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).

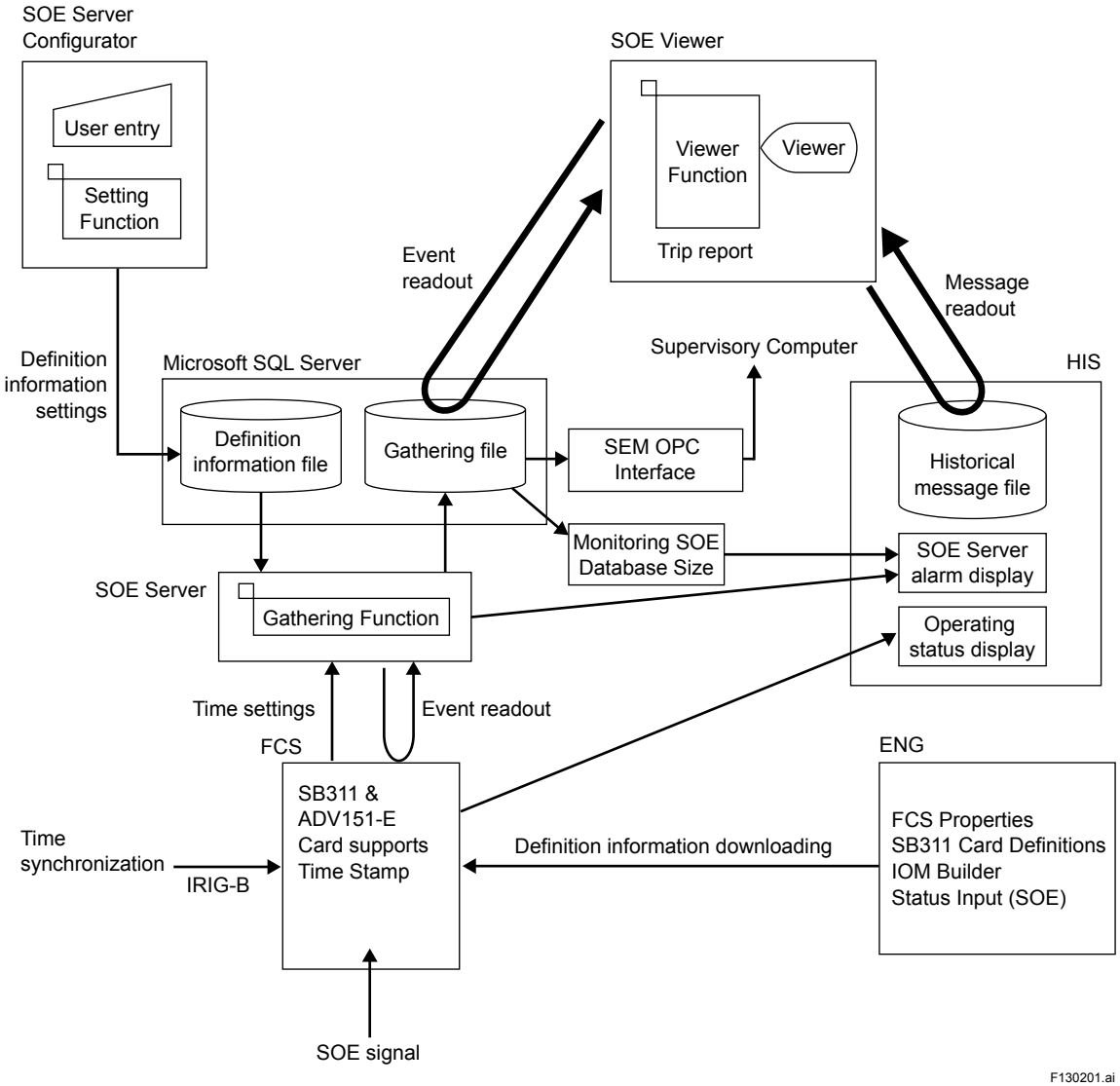

Figure Functional configuration of the sequence of events manager (SEM)

13.3 Basic SEM Configuration Equipment and Software Packages

The SEM is comprised of the following basic equipment and software packages.

SOE Server

The SOE server acquires and stores time-stamped SOE data from FCSs, and has a server function that transfers the stored SOE data to multiple SOE viewers upon request. The SOE server runs on Microsoft Windows 2000 Server or Windows Server 2003. The SOE server operates when an SOE server package (LPC6900) is installed in an SQL server PC on which Microsoft SQL Server 2000 is running.

The SOE server uses two independent Ethernet networks: one for SOE data acquisition from FCSs, and the other for SOE data transmission to SOE viewers. Up to 2000 SOE inputs can be acquired by one SOE server. The number of SOE viewer clients that can be connected to one SOE server is determined by the number of Windows and SQL server client licenses. Configure the system with the number of client licenses needed for SOE viewers.

SOE Viewer

The SOE viewers display SOE data stored by the SOE server in chronological order according to preset retrieval conditions. The SOE viewers operate when the SOE Viewer Package (LPC6920) is installed on a PC running Windows 2000 or Windows XP, connected to the SOE server via Ethernet.

The SOE viewers provide the functions listed below:

- Event mode display: Lists data source parameters set by the SOE viewer property and all messages matched with the date and time.
- Trip trigger mode display: Lists trip trigger events in the range of dates set by the SOE viewer property.
- Trip detail display: Displays all trip detail records relating to trigger events selected on the trip trigger mode display screen.
- Automatic trip report mode display: Automatically acquires newly generated trip triggers.
- Trip report output: Outputs the trip reports acquired by trip triggers to a csv type file and/or a printer.

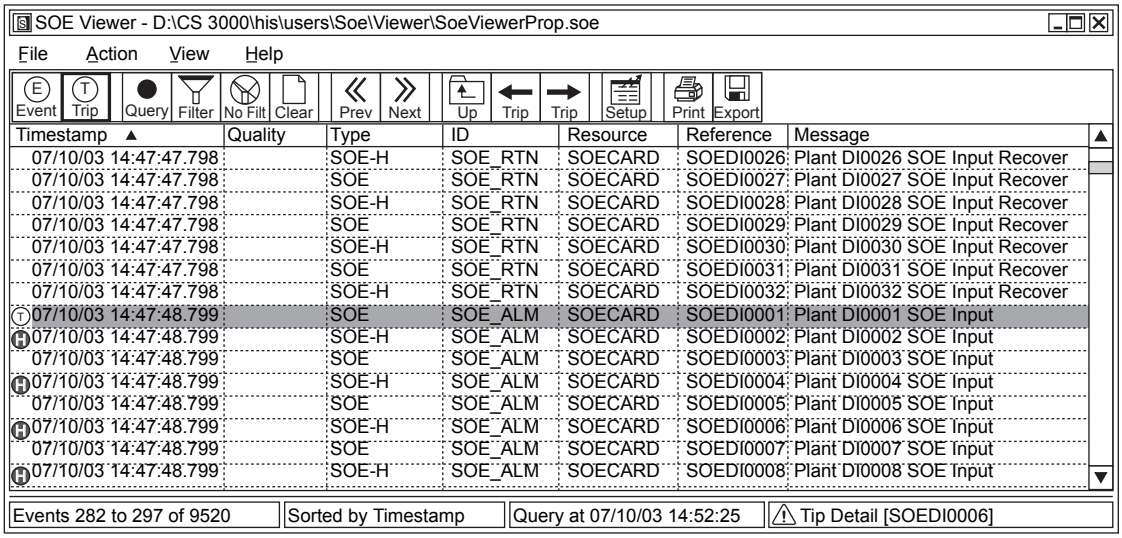

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Figure Trip detail display

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.