Title	**Service and repair consumer electronic products for service technicians**		
Level	**4**	**Credits**	**25**

Purpose	This unit standard is intended for electrical technicians and servicepersons, who test, diagnose and repair complex faults to a modular or component level in complex consumer electronic products. People credited with this unit standard are able to: – identify and verify faulty operation in complex consumer electronic products and decide appropriate action; – isolate consumer electronic products for servicing; – replace or repair faulty components or modules; and – return consumer electronic products to service.

Classification	Electrical Engineering > Electrical Appliance Servicing

Available grade	Achieved

Prerequisites	Unit 22763, *Service electrical or electronic goods*; Unit 27911, *Demonstrate knowledge of workplace safety in an electrotechnology or telecommunications environment;* Unit 28881, *Enhance workplace safety and mitigate environmental impacts in an electrotechnology or telecommunications environment;* or demonstrate equivalent knowledge and skills.

Guidance Information

1 This unit standard has been developed for learning and assessment on-job under adequate supervision as defined in the Electricity Act 1992, unless the candidate is registered and licenced under the Electricity Act 1992.

2 Recommended unit standards for entry
Unit 30641, *Demonstrate knowledge of electromechanical engineering principles for technicians*;
Unit 30642, *Demonstrate knowledge of specialist equipment used in electronic repairs*;
Unit 30644, *Demonstrate basic knowledge of diagnostics and fault finding for service and installation technicians*;
Unit 30651, *Explain regulatory requirements for installing and servicing extra-low and low voltage customer premises systems*.

3 References

Consumer Guarantees Act 1993;
Electricity Act 1992;
Electricity (Safety) Regulations 2010;
Fair Trading Act 1986;
Hazardous Substances and New Organisms Act 1996 1 October 2018 reprint;
Health and Safety at Work (Hazardous Substances) Regulations 2017;
Health and Safety at Work Act 2015;
Privacy Act 1993;
Resource Management Act 1991;
Contract and Commercial Law Act 2017, *Part 3 Sale of Goods*;
New Zealand Electrical Codes of Practice, ISSN 0114-0663, available from www.worksafe.govt.nz;
and all subsequent amendments and replacements.

4 Definitions

Company practice – those practices and procedures that have been circulated by the company for use by their employees.
Complex consumer electronic product – three or more components and/or modules used together in a consumer electronic product.
Complex fault – two or more faults occurring across two or more components and/or modules in a consumer electronic product.
Electrical technicians and service persons – for the purposes of this unit standard means, people who hold or who are working towards electrical registration as an Electrical Service Technician, Electrical Appliance Serviceperson (endorsed to disconnect and connect), or Electrical Appliance Serviceperson.
ESC – Electrical Safety Certificate.
Industry acceptable time-frame – the length of time within which a competent person at this level could reasonably be expected to perform the task. In the appliance and consumer electronic product service industry, time is a significant factor in judging competence. Assessors must therefore ensure that the time taken is representative of industry expectations for the type of servicing undertaken.
Industry conventions – a set of agreed, specified, or generally accepted standards.
Industry practice – those practices that competent practitioners within the industry recognise as current industry best practice.
Safe and sound practice – as it relates to the installation of electrical equipment is defined in AS/NZS 3000:2007, *Electrical Installations (known as the Australian/New Zealand Wiring Rules).*
SDoC – Supplier Declaration of Conformity (producer statement).

5 Range

a Competence may be assessed on consumer electronic products which may include but are not limited to – radio receivers, television sets, MP3 players, video recorders, DVD players, digital cameras, camcorders, personal computers, video game consoles, telephones, mobile phones.
b Evidence is required of at least 12 complex repairs covering at least four different types of complex consumer electronic products, and involving repair or replacement of mechanical, electrical, or electronic modules or components, 6 of which must be completed in the customers premises.

The four different products are to be selected from the consumer electronic products range, to ensure that assessment is relevant to, and in context for the industry sector the candidate works in. Note: these repairs must be in addition to the repairs completed and assessed for Unit 22763, *Service electrical or electronic goods to gain electrical registration for electrical technicians and service persons.*

c Typical mechanical components include but are not limited to – shaft, mechanical linkage, drive coupling, drive belt, drive chain, pulley, gearbox, transmission, clutch, brake, balance weight, valve, pump, compressor, condenser, lint screen, filter, trap, agitator, air or liquid impeller, bearing, gasket, door lock.

d Typical electrical components include but are not limited to – overload device, control switch, micro-switch, touch switch, capacitor switch, controller, push-button switch, pressure switch, float switch, proximity switch, fuse holder, plug, power socket, lamp socket, contactor, solenoid, heating element, induction coil, resistor, capacitor, motor, transformer, thermostat, simmerstat, thermistor, timer, time clock, electrical cord, wiring.

e Typical electronic modules or components include but are not limited to – printed circuit board, plug-in control chip, displays, motor starting capacitors, radio frequency suppression circuits, power supply circuits, discreet components.

f All servicing work must be performed within industry acceptable time-frames.

g All activities and evidence presented for all outcomes and performance criteria in this unit standard must be in accordance with:

- i legislation;
- ii policies and procedures;
- iii ethical codes;
- iv Standards – may include but are not limited to those listed in Schedule 2 of the Electricity (Safety) Regulations 2010;
- v safe and sound practice;
- vi applicable site, enterprise, industry practice and industry conventions;
- vii where appropriate or applicable, environmental requirements, manufacturer instructions, specifications, data sheets and manufacturer, supplier and company health and safety procedures.

6 Persons assessing against this unit standard are required to hold a current practising licence at or above the level being sought by the trainee.

Details about classes of registration for electrical workers are available at EWRB Electrical Licensing Classes.

Outcomes and performance criteria

Outcome 1

Identify and verify faulty operation in complex consumer electronic products, and decide appropriate action.

Performance criteria

1.1 Identify fault symptoms by questioning customer or from information detailed on job card.

Range visual, sound, smell, timing of occurrences, departure from normal operation.

1.2 Verify fault symptoms by direct observation.

Range visual, sound, smell, heat sensing where appropriate, checking of fault codes where applicable.

1.3 Assess and evaluate alternative causes of the fault symptom prior to making a decision as to the likely cause.

Range mechanical versus electrical; control circuit versus power circuit; external influences; module versus wiring and terminations; where appropriate, alternatives listed in service diagnostics book or service manual.

1.4 Apply logical fault-finding techniques of analysing symptoms and taking measurements where necessary, to establish the cause of the problem and locate the fault and/or faulty components and/or modules. Follow manufacturer documented procedures where available.

Range techniques may include but are not limited to – customer feedback, questioning, observation, simulation, measurement, identification of function loss, comparison with previous fault data including frequency of occurrence, manufacturer's documentation and diagnostic procedures, trending, built-in diagnostics, half split, step by step, resetting modules, testing.

1.5 Match fault codes against fault code table or charts in the relevant source.

Range fault codes matching sources may include but are not limited to – manuals, flowcharts, manufacturer specifications and diagnostic procedures, built in diagnostic modules, remote interface, hand-held interface, computer or mobile phone app interface.

1.6 Assess viability of repair taking into account component or module availability, cost and time to repair, cost of equivalent new product, and supervisor or customer instructions.

1.7 Obtain agreement from customers or supervisor to proceed with repair(s).

Outcome 2

Isolate consumer electronic product for servicing.

Performance criteria

2.1 Isolate product from the supply in accordance with current electrical regulations and industry practice.

2.2 Tag product as being under service to prevent its further use.

Outcome 3

Replace or repair faulty components or modules.

Performance criteria

3.1 Select hand tools, power tools, specialist tools and equipment, and test instruments appropriate to work requirements and the repair to be completed.

Range hand tool selection may include but is not limited to – tool function, length, weight, opening width, blade width, tool type;
power tools may include but are not limited to – battery operated drills and screwdrivers, dremel, powered hand and bench tools, bench power supply;
specialist tools and equipment may include but are not limited to – bearing puller, torque spanners, soldering irons, soldering stations, solder sucker, solder wick, battery chargers;
test instruments may include but are not limited to – multimeter, insulation resistance tester, clampmeter, temperature probes, meters, oscilloscope, logic probes, signal generator;
work requirements – size and type of material, risk of damage to the work.

3.2 Remove or desolder faulty components or modules in accordance with manufacturer guidelines, without damage to other components, and taking electrostatic precautions where appropriate.

3.3 Obtain replacement components or modules in accordance with company practice, or repair the original components as appropriate in accordance with manufacturer instructions.

3.4 Re-install or solder replacement or repaired parts in accordance with manufacturer instructions, industry practice, and current regulations and standards where they apply, and taking electrostatic precautions where appropriate.

3.5 Use hand tools, power tools, specialist tools, and test instruments in accordance with manufacturer documentation, industry best practice and health and safety requirements, and ensure that the use of test instruments do not impact on circuit operation.

3.6 Clean, maintain as appropriate, and store hand tools, power tools, specialist tools, and test instruments after completion of the repair.

Outcome 4

Return consumer electronic product to service.

Performance criteria

4.1 Complete electrical, mechanical, and visual safety tests in accordance with current regulations and standards.

4.2 Re-connect the electrical supply in accordance with current regulations and standards.

4.3 Carry out operational tests and adjustments where relevant or necessary to ensure that the products perform according to manufacturer specifications.

4.4 Complete documentation, post job tasks, and advise the customer or supervisor in accordance with company requirements.

Range may include but is not limited to – arrange faulty module repair or replacement, log and file information, customer report, close out job task in management system, safety testing, ESC, SDoC.

This unit standard is expiring. Assessment against the standard must take place by the last date for assessment set out below.

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	28 March 2019	31 December 2025
Review	2	30 January 2025	31 December 2025

Consent and Moderation Requirements (CMR) reference	0003

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