

Recording Magazine, August 2001 DigiMAX 96k



By Nathan Rosenberg

Perhaps the biggest audio equipment story of the past few years is the boom of affordable multichannel computer audio systems. One of the interesting things about these systems is that they have multi channel digital audio I/O, so they can be upgraded to sound as good as the front-end equipment you're using to feed those digital connections.

That doesn't mean there's anything wrong with the "stock" analog electronics and A/D converters on systems like MOTU's 2408 and Digidesign's Digi001 (among many others). But it is true that one of the best ways for recording musicians to improve the sound out of their studios is to upgrade their recording chain: mic preamps, dynamics processors, and A/D converters (and sometimes equalizers).

So manufacturers are coming out with equipment tailored to fit this application. Case in point: the new DigiMAX from PreSonus, which packs eight mic preamps, limiters, and A/D converters into a single rack space unit—and manages to do it with class for just \$1700.

The well-dressed preamp

Each of the DigiMAX's eight channels has an EQ Enhance button (a 3 dB cut from 250 Hz to 5 kHz), a 20 dB pad, and balanced analog preamp outputs useful for monitoring or recording direct to tape (if you're not using the converters). Unlike many consoles, the DigiMAX features 48V switchable phantom power on each channel, although in some setups it can be hard to reach these buttons on the rear panel.

For metering, each channel has three LEDs that change color. They glow green to register that a -20 dB or greater signal is present; red to indicate preamp overload at +24 dB; and yellow when the limiter is activated.

Channels 1 and 2 both have discrete phase-invert buttons as well as 1/4" instrument inputs right on the front. One can't help but wonder if the phase reverse buttons would not be better served on channels 7 and 8. These channels are more likely to be used with mics and stereo sources that can benefit from phase reversal, as opposed to direct inputs from electric instruments. On the other hand, many users will opt to perform phase adjustments in software anyway.

In addition to its ADAT lightpipe output, the DigiMAX can send eight channels out via S/PDIF or AES/EBU. To do this you will need a special cable that connects to a 9-pin D-sub connector on the back of the DigiMAX (around \$20 from PreSonus). The DigiMAX operates at a resolution of 24 bits and sample rates of 32, 44.1, and 48 kHz. It has word clock I/O on BNC connectors.

Front and back

The layout of the DigiMAX is clean and efficient. Its front panel is a metallic aluminum with easy to read black lettering, while the gain potentiometers are a distinctive dark metallic blue. All the buttons illuminate to indicate their settings.

You adjust the preamps using dual concentric knobs. The inner pot provides up to 60 dB of gain and the outer ring sets the limiter threshold between 0 and +24 dB. This kind of knob arrangement can often feel cramped, but in this case the knobs extend quite far outward, making it easy to adjust the separate parameters. One of the nice things about this setup is that you can see the relationship between compression and gain on a channel right away.

The construction of the DigiMAX is excellent; it's hefty and has a very solid feel. Speaking of which, the included power supply is about the size and heft of a brick—a far cry from the typical wall wart. This item is generously endowed with heat sinks. The power button is located on the power supply, so you'll want to keep it within reach (although you could rack mount it with a universal plate).

Regardless of where you put it, you could hardly miss the power supply! Staring out its faceplate like a huge eye is a big red button that looks like it may have once served as the emergency eject for an F-16. Push it in and four green lights illuminate to indicate that each of the DigiMAX's voltage rails has been powered up. The power supply is factory configured to operate at the level of your local voltage.

Nothing here has the feel of budget gear. My only wish is that the A/C cord was the detachable IEC type, which can be swapped out if it breaks. But keeping heat and

A/C away from sensitive circuits is never a bad idea. The DigiMAX does get pretty warm during use, so the solidity of the power supply was definitely good design.

The DigiMAX itself is also solidly built, with a heavy metal faceplate and vents on its sides. All the knobs turn smoothly and aren't stiff, and the buttons are set low and aren't prone to being pressed inadvertently. They feel positive yet light.

Neutrik[®] makes the XLR mic pre connectors on the rear. They do not lock. The 1/4" preamp outputs are differentially balanced.

Plugging in

Quite honestly, I was really surprised when I plugged a Neumann TLM 103 into the DigiMAX. Compared with the sound I was getting straight from the preamps of my trusty budget console, the DigiMAX sounded, well, expensive.

The increased definition and overall warmer tone were obvious immediately. Whether or not the sound was more "accurate" is hard to measure, although I felt that the DigiMAX did have a color of its own. Whether or not that is just a subjective impression, the important thing is that the sound was simply more pleasing.

Keep in mind that the DigiMAX uses a transformerless design. Transformers generally impart a color to the signal, but then it's often a desirable color; there are excellent preamps both with and without transformers. In any case, good transformers are usually the most expensive component in a mic preamp that uses them by a considerable margin (with the possible exception of esoteric tubes).

On stereo piano tracks I noticed an improvement in stereo imaging that for me is the litmus test of good transient response. The piano tech who heard these recordings felt as if the sound waves were "swirling around him." Vocals sounded very present and well defined. The DigiMAX brought out a wonderful sparkle on acoustic steel-string guitar.

The preamps offer plenty of gain and very little noise, probably due to their class-A design and dual-servo gain staging. Its capacitorless design helps make it quiet even with lots of gain. While the 20 dB pad proved useful on an aggressive snare drum in one rock tune, the DigiMAX seems to have plenty of headroom-it's quite happy with hot signals.

It was on a pair of drum overheads that I was able to hear the unit respond to a wide range of frequencies. Subjectively, the sizzle on top, meat in the middle, and punch on the low end were all pleasing.

The overheads also revealed the effects of that Enhance button very clearly. With this mild EQ circuit engaged, there was just a trace of thinning evident in the midrange. It might be useful for cutting a bit of mud, but the effect is subtle enough that you could even leave it on without noticing it—certainly not the hyped, smiley EQ curve you might hear on someone's home stereo.

As with many engineers, my personal preference is to record with as little EQ as possible and rely mainly on mic choice and position for color. The DigiMAX flatters a good microphone, and it is this writer's opinion that most engineers will not need to make much fuss over the Enhance feature. But it is there if you need it, and happily it doesn't create any phase artifacts or ringing.

The electric bass and guitar players I recorded through the direct instrument inputs are both excellent players with very good instruments. Taking that into account, everyone in the control room felt that the sound was better than a regular direct signal. These tracks bore none of the brittle qualities typical of recordings made through a bad DI box.

All in all, it seemed that everything plugged in to the DigiMAX ended up sounding really, really good.

Limiting factors

It's usually a good idea to use limiting or mild compression when recording to analog or digital media, because these systems sound their best when the average level is relatively high. Dynamics

It turned out that the threshold simply needed lowering so that the processor could separate the peaks from the average levels. At that setting the results were quite a bit more transparent, and the recorded levels were more in line with what I had hoped for.

After figuring out how to use them effectively, I found the limiters to be totally usable. This design is also capable of much more brutal signal squishing; while it isn't designed to operate like an outboard compressor, it's nice that some of those sounds are in its vocabulary as well.

The only thing missing is the ability to link two channels' limiters for stereo recording. When that was called for (for instance with the drum overheads), the solution was simply to lower the gain for safety and defeat the limiters by turning their threshold control fully clockwise.

Over the top

Most audio equipment, whether digital or analog, has a learning curve. In this case, having only three LEDs for signal metering makes setting levels a little difficult at first; I found myself relying more on the meters within Emagic Logic Audio than on the LEDs.

Manufacturers have different philosophies about what their "over" lights should indicate. On the PreSonus, red means business: overload. Sometimes I heard distortion when it went off, but usually I didn't; often the software would register overloads that didn't trigger the light.

The key, I found, is to understand that the overload light indicates distortion at the preamp, not the converter. With a preamp and a converter both in the same box, one would hope for them to be calibrated together. This may not be realistic. Converters don't have the headroom that a good preamp has. They also have a very different job to do. In any case, the converter on the DigiMAX is likely to overload well before the mic pre distorts.

Even so, on playback these digital overloads usually do not sound badly clipped. This is a sign of a well-designed A/D converter.

Now, one of the features that makes the DigiMAX work so well with DAWs is that its analog and digital outputs are active simultaneously. That means you can monitor the analog outputs with no latency while recording into the DAW. And if you're doing that, it may be worth double-checking the digital recording for distortion on any peaks that go into the red- at least until you develop a feel for the unit.

Conversion

The direct analog outputs also provided a good comparison source for evaluating the DigiMAX's A/D converters. This is often an overlooked point, because not all converters are equal, although the newer converters today continue to push the envelope of what digital recording should sound like.

The DigiMAX's converters are indeed respectable and they are good. These are 24-bit converters with 64X oversampling. The digital clock is derived from a phase-locked loop, which is an effective way for the designers to minimize timing jitter.

Interestingly, the manual states that the DigiMAX uses psychoacoustic dither. This can't be defeated, but it's unclear at what bit level this is being applied or whether it's just the analog dither all modern converters apply before conversion. In any case, no problems surfaced when I mixed the 24-bit recordings and redithered the stereo files down to 16 bits-and double-dithering can theoretically cause problems-so there's no need to complain.

While you can easily spend more than the price of the whole DigiMAX just for stereo A/D converters, the bottom line is that these sound really pristine.

Conclusion

The beauty of the DigiMAX is that it takes a signal from mic to disk without really compromising at any stage along the way. For something in this price range, it sounds downright luxurious-in fact it packs a lot of punch at any price. You're unlikely to outgrow a unit with this sound quality, construction, and utility in a hurry.