



SEMI E37.1-96^E

HIGH-SPEED SECS MESSAGE SERVICES SINGLE-SESSION MODE (HSMS-SS)

^E This document was modified in August 1999 to include the second paragraph in Section 9.1, which was omitted from previous published versions of this document.

1 Purpose

HSMS-SS provides a means for independent manufacturers to produce implementations which can be connected without requiring specific knowledge of one another.

HSMS-SS is intended as an alternative to SEMI E4 (SECS-I) for applications where higher speed communication is needed.

HSMS-SS is intended as an alternative to SEMI E13 (SECS Message Services) for applications where TCP/IP is preferred over OSI as a communications basis.

2 Scope

High-Speed SECS Message Services Single-Session Mode (HSMS-SS) is a subsidiary standard to High-Speed SECS Message Services (HSMS) Generic Services.

3 Applicable Documents

3.1 SEMI Standards

SEMI E4 — SEMI Equipment Communication Standard 1 Message Transport (SECS I)

SEMI E5 — SEMI Equipment Communication Standard 2 Message Content (SECS II)

SEMI E37 — High-Speed SECS Message Service (HSMS) Generic Services

4 Selected Definitions

device ID — A 15-bit field in the message header used to identify a subentity within the equipment.

In addition, all definitions for HSMS Generic Services apply.

Note that the terms HSMS and HSMS generic services both refer to the HSMS Generic Services standard definition (SEMI E37).

5 HSMS-SS Overview and State Machine

This definition defines the HSMS-SS-specific use of HSMS Generic Services suitable for applications requiring a simple SECS-I replacement. The purpose of this standard is to explicitly limit the capabilities of the HSMS Generic Services to the minimum necessary for this type of application. Specifically, HSMS imposes the following limitations:

1. HSMS-SS eliminates the use of a number of HSMS procedures. Deselect is not to be used to end HSMS-SS communications (use Separate instead), and the Reject procedure is optional.
2. HSMS-SS limits certain other procedures such as Select to simplify operation for the specific case of SECS-I replacement.

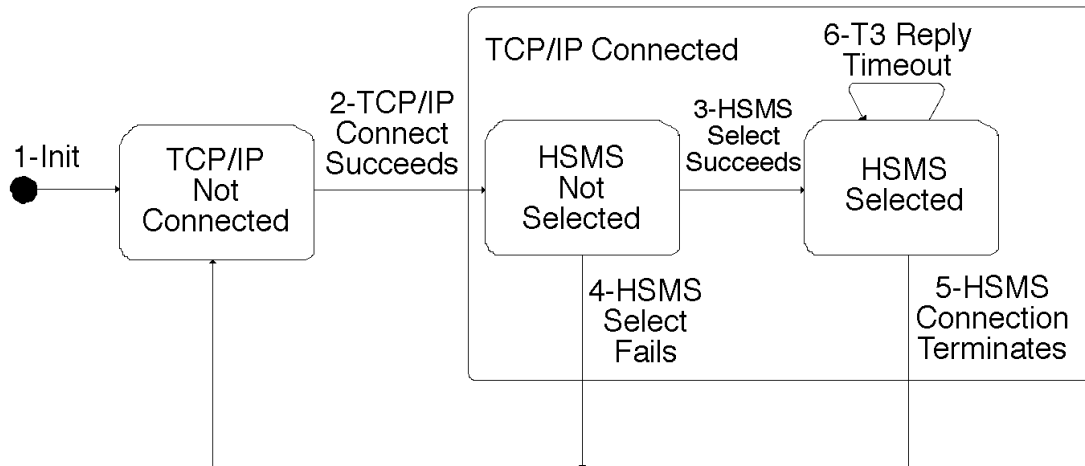
The remainder of this document describes these limitations in more detail.



5.1 *HSMS-SS State Machine* — The HSMS-SS behavior and state machine differ from that specified in the HSMS Generic Services in the following ways:

1. The SelectionCounter defined in HSMS Generic Services is not required.
2. Various transitions are defined differently as illustrated in the HSMS-SS state machine illustrated below.

The HSMS-SS state machine is illustrated in the diagram below





5.2 State Transition Table for Passive Mode Connect

Table 1. HSMS-SS Passive Mode Connect State Transitions

#	Old State	New State	Trigger	Actions
1	—	TCP/IP NOT CONNECTED	Initialization	
2	TCP/IP NOT CONNECTED	HSMS NOT SELECTED	TCP/IP Connect Succeeds: 1. TCP/IP “accept” succeeds.	Start T7 timeout
3	HSMS NOT SELECTED	HSMS SELECTED	HSMS Select Succeeds: 1. Receive Select.req and decide to allow it.	1. Cancel T7 timeout; and 2. Send Select.rsp with zero SelectStatus
4	HSMS NOT SELECTED	TCP/IP NOT CONNECTED	HSMS Select Fails: 1. T7 Timeout waiting for Select.req; or 2. Receive Select.req and decide to reject it and send Select.rsp with non-zero SelectStatus; or 3. Receive any HSMS message other than Select.req; or 4. Receive HSMS message length not equal to 10; or 5. Receive bad HSMS message header; or 6. T8 timeout waiting for TCP/IP; or 7. Other unrecoverable TCP/IP Error (entity-specific)	1. Close TCP/IP connection
5	HSMS SELECTED	TCP/IP NOT CONNECTED	HSMS Connection Terminates: 1. Decide to terminate and send Separate.req; or 2. Receive Separate.req; or 3. T6 timeout waiting for Linktest.rsp; or 4. Receive HSMS message <10; or 5. Receive HSMS message length > maximum supported by entity; or 6. Receive bad HSMS message header; or 7. T8 timeout waiting for TCP/IP; or 8. Other uncorrectable TCP/IP Error (entity-specific)	1. Close TCP/IP connection
6	HSMS SELECTED	HSMS SELECTED	T3 Timeout waiting for Data Reply Message	1. Cancel the Data Transaction as appropriate (entity-specific) but do not terminate the TCP/IP connection; and 2. If entity is EQUIPMENT send SECS-II S9F9.



5.3 State Transition Table for Active Mode Connect

Table 2. HSMS-SS Active Mode Connect State Transitions

#	Old State	New State	Trigger	Actions
1	–	TCP/IP NOT CONNECTED	Initialization	
2	TCP/IP NOT CONNECTED	HSMS NOT SELECTED	TCP/IP Connect Succeeds: 1. Decide to connect.	1. TCP/IP Connect; and 2. Send Select.req; and 3. Start T6 timeout
3	HSMS NOT SELECTED	HSMS SELECTED	HSMS Select Succeeds: 1. Receive Select.rsp with zero SelectStatus	1. Cancel T6 timeout
4	HSMS NOT SELECTED	TCP/IP NOT CONNECTED	HSMS Select Fails: 1. T6 Timeout waiting for Select.rsp; or 2. Receive Select.rsp with non-zero Select.Status; or 3. Receive any HSMS message other than Select.rsp; or 4. Receive HSMS message length not equal to 10; or 5. Receive bad HSMS message header; or 6. T8 timeout waiting for TCP/IP; or 7. Other unrecoverable TCP/IP Error (entity-specific)	1. Close TCP/IP connection; and 2. Start T5 Timeout
5	HSMS SELECTED	TCP/IP NOT CONNECTED	HSMS Connection Terminates: 1. Decide to terminate and send Separate.req; or 2. Receive Separate.req; or 3. T6 timeout waiting for Linktest.rsp; or 4. Receive HSMS message length < 10; or 5. Receive HSMS message length > maximum supported by entity; or 6. Receive bad HSMS message header; or 7. T8 timeout waiting for TCP/IP; or 8. Other uncorrectable TCP/IP Error (entity-specific)	1. Close TCP/IP connection
6	HSMS SELECTED	HSMS SELECTED	T3 Timeout waiting for Data Reply Message	1. Cancel the Data Transaction as appropriate (entry-specific) but do not terminate the TCP/IP connection; and 2. If entity is EQUIPMENT, send SECS-II S9F9.



Table 3. When HSMS Transactions are Allowed

<i>HSMS Transition</i>	<i>Allowed in State(s)</i>	<i>Who Initiates Transaction?</i>
Select	HSMS Not Selected	Active Entity
Link Test	HSMS Selected	Either Entity
Data	HSMS Selected	Either Entity
Separate	HSMS Selected	Either Entity

6 HSMS-SS Use of TCP/IP

As defined in HSMS.

7 HSMS-SS Procedures

7.1 Select Procedure — The Select Procedure shall only be initiated by the entity establishing the TCP/IP connection in active mode. The Passive Mode Entity shall not initiate the Select Procedure.

The Select Procedure is only permitted in the NOT SELECTED state. It uses a SessionID value of 0xFFFF and implies that all device IDs are available for communication. Immediately following any Select Procedure which fails to complete successfully with a zero Select Status, each Entity must close the TCP/IP connection and transit to the NOT CONNECTED state.

7.2 Data Procedure — The Data Procedure is as defined in HSMS Generic Services. Note that any SessionID value that corresponds with a DeviceID supported by the Local Entity is valid as long as the Local Entity is in the SELECTED state.

7.3 Deselect Procedure — Deselect shall not be used in an HSMS-SS implementation. Communication is ended using the Separate Procedure.

7.4 Linktest Procedure — As defined by HSMS. Under HSMS-SS, the use of Linktest is strictly limited to the SELECTED state.

7.5 Reject Procedure — The Reject Procedure is optional in HSMS communications. Note, however, that any situation which would require the use of the Reject as described in HSMS Generic Services shall be treated as a communications failure in implementations not supporting reject. Specifically, the TCP/IP connection is immediately closed.

7.6 Separate Procedure — Separate shall always use SessionID 0xFFFF (binary, all ones). In HSMS-SS, the Separate.req is valid only in the TCP/IP CONNECTED state and its substates. After either initiating or receiving a Separate.req message, the entity shall immediately close the TCP/IP connection and transit to the TCP/IP NOT CONNECTED state.

7.7 Communications Failures — As defined by HSMS. Note that, in addition to the communications failures defined under HSMS, any violation of the restrictions defined in prior sections of this document are also to be treated as communication failures.

8 HSMS-SS Message Format

8.1 Session ID — In HSMS-SS Data Messages, the high-order bit of Session ID is zero, and the low-order 15 bits contain Device ID, a 15-bit unsigned integer value, which occupies the low-order 7 bits (bits 6-0) of byte 0 and all of byte 1 of the header. Device ID is a property of the equipment, and can be viewed as a logical identifier associated with a physical device or sub-entity within the equipment. The precise meaning of "device" or "sub-entity" is equipment-defined. A unit of equipment must have at least one Device ID. Equipment which contains several devices may define a unique Device ID for each device.

In HSMS-SS Control Messages, Session ID will always assume the special value 0xFFFF (all one bits).

8.2 PType — All HSMS-SS messages are PType 0 (SECS II encoded) as defined in HSMS.

8.3 SType — Only HSMS-defined STypes are permitted in HSMS-SS. User-defined SType messages are not permitted.



9 Special Considerations

9.1 *Multiblock Messages* — For each SECS-II message, the SECS-II standard defines whether that message should be transmitted in SECS-I as a single-block message or as a multiblock message.

This distinction becomes unimportant with HSMS, which transmits all messages in the same fashion. However, to be compatible with older SECS-I applications, when an HSMS application sends a SECS-II message defined as single block, the HSMS Message Length should not exceed 254 bytes (10 byte header plus 244 text bytes).

10 HSMS-SS Documentation

An HSMS-SS implementation is required to document the following information in addition to the information required by HSMS.

1. The number of deviceIDs supported and their specific values.
2. Whether or not the implementation supports the normal or the restricted procedure for terminating communications.
3. The setting of the host vs. equipment parameter.

10.1 *Host vs. Equipment* — Many applications using SECS-II will need to designate one end of the communication link as "Equipment" and the other end as "Host." HSMS-SS itself does not require configuring of "Host" and "Equipment," but this parameter may be included in configuration where needed. HSMS can also be used in applications where the distinction between Host and Equipment is not used.



RELATED INFORMATION 1 APPLICATION NOTES

NOTE: This related information is not an official part of SEMI E37.1 and is not intended to modify or supercede the official standard. Publication was authorized by full letter ballot. Determination of the suitability of the material is solely the responsibility of the user.

The user's attention is called to the possibility that compliance with this standard may require use of copyrighted material or of an invention covered by patent rights. By publication of this standard, SEMI takes no position respecting the validity of any patent rights or copyrights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of any such patent rights or copyrights, and the risk of infringement of such rights, are entirely their own responsibility.

R1-1 Multiple HSMS Connections

Typically, an Equipment will accept only one Host Connection.

A Host may connect to several units of Equipment, so the Host may have several simultaneously active Connections (each to one Equipment).

A Cell Controller (or similar entity) might have one Connection by which the Cell Controller appears as "Equipment" to the Factory Host Computer, as well as several Connections by which the Cell Controller appears as "Host" to Equipment.

R1-2 Equipment Support for Multiple Hosts

HSMS requires Equipment to accept at least one active Connection, and does not require the equipment to support access by multiple concurrent Hosts. That is, if the Equipment has already accepted a Host Connection, but a Host (the same or a different Host) attempts a second Connection, the Equipment will immediately terminate that second Connection attempt.

For specialized applications, an equipment could accept more than one Host Connection. Coordination of activity by multiple hosts is equipment-defined.

NOTICE: These standards do not purport to address safety issues, if any, associated with their use. It is the responsibility of the user of these standards to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. SEMI makes no warranties or representations as to the suitability of the standards set forth herein for any particular application. The determination of the suitability of the standard is solely the responsibility of the user. Users are cautioned to refer to manufacturer's instructions, product labels, product data sheets, and other relevant literature respecting any materials mentioned herein. These standards are subject to change without notice.