

Title	Operate automatic assembly equipment for printed circuit boards		
Level	3	Credits	35

Purpose	<p>This unit standard covers the operation of equipment designed to automatically populate printed circuit boards (PCB) with through-hole or surface mount components in electronic manufacturing. This includes flow soldering or bonding of the components.</p> <p>People credited with this unit standard are able to:</p> <ul style="list-style-type: none"> –set up automatic assembly equipment; and –ensure build performance of automatically assembled printed circuit boards.
----------------	---

Classification	Electronic Engineering > Electronic Manufacturing
-----------------------	---

Available grade	Achieved
------------------------	----------

Guidance Information

- 1 Competence in the use of relevant assembly software packages is assumed.
- 2 Definitions
 - through-hole (or leaded) components* – components that use leads or wires for their connection to a printed circuit board.
 - surface mount devices (SMD)* – components that are bonded directly to the circuit board.
- 3 Range
 - a either automatic assembly of printed circuit boards using through-hole component technology, and flow soldering;
 - b or automatic assembly of printed circuit boards with SMD technology using either solder or glue placement, and a solder reflow operation.
- 4 References
 - Hazardous Substances and New Organisms Act 1996;
 - 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.
 - IPC-S-816, *SMT Process Guideline and Checklist*, July 1993, published by IPC – Association Connecting Electronics Industries.

- 5 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, and the Hazardous Substances and New Organisms Act 1996.
- 6 People who are registered as physically disabled may achieve this unit standard with exemption from the physical loading and mechanical equipment adjustment criteria in both outcomes.

Outcomes and performance criteria

Outcome 1

Set up automatic assembly equipment.

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, functionality, loading in feeders, polarity;
equipment – settings, adjustments, calibrations.
- 1.2 Loading and setting operations do not compromise the operational integrity of the machine.
- Range operations may include but are not limited to – registration and component feed settings.
- 1.3 Component and board integrity is not affected by setup or handling operations.
- Range PCB and component physical structure, appearance, finish, electrostatic discharge (ESD) effects.
- 1.4 The equipment setup and operation conform to enterprise safety requirements and present no uncontrolled hazards to any person.
- Range safety screen status, specified enterprise operational safety protocols.
- 1.5 Process checks provide results that comply with job instructions, and meet industry standards.
- Range IPC standards, or equivalent, for component placement, bonding, soldering.

Outcome 2

Ensure build performance of automatically assembled printed circuit boards.

Performance criteria

2.1 Completed boards comply with industry quality standards.

Range IPC standards, or equivalent, for registration accuracy, missing components, misplaced components, insertion failure, bonding integrity.

2.2 Checks confirm the continuing integrity of equipment operations.

Range checks include assembled board inspection, component availability, machine settings, machine warnings.

2.3 Enterprise procedures are followed to solve operational problems.

Range valid methods may include but are not limited to – use of equipment guides, technical assistance, fault finding trees, cause and effect analysis, process analysis.

2.4 Procedures for dealing with abnormal equipment conditions and emergencies are known.

Range examples of emergencies may include – machine shutdown, machine failure, occurrences of known operational hazards.

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

Consent and Moderation Requirements (CMR) reference

0003

This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.