following message appears when attempting to send the playlist or create a disk: “The file is not at the described location”.

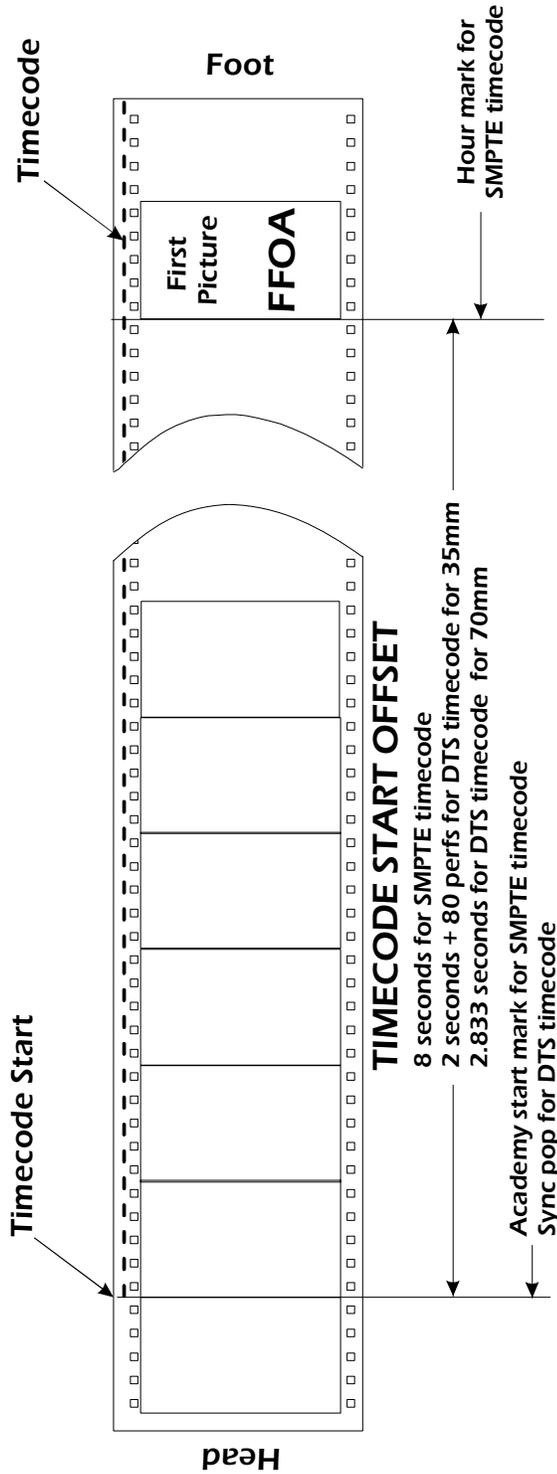
## Appendix L: Technical Notes

Tech Notes published by DTS Digital Cinema.

### Technical Notes

Document No.	Description
TI-H299	Timecode Printing Offset for 35mm and 70mm Film
n/a	DTS Special Venue Timecode Offset
TI-E243B	DTS 35mm Track Specification
TI-E244B	DTS 70mm Track Specification
TN-E698B	Timecode Reading Problems
TN-H171	XD10 Operation with SMPTE Timecode
TM-H292 V1.0	DTS timecode playback from Digital Cinema packages
TN-E550B	Reader Head LED Voltage Calibration

# Timecode Printing Offset for 35MM and 70MM Film (DTS Timecode and SMPTE Timecode)



Timecode start to first picture =  
 2 second (sync pop) + 5/8 second (standard optical pullup) = 2 5/8 seconds

## 35MM PRINTS

Film Speed (film perfs per second)	DTS Timecode Offset (in film perfs)	SMPTE Timecode Offset (in film perfs)
60	200	1536
(24 fps, 4 perf)	272	1920
(24 fps, 5 perf)	320	2400
150	380	2880
192	464	3072
240	560	
300	680	
360	800	
384	848	

## 70MM PRINTS

Film Speed (film perfs per second)	DTS Timecode Offset (in film perfs)	SMPTE Timecode Offset (in film perfs)
60	170	1536
(24 fps, 4 perf)	272	1920
(24 fps, 5 perf)	340	2400
150	425	2880
192	544	3072
240	680	
300	850	
360	1020	
384	1088	

TITLE: DTS 35/70 TIMECODE PRINTING OFFSET	APPROVED	DRAWN: J. DELLARIA
DATE:	SCALE: NONE	REV: A
DTS DIGITAL CINEMA 9631 TOPANGA CANYON PLACE CHATSWORTH, CA 91311		
COMPUTER FILE NAME: TIH299 (TC printing offset).CDR	DWG. NO. TIH299	

Phone: +1.818.401.4253 Fax: +1.866.448.6802  
 Web: www.dtsdigitalcinema.com

Rev 16OCT08

## DTS Special Venue Timecode Offset

The DTS timecode offset setting is unique to the film format and the distance between the DTS reader head and the picture aperture. The **calculations** below are used when determining the timecode offset for special film speeds and formats. Notice that all the film speeds MUST be divisible by 30.

### 35mm PRINTS

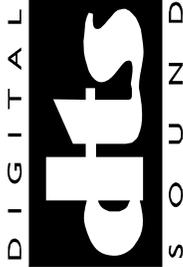
Film Speed (in perfs per second) <u>[frames/sec X perfs/frame]</u>	1.1.1. Delay Setting	
	<u>DTS Timecode</u>	<u>SMPTE Timecode</u>
60	P / 2 + 15	P / 2
96	P / 3 . 2 - 0	P / 3 . 2
120	P / 4 - 5	P / 4
150	P / 5 - 9	P / 5
192	P / 6 . 4 - 12 . 5	P / 6 . 4

### 70mm PRINTS

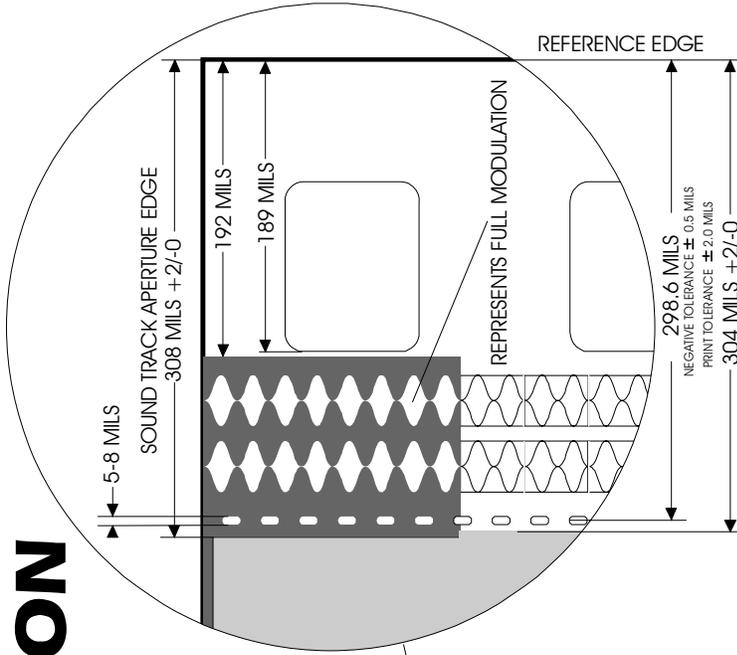
1.1.2. Film Speed (in perfs per second) <u>[frames/sec X perfs/frame]</u>	1.1.3. Delay Setting
60	P / 2
96	P / 3 . 2
120	P / 4
150	P / 5
192	P / 6 . 4
240	P / 8
300	P / 10
360	P / 12
384	P / 12 . 8

**P** = Distance in perfs from the picture aperture to the DTS reader head lens.

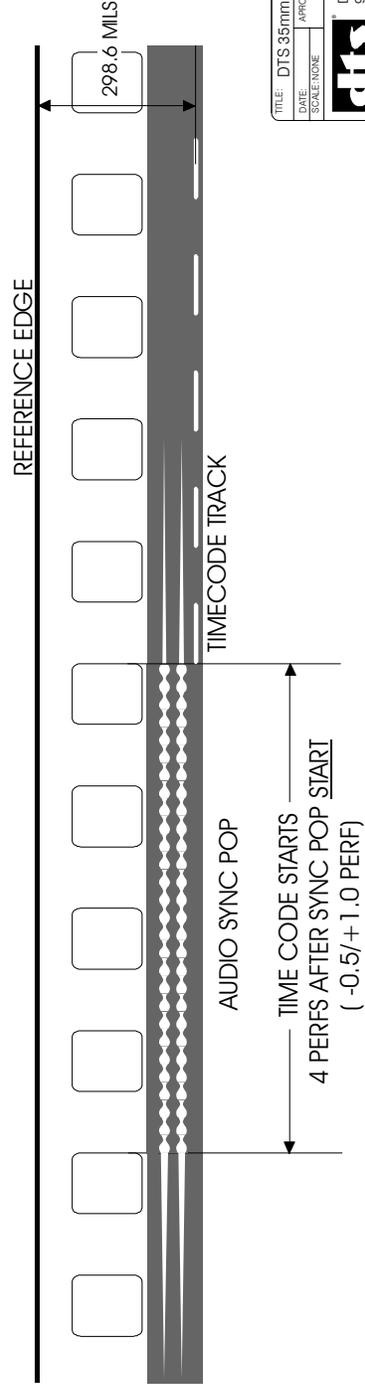
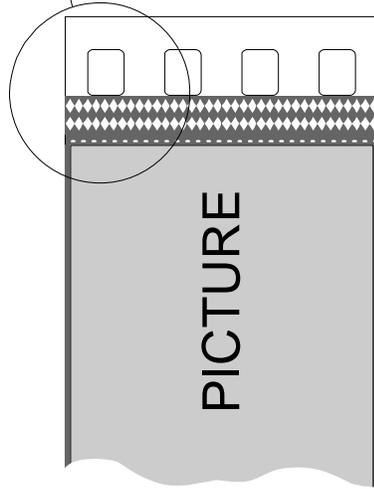
# DTS TRACK SPECIFICATION



NOTE: 1 MIL = 0.001 INCH (0.025mm)

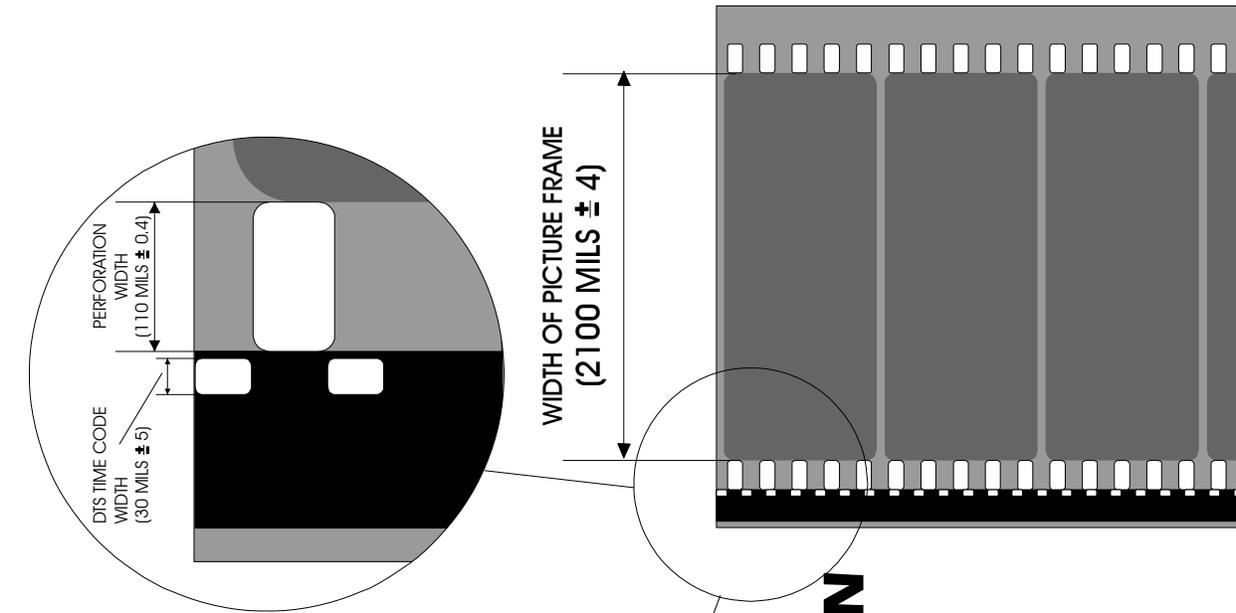


Ref. ANSI/SMPTE 40-1991, 111-1996  
NOTE: Application to 304 mils +2/-0  
cs per reference above



TITLE: DTS 35mm TRACK SPECIFICATION	DRAWN: J. DELARIA
DATE: APPROVED	REV: B
SCALE: NONE	
DTS DIGITAL CINEMA 9631 TOPANGA CANYON PLACE CHATSWORTH, CA 91311	
COMP: FILM/VIDEO	DWG. NO. TFE243B
FILE: TFE243B (FILMSPEC).CDR	

Revised: October 16, 2008



# DTS 70MM TRACK SPECIFICATION

TITLE: DTS 70mm TRACK SPECIFICATION	
DATE: APPROVED	DRAWN: J. DELLARIA
SCALE: NONE	REV: B
DTS DIGITAL CINEMA 9631 TOPANGA CANYON PLACE CHATSWORTH, CA 91311	
COMPUTER FILE NAME TIE244B (70MMSPEC).CDR	DWG. NO. TI-E244B

	TITLE		NUMBER	REV	Page
	<b>Timecode Reading Problems</b>		<b>TN-E698</b>	A	6 of 23
DATE PREPARED	CREATED BY:	EFFECTIVE DATE	APPROVED BY:		
Sept. 12, 2003	K. Hultgren	January 23, 2009	L. Brown		

DTS Digital Cinema, 9631 Topanga Canyon Pl, Chatsworth, CA 91311 Contact Document Control for the latest revision.

## Timecode Reading Problems

When DTS encoded film is running through the DTS reader, the **TIMECODE** green LED indicators on the DTS player and the reader (**DTS-6/-6D, XD10** and **XD20**) should remain brightly lit and not flash more than a few times a minute. Excessive flashing indicates a problem and should be fixed immediately. The optics on the reader should be blown off with compressed air at least once a day, but **never adjust the lens**.

Excessive blinking will cause dropouts (if the 4-second free-wheel is exceeded). Timecode dropouts can produce “wow”, edits, and repeated sound track. When too many edits are seen, the player will drop out of digital mode until it is rebooted.

On the **DTS-6AD**, the reader may not blink when there is a timecode reading problem. Instead, the DTS-6AD will log reading problems as edits and when excessive edits are seen, the unit will drop to analog mode and remain in analog mode until it is rebooted. The edit counter can be seen by entering the STATUS screen, by pressing MENU ► STATUS. Treat excessive edits (more than 50 per reel) the same as you would a flashing TIMECODE indicator.

- Be aware that the EDITS counter resets at each reel change and after rebooting. So, monitor the suspect reel while the reel is running.

### There are four things that can cause the TIMECODE LED indicator to blink:

1. **Bad/poor timecode.** This is usually limited to a single reel or trailer, and is not a common problem. If only one reel blinks, then call the film distributor and request a replacement reel. If all reels blink or if you are finding bad reels frequently, check for other problems.
2. **Film instability/speed.** This is caused by film bouncing through the reader or a projector that is running at the far end of the DTS player’s speed range. The reader requires some film back-tension to read properly.
3. **Electrical noise/grounding problems.** The projector’s chassis must be earth grounded. Do not run timecode cable next to power lines/sources or fluorescent lights. Shielded cable must be used.
4. **DTS equipment** problem. Look at the timecode reader first. If another reader can be borrowed from a working screen, try swapping (exchanging components).

### 1.2. Bad/Poor Timecode

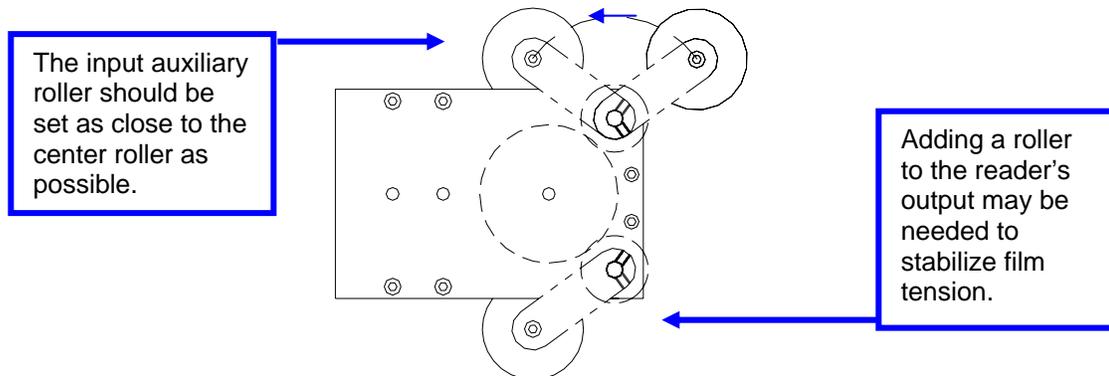
See “DTS Encoded Film” specifications in the DTS Player manual.

### 1.3. Film Instability / Running Off-speed

- Check the speed of the projector. It should run at 24 fps +/- 5%, unless running a “special venue” show/player.
- Watch the film run through the reader. If aligned properly, the film should contact each side of the roller evenly and not bounce through the reader. Minimize the amount of film bounce from the platter to the projector.

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Sept. 12, 2003	K. Hultgren	January 23, 2009	L. Brown		

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- Make sure the reader's auxiliary roller (black roller with an adjustable arm) is installed and provides as much film wrap as possible on the incoming silver roller. It should be pivoted towards the large center silver roller.
- While the film is running, gently squeeze the edges of the film between two fingers as it enters the reader, pull back slightly and allow your fingers to act as shock absorbers. Repeat on the exit side of the reader. If the TIMECODE LED stabilizes, find the source of instability. The following are possible sources of instability:
  - Poor reader alignment
  - Bad rollers(s)
  - Bad platter center piece
  - Bad projector belt, gear, or sprocket
  - Platter center piece spring removed (AW-3)
  - Too much tension
  - Too little tension
  - Reel clutch
  - Bent reel
  - Reader out of calibration (see TN-E550). Only applies to readers with D424 P.C. board.
- Bad or noisy output from the reader (see pages 3 and 4)

#### 1.4. Electrical noise/grounding problems

- Electrical noise on the timecode input(s) can confuse the timecode reader circuit. This causes the TIMECODE LED to blink and, in some cases, causes sound “wow”, edits, and dropouts. First make sure the projector(s) and the DTS player chassis are earth grounded.
- The current reader cables (from the DTS factory) have a shield wire (earth ground of player chassis) shrink-wrapped to the cable's jacket, on the reader end. Cut the shrink-wrap away and connect the wire to one of the screws that hold the reader to its bracket. Check whether the blinking stops.
- If you have made your own cable or modified the factory cable in any way, be sure the shield is connected to the conductive connector shells **at both ends**.

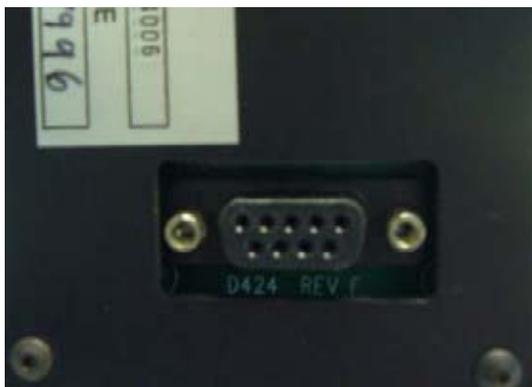
	TITLE		NUMBER	REV	Page
	<b>Timecode Reading Problems</b>		<b>TN-E698</b>	<b>A</b>	8 of 23
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Sept. 12, 2003	K. Hultgren	January 23, 2009	L. Brown		

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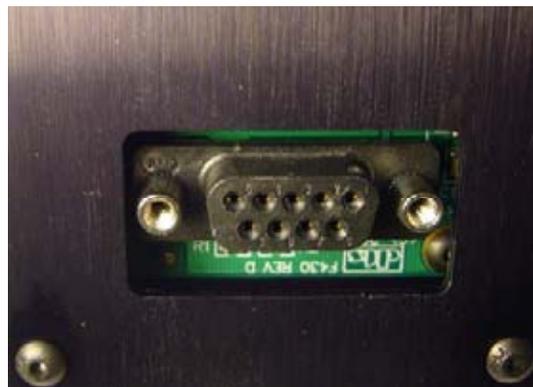
- Do not run the timecode cable along power lines, over florescent light fixtures, or near motor controllers. Cable must be shielded.
- If the timecode reader-head circuit board is D424 Rev. F or *earlier*, replace the reader or do a “repair-exchange” on the reader.

### 1.5. DTS equipment problem

- Verify the lateral adjustment is correct on the reader. Consult DTS technical support for guidance on the alignment procedure.
- Readers with D424 circuit boards only: Verify the voltage to the reader’s red LED is properly calibrated by following the procedure in DTS technical notice TN-E550. Reader heads with the D424 circuit board have a date code of May 2006 or earlier. Reader heads with the newer F430 circuit board are self calibrating and require no adjustments. The P.C. board number can be viewed, without removing the cover, by tilting the reader and looking just below the 9-pin connector (see examples below).



D424 Board



F430 Board

- **Check the timecode cable. Verify continuity and physical integrity.** If running two projectors to one DTS player, be sure you have used the correct timecode cables and that they are correctly wired.
- Check firmware inside the DTS-6 or -6D player (not DTS-6AD cinema processor). The current TCR version is V1.46 and is located at U14 on the D422 board.
- Borrow a known good reader from another screen. If this fixes the problem, replace the faulty reader.

#### 1.5.1. Please refer questions to DTS Cinema Technical Support

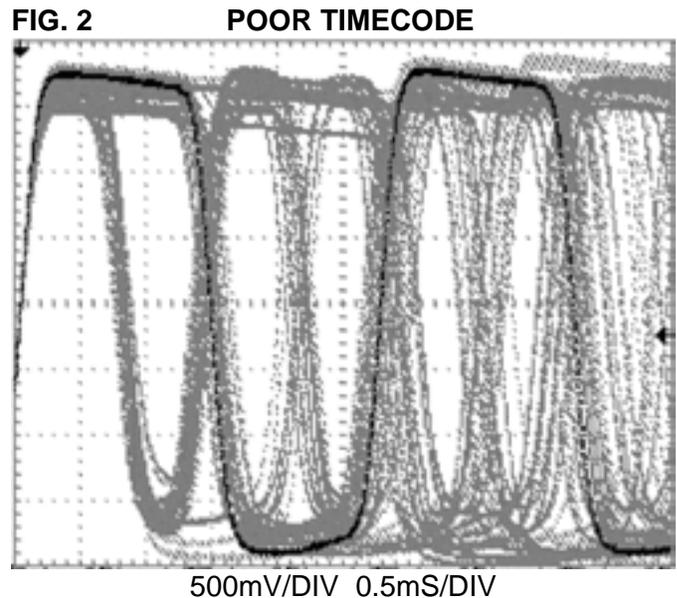
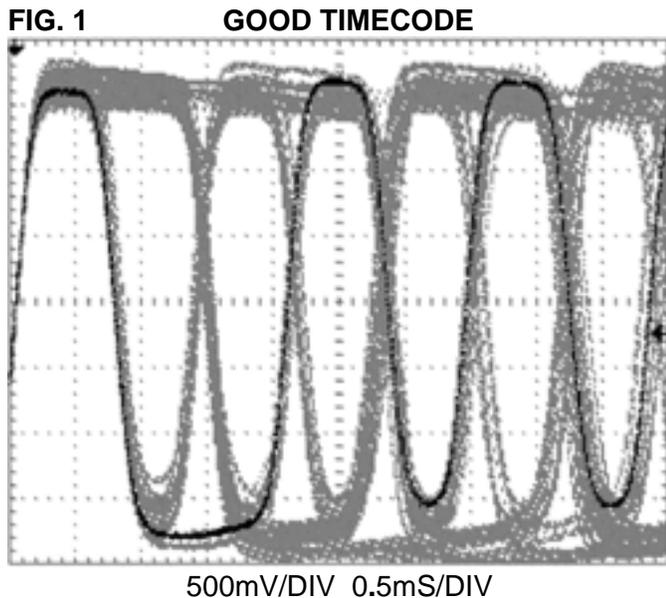
<b>DTS Digital Cinema Headquarters</b>	<b>DTS Digital Cinema Europe</b>
Email: <a href="mailto:techsupport@dtscinema.com">techsupport@dtscinema.com</a>	Email: <a href="mailto:eusupport@dtscinema.com">eusupport@dtscinema.com</a>
Tel outside USA: +1.818.401.4253	Tel: +44 (0) 1189.349.199
Tel in USA: 888.428.2268	Fax: +44 (0) 1189.349.198
Fax: +1.866-448-6802	<a href="http://www.dtscinema.com">www.dtscinema.com</a>
<a href="http://www.dtscinema.com">www.dtscinema.com</a>	

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Sept. 12, 2003	K. Hultgren	January 23, 2009	L. Brown		

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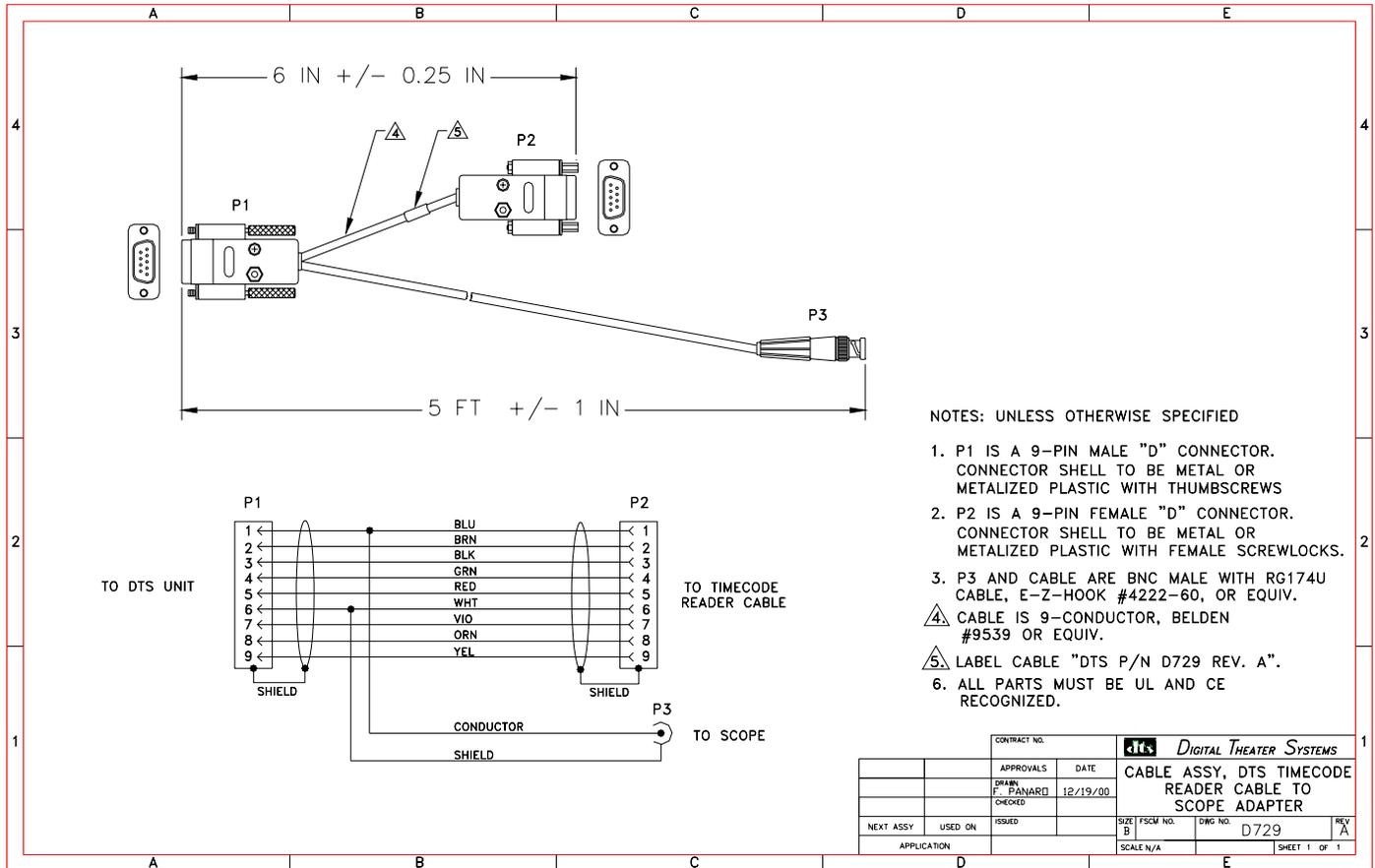
## Checking timecode with an oscilloscope

- Connect option 1      Remove the timecode reader cable's connector shell from the reader end. Connect the scope probe to Pin 1 and the scope ground to Pin 6.
- Connect option 2      If using the "DTS timecode reader-to-oscilloscope adapter" (DTS part # D729), simply disconnect the timecode cable from the reader head. Connect the adapter to the reader head (male DB9) and connect the timecode cable to the other end of the adapter (female DB9). Then, connect the BNC to the oscilloscope.
1. Set the scope to 0.5V/division, sweep at 0.5mS/division, and the trigger to internal.
  2. Run a reel of time-coded film (BILL and BUZZ reel is recommended) and observe the timecode cells. The amplitude should be constant and at **4 Volts Peak-to-Peak**. The cells should be visible all the way to the right of the scope screen. The cross-points ("X"s) should be well defined (FIG. 1). Poorly defined cells are shown in FIG. 2. They are caused by film bounce and jitter through the projector or from the platter/reel.



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Sept. 12, 2003	K. Hultgren	January 23, 2009	L. Brown		
DTS Digital Cinema, 9631 Topanga Canyon Pl, Chatsworth, CA 91311			Contact Document Control for the latest revision.		

The D729 adapter assembly, shown below, may be purchased from DTS or you may build it yourself.



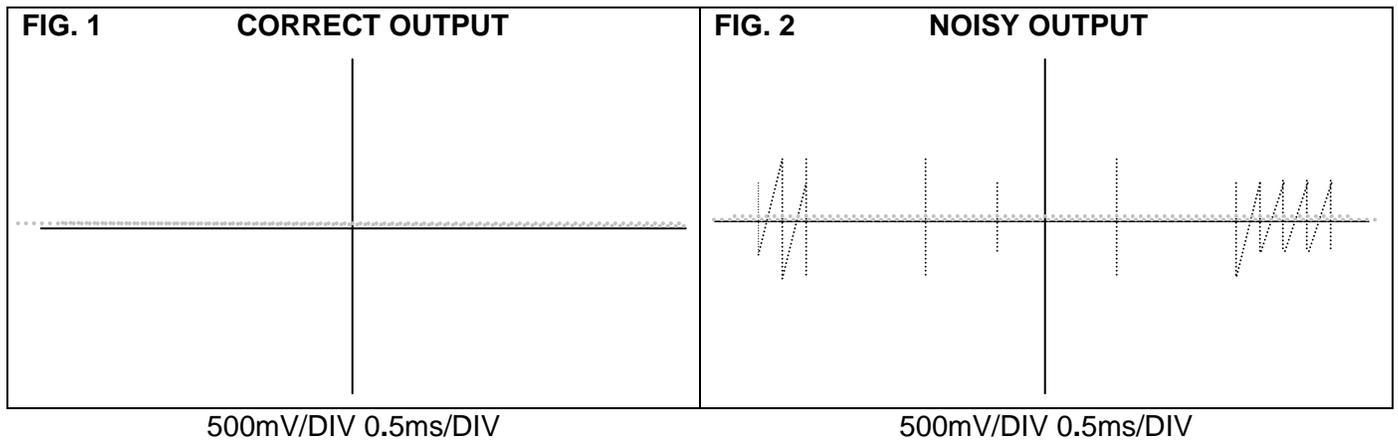
- NOTES: UNLESS OTHERWISE SPECIFIED
- P1 IS A 9-PIN MALE "D" CONNECTOR. CONNECTOR SHELL TO BE METAL OR METALIZED PLASTIC WITH THUMBSCREWS
  - P2 IS A 9-PIN FEMALE "D" CONNECTOR. CONNECTOR SHELL TO BE METAL OR METALIZED PLASTIC WITH FEMALE SCREWLOCKS.
  - P3 AND CABLE ARE BNC MALE WITH RG174U CABLE, E-Z-HOOK #4222-60, OR EQUIV.
  - CABLE IS 9-CONDUCTOR, BELDEN #9539 OR EQUIV.
  - LABEL CABLE "DTS P/N D729 REV. A".
  - ALL PARTS MUST BE UL AND CE RECOGNIZED.

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Sept. 12, 2003	K. Hultgren	January 23, 2009	L. Brown		

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## Checking for noise on a timecode reader using an oscilloscope

1. Connect the oscilloscope to the reader as explained on page 4.
2. Set the oscilloscope to 0.5V/division, sweep at 0.5ms/division, and set the trigger to internal. Perform the test with no film threaded through the reader.



The signal output should be clean and without any noise or spikes. If your timecode reader has noisy output, replace the reader.

	TITLE		NUMBER	REV	PAGE
	<b>XD10 Operation with SMPTE Timecode</b>		<b>TN-H171</b>		12 of 23
DEPARTMENT Engineering	CREATED BY: F. Pflaum	EFFECTIVE DATE June 25 2007	APPROVED BY:		

This document describes the operation of the XD10 with V2.1 or above using SMPTE TC to play film content (Soundtrack and/or access material).

**Note:** The displayed software version is 2.1.00 or above.

## Contents

- 5. Show selection—page 1
- 6. Serial number—page 1
- 7. Reel number—page 2
- 8. Synchronization—page 2

### 1 Show Selection

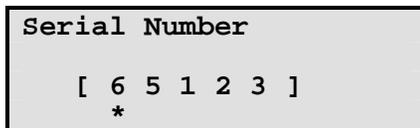
The XD10 selects the soundtrack file based on the serial number and reel number. The serial number can be defined either through the SMPTE user bits, or by defining it through the menus.

### 2 Serial Number

#### Serial Number Menu

The user can enter the serial number through the XD10 menus.

The example below shows the serial number set to 65123. The serial number from the menu overrides the serial number from the userbits.



**Main menu -> Setup -> TC Reader Offset->SMPTE->Serial Number**

#### Using Userbits

The serial number menu is set to 00000, then the serial number is read from the userbit in the SMPTE TC. The four hexadecimal characters of the userbits are converted to the serial number.

Example:

1. The DTS soundtrack has serial number 65123.
2. Set the serial number menu to 00000.
3. Convert 65123 to hex and get FE63.
4. Set the userbits for the SMPTE timecode source to be FE:63:00:00.

For example, to play content for serial number 65123, the timecode should have the userbits set to.

**Note:** Serial number menu (see below) must be set to 00000 in order to use userbits for the serial number.

	TITLE		NUMBER	REV	PAGE
	<b>XD10 Operation with SMPTE Timecode</b>		<b>TN-H171</b>		13 of 23
DEPARTMENT Engineering	CREATED BY: F. Pflaum	EFFECTIVE DATE June 25 2007	APPROVED BY:		

### 3 Reel Number

When playing SMPTE timecode the XD10 may select the reel number based on either the SMPTE timecode hour value, or through a menu selection.

#### Reel Number Menu

The reel number menu below is used to specify the reel number for SMPTE timecode. Valid reel numbers are 1 through 15. Selecting Reel 0 will instruct the XD10 use the reel number from the Hours value in the SMPTE timecode.

```

Reel Number
R0 => Use Hours

[ Reel 0 ]

```

**Main menu -> Setup -> TC Reader Offset->SMPTE->Reel Number**

- Note:** The reel number must be selected to play shows longer than one hour.

### 4 Synchronization

The following should be considered for synchronization purposes:

- The XD10 adds 6 seconds to the incoming SMPTE timecode. The XD10 will display the timecode as 6 seconds ahead of the source timecode.
- There is a 1 second delay for the audio played and the timecode displayed on the XD10.
- Additional timing differences can be created by using the offset menu.

#### SMPTE Timecode Offset Menu

The menu below is used to offset the timecode and is only applied to SMPTE timecode. The format is +/- [00:MM:SS:FF]. This allows a timecode offset to be set from -59:59:29 to +59:59:29.

The offset is in the frame rate that is being received. An offset of 29 frames will be converted to 24 frames for 25 fps timecode.

```

Offset

+ [00:00:00:00]
*

```

**Main menu -> Setup -> TC Reader Offset->SMPTE->Offset**

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# DTS Timecode Playback from Digital Cinema Packages

**Release Version 1.0**

**Effective Date: Sept 2008  
Document # TM-H292**

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Chatsworth, CA 91311  
USA**

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DTS Timecode Playback from Digital Cinema Packages, version 1.0

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September 2008

### Record of Changes

Manual Version / Date	Description
1.0/ September 2008	Initial release

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## Introduction

As the cinema industry makes the transition from film to digital projection, around the world people are recognizing the advantages of incorporating DTS timecode into the digital cinema file server. Driving a DTS player from the DTS timecode output of a digital cinema server is a very useful scheme for allowing the use of the DTS-CSS or XD10 functions of Subtitling, Narration, and open or closed captions.

To accomplish this, the digital cinema server must source DTS timecode to the DTS player. This specification details where the DTS timecode is to be recorded on the master to ensure proper sync and avoid interference with the existing 5.1 Audio, and outlines the proper setup to playback access discs or standard DTS film soundtracks in a digital cinema environment.

## Timecode Setup for Digital Cinema Distribution Masters (DCDM)

DTS timecode is placed on the selected channels of the DCDM. Audio description, if available, is also placed on the selected channels of the DCDM. Then the transfer, handling, and packaging of the DTS timecode track and audio description can be done simultaneously with the 5.1 audio.

### 3. Playback Setup

DTS timecode is recorded at -10dbFS as a digital audio track on the selected channel of the digital feature. The DTS player requires an analog timecode signal; if the timecode channel is delivered digitally then an external digital to analog converter (D/A) is required.

DTS captioning, narration, subtitling and audio are wired as normal.

#### **System Requirements:**

DTS playback system XD10 or CSS for captioning and narration. DTS-6, DTS-6D, DTS-6AD for audio only playback (alternate language).

Digital cinema server with channel 1-8 audio outputs.

D to A converter if the timecode output channel is digital. AES/EBU 48K and 96K 24bit, such as RDL's HR-DAC1. (<http://www.rdlnet.com/>.)

Follow this procedure to provide playback:

- A. Connect the timecode input of the DTS theater playback unit to the analog output of the designated timecode channel of the digital cinema server. If a D/A audio converter is used, then connect to the output of the D/A converter. All DTS playback systems have two timecode inputs – projector 1 and projector 2 – route the timecode input to projector 1 if you will not be using film. If you will be switching between film and digital and only have one film projector (no change over) you can use input 2 to avoid swapping cables. The DTS-6AD has 2 timecode connectors that use pin 1 for input. All other DTS players use pin 1 for projector 1 and pin 2 for projector 2. DTS-6s and DTS-6Ds require an internal jumper change to enable the projector 2 input; see your manual for jumper instructions.

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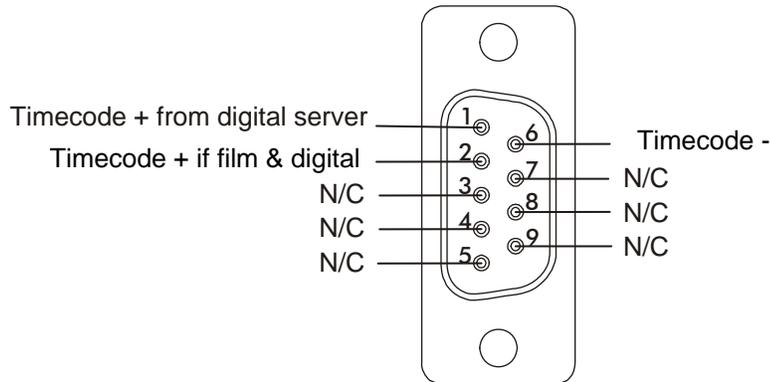


Figure 1. Timecode Input

**⚠ Caution:** Do NOT make any connection to any pin labeled N/C.

- B. The DTS playback systems will have an offset number that is calibrated for the film projector. Make sure you write the film offset number down as it will have to be set back (reset) prior to playing film again. The offset for digital projection on the DTS player is 24 frames. While an offset error of 1 or 2 frames is easily seen with sound play back, captioning and description playback is more forgiving. If you will be going back and forth between film and digital and your film offset is between 20 and 28 frames, you could leave your offset on the film setting. This would avoid sync problems if the operator forgets to change it back to the film offset.
- C. Provided the playback material – that is, Subtitling, Narration, Rear Window/Data Wall or a soundtrack disc with the appropriate serial number – has been loaded into the DTS player and it matches the recorded TC serial number on channel 7 or 9, then the file will play. The serial number will allow for an automatic selection process and select the file from the hard-drive or CD-ROM drive. The file will automatically play and sync with the digital file master.
- D. Perform a quality check once the D-Cinema file is loaded.  
See the block diagrams below for playback wiring.

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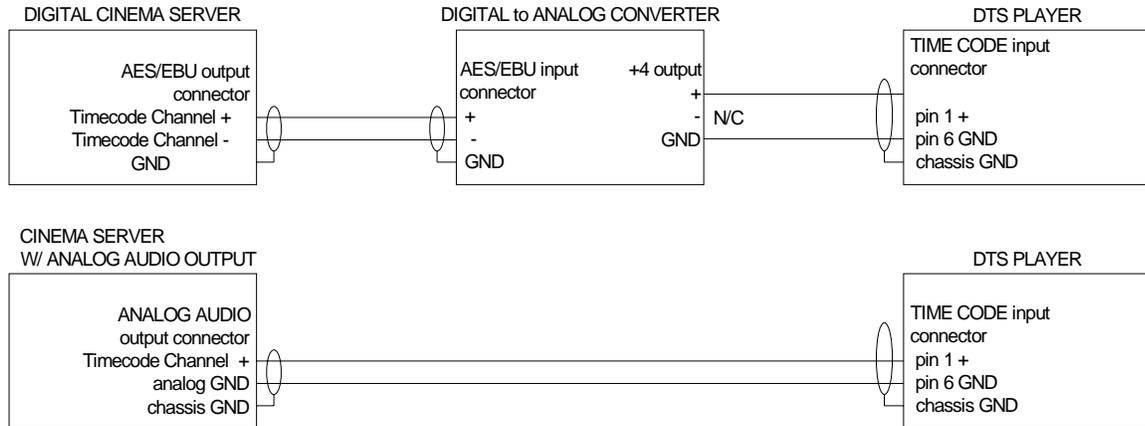


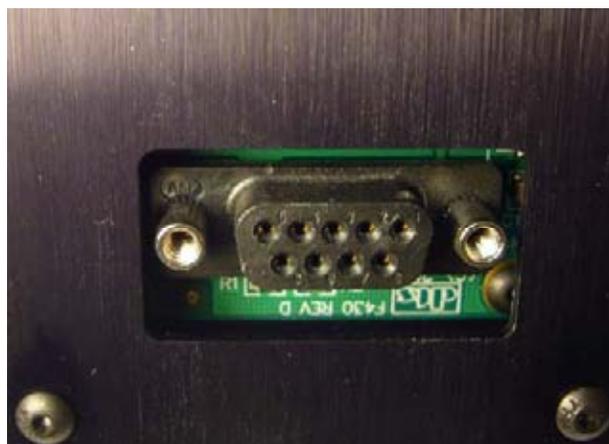
Figure 2. Playback D-Cinema Server with DTS CSS Unit

	TITLE <b>Reader Head LED Voltage Calibration          (D424 P.C. Board Only)</b>		NUMBER <b>TN-E550</b>	REV <b>B</b>	Page 20 of 23
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This procedure applies only to reader heads with the D424 P.C. board. The D424 P.C. board was used in reader heads with a date code of May 2006 or earlier. Newer reader heads use the F430 P.C. board which is self-calibrating and requires no adjustment. The P.C. board number can be viewed, without removing the cover, by tilting the reader and looking just below the 9-pin connector (see examples below).



D424 Board



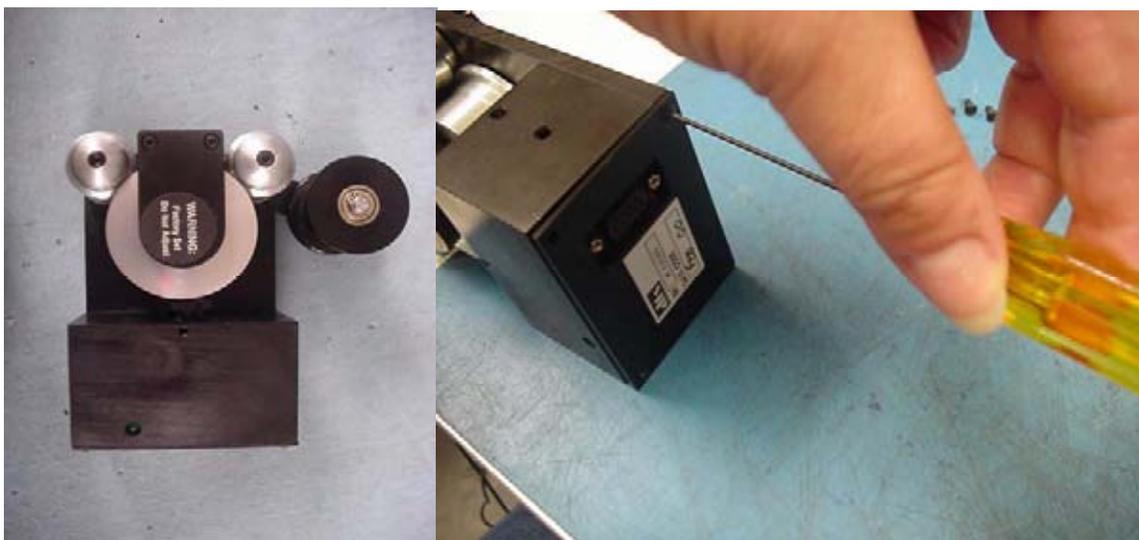
F430 Board

All reader heads, with the D424, must be periodically checked for proper gain. It is easily done using a multimeter and with **NO** film loaded through the reader. For demonstration purposes, the reader is shown removed from the projector.

### 1.6. TOOLS REQUIRED

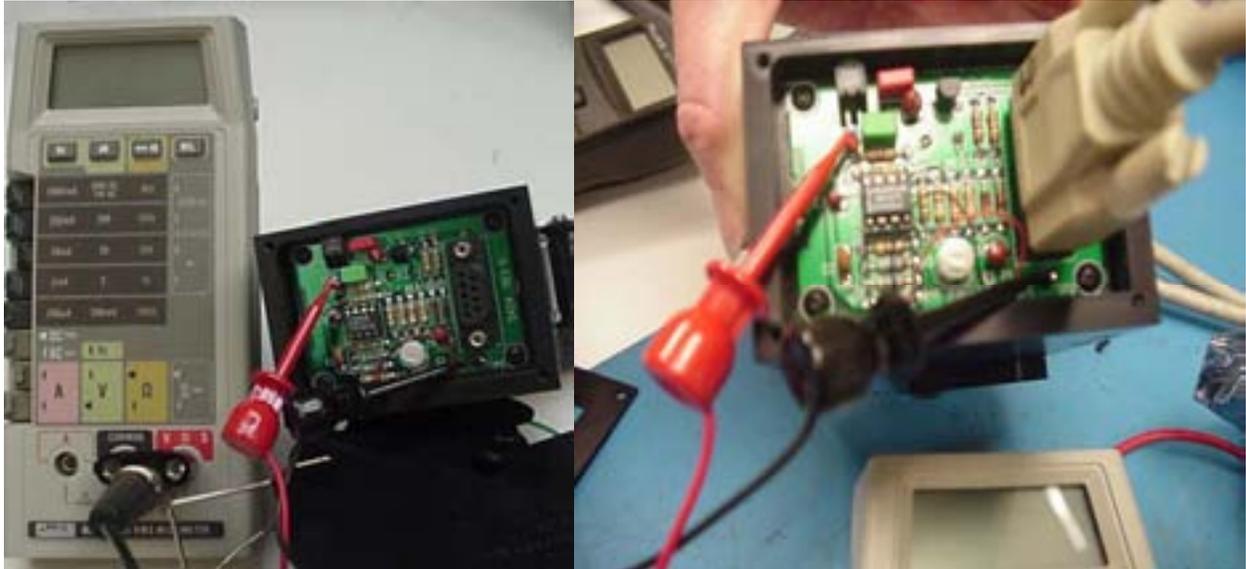
- DTS player
- Timecode cable
- 1/16" (1.58 mm) Allen-head (hex) screwdriver
- Small flat-bladed screwdriver
- Multimeter

① Remove the reader's back cover by removing the -4- hex screws. Save the screws.



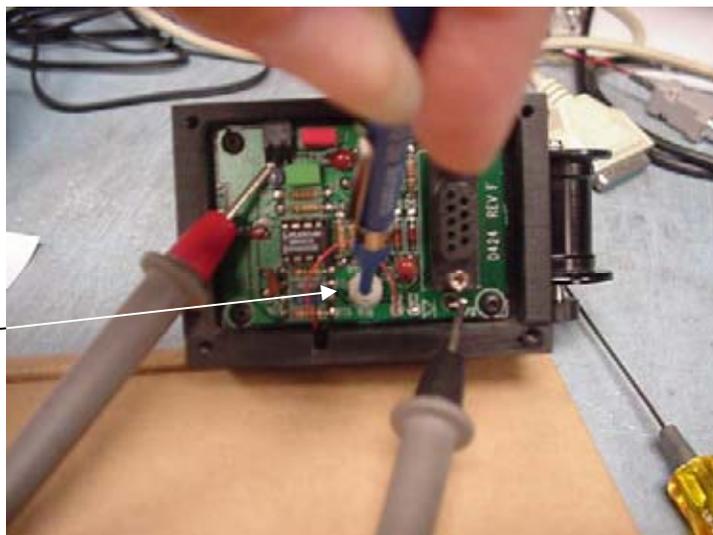
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- ② First, set the meter to DC volts. Connect leads to TP1 (“+” signal) and TP2 (ground) on the D424 board. Then, connect the reader to a powered DTS player. The reader gets its power from the DTS player.



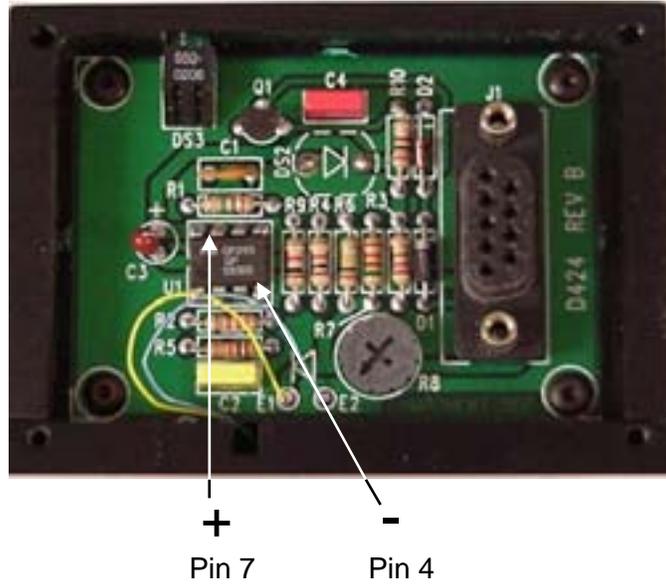
- ③ Adjust R16 trim pot (on **Rev. E** and higher D424 boards) for **4.0** volts DC on the multimeter. If you cannot achieve the correct voltage, the LED may be damaged or aged. Older version D424 boards may not have a trim pot. In that case, if the voltage is not between 2.5 and 4.0 volts DC, then you must do a repair-exchange on the reader. Contact your local DTS dealer.

Adjust trim pot until  
the volt meter reads  
4 volts DC



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- ④ On older versions of D424 boards that have a trim pot but no test points, carefully connect your meter as shown below and measure the voltage. Adjust trim pot for 4.0 volts DC on a multimeter.



Version "A" D424 boards do not have test points or a trim pot. In that case, measure the same as above and if the voltage is not between 3.5 and 4.0 volts DC, then you must do a repair-exchange on the reader. Contact your local DTS dealer.

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- ⑤ After adjustments are complete, reattach the back cover using the saved hex screws. Tighten all set-screws on the reader and check that all rollers rotate freely and do not wobble. Check that the reader's mounting bracket is tightly fastened to the projector and that the reader is securely attached to the bracket.



One set-screw to secure auxiliary roller

Two set-screws to secure rollers

### 1.6.1. Please refer questions to DTS Cinema Technical Support

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## Appendix M: H260 DVD Drive Unit (Model DR-1)

The DR-1 DVD drive unit is used to load DVD based content into one or more XD20 Media Players. A single DR-1 can serve the needs of all XD20 units on a local network within a theatre. Note: There are no user serviceable parts in the DR-1.

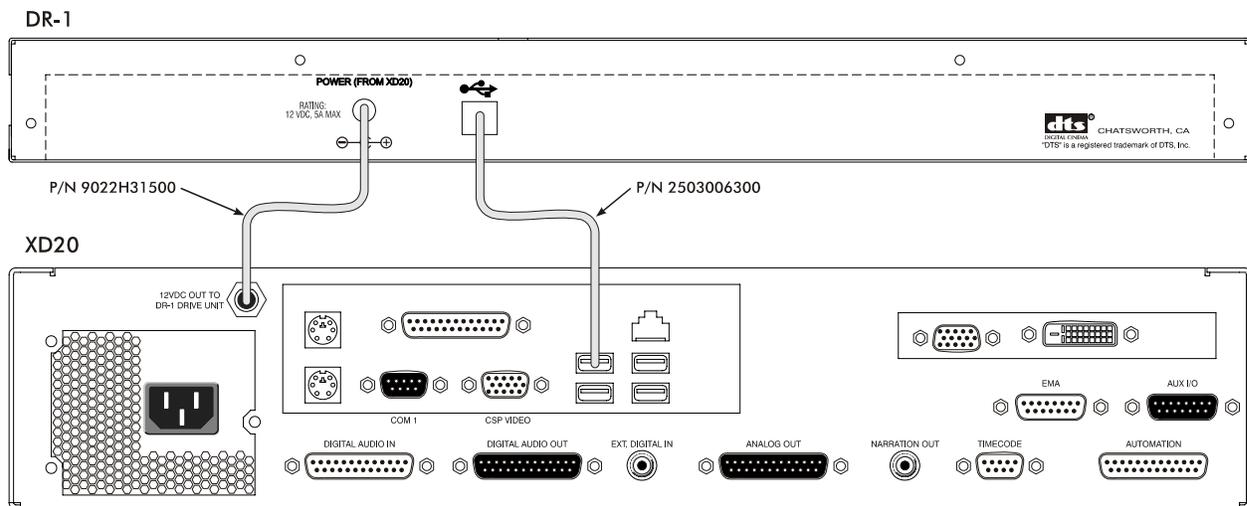
The DR-1 is powered via 12V output from an XD20 unit, so the drive unit should be mounted in a rack near one of the XD20 units. The DR-1 has an Ethernet connector, for communication of data with one or more XD20 players.

Due to the lengths of the supplied power and USB cables, we recommend mounting the DR-1 *directly* above or below the XD20.



The front panel has three LEDs, indicating activity on drives A and B, and presence of power. Each drive (A and B) has an Open/Close button.

The rear panel has a power connector (for 12V power IN from XD20) and a USB connector for data communication to the XD20.



TITLE CABLE CONNECTIONS: DR-1 DRIVE UNIT TO XD20

DRAWING NO. H318

REV. A1

DATE 21NOV08