



view

BY RAY LEGNINI

E-MU has a long history in digital audio. For many years its Emulator samplers and Proteus sample-playback modules were standout studio standards. When its parent company, Creative Labs (itself known for the SoundBlaster line of computer sound cards) took over the sampler and keyboard manufacturer Ensoniq, E-MU marketed the Ensoniq PARIS digital audio recording system.

Now E-MU offers a soundcard-based studio interface that is sold as a trio of products, scaled to meet the needs of project and many professional studios.

E-MU's new Digital Audio System products include the 1212M, the 1820, and the flagship 1820M, which is the one I received for review. The systems combine audio, MIDI and sync I/O with powerful on-board DSP capabilities to create compelling studio solutions. The three products have some components in common, allowing you to buy only what you need for your studio and to expand the systems later as your needs grow.

Product descriptions

The E-MU Digital Audio System products operate only on PCs; there is no Mac support. They require either the Windows 2000 OS with Service Pack 4 or Windows XP with Service Pack 1 to operate. The specs suggest that you have 128 MB of RAM available minimally, and the full package takes about 500 MB of hard disk space to install, including the bonus software offerings.

The E-MU 1010 PCI card serves as the basis for each product. It provides eight channels of ADAT optical digital I/O, S/PDIF two-channel digital I/O that is switchable to AES/EBU format, and a FireWire port for connection to external drives, CD writers, etc. (FireWire audio transfer is not supported at this time.) E-MU's E-DSP 32-bit multi-effects processor

E-MU 1820M

Digital Audio System

Onboard DSP takes this flagship audio interface to new heights

offers hardware-accelerated plug-in effects with no CPU load right from the card.

All variations of the system offer thirty-two channels of zero-latency monitoring and mixing. The system works with DirectSound, WDM, and ASIO 2.0 drivers, meaning that the system is compatible with most popular audio programs. E-MU states that the A/D converters in the 1212M and 1820M are the same as those used by Digidesign on its HD192 systems. The various analog I/O options and sync capabilities are what sets the three products apart—for those of you who missed the product preview in our June issue, here's a brief recap:

The 1212M (\$199.99) is the most affordable of the three products. It uses a daughter card, called the E-MU 0202, which resides inside the PC and provides two channels of 24-bit/192 kHz balanced 1/4-inch TRS line inputs and outputs along with MIDI In and Out jacks. We will be taking a look at this package in more detail in an upcoming issue, along with the Emulator X software sampler.

The 1820 (\$399.99) adds more I/O flexibility with the inclusion of the AudioDock breakout box. The 1/2-rack space AudioDock connects to the main 1010 PCI card with a single cable. The 3-meter cable, which includes some ferrite beads at each

end, is of the CAT5 type and is made especially by E-MU for this package. The cable supplies power to the dock as well as providing for data communication to and from the host. I'm told that replacement cables are available directly from E-MU and the current maximum length is the aforementioned three meters.

The 1820 offers two mono mic/line inputs with variable gain and 48-volt phantom power for the mic inputs, a headphone output with gain control, and an optical S/PDIF out on the front panel. There are six line inputs, a turntable preamp (yeah!) and MIDI I/O ports on the front and rear. The unit has eight 1/4-inch TRS balanced line outputs on the rear panel and also has four stereo 1/8-inch mini outputs designed for use with computer-style desktop monitoring systems, a very thoughtful addition for those doing desktop production. The converters aren't the premium ones mentioned above, but are still 24-bit/192 kHz capable and of very high quality.

The 1820M (\$499.99) is the top of the line and raises the bar as far as connectivity is concerned. The package includes the 1010 PCI card, the Sync Daughter Card, and an upgraded version of the AudioDock that includes the premium converters. The Sync Daughter Card adds 1/4-inch SMPTE I/O, BNC Word Clock



I/O, and a separate MIDI Time Code (MTC) output port. This is the hardware I'm looking at today.

Hardware installation

The system that I reviewed, the 1820M as well as the standard 1820 model, requires that the PC have two *adjacent* open PCI slots. The two cards must be connected internally by a supplied ribbon cable to operate. Only one PCI slot is actually used, however; the Sync daughtercard does not connect to the PCI slot on the PC motherboard. Instead the card is simply held firmly in place by the computer's existing mounting hardware and passes data to the 1010 via the ribbon cable. This seems to be a fair slot tradeoff considering the power the system adds to your studio and the price point.

I had to move some cards around on the Dell PC I used for the review since my PCI slots were already filled with a modem card, a network card, a SoundBlaster audio card, and an ADAT card. I opted to remove the ADAT and modem cards. Of course, these were the cards on the outside top and bottom of the PCI slots, requiring that *all* the cards be shuffled around to leave two free PCI slots next to each other for the 1820M system to use.

I then took the safe route and rebooted the computer to check that it was happy. Everything seemed OK, the plug-and-play Windows XP OS worked as advertised and informed me of the new hardware changes. A quick check of the existing audio capabilities with my current sound card and a minute surfing the Internet confirmed that I was indeed ready to install the new hardware package.

The instructions in both the full-size manual and quick-start guide were clear and easy to follow. Kudos go to E-MU for the well-written documentation, something that is sorely missing from some products in these days of PDF-only documentation.

Hardware installation requires that you mount the 1010 card first, followed by the Sync card with the ribbon cable already attached to one end. Once the Sync card is tightened down, the ribbon cable connects from the Sync card to the 1010 card. The cable is pretty short, but it does fit if you follow the instructions in the manual.

In addition to the PCI connection and the ribbon interconnect, the system requires a power connection from your PC's internal supply, similar to that used for the CD-ROM drive or internal hard disks. The supplied power cable connects with a small four-pin jack on one end to the 1010 card and then to an available open power supply connector with the typical 4-pin PC-style plastic jack.

According to Murphy's Law, the supplied cable was about one inch too short for it to reach the only available unused power connection in the CD drive section of my Dell PC. Fortunately E-MU supplies the power connection cable with an in jack *and* an out jack. I needed to dive into the area around the back of my main hard drive and pull its power connector off, insert the E-MU cable, and daisy chain the hard drive from that cable to the 1010 audio card. The location of the connections did not make this easy, but after some fumbling and grumbling it worked.

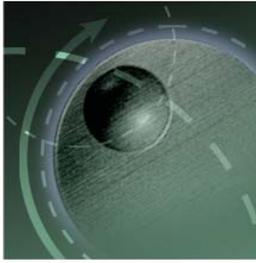
Software installs

The supplied CD-ROM includes the Windows drivers, 1820M PatchMix DSP control panel software, PDF versions of the printed documentation, and some nice bonus software including a full (but since superseded) version of Cubase VST-32 version 5.1 (it only works with the E-MU 1820M by using the card as the copy protection dongle), WaveLab Lite, and a light version of the SFX Machine plug-in package. A quick trip to E-MU's web site led me to a newer set of drivers than were on the supplied CD. Product software installation was effortless. You have the option to install any or all of the supplied applications from the installer's start screen by simply checking or unchecking the items you need.

After the requisite PC restart, the PatchMix DSP control panel software automatically opens and initializes the hardware. Then the Creative software registration tool automatically launches, and prompts you through the steps to register your software. At this point you are in business!

PatchMix DSP

The included PatchMix DSP control panel software looks like the mixing board section of your typical DAW. It is designed to allow the user to define the inputs and outputs of the system—both on the PCI card and the AudioDock—as they relate to the audio software being used. The real power of the system is revealed when you realize that you have not only an audio interface with flexible routing, but a powerful onboard DSP effects engine *and* a virtual patch bay. The patch bay aspect takes this package over the top as far as total system capabilities are concerned.



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When you use a typical audio interface with your favorite DAW software, the hardware inputs and outputs are accessed and assigned from within your DAW application, most likely in its mixer. In most cases there is a one-to-one relationship between the physical hardware and the assignments you can make in your recording software.

E-MU's PatchMix DSP takes this concept one step further by allowing you to create connections as needed and route audio to various places before and after it gets to your DAW. The connections in this case are treated the same as an insert effect. Each channel strip has slots available into which you can put any of the available patchable devices, whether that device be a physical output, ASIO connection, DSP effect, insert send/return loop or a combination of all of the above! Strips can be added to or deleted from the mixer as needed. Each strip does use up a bit of DSP, so it's wise to manage your I/O to maximize your effects resources.

In fact, by using the PatchMix DSP insert capabilities, audio can be routed to multiple destinations simultaneously. This includes the ability to run audio through VST effects while recording, adding different VST effects for monitor use only, and the capability to insert real external hardware processors into the chain at any point.

E-MU has thoughtfully provided the facility to save setups as presets so you can create and recall complicated routing schemes instantly, keeping your workflow smooth. Did I mention that I think this is a really cool concept yet? Yes, the setups remember any of the E-MU DSP effects that are inserted along with all of their parameters.

An input strip example

In the screen shot at the top of this page, you can see an input strip I created to record a stereo synth arpeggio part; the channel is highlighted in red. Audio enters the channel via the 1820M's AudioDock rear panel inputs 1L and 1R inputs. It then passes through a level meter, and then into a distortion plug-in. After the distortion comes another meter, added for monitoring the level exiting the plug-in.

Next, there is an ASIO patch inserted to send the distorted sound to the DAW track to be recorded. Note that after the ASIO send, there is a stereo delay inserted in the monitor path that does not get recorded; cool. This



The PatchMix DSP control panel

flexibility is really the key to the power lying beneath the surface of this interface. The Stereo Delay has been selected, and its editable parameters can be seen in the master section of the mixer.

Main mix and monitor bus

Monitoring your audio during a session is another area where the PatchMix DSP software shines. There are software views in the master section of the virtual mixer (which E-MU refers to as the "TV") where you can

assign channel strips to the various available outputs. This includes two types of 2-channel audio paths, the main stereo mix and the monitor bus.

Think of the Main Mix outputs as the final mix level that will be captured by your mixdown machine, DAT, or DAW; this will be set to the maximum level before distortion in most cases to achieve the highest fidelity. The Monitor section has its own volume that can be raised or lowered without affecting the level of the mix being sent to the Main Mix outputs.

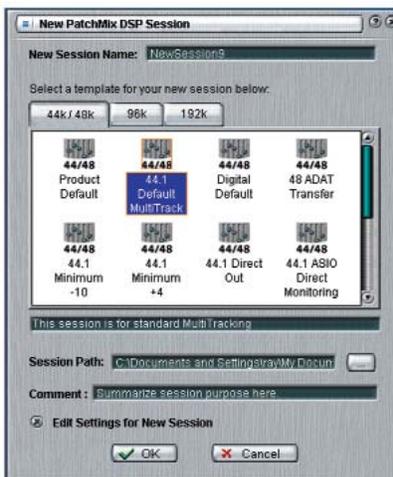
The Main Mix section also has its own set of insert points. These can be used the same way the channel inserts can, allowing you to route the main mix to various virtual and physical outputs. This allowed me to route a 2-channel mix to my monitors, to a DAT via the S/PDIF outs on the PCI card, to a pair of ASIO channels, a pair of ADAT channels, the S/PDIF digital output on the Dock, and the headphones all at the same time! And I could save and recall that setup for later use.

This functionality allows you to create a stereo output pair that can be used for a cue mix when recording. Hey, did I mention that I think this is a really cool idea? It's like having a virtual assistant engineer who can write up all the session patching, effects info, etc., all without drinking all of your coffee, saying "yo, umm, like dude..." all the time, or hitting on your girlfriend.

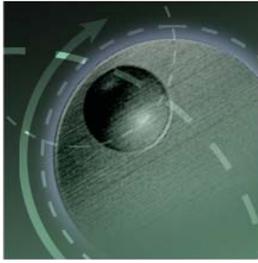
Recording

The front panel of the 1820M's Dock contains two TFPro mic preamps, designed by UK builder Ted Fletcher, formerly of Joemeek. The inputs have Neutrik Combo dual XLR mic and 1/4" jacks that can accommodate mic signals or guitar level signals. Phantom power is available, though it is a single switch that applies 48 volts to both channels at once. Most modern non-condenser mics should not be harmed if used in one of the preamps with the phantom power supply turned on.

I recorded a variety of sources through the 1820M. A Tele plugged directly into the front panel of the 1820M yielded a surprisingly quiet recording, even with moderately high input gain settings on the front panel. The cool part about the zero-latency monitoring is that you can slap on some effects like a compressor, some chorus and delay and get the right 'vibe' for the part as it is being laid down while monitoring with a bit of



Selecting a new Session from templates

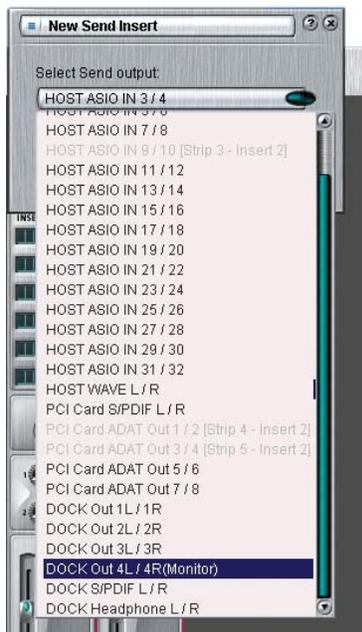


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reverb that is not being tracked. Playing against a pre-recorded track, I was pleased to notice that the headphone output level on the 1820M front panel provides a healthy amount of gain and sounds nice and full.

Moving on to miked sources, I put the mic pres to the test by recording some solo instruments in stereo, this time at the higher sampling rate of 96 kHz. The 24-bit recordings were captured directly into Cubase that came as a part of the 1820M package.



Adding a Send to a channel strip

One important fact to note about high sample rate recording—the system does not allow any E-MU DSP such as eq or compression to be added to the signal chain when using the higher sampling rates. This detracts from the overall flexibility and usefulness of the package when compared to working at 44.1 kHz and 48 kHz. The fidelity of the recordings was excellent, however. The D/A converters in the AudioDock sound good and are very quiet.

Processing power

All of the Digital Audio System products have substantial on-board DSP processing, available—as mentioned above—when using the standard

recording rates of 44.1 and 48 kHz. The channel insert paths default to having four slots, but can accommodate up to sixteen inserts. Extra slots appear as you add a plug-in at the end of the slot list.

The Master section also has an insert effects section which behaves in a similar manner. Two Aux Sends for each channel are provided, each with a Send knob. The Master section of the virtual mixer contains the Aux effects and their return level knobs. The channels' Auxes can be set to be pre- or post-fader, but this needs to be done when the channel is created. I'd prefer a switch on the channel strip itself rather than requiring that you delete the channel and recreate it to change the aux send behavior. It's a bit of a pain to have to recreate a channel with complex routing in place just to change the Aux routing.

Effects

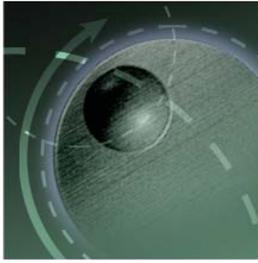
The effects provided with the system run the gamut from useful bread-and-butter tools such as delay and reverb, to the more exotic effects like vocal morphing and a frequency shifter. The effects come with a set of useful presets for each. You can edit and create your own presets, saving them in the default folders E-MU provides or in custom ones you create yourself.

Each effect has four to eight parameters that can be edited, plenty for all but the most advanced tweakers. The effects can also be chained together to create more complex processors. For example, you could create a vocal chain with a compressor set to a 4:1 ratio with a -8 dB threshold, an eq set at -4 dB at 350 Hz, then a level meter, followed by a stereo delay set for a doubling effect which in turn is fed into a stereo reverb. This setup can be saved as a preset for recall at any time—a very nice touch.

The DSP resources are not endless, however. E-MU specs the resources at sixteen effects, but each effect is a different size, so (for example) you'll get more one-band equalizers installed than stereo reverb processors. The number of channel strips in your current



The Master section, showing how effects can be inserted into the signal chain



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setup also uses DSP power, so you'll want to eliminate unnecessary strips when trying to max out the number of available effects.

All in all, the effects are quite useful; some of the combination effects chains are very creative. The stereo reverb is kind of a memory hog. It's not the smoothest 'verb on the planet, but quite serviceable. It worked well on percussion and synth sounds but was not my favorite on vocals or exposed solo instruments.

I tried to load up the system to see what DSP restrictions there were in actual session use. With a stereo reverb and a chorus installed in the Auxes in the main output section, I was able to install sixteen one-band equalizers, or sixteen compressors, or seven four-band equalizers. Remember, this DSP is completely generated by the E-MU card; all the PC's host-generated VST effects were still available.

Sync and stuff

The 1820M package, as mentioned previously, comes with the Sync daughtercard that mounts inside the computer, connected by a ribbon cable to the main processing card.

I put the system to the test by creating a mondo two-computer Mac-and-PC synced DAW. I used my Mac system running Digital Performer with a MOTU 896 FireWire audio interface and connected it with ADAT Lightpipe, word clock, and MIDI to the 1820M system. I was able to sync the two systems without any issues, transfer some rhythm tracks from the Mac into the PC, and then add some new tracks to the project.

MIDI time code was sent via my MOTU MIDI Express XT to the second MIDI input on the rear of the 1820M AudioDock to control Cubase running on the other computer. It was great fun playing with the various effects on each platform to mangle a drum groove as it was transferred back and forth between platforms, turning it into a wild alien space bongo symphonic freakout. (Please, no email from extraterrestrial fans of exotic bongo music.)

The hardest part of the whole exercise was getting all the components physically close enough together to make all the patches. There were cables running from PC card slots, the AudioDock several feet away, from the MIDI interface in one rack and the 896 interface in another rack.

clicking its icon on screen. There are no keyboard shortcuts; none are documented in the manual either. I did find out accidentally that Control+S (the "Save" command in most applications) opens the SMPTE sync window. This is an area that could improve and make an already useful hardware/software combination even more intuitive.

On the Mixer, the pan controls are represented with red and green knobs. But the red knob is for the left channel. Hmmm. I thought "red for right" was the accepted rule. Again, not earth shattering, but counterintuitive.

My personal preference would be to have the hardware I/O appear on the breakout box, the AudioDock. As it is, some studio owners may find it a bit difficult to connect and interface certain devices in the studio with some of the I/O on the rear of the PC and the rest ten feet away on the Dock. I suspect this was done both for cost reasons and to keep the three-part system expandable and upgradeable. Again, it's a fair tradeoff considering the price point and overwhelming power of the system, but I have plenty of digital and analog spaghetti under my feet as it is.

The bottom line

The real kicker as far as this system is concerned is that for a mere hundred bucks more you can add the Emulator X software, E-MU's new soft synth/sampler package. The product has all the features of E-MU's popular Emulator 4 and Proteus hardware line, and it directly interfaces with the 1820M. Look for a review of the Emulator X in an upcoming issue of *Recording*.

E-MU has a winner with this package. Sorry, guys, but you're not getting this one back, it's a keeper! Send me the bill, and in the meantime it's time to write some tunes...

Prices: as given above

More from: E-MU Systems, Inc., 1500 Green Hills Rd., Scotts Valley, CA 95067. 831/438-1921 or 877/742-6084, fax 831/438-8612, www.emu.com.

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The Effects Palette

Nitpicks

There's a lot to like about this system, but I did find a couple of things a bit weird. Most operations like Open, Save, etc., require that you use the mouse to select the operation by



Creating a chained effects preset