

The Cure for the Common Card

Lynx Studio Technology LynxTWO Digital Audio Interface

by Frank Wells

When the words, "Sound Card," are spoken, audio professionals raised in the era of tape machines and mammoth consoles may tend to think of the decidedly low-fi cards common for the bulk of the history of PC audio. The inside of a PC (or MAC) is a hostile environment for audio, and the audio I/O solutions most accepted by professionals have typically housed any analog circuitry exterior to the computer.

That trend has slowly changed, as new techniques have allowed quality conversion to occur within the computer, with the cream of the latest crop of computer audio interfaces providing performance that rivals (and, in many cases, exceeds) their stand-alone counterparts. Lynx Studio Technology, manufacturers of high-performance, computer-based audio interfaces, has an exemplary line of full-featured products that prove this point.

The LynxTWO PCI card is one such product. Available in three configurations, the LynxTWO offers four channels of balanced, pro-level analog I/O (20 dBu max levels) in the A configuration, two analog inputs and six outputs in the B configuration, and six inputs against two outputs in the C format. The card uses a 25-pin D-sub connector for analog audio, but a high-quality, 6-foot pigtail terminated in XLR connectors is provided. A 15-pin D-Sub provides breakout for an additional harness (also provided), offering an AES

I/O pair on XLR (and S/PDIF with a provided adapter set), LTC I/O on a pair of BNC connectors, and Sync In/Word Clock Out on BNCs. Linear Time Code (LTC) is a particularly welcome addition to the LynxTWO card. The time-code generator can output all the requisite frame rates and formats, though runs on its own timebase—asynchronous with the word clock rate unless both are slave to the same video sync.

Speaking of sync, the LynxTWO can lock to a broad range of external clocks, including word, 256x word clock, video sync and the AES inputs. Digital I/O runs at sampling rates up to 96 kHz. Multiple Lynx cards can be slaved together internal to the computer, via headers on the card. Additional I/O support will soon be available via an LStream Expansion Port—a serial 16-channel bi-directional I/O, also running at up to 192 kHz (limited to four channels per port at that rate, with eight channels per port at 96 kHz, and 16 channels at conventional rates), that can be connected to Lynx expansion modules for up to 16 channels

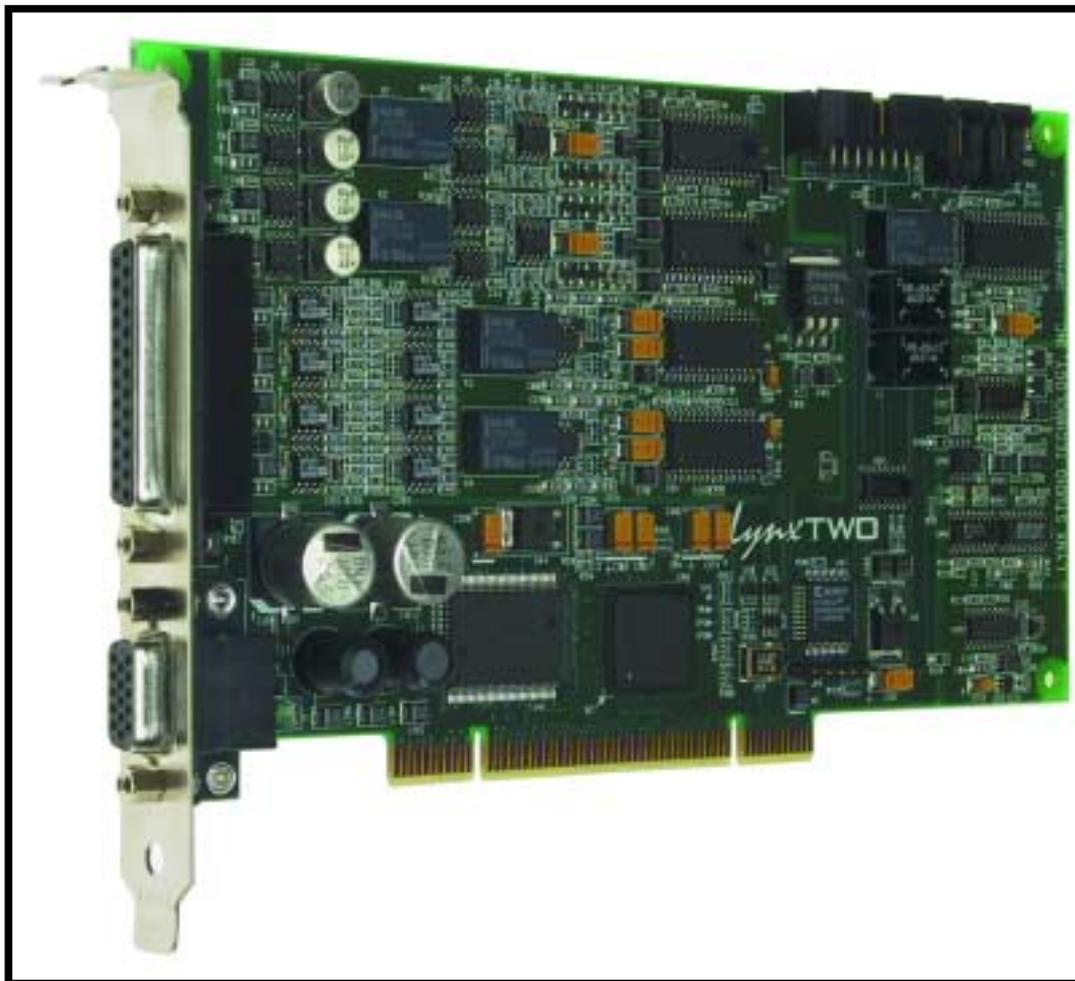
of ADAT, TDIF and AES interface. The ADAT module is expected to debut in July, with the AES module slated next, followed by the TDIF adapter in the fall.

My first step once the card was installed was to insure that I could get bit-accurate digital throughput with the LynxTWO. I made my attempts without first consulting the manual (not a good idea on the card and driver install, as following the proper sequence for your operating system can save a lot of time) and managed to maneuver the LynxTWO mixer interface with no troubles. Throughput was

excellent THD+N distortion performance. Crosstalk between channels is low. On the D/A side, this performance was nearly matched, with only slightly higher distortion numbers. The linearity of the system is very good.

While the published specs for the LynxTWO are conservatively rated—it consistently measured better than specified—the bench performance is proved out in use. The LynxTWO sounds excellent—as good a performance as I've ever heard from a sound card, and better than many outboard converters.

Windows drivers from Win 98 through XP



completely transparent to the input, though channel status, dithering and level processing could be easily accomplished along the way as desired.

The hardware mixer and router is controlled by a 4-window utility, one window controlling Adapter functions like clocking, SRC (hardware), dither (TPDF, noise-shaped TPDF and rectangular) and formats, one window controlling Record functions (with metering), one controlling Play functions, and one controlling Outputs (also with metering). The interface is relatively intuitive, and there is ample feedback on the status of the various card functions and individual channel configurations. Once I finally consulted the manual, I found it short, concise and helpful.

The analog side of the equation is where the LynxTWO truly shines, with conversion capability to 192 kHz (actually, adjustable from 8 to 200 kHz, allowing for variability and pull-up, pull-down rates). The measured performance of the A/Ds showed flat frequency response, a clean and quiet noise floor, with

are available online, as are drivers for MAC OS9. The LynxTWO has updateable firmware, and updaters tools are also downloadable. I used the LynxTWO with Cakewalk's SONAR and Steinberg Cubase SX with good results—no driver glitches on either new program.

The LynxTWO is a capable enough performer to be considered a benchmark for computer-based audio interfaces. Its performance is easily sufficient to explain and justify its price. For the DAW recordist looking for uncompromising performance, top build quality and a flexible interface, the LynxTWO may be a place to stop looking.

Product information

LynxTWO-A: \$1,095
LynxTWO-B: \$995
LynxTWO-C: \$1,195
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The Drawing Board

The LynxTWO digital audio interface card was designed without limitations, according to Lynx Studio Technology co-founder, Bob Bauman. "We knew we wanted to offer absolutely the best quality analog I/O and conversion," he elaborates, "and add enough features that would allow the card to be useful in an audio production studio, mastering studio or video post-production studio, as evidenced by the extensive synchronization, the timecode and the ability to genlock to composite video."

Bauman reports that "years of experience" went into achieving the card's audio performance—no magic, just time and attention to detail. "It's a combination of extensive ground planes, power supply filtering, differential circuit topology with high common-mode rejection ratios, precision resistor networks and just a lot of time on circuit board layout." Bauman also cites layout concerns like the distance between traces, ground traces separating channels and selection of op-amps and converters—the "best of what's out there"—Crystal parts on D/A, AKM A/Ds and Analog Devices OP series op-amps.

Insuring compatibility and driver development is an ongoing exercise for Lynx Technology. "We're fortunate that we have our driver development in-house," says Bauman. "My partner [David Hoatson] spends 100 percent of his time writing drivers." Constant communication is maintained with manufacturers to stay on top of the latest software. At the 5th level of Beta and close to release are the ASIO2 drivers for the PC, and ASIO drivers for the MAC are at the 2nd level of Beta. WDM drivers for Windows are currently under development. Bauman adds, "There's a high-speed DMA engine and ASIO-specific hardware that we just turned on with the releases of the ASIO drivers that gets our latency down. We've got people doing large numbers of channels with 1 mS, 2mS latencies, which is excellent."

In addition to the drivers, the core of the system can be updated in the field. "We have a lot of flexibility in the LynxTWO and L22 designs," Bauman explains. "In that, there's a huge FPGA on there [Field Programmable Gate Array] that's basically the heart of the card—the PCI interface, the 32 channel mixer, the SMPTE generator and reader, data routing—so we can alter those things and improve those things, based on customer feedback and needs." Bauman says you "can call it a Lynx DSP." Not working serially like general-purpose processors, the FPGA can have multiple "machines" processing data simultaneously. "You can do a lot more on every clock cycle," Baumann asserts.

Along with the three LynxTWO models, Lynx Studio Technology offers the L22, featuring the same converters and analog structure, but only two channels analog I/O and no SMPTE timecode, still with the same digital out and expansion capabilities. The company's original product, the LynxONE, is still available at about half the price of the LynxTWO.