



Australian Government

Department of Education, Employment and Workplace Relations

MEM18056B Diagnose and repair analog equipment and components

Release: 2

MEM18056B Diagnose and repair analog equipment and components

Modification History

Single band identifier removed to clarify dual status

Unit Descriptor

Unit descriptor	This unit covers locating faults in analogue electronic equipment or sub-assemblies, and replacing faulty components.
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Application of the Unit

Application of the unit	<p>This unit applies to electronic systems or equipment including amplifiers, analogue hardware, communication, consumer audio/video, electronic appliances, scanning systems, security/fire systems, power supplies and test equipment etc.</p> <p>All specifications and procedures are gained from schematics, circuit drawings, engineering data sheets or manufacturers' handbooks.</p> <p>Unit MEM05002B (Perform high reliability soldering and desoldering) must also be selected if 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. Where termination of cables is involved, Unit MEM10002B (Terminate and connect electrical wiring) and/or Unit MEM18063B (Terminate signal and data cables) must also be selected.</p> <p>Band:</p> <p>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).</p> <p>Unit Weight: 10</p>
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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM05001B	Perform manual soldering/desoldering - electrical/electronic components
	MEM09002B	Interpret technical drawing
	MEM12004B	Perform precision electrical/electronic measurement
	MEM18001C	Use hand tools
	MEM18057B	Maintain/service analog/digital electronic equipment

Employability Skills Information

Employability skills	This unit contains employability skills.
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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Locate fault in electronic system/sub-assembly	<p>1.1. System/sub-assembly functions and principles are determined with reference to equipment manuals, circuit diagrams etc.</p> <p>1.2. Built-in test functions are run and fault indicator error codes and appropriate maintenance records are checked and reviewed.</p> <p>1.3. Fault symptoms are reproduced, where appropriate, and verified using appropriate fault finding techniques.</p> <p>1.4. Where appropriate, faulty sub-assembly is isolated and removed from electronic system using correct and appropriate tools and techniques.</p> <p>1.5. Sub-assembly is checked and tested using correct and appropriate test equipment and fault finding techniques.</p> <p>1.6. Faulty component/s are identified and/or fault cause is isolated.</p>
2. Repair/replace faulty components	<p>2.1. Faulty component is removed, where required, using correct and appropriate tools and techniques.</p> <p>2.2. Faulty component is repaired/replaced in accordance with manufacturers' recommended procedures or to standard operating procedures.</p> <p>2.3. Repaired/replacement components are fitted in accordance with manufacturers' recommended procedure or to standard operating procedures using correct and appropriate tools and techniques.</p> <p>2.4. Where appropriate, repaired sub-assembly is refitted to electronic system using correct and appropriate tools and techniques.</p> <p>2.5. Systems/sub-assembly is checked and tested for correct operational compliance with specifications utilising correct and appropriate test procedures and equipment.</p>

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

REQUIRED SKILLS AND KNOWLEDGE**Required skills**

Look for evidence that confirms skills in:

- obtaining and following relevant circuit diagrams, manuals, specifications, schematics, maintenance records, supplier catalogues, etc.
- locating, reading/recording and diagnosing built-in fault indicators
- obtaining error code interpretation documents
- running test functions and recording faults and/or equipment status indicated by built-in test functions/displays
- checking electronic equipment/sub-assemblies, components, connections and terminations for conformance to specifications
- removing and replacing/repairing faulty components from the electronic equipment
- recording results of tests undertaken on electronic equipment
- isolating electronic sub-assembly from the power supply
- adjusting/tuning and calibrating electronic equipment/sub-assemblies
- returning to service and testing to specification the repaired electronic equipment/sub-assembly
- using language and literacy skills to provide brief reports/records/results of tests
- reproducing fault symptoms in the electronic equipment and verifying faults using appropriate test equipment and fault finding techniques
- refitting repaired/replaced components into the sub-assembly

Required knowledge

Look for evidence that confirms knowledge of:

- analogue electronics including amplifiers, oscillators, power suppliers, filters
- the function(s) of the electronic equipment/sub-assembly
- symptoms of the fault in the electronic equipment/sub-assembly
- the 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
 - removing faulty components from electronic equipment
 - fitting repaired/replaced components into sub-assemblies
 - fitting repaired sub-assemblies into electronic equipment
 - testing electronic equipment/sub-assembly performance

REQUIRED SKILLS AND KNOWLEDGE

- errors indicated by built-in devices
- test equipment and fault finding techniques necessary to confirm electronic equipment/sub-assembly faults
- hazards associated with electronic equipment/sub-assemblies including electro-static discharge (ESD)
- 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
- operational specifications of the electronic equipment/sub-assembly/component
- test equipment and techniques necessary to check electronic equipment/sub-assembly performance
- any applicable industry standards, national/Australian standards, NOHSC guides, State/Territory regulatory codes of practice/standards
- use and application of personal protective equipment
- safe work practices and procedures

Evidence Guide

EVIDENCE GUIDE	
<p>The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.</p>	
<p>Overview of assessment</p>	<p>A person who demonstrates competency in this unit must be able to diagnose and repair analog equipment and components. Competency in this unit cannot be claimed until all prerequisites have been satisfied.</p>
<p>Critical aspects for assessment and evidence required to demonstrate competency in this unit</p>	<p>Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.</p>
<p>Context of and specific resources for assessment</p>	<p>This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.</p> <p>This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with diagnosing and repairing analog equipment and components, or other units requiring the exercise of the skills and knowledge covered by this unit.</p>
<p>Method of assessment</p>	<p>Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.</p>

EVIDENCE GUIDE

Guidance information for assessment	
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Range Statement**RANGE STATEMENT**

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Fault finding techniques

Fault finding techniques	Signal injection, substitution, monitoring, measurement, heating, sound, visual, touch, smell
Test equipment	Continuity testers, ammeters, voltmeters, cathode ray oscilloscopes, frequency counters, signal generators, digital probes
Components	Discrete component assemblies or individual components such as resistors, switching devices, capacitors, transformers, solenoids, tubes, semi-conductors

Test equipment**Components****Unit Sector(s)**

Unit sector	
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Co-requisite units

Co-requisite units	

Co-requisite units		

Competency field

Competency field	Maintenance and diagnostics
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