BA/HA

Lighting & Air Conditioning Service in KTV

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Nowadays, KTV has become one of the most popular entertainment places for modern people. In order to win and keep customers, automation control has been introduced to enhance services already provided and create add-on values by providing new services.

System Description

Lighting control and air conditioning are the most important parts for indoor entertainment places, especially for KTV private rooms, lighting control usually plays an important role in creating pleasant atmosphere and air conditioning helps to get rid of odd smells and adjust temperature to makes a comfort environment.

Lighting Control System

In the past, when it comes to the design of lighting control system, the designer usually tries to break down the operations into as many details as possible; and the user has to perform a lot of operations to manually adjust and turn on/off multiple switches to achieve desired effect for specific lighting requirement. Nowadays, as the requirements of lighting control is getting even more complicated and people prefer simplified all-in-one-touch operation; a control panel with convenient one-click options to meet various lighting requirements is getting popular.

Air Conditioning System

Unlike typical window air conditioners used for general household, the air conditioning systems for large-scale applications such as commercial offices, buildings, shopping malls … and so on, usually adopt central air-conditioning systems. To adjust air conditioning in a certain region of a central air conditioning system, it usually requires the measurements of temperature sensors and to control the valves in accordingly, therefore, 3 major operations: "Start/Stop the Switches", "Adjusting the Air Volume" and "Settings of the Target Temperature" are involved. In the past, the operations are done by turning on/off and adjusting the switches to control the air volume to achieve desired

temperature; these operations are done by analog regulations; the interface usually is lacking of guiding and the configuration is hard to perform. In recent years, as the advance of the technology, all these tedious operations can be replaced by an integrated control panel with intuitive interfaces for users to easily perform all the tasks.

System Architecture

In this system, the architecture is planned by carefully taking all requirements into consideration from an integrated view. The design for communication connections and modules selected are all planned by collected data based on the scale and needs. The communication protocol of this system is implemented by Modbus protocol. For ICP DAS provides a wide range of Modbus modules to select from, it is easy to choose Modbus modules with most appropriate I/O combinations to meet specific requirements based on the control operations and functions of the devices.
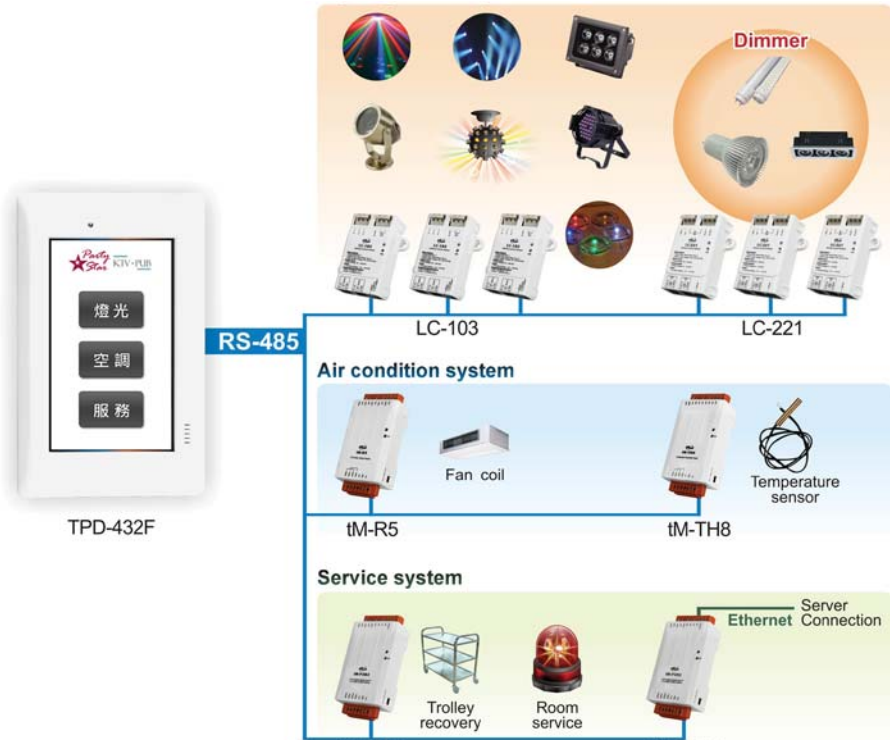
Lighting Control

Mode	Module	Description	Note
Digital Turn ON/OFF	LC-103	1-channel AC Digital Input and 3-channel Relay Output	Max. Load Current 5A
Analog Dimming Control	LC-221	1-channel Analog Output	0 to 10 V Dimmable Ballasts

Air Conditioning

| Mode	Module	Description	Note
Valve Control	tM-R5	5-channel Relay Output	Max. Load Current 5A
Temperature Sensor	tM-TH8	8-channel Isolation Thermistor Input	Support Precon ST-A3, Fenwell U, YSI L100, YSI L300, YSI L1000, YSI B2252, YSI B3000, YSI B5000, SI B6000, YSI B10000, YSI H10000, YSI H30000 and User-defined

Service System

Mode	Module	Description	Note
Local Service Options	tM-P3R3	3-channel Relay Output and 3-channel Wet Contact	Max. Load Current 5A
Remote Service Signal	tET-P2R2	2-channel Relay Output and 2-channel Wet Contact	TCP Protocol, Max. Load Current 5A

System Integration

In this modern world, an independent system without distributed resources is gradually eliminated due to lacking of efficiency and flexibility. Small systems (subsystems) - as the basic parts of "Internet of Things" - feature flexibility, cost-effective and energy-efficient; therefore are getting popular. They can work independently and at the same time, provide interconnectivity communication if required.

This KTV system is also implemented based on the subsystem concept, each subsystem such as lighting control system, air conditioning system and service system can function independently and can communicate with each other. Under this distributed
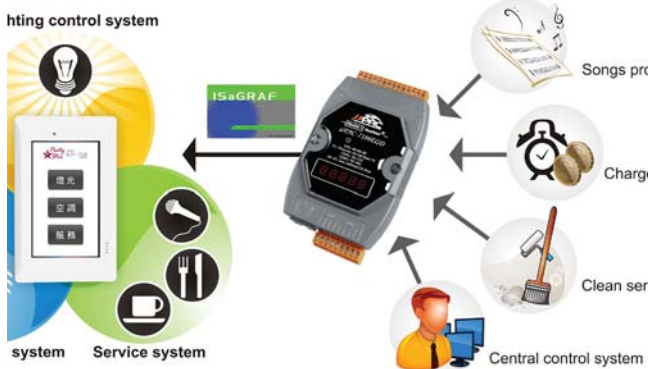
architecture, ISaGRAF PAC works as an agent controller for information exchange and for linking actions and communication between newly-added service and the original operations of the KTV system.

A. Song Menu System

The songs stored in the database are classified as 4 modes: "bright", "soft", "romantic" and "dynamic". When a song is played, a signal will be sent to the lighting control system to launch the corresponding lighting control operations.

B. Timing System

The system can perform related operations of time charging of the room. It also can automatically turn on the equipments in the private room just right before the time start to charge. And when the room is idle, the equipments can also be automatically turned off for energy saving.

C. Cleaning Service System

In this KTV, dining carts and plates are used for dining services. When a private room requires cleaning service of the used plates, they can put the dining cart and used plates in a certain zone in the room, by infrared position detection, a message for cleaning service can be automatically sent for immediate notification.

D. Central Control System

The Central Control System requires perceiving full information of the private room status in real time for best arrangements and efficient operations. For the private rooms may be far from the control center, Ethernet is used for communications between the private rooms and the Central Control System.

Summary

In this KTV application, each private room is equipped with lighting control system, air conditioning system, service ring (service system) as well as a few services for other purposes. In the original deployment, each service is independent from each other therefore requires an independent control interface (mounted on the wall) which makes users confused and hard for maintenances. By using ICP DAS solution, all services can be integrated and operations can be linked for most efficient performance. The resource and information can be shared, and the integrated data can be easily collected for further analysis and management from an overall perspective. The integrated touch screen HMI controller allows all control interfaces to be displayed as pages on a single touch screen; the operations can be simple, intuitive and efficient to bring customers a whole new better service experience.