



Australian Government

MEM18056 Diagnose and repair analog equipment and components

Release: 1

MEM18056 Diagnose and repair analog equipment and components

Modification History

Release 1. Supersedes and is equivalent to MEM18056B Diagnose and repair analog equipment and components

Application

This unit of competency defines the skills and knowledge required to locate faults in analog electronic equipment or sub-assemblies, and replace faulty components.

Where soldering of components is required to advanced or military specifications, where the reliability of electrical connections is critical, or where surface mounted devices are being soldered/de-soldered then unit MEM05002 Perform high reliability soldering and desoldering should also be selected.

Where termination of cables is required unit MEM10002 Terminate and connect electrical wiring and unit MEM18063 Terminate signal and data cables, should also be selected as appropriate.

Where the selection and use of engineering measurement is required unit MEM12023 Perform engineering measurements should also be selected.

Where the selection and use of power tools/hand held operations is required unit MEM18002 Use power tools/hand held operations should also be selected.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Band:

This unit has dual status and is to be regarded as both a Specialisation Band A unit and Specialisation Band B unit for progression to C7 (AQF level IV).

Unit Weight: 10

Pre-requisite Unit

MEM05001	Perform manual soldering/desoldering - electrical/electronic components
MEM09002	Interpret technical drawing
MEM11011	Undertake manual handling
MEM12004	Perform precision electrical/electronic measurement
MEM13015	Work safely and effectively in manufacturing and engineering

MEM16006	Organise and communicate information
MEM18001	Use hand tools
MEM18057	Maintain/service analog/digital electronic equipment

Competency Field

Maintenance and diagnostics

Elements and Performance Criteria

Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.												
1 Determine job requirements	<table><tr><td>1.1</td><td>Follow standard operating procedures (SOPs)</td></tr><tr><td>1.2</td><td>Comply with work health and safety (WHS) requirements at all times</td></tr><tr><td>1.3</td><td>Use appropriate personal protective equipment (PPE) in accordance with SOPs</td></tr><tr><td>1.4</td><td>Identify job requirements from specifications, drawings, job sheets or work instructions</td></tr></table>	1.1	Follow standard operating procedures (SOPs)	1.2	Comply with work health and safety (WHS) requirements at all times	1.3	Use appropriate personal protective equipment (PPE) in accordance with SOPs	1.4	Identify job requirements from specifications, drawings, job sheets or work instructions				
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2 Locate fault in electronic system/sub-assembly	<table><tr><td>2.1</td><td>Determine functions and principles of system/sub-assembly with reference to equipment manuals and circuit diagrams</td></tr><tr><td>2.2</td><td>Run built-in test functions and fault indicator error codes and check and review appropriate maintenance records</td></tr><tr><td>2.3</td><td>Reproduce fault symptoms and verify using appropriate fault-finding techniques</td></tr><tr><td>2.4</td><td>Isolate and remove faulty sub-assembly from electronic system using appropriate tools and techniques, where appropriate</td></tr><tr><td>2.5</td><td>Check and test sub-assembly using appropriate test equipment and fault-finding techniques</td></tr><tr><td>2.6</td><td>Identify faulty component and/or isolate fault cause</td></tr></table>	2.1	Determine functions and principles of system/sub-assembly with reference to equipment manuals and circuit diagrams	2.2	Run built-in test functions and fault indicator error codes and check and review appropriate maintenance records	2.3	Reproduce fault symptoms and verify using appropriate fault-finding techniques	2.4	Isolate and remove faulty sub-assembly from electronic system using appropriate tools and techniques, where appropriate	2.5	Check and test sub-assembly using appropriate test equipment and fault-finding techniques	2.6	Identify faulty component and/or isolate fault cause
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Performance criteria describe the performance needed to demonstrate achievement of the element.

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| 3 | Repair/replace faulty components | 3.1 | Remove faulty component using appropriate tools and techniques |
| | | 3.2 | Repair/replace faulty component in accordance with site/manufacturers' recommended procedure |
| | | 3.3 | Re-fit repaired/replacement components into system/sub-assembly |
| | | 3.4 | Refit repaired sub-assembly to electronic system, where appropriate |
| | | 3.5 | Check and test systems/sub-assembly for compliance with specifications utilising appropriate test procedures and equipment |

Foundation Skills

This section describes those required skills (reading, writing, oral communication and numeracy) that are essential to workplace performance in this unit of competency.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

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Electronic systems and equipment include one (1) or more of the following:

- amplifiers
- analog hardware
- communication
- consumer audio/video
- electronic appliances
- scanning systems
- security/fire systems
- power supplies
- test equipment

Fault-finding techniques include one (1) or more of the following:

- signal injection
- substitution
- monitoring
- measurement
- heating
- sound
- visual
- touch
- smell

Test equipment includes one (1) or more of the following:

- continuity testers
- ammeters
- voltmeters
- cathode ray oscilloscopes
- frequency counters
- signal generators
- digital probes

Components include (1) one or more of the following:

- discrete component assemblies
- individual components, including:
 - resistors
 - switching devices
 - capacitors
 - transformers
 - solenoids
 - tubes
 - semi-conductors

Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM18056B Diagnose and repair analog equipment and components

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b7050d37-5fd0-4740-8f7d-3b7a49c10bb2>

Assessment Requirements for MEM18056 Diagnose and repair analog equipment and components

Modification History

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Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy the requirements of the elements and performance criteria on at least two (2) occasions and include:

- following work instructions, standard operating procedures (SOPs) and safe work practices
- identifying and interpreting circuit diagrams, specifications, schematics, maintenance records, drawings, supplier catalogues and obtain relevant data with respect to diagnosing and repairing analog equipment and components
- checking electronic equipment/sub-assemblies, components, connections and terminations for compliance to specifications
- locating, reading/recording and diagnosing built-in fault indicators and obtaining error code interpretation documents and running test functions and recording faults and/or equipment status indicated by built-in test functions/displays
- checking and testing sub-assembly using appropriate test equipment for compliance with specifications
- reproducing fault symptoms in the electronic equipment and verifying faults using appropriate test equipment and fault-finding techniques to locate and isolate faulty component or fault cause
- removing and replacing faulty components from the electronic equipment
- adjusting/tuning, calibrating and testing the repaired electronic equipment/sub-assemblies to specifications
- returning the repaired electronic equipment/sub-assembly to service in accordance with SOPs.

Knowledge Evidence

Evidence required to demonstrate the required knowledge for this unit must be relevant to and satisfy the requirements of the elements and performance criteria and include knowledge of:

- safe work practices and procedures and use of personal protective equipment (PPE)
- implications of electro-static discharge (ESD) upon the electronic equipment
- analog electronics, including amplifiers, oscillators, power suppliers and filters
- function(s) of the electronic equipment/sub-assembly
- symptoms of the fault in the electronic equipment/sub-assembly
- purpose of reproducing electronic equipment/sub-assembly fault symptoms

- equipment and techniques to be used to test the faulty sub-assemblies/component
- probable causes of component failure
- procedures for:
 - running built-in test functions
 - verifying faults in electronic equipment/sub-assemblies
 - isolating electronic equipment/sub-assemblies
 - removing sub-assemblies from electronic equipment
 - testing faulty sub-assemblies and removing faulty components from electronic equipment
 - fitting repaired/replaced components into sub-assemblies and fitting repaired sub-assemblies into electronic equipment
 - testing electronic equipment/sub-assembly performance
- errors indicated by built-in devices
- test equipment and fault-finding techniques necessary to confirm electronic equipment/sub-assembly faults
- tools and techniques to be used to remove/refit/repair/replace the faulty sub-assemblies/component from the electronic equipment
- operational specifications of the sub-assembly and electronic equipment/component
- test equipment and techniques necessary to check electronic equipment/sub-assembly performance.

Assessment Conditions

- Assessors must:
 - have vocational competency in diagnosing and repairing analog equipment and components at least to the level being assessed with relevant industry knowledge and experience
 - satisfy the assessor requirements in the *Standards for Registered Training Organisations 2015* or its replacement and comply with the *National Vocational Education and Training Regulator Act 2011*, its replacement or equivalent legislation covering VET regulation in a non-referring state/territory as the case requires
- Where possible assessment must occur in operational workplace situations. Where this is not possible or where personal safety or environmental damage are limiting factors, assessment must occur in a sufficiently rigorous simulated environment that reflects realistic operational workplace conditions. This must cover all aspects of workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills
- Conditions for assessment must include access to all tools, equipment, materials and documentation required, including relevant workplace procedures, product and manufacturing specifications
- Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

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