13.2 Functional Configuration

The SEM consists basically of a sequence of events (SOE) input module that captures plant event signals, an FCS with an SOE interface module (SB311), an SOE server that acquires SOE data from the FCS via Ethernet and stores them, the SOE viewers that display stored data under specified conditions, and an SOE server configurator that defines SOE server system configuration. The SOE data is time-stamped in the SOE input module and sent to the SOE server via the SOE interface module (SB311) in the FCS.

The FCS performs a time synchronization with an external master clock using an IRIG-B time code format through an RS-422 signal.

The acquired SOE data can be displayed and output for any purpose in accordance with the event message display function, trip detail display function, and trip report function supported by the SOE viewer. In addition, The SOE data can be output to an external OPC client, such as the Exaquantum historian. This feature allows the integrated management of SOE data by the Plant Information Management System (PIMS).

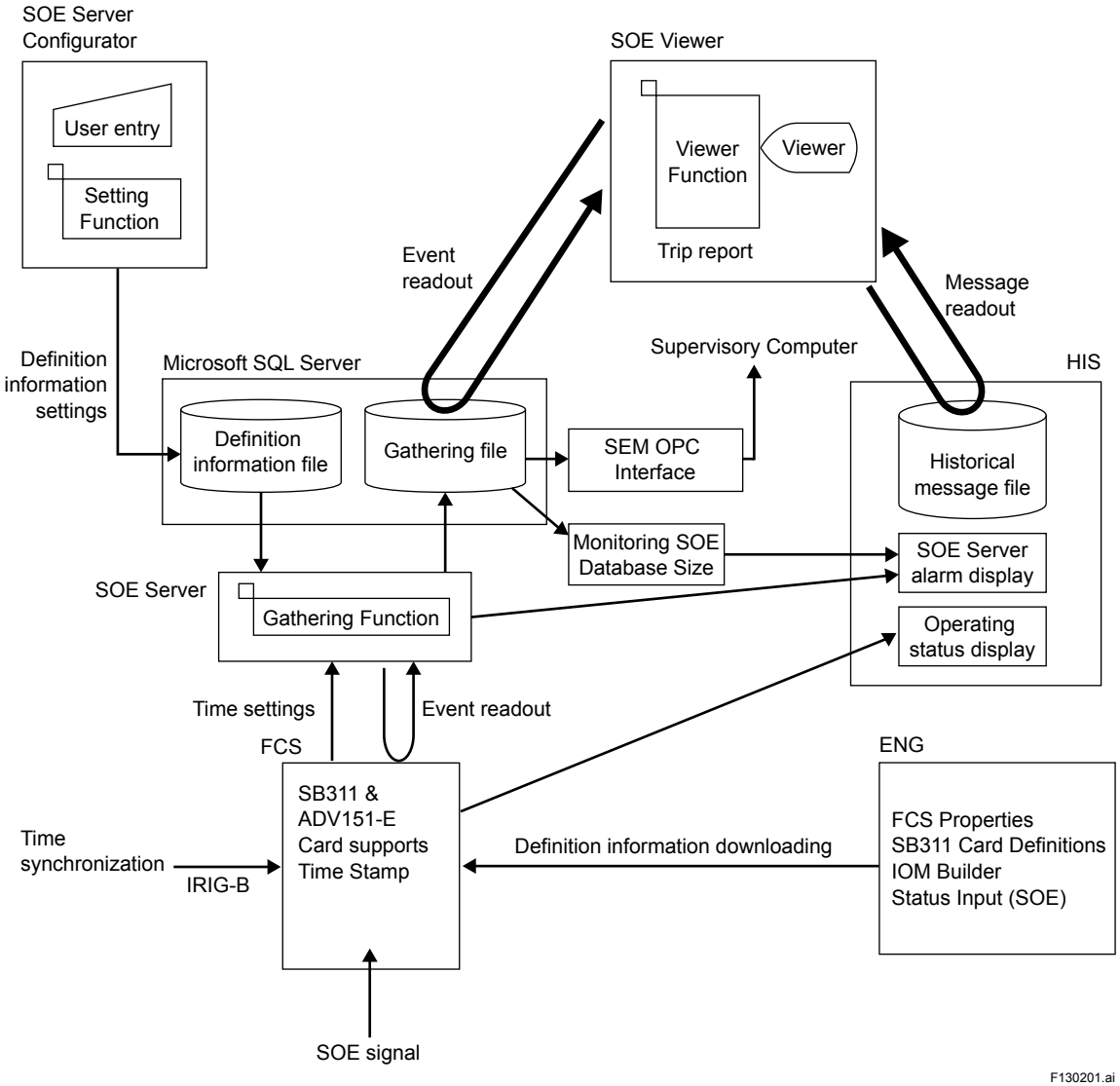
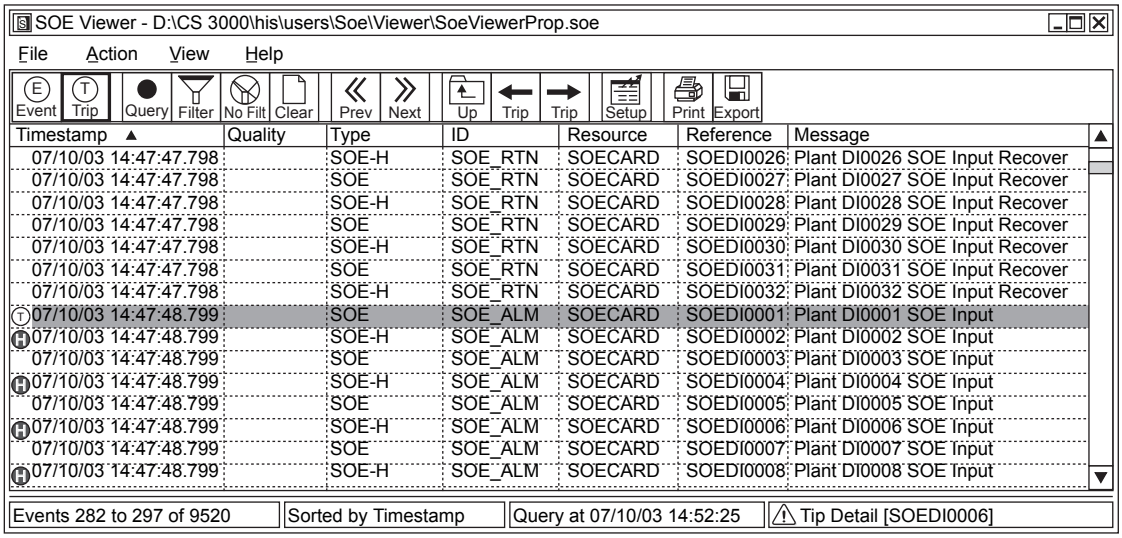


Figure Functional configuration of the sequence of events manager (SEM)



F130301.ai

Figure Trip detail display

The SOE viewer displays SOE data stored by the SOE server and can also access HIS message databases and Unified Operator Interface (UOI) servers to allow an integrated data display of SOE and other message data. Up to eight message data sources can be assigned.

Field Control Station (FCS) with SOE Interface Module

The SEM provides the following four FCS models. These models incorporate two SOE interface modules (SB311) and one IRIG-B branch unit per FCS.

- Models AFS30D-HE and AFG30D-HE 19-inch Rack Mountable, Duplexed Field Control Units for FIO and 19-inch rack mountable
- Models AFS40D-HE and AFG40D-HE Duplexed Field Control Units for FIO with Cabinet

The SB311 module is installed in a dual-redundant configuration consisting of ESB-bus modules with an Ethernet port (for SOE server) and an RS-422 port (for time synchronization). An Ethernet port is connected to the SOE server via an Ethernet hub. An RS-422 port is connected to an external master clock via an IRIG-B branch unit inside the FCS. RS-422 cables are cascade-connected to the IRIG-B branch units in each FCS, and an YCB128 RIO bus terminator is attached at the end of the FCS.

Up to 16 FCS's can be connected to an SOE server. The SOE viewer can display data sources for up to eight SOE servers. If 16 or more FCS's are used, or 2000 or more SOE data items are used, use multiple SOE servers.

SOE Digital Input Module (ADV151-E)

The SOE signals are connected to the SOE Digital Input Module (ADV151-E) installed on a local node in the FCS. Up to 32-point SOE signals can be applied to one ADV151-E module. For each input terminal, the SOE signal input specifications can be set. The status of SOE signal can be used as FCS control and monitoring signals. The ADV151-E module specifications are the same as those of the ADV151-P module except for the SOE-specific functions.

SOE Server Configurator

The SOE Server Configurator is a builder for the SOE server to define the configuration required for acquiring SOE data from the FCS. The SOE Server Configurator (LPC6910) operates when installed on a PC running Windows 2000 or Windows XP connected to the SOE server via Ethernet.

SEM OPC Interface

The SEM provides an OPC interface function for transferring SOE data stored in the SOE server, to an OPC client, such as Exaquantum, connected via Ethernet as an OPC alarm and events (A&E) server. The SEM OPC interface function works when installing the SEM OPC Interface Package (LPC6930) on a PC running as an SOE server.

External Master Clock

The FCS, to assure 1-ms SOE data resolution and time, performs time synchronization by a pulse-width modulated IRIG-B code signal using an external master clock that incorporates GPS and through an RS422-interface. In addition, time synchronization by the SOE server is executed periodically with an FCS via Ethernet for SOE data acquisition.

Time synchronization for SOE viewers, human interface stations (HIS's), and network equipment, such as an engineering PC, depends on the system configuration. So, use a network time protocol (NTP) to separately set the SOE server.

13.4 System Monitoring and Maintenance Functions

The SEM provides the following functions for system monitoring and maintenance.

- Monitor the SOE server
- Display operating status of the SB311 and ADV151-E
- Monitor free disk space capacity of the SOE server
- Backup and restore the SOE server database