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| <b>Title</b> | <b>Construct, and report on the performance of, a simple electronic programmable circuit</b> |                |          |
| <b>Level</b> | <b>3</b>   | <b>Credits</b> | <b>4</b> |

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| <b>Purpose</b> | <p>This unit standard is intended for use in a senior secondary school environment, pre-employment electronics courses, or for electronics technicians.</p> <p>People credited with this unit standard are able to:</p> <ul style="list-style-type: none"> <li>– identify and select electronic components from given samples to match a supplied schematic;</li> <li>– construct a circuit based on a given specification for a simple electronic programmable circuit;</li> <li>– programme a microcontroller; and</li> <li>– report on the construction and performance of the circuit.</li> </ul> |
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| <b>Classification</b> | Electronic Engineering > Electronics Technology |
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| <b>Available grade</b> | Achieved, Merit, and Excellence |
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| <b>Entry information</b>                |  |
| <b>Recommended skills and knowledge</b> | Unit 18240, <i>Demonstrate knowledge of basic electronic components</i> ; and Unit 18241, <i>Demonstrate knowledge of basic electronic systems</i> . |

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| <b>Criteria for Merit</b> | For merit to be awarded, the candidate must meet the merit criteria specified in evidence requirement 4.1. |
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| <b>Criteria for Excellence</b> | For excellence to be awarded, the candidate must meet the excellence criteria specified in evidence requirement 4.1. |
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## Explanatory notes

### 1 Assessment definitions

*Describe* – for the purpose of this unit standard means to relate, recount, or characterise in sequence or story form.

*Explain* – for the purpose of this unit standard means to interpret and clarify points, and investigate causes where possible.

*Discuss* – for the purpose of this unit standard means to evaluate and analyse processes, draw comparisons and suggest options or alternatives.

## 2 References

Health and Safety in Employment Act 1992;  
*Safety in Technology Education: A Guidance Manual for New Zealand Schools*,  
available from <http://technology.tki.org.nz/Curriculum-support/Safety-and-Technology-Education>;  
and all subsequent amendments and replacements.

## 3 Definitions

*PCB* – printed circuit board.

*Simple electronic programmable circuit* – for the purposes of this unit standard means a working electronic circuit comprising fewer than twenty components that incorporates analogue and/or digital hardware with software control.

*Specification* – document that describes the requirements for hardware and software of the circuit including key circuit values.

4 Evidence presented for assessment against this unit standard must be based on a given specification provided by the assessor.

## 5 Range

a Circuit selection may include but is not limited to one of – greenhouse controller, alarm system, sound effects generator, electronic game.

b Circuit to be constructed on a PCB prepared by the candidate.

c All measurements are to be expressed in Système International (SI) units, and, where required, converted from Imperial units into SI units.

d All activities must comply with any policies, procedures, and requirements of the organisations involved.

e Laboratory and workshop safety practices are to be observed at all times.

f It is recommended that a diary or log be kept for each stage of the process and may include – sketches, diagrams, schematics, photos, videos.

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## Outcomes and evidence requirements

### Outcome 1

Identify and select electronic components from provided samples to match a supplied schematic.

#### Evidence requirements

1.1 Components are identified from provided samples.

Range values, tolerances, pinouts.

1.2 Components are selected from provided samples to match the schematic.

### Outcome 2

Construct a circuit based on a provided specification for a simple electronic programmable circuit.

#### Evidence requirements

- 2.1 A PCB is produced in accordance with circuit requirements.
- 2.2 Components are assembled and connected in circuit on the PCB to meet the requirements of the given specification.

### Outcome 3

Programme a microcontroller.

#### Evidence requirements

- 3.1 Programme structures are selected from a given range to meet the requirements of the given specification.
- 3.2 A microcontroller is programmed to enable the circuit to perform to meet the requirements of the given specification.

### Outcome 4

Report on the construction and performance of the circuit.

Range report will be based on the diary or log.

#### Evidence requirements

- 4.1 The construction and performance of a simple electronic programmable circuit is described in a report.

Range hardware, software, key circuit values.  
Key circuit values may include but are not limited to one or more of – voltage, current, resistance, power, frequency, amplitude, gain.

For merit – the candidate must describe and explain the construction and performance of the circuit in the report. The explanation must include reference to the behaviour of the circuit in relation to the requirements of the given specification and must provide reasons for possible differences.

For excellence – the candidate must describe and explain as for merit, and discuss the performance of the circuit in the report. The discussion must include suggestions for improvements to the circuit and the effects these may have, and compare the circuit to a circuit of similar function in an applied context.

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| <b>Planned review date</b> | 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       | 16 April 2010   | 31 December 2012         |
| Review                | 2       | 15 April 2011   | 31 December 2013         |
| Rollover and Revision | 3       | 15 March 2012   | N/A                      |
| Revision              | 4       | 15 January 2014 | N/A                      |
| Rollover and Revision | 5       | 27 January 2015 | N/A                      |

**Consent and Moderation Requirements (CMR) reference**

0003

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](mailto:reviewcomments@skills.org.nz) if you wish to suggest changes to the content of this unit standard.