

<b>Title</b>	<b>Demonstrate knowledge of basic electronic systems</b>		
<b>Level</b>	<b>2</b>	<b>Credits</b>	<b>5</b>

<b>Purpose</b>	<p>People credited with this unit standard are able to demonstrate knowledge of:</p> <ul style="list-style-type: none"> <li>– resistive voltage dividers;</li> <li>– a resistor-capacitor circuit;</li> <li>– resistor-diode combinations;</li> <li>– transistor switches; and</li> <li>– d.c. voltage in a single transistor amplifier.</li> </ul>
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<b>Classification</b>	Electronic Engineering > Electronics Technology
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<b>Available grade</b>	Achieved
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### Guidance Information

- 1 Suitable drawing symbols can be found in Robertson, M, *Electronics for Young Entrepreneurs* (2016), available from The Skills Organisation, [www.skills.org.nz](http://www.skills.org.nz).
- 2 Definitions  
*Basic electronic systems* refer to the following combinations of two or more electronic components:
  - resistive voltage divider;
  - capacitance charge-discharge circuit;
  - resistor-diode combination;
  - resistor-zener diode combination;
  - single transistor used as switch or a basic amplifier;*d.c.* – direct current;  
*LDR* – light dependent resistor.
- 3 Assessment  
 Where needed, sketches and drawings may be used to aid explanations.
- 4 Range
  - a All calculations and measurements must be expressed in Système International (SI) units and multipliers.
  - b Use of resistor and capacitor colour coding charts is permitted during assessment.

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### Outcomes and performance criteria

#### Outcome 1

Demonstrate knowledge of resistive voltage dividers.

**Performance criteria**

- 1.1 Calculate the component values for a two-resistance voltage divider given input voltage and desired output voltage.
- 1.2 Calculate the output voltage of a two-resistance voltage divider from the input voltage and the resistance values.
- 1.3 Explain the behaviour of a voltage divider using an LDR and a fixed resistor with reference to changes in light level.
- 1.4 Take measurements to confirm the calculations carried out in performance criteria 1.1 and 1.2.

**Outcome 2**

Demonstrate knowledge of a resistor-capacitor circuit.

**Performance criteria**

- 2.1 Explain the charge and discharge characteristics of a capacitor through a resistor and confirm by measurement.  
  
Range characteristics – voltage vs time, and current vs time for charging and discharging.
- 2.2 Explain the concept of time constant in terms of the time to charge or discharge a capacitor.
- 2.3 Determine the time constant for a resistor-capacitor combination.

**Outcome 3**

Demonstrate knowledge of resistor-diode combinations.

**Performance criteria**

- 3.1 Explain the behaviour of resistor-diode combinations using circuit schematics and characteristic curves.
- 3.2 State the characteristics of a zener diode-resistor voltage regulator using circuit schematics and characteristic curves.
- 3.3 Take measurements to confirm the explanation and sketches.

**Outcome 4**

Demonstrate knowledge of transistor switches.

**Performance criteria**

- 4.1 Explain the operation of a transistor switch circuit in terms of its on and off conditions.
- 4.2 Take a measurement to confirm the explanation of performance criterion 4.1.
- 4.3 Describe the function of a transistor switch in a practical application.

**Outcome 5**

Demonstrate knowledge of d.c. voltage in a single transistor amplifier.

Range voltage divider with a transistor emitter resistor.

**Performance criteria**

- 5.1 Explain the functions of all components.
- 5.2 Calculate collector, base, and emitter voltages in a given circuit.
- 5.3 Take measurements to confirm correct use of calculation procedures.

<b>Planned review date</b>	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	30 April 2001	31 December 2012
Revision	2	12 March 2002	31 December 2012
Revision	3	17 March 2004	31 December 2012
Review	4	25 May 2007	31 December 2024
Rollover and Revision	5	15 March 2012	31 December 2024
Revision	6	15 January 2014	31 December 2024
Rollover and Revision	7	27 January 2015	31 December 2024
Review	8	24 June 2021	N/A

<b>Consent and Moderation Requirements (CMR) reference</b>	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](mailto:reviewcomments@skills.org.nz) if you wish to suggest changes to the content of this unit standard.