

Title	Demonstrate basic knowledge of electronic security data protocols and cabling		
Level	3	Credits	15

Purpose	<p>This unit standard is for electronic security installers engaged in the installation of basic building and data cabling for electronic security services, and covers basic underpinning knowledge for this occupation.</p> <p>People credited with this unit standard are able to demonstrate basic knowledge of:</p> <ul style="list-style-type: none"> – data protocols utilised in electronic security systems; – LANs and LANs cables; – electronic security systems and data cabling services; – data cabling services entrance and terminating facilities used in electronic security systems; – earthing, bonding, and surge protection for electronic security data cabling systems; – building cable backbone and horizontal cabling systems; – fibre optic cables; – principles of fire-stopping; and – plans and specifications used in electronic security systems and data cabling.
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Classification	Electronic Engineering > Electronic Security
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Available grade	Achieved
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Guidance Information

1 This unit standard has been designed for training and assessment off-job.

2 Definitions

Cable – any or all of copper cable, fibre optic cable, coaxial cable.

Coaxial cable includes:

10Base-2 – 10Mbps baseband coaxial cable (Thinnet).

10Base-5 – 10Mbps baseband coaxial cable (Thicknet).

Ethernet (xBASE-T) – x Mbps baseband data transmission over twisted pair copper wire.

Industry practice – those practices which competent practitioners within the industry recognise as current industry best practice.

LAN – Local Area Network.

Specifications – any or all of: detailed job specifications, drawings, and instructions; manufacturers’ specifications and instructions; and industry standards and codes of practice, relating to the type of cabling system being installed.

STP – Shielded Twisted Pair cable.

TCP – Transmission Control Protocol.

UTP – Unshielded Twisted Pair cable, connectors, and accessories, complying with Category 5, Category 5E, or Category 6 standards.

UDP – User Datagram Protocol.

WAN – Wide Area Network.

- 3 References – Specific to Electronic Security Industry
AS/NZS 2201.1:2007, Intruder alarm systems – Client's premises – Design, installation, commissioning and maintenance;
AS/NZS 2201.5:2008, Intruder alarm systems – Alarm transmission systems;
NZS 4301.3:1993, Intruder alarm systems – Detection devices for internal use;
NZS/AS 2201.2:1992, Intruder alarm systems – Central stations;
NZS/AS 2201.4:1990, Intruder alarm systems – Wire-free systems installed in client's premises;
 and all subsequent amendments and replacements.

References – General to Electronic Security Industry

Building Act 2004;

Electricity (Safety) Regulations 2010;

NZS 2772.1:1999, Radiofrequency fields – Maximum exposure levels – 3kHz to 300GHz;

ANSI/TIA-1005 2009, Telecommunications Infrastructure Standard for Industrial Premises;

Telecommunications Act 2001;

Telecommunications (Residual Provisions) Act 1987;

and their subsequent amendments and replacements.

- 4 All activities and evidence presented for all outcomes and performance criteria in this unit standard must be in accordance with legislation, policies, procedures, ethical codes and standards, and industry practice; and where appropriate, manufacturers' instructions, specifications, and data sheets.

Outcomes and performance criteria

Outcome 1

Demonstrate basic knowledge of data protocols utilised in electronic security systems.

Performance criteria

- 1.1 Electronic security systems data network services are described in terms of their operation, the services provided, and the key features of each data protocol.
- Range RS485, RS232, current loop, Poll & Reply, broadcast, TCP, UDP.
- 1.2 Computer networks are described in terms of their operation and the services provided.
- Range LAN, WAN, internet, wireless.

- 1.3 The basic concepts of *analogue transmission*, *digital transmission*, *asynchronous transmission*, and *synchronous transmission* are described.

Outcome 2

Demonstrate basic knowledge of LANs and LAN cables.

Performance criteria

- 2.1 LAN topologies are identified and described with reference to structure, operation, and advantages and disadvantages.

Range LAN topologies – bus, ring, star.

- 2.2 LAN protocols are identified and described.

Range ethernet, token ring.

Outcome 3

Demonstrate basic knowledge of electronic security systems and data cabling services.

Performance criteria

- 3.1 Cable types are described with reference to physical construction, electrical characteristics, and application.

Range may include but is not limited to:
cable types – UTP, STP, Category 5, Category 5E, or Category 6 standards, coaxial, fibre;
electrical characteristics – loop resistance, insulation resistance, loss at audio and high frequencies, noise, bit error rate, impedance.
Evidence of three cable types is required.

- 3.2 A typical data cabling system for a building with more than one floor is outlined with reference to components, their purposes, and interconnections.

Range outline includes building entrance, equipment room, earthing facilities, backbone system, closets, horizontal system, outlet boxes, structured cabling systems.

- 3.3 Regulations, codes of practice, and standards of relevance to building and data cabling are identified and their scopes stated.

Outcome 4

Demonstrate basic knowledge of data cabling services entrance and terminating facilities used in electronic security systems.

Performance criteria

4.1 Service entrances are described with reference to function and installation practice.

Range buried, above ground, aerial, termination of conduit, network interfaces, earthing and bonding.

4.2 Terminating facilities and equipment rooms are described with reference to purpose, and suitability for cables and installation practice.

Range structure and location of equipment rooms, building frames, cabinets, outside building terminals (pedestals and cabinets).

Outcome 5

Demonstrate basic knowledge of earthing, bonding, and surge protection for electronic security data cabling systems.

Performance criteria

5.1 The terms bonding, earthing, and surge protection are defined.

5.2 The reasons for bonding, earthing, and surge protectors are described in terms of safety to personnel, equipment damage, and signal noise.

5.3 Bonding, earthing and surge protection practices are described.

Range cables, equipment, frames, backbone and horizontal systems, coaxial cable, earthing loops.

Outcome 6

Demonstrate basic knowledge of building cable backbone and horizontal cabling systems.

Performance criteria

6.1 The method of construction of a backbone and horizontal cabling systems are described in terms of cable types and locations.

Range locations – ceiling distribution systems, under-floor duct systems, under-carpet cable, cable trays, conduit, pull and splice boxes for conduit, under-floor ducts, access floors, space requirements, cabling guidelines.

- 6.2 The types of transmission media and permissible cable lengths are stated.
Range evidence of five different installations is required.
- 6.3 Methods of mounting cable pathways and cables are described.
- 6.4 Termination of a backbone and horizontal cable is explained.
Range cat cable, distribution frames, fibre, coaxial.
- 6.5 Principles of testing of backbone and horizontal cables are described and practical testing is explained.
Range installation testing, fault identification.
- 6.6 Types of distribution systems are described in terms of their advantages and disadvantages and performance categories.
Range star, ring, bus.
- 6.7 Commonly used types of cables are identified by inspection, and matched with associated terminating hardware, cross-connect wires, patch cords and data protocols.
Range evidence of three is required.
- 6.8 Installation practices for horizontal cable systems are described.
Range evidence of five is required.
- 6.9 Numbering systems for building and data cables are described.

Outcome 7

Demonstrate basic knowledge of fibre optic cables.

Performance criteria

- 7.1 Basic concepts of fibre optic cables are described.
Range applicable standards, types of cable, single mode, multi mode, method of construction, principle of light transmission, application.
- 7.2 Basic installation practices for fibre optic cables are described.
Range installation specifications, duct utilisation and cable protection during installation, termination methods, connectorisation, patch panels.

7.3 Splicing methods are described.

Range splicing principles and methods, splice protection, pigtail splicing, fan-out kits.

7.4 Principles of testing of fibre cable relevant to data cabling are described.

Outcome 8

Demonstrate basic knowledge of the principles of fire-stopping.

Performance criteria

8.1 The purpose of fire stopping is described, and relevant standards identified.

8.2 Types of fire-stopping systems, fire-rated barriers, and methods of evaluation and testing are described.

8.3 Methods of fire-stopping in various situations are described.

Range brick, concrete, and concrete block walls; gypsum board walls; lath and plaster walls; combination walls; floor assemblies; floor and ceiling assemblies; structural steel floor units with concrete floor fill and no suspended ceiling; roof and ceiling assemblies; vertical shafts; curtain wall floor to ceiling seals, metal clad expanded foam.

Outcome 9

Demonstrate basic knowledge of plans and specifications used in electronic security systems and data cabling.

Performance criteria

9.1 A set of plans for a small installation is explained.

Range correct identification from the plans of type, location, and interconnections of enclosures, cables, cable trays, terminating boxes, symbol identification, electronic security equipment.

9.2 A typical specification for a small installation is interpreted in terms of identifying all practical installation requirements.

9.3 Drawing revisions are made and as-built drawings completed.

This unit standard is expiring. Assessment against the standard must take place by the last date for assessment set out below.

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	19 November 2010	31 December 2021
Revision	2	17 June 2011	31 December 2021
Review	3	24 January 2019	31 December 2021

Consent and Moderation Requirements (CMR) reference	0003
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This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

This unit standard is Expiring