

Unit 16: Repair and decommission of IT equipment (LEVEL 2)

Learning outcomes

By completing this unit, candidates will develop the knowledge, understanding and skills to find a fault with IT equipment and to implement a repair of the fault.

Candidates will be able to:

- explain current health and safety procedures and implement them in a workplace environment
- develop procedures for the repair of equipment
- identify common faults that occur with IT equipment and the main causes of faults
- select and explain the use of appropriate hardware and software tools to test equipment for three different faults
- identify sources of information to assist with faults/testing
- test hardware and suggest solutions for failed equipment
- repair IT equipment by dismantling and reassembling
- identify legislation and describe procedures for the safe decommissioning of IT equipment.

It is anticipated that a candidate will require 60 guided learning hours to complete this unit.

Assessment objectives	Knowledge, understanding and skills
1 Explain current health and safety procedures and implement them in a workplace environment	Standard safety equipment required eg anti static wrist band, anti static mats, eye protection, appropriate clothing, appropriate fire extinguisher Procedures prior to repair: <ul style="list-style-type: none">• main power disconnected• tools in good state of repair• location of COSHH (Control of Substances Hazardous to Health) file, location of first aid equipment and safety officer
2 Develop procedures for the repair of equipment	To include: <ul style="list-style-type: none">• inventory procedures• production of quotations• documenting repair• customer records/services• suppliers records/services• collation of repair information for devices• maintaining history of equipment repaired• invoicing for repair• decommissioning procedures• health and safety

Assessment objectives	Knowledge, understanding and skills
3 Identify common faults that occur with IT equipment and the main causes of faults	<p>Common faults including:</p> <ul style="list-style-type: none"> • user error • unplugged device • graphics problem • disk drive problems – (complete failure or partial failure, bad sectors) • input device errors (eg mouse, keyboard) • memory problems CPU (Central Processor Unit) problems (eg total failure, overheating) • communication problems (eg printer, scanner) • driver problems • IRQ (Interrupt Request) and memory address allocation problems <p>For faults identified, understand the common causes of the fault</p>
4 Select and explain the use of appropriate hardware and software tools to test equipment for three different faults	<p>Software tools that are appropriate to diagnose problems including how and where they would be used:</p> <ul style="list-style-type: none"> • POST (Power On Self Test) analysis tools • disk analysis tools • disk drive and CD-Rom drive testing software • software testing suites • peripheral testing software supplied with device such as printer and scanner <p>Hardware tools that are appropriate to diagnose problems including:</p> <ul style="list-style-type: none"> • multimeter • signal generator • appliance tester
5 Identify sources of information to assist with faults/testing	<p>The importance of the customer in identifying the fault:</p> <ul style="list-style-type: none"> • sources of information specific to testing equipment and select which ones to use • manufacturer web site, generic testing web site, software tools diagnosis web site, hardware tools diagnosis web site • manual for equipment, safety manuals
6 Test hardware and suggest solutions for failed equipment	<p>Testing:</p> <ul style="list-style-type: none"> • diagnostic tests carried out on equipment • document identified problem <p>Solutions:</p> <ul style="list-style-type: none"> • software or hardware fix • when to repair, replace, upgrade or decommission
7 Repair IT equipment by dismantling and reassembling	<p>Safety precautions to take place before and during disassembly and reassembly of IT equipment</p> <p>Equipment required to safely dismantle and reassemble IT equipment:</p> <p>Disassemble equipment to component level:</p> <ul style="list-style-type: none"> • recognise importance of backing up user files • recognise importance of documenting procedures and implement method of doing so • once removed, store each component appropriately <p>Reassemble equipment to working order:</p> <ul style="list-style-type: none"> • install components in correct order <p>Perform tests to ensure equipment works as required</p>

Assessment objectives	Knowledge, understanding and skills
8 Identify legislation and describe procedures for the safe decommissioning of IT equipment	<p>Software licences:</p> <ul style="list-style-type: none"> • removal of licence from machine • legal situation regarding re-use of licence <p>Data in the equipment:</p> <ul style="list-style-type: none"> • removing sensitive material from the equipment <p>Health and safety:</p> <ul style="list-style-type: none"> • transferring equipment • electrical testing • disposal of electrical equipment • CRT (Cathode Ray Tube) – removal of fluorescent coating, mercury • PCB (Printer Circuit Board) • LCD (Liquid Crystal Display) • removal of equipment by a registered waste carrier

Assessment

This unit is centre assessed and externally moderated.

In order to achieve this unit, candidates must produce a portfolio of evidence showing that they have met all of the assessment objectives.

Portfolios of work must be produced independently. They will need to be made available, together with witness statements and any other supporting documentation, to the OCR Visiting Moderator when required.

Centres must confirm to OCR that the evidence produced by candidates is authentic. An OCR Centre Authentication Form is provided in the Centre Handbook and includes a declaration for assessors to sign. It is a requirement of the QCA Common Criteria for all Qualifications that proof of authentication is received.

Guidance on assessment and evidence requirements

This is a practical unit where candidates will need time to practice the skills and techniques listed. The IT equipment utilised for the delivery of this unit should be that which is commonly found in a business setting (eg monitors, printers, scanners, base units, etc).

The health and safety theory for working with computer equipment must be taught before candidates carry out practical exercises with equipment. It is very important that the candidates can work safely; therefore, Assessment Objective 1 must be covered first.

For Assessment Objective 1 candidates must explain current health and safety procedures and implement them in a workplace environment. They must demonstrate a knowledge and understanding of standard safety equipment required (eg anti static wrist band, anti static mats, eye protection, appropriate clothing, appropriate fire extinguisher). They should check the following procedures prior to undertaking any repair work: disconnect main power, check that tools are in a good state of repair, check the location of the COSHH (Control of Substances Hazardous to Health) file and first aid equipment and identify the safety officer.

For Assessment Objective 2 candidates should develop procedures for the repair of equipment. These procedures should include inventory procedures, production of quotations, documenting repair, customer records/services, suppliers' records/services, collation of repair information for devices, maintaining history of equipment repaired, invoicing for repair, decommissioning procedures and health and safety.

For Assessment Objective 3 candidates should identify common faults that occur with IT equipment and the main causes of faults including common causes. Common faults problems would include user error, unplugged device(s); input device error; graphics, disk drive, CPU, communication and driver problems and IRQ and memory address allocation problems.

For Assessment Objective 4 candidates should select and explain the use of appropriate hardware and software tools to test equipment for three different faults. When selecting software tools candidates should include details of how and where these would be used. Software tools could include those appropriate to diagnose problems, for example POST, analysis tools, disk analysis tools, disk drive and CD-ROM drive testing software, software testing suites, peripheral testing software supplied with device such as printer and scanner. Hardware tools that are appropriate to diagnose problems could include a multimeter, signal generator and appliance tester. Candidates should include details of how and where they would be used.

For Assessment Objective 5 candidates should identify sources of information to assist with faults/testing. They must demonstrate knowledge of the importance of the customer in identifying the fault including sources of information specific to testing equipment and which ones to use. They could identify manufacturer's websites, generic testing websites, software tools diagnosis websites, hardware tools diagnosis websites and equipment and safety manuals.

For Assessment Objective 6 candidates must test hardware and suggest solutions for failed equipment. Testing could include diagnostic tests carried out on equipment and documenting any identified problems. Solutions could include software or hardware fixes, advice on when to repair, replace, upgrade or decommission.

For Assessment Objective 7 candidates should repair IT equipment by dismantling and reassembling equipment. Candidates should take safety precautions before and during disassembly and reassembly of IT equipment. They will need to safely dismantle and reassemble IT equipment. They should disassemble equipment to component level and recognise the importance of backing-up user files, of documenting procedures and implement methods of doing so and storing each component appropriately. They must then reassemble equipment to working order. This should include installing components in the correct order and performing tests to ensure equipment works as required.

For Assessment Objective 8 candidates should identify legislation and describe the procedures for the safe decommissioning of IT equipment. They must demonstrate a knowledge of software licenses including removal of a license from machine(s) and be aware of the legal situation regarding re-use of license(s). They should know how to remove sensitive material from the equipment and be aware of health and safety when transferring equipment, when carrying out electrical testing and disposing of electrical equipment and be aware of the guidelines for removal of equipment by a registered waste carrier.

Candidates may provide portfolio evidence for the assessment objectives of this unit using a range of presentation techniques. This may include written data, the use of video, audio or computer based presentation, and assessor testimony/witness statements (if appropriate). Where candidates demonstrate competence, centres should record skills demonstrated on appropriate recording documentation.

Signposting to Key Skills

- ✓ The unit contains opportunities for developing the Key Skill, and possibly for generating portfolio evidence, if teaching and learning is focused on that aim.

Key Skill reference		Key Skill reference		Key Skill reference	
C2.1a		ICT2.1	✓	N2.1	✓
C2.1b		ICT2.2	✓	N2.2	
C2.2	✓	ICT2.3	✓	N2.3	
C2.3					

Mapping to National Occupational Standards

National Occupational Standards	Reference ID	Title
IT professional (e-skills UK)		Technical fault diagnosis Level 2
IT professional (e-skills UK)		Technical fault remedy selection Level 2
IT professional (e-skills UK)		Working with ICT hardware and equipment Level 2

Resources

This section provides suggestions of suitable resources. The list is neither prescriptive nor exhaustive, and candidates should be encouraged to gather information from a variety of sources. Some suggested resources are intended for Tutor use. The resources in this section were correct at the time of production.

Books

Mueller, S.	<i>Upgrading and Repairing PCs</i>
Press, M. & Press, B.	<i>PC Upgrade and Repair Bible</i>
Miller, M.	<i>Absolute Beginners' Guide to Upgrading and Fixing Your PC</i>
Rathbone, A.	<i>Upgrading and Fixing PCs for Dummies</i>

Websites

DTI. - [URL:http://www.dti.gov.uk/sustainability/weee/](http://www.dti.gov.uk/sustainability/weee/).

Information relating to the EEC Directive on Waste Electrical and Electronic Equipment.

Karbo's Guide. - [URL:http://www.karbosguide.com/](http://www.karbosguide.com/).

An illustrated guide to PC hardware. This site also includes a useful dictionary of terms.

[URL:http://www.hse.gov.uk/](http://www.hse.gov.uk/)

Health and safety executive – responsible for health and safety regulation in Great Britain.

[URL:http://pcmech.com/](http://pcmech.com/)

PC Mechanic – Provides tutorials, reviews, forums etc to answer your questions.

Build Your Own Computer. - [URL:http://www.buildyourowncomputer.net/learntobuild.html](http://www.buildyourowncomputer.net/learntobuild.html)

How Stuff Works. - [URL:http://computer.howstuffworks.com/](http://computer.howstuffworks.com/)

Grading

Assessment Objective	Pass	Merit	Distinction
AO1 Explain current health and safety procedures and implement them in a workplace environment	Candidates will explain and apply current health and safety procedures competently; some guidance may be required.	Candidates will provide detailed explanations of current health and safety procedures. They will apply their knowledge competently and mostly use the correct equipment for the job; little guidance will be required.	Candidates will provide detailed explanations of current health and safety procedures; examples will be given relating to their own experiences. They will apply their knowledge competently and always use the correct equipment for the job.
AO2 Develop procedures for the repair of equipment	Candidates will develop basic procedures for the repair of equipment. The documentation will be usable. The document will include at least five of the listed procedures.	Candidates will develop detailed procedures for the repair of equipment. The documentation will be clear and easy to use. The document will include at least five of the listed procedures.	Candidates will develop detailed procedures for the repair of equipment. The documentation will be structured well and easy to use. The document will include more than five of the listed procedures.
AO3 Identify common faults that occur with IT equipment and the main causes of faults	Candidates will list a range of IT equipment and identify common faults that occur with this equipment. For two of the listed items they will give a limited explanation of the causes of those faults.	Candidates will identify common faults that occur with a range of IT equipment. For most of the faults identified, explanations will be provided; not all explanations will be accurate.	Candidates will identify common faults that occur with a range of IT equipment. They will provide detailed explanations of the causes of these faults. Candidates will provide more than one explanation of the causes of the faults identified, where appropriate. Most of their explanations will be accurate.
AO4 Select and explain the use of appropriate hardware and software tools to test equipment for three different faults	Candidates will test equipment for three different faults using hardware and software tools. They will provide a basic explanation of their choice of hardware and software for testing; their explanations and selections will not always be accurate and appropriate.	Candidates will test equipment for three different faults selecting appropriate hardware and software tools. They will provide a thorough explanation of their choice of hardware and software for testing; their explanations will not always be accurate.	Candidates will test equipment for at least three different faults selecting appropriate hardware and software tools. They will provide a thorough explanation of their choice of hardware and software for testing; their explanations will mostly be accurate.

Assessment Objective	Pass	Merit	Distinction
AO5 Identify sources of information to assist with faults/testing	Candidates will identify the different types of information required to assist with faults/testing: manufacturers' website, manuals for equipment and safety manuals. Not all the sources identified will be current or useful.	Candidates will identify the different types of information required to assist with faults/testing: manufacturers' website, manuals for equipment and safety manuals. All of the sources identified will be current and mostly useful.	Candidates will identify the different types of information required to assist with faults/testing: manufacturers' website, manuals for equipment and safety manuals. All of the sources identified will be current. The information obtained will be useful.
AO6 Test hardware and suggest solutions for failed equipment	Candidates will carry out some diagnostic tests on hardware and identify the fault. Their solutions will identify whether the fault involves a hardware or software fix. They will not always accurately assess the fault for deciding whether to repair, replace, upgrade or decommission.	Candidates will carry out diagnostic tests on hardware and document the identified fault(s) and most of the tests needed to be carried out. Their solutions will accurately identify whether the fault(s) involves hardware or software fixes and whether to repair, replace, upgrade or decommission. A brief explanation of how the tests led them to their solution(s) will be provided.	Candidates will carry out diagnostic tests on hardware and document the identified fault(s) and all the tests needed to be carried out. Their solutions will accurately identify whether the fault(s) involves hardware or software fixes and whether to repair, replace, upgrade or decommission. They will explain in detail how their testing led them to these final decisions.
AO7 Repair IT equipment by dismantling and reassembling	The candidate will take appropriate action to repair the fault and follow correct safety procedures. There is always the possibility that the fault cannot be repaired and it cannot be replaced. The candidate needs to identify the actions that they would need to take if disposal of the equipment is required.	The candidate will take appropriate action to repair the fault and follow correct safety procedures. All actions carried out will be documented. Testing will be carried out to show that the repair has been done successfully. The process of testing will be documented. If the fault cannot be repaired or replaced then candidates will need to describe in detail the actions that they would take for the disposal of the equipment.	The candidate will take appropriate action to repair the fault and follow correct safety procedures. All actions carried out will be documented in sufficient detail for a third party to use. Testing will be carried out to show that the repair has been done successfully. Candidates will produce a test plan and will document the process of testing. If the fault cannot be repaired or replaced then candidates will need to describe in detail the actions that they would take for the disposal of the equipment. This will be usable (continued)

Assessment Objective	Pass	Merit	Distinction
A07 Cont. Repair IT equipment by dismantling and reassembling			documentation for decommissioning equipment; names and addresses, costs, and health and safety requirements will be included.
A08 Identify legislation and describe procedures for the safe decommissioning of IT equipment	Candidates will list some of the legislation for the safe decommissioning of IT equipment: removal of licence from machine, removal of stored sensitive material and some of the safety procedures for disposing of equipment.	Candidates will list most of the legislation for the safe decommissioning of IT equipment: removal of license from machine, legal situation regarding re-use of license, removal of stored sensitive material and most of the safety procedures for disposing, transferring and electrical testing of equipment. They will provide some explanations of the need for these procedures.	Candidates will list most of the legislation for the safe decommissioning of IT equipment: removal of license from machine, legal situation regarding re-use of license, removal of stored sensitive material and most of the safety procedures for disposing, transferring and electrical testing of equipment. They will provide detailed explanations of the need for these procedures.