Spatializer HTMS-2510
Surround Processor

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Spatializer's HTMS-2510 is a stand-alone accessory component intended to be, in its manufacturer's words, "a convenient and affordable alternative to complicated and expensive sound-enhancement and multispeaker surround-sound systems." It produces enhanced imaging effects using only a pair of stereo speakers.

Hooking it up is indeed uncomplicated. It connects via standard line-level jacks into a system's tape-monitor or external-processor loop. Two stereo inputs are provided but only a single processed-stereo output. A small AC adaptor module supplies power. The front panel has pushbuttons for power, a bass boost (producing a shelving low-frequency boost of 5 dB below 100 Hz), input selection, and processing bypass. Two Space buttons are used to select among the three available levels of processing. When held down, the bass-boost button also activates a test tone for optimizing setup. All front-panel functions except the test tone are duplicated on the supplied infrared remote control.

Spatializer's brochure trendily emphasizes the device's abilities for playing surround-sound material, but my measurements and Spatializer's patents indicate that the HTMS-2510 is a variant of the classic stereo crosstalk-cancellation scheme. Such schemes are used to "correct" for each ear's hearing both speakers in a stereo pair.

Crosstalk cancellation works by having each speaker reproduce a signal deliberately "leaked" from the opposite channel together with the signal from its assigned channel. The leaked, crossfed signal is reproduced with its polarity inverted (180 degrees out of phase). For example, the left speaker will emit the normal left-channel signal plus an out-of-phase version of the right-channel signal. At the left ear, this crossfed signal meets the right-channel crosstalk signal from the right speaker, and since the two are out of phase, the crosstalk is canceled, at least in theory.

A rigorous embodiment of crosstalk cancellation can produce headphone-like imaging effects over loudspeakers. But precision crosstalk cancellation requires complex equalization (EQ) as well as a recirculating delay, both expensive circuits. The process also requires some rigor from the listener: The cancellation works correctly only in a small listening area, and a turn of the head can throw it awry.

Our graph on page 54 illustrates the three main aspects of HTMS-2510 processing: crossfeeding, equalization, and DDP. With a pseudo-Dolby Surround-encoded center (mono) signal, it had a very flat response (green trace). With a pseudo-Dolby Surround-encoded surround signal, the response normally receives a midrange boost from the EQ. But the red trace shows how the response at high input levels was flattened by DDP. The actions of DDP are even more evident in the blue and black traces. With DDP inactive and the HTMS-2510 fed a left-only...