

SEMI G81-1000

SPECIFICATION FOR MAP DATA ITEMS

This Standard was technically approved by the Automated Test Equipment Global Technical Committee. This edition was approved for publication by the global Audits and Reviews Subcommittee on July 28, 2000. Available at www.semi.org in October 2000.

1 Purpose

1.1 This Document describes the data items that relate to electronic wafer mapping.

2 Scope

2.1 This Document applies only to wafer map data items.

2.2 This Document does not address the transmission, file naming conventions, storage or archiving of wafer maps.

2.3 The specification of which data items are optional and which are required is not specified in this Document.

2.4 The size of each data item described in this Document is maximum size. The actual size may be further restricted by an application document.

2.5 The order of the data items is not restricted in this Document. The order of the data items may be restricted by an application document.

NOTICE: SEMI Standards and Safety Guidelines do not purport to address all safety issues associated with their use. It is the responsibility of the users of the Documents to establish appropriate safety and health practices, and determine the applicability of regulatory or other limitations prior to use.

3 Limitations

3.1 There are no known limitations within the defined scope.

4 Referenced Standards and Documents

4.1 *SEMI Standards and Safety Guidelines*

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

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

5 Terminology

5.1 *Definitions*

5.1.1 *map* — a common data set for any electric test data.

6 Requirements

6.1 This Document does not define format of each data item specified in following chapter. In order to implement this Specification, it requires standardized and/or specific format definition documents. Standardized format definition documents are those generic, application specific or equipment specific specification, supplied by SEMI. They may be format specification, static file specification or communication specification; for example, SEMI E5. Specific format definition documents may be defined by supplier and user.

6.2 Also this Document does not define communication protocol at all. If an implementation requires transfer data items defined in following chapter, it is necessary to prepare custom communication protocol document or to compliant to appropriate SEMI communication standards.

6.3 This Document does not assume any context or scenario to pass data items defined in following chapter to some agent, save as files or store into database. It is recommended for implementation to take care possible error conditions like racing, for example.

7 Description

7.1 The wafer map data item specifications defined in this Document are shown in Table 2. The columns in this table are described in the following sections.

7.1.1 *Item Name Column* — The name by which the data item is referenced.

7.1.2 *Data Type Column* — The type of the data as defined in Table 1.

Table 1 Data Types and Sizes

Type	Definition
String	A string of ASCII characters
Integer	A string of numeric characters (0..9) that represent an integer value
Float	A string representing a floating point value in exponent format

7.1.3 *Size Column* — The maximum number of characters that may be used to represent the data.

7.1.4 *Description Column* — Describes what the data item is and what value restrictions it has.

7.2 Coordinate System Conventions

7.2.1 Whenever reference is made to rows, columns, *X* or *Y* they are defined as follows. See Figure 7.

7.2.2 The *X* axis is the horizontal axis when the wafer is rotated according to [WaferOrientation] in Table 2.

7.2.3 The *Y* axis is the horizontal axis when the wafer is rotated according to [WaferOrientation] in Table 2.

7.2.4 Columns increase along the *X*-axis. Rows increase along the *Y*-axis.

Table 2 Wafer Map Data Items

Item Name	Data Type	Size	Description
FormatRevision	String	256	Specifies the exact name and revision of the format used to represent wafer map data. This field can be used by a parser to automatically determine the format of the remaining wafer map data.
ProductId	String	256	Product identifier
LotId	String	32	Production lot identifier for this data
WaferOrientation	Integer	3	The orientation flat (or notch) direction when wafer map data is created by test equipment. This variable will increase in the right (clockwise) direction from 0° position, one degree at a time. The 0° position is horizontal with the surface on which the die is located on the wafer on top, with the orientation flat (or notch) brought to the front (bottom). See Figure 2.
WaferSize	Integer	3	Size of Wafer in unit of millimeter
DieSizeX	Float	14	Die Size on <i>X</i> axis in microns
DieSizeY	Float	14	Die Size on <i>Y</i> axis in microns
WaferId	String	32	A character code that may be printed or encoded on wafer, which uniquely identifies the wafer, and can be used to correlate the map with physical wafer. See Figure 5 for an example of printing position.
Rows	Integer	4	The number of rows of (measured) die matrix on substrate, that is the number of dice on the <i>Y</i> -axis of the map data. It is required if the type of the map data is simple array structure.

Item Name	Data Type	Size	Description
Columns	Integer	4	The number of columns of (measured) die matrix on substrate, that is the number of dice on the <i>X</i> -axis of the map data. It is required if the type of the map data is simple array structure.
MapType	String	16	Possible variations of data structure, one of which is to be chosen for passing map data. This document allows formats of the three types shown below. See Figure 1 for a detailed example. [MapType] = 'Row': Row/Column Format Expression using the coordinate showing the head of a row as well as the number of dice in the row and the bin data of the relevant row. Each bin data is attached in succession to each row. Example: X, Y, N, BIN, BIN, BIN, ..., BIN (N: Number of dice) [MapType] = 'Array': Array Format All of a wafer's bin data is expressed in a one-dimensional array form. Left to right and top down wafer map data will be set in a one-dimensional array. Example: BIN, BIN, BIN, ... [MapType] = 'Die': Coordinate Format Expressed by XY coordinates of each die on a wafer as well as bin data Even when using this format, to prevent omission of data, it is best to set bin data for all dice tested in front end processing. Example: X, Y, BIN, ..., X, Y, BIN The MAP coordinates set here are values for the state with the wafer orientation flat rotated to the angle given by [MAP_ROTATION]. NOTE 1: MAP coordinates can also be negative values.
HeadingDieX	Integer	5	<i>X</i> coordinate of the heading die of a row in the map data This item is used when [MapType] = 'Row'
HeadingDieY	Integer	5	<i>Y</i> coordinate of the heading die of a row in the map data This item is used when [MapType] = 'Row'
DiceRow	Integer	3	Number of the dice on a row in the map data This item is used when [MapType] = 'Row'
DieX	Integer	5	<i>X</i> coordinate of the die in the map data This item is used when [MapType] = 'Die'
DieY	Integer	5	<i>Y</i> coordinate of the die in the map data This item is used when [MapType] = 'Die'
BinType	String	16	The format in which the bin code for each dice will be represented in the [Map]. The choices are as follows: [BinType]='Ascii': Single ASCII character [BinType]='Decimal': 3 digit integer from 000 to 255 [BinType]='HexaDecimal': 2 digit Hexadecimal value from 00 to FF NOTE 1: For readability when [BinType]='Decimal' there must be spaces added between each dice and each row of die should be on a new line.
Data	String	---	Map data on substrate represented according to [BinType]
ReferenceDieX	Integer	4	<i>X</i> coordinate of the reference die to align die matrix on physical wafer with the map data
ReferenceDieY	Integer	4	<i>Y</i> coordinate of the reference die to align die matrix on physical wafer with the map data
RefDiePosX	Integer	7	Offset in μm of the center of a reference die in the <i>X</i> -direction from the center of substrate. See Figure 4.
RefDiePosY	Integer	7	Offset in μm of the center of a reference die in the <i>Y</i> -direction from the center of substrate. See Figure 4.