



Australian Government

MEAAVI0040 Modify and repair aircraft component multi-layer printed circuit boards

Release: 1

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Modification History

Release 1. Application changed. Elements and Performance Criteria changed. Foundation Skills made explicit. Range of Conditions removed, and relevant information moved to Assessment Requirements. Assessment Requirements clarified. Supersedes and is equivalent to MEA263 Modify/repair aircraft component multi-layer printed circuit boards.

Application

This unit describes the skills and knowledge required to apply hand skills (including those required to gain access to inner layers and repair outer layers after track repair, and high reliability hand soldering), and knowledge of standard practices and techniques in the repair of multi-layer printed circuit boards from aircraft avionic components that are repaired in aviation workshops during scheduled or unscheduled maintenance. Work may be performed individually or as part of a team.

The unit is used in workplaces that operate under the airworthiness regulatory systems of the Civil Aviation Safety Authority (CASA) and the Defence Aviation Safety Authority (DASA).

Any other relevant legislation, industry standards and codes of practice within Australia must be applied.

Pre-requisite Unit

MEAAVI0038 Use electronic test equipment

MEA296 Use electrical test equipment in aviation maintenance activities

Competency Field

Aviation maintenance

Elements and Performance Criteria

Elements	Performance Criteria
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
1. Inspect multi-layer printed circuit boards and associated components	1.1 Interpret required maintenance documentation, including component defect reports and match parts and serial numbers 1.2 Prepare work area and circuit board assemblies in accordance with standard enterprise procedures to allow for effective detailed inspection of all substrate, circuit tracks, edge connectors and attached components,

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	taking into account any static discharge procedures 1.3 Visually or physically inspect circuit board assemblies for physical integrity of substrate, circuit tracks, edge connectors and attached components in accordance with maintenance documentation while observing all relevant work health and safety (WHS) requirements 1.4 Establish modification status to assist in determining repair requirements 1.5 Identify and report defects in accordance with standard enterprise procedures
2. Test or adjust multi-layer printed circuit boards and associated components	2.1 Prepare and connect circuit board assemblies to the appropriate test facility in accordance with approved procedures, or prepare and connect circuit board assemblies in situ to allow required test procedures to be performed 2.2 Perform functional testing on circuit board assemblies for evidence of serviceability or malfunction in accordance with normal trade practice and maintenance documentation 2.3 Electronically or physically adjust or align circuit board assemblies, attached hardware and electronic components in accordance with maintenance manuals or other prescribed procedures
3. Troubleshoot multi-layer printed circuit cards and associated components	3.1 Use required maintenance documentation, physical inspection and test results to assist in fault determination 3.2 Troubleshoot using maintenance manual fault diagnosis guides, logical processes and test equipment 3.3 Locate component faults and identify and record causes of faults in required maintenance documentation 3.4 Determine required for rectification of faults
4. Dismantle multi-layer printed circuit cards and associated components	4.1 Remove conformal or protective coatings from the circuit board assembly to the extent required to effect necessary repairs and in accordance with maintenance manuals, industry or enterprise standards as applicable 4.2 Observe WHS requirements at all times during maintenance procedures and use required material safety data sheets (MSDSs) and personal protective equipment (PPE) 4.3 Dismantle circuit board assembly to the extent necessary to allow repair of all identified faults 4.4 Tag and dispatch parts for processing in accordance with specified

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	procedures 4.5 Package and store parts for retention and refitment in accordance with standard enterprise procedures to avoid physical and electrostatic damage 4.6 Pack and process parts for disposal in accordance with statutory requirements pertaining to dangerous goods
5. Assemble multi-layer printed circuit boards and associated components	5.1 Collect parts removed for access and replacement parts, ensuring appropriate modification status, component tolerances and assembly configuration is maintained 5.2 Replace conformal or protective coatings to the required standard of the equipment manufacturer or industry standard 5.3 Ensure rework techniques are in accordance with industry approved procedures, and observe required WHS precautions, including use of MSDS and PPE 5.4 Assemble printed circuit board and associated components in accordance with maintenance manuals, and ensure all electrical joints meet the required standard of the equipment manufacturer or industry standard 5.5 Rework circuit substrate material, circuit tracks, edge connectors and through-hole eyelets as required to restore printed circuit board to a serviceable condition

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance but not explicit in the performance criteria.

- Reading skills to interpret maintenance manuals.
- Writing skills to report on defects
- Numeracy skills to interpret technical information.

Other foundation skills essential to performance are explicit in the performance criteria of this unit.

Unit Mapping Information

Release 1. Supersedes and is equivalent to MEA263 Modify/repair aircraft component multi-layer printed circuit boards.

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=ce216c9c-04d5-4b3b-9bcf-4e81d0950371>

Assessment Requirements for MEAAVI0040 Modify and repair aircraft component multi-layer printed circuit boards

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Performance Evidence

There must be evidence the candidate has completed all the tasks outlined in the elements and performance criteria of this unit, and demonstrated the ability to:

- modify or repair aircraft component multi-layer printed circuit boards comprising at least eight of the following substrate materials and components and using approved repair procedures and processes relating to multi-layer circuit board:
 - capacitors
 - resistors
 - wires
 - semiconductors
 - inductors
 - transformers
 - switches
 - connectors
 - multi-pin ICs
 - terminal posts
 - heat-sink materials
 - electrostatic sensitive devices
- recognise the following for circuit boards being repaired or modified:
 - unacceptable soldered connections
 - damaged circuit card components
 - circuit tracks integrity
 - substrate damage
 - edge connector condition
- rework unacceptable printed circuit board soldered connections via acceptable de-soldering and soldering techniques on the circuit boards being modified or repaired
- follow substrate abrasion and rebuilding techniques and precautions associated with handling and assembly of electrostatic and temperature sensitive devices, and safety precautions associated with beryllium materials and use of fluxes and solvents, as relevant to the circuit boards being modified or repaired.

Knowledge Evidence

There must be evidence the candidate has knowledge of:

- component operation
- basic principles and functions relating to electrical and electronic components on printed circuit boards
- substrate materials
- types of conformal coating
- types of soldering equipment and solders used in track repair and component assembly
- de-soldering techniques
- optical equipment and tools used in multi-layer printed circuit board repair
- how to obtain material safety data sheets (MSDS)
- work health and safety (WHS) procedures for modifying or repairing aircraft component multi-layer circuit board
- maintenance manuals for modifying or repairing aircraft component multi-layer circuit board
- relevant regulatory requirements and standard procedures
- procedures and standards for repair of printed circuit card assemblies, including a range of general engineering hand skills in addition to specific high-reliability soldering skills.

Assessment Conditions

The following conditions of assessment represent the requirements of the regulators (DASA and CASA) and maintenance stakeholders and must be rigorously observed.

Skills must have been demonstrated under routine supervision in the workplace or in a simulated environment that reflects workplace conditions and contingencies encountered in modifying or repairing aircraft component multi-layer circuit boards. The following conditions must be met for this unit:

- use of suitable facilities, equipment and resources, including:
 - workplace procedures, manufacturing specifications, codes, standards, manuals, and reference materials relevant to modifying or repairing aircraft component multi-layer circuit boards
 - tools and equipment specified in maintenance manuals
 - general and special-purpose test equipment found in most routine situations.

The work plan should take account of applicable safety and quality requirements in accordance with the industry and regulatory standards.

Evidence of tasks demonstrating competency must be recorded in a log of industrial experience and achievement.

Assessors must satisfy the NVR/AQTF mandatory competency requirements for assessors.

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