

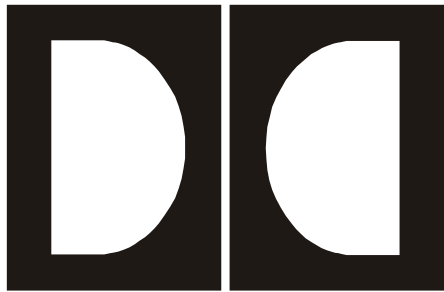
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Dolby
Model CP650
Digital Cinema Sound
Processor Setup Software

DPN 91694

Issue 2

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Chapter 1

Introduction

1.1 Scope of this Manual

This manual describes the use of the **CP650 Setup Program**, a Windows application for configuring the CP650 and the **Reader Alignment Program**.

1.2 Related Documents

Model CP650 Digital Cinema Sound Processor, Dolby Part No. 91569.

1.3 Software Description

This software is designed to set up and configure the Dolby CP650 from a Windows 95, Windows 98, or Windows NT computer. The software can be run either as a stand-alone application or connected to a CP650. In either case, parameter files can be saved on the PC hard disk for later retrieval and editing.

1.4 System Requirements

The CP650 Setup software and the Reader Alignment program will run on Windows 95, Windows 98, or Windows NT 4.0 or later. The computer used should be a 486-type or better and have ten megabytes of available disk space. Only a single instance of each application can run at one time.

1.5 Hardware Connection

1. Connect an RS-232 serial cable (pin-to-pin) to any available serial port on your Windows machine.
2. Connect the other end to the "SERIAL DATA" port on the CP650 (either front or rear port will do).

1.6 Software Installation

The CP650 Setup software may be provided on diskettes or CD ROM.

Note: If you have an earlier version of CP650 Setup installed, remove it before installing new software.

Diskette Installation

1. Place diskette 1 in the PC and run Setup.exe.
2. Select the desired language.
3. Following screen prompts until installation is complete.

CD ROM

1. Open the **CP650 Setup** folder and run Setup.exe.
2. Select the desired language.
3. Following screen prompts until installation is complete.

1.7 Launching the Setup Application

1. Launch the Dolby CP650 Software. Click the **Start** button and scroll to **Programs**. In the **Dolby** folder, select **CP650 PC Setup Software**.
 2. From the **Action** menu, select **Communications Setup**. Select the **Com** port to be used to communicate with the CP650.
 3. From the **Action** menu, select **Connect** to connect to the CP650.
-

4. You may be prompted to **Send** or **Retrieve** the settings. Once connected, the CP650 front panel should indicate *External Control Active*.
5. Adjust settings using the **Setup** window.

When **Connect** is selected from the menu or tool bar, Setup attempts to connect the selected communications port of the PC to the serial interface of the CP650. Upon connection, CP650 Setup will automatically retrieve the parameter file from the processor or will prompt to **Retrieve** or **Send** settings. If Retrieve is selected, Setup prompts to save the current settings (existing parameter file in the PC prior to retrieving settings from the CP650). If **Send** is selected, the parameter file that is open in the PC will be sent to the CP650.

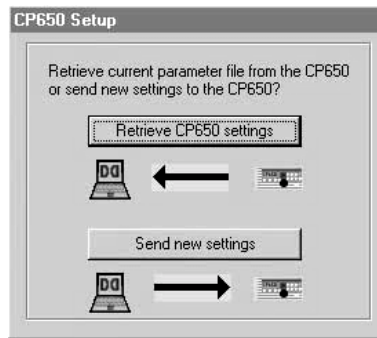


Figure 1-1 Retrieve/Send Dialog Box

Once connected, the user can adjust settings through the Setup tab property pages. Any changes to the settings, such as moving a slider control, are reflected immediately in the current operation of the CP650. Changes are saved to the permanent CP650 flash memory upon disconnect or exit from the **Setup** software. If the CP650 is turned off before disconnect from the **Setup** software, any parameter changes will be lost.

When connected, the fader knob is locked out.

Any adjustment marks the open parameter file as modified, and any attempt to exit or open a different file prompts the user to save the current file.

*Note: This is different from the front panel of the CP650 operation. On the front panel, you must explicitly **Save** each change via the **OK** button before leaving the screen for that setting.*

1.8 Launching the Reader Alignment Application

To launch the Reader Alignment application, click the **Start** button and scroll to **Programs**. In the **Dolby** folder, select **CP650 Reader Alignment**.

Chapter 2 Setup Window

The main window of **Setup** contains the title bar, which displays the application name and the name of the current parameter file, a menu bar, tool bar, status bar, and the tab property pages.

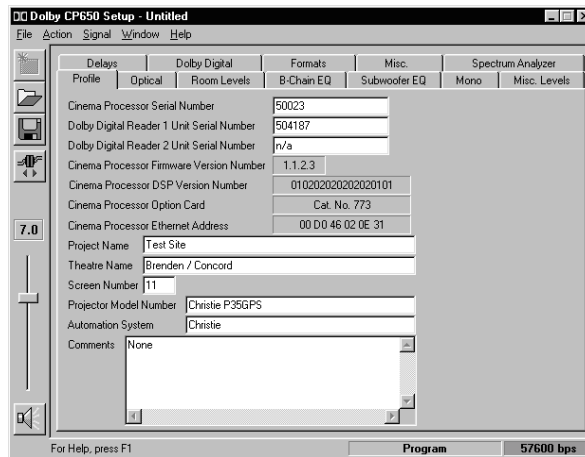


Figure 2-1 CP650 Setup Window

The program opens with a new, untitled **Setup** window. Once any setting is altered in the current parameter file, that file is thereafter known as “modified.” Once modified, any attempt to open a different file (new or existing) or exit the application will prompt the user to save the current settings. The file can be saved to the same file name that was opened or, in the case of the Untitled file, to a new file name on the PC. The user can work with the software at length in this manner to create files with different configurations, all without ever connecting to a cinema processor.

Note: A number of setup tabs cause the format of the CP650 to change automatically. This change will not be reflected on the front panel of the CP650.

When leaving a tab that has forced a format change, the previous format is restored.

2.1 Menus

2.1.1 File Menu

New – Ctrl+N

When a **New** file is requested, the current document is closed (the user will be prompted to save if the current document has been modified) and a new **Untitled** document with default settings is opened.

Open – Ctrl+O

Open an existing file from the PC file system, with a filter for *.dby files, CP650 configuration files. When a file is chosen, you will be prompted to save the current file if it has been modified.

Save – Ctrl+S

Use **Save** to save the current settings. In the case of an untitled document, there is a prompt for a file name.

Save As

Use **Save As** to save the current settings to a file other than the file open in the **Setup** window. That file then becomes the current **Setup** file.

Revert to Saved

Use **Revert to Saved** to ignore any changes made to the open file and revert to the previously saved version of the file. A confirmation prompt is displayed. After the original file is loaded, the settings are automatically sent to the CP650 if connected.

Previous Files

When the **File** menu is opened, a list of the most recently used files from the PC file system is displayed.

Exit – Alt+F4

This command will disconnect from the CP650 if connected, close the current document, prompt to save if modified, and exit the application. This operation is canceled if the user chooses **Cancel** when prompted to save the current modified document.

2.1.2 Action Menu**Connect/Disconnect**

The **Connect** command is used to establish a serial connection to a CP650. After connecting, this **Action** menu command changes to **Disconnect**. The **Disconnect** action severs the serial connection and restores the CP650 to normal stand-alone operation. There is no confirmation prompt when **Disconnect** is selected. After disconnecting, the **Action** menu command changes back to **Connect**.

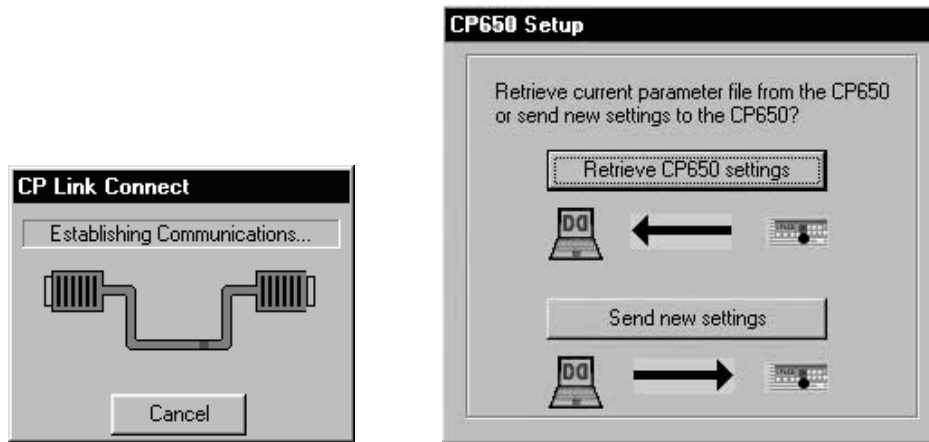


Figure 2-2 Connecting to the CP650

If successfully connected, the prompt to either **Send** or **Retrieve** settings is displayed. Pressing **Esc** at this time will cancel the connection.

Update Software – Ctrl+U

The CP650 software may be updated from a file on the PC. The CP650 will automatically reboot once the software update is complete. Following the reboot, CP650 Setup will refresh the CP650 settings to the same state they were in prior to the update.

One of the key functions of the **Setup** software is to update the embedded control and DSP code in the flash memory of the cinema processor. The update comes as a single

package that represents a complete system snapshot. This package is available from a distribution disk or the Dolby extranet website. Upon selection of the **Update Software** action, **Setup** will prompt to save the current settings before proceeding. This is not absolutely necessary as the existing parameters will be packaged with the new software, however, it is always a good idea to save settings. **Setup** will present an **Open file** dialog to locate the file on disk. The software update file will have a file extension of .bin. Upon reading this file, **Setup** will present the **Update Software** dialog that displays:

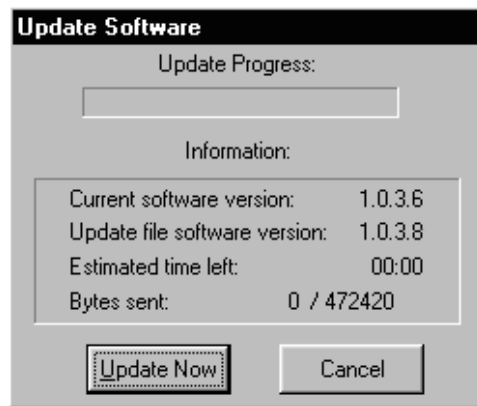


Figure 2-3 Update Software

Mute – Ctrl+M

The **Action** menu **Mute** command is equivalent to pushing the **Mute** button on the front panel or clicking the **Mute** button on the **Setup** toolbar. The command toggles the mute state of the CP650.

Communications Setup

Use the **Communications Setup** command to select the serial connection to the CP650. A list of the communication ports is displayed.

2.1.3 Signal Menu

The **Signal** menu allows the selection of the signal to be used for several alignment operations. Certain setup tabs will force or provide their own signal selection options. The current signal selection is displayed in the status bar area at the bottom of the main window.

Program

Selecting **Program** effectively restores the cinema processor to the last film format that was in effect.

The available test signals available on the CP650 are:

- 100 Hz Sine Wave
- 1 kHz Sine Wave
- 10 kHz Sine Wave
- Thump, at 1-second intervals - this low-frequency signal is used with the phase checker.

2.1.4 Window Menu

Event Log – Ctrl+E

The **Event Log** command displays the **Event Log** window. The **Event Log** immediately receives and displays the current event log information from the cinema processor. This log includes a date/time stamp, summary, and description for each event. The source and details of each event are determined by the cinema processor control software.

The **Event Log** window provides options for printing the **Event Log** and saving the **Event Log** as text.

2.1.5 Help Menu

About this Cinema Processor...

This window displays the firmware version and Ethernet address.

About this Software...

This window displays the revision number of the **Setup** software, and copyright and license information.

2.1.6 Tool Bar

The main frame tool bar includes buttons for quick access to commonly used menu commands, a master fader, and mute control. The tool bar is oriented vertically on the left edge of the frame and contains buttons for the following commands:



New

When a **New** file is requested, the current document is closed (a prompt to save the current document if it has been modified will appear) and a new **Untitled** document with default settings is opened.



Open

Use the **Open** command to open an existing file from the PC file system. Cinema Processor files have the extension .dby. If a file is chosen, the current file is closed with a prompt to **Save** if modified.



Save

Save is enabled if the current document is modified. It saves the current settings document with the same name. In the case of an untitled document, the user is prompted for a file name. After performing a **Save**, the **Save** menu option is disabled as the document is no longer modified.




Connect/Disconnect

Use the **Connect** command to establish a serial connection to the cinema processor. If successfully connected, follow the prompt to either **Send** or **Retrieve** settings as necessary. After connecting, this command changes to **Disconnect**.

The **Disconnect** action severs the serial connection and restores the CP650 to normal stand-alone operation. The **Setup** software does NOT prompt, save, exit, close, or otherwise alter the current parameter file when disconnecting. The **Disconnect** command then changes back to **Connect**. Upon disconnection, any changes made to the CP650 settings are made part of the permanent flash memory in the unit.

7.0

Master Fader

The function of the fader is to adjust the gain of the output according to the Fader Law shown in Figure 2-4 **Fader Law**. As the Fader increases from 0 to 4 in increments of 0.1, the gain will increase from -90 dB to -10 dB. This translates to an increase of 20 dB per whole fader unit. As the fader increases from 4 to 10 in increments of 0.1, the gain will increase from -10 dB to 10 dB. This translates to an increase of $3 \frac{1}{3}$ dB per fader unit. The fader level is displayed on the CP650 front panel in a two-digit, seven-segment display.

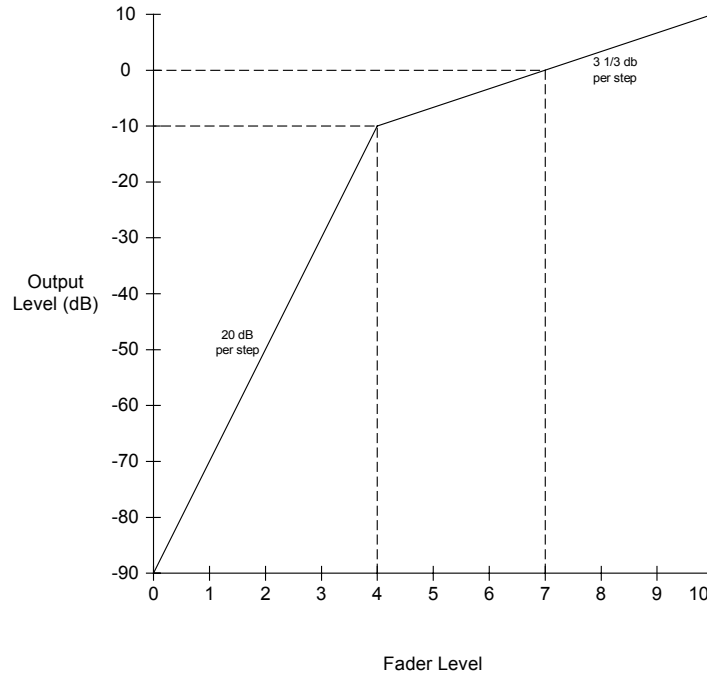


Figure 2-4 Fader Law

The master fader includes a fader level display, a slider to adjust the level, and a mute button that correspond directly to the analogous display and controls on the front panel of the cinema processor. The master fader is enabled whenever the **Setup**

software is connected, except when a tab is displayed which prescribes that the master fader be fixed at 7.0 (e.g., B-Chain EQ, Room Levels when **Pink Noise** is selected).



Mute

The **Mute** button controls the master mute function of the CP650. When the mute function has been activated, the **Mute** key on the CP650 front panel will flash. When the unit is unmuted, the illumination will extinguish. The speed at which the mute/unmute functions occur are set with the **Fade In Speed** and **Fade Out Speed** control described in Section 2.12.1.

2.1.7 Status Bar

This area at the bottom of the main window displays help text for menu options, the current status of the signal source, and the cinema processor link status, **Connected** along with the baud rate or **Disconnected**.

2.2 Profile Tab

This tab allows the user to enter identifying information about the cinema processor, theatre, and settings file. The entries made on this tab are not stored in the cinema

processor. When a new file is created (at startup or by using **File->New**), this becomes the top tab, and the cursor is set to the first field for data entry.

The **Profile** tab should be used to record system configuration details. The information entered, along with the setup parameters, can then be saved to a file and reloaded as needed.

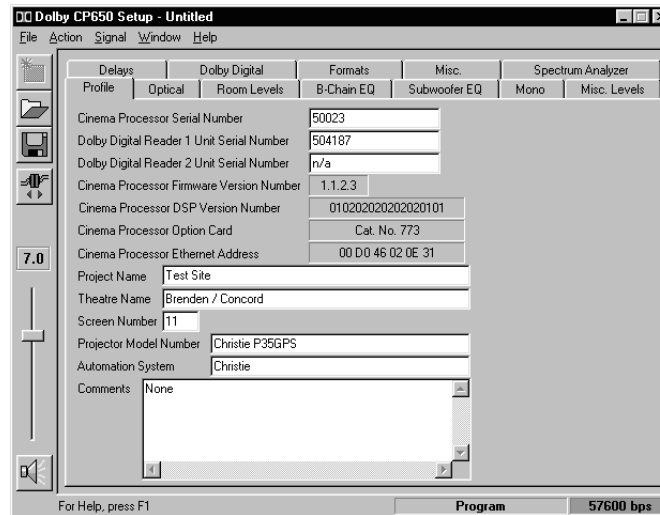


Figure 2-5 Setup Profile Tab

2.2.1 Cinema Processor Serial Number

Enter the serial number of the cinema processor to maintain a full record of the system setup.

2.2.2 Dolby Digital Reader 1/2 Unit Serial Number

Enter the digital reader serial numbers to maintain a full record of the system setup.

2.2.3 Cinema Processor Firmware Version Number

Information about the cinema processor is sent from the CP650 to the PC when a connection is made. The **Firmware Version Number**, **DSP Version Number**, **Option Card**, and **Ethernet address** will then be displayed.

2.2.4 Cinema Processor DSP Version Number

The CP650 module version string is sent from the CP650 to the PC when a connection is made.

2.2.5 Cinema Processor Option Card

Information about installed option cards is sent from the CP650 to the PC when a connection is made.

2.2.6 CP650 Ethernet address

If an Ethernet card is installed in the CP650, the address will be read by the PC and displayed on this tab.

2.2.7 Additional Fields

Enter data for the remaining fields as desired: **Project Name, Theatre Name, Screen Number, Projector Model Number, Automation System, and Comments.**

2.3 Optical Tab

This tab is used to configure the optical settings in the cinema processor, including level and slit-loss equalization. When the Optical tab is selected, the format automatically changes to Mono (Format 01). Optical adjustments require the use of Cat. No. 69T and Cat. No. 69P test film.

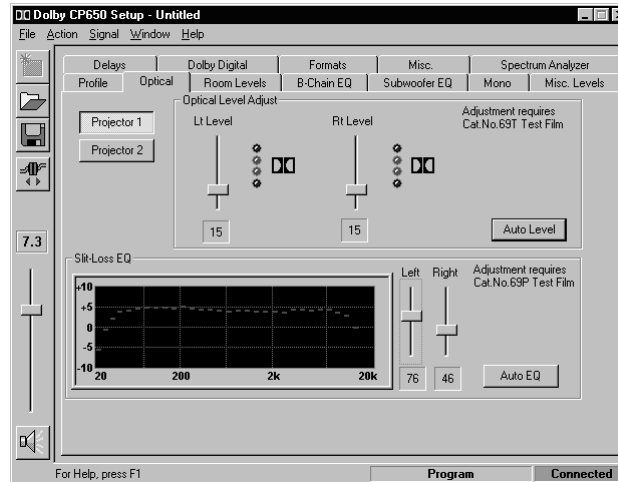


Figure 2-6 Setup Optical Tab

2.3.1 Projector 1/2

Click on **Projector 1** or **Projector 2** to begin adjustment of projector one or two.

2.3.2 Lt Level and Rt Level Adjustments

While running Cat. No. 69T, Dolby Tone Test Film, Lt and Rt may be adjusted individually using the associated slider until both green elements are illuminated.

(Click **Lt** or **Rt Level** slider to activate the spectrum analyzer display.) This assures the correct input level to the CP650. Alternately, click **Auto Level** to allow the CP650 to perform the adjustment.

2.3.3 Auto Level

Click **Auto Level** to allow the CP650 to automatically adjust the Lt and Rt preamp gain levels.

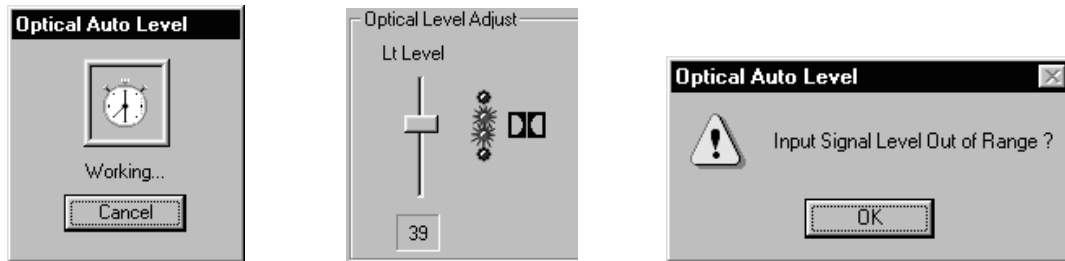


Figure 2-7 Auto Level in Progress Adjustment Complete

Level Out of Range

2.3.4 Slit-Loss EQ

The **Slit-Loss EQ** is an equalization curve that compensates for optical deficiencies that result from slit height variations. The curve provides a unique high-frequency

boost that compensates for these variations. The level of correction necessary will vary by reader type. Typically, reverse-scan basement readers require less adjustment than forward-scan readers.

2.3.5 **Left/Right**

Adjust the **Left** and **Right** Slit-Loss EQ for the most extended high-frequency response without forming a peak.

2.3.6 **Auto EQ**

Alternately, click **Auto EQ** to allow the CP650 to perform the adjustment. A dramatic difference in the Left and Right levels may indicate an optical problem.

2.4 **Room Levels Tab**

The current signal selection (Pink Noise, program, 100 Hz, etc.) is maintained between pages that support the Pink Noise option (B-Chain EQ, Room Levels, and Subwoofer EQ) Switching the signal mode to Pink Noise clears all the channels.

With **Pink Noise** on, all channels are mutually exclusive—selecting any one clears any other selection. To select multiple surround channels, hold the **Control** key down

while making selections. Screen channels cannot be used in combinations in Pink Noise mode. The subwoofer channel is independent in all cases.

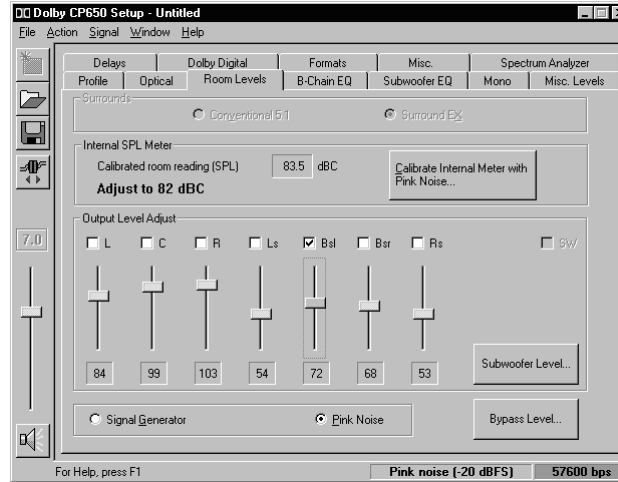


Figure 2-8 Setup Room Levels Tab

2.4.1 Surrounds

Surrounds define the configuration of the surround channels for output-level adjust and B-Chain EQ. If operating disconnected, the interface provides two options for surround configuration. If connected and a **Surround EX** adapter card is installed in

the CP650, the selection is forced to **Surround EX** and the button is disabled. If no **Surround EX** card is installed, the **Surround EX** button choice is not available.

Conventional 5.1

This is the default setting. Dolby Digital utilizes discrete left and right surround channels. During optical film playback, both Ls and Rs are fed an identical mono surround signal.

Surround EX

Surround EX includes channels **Ls**, **Bsl** (Back Surround Left), **Bsr** (Back Surround Right), and **Rs**.

2.4.2 SPL Meter

The Internal SPL meter can be used to set room levels of each channel if calibrated. The microphone is connected through either the rear XLR connector or the front **Mic Mux** connector.

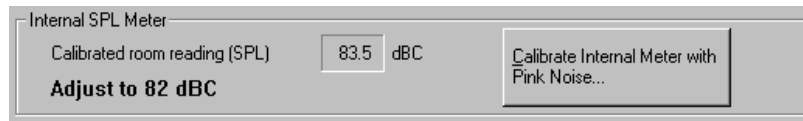


Figure 2-9 Internal SPL Meter

2.4.3 Internal Calibration

Click **Calibrate Internal Meter** to enable microphone calibration. Pink Noise will be routed through the center channel. While using an external SPL meter in close proximity to the microphone, dial in the SPL reading to match what is detected in the theatre. Click **Calibrate** to calibrate the CP650 and microphone to the SPL reading. If an error message occurs indicating the microphone level is too low, check your connections, phantom power and mic level trimpot located on the front panel of the CP650.



Figure 2-10 Error Message for Failed Calibration

2.4.4 Output Level Adjust

This group provides checkbox, label, static value display, and slider controls for each channel as determined by the current Surround configuration. The value always displays the current channel slider setting which, when connected, always matches the setting currently in use in the cinema processor. When leaving the **Room Levels** page, all channels are activated.

Subwoofer Level

Clicking this button brings up the **Subwoofer Level** dialog box. This window provides for level trim of the two subwoofer modes, optical and digital. Checkboxes are provided to turn **Center Noise** and **Reverse Sub Polarity** on and off when the **Optical Level** is selected; these checkboxes are disabled when **Digital Level** is selected.

***Note:** The reference values will not be displayed on the Subwoofer spectrum analyzer until the microphone is calibrated.*

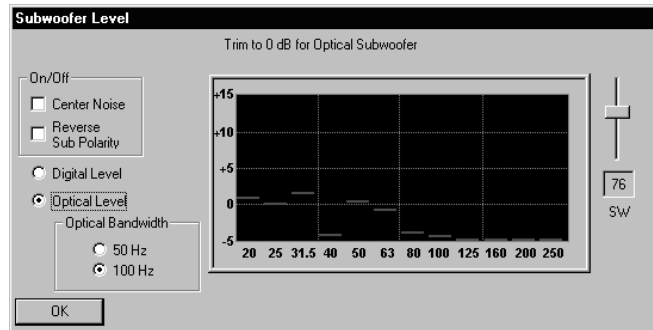


Figure 2-11 Subwoofer Level

The initial level setting for the digital subwoofer is 1. The optical subwoofer level is relative to the digital level. If making adjustments to one, check the other.

Center Noise and **Reverse Sub Polarity** are only available when adjusting the Optical Subwoofer Level.

The **Center Noise** checkbox corresponds to the **Center** channel checkbox on the **Room Levels** tab. It is initially selected if the **Center** channel checkbox was selected on the **Room Levels** tab. If using the Setup analyzer, **Center Noise** should come up to the 0 dB line. Digital subwoofer level should be trimmed to +10 dB while the optical subwoofer level should be trimmed to 0 dB.

The **Reverse Sub Polarity** checkbox is initially clear. It is used to check for subwoofer center channel phase matching. With **Optical Level** and **Center Noise** selected, there should be some adding of the lower frequencies; with **Reverse Sub Polarity** selected, there should be some noticeable subtraction of lower frequencies. If the **Reverse Sub Polarity** checkbox is set when leaving the **Subwoofer Level** window, a warning message to verify speaker connections is displayed and the polarity returned to normal.

2.4.5 Signal

Signal Generator

The **Signal Generator** selection is maintained between pages that support the Pink Noise option (B-Chain EQ, Room Levels, and Subwoofer EQ).

Pink Noise

Dolby Level pink noise is used when this is selected. Initial selection of this option clears all output channels. The user must then manually select to which channels to apply the noise. If **Pink Noise** is selected when switching to a different setup tab, the noise is turned off, and the signal output is returned to the global signal generator setting.

2.4.6 Bypass

Pressing the **Bypass Level** button invokes the **Bypass Level Adjust** window. This places the CP650 in Format 05. Clicking the **Bypass On** checkbox switches the CP650 into **Bypass** mode. Adjust the **Bypass Level** trimpot to match the SPL of the same film in Format 05.



Figure 2-12 Bypass Level Adjust

2.5 B-Chain EQ Tab

The **B-Chain EQ** tab is used to adjust each channel's frequency response to achieve the desired response curve. This is achieved by using a combination of bulk and one-third octave EQ.

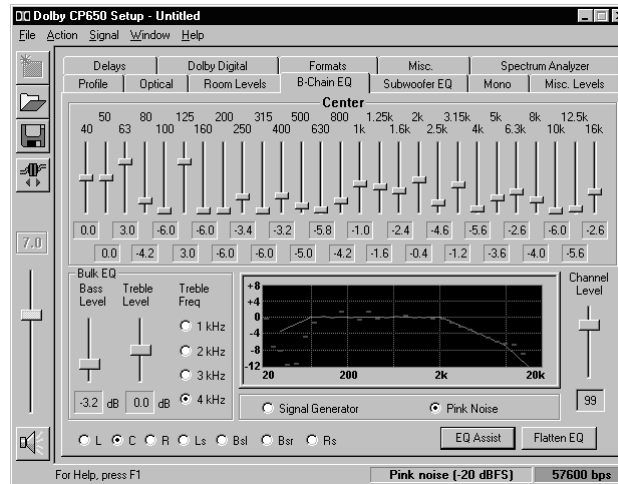


Figure 2-13 Setup B-Chain EQ Tab

2.5.1 Channels

The current channel name appears at the top of the **B-Chain EQ** tab, as selected at the bottom of the tab. The solid line on the graph represents the standard ISO 2969 curve. When one of the frequency sliders is selected, the corresponding line segment is yellow. The slider can then be adjusted for boost or cut.

With the cursor anywhere on the B-Chain EQ tab, click the right mouse button to display Copy and Paste functions. These may be used to copy frequency settings from one channel to another.

2.5.2 EQ Assist

Use this button to apply an approximation algorithm to bring the EQ for the channel close to the desired response curve. **Bulk EQ** as well as amplifier gains should always be adjusted before applying **EQ Assist**. **EQ Assist** is only enabled if the internal SPL meter has been calibrated on the **Room Levels** screen and **Pink Noise** is activated.

2.5.3 Flatten EQ

Click **Flatten EQ** to return all frequency bands to zero. A prompt will appear for confirmation.

2.5.4 Bulk EQ

Bulk EQ is used to adjust the bulk equalizers. It is important to adjust both the **Bass** and the **Treble EQ** prior to adjusting the individual one-third-octave bands.

Bass Level

The **Bass Level** is adjustable from -6 to $+6$ dB in 0.2 dB steps. Use the slider to make adjustments to match the reference curve.

Treble Level

The **Treble Level** is adjustable from -10 to $+10$ dB in 0.2 dB steps.

Treble Freq

The treble corner frequency can be 1, 2, 3, or 4 kHz, and only applies to the Left, Center, and Right channels. Adjust to match the reference curve as closely as possible. (The corner frequency is fixed at 2 kHz for the surround channels.)

2.5.5 Channel Level

This slider may be used to adjust the output level of the currently selected channel and is reflected on the **Room Levels** tab. This will not affect the overall level seen on the

spectrum analyzer because the average of frequency bands 7 through 20 is always placed at 0 dB.

2.5.6 Signal Generator/Pink Noise

Buttons are provided to select the signal source as **Signal Generator** or **Pink Noise**. The spectrum analyzer is only active when **Pink Noise** is selected.

2.6 Subwoofer EQ Tab

This screen is used to adjust the subwoofer's parametric equalizer. The three parameters that define the equalizer are **Frequency**, **Q**, and **Cut**. Identify a frequency region that may contain a peak and adjust the parametric equalizer to obtain a flatter response. Note that the vertical axis will be unlabeled if the **Internal SPL Meter** was not calibrated from the **Room Levels** tab.

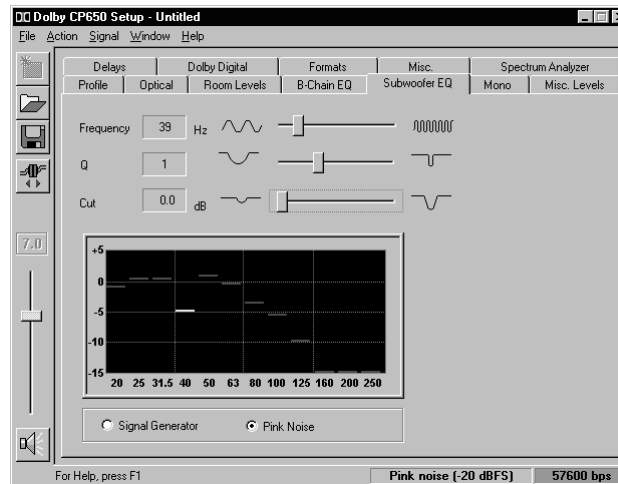


Figure 2-14 Setup Subwoofer EQ Tab

2.6.1 Frequency

The filter's center **Frequency** is adjustable from 25 to 125 Hz. The approximate corresponding band will be highlighted on the real-time analyzer.

2.6.2 Q

The **Q** defines the width of the **Cut** band. The **Q** settings are 0.5, 1, 2, and 4.

2.6.3 **Cut**

The **Cut** value is applied to the center **Frequency** as selected above, reducing the output level in the **Q** region. The cut amount is adjustable between 0 and -12.0 dB in 0.2 dB steps.

2.6.4 **Graph**

When Pink Noise is activated, the graph will display the subwoofer frequency response. With 0.0 dB of **Cut**, no cut, identify the frequency region with the tallest bump. Adjust **Frequency**, **Q**, and **Cut** to achieve the flattest frequency response.

2.6.5 **Signal Generator/Pink Noise**

Buttons are provided to select the signal source as **Signal Generator** or **Pink Noise**.

2.7 **Mono Tab**

Selecting the **Mono** tab sets the CP650 to Format 01. The functions on this tab apply to the Center channel while in Format 01.

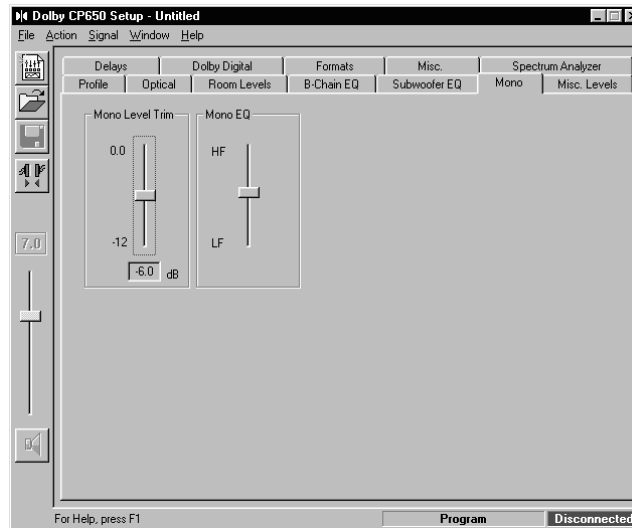


Figure 2-15 Setup Mono Tab

2.7.1 Mono Level Trim

Mono Level Trim adjustment can vary between -12 dB and 0 dB in 0.2 dB steps. This trim is an offset from the normal playback level.

2.7.2 Mono EQ

While monitoring film program material, adjust **Mono EQ** for preferred audio tonal quality. There are 16 steps between the low-frequency and high-frequency settings for the **Mono EQ**.

2.8 Misc Levels Tab

The **Misc Levels** tab provides sliders for adjusting the **Optical Surround Level Trim** and **Nonsync 1** and **2** levels.

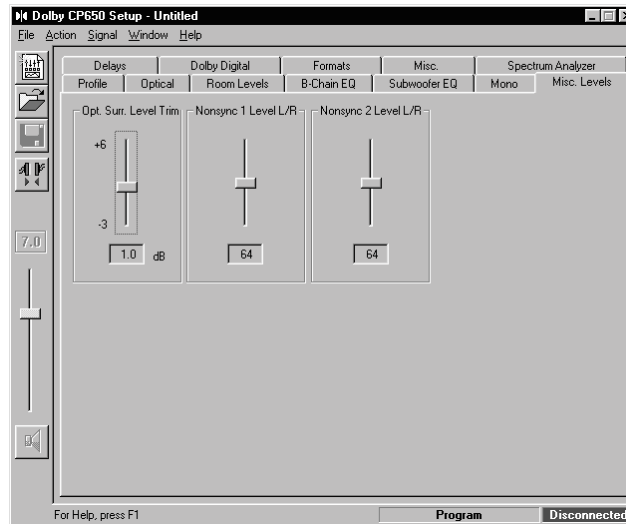


Figure 2-16 Setup Miscellaneous Levels Tab

2.8.1 Opt. Surr. Level Trim

The **Optical Surround Level Trim** is adjustable from -3 dB to +6 dB in 0.2 dB steps. This applies to optical surround playback.

2.8.2 Nonsync 1 and 2 Level

The **Nonsync 1** and **2** adjustments are controlled by sliders. The number is unitless, and ranges from 1 to 127.

2.9 Delays Tab

The **Optical Surround Delay** should be adjusted so that sounds from the rear of the theatre (surround channels) arrive at the listener's ear approximately 20 ms after the arrival of sound from the screen speakers.

The **Digital Surround Delay** should be adjusted so that sounds from the rear of the theatre arrive at the listener's ear at the same time as the screen speakers.

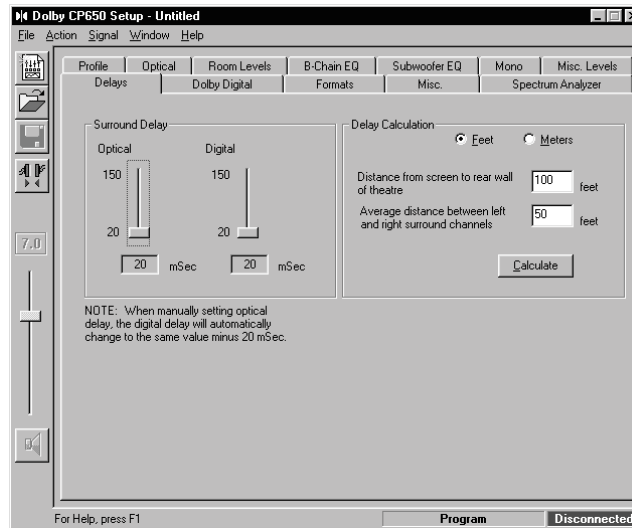


Figure 2-17 Setup Delays Tab

2.9.1 Surround Delay

Optical

The **Optical Surround Delay** is adjustable from 20 to 150 ms in 1 ms steps. When the **Optical** delay level is set manually, the **Digital** delay will automatically change to the same level minus 20 ms.

Digital

The **Digital Surround Delay** is adjustable from 20 to 150 milliseconds in 1 ms steps.

2.9.2 Delay Calculation

The Setup program can calculate and set both **Optical** and **Digital Surround Delay** values based on theatre measurements entered here.

Feet/Meters

Measurements may be made in **Feet** or **Meters**. Select the desired units.

Distance from screen to rear wall of theatre

Values must be between 10 and 200, **Feet** or **Meters**.

Average distance between left and right surround channels

Values must be between 10 and 140, **Feet** or **Meters**.

Calculate

Click **Calculate** to calculate and automatically set the **Surround Delay**.

2.10 Dolby Digital Tab

Selecting the **Dolby Digital** tab automatically sets the CP650 to Format 10, Dolby Digital.

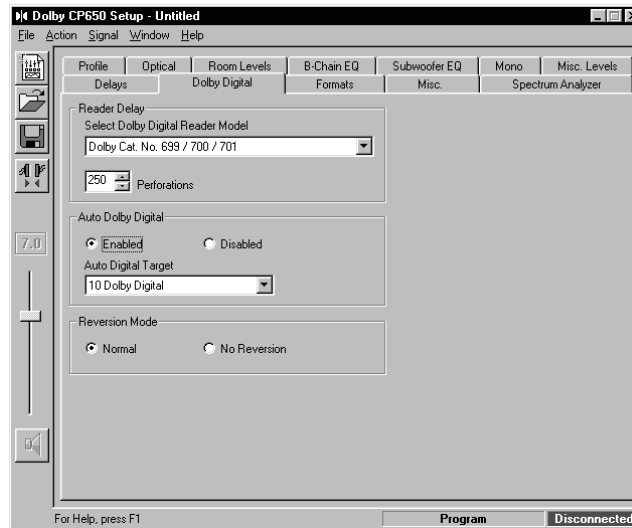


Figure 2-18 Setup Dolby Digital Tab

2.10.1 Reader Delay

Reader Delay adjustment is used to synchronize the digital soundtrack with the analog track and the picture. It can be set by selecting the reader model or by manually adjusting the number of perforations when using the Cat 1010 Sync Test Film.

Select Dolby Digital Reader Model

The specific reader model selection is shown in Table 2-1.

Table 2-1 Dolby Digital Reader Models

| Reader Model | Perforations |
|---|---------------------|
| Other (default) | 20 |
| Dolby Cat. No. 699/700/701 | 250 |
| Ballantyne 35 penthouse | 247 |
| Century Projector with Component Engineering or Kelmar basement | 20 |
| Century 35mm (SA) penthouse | 245 |
| Century 35/70 (JJ) penthouse | 309 |
| Christie basement | 26 |
| Christie penthouse | 250 |
| Cinemeccanica V5 basement | 28 |
| Cinemeccanica V5 penthouse | 252 |
| Cinemacconica V8 penthouse | 260 |
| Kinoton FP30 | 21 |
| Norelco/Kinoton AAll (DP70) penthouse | 283 |
| Simplex with Component Engineering or Kelmar basement | 26 |
| Simplex 35mm (XL) penthouse | 242 |
| Simplex 35/70 penthouse | 298 |

Perforations

The number of **Perforations** to delay can be set from 16 to 512 using the up and down arrows. When a reader is selected, as described above, the number of perforations changes accordingly.

2.10.2 Auto Dolby Digital

If Dolby Digital is playing and another film format is selected the CP650 will go into the selected format, and auto digital is temporarily disabled. **Auto Digital** will be re-enabled when a non-film format is asserted and then a film format is asserted. At that time the system is ready to automatically go into the target format when Dolby Digital audio appears.

Auto Digital Target

The **Auto Digital Target** may be format 10, or format 13 if a Surround EX card is installed.

2.10.3 Reversion Mode

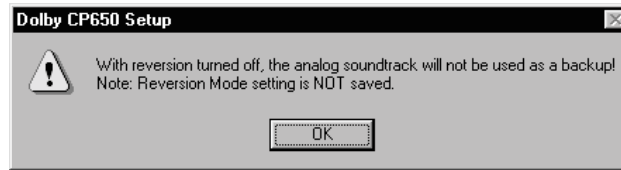


Figure 2-19 No Reversion Warning

With **Reversion Mode** set to **Normal**, the audio may revert to the analog soundtrack if necessary. A setting of **No Reversion** will keep the CP650 in the target format regardless of the condition of the Dolby Digital data.

2.11 Formats Tab

Use the **Formats** tab to enable and assign **Preset Fader Settings**, **User formats**, and to select the **Power-on Format**.



Figure 2-20 Setup Dolby Digital Tab

2.11.1 Enable Preset Fader Setting

Click on a box to enable the **Preset Fader**. Use the up and down arrows to modify the **Fader Setting** between 0 and 10.0. The default **Fader Setting** is **7.0**.

User 1, User 2, and Nonsync

User 1, **User 2**, and **Nonsync** may be set to any of the formats listed in Table 2-2.

Table 2-2 Fader Setting Formats

| Number | Format | Number | Format |
|--------|---------------------------|--------|---|
| 01 | Mono | 64 | Public Address Center Channel |
| 04 | Dolby A-type | 65 | Public Address Surround Channels |
| 05 | Dolby SR | 66 | Test Tone 320 Hz |
| 10 | Dolby Digital | 70 | Video PA (NS1) |
| 11 | External 6-Channel | 71 | Video Mono (NS1) |
| 13 | Dolby Digital Surround EX | 73 | Video LCR (NS1) |
| 20 | 35 mm Magnetic, 3-Channel | 74 | Video Pro Logic no Subwoofer (NS1) |
| 22 | 35 mm Magnetic, 4-Channel | 75 | Video Pro Logic with Subwoofer (NS1) |
| 42 | 70 mm Dolby Stereo | 80 | Digital Input |
| 60 | Nonsync 1 | 81 | External Dolby Digital with Surround EX |
| 61 | Nonsync 2 | 87 | External 6-Channel with Surround EX |

2.11.2 Power-On Format

Select the audio format for the CP650 when power is turned on.

Table 2-3 Power On Formats

| Power On Formats |
|-------------------------|
| Last Format |
| Format 01 |
| Format 04 |
| Format 05 |
| Format 10 |
| Format 11 |
| User 1 |
| User 2 |
| Nonsync |

2.12 Misc. Tab

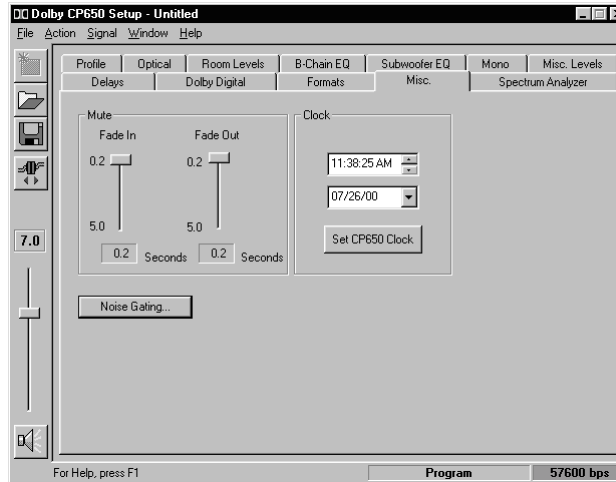


Figure 2-21 Setup Miscellaneous Tab

2.12.1 Mute

The length of time for sound to fade from normal to mute, when **Mute** is selected, is the **Fade Out Speed**. The time to return from muted to normal is the **Fade In Speed**. Both are adjustable from 0.2 to 5.0 seconds in 0.1-second intervals using the appropriate slider.

2.12.2 Clock

The current PC time and date are displayed. Use the **Set CP650 Clock** button to synchronize the CP650 clock to the PC time.

2.12.3 Noise Gating

Pressing this button will put the CP650 in noise gate mode. Click **OK** to exit the noise gate mode. When in noise gating mode, an automation line will control an internal pink noise source. Pink noise is activated by shorting the automation line associated pin to ground (pin 12); pin numbers 1 through 8 represent L, C, R, Ls, Rs, SW, all and Bs.

2.13 Spectrum Analyzer Tab

The **Spectrum Analyzer** tab displays the frequency response of the selected audio input. When the tab is selected, the default format is Nonsync 1. Only one channel may be selected at a time.

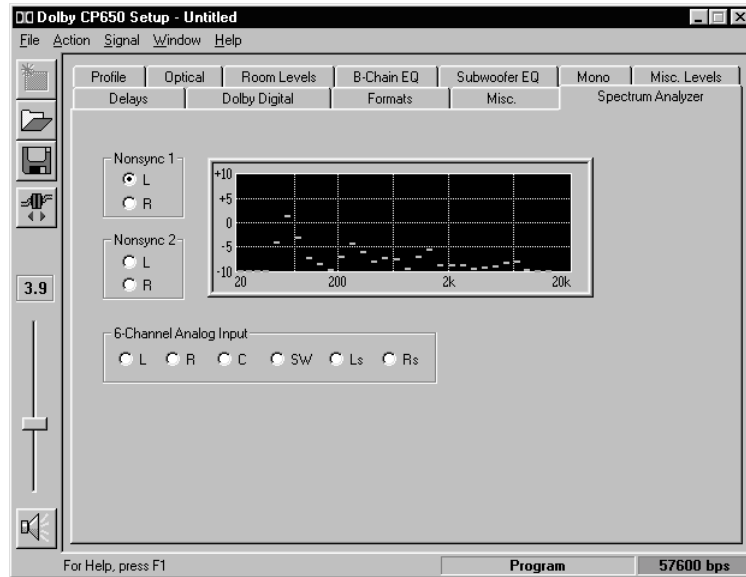


Figure 2-22 Setup Spectrum Analyzer

Chapter 3

Dolby Reader Alignment Program

When Dolby Digital film is played through the CP650, additional information on the Dolby Digital soundtrack is available from the cinema processor 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 the CP650 without impacting the unit's operation.

***Note:** This Dolby Reader Alignment software is for use on the CP650 only.*

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

The Reader Alignment window is an overlapping window that can show the current information coming from the CP650 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.

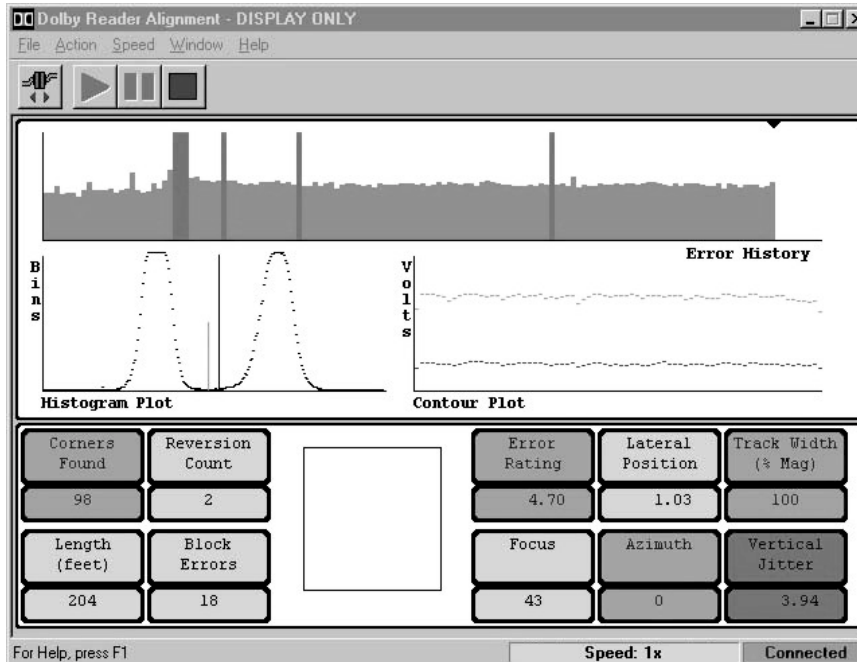


Figure 3-1 Dolby Reader Alignment Window

The Reader Alignment window contains the title bar, which displays **Dolby Reader Alignment** and the name of the current document, a menu bar, tool bar, 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

Selection of the mode is done through the **File** menu.

3.1 Menus

3.1.1 File Menu

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

New Display

This command is available only when the PC is connected to a CP650. It will close the current document and create a new *Display Only* document, which will NOT save the data stream to a file.

New Display & Log

This command is available only when the PC is connected to a CP650. 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 will save the new data to the given file for replay later or transmission to a remote site.

Open Existing QC File

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

Close Reader Alignment

This command will close the **Dolby Reader Alignment** window.

3.1.2 Action Menu

Connect/Disconnect

Use the **Connect** command to establish a serial connection to the CP650. Prompt to either SEND or RECEIVE settings for the main **Setup** frame as necessary. While connected, this command changes to **Disconnect**. The **Disconnect** action severs the serial connection with the CP650.

Run/Stop

Click **Run** to begin the display of the reader alignment data stream either from the CP650 or from the existing file already opened. After starting, the menu option changes to **Stop**. Choosing **Stop** will terminate the processing of the data stream or playback of the existing file.

Pause

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

Communications Setup

Select the PC Com port to use for the serial connection to the CP650.

3.1.3 Speed

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

Table 3-1 Playback Speeds

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

3.1.4 Window

Event Log

See Chapter 4.

3.1.5 Help

See Section 2.1.5, Help Menu.

3.2 Tool Bar

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



Connect/Disconnect

This corresponds to the **Action** menu **Connect/Disconnect** commands. See Section 3.1.2.



Run

This corresponds to the **Action** menu **Run** command. See Section 3.1.2.



Pause

This corresponds to the **Action** menu **Pause** command. See Section 3.1.2.



Stop

This corresponds to the **Action** menu **Stop** command. See Section 3.1.2.

3.3 Status Bar

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

3.4 Plot Window

3.4.1 Error History

The **Error History** graph shows the Error rating 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 3-2 Error History

3.4.2 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 1's and 0's. In reality, a Gaussian-like distribution is seen for both the dark areas and the light 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 3-3. 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 will cause broadening of the peaks.

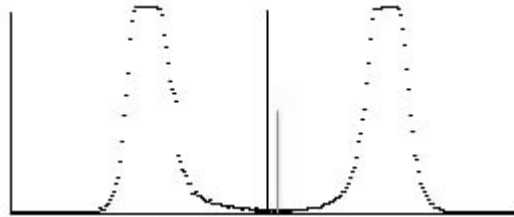


Figure 3-3 Typical Film Histogram

Figure 3-3 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.

3.4.3 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 3-4 Contour Plot

3.5 Quality Window

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

3.5.1 Corners Found

Registration patterns are placed in the four corners of every Dolby Digital block. They are used by the Digital Processor to locate 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.

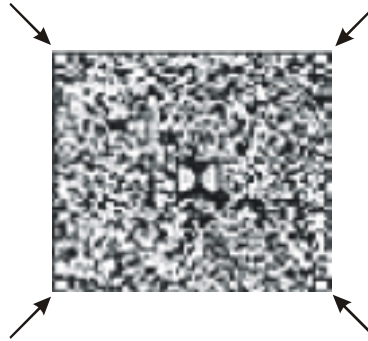


Figure 3-5 Dolby Digital Block Corners

3.5.2 Reversion Count

The CP650 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 will occur when there are many block errors close together.

3.5.3 Error Rating

The CP650 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. Low numbers indicate low error rate, higher numbers indicate higher error rate, mid range is typical. Block errors will cause an F to be displayed. Poor reader alignment or damaged film will directly effect error rate, and cause a higher number.

3.5.4 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 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.

3.5.5 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 should read 100%. If the magnification is too low, it will read lower, and if the magnification is too high, it will read 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.

3.5.6 Length (Feet)

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

3.5.7 Block Errors

The CP650 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.

3.5.8 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.

3.5.9 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.

3.5.10 **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.

3.5.11 **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 may indicate mechanical problems in the projector or soundhead.

Chapter 4 Event Log

Choosing the **Event Log** from the **Window** menu of either the setup program or the reader alignment program, brings up the Event Log window. The Event Log immediately receives and displays the current event log information from the CP650. This log includes a date/time stamp, summary, and description for each event.

The Event Log window provides options for loading the Event Log from the CP650 and saving the Event Log as text. An example is shown on the following page.

```
Cinema Processor Event Log
File      C:\650\South City 3 E. Log 4-5.txt
Date      05Apr2000
Time      11:14:20

System version  1.0.3.3
Setup version   1.0.8.4 Beta

Time                Summary                Description
----                -
23-MAR-00 14:53:35  Startup
27-MAR-00 09:19:07  Startup
27-MAR-00 12:10:33  Startup
```

Figure 4-1 Event Log Example
