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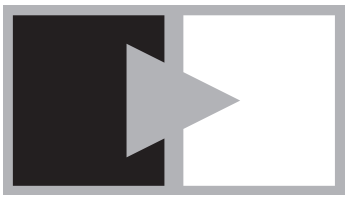
Version 1.5



The Global Standard for Machine-to-Machine Communication in SMT Assembly

Developed by The Hermes Standard Initiative and approved by IPC

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Users of this publication are encouraged to participate in the development of future revisions.

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The Global Standard for Machine-to-Machine Communication in SMT Assembly

1 SCOPE

The aim of this specification is to create a state-of-the-art communication protocol for handling board transfers and associated data at surface-mount technology (SMT) production lines. Therefore, this new communication protocol has to cope with the following:

- Replace the electrical SMEMA interface as specified in IPC-SMEMA-9851
- Extend the interface to communicate:
  - Unique identifiers for the handled printed circuit boards (PCBs)
  - Equipment identifiers of the first machine noticing a PCB
  - Barcodes
  - Conveyor speed and intended board route
  - A lightweight digital twin of the product containing, e.g.,
    - Product type identifier
    - Length
    - Width
    - Thickness
    - Board state

With respect to version numbers The Hermes Standard adheres to the rules of Semantic Versioning 2.0.0 [SemVer_2.0.0].

Hints on naming:

- Wherever a feature is described by the word "**shall**" it is mandatory.
- The word "machine" is used for any equipment which can be found in a SMT production line (e.g., printers, placement machines, ovens, AOIs, transport modules, shuttles, stackers).
- The term "PCB" may also refer to carriers transporting PCBs.
- The word "Hermes" is used as abbreviation for "The Hermes Standard".
- "The Hermes Standard" and IPC-HERMES-9852 are synonyms for the standard specified in this document and might be used interchangeably.

2 TECHNICAL CONCEPT

2.1 Prerequisites This specification is based on the prerequisite, that any application implementing this protocol has to provide connectivity based on Internet Protocol (IP) [IETF_RFC_791] / [IETF_RFC_2460] via Transmission Control Protocol (TCP) [IETF_RFC_793] (ISO / OSI model [ISO_7498-1] layer 3) to the adjacent machines and for communication with supervisory systems.

2.2 Board IDs Board individuals are identified by board IDs. These must be Globally Unique Identifiers (GUIDs) according to [ITU-T_REC_X.667], e.g., 123e4567-e89b-12d3-a456-426655440000. They are generated by the first machine in a consecutive row of machines implementing the Hermes protocol. The board ID is passed from machine to machine. If a machine in a line does not implement the Hermes protocol, the board ID is lost and a new one will be generated by the next machine implementing Hermes.

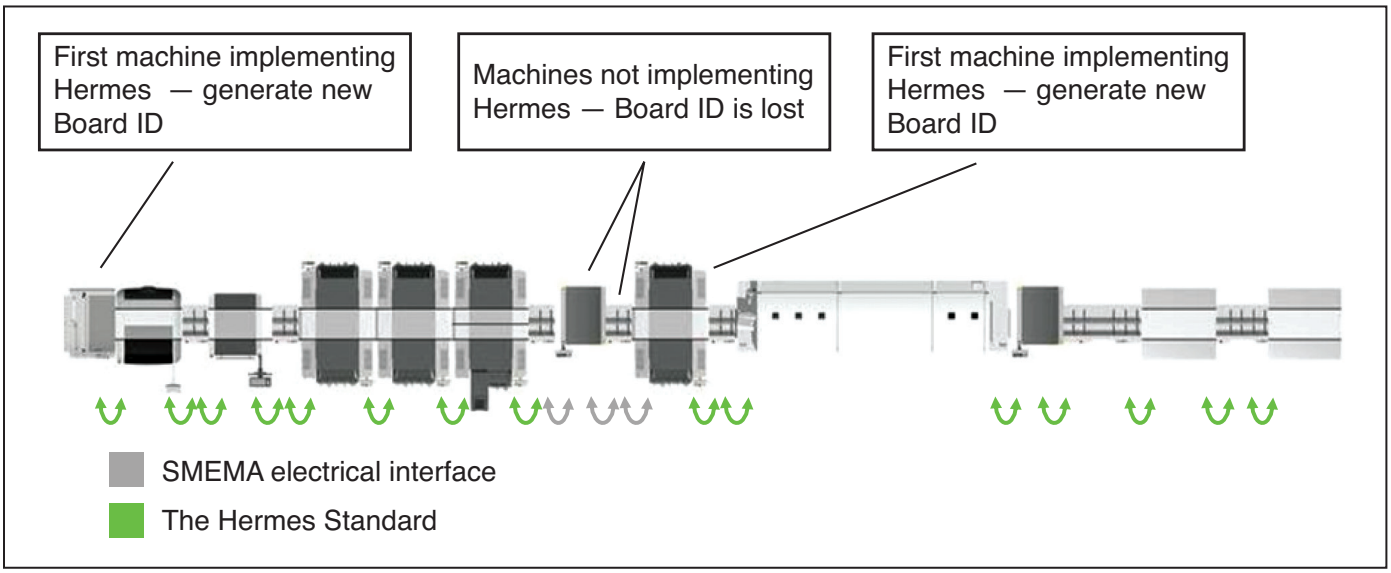

Figure 1 Generation of Board IDs