Title	**Demonstrate knowledge of integrated electronic devices, multiplexing, and microprocessors in the automotive industry**		
Level	**3**	**Credits**	**4**

Purpose	People credited with this unit standard are able to demonstrate knowledge of: digital fundamentals for automotive circuits; multiplex wiring for automotive circuits; and microprocessors used in automotive circuits.

Classification	Motor Industry > Automotive Electrical and Electronics

Available grade	Achieved

Guidance Information

1 It is recommended that people hold credit for Unit 24131, *Demonstrate knowledge of electronic components and their application in the automotive industry* before being assessed against this unit standard.

2 Evidence presented for assessment against this unit standard must be consistent with safe working practices and be in accordance with applicable service information, and company requirements and legislative requirements. This includes the knowledge and use of suitable tools and equipment.

3 Performance of the outcomes of this unit standard must comply with the following: Health and Safety at Work Act 2015.

4 Any new, amended or replacement Acts, regulations, standards, codes of practice, guidelines, or authority requirements or conditions affecting this unit standard will take precedence for assessment purposes, pending review of this unit standard.

5 Definitions
Company requirements refer to instructions to staff on policy and procedures that are available in the workplace. These requirements may include – company policies and procedures, work instructions, product quality specifications and legislative requirements.
Service information refers to technical information for a vehicle, machine, or product detailing operation; installation and servicing procedures; manufacturer instructions; technical terms and descriptions; and detailed illustrations.
Suitable tools and equipment means industry approved tools and equipment that are recognised within the industry as being the most suited to complete the task in a professional and competent manner with due regard to safe working practices.

6 Information on automotive electrical principles can be found from: training providers, industry and/or manufacturer courses; vehicle workshop manuals; automotive

electrical and electronic textbooks (contact a local book retailer, school or polytechnic library or the public library lending service).

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of digital fundamentals for automotive circuits.

Performance criteria

1.1 The differences between analogue and digital electronics are compared.

Range chart differences in on-off characteristics.

1.2 Logic gate operation is described.

Range or, and, not, truth tables.

1.3 Integrated circuits are described.

1.4 Purpose and function of integrated circuits are described.

Outcome 2

Demonstrate knowledge of multiplex wiring for automotive circuits.

Performance criteria

2.1 The application of multiplexing for automotive circuits is identified.

Range electronic control unit (ECU) networking, systems control.

2.2 The basic principles of multiplexing are explained.

Range single wire current driven, twisted pair, voltage driven, communication protocols and language.

Outcome 3

Demonstrate knowledge of microprocessors used in automotive circuits.

Performance criteria

3.1 The operation of memory devices for automotive circuits is described.

Range storing the programme, holding information data for inputs and outputs.

3.2 Terminology associated with microprocessors is described.

Range random access memory (RAM), read only memory (ROM), electronic control module (ECM), input/output, keep alive memory (KAM), bit.

3.3 A block diagram is drawn to describe parts of a microprocessor.

Range control module, arithmetic and logical unit, registers, accumulator, clock.

3.4 The use of microprocessors for automotive systems is described.

Range as an ECM, controlling a system, signal recognition, network integration.

3.5 A block diagram is drawn to describe sections of an ECM.

Range microprocessor, memory section, input-output section.

3.6 The difference between a microprocessor and a microcontroller is identified.

Replacement information	This unit standard, unit standard 24129, unit standard 24130, and unit standard 24131 replaced unit standard 5464. This unit standard and unit standard 24131 replaced unit standard 8187.

Planned review date	31 December 2025

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	25 January 2008	31 December 2022
Review	2	25 March 2021	N/A

Consent and Moderation Requirements (CMR) reference	0014

This CMR can be accessed at http://www.nzqa.govt.nz/framework/search/index.do.

Comments on this unit standard

Please contact MITO New Zealand Incorporated info@mito.org.nz if you wish to suggest changes to the content of this unit standard.