DIRECT DIGITAL CONTROL SYSTEMS

by Roy E. Swain, P.E.

Direct Digital Controls or DDC systems can be an effective, economical choice for commercial buildings.

- *Unlimited control strategies.* Any control strategy that can be conceived can be carried out by a DDC system. Popular strategies such as night temperature setback, economizers, and optimal start can be implemented easily. DDC controls can provide excellent control performance and can maintain setpoints accurately.
- *Excellent remote monitoring.* Once the building is wired, information from the spaces and equipment is automatically accessible throughout the DDC system. If desired, temperature deviations and equipment malfunctions can trigger alarm signals at one or more central monitoring locations. The maintenance manager or service company can have the DDC system make a phone call when a pipe gets close to freezing at 2 am.

DDC systems also have one main limitation:

- *Good maintenance is required.* There is sometimes a tendency of modern building managers to overlook the need for DDC maintenance, with the mistaken belief that because they are electronic, DDC systems do not need maintenance. On the contrary, DDC systems require about the same amount of maintenance as do pneumatic systems, but of a different type. With DDC systems, the electric actuators are the least reliable component. At a site with say, 100 actuators, there may be several failures each year. However, with a well-designed DDC system, such failures generate alarms and can lead to prompt, simple replacement. In general, a good DDC system needs little preventative maintenance, and facilitates prompt replacement of failed components. Some components are designed to be replaced periodically, such as batteries that have a 7 to 10 year life span.

Conclusion.

- Digital control systems have been used successfully in commercial buildings since the late 1970's, and have evolved through about four generations since then. Probably few or none of the first generation systems are still in operation.
- Today's systems "distribute the intelligence" around the building much as pneumatic control systems always have. Thus, maintenance is simplified to replacement of failed components. There is a tendency for building owners to upgrade their systems by replacing the electronic "brains" every couple of generations or so, but often the sensors and actuators remain compatible with the new equipment.
- Direct Digital Control systems are selected for all types of commercial buildings, and especially where complex control strategies and/or high-quality remote monitoring are desired.As long as the system is designed and installed well to begin with, and a good maintenance program is carried out, DDC systems can provide effective service for many years.