The Hermes Standard Change Proposal

Add Work Order ID to related messages

Voting meeting:
28th of January 2019 (APEX / San Diego)

Requesting company:
ASM

Version change:

Minor

Affected versions:

1.1

Service description tag:

-

Description:

The work order in the ERP system contains all business and customer relevant data for production of a set of PCBs. All production related activities and data concerning production need to be linked back to the work order in the ERP system. The WorkOrderId will provide this link from a PCB in a machine to a work order in the ERP system and, thus, is a prerequisite for Hermes Vertical communication from machines to supervisory systems.

Use cases:

The WorkOrderId provides the linkage of PCB production related data such as

- Monitoring of production progress, consumed or moved materials, etc.
- Process Interlocking
- Traceability

Functionality / communication sequences:

-

New / changed XML messages:

There will not be any new XML messages; the following XML messages will be extended:

- BoardAvailable
- MachineReady
- BoardForecast
- SendBoardInfo

Proposed changes to standard:

3 Message format

…

3.6 BoardAvailable

The BoardAvailable message is sent to the downstream machine to indicate the readiness of the upstream machine to handover a PCB. When an optional attribute is received from an upstream machine, then it must be passed on (possibly altered) to the next downstream machine.

BoardAvailable	Type	Range	Optional	Description
BoardId	string	GUID (36 bytes)	no	Indicating the ID of the available board
BoardIdCreatedBy	string	non-empty string (minimum supported length: 80 bytes)	no	MachineId of the machine which created the BoardId (the first machine in a consecutive row of machines implementing this protocol). The MachineId is part of the Hermes configuration.
FailedBoard	int	0 .. 2	no	A value of the list below
ProductTypeId	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 preferred by the upstream machine 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	yes	Identifies the work order for production of the PCB

		length: 80 bytes)		

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

If FlippedBoard is 2 (board bottom side is up) then TopBarcode is facing downwards and BottomBarcode is facing upwards. Same applies for TopClearanceHeight and BottomClearanceHeight.
The definition of board bottom and board top side is outside of the scope of The Hermes Standard and left to the customer.

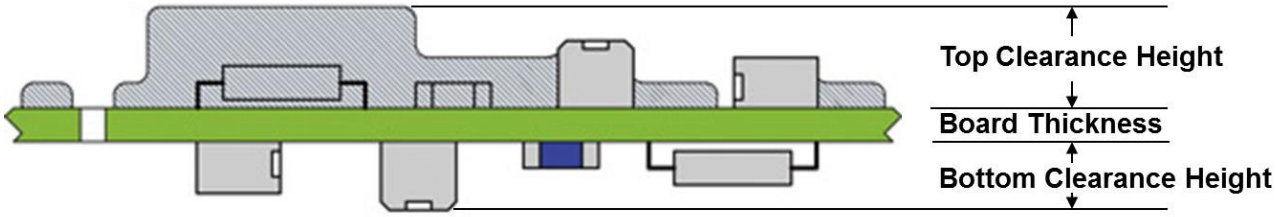

Fig. 20 Explanation for top and bottom clearance height

3.8 MachineReady

The MachineReady message is sent to the upstream machine to indicate the readiness of the downstream machine to accept a PCB.

MachineReady	Type	Range	Optional	Description
FailedBoard	int	0 .. 2	no	A value of the list below
ForecastId	string	any string (minimum supported length: 80 bytes)	yes/no	If responding to a BoardForecast message this is mandatory. It indicates the ID of the original BoardForecast message.
BoardId	string	GUID (36 bytes)	yes	Indicates the ID of the board that will be handed over ~~as~~ next. In case of product change this attribute will not be sent.
ProductTypeId	string	any string (minimum supported length: 254 bytes)	yes	Identifies a collection of PCBs sharing common properties
FlippedBoard	int	0 .. 2	yes	A value of the list below
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 by the upstream machine 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

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

FailedBoard may be one of the following values:

0 Ready to accept any board
1 Ready to accept good boards.
2 Ready to accept failed boards

3.16 BoardForecast

The BoardForecast message is sent to the downstream machine to indicate some changes / command execution are needed or to give advanced ~~a pre~~ information about the next board but a PCB is not yet ~~jet~~ available. If the ForecastId field is set then the downstream machine must at some point respond with a MachineReady carrying the same ForecastId. If needed, downstream machine must send a RevokeMachineReady message first. If the forecasted product is not ~~fitting to~~ accepted by the downstream machine, then it must respond with a Notification of type “BoardForecastError”.

BoardForecast	Type	Range	Optio-nal	Description
ForecastId	string	any string (minimum supported length: 80 bytes)	yes	Indicating the ID of forecast message. The ID must be unambiguous and e.g. can be a timetamp or a GUID.
TimeUntilAvailable	float	positive numbers	yes	Number of seconds until a board may be available at downstream machine
BoardId	string	GUID (36 bytes)	yes	Indicating the ID of the board that will be handed over ~~as~~ next. e.g. in case of product change this field will not be sent
BoardIdCreatedBy	string	any string (minimum supported length: 80 bytes)	yes	MachineId of the machine which created the BoardId.
FailedBoard	int	0 .. 2	no	A value of the list below
ProductTypeId	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 next PCB
BottomBarcode	string	any string (minimum supported length: 254 bytes)	yes	The barcode of the bottom side of the next 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 preferred by the upstream machine 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

The attributes definition are identical to the BoardAvailable message.

FailedBoard may be one of the following values:

0 Ready to accept any board
1 Ready to accept good boards.
2 Ready to accept failed boards

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

3.18 SendBoardInfo

The SendBoardInfo message is sent from the upstream to the downstream machine as response of a received QueryBoardInfo message to transfer stored information about a lost board (see section 4.1.3). If the upstream machine cannot find any board information it will still send the SendBoardInfo message without the BoardId and BoardCreatedBy attributes filled.
Machines supporting the feature FeatureSendBoardInfo shall be able to store and supply upon request the info of at least the last 50 handled boards.

SendBoardInfo	Type	Range	Optional	Description
BoardId	string	GUID (36 bytes)	yes / no	The ID of the board which data has been requested. This attribute will not be sent if the board information has not been found.
BoardIdCreatedBy	string	non-empty string (minimum supported length: 80 bytes)	yes / no	MachineId of the machine which created the BoardId
FailedBoard	Int	0 .. 2	Yes/no	A value of the list below. This attribute will not be sent if the board information has not been found.
ProductTypeId	string	any string (minimum supported length: 254 bytes)	yes	Identifies a collection of PCBs sharing common properties
FlippedBoard	Int	0 .. 2	Yes/no	A value of the list below. This attribute will not be sent if the board information has not been found.
TopBarcode	string	any string (minimum supported length: 254 bytes)	yes/no	The barcode of the top side of the next PCB. This attribute is mandatory if it has been in the QueryBoardInfo message.
BottomBarcode	string	any string (minimum supported length: 254 bytes)	yes/no	The barcode of the bottom side of the next PCB. This attribute is mandatory if it has been in the QueryBoardInfo message.
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.
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.
WorkOrderId	string	any string (minimum	yes	Identifies the work order for production of the PCB

		supported length: 80 bytes)		

The attributes definition are identical to the BoardAvailable message.

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