

Title	Construct a simple printed circuit		
Level	2	Credits	3

Purpose	<p>This unit standard is intended for use in high school or pre-employment electronics courses, or in the training of electronics technicians. It covers the creation of simple electronic circuits using printed circuit board (PCB).</p> <p>People credited with this unit standard are able to:</p> <ul style="list-style-type: none"> – make a printed circuit board for a simple electronic circuit; – demonstrate safe hand soldering practices; and – hand solder electronic components and wires.
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Classification	Electronic Engineering > Electronics Technology
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Available grade	Achieved
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Explanatory notes

- 1 For the purpose of this unit standard, printed circuit board (PCB) construction and soldering should be assessed at amateur or hobby level. Professional or industrial standards are not expected, nor is the use of computer aided drafting software for PCB design.
- 2 Health and safety precautions relevant to the chemicals used and to the type of operation performed must be strictly observed at all times during assessment of this unit standard.
Refer to the publication *Safety in Technology Education – A Guidance Manual for New Zealand Schools*, (1998 edition) published for the Ministry of Education by Learning Media Ltd, PO Box 3293, Wellington.
<http://technology.tki.org.nz/Curriculum-support/Safety-and-Technology-Education>

In addition, cutting and drilling of fibreglass PCB must be such as to minimise exposure to fibreglass dust and particles.

Outcomes and evidence requirements

Outcome 1

Make a PCB for a simple electronic circuit.

Range PCB – single sided laminate, using direct etch or photoresist method;
simple electronic circuit – typically two to three transistors or equivalent.

Evidence requirements

- 1.1 PCB layout diagram is drawn from circuit schematic, following logical layout practice for components, and allowing for mounting of input and output connections as appropriate.
- 1.2 The design is transferred to the PCB, and the board etched in accordance with manufacturers' specifications, and excess board cut off if necessary.
- 1.3 The PCB is drilled to match the components, and trimmed if necessary.

Outcome 2

Demonstrate safe hand soldering practices.

Evidence requirements

- 2.1 Adequacy of ventilation is checked and goggles are worn throughout soldering operations in accordance with *Safety in Technology Education – A Guidance Manual for New Zealand Schools*.
- 2.2 Soldering iron tips are cleaned and tinned in accordance with manufacturer's recommendations.
- 2.3 Power leads are not damaged during use of the soldering iron.
- 2.4 Components to be soldered are cleaned, and tinned if necessary.
- 2.5 Soldering iron tip has reached operating temperature prior to use.
- 2.6 Use of wrist strap and electrostatic discharge mat to prevent damage to components sensitive to electrostatic charge is demonstrated.

Outcome 3

Hand solder electronic components and wires.

Range wires – single and multi strand;
components – for one PCB as in outcome 1, and including terminals and connecting wires.

Evidence requirements

- 3.1 Soldered joints support components and wires mechanically.
- 3.2 Solder has flowed onto the parts to be joined without the formation of 'dry' joints.
- 3.3 Soldering does not cause short circuits to adjacent tracks or components.
- 3.4 Soldering does not cause heat damage of components, wire insulation, and PCB tracks.

3.5 A broken PCB track is repaired without causing further damage.

3.6 Components are de-soldered without damage to components and PCB.

Range evidence of de-soldering a resistor, a diode, and a transistor.

Planned review date	31 December 2018
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Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	30 April 2001	31 December 2012
Revision	2	12 March 2002	31 December 2012
Revision	3	17 March 2004	31 December 2012
Review	4	25 May 2007	N/A
Rollover and Revision	5	15 March 2012	N/A
Revision	6	15 January 2014	N/A
Rollover and Revision	7	27 January 2015	N/A

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

Please note

Providers must be granted consent to assess against standards (accredited) by NZQA, before they can report credits from assessment against unit standards or deliver courses of study leading to that assessment.

Industry Training Organisations must be granted consent to assess against standards by NZQA before they can register credits from assessment against unit standards.

Providers and Industry Training Organisations, which have been granted consent and which are assessing against unit standards must engage with the moderation system that applies to those standards.

Requirements for consent to assess and an outline of the moderation system that applies to this standard are outlined in the Consent and Moderation Requirements (CMR). The CMR also includes useful information about special requirements for organisations wishing to develop education and training programmes, such as minimum qualifications for tutors and assessors, and special resource requirements.

Comments on this unit standard

Please contact The Skills Organisation reviewcomments@skills.org.nz if you wish to suggest changes to the content of this unit standard.