Achievement Standard

Subject Reference	Digital Technologies 2.48				
Title	Implement advanced interfacing procedures in a specified electronic environment				
Level	2	**Credits**	3	**Assessment**	Internal
Subfield	Technology				
Domain	Digital Technologies				
Status	Expiring			**Status date**	29 November 2018

This achievement standard is expiring. Assessment against the standard must take place before the expiry date set out below.

Expiry date	31 December 2019	**Date version published**	29 November 2018

This achievement standard involves implementing advanced interfacing procedures in a specified electronic environment.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
• Implement advanced interfacing procedures in a specified electronic environment.	• Skilfully implement advanced interfacing procedures in a specified electronic environment.	• Efficiently implement advanced interfacing procedures in a specified electronic environment.

Explanatory Notes

1 This achievement standard is derived from Level 7 of the Technology learning area in *The New Zealand Curriculum*, Learning Media, Ministry of Education, 2007; and is related to the material in the *Teaching and Learning Guide for Technology*, Ministry of Education at http://seniorsecondary.tki.org.nz.

Further information can be found at http://www.technology.tki.org.nz/.

Appropriate reference information is available in *Safety and Technology Education: A Guidance Manual for New Zealand Schools,* Ministry of Education at

http://technology.tki.org.nz/Curriculum-support/Safety-and-Technology-Education, and the Health and Safety at Work Act 2015.

This standard is also derived from *Te Marautanga o Aotearoa*. For details of *Te Marautanga o Aotearoa* achievement objectives to which this standard relates, see the Papa Whakaako for the relevant learning area.

2 *Implement advanced interfacing procedures in a specified electronic environment* involves:

- using provided functional sensor subsystems to interact with the environment (e.g.light sensors that allow a line-following robot to decode markings on a path)
- using provided functional actuator subsystems to interact with the environment (e.g.shutters that control greenhouse light level)
- writing software that interfaces with the data provided by the sensors and with the actuators it controls (e.g.analogue to digital conversion (ADC), data processing subroutines)
- testing and debugging a functional model of the interface.

Skilfully implement advanced interfacing procedures in a specified electronic environment involves:

- modifying sensor subsystems to improve the quality of the data delivered by the interface
- modifying actuator subsystems to improve the way they work
- writing annotated, readily understandable software that interfaces with the data provided by the sensors and with the actuators it controls
- testing and debugging a functional model of the interface to achieve and demonstrate improved operation.

Efficiently implement advanced interfacing procedures in a specified electronic environment involves:

- modifying sensor subsystems to substantially improve the quality of the data delivered by the interface
- modifying actuator subsystems to substantially improve the way they work
- writing well-structured, clearly annotated, readily understandable software that interfaces effectively with the data provided by the sensors and with the actuators it controls
- testing and debugging a functional model of the interface to achieve and demonstrate substantially improved operation.

3 *A specified electronic environment* refers to a functional combination of hardware and embedded software with given specifications that define the functional qualities required. The specifications must be of sufficient rigour to allow the student to meet the standard. They may be teacher-given or developed in negotiation with the student. Specifications for this achievement standard will include sensor and actuator requirements and relate to the development of hardware and software for purposes which may include but are not limited to:

- environmental monitoring
- simple robotics

- elevator and traffic light scenarios
- conveyor belt control.

4 *Advanced interfacing procedures* relate to the selection, testing and debugging of the hardware and software that allow sensors and actuators to work together compatibly to meet the given specifications for the specified electronic environment. The sensor and actuator subsystems to be used will be provided by the teacher.

5 *Advanced interfacing procedures* may include but are not limited to:

- selecting the best type and value of component
- selecting the best arrangement of components
- modifying hardware input and/or output parameters
- modifying software parameters
- EMI suppression in motors and relays
- using a multimeter to measure and report voltage and/or current levels at indicated points.

6 Conditions of Assessment related to this achievement standard can be found at http://ncea.tki.org.nz/Resources-for-Internally-Assessed-Achievement-Standards.

Replacement Information

This Achievement Standard, AS91374, and AS91376 were replaced by AS91894.

Quality Assurance

1 Providers and Industry Training Organisations must have been granted consent to assess by NZQA before they can register credits from assessment against achievement standards.

2 Organisations with consent to assess and Industry Training Organisations assessing against achievement standards must engage with the moderation system that applies to those achievement standards.

Consent and Moderation Requirements (CMR) reference 0233