Liebert Foundation

By Kent Kramer

In today's climate of consolidation, doing more with less is fast becoming a standard operating procedure. Engineers are being asked to put more equipment into smaller spaces. Three things must be considered when reliability is concerned: cooling, cleanliness and clean power.

When Big City Radio chose to move its Ventura, CA, station to a new location, it chose a communications site that was already home to two other radio stations. The stations would share a concrete block building that was about 30' × 30'.

With all three stations sharing the building, cooling is a major issue. Air is forced into the building through a filtered blower on the roof. To allow the forced air to escape, every third concrete block is turned on its side on the top of the building on three sides. Additional cooling is provided by two consumer-style window air conditioners mounted in the walls. One is directly behind the air intake on the Class B station's transmitter and the other is in a corner opposite the air inlet from the roof blower.

Performance at a glance

- Adjustable rack rails
- Threaded or square rack rail holes
- Climate-controlled rack
- Integral UPS
- Optional monitoring capability

The Class B station ducts its transmitter exhaust directly outside, while the Class A exhausts into the room. Because of the lack of minimal positive pressure on the room and it being open to the outside, the room environment is dirty from dust and pollen. With the various circulating patterns generated by the air conditioners, the roof blower and the various fans in the transmitters and auxiliary equipment, any dirt that enters the room is held inside by the almost random air patterns.

While the room environment was less than ideal, the tower location was ideal. We were not willing to sacrifice system reliability when constructing the site. One option was to seal the room and install cooling adequate for all three stations. This proved to be too expensive and not worth the return on investment.

The solution to our problem was the Liebert Little Glass House. The Little Glass House (LGH) is an environmentally sealed equipment rack. Since we purchased our LGH units, Liebert has developed the next generation of enclosure and named it Foundation. It has the same basic principles of operation, but offers added improvements to the original LGH.

The racks contain a rack-mounted environmental cooling module (ECM) at the bottom of each unit. The cooling modules are designed to keep the interior temperature between 20°F–30°F below the exterior temperature and not maintain a specific temperature. By using two racks we were able to distribute the cooling load of our equipment between the two.

To maintain separate cooling, the racks could not be ganged together to form a single unit. Two approaches were considered. One was to place one transmitter and exciter in each rack and separate the main and backup audio equipment to provide failure protection. The other was to separate the equipment into two categories, RF and audio. In the end, the physical size of the hardware dictated that the left rack holds the main and auxiliary transmitters and both exciters. The right side rack holds all of the audio, monitoring and telemetry equipment.

Installation

In an effort to help with the heat loading of the building, we built a wooden platform behind the racks to act as a plenum to help direct the heat from the exhaust of the rack out of the building. Liebert manufactures a product designed to duct the exhaust heat away from the rack, but it would still require a platform to cover and protect the ductwork. The plenum seemed to be the better choice.

The LGH and Foundation systems cool the contents by recirculating air around the equipment. Air is directed up one side and pulled back through the Environmental Cooling Module (ECM) on the other side, creating a circular airflow inside the rack. Air is pulled from the front of the rack through a filter and exhausted at floor level in the back to cool the coils.

With the LGH and the Foundation, should the ECM fail, there are options available to maintain some level of cooling. We opted for the single fan mounted on the back door. Louvers on the front door and rear door open when

the temperature inside the rack reaches an adjustable limit. Filtered air is drawn in and through the rack to draw heat out. When the emergency fan is not in use, the louvers are kept sealed by magnets to prevent dirt from entering. The new Foundation series racks feature several configurations for primary and auxiliary cooling.

Power distribution inside the rack is by a factory-installed plug mold. All of the electrical connections to the LGH and the Foundation rack are designed to be plugged into a wall outlet.

Continued development

The Foundation series offers several options. There are a variety of sizes from a custom height of 44" (22RU) to 84" (46RU). The standard height is 78" (42RU). The optional fan-based cooling packages have high-ambient temperature or low-noise options depending on the usage. All of the hardware operates on 120V, single-phase power.

To include UPS power to the rack, Liebert can integrate a rack-mounted UPS. We felt that instead of having two separate UPS systems, it would be more advantageous to provide a UPS for the entire site. This also reduced the heat load inside the rack and gave us more available rack space.

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