Critical manufacturing
an ASM PT company

Material Serialization

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Material Serialization

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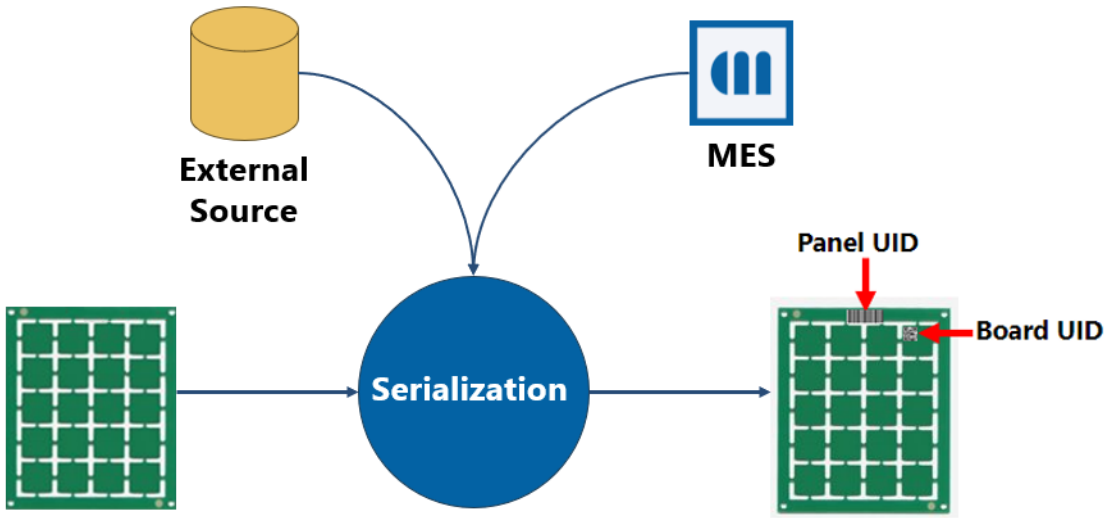
Overview

The **Material Serialization** feature provides a framework for assigning unique identification codes to PCB panels and boards at various stages of the manufacturing process. By utilizing specific **Smart Tables**, users can determine exactly when and how materials expand into smaller units during track-in or track-out operations.

The system supports multiple configurations, including **Special Mode**, which allows for two levels of serialization to occur simultaneously within a single production step.

This level of traceability ensures that every individual component is accurately tracked from the initial SMT line through to final assembly. The flexible setup also accommodates both internal name generation and external naming conventions to suit different factory requirements.



Setting Up Material Serialization

The following configuration is needed:

- Enable the feature by enabling the `/SMT/MaterialSerialization/IsEnabled` config.
- Configure the SMTMaterialExpandContext smart table.
- Configure the SMTMaterialNameGenerationContext smart table.
- Configure the SMTMaterialPrintableDocumentContext smart table. (optional)

Configuring SMTMaterialExpandContext ST

Define:

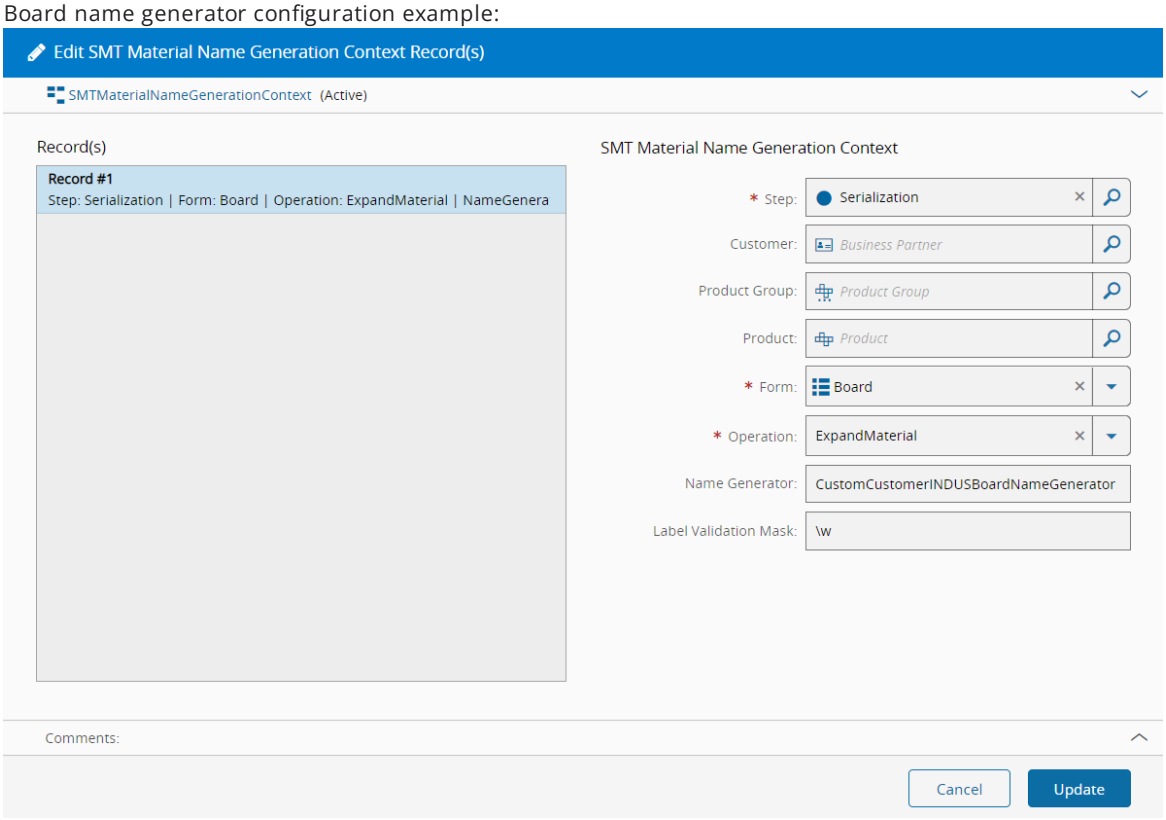
- The production step where serialization occurs
- Parent, child, and sub-child material forms
- Expand Operation: Track-In or Track-Out
- Internal or external naming
- Expansion Factors
- Special Mode usage

Configuring SMTMaterialNameGenerationContext ST

Fields:

- Step
- Form
- Operation: ExpandMaterial
- Name Generator
- Optional Label Validation Mask

Board name generator configuration example:



Configuring SMTMaterialPrintableDocumentContext ST

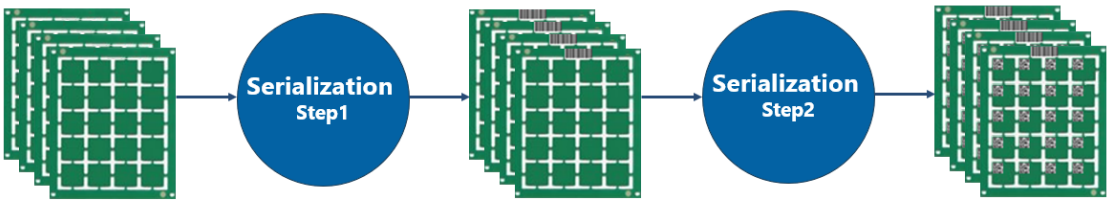
Configure:

- Step
- Material Form
- Operation
- Label
- Synchronous Printing option

Board label configuration example: Screenshot

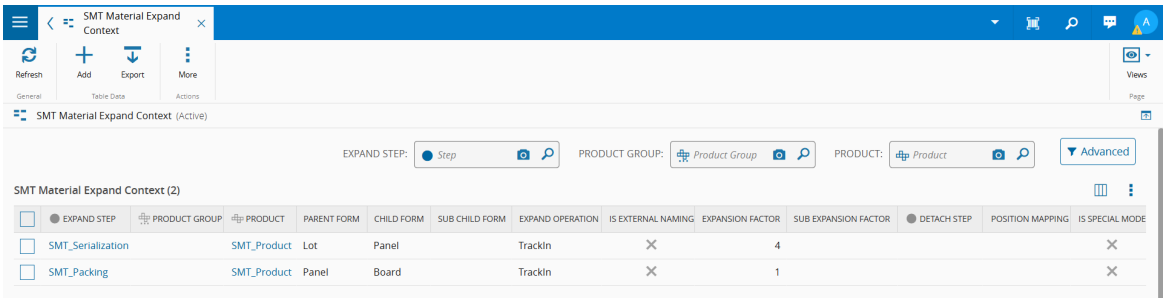
Serialization Without Special Mode

When ST SMTMaterialExpandContext has **Is Special Mode = False**, expansion occurs across multiple steps. Expansion happens in separate production steps

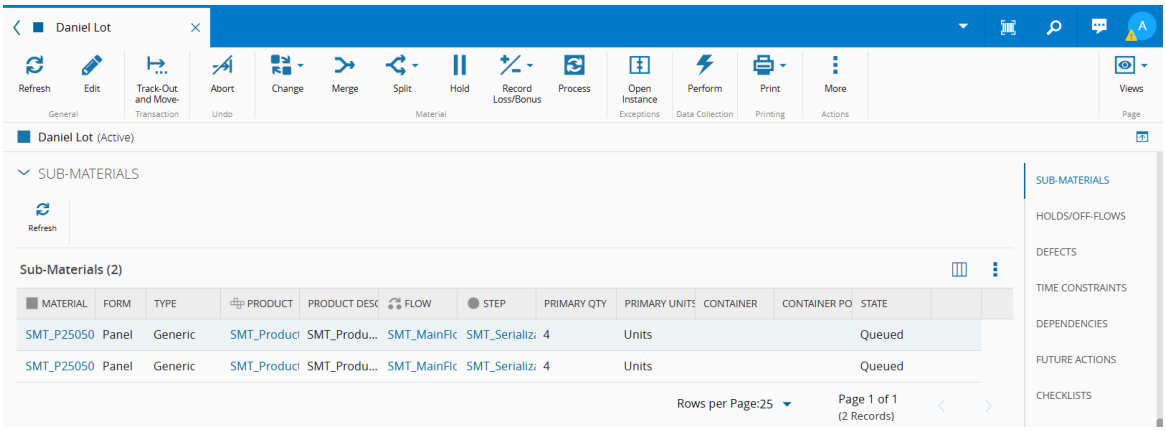


Example:

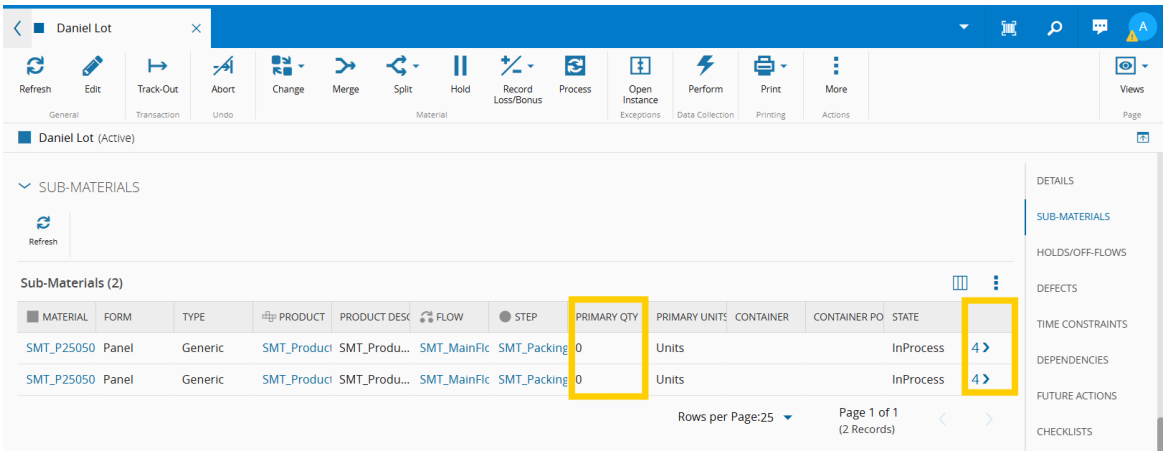
Considering an example for a Panel that has 4 boards each and a lot as a parent material with quantity 8, the target of the parent material is normally defined in quantity of needed boards so in this case the configuration should be as follows:

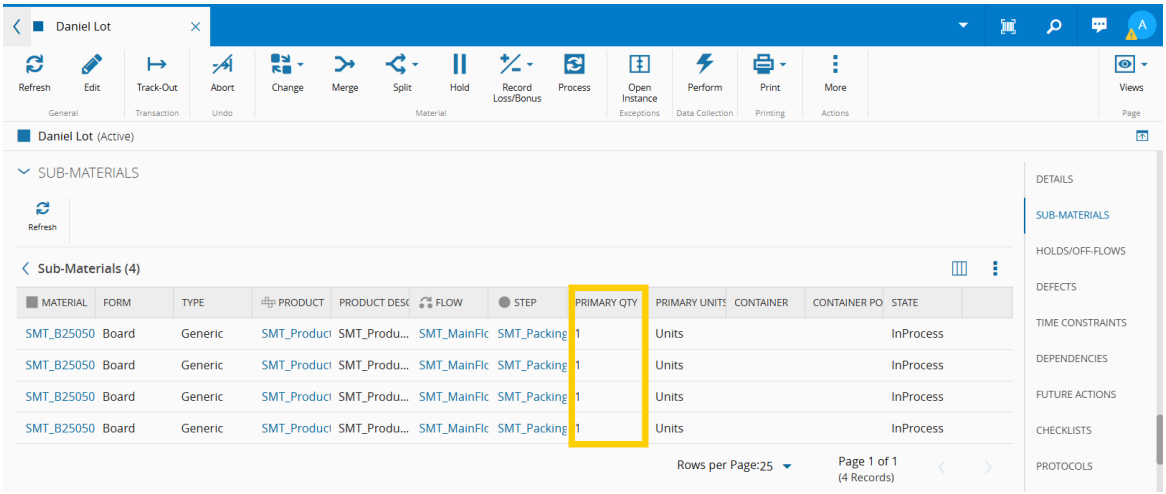


State of the lot material after tracking in the the SMT_Serialization step:



State of the lot material after tracking in the the SMT_Packing step:





Result:

- 1 Lot → 1 Panels → Boards (4 boards per panel)
  - 1 *Lot* material with a *Primary Quantity* of 0 with 1 *Sub-Materials*
  - 1 *Panels* material with a *Primary Quantity* of 0 and each with 4 *Sub-Materials*
  - 4 *Board* materials, each with a *Primary Quantity* of 1

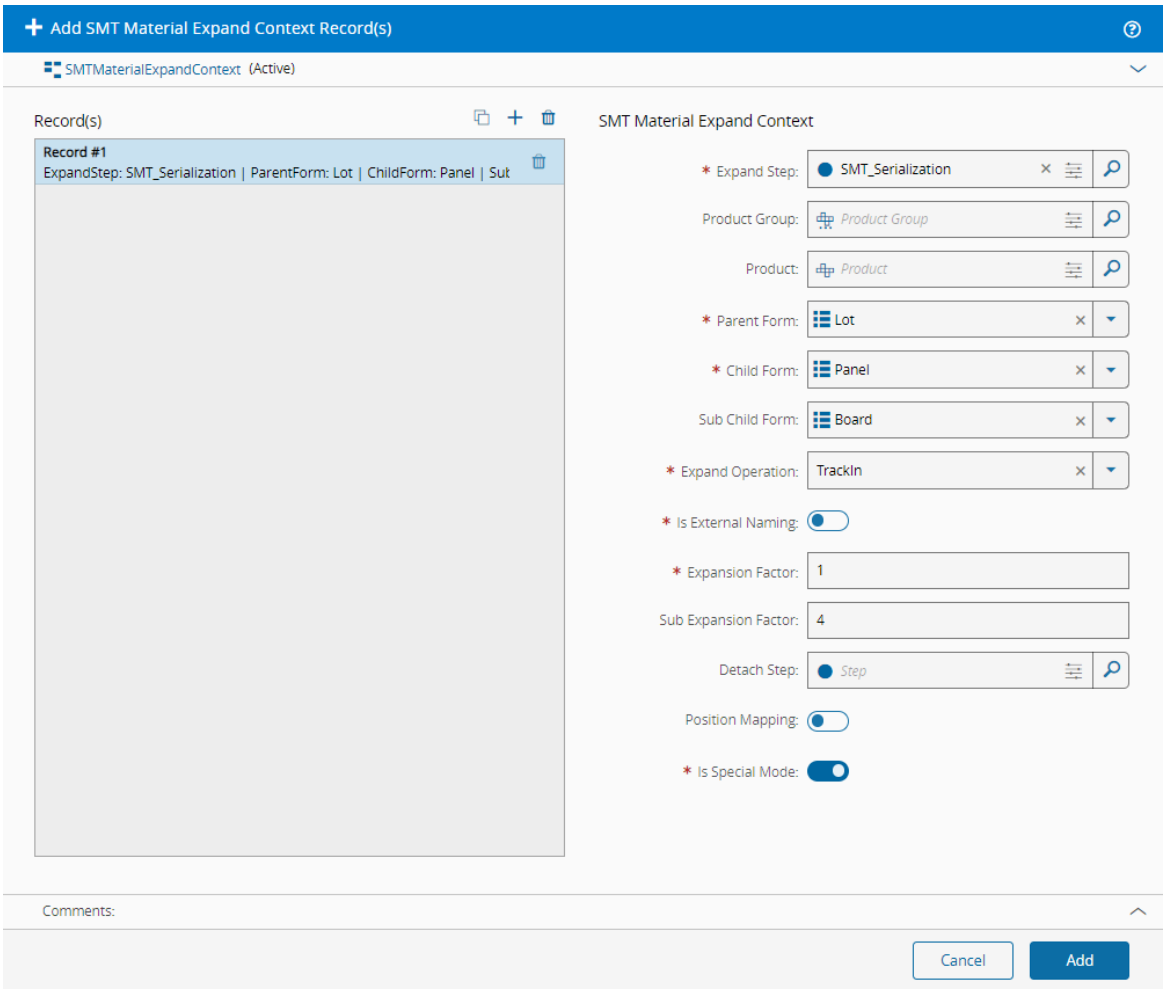
Serialization With Special Mode

When ST SMTMaterialExpandContext has **Is Special Mode = True**, two levels of serialization occur within one step. Each material whose form matches the value defined in `Parent Form` and enters the specified `Expand Step` produces Child and Sub Child materials during that same step.

The quantities of the Child and Sub Child materials, as well as the *Primary Quantity* of each, are calculated based on the parent material's *Primary Quantity* and the configured `Expansion Factor` and `Sub Expansion Factor`.

Example:

- Expand Step: SMT_Serialization
- Parent Form: Lot
- Child Form: Panel
- Sub Chid Form: Board
- Expansion Operation: TrackIn
- Expansion Factor: 1
- Sub Expansion Factor: 4



- Primary Quantity: 12
- 1st Expand (Panels)
  - $\text{number of panels} = \frac{\text{parent primary quantity}}{\text{expansion factor} \times \text{sub-expansion factor}} = \frac{12}{1 \times 4} = 3$ panels created
  - $\text{panels primary quantity} = \text{expansion factor} \times \text{sub-expansion factor} = 1 \times 4 =$ with quantity of 4
- 2nd Expand (Boards)
  - $\text{number of boards} = \text{sub-expansion factor} = 4$ boards created
  - $\text{boards primary quantity} = \text{expansion factor} =$ with quantity of 1

Result:

- 1 Lot → 3 Panels → 12 Boards
  - 1 *Lot* material with a *Primary Quantity* of 0 with 3 *Sub-Materials*
  - 3 *Panels* material with a *Primary Quantity* of 0 and each with 4 *Sub-Materials*
  - 12 *Board* materials, each with a *Primary Quantity* of 1

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