



Multi-Vendor HVAC System Saves Time and Money



The Duke Realty Corporation wanted to provide better environmental conditions for its tenants in one of its buildings constructed in the late 80's. The existing system was controlled with pneumatics and the rooftop units had reached the end of their life expectancy. The terminal units were typical variable volume (VAV) for core cooling and parallel induction (PIU) for perimeter cooling/ heating, a prevalent design for the 80's in the southeastern United States.

The Challenge

The challenge of this project was to keep the occupied building air-conditioned while the controls on the terminal units were retrofitted and new roof top units installed, replacing the existing ones. The cost of the new terminal unit controls had to be economically advantageous over repairing the existing pneumatics.

The Solution

The Duke Realty Corporation contracted Automated Facility Systems, Inc. (AFS), located in Marietta, GA to install Circon Systems' LONMARK VAV controllers, UHC300 and front-end software tools Visual Integrator and Network Editor. The LON network wiring and space sensor wiring was installed first. This enabled the switch over to be carried out as fast as possible, thus minimizing the time the building had to operate on both pneumatics and DDC.

Once the building terminal units were converted, Protech Heating and Air Conditioning was contracted to

replace the roof top units (RTU's) with new Trane units including LON capable boards integrated into the units' controls. AFS integrated the RTU units into the freshly installed LON network and utilized the Circon UHC300 to provide many-to-one bindings to gather information out of the more than 56 PIU's and 26 VAV's providing space temperature, discharge temperature and CFM airflow counts to constantly tune the RTU's for peak operational efficiencies. The UHC300 Network Variable Outputs (NVO's) were then bound to the Trane units through the standard profile SNVT's to provide the customer with a completely integrated multi-vendor system.

The resulting system saved US \$27,000.00 in utility costs over a 6-month period with 56m² (56,540 ft²) of more comfortable work environment and an increase of 35% tenant occupancy. The return air temperature is constantly monitored and as it drops below 21°C (70°F), the supply temperature is reset upward to prevent the ventilation portion of minimum airflows from taxing the electric duct heaters. This strategy allows the space temperatures to be raised more quickly and the duct heaters cycled back off to add to the energy savings.

The rooftop discharge air temperature and static pressure set-points are integrated onto the graphical representations of the units inside the Visual Integrator software package to allow the user easy access to override the automated points for maintenance or manual operation. Scheduling of the building is provided per floor through the onsite front-end computer.

The Circon UHC300 sends NVO Occupied override information to the LONMARK Compliant rooftop units to allow them to be smoothly integrated onto the same schedule page. Unoccupied temperatures for cooling are monitored during the cooling months and once enough terminal units need cooling to provide a minimum load, the rooftop units are activated and operated for a minimum run time to prevent excessive starts during unoccupied times.

During the winter months, the unoccupied heating set-points are maintained by the PIU terminal units. The entrance area and top floor ceiling plenum heaters are controlled by side loop techniques embedded in the Circon controllers and through the use of the outside air information integrated onto the network from the rooftop

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units. This results in additional savings by preventing the heaters from operating when the space is slightly below set-point, unless the weather warrants it. Otherwise, the PIU's are given more time to handle the need and the additional heating is prevented from operating.

This building is typical of older buildings with savings for the owner and more comfort for the tenants. There were also other areas where the system could be

expanded to save even more energy. For example, the electrical meter could be monitored with a LON device and peak demands avoided by resetting the RTU resulting in lower peak readings and lower electricity bills.

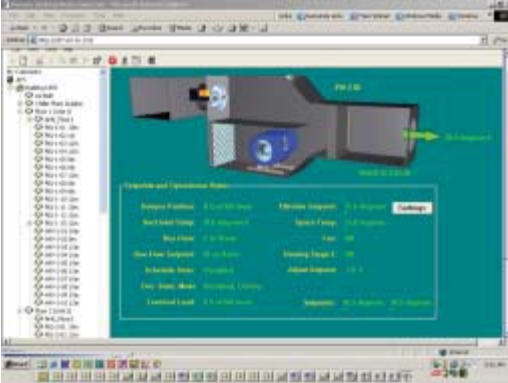
Standby set-points could be utilized with occupancy sensors such that low occupancy hours are operated more efficiently. Currently, the building is operated until 9:00 PM but many of the tenants leave at some point after 5:00 PM. Occupancy sensors would allow the set-points in unoccupied offices to be adjusted by two or more degrees, which would unload the rooftop units. In addition, after hours billing is available where the units would be completely turned off unless a tenant utilized a web server based or telephone based override system and those hours logged and billed to the tenant.

IP networking will allow the front-end computer to be reviewed from anywhere via a browser, and AFS actively utilizes this technique to support its customers from remote locations.

Product Selection Details

- 82 – Circon Systems Corporation UHC302 Variable Volume Controllers
- 1 – Circon Systems Corporation UHC300 Programmable Controller
- 1 – Circon Systems Corporation Visual Integrator 3.0
- 1 – Echelon Corporation PCLTA-20 LON Network Adapter
- 3 – Trane AH540 Roof Top Unit Controllers

Summary The LONWORKS technology provides today's building owners with an economical way of upgrading pneumatic controls into a system that can save energy, provide better information for the maintenance staff, be expanded into further savings, and make use of Internet monitoring for remote technical support. Local integrators like Automated Facility Systems, Inc. are the key to bringing it all together, LONWORKS + Experience = Savings.



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