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EIB INSTALLATIONS AND STRUCTURED CABLING SYSTEMS OF INTELLIGENT BUILDING

The EcoProg Company and Academy of State Fire Service are involved in operations on the extension of an application field and in crease of functionality of the EIB-based Building Management Systems.At present, several projects of the Intelligent Building have been fulfilled and implemented, and the EIB is basic part of the system.

The concept of Intelligent Building was designed in the seventies and eighties and it defined the trend of engineering systems development for commercial and office buildings for the subsequent years. From a beginning of the nineties the Intelligent Building technologies were adapted as well for private houses and they continue to develop.

There is a great number of definitions for an “Intellectual Building”, however, the most exact and comprehensive, in our view, is the definition of Intelligent Building Institute, USA:

“An Intelligent Building is the building which provides a productive and economically effective environment by optimization of four parts”: Structures, Service, Management, Interrelations of the systems.

EIB, as the multifunctional automation system, covers the most of engineering systems of a building and provides it correlation. The multifunctionality of EIB, as a total system of building automation, in the aggregate with other elements of an ‘Intelligent Building’ allows to consider EIB the basic part of Building Management System in an Intelligent Building.

One of the main technologies of an Intelligent Building, which passed the examination by the time, is the technology of structured cabling systems.

In small private houses with a small amount of cabling unstructured solutions are used as usual and it does not create considerable problems for the system maintenance. In large commercial and office buildings the cabling, which is laid unsystematically for each set of different systems create problems both at the stage of designing and at the stages of construction and maintenance. A solution of the problem is the ranking of cabling for all systems of a building, including auto motion systems.

In a standard seven-level information model Open System Interconnection (OSI), the first, physical level defines only physical parameters of the data signal carrier. On this level, the standards for a signal level and its other parameters are defined, but the 3D structure of data signal carriers is not standardized. Let us complete the OSI model with a zero level that defines the 3D structure of the data signal carrier. In the case, when a signal carrier is the cable, the cabling architecture rules the zero level of OSI model. The main limitations are defined for EIB on distances between devices, overall cable length in a segment and cable network topology. The structured cabling systems which were created originally for ranking of cabling for local computing and telephony systems have found the application in systems of building automation as well. One of the first and most completely structured cabling systems is Lucent Technologies SYSTIMAX® Structured Connectivity Solutions (SCS). More than twenty years practice of application of the structured cabling systems has completely confirmed their economic efficiency for administrative and commercial buildings.

The basis of the structured cabling system is composed of unshielded twisted pair cabling (UTP) 4x2 24AWG and multimode optic fibers 62,5/125 μm.

The architecture of the SYSTIMAX® SCS structured cabling system SYSTIMAX SCS is the ‘hierarchical star’ - star-shaped cabling on each level of the system hierarchy.

One of the key concepts of this technology is a “coverage area”. A coverage area is the area, which covers the flexible cable connection between the equipment and the terminal outlet of the cabling system. The coverage area for the EIB installations can be defined as a serviced location or its part selected by functional or territorial indication. The standard rules for EIB

cabling such as a connection by line, by a star, by a tree or their combinations is effective within a coverage area. The connection between a telecommunication center and a service area is made as per star circuit. This area of the cabling system is named as a horizontal segment. In this area the same cable can be shared by different applications, for example, it can be shared between EIB installation and a paging system. The maximum distance of horizontal segment cabling for building automation systems is limited by 80 *m*.

Taking the standard architecture of the structured cabling system into account it is expedient to locate the power supply for an EIB segment at the communication center, thus minimum average distance from the power supply to EIB peripherals will be provided.

The important constituent of an Intelligent Building is the management system, which, except for automatic control, allows making reports automatically, building graphics of state transition of objects in time scale, etc. Usage of a special SCADA (Supervisory Control and Data Acquisition) software for these purposes makes it possible to solve these problems easily. A communication between EIB and SCADA is made through EIB OPC server.

EcoProg company uses CITECT as SCADA software for the projects. CITECT is a product of the Ci Technologies Pty Limited, which is a world leader in SCADA (Supervisory Control and Data Acquisition) software development for the industrial automation. This package allows viewing the state of all the systems and nodes in the runtime mode, to issue control actions, to view and print reports at the certain time or in certain time intervals. Using the graphics editor it is possible to create mnemonic circuits on the screen of the display. These mnemonic screens reflect the physical processes at the real objects and they are necessary for the operator control. When developing a mnemonic screen, a programmer can use the ready elements from the graphics symbol library.

Literature

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