

Level 2 Certificate in Digital Television Aerial Installation (2218)

Qualification Handbook



Image courtesy of Triax UK Limited

About City & Guilds

City & Guilds is the UK's leading provider of vocational qualifications, offering over 500 awards across a wide range of industries, and progressing from entry level to the highest levels of professional achievement. With over 8500 centres in 100 countries, City & Guilds is recognised by employers worldwide for providing qualifications that offer proof of the skills they need to get the job done.

City & Guilds Group

The City & Guilds Group includes ILM (the Institute of Leadership & Management) providing management qualifications, learning materials and membership services and NPTC (National Proficiency Tests Council) which offers land-based qualifications. City & Guilds also manages the Engineering Council Examinations on behalf of the Engineering Council.

Equal Opportunities

City & Guilds fully supports the principle of equal opportunities and we are committed to satisfying this principle in all our activities and published material. A copy of our equal opportunities policy statement 'Access to assessment' is available on our website or from the Customer Relations team.

Copyright

The content of this document is, unless otherwise indicated, © The City and Guilds of London Institute 2005 and may not be copied, reproduced or distributed without prior written consent.

However, approved City & Guilds centres and learners studying for City & Guilds qualifications may photocopy this document free of charge and/or include a locked PDF

version of it on centre intranets on the following conditions

- members of a centre's staff may copy the material only for the purpose of teaching learners at that centre who are studying towards a City & Guilds qualification, or for internal administration purposes
- learners may copy the material only for the purpose of their own private study towards a City & Guilds qualification
- the 'standard copying conditions' shown on City & Guilds website.

Please note: National Occupational Standards are not © The City & Guilds of London Institute. Please check the conditions upon which they may be copied with the relevant Sector Skills Council.

Publications

City & Guilds publications are available online or from our Publications Sales department at the address below or by telephoning +44 (0)20 7294 2850 or faxing +44 (0)20 7294 3387.

City & Guilds

1 Giltspur Street

London, EC1A 9DD

T +44 (0)20 7294 2468

F +44 (0)20 7294 2400

www.city-and-guilds.co.uk

Every effort has been made to ensure that the information contained in this publication

is true and correct at the time of going to press. However, City & Guilds' products and services are subject to continuous development and improvement and the right is reserved to change products and services from time to time. City & Guilds cannot accept liability for loss or damage arising from the use of information in this publication.

Level 2 Certificate in Digital Television Aerial Installation (2218)

Qualification Handbook



www.city-and-guilds.co.uk
August 2005
Version 1

This page is intentionally blank

Contents

1	Level 2 Certificate in Digital Television Aerial Installation (2218)	5
1.1	Introduction	5
1.2	About the qualification	6
1.3	Course design and delivery	8
1.4	Centre and scheme approval	9
1.5	Global Online Assessment (GOLA)	10
1.6	Appeals and Equal Opportunities	11
2	Assessments	12
3	The units	14
Unit 1	Knowledge of digital television aerial installation	14
Unit 2	Installation and testing of digital television aerials	17
Appendix 1	Suggested time allocation: Guided learning hours	18
Appendix 2	Resources	19
Appendix 3	Relationship to NVQ units	20
Appendix 4	Key skills signposting	22

This page is intentionally blank

1 Level 2 Certificate in Digital Television Aerial Installation (2218)

1.1 Introduction

This qualification has been developed in order to recognise a technician's skills and understanding for the installation of domestic and commercial digital television aerials and systems. It provides the technical knowledge as described within the appropriate National Occupational Standards (NOS).

It has been designed to accredit candidates' achievements in a modern, practical way that is relevant to the work context and to provide accreditation for the full breadth of essential knowledge, understanding and skills that would be needed by a competent technician functioning autonomously in a digital television aerial and systems installation job role. The course content covers working safely at heights, site survey and assessment, aerial mountings and fixings, aerials and associated fixings, noise and interference, set top boxes and customer care.

This qualification has been designed to reflect the content of the S/NVQ in Electrical and Electronic Servicing at Level 2 and to provide a basis for progression to this qualification. The Department of Trade and Industry (DTI) supports the recognition of qualified personnel within the sector as part of the crossover from analogue to digital television transmission.

1 Level 2 Certificate in Digital Television Aerial Installation (2218)

1.2 About the qualification

Aims of the qualification

The qualification aims to:

- develop candidates' knowledge and understanding of the digital television industry
- develop candidates' ability to work autonomously in a digital television related context
- develop candidates' interpersonal skills to enable them to work effectively with customers and colleagues
- develop candidates' practical skills in identifying and using digital television related resources and equipment
- encourage progression by assisting in the development of skills and knowledge which candidates' may need to undertake further study

General information

This qualification has been designed by City & Guilds to support Government initiatives in respect of providing training and assessment to support a competent workforce to meet the requirements for digital aerial installation.

The qualification is aimed primarily at those who already possess a basic knowledge and understanding of digital television aerial and systems installations and who wish to extend their knowledge. It is also suitable for those who are studying in preparation for employment in activities where they will be expected to work autonomously in carrying out digital television related installation activities.

General structure

The qualification is made up of two units. The first unit describes the underpinning knowledge that is required to understand the theory behind digital transmission, the various components their function and location and the testing and measurement to provide optimum reception. It also covers issues relating to customer care and safe working practices. The second unit is concerned with the application of practical skills in carrying out installation and testing.

Assessment and quality assurance

National standards and quality assurance will be maintained by the use of:

- City & Guilds written tests, set and marked by City & Guilds using the on line assessment system GOLA
- Practical assessments marked by the centre according to externally set marking criteria with quality assurance assured by the centre and monitored by City & Guilds external verification system.

Quality assurance includes initial centre approval, scheme approval, the centres own procedures for monitoring quality and City & Guilds' ongoing monitoring by an External Verifier. Details of City & Guilds criteria and procedures can be found in Providing City & Guilds Qualifications – a guide to centre and scheme approval.

External verifiers act on behalf of City & Guilds to ensure that national standards are maintained. Full details of their role can be found in the above document.

No higher grade than pass will be awarded for the assessment components.

For candidates with particular requirements, centres should refer to City & Guilds policy document *Access to assessment: candidates with particular requirements*.

1 Level 2 Certificate in Digital Television Aerial Installation (2218)

1.3 Course design and delivery

Course design

Centres wishing to offer the Digital Television Aerial Installer qualification will need to provide clear guidance on the routes and the modes of study available and how these are to be supported and to employ learning activities that assist students to achieve the programmes aims and objectives. Teachers/assessors should familiarise themselves with the structure and content of the course before designing an appropriate course. City & Guilds does not itself provide a course of instruction, there is however a suggested time allocation in the Appendix. This is for guidance and teachers/assessors may design courses in any way that they feel best meets the needs of their candidates.

It is recommended that 20 hours should be allocated to deliver the course.

Please see the Appendix as to where further information in support of a course may be found

Entry to the course

There are no formal entry requirements for this qualification. Candidates will, however, need to possess an awareness of television aerial and system installations including basic health and safety such as working safely at heights and customer care and be able to recognise and operate digital television related test and measurement equipment to a level acceptable in the workplace.

The qualification has been designed to complement the S/NVQ in Electrical and Electronic Servicing at Level 2. It will therefore be appropriate both for those who are preparing to undertake the S/NVQ in Electrical and Electronic Servicing at Level 2 and for those who are already working towards the S/NVQ and who wish to demonstrate additional achievements.

City & Guilds strongly recommends that candidates for the qualification should not registered if they hold from City & Guilds or another awarding body a qualification of a similar level and within the same content area.

Health and safety

The requirement to follow safe working practices is an integral part of all City & Guilds qualifications and assessments and it is the responsibility of centres to ensure that all relevant health and safety requirements are in place before candidates start practical assessments. Should a candidate fail to follow health and safety practice and procedures during an assessment the test must be stopped and the candidates advised of the reasons why. The candidate should be informed that they have failed. Candidates may retake an assessment after remedial tuition in respect of the safety element.

Entry for assessment and certification

Candidates must be entered through an approved centre. Full details will be found on the City & Guilds website.

1 Level 2 Certificate in Digital Television Aerial Installation (2218)

1.4 Centre and scheme approval

Any centre wishing to offer City & Guilds qualifications must gain approval. New centres must apply for centre and scheme approval. Existing City & Guilds centres will need specific scheme approval to run this qualification. Centres must ensure that they can access the resources required for the practical assessment.

Full details of the process for both centre and scheme approval are given *Providing City & Guilds qualifications – a guide to centre and scheme approval* which is available from City & Guilds regional offices.

City & Guilds reserves the right to suspend an approved centre or withdraw its approval from an approved centre to conduct a particular City & Guilds scheme or schemes for reasons of debt, malpractice or for any reason that may be detrimental to the maintenance of authentic, reliable and valid qualifications or that may prejudice the name of City & Guilds.

External verifiers act on behalf of City & Guilds to ensure that national standards are maintained. Full details of their role can be found in *Providing City & Guilds qualifications – a guide to centre and scheme approval*.

1 Level 2 Certificate in Digital Television Aerial Installation (2218)

1.5 Global Online Assessment (GOLA)

GOLA registration

Centres are required to register as a GOLA centre before any tests can be scheduled. The form for this is available from the website www.city-and-guilds.co.uk/e-assessment

A centre only needs to register once for GOLA

Further information

There is a GOLA helpline number - centre enquiries and technical enquiries about GOLA can be directed to this number 0845 241 0070. Centres can also e-mail: gola@city-and-guilds.co.uk.

The following leaflets are available:

- *A centre's guide to global on-line assessment*
- *A centre's guide to technical requirements for global on-line assessment*
- *A centre's guide to administering global on-line assessment*
- *A learner's guide to global on-line assessment.*

Centres looking for general information about GOLA or copies of the GOLA leaflets are advised to use the website: www.city-and-guilds.co.uk/e-assessment.

1 Level 2 Certificate in Digital Television Aerial Installation (2218)

1.6 Appeals and Equal Opportunities

Centres must have their own auditable, appeals procedure. If a candidate is not satisfied with the examination conditions or a candidate feels that the opportunity for examination is being denied, the Centre Manager should, in the first instance, address the problem. If, however, the problem cannot be resolved, City & Guilds will arbitrate and an external verifier may be approached to offer independent advice. All appeals must be clearly documented by the Centre Manager and made available to the external verifier or City & Guilds if advice is required.

Should occasions arise when centres are not satisfied with any aspect of the external verification process, they should contact City & Guilds regional or national office.

2 Assessments

The award

For the award of a certificate candidates must successfully complete both assessment units.

Unit 1 – Knowledge of digital television aerial installations

2218-001

Unit 2 – Installation and testing of digital television aerials

2218-002

Test specifications

2218-001 Knowledge of digital television aerial installation

Multiple choice paper of 30 items Duration: 45 minutes

Section	Topic	Weighting %	No of questions
1	Digital broadcasting and systems	10	3
2	Site survey	17	5
3	Aerial mountings and cable fixings	23	7
4	Aerials and associated feeders	10	3
5	Noise and interference	17	5
6	Customer care	6	2
7	Health and safety	17	5
	Total	100	30

2218-002 Installation and testing of digital television aerials

Practical assessment is based on the installation and testing of a digital aerial.

Centres should comply with the following specification to allow for the practical testing. Provision must be made for installation to be undertaken to a fixing at least 3m above the ground. This can be a mast, wall, chimney or any similar suitable point. The aerial can be of any type suitable for digital reception. Mounting brackets e.g. T and K, mast brackets. Coaxial cable should be run for a minimum of 5m and fitted into a terminal. A digital TV receiver should be provided and appropriate test equipment (spectrum analyser) in order to measure signals. Further details are provided with the Practical Assignment.

In working at heights the centre must ensure that all safety aspects are fully understood and implemented by the candidate.

3 The units

Unit 1 Knowledge of digital television aerial installation

1 Introduction to digital broadcasting and signalling systems and associated set top boxes

- 1.1 Describe digital television broadcasting systems and features including:
- Compressed video transmission (MPEG-2 (video),
 - Advanced audio coding,
 - Carrier to noise ratio,
 - Bit error rate
 - COFDM
- 1.2 Describe the various types and uses of connecting leads including SCART and S-Video
- 1.3 Describe various types of set top boxes, including embedded set top boxes and their associated functions

2 Site survey and assessment

- 2.1 Explain how to identify local frequencies and signals and describe the effects of interference
- 2.2 Describe how to identify television channels used within an area
- 2.3 Describe the classification of Band II, Band III, Band IV and Band V channels and frequencies
- 2.4 Describe the methods used for locating the most appropriate transmitter
- 2.5 State how to use appropriate signal strength/measurements test equipment to determine expected signal strengths
- 2.6 Explain the effects of local obstructions and signal inference sources and how to avoid them
- 2.7 Identify and recommend appropriate aerials and mounting positions
- 2.8 State the need to recognise possible requirements in respect of planning permission

3 Aerial mountings and cable fixings

- 3.1 Describe procedures for mounting and securing aerials in domestic/commercial buildings, including the utilisation of appropriate ladders and lashing techniques
- 3.2 Explain the effects of environmental weather conditions when working at heights

- 3.3 Describe appropriate earthing arrangements/connections
- 3.4 Describe the routing and fixing of cables in order to minimise signal loss and combat carrier to noise.
- 3.5 Identify and describe appropriate fixings to combat local and adverse weather conditions.
- 3.6 Describe the appropriate cable terminating procedures in order to ensure optimum performance
- 3.7 Recognise and select appropriate tools and equipment
- 3.8 Describe procedures for the maintenance of tools and equipment
- 3.9 Describe health and safety precautions associated with the usage of electrical equipment
- 3.10 Explain the importance of using manufacturers instructions and specifications

4 Aerials and associated feeders

- 4.1 Describe the Loss and Gain factors in Aerial Systems including practical usage of the Decibel in aerial systems covering Power Gain, Power Loss and Gains and Losses in series.
- 4.2 Identify and describe types and usage of aerials and associated feeder cables including, where appropriate, their
 - associated loss ratio,
 - aerial frequency and wavelength,
 - isotropic radiator,
 - Dipole and Folded Dipole,
 - aerial gain, (dBd, dBi)

5 Noise and interference

- 5.1 Describe noise sources and practical applications for the reduction of noise including usage of filters and methods of lightning and static protection
- 5.2 Describe the effects of climatic conditions on Signal Amplification and Attenuation including signal to noise ratio
- 5.3 Carry out calculations relating to the overall performance of aerial and feeder cable
- 5.4 Describe the effects of climatic conditions on signal strength and signal quality
- 5.5 Explain the benefits of utilising appropriate aerial arrangements

6 Provide and maintain customer care

- 6.1 State procedures used for developing and maintaining professional relationships with customers

6.2 State the importance of recognising customer needs

6.3 Describe handover procedures

7 Health and safety

7.1 Describe the need to apply safe working procedures

7.2 Describe the statutory regulations and organisational safety requirements, in accordance with approved procedures including employers and employees responsibilities and legislation

7.3 Describe the use of anchorage and fall restraint equipment

7.4 Describe equipment maintenance procedures

7.5 Describe precautions against electric shock and safety procedures when working with electricity

7.6 Describe usage of Personal Protective Equipment, PPE

7.7 State procedures for the correct disposal of waste

3 The units

Unit 2 Installation and testing of digital television aerials

The candidate will be able to install and test a digital aerial installation.

Installation

- 1 Demonstrate the practical ability to recognise, use and maintain height access and associated personal protective equipment including the assessment of risks involved in working safely at heights.
- 2 Demonstrate an awareness of the Health & Safety at Work Act including risk assessment techniques applicable to aerial mounting and cable fixing installation techniques when working at heights.
- 3 Identify and route appropriate cables and associated fixings
- 4 Mount and install aerials and associated fixings securely and safely

Testing

- 5 Demonstrate an ability to identify and use equipment associated with digital television signal strength and measurement including picture quality
- 6 Carry out practical applications associated with the tuning of set top boxes.
- 7 Obtain the most effective signal in order to obtain quality of signal and reliable reception
- 8 Demonstrate an ability to recognise and use test and measurement equipment associated with aerials and associated feeders
- 9 Demonstrate the ability to recognise and use test and measurement equipment associated with Noise Sources, (Interference) including Signal Amplification and Attenuation
- 10 Diagnose and rectify faults in signal reception equipment or systems

Handover and customer care

- 11 Demonstrate the ability to work with customers in identifying their needs, including the products or services to meet those needs, and to provide customers with a practical demonstration on how to operate installed equipment

Appendix 1 Suggested time allocation: Guided learning hours

Topic	Guided learning hours
Introduction to digital broadcasting and signalling and set top boxes	4
Site survey and assessment	3
Aerial mountings and cable fixings	3
Aerials and associated feeders	3
Noise and interference	3
Provide and maintain customer care	2
Health and safety	2
Total	20

Appendix 2 Resources

Resources to support this programme can be obtained from the following organisations:

Organisation	Website
Confederation of Aerial Industries (CIA)	www.cai.org.uk
The Independent Digital Standards Commission (IDSC)	www.idsc.uk.com
The Health & Safety Executive	www.hse.gov.uk
The Digital Television Group (DTG)	www.dtg.org.uk
Office of Communications	www.ofcom.org.uk
Digital Television Project, Department for Culture, Media and Sport (DCMS)	www.digitaltelevision.gov.uk

Appendix 3 Relationship to NVQ units

Digital Television Aerial Installers Certificate

		National Vocational Qualification							
		Unit 201	Unit 202	Unit 203	Unit 204	Unit 205	Unit 206	Unit 207	Unit 208
City & Guilds Aerial Installers Certificate		Complying with statutory regulations and organisational safety requirements	Contributing to positive working relationships	Establishing customer relationships	Installing signal reception equipment in customers' premises	Familiarising customers with the use of products	Working safely at heights with antennas	Diagnosing faults in reception systems	Replacing modules in signal reception systems
	1. Digital Broadcasting and Signalling and Set Top Boxes								
	2. Site Survey and Assessment								
	3. Aerial Mountings and Cable Fixings								
	4. Aerials and Associated Feeders								
	5. Noise and Interference								
	6. Provide and Maintain Customer Care								

7. Health and Safety								
----------------------	--	--	--	--	--	--	--	--

Appendix 4 Key skills signposting

Digital Television Aerial Installers Certificate

	Key skills reference		
	Communication	Application of number	Problem solving
1. Digital Broadcasting and Signalling and Set Top Boxes			
2. Site Survey and Assessment	2.1a 2.2 2.3	2.1	2.1 2.2 2.3
3. Aerial Mountings and Cable Fixings			
4. Aerials and Associated Feeders		2.1	
5. Noise and Interference		2.1	
6. Provide and Maintain Customer Care	2.1a 2.3		1.1 1.2 1.3
7. Health and Safety			

This page is intentionally blank

**Published by City & Guilds
1 Giltspur Street
London
EC1A 9DD
T +44 (0)20 7294 2468
F +44 (0)20 7294 2400
www.city-and-guilds.co.uk**

**City & Guilds is a registered charity
established to promote education
and training**

CD-02-2218