

<b>Title</b>	<b>Assemble surface mount printed circuit boards manually</b>		
<b>Level</b>	<b>3</b>	<b>Credits</b>	<b>15</b>

<b>Purpose</b>	<p>This unit standard covers the manual assembly, including bonding, of surface mount devices (SMD) on printed circuits designed for SMD components.</p> <p>People credited with this unit standard are able to:</p> <ul style="list-style-type: none"> <li>–set up the assembly environment;</li> <li>–assemble surface mount device printed circuit boards;</li> <li>–produce SMD solder connections manually; and</li> <li>–check completed printed circuit boards.</li> </ul>
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<b>Classification</b>	Electronic Engineering > Electronic Manufacturing
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<b>Available grade</b>	Achieved
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**Guidance Information**

- 1 Definition  
*surface mount devices (SMD)* – components that are bonded directly to the circuit board.
  
- 2 Range
  - a assembly includes bonding.
  - b evidence of one or more of the following bonding technologies is required – gluing, reflow, or molten solder bonding.
  
- 3 References  
 Health and Safety in Employment Act 1992;  
 ANSI/IPC J-STD- 001D, *Requirements for Soldered Electrical and Electronic Assemblies*, February 2005, published jointly by IPC – Association Connecting Electronics Industries and the Electronic Industries Alliance;  
 IPC-A-610D, *Acceptability of Electronic Assemblies*, 2005, published by IPC – Association Connecting Electronics Industries.
  
- 4 The following apply to all outcomes of this unit standard:
  - a all activities are to be completed and reported within agreed timeframes;
  - b all work practices must meet worksite's documented quality management requirements;
  - c all activities must comply with policies, procedures and requirements of the enterprises involved; and any relevant legislative and/or regulatory requirements, which include, but are not limited to, the Health and Safety in Employment Act 1992.

- 5 People who are registered as physically disabled may achieve this unit standard with exemption from the requirements of outcome 1 only.

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## Outcomes and performance criteria

### Outcome 1

Set up the assembly environment.

#### Performance criteria

- 1.1 The preparation of equipment and the selection of components match the job instructions.
- Range software – selection, loading and control;  
components – selection, loading, polarity where appropriate;  
equipment – settings, adjustments, calibrations.
- 1.2 The workplace layout conforms to enterprise safety standards and presents no uncontrolled hazards to any person.

### Outcome 2

Assemble surface mount device printed circuit boards.

#### Performance criteria

- 2.1 The assembly sequence complies with the job instructions.
- 2.2 Component and board integrity are not affected by setup or handling operations.
- Range integrity includes – fit, finish, electrostatic discharge (ESD), other specified build requirements.
- 2.3 All assembly operations are completed to industry quality standards, and may include specified jigs, tools, and equipment.
- Range IPC standards, or equivalent, for board preparation, fixing and bonding of SMD components.
- 2.4 Completed boards meet industry quality standards.
- Range IPC standards, or equivalent, for component selection, component positioning, component mounting, bonding joints.

### Outcome 3

Produce SMD solder connections manually.

**Performance criteria**

- 3.1 Component performance is not affected by the soldering process.
- Range mechanical damage, excessive heat, electrostatic damage.
- 3.2 The placement and soldering process complies with the required connection standards for the application.
- Range IPC standards or equivalent for component placement, physical appearance, mechanical strength, electrical properties.

**Outcome 4**

Check completed printed circuit boards.

**Performance criteria**

- 4.1 Checking confirms that assembly work meets enterprise quality standards.
- Range component placement, bonding integrity, visual appearance.

**This unit standard is expiring. Assessment against the standard must take place by the last date for assessment set out below.**

**Status information and last date for assessment for superseded versions**

Process	Version	Date	Last Date for Assessment
Registration	1	24 February 1998	31 December 2021
Review	2	28 June 1999	31 December 2021
Revision	3	3 April 2001	31 December 2021
Review	4	23 November 2003	31 December 2021
Rollover and Revision	5	19 March 2010	31 December 2021
Review	6	26 July 2018	31 December 2021

<b>Consent and Moderation Requirements (CMR) reference</b>	0003
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This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.