# Intelligent Building Automation System and Energy Saving Solution

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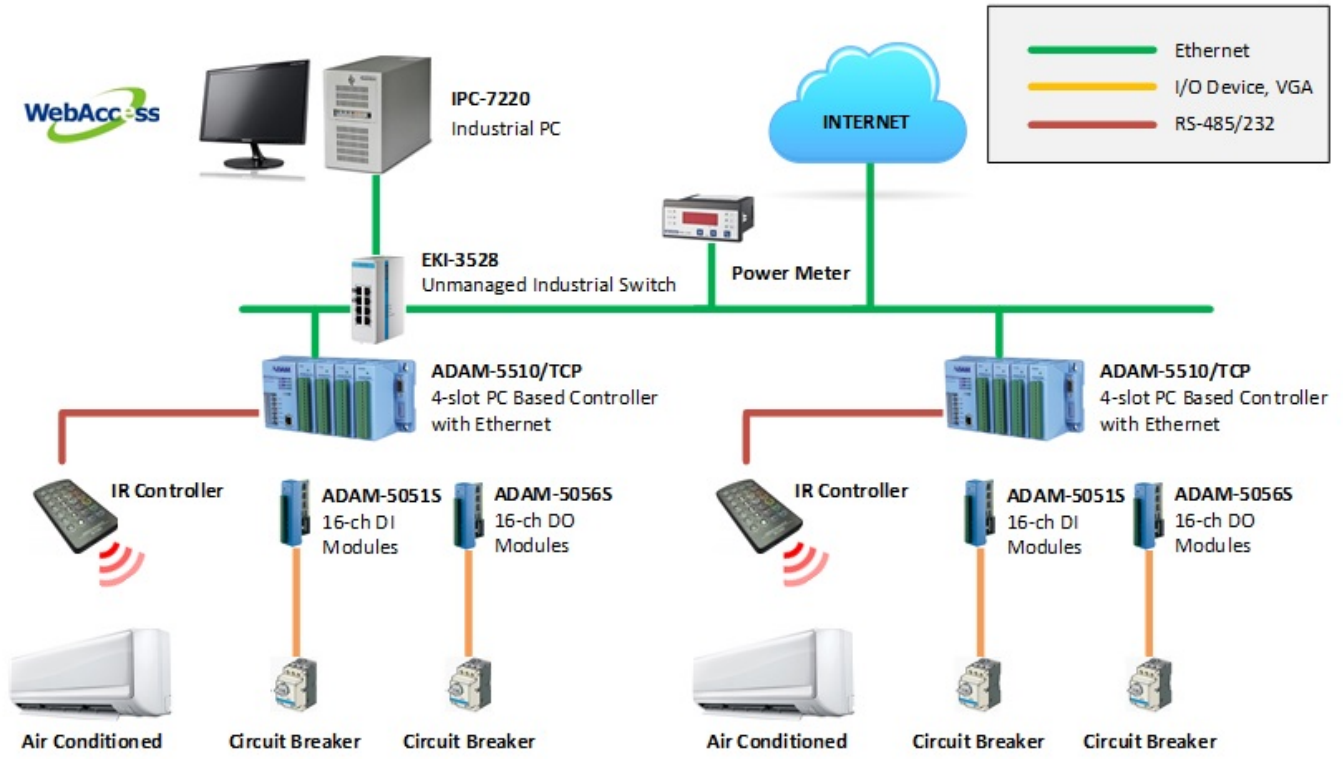



### *Introduction:*

One of the most difficult problems facing the world is conserving energy in buildings. However, it is not easy to have a cost-effective solution to reduce energy usage in a building. One solution for saving energy is to implement an intelligent building automation system (BAS) which can be controlled according to its schedule. In Indonesia a large university with a five floor building and 22 classrooms wanted to save the amount of energy being used.

### *System Requirement:*

The University of Indonesia has a class booking system which is used to force

students and lecturers to use the classrooms effectively. Therefore, the proposed intelligent building automation system needed to be able to integrate with this system and update the schedule time automatically. The proposed system needed to use a SCADA system that could control the lights and air conditioners based on the scheduled system, and monitor the lights and ACs in real-time. Power consumption can also be measured using a power meter installed in the building and connected to the controller.

***System Implementation:***

To manage the data coming from the circuit breakers and air conditioners an IPC-7220 industrial PC is installed with WebAccess 8.0.

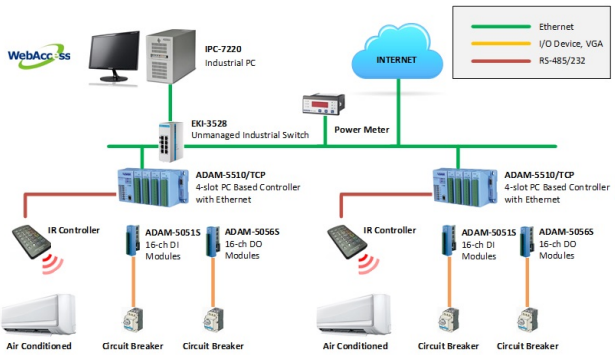
Going beyond SCADA, WebAccess 8.x is also a HTML5 Business Intelligent Dashboard which can be opened from anywhere on any HTML5 compatible browser. The Business Intelligent Dashboard analyses data and helps managers make decisions as to what to do and WebAccess 8.x also provides developers with the tools to design their own widgets and applications and the integration with many database systems such as MySQL, Oracle, SQL Server, through ODBC. Included is a set of Excel templates or users can build their own report templates to generate daily, weekly, monthly and yearly reports to help predict the status of equipment. Through HTML5, a limitless number of users, with varying access levels are able to read information and make changes from wherever they are using either the Internet or Intranet.

To connect the IPC-7220 to the rest of the network and EKI-3528 unmanaged switch is used. The EKI-3528 is a new generation of products with a green Ethernet design. They feature green solutions that automatically adjust power consumption by detecting the link status and cable length. Designed with 1/2 "VIP" ports to get optimal bandwidth for media traffics through VIP ports users can experience better performance of multimedia streaming preferred through prioritized bandwidth setting. The devices come with compact metal and plastic housing that is IP40 rated to protect against dusty industrial environments. The wide power input power (8.4 to 52.4 VDC) is dedicated to operate in areas of unstable power and rugged environments. It also provides an event alarm and in the event of a power failure and connection loop, the integrated LED will activate the alarm to notify administrators.

After the switch is an ADAM-5510/TCP which is used to connect to the air conditioning controllers and the circuit breakers via the ADAM-5056S?s 16-ch Digital Output Module and ADAM-5051S?s 16-ch Digital Input Module. The ADAM-5510/TCP, ADAM-5056S and ADAM-5051S combination is used to control and monitor the status of circuit breakers which is connected to the lights in the classroom. In addition, all ACs in classrooms can be turned on/off based on the scheduler by using

IR-Controller which are connected to ADAM-5510/TCP through an RS-485 connection.

### *System Diagram*




### *Conclusion:*

The proposed system is a very effective solution to save energy by the effective use of classrooms in University of Indonesia. Advantech WebAccess is a very powerful and convenient platform for implementing an intelligent building automation system application. The system is not only very easy to implement, but is also very cost effective and provides many useful features. Therefore, many users try to employ a similar solution for energy saving application and building automation systems. By implementing WebAccess and the controller, Advantech provides an intelligent BAS that can be used for cost effective solutions for energy saving applications.