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Digital Theater Systems

Installation and Operation Manual

DTS6D-SV 6-Track Special Venue System



July 25, 2002
DTS Part #9301DT6D021.0

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EMI NOTICE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Canadian Department of Communications compliance statement:

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

Avis de conformite aux normes du ministere des Communications du Canada:

Cet equipment ne depasse pas les limites de Classe A D'émission de bruits radioelectriques pour les appareils numeriques telles que perscrites par le Reglement sur le brouillage radioelectrique etabli par le ministere des Communications du Canada. L'exploitation faite en milieu residentiel peut entrainer le brouillage des receptions radio et television, ce qui obligerait le proprietaire ou l'operateur a prendre les dispositions necessaires pour en eliminer les causes.

PATENTS

The DTS system has been granted the following patents:

U.S.A. Patent Numbers: 5155510, 5386255, 5450146, 5751398

Australia Patent Numbers: 652965, 661614

Europe Patent Numbers: 0551424, 0615631, 0473677, 0632922

Japan Patent Numbers: 2033555, 2708961

India Patent Number: 181427

Russia Patent Number: 2088962

Korea Patent Number: 153028

France Patent Numbers: 8906807, 9114963

March 9, 1999

WARRANTY INFORMATION

Equipment manufactured by Digital Theater Systems, Inc. is warranted against defects in materials and workmanship for one year from date of purchase. There are no other expressed or implied warranties.

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

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

RETURNS

For warranty, repair, exchange, or replacement parts, please call DTS at (818) 706-3525 or toll free (USA only) 1-800-959-4109 for a Return Authorization number **before** sending any item back. At the time of the call, DTS requires that you provide the serial number of any DTS player(s) or reader head(s) to be returned **before** warranty replacement units will be sent. All return packaging should be clearly marked with the Return Authorization number on the outside of the package. DTS FAX: (818) 879-2746

Please send all returns to:

Digital Theater Systems
5171 Clareton Drive
Agoura Hills, California 91301 USA

PROMOTIONAL MATERIALS

Promotional materials are available from DTS. These items include:

- DTS marquee signs (see order form at the back of this manual)
- DTS one sheet posters
- DTS logo films, available in 35mm and 70mm (see system parts list)
- DTS buttons and pins
- DTS T-shirts
- DTS Hats
- DTS Sweatshirts
- DTS Tweakers

Www.dtsonline.com (click on 'online store')

SPECIAL VENUE **FACTORY WARRANTY INFORMATION** SPECIAL VENUE

The following is a list of information necessary for every location where the DTS6D-SV system is installed. Check one: DTS 5.1 channel system DTS discrete 6.0 channel system

DTS requires the above information to provide proper and timely technical support. Fill page out and send to DTS (address and FAX number below), attention Customer Service.

THEATER NAME/CIRCUIT: _____

THEATER LOCATION: _____

SCREEN NUMBER: _____

THEATER CONTACT/TELE #: _____

LOCAL TECH/TELE #: _____

TIMECODE READER S#: 35mm: _____ 70mm: _____

DTS6D-SV SERIAL NUMBER: _____

PROJECTOR TYPE: _____

SOUND PROCESSOR: _____

SOUND AMPLIFIER: _____

SPEAKER SYSTEM: _____

Screen (model): _____

Surrounds (model): _____

Split: _____ Mono: _____

Subwoofer: _____ Is it self-powered? _____

Subwoofer Amp (model): _____

Are the Left Extra and Right Extra being used for Subwoofer? _____

*****IMPORTANT*****

Failure to return this information sheet within 30 days to DTS **WILL VOID** your warranty.

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RACK-MOUNTED INSTALLATIONS

If the DTS is installed in a closed or multi-unit rack assembly, the following items must be considered.

1. The ambient temperature within the rack may be greater than room ambient temperature. The maximum temperature for the equipment in this environment is 50°C. Consideration should be given to the maximum rated ambient.
2. Installation should be such that the amount of airflow required for safe operation is not compromised, and that a hazardous condition is not achieved due to uneven loading.
3. Check nameplate ratings to assure there is no overloading of supply circuits that could have an effect on overcurrent protection and supply wiring.
4. Reliable grounding of this equipment should be maintained. Particular attention should be given to supply connections when connecting to power strips, rather than direct connections to the branch circuit.
5. A quality surge / spike suppresser power strip is recommended to protect the DTS6D-SV player.

SYSTEM CONSIDERATIONS

A DTS digital playback system can place enormous demands on the amplifiers and speakers in your theater. Some of the factors that can effect the power requirements are speaker efficiency, room size, and room acoustics. The following is a guideline of minimum power requirements:

<u>Theater Size</u>	<u>Screen Channels</u>	<u>Each Surround Channel</u>	<u>Subwoofer</u>
Small	200 WPC	200 WPC	400 W
Medium	300 WPC	300 WPC	600 W
Large	400 - 500 WP	C400 - 500 WPC	+800 W

DTS6D-SV SYSTEM SPECIFICATIONS

General

Is made to operate in one of two modes: ① 5.1 channels (Left, Center, Right, Left Surround, Right Surround, Sub bass) or ② discrete 6.0 channels. Holds three CD-ROM discs capable of up to five hours play time. Compatible with most analog cinema processors and the CinemAcoustics CA-CP600 digital cinema processor. Logic pulses available for automation systems. Programmable to operate on two projector systems and SMPTE or DTS timecode. Functions on a variety of film speeds and picture formats. DC output to reader(s) uses self resetting circuit breakers.

Size

5 1/4" high, 19" long rack mount, 15 1/2" deep

Dynamic Range

96 dB, all channels

Frequency Response

5.1 channel system L, C, R: 20Hz to 20kHz, LS & RS: 80Hz to 20kHz, Sub: 20Hz to 80Hz
 6.0 channel system All 6 channels: 20Hz to 20kHz

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NOTES

Thank you for choosing DTS !

I. INTRODUCTION

The DTS digital sound process for motion pictures is designed for the digital sound release of movies in six-track theaters. It is a dual system in that the digital audio data is recorded on CD-ROM discs. A special DTS timecode is printed on the motion picture print along with, if used, a conventional stereo optical soundtrack. The timecode is used by the DTS system to synchronize the sound and picture. The timecode lies between the picture and optical sound track, and is printed onto the release print from the soundtrack negative. There is a single inventory of prints.

The DTS6D-SV system is available in one of two modes: ① 5.1 channels provides left, center, right, left & right surrounds (or mono surround), and sub bass; or ② discrete 6.0 channel system provides six channels which can be assigned as required by the end user. The system allows for play times up to 5 hours. It is completely automatic and fail-safe in operation requiring no action by the projectionist. The system automatically starts and stops, and tracks film breaks and change-overs. The digital audio data is sampled at 44.1K samples per second. APTX100 digital audio data compression (4:1) is used. Transfer onto DTS encoded discs can be made from conventionally mixed analog or digital sound masters.

How Does The DTS6D-SV System Work?

Either DTS or SMPTE timecode can be used to enable the system to play DTS encoded discs. Timecode is printed on the motion picture film. The DTS6D-SV system (with matching show discs loaded) reads the timecode and plays the correct sound for each frame of film projected. The projectionist inserts the show disc(s) into the DTS6D-SV and threads the film through the DTS timecode reader head. Once the film is started, the DTS system checks a keyed serial number in the timecode and on the show disc(s) to assure the correct sound is being played with the show being shown.

NOTES

Thank you for choosing DTS !

II. UNPACKING

The packaging is designed to handle normal shipping and handling. Upon receipt of shipment, check for signs of damage before opening and report all damage to the carrier. All shipments made from DTS are the customer's responsibility once product leaves our premises.

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

The following is a sample packing list for a single projector (platter) DTS system used with a cinema processor:

- DTS6D-SV player and power cord
- Timecode Reader Head
- Reader Head Mounting Bracket
- Timecode Reader Interconnect Cable, P/N D435*
- Analog Output Cable, P/N 2503-0014-00 **
- Audio breakout board (as it applies to your application)
- Logic breakout board (as it applies to your application)
- Automation (logic) cable, P/N 2503-0014-00** *(same part as analog output cable)*
- Installation Hardware
- Manual

NOTES:

- * Timecode cable for two projector (change-over) systems will change to a "Y" cable, P/N D435-03. Plus, an additional reader head, mounting bracket, and hardware should be included. The DTS6D-SV should be programmed for change-over operation and other special functions, as ordered (see Section 3.2 for DTS6D-SV for programming details).
 - ** Analog output cable, P/N 2503-0014-00, is used with analog cinema processors capable of discrete multi-channel input: Dolby, Kintek, Pana-Stereo, RGM, Smart, and UltraStereo JS Series. Used with DTS audio breakout boards.
1. If any of the items on your packing list cannot be found, contact DTS with the P/N and description of the missing item(s). Refer to "**RETURNS,**" page ii, when sending any product back to DTS.
 2. The DTS logic card is used with the DTS automation cable.
 3. Digital cable is part number E216. Its used with the CinemAcoustics DCP, Model CA-CP600.

NOTES

Thank you for choosing DTS !

III. INSTALLATION PROCEDURE

The DTS6D-SV system consists of two major components: The DTS Timecode Reader Head and the DTS6D-SV player. The DTS6D-SV system for special venue is available in two configurations: The 5.1 system and the discrete 6.0 channel system. The following is a generic procedure intended to supplement the DTS wiring diagrams to sound systems. Look for these diagrams in Section VII.

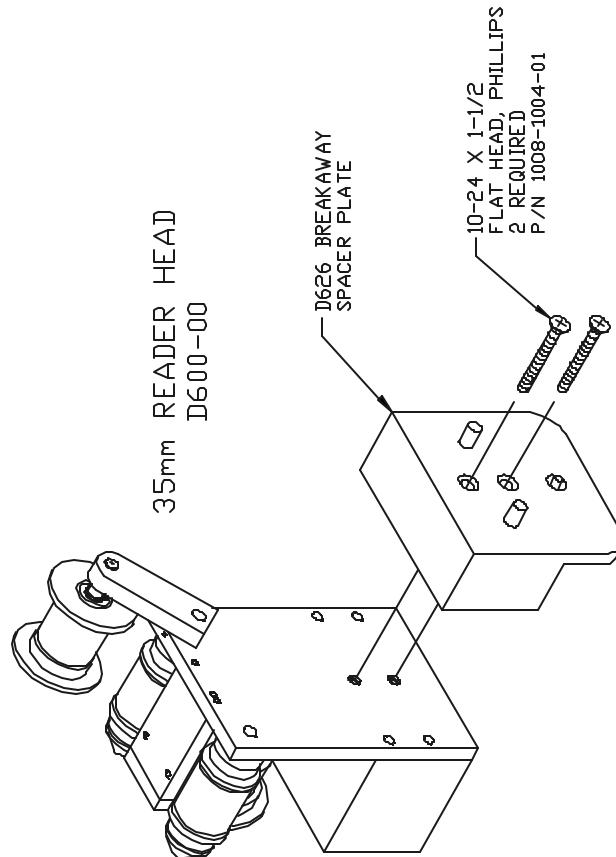
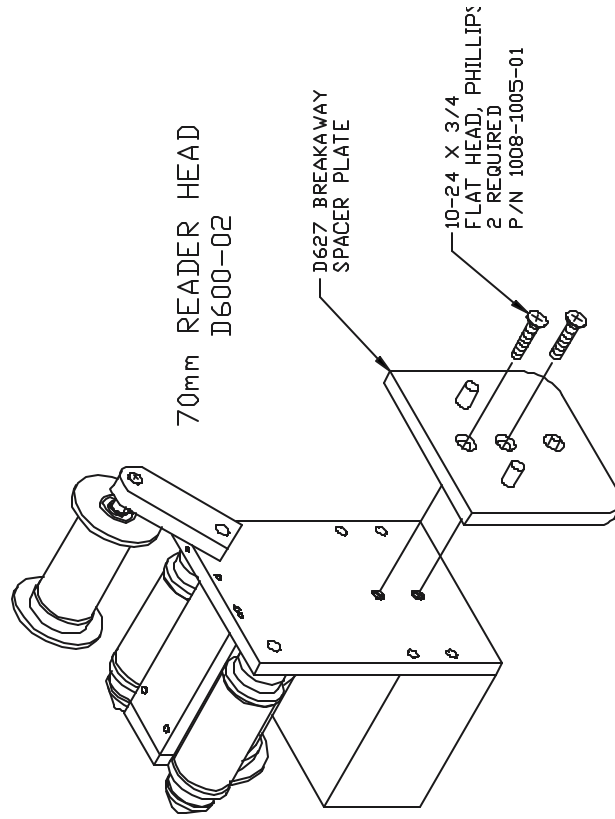
3.1 Timecode Reader Head Installation

- The Timecode Reader Head is designed to mount to projectors by using a single DTS **mounting bracket**. The bracket is usually placed between the projector and the reel arm.
- Position the appropriate DTS **mounting bracket** on the same bolt pattern as the reel arm and bolt securely in place (see “Bracket Mounting Diagrams,” in Section VII).
- If both 35mm and 70mm reader heads are to be used on the same bracket, connect the proper **breakaway plate** to each reader as shown on Figure 7. Keep spacers attached to the reader and keep them as a set once projector alignments are made.
- Install the **Timecode Reader Head** onto the DTS mounting bracket and bolt into place with supplied hardware.
- Reinstall the **reel arm** on the top bolt pattern of the DTS mounting bracket.
- Using film, **align the film** path from the reel arm through the DTS reader mounted on a bracket and to the projector.

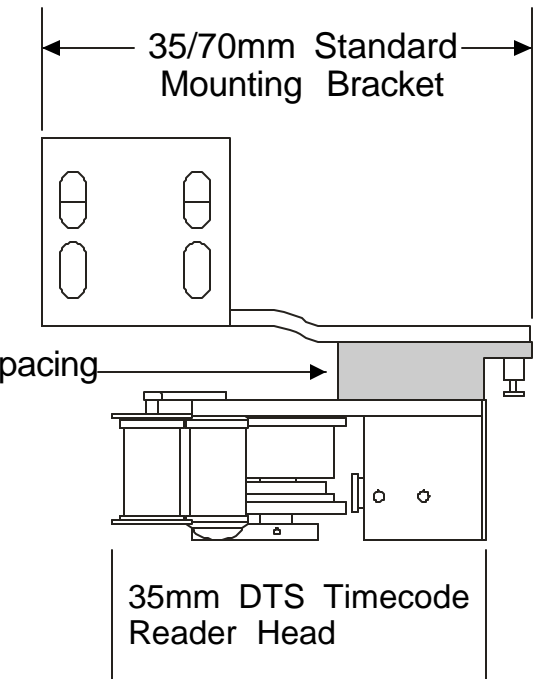
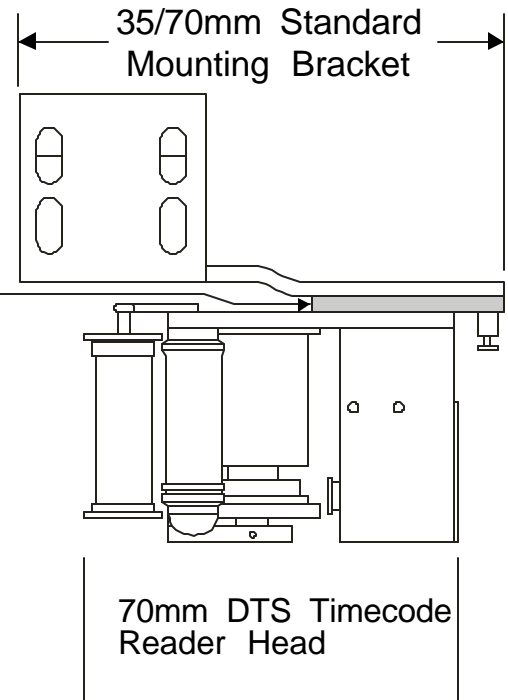
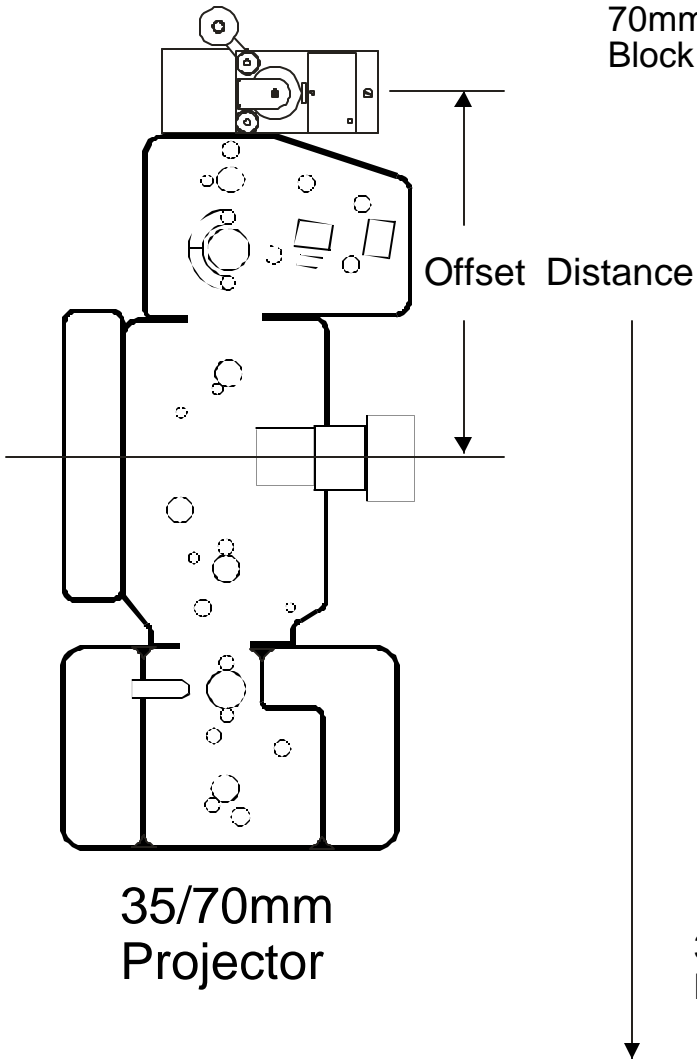
For 70mm — 35mm reader used at the same projector

- Start by mounting the **70mm reader** (with its breakaway plate attached) to the bracket. Use 70mm film to align reader. Once aligned, tighten bracket screws. Loosen the thumbscrews on the breakaway plate so that the 70mm reader detaches from the bracket.
- Now attach the **35mm reader** (with its breakaway plate attached) to the bracket. Use 35mm film to be sure the alignment path is correct – no corrections should be necessary. The principle is to have one alignment for both readers so that no projector adjustments are needed when the readers are exchanged.
- The DTS timecode reader **MUST** have a **straight film path** (no angles or twists) and at least a small amount of tension. The auxiliary flanged roller on the timecode reader head is used to avoid film “walk out” and helps to stabilize the film. Additional guide rollers may be added to ensure proper film tension - most critical on platter systems.
- Connect the 9-pin **timecode cable** from the reader to the DTS player. Route the DTS output cables from the DTS player to the sound processor’s input.
- **Two projector (change-over) theaters**
Be sure to place each reader head at the same place on the projectors. **For proper sync, the DTS offset value must be the same at both projectors.** See Section 4.2.

Breakaway plate mounting




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		
COMPUTER FILE NAME TIE241A (70mm-Mnt).CDR		DWG. NO. TI-E241A

PH: 818-706-3525 Fax: 818-706-1868
 Web: www.dtonline.com

3.2 DTS6D-SV Player Installation

DTS has configured your DTS6D-SV player as indicated on the packing list. A DTS6D-SV labeled “generic” will be set for platter (single projector) and DTS timecode operation. If the DTS6D-SV player you are about to install did not come from the factory then you will must check an internal programming jumper.

**** Be sure the rear panel AC voltage switch is properly set for your mains AC supply rating ****

Remove the top cover. See Figure 1.

Programming for Two Projector (change-over) Operation

Locate the timecode board **D422** (the card with the 9-pin D-connector on the rear panel and LED’s on the front). Near top center of the board there is a 7-position header called “W1”. A shunt is required vertically over position “0” (farthest right position) if you are installing for change-over operation. Cycle power after a programming change.

Programming for One Projector (platter) Operation

Locate the timecode board **D422** (the card with the 9-pin D-connector on the rear panel and LED’s on the front). Near top center of the board there is a 7-position header called “W1”. No shunt is required for platter operation. However, a shunt is supplied with each player and this shunt should be in the “holding” position: Placed horizontally across the top row.

Programming Special Functions

The **D422** board contains “W1” (7-position header) that can be used for special applications. Unless specified otherwise, all factory DTS6D-SV units are programmed for standard theatrical operation — which means none of the special functions, listed below, are enabled.

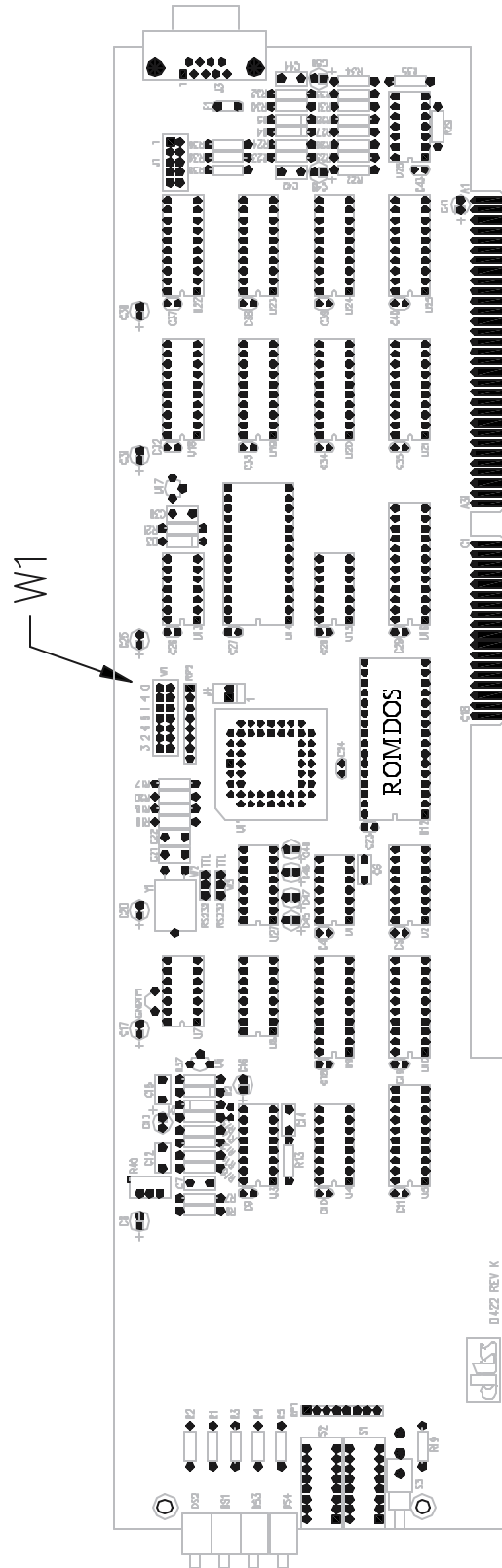
If a special function is required, use the table below to program the DTS6D-SV. To enable any of these applications, place a shunt vertically across the position needed to perform the operation required.

<u>“W1” Position</u>	<u>Special Function</u>
0	‘Change-over’ (two projector/timecode sources) enable
1	‘SMPTE timecode’ enable
2	IN = Reads Hours. Hour 1=Reel #1, Hour 2=Reel #2, etc.
2	OUT = Reads user bits. Bit 1=Reel #1, Bit 2=Reel #2, etc.
4	‘Serial output of timecode’ enable

NOTE: Generally, installations using SMPTE timecode should enable positions #1 & #2.

After the DTS6D-SV is programmed, reinstall top cover.

Figure 1



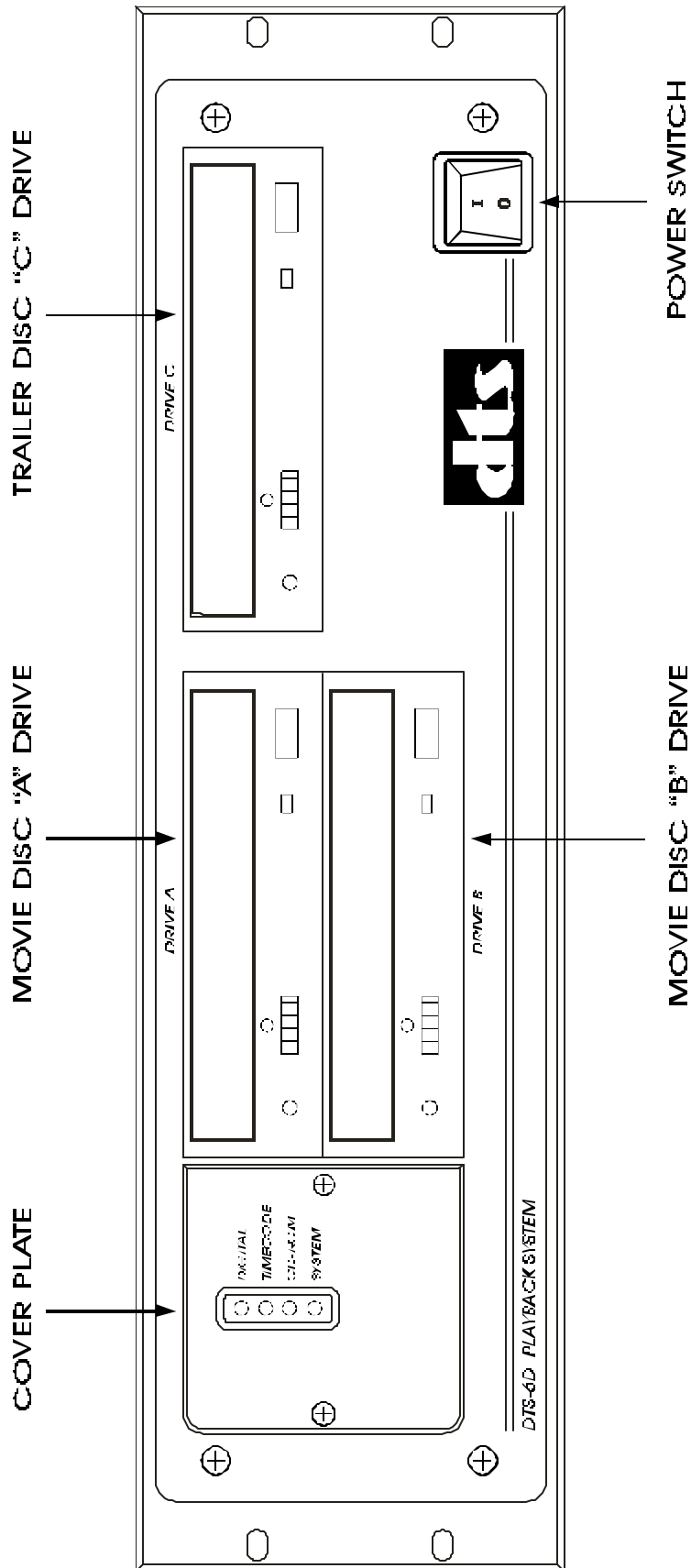
NOTE: If Acqtec ROM board and AQRM IC is used, the ROM-DOS IC is removed from D422-U12.

The DTS6D-SV Player

- DTS6D-SV player requires 5 1/4" tall by 17" deep of 19" wide rack space for proper mounting. Select a space in the sound rack not more than three feet from the existing sound processor to be interconnected. Bolt the DTS player into the rack. Be sure to observe **ventilation** requirements specified in the beginning of this book, see "Rack Mounted Installations", page iv.
- Check that the DTS6D-SV's front panel **power switch** is in the **OFF** position. Check that the rear panel AC voltage switch is properly set for your main AC supply rating.
- Connect the AC **power cable** to the DTS6D-SV player. (NOTE: The DTS6D-SV player is a computer based system and as such can be susceptible to power line surges. A quality surge/spike suppresser made for computers is recommended). Proper grounding must be maintained.
- **Timecode.** Refer to the "Rear Panel Connector Pin-outs" diagram in Section VII that details the 9-pin DTS TIMECODE connector.
- **Audio.** Refer to the "Rear panel connector pin-outs" diagram in Section VII that details the 25-pin ANALOG output connector.
- The DTS6D-SV uses caddy-less **CD-ROM drives**. "Caddy-less" means the drive will not accept a CD-ROM disc in a caddy or case. Instead, you must remove the disc from its case and place it on the CD tray. See Section V "Operating Caddy-less CD-ROM Drives" for details.
- The DTS6D-SV has three CD-ROM drives. You may play show discs in any of the drives.

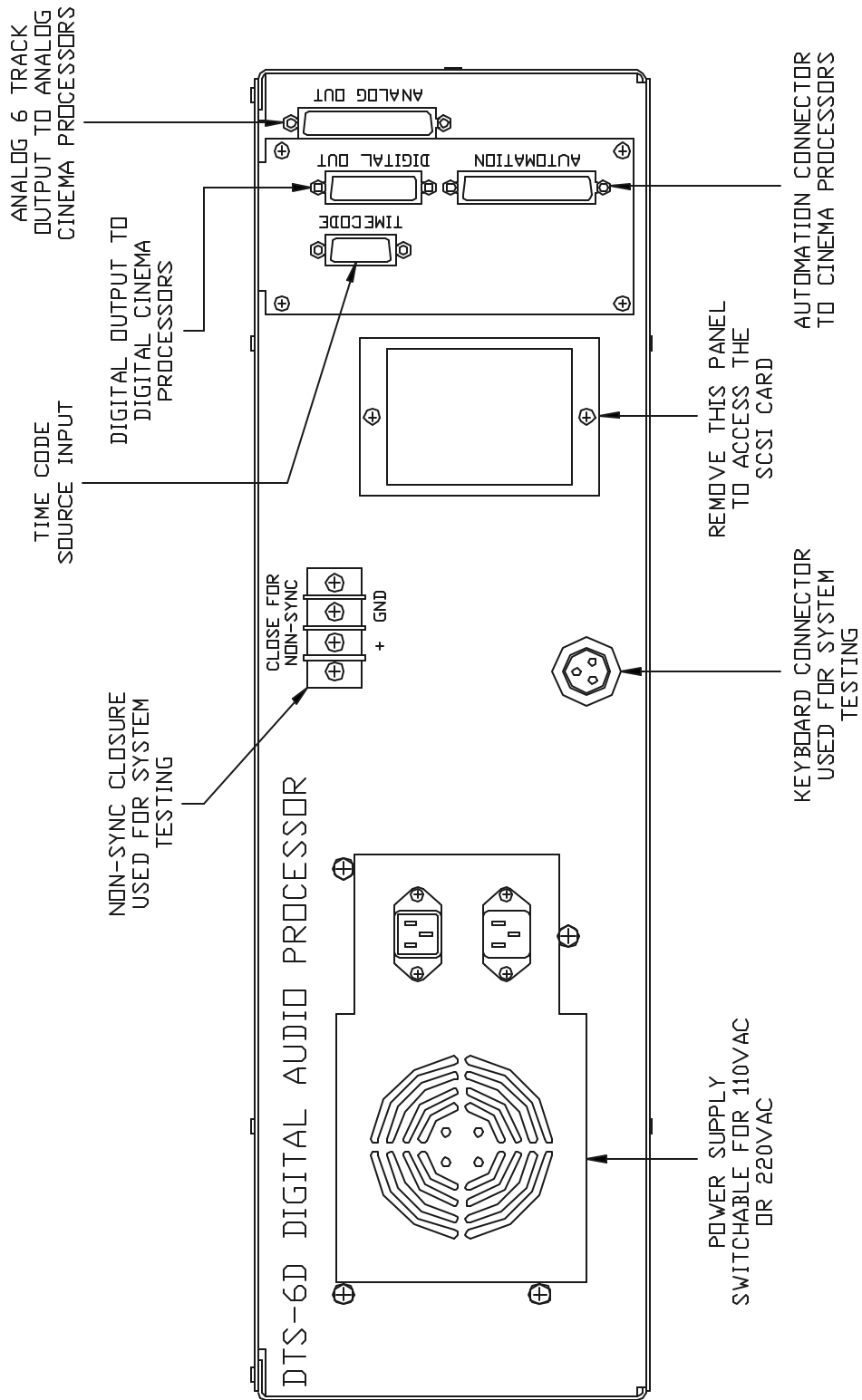
When using the **DIGITAL OUTPUT** connector, please refer to section 8.

Figure 2



NOTE: THESE ARE CADDY-LESS DRIVES. DO NOT ATTEMPT TO INSERT A CADDY INTO ANY OF THESE DRIVES.

Figure 3



IV. CHECKOUT AND ADJUSTMENT PROCEDURE

A multimeter or SPL meter (neither supplied by DTS) and DTS setup discs are required to complete the checkout and adjustment procedure.

- For a **5.1 System**, use the “DTS 5.1 Channel Setup Disc” (date 7/3/97).
- For a Discrete **6.0 Channel System**, use the “DTS Discrete 6 Channel Setup Disc” (date 7/3/97).

4.1 Setting DTS Levels

The theater sound processor’s B-chain must be checked and adjusted before the DTS system is installed. **Any changes to the B-chain will effect the output levels of the DTS system.**

Introduction

The output levels are factory preset at 300mV rms. This level should match the cinema processor’s line level. During the setup procedure, the output levels should be adjusted for correct SPL levels *in the theater* and with the cinema processor.

DTS-SV 5.1 System, Sub bass

The DTS sub bass output level ranges from 20Hz to 80Hz. **You must observe your subwoofer’s specifications to avoid damage to the speaker.** If a subwoofer is driven below its cutoff frequency, its driver(s) may become unloaded. When unloaded, the voice coil can travel outside of the magnet’s gap, thus overheating or causing mechanical damage to the speaker. A high pass filter should be installed on those speakers with high cutoff frequencies. Contact your speaker manufacturer for more information.

Sub bass in the Surrounds?

The DTS sub bass signal is derived by filtering out the surround signals from 80Hz and below. That signal is put on its own “sub bass” output on DTS player. You may verify this while EQ-ing a theater. Insert the DTS Setup disc into the player and play the sub bass pink noise off the disc. 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 hear DTS sub bass pink noise, above 80Hz, in the surrounds. For this reason, turn off the surround amplifier(s) when adjusting the sub bass SPL.

Setting DTS6D-SV Levels (see Figure 4)

Turn power on and load the SETUP DISC to set levels. After a delay of about 40 seconds, the SYSTEM light will blink. Then, the DIGITAL and CD-ROM lights will illuminate. Pink noise (from one channel) should be heard in the theater.

SPL (sound pressure level) meter

Open the screen curtains. Go into the theater to make SPL readings in the rear third and just off-center of the room. **Do not simply point the sound pressure level meter out of the port hole window.** This will not give you accurate SPL readings. See the next page for SPL settings.

Setting DTS level with tones

Use INDEX push button (see Figure 3 for location) switch to increment program on SETUP DISC to Track 7 which is 1kHz reference tone. This tone appears on all channels except sub bass. To set sub bass, use SPL meter and sub bass pink noise.

DTS6D-SV 5.1 System

Use the DTS 5.1 SV CHANNEL SETUP DISC to set DTS levels:	<u>SPL</u>	<u>TRACK</u>
• left channel PINK noise	85dB	1
• left surround PINK noise	82dB	2
• center channel PINK noise	85dB	3
• right surround PINK noise	82dB	4
• right channel PINK noise	85dB	5
• sub bass PINK noise	88dB	6
• 1kHz reference tone, all channels except sub bass		7

DTS6D-SV 6 Channel System

Use the DTS DISCRETE 6 CHANNEL SETUP DISC to set DTS levels:	<u>SPL</u>	<u>TRACK</u>
• channel 1 pink	85dB	1
• channel 2 pink	85dB	2
• channel 3 pink	85dB	3
• channel 4 pink	85dB	4
• channel 5 pink	85dB	5
• channel 6 pink	85dB	6
• 1kHz reference tone, all channels		7

Remove the black cover by unscrewing the two black Philips screws from the front panel. With **ALL** power amplifiers turned on, master fader set to reference position “7” and speakers unmuted, adjust the appropriate trimpots (see Figure 4) on the DTS6D-SV player to achieve the specified SPL noted above. *NOTE: SPL readings should be measured unweighted, or C weighted — slow*

Index Switch

A small black push button switch located below the TIMECODE HEAD OFFSET switches (see Figure 3). It is commonly called the “index switch”. This button can be used to increment to the next track on the test disc.

4.2 Timecode Reader Adjustment. See Figure 5.

- **Thread** the film through the projector *and* the DTS reader head.
- With DTS timecode, calculate the **OFFSET (sync)** setting by using the “DTS 6(D) Delay Setting” chart, page 4-5. If using SMPTE timecode, leave OFFSET switches at “00”
- **Run the film.** The green light on the Timecode Reader Head should light when timecode is read. The light should be bright and steady. If the light blinks, see “Blinking Timecode Reader LED” in Section VII.
- **Listen test.** Go into the theater. Watch and listen to the film. Verify the sound sync to picture is correct. Check the front and back of the theater. If any delay is seen adjust the TIMECODE HEAD OFFSET switches as necessary to obtain proper sync. You should not have to adjust more than +/- 1 OFFSET (switch) position.

Listen through the entire reel to be sure that no distortion or breakup occurs. If running a **change-over** theater, play the film a second time through the other projector.

Figure 4

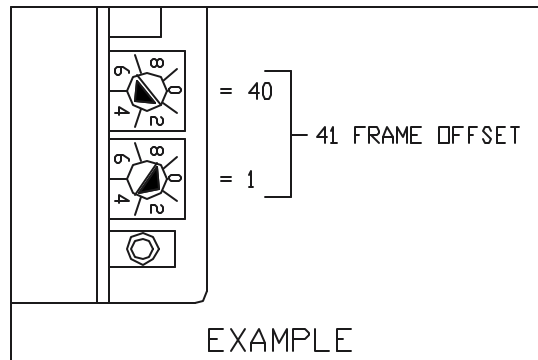
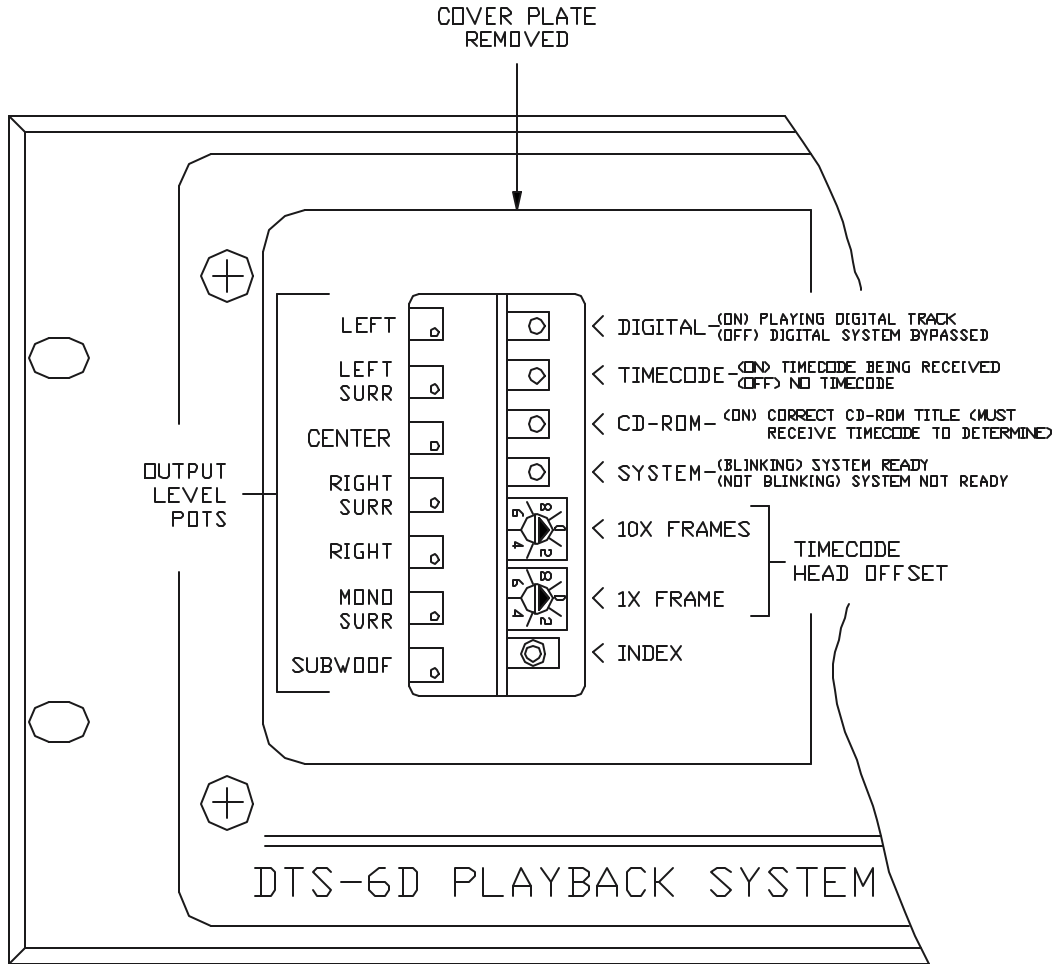
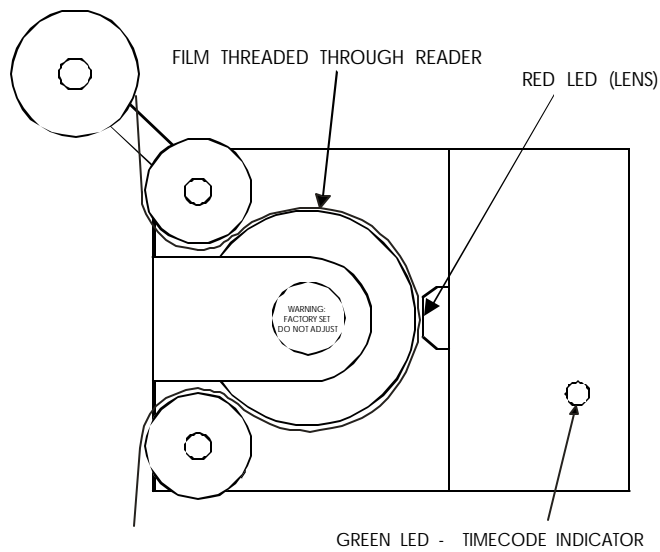
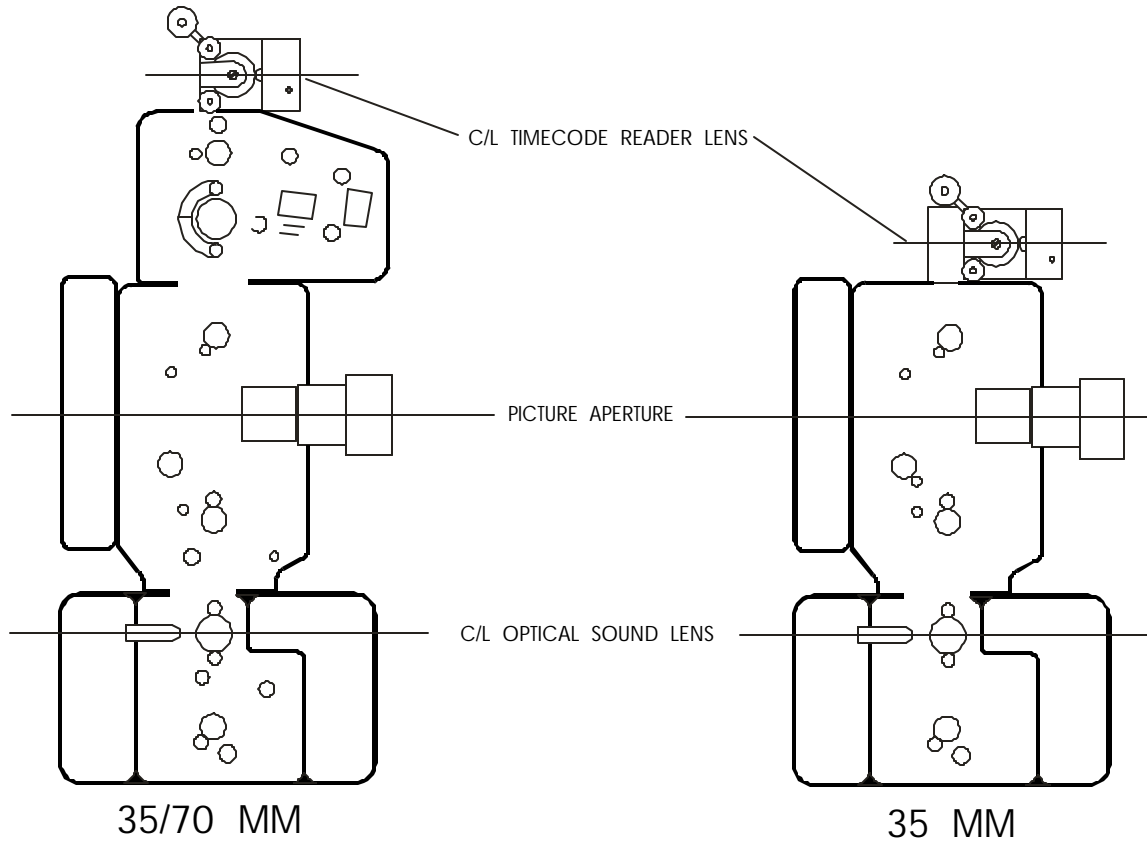



Figure 5 Calculating the OFFSET



TITLE		
DATE	APPROVED	REV.
ISSUE NO.		
 DIGITAL THEATER SYSTEMS 5171 CLARETON DR. ACQUILA HILLS, CA 91301		
COURTESY FILM UNIT		REV. E245

DTS 6(D) Delay Setting

35MM PRINTS

Film Speed (In perfs per second) (Frames/sec x perfs/frame)	Delay Setting	
	DTS Timecode	SMPTE Timecode
60	$\frac{P}{2} + 15$	$\frac{P}{2}$
96	$\frac{P}{32} + -0$	$\frac{P}{32}$
120	$\frac{P}{4} - 5$	$\frac{P}{4}$
150	$\frac{P}{5} - 9$	$\frac{P}{5}$
192	$\frac{P}{64} - 12.5$	$\frac{P}{64}$

70MM PRINTS

Film Speed (In perfs per second) (Frames/sec x perfs/frame)	Delay Setting
60	$\frac{P}{2}$
96	$\frac{P}{32}$
120	$\frac{P}{4}$
150	$\frac{P}{5}$
192	$\frac{P}{64}$
240	$\frac{P}{8}$
300	$\frac{P}{10}$
360	$\frac{P}{12}$
384	$\frac{P}{12.8}$

P = Distance in perfs
from the picture aperture
to the DTS reader lens

NOTES

Thank you for choosing DTS !

V. OPERATION

- **Verify DTS Show Discs**

DTS show discs are issued from the show's distribution company. Make sure the discs match the show (e.g. "Jurassic Park" film with "Jurassic Park" discs). *If the film and discs don't match the digital sound track will not play.*

Shows running over 90 minutes will have **two show discs**: One labeled **6-track A** and another labeled **6-track B**. These discs can be inserted into any two drives.

Only **one show disc** is needed for shows running at/under 90 minutes. This show disc will be labeled "one disc only". You may load the disc into any drive.

Load only ONE show title into the DTS6D-SV. **Never load two or more different show discs into one DTS6D-SV**. If running a *double feature*, change show discs (to second feature) and cycle power on the DTS6D-SV.

- **Caddy-less CD-ROM Drives (see Figure 6)**

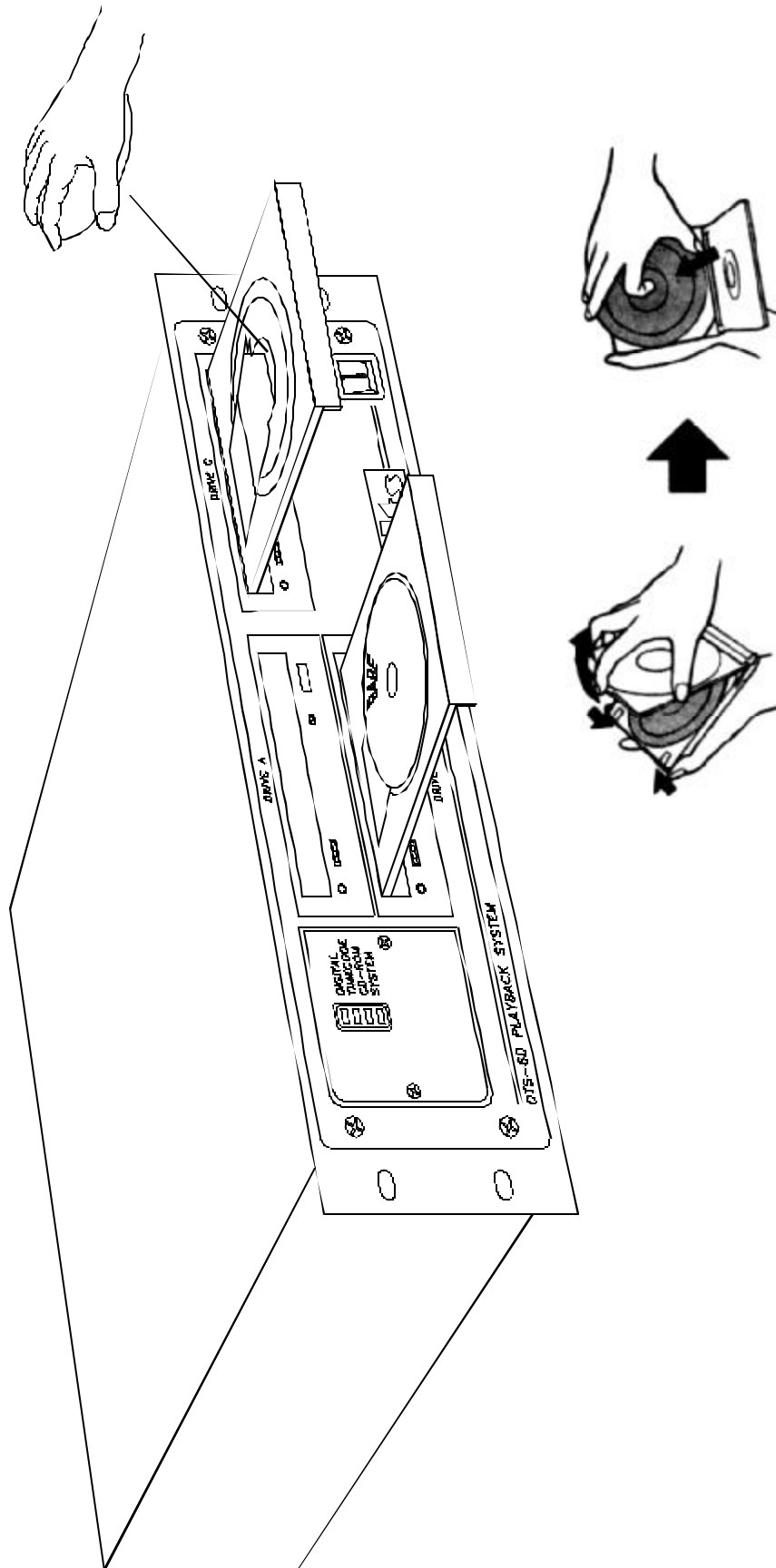
This DTS6D-SV unit uses **caddy-less** CD-ROM drives. "Caddy-less" means the drive will not accept a CD-ROM disc in a caddy. Instead, you must remove the disc from its case and place it on the CD tray.

To load a show disc, open the drive's CD tray. Power on the DTS6D-SV unit. Press the open/close button on the drive to slide out the CD tray. Remove any disc left in the tray. Remove the show disc from the CD caddy (see diagram below) and place it on the tray. **The disc must lay printed side up and flat in the tray.**

To slide the tray back into the drive, press the open/close button or gently push the drawer in. While the DTS6D-SV is playing in digital, do not press the drive's buttons as it will cause an interruption in sound and reset the DTS system.

Use only DTS show discs. Music CDs will not work in the DTS6D-SV unit.

Figure 6, Removing a CD-ROM disc from caddy and loading it in the DTS6D-SV



BEFORE THE SHOW

- **Splice in the DTS trailer film onto the DTS timecoded film**

Add the DTS trailer (logo) film to the head of the DTS encoded show. Splice it in at about six frames after fade-out (should still have timecode) and add it directly to the first frame picture (of the show) with timecode.

If the film does not have timecode, do not add trailers.

- **Threading Timecode Reader:**

Refer to Figure 5. Make the same size loops through the projector as when checking the offset number.

- **House Fader Setting**

House fader should be adjusted for best play in the theater.

STARTING THE SHOW

Less than a minute after power is turned on and the DTS show discs are loaded, the **SYSTEM light will flash**. This indicates the DTS6D-SV player is ready for show start. If the SYSTEM light does not flash, cycle the power on the DTS6D-SV: Switch unit's power off, wait 3 seconds, and switch unit on. If the light does not flash after 40 seconds, turn off the DTS6D-SV unit and contact DTS technical support.

When DTS timecoded film reaches the timecode reader head, the green light on the timecode reader head and the TIMECODE light on the DTS6D-SV player will illuminate. A second later, the **DIGITAL light** on the DTS6D-SV player will illuminate and the DTS digital sound track will start playing. Notice that a light will sporadically flash on the CD-ROM drive whose disc is playing — this is normal.

DTS recommends the **show be pre-run**. Check that the green timecode reader LED is bright and steady, and the system performs properly. Check all reels for good time code, if time permits. Occasional blinking of the TIMECODE LED is acceptable. Go into the theater to listen for good sound quality and a comfortable listening level. Adjust the house fader, if necessary.

- **Change-over**

For those theaters that have two projectors, the DTS6D-SV **player will automatically make a sound change-over when first frame of picture timecode is read on the upcoming projector**. DTS digital sound changes independent of the projector's dower position. Adjustment of the roll down on the upcoming projector may be necessary to keep the change-over "seamless".

- **Film Breaks and Edits**

The DTS6D-SV player will **automatically track any length edit**. A 30 millisecond cross fade makes the edit transparent. Make sure the automation has switched to digital format after show re-start.

- **Maintenance**

The timecode **reader lens should be blown off with compressed air** once a day to remove any dust build up. The CD-ROM drives should be cleaned once a week using a **CD-ROM drive cleaning disc**. DTS recommends "KleenLens" made by AudioSource™. This disc may be obtained from DTS, see "DTS6D System Parts List" in Section VII.

AFTER THE SHOW

When returning a DTS encoded show back to the distributor, **put the show discs back into the yellow reel**. Put the loaded yellow reel in the can with the film. Remember to remove the DTS trailer (logo) film so you may use it with other DTS encoded films.

- **Moving the DTS System**

If you are a theater that moves the DTS System around, there are a few steps that must be taken to ensure proper digital playback. Give the person moving the system *at least* one hour's time to complete the task.

- * The DTS6D-SV **offset** switches may have to be reset. Many people have purchased extra brackets and are marking them with the offset number for that projector. Having a bracket on every projector saves time when installing/moving the reader head. Remember, the unit's offset switches must be correct for the digital sound track to play in sync with the picture. Change-over houses must attach the reader heads at the same place on both projectors so their offset numbers match.
- * The DTS6D-SV **level pots** must be recalibrated for its new location. Use a SPL meter and a DTS SETUP disc to measure the pink noise in the theater. See Section 4.1. *Do not simply point the meter out of the port-hole window*: This will not give you proper readings. SPL readings must be taken in an empty theater with the screen's curtain open and the cinema processor's fader to "7".
- * Whenever anything is changed on the DTS system, be sure to go into the theater at the start of the first screening. Check that the **sync and levels** are correct. Watch mouth movements (lip sync) on screen to verify proper offset.

**** WARNING WARNING ****

Failure to correctly recalibrate the "moved" DTS6D-SV unit will result in improper playback levels and lip sync.

- **How DTS Affects other Cinema Processors**

Dolby CP50, CP100, CP200 Operation

When the DTS switches to digital, the normal signal paths are interrupted. The DTS signals will be inserted just prior to the Dolby EQ cards, in effect taking over the cinema processor (CP200: Program automation optical default format to either “04” A-TYPE or “05” SR — which ever the film requires). When the DTS6D-SV switches out of digital, the cinema processor is released to function as normal and default to the format previously selected.

Unless modified, these cinema processors do not have a subwoofer input. DTS normally inserts its sub bass signal after the fader control. As a result, the subwoofer level will not be effected by the fader or mute.

CP200: D567 (RevB or lower) interface board, set W1, W2, W3 to DRY for standard operation.

Dolby CP45, CP55, CP65, CP500, UltraStereo JS Series, and SMART Operation

The DTS6D-SV will automatically pulse the audio processor to the digital format when it starts to play a digital sound track. Whenever the DTS6D-SV drops out of digital, a pulse will be sent to switch the audio processor back to the optical format. On units equipped with a DTS logic board, the pulse to switch back to optical will be blocked if the audio processor is not in the digital format. So, when the automation switches to non-sync, the DTS6D-SV will not switch back to optical. The DTS logic boards also have a jumper which is used to force either A-TYPE or SR as the fall-back format (installation of the jumper will override disc programming).

The DTS6D-SV will only pulse the audio processor into the digital format when it first switches to digital. After the show has started (or the show is re-started after a film break) make sure the automation doesn't switch the theater processor back out of the digital format. Set the automation/cues so no audio format change takes place after the DTS has switched into digital. Switching to nonsync at the end of the show is OK.

CP500: Must have the Cat. 685 (analog input card) installed. DTS is normally accessed through Format 11 which is programmed in on stock units from Dolby. The DTS D715 logic jumpers must be programmed, see “Wiring Diagrams” section.

NOTES

Thank you for choosing DTS !

VI. TROUBLESHOOTING

INSIDE THE DTS6D-SV, see Figure 7

• D422, Rev. H TIMECODE BOARD

See drawing D422. This board has the timecode head offset switches, the four system status LED lights, a 7-position programming header, a 9-pin timecode cable output connector, the U14 firmware IC, the U12 ROM-DOS IC, an indexing switch, and a circuit breaker (self-resetting fuse).

- * The **OFFSET switches** are adjusted according to the timecode reader location. This setting is different depending on type of projector or location of the timecode reader. Determining the offset setting is accomplished by using the “DTS 6 (D) Delay Setting” chart, page 15.
- * The status **LEDs**: SYSTEM light flashes when the DTS6D-SV is ready to play, TIMECODE lights if good timecode is being read, DIGITAL lights when the DTS6D-SV is playing in digital, and CD-ROM lights if the drives are recognized and the discs are being read.
- * The **7-position header (W1)** has jumper settings to program different timecode functions. See “Programming the DTS6D-SV Player”, Section 3.2.
- * **U14** programmed IC chip contains the timecode (TCR) reader firmware. This chip is located in the center of the board.
- * **U12** “ROM-DOS” chip is not used in players with Adaptek ROM boards.
- * The **index switch**, located below the offset switches, can be used to advance though the individual tracks on DTS SETUP discs. It can also be used to force the DTS6D-SV (when playing in digital) to optical for as long as the button is held down.
- * A **circuit breaker** protects the +5v DC going to the timecode reader (through the back panel 9-pin connector) against short circuits. The breaker is self re-setting so replacement is unnecessary.
- * The **9-pin connector** (on the DTS6D-SV rear panel) is the used to connect the timecode cable to the timecode reader on the projector.

- **D536, Rev. C PLAYBACK BOARD**

See drawing D536 (appears in the next few pages). Located on this board are seven adjustment pots that control the outputs for all channels: Left (1), left surround (2), center (3), right surround (4), right (5), mono surround (6), and sub bass (7). The ANALOG OUT, DIGITAL OUT, and AUTOMATION (logic) outputs are also on this board.

- **POWER SUPPLY**

Supplies power to the DTS6D-SV unit. This supply is switchable between 110 VAC and 220 VAC. This switch is located on the rear panel and on the supply module. **Caution: Before applying power, verify that the AC voltage selected (on the supply) matches the mains AC supply at the installation.**

The cooling fan in the power supply should be rotating when power is applied.

To prevent dirt from being pulled into the CD-ROM drives, do not block the ventilation holes the side of the DTS6D-SV player.

- **SCSI HOST ADAPTER BOARD**

Interfaces the CD-ROM drives to the system.

- **ROM BOARD** (players serial number 10900+)

Contains the AQRM_Rx(“x” refers to version) programmed IC chip. **When using “AQRM” IC, do not use D422-U12 “ROM-DOS”.**

- **MOTHERBOARD**

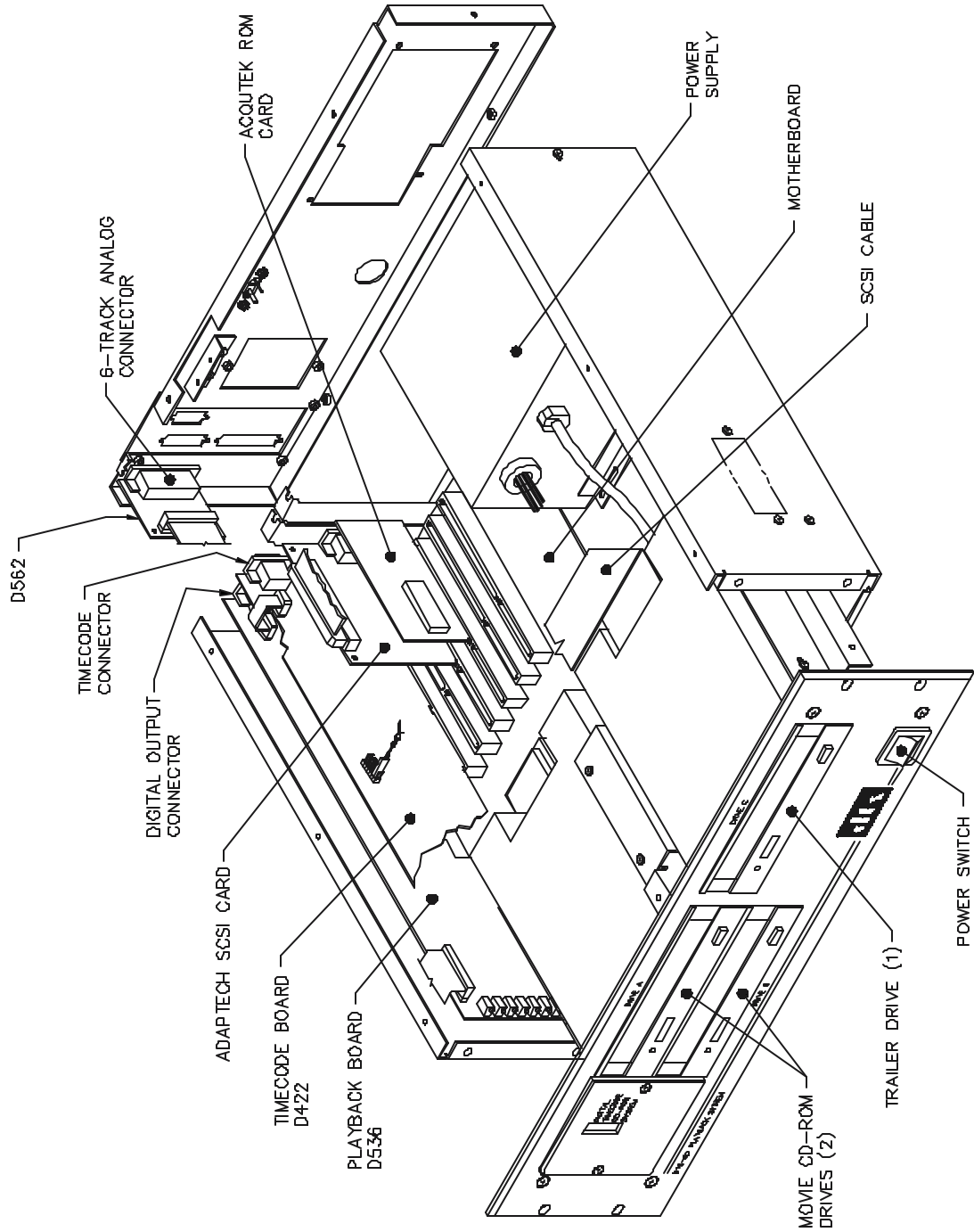
Basic board support, input/output system.

- **CD-ROM DRIVES**

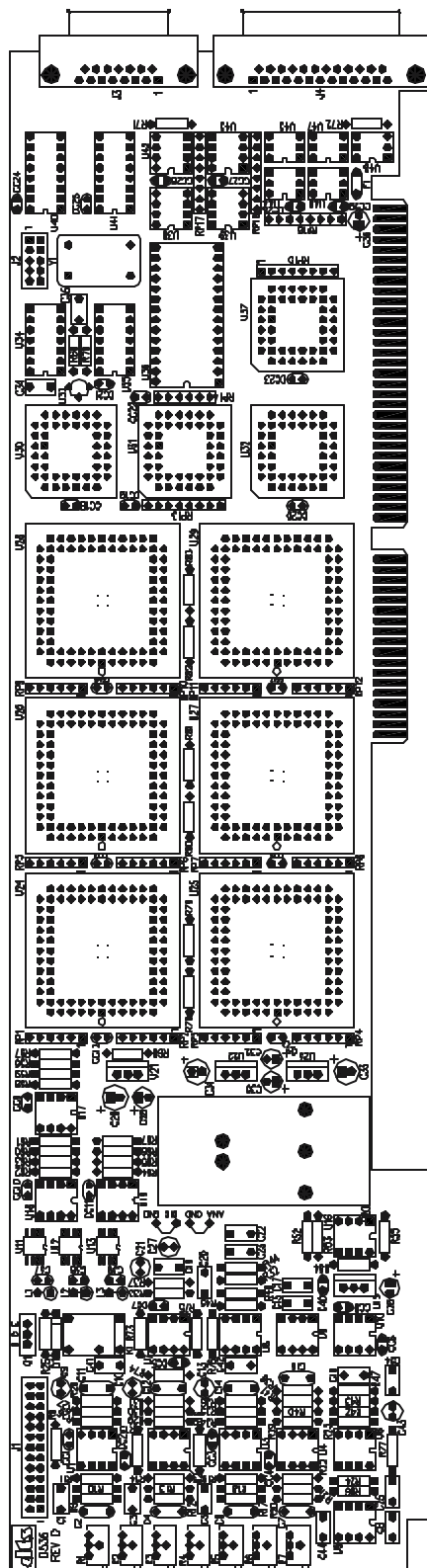
There are three caddy-less CD-ROM drives in the DTS6D-SV. All three are the same with exception of the way program jumpers are installed and if terminating resistors are used. The last drive (“C” drive) in the grouping is terminated.

The lights on the three CD-ROM drives will flash briefly when each drive is recognized during the test cycle (after power-up). The lights will flash sporadically when DTS discs are being read.

Figure 7 Inside the DTS6D



DTS-6D



Playback card layout, D536 Rev. C

EXTERNAL CABLE ASSEMBLIES

- **6-Track Analog Audio Output Cable for DTS6D-SV - 2503-0014-00**

This 25-pin cable connects the DTS6D-SV audio outputs to the outside world, usually to a cinema processor (through a DTS audio board). Since cinema processors are not normally used for special venue, this cable is not normally used or distributed. See section 8 for pin assignments.

- **6-Track Digital Audio Output Cable for DTS6D-SV - E216**

This cable is used to connect to certain digital processors. D536-U40 and -U41 must be changed to DTS part number 1607-0020-00. See page 48 for wiring details. This cable is necessary only when using DTS with a DCP, such as CinemAcoustics CA-CP600. It is NOT compatible with a Dolby CP500 or Sony DPF-3000.

- **Automation (logic) Cable for DTS6D-SV - 2503-0014-00 (same part as analog output cable)**

This 25-pin cable connects the DTS6D-SV logic circuitry to a cinema processor (though a DTS logic card). Since cinema processors are not normally used for special venue, this cable is not normally distributed or used. See page 42 for pin assignments.

- **Timecode Cable Assembly - D435**

This 9-pin cable connects the DTS Timecode Reader to the DTS6D-SV Player. On single projector (platter) systems, this cable has a single connector at both ends. For dual (change-over) projector systems, this cable has a single connector at one end and two connectors at the other end. See D47 7 for assembly diagram. See page 42 for pin assignments.

EXTERNAL BREAK-OUT BOARDS

- **Logic Break-out Boards**

These boards are used to pulse to the cinema processor to the correct playback format. The analog default is automatic or can be hard-wired forced to SR or A-type.

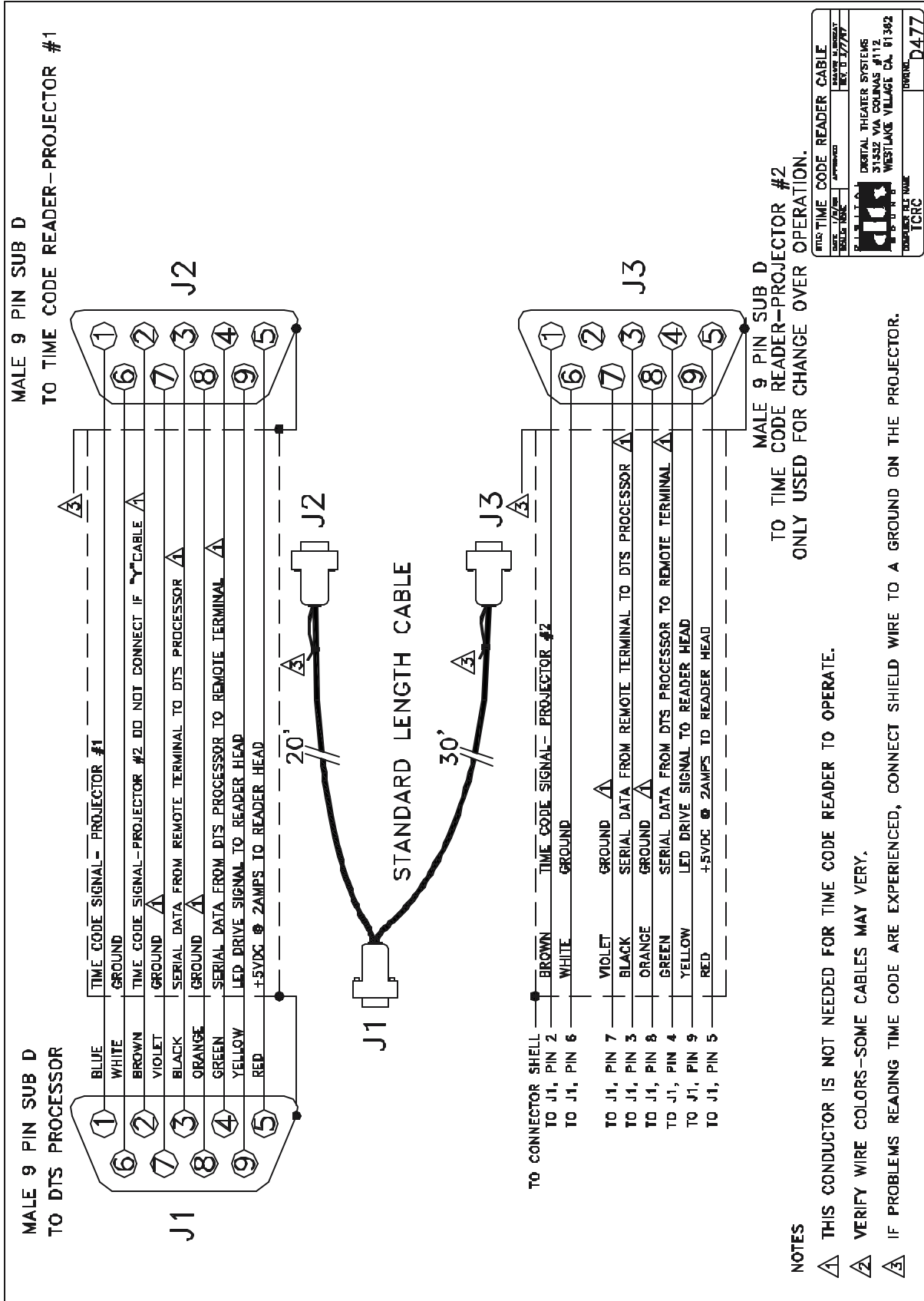
- * D716 is used with the Dolby CP45
- * D565 is used with the Dolby CP55
- * D564 is used with the Dolby CP65
- * D567 and one D711 cable are used with the Dolby CP200, CP100, CP50
- * D715 is used with the Dolby CP500 and CP650. D715 contains programming jumpers that must be set.
- * D571 is used with UltraStereo

- **Audio Break-out Boards**

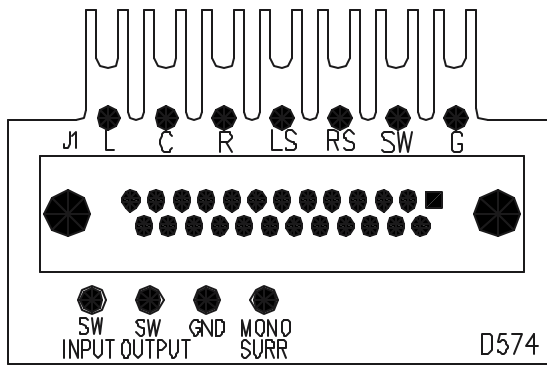
These boards are used to connect DTS 6-track outputs to an analog cinema processor.

- * D574 is used with the Dolby CP45 and CP65
- * D572 is used with the Dolby CP55
- * D572 contains a programming jumper, set for MONO SURR or STEREO surround
- * Two D712 cables are used with the DTS D567 board (mentioned above) for the Dolby CP200, CP100, CP50 D567 RevB or lower, contains three programming jumpers, set all -3- for either DRY (standard configuration) position or MONO SURR (SR-D™ application) position.
- * D575 is used with UltraStereo.
- * The CP500 uses cable adapter D561.
- * D725 (dual input) is used with CP65 and audio dubber.
- * The CP650 does not use a breakout board or adapter.

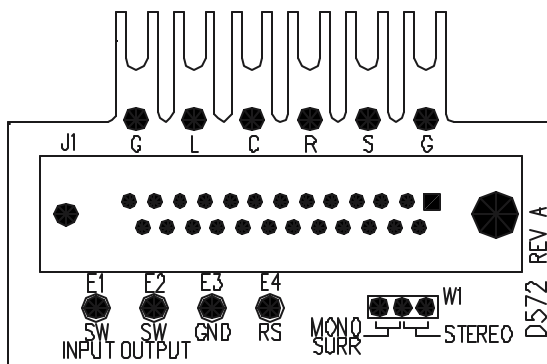
D477 Timecode reader cable diagram



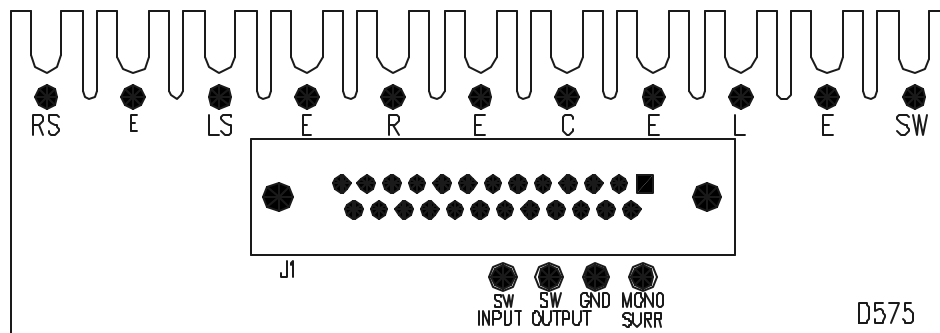
Logic breakout boards



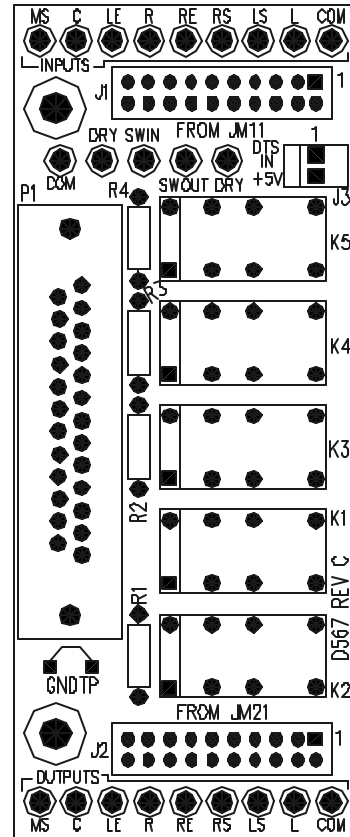
CP45, CP65 AUDIO

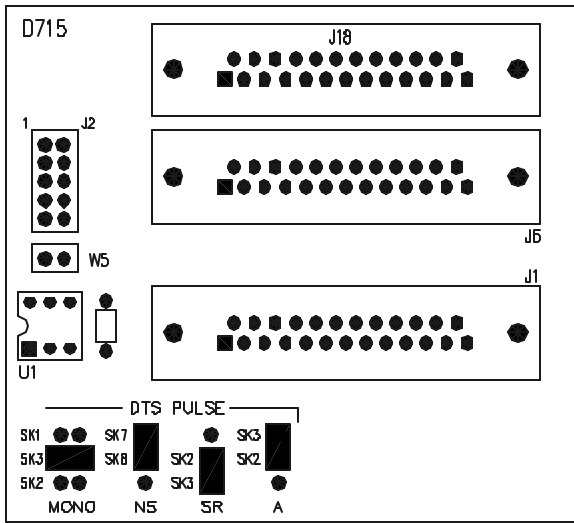


CP55, GENERIC AUDIO

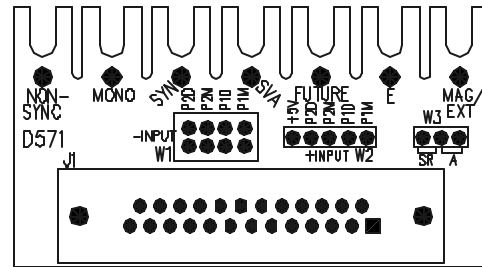


ULTRASTEREO AUDIO

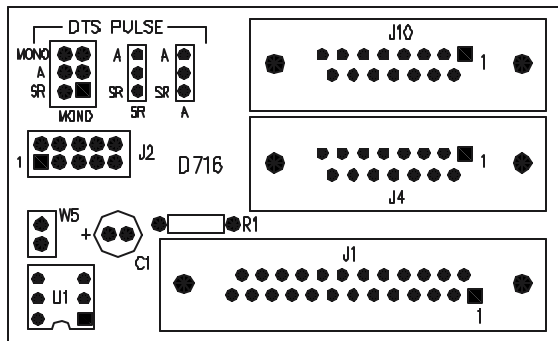




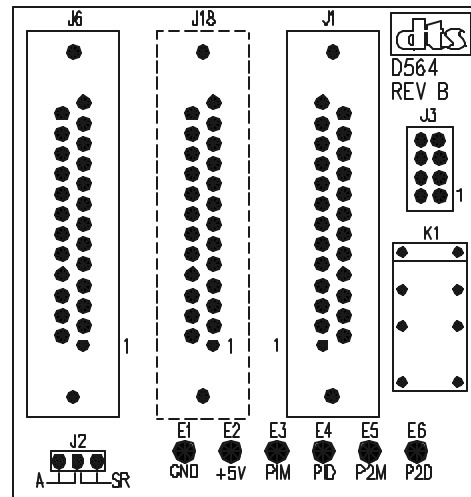
CP500 LOGIC



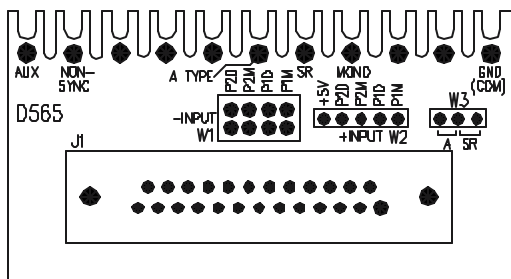
ULTRASTEREO LOGIC



CP45 LOGIC



CP65 LOGIC



CP55 GENERIC LOGIC

TROUBLESHOOTING TIPS

It's always a good idea to stand in the theater and listen to the first few minutes of the show. Listen to the sound level and general quality of the sound. The sound track should be in sync with the picture (wait for a dialogue scene) and played at a comfortable level. Even though not every scene will have surround material, do your best to listen for the surround speakers. Most opening musical sequences have surround information. **Be sure the show discs match the film you are playing.** Feel free to contact DTS for help, if needed.

- **I have a DTS print but I don't have discs**

Contact the show's distributor and ask for disc(s). Remember, a film that runs less than 90 minutes will have only one show disc - it should also be labeled "one disc only". Shows running over 90 minutes and up to 3 hours and 20 minutes, will have three discs. Longer shows will have additional discs and special show instructions.

- **Film not in sync or doesn't sound right**

Sync problem: Use the "DTS 6 (D) Delay Setting" chart, to determine OFFSET value. Be sure the player's OFFSET switches are set to this number. *Threading pattern during OFFSET test must match threading for the show.*

Sound problem: If there is an optical format on the print, turn off the DTS6D-SV unit and check that the show is playing in optical format. Let the film finish playing in optical. Verify the TCR (D422-U14) firmware is the most current.

- **Volume too loud or soft**

If the overall volume is too loud or soft, adjust the master fader. Do not adjust the DTS6D-SV trimmer pots behind the black panel.

- **DTS6D-SV won't switch into digital sound**

- Power off and open the player. Be sure all **cables and boards** are securely connected.
- **Verify show discs** are in the DTS6D-SV unit. Push both CD-ROM drive's EJECT button and if nothing comes out, get the show discs and insert them into the drives.
- Verify the **show discs match the film** title. Push the EJECT button, and look at the show discs. If the disc title doesn't match the film, the DTS6D-SV will not play. Find the correct show discs, insert them in the CD-ROM drives, and cycle power.
- If the **show was recently changed**, first power off the DTS6D-SV unit. Wait three seconds, then turn the player back on. The DTS6D-SV should reboot in about 30 seconds and play in digital if the correct show discs are in the CD-ROM drive(s).
- If the player does not switch to digital, verify the green LED on the **reader head** (on projector) is glowing brightly and steadily while the show is running. If the LED is dark, then verify the film is threaded through the DTS reader and that the film has a timecode strip (located between picture and analog sound track). If *no* timecode (dots & dashes) strip is seen, call the film's distributor and request a DTS print.

- **Timecode LED is not on, or is on but blinks**

If the **TIMECODE** light blinks or is almost never on, see "Blinking Timecode Reader LED" in Section VII. Is timecode cable properly wired? Observe polarity.

- **How Do I replace CD-ROM drive?**

Contact DTS for instructions. We can FAX documentation to you.

- **Switches out of DTS digital**

- The sound should automatically default to optical when the DTS6D-SV does not see timecode for four seconds. Verify the green LED on the DTS reader head is glowing brightly and steadily while the film is running. If the light on the CD-ROM drive(s) is on solid when film is playing, it means they cannot read disc; try swapping discs. Also, see “**Blinking Timecode Reader LED**” in Section VII.
- Use **compressed air** to blow off the reader head’s lens, but *never adjust the lens*.
- Attach the **grounding jumper** on the timecode cable to the projector. Easiest place to do that is attach to the screw that secures the timecode cable to the reader head. The reader’s housing must be electrically connected to the projector housing. Verify with an ohm meter. This is needed for projectors that are not properly grounded.
- If the **drop-out occurs during the same place(s)** in the show, replace the reel(s).
- In a **platter house** - turn off the DTS6D-SV unit. Take the unit out of the rack and open the lid. Look inside at the timecode card (one with LEDs). Verify the jumper is positioned horizontally across the top row of W1. The jumper should **not** be installed vertically (vertical placement is for two projectors only).
- **Do not put any sound format cues on film with timecode.** Do not use leader with timecode elsewhere as it will cause a false start on the player.

- **Discs eject themselves from the player**

- Check that the discs are DTS discs. Also, check that the discs match your system. If you have a **discrete 6.0 channel system**, only discrete 6 channel discs will work.
- Try a DTS Setup Disc, if that disc ejects as well, try cleaning the drive and if that doesn’t help, replace the drive. **CD-ROM drive cleaning discs** are available from DTS. When replacing a CD-ROM drive, see Section VII.

- **Player seems dead.**

Is the power supply’s **fan** turning?

- Be sure the **power cable** is securely installed at both ends.
 - Be sure the **AC switch** on the back of the player is set to match your main AC rating.
- Take off player’s top cover and inspect the inside. Be sure:

- All **cables** are plugged in
- All the **boards** are pushed down on their connectors.

Use a **setup disc** to test system.

- You must use one of two discs mentioned on pages 11 – 12.
- The DTS system will not fully boot up until a DTS disc is inserted.

- **What do I do with the discs when the show has finished its run?**

The discs must stay with the film.

DTS TECHNICAL SUPPORT

TELEPHONE: (800) 959-4109 *or* (818) 706-3525 **FAX:** (818) 879-2746

DTS engineers are available to assist you. If you have an emergency after business hours, please leave a message with the answering service and your call will be returned as soon as possible.

INTERNET users may send email to the following address: cinematech@dtsonline.com

DTS Web Site is located at address: <http://www.dtsonline.com>

VII. INSTALLATION DIAGRAMS

The diagrams on the following pages cover most installations. Contact DTS if the sound system you are installing does not appear. DTS has wiring diagrams to most cinema processors.

Brackets for the DTS Timecode Reader Head

- **D614 - Standard Bracket** — cannot be used with breakaway plates.
- **D625 – 35mm/70mm Standard Bracket** — used with breakaway plates.

For projectors: Century, Simplex, and Cinemeccanica with Kelmar bracket (below). Intended to fit between the projector and reel arm. DTS has produced this 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:

<u>Application</u>	<u>QTY</u>	<u>Description</u>
35mm	2	10 x 24 x 1/2" long screws
35mm	2	3/4 x 16 x 1" long hex bolt nuts
35mm/70mm	2	3/8" lock washers
70mm	2	3/8 x 1 1/2" long cap screws
70mm	2	3/8" flat washers
70mm	2	3/8" hex nuts

- **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:

<u>QTY</u>	<u>Description</u>
2	10 x 24 x 1/2" long screws
2	3.4 x 16 x 1" long hex bolt nuts
2	3/8" lock washers

- **D616 - AA2 bracket**

For Norelco AA projectors. Comes with the following hardware:

<u>QTY</u>	<u>Description</u>
2	#10 lock washers
3	5/16" x 18 x 5" long screws
3	3/8" split ring lock
2	10 x 24 x 1/2" long screw

- **D617 - DP75 Bracket (35mm only)**
- **D628 - DP75 Bracket (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).

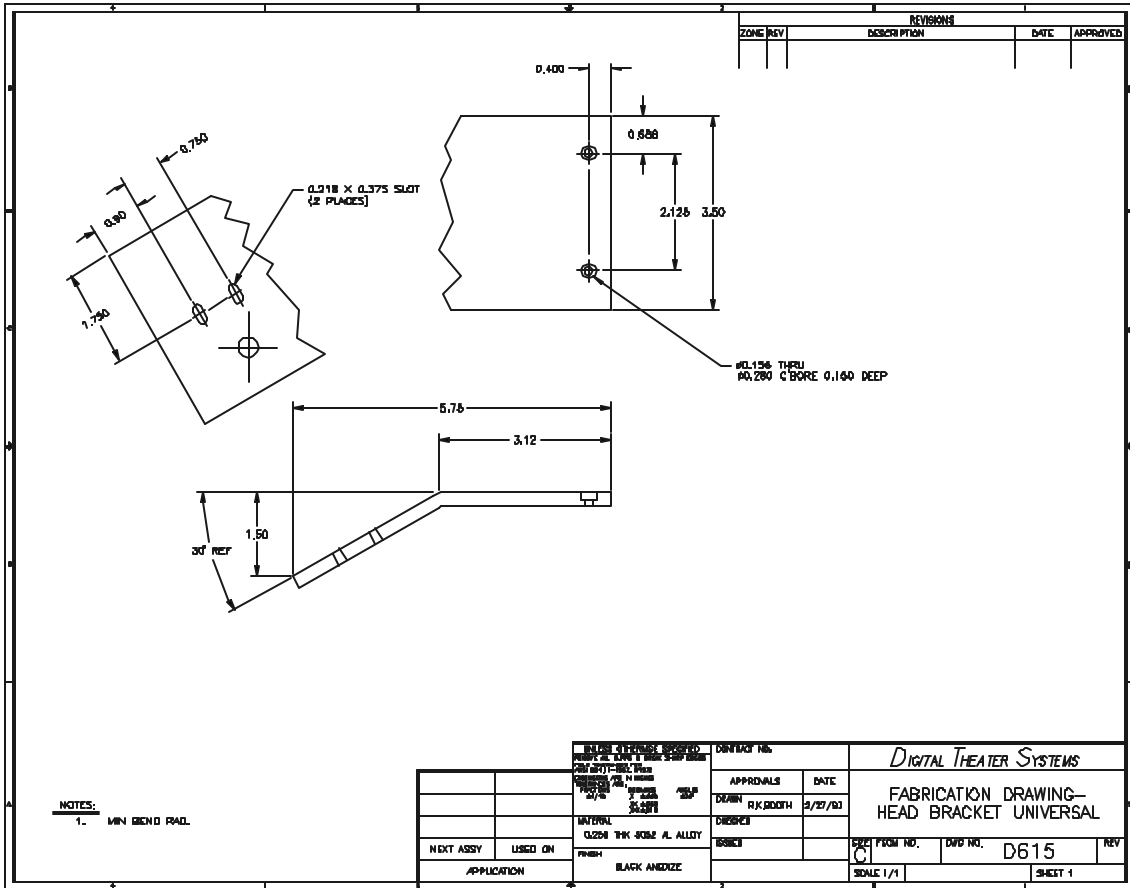
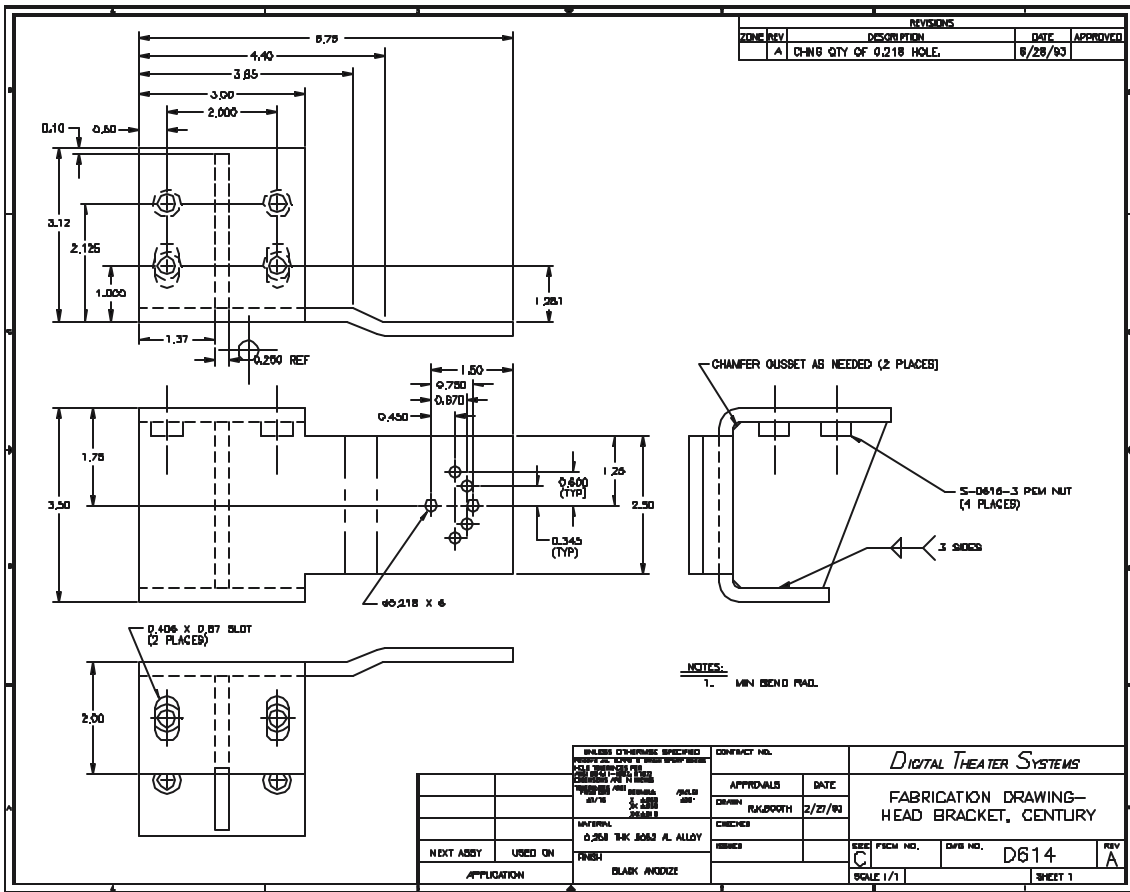
- **D622 - Front Mount Bracket (35mm only)**

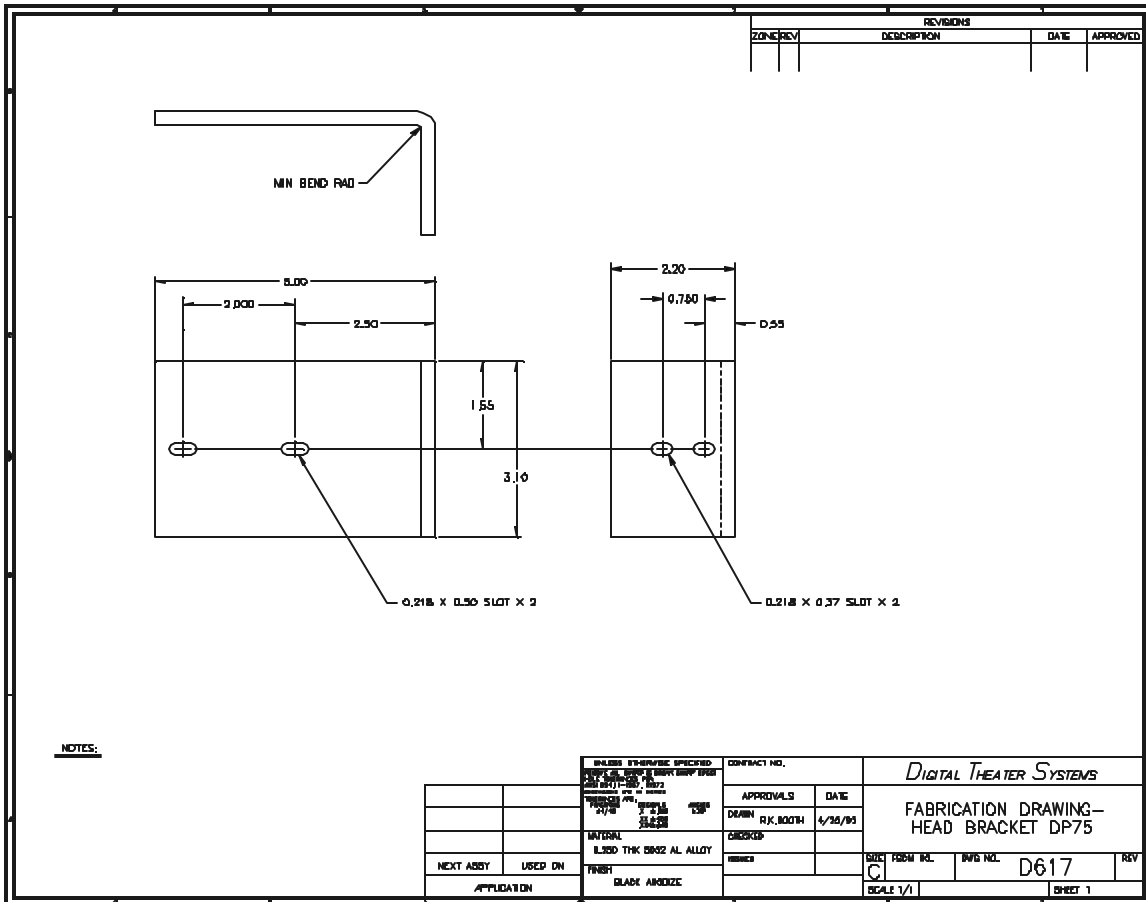
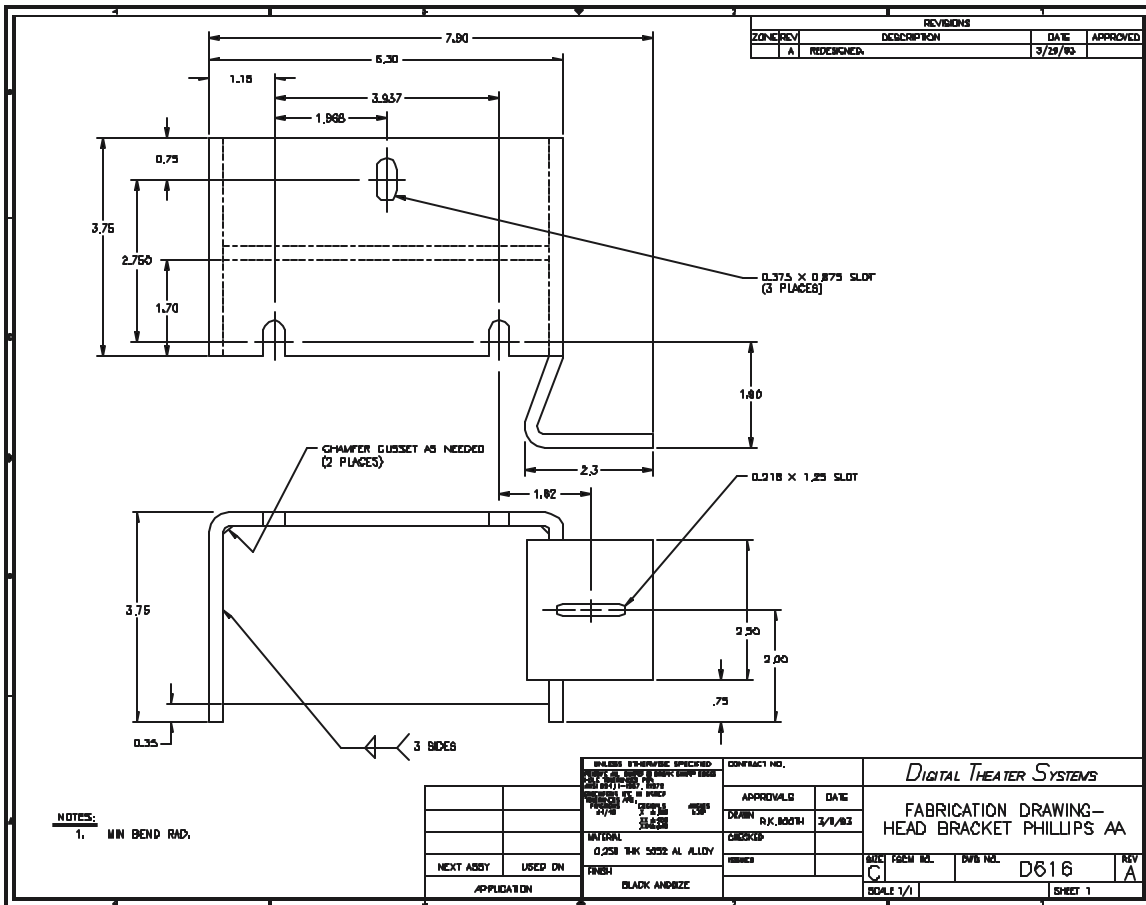
Used when installing multiple digital sound heads or when there is no headroom to lift the projector arm.

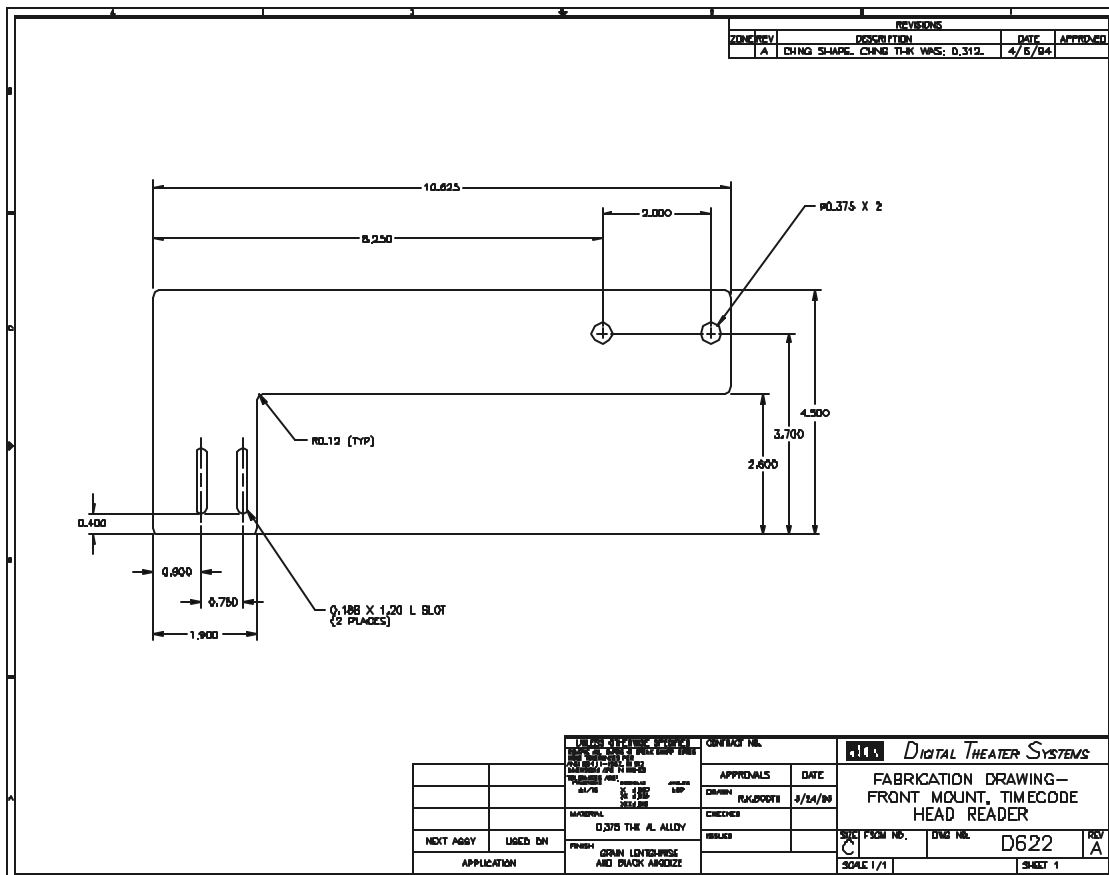
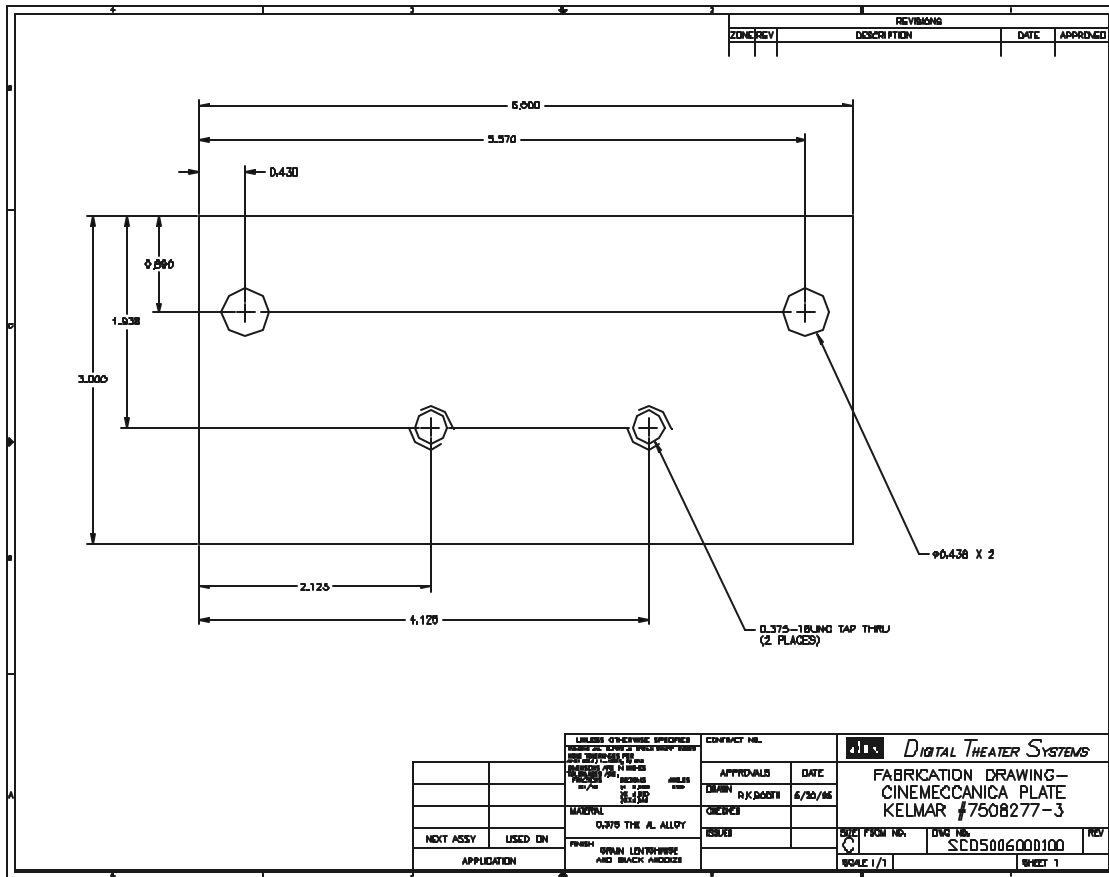
- **5006-0001-00 Cinemeccanica Bracket / adapter plate (35mm only)**

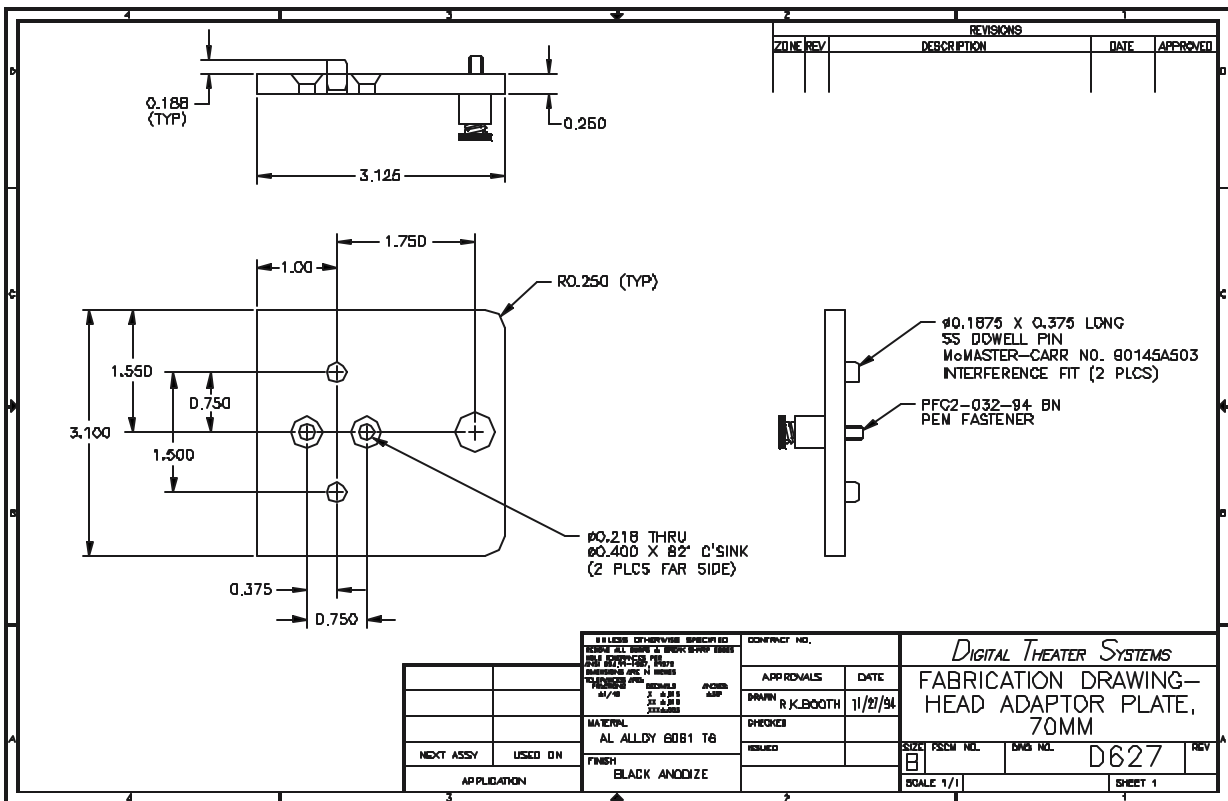
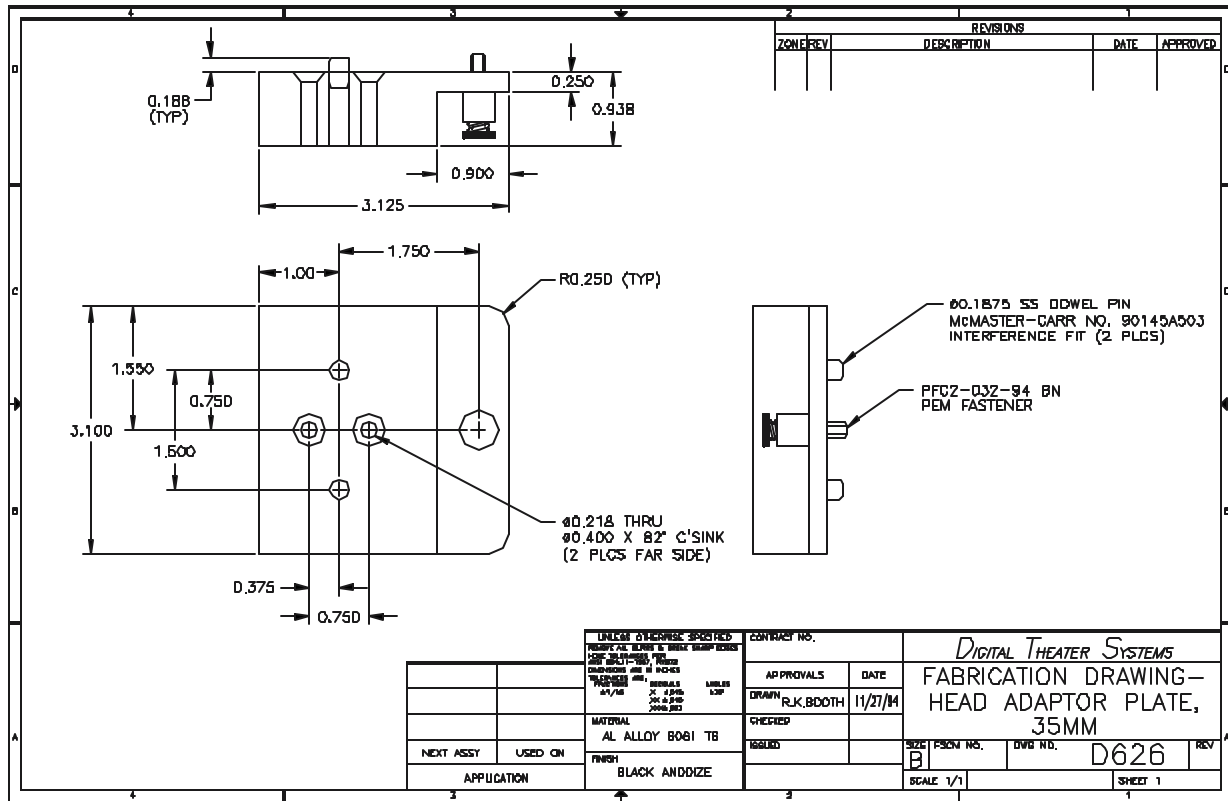
For Cinemeccanica projectors. Must be used with the D164 standard bracket for mounting the DTS timecode reader head. If the reel arm needs to be remounted, two plates are required. Cinemeccanica also has their own brackets available, contact them directly.

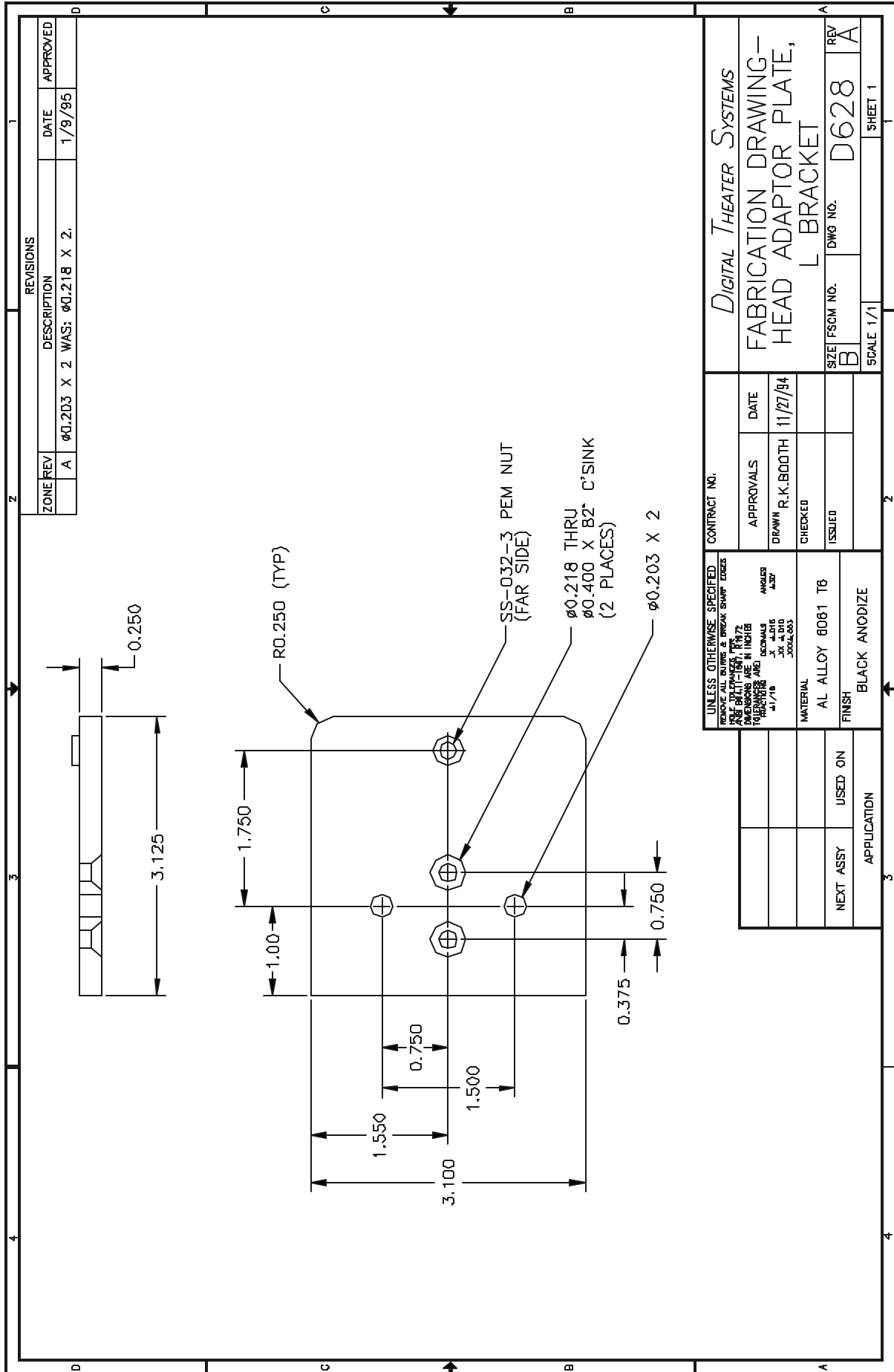
- **D626 - Spacer Breakaway Plate** – Used to mount 35mm DTS reader to 35/70 brackets.
- **D627 - Spacer Breakaway Plate** – Used to mount 70mm DTS reader to 35/70 brackets.











UNLESS OTHERWISE SPECIFIED REMOVE ALL DRILLS & BREAK SHARP EDGES AND FILE ALL CORNERS TO R0.125 DIMENSIONS ARE IN INCHES TOLERANCES ARE DECIMALS +1/16 -1/16 X .015 X .010 X .005 X .0025		CONTRACT NO.	
MATERIAL AL ALLOY 6061 T6		APPROVALS	DATE
FINISH BLACK ANODIZE		DRAWN R.K. BOOTH	11/27/94
NEXT ASSY	USED ON	CHECKED	
APPLICATION		ISSUED	
		SIZE	FSCM NO.
		B	D628
		SCALE	1/1
		REV	A
		SHEET 1	

NOTES

Thank you for choosing DTS !

WIRING THE DTS6D-SV TO THE OUTSIDE WORLD

If interfacing to a cinema processor and the wiring of DTS to that processor does not appear, contact DTS. We have wiring diagrams to almost all cinema processors. Please contact DTS if schematics are needed for DTS accessory boards that are not included in this manual.

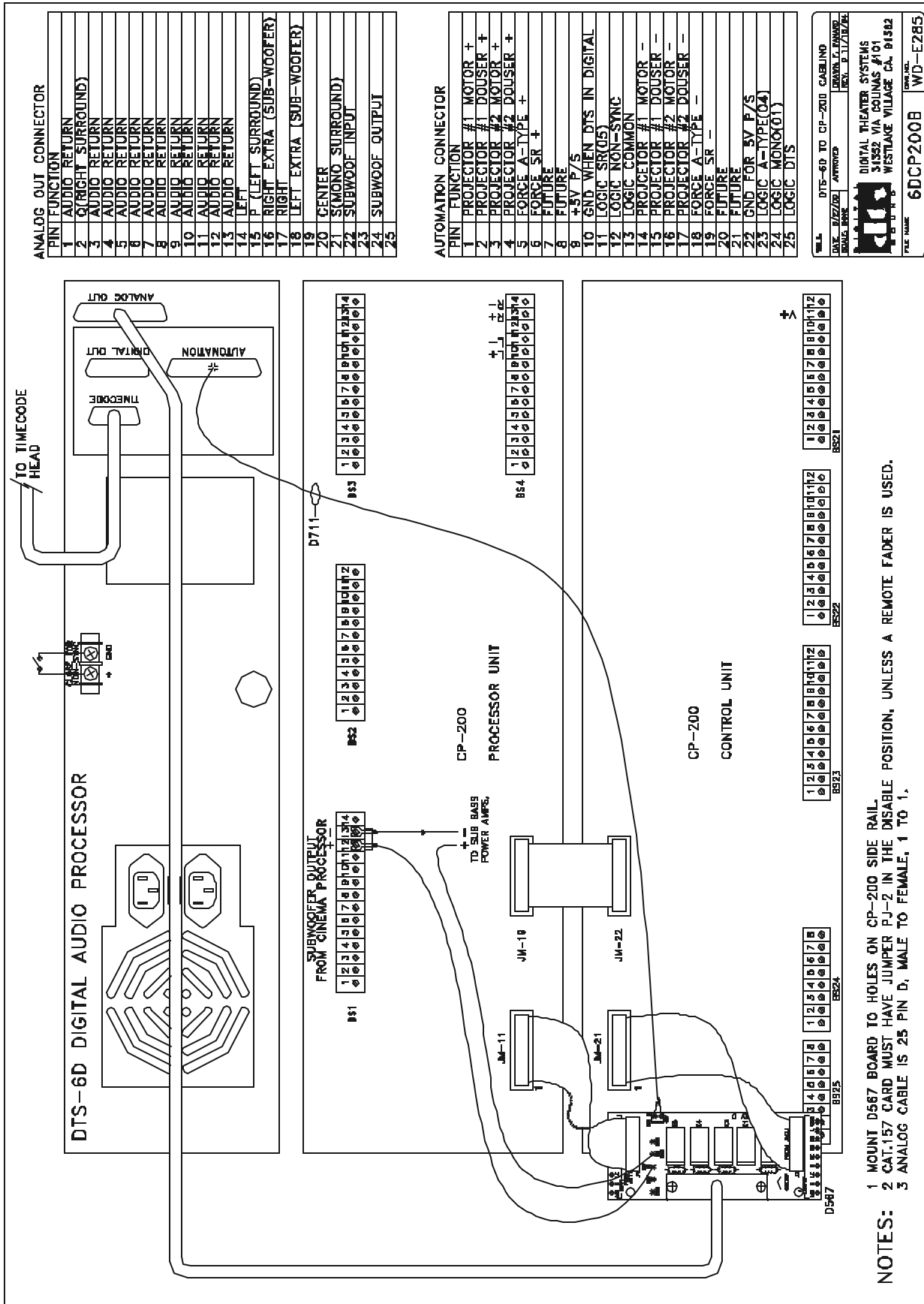
DTS-6D-SV Rear Panel Connector Pin-Outs

ANALOG OUT Connector (25-pin D male on player)				AUTOMATION Connector (25-pin D female on player)	
<i>Channel Output Assignments</i>					
PIN	5.1 ch.	6.0 ch.*	Alt. 6 ch	PIN	FUNCTION
1	Audio Return			1	Projector #1 motor + (future)
2	Q (right surround)	5	RS	2	Projector #1 douser + (future)
3	Audio Return			3	Projector #2 motor + (future)
4	Audio Return			4	Projector #2 douser + (future)
5	Audio Return			5	Force A-type (04)+
6	Audio Return			6	Force SR (05)+
7	Audio Return			7	Not used
8	Audio Return			8	Not used
9	Audio Return			9	+5v DC (from DTS player)
10	Audio Return			10	Ground when DTS in DIGITAL
11	Audio Return			11	Logic SR (05)
12	Audio Return			12	Logic NON-SYNC
13	Audio Return			13	Logic Common
14	Left Channel	1	LS	14	Projector #1 motor - (future)
15	P (left surround)	2	L	15	Projector #1 motor - (future)
16	Right extra			16	Projector #2 motor - (future)
17	Right Channel	4	R	17	Projector #2 douser - (future)
18	Not used			18	Force A-type (04) -
19	Not used			19	Force SR (05) -
20	Center Channel	3	C	20	Not used
21	S (mono surround)			21	Not used
22	Sub bass input			22	5v DC ground (from DTS player)
23	Not used			23	Logic A-type (04)
24	DTS Sub bass output	6	HC	24	Logic MONO (01)
25	Not used			25	Logic DTS

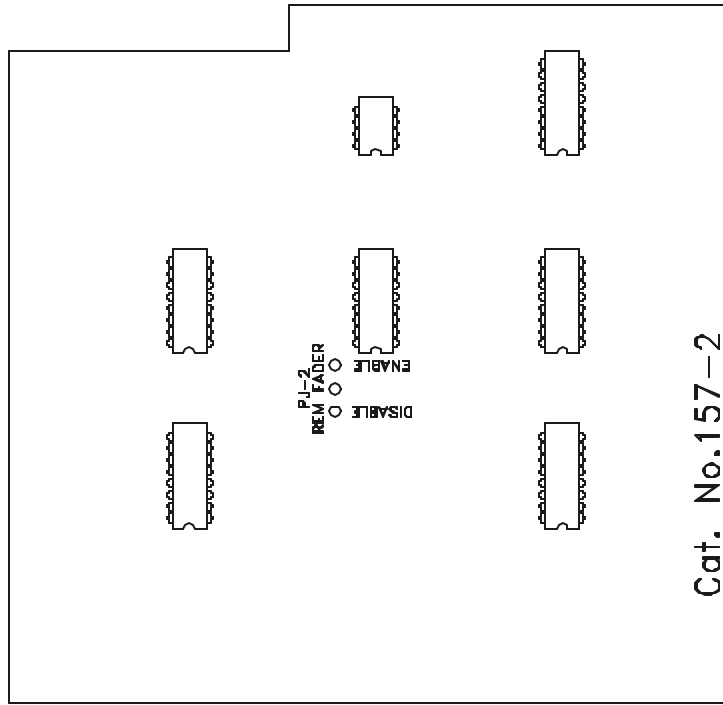
* NOTE: These are the most common assignments and are subject to change by the end user.

TIMECODE (Reader) Connector (9-pin D female on player and reader)

PIN	FUNCTION
1	Timecode signal, from projector 1 (pin 1 @ proj. 1 TCRH)
2	Timecode signal, from projector 2 (pin 1 @ proj. 2 TCRH)
3	Serial data from remote terminal to DTS player
4	Serial data from DTS player to remoter terminal
5	+5v DC @ 2amps from DTS player to TCRH (timecode reader head)
6	Ground
7	Ground
8	Ground
9	LED drive signal from DTS player to TCRH

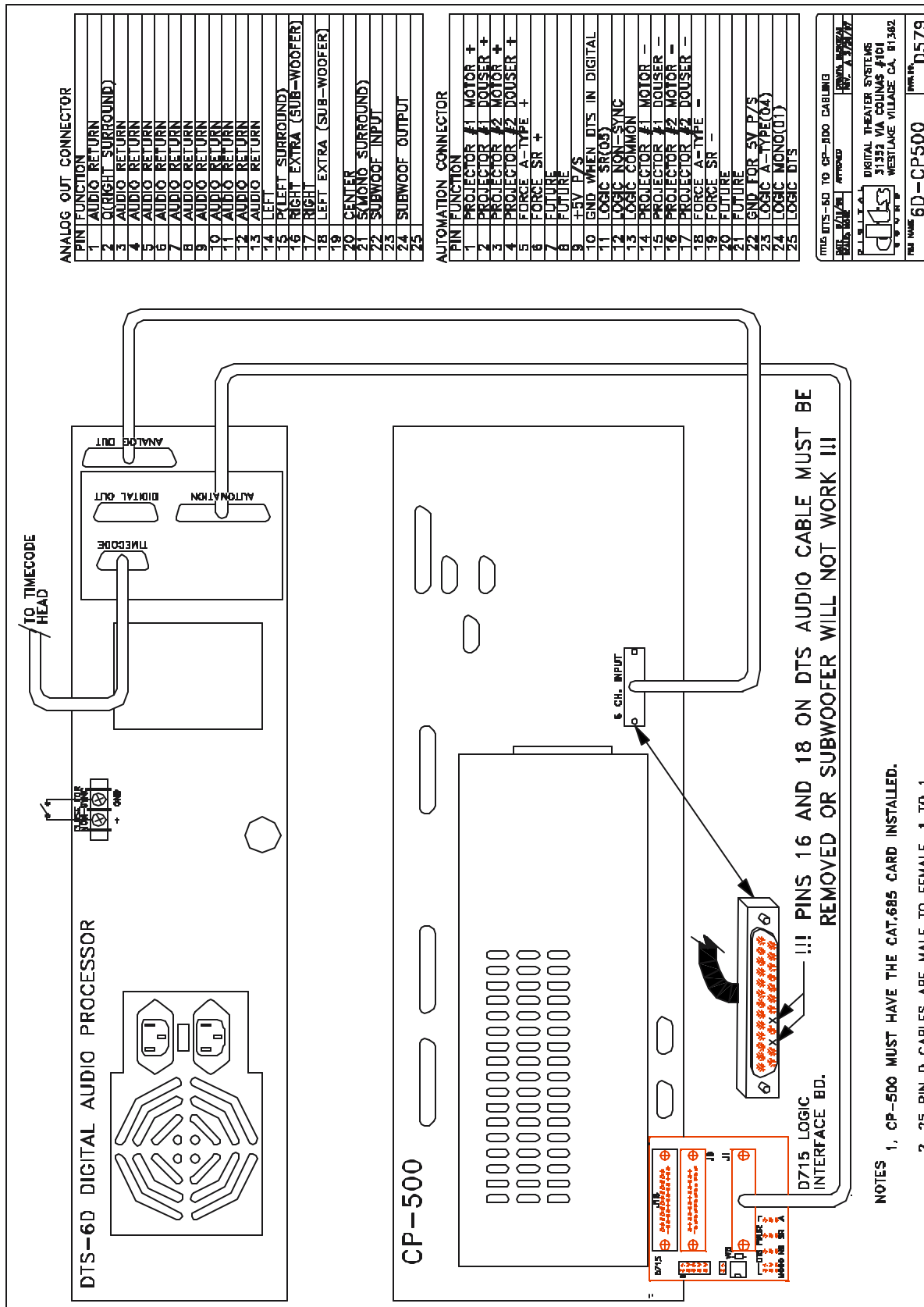


CP-200 MODIFICATION.



THE PJ-2 MUST BE IN THE DISABLE POSITION, UNLESS A REMOTE FADER IS BEING USED.

THIS CP-200/CAT-157 CARD MOD.	
DATE	APPROVED
BY	BY
FOR	FOR
DTSS	
DIGITAL THEATER SYSTEMS	
81382 VIA COLINAS #101	
WESTLAKE VILLAGE CA, 91362	
EQUIPMENT IDENTIFICATION	VERSION
CAT-157	D450



DTS TECHNICAL UPDATE

DTS-6 and DTS-6D To Dolby CP500 D715 Logic Interface Board

DTS-6D – D715 Operation With The Dolby CP500 Cinema Processor

When the DTS-6D drops out of digital it will send 1 of 4 pulses to the CP500. The D715 board has jumpers to “steer” each pulse to one of several CP500 soft (“SK”) keys. The DTS digital pulse is sent to SK5. The MONO, A-TYPE, and SR pulses are sent by the DTS-6D. They are programmed on the DTS movie disc(s) and are used to return the cinema processor back to the optical format the movie was recorded in. The NON-SYNC (NS) pulse (from the DTS-6D) will be sent when DTS timecode is lost during the last 60 seconds of the last reel. The J6 connector is a pass-through connection for automation.

MONO JUMPER - place this jumper in the SK button number that reflects the optical format of your trailers. Options are SK1, SK2, and SK3.

NS JUMPER - place this jumper between the center pin and the SK button number that reflects the non-sync format you wish to return to after the feature. This jumper may be removed to allow your automation to control non-sync switching. Options are SK7 & SK8.

SR JUMPER - place this jumper between the center pin and the SK button number that reflects the SR format you wish to return to if the DTS drops out of digital. Options are SK2 & SK3.

A-TYPE JUMPER - place this jumper between the center pin and the SK button number that reflects the A-type format you wish to return to if the DTS drops out of digital. Options are SK2 & SK3.

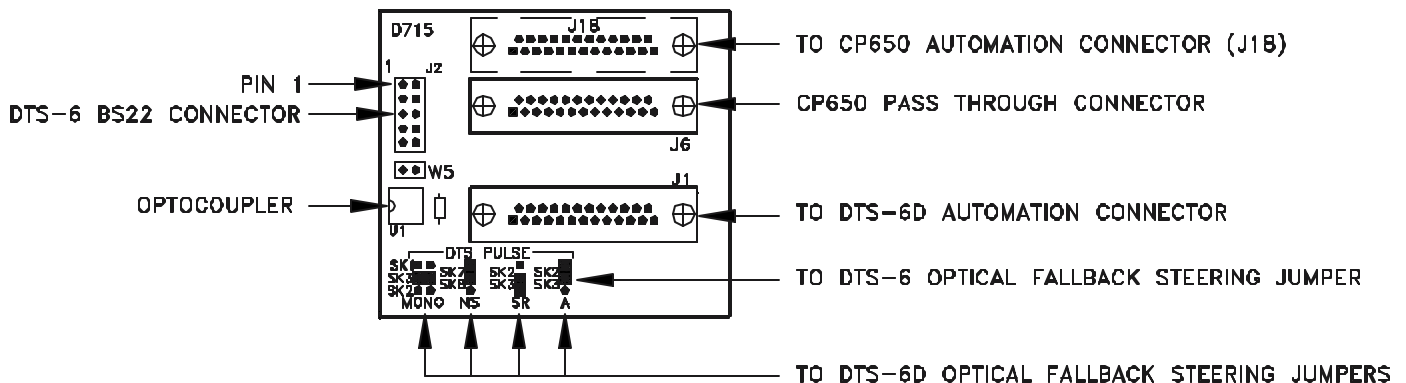
W5 and J2 (10 pin header) are used only for operation with the DTS-6

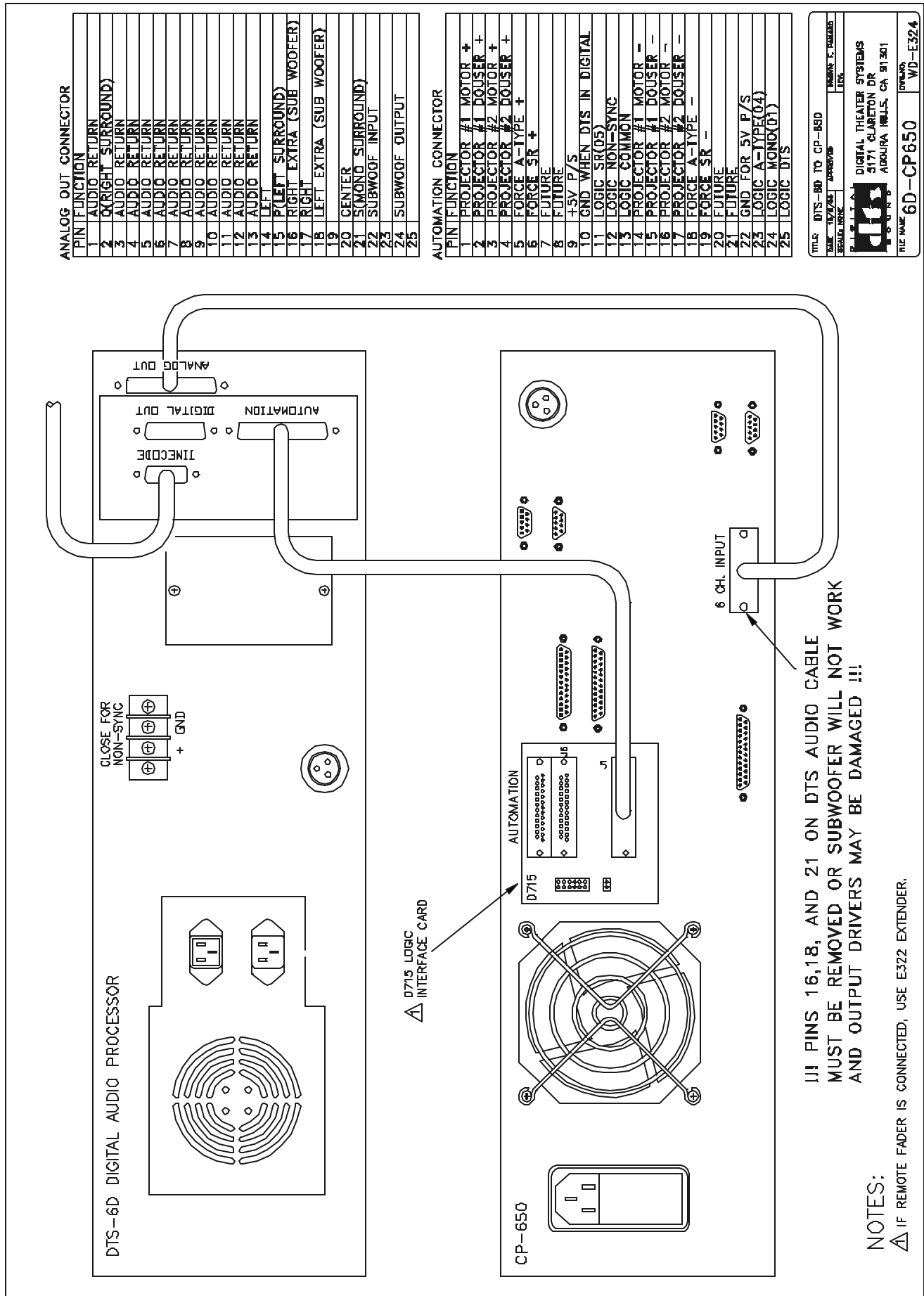
DTS-6 -- D715 Operation With The Dolby CP500 Cinema Processor

When the DTS-6 drops out of digital it will send a pulse to the CP500. The D715 board’s ”A” 3 pin header “steers” the pulse to SK2 or SK3 on the CP500. The DTS digital pulse is sent to SK5. The MONO, SR and non-sync headers are not used with the DTS-6.

An optocoupler (U1) monitors the CP500’s “ID lines”. The optocoupler only passes the optical fallback pulse if the CP500 is in the DTS format. This keeps the DTS from switching to the optical format after the automation has switched to non-sync. Early CP500 may not have “ID lines”, install a jumper on **W5** to bypass the optocoupler for these early CP500.

J2-10 pin header connects to BS22 connector on the DTS-6 ribbon cable. Note pin 1 for orientation





ANALOG OUT CONNECTOR

PIN	FUNCTION
1	AUDIO RETURN
2	RIGHT SURROUND
3	AUDIO RETURN
4	AUDIO RETURN
5	AUDIO RETURN
6	AUDIO RETURN
7	AUDIO RETURN
8	AUDIO RETURN
9	AUDIO RETURN
10	AUDIO RETURN
11	AUDIO RETURN
12	AUDIO RETURN
13	AUDIO RETURN
14	LEFT
15	LEFT SURROUND
16	RIGHT EXTRA (SUB WOOFER)
17	RIGHT
18	LEFT EXTRA (SUB WOOFER)
19	
20	CENTER
21	50MM SURROUND
22	SUBWOOF INPUT
23	
24	SUBWOOF OUTPUT
25	

AUTOMATION CONNECTOR

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

FILE: DTS-6D TO CP-65D
 DATE: 12/2/95 APPROVED: [Signature]
 DESIGNER: F. FOUADER
 DTS
 DIGITAL THEATER SYSTEMS
 5171 CLARETON DR
 ALPHARETTA, GA 31701
 FILE NAME: 6D-CP650
 DRAWING: WD-E324

DTS Technical Update

DTS-6 and DTS-6D to Dolby CP650

D715 Logic Interface Board

• **DTS D715 operation with DTS-6D (3-drives) and Dolby CP650**

Connect D715-J18 to the CP650 “AUTOMATION” connector. A 25-pin cable connects the DTS-6DAUTOMATION to D715 on J1. If using the CP650 remote fader, use the DTS E322 extender to lift D715 away from the rear panel and give clearance to the remote fader connector.

D715 board: W5 and J2 are used only for DTS-6 applications and J6 is a pass-through connection for automation.

When the DTS-6D switches into digital, it sends a format pulse to the CP650 “AUTOMATION” connector on pin 5 (Format 11 “external 6-channel analog” = DTS) which engages button “11” on the front panel.

When the DTS-6D drops out of digital, it will send 1 of 4 (fallback) pulses to the CP650. The D715 logic board has jumpers that “steer” each default pulse to one of several CP650 format keys.

The MONO, A-TYPE (“A”), and SR pulses are sent by the DTS-6D. They are programmed on the DTS movie disc(s) and are used to return the CP650 back to the optical format the movie was recorded in. The NONSYNC (“NS”) pulse (from the DTS-6D) will be sent if DTS timecode is lost during the last 60 seconds of the last reel.

SETTING FORMAT JUMPERS

- MONO jumper - place jumper horizontally across SK1 (‘01’ button)
- NS jumper - place jumper between center pin and SK7 (“NS” button)
- SR jumper - place jumper between center pin and SK3 (“05” button)
- “A” jumper - place jumper between center pin and SK2 (“04” button)

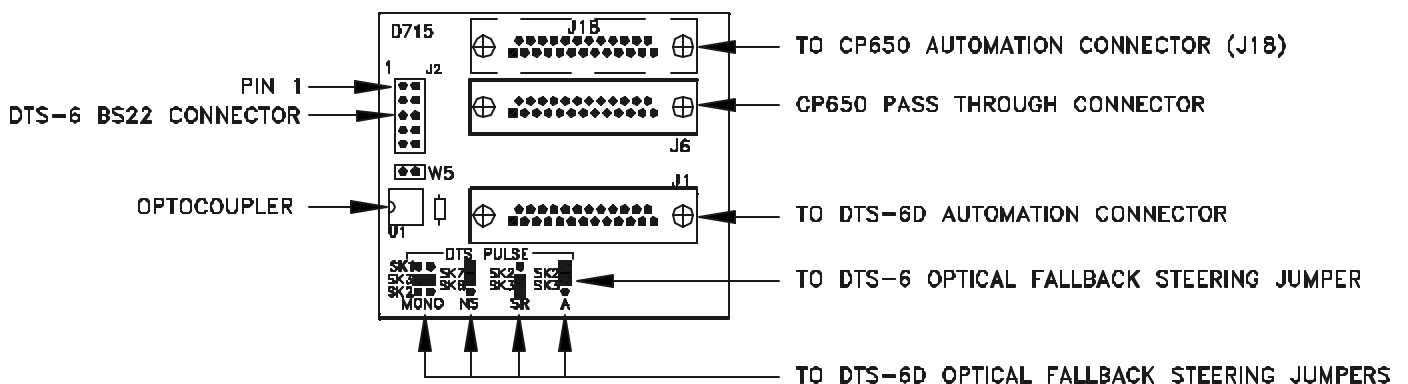
• **DTS D715 operation with DTS-6 (2-drives) and Dolby CP650**

Connect D715-J18 to the CP650 “AUTOMATION” connector. The DTS-6 “BS22” 10-pin connector (on the 50-pin cable) connects the DTS-6 logic to D715 on J2. Note pin 1 for proper orientation. If using the CP650 remote fader, use the DTS E322 extender to lift D715 away from the rear panel and give clearance to the remote fader connector.

D715 board: J1 is normally used only for DTS-6D applications and J6 is a pass-through connection for automation.

When the DTS-6 switches into digital, it sends a format pulse to the CP650 “AUTOMATION” connector on pin 5 (Format 11 “external 6-channel analog” = DTS) which engages button “11” on the front panel.

W5 must be installed for “fallback” operation (use jumper from “SR” or “NS” header) with the DTS-6. When W5 is installed and the DTS-6 drops out of digital, a single “fallback” pulse will be sent to the CP650. The D715 board’s “A” 3-pin header “steers” the pulse to either SK2 (A-TYPE = “04” button) or SK3 (SR = “05” button). The user must select which format is desired and selection is made with a jumper from the center pin to the optical sound format the movie was recorded in. In most cases, that will be SR.



Wiring Diagram

DTS-SV (analog) to CinemAcoustics CA-CP600

DTS ANALOG Output	CA-CP600 Input	Definition
<u>Female Pin #</u>	<u>Male Pin#</u>	<u>Definition</u>
1	2, 4, 6, 9, 11, 13	Common or - audio
2	8	Right Surround Channel +
3 to 13 Not Used		
14	1	Left Channel +
15	10	Left Surround +
16 Not Used		
17	5	Right Channel +
18 Not Used		
19 Not Used		
20	3	Center Channel +
21 Not Used		
22 Not Used		
23 Not Used		
24	12	Sub Bass Channel +
25 Not Used		

AUTOMATION	CA-CP600	Definition
<u>Male Pin #</u>	<u>Cable-end Pin=Color</u>	<u>Definition</u>
Control From DTS	Automation Control	
1 to 10 Not Used		
11	Wht/Blu	Stereo "SR"
12	Wht/Or	Non-sync
13	Brn	
14 to 22 Not Used		
23	Grn	Stereo "A"
24	Wht/Brn	Mono
25	Blue	Digital

NOTE: See next page if using the DTS DIGITAL OUT (15-pin D male) to CA-CP600.

Using the DIGITAL OUT Connector

In the DTS-6D, **D536 U40 and U41 must be changed** to DTS P/N 1607-0020-01 (National DS34C87NT).

Use the DTS **E216 DIGITAL** cable assembly. Connections shown below are for DTS-6D direct digital interface wiring to a digital cinema processor.

E216 “DIGITAL” CABLE ASSEMBLY FOR DTS-6D

15-PIN FEMALE (To DTS-6D)

15-PIN MALE (To DCP)

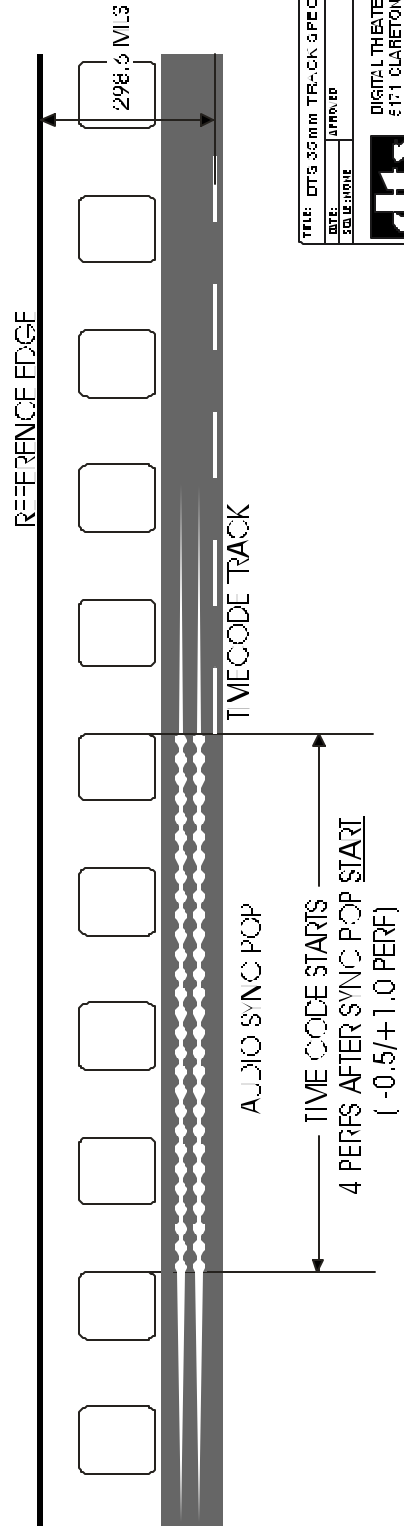
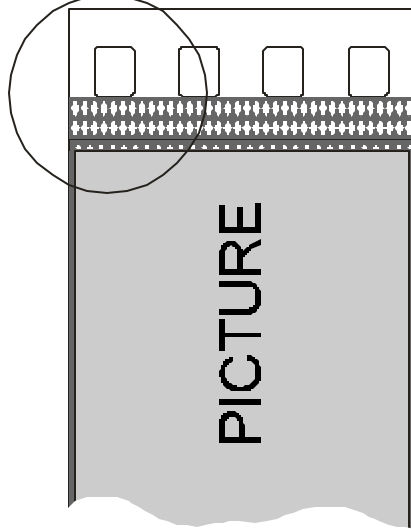
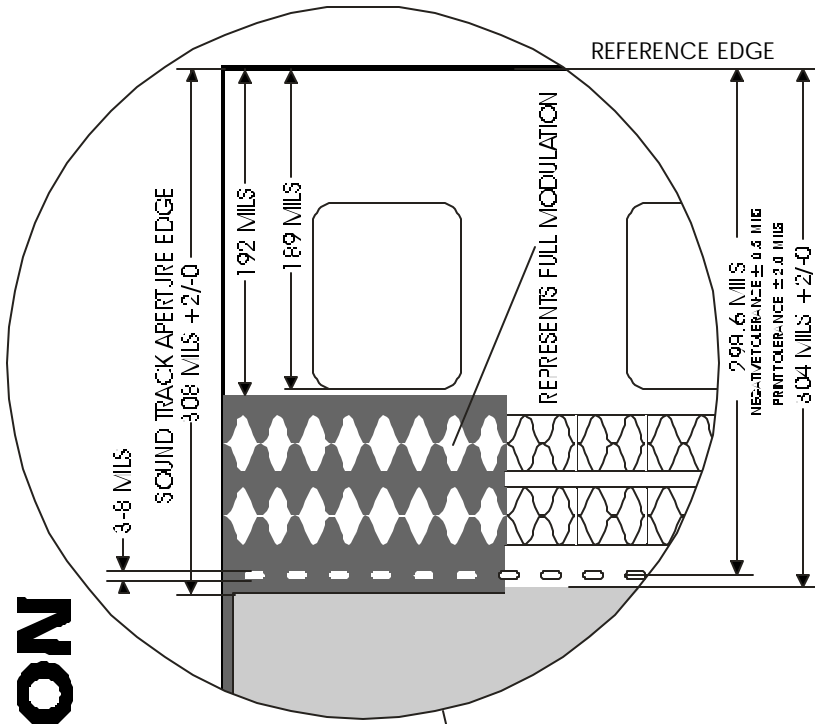
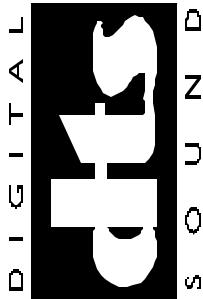
1	—————	1	+	
				Sync
9	—————	9	-	
2	—————	2	+	
				L / R Clock
10	—————	10	-	
3	—————	3	+	
				LS / RS Data
11	—————	11	-	
4	—————	4	+	
				Left / Right Data
12	—————	12	-	
5	—————	5	+	
				Center / Center Top Data
13	—————	13	-	
6	—————	6		Sys_In
14	—————	14		Non-Sync
7	—————	7		6-Channel
15	—————	15		Ground
8	—————	8		De_Emp

NOTES

1. Cable is 4 feet long. Must be 7-pair shielded, low capacitance = Belden 9808.
2. Pairs 1 & 9, 2 & 10, 3 & 11, 4 & 12, 5 & 13 must be shielded twisted pairs.
3. All shields must be tied together and connected to pin 15 (ground).
4. Hook braid shield to connector shell of female (“To DTS-6D”) connector only.
5. See page 9-13 for cable assembly.

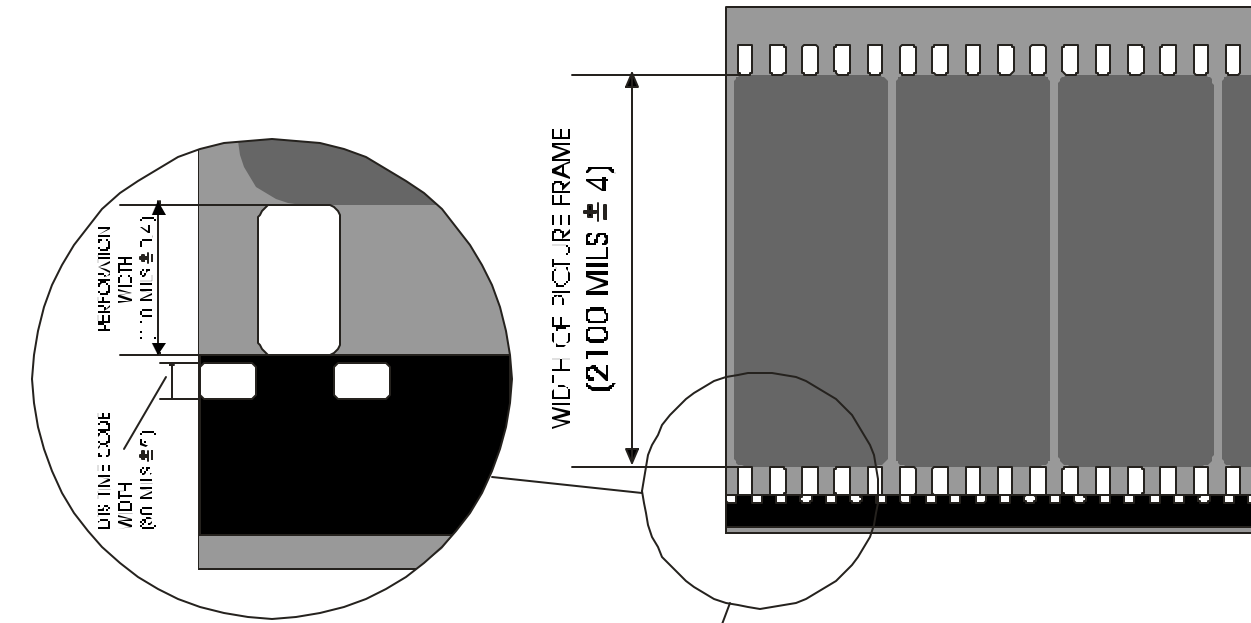
OTHER HELPFUL DOCUMENTS

DTS TRACK SPECIFICATION



TITLE: DTS 35MM TRACK SPECIFICATION			
DATE:	APPROVED:	DESIGNED BY:	REV. A
DIGITAL THEATER SYSTEMS 571 CLARETON DR AGOURA HILLS, CA 91301			
CONTRACT NUMBER:	COMPANY:	DWG. NO.:	TR-243A
T1243A (FILM SPECI. GDP)	DTS, INC.		

Revised: February 16, 2000



DTS 70MM TRACK SPECIFICATION

TITLE: DTS 70mm TRACK SPECIFICATION		DRAWN BY: JELIARIA	
DATE:	APPROVED:	REV. A	
SCALE: NONE		DIGITAL THEATER SYSTEMS	
		5171 CLARETON DR	
		AGOURA HILLS, CA 91301	
COMPUTER FILE NAME		DATE PLOTTED	
TIE2Z4A_70MM(SPEC).CDR		11/15/00 11:24:44A	

PH: 818-706-3525 Fax: 818-706-1868
 Web: www.dtsonline.com

DTS6D-SV System Parts List

For use with cinema processors:

D564	Logic break-out board (Dolby CP65)
D565	Logic break-out board (Dolby CP55, “generic”)
D567	Interface board (Dolby CP200, CP100, CP50) – requires D711 and D712 cables
D571	Logic break out board (UltraStereo JS Series)
D572	Audio break-out board (Dolby CP55, “generic”)
D574	Audio break-out board (Dolby CP45, CP65)
D575	Audio break-out board (UltraStereo JS Series)
D715	Logic break-out board (Dolby CP500)
D716	Logic break-out board (Dolby CP45)
D725	Dual input (to cinema processor) interface board
2503-0014-00	Analog output cable, 6 feet long, round, standard cable
2503-0014-00	Automation (logic) cable, 6 feet long, round, standard cable <i>(same part# as analog cable)</i>
D711	Interface power cable for D567 (DTS6D interface) to Dolby CP200/100/50 1/board
D712	Interface audio cable for D567 (DTS6D interface) to Dolby CP200/100/50 2/board
E216	DIGITAL cable assembly interface, DTS-6D to DCP
1607-0020-01	IC, National DS34C87NT, D536 U40 & U41 mod. for DTS-6D to DCP 2/board

Cables:

2501-0001-00	Power cord, straight, detachable, standard <i>bare-ended available, call DTS</i>
2501-0002-00	Power cord, right angle, detachable

For single projectors:

D435-01	30 ft. Timecode cable, round <i>single-ended available, call DTS</i>
D435-02	40 ft. Timecode cable, round
D435-05	45 ft. Timecode cable, round
D435-06	60 ft. Timecode cable, round

For dual projectors:

D435-03	Timecode Y cable, 20 ft. / 30 ft, round <i>single-ended available, call DTS</i>
D435-08	Timecode Y cable, 30 ft. / 40 ft, round, standard
D435-09	Timecode Y cable, 40 ft. / 50 ft, round
D435-10	Timecode Y cable, 60 ft. / 60 ft, round

Mounting brackets for DTS timecode reader heads (hardware included):

D614	Standard bracket (for Century, Simplex, Ballantyne)
D615	Universal bracket
D616	Phillips AA bracket (Norelco)
D617	“L” bracket (Kinoton)
D622	Front mount bracket
D625	35/70mm standard bracket used with breakaway plates
D626	Breakaway (“spacing block”) plate for 35mm DTS reader head
D627	Breakaway (“spacing block”) plate for 70mm DTS reader head
D628	Adapter panel for D617 “L” bracket (so breakway plates can be used)
5006-0001-00	Cinemecanica bracket (use with D614 standard bracket)
E102	70mm spacer kit (used to fit a 35mm DTS reader in a 70mm space, adds width to reader)

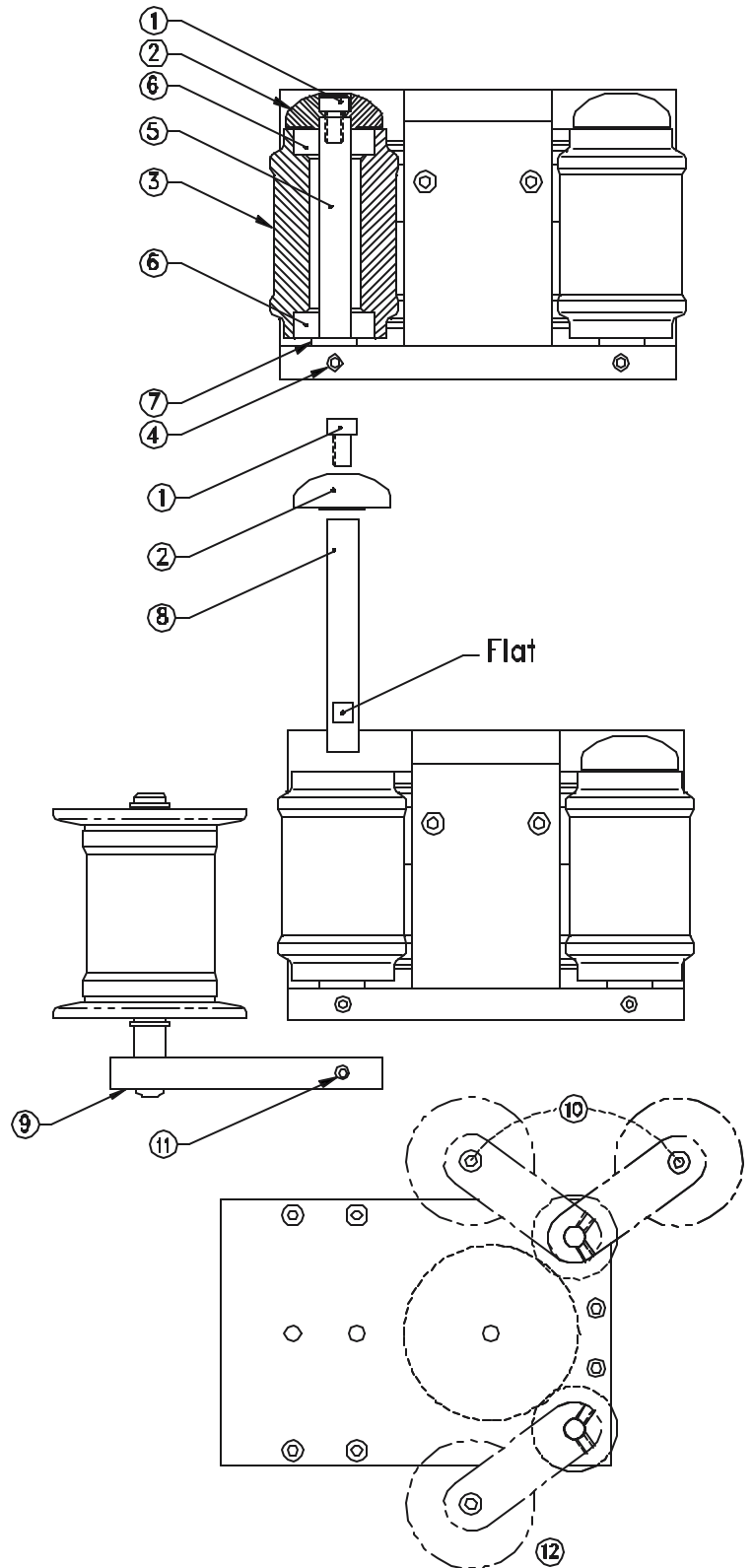
Accessories:

D600-00	Timecode reader head, 35mm, auxiliary roller attached
D600-01	Timecode reader head, 70mm, auxiliary roller attached
E108	Auxiliary roller assembly kit, 35mm
E163	Auxiliary roller assembly kit, 70mm
6800-1045-00	DTS logo film, 35mm, flat
6800-1045-01	DTS logo film, 35mm, scope
6800-1045-02	DTS logo film, 70mm, 8 perf
6800-1045-03	DTS logo film, 70mm, 15 perf
6060-0009-00	DTS-SV 5.1 Channel Setup Disc (for 5.1 channel systems)
6060-0010-00	DTS-SV Discrete 6 Channel Setup Disc (for 6.0 channel systems only)
6303-0001-00	CD-ROM drive cleaning disc
E188	DTS-SV Upgrade kit, from 5.1 channels to discrete 6.0 channels

Installation Procedure, Timecode Reader Head Auxiliary Roller

The Auxiliary Roller is designed to mount on either of the two Secondary rollers of the Timecode Reader Head, as detailed below:

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. Note: Excessive force may damage the bearings ⑥. Be careful not to lose the washer ⑦, or the bearings ⑥ that mount on the roller shaft ⑤.
4. Install the longer roller shaft ⑧ provided. Note: 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.
5. Tighten the set screw ④, and replace the secondary roller ③ and end cap ②.
6. 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 ③ still does not spin, double check that all parts have been properly replaced onto the roller shaft ⑤.
7. Place the Auxiliary Roller ⑨ on the protruding section of the roller shaft ⑧, in the desired position ⑩, and tighten the cap screw ⑪. For most installations, keeping the auxiliary roller close to the large center roller achieves the best results. Add a second auxiliary roller ⑫ if necessary, to stabilize film.



BLINKING TIMECODE READER LED

The timecode reader LED should remain bright and not flash more than a few times a minute. Excessive flashing indicates a problem and should be fixed as soon as possible. The optics on the reader should be blown off with compressed air at least once a day, but **never adjust the lens**

Excessive blinking can cause drop-outs (if the 4-second flywheel is exceeded). Drop-outs can produce wow, edits, and repeated sound track.

There are four things that can cause the reader LED to blink:

- 1) **Bad/poor timecode.** This is usually limited to a single reel or trailer, and is encountered infrequently. If seeing bad reels regularly, 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.** One cause is the projector's chassis not being earth grounded.
- 4) **DTS equipment problem.** This is caused by either the reader or the player. If another reader can be borrowed from a working screen, try swapping.

Bad/Poor Timecode

See "DTS Encoded Film" specifications in DTS player manual.

Film Instability/Speed

- Check the speed of the projector. It should run at 24 fps +/-5%.
- Make sure the reader's auxiliary roller (back with an adjustable arm) is installed and provides as much wrap as possible on the incoming silver roller. It should be pivoted towards the cable end of the reader and be back as far as possible.
- Watch the film run through the reader. If aligned properly, the film should contact each side of the roller evenly.
- 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 LED stabilizes, try to find the source of instability. The following are possible sources of instability:

• Poor reader alignment	• Too much tension	• Bad rollers(s)
• Bad platter center piece	• Bent reel	• Bad projector belt, gear, or sprocket
• Too little tension	• Reel clutch	• Platter center piece spring removed (AW-3)

-continued-

BLINKING TIMECODE READER LED (continued)

Electrical noise/grounding problems

- Electrical noise on the timecode input(s) can confuse the timecode reader circuit. This causes the LED to blink and, in some cases, cause sound wow, edits, and dropouts. First, make sure the projector(s) and the DTS chassis are earth grounded.
- The current reader cables (from the DTS factory) have a shield wire 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 for any change in operation.
- 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**
- 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 board is Rev. F or lower, replace the reader with a newer revision board. You can view the revision of the board by tilting the reader and looking just below the 9-pin connector.

DTS equipment problem

- Borrow a known good reader from another screen. If this fixes the problem, replace the reader.
- Check the timecode cable. Verify continuity and physical integrity.
- Check firmware inside the player. The current TCR version is V1.46 and is located at U14 on the D422 board.
- Check voltage to the reader's red LED. See TN-E550 for details.

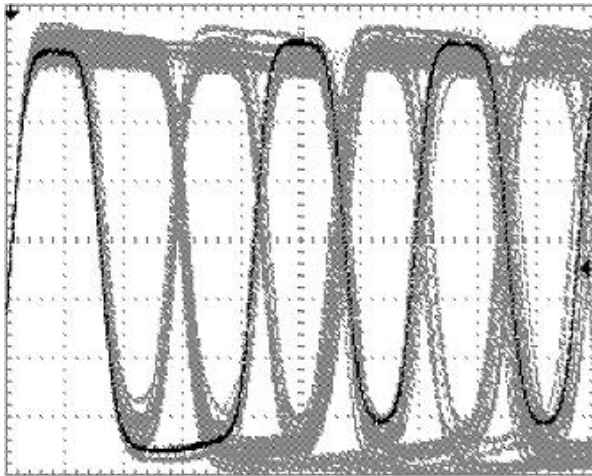
Checking timecode with an oscilloscope

- 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 P/N D929), 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.

Set the scope to 0.5V/division, sweep at 0.5mS/division, and the trigger to internal.

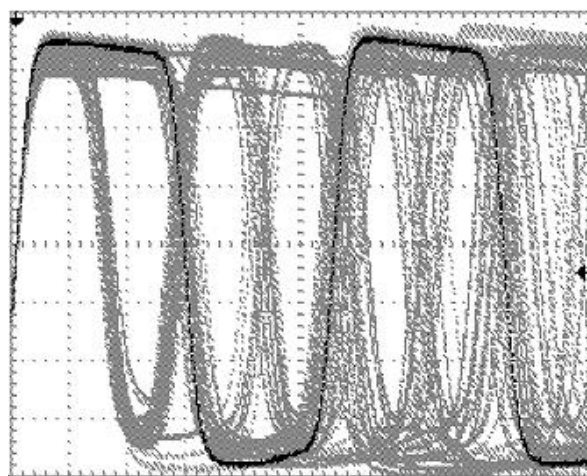
Run a reel of time-coded film (BILL AND BUZZ reel preferred) and observe the timecode cells. The amplitude should be constant, and approximately 4 Volts Peak-to-Peak. The cells should be visible all the way to the right of the scope screen. The cross-points ("X"s) should be well defined (FIG. 1). Poorly defined cells are shown in FIG. 2. They are caused by film bounce and jitter through the projector or from the platter/reel.

FIG. 1 GOOD TIMECODE



500mV/DIV .5mS/DIV

FIG. 2 POOR TIMECODE



500mV/DIV .5mS/DIV



DTS Technical Notice

Subject: Upgrading the DTS-SV 5.1 Channels to Discrete 6.0 Channels

The DTS6D-SV 5.1 channel system can be upgraded to a discrete 6.0 channel system. The kit, **DTS part number 9005-E188-00**, must be purchased.

Installation procedure

1. Two parts must be installed:
 - **APT X100ED** IC should be installed into D536 at position U27
 - **U14** TCR EPROM IC should be installed into D422 at position U14.
2. If your player *does not* have an IC installed into D422-U12, install the **AQRM IC** into the Acqutek board. See diagram on the next page for details.
3. Once the parts are installed, power the DTS player and use the “**Discrete 6 Channel Setup Disc**” to test and setup the system. Please note that your system must be upgraded to 6.0 before this disc will play.
4. Set all DTS channels for **85dB output**. For details, see page 4-2 in this manual.
5. To test the system and set levels, use the DISCRETE 6 CHANNEL SET-UP DISC (6.0 SV) Please note that this disc will NOT work on a 5.1 DTS system.

Dual Projector Theaters

This should be used by theaters that have not wired in the DTS dowser control connections.

Guide For A Seamless Change-Over

Occasionally, when running a DTS show with dual projectors, you may come across situations when the picture and sound are not changing in unison during a change over. This is due to the fact 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 independent of the projector's dowser position. Change over anomalies are most evident on movies that have very tight editing / scene change tolerances from one reel's end to the next reel's start.

Since every brand of projector has variances (speed, for example), you may come across occasions when, during a change-over, the picture and sound are not changing at the same time. When this occurs, do the steps below.

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.

Picture changes before sound

When threading the incoming projector, roll down the film to a lesser number of feet. If you normally thread to "8", try threading to "7" or "6". Keep adjusting the roll down setting until the picture changes with the sound. Be sure to hesitate opening the dowser on the incoming projector (on the second cue) until the last word on the outgoing reel is heard on screen.

Determining roll-down

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

For further information, please contact DTS at (800) 949-4109.

DTS MARQUEE SIGN ORDER FORM

For every DTS-SV unit installed in a theater, we will provide one-sheet posters, 4” mini-marquee, 8”, 10”, or 12” marquee signs at no charge. Please fill out the following information and they will be shipped within 2 to 3 weeks upon receipt of this completed order form. Marquees and posters can be sent directly to the theater or dealer for distribution. If the marquees are directly sent to the dealer, the name(s) and location(s) of the theater(s) is needed for our records.

January 1999

Dealer: _____ Theater: _____

Address: _____ Address: _____

Contact: _____ Contact: _____

Phone: _____ Phone: _____

FOR DTS-EQUIPPED THEATERS

4” mini marquee Qty. _____

8” panel Qty. _____

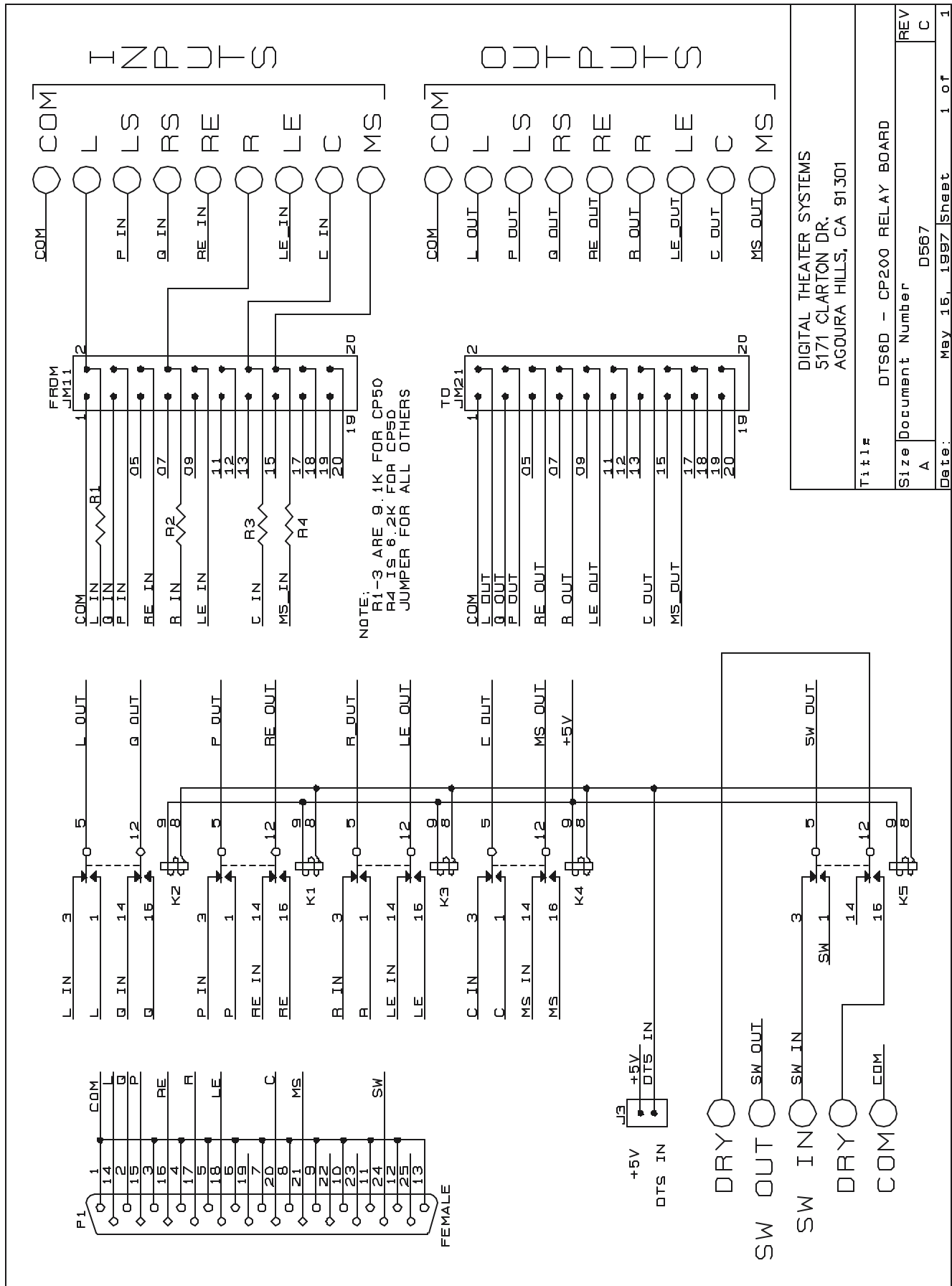
10” panel Qty. _____

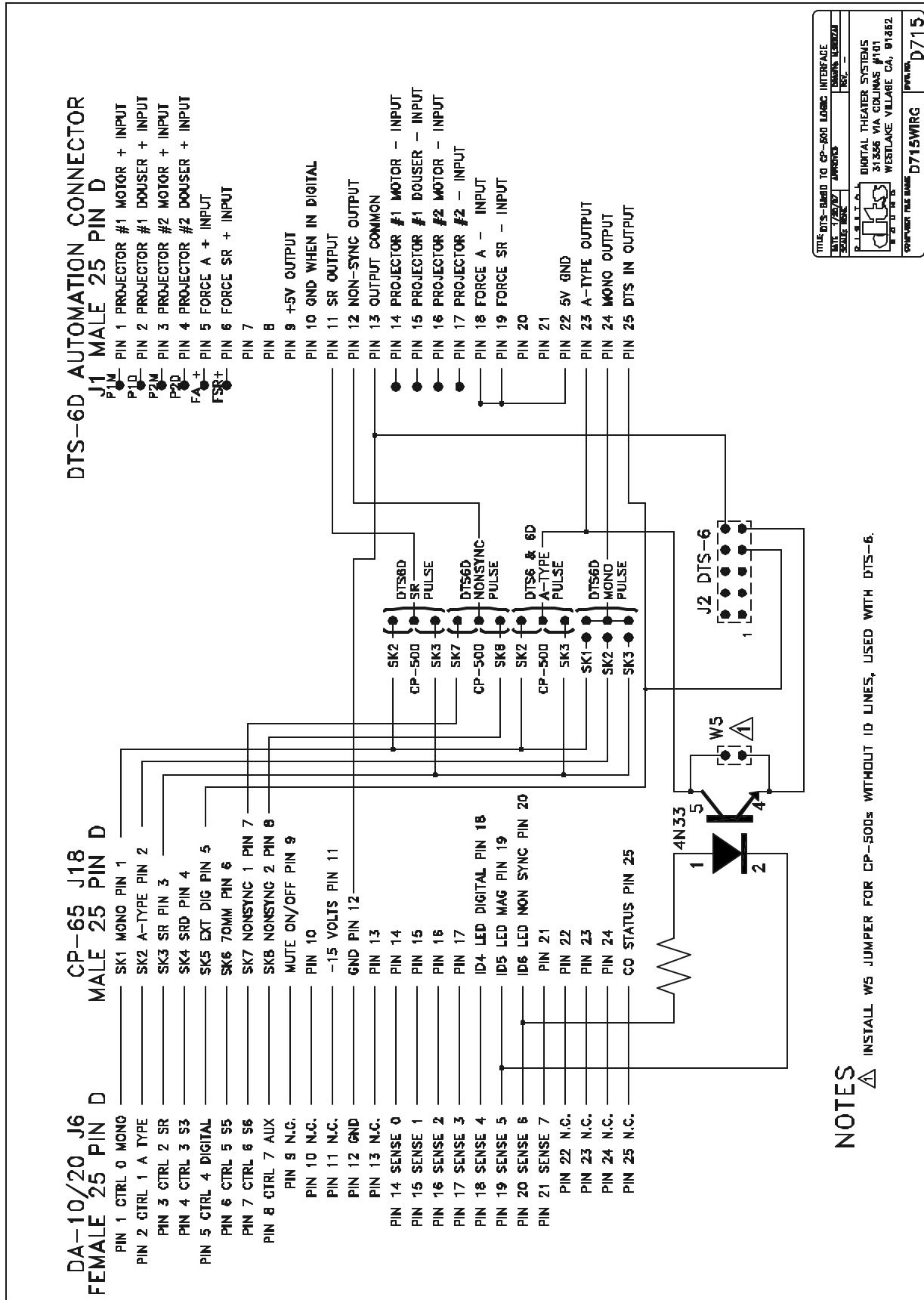
12” panel Qty. _____

One sheets Qty. _____

Please return this form to:

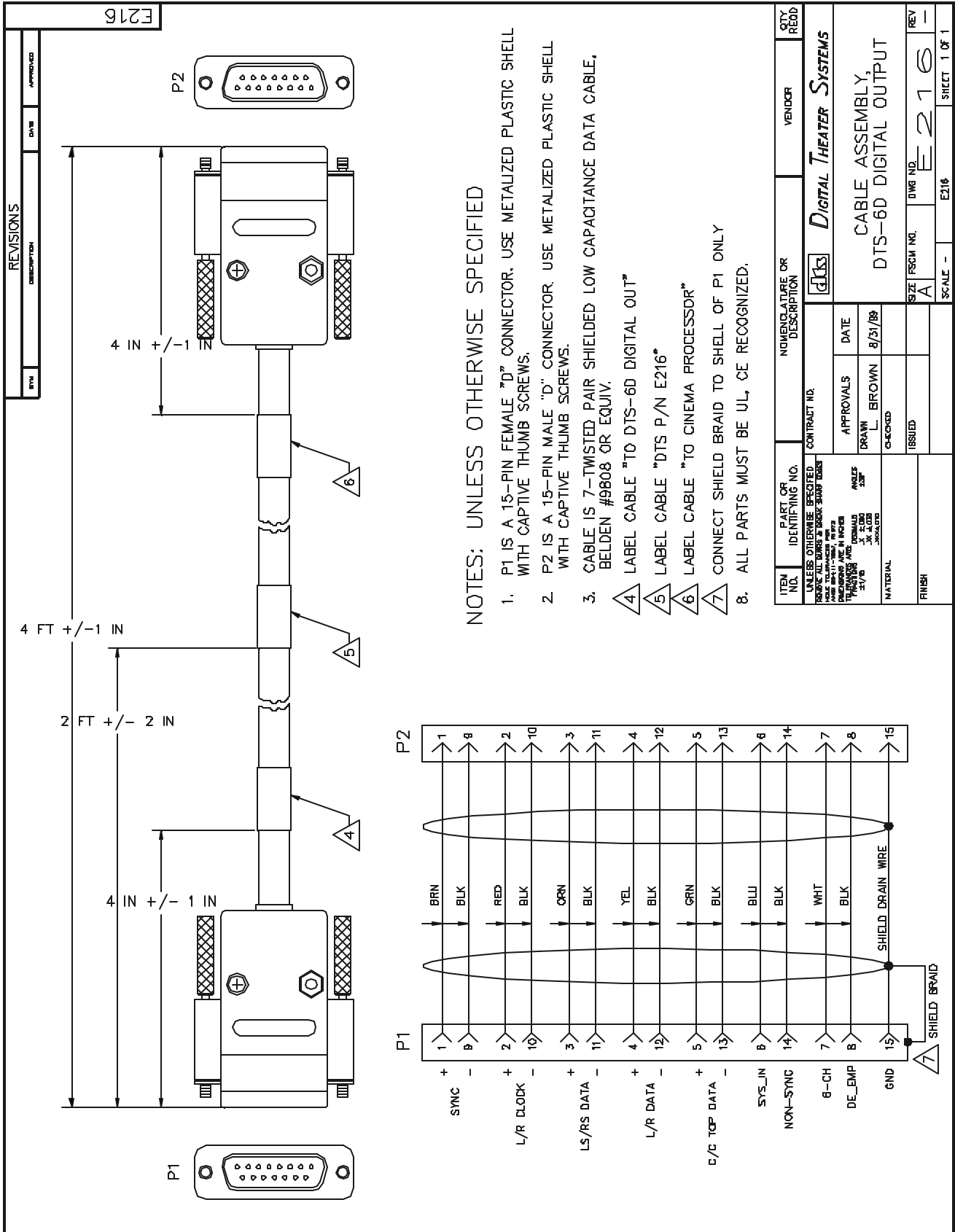
Natasha Norris
Digital Theater Systems
5171 Clareton Drive
Agoura Hills, CA 91301 USA
Telephone: (818) 706-3525 or (800) 959-4109
Fax: (818) 879-2746






TITLE: DTS-6D TO CP-600 LOGIC INTERFACE	
DATE: 7/27/87	DESIGN: KLEIN/DT
DESIGN: KLEIN	REV: -
DIGITAL THEATER SYSTEMS 31,826 VIA CALINAS #101 WESTLAKE VILLAGE, CA, 91382	
COMPONENT FILE NAME: D715WIRG	FILE NO: D715

NOTES INSTALL W5 JUMPER FOR CP-500s WITHOUT ID LINES, USED WITH DTS-6.



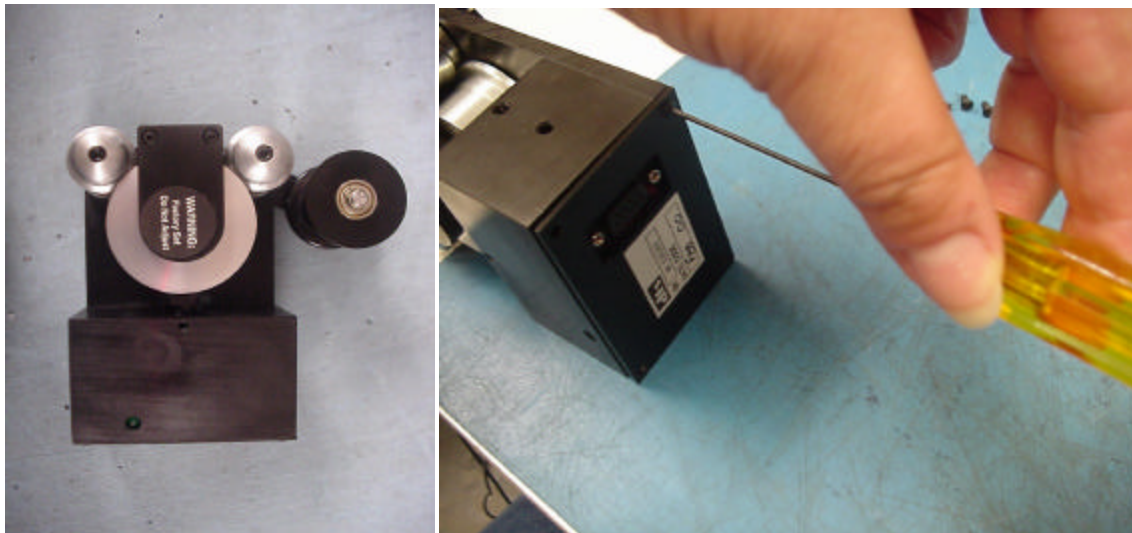
	TITLE		NUMBER	REV	Page 1 of 3
	Reader Head LED Voltage Calibration		TN-E550	A	
DATE PREPARED August 6, 2002	CREATED BY: K. Hultgren	EFFECTIVE DATE 8/7/02	APPROVED BY: B. Plunkett		

All reader heads 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.

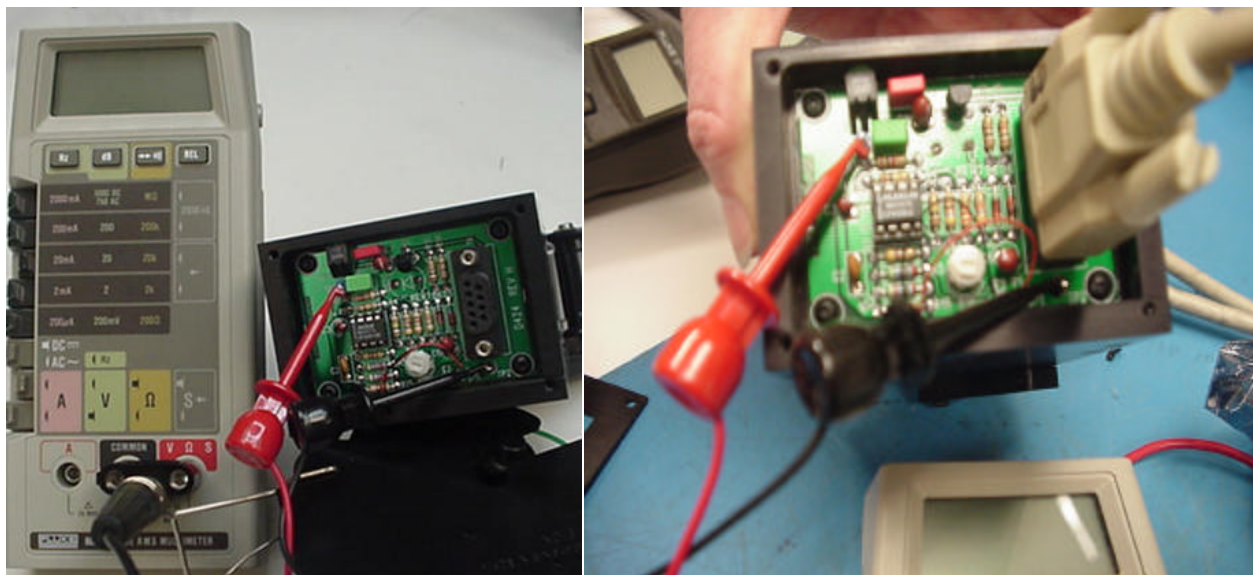
TOOLS REQUIRED


- DTS player
- 1/16" (1.58 mm) Allen-head (hex) screwdriver
- Multimeter
- Timecode cable
- Small flat-bladed screwdriver

① Remove the reader's back cover by removing the -4- hex screws. Save the screws.



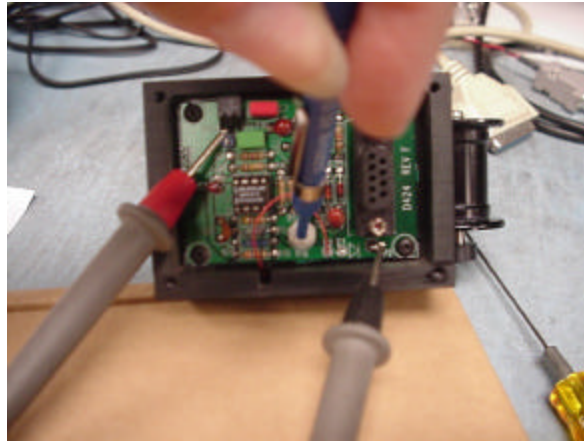
② First, set the meter to DC volts. Connect leads to TP1 (“+” signal) and TP2 (ground) on the D424 board. Then, connect the reader to a powered DTS player. The reader gets its power from the DTS player.



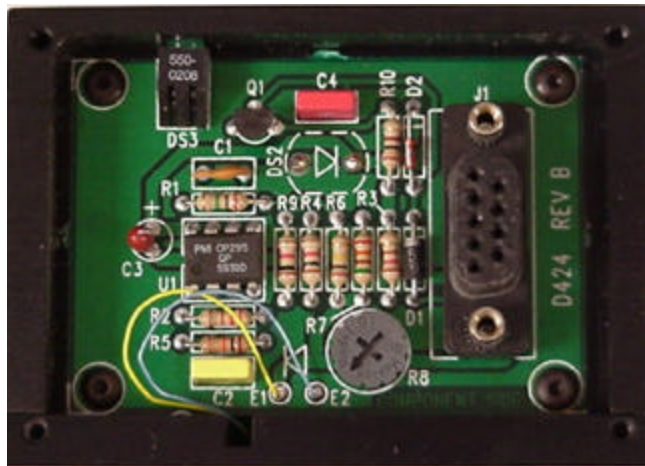
	TITLE		NUMBER	REV	Page 2 of 3
	Reader Head LED Voltage Calibration		TN-E550	A	
DATE PREPARED August 6, 2002	CREATED BY: K. Hultgren	EFFECTIVE DATE 8/7/02	APPROVED BY: B. Plunkett		

- ③ Adjust R16 trim pot (on **Rev. E** and higher D424 boards) for 4 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 3.5 and 4.5 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




- 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 volts DC on a multimeter.



Pin 7

Pin 4

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 4.5 volts DC, then you must do a repair-exchange on the reader. Contact your local DTS dealer.

	TITLE		NUMBER	REV	Page 3 of 3
	Reader Head LED Voltage Calibration		TN-E550	A	
DATE PREPARED August 6, 2002	CREATED BY: K. Hultgren	EFFECTIVE DATE 8/7/02	APPROVED BY: B. Plunkett		

- 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

Please refer questions to DTS Cinema Technical Support

Telephone: (818) 706-3525 or (800) 959-4109

Fax: (818) 879-27246

Email: cinematech@dtsonline.com

www.dtsonline.com

NOTES

Thank you for choosing DTS !

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