SEMI E5-0622
SPECIFICATION FOR SEMI EQUIPMENT COMMUNICATIONS STANDARD 2 MESSAGE CONTENT (SECS-II)

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1 Purpose

1.1 The SEMI Equipment Communications Standard Part 2 (SECS-II) defines the details of the interpretation of messages exchanged between intelligent equipment and a host. This Specification has been developed in cooperation with the Japan Electronic Industry Development Association Committee 12 on Equipment Communications.

1.1.1 It is the intent of this Standard to be fully compatible with SEMI E4, Equipment Communications Standard (SECS-I). It is also the intent to allow for compatibility with alternative message transfer protocols. The details of the message transfer protocol requirements are contained in § 6.

1.1.2 It is the intent of this Standard to define messages to such a level of detail that some consistent host software may be constructed with only minimal knowledge of individual equipment. The equipment, in turn, may be constructed with only minimal knowledge of the host.

1.1.3 The messages defined in the Standard support the most typical activities required for IC manufacturing. The Standard also provides for the definition of equipment-specific messages to support those activities not covered by the standard messages. While certain activities can be handled by common software in the host, it is expected that equipment-specific host software may be required to support the full capabilities of the equipment.

2 Scope

2.1 SECS-II gives form and meaning to messages exchanged between equipment and host using a message transfer protocol, such as SECS-I.

2.1.1 SECS-II defines the method of conveying information between equipment and host in the form of messages. These messages are organized into categories of activities, called streams, which contain specific messages, called functions. A request for information and the corresponding data transmission is an example of such an activity.

2.1.2 SECS-II defines the structure of messages into entities called items and lists of items. This structure allows for a self-describing data format to guarantee proper interpretation of the message.

2.1.3 The interchange of messages is governed by a set of rules for handling messages called the transaction protocol. The transaction protocol places some minimum requirements on any SECS-II implementation.

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3 Limitations

3.1 SECS-II applies to equipment and hosts used in the manufacturing of semiconductor devices. Examples of the activities supported by the Standard are: transfer of control programs, material movement information, measurement data, summarized test data, and alarms.

3.1.1 The minimum compliance to this Standard involves meeting the few constraints outlined in § 8. It is expected that a given piece of equipment will require only a subset of the functions described in this Standard. The number of functions and the selection of functions will depend upon the equipment capabilities and requirements. For each piece of equipment, the exact format for each function provided must be documented according to the form outlined in § 10.

3.1.2 It is assumed that the equipment will define the messages used in a particular implementation of SECS-II. It is assumed the host will support equipment implementation.

4 Referenced Standards and Documents

4.1 *SEMI Standards and Safety Guidelines*

SEMI E4 — Specification for SEMI Equipment Communications Standard 1 Message Transfer (SECS-I)

SEMI E148 — Specification for Time Synchronization and Definition of the TS-Clock Object

SEMI E170 — Specification for Secured Foundation of Recipe Management System (SFORMS)

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4.2 *ANSI® Standards* [1]

ANSI X3.4-1977 — Code for Information Interchange (ASCII)

4.3 *IEEE® Standards* [2]

IEEE 754 — Standard for Binary Floating Point Arithmetic

4.4 The Japan Electronic Industry Development Association (JEIDA) has requested that the SECS-II Standard incorporate support for the JIS-8 codes for data exchange. This code would allow support for katakana characters in Japanese implementations of SECS-II.

JIS-6226 — JIS 8-bit Coded Character Set for Information Interchange, Japanese Industrial Standards [3]

NOTICE: Unless otherwise indicated, all documents cited shall be the latest published versions.

5 Terminology

5.1 *Definitions*

5.1.1 The following brief definitions refer to sections providing further information.

5.1.2 *block* — a physical division of a message used by the message transfer protocol (refer to § 6.3).

5.1.3 *conversation* — a sequence of related messages (refer to § 8.4).

5.1.4 *conversation timeout* — an indication that a conversation has not completed properly (refer to § 8.4.1).

5.1.5 *device ID* — a number between 0 and 32767 used in identifying the particular piece of equipment communicating with a host (refer to § 6.4.1).

5.1.6 *equipment* — the intelligent system which communicates with a host.

5.1.7 *function* — a specific message for a specific activity within a stream (refer to § 7.2).

5.1.8 *host* — the intelligent system which communicates with the equipment.

5.1.9 *interpreter* — the system that interprets a primary message and generates a reply when requested (refer to § 6.2).

5.1.10 *item* — a data element within a message (refer to § 9.2).

5.1.11 *item format* — a code used to identify the data type of an item (refer to § 9.2).

5.1.12 *list* — a group of items (refer to § 9.3).

5.1.13 *message* — a complete unit of communication (refer to § 6.2).

5.1.14 *message header* — information about the message passed by the message transfer protocol (refer to § 6.4).

5.1.15 *multi-block message* — a message sent in more than one block by the message transfer protocol (refer to § 6.3.2).

5.1.16 *originator* — the creator of a primary message (refer to § 6.2).

5.1.17 *packet* — a physical division of a message used by the message transfer protocol (refer to § 6.3).

5.1.18 *primary message* — an odd numbered message. Also, the first message of a transaction (refer to §§ 6.2 and 7.2).

5.1.19 *reply* — the particular secondary message corresponding to a primary message (refer to §§ 6.2 and 7.2).

[1] American National Standards Institute, 25 West 43rd Street, New York, NY 10036, USA; Telephone: +1.212.642.4900, Fax: +1.212.398.0023, http://www.ansi.org. ANSI trademark is owned by the American National Standards Institute.

[2] Institute of Electrical and Electronics Engineers, 3 Park Avenue, 17th Floor, New York, NY 10016-5997, USA; Telephone: +1.212.419.7900, Fax: +1.212.752.4929, http://www.ieee.org. IEEE trademark is owned by the Institute of Electrical and Electronics Engineers.

[3] Japanese Standards Association, 4-1-24 Akasaka, Minato-ku, Tokyo 107-8440, Japan; Telephone: +81.3.3583.8005, Fax: +81.3.3586.2014, http://www.jsa.or.jp

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5.1.20 *secondary message* — an even-numbered message. Also the second message of a transaction (refer to §§ 6.2 and 7.2).

5.1.21 *single-block message* — a message sent in one block by the message transfer protocol (refer to § 6.3.1).

5.1.22 *stream* — a category of messages (refer to § 7.1).

5.1.23 *transaction* — a primary message and its associated secondary message, if any (refer to § 8.2).

5.1.24 *transaction timeout* — an indication from the message transfer protocol that a transaction has not completed properly (refer to § 6.5).

6 The Message Transfer Protocol

6.1 *Intent* — SECS-II is fully compatible with the message transfer protocol defined by SECS-I. It is the intent of this Standard to allow for compatibility with alternative message transfer protocols. The purpose of this section is to define the requirements of the interaction between an application using SECS-II and the message transfer protocol. The methods used to implement these requirements are not covered as a part of this Standard. The terms used in this Standard are those used by SECS-I. Equivalent terms may be different for other message transfer protocols.

6.2 *Messages* — The message transfer protocol is used to send messages between equipment and host. The message transfer protocol must be capable of sending a primary message, indicating whether a reply is requested; and, if a reply is requested, it must be capable of associating the corresponding secondary message or reply message with the original primary message. The term originator will refer to the creator of the original primary message. The term interpreter will refer to the entity that interprets the primary message at its destination and generates a reply when requested.

6.3 *Blocking Requirements* — The message transfer protocol must support the following SECS-II message blocking requirements.

6.3.1 *Single-Block Messages* — SECS-II requires that certain messages be sent in a single block or single packet by the message transfer protocol. Those messages defined in this Standard as single-block SECS-II messages must be sent in a single-block or packet. The method used by the application software to tell the message transfer protocol that a particular message must be sent as a single block is not covered as part of this Standard. For compatibility with SECS-I, the maximum length allowed for a single-block SECS-II message is 244 bytes. The minimum requirement for the message transfer protocol is to be able to send single-block SECS-II messages.

6.3.2 *Multi-Block Messages* — For compatibility with SECS-I, SECS-II messages that are longer than 244 bytes are referred to as multi-block messages. Also, certain SECS-II messages are allowed to be multi-block messages even if they otherwise meet the single-block length requirements. Certain older implementations may impose application-specific requirements on block sizes for certain incoming messages. Beginning with the 1988 revision of the Standard, new applications may not impose application-specific requirements on incoming block sizes. Applications implemented before 1988 may impose such requirements.

6.4 *Message Header* — The message transfer protocol must provide the following information, called the message header, with every message. Only the content of the message header is defined by this Standard. The exact format of the message header passed between the application and the message transfer protocol is not covered as part of this Standard.

NOTE 1: In SECS-I, this information is contained in the 10 byte header of each block of a message.

6.4.1 *Device ID* — The message transfer protocol must be capable of identifying the device ID (0 to 32767) which indicates the source or destination of a message.

6.4.2 *Stream and Function* — The message transfer protocol must be capable of identifying to SECS-II a minimum15 bit message identification code. In SECS-II, messages are identified by a stream code (0 to 127, 7 bits) and a function code (0 to 255, 8 bits). Each combination of stream and function represents a distinct message identification.

6.4.3 *Reply Requested* — The message transfer protocol must be capable of identifying whether a reply is requested to a primary message.

6.5 *Transaction Timeout* — It is presumed that the message transfer protocol will notify SECS-II in the event of failure to receive an expected reply message within a specified transaction timeout period.

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NOTE 2: In SECS-I, a transaction timeout occurs if either the reply timeout (T3) is exceeded before the first block of a reply message is received or if the interblock timeout (T4) is exceeded before an expected block of a multi-block message is received.

6.6 *Multiple Open Transactions* — This Standard allows, but does not require, the support of more than one concurrent open transaction.

7 Streams and Functions

7.1 *Streams* — A stream is a category of messages intended to support similar or related activities.

7.2 *Functions* — A function is a specific message for a specific activity within a stream. All the functions used in SECS-II will follow a numbering convention corresponding to primary and secondary message pairs. All primary messages will be given an odd-numbered function code. The reply message function code is determined by adding one to the primary message function code. The even-numbered function following a primary message which requests no reply is reserved and is not to be used. Function code 0 is reserved in all streams for aborting transactions as described in § 10.4.

7.3 *Stream and Function Allocation* — Some of the stream and function code combinations are reserved for this Standard, while others are available for user definition. The stream and function codes reserved for this Standard are as follows:

- In Stream 0, Functions 0 to 255.
- In Streams 1 to 63, Functions 0 to 64.
- In Streams 64 to 127, Function 0.

7.3.1 The stream and function codes available for user definition are as follows:

- In Streams 1 to 63, Functions 65 to 255.
- In Streams 64 to 127, Functions 1 to 255.

7.3.2 The stream and function code assignment can also be represented by the diagram shown in Figure 1.

7.3.3 The reserved codes assigned by this Standard are listed in § 10. It is recognized that there will be user needs beyond the specific definitions given in this Standard. In these situations, the streams and functions reserved for user definition should be used subject to the guidelines for minimum compliance outlined in § 8.

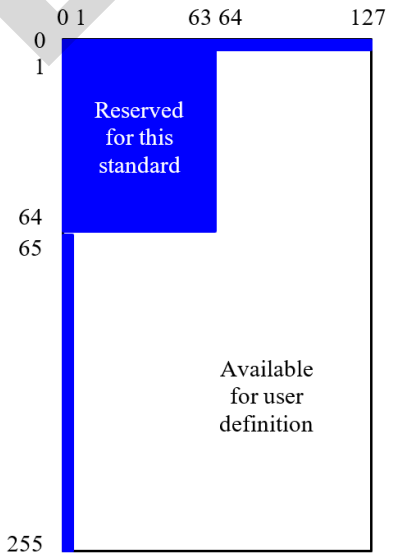

Figure 1
Stream and Function Allocation

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8 Transaction and Conversation Protocols

8.1 *Intent* — For an implementation to be in compliance with SECS-II, it must meet the minimum transaction requirements outlined in this section. The conversation protocols serve to further define the use and interaction between transactions.

8.2 *Transaction Definition* — A transaction forms the basis for all information exchanges in SECS-II. A transaction consists of either a primary message for which no reply is requested, or a primary message which requests a reply together with its corresponding secondary message. Secondary messages cannot request a reply.

8.3 *Transaction Level Requirements* — The following are the requirements to comply with the SECS-II protocol at the transaction level:

1. Respond to S1,F1 with S1,F2 as described in § 10.5.
2. For any received message that cannot be processed by the equipment, send the appropriate error message on Stream 9. As described in § 10.13, S9,F1, F3, F5, F7, or F11 are possible.
3. Format any other supported messages according to § 10.
4. Upon detection of a transaction timeout at the equipment, send S9,F9 to the host.
5. Upon receipt of function 0 as a reply to a primary message, terminate the related transaction. No error message should be sent to the host by the equipment.

8.4 *Conversation Protocols* — A conversation is a series of one or more related transactions used to complete a specific task. A conversation should include all transactions necessary to accomplish the task and leave both the originator and interpreter free of resource commitments at its conclusion.

8.4.1 *Conversation Timeout* — A conversation timeout is used to indicate that a conversation has not completed properly. A conversation timeout is application-dependent, and the methods used for detecting conversation timeouts are not covered as part of this Standard. A conversation timeout will terminate further action on the conversation, and will allow for the clearing of any committed resources. Upon detection of a conversation timeout at the equipment, S9,F13 should be sent to the host.

8.4.2 *Types of Conversations* — There are seven types of conversations which characterize all information exchanges in SECS-II:

1. A primary message with no reply is the simplest conversation. This message must be a single-block SECS-II message. The originator must assume that the interpreter responds to the message. This conversation is used where the originator can do nothing if the message is rejected.
2. If the interpreter has data that the originator wants, the data are requested with a primary message and the data returned to the originator as a reply message. It is assumed that the originator requesting the data is prepared to receive the amount of data returned. This is the request/data conversation.
3. If the originator wishes to send data in a single-block SECS-II message to the interpreter, then the originator sends the data and expects an acknowledgment from the interpreter. This is the send/acknowledge conversation.
4. If the originator has a multi-block SECS-II message to send for a particular exchange, then the originator must receive permission from the interpreter prior to sending the data. The first transaction requests permission to send, and the interpreter either grants or denies permission. If permission is granted, the originator sends the data and the interpreter replies appropriately. This is the Inquire/Grant/Send/Acknowledge conversation. Between the inquire and the send, the interpreter may commit some resources in preparation for the data. Consequently, a conversation timeout may be set by the interpreter at a time dependent upon the application, at which time the interpreter will free its resources and send an S9,F13 error message to the originator. Note that under the definition of S9,F13 in this Standard, only the equipment should generate an error message to the host under these conditions.
5. There is a conversation related to the transfer of unformatted data sets between equipment and host. This conversation is described in detail in Stream 13 (refer to § 10.17).
6. There is a conversation related to the handling of material between equipment. This conversation is described in detail in Stream 4 (refer to § 10.8).

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7. The originator may request information from the interpreter which requires some time to obtain (e.g., operator input is required). The first transaction requests the information and the interpreter responds in one of three ways: (1) the information is returned, (2) the interpreter indicates that the information cannot or will not be obtained, or (3) the interpreter indicates that the information will be obtained and returned in a subsequent transaction, as specified for this conversation. For case number 3, the interpreter will initiate the subsequent transaction when the information is available.

8.4.2.1 Case 3 is the request/acknowledge/send/acknowledge transaction.

8.4.2.2 The originator of the request/acknowledge/send/acknowledge conversation may commit some resources in anticipation of the send/acknowledge transaction. Consequently, a conversation timeout may be set by the originator at a time dependent on the application. On timeout, the originator will free its resources and restart the conversation with the 'request', or send an S9,F13 error message. Note that under the definition of S9,F13 in this Standard, only the equipment should generate an error message to the host under these conditions.

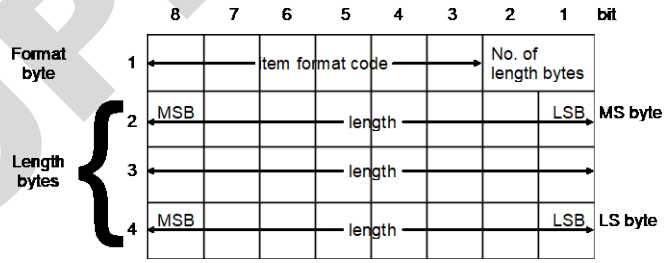
8.4.3 The key words, request, data, send, acknowledge, inquire, and grant are used in the function names as an aid to understanding the relationship between the messages and the conversation. Single message transactions do not use these words.

9 Data Structures

9.1 *Intent* — All information transmitted according to this Standard will be formatted using two data structures, items and lists. These data structures define the logical divisions of the message, as distinct from the physical divisions of the message transfer protocol. They are intended to provide a self-describing internal structure to messages passed between equipment and host.

9.2 *Item* — An item is an information packet which has a length and format defined by the first 2, 3, or 4 bytes of the item. These first bytes are called the item header (IH). The item header consists of the format byte and the length byte(s) as shown in Figure 2. Bits one and two of the item header tell how many of the following bytes refer to the length of the item. This feature allows for long items without requiring the byte overhead for shorter items. The item length refers to the number of bytes following the item header, called the item body (IB), which is the actual data of the item. The item length refers only to the item body not including the item header, so the actual number of bytes in the message for one item is the item length plus 2, 3, or 4 bytes for the item header. All bytes in the item body are in the format specified in the format byte.

9.2.1 A zero-length in the format byte is illegal and produces an error. A zero-length in the item length bytes has a special meaning as defined in the detailed message definitions.



No. of Length bytes
0 = Illegal, data format error
1 = One binary length byte (max = 255)
2 = Two binary length bytes (max = 65,535)
3 = Three binary length bytes (max =16,777,215).
Note that transport protocols such as E4 and E37 impose SECS message size limitations that may affect the maximum length of a SECS data item.

Length refers to the number of bytes except in a list format where it refers to the number of elements (items or lists) in the list.

Figure 2
Item and List Header

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9.2.2 Bits 3 to 8 of the format byte of the item header define the format of the data which follows. Of the 64 possible formats, 16 are defined as shown in Table 1. Format code 0 is called a list and is defined in § 9.3. Format code 22 (octal) is called a localized string and is defined in § 9.4. The remaining 14 item formats define unspecified binary, code 10 (octal); Boolean, code 11 (octal); ASCII character strings, code 20 (octal); JIS-8 character strings, code 21 (octal) signed integer, codes 30, 31, 32, 34 (octal); floating point, codes 40, 44 (octal); and unsigned integer, codes 50, 51, 52, 54 (octal). These formats are used for groups of data which have the same representation in order to save repeated item headers. In signed integers, negative values will be two's complement values. Floating point numbers will conform to the IEEE standard 754. Boolean values will be byte quantities, with zero being equivalent to false, and non-zero being equivalent to true.

9.3 *List* — A list is an ordered set of elements, where an element can be either an item (§ 9.2) or a list. The list header (LH) has the same form as an item header with format type 0. However, the length bytes refer to the number of elements in the list rather than to the number of bytes. The list structure allows grouping items of related information which may have different formats into a useful structure.

9.3.1 A zero-length in the format byte is illegal and produces an error. A zero-length in the list length bytes has a special meaning, which is defined in the detailed message definitions.

Table 1 Item Format Codes

Format Code (Bit 876543)		*Meaning*
Binary	*Octal*	*Data after the heading has the following form*
000000	00	LIST (length in elements)
001000	10	Binary
001001	11	Boolean
010000	20	ASCII[#1]
010001	21	JIS-8
010010	22	2 byte character[#2,#4]
011000	30	8 byte integer (signed)[#2]
011001	31	1 byte integer (signed)
011010	32	2 byte integer (signed)[#2]
011100	34	4 byte integer (signed)[#2]
100000	40	8 byte floating point[#3]
100100	44	4 byte floating point[#3]
101000	50	8 byte integer (unsigned)[#2]
101001	51	1 byte integer (unsigned)
101010	52	2 byte integer (unsigned)[#2]
101100	54	4 byte integer (unsigned)[#2]

#1 Nonprinting characters are equipment-specific.

#2 Most significant byte sent first.

#3 IEEE 754. The byte containing the sign bit is sent first.

#4 The code for Multi-byte character must be specified in the data in the first 2 bytes of the TEXT item.

#5 Changes in integer format codes may conflict with earlier implementations.

9.4 *Localized Character String Items* — A localized character string is an item which is used for representing a string of multi-byte characters. Because there are many different encoding schemes and the information could be in any one of a number of languages, these characteristics must also be included in the item. Thus for localized character strings which use item format code 22 (octal), there is an additional localized string header (LSH).

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9.4.1 This LSH follows the item header and precedes the string. The LSH is part of the item data, thus the length of the header (2 bytes) is included in the length in the item header. The length of the localized string itself is the number of bytes that it occupies, regardless of the number of characters that represents the string. The LSH followed by the string together comprise the localized string item. For example, a 2 byte localized string (which may represent a single character), because of the 2 byte length of the LSH, will have a 4 byte length in the item header.

9.4.2 The LSH is a 16 bit number which specifies the encoding method used for the string. Defined values for the encoding are as follows:

Table 2

Encoding Code (Decimal)	*Encoding Scheme*	*Notes*
0	none	reserved
1	ISO 10646 UCS-2	Unicode 2.0
2	UTF-8	Transformation of ISO 10646 UCS-2
3	ISO 646-1991	ASCII, 7-bit
4	ISO 8859-1	ISO Latin-1, Western Europe
5	ISO 8859-11 (proposed)	Thai
6	TIS 620	Thai (will be supported by ISO 8859-11)
7	IS 13194 (1991)	ISCII
8	Shift JIS	
9	Japanese EUC-JP	
10	Korean EUC-KR	
11	Simplified Chinese GB	
12	Simplified Chinese EUC-CN	
13	Traditional Chinese Big5	
14	Traditional Chinese EUC-TW	

9.4.3 Encoding codes from 15 to 32767 are reserved for future expansion. Encoding codes from 32768 to 65535 are available for custom purposes.

9.5 *Example Data Structures* — The data structures for different types of items are illustrated in the following examples:

a. An item contains one binary code 10101010.

```
bit
87654321

00100001      Item, binary, 1 length byte
00000001      1 byte long
10101010      data byte
```

b. An item contains three ASCII characters ABC.

```
01000001      Item ASCII, 1 length byte
00000011      Three bytes long
01000001      ASCII A
01000010      ASCII B
01000011      ASCII C
```

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c. An item contains three binary numbers in 2-byte signed integer form.

```
01101001      Item, 2-byte integers
00000110      6 bytes total (6/2 = 3 integers)
 xxxxxxxx     MSByte number x
 xxxxxxxx     LSByte number x
 yyyyyyyy     MSByte number y
 yyyyyyyy     LSByte number y
 zzzzzzzz     MSByte number z
 zzzzzzzz     LSByte number z
```

d. An item contains one 4-byte IEEE floating point number.

```
10010001      Item, 4-byte floating point
00000100      4 bytes (4/4 = 1 number)
ffffffff
ffffffff      Floating point number
ffffffff      in IEEE 754
ffffffff
```

e. A message is sent from device 66 telling the host that the temperature at point T1 has exceeded a preset process limit. The message ID is stream 5, function 1, and the data consists of a list of three items. The first item is a code for the alarm set and the alarm category code. The second item is the equipment-specific alarm number for this alarm (e.g., 17). The third item is a string of text giving a brief description of the alarm (e.g., 'T1 HIGH'). No reply is requested. The complete message including the header is as follows:

```
10000000      R = 1 (to the host)
01000010      Device Code = 66
00000101      Stream 5, W = 0
00000001      Function 1
10000000      E = 1
00000001      Block 1
00000000
00000000      System bytes = 0
00000000
00000000
00000001      List
00000011      3 Elements
00100001      Binary Item next byte length
00000001      1 byte long
10000100      Alarm set, category 4
01100101      Item, 1-byte integer, next byte length
00000001      1 byte long
00010001      Alarm 17
01000001      Item, ASCII, next byte length
00000111      7 characters
01010100      ASCII T
00110001      ASCII 1
00100000      ASCII space
01001000      ASCII H
01001001      ASCII I
01000111      ASCII G
01001000      ASCII H
```

9.5.1 Using SEMI E4 SECS-I transmission, the entire message contains 1 byte length (not shown), 10 bytes of header, 17 bytes of data, and 2 bytes checksum (not shown) for a total of 30 bytes. At 9600 baud transmission, the message would be sent in 31 milliseconds.

9.6 *Data Item Dictionary* — This section defines the data items used in the standard SECS-II messages described in § 10, Message Detail.

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- *Name* — A unique mnemonic name for this data item. This name is used in message definitions.
- *Format* — The allowable item format codes which can be used for this standard data item. Item format codes are shown in octal, as described in Table 1, Item Format Codes. The notation '3()' indicates any of the signed integer formats (30, 31, 32, 34). The notation '4()' indicates any of the floating point formats (40, 44). The notation '5()' indicates any of the unsigned integer formats (50, 51, 52, 54). The notation '0' indicates that a list with user-defined structure may be used. Where more than one format is shown, a given implementation can use any of the formats specified.
- *Description* — A description of the data item, with the meanings of specific values.
- *Where Used* — The standard messages in which this data item appears.

Table 3 Data Item Dictionary

Name	*Format*	*Description*	*Values*	*Where Used*
ABS	10	Any binary string.		S2F25, F26
ACCESSMODE	51	Load Port Access Mode. Possible values are:	0 = Manual 1 = Auto	S3F21, F27
ACDS	32, 52	After Command Codes.	Vector of all command codes which defined command must succeed within the same block.	S7F22
ACKA	11	Indicates success of a request:	TRUE is successful else FALSE	S5F14, F15, F18; S16F4, F6, F7, F12, F16, F18, F24, F26, F28, F30; S17F4, F8, F14
ACKC3	10	Acknowledge code, 1 byte.	0 = Accepted >0 = Error, not accepted 1-63 = Reserved	S3F6, F8, F10
ACKC5	10	Acknowledge code, 1 byte.	0 = Accepted >0 = Error, not accepted 1-63 = Reserved	S5F2, F4
ACKC6	10	Acknowledge code, 1 byte.	0 = Accepted >0 = Error, not accepted 1-63 = Reserved	S6F2, F4, F10, F12, F14, F26
ACKC7	10	Acknowledge code, 1 byte.	0 = Accepted 1 = Permission not granted 2 = Length error 3 = Matrix overflow 4 = PPID not found 5 = Mode unsupported 6 = Command will be performed with completion signaled later 7 = Storage limit error >7 = Other error 8-63 = Reserved	S7F4, F12, F14, F16, F18, F24, F32; S7F38, F40, F42, F44

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Name	Format	Description	Values	Where Used
ACKC7A	31, 51	Acknowledge Code, 1 byte.	0 = Accepted 1 = MDLN is inconsistent 2 = SOFTREV is inconsistent 3 = Invalid CCODE 4 = Invalid PPARM value 5 = Other error (described by ERRW7) 6-63 = Reserved	S7F27
ACKC10	10	Acknowledge Code, 1 byte.	0 = Accepted for display 1 = Message will not be displayed 2 = Terminal not available 3-63 = Reserved	S10F2, F4, F6, F10
ACKC13	10	Return code for secondary messages 1 byte.	0 = O.K. 1 = ERROR: Try Later 2 = ERROR: Unknown Data Set name 3 = ERROR: Illegal Checkpoint value 4 = ERROR: Too many open Data Sets 5 = ERROR: Data set open too many times 6 = ERROR: No open Data Set 7 = ERROR: Cannot continue 8 = ERROR: End of Data 9 = ERROR: Handle in Use >10 = ERROR: Pending Transaction 11-127 = Reserved	S13F2, F4, F6, F8
ACKC15	10	Return code for secondary messages, 1 byte.	0 = Accepted 1 = command will be performed with completion signaled later 2 = DSNAME not found 3 = Permission not granted 4 = other error 5-63 = Reserved	S15F50, F52
AGENT	20			S15F11, F12, F21, F22, F25

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Name	Format	Description	Values	Where Used
ALCD	10	Alarm code byte.	bit 8 = 1 means alarm set bit 8 = 0 means alarm cleared bit 7-1 is alarm category 0 = Not used 1 = Personal safety 2 = Equipment safety 3 = Parameter control warning 4 = Parameter control error 5 = Irrecoverable error 6 = Equipment status warning 7 = Attention flags 8 = Data integrity >8 = Other categories 9-63 = Reserved	S5F1, F6, F8
ALED	10	Alarm enable/disable code, 1 byte.	bit 8 = 1 means enable alarm bit 8 = 0 means disable alarm	S5F3
ALID	3(), 5()	Alarm identification.		S5F1, F3, F5, F6, F8
ALTX	20	Alarm text limited to 120 characters.		S5F1, F6, F8
ASSGNID	51	An identifier which indicates who assigned the Base Part of RecipeXID.	0 = RMSASN 1 = EQUASN	S20F12, F13, F15, F17, F18, F20, F21, F23, F27, F30, F32
ATTRDATA	0, 10, 20, 3(), 4(), 5(), 11	Contains a specific attribute value for a specific object.		S1F20; S3F17, F35; S13F13, F16; S14F1, F2, F3, F4, F9, F10, F11, F12, F13, F14, F15, F16, F17, F18, F19; S18F2, F3
ATTRID	20, 5()	Identifier for an attribute for a specific type of object.		S1F19; S3F17, F35; S13F13, F16; S14F1, F2, F3, F4, F8, F9, F10, F11, F12, F13, F14, F15, F16, F17, F18, F19; S18F1, F3

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Name	Format	Description	Values	Where Used
ATTRRELN	51	The relationship that a specified qualifying value has to the value of an attribute of an object instance (the value of interest):	0 = The qualifying value is equal to the value of interest, 1 = The qualifying value is not equal to the value of interest, 2 = The qualifying value is less than the value of interest, 3 = The qualifying value is less than or equal to the value of interest, 4 = The qualifying value is greater than the value of interest, 5 = The qualifying value is greater than or equal to the value of interest, 6 = The qualifying value is present (contained in the set of) the value of interest, 7 = The qualifying value is absent (not contained in the set of) the value of interest, >7 = Reserved.	S14F1
AUTOCLEAR	51	On/Off of automatic clear of recipes under control of the SRO when the SRO moves to Local state.	0 = ON 1 = OFF	S20F1
AUTOCLOSE	52	A function that equipment closes the session automatically when operator access doesn't occur exceeding the predefined maximum time.	0 = AutoClose function is not used 1 or more = Maximum Time	S20F1
AUTOPOST	51	On/Off of automatic posting of recipes under control of the SRO to RMS just before the SRO moves to Local state.	0 = ON 1 = OFF	S20F1
BCDS	32, 52	Before Command Codes.	Vector of all command codes which defined command must precede within the same block.	S7F22
BCEQU	20, 51	Bin code equivalents.	Array of all codes that are to be processed. Must be the same format as BINLT and NULBC. Zero length indicates all codes be sent.	S12F3, F4
BINLT	20, 51	The Bin List.	Is an array of bin values. Format must be the same as used in NULBC and BCEQU.	S12F7, F9, F11, F14, F16, F18

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Name	Format	Description	Values	Where Used
BLKDEF	31, 51	Block Definition.	Blocks define the range for before/after code checking (specified by BCDS, IBCDS, NBCDS, ACDS, IACDS, and NACDS). BLKDEF specifies whether the command being defined starts a block (+1), terminates a block (-1), or is within the body of a block (0). All other values are invalid. The outermost block of a process program is implicit, and is bounded by the first and last command of the process program. Before/after checks for a particular command are performed with all other commands in the same block and at the same nesting level. For the purpose of before/after checking, a set of commands making up a block is considered to be a single body command of its containing block. This command has the before/after restrictions of the start block command which begins the block.	S7F22
BPD	10	Boot program Data.		S8F2
BYTMAX	3(), 5()	Byte Maximum.	Maximum length of process program. A value of zero indicates no limit. Negative values are invalid.	S7F22
CAACK	51	Carrier Action Acknowledge Code, 1 byte.	0 = Acknowledge, command has been performed. 1 = Invalid command. 2 = Cannot perform now. 3 = Invalid data or argument. 4 = Acknowledge, request will be performed with completion signaled later by an event. 5 = Rejected. Invalid state. 6 = Command performed with errors. 7-63 = Reserved.	S3F18, F20, F22, F24, F26, F28, F30, F32, F34
CARRIERACTION	20	Specifies the action requested for a carrier.		S3F17

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Name	Format	Description	Values	Where Used
CARRIERID	20	The identifier of a carrier.		S3F17; S16F11, F15
CARRIERSPEC	20	The object specifier for a carrier. Conforms to OBJSPEC.		S3F29, F31
CATTRDATA	0, 10, 20, 3(), 4(), 5(), 11	The value of a carrier attribute.		S3F17
CATTRID	20	The name of a carrier attribute.		S3F17
CCEACK	51	Information concerning the result of the event.	0 = Done 1 = Error	S20F8
CCODE	20, 32, 34, 52, 54	Command Code.	Each command code corresponds to a unique process operation the machine is capable of performing.	S7F22, F23, F26, F31, F39, F43
CEED	11	Collection event or trace enable/disable code, 1 byte.	FALSE = Disable TRUE = Enable	S2F37; S17F5
CEID	20, 3(), 5()	Collected event ID.		S1F23, F24; S2F35, F37, F55, F56, F58; S6F3, F8, F9, F11, F13, F15, F16, F17, F18; S17F5, F9, F10, F11, F12
CENAME	20	Collection event name.		S1F24; S2F56
CEPACK	0, 51	Command Enhanced Parameter Acknowledge. If a specific value of CPNAME is defined to have a CEPVAL that is a LIST, then CEPACK shall have the same structure as the corresponding list format of CEPVAL as used in S2,F49. Otherwise CEPACK will be a 1 byte integer. Enumerated:	0 = No error 1 = Parameter name (CPNAME) does not exist 2 = Illegal value specified for CEPVAL 3 = Illegal format specified for CEPVAL 4 = Parameter name (CPNAME) not valid as used 5-63 = Reserved	S2F50
CEPVAL	0, 10, 11, 20, 21, 3(), 4(), 5()	Command Enhanced Parameter Value. A specific application of CEPVAL shall always be identified with a specific value of CPNAME. A CEPVAL has the following forms: a single (non-list) value (e.g., CPVAL), a list of single items of identical format and type, or a list of items of the form.		S2F49
CHKINFO		User defined.		S20F31

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Name	Format	Description	Values	Where Used
CKPNT	54	Checkpoint as defined by the sending system.		S13F3, F6
CMDA	31, 51	Command acknowledge code.	0 = Completed or done 1 = Command does not exist 2 = Cannot perform now >2 = Other equipment-specific error 3-63 = Reserved	S2F22, F28
CMDMAX	3(), 5()	Command Maximum.	Maximum number of commands to be allowed in a process program. A value of zero indicates no limit. Negative values are invalid.	S7F22
CNAME	20	Command Name = 16 characters.	Text string unique among other CNAMEs in PCD which describes the processing done by the equipment for the corresponding CCODE.	S7F22
COACK	51	Information concerning the result of the service	0 = Done 1 = Error	S20F10
COLCT	5()	Column count in die increments.		S12F1, F4
COLHDR	20	Text description of contents of TBLELT. 1–20 characters.		S13F13, F15, F16
COMMACK	10	Establish Communications Acknowledge Code, 1 byte.	0 = Accepted 1 = Denied, Try Again 2-63 Reserved	S1F14
COMPARISONOPERATOR	51	Choice of available operators that compare the supplied value to the current attribute value. Evaluated as 'Current value XX supplied value' where XX is one of the enumerated values (e.g., 'GT').	0 = EQ - Equals (numeric or string) 1 = NotEQ - Not Equal (numeric or string) 2 = LT - Less Than (numeric) 3 = LE - Less than or equal to (numeric) 4 = GT - Greater Than (numeric) 5 = GE - Greater than or equal to (numeric) 6 = Like - Contains the substring (string) 7 = NotLike - Does not contain the substring (string) 8-255 Reserved	S19F1
CONDITION	20	Provides condition information for a subsystem component. Used in the data item in the CONDITIONLIST.		Refer to CONDITION LIST

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Name	Format	Description	Values	Where Used
CONDITIONLIST	0	A list of CONDITION data sent in a fixed order. CONDITIONLIST has the following form:	L,s 1.<CONDITION1> . s.<CONDITIONs>	S18F16
COPYID	51	An identifier which indicates which type of copy the recipe is.	0 = MCOPY 1 = RCOPY 2 = NCOPY 3 = CCOPY	S20F12, F13, F15, F17, F18, F20, F21, F23, F27, F30, F32
CPACK	10	Command Parameter Acknowledge Code, 1 byte.	1 = Parameter Name (CPNAME) does not exist 2 = Illegal Value specified for CPVAL 3 = Illegal Format specified for CPVAL >3 = Other equipment-specific error 4-63 Reserved	S2F42
CPNAME	20, 3(), 5()	Command Parameter Name.		S2F41, F42, F49, F50; S4F21, F29; S16F5, F27
CPVAL	10, 11, 20, 21, 3(), 5()	Command Parameter Value.		S2F41, F49; S4F21, F29; S16F5, F27; S18F13
CSAACK	10	Equipment Acknowledgement code, 1 byte.	0 = Everything correct 1 = Busy 2 = Invalid SPID 3 = Invalid data >3 = Equipment-specific error 4-63 Reserved	S2F8
CTLJOBCMD	51	Control Job command codes are assigned as follows:	1 = CJStart 2 = CJPause 3 = CJResume 4 = CJCancel 5 = CJDeselect 6 = CJStop 7 = CJAbort 8 = CJHOQ	S16F27
CTLJOBID	20	Identifier for Control Job. Conforms to OBJID.		S16F27
DATA	20	A vector or string of unformatted data.		S3F30, F31; S18F6, F7
DATAACK	10	Acknowledge code for data.	0 = Acknowledge 1 = Unknown DATAID 2 = At least parameter is invalid 3-63 Reserved	S14F22

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Name	Format	Description	Values	Where Used
DATAID	20, 3(), 5()	Data ID.		S2F33, F35, F39, F45, F49; S3F15, F17; S4F19, F25; S6F3, F5, F7, F8, F9, F11, F13, F16, F18, F25, F27; S13F11, F13, F15; S14F19, F21, F23; S15F1, F13, F15, F21, F23, F25, F27, F29, F33, F35, F39, F41, F43, F45, F47, F49; S16F1, F3, F5, F11, F15; S17F1, F5, F9
DATALENGTH	3(), 5()	Total bytes to be sent.		S2F39; S3F15, F29, F31; S4F25; S6F5; S13F11; S14F23; S16F1; S18F5, F7; S19F19
DATASEG	20	Used to identify the data requested.		S3F29, F31; S18F5, F7
DATASRC	20	Object type for Data Source Objects.		S17F1
DATLC	51	Data location.	Location of invalid data, represented in bytes, measured from the start of the message in question, excluding all header bytes.	S12F19
DELRSPSTAT	51	Status response for the Delete PDE request.	0 = OK - Successfully deleted specified PDEs. 1 = PDEnotFound - PDE was not found on the service provider. 2 = PDElocked - The PDE is present, but cannot be deleted at this time. For example, the PDE might be executing or reserved for a job. The PDE was not deleted. 3-254 Reserved 255 = Other - A problem occurred that is not described by the other enumerated values. The PDE was not deleted.	S19F4

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Name	Format	Description	Values	Where Used
DIRRSPSTAT	51	Status response for the GET PDE Directory request.	0 = OK - Successfully returned requested data. 1 = BadFilter - One or more of the PDE filter specified were not properly specified. 2 = BadAttribute - One or more of the PDE attributes requested to be returned do not exist. 3 = DateTimeCompareFailed - The filtering of a time formatted field failed because the comparison was indeterminate for one or more PDE's. 4-254 Reserved 255 = Other - A problem occurred that is not described by the other enumerated values.	S19F2
DRACK	10	Define Report Acknowledge Code, 1 byte.	0 = Accept 1 = Denied. Insufficient space. 2 = Denied. Invalid format. 3 = Denied. At least one RPTID already defined. 4 = Denied. At least VID does not exist. >4 = Other errors 5-63 Reserved	S2F34
DRRACK	51	Information concerning the result of the service.	0 = Done 1 = Error	S20F14
DSID	20, 3(), 5()	Data set ID.		S6F3, F8, F9
DSNAME	20	The name of the Data Set.	The minimum length is zero. The maximum is 200 characters.	S13F1, F2, F3, F4; S7F37, F39, F41, F43; S15F49, F51

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Name	Format	Description	Values	Where Used
DSPER	20	Data sample period. DSPER has two allowable formats:	Format 1: hhmmss, 6 bytes Format 2: hhmmsscc, 8 bytes Where "hh" is hours, "mm" is minutes, "ss" is seconds, and "cc" is centiseconds. Equipment shall either (1) support only Format 1, or (2) support both Format 1 and Format 2. Equipment shall document which formats it accepts. Equipment which supports Format 2 need not necessarily support a minimum DSPER of 1 centisecond, nor a trace resolution of 1 centisecond, but equipment suppliers shall document its trace performance limits.	S2F23, F64
DUTMS	20	Die Units of Measure.	Use units description per SEMI E5, § 12.	S12F1, F4
DVID (or DVNAME)	3(), 20, 5()	Data Variable identifier. Recommend using DVID.		S1F21, F22, F24; S6F3, F8
DVVAL	0, 10, 11, 20, 21, 3(), 4(), 5()	Data Variable value.		S6F3, F8, F9
DVVALNAME	20	A descriptive name for the data variable.		S1F22
EAC	10	Equipment acknowledge code, 1 byte.	0 = Acknowledge 1 = Denied. At least one constant does not exist 2 = Denied. Busy 3 = Denied. At least one constant out of range >3 = Other equipment-specific error 4-63 Reserved	S2F16
ECDEF	10, 11, 20, 21, 3(), 4(), 5()	Equipment constant default value.		S2F30
ECID	3(), 20, 5()	Equipment Constant ID.		S2F13, F15, F29, F30

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Name	Format	Description	Values	Where Used
ECMAX	10, 11, 20, 21, 3(), 4(), 5()	Equipment constant maximum value.		S2F30
ECMIN	10, 11, 20, 21, 3(), 4(), 5()	Equipment constant minimum value.		S2F30
ECNAME	20	Equipment constant name.		S2F30
ECV	10, 11, 20, 21, 3(), 4(), 5()	Equipment Constant Value.		S2F14, F15
EDID	10, 20, 3(), 5()	Expected data Identification.	Typical responses: MEXP = "S02F03" : EDID = <SPID> MEXP = "S03F13" : EDID = <PTN> MEXP = "S07F03" : EDID = <PPID>	S9F13
EMID	10, 20	Equivalent material ID (16 bytes maximum).		S3F9
EPD	10	Executive program data.		S8F4
EQID	20	An additional recipe identifier that indicates equipment which the recipe is prepared or tuned for.	Maximum 256 characters.	S20F12, F13, F15, F17, F18, F20, F21, F23, F27, F30, F32
EQNAME	20	A unique ASCII equipment identifier assigned by the factory to the equipment. Limited to a maximum of 80 characters.		S4F27
EQUSERID	20	Authentication of recipe operation user in equipment	Maximum 64 characters	S20,F5
ERACK	10	Enable/Disable Event Report. Acknowledge Code, 1 byte.	0 = Accepted 1 = Denied. At least one CEID does not exist >1 = Other Errors 2-63 Reserved	S2F38

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Name	Format	Description	Values	Where Used
ERRCODE	5()	Code identifying an error.	0 = No error 1 = Unknown object in Object Specifier 2 = Unknown target object type 3 = Unknown object instance 4 = Unknown attribute name 5 = Read-only attribute - access denied 6 = Unknown object type 7 = Invalid attribute value 8 = Syntax error 9 = Verification error 10 = Validation error 11 = Object identifier in use 12 = Parameters improperly specified 13 = Insufficient parameters specified 14 = Unsupported option requested 15 = Busy 16 = Not available for processing 17 = Command not valid for current state 18 = No material altered 19 = Material partially processed 20 = All material processed 21 = Recipe specification related error 22 = Failed during processing 23 = Failed while not processing 24 = Failed due to lack of material 25 = Job aborted 26 = Job stopped 27 = Job cancelled 28 = Cannot change selected recipe 29 = Unknown event 30 = Duplicate report ID 31 = Unknown data report 32 = Data report not linked 33 = Unknown trace report	S1F20; S3F18, F20, F22, F24, F26, F28, F30, F32, F34, F36; S4F20, F22, F23, F31, F33; S5F14, F15, F18; S6F25, F30; S13F14, F16; S14F2, F4, F6, F8, F10, F12, F14, F16, F18, F20, F21, F26, F28; S15F4, F6, F8, F10, F12, F14, F16, F18, F20, F22, F24, F26, F28, F30, F32, F34, F36, F38, F40, F42, F44, F48, F53; S16F4, F6, F7, F12, F16, F18, F24, F26, F28; S17F2, F4, F6, F8, F10, F12, F14

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Name	Format	Description	Values	Where Used
ERRCODE (cont.)	5()	Code identifying an error.	34 = Duplicate trace ID 35 = Too many data reports 36 = Sample period out of range 37 = Group size to large 38 = Recovery action currently invalid 39 = Busy with another recovery currently unable to perform the recovery 40 = No active recovery action 41 = Exception recovery failed 42 = Exception recovery aborted 43 = Invalid table element 44 = Unknown table element 45 = Cannot delete predefined 46 = Invalid token 47 = Invalid parameter 48 = Load port does not exist 49 = Load port already in use 50 = Missing Carrier 51-63 = Reserved (data formats 51, 52, 54, or 50 must be used) 64-32767 = User defined (data formats 52, 54, or 50 must be used) formats 52, 54, or 50 must be used) 32768 = Action will be performed at earliest opportunity 32769 = Action cannot be performed now 32770 = Action failed due to errors 32771 = Invalid command 32772 = Client Alr 32773 = Duplicate ClientID 32774 = Invalid ClientType 32775 = IncompatibleVersions	S1F20; S3F18, F20, F22, F24, F26, F28, F30, F32, F34, F36; S4F20, F22, F23, F31, F33; S5F14, F15, F18; S6F25, F30; S13F14, F16; S14F2, F4, F6, F8, F10, F12, F14, F16, F18, F20, F21, F26, F28; S15F4, F6, F8, F10, F12, F14, F16, F18, F20, F22, F24, F26, F28, F30, F32, F34, F36, F38, F40, F42, F44, F48, F53; S16F4, F6, F7, F12, F16, F18, F24, F26, F28; S17F2, F4, F6, F8, F10, F12, F14

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Name	Format	Description	Values	Where Used
ERRCODE (cont.)	5()	Code identifying an error.	32776 = Unrecognized ClientID (Client not currently connected) 32777 = Failed (Completed Unsuccess-fully) 32778 = Failed (Unsafe) – External intervention required 32779 = Sensor-Detected Obstacle 32780 = Material Not Sent 32781 = Material Not Received 32782 = Material Lost 32783 = Hardware Failure 32784 = Transfer Cancelled 32785-32792 reserved for future use by SEMI E127 service requests. 32793-65335 Reserved (data formats 52, 54, or 50 must be used) 65536 or above = User defined (data formats 54 or 50 must be used)	S1F20; S3F18, F20, F22, F24, F26, F28, F30, F32, F34, F36; S4F20, F22, F23, F31, F33; S5F14, F15, F18; S6F25, F30; S13F14, F16; S14F2, F4, F6, F8, F10, F12, F14, F16, F18, F20, F21, F26, F28; S15F4, F6, F8, F10, F12, F14, F16, F18, F20, F22, F24, F26, F28, F30, F32, F34, F36, F38, F40, F42, F44, F48, F53; S16F4, F6, F7, F12, F16, F18, F24, F26, F28; S17F2, F4, F6, F8, F10, F12, F14
ERRTEXT	20	Text string describing the error noted in the corresponding ERRCODE. Limited to 120 characters maximum.		S1F20; S3F18, F20, F22, F24, F26, F28, F30, F32, F34, F36; S4F20, F22, F23, F31, F33; S5F14, F15, F18; S6F25; S13F14, F16; S14F2, F4, F6, F8, F10, F12, F14, F16, F18, F20, F21, F26, F28; S15F4, F6, F8, F10, F12, F14, F16, F18, F20, F22, F24, F26, F28, F30, F32, F34, F36, F38, F40, F42, F44, F48, F53; S16F4, F6, F7, F12, F16, F18, F24, F26, F28; S17F4, F8, F14

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Name	Format	Description	Values	Where Used
ERRW7	20	Text string describing error found in process program.		S7F27
EVNTSRC	20	Object type for Event Source Objects.		S17F5, F9, F10, F11, F12
EXID	20	Unique identifier for the exception. Maximum length of 20 characters.		S5F9, F11, F13, F14, F15, F17, F18
EXMESSAGE	20	Text which describes the nature of the exception.		S5F9, F11
EXRECVRA	20	Text which specifies a recovery action for an exception. Maximum length of 40 bytes.		S5F9, F13
EXTYPE	20	Text which identifies the type of an exception. It is usually a single word of text.	"ALARM" "ERROR"	S5F9, F11
FCNID	51	Function Identification.		S2F43, F44, F60
FFROT	52	Film Frame Rotation.	In degrees from the bottom CW. (Bottom equals zero degrees.) Zero length indicates not used.	S12F1, F3
FILDAT	10, 20	Data from the Data Set.	The maximum length is the RECLEN from Open Data Set Data.	S13F6
FNLOC	52	Flat/Notch Location.	In degrees from the bottom CW. (Bottom equals zero degrees.) Zero length indicates not used.	S12F1, F3, F4
FRMLEN	3(), 5()	Formatted Process Program Length.	If greater than zero, indicates PPID is available as a formatted process program and its length in bytes. If zero, the PPID is not available as a formatted program. Negative values are invalid.	S7F34

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Name	Format	Description	Values	Where Used
GETRSPSTAT	51	Status response for the Get PDE and Get PDEheader requests.	0 = OK - PDE will be transferred. 1 = PDENotFound - The PDE is not available. 2 = PDELocked - The PDE exists, but cannot be transferred now. 3 = TransferNotAllowed – The *PDE* exists, but transfer is prohibited for this *PDE* or type of *PDE*. 4-254 Reserved 255 = Other - A problem occurred that is not described by the other enumerated values.	S19F6, F8
GOILACK	51	Information concerning the result of the service	0 = Done 1 = Error	S20F4
GRANT	10	Grant code, 1 byte.	0 = Permission Granted 1 = Busy, Try Again 2 = No Space Available 3 = Duplicate DATAID >3 = Equipment Specific Error Code 4-63 Reserved	S2F2, F40; S3F16; S4F26; S13F12; S14F24; S16F2; S19F20
GRANT6	10	Permission to send, 1 byte.	0 = Permission granted 1 = Busy, try again 2 = Not interested >2 = Other errors 3-63 Reserved	S6F6
GRNT1	10	Grant code, 1 byte.	0 = Positive response, transfer ok 1 = Busy, try again 2 = No space 3 = Map too large 4 = Duplicate ID 5 = Material ID not found 6 = Unknown map format >6 = Error 7-63 Reserved	S12F6
GRXLACK	51	Information concerning the result of the service.	0 = Done 1 = Error	S20F12
HANDLE	3(), 5()	Logical unit or channel.		S13F3, F4, F5, F6, F7, F8

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Name	Format	Description	Values	Where Used
HCACK	10	Host Command Parameter Acknowledge Code, 1 byte.	0 = Acknowledge, command has been performed 1 = Command does not exist 2 = Cannot perform now 3 = At least one parameter is invalid 4 = Acknowledge, command will be performed with completion signaled later by an event 5 = Rejected, Already in Desired Condition 6 = No such object exists 7-63 Reserved	S2F42, F50
HOACK	11	Conveys whether the corresponding handoff activity succeeded (= True) or failed (= False).		S4F31, F33
HOCANCELACK	51	Tells whether the cancel ready message was accepted or rejected.	0 = Cancel Ready Accepted 1 = Atomic Transfer Unknown 2 = Cancel Ready Rejected - Handoff Begun	S4F37
HOCMDNAME	20	Identifier for the handoff command to be executed.		S4F29
HOHALTACK	51	Tells whether the halt command was accepted or rejected.	0 = Halt Accepted 1 = Atomic Transfer Unknown 2-63 Reserved	S4F41
IACDS	32, 52	Immediately After Command Codes.	Vector of all command codes which defined command must immediately succeed within the same block.	S7F22
IBCDS	32, 52	Immediately Before Command Codes.	Vector of all command codes which defined command must immediately precede within the same block.	S7F22
IDTYP	10	Id type.	0 = Wafer ID 1 = Wafer Cassette ID 2 = Film Frame ID >2 = Error 3-63 Reserved	S12F1, F3, F4, F5, F7, F9, F11, F13, F14, F15, F16, F17, F18
INPTN	10, 51	A specialized version of PTN indicating the InputPort.		S3F35

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Name	Format	Description	Values	Where Used
ITEMACK	10	Acknowledge Code for item requests.	0 = OK 1 = Error. Invalid ITEMTYPE 2 = Error. Invalid ITEMID 3 = Error. One or more invalid ITEMPART 4 = Error. Item is too large. 5 = Error. Busy. Try again later. 6 = Error. Already have item. 7 = Error. Permission denied 8 = Error. Does not exist 9 = Error. Invalid Item content. 10=Error. Invalid ITEMVERSION 11 = Error, Insufficient space 12 = Error, Too many items 13 = Error 32 = Retry 64-255 User Defined	S21F2, F4, F6, F8, F10, F12, F14, F16, F18
ITEMERROR	20	Error description, limited to 1024 characters.	Empty when there is no error.	S21F2, F4, F6, F8, F10, F12, F14, F16, F18
ITEMID	20	The ID of the transferred item. For example, the name of a process program when the ITEMTYPE is "SEMI:UNFORMATTEDPROCESSPROGRAM".		S21F1, F3, F5, F6, F8, F11, F12, F13, F15, F16, F17
ITEMINDEX	54	Ordered index of an item part. The index shall be 1-based.	A value of 0 indicates completion of a sequence. A value of 4,294,967,295 aborts a sequence.	S21F17
ITEMLENGTH	50, 54	An item's total number of bytes. This is the sum of each ITEMPART length within the list. This is not the size of the SECS message.		S21F1, F3, F6 F8, F13, F16, F17
ITEMPART	20, 10	Part of an item, such as a recipe. The list of ITEMPART data items constitute the complete item.		S21F3, F6, F17
ITEMPARTCOUNT	54	Total number of item parts when an item has been split for transfer.		S21F13, F16, F17

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Name	Format	Description	Values	Where Used
ITEMPARTLENGTH	54	The length of a specific item part.		S21F17
ITEMTYPE	20	The type of item to be transferred. Values are case sensitive.	When referencing unformatted process programs, the value shall be "SEMI:UNFORMATTEDPROCESSPROGRAM" Additional values can be defined by the implementer and by other SEMI Standards. The "SEMI:" prefix is reserved for SEMI Standards.	S21F1, F3, F5, F6, F7, F8, F10, F11, F12, F13, F15, F16, F17
ITEMTYPESUPPORT	54	Identify which stream 21 primary message(s) are accepted for a particular item type.	Bitwise values: 1 – S21,F1 Item Load Inquire 2 – S21,F3 Item Send 3 – S21,F5 Item Request 4 – S21,F7 Item Type List Request 5 – S21,F9 Supported Item Type List Request 6 – S21,F11 Item Delete 7 – S21,F13 Request Permission to Send Item Using S21,F17 8 – S21,F15 Item Request Using S21,F17 9 – S21,F17 Send Item Part A 1 for the bit means that the message is supported for that ITEMTYPE.	S21F20
ITEMVERSION	20	The version of an item.	By default, the value shall indicate when the item was last modified using a 16 byte timestamp with the format: YYYYMMDDhhmmsscc If the version is unknown, then the value shall be an empty string.	S21F1, F3, F6, F8, F13, F16, F17
JOBACTION	20	Specifies the action for a ReticleTransferJob.		S3F35
LENGTH	3(), 5()	Length of the service program or process program in bytes.		S2F1; S7F1, F29

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Name	Format	Description	Values	Where Used
LIMITACK	10	Acknowledgment code for variable limit attribute set, 1 byte.	1 = LIMITID does not exist 2 = UPPERDB > LIMITMAX 3 = LOWERDB < LIMITMIN 4 = UPPERDB < LOWERDB 5 = Illegal format specified for UPPERDB or LOWERDB 6 = ASCII value cannot be translated to numeric 7 = Duplicate limit definition for this variable >7 = Other equipment-specific error 8-63 Reserved	S2F46
LIMITID	10	The identifier of a specific limit in the set of limits (as defined by UPPERDB and LOWERDB) for a variable to which the corresponding limit attributes refer, 1 byte.		S2F45, F46, F48
LIMITMAX	11, 20, 3(), 4(), 5()	The maximum allowed value for the limit values of a specific variable. The equipment manufacturer should specify this value, which would typically coincide with the maximum value of the variable being monitored. The format must match that of the referenced variable.		S2F48
LIMITMIN	11, 20, 3(), 4(), 5()	The minimum allowed value for the limit values of a specific variable. The equipment manufacturer should specify this value, which would typically coincide with the minimum value of the variable being monitored. The format must match that of the referenced variable.		S2F48
LINKID	54	Used to link a completion message with a request that an operation be performed. LINKID is set to the value of RMOPID in the initial request except for the last completion message to be sent, where it is set to zero.		S6F25; S14F20, F21; S15F22, F30
LLIM	3(), 4(), 5()	Lower limit for numeric value.		S7F22
LOC	10	Machine material location code, 1 byte.		S2F27; S3F2

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Name	Format	Description	Values	Where Used
LOCID	20	The logical identifier of a material location.		S3F29, F31
LOWERDB	11, 20, 3(), 4(), 5()	A variable limit attribute which defines the lower boundary of the deadband of a limit. The value applies to a single limit (LIMITID) for a specified VID. Thus, UPPERDB and LOWERDB as a pair define a limit.		S2F45, F48
LRACK	10	Link Report Acknowledge Code, 1 byte.	0 = Accepted 1 = Denied. Insufficient space 2 = Denied. Invalid format 3 = Denied. At least one CEID link already defined 4 = Denied. At least one CEID does not exist 5 = Denied. At least one RPTID does not exist >5 = Other errors 6-63 Reserved	S2F36
LVACK	10	Variable limit definition acknowledge code, 1 byte. Defines the error with the limit attributes for the referenceVID.	1 = Variable does not exist 2 = Variable has no limits capability 3 = Variable repeated in message 4 = Limit value error as described in LIMITACK 5-63 Reserved	S2F46
MAPER	10	Map Error.	0 = ID not found 1 = Invalid Data 2 = Format Error >2 = Invalid error 3-63 Reserved	S12F19
MAPFT	10	Map data format type.	0 = Row format 1 = Array format 2 = Coordinate format >2 = Error 3-63 Reserved	S12F3, F5
MAXNUMBER	52	Provides MaxNumber information for each subspace. Used in the data item MAXNUMBERLIST.		Refer to MAXNUMBER LIST

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Name	Format	Description	Values	Where Used
MAXNUMBERLIST	0	Maximum number of PEM Recipes allowed to be preserved in PRC after PJ creation. MaxNumber has a list structure so that it can be applied to each subspace. The usage of the list structure is equipment defined.	L,n 1.<MAXNUMBER$_1$> n.<MAXNUMBER$_n$> 'n' is recipes allowed	S20F25 Refer to SEMI E170 PRCOBJ Service Message Parameter Definition for detail.
MAXTIME	52	Maximum time during which a PEM Recipe allowed to be in PRC after use.	0 = Maximum Time function is not used 1 or more = Maximum Time	S20F25
MCINDEX	5()	Identifier used to link a handoff command message with its eventual completion message. Corresponding messages carry the same value for this data item.		S4F29, F31
MDACK	10	Map data acknowledge.	0 = Map received 1 = Format error 2 = No ID match 3 = Abort/discard map >3 = Error 4-63 Reserved	S12F8, F10, F12
MDLN	20	Equipment Model Type, 20 bytes max.	Same data as returned by S1,F2	S1F2, F13, F14; S7F22, F23, F26, F31, F39, F43
MEXP	20	Message expected in the form SxxFyy where x is stream and y is function.		S9F13

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Name	Format	Description	Values	Where Used
MF	10, 20	Material format code 1 byte by Format 10.	Items with format 10 will be encoded as follows: 1 = Quantities in wafers 2 = Quantities in cassette 3 = Quantities in die or chips 4 = Quantities in boats 5 = Quantities in ingots 6 = Quantities in leadframes 7 = Quantities in lots 8 = Quantities in magazines 9 = Quantities in packages 10 = Quantities in plates 11 = Quantities in tubes 12 = Quantities in waterframes 13 = Quantities in carriers 14 = Quantities in substrates 15-63 Reserved Items with format 20 will be a unit identifier for one of the special SECS generic units, as specified in § 12.	S3F2, F4, F5, F7; S16F3, F11, F15
MHEAD	10	SECS message block header associated with message block in error.		S9F1, F3, F5, F7, F11
MID	10, 20	Material ID.	80 Characters maximum	S2F27; S3F2, F4, F7, F9, F12, F13; S4F1, F3, F5, F7, F9, F11, F13, F15, F17; S7F7, F8, F10, F11, F13, F35, F36; S12F1, F3, F4, F5, F7, F9, F11, F13, F14, F15, F16, F17, F18; S16F3, F11, F15; S18F10, F11, F16

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Name	Format	Description	Values	Where Used
MIDAC	10	Material ID Acknowledge Code, 1 byte.	0 = Accepted 1 = Invalid port number 2 = Material is not present at identified port >2 = Error 3-63 Reserved	S3F14
MIDRA	10	Material ID Acknowledge Code, 1 byte.	0 = Acknowledge, MID follows 1 = Acknowledge, will not send MID 2 = Acknowledge, will send MID later in S3F13 3-63 Reserved	S3F12
MLCL	5()	Message length.	Defined by message size in (bytes)	S12F4, F5
MMODE	10	Matrix mode select, 1 byte.	1 = Host source mode Use S7F7 and F8 to define the process program to be used. 2 = Local source mode Use the matrix defined by S7F9, F10, F11 and F13 to define the process program to be used. The equipment will initialize to local source mode at power up. The equipment will default to local source mode from host source mode in the event of loss of communication with the host. 3 = Host immediate mode Use the current process program for all material unless changed by S7F1-F4. The timing of the mode change is equipment-specific.	S7F15
NACDS	32, 52	Not After Command Codes.	Vector of all command codes which defined command may not succeed within the same block.	S7F22
NBCDS	32, 52	Not Before Command Codes.	Vector of all command codes which defined command may not precede within the same block.	S7F22

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Name	Format	Description	Values	Where Used
NULBC	20, 51	Null bin code value.	This value is the bin code value that is used for no die at a location. (For X/Y coordinate format the ASCII value is a value with 'n' length. For other map formats, ASCII is a single byte per bin with 'n' length per item; thus, the total number of bins is the length, i.e., length 'n' = 10 for ASCII format is 10 single byte bin codes.) The format used must be the same as the one used for BINLT and BCEQU. Zero length indicates not used.	S12F1, F3, F4
OBJACK	51	Acknowledge code:	0 = Successful completion of requested data 1 = Error >1 Reserved	S14F2, F4, F6, F8, F10, F12, F14, F16, F18, F26, F28
OBJCMD	51	Specifies an action to be performed by an object:	0 = Reserved 1 = Attach to requestor 2 = Detach from requestor (requires authorization token) 3 = Reattach to requestor 4 = Set attributes (requires authorization token) >4 Reserved	S14F15, F17
OBJID	20, 5()	Identifier for an object.		S1F19; S14F1, F2, F3, F4; S20F1, F3, F5, F7, F9, F11, F13, F15, F17, F19, F21, F23, F25, F27, F29, F31, F33

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Name	Format	Description	Values	Where Used
OBJSPEC	20	A text string that has an internal format and that is used to point to a specific object instance. The string is formed out of a sequence of formatted substrings, each specifying an object's type and identifier. The substring format has the following four fields: object type, colon character ':', object identifier, greater-than symbol '>' where the colon character ':' is used to terminate an object type and the greater than symbol '>' is used to terminate an identifier field. The object type field may be omitted where it may be otherwise determined. The final '>' is optional.		S2F49; S13F11, F13, F15; S14F1, F3, F5, F7, F9, F10, F11, F13, F15, F17, F19, F25, F27; S15F7, F23, F43, F47
OBJTOKEN	54	Token used for authorization.		S14F14, F15; S15F37, F39, F41
OBJTYPE	20, 5()	Identifier for a group or class of objects. All objects of the same type must have the same set of attributes available.		S1F19; S14F1, F3, F6, F7, F8, F9, F25, F26, F27; S20F1, F3, F5, F7, F9, F11, F13, F15, F17, F19, F21, F23, F25, F27, F29, F31, F33
OCEACK	51	Information concerning the result of the event	0 = Done 1 = OK 2 = NG 3 = Error	S20F6
OFLACK	10	Acknowledge code for OFF-LINE request.	0 = OFF-LINE Acknowledge 1-63 Reserved	S1F16
ONLACK	10	Acknowledge code for ON-LINE request.	0 = ON-LINE Accepted 1 = ON-LINE Not Allowed 2 = Equipment Already ON-LINE 3-63 Reserved	S1F18
OPEID	20	An identifier that is used to indicate which Operation the recipe belongs to.	Maximum 16 characters.	S20F4, F5, F6, F7, F8, F9, F11, F12, F13, F15, F17, F18, F19, F20, F21, F23, F27, F29, F30, F31, F32, F33

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Name	*Format*	*Description*	*Values*	*Where Used*
OPETYPE	51	Operation Type	0=COP 1=EOP 2=FOP 3=ROP 4=POP 5-63 Reserved	S20,F3, F5, F7, F9, F11, F13, F15, F17, F19, F21, F23, F27, F29, F31, F33
OPID	5()	Operation ID. A unique integer generated by the requestor of an operation, used where multiple completion confirmations may occur.		S6F25; S14F19, F21; S15F21, F29, F30, F37, F41, F44, F46
ORLOC	10	Origin Location.	implicit value of (0,0) 0 = Center die of wafer (Determined by: row or column count +1 2 truncated) 1 = Upper right 2 = Upper left 3 = Lower left 4 = Lower right >4 = Error 5-63 Reserved Zero length indicates not available	S12F1, F3, F4
OUTPTN	10, 51	A specialized version of PTN indicating the OutPutPort.		S3F35
PARAMNAME	20	The name of a parameter in a request.		S3F23, F25
PARAMVAL	0, 10, 11, 20, 3(), 4(), 5()	The value of the parameter named in PARAMNAME. Values that are lists are restricted to lists of single items of the same format type.		S3F23, F25

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Name	Format	Description	Values	Where Used
PDEATTRIBUTE	51	Selection from available PDE attributes whose values could be reported.	0 RESERVED 1 = name 2 = gid 3 = groupName 4 = description 5 = type 6 = executable 7 = maxAntecedents 8 = createDate 9 = createNode 10 = author 11 = userInfo 12 = supplierInfo 13 = checksum 14-255 Reserved	S19F1, F2
PDEATTRIBUTENAME	51	Selection from available PDE attributes that can be used to filter the PDE directory report.	0 = uid 1 = name 2 = gid 3 = groupName 4 = description 5 = type 6 = executable 7 RESERVED 8 = createDate 9 = createNode 10 = author 11 = userInfo 12 = supplierInfo 13-255 Reserved	S19F1
PDEATTRIBUTEVALUE	00, 11, 20, 21, 51	Contains the value of the corresponding PDEATTRIBUTE in the appropriate format.	Formats: 00 used for list of strings (20 or 21) for userInfo and supplierInfo 11 used for executable 20 used for uid and gid and also for createDate and for checksum (hex string) 20 or 21 used for name, groupName, description, type, createNode, author 51 used for maxAntecedents	S19F1, F2
PDEREF	20	Contains the unique identifier of a PDE (uid) or of a PDE group (gid).	36 character string in groupings of 8, 4, 4, 4, and 12 separated by hyphens 'xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx'	S19F15, F16, F17

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Name	Format	Description	Values	Where Used
PDFLT	11, 20, 3(), 4(), 5()	Parameter Default Value.	Specifies default value and data type of parameter. If no defaults are provided, item data length will be zero. For numeric or Boolean data, the default item may be a multi-varied vector if the parameter itself can be a vector. If RQPAR is false: Position of data in a default item is significant. When obtaining a default value to be used in the Nth position of a vector parameter, the value is obtained from the Nth position of the default item. If the default item has L entries, no default value will be provided for the L+1,...,PMAX parameter entries. If RQPAR is true: The length of the default vector (L) specifies the minimum number of entries which must be entered for the parameter. If > PMAX, only PMAX entries are required.	S7F22
PECEACK	51	Information concerning the result of the event.	0 = Done 1 = Error	S20F32
PECRSLT	51	Check result from RMS.	0 = Pass 1 = Fail	S20F32
PFCD	10	Predefined form code, 1 byte.		S6F9
PGRPACTION	20	The action to be performed on a port group.		S3F23

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Name	Format	Description	Values	Where Used
PMAX	3(), 5()	Parameter Count Maximum.	Maximum amount of data to be accepted by the host for this parameter. When a conflict arises between value of PMAX and length of PDFLT, PMAX takes precedence. For numeric and Boolean parameters: PMAX < 0 invalid PMAX = 0 specifies there is no upper bound PMAX = 1 specified a single value is expected PMAX > 1 specifies a vector of values is expected with a maximum of PMAX entries For string parameters: PMAX < 0 invalid PMAX = 0 specifies there is no upper bound PMAX > 0 maximum length of parameter string	S7F22
PNAME	20	Parameter Name ≤16 characters.	Text string identifying the parameter value expected by its parent process command.	S7F22
PODID	20	Identifier of Reticle Pod.		S3F35
PORTACTION	20	The action to be performed on a port.		S3F25
PORTGRPNAME	20	The identifier of a group of ports.		S3F21, F23
PPARM	11, 20, 3(), 4(), 5()	Process Parameter.	Numeric or Boolean SECS data item, single or multiple value, or text string which provides information required to complete the process command to which the parameter refers.	S7F23, F26, F31, F39, F43
PPBODY	10, 20, 3(), 5()	Process program body.	The process program describes to the equipment, in its own language, the actions to be taken in processing the material it receives.	S7F3, F6, F36, F37, F41
PPGNT	10	Process program grant status, 1 byte.	0 = OK 1 = Already have 2 = No space 3 = Invalid PPID 4 = Busy, try later 5 = Will not accept >5 = Other error 6-63 Reserved	S7F2, F30

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Name	Format	Description	Values	Where Used
PPID	10, 20	Process program ID.	Limited to a maximum of 120 bytes. The format used in the PPID will be host-dependent. For internal use of the equipment, the PPID can be treated as a unique binary pattern. If the local equipment is not prepared to display the transmitted code, the display should be in hexadecimal form.	S2F27; S7F1, F3, F5, F6, F8, F10, F11, F13, F17, F20, F23, F25, F26, F27, F31, F33, F34, F36, F39, F43; S16F3, F11, F15
PRAXI	10	Process axis.	0 = Rows (X-axis), top, increasing 1 = Rows (X-axis), top, decreasing 2 = Rows (X-axis), bottom, increasing 3 = Rows (X-axis), bottom, decreasing 4 = Columns (Y-axis), left, increasing 5 = Columns (Y-axis), left, decreasing 6 = Columns (Y-axis), right, increasing 7 = Columns (Y-axis), right, decreasing >7 = Error 8-63 Reserved	S12F1, F3
PRCMDNAME	20	Commands sent to a Process Job:	'START' 'STOP' 'PAUSE' 'RESUME' 'ABORT' 'CANCEL'	S16F5
PRCPREEXECHK	51	Enable/Disable of Pre-Execution Check option. This defines use of optional Pre-Execution Check.	0 = Disabled 1 = Enabled	S20F25
PRDCT	5()	Process Die Count.	Number of die to be processed or number of die, which have been processed. (Zero length indicates not used.)	S12F1, F4
PREACK	51	Information concerning the result of the event.	0 = Done 1 = Error	S20F24
PREVENTID	5()	Processing related event identification:	1 = Waiting for material 2 = Job state change	S16F9

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Name	Format	Description	Values	Where Used
PRJOBID	20	Text string which uniquely identifies a Process Job.		S16F4, F5, F6, F7, F9, F11, F12, F15, F16, F17, F18, F20, F23, F25, F26; S20F27, 29, F31, F33
PRJOBMILESTONE	5()	Notification of Processing status shall have one of the following values:	1 = Job Setup 2 = Job Processing 3 = Job Processing Complete 4 = Job Complete 5 = Job Waiting for Start	S16F7
PRJOBSPACE	52	The number of Process Jobs that can be created.		S16F22
PRMTRLORDER	51	Defines the order by which material in the Process Jobs material list will be processed. Possible values are assigned as follows:	1 = ARRIVAL – process whichever material first arrives 2 = OPTIMIZE – process in an order that maximizes throughput 3 = LIST – follow the order in the list	S16F29
PRPAUSEEVENT	00	The list of event identifiers, which may be sent as an attribute value to a Process Job. When a Process Job encounters one of these events it will pause, until it receives the PRJobCommand RESUME.		S16F11, F15
PRPROCESSSTART	11	Indicates that the process resource start processing immediately when ready:	TRUE = Automatic Start FALSE = Manual Start	S16F3, F11, F15, F25
PRRECIPEMETHOD	51	Indicates the recipe specification type, whether tuning is applied and which method is used:	1 – Recipe only 2 – Recipe with variable tuning	S16F3, F11, F15
PRSTATE	51	Enumerated value, 1 byte.		S16F20
PSRACK	51	Information concerning the result of the service.	0 = Done 1 = Error	S20F28
PSREACK	51	Information concerning the result of the event.	0 = Done 1 = Error	S20F34
PTN	10, 51	Material Port number, 1 byte.		S3F11, F12, F13, F17, F21, F25, F27, F28; S4F1, F3, F5, F7, F9, F11, F13, F15, F17
QPRKEACK	51	Information concerning the result of the event	0 = Done 1 = Error	S20F30
QREACK	51	Information concerning the result of the event.	0 = Done 1 = Error	S20F22

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Name	Format	Description	Values	Where Used
QRXLEACK	51	Information concerning the result of the event.	0 = Done 1 = Error	S20F20
QUA	10	Quantity in format, 1 byte.		S3F2, F4, F5, F7
RAC	31, 51	Reset acknowledge, 1 byte.	0 = Reset to be done 1 = Reset denied >1 = Other errors 2-63 Reserved	S2F20
RCMD	20, 31, 51	Remote command code or string.		S2F21, F41, F49
RCPBODYA	0, 10, 20, 3(), 5()	User Defined Recipe body allowed list structure.		S20F15, F18, F23, F32
RCPATTRDATA	0, 10, 11, 20, 3(), 4(), 5()	The contents (value) of a recipe attribute.		S6F25; S15F13, F15, F18, F27, F28, F30, F32, F49, F51
RCPATTRID	20	The name (identifier) of a non-identifier recipe attribute.		S6F25; S15F13, F15, F18, F27, F28, F30, F32, F49, F51
RCPBODY	10, 20, 3(), 5()	Recipe body.		S15F13, F15, F18, F27, F32, F49, F51
RCPCLASS	20	Recipe class.		S15F11
RCPCMD	51	Indicates an action to be performed on a recipe.	5 = Delete 8 = Unprotect 9 = Protect 10 = Verify 11 = Link 12 = Unlink 13 = Certify 14 = De-certify 15 = Download 16 = Upload 0-4, 6-7, 17-63 Reserved	S15F21, F22
RCPDEL	51		0 = Delete 1 = Deselect >1 Reserved	S15F35
RCPDESCLTH	5()	The length in bytes of a recipe section.		S15F24
RCPDESCNM	20	Identifies a type of descriptor of a recipe: ‘ASDesc’, ‘BodyDesc’, ‘GenDesc.’		S15F24
RCPDESCTIME	20	The timestamp of a recipe section, in the format ‘YYYYMMDDhhmmsscc.’		S15F24

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Name	Format	Description	Values	Where Used
RCPID	20	Recipe identifier. Formatted text conforming to the requirements of OBJSPEC.		S15F21, F23, F28, F29, F30, F33, F35, F37, F41, F44, F53
RCPNAME	20	Recipe name.		S15F11
RCPNEWID	20	The new recipe identifier assigned as the result of a copy or rename operation.		S15F19, F41, F44, F45
RCPOWCODE	11	Indicates whether any pre-existing recipe is to be overwritten (= TRUE) or not (= FALSE) on download.		S15F27, F49
RCPPARNM	20	The name of a recipe variable parameter. Maximum length of 256 characters.		S15F25, F33; S16F3, F11, F15, F23
RCPPARRULE	20	The restrictions applied to a recipe variable parameter setting. Maximum length of 80 characters.		S15F25
RCPPARVAL	0, 10, 11, 20, 3(), 4(), 5()	The initial setting assigned to a recipe variable parameter. Text form restricted to maximum of 80 characters.		S15F25, F33; S16F3, F11, F15, F23
RCPRENAME	11	Indicates whether a recipe is to be renamed (= TRUE) or copied (= FALSE).		S15F19
RCPSECCODE	10	Indicates the sections of a recipe requested for transfer or being transferred:	1 = Generic attributes only 3 = Generic attributes and body 4 = All agent-specific datasets (zero or more) 7 = Generic attributes, body, and all agent-specific datasets 8 = Single agent-specific dataset (zero or one) 11 = Generic attributes, body, and single agent-specific datasets All other values reserved	S15F15, F16, F17
RCPSECNM	20	Recipe section name: ‘Generic’, ‘Body’, or ‘ASDS.’		S15F15, F18
RCPSPEC	20	Recipe specifier. The object specifier of a recipe.		S6F25; S15F1, F9, F13, F15, F17, F19, F27, F31, F32, F45, F49, F51, F53; S16F3, F11, F15

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Name	Format	Description	Values	Where Used
RCPSTAT	51	The status of a managed recipe.	0 = Does not exist 8 = Unprotected 9 = Protected	S15F10
RCPUPDT	11	Indicates if an existing recipe is to be updated (= True) or a new recipe is to be created (= False).		S15F13
RCPVERS	20	Recipe version.		S15F10, F12
READLN	3(), 5()	Maximum length to read.		S13F5
RecID	20	<RCPSPEC> or <PPID> RecID may not always be a unique identifier.		S20F12, F13, F15, F17, F18, F20, F21, F23, F27, F30, F32
RECLEN	3(), 5()	Maximum length of a Discrete record.		S13F4
REFP	3()	Reference Point.		S12F1, F4
REPGSZ	20, 3(), 5()	Reporting group size.		S2F23, F64; S17F5
RESC	31, 51	Resolution code for numeric data.	1 = Absolute. Value may be specified to nearest increment of RESV 2 = Significant Digits. Value may be specified with no more significant digits than RESV allows	S7F22
RESOLUTION	20	Contains the unique identifier of a PDE (uid).	36 character string in groupings of 8, 4, 4, 4, and 12 separated by hyphens 'xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx'	S19F15, F16, F17
RESPDESTAT	51	Status response for the Resolve PDE request. If more than one of these conditions applies, the first value on the list that applies should be returned.	0 = OK – Indicates successful completion; no problems were encountered. 1 = InvalidInputMap – The supplied *inputMap* was improperly formatted. This response shall be reported only for the *targetPDE*. 2 = MapPDENotFound – A PDE reference was resolved in the inputMap, but not found in the local store. 3 = ResolveDenied – The equipment was not allowed to resolve this *PDE* reference.	S19F16

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Name	Format	Description	Values	Where Used
RESPDESTAT (cont.)	51	Status response for the Resolve PDE request. If more than one of these conditions applies, the first value on the list that applies should be returned.	4 = ReferencedPDENotFound – No *PDE* could be found in the local store to satisfy one or more *PDE* references within this *PDE*. 5 = PDENotFound - The specified *PDE* was not found in the local store. 6 = DateTimeCompareFailed - The createDate fields of the PDE's within a group could not be compared successfully. 7-254 Reserved 255 = Other - A problem occurred that is not described by the other enumerated values.	S19F16
RESPEC	20	Object specifier for the recipe executor.		S15F29, F33, F35
RESV	3(), 4(), 5()	Resolution value for numeric data.	If RESC=1, then RESV contains smallest increment allowed for parameter.	S7F22
RETAINRECIPE	51	On/Off of retention of recipes when connection is unexpectedly cut.	0 = ON 1 = OFF	S20F1
RETICLEID	20	The object identifier for a reticle. Conforms to OBJSPEC.		S3F35
RETPLACEINSTR	51	Instructions to indicate which pod slots will have reticles placed. Possible values for Reticle-PlacementInstruction are:	0 = PLACE 1 = PASS BY 2 = CURRENTLY OCCUPIED	S3F35
RETREMOVEINSTR	51	Instructions to indicate which pod slots will have reticles removed.	0 = REMOVE 1 = PASS BY	S3F35
REVID	20	An identifier which identifies that the recipe is revised in SRO or SRO Counterpart.	Maximum 256 characters.	S20F12, F13, F15, F17, F18, F20, F21, F23, F27, F30, F32
RIC	31, 51	Reset code, 1 byte.	0 = Not used 1 = Power up reset >1 Other reset conditions 2-63 Reserved	S2F19
RMACK	51	Conveys whether a requested action was successfully completed, denied, completed with errors, or will be completed with notification to the requestor.	0 = Successful completion 1 = Cannot perform action 2 = Completed with errors 3 = Action will be completed and notification sent 4 = No request for this action exists	S6F25; S15F4, F6, F8, F10, F12, F14, F16, F18, F20, F22, F24, F26, F28, F30, F32, F34, F36, F38, F40, F42, F44, F48, F53

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Name	Format	Description	Values	Where Used
RMCHGSTAT	5()	Indicates the change that occurred for an object.	0 = No change 1 = Created 2 = Updated 3 = Stored (new) 4 = Replaced 5 = Deleted 6 = Copied (new object) 7 = Renamed 8 = Unprotected 9 = Protected 10 = Verified 11 = Linked 12 = Unlinked 13 = Certified 14 = De-certified 15 = Selected 16 = Deselected	S6F25
RMCHGTYPE	5()	Indicates the type of change for a recipe.	0 = No change 1 = Create 2 = Update 5 = Delete 6 = Copy (new object) 7 = Rename 8 = Unprotect 9 = Product 10 = Verify 11 = Link 12 = Unlink 13 = Certify 14 = De-certify 15 = Change generic attribute 16 = Change agent-specific attribute 17 = Change both generic and agent-specific attributes	S15F37, F41, F44, F45, F46
RMDATASIZE	5()	The maximum total length, in bytes, of a multi-block message, used by the receiver to determine if the anticipated message exceeds the receiver's capacity.		S15F1
RMGRNT	10	Grant code, used to grant or deny a request. 1 byte.	0 = Permission granted 1 = Cannot accept now, try again 2 = No space 3 = Request is on hold 4-64 Reserved	S15F2, F37, F46

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Name	Format	Description	Values	Where Used
RMNEWNS	20	New name (identifier) assigned to a recipe namespace.		S15F5
RMNSCMD	51	Action to be performed on a recipe namespace.	1 = Created 5 = Deleted 0, 2-4, 6-63 Reserved	S15F3, F39, F41
RMNSSPEC	20	The object specifier of a recipe namespace.		S15F3, F5, F11, F21, F25, F47
RMRECSPEC	20	The object specifier of a distributed recipe namespace recorder.		S15F39, F41, F47
RMREQUESTOR	11	Set to TRUE if initiator of change request was an attached segment. Set to FALSE otherwise.		S15F41, F44
RMSEGSPEC	20	The object specifier of a distributed recipe namespace segment.		S15F37, F39, F41, F44, F47
RMSPACE	5()	The amount of storage available for at least one recipe in a recipe namespace, in bytes.		S15F8
RMSPWD	20	Password of the SROUser (For authentication)	Password of the SROUser (For authentication). Maximum 64 characters.	S20F5
RMSUSERID	20	Identifier of SROUser (For authentication)	Maximum 64 characters.	S20F5
ROWCT	5()	Row count in die increments.		S12F1, F4
RPMACK	51	Reticle Pod management service acknowledge code. 1 byte.	0 = Acknowledge, service has been performed 1 = Service does not exist 2 = Cannot perform now 3 = At least parameter does not exist 4 = Acknowledge, request will be performed with completion signaled later by an event 5 = Service is not completed or prohibited 6 = No such object exists 7-63 Reserved	S3F36
RPMDESTLOC	20	The LocationID towards which a reticle must be moved. Conforms to OBJID.		
RPMSOURLOC		The LocationID of the location from which to pick-up a reticle for moving it to another location. Conforms to OBJID.		

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