Multichannel audio measurements on surround sound decoders

with the Audio Analyzer UPL, Option UPL-B23 and Audio Switcher UPZ

Option UPL-B23

- Generation of coded test signals in AC-3 format (Dolby Digital)
- User-selectable sweep parameters

Audio Switcher UPZ

- Available as input and output switcher
- Cascading of up to 128 channels

- Direct operation via the Audio Analyzer UPL
- Control via RS-232-C for universal applications

ROHDE&SCHWARZ

Coded Audio Signal Generation (UPL-B23)

Coded audio signals

It is hard to imagine the current audio world without keywords such as surround sound, 5.1 channels, etc. Originally designed for use in movie theaters, these multichannel transmission methods have in the meantime found their way into private households.

In all multichannel methods, the six channels generally used are data-reduced for transfer in the digital audio formats established for stereo transmission. In the home units, such as audio/video receivers, the data streams are decoded for analog and multichannel replay.

Previous method

Up to now, measuring surround decoders necessarily involved defining and storing coded test sequences on a DVD or the PC hard disk. The DVD player/PC was connected to the DUT, where the test signals were decoded and finally measured by an audio analyzer at the analog outputs. Since the test files and the measurements ran on different instruments, synchronization was difficult, leading to extended measurement times.

Modern solution: Audio Analyzer UPL plus UPL-B23

The UPL-B23 option enables the Audio Analyzer UPL to generate AC-3-coded test signals directly with the built-in generator. The measurements are synchronized automatically between the generator and the analyzer.

This has the following advantages:

- The internal synchronization considerably speeds up measurements
- Test sequences can be combined much more flexibly, since the number of channels, frequency or level sweep, start and stop frequency/level as well as the number of sweep points can be set directly; settings are made in a similar way to those for a standard analog sweep
- The test signals are no longer recorded on DVD/PC, thus saving time previously spent on combining and coding the test signals
- Additional hardware, such as a PC or DVD player, is not required

Functional description

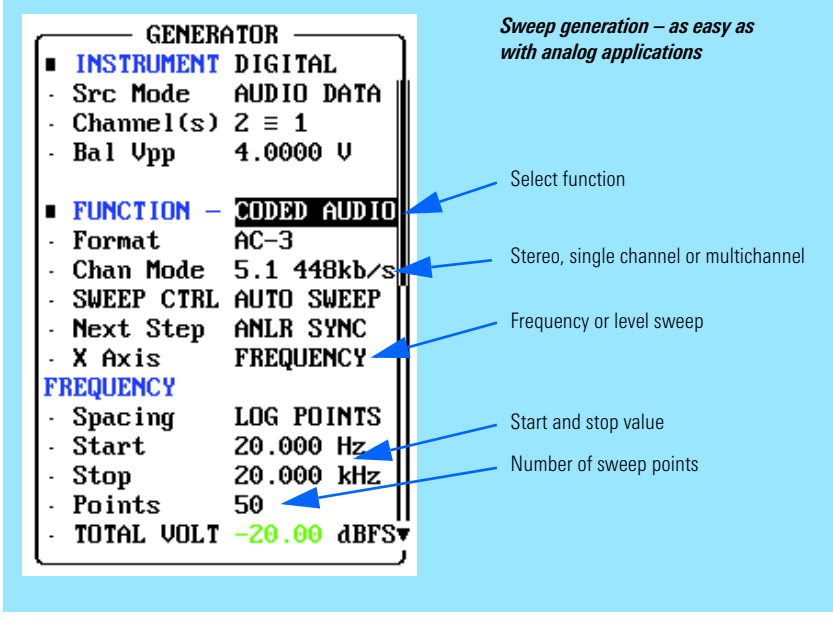
Several thousand AC-3-coded test files are stored on the hard disk of the Audio Analyzer UPL, with each individual file representing a defined frequency/level combination. The files required for a sweep are loaded into the DSP and replayed until the analyzer yields a settled measurement result. The analyzer then switches automatically to the next file (=next frequency/level point), and the next measurement is triggered until the complete sweep has been processed.

Each of the WAV files used contains one or more complete sine periods. The files can thus be combined to form a test sequence without interruption and artifacts. The DUT remains synchronized to the AC-3 data stream.

Test files available

The AC-3 format (Dolby Digital) is currently supported, and other data formats are in preparation. At present, the test files are:

- Stereo signals (coded with 192 kbit/s) and 5.1-channel signals (448 kbit/s), for frequency and level sweeps; these signals allow the measurement of frequency response, linearity, S/N ratio and harmonic distortion
- Test signals for the individual channels (448 kbit/s) to determine crosstalk attenuation



Sweep generation – as easy as with analog applications

Audio Switcher UPZ

Measuring surround decoders
Surround applications for use in the home generally have six channels. In order to test 5.1 decoders, the six channels are connected to the Audio Analyzer UPL via the Audio Switcher UPZ. The UPZ is controlled directly from the UPL panel via an RS-232-C interface.

For professional surround applications, the Audio Switcher UPZ comprises 8 channels, with two output channels to allow the two UPL measurement channels to be used simultaneously.

Input/output model
Like the Audio Analyzer UPL, the Audio Switcher UPZ has XLR connectors. Since there is a difference between male and female connectors in the XLR system, the UPZ is available both as an input and an output model.

It is possible to cascade up to 16 input switchers plus 16 output switchers, allowing up to 128 input and output channels to be switched.

Extended range of applications
The Audio Switcher UPZ can be operated not only via the UPL. Through its RS-232-C interface, it can also be controlled directly from other units or a controller. This opens up new possibilities; for instance, in broadcasting stations, where studio operations require the switching of several audio channels. The UPZ may also be used in production; for instance, when car radios are tested, measurements can be performed at all four loudspeaker outputs.

Multichannel measurements on audio/video receiver

With the Audio Switcher UPZ, up to 128 input and 128 output channels can be cascaded

Specifications

Coded Audio Signal Generation UPL-B23

Format	AC-3 (IEC 61937)
Coding	
Stereo signals	192 kbit/s
5.1-multichannel	448 kbit/s
Single channels	448 kbit/s
Frequency range	5.2083 Hz to 20 kHz
Level range	0 dBFS to –120 dBFS
Sweep parameters	frequency, level

Audio Switcher UPZ

Electrical data

Signal amplitude [1]	30 V (RMS)/2 A (42 V (peak))
Crosstalk (balanced 600 Ω load) [2]	
20 kHz	–140 dB typ.
100 kHz	–126 dB typ.
Series resistance	<0.3 Ω typ. (per signal pin)
Shunt capacitance	<90 pF typ. (each signal pin to ground)

General data

Operating temperature range	0 °C to +50 °C
Storage temperature range	–40 °C to +70 °C
Humidity	95% relative humidity at +40 °C; meets IEC68-2-3 (no condensation)
EMI	EN 50081-1
EMS	EN 50082-2
Safety standards	DIN EN 61010-1, IEC 61010-1, UL 3111-1, CAN/CSA C 22.2 No. 1010-1
Test marks	VDE-GS, cCSAus
Power supply	100 V to 120 V (AC) (±10%) 220 V to 240 V (AC) (±10%) 50 Hz to 60 Hz (±5%)
Power consumption	
Input switcher	5 VA typ. 10 VA max.
Output switcher	5 VA typ. 12 VA typ. (all channels active) 15 VA max.
Remote control	via RS-232-C
Dimensions (W x H x D)	427 mm x 43 mm x 350 mm
Weight	3.7 kg

[1] For maximum relay life: 5 W or 0.2 A max.
[2] Between any two channels into 600 Ω.

Ordering information

Order designation

Coded Audio Signal Generation	UPL-B23	1078.5188.02
Audio Switcher (Input, female)	UPZ	1120.8004.02
Audio Switcher (Output, male)	UPZ	1120.8004.03

Accessories supplied (UPZ) power cable, operating manual, service manual, RS-232-C extension cable

Recommended extras (UPZ)

19" Rack Adapter	ZZA-111	1096.3254.00

Certified Quality System
ISO 9001
DQS REG. NO 1954

Certified Environmental System
ISO 14001
REG. NO 1954

1001 (Bi we/bb) Printed in Germany

ROHDE&SCHWARZ

ROHDE&SCHWARZ GmbH & Co. KG · Mühldorfstraße 15 · 81671 München · Germany · P.O.B. 80 14 69 · 81614 München · Germany · Telephone +49 89 4129-0
www.rohde-schwarz.com · Customer Support: Tel. +49 1805124242, Fax +49 89 4129-13777, E-mail: CustomerSupport@rohde-schwarz.com