



Australian Government

Department of Education, Employment and Workplace Relations

ICTTEN3089A Repair and replace telecommunications network hardware

Release: 1

ICTTEN3089A Repair and replace telecommunications network hardware

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to repair and replace network hardware in a telecommunications network as part of fault restoration. This unit involves work performed under the direction of the Network Operations Centre (NOC), where control of the network is coordinated. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement but users should confirm requirements with the relevant federal, state or territory authority.
------------------------	--

Application of the Unit

Application of the unit	Field officers, technicians or technical supervisors from carriers, contractors or other service providers apply the skills and knowledge in this unit. This unit may apply to replacement of equipment in switching, transmission and fixed and mobile radio networks, including the various transmission path components, such as cable, optical fibre, radio, microwave and satellite. The unit applies to installation of new, additional and replacement equipment.
--------------------------------	---

Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Prerequisite units		

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.
-----------------------------	--

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.
---	--

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for hardware repair and replacement	1.1. Obtain relevant legislation, codes, regulations and standards for the given work 1.2. Discuss and record details of hardware to be repaired or replaced and proposed work schedule with the NOC appropriate person 1.3. Work safely according to relevant safety legislation and company work practices identifying hazards and using personal protective equipment 1.4. Obtain appropriate replacement hardware and associated documentation 1.5. Inspect network and determine the need for repair task 1.6. Obtain tools and check they are in good working order 1.7. Undertake an impact risk assessment of the hardware replacement with the NOC and prepare for contingencies using contingency plan
2. Rectify fault by replacing hardware	2.1. Replace equipment as instructed by the NOC following anti-static precautions in the case of sensitive electronic equipment and occupational health and safety (OHS) and environmental requirements 2.2. Inform NOC if problems occur with hardware replacement so that escalation may commence and contingency plan initiated 2.3. Test the replacement hardware to ensure satisfactory functionality
3. Clean up worksite and complete administrative work	3.1. Remove waste and debris from work site and dispose of according to environmental requirements and restore work area to customer's satisfaction 3.2. Recover faulty equipment and return to appropriate point for disposal or refurbishment 3.3. Complete documentation, update fault records and make recommendations according to the enterprise quality assurance system 3.4. Notify the customer of job completion and obtain sign off

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

- communication skills to question and respond to subject matter experts on technical and operational matters related to performance of telecommunications networks and fault-finding
- literacy skills to:
 - incorporate technical language into written tasks and basic reports
 - interpret enterprise policy
 - interpret technical documentation
- numeracy skills to:
 - apply mathematical formulas to solve problems in AC and DC circuits
 - interpret technical data for specifications of telecommunications networks
- PC skills to update records database
- planning and organisational skills to:
 - coordinate the fault-finding process in liaison with others
 - plan, prioritise and monitor own work
- problem solving skills to:
 - apply AC and DC fault finding techniques to different situations
 - apply network fault-finding techniques in a telecommunications network
- research skills to interrogate databases and other sources to investigate systematic and logical fault-finding techniques of telecommunication networks
- safety awareness skills to:
 - apply precautions and required action to minimise, control or eliminate hazards that may exist during work activities
 - select and use required personal protective equipment conforming to industry and OHS standards
 - work systematically with required attention to detail without injury to self or others, or damage to goods or equipment
- technical skills to:
 - replace network hardware
 - select and use appropriate test equipment to undertake fault finding techniques in telecommunications networks
 - use anti static procedures

Required knowledge

- application of DC and AC electrical and principles
- behaviour of faulty network elements including symptoms and impact on network

REQUIRED SKILLS AND KNOWLEDGE

- interpretation of test results and network element/system specifications
- operation and purpose of testing equipment
- overview of telecommunications hardware and networks
- performance testing and fault-finding techniques of telecommunications networks
- systematic and logical fault-finding
- types of power sources used in telecommunications networks

Evidence Guide

EVIDENCE GUIDE

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.

Overview of assessment

Critical aspects for assessment and evidence required to demonstrate competency in this unit

Evidence of the ability to:

- rectify fault as instructed by NOC, following OHS requirements and anti-static precautions
- replace telecommunications hardware within service assurance guidelines according to enterprise procedures
- update fault records database according to enterprise procedures.

Context of and specific resources for assessment

Assessment must ensure:

- suitable site to replace telecommunications network hardware
- range of hardware currently used in industry
- range of general and test equipment required for testing telecommunications network hardware.

Method of assessment

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:

- direct observation of the candidate developing rectification strategy
- direct observation of the candidate replacing telecommunications network hardware within service assurance guidelines
- oral or written questioning of the candidate to assess knowledge of replacement of telecommunications network hardware practices.

Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example:

- ICTTEN3056A Install telecommunications network equipment.

Aboriginal people and other people from a non-English

EVIDENCE GUIDE

	speaking background may have second language issues. Access must be provided to appropriate learning and assessment support when required. Assessment processes and techniques must be culturally appropriate, and appropriate to the oral communication skill level, and language and literacy capacity of the candidate and the work being performed. In all cases where practical assessment is used it will be combined with targeted questioning to assess required knowledge. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. Where applicable, physical resources should include equipment modified for people with special needs.
--	---

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.

Relevant legislation, codes, regulations and standards may include:

- Australian Communications Industry Forum (ACIF) standards and codes
- AS Communications Cabling Manual (CCM) Volume 1
- AS/NZS 3000:2007
- AS/NZS 3080:2003
- AS/NZS 3084:2003
- AS/NZS 3085.1:2004
- AS/NZS IEC 61935.1:2006

RANGE STATEMENT	
	• AS/NZS IEC 61935.2:2006 • AS/NZS ISO/IEC 14763.3:2007 • AS/NZS ISO/IEC 15018:2005 • AS/NZS ISO/IEC 24702:2007 • Australian building codes and regulations • cabling security codes and regulations • compliance with appropriate Australian Communications and Media Authority (ACMA) technical standard requirements for underground, aerial, Category 5, 6, 6A, 7 or 7A and unshielded twisted pairs (UTP) • Environmental Protection Acts • OHS • relevant international standards • technical standards AS/ACIF S008:2006 and AS/ACIF S009:2006.
Hardware may include:	• complete systems, subunits or circuit cards from: • access • broadband • cellular radio • hybrid fibre coaxial (HFC) • internet protocol (IP) network: • gateways • router • servers • switches • voice over internet protocol (VoIP) • wireless LAN • network management • optical transmission • synchronous digital hierarchy (SDH) multiplexing • switching • transmission.
NOC may relate to:	• engineering unit within an enterprise responsible for: • analysing problems • communicating with other NOCs and technical staff

RANGE STATEMENT	
	• coordinating repairs or changes to the network • escalation of issues • establishing control over a network • monitoring the network alarms • performing diagnostic tests • tracking problems through to completion.
Appropriate person may include:	• customer • engineer • project manager • supervisor.
Hazards may include:	• building debris • earth potential rise • glass fibre • live power lines • manual handling • mud and water • natural gas and other gas build up • needle stick injury • optical fibre cable may contain hazardous light • radio frequency (RF) equipment emitting radiation • remote power feeding services which operate at above telecommunications network voltage (TNV) • vermin.
Personal protective equipment may include:	• earmuffs • electrical isolators • gas detectors • gloves • head protection • kneepads • masks • personal protective clothing • safety boots • safety glasses.
Repair task may include:	• conducting test • evaluating AC and DC test results • determining faulty component • replacement of faulty component.

RANGE STATEMENT	
Tools may include:	• crimping tools • hacksaw • ladders • levels and measuring tools • PC board or subrack card removal tool • pliers • power drills • screwdrivers • sockets • soldering iron • spanners • terminating tools.
Hardware replacement may include:	• cold swap • hot swap.
Contingencies may include:	• additional notification to affected customers • provision of: • additional services • additional technical support • redundant path • standby equipment.
Anti-static precautions may include:	• anti-static floor mat • anti-static workbench mat • anti-static wrist strap • controlled environment • correct printed circuit board handling procedures • use of anti-static bags.
OHS and environmental requirements may relate to:	• decommissioning and isolating worksite and lines prior to commencement • flashing lights • gas and other hazard detection equipment • identifying other services, including power and gas • safety barriers • safety equipment • safe working practices, such as the safe use and handling of: • asbestos • chemicals

RANGE STATEMENT	
	• materials • tools and equipment • work platforms • special access requirements • suitable light and ventilation • trench guards • warning signs and tapes • witches hats • environmental considerations: • clean-up protection • noise, dust and clean-up management • stormwater protection • waste management.
Test may include:	• bandwidth • blocking • call rate • congestion • distortion • drop out rate • functionality • generation of alarms • interference • latency • network tests • packet loss rate • power level measurement • quality of service • recovery rate • redundancy • signal to noise ratio • transmission quality • upload and download rate.
Quality assurance may include:	• acting on logs, reports and other data to guide ongoing quality improvements • updating logs and reporting on installation or maintenance activities.

Unit Sector(s)

Unit sector	Telecommunications
--------------------	--------------------

Co-requisite units

Co-requisite units		

Competency field

Competency field	Telecommunications networks engineering
-------------------------	---