

## Power Rules for Speakers At Daytona Speedway

**DAYTONA  
SPEEDWAY**  
Daytona Beach, FL

### The Challenge

- High profile world-class venue with fans who expect sound to be on target
- Installation of 423 speakers and more than 27 miles of wire to be completed in three months
- Provide sound system for music and announcements in nine specific areas
- Install sound system that will endure hurricanes, strong winds, rain and high heat near the Atlantic coast and provide lifelike sound year after year
- High sound pressure levels with decibel (dB) levels ranging from 60 to 85 and higher



### The Solution

The World Center of Racing embodies a new multimillion dollar, state-of-the-art venue located within the Daytona Speedway's infield. This facility offers the world's most extraordinary, "up-close and personal" fan experience in motor sports: interactive displays, a tribute area to the legends of the Speedway, rooftop spectator areas, upgraded specialty vehicle infield parking, renovated NEXTEL Cup Series and NASCAR Busch Series Garages, a new Gatorade Victory Lane, and a new signature infield structure, the DAYTONA® 500 Club building. Creating world-class sound for fans to truly feel the experience represented another challenge for the Speedway.

According to QuestCom Group, Inc., Jacksonville, FL, President Scott Fenstermacher, who engineered and installed the facility's sound system, "putting up a world-class sound system in seven months in multiple venues and then tying everything together was one the most challenging assignments that QuestCom has faced. There was no margin for error given the high profile nature of Daytona."

### AWARD WINNER

QuestCom won the Associated Builders and Contractors (ABC) Excellence in Construction award for the best commercial electrical installation under \$2 million in the United States for the Daytona International Speedway Redevelopment Program. ABC is a national trade association representing 23,000 merit shop contractors, subcontractors, material suppliers and related firms in 79 chapters across the United States. Listed among *Fortune* magazine's top 50 most influential national organizations, ABC is devoted exclusively to the advancement of the merit shop construction philosophy which encourages open competition and a free-enterprise approach that awards contracts based solely on merit.



"The main reason for selecting Bogen and Apogee products was their performance and secondarily their Free Design Service," said Fenstermacher. He noted that Bogen's Systems Design Engineer, Al Gessman, was extremely effective in the installation process because of his knowledge and experience especially in deciding where to place the NEAR speakers. His participation in the overall scheme paid off during pre-show and post-race periods following the installation, when the speaker system proved itself more than effective.

Fenstermacher points out that all sound reinforcement in each of these locations is delivered exclusively through Bogen and Apogee sound equipment.

In addition to providing the clarity of sound that is needed to rise above screaming fans, the installation had to endure the changeable Florida weather conditions such as hurricanes, strong winds, rain, baking sun, and high temperatures. Bogen's NEAR® A-Series "all-environment" loudspeakers in the Fan Zone easily weather Florida's ever-changing climate conditions and keep on sounding and looking great. These speakers feature Metal Diaphragm Technology (MDT™) metal-alloy drivers and patented Magnetic Liquid Suspension (MLS™) for optimum sound quality. While many speakers are attached to buildings and poles outdoors, the two Bogen NEAR Orbit Pendant Speakers (OPS1) in the Communication Center and the six Bogen NEAR Orbit Pendant Speakers (OPS1) in the Victory Lane Club hang from the ceiling. They use NEAR-patented Magnetic Liquid Suspension (MLS) and Metal Diaphragm Technology (MDT) to deliver clean, intelligible audio. With MLS, the speakers actually become more accurate as loudness increases. In addition, a proprietary Ferrofluid® seals the magnet gap and voice coil against moisture and corrosion and heatsinks the voice coil to the magnet for greater power handling. MDT produces natural sound, significantly better phase response,

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musical accuracy, and fine detail of sound with ultra-low distortion. In addition, these speakers' 140-degree wide-dispersion coaxial drivers permit broad, even coverage.

With such a large infield area, being able to hear announcements could easily have been a problem. To ensure the sounds are intelligible and accurate, The QuestCom Group chose Bogen and Apogee sound equipment because of positive past experiences.

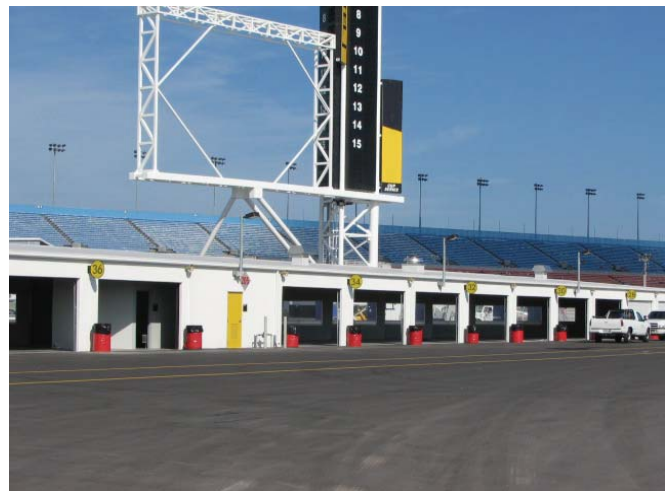
### Installation

The Haskell Company, Jacksonville, FL, served as the general contractor for the project. Bill Kilgannon, Construction Manager for The Haskell Company, said, "the overall construction part of the project had a six-month time frame for completion, while the entire sound system had to be installed in only three months from wiring to testing." The install had to be completed in this time frame to be ready for an upcoming Daytona race. The project involved installing 423 speakers, more than 27 miles of wiring, amplifiers, and related components.

Kilgannon explained that each of the 64 Apogee Fixed Installation Series Loudspeakers (AFI-4) enables visitors to hear announcements pre-show and post-show. These speakers have 200 watts of continuous power or up to 800 watts of peak power. The speakers aren't only about volume, they provide clear, accurate sound. Features such as custom magnetic fluid-cooled drivers in 15-ply birch housings along with other carefully designed monitoring and control technologies contribute to high intelligibility. The combination of 17 Apogee CA-Series Professional Amplifiers and powerful Apogee speakers results in lifelike sound at super high volume. The advanced clip eliminator in these amplifiers reduces distortion to less than 0.01 percent. Known for their reliability, the design of these amplifiers permits reduced heat output. In addition, special low equivalent series resistance capacitors and uniformly-wound toroidal transformers contribute to the power supply robustness in the Apogee amplifiers.

The 109 Bogen High-Fidelity Ceiling Speakers (HFCS1) can be found in seven of the nine zones. They are used in the Victory Lane Club, Fitness, Communication Center, Media Center, Busch, Fire Safety, and Nextel areas. Of these, the Communication and Media Center, Fire Safety, Fitness, and Nextel are indoors while the Victory Lane Club has some speakers indoors and others outdoors. Their large steel back cans and dual front exit ports allow for deep bass response of music and speech. Installers appreciate how quick and easy it is to install these speakers because wiring for them is terminated at a four-screw snap-lock input connector with two positive and two negative terminals to accommodate daisy chaining of speakers. These speakers also have a front-mounted power tap selector. "The High Fidelity Ceiling Speakers were selected for this application for the Victory Lane area to enable fans to hear live music, background music, and presentations," said Fenstermacher.

To supply the required power for the Fan Zone, Daytona Speedway uses four Apogee CA-Series Professional Amplifiers (CA-8000). "There's enough power in the Fan Zone and sometimes fans ask us to turn down the volume," said Fenstermacher. These amplifiers contribute to the high intelligibility that gives fans the sound they desire.



## Product Highlights

### Connections

A Bogen PCM2000 Zone Paging System and mixer are connected to various Bogen Amplifiers. Located in the garage area, the PCM2000 System is used for the garage paging, according to Fenstermacher. In the Fan Zone, the four amplifiers support 14 AFI-4 Series Fixed Installation Outdoor Speakers (SX versions).

Each NASCAR NEXTEL Cup Series Garage relies on 11 Bogen High-Fidelity Ceiling Speakers (HFCS1) and 52 Bogen Horn Loudspeakers (SPT30A) located on the outside to supply music and track information to fans as they view teams working on race cars. Two M-Class Power Amplifiers (M600) and five Apogee CA-Series Professional Amplifiers (CA-8000) power the speakers.

At the Busch Garages, drivers and their crew members receive track announcements from 71 speakers including 7 High-Fidelity Ceiling Speakers (HFCS1), 8 Easy Design™ Ceiling Speakers (CS1EZ) and 56 Horn Loudspeakers (SPT30A). For paging, this part of the infield relies on two Bogen M-Class Amplifiers (M600). Also, in the Busch area, 22 Apogee Loudspeakers (AFI-4SX) are powered by six Apogee CA-Series Amplifiers (CA-8000) to produce the big sound needed for a speedway infield.

Positioned in the Gatorade Victory Lane podium area, 68 speakers are powered by a CA-Series Amplifier (CA-8000) and a Bogen M-Class Power Amplifier (M600) to enable Speedway managers to announce the winner to fans, drivers and owners. These speakers include 36 High Fidelity Ceiling Speakers (HFCS1), 15 NEAR A-Series (A2T), and 4 Apogee Loudspeakers (AFI-4). The sound system enables a large crowd of fans spread across a broad area to learn the winner's name. All wiring connections are below ground in conduit, according to Fenstermacher.

### The Results

The sound system generates sounds in the high 80 to low 90 decibel range—enough to surpass screaming fans without muting the sound of high horsepower engines as the cars roar past, providing an incomparable fan experience. “The sound delivered by the Bogen and Apogee products is unmatched,” said Fenstermacher.

David Chambers, Senior Vice President, Bogen Communications and point of contact for the Daytona installation, said, “Bogen’s range and scope of products were perfectly suited for this world renowned facility. From our flagship Power Vector amplifiers and High-Fidelity Ceiling Speakers, to our state-of-the-art M-Class Power Amplifiers and high-fidelity, all-weather NEAR A-Series speakers, Bogen was able to provide the best solution for each Speedway requirement. And most notably, for the ‘big-sound’ requirements of the FanZone, our world-class Apogee AFI-Series Fixed Installation Loudspeakers and CA-Series Power Amplifiers promise to deliver breathtaking sound, providing an incomparable fan experience.”

Daytona’s new infield shows that Bogen and Apogee remain the top choice for demanding venues that require a total, integrated solution to sound reinforcement requirements. Bogen was able to deliver a range of products that perform flawlessly in challenging settings and conditions, from the upscale environs of the DAYTONA® 500 Club to the demanding outdoor Fan Zone.





## Equipment List

- 24 Apogee Fixed Installation Outdoor Loudspeakers (AFI-4WSX)
- 40 Apogee Fixed Installation Outdoor Loudspeakers (AFI-4SX)
- 17 Apogee CA-Series Amplifiers (CA-8000)
- 8 NEAR Orbit Pendant Speakers (OPS1)
- 22 NEAR 64-Watt A-Series Speakers (A8T)
- 42 NEAR 32-Watt A-Series Speakers (A6T)
- 42 NEAR 16-Watt A-Series Speakers (A2T)
- 109 Bogen High-Fidelity Ceiling Speakers (HFCS1)
- 108 Bogen 30-Watt Horn Speakers (SPT30A)
- 28 Bogen Easy Install® Ceiling Speakers (CS1EZ)
- 8 Bogen 1200-Watt M-Class Power Amplifiers (M600)
- 7 Bogen 600-Watt M-Class Power Amplifiers (M300)
- 1 Bogen 150-Watt Power Vector Amplifier (V150)
- 1 Bogen 60-Watt Power Vector Amplifier (V60)
- 1 Bogen 35-Watt Power Vector Amplifier (V35)
- 15 M-Class Rack Mounting Kits (RPK86)
- 3 Power Vector Rack Mounting Kits (RPK87)
- 3 Bogen Transformer Balanced Input Modules (TBL1S)
- 11 Parametric Equalizer Signal-Processing Output Modules (PEQ1R)
- 2 Bogen Microphone Input Modules (MIC1S)
- 2 Bogen Stereo Auxiliary Input Modules (SAX1R)
- 1 Line Matching Transformer (WMT1A)
- 117 HFCS1/OPS1 Suspension/Safety Cables (CK10)
- 72 Tile Bridge/Support Rings (TBCR)
- 106 Terminal Block Covers (ASTB4)
- 1 PCM2000 Zone Paging System (9-zone configuration)
- 1 PCM2000 Zone Paging Module Rack Mounting Kit (RPK84)
- 1 Avaya Call Stacker (LULCST)

## Key Products



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