

Title	Diagnose and repair faulty electronic systems to module level		
Level	4	Credits	25

Purpose	<p>This unit standard covers the diagnosis and repair of electronic systems in general to module level for electronics technicians.</p> <p>Excluded are computing equipment, consumer electronic equipment, electronic office equipment, marine electronic systems, radar, and radio, which are covered by the unit standards listed in explanatory note 6.</p> <p>People credited with this unit standard are able to:</p> <ul style="list-style-type: none"> – prepare to diagnose and repair electronic systems; – diagnose faults; – repair and test equipment; and – complete post-repair procedures.
----------------	--

Classification	Electronic Engineering > Electronic Installation and Maintenance
-----------------------	--

Available grade	Achieved
------------------------	----------

Entry information	
Recommended skills and knowledge	Unit 26725, <i>Demonstrate and apply knowledge of electronic product reliability and advanced electronic measurement and diagnosis</i> , or demonstrate equivalent knowledge and skills.

Explanatory notes

- 1 This unit standard has been developed for learning and assessment on-job.
- 2 References
Electricity Act 1992;
Electricity (Safety) Regulations 2010;
Health and Safety in Employment Act 1992 and associated regulations;
IPC-A-610E Acceptability of Electronic Assemblies;
and all subsequent amendments and replacements.

3 Definitions

Enterprise practice – those practices and procedures that have been promulgated by the company or enterprise for use by their employees.

Industry practice – those practices that competent practitioners within the industry recognise as current industry best practice.

4 Range

- a An electronic system should consist of a number of interrelated electronic modules, cards, shelves, racks, or cabinets, forming a collective entity, fixed in place, and involving interconnecting cables. It may also involve mechanical or electromagnetic components. Excluded are computing equipment, consumer electronic equipment, electronic office equipment, marine electronic systems, radar, and radio, which are covered by the unit standards listed in explanatory note 6.
- b The type of diagnosis and repair work required to achieve this unit standard must include:
 - i diagnosis and repair of equipment to module level;
 - ii use of test instruments to identify faults, measure and adjust equipment, and confirm proper performance. Typical instruments include multimeters, oscilloscopes, signal generators, and signal tracers. More specialised instruments may be required depending on the nature of the equipment.
- c All diagnostic and repair work must be completed within an *industry acceptable timeframe*, ie the length of time within which a competent person at this level could reasonably be expected to perform the task. In the electronics 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 work.
- d Candidates are expected to meet the outcomes of this unit standard without direct technical supervision, and with complete responsibility for quality and quantity of output.
- e Electrical, radiation, and workshop or laboratory safety practices are to be observed at all times.
- f All activities and evidence presented for all outcomes and evidence requirements in this unit standard must be in accordance with legislation, policies, procedures, ethical codes, Standards, applicable site and enterprise practice, and industry practice; and, where appropriate, manufacturers' instructions, specifications, and data sheets.
- g Evidence is required of a minimum of 30 different types of repairs covering a range of different types of electronic systems. The number and type of equipment chosen is left to the discretion of the assessor, but must be sufficient to assess competence in all outcomes of the unit standard.

5 For diagnosis and repair of more specific systems as indicated in explanatory note 4, refer to the following unit standards:

computing equipment – standards 6873 and 6874;

industrial, telecommunications, and consumer electronic equipment – standard 26726;

electronic office equipment – standard 6066;

marine electronic systems – standards 11795 and 11796;

radar – standard 6061

radio – standard 26724.

Outcomes and evidence requirements

Outcome 1

Prepare to diagnose and repair electronic systems.

Evidence requirements

- 1.1 Fault symptoms are identified, verified against the customer's detailed fault description, and recorded.
- 1.2 Agreed expenditure and repair turn around time expectations are identified.
- 1.3 All site occupational safety and health implications for self and others are identified, and hazard control measures are put in place.
- 1.4 Service information is available for the commencement of repair.

Range typically this may include – manuals, schematic diagrams, modification sheets, fault and service guides.
- 1.5 Accessories are handled in a manner that prevents loss or damage.

Outcome 2

Diagnose faults.

Evidence requirements

- 2.1 Cause of fault and faulty components are identified using efficient diagnostic techniques, tools, test instruments, and servicing data.
- 2.2 Repair feasibility is established with respect to agreed expenditure and repair reliability.
- 2.3 Modules are protected from static damage by anti-static precautions.
- 2.4 Diagnostic processes do not damage the equipment.
- 2.5 Diagnostic report is in accordance with enterprise practice.

Outcome 3

Repair and test equipment.

Evidence requirements

- 3.1 Faulty modules are replaced in accordance with service information, and where appropriate, soldered joints are in accordance with industry practice.

Range industry practice – joints are smooth; without short circuits, dry joints, no excess solder.

3.2 System is reassembled in a manner that prevents damage and conforms to the manufacturer's layout.

Range layout – lead dress, screw location, shields and screens, board positioning and securing, cover positioning and fastening.

3.3 Testing confirms electrical safety.

3.4 Testing confirms that the repaired equipment is ready for service.

Outcome 4

Complete post-repair procedures.

Evidence requirements

4.1 Fault repair documentation is in accordance with enterprise practice.

Range typical fault repair documents – may include but not limited to workshop register, job card, invoice, order forms, warranty forms, fault manuals, fault database, instructions to customer.

4.2 All traces of servicing and repair work are removed from equipment, and in the case of on-site repairs, premises are left in their original state of cleanliness and tidiness.

Planned review date	31 December 2016
----------------------------	------------------

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	26 July 2004	31 December 2012
Review	2	21 July 2011	N/A

Consent and Moderation Requirements (CMR) reference	0003
--	------

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 (CMRs). 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 ElectroTechnology Industry Training Organisation reviewcomments@etito.co.nz if you wish to suggest changes to the content of this unit standard.