Design and Implementation of a RFID-based Clean Room Real-Time Location-aware System

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Abstract

The application of Automated Material Handling System (AMHS) to the semiconductor manufacturing factories is one of the most important stage in the automation process of semiconductor business. All carriers in the rail guided vehicle will be able to send their positioning information through this system. Nevertheless, some positioning information will be interfered or get lost if there is any relocation of the carriers from the effective ranges of AMHS by operators. In order to allocate these lost carriers only manpower is possible, and the searching process is time wasting and inefficient. In this paper, we implement a Clean Room Real-Time Location-aware System (CRRLS) based on the technology of RFID in accordance with the special character of equipments arrangement of clean rooms in the semiconductor manufacturing factories. The proposed system can reveal the positioning information of the carriers in the clean room by analyzing the received radio frequency energy information. Moreover, we establish a transmitting model of radio signal, and used this model to estimate distance between tag and RFID (Radio Frequency Identification) readers. A triangular positioning algorithm is developed to define the location and its two-dimensional coordinate of the item. As a result, the lost item can be retrieved easily. Furthermore, reused RFID tags can store additional information sent by the transceivers and data of parameter of the production process to reduce the possibility of

severe damage because of wrong
parameters setting, as a result, competitive advantage of the
semiconductor business can herewith greatly
increase.

Keyword：Automated material handling system, Clean Room Real-Time
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