

The Hermes Standard
for "M-to-M" in SMT Assembly

The Hermes Standard

The Hermes Standard Change Proposal

Board Tracking to Supervisory System

Voting meeting:

28th of January 2019 (APEX / San Diego)

Requesting company:

Workgroup "Hermes Vertical"



The Hermes Standard for vendor independent machine-to-machine communication in SMT Assembly.

Version change:

Minor

Affected versions:

1.1

Service description tag:

FeatureBoardTracking

Description:

Today Hermes communication is mainly horizontal with the only exception of the Hermes service port to query and set the Hermes configuration. However, horizontal communication from machine to machine alone is not sufficient - Hermes needs to be connected to supervisory systems, e.g. MES, to send board tracking data when a board arrives at a machine or leaves a machine.

This new feature requires the Hermes-Vertical Channel, which connects supervisory systems to Hermes machine-to-machine communication.

Use cases:

- Send board data from machine to supervisory system whenever a board has arrived at this machine (from upstream machine, magazine or manually inserted)
- Send board data from machine to supervisory system whenever a board leaves this machine (to downstream machine, magazine or manually removed)

Functionality / communication sequences:

-

New / changed XML messages:

Two new messages: BoardArrived and BoardDeparted



Proposed changes to standard:

3 Message Definition

...

3.22 SupervisoryServiceDescription

The SupervisoryServiceDescription message is sent by both machine and supervisory system after a connection is established. The supervisory system sends its SupervisoryServiceDescription first whereupon the machine answers by sending its own SupervisoryServiceDescription.

SupervisoryServiceDescription	Type	Range	Optional	Description
◆ SystemId	String	any string (minimum supported length: 80 bytes)	no	ID / name of the sending machine or supervisory system for identifying it in a Hermes enabled production line.
◆ Version	String	xxx.yyy (7 bytes)	no	The implemented interface version of the machine or supervisory system
📁 SupportedFeatures	SupervisoryFeature []		no	List of supported supervisory features (empty for version 1.0)

SupervisoryFeature	Type	Range	Optional	Description
📁 FeatureConfiguration	FeatureConfiguration		yes	Indication of configuration functions implementation
📁 FeatureCheckAliveResponse	FeatureCheckAliveResponse		yes	Indication of CheckAliveResponse function implementation
📁 FeatureBoardTracking	FeatureBoardTracking		yes	Indication of board tracking functions implementation

xxx.yyy must match the regular expression

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[1-9][0-9]{0,2}\.[0-9]{1,3}
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3.23 BoardArrived

The BoardArrived message is sent via Hermes vertical channel to a supervisory system to indicate that a PCB has arrived at this machine.

Note: The function of BoardArrived is optional. If FeatureBoardTracking is specified in the SupervisoryServiceDescription, it must be fully supported. Otherwise it can be ignored.



BoardArrived	Type	Range	Optional	Description
◆ Machineld	string	any string (minimum supported length: 80 bytes)	no	ID / name of this machine for identifying it in a Hermes enabled production line.
◆ UpstreamLaneld	int	1 .. n	no	The lane on the upstream side Lanes are enumerated looking downstream from right to left beginning with 1
◆ UpstreamInterfaceld	string	any string (minimum supported length: 80 bytes)	yes	The ID of the transportation interface on the upstream side
◆ Magazineld	string	any string (minimum supported length: 80 bytes)	yes	Barcode of a magazine, required to identify the magazine from which the Board was transferred.
◆ SlotId	int	1 .. n	yes	Indicates the slot in the magazine, enumerated from bottom to top, beginning with 1.
◆ BoardTransfer	int	1 .. 3	no	A value of the list below
◆ BoardId	string	GUID (36 bytes)	no	Indicating the ID of the available board
◆ BoardIdCreatedBy	string	non-empty string (minimum supported length: 80 bytes)	no	Machineld of the machine which created the BoardId (the first machine in a consecutive row of machines implementing this protocol). The Machineld is part of the Hermes configuration.
◆ FailedBoard	int	0 .. 2	no	A value of the list below
◆ ProductTypeld	string	any string (minimum supported length: 254 bytes)	yes	Identifies a collection of PCBs sharing common properties
◆ FlippedBoard	int	0 .. 2	no	A value of the list below
◆ TopBarcode	string	any string (minimum supported length: 254 bytes)	yes	The barcode of the top side of the PCB



◆ BottomBarcode	string	any string (minimum supported length: 254 bytes)	yes	The barcode of the bottom side of the PCB
◆ Length	float	positive numbers	yes	The length of the PCB in millimeter.
◆ Width	float	positive numbers	yes	The width of the PCB in millimeter.
◆ Thickness	float	positive numbers	yes	The thickness of the PCB in millimeter.
◆ ConveyorSpeed	float	positive numbers	yes	The conveyor speed used for the PCB transfer in millimeter per second
◆ TopClearanceHeight	float	positive numbers	yes	The clearance height for the top side of the PCB in millimeter.
◆ BottomClearanceHeight	float	positive numbers	yes	The clearance height for the bottom side of the PCB in millimeter.
◆ Weight	float	positive numbers	yes	The weight of the PCB in grams.
◆ WorkOrderId	string	any string (minimum supported length: 80 bytes)	yes	Identifies the work order for production of the PCB

GUID must match the regular expression

`[0-9a-f]{8}-[0-9a-f]{4}-[0-9a-f]{4}-[0-9a-f]{4}-[0-9a-f]{12}`

FailedBoard may be one of the following values:

- 0 Board of unknown quality available
- 1 Good board available
- 2 Failed board available

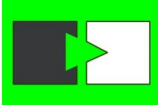
FlippedBoard may be one of the following values:

- 0 Side up is unknown
- 1 Board top side is up
- 2 Board bottom side is up

BoardTransfer may be one of the following values:

- 1 Transferred – Board arrived from upstream machine via Hermes or SMEMA
- 2 Loaded – Board was loaded from a magazine or a stack of Boards
- 3 Inserted – Board was manually inserted into the machine





3.24 BoardDeparted

The BoardDeparted message is sent via Hermes vertical channel to a supervisory system to indicate that a PCB has left this machine.

Note: The function of BoardDeparted is optional. If FeatureBoardTracking is specified in the SupervisoryServiceDescription, it must be fully supported. Otherwise it can be ignored.



BoardDepended	Type	Range	Optional	Description
◆ Machineld	string	any string (minimum supported length: 80 bytes)	no	ID / name of this machine for identifying it in a Hermes enabled production line.
◆ DownstreamLaneld	int	1 .. n	no	The lane on the downstream side Lanes are enumerated looking downstream from right to left beginning with 1
◆ DownstreamInterfaceld	string	any string (minimum supported length: 80 bytes)	yes	The ID of the transportation interface on the downstream side
◆ Magazineld	string	any string (minimum supported length: 80 bytes)	yes	Barcode of a magazine, required to identify the magazine to which the Board was transferred.
◆ Slotld	int	1 .. n	yes	Indicates the slot in the magazine, enumerated from bottom to top, beginning with 1.
◆ BoardTransfer	int	1 .. 3	no	A value of the list below
◆ Boardld	string	GUID (36 bytes)	no	Indicating the ID of the available board
◆ BoardldCreatedBy	string	non-empty string (minimum supported length: 80 bytes)	no	Machineld of the machine which created the Boardld (the first machine in a consecutive row of machines implementing this protocol). The Machineld is part of the Hermes configuration.
◆ FailedBoard	int	0 .. 2	no	A value of the list below
◆ ProductTypeld	string	any string (minimum supported length: 254 bytes)	yes	Identifies a collection of PCBs sharing common properties
◆ FlippedBoard	int	0 .. 2	no	A value of the list below
◆ TopBarcode	string	any string (minimum supported length: 254 bytes)	yes	The barcode of the top side of the PCB



◆ BottomBarcode	string	any string (minimum supported length: 254 bytes)	yes	The barcode of the bottom side of the PCB
◆ Length	float	positive numbers	yes	The length of the PCB in millimeter.
◆ Width	float	positive numbers	yes	The width of the PCB in millimeter.
◆ Thickness	float	positive numbers	yes	The thickness of the PCB in millimeter.
◆ ConveyorSpeed	float	positive numbers	yes	The conveyor speed used for the PCB transfer in millimeter per second
◆ TopClearanceHeight	float	positive numbers	yes	The clearance height for the top side of the PCB in millimeter.
◆ BottomClearanceHeight	float	positive numbers	yes	The clearance height for the bottom side of the PCB in millimeter.
◆ Weight	float	positive numbers	yes	The weight of the PCB in grams.
◆ WorkOrderId	string	any string (minimum supported length: 80 bytes)	yes	Identifies the work order for production of the PCB

GUID must match the regular expression

`[0-9a-f]{8}-[0-9a-f]{4}-[0-9a-f]{4}-[0-9a-f]{4}-[0-9a-f]{12}`

FailedBoard may be one of the following values:

- 0 Board of unknown quality available
- 1 Good board available
- 2 Failed board available

FlippedBoard may be one of the following values:

- 0 Side up is unknown
- 1 Board top side is up
- 2 Board bottom side is up

BoardTransfer may be one of the following values:

- 1 Transferred – Board moved to downstream machine via Hermes or SMEMA
- 2 Unloaded – Board was unloaded into a magazine
- 3 Removed – Board was manually taken out of the machine

