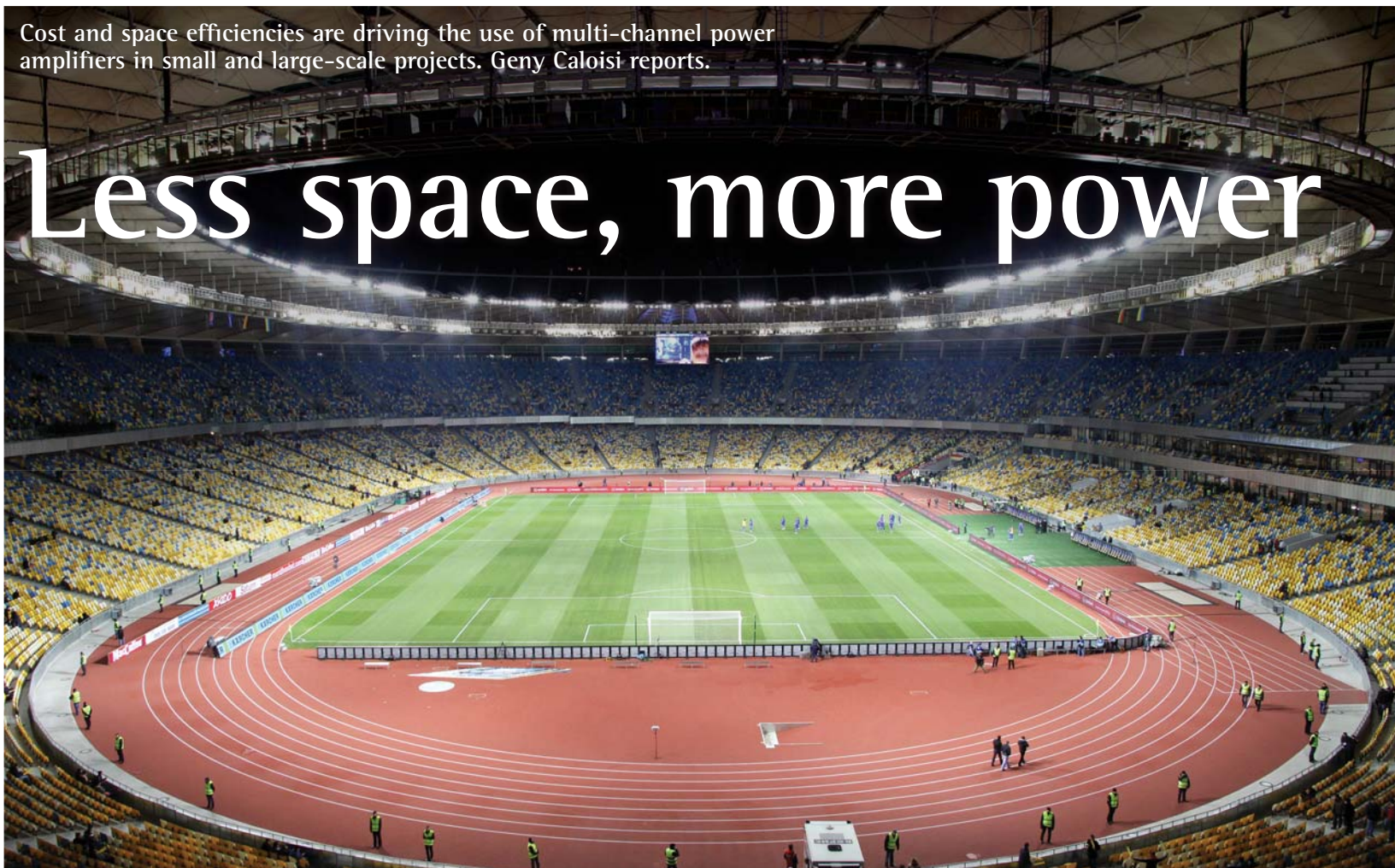


Cost and space efficiencies are driving the use of multi-channel power amplifiers in small and large-scale projects. Geny Caloisi reports.

Less space, more power



Increases in power-per-channel are pushing multi-channel amps into a number of professional installation environments right up to demanding applications such as stadiums.

Whether we are talking about a boardroom, a restaurant or a massive stadium, saving space and maximising the usage of power are priorities

in the world of pro AV audio installs.

Phil Sanchez, QSC senior communication and PR manager, points out: “Multi-channel amps are found in both fixed installations and portable applications.

“Restaurants, retail, houses of worship, theatres, stadia, education; any place where a high channel count is required and rack space is at a premium are good candidates for multi channel amp configurations.

“Likewise, cost can be a consideration as multi channel amps can sometimes be a more cost-effective solution versus multiple two channel amplifier configurations.”

The Brea California Community Centre is a good example of music playback and paging system being managed by QSC Q-Sys Core 250i processor and two additional four and eight channel CX Series multichannel amplifiers.

“The community centre, located about 25 miles south east of downtown Los Angeles, offers facilities for business and community meetings, youth and adult education, and health and fitness activities.

In Jenna, Germany, 16 QSC CX254 four-channel amplifiers were installed to power 60 two-way QSC AD-S82H loudspeakers and subwoofers at the Zeiss Planetarium, the country’s oldest planetarium.

Anthony Errigo, director of marketing communications at Ashly Audio, a USA based company with a strong hold on the houses of worship and restaurants market, says that using multi-channel power amps is a no-brainer when it comes to facilities upgrades and new installs.

“Multi-channel amplifiers provide increased value by having the equivalent of multiple single-channel amps, at a reduced total cost to the customer. The value equation is simple – replace a traditional rack of amplifiers and separate DSP Processor with fewer, energy-efficient multi-channel amps and put the DSP inside the amp.”

Ashly’s ne8250pe Network Eight-Channel 250W

Power Amp with on-board DSP multi-channel amplifiers, was recently installed in three Perry’s Steakhouse & Grille restaurants in San Antonio, Texas.

Live music is an integral part of the Perry’s experience, so all three locations feature a mixing console adjoining a small stage. Its output joins a handful of cable TV channels, a background music player, and a wireless microphone at the input to the Ashly Protea DSP environment.

The Ashly Protea DSP Matrix Mixer is used as a room combiner in the private dining rooms, allowing the restaurant to host any size dinner meeting or event. Other common zones include the bar area, lobby, hallways, toilets, entry, patio plus four or five private dining rooms.

Ashly ne8250pe includes separate processing on each output, allowing signal alignment for multi-zone applications.

“Using more channels instead of having more drivers enables better steering and higher reliability.”

- Tom Van de Sande, Audac

< There seems to be no limit on the size of the installation that multi-channel power amps can cater for.

“Control is everything,” says Tom Van de Sande, marketing manager of Audac. “So by using more channels instead of having more drivers depending on a channel of an amp enables better steering and higher reliability.”

The Denver Broncos NFL stadium is a recent installation with over 100 Lab.gruppen four-channel PLM amplifiers.

QSC CXD amplifiers are capable of up to 5,000W. The University of Texas at Arlington’s new College Park Center Complex events arena is a great example of an install where multi-channel power amps are used for the concourse and concessions areas, toilets, bars and gift shop.

What to watch out for

Some of the legacy concerns on multi-channel amps are: overheating, audio quality loss and the possibility of having several zones within a building with no sound because of an amp failure.

Ashly’s Errigo explains, “Combining multiple amplifier channels inside the same chassis enclosure provides technical challenges in thermal management and management of AC input power requirements.

“Ashly handled this through the use of a Class-D amplifier topology and SMPS (Switch Mode Power Supply), both of which provide sizable increases in power efficiency, and therefore much lower heat dissipation.”

“Less heat means longer life and increased reliability over time. The increased power efficiency also translates to lower utility costs for a specific ‘rated audio power level,’ because more power is converted to audio and less lost as heat.”

When it comes to cost/efficiency calculation, Lab.gruppen’s product research manager Klas Dalbjorn, says that these solutions are winners: “Sharing the cost of processing, network and power supply over more channels creates cost benefits. We see twice the total power in the same space every six years in the past 30 years.

“This increase has been made possible by efficiency gains, increased channel count (going to four channels), algorithms avoiding breaker tripping, and acceptance that music and speech are different from a constant sine wave (i.e. you don’t need the rated power all the time).”

He adds: “This trend is hard keep up with as we now have to be clever to avoid tripping the breakers as we



[Top to bottom] Ashly’s ne8250 8-channel amplifier; Lab.gruppen’s PLM series; Audac Q4 Quad channel amplifier; QSC CXD Installation processing amplifiers

temporarily exceed what can be drawn over time from a single power outlet. Further increases in efficiency may allow for smaller sizes as the heat losses are reduced further. This will, however, require new semiconductor technology with associated costs.”

Josh Evans, technical manager for TC Group’s AET division, warns that some system integrators and designers might not be comfortable with having multiple channels on one power supply.

“Some designers have wanted to wait for the products to be proven in the field by others before adopting them,” he says.

“But we have proved that if the cooling is taken into consideration (HVAC) then over the life of the systems we can save venue owners in rooms with over 2,000 seats, an average of \$10,000 (7,500) per year on their electricity bill, which is a sizeable benefit.”

Stuart Cunningham, general manager at Powersoft’s UK distributor CUK Audio, agrees: “One objection that needs to be overcome is the ‘eggs in one basket’ argument.

“The fear is that if an eight channel amplifier fails,

it will have a greater impact than if one out of four 2-channel amplifiers should fail. Powersoft has some unique technologies including the patented SRM (Smart Rails Management) technology that reduces power consumption and maximises efficiency.”

Meanwhile, Ashly’s Errigo, points out that new features built into the company’s nX series makes them more reliable in case of power fluctuation.

“The nX series selectable impedance per channel allows the amp to perform under various loads such as 2, 4 or 8 Ohms, 70V or 100V. It is also important to have networking on board your amplifiers so you can always know how well the amps are performing. If the amplifier exhibits some problems, networking will help you to diagnose quickly and, in some cases, even correct the problem.”

Dale Sandberg, QSC senior product manager, agrees: “Probably the biggest challenge is planning for AC power and network distribution. Infrastructure planning is a major element of system design, and cannot be overlooked.”

Dan Saenz, Crown’s business segment manager of Install Sound, also says that it is important not to compromise the audio quality. To get around this issue Crown together with Texas Instruments developed the DriveCore chip, which takes care of the audio signal and the power output. “At the heart of both our ComTech DriveCore and DCI Install amplifiers is our DriveCore amplifier chip technology,” says Saenz.

What products are available?

Powersoft’s most popular product is the Ottocanali series which is designed for professional installations. Each of the amplifiers has eight channels that can be used in both low impedance and 100V constant voltage systems. The most powerful model in the range, Ottocanali 12K4, outputs 1500W per channel to both 100V or 4 ohm loads.

For smaller installs, such as executive boardrooms to luxury suites at major sports venues, Crown has its ComTech DriveCore amplifier solution, Crown’s DCI Install Series is its flagship install product for larger projects such as foreground and background audio systems at stadiums, arenas, hotels and other professional facilities.

Ashly offers Network Power Amplifiers in three, multi-channel platforms and two families of convection-cooled four-channel amplifiers. The new nX Family of high output power amplifiers and the Pema four and eight-channel 125W or 250W amplifiers, feature a built-in 8x8 matrix DSP Processor. Protea Software



< options include Gain Sharing Automatic Microphone Mixing, Automatic Feedback Suppression and Ambient Noise Control.

Lab.gruppen has the C, FP+ and PLM Series on multi-channel amplifiers. “With only two channels the Lucia and E Series are sometimes relevant too,” Evans says.

QSC offers a variety of products, from four channel CXD Series amplifiers to the two, four and eight channel CX Series amplifiers.

Sanchez points out: “Added benefits of our new four channel CXD Series Amplifiers include a DSP front end and can eliminate the need for additional outboard and, like our PLD amps amp channels, can also be combined for increased power output.”

Trends

Networkable multi-channel power amps are becoming a must, particularly as applications become larger and more complex.

QSC’s Sandberg explains, “The more amplifiers in the system, the greater the need for monitoring and system management. Having the capability to monitor each amp (and its load) is important to maintain a stable, long-term system.

“Multi-channel amps can relieve some of the network and infrastructure needs by housing more amp channels in a single chassis, but each channel still needs to be monitored and controlled.

“This means that the control system must provide tools to escalate load and amplifier faults. In large systems, User Control Interfaces (UCI) relay information about how each geographic location within the system is functioning. If a fault occurs the UCI will flag the

“The more amplifiers in the system, the greater the need for monitoring and system management.”

- Dale Sandberg, QSC

administrator who can then look in an error log or navigate within the system design to find the issue.”

Cobranet is a prominent networking protocol in this area but it is rapidly being replaced by Dante and AVB, although the later still lacks interoperability with a few products.

“In the last year I have seen the largest increase in the systems that use Dante,” confirms Tom Van de Sande, Audac.

Crown’s Saenz explains, “Digital audio transport to amplifiers makes sense because of the ease of managing. By the time we get to next summer, I believe major adoption of a protocol will be possible.

“Until then, we must be able to support all viable transports, which we do within our system approach through BSS. With this in mind, Harman is capable of handling AVB or Dante from rack room to rack room through the use of Harman’s BSS Soundweb London products and their digital audio bus (also known as BLU-link).”

Meanwhile other IP networking solutions are being used, as is the case with QSC’s Q-Sys, which uses standard Layer 3 Ethernet network protocols packaged into what we call Q-LAN.

“Q-Sys uses Q-LAN to provide networked audio distribution, processing, control and system monitoring. Q-Sys connects directly to amplifiers using

DataPort cards. DataPort connections provide audio, control and monitoring of the connected amplifiers,” says Sandberg.

Although one would imagine that the main trend is more channels, higher optimised power and lower cost, this is not always the case.

Rane has recently introduced a new amplifier, which is a single channel. Low power (1 watt) which integrates the company’s HAL programmable DSPs. “This amp, the RAD24, installs in a 4-square gang box. Alternatively the tabs can be removed and the RAD can be mounted to a ceiling loudspeaker’s transformer mounting holes or to any flat surface. This small amplifier provides the perfect solution for small areas that need to be treated as independent zones with their own sources and levels.

Rane plans to develop additional amplifier models that will integrate with HAL to provide solutions not currently addressed by mainstream amplifiers.

In multi-channel power amps, design limitations are becoming a thing of the past thanks to switching power supplies, PWM (Pulse-Width Modulation) and class D output topologies.

Lower costs and power consumption will always be a plus for multi-channel amps adoption and the products that are in greatest demand are scalable and networkable. 