



**Australian Government**

# **ICTCBL2139B Apply safe technical work practices for cabling registration when configuring ADSL circuits**

Release 1

## ICTCBL2139B Apply safe technical work practices for cabling registration when configuring ADSL circuits

### Modification History

Release	Comments
Release 2	<p>This version first released with <i>ICT10 Integrated Telecommunications Training Package Version 3.0</i>.</p> <p>Minor change to title, descriptor and performance criterion.</p> <p>Outcomes deemed equivalent.</p>
Release 1	<p>This version first released with <i>ICT10 Integrated Telecommunications Training Package Version 1.0</i>.</p>

### Unit Descriptor

This unit describes the performance outcomes, skills and knowledge required to gain proficiency in current work practices and methodologies used for Open and Restricted Cabling Registration.

It covers safe installation and alteration practices for configuring the Carrier NTD/ADSL Filter and Modem/Mode 3 socket/cabling for an alarm system connected to a monitoring station using a carrier line supporting an asymmetric digital subscriber line (ADSL) modem service.

### Application of the Unit

Cablers, installers and technicians in the field apply the skills and knowledge in this unit in the context of technology convergence and digital subscriber lines (DSL) technologies as applied in the telecommunications industry.

It can be applied to installation, maintenance or upgrades of existing systems in voice, data or security systems.

## Licensing/Regulatory Information

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.

## Pre-Requisites

Not applicable

## Employability Skills Information

This unit contains employability skills.

## Elements and Performance Criteria Pre-Content

<b>Elements</b>	<b>Performance Criteria</b>
<i>Elements describe the essential outcomes of a unit of competency.</i>	<i>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.</i>

## Elements and Performance Criteria

<p>1. Build and test DC and AC circuits and telephone earthing</p>	<p>1.1 Identify any hazards and occupational health and safety (OHS) issues for a safe work site and notify appropriate personnel</p> <p>1.2 Connect a series and a parallel <i>DC and AC circuit configuration</i> following <i>safe work practices</i></p> <p>1.3 Choose the appropriate <i>test equipment</i> and measure the values of <i>electrical quantities</i> of the circuits</p> <p>1.4 Use <i>calculations</i> to verify the measured values of the electrical quantities in a series and in a parallel circuit configuration</p> <p>1.5 Compare measured values to calculated values and determine the reasons for any variations</p> <p>1.6 Evaluate results and determine the <i>probable faults</i> if relevant</p> <p>1.7 Measure voltages present on a telephone line and compare to exchange battery voltage</p> <p>1.8 Measure resistance to earth, ensuring an electrical earth in a telecommunications installation</p>
<p>2. Configure a safe ADSL circuit configuration with Mode 3 connection</p>	<p>2.1 Determine the effects of bandwidth, frequency and attenuation on <i>xDSL circuits</i> as used for broadband customer access</p> <p>2.2 Design and configure an <i>ADSL circuit</i> from network boundary through to Mode 3 socket for an alarm system connected to a monitoring station</p> <p>2.3 Configure connection to ensure that an ADSL circuit is not disconnected for safety reasons when an alarm activation in conjunction with a Mode 3 socket disconnects the plain old telephone service (POTS) circuit</p> <p>2.4 Use a <i>level 3 tester</i> to verify correct termination and installation practices on a digital transmission line</p>
<p>3. Diagnose and rectify faults</p>	<p>3.1 Determine urgency and impact of faults and required response timeframe for clearance</p> <p>3.2 Identify <i>type of fault</i> and determine most probable causes of fault from data and historical trends where available</p> <p>3.3 Select tools and test equipment relevant to the system and type of fault</p> <p>3.4 Diagnose fault in a methodical and safe manner using suitable <i>fault-finding technique</i></p>

	<p>3.5 Isolate fault progressively to remove likely variables from diagnostic</p> <p>3.6 Determine options to rectify the fault and present to customer for decision on rectification</p> <p>3.7 Document test methods and results and file with other system installation records</p>
4. Alter existing services	<p>4.1 Identify existing and proposed cable systems for <b><i>altering services</i></b> to an existing installation</p> <p>4.2 Plan alterations to cause minimal disruption to ongoing client activity</p> <p>4.3 Use <b><i>appropriate tools</i></b> to safely <b><i>terminate telecommunications cables and outlets</i></b></p> <p>4.4 Identify and rectify any <b><i>cable fault</i></b></p> <p>4.5 Carry out alterations in a safe manner and according to both mandatory and recommended industry standards</p> <p>4.6 Identify risks posed by contact with remote power feeding services</p> <p>4.7 Test alteration and obtain sign-off from customer</p>

## Required Skills and Knowledge

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

### Required skills

- communication skills to listen and liaise with clients on technical and operational matters related to sign-off for alteration of services
- literacy skills to interpret technical documentation and incorporate technical language into written tasks, such as reporting on recommendations to minimise recurrent fault occurrence
- numeracy skills to:
  - interpret technical data, such as specifications of telecommunications networks
  - perform mathematical problem solving in AC and DC tasks and fault-finding
- problem-solving skills to apply AC and DC fault-finding techniques to different situations
- research skills to access technical information and sources to understand fundamental principles 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:
  - select and use appropriate test equipment and practices to perform basic AC and DC testing
  - perform fault-finding tasks
  - alter services.
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### Required knowledge

- application of binary number conversion and interpretation
- AC and DC electrical quantities, including SI units, OHS issues and the application of Ohm's law
- fault-finding techniques and use of testing equipment, including:
  - multimeter to measure DC voltage, current and resistance
  - continuity tester to check continuity wiring
  - testing of open circuits and short circuits
- overview of:
  - ADSL circuitry and configurations
  - digital transmission concepts, including installation practices and testing
  - procedures in altering existing services, including sign-off
  - difference between analog and digital signals.

## 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.*

<b>Overview of assessment</b>	
<b>Critical aspects for assessment and evidence required to demonstrate competency in this unit</b>	<p>Evidence of the ability to:</p> <ul style="list-style-type: none"> <li>• use concepts of ADSL application and design</li> <li>• use fault-finding techniques to locate cabling faults in telecommunications networks</li> <li>• use Ohm’s law to solve DC and AC electrical problems</li> <li>• apply digital transmission principles and testing</li> <li>• use test equipment</li> <li>• alter existing customer services complying with all related OHS requirements and work practices.</li> </ul>
<b>Context of and specific resources for assessment</b>	<p>Assessment must ensure:</p> <ul style="list-style-type: none"> <li>• a site where altering existing services for a customer may be conducted</li> <li>• appropriate AC and DC testing equipment</li> <li>• manufacturer’s documentation and equipment</li> <li>• correct tools and measuring equipment currently used in industry.</li> </ul>
<b>Method of assessment</b>	<p>A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit:</p> <ul style="list-style-type: none"> <li>• direct observation of the candidate undertaking AC and DC measurements and fault-finding</li> <li>• oral or written questioning to assess knowledge of fundamental concepts of telecommunications practices and recurrent fault-finding techniques</li> <li>• evaluation of written ADSL design concepts</li> <li>• direct observation of visual checks and evaluation of written procedures in altering existing services</li> <li>• direct observation of the candidate altering existing customer services.</li> </ul>
<b>Guidance information</b>	<p>Holistic assessment with other units relevant to the industry</p>

<b>for assessment</b>	<p>sector, workplace and job role is recommended, for example:</p> <ul style="list-style-type: none"><li>• ICTCBL2136B Install, maintain and modify customer premises communications cabling: ACMA Restricted Rule</li><li>• ICTTEN2140B Use hand and power tools</li><li>• ICTWHS2170B Follow work health and safety and environmental policies and procedures.</li></ul> <p>Aboriginal people and other people from a non-English speaking background may have second language issues.</p> <p>Access must be provided to appropriate learning and assessment support when required.</p> <p>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.</p> <p>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.</p> <p>Where applicable, physical resources should include equipment modified for people with special needs.</p>
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## 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.*

<p><b><i>DC and AC circuit configuration</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• DC circuit:                     <ul style="list-style-type: none"> <li>• resistances</li> <li>• single DC voltage source:                             <ul style="list-style-type: none"> <li>• battery</li> <li>• DC voltage supply</li> <li>• solar panel</li> </ul> </li> </ul> </li> <li>• AC circuit:                     <ul style="list-style-type: none"> <li>• inductors, capacitors and resistances</li> <li>• single AC voltage source:                             <ul style="list-style-type: none"> <li>• AC generator</li> <li>• AC voltage supply</li> <li>• alternator</li> <li>• low voltage (LV) AC source.</li> </ul> </li> </ul> </li> </ul>
<p><b><i>Safe work practices</i></b> may relate to:</p>	<ul style="list-style-type: none"> <li>• component tolerances are not exceeded</li> <li>• correct use of power supply and test equipment</li> <li>• identifying any electrical safety hazards</li> <li>• isolation from main supply</li> <li>• overdrawing of current</li> <li>• power down during set-up procedure</li> <li>• well laid out circuitry:                     <ul style="list-style-type: none"> <li>• avoid contact with external sources</li> <li>• avoid shorting of components.</li> </ul> </li> </ul>
<p><b><i>Test equipment</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• digital multimeter</li> <li>• multimeter</li> <li>• ohmmeter</li> <li>• voltmeter.</li> </ul>
<p><b><i>Electrical quantities</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• current</li> <li>• power</li> <li>• voltage.</li> </ul>
<p><b><i>Calculations</i></b> may include:</p>	<ul style="list-style-type: none"> <li>• application of Ohm's law</li> <li>• engineering notation</li> <li>• power calculations</li> </ul>

	<ul style="list-style-type: none"> <li>• power consumption and efficiencies</li> <li>• voltage dividers</li> <li>• voltage, resistance and current calculations.</li> </ul>
<b>Probable faults</b> may include:	<ul style="list-style-type: none"> <li>• faulty component</li> <li>• faulty source voltage</li> <li>• open circuits</li> <li>• short circuits.</li> </ul>
<b>xDSL circuits</b> may include:	<ul style="list-style-type: none"> <li>• ADSL</li> <li>• ADSL2</li> <li>• ADSL2+.</li> </ul>
<b>ADSL circuit</b> may include:	<ul style="list-style-type: none"> <li>• ADSL filters connected at a main distribution frame (MDF)</li> <li>• central filters and splitters installed at a network termination device (NTD)</li> <li>• central filters and splitters installed internally</li> <li>• domestic installations and small shops that use a telecommunications outlet (TO) or NTD as a network boundary</li> <li>• DSL and Mode 3 connections.</li> </ul>
<b>Level 3 tester</b> may include:	<ul style="list-style-type: none"> <li>• continuity</li> <li>• F set</li> <li>• local area network (LAN) Cat tester</li> <li>• split pair</li> <li>• wire map.</li> </ul>
<b>Type of fault</b> may include:	<ul style="list-style-type: none"> <li>• cable</li> <li>• electrical</li> <li>• hardware</li> <li>• software</li> <li>• system.</li> </ul>
<b>Fault-finding technique</b> may include:	<ul style="list-style-type: none"> <li>• half term testing</li> <li>• isolation of sections</li> <li>• logical mapping</li> <li>• using testing equipment.</li> </ul>
<b>Altering services</b> may include:	<ul style="list-style-type: none"> <li>• changing cable installation</li> <li>• client interaction</li> <li>• identifying mission critical services</li> <li>• identifying remote power feeding</li> <li>• upgrading a service.</li> </ul>
<b>Appropriate tools</b> may include:	<ul style="list-style-type: none"> <li>• basic hand tools</li> <li>• F sets for cable identification</li> <li>• Krone termination tool</li> </ul>

	<ul style="list-style-type: none"><li>• multimeter</li><li>• wire strippers.</li></ul>
<i>Terminate telecommunications cables and outlets</i> may include:	<ul style="list-style-type: none"><li>• stripping a:<ul style="list-style-type: none"><li>• 2 pair internal rated</li><li>• 3 pair external rated cable</li><li>• 4 pair Category 5 unshielded twisted pair (UTP) cable</li></ul></li><li>• terminating a TO</li><li>• termination using screw terminals.</li></ul>
<i>Cable fault</i> may include:	<ul style="list-style-type: none"><li>• earth contact</li><li>• foreign battery</li><li>• no voltage</li><li>• open circuit</li><li>• short circuit</li><li>• split pair.</li></ul>

## Unit Sector(s)

Telecommunications - Cabling