DSA-1 AES & S/PDIF INTERFACE ANALYZER

DSA-1

Digital Audio Stress Relief

- Electrical & timing (jitter) analysis and other measurements for AES/EBU & S/PDIF (IEC60958)
- Generate & test audio, Channel Status data and electrical parameters
- Automated Go/No Go tests
- Check for bit-errors and drop-outs with Channel Check & Watchdog
- Re-clock/de-jitter AES streams
- Patch Channel Status “In-line”
- Re-chargeable battery
- Monitor speaker
- Programming & results capture using a Windows PC

The DSA-1 is a portable instrument providing the specialised measurements and checks needed to ensure reliable operation of digital audio systems. These “connectivity” checks, combined with built-in automatic test sequences, provide a unique capability to give quick and reliable go/no-go indications in a wide range of circumstances. Some rely on a “known & trusted” receiver into which suspect sources are connected for test, but this can be misleading and may lead to the wrong conclusions. The DSA-1’s test sequences are the most reliable way to check AES sources and offer the flexibility to tailor tests appropriately.

The DSA-1 delivers a detailed diagnosis including both audio and Channel Status data content and electrical characteristics including source and data-related jitter, amplitude and eye narrowing.

The DSA-1 also provides signal generator capability, including a range of specialist test signals designed for use with the AES/EBU (IEC60958) Digital Audio interface. These include degraded signals with source or data related jitter, Psuedo-random sequences (PRS) used for bit error detection and the Prism Sound JTEST signal designed to stimulate inter-symbol interference where a lossy transmission media is involved.

DSA-1 can generate and measure the return signal at the same time.

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Prism Sound

DSA-1 AES & S/PDIF INTERFACE ANALYZER

1. Input and output

- XLR, coaxial (BNC or RCA) & optical test inputs are provided.
- XLR and coaxial test outputs.
- XLR and coaxial reference inputs for AES11 or Wordclock.
- Sync input : Check/update frequency calibration, phase, and as external reference for the signal generator.

2. Front-panel LED indications

- Carrier failure.
- Biphase or parity violation.
- Near Fail - eye-width < 50%.
- Block error - length <> 192 OR phase error in function generator mode.
- Analogue - <20kHz signal found.
- Sample rate - 32kHz, 44.056kHz, 44.1kHz, 48kHz or 'other'.
- Sample rate accuracy - 2ppm, 10ppm, 50ppm, 200ppm.
- Audio word-length 16,20 or 24 bits.
- Validity flag.
- User-bit activity.
- Basic Channel Status:
  Professional / consumer;
  Emphasis;
  SCMS / copy status;
  Stereo / 2-channel / mono;
  CRC error;
  A B (Ch. Stat. Difference).

3. Speaker and headphone

An internal speaker allows audio monitoring, plus headphone jack.

4. Oscilloscope connections

To aid display of carrier waveform, the DSA-1 provides an isolated, unbalanced feed of the test-signal, plus trigger pulse, on a pair of BNC connectors. The trigger point can be selected from test-signal's A-channel preamble, B-channel preamble, block-start preamble or can be derived from the reference sync.

5. Test Functions

- Sample-rate display - in Hz and ppm; Internal TCXO is accurate to 3ppm .
- Software calibration to external reference (<1ppm).
- PLL corner frequency can be set to either 700Hz or 1.5kHz.
- Interface Jitter measurement:
  fs Jitter measures source jitter.
  Data Jitter measures the total from source and cabling.
  Eye-narrowing measures both independent of program.
- Carrier amplitude is displayed in volts or millivolts p-p.
- Biphase / parity error count.
- Phase versus reference sync.
- Common-mode carrier amplitude (Balanced mode).
- Bit activity : each bit shown as low or active (high or changing).
- Incoming Channel Status by field:
  Professional or Consumer.
- Log (& Upload) or Print Measurement results (serial printer)

6. Signal generator/ editor

Generator sync source may be:
- reference sync input (AES11 XLR or coax, or Wordclock 30KHz - 50KHz),
- Internal at 44.1KHz or 48KHz.

- Generator settings can be logged

Gen 1 mode functions:
- Sine, square, triangle & ramp with variable frequency and amplitude;
- Pulse waveform consisting of one or more samples of digital full-scale separated by zeros(with polarity control);
- PrismSound Jtest signal for investigating cable-related jitter.

- Channel Status – full flexibility; All fields (professional/consumer).
- Valid Bit may be set or clear.
- Edit mode, (DI to DO):
  The audio, Valid bit and Channel Status bit data fields on the AES format can be individually modified or passed through.

Gen 2 mode functions:
- Special functions for jitter testing and bit-error detection.
- Sine at fs/4(12KHz @ 48KHz fs).
- PrismSound Jtest signal
- Pseudo-Random Sequence (PRS)

In Gen 2, jitter may be added to the generator output. Modulation functions:
- Wide-band pseudo-random (PRS);
- Band-limited PRS;
- Low-frequency (fs/8);
- Cable simulation (Data Jitter)

- Edit mode, (DI to DO): add jitter to incoming signals

7. Channel Check

- Tests the integrity of a data channel.
- Useful where occasional data errors or link dropouts occur.
- Channel Check mode uses Gen 2 signal generator PRS function.
- Allows long-term monitoring of every incoming sample against the generated PRS (sequence).
- Word-length 16, 20 or 24 bits
- Log entries for failures vs time.
- A or B or both channels together.

- Generate and test simultaneously or
- Generate and test independently
- Unaffected by Path delay
- Test output can have added jitter.

8. Watchdog

- Allows continuous monitoring of key parameters over a period of time.
- Log entries for failures vs time.
- Select indicators from 'Carrier' and 'Data' groups for monitoring.
- Typical Watchdog configurations might include 'FAIL' and 'NEAR FAIL' indicators, 'VALID' and the Channel Status 'CRC ERROR' indicator.

9. The DSA-1 Microscope

- In-line digital audio gain (0 to +90dB).
- Monitor post-gain signal on the speaker/headphone or digital output.
- Overload indicators are included.

10. Automatic test sequences

- Easy GO / NO-GO testing by non-specialist operators.
- Allows a wide range of DSA-1 measurements to be applied quickly, in a pre-arranged sequence, against user-programmable test limits.
- 4 Built in Test Sequences:
  Global;
  Professional (AES3);
  Consumer (IEC958);
  Strict Professional
- 4 User programmable Sequences.

User-defined sequences are written and compiled (see below) from a simple programming language, on the user's PC, and loaded into the DSA-1's non-volatile memory via RS232. This allows technicians to apply house test standards at the touch of a key.

11. Results Log

Most measured parameters, including carrier measurements, test sequence results, Channel Status snapshots and the results of channel checking or watchdog operation can be printed immediately via RS232, or retained in the log (non-volatile memory). The contents of the log may later be inspected, printed or uploaded to the user's PC, from where they can in turn be printed, edited or incorporated into reports.

12. Remote Control

- Control via an RS232 serial link.
- Program custom applications
- DSA-1 macro-processor can be used (see below).

13. Macro processor

A text-file command processor that simplifies the creation of remote control applications and avoids the need to program in languages such as 'C'.

14. Support software

- Results Log uploader : Upload, edit and print the contents of the Results Log.
- Test Sequence Compiler : Create, edit, compile and download customized Test Sequences.
- Windows 95/98 compatible

PrismSound

The PrismSound DSA-1 is a hand-held, battery-powered trouble-shooting tool for digital audio equipment and installations.

It provides a signal generator and facilities for electrical, timing and data analysis for AES3 or IEC60958 digital audio interfaces.

The DSA-1 can be used at any point in a distribution system, or directly at equipment ports. A battery–powered, hand-held unit, it is primarily intended for field use in broadcast, studio or facilities houses.

- **Diagnose digital interface problems fast**
- **Quick go/no-go checks**
- **Programmable test limits**
- **Jitter tests**
- **Check loss in cabling**
- **Patch Channnel Status**
- **Audio path bit error tests**

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