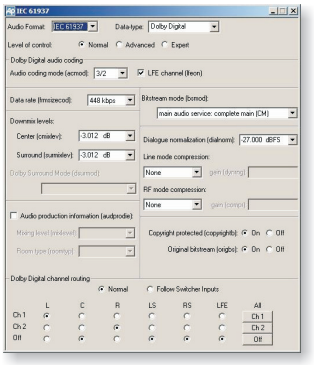
Audio precision®

Testing for Optimal Results

PRODUCT BULLETIN



# OPT-2711

# Dolby™ Digital Generator

## *A powerful and efficient way to test Dolby Digital decoders*

DOLBY DIGITAL®

## Introducing the OPT 2711 Dolby Digital Generator

The combination of an Audio Precision 2700 series audio analyzer and Dolby™ Digital Generator is the world's fastest, most accurate way to test to the Dolby Digital standard. Now, manufacturing, R&D and verification engineers and technicians can test quickly and accurately to Dolby Digital standards. Audio Precision's exclusive closed loop system allows completely automated Dolby Digital testing and verification while avoiding frustrations common to other solutions including:

- No sync signals required
- No external sweeps
- No pre-encoded test DVD, DVD player or video monitor
- No track-to-track DVD navigation between measurements

Until now, testing compressed audio decoders such as Dolby Digital has been time consuming and inflexible. A test engineer must start with some kind of encoded bit streams. In most cases, this means pre-encoded test signals stored on a DVD or hard disk. Reproducing the test signals requires a DVD player or PC sound card with digital outputs. The test signals are passed through to the DUT where they are decoded, converted, and measured as analog signals. Test engineers must be able to ensure that all modes of the decoding process are working correctly and that the digital to analog conversion does not degrade the audio quality after decoding. Problems created by this situation include lengthy test times, lack of control, and incomplete testing. The Audio Precision OPT-2711 closed-loop solution solves these problems.

## Benefits:

- Real-time testing, not limited by the speed of DVD playback.
- Control the complete process from the PC user interface or automation scripts--no need to control a DVD player.
- Up to ten times faster than DVD source techniques.
- “Closed-loop” process allows interactive testing.
- Full test signal flexibility, not just pre-recorded signals.
- No limits on how to use test signals--change in real time, create unusual test signals, sweep parameters of the test signal.
- Test signals are asynchronous. Like program material, signals are not synced to the Dolby Digital frame rate, for more rigorous decoder testing.
- Digital output parameters and impairments like jitter can be set just as they can with linear PCM digital outputs. The complete complement of digital generator test signals is available.
- Flexible routing control for all 5.1 channels.
- Selectable user interface levels--*Normal, Advanced, Expert*. Choose the best one for the application.
- Facilitates efficient evaluation of the multitude of tests required for comprehensive decoder evaluation.
- Maintains the high performance of Audio Precision 2700 Series instruments.
- Easily adapt existing PCM tests to test Dolby Digital encoders.

## OPT-2711 uses:

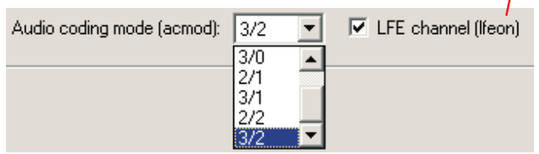
- Dolby Digital License Certification of decoders.
- Decoder Design Performance Evaluation.
- Decoder ICs and software.
- Consumer DVD players, home theater systems, AV receivers.
- Set-top boxes and video games.
- PC sound cards, motherboards, USB devices with Surround Sound.
- Automotive audio equipment.
- ATSC standard for High Definition Television.
- Consumer personal/portable audio electronics.
- Professional, broadcast, and multimedia studios.

# Dolby Digital Generator

*A powerful and efficient way to test Dolby Digital decoders*

Dolby Digital is an audio distribution system that can provide high-quality discrete multichannel audio capabilities with sophisticated metadata control, all carried on a single IEC 60958 (AES3/SPDIF) digital interface signal. The original multichannel audio is first preprocessed and digitally compressed; metadata is added, and resulting data is inserted into the IEC 60958 bitstream as AC-3 data according to the IEC 61937 standard. Dolby Digital audio is provided for DTV emission or as a component signal for distribution on media such as DVD-video.

The OPT-2711 Dolby Digital Generator can encode into Dolby Digital any of the wide range of digital stimulus signals available within a 2700 series instrument, with both the stimulus generation and the Dolby Digital and IEC 61937 parameters under programmatic control (using AP Basic), if desired. The decoded multichannel outputs of the DUT can be routed through an audio switcher and into the 2700 series analyzer, once again under programmatic control. The stimulus signals and the integrated control of switching, sweeps, measurement and display can thoroughly and very quickly test DUTs that incorporate Dolby Digital decoder functions.



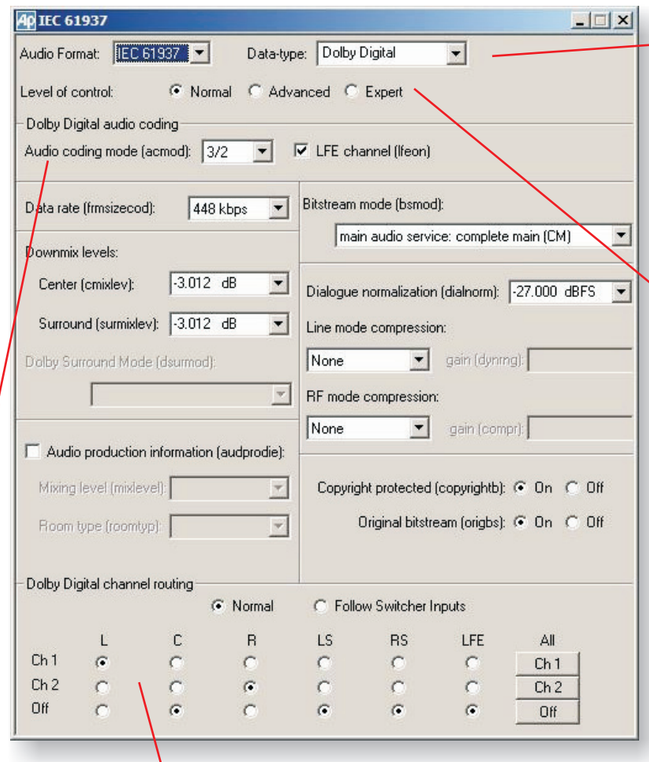

## Setting the Encoding Parameters:

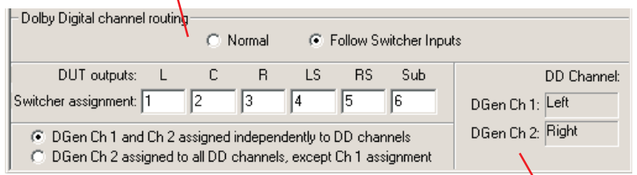
The IEC-61937 panel lets you choose metadata and encoder processing options. Metadata are decoder instructions embedded in the digital bit stream. These are used to control decoding functions like *Dialog Normalization Level, Dynamic Range Compression*, and *downmixing*. Since all of the encoding parameters and metadata can be controlled via OLE instructions, scripts can be used to allow complete automation of decoder functional testing. For example, the coding mode (3/2, 2/1, etc.) can be stepped through all eight possibilities under program control.

Numeric parameters like *Dialog Normalization Level* can be swept like any other 2700 Series setting. This permits "Closed-Loop" sweeps of the entire encoding/decoding process.

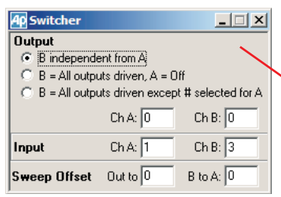
Some decoder features like *Dynamic Range Compression* involve complex response curves. With an exclusive Audio Precision feature, the compression value can be swept directly to expedite the testing and simplify analysis of the test results.

## Dolby Digital Encoding Control Panel

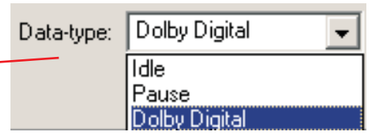



## Multi-channel Signal Routing




The SYS-2722 digital audio generator can produce two channels of audio. Dolby Digital accommodates six channels of audio. An input multiplexer function allows routing the two generator signals to any or all of the encoder inputs. A *Follow Switcher Inputs* mode allows the encoder input channel routing to follow the analog input switcher channel to analyze the proper decoder output channels. Used in a sweep, this simplifies automation of multichannel converter and power amplifier testing.

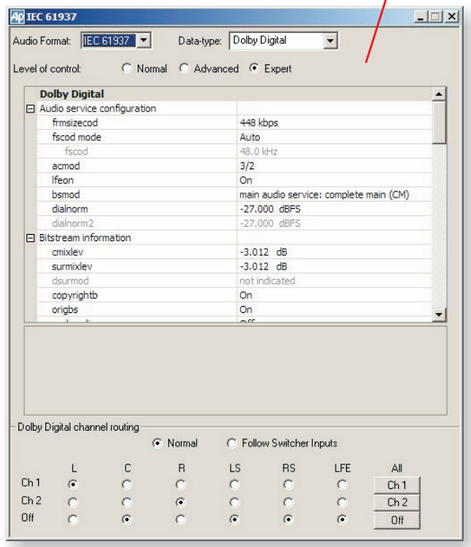



*Data Types:*

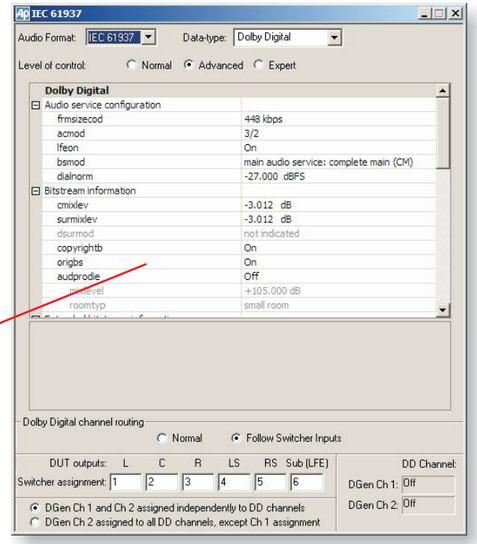
- Idle (null bursts - no audio data)
- Pause (gaps in the audio data)
- Dolby Digital audio

Select your desired level of control on the IEC-61937 Panel

**Normal (shown left)** – Only common Dolby Digital settings available

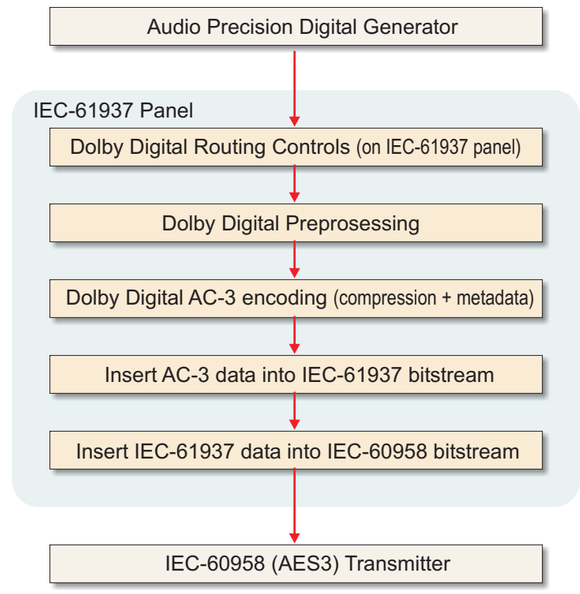




IEC-61937 Panel **Expert** mode
All settings accessible and accepts out-of-range parameter values.



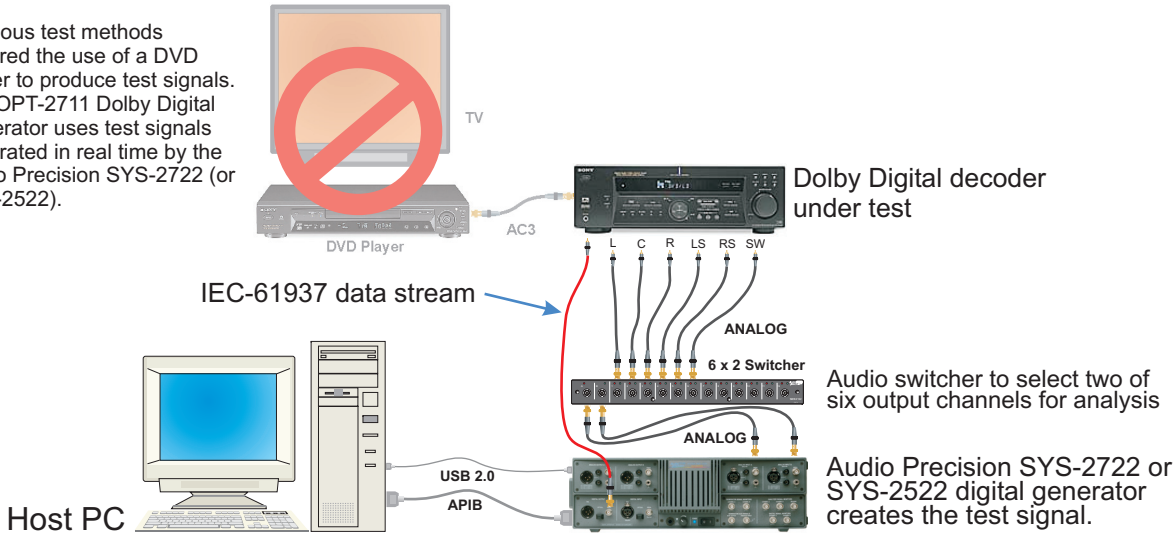

IEC-61937 Panel **Advanced** mode
Most settings accessible.

## Signal Flow

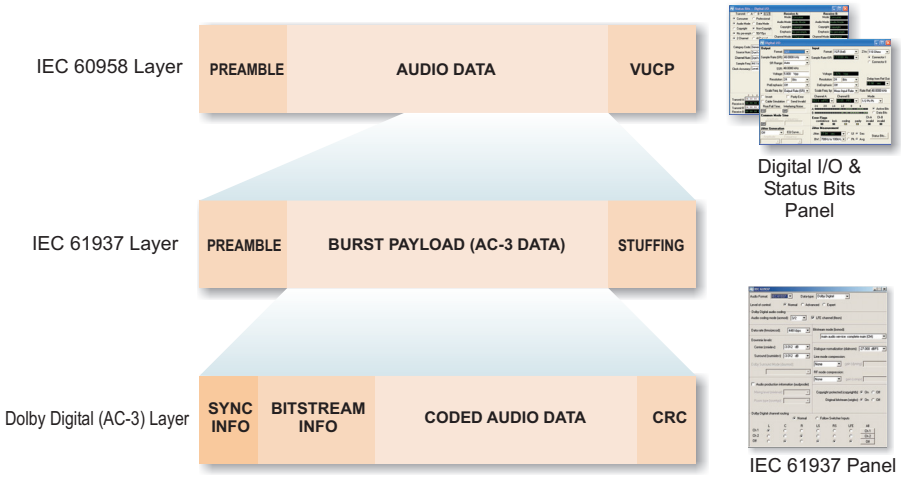


## How It Works - Test Setup

Previous test methods required the use of a DVD player to produce test signals. The OPT-2711 Dolby Digital Generator uses test signals generated in real time by the Audio Precision SYS-2722 (or SYS-2522).




## Digital Audio Protocol Stack






Digital I/O & Status Bits Panel



IEC 61937 Panel

### What is IEC-61937?

*IEC-60958 is the Standard that defines how digital audio is transported on a serial bitstream. It is more popularly called: "S/PDIF" or "AES-3".*

*IEC-61937 is the Standard by which coded audio is carried on an IEC-60958 bitstream.*

*IEC-61937 provides a protocol for embedding coded audio data where the linear PCM audio data is normally transmitted.*

## System Requirements

The Dolby Digital Generator is a software option compatible with Audio Precision SYS 2722 or SYS 2522 audio analyzers. The Dolby Digital Generator includes a license to encode Dolby Digital format signals for test and measurement purposes. A hardware modification to add a USB interface is required for upgrades and must be performed by Audio Precision or an authorized Audio Precision service partner. *(This interface does not replace the existing APIB system control interface.)* The solution also requires the use of a PC with a USB 2.0 port and PC clock speed of 1GHz or higher.

Although the software to control this option resides on the host PC, it is activated to run on a particular SYS-2722 (or SYS-2522) instrument. It is possible to transfer this activated license from one instrument to another compatible instrument.

## Ordering Information

The OPT-2711 Dolby Digital Generator option may be ordered as an upgrade option to a SYS-2522 or SYS-2722 or may be ordered installed with a new SYS-2722. The OPT-2711 includes the control software described in this document, the hardware required to enable signal communication between the instrument and the PC, and a special Dolby Digital encoder license.



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