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

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| Purpose | <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"> – plan, construct, and modify an electronic prototype. |
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| Classification | Electronic Engineering > Electronics Technology |
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| Available grade | Achieved, Merit, and Excellence |
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| Criteria for Merit | The candidate must provide an in-depth description of the prototype and modified prototype that includes a reference to the behaviour of the circuit, and possible reasons for any differences. |
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| Criteria for Excellence | The candidate must provide a comprehensive description of the prototype and modified prototype that includes the identification of shortcomings in the design, and suggestion for improvements that will address these shortcomings. |
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Guidance Information

- 1 Recommended unit standards for entry:
 Unit 26119, *Construct, and describe the performance of, a simple electronic programmable circuit*; and
 Unit 26120, *Describe and construct circuits to demonstrate the operation and properties of electronic devices*.
- 2 This unit standard can be awarded with Achieved, Merit, or Excellence. For the Achieved grade to be awarded, the outcome must be achieved as specified in the outcome statement. For Merit or Excellence to be awarded, the candidate must meet the Merit or Excellence criteria specified above.
- 3 Definitions
Mock-up – may include interim bread boarded circuits or simulation and emulation programmes or 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 all the requirements of this unit standard.
- 6 **References**
Health and Safety at Work Act 2015;
Safety in Technology Education – A Guidance Manual for New Zealand Schools, available from <https://technology.tki.org.nz/Technology-in-the-NZC/Safety-in-Technology-Education>;
and all subsequent amendments and replacements.
- 7 **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 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 performance criteria

Outcome 1

Plan, construct, and modify an electronic prototype.

Performance criteria

- 1.1 Develop a plan for the construction and modification of a working prototype of an electronic product using a project management tool.

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

1.2 Construct an electronic prototype using basic electronic components and processes to meet the requirements of the project specification and project plan.

Range includes selecting components, mock-up trial to test and refine the concept, effective soldering to industry standards, user interface is effective, testing to meet specifications.

1.3 Modify the prototype and evaluate against the modification specification.

1.4 Describe the development process and performance of the prototype and modified prototype.

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

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| Planned review date | 31 December 2025 |
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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 2024 |
| Rollover and Revision | 3 | 15 March 2012 | 31 December 2024 |
| Revision | 4 | 15 January 2014 | 31 December 2024 |
| Rollover and Revision | 5 | 27 January 2015 | 31 December 2024 |
| Review | 6 | 24 June 2021 | N/A |

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| 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>.

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.