The Realization of Zigbee Mesh Networks

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ABSTRACT

Nowadays, there are many short distance wireless communication systems, such as Blue-tooth, Zigbee and Z-wave. In such three communications, the Blue-tooth system provides the largest data transmission but 10 meter transmission distances. The Z-wave system is just beginning, and few applications are available. Although the Zigbee system provides a littler data transmission than the Blue-tooth systems, however, it needs lower electricity and can achieve as long as 100 meter transmission in free space, which is suitable for the surveillant systems. So in this thesis, implementations are devised based on the Zigbee system. With increases of the kinds of electrical devices, it is not easily to manage them in a certain limited area. If a devise is installed in a mesh network, not only is it easily used in the hand, but the management of electrical devices is also systematical. How to implement the mesh network is a main exploration in this thesis. The implementation in the thesis is based on IEEE 802.15.4, which the principle of CSMA/CA is devised in the data transmission. The principle of CSMA/CA is simply described as: channel detection has been employed before a transmission of data, and if the channel is available data is immediately transmitted, otherwise no data is transmitted and a random time is required to wait and then channel detection is checked again. For the aspect of hardware, some chips are used, such as MC13191, MC13192 and MC 13213, which are specially designed for Zigbee systems. A development software, called Worrior C, and a Freescale mother board are utilized to design a Zigbee star network, which contains light remote controllers and window curtain remote controllers. A Zigbee mesh network is then devised to integrate light remote controllers, window curtain remote controllers and data transmission between computers.

Keywords : Zigbee ; Zigbee mesh network

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