S/PDIF

Sony / Philips Digital Interface

The S/PDIF interface was developed by Sony and Philips for semi professional and consumer purposes. Later it was standardised by the IEC under the official name IEC-60958 Type II.

This interface enables a cost effective way to connect all types of consumer products as CD players, PC soundcards, DVD players or others that provide this digital audio interface. The S/PDIF interface is much the same as the AES3 interface. It adopts the identical frame structure and coding rules as AES3.

The differences are these:

Transmission takes place via short unbalanced cables or short optical fibres. Channel status information are specific for consumer applications. Only sample frequencies up to 48kHz are specified.

Specifications

- protocol identical with AES3
- 2 channel transmission (as AES3)
- audio data up to 24Bit / 48kHz

Optical connections

- optical fiber made from inexpensive plastic
- TOSLINK connectors
- cable length: 3m up to 10m (depending on quality of components; cable lengths are not specified within the standard)

Electrical connection

- unbalanced cable
- cinch connector
- cable length: max. 1m
- impedance 75Ohm (± 20%)
- levels: 200 500 mVpp (at 75Ohm)

How the SCMS works

Figure:
The somewhat obscured Serial Copy Management information represented in an evident manner by NTi Audio's digital audio analyzer DL1. The figure shows a not copied signal (generation ORIGINAL) with no copyright asserted.

The copy protection possibility when running the AES3 interface in consumer mode was already mentioned above in brief. The protection will disable copying of a digital audio data stream in more than one generation. This means: for backup purposes one copy of copyrighted audio material is allowed. But from this copy no further copy can be made. The method of copy protection applied here is called SCMS (Serial Copy Management System) and it works as follows:

Consumer channel status Bits 2 and 15 pertain to this matter. Aside other status information as sample frequency, sample resolution emphasis etc. is available. Bit 15 is called the L-bit. Bit 2 decides if copyright is asserted to the audio material.

The L-bit signifies the generation of the audio material. An digital audio stream with L-bit set ´1´ comes from the original and not from a copy. When copying this data stream the L-bit is set to ´0´. A data stream from this copy can't be copied.

Strangely enough the signification of the L-bit is just reverse for CD players (0 = Original, 1 = copy). Perhaps this is by historical reasons.

Cable

Impedance of cables proper for S/PDIF is 75 Ohm. This is just the same impedance as common with video. So video cable with cinch connectors is very suitable.