Title	Plan, construct, modify, and report on an electronic prototype		
Level	3	Credits	6

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:
	– develop a project plan to cover the stages of the construction and modification of a working prototype of an electronic product;
	– identify and utilise basic electronic components and processes to construct an electronic prototype;
	– modify the prototype; and
	– report on the development and performance of the prototype and modified prototype.

Classification	Electronic Engineering > Electronics Technology

Available grade	Achieved, Merit, and Excellence

Entry information	
Recommended skills and knowledge	Unit 26119, *Construct, and report on the performance of, a simple electronic programmable circuit*; and Unit 26120, *Describe and construct circuits to demonstrate the operation and properties of electronic devices*.

Criteria for Merit	For merit to be awarded, the candidate must meet the merit criteria specified in evidence requirement 4.1.

Criteria for Excellence	For excellence to be awarded, the candidate must meet the excellence criteria specified in evidence requirement 4.1.

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
      Mock-up – may include interim bread boarded circuits or simulation and emulation
      programmes, such as Crocodile Clips (hardware) or PICAXE Programme Editor
      software.
      Modification specification – document that specifies outcomes, including altered
      function and expected key circuit values (e.g. voltage, current, resistance, power,
      frequency, amplitude, gain) for the prototype.
      Specification – document that describes the requirements for hardware and software
      of the prototype, including the values of key circuit variables.

4   Evidence presented for assessment against this unit standard must be based on a
      project specification and modifications negotiated with, and approved by, the
      assessor.

5   Work for this unit standard may be carried out as part of a small group. Each
      candidate must present evidence of individual competence against the outcomes of
      this unit standard.

6   Range
      a The prototype must include at least four transducers and a programmed
         microcontroller. The four transducers should include at least one integrated circuit
         device.
      b Project components are to be assembled and soldered on a printed circuit board in
         accordance with electronics industry standards.
      c The prototype needs to be functional and must be housed in an appropriate
         container, with an effective user-interface.
      d The embedded programme should reflect best practice in algorithm selection,
         programme structure, and annotation.
      e All activities must comply with any policies, procedures, and requirements of the
         organisations involved.
      f Laboratory and workshop safety practices are to be observed at all times.
      g It is recommended that a diary or log be kept for each stage of the process and
         may include – sketches, diagrams, schematics, photos, videos.

Outcomes and evidence requirements

Outcome 1

Develop a project plan to cover the stages of the construction and modification of a working prototype of an electronic product.

Evidence requirements

1.1 A project management tool is selected to enable project planning.

1.2 A project plan is developed to meet the requirements of an approved project specification using the selected project management tool.

   Range   project plan includes – timelines, task breakdown, reporting milestones, resources required, budget;
            project plan may include – roles, responsibilities.

Outcome 2

Identify and utilise basic electronic components and processes to construct an electronic prototype.

Evidence requirements

2.1 Electronic components and processes suitable for the development of the prototype are identified to meet the requirements of the project specification and project plan.

2.2 Electronic or mock-up trials are conducted to test and refine the concept to meet the requirements of the project specification and project plan.

2.3 Electronic components and processes are used to construct a prototype to meet the requirements of the project specification and project plan.

   Range   soldering to industry standard, tidy board layout, annotated programme, suitable container, effective user interface.

2.4 Tests confirm that the prototype meets the requirements of the project specification.

Outcome 3

Modify the prototype.

Evidence requirements

3.1 The prototype is modified to meet the requirements of an approved modification specification.

3.2 The prototype is evaluated against the modification specification.

Outcome 4

Report on the development and performance of the prototype and modified prototype.

Evidence requirements

4.1   The development process and performance of the prototype and modified prototype is described in a report.

Range   report will be based on the diary or log and is to include reference to – planning, design process, component procurement, construction procedure, testing, design adjustment.

For merit – the candidate must describe and explain the development process and performance of the prototype and modified prototype in the report. The explanation must include reference to the behaviour of the prototype and modified prototype in relation to the requirements of the given specification and modification brief and it must provide possible reasons for any differences.

For excellence – the candidate must describe and explain as for merit and discuss the development process and performance of the prototype and modified prototype in the report. The discussion must compare the prototype to at least one commercial example of similar function or technology; the identification of shortcomings in the prototype design; and suggestions for improvements that will address these shortcomings.

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