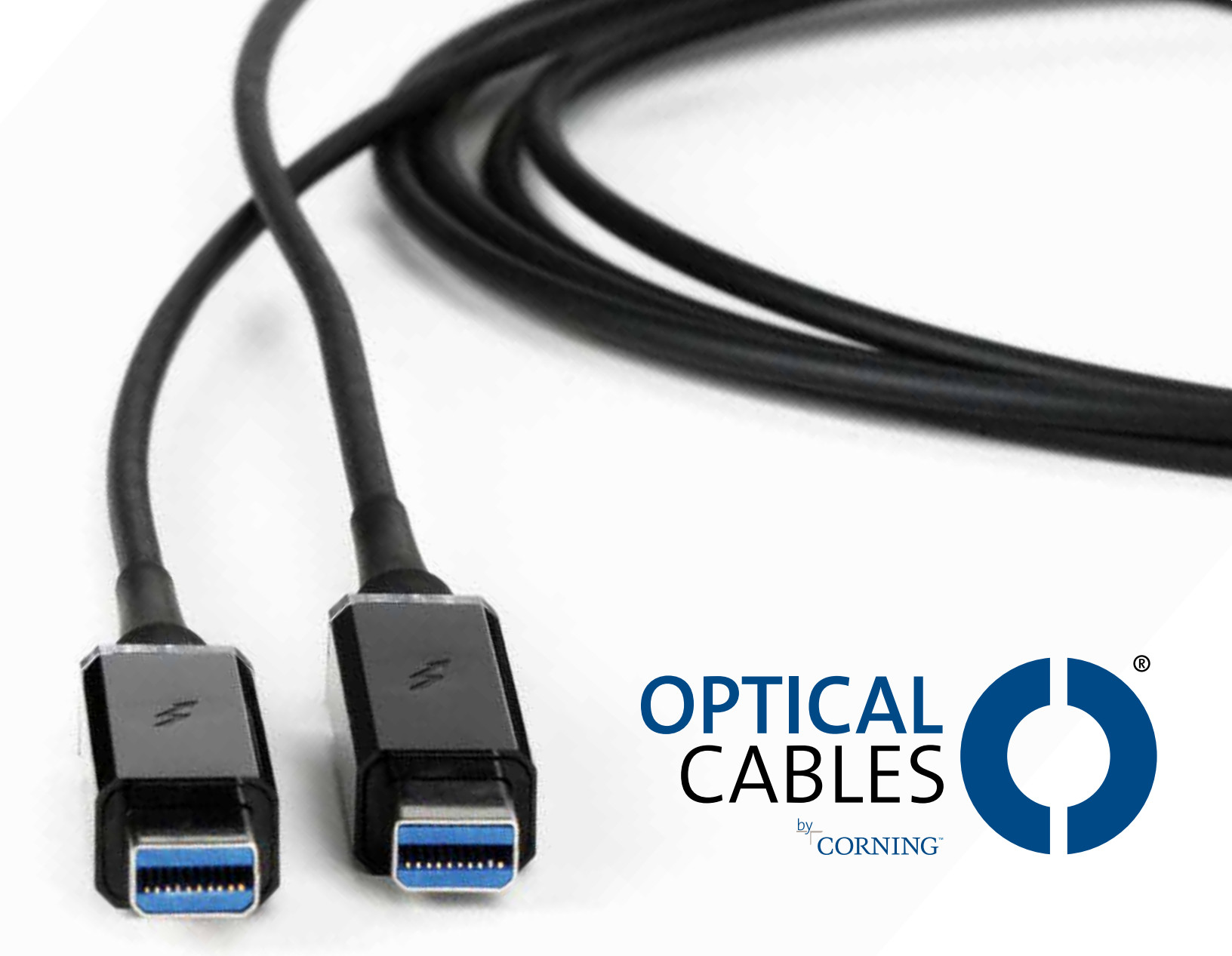


OPTICAL CABLES by CORNING®

Thunderbolt™ Optical Cables by Corning

UNIVERSAL AUDIO USE CASE

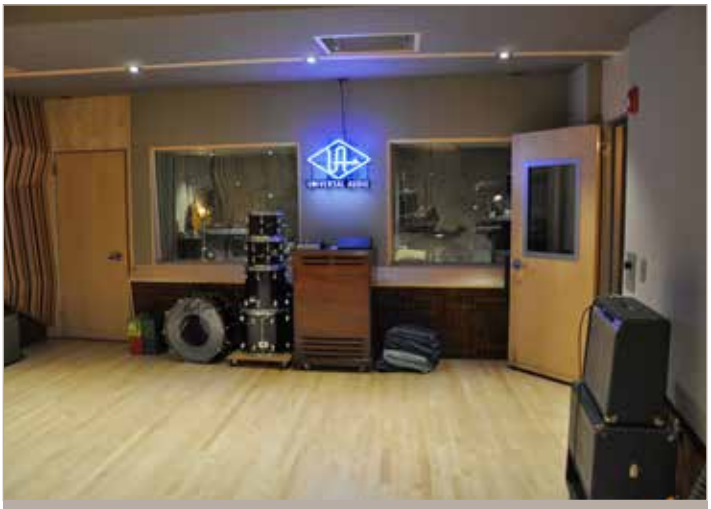
I. The Universal Audio Story

For more than 50 years, the Universal Audio name has been synonymous with innovative recording products. In fact, founder M.T. "Bill" Putnam Sr., a favorite engineer to Frank Sinatra, Led Zeppelin and The Beatles, is widely regarded as the father of modern recording. Many of his legendary studio and equipment designs, including the legendry UA 610 all-tube modular recording console and the 1176 Limiting Amplifier, are still in use today.

Now under the guidance of Bill Putnam Jr., Universal Audio continues to hand-produce classic analog gear from its past, one unit at a time, in its Scotts Valley, CA headquarters. But today, analog is only half the story. Universal Audio also employs some of the brightest digital signal processing (DSP) engineers and digital modeling authorities to develop their award-winning UAD Powered Plug-Ins platform, featuring the most authentic analog emulation software in the industry. These DSP gurus work with the original hardware manufacturers – using their exact schematics, golden units, and experienced ears – to give UAD plug-ins warmth and harmonics in all the right places, just like analog.

II. Corning Thunderbolt™ Optical Cables – A Perfect Match for Studio 610

When developing new audio gear or UAD Powered Plug-Ins, Universal Audio engineers need to test in a recording studio environment – often critically listening and comparing to "golden units" of the analog hardware that UAD software is intended to emulate. So it makes sense that Universal Audio built a fully functional recording studio, "Studio 610," at its headquarters.



Studio 610 Recording Studio

Essential to the design layout for Studio 610 was the option to position noisy fans and hard drives away from the crucial live tracking (recording) room and control (mixing) rooms, and instead place them in a machine room.

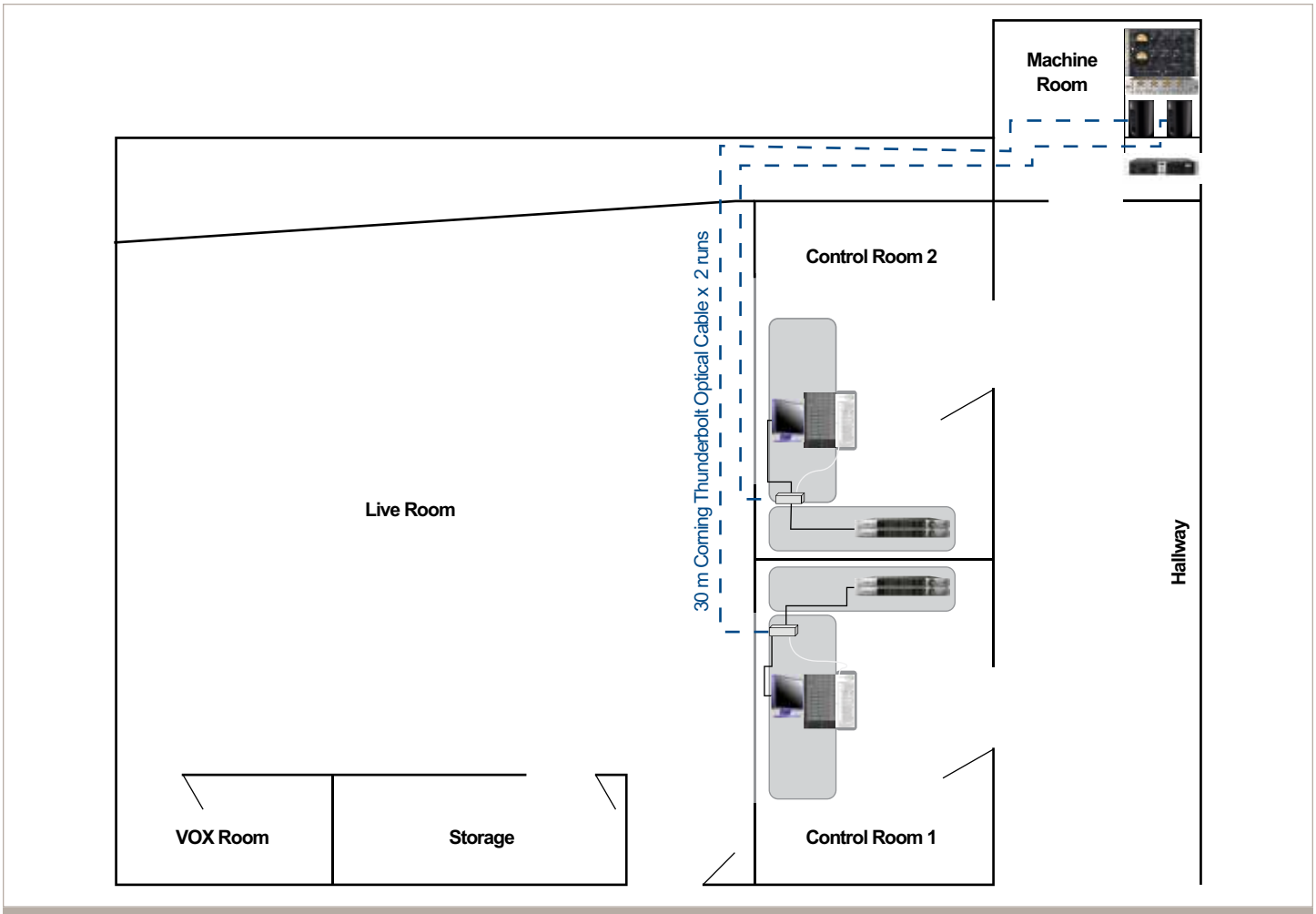
Originally the designers considered a collection of off-the-shelf extension solutions. One set of USB extender (KVM) boxes would be used to extend the cabling for the keyboard and mouse. Another set of extenders would be required to carry the HDMI signal over the 50 ft run to the workstation. Finally, for the sound engineer to be able to control the Universal Audio Apollo 16 Audio Interfaces remotely, they would have to link via FireWire 800 over a pair of extender boxes.

Convinced that there had to be an easier solution for moving the noisy equipment out of the working "live" areas, Universal Audio designers consulted with Corning to better understand the capability of the newly developed Thunderbolt™ Optical Cables by Corning. Corning's Thunderbolt Optical Cable was the perfect solution to merge the three intended extenders over a single cable, thus eliminating the clutter and expense of six converter boxes per link.

Another major advantage of the Thunderbolt Optical Cables by Corning is that they use pure light signaling to transfer data; each end of the cable is electrically isolated from the other. In fact, the two ends are on two completely different ground planes. This isolation ensures that the cables do not pick up spurious noise from the environment or radiate out any harmful RF emissions from the cable.

Using 30 m runs of Corning's Thunderbolt Optical Cables and routing them through conduits in the rafters,* the Studio 610

*Routed through non air-handling channels.

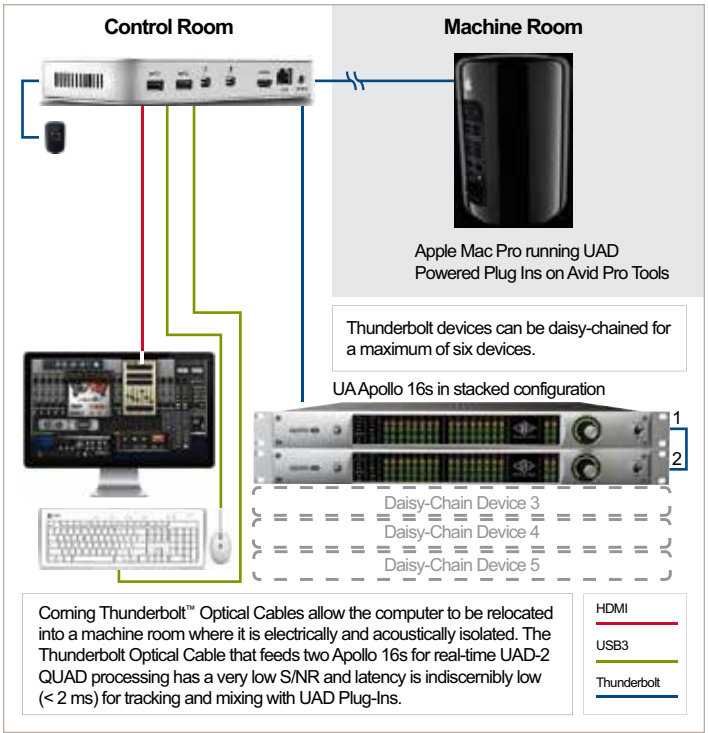


Universal Audio's Studio 610 Layout

Digital Audio Workstations (Apple Mac Pros) that run the UAD Powered Plug-Ins could be placed on racks in the machine room, while all the instrumentation could be brought into the control room where sound engineers could mix.

Finally, by leveraging the inherently tight timing synchronization (within 8 ns across 7 hops downstream from a host) and low latencies of Thunderbolt™ technology, studio-quality media can be produced. This is achieved by using Unison technology, an audio processing breakthrough from Universal Audio that enables their popular Apollo Audio interfaces' on-board mic preamps to sound and behave like the world's most sought-after tube and solid state preamps.

More than three years in the making, Unison is an exclusive analog/digital integration system that gives the user continuous, real-time, bidirectional control and interplay between Apollo's physical hardware and UAD software mic preamp models. With Unison, the Apollo mic preamp's analog impedance, gain stage sweet spots, and component-level circuit behaviors are adjusted in real time prior to analog-to-digital conversion to accurately emulate the target mic preamp model. And this technology holds great promise for the future of Universal Audio products.



Universal Audio's Studio 610 Connection Diagram

Through a combination of thoughtful studio design, superior Universal Audio equipment, and Thunderbolt™ Optical Cables by Corning, Universal Audio's new Studio 610 gives Universal Audio's in-house DSP engineers and Universal Audio-endorsed recording artists fertile ground to create and explore new tools for musical expression.

Studio 610's Mixing Console

III. High-Level Benefits

Single Cable.
Allows multiplexing of multiple protocols (FireWire, USB, HDMI, PCIe, DisplayPort) over a single cable for distances of up to 60 m (197 ft).

Acoustic Isolation.
Enables placement of machines with noisy fans and motors into a machine room far away from recording environment.

Electrical Isolation.
Electrically isolated optical connection provides excellent signal-to-noise ratio as no metallic wires would pick up noise from surroundings.

High-Speed Interconnect.
Provides a 10 Gbp/s dual channel link with Thunderbolt and 20 Gbp/s when used with Thunderbolt 2 devices.

Low Latency.
Thunderbolt protocol has tight timing specifications that enable latency of less than 8 ns even across a daisy-chain of seven devices.

Robust Cable.
Optical Cables are thin, light, and remarkably tough. Optical Cables by Corning can be bent, squeezed, and tangled.

OPTICAL CABLES by CORNING®

Corning Optical Communications LLC • PO Box 489 • Hickory, NC 28603-0489 USA
800-743-2675 • www.OpticalCablesByCorning.com