

<b>Title</b>	<b>Demonstrate knowledge of and build circuits using digital electronic devices that interface with ADC and DAC functions</b>		
<b>Level</b>	<b>3</b>	<b>Credits</b>	<b>3</b>

<b>Purpose</b>	<p>This unit standard is intended for use in a senior secondary school environment, pre-employment electronics courses, or electronics technicians.</p> <p>People credited with this unit standard are able to:</p> <ul style="list-style-type: none"> <li>– describe the operation of digital electronic devices;</li> <li>– demonstrate knowledge of the operation of ADC and DAC circuits and analogue-digital conversion; and</li> <li>– construct circuits to demonstrate ADC or DAC functions.</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>Criteria for Merit</b>	For merit to be awarded, the candidate must meet the merit criteria specified in evidence requirement 2.4.
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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 2.4.
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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, or 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
 

*ADC* – analogue-to-digital conversion.

DAC – digital-to-analogue conversion.

*Digital electronic devices* – integrated circuits with discrete functions such as buffer, inverter, monostable, astable, Schmitt trigger, half-adder, decoder/driver, JK-flipflop.

#### 4 Range

- a All activities must comply with any policies, procedures, and requirements of the organisations involved.
- b Laboratory and workshop safety practices are to be observed at all times.

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## Outcomes and evidence requirements

### Outcome 1

Describe the operation of digital electronic devices.

Range evidence of four devices is required.

#### Evidence requirements

- 1.1 The operation of digital electronic devices is described in terms of input, output, and process.
- 1.2 One practical application for each of the digital electronic *each digital electronic device* described.

### Outcome 2

Demonstrate knowledge of the operation of ADC and DAC circuits and analogue-digital conversion.

#### Evidence requirements

- 2.1 Analogue and digital information are described and a distinction is drawn between them.
- 2.2 The operation of a three-bit ADC circuit is described.
- 2.3 The operation of a three-bit DAC circuit is described.
- 2.4 Analogue-to-digital and digital-to-analogue converts are described with reference to a practical application.

For merit – the candidate must describe and explain analogue-digital conversion. The explanation must include examples of analogue-digital conversion in three practical applications and give reasons for why this is needed in these applications.

For excellence – the candidate must describe and explain as for merit, and discuss three different techniques of analogue-digital conversion as used in practical applications.

**Outcome 3**

Construct circuits to demonstrate ADC or DAC functions.

**Evidence requirements**

3.1 Using either discrete components or a programmed microcontroller circuits are constructed to demonstrate how digital electronic devices can be linked to ADC or DAC functions.

Range evidence of four digital electronic devices in one or more circuits is required.

<b>Replacement information</b>	This unit standard replaced unit standard 19744.
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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	N/A
Rollover and Revision	3	15 March 2012	N/A
Revision	4	15 January 2014	N/A
Rollover	5	27 January 2015	N/A

<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>.

**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.

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### **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.