Cabling Installation & Maintenance EUROPE

October 2000 INSTALLATION


# Structured cabling for intelligent buildings

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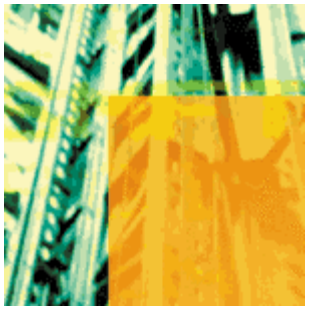
The degree of sophistication, level of service, and tenant benefits that are currently being asked for in office buildings are much more demanding than was the case just a few years ago. Adoption by the enterprise of computers, telecommunications, the Internet, and other information systems has driven technological change at an ever-increasing rate, and it is difficult for implementers and users to keep up with this fast pace.

These high-technology industries serve customers who have come to expect new features and functions on a continuous basis. Building owners, developers, tenants, facilities personnel, and information-systems managers are also interested in understanding how their buildings can provide a safer, healthier, more productive environment, how they can differentiate and increase the value of their property, and how they can save on energy costs. Intelligent buildings that use building-automation and structured cabling

systems (SCSs) can help achieve these goals.

It is difficult to find a universally acceptable definition of the "intelligent building." The U.S.-based Intelligent Buildings Institute defined an intelligent building as "one that provides a productive and cost-effective environment through optimisation of its four basic elements-structure, systems, services, and management-and the interrelationships among them." An intelligent building should have integrated building-automation, information, and telecommunications systems-all of which use a structured cabling infrastructure.



*The term "intelligent building" has been around for years, but its definition changes as new requirements and technologies are introduced.*

A building-automation system (BAS) uses direct digital-control (DDC) technology to provide heating, ventilation, and air-conditioning (HVAC) control, as well as management for fire, security, lighting, and energy management services. Intelligent-building functions are performed by the DDC systems, which depend on the appropriate sensors, and which are managed by a software-based facility-management system for centralised control.

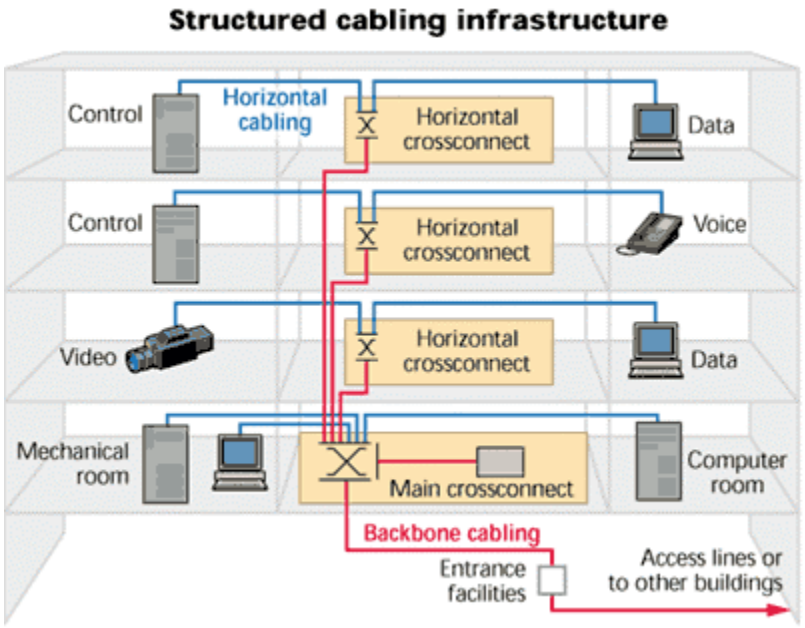
In an intelligent building, the building-automation subsystems are integrated and able to communicate with each other. Devices such as sensors gather and transmit data to the controllers, which then ensure continuous and optimal conditions within the building. Automated tools detect conditions, diagnose performance, and then take appropriate corrective actions.

An integrated BAS is designed to optimise operations across all building-control subsystems, while also optimising energy utilisation, guiding maintenance activities, and reporting building performance. The goal is to ensure the occupants' needs for comfort, health, and safety are met at the lowest possible cost.

An integrated BAS shares information between subsystems. For example, a smoke detector senses smoke, sounds an alarm, and, in turn, the fire-control subsystem sends a message to the HVAC subsystem to close the air vents to prevent the smoke from spreading. It then sends a message to the security system to open the door locks so people can get out of the building.

## LANs take on control functions

The increase in DDC computing power has encouraged the use of standard local area networks (LANs), their associated structured cabling, and other information technologies to handle building control and other such functions. With high-speed data communications and effective information-sharing becoming increasingly vital to the enterprise, information, communication, and control networks need a structured cabling infrastructure that supports all potential applications: a mix of voice, data, video, and control functions.




*Communication and control networks in intelligent buildings need a structured cabling infrastructure that supports all potential applications: a mix of voice, data, video, and control functions.*

The aims of an SCS are to provide application independence; multiple logical topologies; easy moves, adds, and changes to cabling infrastructure; and reduced administration costs.

Control-system cabling tends to be unstructured compared with voice/data cabling, making it less reliable, more inflexible, and less cost-effective. The various control systems in a typical building use a different gauge of cabling, ranging from unshielded twisted-pair to coaxial, and it is usually installed without integration and with widely varying system designs that use different installation and administration methods.

Partly as a result of the acceptance of the SCS concept in the voice and data marketplaces, appreciation for the "intelligent building"-which uses a single, structured cabling network to provide a simple, cost-effective communication infrastructure-is also growing. The distinction between the two ideas is that the intelligent building integrates both telecommunications-voice, data, and video-and control applications in a single system.

Each communication device in the network, whether voice, data, sensor, or camera, is connected to its own cable. But, a single structured cabling infrastructure integrates all these applications into a single network. Integration of network and facility-control management can then be implemented on a single personal computer, or, alternatively, responsibilities can be divided between terminals.

Structured cabling can also introduce significant "future proofing" into the equation. During a building's design life, its enabling technologies will almost certainly change several times, as follows: The office-automation life cycle is one to three years, the telecommunications life cycle is three to five years, and the building-management life cycle is five to seven years.

One result of designing an intelligent building is the maximised useful life cycles of installed technologies over the life span of the building itself. The financial value of cabling to an information network can be overlooked in this equation, because it typically accounts for a small fraction of a network's costs. Taken for granted when it works, inadequate or faulty cabling can bring a network to its knees. With new applications such as multimedia and full-

motion video demanding ever-faster data transmission speeds, the benefits of structured cabling have never been greater.

## BAS industry adopts voice/data

The building-automation system industry is adopting these voice/data technologies and leveraging them to deliver new products and services. This convergence also provides the opportunity to integrate building-automation systems into the enterprise information network by using an SCS to support the building's communications network and its other subsystems.

Many intelligent buildings have already been built around the world, including ÉTS (École de Technologie Supérieure), in Montreal, Canada, one of Quebec's leading engineering schools. In December 1996, the school celebrated the opening of its new campus in the city. This event prompted ÉTS to undertake a major construction project, which involved turning an existing building into a state-of-the-art teaching facility. The new facility, once the Molson-O'Keefe Brewery, was originally built in 1912, but has since been transformed into one of the most advanced intelligent buildings in North America.

The building's telecommunications (voice, data, and video) and control subsystems (heating, ventilation, and air conditioning; fire; lighting; and security) are integrated using the NORDX/CDT IBDN Intelligent Building Solution cabling system, which provides interoperability among these multiple technologies.

IBDN Intelligent Building Solution cabling supports low-voltage control communications and consolidates this function with the traditional communications and connectivity infrastructure used for telecommunications. All applications share the same Asynchronous Transfer Mode (ATM) backbone, which is terminated within each telecommunications closet.

Wider acceptance of intelligent buildings and of using structured cabling for all applications within these buildings seems inevitable as their benefits become increasingly apparent. Structured cabling, now common for voice and data systems, is quickly becoming more commonplace for other building-

services applications. As the trend toward more energy-efficient and secure buildings continues, commercial real-estate developers and building owners will find their properties easier to lease, while existing buildings, without the advantages of their newer, more intelligent counterparts, may begin to lose tenants.

Likewise, those responsible for cable installations will find being familiar with structured cabling for all in-building applications will increase the demand for their services.

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