# Film-Tech

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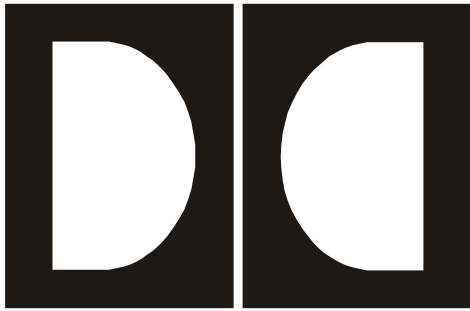
Dolby
Reader Alignment Software

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1 Overview

The Dolby Reader Alignment software (DRAS) can be used with Dolby cinema processors CP650, CP500, or DA20. When Dolby Digital film is played through one of these cinema processors, additional information on the Dolby Digital soundtrack is available including block positions, error rates, and other relevant parameters. Through the use of the Reader Alignment software, Dolby Digital soundtrack information can be viewed in real time from a cinema processor without impacting the unit's operation. The Reader Alignment window shows the current information coming from the cinema processor or the contents of a previously saved file. The data may be saved as a log (*.qc) file to be replayed later or sent to someone else (e.g., Dolby Technical Support) for replay at a remote site. This allows detailed information about the functioning of a digital reader to be viewed by someone remotely.

Note: Although the Dolby Reader Alignment window is a valuable tool when aligning a reader, an oscilloscope is still necessary to adjust the video amplitude.

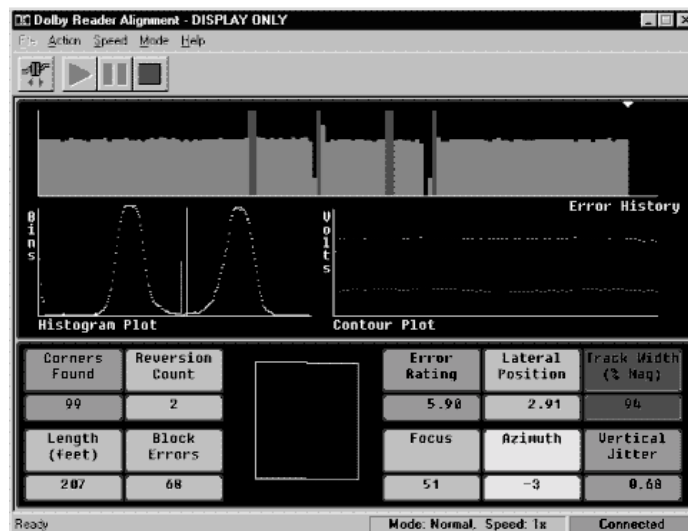**Figure 1** Dolby Reader Alignment Window

The Reader Alignment window contains the title bar, which displays **Dolby Reader Alignment** plus the name of the current document, a menu bar, toolbar, status bar, and the Reader Alignment screen. The Reader Alignment window operates in one of three modes:

- Display Only
- Display and Log
- Open Existing File

The mode is selected through the **File** menu.

2 System Requirements

The Reader Alignment program runs under Windows 95, Windows 98, Windows NT 4.0 or later, Windows 200, or Windows ME. The computer used should be a 486-type or better and have ten megabytes of available disk space.

3 Software Installation

The DRAS software may be provided on diskettes or CD ROM.

Diskette Installation

1. Place diskette 1 in the PC and run **Setup.exe**.

2. Select the desired language.

3. Follow screen prompts until installation is complete.

CD ROM

1. Open the **DRAS** folder and run **Setup.exe**.

2. Select the desired language.

3. Follow screen prompts until installation is complete.

4 Hardware Connection

1. Connect an RS-232 serial cable (pin-to-pin) to any available serial port on your Windows computer.

2. Connect the other end to the "SERIAL DATA" port on the cinema processor (either front or rear port).

Note: Only one serial device may be connected to a cinema processor at a time.

5 Launching the Reader Alignment Software

1. Click the Windows **Start** button and scroll to **Programs**. In the **Dolby** folder, select **Dolby Reader Alignment**.

2. From the **Action** menu, select **Communications Setup**. Select the **Com** port to be used to communicate with the cinema processor.

3. From the **Action** menu, select **Connect** to connect to the cinema processor.

6 Menus

6.1 File Menu

There is no explicit **Save** operation in the Dolby Reader Alignment. Files cannot be appended or edited.

6.1.1 New Display

This command is available only when the PC is connected to a cinema processor. It closes the current document and creates a new *Display Only* document, which will NOT save the data stream to a file.

6.1.2 New Display & Log

This command is available only when the PC is connected to a cinema processor. This is the only mode in which a new file is created. A prompt for the name of a new file is displayed, and a new log document for that file is created. Starting the data stream in this mode saves the new data to the given file for replay later or for transmission to a remote site.

6.1.3 Open Existing QC File

Use this command to open a previously saved QC file. If a file is chosen, the current document is closed.

6.1.4 Close Reader Alignment

This command closes the **Dolby Reader Alignment** program.

6.2 Action Menu

6.2.1 Connect/Disconnect

Use the **Connect** command to establish a serial connection to the cinema processor. While connected, this command changes to **Disconnect**. Choosing **Disconnect** severs the serial connection with the cinema processor.

6.2.2   Run/Stop

Click **Run** to begin the display of the reader alignment data stream either from the cinema processor or from the existing file already opened. After starting, the menu option changes to **Stop**. Choosing **Stop** terminates the processing of the data stream or playback of the existing file.

6.2.3   Pause

When replaying a saved .qc file, **Pause** may be used to halt the replay. Use **Run** to restart.

6.2.4   Communications Setup

Select the PC Com port desired for the serial connection to the cinema processor.

6.3   Speed

When an existing QC file is opened for playback, choose the speed at which playback proceeds.

Table 1 Playback Speeds

Playback Speeds
Pause
1x (default)
10x
20x
30x
40x
50x

6.4   Mode Menu

6.4.1   Normal

Normal mode is the default mode with all three displays in the Plot Window active. This is the only available mode when connected to a CP650 or playing back any pre-recorded .qc file from disk

6.4.2   Histogram

In Histogram mode, only the Histogram plot in the Plot Window is active. However, unlike in Normal mode, the Histogram plot is updated many times per second

producing a much smoother display. This option is only available when connected to a CP500 or DA20.

6.4.3   Contour

In Contour mode, only the Contour plot in the Plot Window is active. However, unlike in Normal mode, the Contour plot is updated many times per second producing a much smoother display. This option is only available when connected to a CP500 or DA20.

7   Tool Bar

The Reader Alignment toolbar includes buttons for quick access to commonly used menu commands. The toolbar is oriented horizontally just below the menu bar. The toolbar contains buttons for the following commands:

7.1   Connect/Disconnect

This corresponds to the **Action** menu **Connect**/**Disconnect** commands. See Section 6.2.1.

7.2   Run

This corresponds to the **Action** menu **Run** command. See Section 6.2.2.

7.3   Pause

This corresponds to the **Action** menu **Pause** command. See Section 6.2.3.

7.4   Stop

This corresponds to the **Action** menu **Stop** command. See Section 6.2.2.

8   Status Bar

This area at the bottom of the main window displays help text for browsing the menu options, speed mode, and cinema processor link status (Connected or Disconnected).

9 Plot Window

9.1 Error History

The **Error History** graph shows the Error rate for each second of film. The error rate numbers on the vertical axis of the graph are arranged with the *highest quality at the bottom* and the *lowest quality at the top*. This makes low-quality ratings stand out. One-second sections of film with correctable block errors are seen as cyan bars, and unacceptable film sections stand out as tall red bars on the graph. This window can be used to identify a region of the film where problems are occurring. It can also be used to track improvements in reader alignment as they are being made.

Figure 2 Error History

9.2 Histogram Plot

The **Histogram Plot** is dependent on print quality and reader alignment. Ideally, the Dolby Digital film blocks would have perfectly clear (100% light transmission) pixels and perfectly opaque (0% light transmission) pixels to represent the 1s and 0s. A double Gaussian distribution is seen for both the light areas and the dark areas. On the horizontal axis, the light range is displayed, with the dark area on the left and the clear area on the right. On the vertical axis, the relative quantities of pixels are shown for a given light level.

Real film has a range of clear and dark levels as shown Figure 3. This histogram shows two peaks that represent a wider range of light levels. It is very easy to determine most of the clear pixels and most of the dark pixels. Special algorithms have been developed to deal with the small number of pixels that fall in the *gray* area. These algorithms determine a threshold value for the boundary between the clear and dark pixels. If the histogram is degraded, with broad peaks, this can indicate insufficient video amplitude. In addition, bad focus, incorrect magnification, and badly aligned azimuth cause broadening of the peaks.
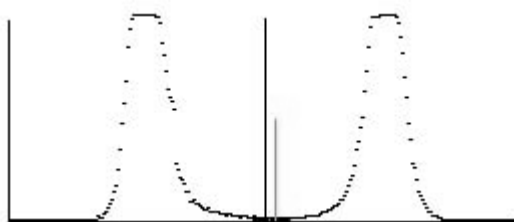
Figure 3 Typical Film Histogram

Figure 3 is a histogram of a typical film as it might appear in the Histogram window. The histogram also includes two lines that show the relative position of two of the factors used to determine the dark-to-clear boundary. The shorter of the two lines shows the position of the determined threshold. The taller line shows the halfway point between the peak values on the histogram. Ideally, the two lines should be close together indicating sharp transitioning between pixels.

9.3 Contour Plot

The **Contour Plot** shows differences in film density between the lighter and darker areas of the Dolby Digital data block region. The top line of the **Contour Plot** represents the variations in light distribution across the data block. The bottom line of the plot shows variations in film density of the data block.

Figure 4 Contour Plot

10 Quality Window

There are ten parameters measured and displayed in the **Quality** window.

10.1 Corners Found

Registration patterns are placed in the four corners of every Dolby Digital block. These are used by the digital processor to locate the block position. The **Corners Found** window indicates the percentage of registration patterns that have been located by the digital processor. On good film prints this number is typically between 97 and 99.

Loss of corners found can be caused by incorrect lateral alignment, incorrect magnification, bad focus, incorrect azimuth adjustment, or vertical jitter. In general, corners must be found reliably before the system can function.
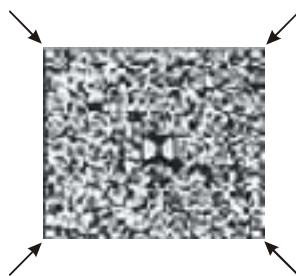
Figure 5 Dolby Digital Block Corners

10.2 Reversion Count

The cinema processor has been designed so that a burst of uncorrected errors may cause it to switch from playing the digital soundtrack to playing the analog sound track on the film. The **Reversion Count** window displays a running total of the instances where the processor has reverted from digital to analog playback. A reversion occurs when there are many block errors close together.

10.3 Error Rating

The cinema processor employs an error correction circuit that can recover data lost due to a variety of conditions. The Error Rating box indicates how hard the error correction circuit is working to produce perfectly correct data. A low number indicates a low error rate; a higher number indicates a higher error rate, while mid-range is typical. Block errors cause an F to be displayed. Poor reader alignment or damaged film directly affects error rate, and causes a higher number.

10.4 Lateral Position

The Cat. No. 530 Test Film should be used to adjust the lateral position of the reader to the number indicated on the test film. The number reported in the **Lateral Position** window is the offset distance from the ideal position in mils (0.001 inch). A positive number indicates an offset toward the closest edge of the film. A negative number indicates an offset toward the picture area of the film.

10.5 Track Width (% Mag)

The number reported in the **Track Width** window shows the percentage of the magnification. If the magnification is adjusted properly, the number reads 100%. If the magnification is too low, it reads lower, and if the magnification is too high, it reads higher. The track width should be set to 100%, with a range of 97% to 103% being acceptable. On Cat. No. 699/700/701 readers, track width is set at the factory and is not adjustable.

10.6   Length (Feet)

Film length is shown in feet. This window is updated every foot.

10.7   Block Errors

The cinema processor employs a multitude of ways to clean up data and correct errors from the data stream. When the data on the film is not of good quality, the data may not be correctable. The **Block Errors** window displays a running count of those instances.

10.8   Film Block Position Graphic

A graphic representation of the block position is displayed in the large box centered between the quality windows. This display is updated in real time and can be used to troubleshoot problems that show themselves as azimuth variations and flutter frequencies.

10.9   Focus

The **Focus** window indicates the sharpness of the transitions from dark (digital 0s) to clear (digital 1s) areas on the film. Higher numbers (66–100) represent good focus, and lower numbers (0–33) indicate bad focus. The number that is displayed depends on the reader alignment and the quality of the film. This number is relative and should be adjusted for the highest attainable value.

10.10   Azimuth

The number reported in the **Azimuth** window is the average azimuth over a one-second interval. This number is reported in pixels. One pixel azimuth represents about 0.3 degrees of rotation. Using the Cat. No. 530 Test Film, adjust the azimuth until the number in the window matches the number indicated on the film.

10.11   Vertical Jitter

The number reported in the **Vertical Jitter** window is the peak variation of the Dolby Digital block from its nominal position between two adjacent sprocket holes over an interval of time. The number is reported in mils. Observing the number over time gives the user an indication of any jitter in the reader. Typically, the variation over a few seconds is seen to be about 1.0 mils. Excessive jitter, indicated by a higher number, may indicate mechanical problems in the projector or soundhead.