Title	**Demonstrate knowledge of the practical applications of logic circuits**		
Level	**3**	**Credits**	**3**

Purpose	This unit standard is intended for use in a senior secondary school environment, pre-employment electronics courses, or for electronics technicians. People credited with this unit standard are able to: – demonstrate knowledge of logic circuits; and – construct compound logic circuits and demonstrate knowledge of their applications.

Classification	Electronic Engineering > Electronics Technology

Available grade	Achieved, Merit, and Excellence

Criteria for Merit	For merit to be awarded, the candidate must meet the merit criteria specified in evidence requirement 2.2.

Criteria for Excellence	For excellence to be awarded, the candidate must meet the excellence criteria specified in evidence requirement 2.2.

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

Boolean logic – for the purpose of this unit standard means the logic expressed by a suitable truth table.
Boolean logic functions:
AND – the Boolean function that is true only if all its arguments are true.
NAND – Not AND, the Boolean function that is true unless both its arguments are true, the logical complement of AND.
NOR – Not OR, the Boolean function that is true if none of its inputs are true. It is the logical complement of inclusive OR.
NOT – the Boolean function that is true only if its input is false.
OR – the Boolean function that is true if any of its arguments are true.
XOR – exclusive OR gate, a two-input Boolean logic function with an output that is true if one input is true and the other is false.
Compound logic circuit – for the purpose of this unit standard means a circuit comprising at least four logic functions, at least three of which are different.
Half-adder – a logic circuit that performs an addition operation on two one-bit binary numbers.
Logic gates – circuits that perform Boolean logic operations that may be discrete or PLA-based.
PLA – programmable logic array.
Specification – document that describes the requirements for hardware and software of the prototype, including the values of key circuit variables.
Truth tables – mathematical tables used to define Boolean logic operations.

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.

Outcomes and evidence requirements

Outcome 1

Demonstrate knowledge of logic circuits.

Evidence requirements

1.1 Binary terminology is described.

Range up to and including eight bit numbers.

1.2 Truth tables are used to describe simple logic gates.

Range AND, OR, NOT, NAND, NOR, XOR, half-adder.

1.3 The functions of simple logic gate circuits are demonstrated.

Range AND, OR, NOT, NAND, NOR, XOR, half-adder.

Outcome 2

Construct compound logic circuits and demonstrate knowledge of their applications.

Range evidence of two circuits is required.

Evidence requirements

2.1 Compound logic circuits are constructed to a given specification and their truth tables drawn.

2.2 One practical application for each compound logic circuit is described.

For merit – the candidate must describe how the practical applications function for the compound logic circuits and explain how the application works.

For excellence – the candidate must describe and explain as for merit, and discuss practical applications for the compound logic circuits.

Planned review date	31 December 2018

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

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 if you wish to suggest changes to the content of this unit standard.