



Certified Alarm-Security Technician – (CAST) and (CAST C) Competency Requirements – ETA, 2007

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

(Identify and describe the operations of:)

- 2.1 Power supplies and alarm power sources
- 2.2 Switching devices
- 2.3 Seismic and glass break detectors,
- 2.4 Door contacts and switches
- 2.5 Infrared motion detectors
- 2.6 Audio detectors
- 2.7 Heat and ionization detectors
- 2.8 Tamper switches
- 3.1 Mercury tilt switches
- 3.2 Bell/horn
- 3.3 VCRs and cameras
- 3.4 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 VCR, CD or other recording and storage devices, switches and multiplexers are utilized.
- 3.3 Explain the operation of time-lapse recorders.
- 3.4 Describe common intercom products and installation options.
- 3.5 Explain why different lens or iris's are used in security systems
- 3.6 Explain the differences between Vidcom and CCD cameras

4.0 COMPONENTS

- 4.1 Identify basic electronics and electrical components. These include resistors, inductors, capacitors, transformers, batteries, transistors and other solid state devices, including common integrated circuits and computer chips; schematic symbols, relays, switches, connectors, speakers and microphones, fuses and circuit breakers, reostats and potentiometers, motors and generators, regulators and schematic symbols
- 4.2 Identify basic circuits used in security products.
- 4.3 Explain C-MOS handling restraints
- 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 & CONNECTORS

- 5.1 Compare RG 6 vs 59 coaxial cable and their differences
- 5.2 Describe basic fiber optics and telephone line principles
- 5.3 Properly prepare cable ends, crimping and installing fittings.
- 5.4 Describe the effects of open or shorted cables
- 5.5 Describe impedance and its difference from resistance
- 5.6 Explain bend ratios and their importance in cabling.
- 5.7 Demonstrate the proper use of signal level meters and light meters
- 5.8 Explain telephone wiring as it applies to security systems and telephone/computer interfacing
- 5.9 Explain the purpose and standards for building wiring safety codes – NEC, NFPC, EIA/TIA 568 –9
- 5.10 Explain the basics of attic, crawl space, wire-fishing and ducting techniques
- 5.11 Identify wire gauges, uses and limitations
- 5.12 Explain the basics of high-speed backbone systems used for central office monitoring
- 5.13 Describe LAN, WAN and wireless telecommunications basics
- 5.14 Explain the differences between RS 232 and RS 445 standards
- 5.15 Explain grounding requirements for cabling in buildings
- 5.16 Describe Line-Security products
- 5.17 Identify BNC, RCA, Phone, miniature and special connectors
- 5.18 Describe the differences between plenum, non-plenum and FPL cables

6.0 INTERFACING

- 6.1 Explain TV/monitor 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 the divide and conquer troubleshooting method
- 8.4 List various safety aspects of troubleshooting
- 8.5 Explain how flow charts are used in troubleshooting
- 8.6 Demonstrate safe procedures for interchanging major components

9.0 TROUBLESHOOTING

- 9.1 Demonstrate proper use of common test equipment, including volt, ohm and current meters - oscilloscopes - signal generators - power supplies – decade resistance boxes and cable checkers
- 9.2 Utilize software troubleshooting programs and available trouble-fix data bases
- 9.3 Demonstrate understanding of static and safety precautions 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 & DIGITAL CONCEPTS

- 10.1 Describe computer operation and concepts
- 10.2 Identify component and software symbols
- 10.3 Draw basic gate circuits and list truth tables for each
- 10.4 Describe basic integrated circuit operation, usage of common chips – DACs, ADCs, interface devices, modems, 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 vs: USB, SCSI and FUI interfaces
- 10.9 Explain differences between DOS, UNIX, UNIX SCO and other computer operating systems
- 10.10 Explain how residential Windows XP Media Edition is used as related to security-surveillance issues

11.0 HAND TOOLS - SOLDERING

- 11.1 Describe proper use of common hand tools - various types of pliers - wrenches - probes - screwdrivers - crimping devices - hack saws - hand drills and bits - wood and masonry bits
- 11.2 Explain the different types of solder - flux - care of soldering equipment and use of solder removers. Explain the hazards when working with lead based solder

12.0 DATA COMMUNICATIONS

- 12.1 Explain the basic concepts of data communications
- 12.2 Describe high speed telephone lines.
- 12.3 Describe direct wireless connections to computer modems.

13.0 FIBER OPTICS - TELECOMMUNICATIONS

- 13.1 FO basics - understand the basic concepts of light meters and OTDRs
- 13.2 Explain safety precautions peculiar to fiber
- 13.3 Describe the basic concepts of termination, connectorization and splicing
- 13.4 Describe telephone broadband communications - single and multimode fiber optics
- 13.5 Explain wiring protection, codes and safety

14.0 MATHEMATICS

- 14.1 Work basic math problems - using electronics formulas
- 14.2 Demonstrate ability to use scientific calculators.
- 14.3 Demonstrate ability to use computer calculators and computer math programs
- 14.4 Describe common electronics concepts as they relate mathematically - use of electrical color code - calculate voltage drops, time constants, currents, series and parallel resistances and numbering systems.

15.0 SOFTWARE

- 15.1 Describe the purpose of a spread-sheet, word processor, graphics and network software, virus detectors and utilities programs
- 15.2 Demonstrate usage of product diagnostic programs; Understand computer terms such as ASCII, Windows and Windows 98, 2000, XT
- 15.3 Describe memory methods and define extended memory
- 15.4 Explain proper ways to name files; explain special computer keys such as CTRL, ALT, DEL and other common dual-function computer keys.

16.0 PEOPLE RELATIONS

- 16.1 Understand the concepts of the Customer Service Specialist program of ETA-I
- 16.2 Describe negative and positive ways to work with fellow employees including non-technical workers
- 16.3 Explain the requirements when working with difficult customers and resolving customer service problems
- 16.4 Demonstrate personal hygiene and appearance requirements for technicians.

ADDITIONAL competencies required for CAST(C) (Commercial)

17.0 BANK SECURITY

- 17.1 Explain operation of Audio/Video equipment for communications between customer and teller.
- 17.2 Demonstrate methods used to troubleshoot relays and switches.
- 17.3 Describe foot switches, foot rails and wireless receivers (for hold-up applications)

18.0 ATMS

- 18.1 Explain security methods for ATMs.
- 18.2 Draw circuitry and specify common problems associated with ATMs.

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 such as bar coding, magnetic strip, proximity

20.0 Money Machines - Cash Counters

- 20.1 Describe operation of these units.
- 20.2 Define security concerns
- 20.3 Describe troubleshooting concepts

21.0 Satellite and Microwave Communications

- 21.1 Describe usage of satellites for security purposes
- 21.2 Explain how microwave links work for security purposes
- 21.3 Describe how MW and satellite might interface with central office communications

22.0 Sprinkler Systems

- 22.1 Explain how sprinkler systems interconnect with alarm systems
- 22.2 Describe sensors for sprinkler systems
- 22.3 Describe methods of installation for automatic fire sprinkler systems
- 22.3 List electrical and building codes for sprinkler systems

23.0 Design – Profitability – Management

- 23.1 Explain each item on a standard profit and loss statement
- 23.2 List the ingredients for making bids and estimates for new installations or repairs
- 23.3 Explain how and why security records are kept
- 23.4 Explain policies for managing multiple crews (fleet management)
- 23.5 Compare the management concerns of the security business office; installation/project management, service department; and the parts procurement operation
- 23.6 Explain the procedures for product and parts procurement

**End of Certified Alarm Security Technician Competencies Listings
(with 23 major Categories)**

Find An ETA Test Site:

<http://www.eta-i.org/testing.html>

Suggested Study Material:

CCTV Networking & Digital Technology,2E; Damjanovski; ISBN 978-0750678001; Butterworth-Heinemann Pub
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 Pub.
The Complete Security Installers Certification Course; Freeman, Palmer, Coney; ISBN 978-1581221060; www.marcraft.com; available at ETA at 800-288-3824

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