



Australian Government

UEEEEC0013 Design electronic printed circuit boards

Release: 1

UEEEEC0013 Design electronic printed circuit boards

Modification History

Release 1. This is the first release of this unit of competency in the UEE Electrotechnology Training Package.

Application

This unit involves the skills and knowledge required to design electronic printed circuit boards.

It includes designing electronic printed circuit boards. It also includes developing alternative printed circuit board design schemes based on design brief and customer relations, and documenting designs.

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

Pre-requisite Unit

UEECD0007 Apply work health and safety regulations, codes and practices in the workplace

Competency Field

Electronics and Communications

Unit Sector

Electrotechnology

Elements and Performance Criteria

ELEMENTS

Elements describe the essential outcomes.

1 Prepare to design printed circuit board assembly

PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- | | |
|------------|---|
| 1.1 | Work health and safety (WHS)/occupational health and safety (OHS) requirements and workplace procedures for a given work area are identified and be applied |
| 1.2 | Extent of the proposed circuit board and sub-assemblies design is determined from the design brief or in consultation with appropriate person/s |

	1.3	Design development work is planned to meet scheduled timelines in consultation with relevant person/s involved
2 Develop printed circuit board assembly design	2.1	Electronic components, sub-assemblies and industry standards are applied to the design
	2.2	Alternative arrangements for the printed circuit board design are considered based on the requirements outlined in the design brief
	2.3	Safety and functional considerations are incorporated in the printed circuit board design
	2.4	Printed circuit board design draft is checked for compliance with the design brief and design rules
	2.5	Printed circuit board design is documented for submission to appropriate person/s for approval
	2.6	Unplanned situations are responded to in accordance with workplace procedures in a manner that minimises risk to personnel and equipment
3 Provide assembly drawings and artwork files ready for production	3.1	Printed circuit board design is presented and explained to client representative and/or relevant person/s
	3.2	Requests for alterations to the printed circuit board design are negotiated with relevant person/s within the constraints of workplace policy
	3.3	Final printed circuit board design is documented and approval obtained from appropriate person/s
	3.4	Quality of work is monitored against performance agreement and/or workplace procedures or industry standards

Foundation Skills

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

Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions may be found in the UEE Electrotechnology Training Package Companion Volume Implementation Guide.

Designing electronic printed circuit boards must include at least the following:

- two printed boards for different component population densities and related sub-assemblies, including:
 - single-sided printed circuit board
 - doubled-sided printed circuit board

Unit Mapping Information

This unit replaces and is equivalent to UEENEEH181A Design electronic printed circuit boards.

Links

Companion Volume implementation guides are found in VETNet - -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b8a8f136-5421-4ce1-92e0-2b50341431b6>

Assessment Requirements for UEEEC0013 Design electronic printed circuit boards

Modification History

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Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least two separate occasions and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements, workplace procedures and practices, including using risk control measures
- creating a library of components
- creating custom component footprints and schematic elements using physical measurements and/or applicable datasheets
- dealing with unplanned situations in accordance with workplace procedures in a manner that minimises risk to personnel and equipment
- designing single and double-layer boards
- developing outlines of alternative designs
- developing the design within safety and functional requirements
- documenting and presenting design effectively
- extracting and checking manufacturing files/gerber and drill/excelon
- implementing common design rule parameters used by printed circuit board fabrication houses
- modifying existing component footprints and schematic elements using physical measurements and/or applicable datasheets
- running design rule and error checks within software package
- using a version control system (VCS) or implementing a version control strategy
- using an industry standard printed circuit board design software package
- using both surface mount device (SMD)/surface mount technology (SMT) and through-hole components
- using Vias in accordance with industry standards.

Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- design principles and industry standards

- design tools and software
- factors influencing design, including component placement, routing and auto-routing and design rules
- printed circuit board techniques, including materials and processes overview (photographic, mechanical, thermal and dielectric) and types of printed circuit board (single-sided, double-sided and multi-layer)
- relevant job safety assessments or risk mitigation processes
- relevant printed circuit board manufacturer specifications, including component specifications and their implications in a given circuit
- relevant WHS/OHS legislated requirements
- relevant workplace documentation
- relevant workplace policies and procedures
- sources of components and technical data, including sources of components and technical data (data sheets and manufacturer's data) and circuit/apparatus parameters and specifications.

Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that replicate workplace conditions.

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.

Resources for assessment must include access to:

- a range of relevant exercises, case studies and/or other simulations
- relevant and appropriate materials, tools, equipment and personal protective equipment (PPE) currently used in industry
- resources that reflect current industry practices in relation to designing electronic printed circuit boards
- applicable documentation, including workplace procedures, equipment specifications, regulations, codes of practice and operation manuals.

Links

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