

Title	Demonstrate knowledge of basic electronic systems		
Level	2	Credits	5

Purpose	<p>This unit standard is intended for use in high school or pre-employment electronics courses, or in the training of electronics technicians. It covers basic electronic systems.</p> <p>People credited with this unit standard are able to demonstrate knowledge of:</p> <ul style="list-style-type: none"> – resistive voltage dividers; – a resistor-capacitor circuit in response to a step voltage; – resistor-diode combinations; – the transistor switch; and – d.c. bias of a single transistor circuit.
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Classification	Electronic Engineering > Electronics Technology
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Available grade	Achieved
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Explanatory notes

1 Definitions

Basic electronic systems refers 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;
 d.c. – direct current;
 LDR – light dependent resistor.

2 Range

- a All calculations and measurements are to be expressed in Système International (SI) units and multipliers.
- b Use of resistor and capacitor colour coding charts is permitted during assessment.

3 Suitable drawing symbols can be found in Robertson, M, *Electronics for Young Entrepreneurs* (2002), which is available from The Skills Organisation, PO Box 24-469, Royal Oak, Auckland 1345.

Outcomes and evidence requirements

Outcome 1

Demonstrate knowledge of resistive voltage dividers.

Evidence requirements

- 1.1 The component values for a two resistance voltage divider are calculated given input voltage and desired output voltage.
- 1.2 The output voltage of a two resistance voltage divider is calculated from the input voltage and the resistance values.
- 1.3 The behaviour of a voltage divider using an LDR and a fixed resistor is explained with reference to changes in light level.
- 1.4 Measurements confirm the calculations.

Outcome 2

Demonstrate knowledge of a resistor-capacitor circuit in response to a step voltage.

Evidence requirements

- 2.1 The charge and discharge characteristics of a capacitor through a resistor are explained and sketched, and confirmed by measurement.

Range characteristics – voltage across capacitor vs time, charging-discharging current vs time.
- 2.2 The concept of time constant is explained in terms of the time to charge or discharge a capacitor by 63%.
- 2.3 The time constant of a given resistor-capacitor combination is calculated with units.

Outcome 3

Demonstrate knowledge of resistor-diode combinations.

Evidence requirements

- 3.1 The behaviour of resistor-diode combinations are explained with sketches of schematics and characteristic curves.

Range diodes – small signal or power diode, light emitting diode.
- 3.2 The characteristics of a zener diode-resistor voltage regulator are explained with sketches of schematic, and characteristic curves.
- 3.3 Measurements confirm the explanation and sketches.

Outcome 4

Demonstrate knowledge of the transistor switch.

Range transistor switch – using a single transistor.

Evidence requirements

- 4.1 The circuit of transistor switch is sketched, and its operation explained with respect to the on and off conditions.
- 4.2 Measurement confirms the explanation of evidence requirement 4.1.
- 4.3 The function of a transistor switch in a practical application is described with reference to a circuit diagram.

Outcome 5

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

Range voltage divider with a transistor emitter resistor.

Evidence requirements

- 5.1 The functions of all components are explained with reference to sketches drawn from memory.
- 5.2 Collector, base, and emitter voltages are calculated in a given circuit.
- 5.3 Measurements confirm correct use of calculation procedures.

Planned review date	31 December 2018
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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	N/A
Rollover and Revision	5	15 March 2012	N/A
Revision	6	15 January 2014	N/A
Rollover and Revision	7	27 January 2015	N/A

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>.

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.