



Dolby E

Model DP571 Encoder

Model DP572 Decoder

Multichannel Distribution System

User Manual

Issue 3

Version 1.05

Part No. 91685

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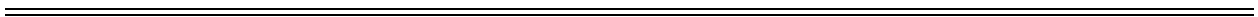
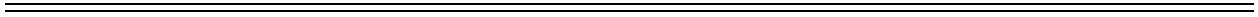
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Preface

Regulatory Notices

FCC

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 this 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 or her own expense.

Canada

This Class A digital apparatus complies with Canadian ICES-003.

UL

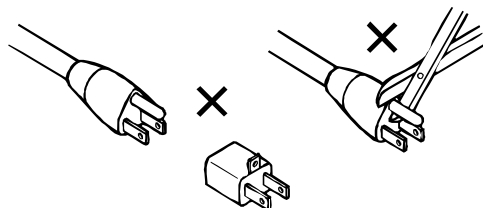
Troubleshooting must be performed by trained technicians. Do not attempt to service this equipment unless you are qualified to do so.



WARNING: Check that the correct fuses have been installed. To reduce the risk of fire, replace the fuses only with the same type and rating.

Exposed portions of the power supply are electrically “hot.” In order to reduce the risk of electrical shock, the power cord **MUST** be disconnected when the cover of this equipment is removed.

The ground terminal of the power plug is connected directly to the chassis of the unit. For continued protection against electric shock, a three-pin power outlet that is correctly wired and earthed must be used. Do not use a ground-lifting adapter and never cut the ground pin on the three-prong plug.



UK

As the colours of the cores in the mains lead may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:

- The core which is coloured green and yellow must be connected to the terminal in the plug which is marked with the letter *E* or by the earth symbol \perp or coloured green or green and yellow.
- The core which is coloured blue must be connected to the terminal which is marked with the letter *N* or coloured black.
- The core which is coloured brown must be connected to the terminal which is marked with the letter *L* or coloured red.

This apparatus must be earthed.

IEC Notices

This equipment complies with the EMC requirements of EN55103-1 and EN55103-2 when operated in an E2 environment in accordance with this manual. This equipment shall not be exposed to dripping or splashing and no objects filled with liquids, such as coffee cups, shall be placed on the equipment.

Important Safety Notice**GB**

This unit complies with the safety standard IEC65. To ensure safe operation and to guard against potential shock hazard or risk of fire, the following must be observed:

- If the unit has a voltage selector, ensure that it is set to the correct mains voltage for your supply. If there is no voltage selector, ensure that your supply is in the correct range for the input requirement of the unit.
- Ensure fuses fitted are the correct rating and type as marked on the unit.
- The unit must be earthed by connecting to a correctly wired and earthed power outlet.
- The power cord supplied with this unit must be wired as follows:
Live-Brown Neutral-Blue Earth-Green/Yellow
- The unit shall not be exposed to dripping or splashing and no objects filled with liquids, such as coffee cups, shall be placed on the equipment.

Important - Note de Securite**F**

Ce materiel est conforme à la norme IEC65. Pour vous assurer d'un fonctionnement sans danger et de prévenir tout choc électrique ou tout risque d'incendie, veuillez à observer les recommandations suivantes.

- Le selecteur de tension doit être placé sur la valeur correspondante à votre alimentation réseau.
- Les fusibles doivent correspondre à la valeur indiquée sur le materiel.
- Le materiel doit être correctement relié à la terre.
- Le cordon secteur livré avec le materiel doit être câblé de la manière suivante:
Phase-Brun Neutre-Bleu Terre-Vert/Jaune
- Ne pas exposer cet appareil aux éclaboussures ou aux gouttes de liquide. Ne pas poser d'objets remplis de liquide, tels que des tasses de café, sur l'appareil.

Wichtiger Sicherheitshinweis**D**

Dieses Gerät entspricht der Sicherheitsnorm IEC65. Für das sichere Funktionieren des Gerätes und zur Unfallverhütung (elektrischer Schlag, Feuer) sind die folgenden Regeln unbedingt einzuhalten:

- Der Spannungswähler muß auf Ihre Netzspannung eingestellt sein.
- Die Sicherungen müssen in Typ und Stromwert mit den Angaben auf dem Gerät übereinstimmen.
- Die Erdung des Gerätes muß über eine geerdete Steckdose gewährleistet sein.
- Das mitgelieferte Netzkabel muß wie folgt verdrahtet werden:
Phase-braun Nulleiter-blau Erde-grün/gelb
- Das Gerät darf nicht mit Flüssigkeiten (Spritzwasser usw.) in Berührung kommen; stellen Sie keine Gefäße, z.B. Kaffeetassen, auf das Gerät.

Norme di Sicurezza - Importante**I**

Questa apparecchiatura è stata costruita in accordo alle norme di sicurezza IEC 65. Per una perfetta sicurezza ed al fine di evitare eventuali rischi di scossa elettrica o d'incendio vanno osservate le seguenti misure di sicurezza:

- Assicurarsi che il selettore di cambio tensione sia posizionato sul valore corretto.
- Assicurarsi che la portata ed il tipo di fusibili siano quelli prescritti dalla casa costruttrice.
- L'apparecchiatura deve avere un collegamento di messa a terra ben eseguito; anche la connessione rete deve avere un collegamento a terra.
- Il cavo di alimentazione a corredo dell'apparecchiatura deve essere collegato come segue:
Filo tensione-Marrone Neutro-Blu Massa-Verde/Giallo
- Il prodotto non deve essere sottoposto a schizzi, spruzzi e gocciolamenti, e nessun tipo di oggetto riempito con liquidi, come ad esempio tazze di caffè, deve essere appoggiato sul dispositivo.

Aviso Importante De Seguridad

E

Esta unidad cumple con la norma de seguridad IEC65. Para asegurarse un funcionamiento seguro y prevenir cualquier posible peligro de descarga o riesgo de incendio, se han de observar las siguientes precauciones:

- Asegúrese que el selector de tensión esté ajustado a la tensión correcta para su alimentación.
- Asegúrese que los fusibles colocados son del tipo y valor correctos, tal como se marca en la unidad.
- La unidad debe ser puesta a tierra, conectándola a un conector de red correctamente cableado y puesto a tierra.
- El cable de red suministrado con esta unidad, debe ser cableado como sigue:
Vivo-Marrón Neutro-Azul Tierra-Verde/Amarill
- La unidad no debe ser expuesta a goteos o salpicaduras y no deben colocarse sobre el equipo recipientes con líquidos, como tazas de café.

Viktiga Säkerhetsåtgärder

S

Denna enhet uppfyller säkerhetsstandard IEC65. För att garantera säkerheten och gardera mot eventuell elchock eller brandrisk, måste följande observeras:

- Kontrollera att spänningsväljaren är inställd på korrekt nätspänning.
- Kontrollera att säkringarna är av rätt typ och för rätt strömstyrka så som anvisningarna på enheten föreskriver.
- Enheten måste vara jordad genom anslutning till ett korrekt kopplat och jordat el-uttag.
- El-sladden som medföljer denna enhet måste kopplas enligt följande:
Fas-Brun Neutral-Blå Jord-Grön/Gul
- Enheten får ej utsättas för yttre åverkan samt föremål innehållande vätska, såsom kaffemuggar, får ej placeras på utrustningen.

Belangrijk Veiligheids-voorschrift

NL

Deze unit voldoet aan de IEC65 veiligheids-standaards. Voor een veilig gebruik en om het gevaar van elektrische schokken en het risico van brand te vermijden, dienen de volgende regels in acht te worden genomen:

- Controleer of de spanningscarroussel op het juiste Voltage staat.
- Gebruik alleen zekeringen van de aangegeven typen en waarden.
- Aansluiting van de unit alleen aan een geaarde wandcontactdoos.
- De netkabel die met de unit wordt geleverd, moet als volgt worden aangesloten:
Fase-Bruin Nul-Blauw Aarde-Groen/Geel
- Dit apparaat mag niet worden blootgesteld aan vocht. Vanwege het risico dat er druppels in het apparaat vallen, dient u er geen vloeistoffen in bekertjes op te plaatsen.

Chapter 1

Introduction

The Dolby E multichannel distribution system is the first technology that can transport multichannel audio within the digital broadcast industry's current two-channel infrastructure. A single Dolby E bitstream can carry up to eight discrete audio channels, each with its associated Dolby Digital metadata, in a 16- or 20-bit, 48 kHz AES pair.

Since Dolby E's audio and video frame rates are identical, many common editing and switching practices can be performed on the encoded bitstream without causing mutes or other disturbances in the decoded PCM audio. For editing tasks that require decoding, Dolby E's sophisticated audio coding algorithm allows ten or more encode/decode cycles without audible degradation; this exceeds the requirements of even the most elaborate program contribution, distribution, and emission paths.

Even experienced studio engineers must learn new techniques and terminology to begin using these Dolby E devices. Fortunately, Dolby Laboratories has greatly simplified the process of getting started:

- The DP571 encoder and DP572 decoder employ an almost identical front-panel user interface. The devices are also similar to some of the Dolby Digital series of encoders and decoders, which may be familiar to broadcast engineers.
- Choosing the appropriate Program Configuration on the DP571 is logically connected to the application type. Selecting the Program Config sets most of the DP571 encoding parameters including the Dolby Digital metadata. Very few, if any, individual parameters need to be set.
- The DP572 decoder is almost entirely configured by the settings in the encoded Dolby E stream from the DP571.

We included both devices in one manual because they will almost always be used in the same system. This manual is organized to emphasize the similarities between the encoder and decoder, and to enable engineers with different learning styles access to the material in the manner they prefer.

The rest of this chapter presents important introductory information:

- Section 1.1 - *Unpacking and Inspection*
Discusses how to unpack, inspect, and check the fuses for both units.
- Section 1.2 - *System Considerations*
Discusses Dolby E's digital I/O, connector types, and signal characteristics.
- Section 1.3 - *Connection with the DP569 Multichannel Encoder*
Discusses connection with a Dolby E system and metadata setup of the Dolby Digital encoder.
- Section 1.4 - *Front-Panel User Interface*
Discusses how to navigate the menus, set new values, and interpret the LEDs.
- Section 1.5 - *Quickstart Guide for the DP571 and DP572*
This is the fastest way to begin encoding/decoding.

The remainder of the manual examines the devices and common applications in greater detail:

- Chapter 2 – *Common Dolby E Applications*
Emphasizes that most Dolby E applications fall into one of the types discussed in this chapter. Each application type strongly suggests a program configuration which, in turn, almost entirely configures both devices.
- Chapter 3 – *DP571 Dolby E Encoder* and Chapter 4 – *DP572 Dolby E Decoder*
Supplies detailed hardware and menu reference information about each device.
- Chapter 5 – *System Specifications*
Presents a complete specifications table.

1.1 Unpacking and Inspection

Before unpacking the unit, inspect the outer carton for shipping damage. If the carton shows damage, inspect the unit in those areas.

Several accessories are provided with the unit. These may include:

- Rack screws and washers
- Power cord
- BNC 75 Ω terminators, used on **Digital** and **Video Ref** inputs (Part No. 79114)
- Spare fuse 1 A (Part. No. 56016)
- Spare fuse, 2 A, used on the internal power supply (Part No. 56017)
- Hex wrench (to access inside of unit)

Carefully remove the unit from its carton, remove the plastic wrapping, and place on a flat surface. If there are no signs of damage, proceed to Section 1.1.1 - *Fusing Information*.

1.1.1 Fusing Information



WARNING: To reduce the risk of fire, replace fuses only with the same type and rating.

Each unit uses a universal switching power supply that handles the full range of nominal mains voltages between 90 and 264 VAC and any frequency between 50 and 60 Hz.

Check Main Fuse

T 1A L - 1 Amp, 250 V, 20 mm, time-lag fuse, low-breaking capacity (for all operating voltages)



WARNING: The power to the unit must be off when the following steps are performed. Ensure that the main power cable to the unit is not connected to a power source.

1. Open the fuse compartment door in the AC power input housing with a small flat-blade screwdriver (Figure 1-1).
2. Check that the fuse in the active (lower) fuse carrier is the correct rating. The fuse carrier must be inserted into the compartment with the orientation shown in Figure 1-1. *Do not force the carrier into the compartment or both could be damaged.*
3. Snap the fuse compartment door closed.

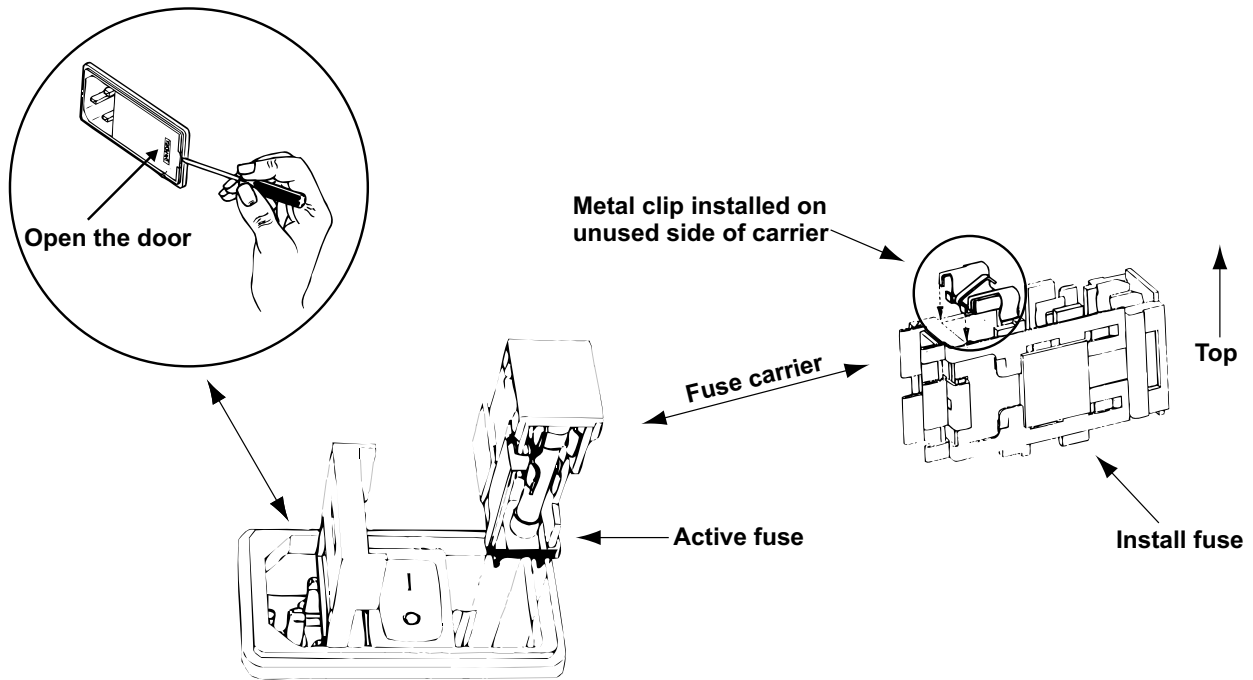


Figure 1-1 Checking the main fuse

Internal Fuse

The switching power supply contains a separate fuse. Most fault conditions should be protected by the main fuse. The internal fuse rating is:

F 2A L - 2 Amp, 250 V, 20 mm, fast-acting, low-breaking capacity (for all operating voltages)

1.2 System Considerations

1.2.1 Digital I/O

The digital input and output connections on the DP571 encoder and DP572 decoder may seem unfamiliar to the first time user of a digital audio device. The Audio Engineering Society (AES) created a standard electrical interface for digital audio with a balanced XLR connector and 110 Ω impedance called AES3-1995. This interface was later expanded to include an unbalanced BNC connector, 1 V peak-to-peak signal level, and 75 Ω impedance; the new standard is known as both AES3-ID-1995 and SMPTE-276M. The DP571 encoder and DP572 decoder use this new standard for both digital audio and Dolby E electrical interface connections.

Note: These signals must be properly terminated with a 75 Ω impedance at one point only. We recommend a standard video terminator.

1.2.2 Video Reference

One of Dolby E's most significant features is that the audio and video frame rates are identical. The DP571 encoder and DP572 decoder both require a reference video signal to lock the audio and video at frame boundaries. Standard black burst or color bars can be used as reference video if they are locked to the plant reference. A passive loop-through connection on the encoder and decoder can properly terminate the reference signal or distribute it to multiple devices.

Note: This reference signal must be terminated with a 75 Ω impedance on the last device in the signal chain.

1.2.3 Signal Characteristics

Although the Dolby E stream is carried on a standard AES pair, its format is different than that of a conventional digital audio signal. The PCM audio that normally comprises a digital audio signal is encoded, along with metadata and time code, into the Dolby E bitstream. The resulting data no longer directly represents the audio. Since a standard Dolby E signal can appear to the unwitting observer as a clipped or distorted digital audio signal, this section explains what to expect when measuring or monitoring a Dolby E signal.

For example, a VTR's meters indicate a digital full-scale signal when recording or playing a Dolby E stream and the clip indicators may flash intermittently. Dolby E uses the entire audio payload of an AES pair, which creates the appearance of full-scale audio on the VTR. The Dolby E signal sounds like full-scale noise when monitored through speakers or headphones; this is useful to quickly verify the VTR is receiving a Dolby E signal.

To simplify working with these new signals and to allow for more detailed analysis, Dolby Laboratories has recently introduced the DM100 Portable Audio Monitor. This hand-held unit displays metadata parameters (see Section 3.2.4) and decodes Dolby E, Dolby Digital, and PCM bitstreams. The decoded audio can be monitored through an internal speaker or through user-supplied headphones.

1.3 Connection with the DP569 Multichannel Encoder

One of Dolby E's most important features is its ability to carry Dolby Digital metadata. The DP571 can receive metadata from an external device, such as a metadata authoring tool, or it can generate metadata internally. The DP572 decodes the Dolby E signal, extracts the metadata and sends it to the DP569 Dolby Digital encoder. Use a standard DB9 male-to-male cable (not a null modem) to connect the Metadata output on the DP572 decoder to the Aux Data input on the DP569.

Note: To be used effectively in a Dolby E system, the DP569 must have software version 1.21 or later.

Figure 1-2 shows the audio connections between the DP572 and DP569. Connect the DP572's **Digital Output** channels 1/2, 3/4, 5/6 to the DP569's **Digital Input** channels 1/2, 3/4, 5/6, respectively. Install 75 Ω terminators if the loop-through BNC connectors on the DP569 are unused.

When a DP569 receives external metadata, the following parameters must be explicitly set:

- Set the **Metadata Source** to **External**.
- Set the **Metadata Program** to **Program 1**.
- Set the **Metadata Reversion** mode. **Last Used** is recommended for a DTV facility because it is the only setting that continues encoding if the external metadata source is interrupted. See *Metadata Revert* on page 3-9 for a complete discussion.

Figure 1-2 also shows signals applied to the **PCM Input** and **Status** connectors. The Status signals can command the DP572 to change modes to allow the PCM Input signal to be mixed with (**Voiceover**) or replace (**Switched Out**) the Dolby E decoded audio. This feature is particularly useful in a facility that must pass network-originated multi-channel audio but can route a maximum of four channels. **Voiceover** and **Switched Out** modes are effected within the DP572 and therefore require no additional processors. Both modes are described in detail in *Output Routing* on page 4-8.

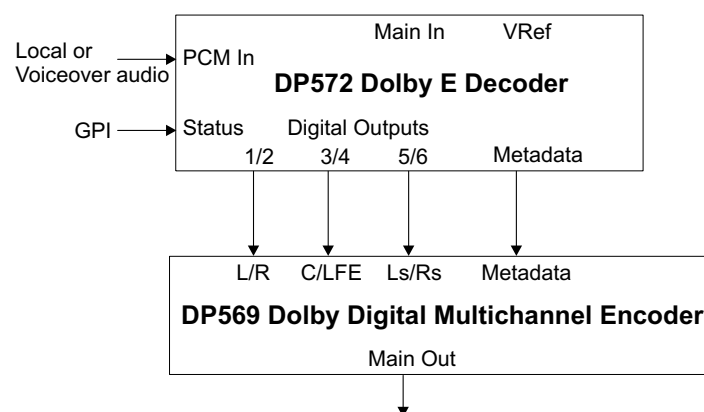


Figure 1-2 Connection between a DP569 and DP572

1.4 Front-Panel User Interface

The DP571 and DP572 employ the same user interface to access menus and display status information. This section introduces the interface, controls, and display features (see Figure 1-3).

Conventions

The + symbol will be used to notate key sequences *not* simultaneous key combinations. For example, “press **Shift** + **Setup** to enter Status mode” means “press the Shift key *then* press the Setup key” *not* “press the Shift and Setup keys at the same time.”

The **Shift** key provides access to the functions labeled above and below the Arrow, Setup, and Enter (DP572) keys. This manual will refer to the marking on the actual key pressed when giving instructions *not* the text above the key. For example, access the **Contrast** menu by pressing **Shift** + ↓. Access the headphone level menu on the DP572 by pressing **Shift** + **Enter**.

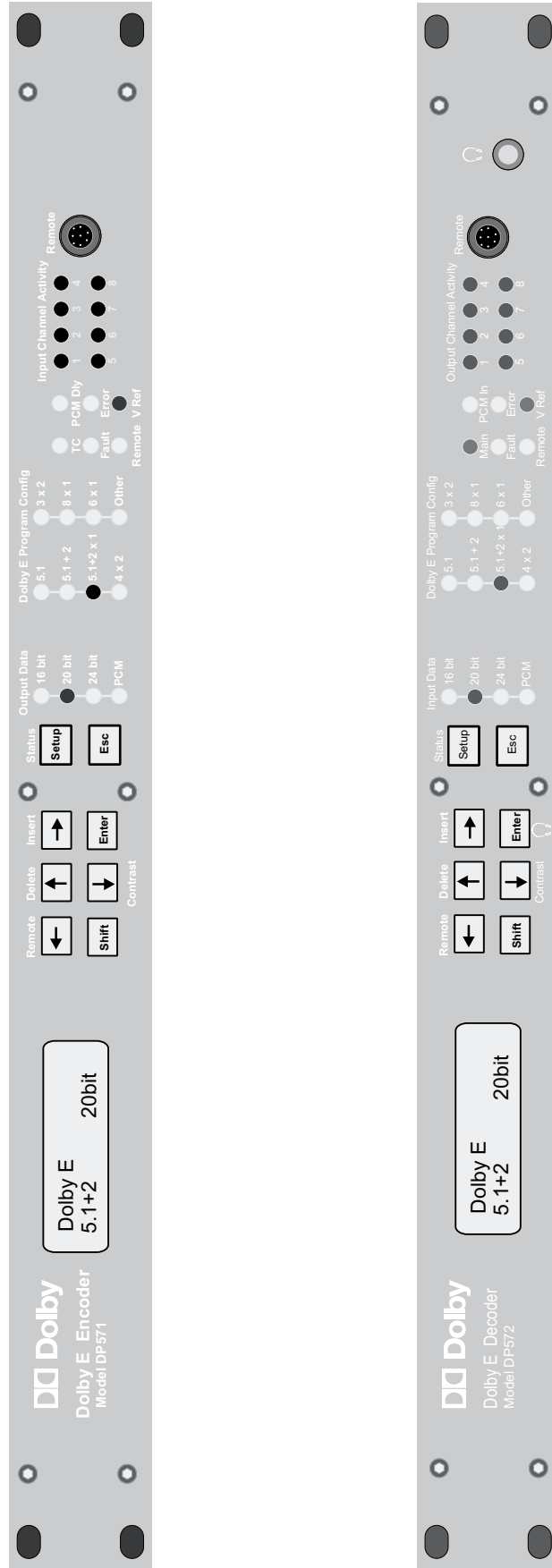


Figure 1-3 DP571 and DP572 front-panel controls and LEDs

1.4.1 Menu Selection and Push-button Operation

The DP571 and DP572 share an almost identical push-button user interface.

↓ → Keys

Both keys advance to the next menu or parameter value. When editing a text field, → moves to the next letter in the name; ↓ changes the value of the current character to the next alphanumeric character.

↑ ← Keys

Both keys return to the previous menu or parameter value. When editing a text field, ← moves to the previous letter in the name; ↑ changes the value of the current character to the previous alphanumeric character.

Enter

Enters the displayed value as the currently active value or descends one level in the menu hierarchy.

Esc

Aborts the current operation or ascends one level in the menu hierarchy. When setting a new value in Setup mode, a blinking cursor indicates a new value has been *selected* but not *set*. Press **Enter** to set the value or **Esc** to restore the current value; either key removes the blinking cursor. Pressing **Esc** again ascends one level in the menu hierarchy.

Shift

Press **Shift** to access the functions labeled above and below the arrow, Setup, and Enter (DP572) keys. The Shift key illuminates until another key is pressed. This manual will refer to the *actual key* marking when giving instructions, not to the labels above or below the key. For example: access the **Contrast** menu by pressing **Shift** + ↓. Access the head-phone level on the DP572 by pressing **Shift** + **Enter**.

Status

Press **Shift** + **Setup** to enter Status mode to query the device status; values can be viewed but not set in this mode. See Section 3.3 - *DP571 Status Mode Menu* and Section 4.3 - *DP572 Status Mode Menu* to view the Status mode menus.

Setup

Press **Setup** to enter Setup mode. Displays **DP571 Unit Setup: Program Config** or **DP572 Unit Setup: Operating Mode** from any mode or menu. Use the **Enter**, **Esc**, ↑, ←, ↓, and → keys to navigate and set values in this mode.

1.4.2 Display

The display is a 2-line by 16-character alphanumeric display with green LED back-lighting. The contrast can be adjusted by pressing **Shift** + \downarrow . Use the arrows to set the contrast.

- During normal Dolby E encoding, the DP571 displays the Program Config, frame rate, and the output data width.
- During normal Dolby E decoding, the DP572 displays signal type (PCM or Dolby E), Program Config, frame rate, and the input data width.

1.4.3 Display LEDs

Output/Input Data

The DP571 displays the Output Data width. At version 1.05, only the 16- and 20-bit settings are valid. The DP572 displays the Input Data width for the incoming Dolby E stream.

Note: A 24-bit version will be available in the future.

Dolby E Program Config

The DP571 displays the current encoding Program Configuration on one of eight LEDs.

The DP572 displays the Program Configuration on one of eight LEDs for the incoming Dolby E stream. The LEDs are disabled if the input is PCM audio.

The LEDs are mutually exclusive. The seven most common Program Configs have their own LEDs; **Other** denotes any of the other 15 Program Configs. See Section 3.2.1 - *Program Config* for a complete listing.

Fault, Remote, PCM Dly, Error, and VRef

Table 1-1 LEDs common to the DP571 and DP572

Name	Function
Fault	Red: Hardware related fault condition Off: No fault condition
Remote	Green: Remote mode enabled with no communication errors Red: Remote mode enabled but communication error detected Off: Remote mode not enabled
PCM Delay	Green: Valid PCM signal Yellow: Non-48 kHz signal Off: No PCM signal
Error	Red: Input(s) not valid for current settings Off: No error condition
VRef	Green: Lock with a valid analog composite video signal Red: Lock not achieved Yellow: Frame rate of Vref unequal to frame rate of Dolby E Main Input (DP572) or Main Output (DP571)

TC and Main

Table 1-2 LEDs unique to the DP571 and DP572

Name	Function
TC (DP571)	Green: Valid time code signal Yellow: Non-29.97 Hz signal Off: No TC signal detected
Main (DP572)	Green: Dolby E or PCM signal Red: No input signal Yellow: Non-48 kHz input or AES3 error condition

Input/Output Channel Activity

The DP571 Input Channel Activity LEDs display the number of channels in the currently selected program configuration.

The DP572 Output Channel Activity LEDs display the number of active output channels.

The following LED color codes describe the same channel activity for both units:

Table 1-3 Channel Activity LEDs for the DP571 and DP572

Name	Function
Yellow	Channel enabled; level < -60 dBFS
Green	Channel enabled; $-60 \leq \text{level} < -0.1$ dBFS
Red	Channel enabled; level ≥ -0.1 dBFS
Off	Channel disabled
Flashing Yellow	Channel sample frequency out of range (DP571 only)

1.4.4 Remote

Future versions of the DP571 and DP572 will allow remote control operation. The front-panel **Remote** port is an RS-232 connector.

1.5 Quickstart Guide for the DP571 and DP572

This section supplies necessary information to allow immediate encoding and decoding.

1. After unpacking the DP571 and/or the DP572 but before applying AC power, plug in a stable analog video reference signal. Standard black burst or color bars can be used as reference video if they are locked to the plant reference.

Since neither unit will function without a video reference signal, we recommend making this connection first.

2. Connect the digital audio inputs to the DP571.

These are AES3-ID inputs (unbalanced, 75Ω, 1 V peak-to-peak standard output), and are very similar to analog composite video.¹ If the loop-through BNC connectors are not being used to feed additional equipment, terminate them with a standard 75Ω video terminator.

3. Connect the digital audio outputs of the DP572.

These AES3-ID outputs are electrically separate, not loop-throughs, and should not be terminated at the DP572. Like analog composite video, the termination should be placed on the last device in the signal chain. For example, if the DP572 is connected to a DP569, the terminators should be applied to the loop-through BNC connectors on the DP569.

4. Connect the **Main Out** of the encoder to the **Main In** of the decoder and terminate the input.

5. Apply power to the DP571 and/or DP572.

6. After completing the boot process (about 25 s), both units show their current status on the display (same configuration as when they were last powered down).

7. If the **VRef** LEDs are not green on both units, make sure a valid analog NTSC or PAL reference signal (black burst) is applied to both units and that they are properly terminated.

8. The DP571 shows the current encoding **Program Config**. Set it to 5.1 + 2 by pressing **Setup** + **Enter** when the display shows **DP571 Unit Setup: Program Config**. The display now shows the current program configuration. Press the ↓ or ↑ keys until 5.1 + 2 is displayed and press **Enter**. The square cursor to the left stops blinking and disappears to indicate the value has been entered.

¹. Using video equipment for distribution of this AES signal is not generally recommended. Equipment is available designed specifically for passing AES3-ID signals.

9. Verify that the Metadata Revert and Source parameters are in the correct mode.
Press **Esc** until **DP571 Unit Setup: Program Config** is displayed again (*home* in the setup menu structure). Press the **↓** key until **DP571 Unit Setup: Operating Mode** is displayed, then press **Enter**.
Press the **↓** key until **Operating Mode: Metadata Revert** is displayed, then press **Enter**. Use the **↓↑** keys to select **Metadata Revert: Last Used** and press **Enter**.
Press **Esc** to return to the **Operating Mode: Metadata Revert** screen. Use the arrow keys to display the **Operating Mode: Metadata Source** screen, and press **Enter**. Use the arrow keys to select **Metadata Source: Internal** and press **Enter**.
Selecting the Program Configuration automatically sets the associated Dolby Digital metadata parameters for that program but they can be modified under the **DP571 Unit Setup: Metadata Params** menu.² (See Section 3.2.4 - *Metadata Params*.)
10. Return to the status screen by pressing **Shift + Setup**.
11. The DP571 is now set properly.
12. Headphone level can be accessed by pressing **Shift + Enter** (the headphone icon is below the Enter key) and adjusted with the arrow keys. Other than **Headphone Mapping and Level**, and **Voiceover**, the DP572 has very few set-up parameters that require user attention because it is almost completely configured by the DP571.
13. Like the DP571, pressing **Shift + Setup** returns the DP572 to the main Status Screen. The display on both units should now show:

Dolby E	
5.1 + 2	20bit

Both units are ready for testing.

². Example: In 5.1 + 2 mode, Program One is **5.1**-channel, and Program Two is **2**-channel. Each of these programs has its own Dolby Digital Metadata. Similar to a DP569 Dolby Digital encoder, a unit placed into 5.1-channel mode (3/2L) automatically loads a table of metadata values. In 5.1-channel mode, *acmod* is set to 3/2L, the LFE is turned on, etc. In two-channel mode, *acmod* is set to 2/0, the LFE is turned off, etc. The same thing occurs in the DP571 when the Program Configuration is changed.

1.6 Common Features of the DP571 and DP572

This section discusses the most important common features between the encoder and decoder. See Chapter 3 – *DP571 Dolby E Encoder* and Chapter 4 – *DP572 Dolby E Decoder* for complete references for both units.

1.6.1 PCM Delay Channel

The encoder and decoder each impart an audio delay equal to one video frame. When feeding a pair of channels on a digital VTR, the non-encoded pair would be out of sync with the encoded signal. To compensate for the delay, the encoder and decoder both contain a one video frame PCM utility delay.

1.6.2 Metadata

Metadata can be supplied to the DP571 encoder via an RS485 connection. During Dolby E decoding, the DP572 outputs metadata on an RS485 connection. Metadata can also be generated internally in the DP571.

1.6.3 Timecode

SMPTE Linear Time Code (LTC) can be applied to the unbalanced BNC connector on the DP571, and can be recovered during decoding from the unbalanced BNC connector on the DP572. Both connectors are marked *LTC*. The time code data is carried as part of the Dolby E bitstream.

1.6.4 Video Reference

An analog composite video reference signal is required for Dolby E encoding and decoding. Versions 1.05 and later support two frame rates: 29.97 Hz (NTSC) and 25 Hz (PAL). VITC information can be extracted from the video reference signal sent to the DP571 (for more information, see *Time Code Input* on page 3-9).

If the video reference signal is not present or invalid, the:

- DP571 will not encode a Dolby E bitstream;
- DP572 will stop decoding the Dolby E bitstream;
- Dolby E output on the encoder and the PCM outputs on the decoder will be muted;
- VRef LED will be red (if not present) or yellow (Vref unequal to frame rate).

1.6.5 Channel Configuration

Because neither the DP571 nor DP572 permit internal remapping of the audio channels, the following channel configuration must be used to input a 5.1-channel signal to the DP571:

L/R → Digital Inputs 1/2

C/LFE → Digital Inputs 3/4

Ls/Rs → Digital Inputs 5/6

1.7 Configuring Jumper Settings

Although the DP571 encoder and DP572 decoder will function correctly with no internal adjustments, five jumpers provide additional termination options. Any necessary changes to the jumpers should be made before the units are installed.

There are 124 Ω terminations on both units for the RS-485 Metadata and Remote control ports. The units ship with these terminations bypassed (pins 3 and 4). Refer to the table below for additional settings.

Table 1-4 RS-485 Termination jumper settings

Connector	Tx Term On	Rx Term On
DP571 Metadata	J13, Pin 1/2	J15, Pin 1/2
DP571 Remote	J12, Pin 1/2	J14, Pin 1/2
DP572 Metadata	J15, Pin 1/2	J13, Pin 1/2
DP572 Remote	J12, Pin 1/2	J14, Pin 1/2

The only remaining terminations are accessed via the passive loop-through BNC connectors on each unit's rear panel. The video reference input on both units should be terminated if the loop through is not used to feed other equipment.

The AES3-ID-1995/SMPTE276-M standard uses a 75 Ω connection and requires proper termination. As with video, the termination should occur only at the destination of the signal (i.e., on the inputs to a device). For the DP571, the loop-through BNC connectors for the inputs must have terminators if they are not being used to feed other equipment. For the DP572, the loop-through BNC for the Dolby E input must be terminated.

Chapter 2

Common Dolby E Applications

This section presents six common broadcast audio applications with configuration instructions for the Dolby E encoder and decoder. With minor modifications to these application settings, most common variations can be easily accommodated.

2.1 Film

The two most common types of major motion picture sound formats are two-channel Dolby Stereo (compatible with Dolby Surround), and 5.1-channel Dolby Digital. Most modern films are produced with a 5.1-channel soundtrack that is also compatible with DVD and Digital TV formats. It is important to note that while *not* all Dolby Stereo films have a 5.1-channel Dolby Digital soundtrack, *all* 5.1-channel Dolby Digital films have a Dolby Stereo soundtrack. Including a Dolby Stereo soundtrack on Dolby Digital films ensures that a single film print can play in theatres with or without a Dolby Digital reproduction system.

A two-channel Dolby Surround film should use the **2 + 2** program configuration. This allows Program 1 (the first 2 in 2 + 2) to carry the Lt/Rt audio with full dynamic range, and Program 2 to carry either an NTSC version with a reduced dynamic range or a stereo foreign language (SAP) version. Since Program 1 is Dolby Surround encoded, the **Dolby Srnd Mode** metadata parameter should be set to **Indicated**. Foreign language versions of films are also commonly produced in Dolby Stereo, so Program 2's **Dolby Srnd Mode** metadata parameter should be set to **Indicated**. The **Metadata Params** settings **Line Mode Pro** and **RF Mode Pro** in both programs should be set to either **Film Standard** or **Film Light** depending on the type of film being encoded. See Section 3.2.4 - *Metadata Params* for more information.

Select the **2 + 2 x 1** program configuration to encode a stereo program as Program 1 and two mono SAP channels as Programs 2 and 3. Since Program 1 is Dolby Surround encoded, the **Dolby Srnd Mode** metadata parameter should be set to **Indicated**. **Line Mode Pro** and **RF Mode Pro** in all three programs should be set to either **Film Standard** or **Film Light** depending on the type of film.

Select the **5.1 + 2** program configuration for a 5.1-channel Dolby Digital film. Program 1 contains a copy of the 5.1-channel master used to create the original film. Program 2 can carry either an Lt/Rt version of the film with a reduced dynamic range for the NTSC feed, or a stereo SAP. Since Program 2 is Dolby Surround encoded, the **Dolby Srnd Mode** metadata parameter should be set to **Indicated**. **Line Mode Pro** and **RF Mode Pro** in both programs should be set to either **Film Standard** or **Film Light** depending on the type of film.

Select the **5.1 + 2 x 1** program configuration to encode a 5.1-channel program and two mono SAP channels. **Line Mode Pro** and **RF Mode Pro** in all three programs should be set to either **Film Standard** or **Film Light** depending on the type of film.

2.2 Commercial and Interstitial

Although current commercial and interstitial material is primarily two-channel stereo, this fast-growing broadcasting sector will almost certainly catch up to film practice, thereby ensuring smooth transitions between commercial and feature programs. See Section 2.1 - *Film* for the settings to use for two- and 5.1-channel material.

2.3 News and Local Programming

News and local programming is either two-channel stereo or two-channel mono. The **Dolby Srnd Mode** metadata parameter should be set to **Indicated**. Programs that are Dolby Digital encoded at the DTV station, then decoded by the consumer result in mono programming directed to the Center channel, while stereo programming is mapped to the L, C, R channels. During Pro Logic decoding, dialogue emanates primarily from the Center channel in both cases. This channel placement most closely matches a 5.1-channel program and provides smooth transitions between mono, stereo, and 5.1-channel programming without operator intervention. **Line Mode Pro** and **RF Mode Pro** in both programs should be set to either **Speech** or **Film Light** depending on the type of program. **Film Light** is a good general purpose setting for programs with speech and music.

2.4 Music

Film and DVD have introduced 5.1-channel music to the general public and these both require the 5.1 + 2 program configuration. The predominant music format, however, remains the two-channel compact disc; use the 2 + 2 program configuration. Since music is generally recorded at a much higher level than film audio, it may be necessary to increase the *dialnorm* value (i.e., closer to 0) to apply more attenuation at the Dolby Digital decoder. **Line Mode Pro** and **RF Mode Pro** should be set to either **Music Standard** or **Music Light** depending on the music. See Section 3.2.4 - *Metadata Params*.

2.5 Live Events

Live events can require encoding techniques from each category mentioned in this chapter. The most distinguishing feature of a live event is that, although a VTR may record the event for later broadcast or storage, the tape cannot normally be stopped to alter encoding parameters and then restarted. This is not an issue for postproduction but is a serious concern for live events.

Using **Presets** is an excellent method of changing Program Configs during an encoding session to match the metadata to the source material being encoded. Pick the most applicable program configuration for a specific task and store it as a Preset. During the live event, simply recall the Presets as the encoding requirements change and all associated metadata parameters follow automatically.

See Section 3.2.3 - *Presets, Using the Status Port to Select Presets* on page 3-4 and *Using the Status Port to Select Voiceover and Switched Modes* on page 4-4 for more detailed information.

2.6 Postproduction

Figure 2-1 shows a typical postproduction configuration using Dolby E. The same VRef black burst signal locks all units; an LTC signal slave-locks a digital multitrack recorder to a digital VTR. The LTC signal is also sent to the DP571 LTC Input via the loop-through connector on the multitrack. The DP571 and VTR have the same time code signal to resynchronize the video and audio if they are separated.

Connect the DP571's Main Out to channels 3/4 on the VTR. Although the Dolby E signal could be recorded on either channel pair, using channels 1/2 for PCM stereo or Lt/Rt allows use of the tape at facilities without a Dolby E decoder. It also allows audio reproduction from these tracks during jog and shuttle operations in which Dolby E is muted.

Connect the VTR's output channels 3/4 to the DP572 decoder for confidence monitoring. Headphones can be used to monitor any of the active channels. It is also possible to connect the DP572's Digital Outputs to a proper monitoring system to evaluate the entire mix.

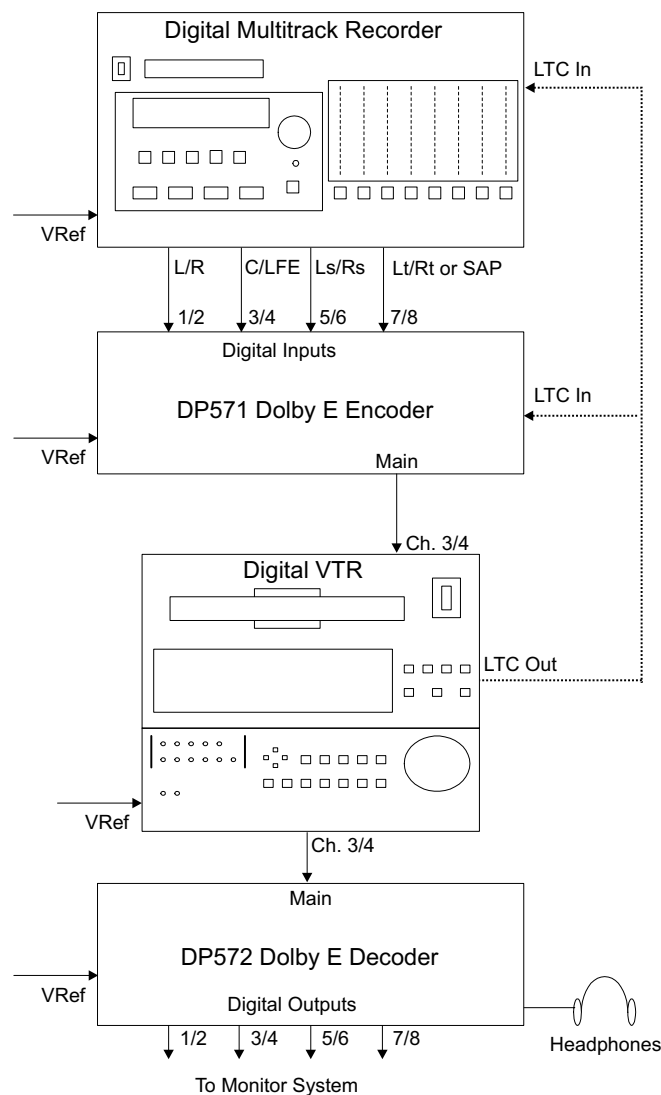
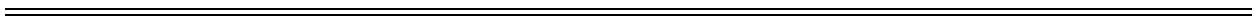
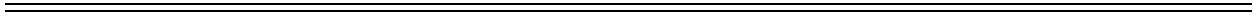


Figure 2-1 Typical Dolby E system in a postproduction facility



Chapter 3

DP571 Dolby E Encoder

3.1 Hardware Reference

This section discusses the DP571 hardware connectors. Refer to the following diagrams while reading this chapter:

- Figure 3-1 – block diagram of the DP571
- Figure 3-2 – DP571 front and rear panels

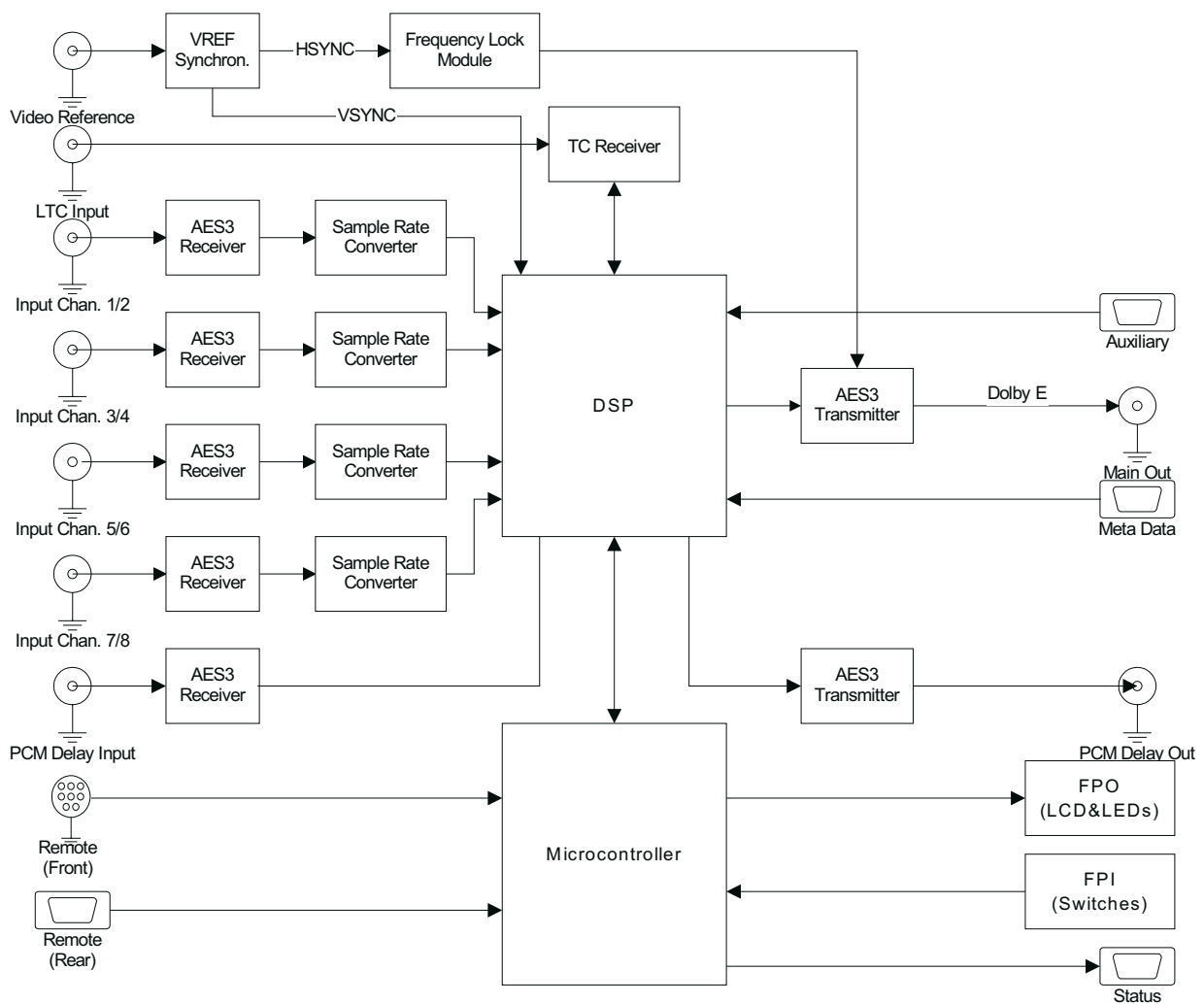


Figure 3-1 DP571 Block Diagram

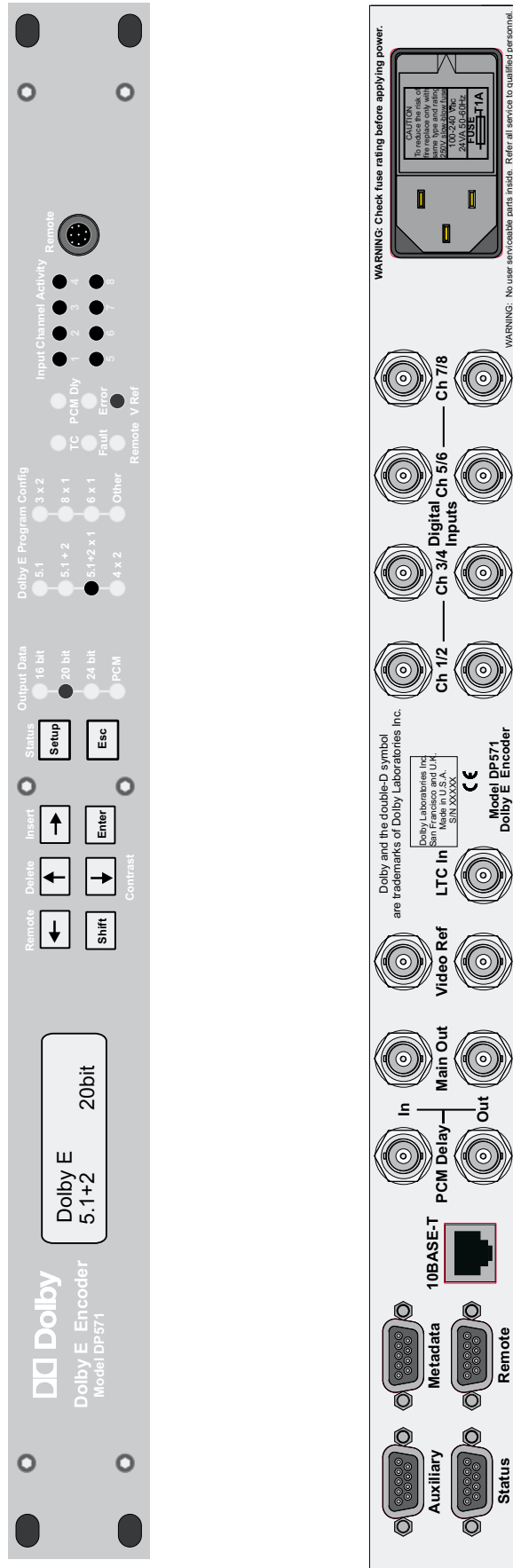


Figure 3-2 DP571 front and back panel

3.1.1 Digital Inputs

A maximum of eight PCM channels can be sent to the Digital Inputs, each with a loop-through connection.

3.1.2 Video Reference

An analog composite video reference signal is required for Dolby E encoding. Versions 1.05 and later support two frame rates: 29.97 Hz (NTSC) and 25 Hz (PAL). VITC information can also be extracted from the video reference signal.

If the video reference signal is not present or invalid, the:

- DP571 will not encode the Dolby E bitstream;
- outputs will all be muted;
- VRefLED will be red (Vref not present) or yellow (Vref unequal to frame rate of Dolby E Main Output).

3.1.3 LTC Input

The DP571 accepts a SMPTE LTC signal. After decoding in the LTC receiver, the resulting time code information is passed to the DSP subsystem.

3.1.4 PCM Delay Input

When sending both encoded and non-encoded channel pairs to a digital recorder, the non-encoded pair must be delayed to remain synchronized with the encoded signal. The encoder contains a one video frame PCM utility delay that allows the PCM input signal to be transported in parallel with the Digital Inputs.

3.1.5 Metadata

The DP571 receives, generates, and modifies metadata information. Metadata is received through the rear-panel input from an external source, such as an authoring system, and embedded into the Dolby E bitstream. See Section 3.2.4 - *Metadata Params* for a discussion of metadata parameters that might need to be explicitly set or checked.

3.1.6 Remote

Future versions of the DP571 will allow remote control via the front- (RS-232) or rear-panel (RS-485) ports.

3.1.7 Main Out

The encoded Dolby E bitstream is output from the rear-panel **Main Out** connector as an AES3 coaxial digital signal. Two connectors are available for transmission of Dolby E data to multiple decoders or monitoring units.

Note: The two **Main** outputs are electrically separate, not passive loop-through connections, so there is no need to terminate an unused output.

3.1.8 PCM Delay Out

Encoding delay is added to the PCM signal transmitted from the **PCM Delay Out** connector. The DSP subsystem calculates the delay equivalent to the main channel latency and applies it to the **PCM Delay Out**.

3.1.9 Status

General Purpose Input/Output (GPIO) signals for the DP571 are available from the Status port, a female DB-9 connector. The input and output signals are 0 – 5 V TTL. The pin configuration is defined in the table below:

Table 3-1 DP571 Status port pin functions

Pin	Connection	Explanation
1	Preset Tally A	Preset tally output
2	Reference Video Valid	1 : Valid; 0 : Ref video error
3	Dolby E Encoding Valid	1 : Valid; 0 : Encoding error
4	System Operational	1 : Functional; 0 : Failed
5	Fault	1 : Functional; 0 : Hardware fault
6	Preset Tally B	Preset tally output
7	Preset Ctrl A	Preset control input
8	Preset Ctrl B	Preset control input
9	Ground	

Using the Status Port to Select Presets

The two inputs on pins 7 and 8 select among the first three (of eight) presets stored in the DP571. The inputs are normally high (internal pull-up) and trigger a preset recall by sensing a momentary high-to-low transition. A momentary contact closure between pins 7 and 9 (ground) or pins 8 and 9 is sufficient to activate a function but a held closure also works. A low-to-high transition (i.e., a switch release) is ignored. Table 3-2 summarizes the operation of the two inputs.

Table 3-2 Status port preset selection

Pin 7 Transition	Pin 8 Transition	Preset
High-to-low	None or low-to-high	1
None or low-to-high	High-to-low	2
High-to-low	High-to-low	3

Presets 1 – 3 also generate corresponding outputs on the Status port that can be used to indicate selection of a preset via the Status port, Serial Remote port (future), or the front panel. A high level for both outputs indicates selection of a preset other than 1 – 3 (or no preset). Table 3-2 summarizes the two outputs.

Table 3-3 Preset mode tally indication on Status port

Preset Tally A	Preset Tally B	Preset
Low	High	1
High	Low	2
Low	Low	3

3.1.10 Auxiliary

The RS-485 auxiliary port will be implemented in future versions.

3.1.11 10BASE-T

This port will be implemented in future versions.

3.2 DP571 Setup Mode Menu Reference

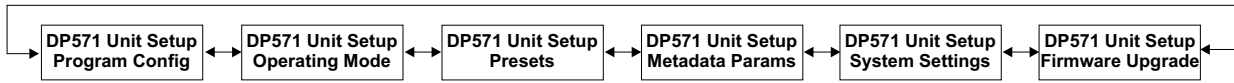


Figure 3-3 DP571 Unit Setup menus

This is the top level of the DP571 menu hierarchy for editable parameters. Each menu is discussed in its own section and displayed with all submenus and values.

Conventions

In the menu diagrams, the arrow keys select among menus at the same hierarchical level and settings within a menu category. Although selection between menus and settings is indicated in the diagrams by horizontal and vertical arrows, respectively, this is a graphical convention only. The $\downarrow \rightarrow$ keys both go to the next menu or setting; the $\uparrow \leftarrow$ keys both return to the previous menu or setting. A double-headed arrow in the diagrams indicates that an arrow key can select between the two settings or menus.

The **Esc** and **Enter** keys ascend and descend, respectively, one menu level. They are labeled in the menu diagrams and appear as single-headed arrows; down for Enter and up for Esc.

3.2.1 Program Config

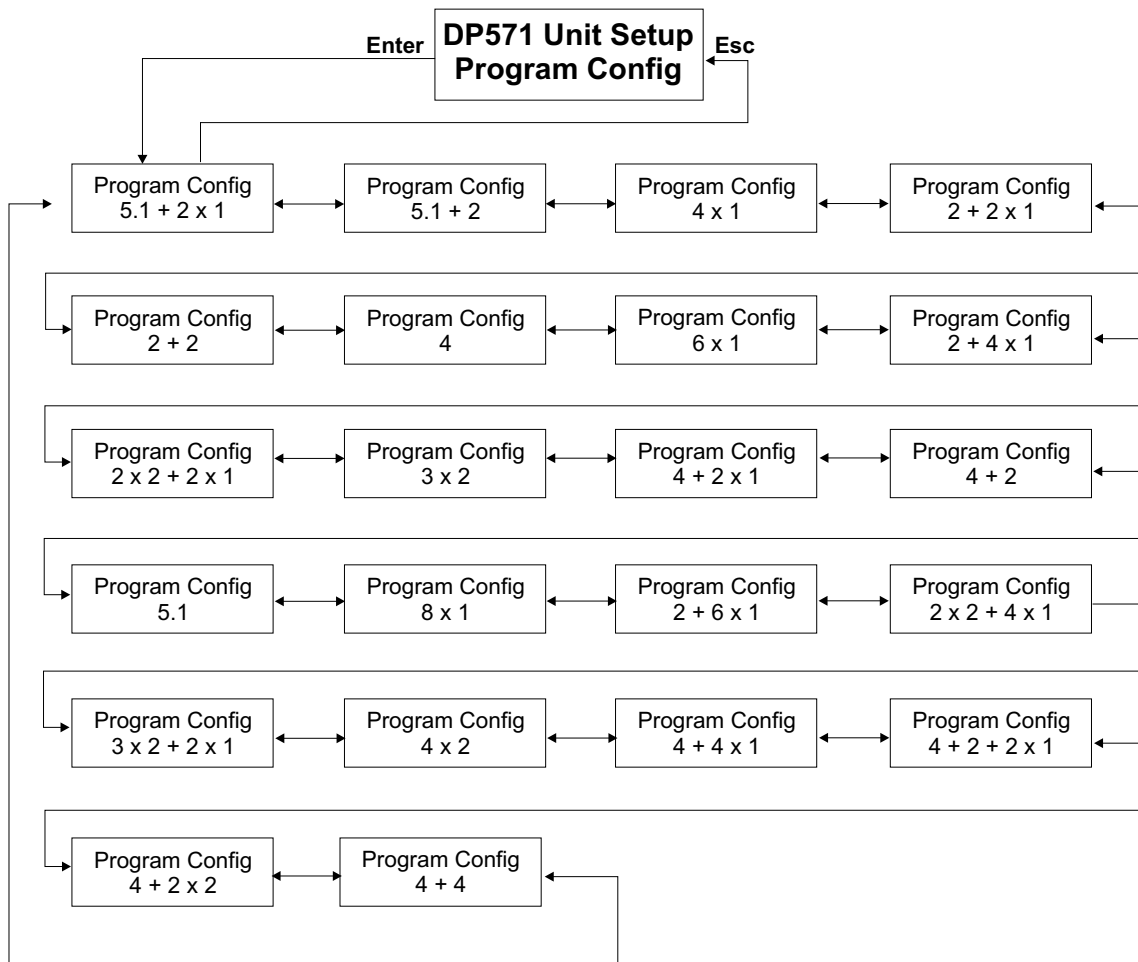


Figure 3-4 Program Config menu

Selecting a Program Config assigns all metadata values that best fit the most common use of that configuration. Although the metadata values can be modified, it is unlikely the user will need to do so. See Section 3.2.4 - *Metadata Params* for a discussion of the values that may need to be changed.

Notational Conventions

The + symbol separates programs within a configuration. For example, 5.1 + 2 represents one 5.1-channel and one stereo program. The x symbol shows the number of a given channel format within that configuration. For example, 4 x 2 represents four two-channel programs. One configuration has three different formats: 4 + 2 + 2 x 1 is one four-channel, one two-channel, and two mono programs.

Encoding Considerations

It is important to distinguish between configurations with the same number of channels but different program formats, such as 8 x 1 and 4 x 2. Although both configurations encode eight channels, 8 x 1 uses eight metadata streams while 4 x 2 uses two. Increasing the number of programs with independent metadata streams decreases the number of encode/decode generations possible without audible degradation.

Table 3-4 DP571 Program Configurations

Program Config	Program and Channel Explanation
5.1 + 2 x 1	One 5.1-channel and two mono programs. May be used for a 5.1-channel and two mono SAPs.
5.1 + 2	One 5.1-channel and one stereo program. One of the most common configs. Two channel could be stereo, Dolby Surround (Lt/Rt), or even stereo SAP.
4 x 1	Four mono programs
2 + 2 x 1	One stereo and two mono programs
2 + 2	Two stereo programs
4	One four-channel program (LCRS)
6 x 1	Six mono programs
2 + 4 x 1	One stereo and four mono programs
2 x 2 + 2 x 1	Two stereo and two mono programs
3 x 2	Three stereo programs
4 + 2 x 1	One four-channel and two mono programs
4 + 2	One four-channel program and one two-channel program (i.e., L, C, R, S and Lt/Rt for archiving Dolby Surround soundtracks)
5.1	One 5.1-channel program
8 x 1	Eight mono programs
2 + 6 x 1	One stereo and six mono programs
2 x 2 + 4 x 1	Two stereo and four mono programs
3 x 2 + 2 x 1	Three stereo and two mono programs
4 x 2	Four stereo programs
4 + 4 x 1	One four-channel and four mono programs
4 + 2 + 2 x 1	One four-channel, one stereo, and two mono programs
4 + 2 x 2	One four-channel and two stereo programs
4 + 4	Two four-channel programs

3.2.2 Operating Mode

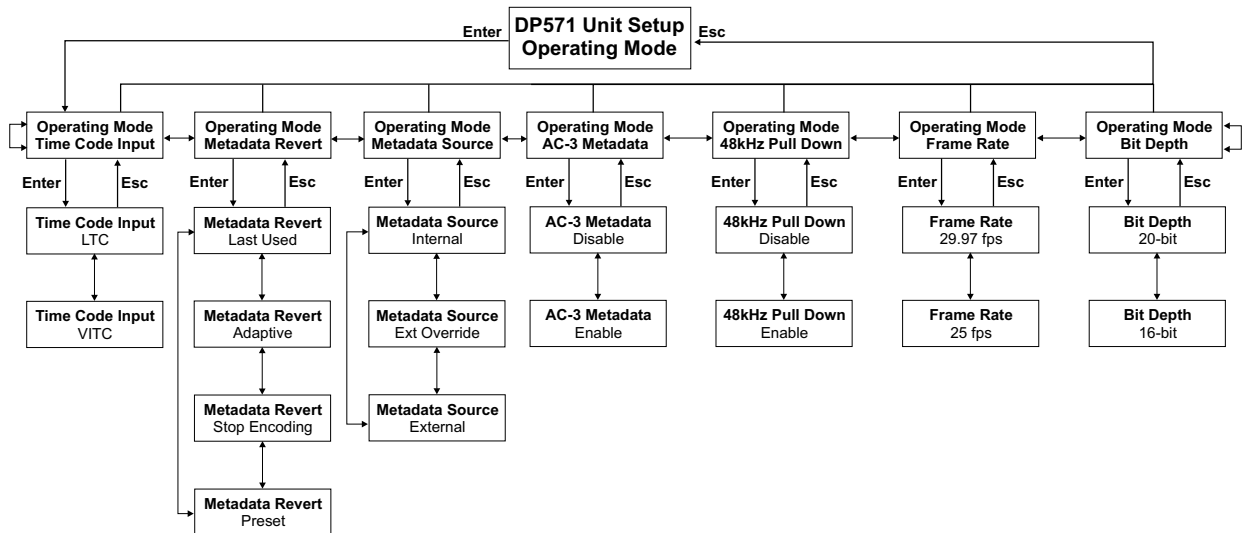


Figure 3-5 Operating Mode menu

Time Code Input

This parameter controls where the DP571 derives its time code information.

LTC: **LTC In** connector supplies time code.

VITC: **Vertical Interval Time Code** is derived from the **Video Ref In** connector.

Metadata Revert

This parameter determines what happens if the external metadata source is interrupted. These settings are only active if the Metadata Source is set to **External** or **Ext Override**.

Stop Encoding: Stops encoding and displays error status on front-panel **Error** LED. Most likely useful only in postproduction.

Last Used: Continues encoding using the last values set by the external source.

Preset: If any metadata parameters are missing, the Program Config selected in **Metadata Params: Reversion Preset** is used but *no Dolby Digital metadata is included in the Dolby E bitstream*. See Section 3.2.4 - *Metadata Params*.

Adaptive: Behaves like **Last Used** if the metadata disappears completely. Behaves like **Preset** if any metadata parameters are missing.

Metadata Source

Internal: Assigns factory default metadata values based on each Program within a Program Config; these values can still be modified (see Section 3.2.4 - *Metadata Params*).

Ext Override: Allows local modification of the external source's metadata values.

External: Uses the external source's Metadata *without* permitting local modification.

AC-3 Metadata

Disable: Does not include Dolby Digital metadata in the encoded Dolby E stream. *Useful only if the decoded audio will never be Dolby Digital encoded.*

Enable: This is the default setting that includes metadata in the Dolby E stream.

48kHz Pull Down

Disable: Default value appropriate for most common VTRs.

Enable: Allows a DP571 encoder to be used with a 30 Hz VTR operating at 29.97 Hz. The < in the display below reflects that 48 kHz Pull Down is enabled.

Dolby E	<
5.1 + 2	20bit

Frame Rate

Version 1.05 and later allows selection between two frame rates: 29.97 fps (NTSC) and 25 fps (PAL). Versions prior to 1.05 offer only 29.97 fps.

The Vref input rate must match the selected frame rate. For example, if the incoming Vref signal is 29.97 Hz/NTSC/black burst, the frame rate must be 29.97 fps, otherwise the Vref LED turns from green to yellow and encoding is disrupted.

The DP572 does not have a frame rate setting. The Vref input rate must match the frame rate of the incoming encoded stream to be properly decoded. For example, a DP572 that receives a 29.97 Hz Vref input will only decode a Dolby E stream encoded at 29.97 fps, otherwise the Vref LED turns from green to yellow and decoding is disrupted.

29.97 fps: Default value for Dolby E output used with NTSC equipment.

25 fps: For Dolby E output used with PAL equipment.

Bit Depth

Version 1.05 and later of the DP571/572 can encode/decode both 16- and 20-bit Dolby E bitstreams. Versions prior to 1.05 offer only 20-bit operation and future versions will offer 24-bit operation. The 16-bit feature allows Dolby E to be used with 16-bit recording devices.

The DP572 automatically responds to the encoded input signal's bit depth and inaudibly switches to decode the correct Dolby E stream. The bit depth of the current input stream is denoted by the **Input Data** LEDs.

Note: This only affects the space the Dolby E bitstream occupies in the main AES output and *not the resolution of the encoded or decoded PCM audio*.

A 16-bit/48 kHz AES channel has a data rate of 1.5 Mbps, which is 400 kbps less than a 20-bit/48 kHz channel. To compensate for this lower data rate and maintain the highest audio quality over the maximum number of encode/decode generations, only six audio channels can be encoded in 16-bit mode. As the decoder automatically switches from 16- to 20-bit decoding in response to the input stream, it seamlessly enables decoding the two additional channels.

Selecting 16-bit mode is possible only if the current Program Config uses no more than six channels. For example, while the **5.1 + 2** Program Config is selected, 16-bit mode is not visible and cannot be selected. Change the Program Config to anything with six channels or less and 16-bit mode can be selected. *When 16-bit mode is selected, Program Configs with more than six channels are not available nor are they displayed in the Program Config menu.*

Current postproduction practice stores Dolby E in the 20-bit format for both High Definition (HD) and Standard Definition (SD) programming. This allows storing a 5.1-channel mix along with a two-channel foreign language version of the same program on one AES pair of channels on a VTR (usually channels 3 and 4). Channels 1 and 2 normally carry a Dolby Surround or stereo version of the same program. This convention makes the tape useful when the multichannel version is not required or cannot be decoded.

When recording Dolby E onto a digital VTR, certain parameters must be adjusted to identify the signal as data instead of audio. Both the Sony HDCAM and Panasonic HD-D5 have menu settings that switch the audio tracks to DATA MODE. The Sony Digital Betacam is automatically in DATA MODE, but may require adjustment to the following parameters to optimize performance: Edit Mode (butt-splice only), Crossfade (Off or 0 ms), and Error Correct (Correct, not Conceal).

Note: If this tape was played back through a plant capable of passing only 16-bit audio, the Dolby E track would be truncated and the tape rendered useless.

20-bit: Default value allows Dolby E encoding of up to eight channels into a 1.9 Mbps AES pair.

16-bit: Allows Dolby E encoding of up to six channels into a 1.5 Mbps AES pair.

3.2.4 Metadata Params

The Metadata Params affect Dolby Digital decoding, *not* Dolby E encoding or decoding.

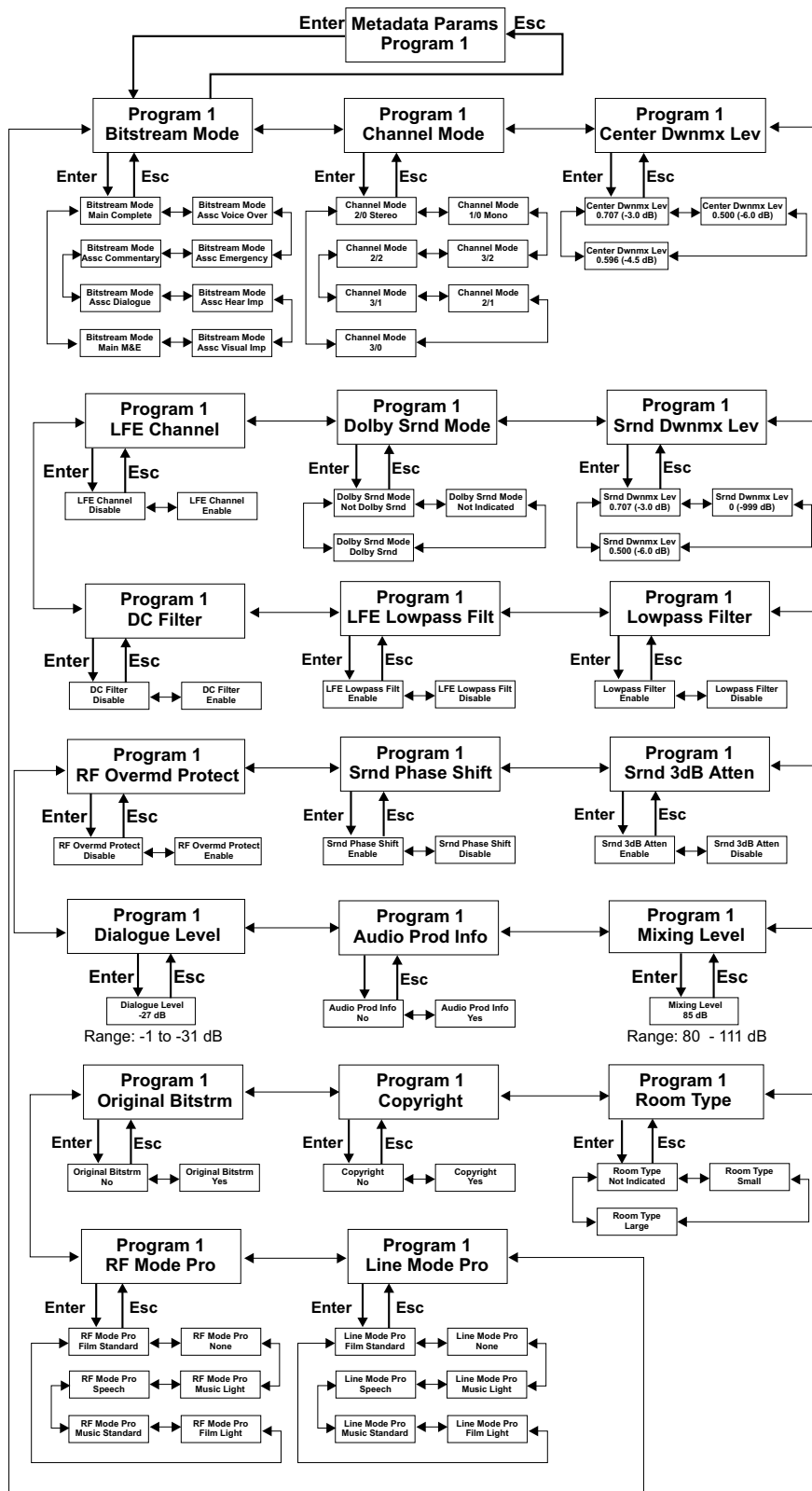
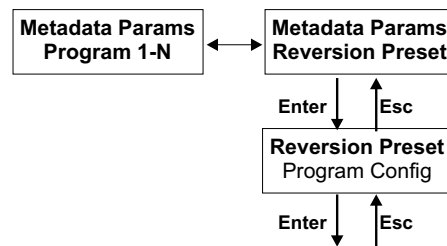


Figure 3-7 Metadata Params menu

Reversion Preset



See the Program Config section for possible settings.

Figure 3-8 Reversion Preset menu

Reversion Preset specifies a Program Config to use in case an external metadata source is interrupted. See *Metadata Revert* on page 9 for more information on this feature.

Channel Mode

- 1/0 Mono:** Single front channel, no surround channels. For a two-channel system, the signal is reproduced equally from both channels attenuated 3 dB. For a 5.1-channel system, the signal is reproduced from the center channel (L, R, LS, RS channels are not used).
- 2/0 Stereo:** Left and right channels, no center or surround channels. For a two-channel system, the signal is reproduced equally from the L, R channels. For a 5.1-channel system, the signal can either be reproduced from only the L, R channels or, optionally, from L, C, R, S (see *Dolby Srnd Mode*).
- 3/0:** Left, center, and right channels, no surround channels. For a two-channel system, the L, R signal is reproduced equally from the L, R channels; the center channel is attenuated 3 dB and sent to the L, R channels. For a 5.1-channel system, the signal is reproduced by the L, C, R channels.
- 2/1:** Left, right, and surround channels. For a two-channel system, the L, R signal is reproduced equally from the L, R channels; the surround channel is attenuated 3 dB and sent to the L, R channels. For a 5.1-channel system, the signal is reproduced by the L, R, S channels. This is an extremely uncommon format.
- 3/1:** Left, center, right, and surround channels. For a two-channel system, the L, R signal is reproduced equally from the L, R channels; the center and surround channels are attenuated 3 dB and sent to the L, R channels. For a 5.1-channel system, the signal is reproduced by the L, C, R, S channels.
- 2/2:** Left, right, left surround, and right surround channels. For a two-channel system, the L, R signal is reproduced equally from L, R channels; the Ls, Rs channels are attenuated 3 dB and sent to the L, R channels, respectively. For a 5.1-channel system, the signal is reproduced by the L, R, Ls, Rs channels. This format is sometimes called *quad*.
- 3/2:** Left, center, right, left surround, and right surround channels. For a two-channel system, the L, R signal is reproduced equally from the L, R channels. The center channel is attenuated 3 dB and sent to the L, R channels. The Ls, Rs channels are attenuated 3 dB and sent to the L, R channels, respectively. For a 5.1-channel system, the signal is reproduced by the L, C, R, Ls, Rs channels.

Dolby Srnd Mode

Dolby Srnd: Indicates to the decoder that a two-channel signal is a Dolby Surround (Lt/Rt) program. Can activate Dolby Pro Logic decoding in a 5.1-channel Dolby Digital decoder.

Not Dolby Srnd: Indicates to the decoder that a two-channel signal is not a Dolby Surround Pro Logic (Lt/Rt) program.

Not Indicated: Indicates to the decoder that a two-channel signal may or may not be a Dolby Surround (Lt/Rt) program.

Dialogue Level

Adjusts the *dialnorm* metadata parameter between -31 (decoder applies no attenuation) to -1 (30 dB attenuation).

Line Mode Pro

Line Mode Pro(file) sets the *dynrng* metadata parameter to one of five presets.

None: No dynamic range compression is applied unless downmixing could cause overload, in which case protection *dynrng* is automatically applied.

Speech: Appropriate for programs with predominantly dialogue.

Music Light: Applies light compression to music that is already compressed and does not require excessive dynamic range restriction.

Music Standard: Applies more compression to music that is not compressed and requires dynamic range restriction.

Film Light: Applies light compression to a subjectively quiet film that does not require excessive dynamic range restriction.

Film Standard: Applies more compression to a subjectively loud film that requires dynamic range restriction.

RF Mode Pro

RF Mode Pro(file) sets the *compr* metadata parameter to presets with the same names as Line Mode Pro, but each setting is 11 dB more sensitive to avoid overloading the RF input of a television.

3.2.5 System Settings

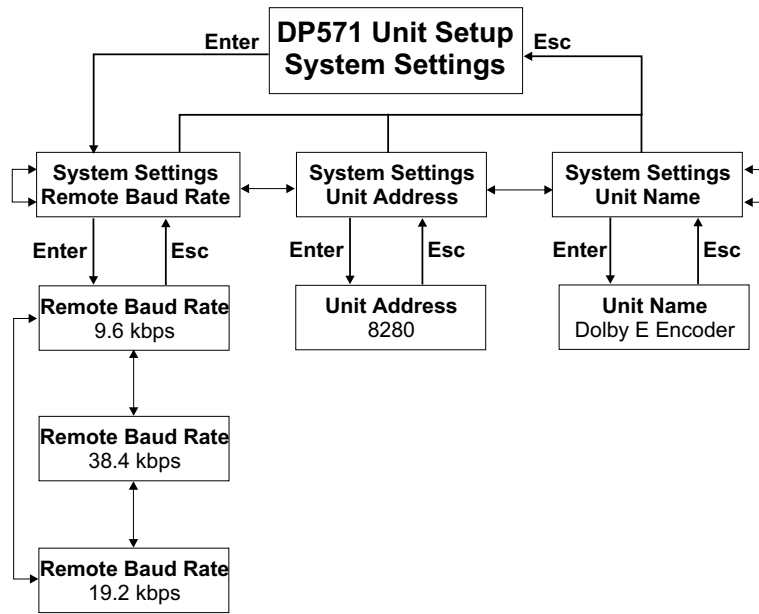


Figure 3-9 System Settings menu

Remote control functions are not yet available for the initial Dolby E product release, so this menu is useful only during firmware upgrades (see the next section).

3.2.6 Firmware Upgrade

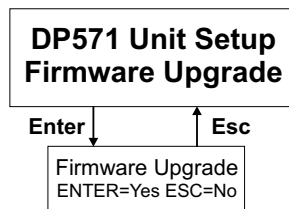


Figure 3-10 Firmware Upgrade menu

The firmware in the DP571 can be upgraded via the Remote Serial port. See the documentation that accompanies the upgrade kit.

3.3 DP571 Status Mode Menu

Access the Status mode menus by pressing **Shift + Setup**. These menus simply display the device’s current status and are not used to set values. Use the Setup mode menus to set new values.

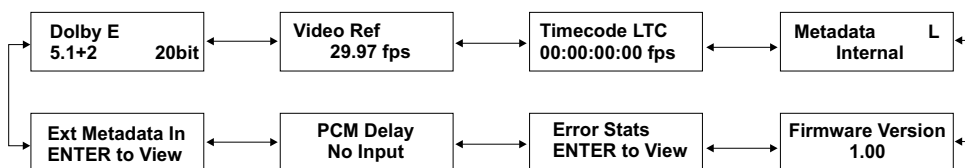


Figure 3-11 DP571 status menus

Chapter 4

DP572 Dolby E Decoder

4.1 Hardware Reference

This section discusses the DP572 hardware connectors. Refer to the following diagrams while reading this chapter:

- Figure 4-1 – block diagram of the DP572
- Figure 4-2 – DP572 front and rear panels

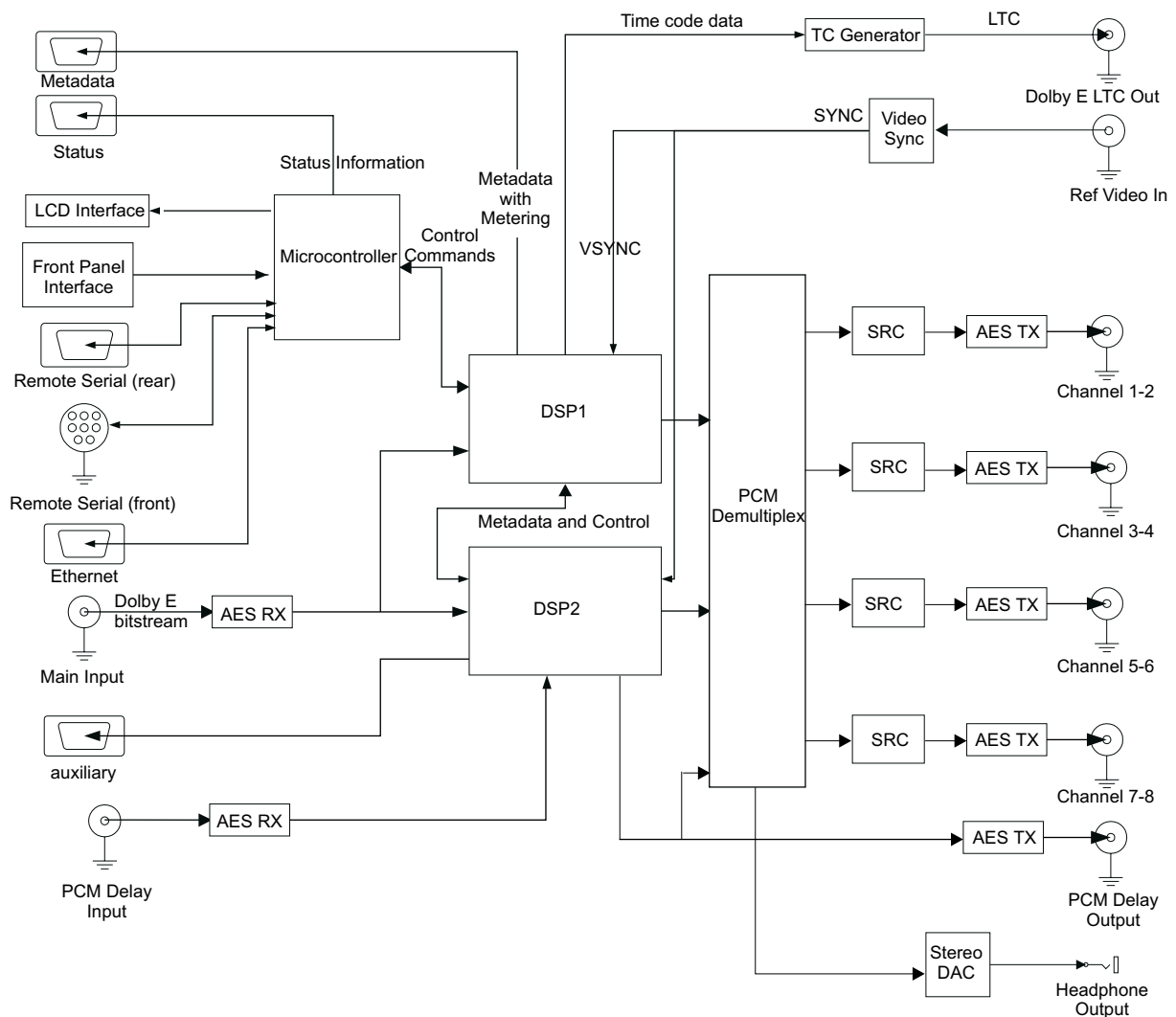


Figure 4-1 DP572 block diagram

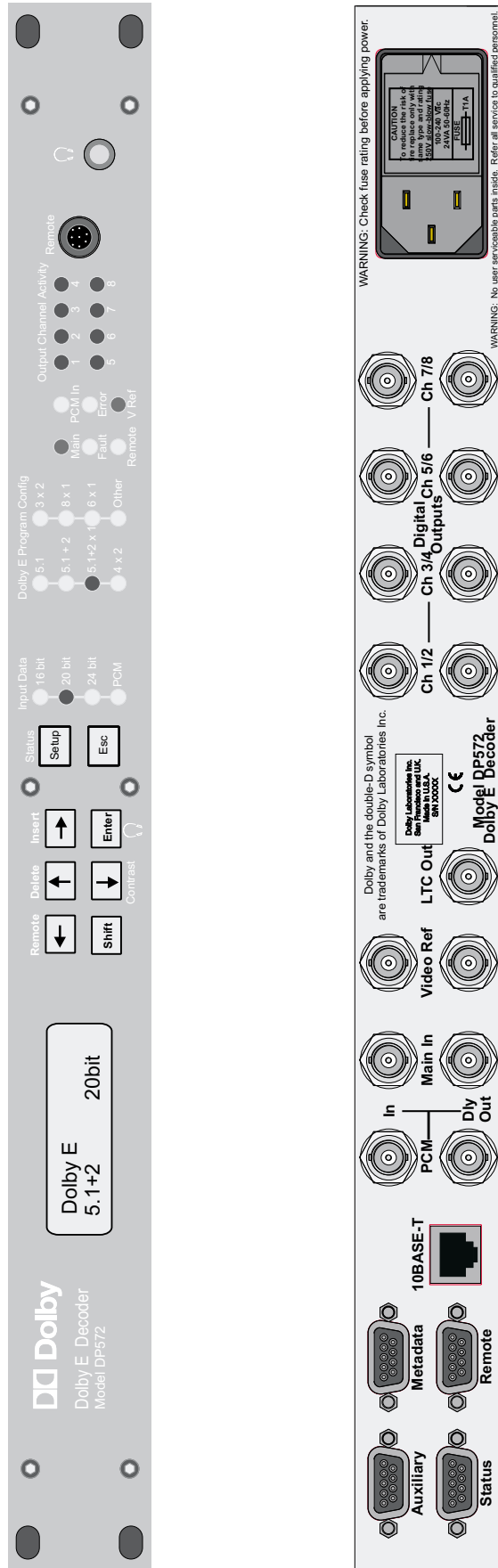


Figure 4-2 DP572 front and rear panels

4.1.1 Main In

A Dolby E encoded signal is applied to **Main In**, sent to an AES3 receiver, then passed to the DSP subsystem for decoding. A PCM signal can also be input to Main In and passed directly to Digital Outputs 1/2. The DP572 automatically detects whether the Main In signal is Dolby E or PCM.

4.1.2 Video Reference

An analog composite video reference signal is required for Dolby E decoding. Versions 1.05 and later support two frame rates: 29.97 Hz (NTSC) and 25 Hz (PAL).

If the video reference signal is not present or invalid, the:

- DP572 will stop decoding the Dolby E bitstream;
- PCM outputs on the decoder will be muted;
- VRefLED will be red (Vref not present) or yellow (Vref unequal to frame rate of Dolby E Main Input).

4.1.3 PCM Input

A separate PCM signal can be applied to the PCM Input and transported in parallel with the Main In signal. A delay equal to the main channel latency is added to the PCM signal.

4.1.4 Remote

Future versions of the DP572 will permit remote control through the front- (RS-232) or rear-panel (RS-485) remote ports.

4.1.5 Auxiliary

The RS-485 auxiliary port will be implemented in future versions.

4.1.6 10BASE-T

This port will be implemented in future versions.

4.1.7 Metadata

Dolby Digital metadata is extracted from the Dolby E bitstream and sent out the metadata port. This port can be connected to the DP569 Dolby Digital Multichannel Encoder (software must be version 1.21 or later).

4.1.8 Status

General Purpose Input/Output (GPI/O) signals for the DP572 are available from the Status port, a female DB-9 connector. The input and output signals are 0 – 5 V TTL. Table 4-1 defines the pin configuration.

Table 4-1 DP572 Status Port Pin Functions

Pin	Direction	Connection	Explanation
1	Output	Dolby E Detect	1 : Dolby E; 0 : PCM or none
2	Output	Reference Video Valid	1 : Valid; 0 : Ref video error
3	Output	Dolby E Decoding Valid	1 : Valid; 0 : Decoding error
4	Output	System Operational	1 : Functional; 0 : Failed
5	Output	Fault	1 : Functional; 0 : Hardware fault
6	Output	Reserved	
7	Input	PCM channel routing	Voiceover and Switched mode
8	Input	PCM channel routing	Voiceover and Switched mode
9	N/A	Ground	

Using the Status Port to Select Voiceover and Switched Modes

The PCM Input channel routing can be changed via the Status port between **Voiceover** and **Switched Out** modes, which are generally used when Dolby E is part of a distribution system without a VTR (i.e., a network feed to an affiliate).

- **Voiceover** mode *mixes* the PCM input *over* the main program audio.
- **Switched Out** mode *replaces* the main program audio with the PCM input.

These modes can be controlled from the front panel, serial remote, or Status port. See “Output Routing” on page 8. for a complete explanation of other PCM Chan Config Output Routing modes not accessible to change via the Status port.

The state of the pins is normally high (internal pull up), and they detect a high-to-low transition. A held contact closure between pins 7 and 9 (ground) or pins 8 and 9 is required to activate a function. A low-to-high transition (i.e., a switch release) restores the **External Standby** setting. Table 4-2 shows the function of the two GPI pins on the DP572.

Table 4-2 Status port output routing mode selection

Ctrl in pin 8	Ctrl in pin 7	PCM Chan Config Output Routing Mode
High	High	External Standby
High	Low	Voiceover
Low	High	Switched Out
Low	Low	Reserved

4.1.9 Digital Outputs

A maximum of eight channels of decoded audio are supplied on the four AES3 outputs. A second electrically isolated output is supplied for each channel pair.

Note: The digital outputs are electrically separate, not passive loop-through connections, so there is no need to terminate an unused output.

4.1.10 PCM Delay Output

Encoding delay is added to the PCM signal which is then transmitted from the **PCM Delay Out** connector. The DSP subsystem calculates the delay equivalent to the main channel latency and applies it to the **PCM Delay Out**. If PCM bypass mode is enabled, the delay matches that of the bypass channel.

4.1.11 LTC Output

After de-multiplexing timecode information from the Dolby E stream, the DP572 provides a standard SMPTE LTC signal.

4.2 DP572 Setup Mode Menu Reference

This is the top level of the DP572 menu hierarchy for editable parameters. Each menu is discussed in its own section and displayed with all submenus and values.

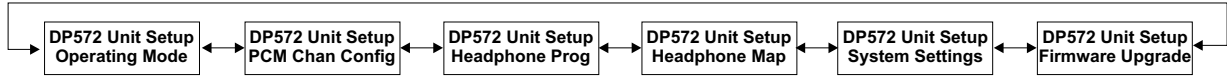


Figure 4-3 DP572 Unit Setup menu

Conventions

In the menu diagrams, the arrow keys select among menus at the same hierarchical level and settings within a menu category. Although selection between menus and settings is indicated in the diagrams by horizontal and vertical arrows, respectively, this is a graphical convention only. The $\downarrow \rightarrow$ keys both go to the next menu or setting; the $\uparrow \leftarrow$ keys both return to the previous menu or setting. A double-headed arrow in the diagrams indicates that an arrow key can select between the two settings or menus.

The **Esc** and **Enter** keys ascend and descend, respectively, one menu level. They are labeled in the menu diagrams and appear as single-headed arrows; down for Enter and up for Esc.

4.2.1 Operating Mode

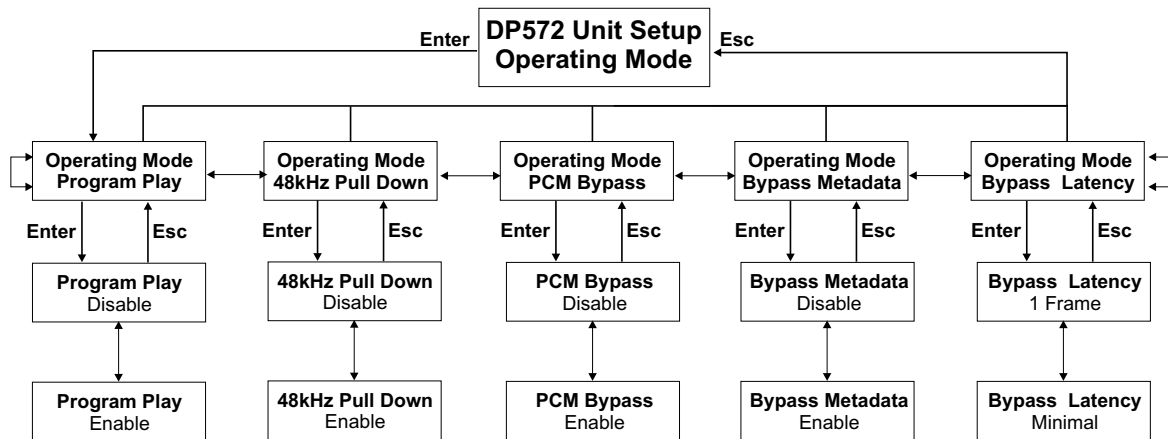


Figure 4-4 Operating Mode menu

Program Play

Enable: Allows the input to **Main In** to vary from the nominal 48 kHz sample rate. Permits the decoder to operate with a VTR in Program Play mode. As the sample rate varies from 48 kHz, the decoding latency is no longer exactly one video frame. The **P** in the display below reflects that Program Play is enabled.

Dolby E	P
5.1 + 2	20bit

Disable: The sample rate of the Main In input must be 48 kHz for the DP572 to decode.

48 kHz Pull Down

See *48kHz Pull Down* on page 3-10.

PCM Bypass

Enable: Allows smooth transitions between decoded Dolby E and PCM audio.

Disable: Audio outputs are muted until a valid Dolby E stream is received at the Main In input. This is useful when editing on a VTR while decoding with the DP572.

Bypass Metadata

This feature is only relevant if PCM Bypass mode is enabled.

Disable: While the DP572 receives PCM input, no metadata is output.

Enable: While the DP572 receives PCM input, a default set of metadata parameters more appropriate for two-channel audio is sent instead of the Dolby E stream's metadata.

Bypass Latency

This feature is only relevant if PCM Bypass mode is enabled.

1 Frame: Maintains a one-frame delay.

Minimal: The PCM Bypass audio undergoes the minimum propagation delay from Main In to PCM Out.

4.2.2 PCM Chan Config

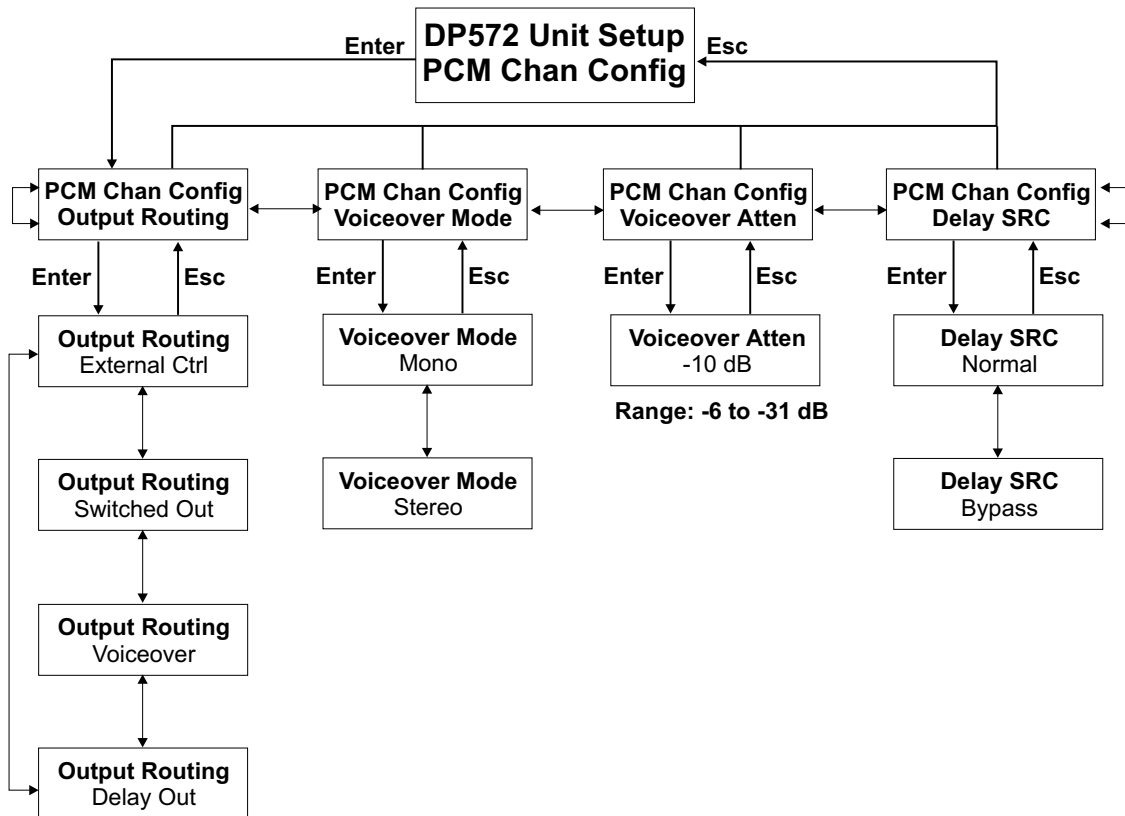


Figure 4-5 PCM Chan Config menu

Output Routing

Switched Out: Replaces the Program 1 audio with the PCM input. The PCM Dly Output is muted. Switching is accomplished with a smooth crossfade. Main In can be PCM or Dolby E.

Voiceover: Mixes the Program 1 audio with the PCM input. The PCM Dly Output is muted. Main In must be Dolby E for Voiceover to function properly.

Delay Out: Matches the decoding latency of the Main In signal path. This is used when the decoder is connected to a VTR to synchronize Dolby E encoded audio with non-encoded PCM audio. This is the default setting.

External Ctrl: Puts the DP572 in a standby state waiting for commands from the Status port.

Voiceover Mode

Selects Mono or Stereo for Voiceover PCM input. Mono adds PCM Input Channels 1 and 2 and attenuates 6 dB.

Note: Voiceover and **Switched Out** modes can be selected via the Status port. See Section 4.1.8 - *Status*.

Voiceover Atten

Applies 0 to -31 dB attenuation to the main Dolby E program. At 0 dB attenuation, overload can occur if the main Dolby E program and Voiceover audio both reach 0 dBFS.

Delay SRC

The Delay Sample Rate Converter setting is only relevant if the Output Routing mode is **Delay Out**.

Bypass: Does not send the PCM input through a sample rate converter.

Normal: Passes the PCM input through a sample rate converter.

4.2.3 Headphone Prog

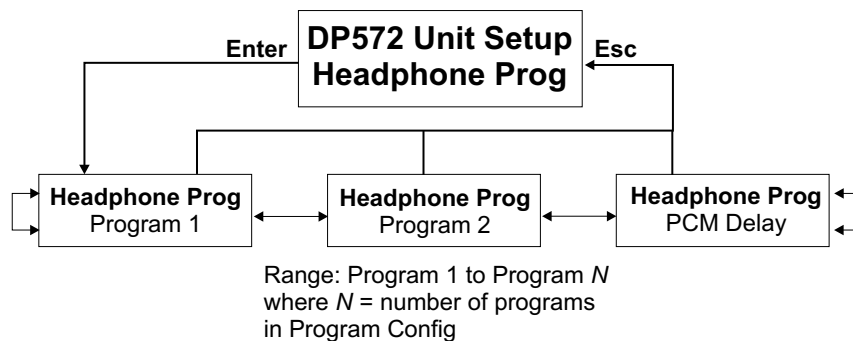


Figure 4-6 Headphone Prog menu

The front panel of the DP572 Dolby E decoder includes a stereo headphone output from a ¼-inch female connector. This menu selects the headphone signal source from the four pairs of rear-panel channel outputs: 1/2, 3/4, 5/6, 7/8, and PCM Delay. The selectable pairs depend on the active Program Config. For example, channel pair 7/8 can not be monitored in a format with only six channels. Change the headphone volume by pressing **Shift + Enter** (the headphone icon is below the Enter key) and using the arrow keys.

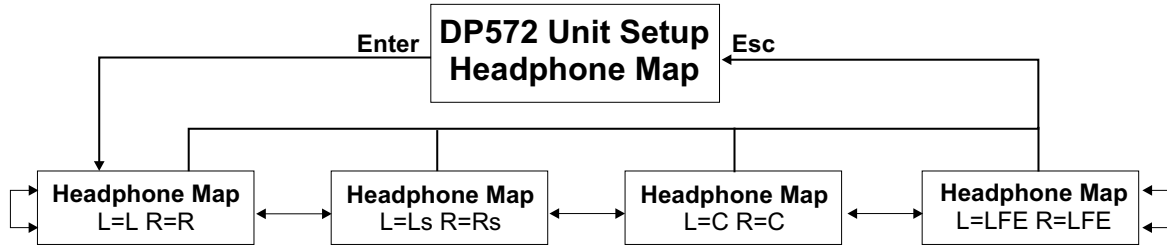
Program 1–N

Selects the Program within the Program Config to monitor through the headphone output. The Headphone Map menu (see below) contains the allowable channel-to-headphone mappings for that Program.

PCM Delay

Selects the PCM Input channel for headphone monitoring.

4.2.4 Headphone Map



The mappings above are for a 5.1-channel configuration

Mappings for a four-channel configuration are: L=L R=R, L=C R=C, L=S R=S
 Mapping for a two-channel configuration is: L=L R=R
 Mapping for a single-channel configuration is: L=C R=C

Figure 4-7 Headphone Map menu

This menu provides the allowable channel-to-headphone mappings based on the Program selected in the Headphone Prog menu.

4.2.5 System Settings

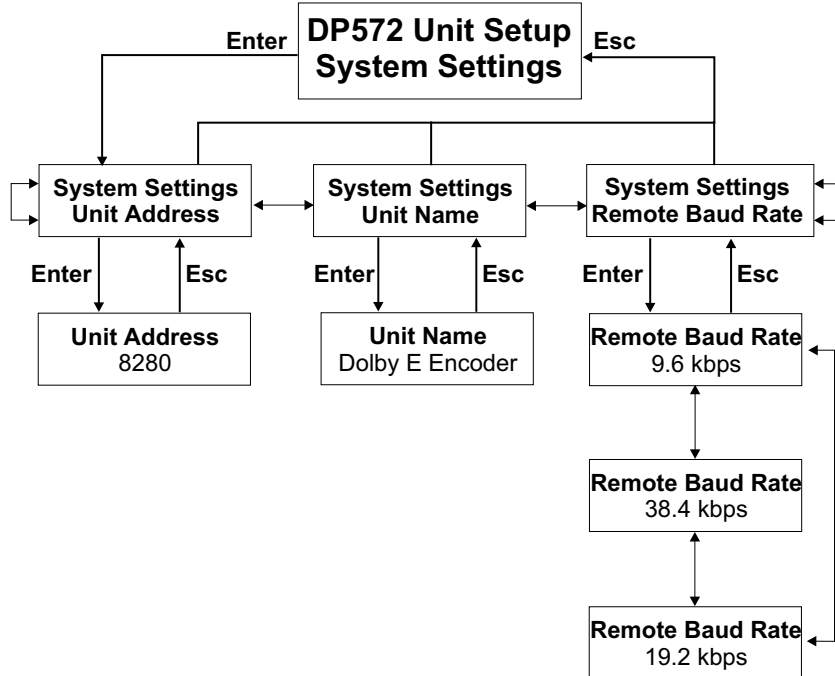


Figure 4-8 System Settings menu

Remote control functions are not yet available for the initial Dolby E product release, so this menu is useful only during firmware upgrades (see the next section).

4.2.6 Firmware Upgrade

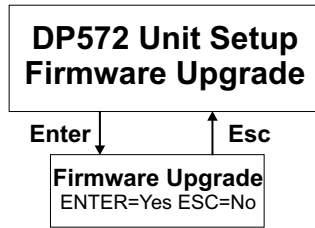


Figure 4-9 Firmware Upgrade menu

The firmware in the DP572 can be upgraded via the Remote Serial port. See the documentation that accompanies the upgrade kit.

4.3 DP572 Status Mode Menu

Access the Status mode menus by pressing **Shift + Setup**. These menus simply display the device’s current status and are not used to set values. Use the Setup mode menus to set new values.

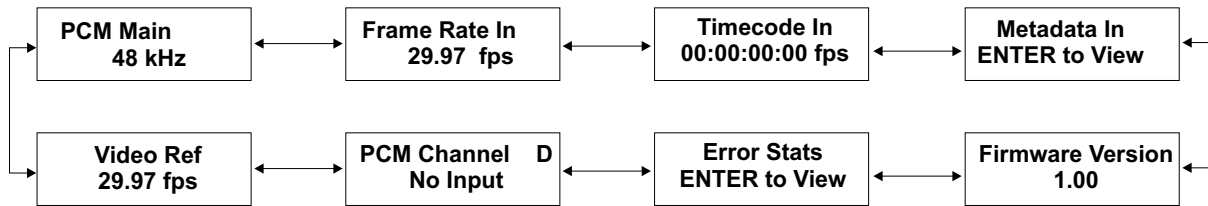
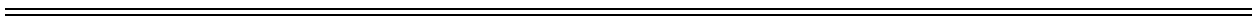
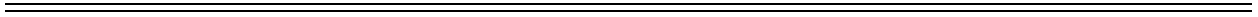


Figure 4-10 DP572 status menus



Chapter 5

System Specifications

Audio Encoding Method	Dolby E
Frequency Response	20 Hz – 20 kHz \pm 0.25 dB
Distortion	< 0.01% at 1 kHz; < 0.02%, 20 Hz – 20 kHz
Dynamic Range	> 110 dB
Sampling Rate	48 kHz
Video Frame Rate	29.97 Hz (NTSC); 25 Hz (PAL)
Encoding Delay	1 video frame (fixed)
Output Data Width	20-bit (8 channels); 16-bit (6 channels)
Dolby E Configurations	User Selectable: 5.1/5.1+2/5.1+1+1/4x2/3x2/8x1/6x1/Other
Dolby E Concatenations	10 encode/decode concatenations (minimum)
PCM Delay	Same as Dolby E encoding delay (1 video frame)
Digital Audio I/O	Four BNC female connectors, AES-3ID-1995/SMPTE 276M
Dolby E I/O	Two BNC female connectors, AES-3ID-1995/SMPTE 276M
PCM Delay I/O	Two BNC female connectors, AES-3ID-1995/SMPTE 276M
LTC I/O	BNC female connector
Remote Port	RS-232, 8-pin female mini DIN on the front panel RS-485, 9-pin female D on the rear panel
Status Port	TTL levels, 9-pin female D on the rear panel
Auxiliary Port	RS-485, 9-pin female D on the rear panel
10BASET Port	RJ-45 female jack connector on the rear panel
Dimensions	Size: 1 rack unit, 1.75 x 19 x 12.75 inches (44 x 483 x 324 mm) Weight: 6.0 lb (2.7 kg)

