Film-Tech

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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:

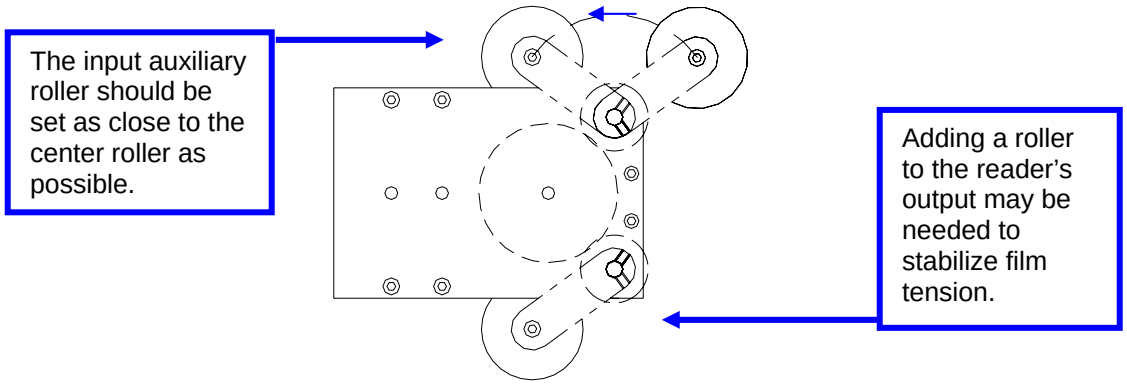
1. **Bad/poor timecode.** This is usually limited to a single reel or trailer, and is not a common problem. If only one reel blinks, then call the film distributor and request a replacement reel. If all reels blink or if you are finding bad reels frequently, check for other problems.
2. **Film instability/speed.** 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. Bad/Poor Timecode

See "DTS Encoded Film" specifications in the DTS Player manual.

2. 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.



- 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)

3. Electrical noise/grounding problems

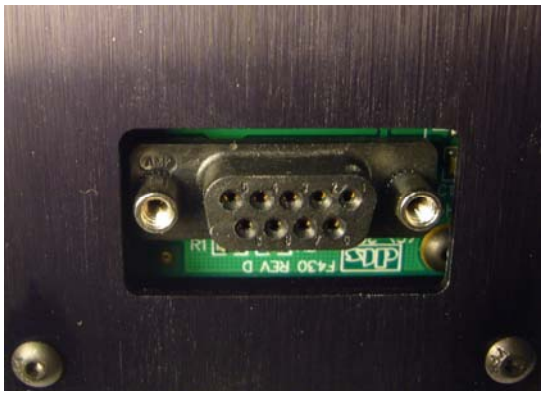
- Electrical noise on the timecode input(s) can confuse the timecode reader circuit. This causes the TIMECODE LED to blink and, in some cases, causes sound "wow", edits, and dropouts. First make sure the projector(s) and the DTS player chassis are earth grounded.
- The current reader cables (from the 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**.

- 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.

4. 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.

Please refer questions to DTS Cinema Technical Support

DTS Digital Cinema Headquarters	DTS Digital Cinema Europe
Email: techsupport@dtsdcinema.com	Email: eusupport@dtsdcinema.com
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	www.dtsdcinema.com
www.dtsdcinema.com	

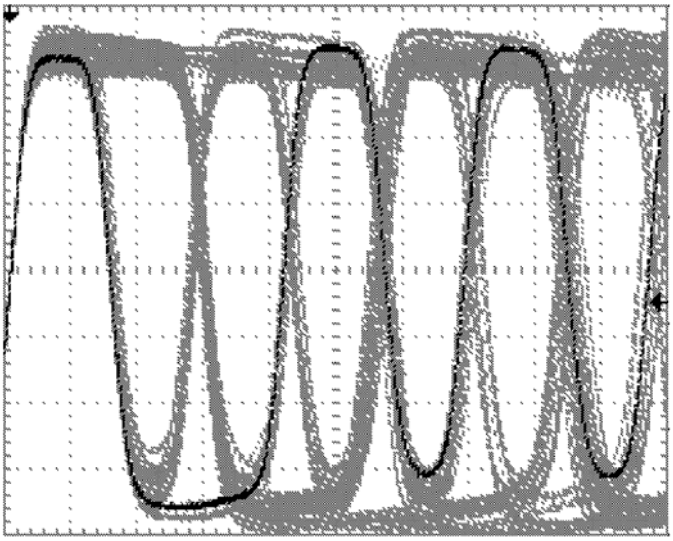
Checking timecode with an oscilloscope

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.

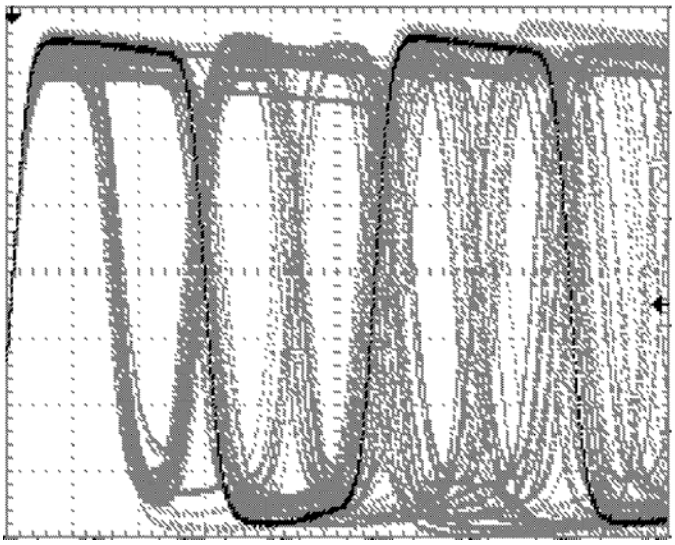
1. Set the scope to 0.5V/division, sweep at 0.5mS/division, and the trigger to internal.
2. Run a reel of time-coded film (BILL and BUZZ reel is recommended) and observe the timecode cells. The amplitude should be constant and at **4 Volts Peak-to-Peak**. The cells should be visible all the way to the 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.

FIG. 1 GOOD TIMECODE



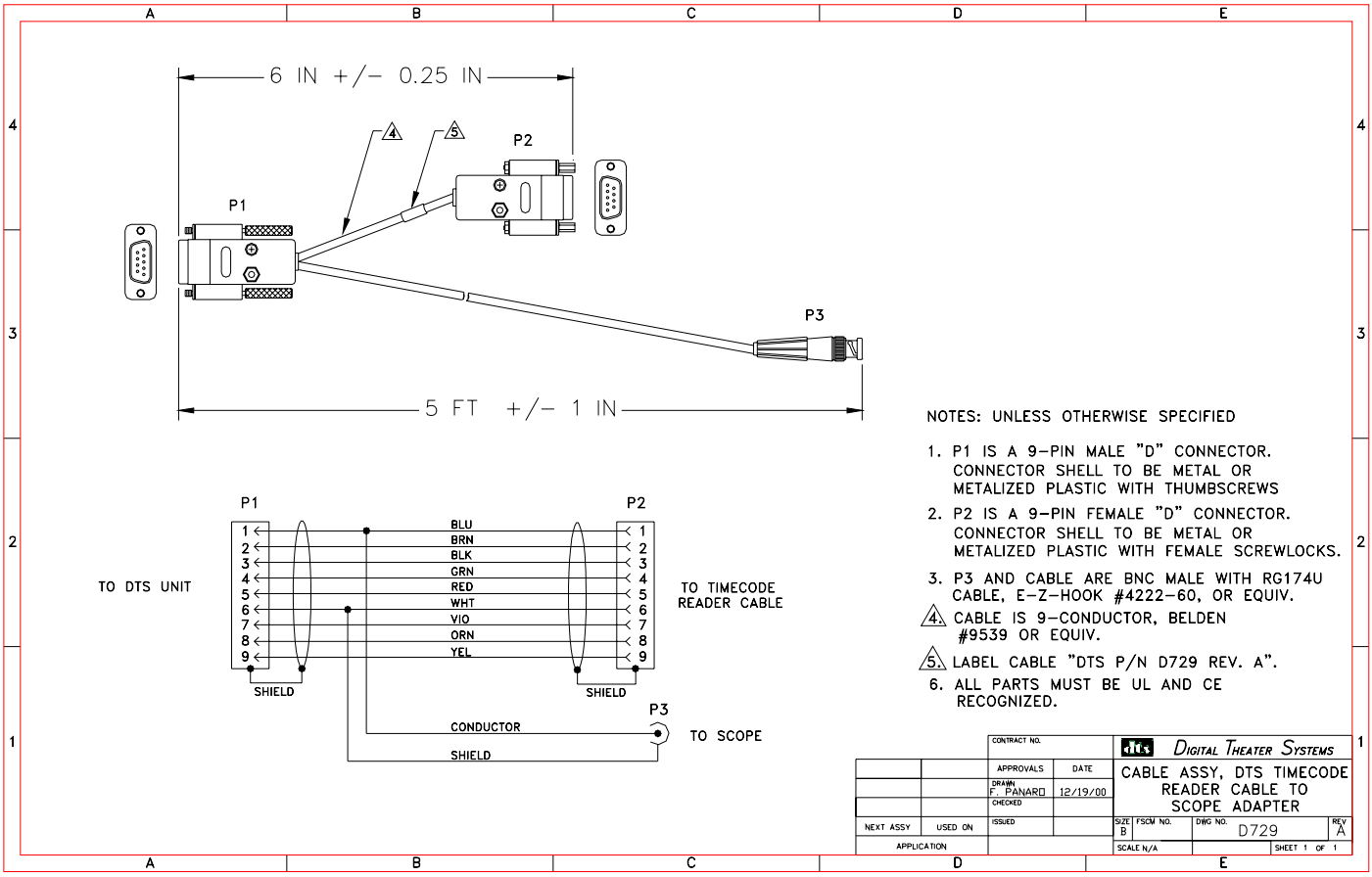
500mV/DIV 0.5mS/DIV

FIG. 2 POOR TIMECODE



500mV/DIV 0.5mS/DIV

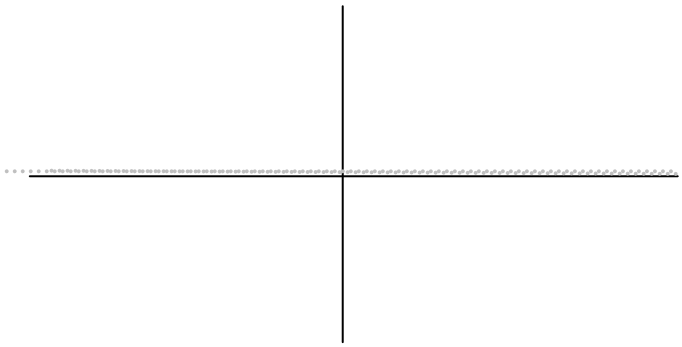
The D729 adapter assembly, shown below, may be purchased from DTS or you may build it yourself.



Checking for noise on a timecode reader using an oscilloscope

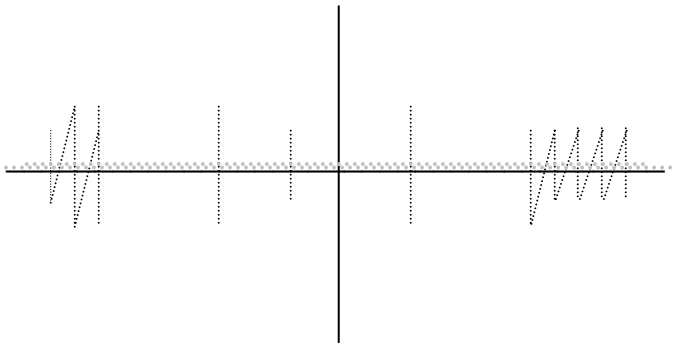
1. Connect the oscilloscope to the reader as explained on page 4.
2. Set the oscilloscope to 0.5V/division, sweep at 0.5ms/division, and set the trigger to internal. Perform the test with no film threaded through the reader.

FIG. 1 CORRECT OUTPUT



500mV/DIV 0.5ms/DIV

FIG. 2 NOISY OUTPUT



500mV/DIV 0.5ms/DIV

The signal output should be clean and without any noise or spikes. If your timecode reader has noisy output, replace the reader.