



Certified Alarm-Security Technician – (CAST) and (CAST C {Commercial}) Competency Requirements

1.0 Technology and Configuration

- 1.1 Describe principles of operation of common alarm and access systems
- 1.2 Explain methods of preventing system-defeating schemes
- 1.3 Draw a circuit of the wiring schemes for surveillance cameras and detection equipment
- 1.4 Compare installation options by using documentation, hardware and software tools
- 1.5 Demonstrate knowledge of system upgrading and optimization
- 1.6 Draw a diagram of normally-open and normally-closed circuit configurations
- 1.7 Describe the concept of badging systems

2.0 Alarms

- 2.1 Identify and describe the operations of:
 - 2.1.1 Power supplies and alarm power sources
 - 2.1.2 Switching devices
 - 2.1.3 Seismic and glass break detectors
 - 2.1.4 Door contacts and switches
 - 2.1.5 Infrared motion detectors
 - 2.1.6 Audio detectors
 - 2.1.6.1 sound/bell/horn
 - 2.1.7 Heat and ionization detectors
 - 2.1.8 Tamper switches
 - 2.1.9 Mercury tilt switches
 - 2.1.10 DVD/VCRs and cameras
- 2.2 Determine alarm system power requirements and standby power needs

3.0 Cameras and Intercoms

- 3.1 Describe proper installation and connection of CCTV equipment
- 3.2 Explain how recording/ storage devices, switches and multiplexers are utilized
 - 3.2.1 Explain the operation of time-lapse recorders
- 3.3 Describe common intercom products and installation options
- 3.4 Explain why different lens types are used in security systems
- 3.5 Explain the differences between digital and analog cameras

4.0 Components

- 4.1 Identify basic electronics and electrical components including:
 - 4.1.1 resistors
 - 4.1.1.1 rheostats and potentiometers
 - 4.1.2 inductors
 - 4.1.3 capacitors
 - 4.1.4 transformers
 - 4.1.5 batteries
 - 4.1.6 transistors and other solid state devices:
 - 4.1.6.1 common integrated circuits and computer chips
 - 4.1.7 relays, regulators and switches
 - 4.1.8 connectors
 - 4.1.9 speakers and microphones
 - 4.1.10 fuses and circuit breakers
 - 4.1.11 motors and generators
 - 4.1.12 schematic symbols
- 4.2 Identify basic circuits used in security products
- 4.3 Explain CMOS and TTL handling precautions
- 4.4 Identify gates and connector symbols

- 4.5 Describe LCD, LED, plasma and kinescope displays
- 4.6 Explain the operation of hold up switches and attention devices

5.0 Cabling and Connectors

- 5.1 Compare various coaxial cables and their differences
- 5.2 Describe copper cable and telephone line principles
- 5.3 Properly prepare copper cable ends, crimping and installing fittings
- 5.4 Describe basic fiber optics principles
 - 5.4.1 Explain safety precautions peculiar to optical fiber
 - 5.4.2 Describe telephone broadband communications – single-mode and multimode fiber
 - 5.4.3 Describe the basic concepts of termination, connectorization and splicing
 - 5.4.4 understand the basic concepts of light meters and OTDRs
- 5.5 Describe the effects of open or shorted cables
- 5.6 Describe impedance and its difference from resistance
- 5.7 Explain bend ratios and their importance in cabling
- 5.8 Demonstrate the proper use of signal level meters and light meters
- 5.9 Explain how cabling interfaces to security and telephone/computer systems
- 5.10 Explain the purpose and standards for building wiring safety codes – National Electrical Code (NEC[®]), NFPC, ANSI/TIA 568 and 569
- 5.11 Explain the basics of attic, crawl space, wire-fishing and ducting techniques
- 5.12 Identify wire gauges, uses and limitations
- 5.13 Explain the basics of high-speed backbone systems used for central office monitoring
- 5.14 Describe telecommunication communications basics
- 5.15 Explain the differences between RS 232 and RS 445 standards
- 5.16 Explain grounding requirements for cabling in buildings
- 5.17 Describe Line-Security products
- 5.18 Identify special connectors such as BNC, RCA, Phone, and miniature
- 5.19 Describe the differences between plenum, non-plenum and FPL cables

6.0 Interfacing

- 6.1 Explain TV/monitor/display requirements for security systems
- 6.2 Describe audio and video - desired signal levels for interconnecting equipment
- 6.3 Explain methods of troubleshooting distribution and interconnection problems
- 6.4 Describe plug and jack nomenclature and configuration requirements
- 6.5 Describe the purpose of PCIA computer interfacing
- 6.6 List peripherals commonly utilized by security systems
- 6.7 Describe help desks and troubleshooting software used in security systems

7.0 Locks

- 7.1 Describe various common locks and locking systems, timers and overrides, including electronic locking systems
- 7.2 Explain the operation of magnetic locks and electronic releases and touch boards
- 7.3 Describe REX (request for exit) concepts, types and methods used

8.0 Block Diagrams and Schematics

- 8.1 Describe the principles of block diagrams and their usage in troubleshooting
- 8.2 Determine expected voltage, current, resistance or signals at block diagram and schematic test points
- 8.3 Explain how flow charts are used in troubleshooting
- 8.4 Explain the divide and conquer troubleshooting method
- 8.5 List various safety aspects of troubleshooting
- 8.6 Demonstrate safe procedures for interchanging major components

9.0 Troubleshooting

- 9.1 Describe how to properly use of common test equipment including:
 - 9.1.1 volt, ohm and current meters
 - 9.1.2 oscilloscopes

- 9.1.3 signal generators
- 9.1.4 spectrum analyzers, if needed
- 9.1.5 power supplies
- 9.1.6 decade resistance boxes and cable checkers
- 9.2 Explain software troubleshooting programs and available trouble-fix data bases
- 9.3 Describe safety precautions for static and non-destructive testing
- 9.4 Explain practical repair considerations involved with component and subassembly substitution
- 9.5 Explain proper record keeping and security aspects of systems details
- 9.6 Explain parts and literature procurement procedures
- 9.7 Describe profitability and productivity aspects of repair departments
- 9.8 Explain the value of utilizing the resources of technician and dealer associations, suppliers and manufacturers
- 9.9 Identify and locate all schematic components, connections and test points.

10.0 Computers and Digital Concepts

- 10.1 Describe computer operation and concepts
- 10.2 Identify component and software symbols
- 10.3 Identify basic gate circuits and list truth tables for each
- 10.4 Describe basic integrated circuit operation, usage of common chips such as DACs, ADCs, interface devices, modems, and special purpose circuit boards
- 10.5 Explain basic programming concepts
- 10.6 Describe how storage devices work
- 10.7 Explain the differences between serial and parallel I/O devices and connectors
- 10.8 Explain the differences between Bus versus USB, SCSI and FUI interfaces
- 10.9 Explain differences between DOS, UNIX, UNIX SCO and other computer operating systems
- 10.10 Explain residential constraints as related to security-surveillance issues

11.0 Hand Tools - Soldering

- 11.1 Describe proper use of common types of hand tools:
 - 11.1.1 pliers
 - 11.1.2 wrenches
 - 11.1.3 probes
 - 11.1.4 screwdrivers
 - 11.1.5 crimping devices
 - 11.1.6 various saws
 - 11.1.7 drills and bits
- 11.2 Explain how to properly use soldering equipment and it's care including:
 - 11.2.1 irons
 - 11.2.2 removers
- 11.3 Describe different types of solder and flux
 - 11.3.1 Explain the hazards when working with lead based solder

12.0 Data Communications and Software

- 12.1 Explain the basic concepts of data communications
- 12.2 Describe high speed telephone lines
- 12.3 Describe direct wireless connections
- 12.4 Describe the purpose of programs using:
 - 12.4.1 spread-sheet
 - 12.4.2 word processing
 - 12.4.3 graphics
 - 12.4.4 networking LAN, WAN and wireless
 - 12.4.5 virus detectors
 - 12.4.6 utilities
- 12.5 Demonstrate usage of product diagnostic programs
- 12.6 Describe memory methods and define extended memory
- 12.7 Explain proper ways to name files; explain special computer keys such as CTRL, ALT, DEL and other common dual-function computer keys

13.0 Mathematics

- 13.1 Explain how to calculate basic math problems including using electronics formulas
- 13.2 Demonstrate ability to use scientific calculators
- 13.3 Demonstrate ability to use computer calculators and math programming
- 13.4 Describe common electronics concepts as they relate mathematically including:
 - 13.4.1 use of electrical color code
 - 13.4.2 calculating voltage drops
 - 13.4.3 time constants
 - 13.4.4 currents
 - 13.4.5 series, parallel and series-parallel
 - 13.4.6 resistances
 - 13.4.7 numbering systems

ADDITIONAL competencies required for CAST(C) (Commercial)

14.0 Bank Security

- 14.1 Explain operation of Audio/Video equipment for communications between customer and teller.
- 14.2 Demonstrate methods used to troubleshoot relays and switches
- 14.3 Describe foot switches, foot rails and wireless receivers (for emergency applications)
- 14.4 Explain ATM security methods
- 14.5 Explain ATM specific circuitry
 - 14.5.1 Specify common problems unique with ATMs

18.0 Money Machines - Cash Counters

- 18.1 Describe operation of these units
- 18.2 Define security concerns
- 1.83 Describe troubleshooting concepts

19.0 Access Control or Systems (Key Cards, Etc.)

- 19.1 Describe entry and traffic control systems
- 19.2 Describe and name various access card technologies including:
 - 19.2.1 bar coding
 - 19.2.2 RFID
 - 19.2.3 magnetic strip
 - 19.2.4 proximity

20.0 Satellite and Microwave Communications

- 20.1 Describe usage of satellites for security purposes
- 20.2 Explain how microwave (MW) links work for security purposes
- 20.3 Describe how MW and satellite might interface with central office communications

21.0 Sprinkler Systems

- 21.1 Explain how sprinkler systems interconnect with alarm systems
- 21.2 Describe sensors for sprinkler systems
- 21.3 Describe methods of installation for automatic sprinkler systems
 - 21.3.1 fire suppression
 - 21.3.2 lawn and landscaping maintenance
- 21.4 List electrical and building codes for sprinkler systems

End of Certified Alarm Security Technician Competencies Listings

Find an ETA approved school and approved test site: http://www.eta-i.org/test_sites.html

Suggested Additional Resources and Study Material:

CCTV Networking & Digital Technology,2E; Damjanovski; ISBN 978-0750678001;
Butterworth-Heinemann Publishers
Intelligent Network Video: Understanding Modern Video Surveillance Systems; Nilsson,
AXIS Comm.; ISBN 978-1420061567; CRC Press, 2008
Integrated Security Systems Design: Concepts, Specifications, and Implementation (v. 1);
Norman; ISBN 978-0750679091; Butterworth-Heinemann Publishers.
The Complete Security Installers Certification Course; Freeman, Palmer, Coney; ISBN 978-
1581221060; www.marcraft.com;
Applied Security Devices and Circuits; Paul Benton; ISBN 978-0790612478; SAMS Technical
Publishing Connectivity Series; Prompt Publications 2001; 244 ppg;

CAST Subject Matter Advisory Committee:

Abbott, John,	Alabama	jabbott1@neo.rr.com
Bagley, CETa, Thomas	Indiana	tbagley@mindspring.com
Clark, CETa, Harold,	New Jersey	clarkvideo@aol.com
Clemente, Mike,	Indiana	
Cline, CETa, Steve,	South Carolina	gcrozier@comcast.net
Crozier, Gary,	Florida	
Dean, CETa, CSS, David,	New Jersey	
Fernandez, Hugo,	APO, AE	glowfuel@intergate.com
Gabriel, Juan,	Florida	noel.gonzale@gte.net
Gonzalez, Noel H,	Ohio	
Gossick, CET, Lou,	Wyoming	hashimto@uwyo.edu
Hashimoto, Lloyd K,	Ohio	
Henson, John,	Texas	
Holmes, Harvey,	Illinois	
Howell, Steven,	New Mexico	cgetc76@aol.com
Huber, Terry,	New Jersey	
Iommi, Steve,	Kentucky	
Johnson, Charles Gene,	New York	
King, Kendall,	Arizona	
Lomnicki, Marty,	Texas	hlove11179@aol.com
Lovejoy, Harold W.,	New York	ruy567@aol.com
Mangra, Rudolph,	California	atcprogcoord@aol.com
Mikesell, CETa, CSS, Richard	Puerto Rico	
Morales, Wildy, Humacao	Pennsylvania	davidsamsell@netzero.net
Samsell, CETsr, David,	Hawai'i	tronfxr@aloha.net
Wagner, CET, Michael,		

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