

Object-oriented model for Generic Equipment Model

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Abstract

This paper proposes an Object-oriented model for Generic Equipment Model(GEM) which is applied to semiconductor processing Equipment. A proposed implementation model for GEM consists of three modules : a module to convert SECS-II message and a module to transmit messages between GEM and a physical equipment. The proposed Object-oriented model for GEM has advantages in reuse and user management from the point of view of development program. Especially, this paper proposes a GEM agent COM, which is a base of GEM, transmits messages and events among modules. This Object-oriented model is analysed and developed by using UML.

1. Introduction

Currently it is necessary that FA system make use of network service and the preference of FA system which supply network service cause network service to make an essential part of FA system and this tendency is also applied to the semiconductor processing equipment and increase the necessary of implement the network protocol for the semiconductor processing equipment that is SECS-II(Semi-conductor Equipment Communication Standard), GEM, HSMS(High Speed SECS Message Services).

Now SEMI(Semiconductor Equipment and Materials international) is making a lively discussion for applying the concept of Object-oriented. It will cause the reuse, portability of software to improve and the cost application development to reduces.

We propose the Object-oriented model for GEM applied to the semiconductor processing equipment. The proposed model consist of the general COM for basic capability of GEM and the agent COM which communicate with COM server. The capability of agent COM not only play a part of communicating

data between the elementary COM of GEM but also provides a automated mechanism for updating data based on data obtained from external equipment. User develop the GEM application as using the GEM agent COM. That is, user will be provided with the environment of developing program only using the interfaces provided by GEM agent COM.

This paper is organized as follows. Section 2 presents the concept, capability of GEM and section 3 presents the proposed COM-based GEM structure. Finally, section 4 concludes the paper.

2. Overview of GEM

GEM defines a standard implementation of SECS-II for all semiconductor manufacturing equipment. that is GEM standard specify a model of the behavior to exhibited by semiconductor manufacturing equipment in a SECS-II communication environment, a description of information and control functions needed in a semiconductor manufacturing equipment, a definition of the basic SECS-II communications capabilities of semiconductor manufacturing equipment, a single consistent means of accomplishing an action when SECS-II provides multiple possible methods, and standard message dialogues necessary to achieve useful communication capabilities.

First, fundamental GEM requirement should be satisfied to implement GEM S/W and when not only adding fundamental GEM capability but additional GEM capability, it will satisfy to implement GEM S/W. the GEM standard contains two types of specifications; fundamental GEM requirement, additional GEM capabilities. In fundamental GEM requirement, it comply with state models, equipment processing states, Host-Initiated S1,F13/F14 scenario, Event notification, On-line identification, Error messages, Control and documentation. and additional GEM capabilities comply with establish communications, event notification, Dynamic event