Video Security Systems Technician

Level I Certification

Content Outline

National Institute for Certification in Engineering Technologies
Introduction

The purpose of this certification program is to recognize the professionalism of qualified technicians and provide a way for others to distinguish those technicians who have demonstrated job knowledge and work experience. NICET will do this by defining and testing relevant knowledge and evaluating experience.

This document presents the content that is covered in the examination and other criteria for certification as a Video Security Systems Technician at Level I. This program is based on an analysis of the tasks that are performed by a competent technician. The content outline is a listing of tasks that should be performed well by a Level I certified Technician. Also included are knowledge and skills needed to succeed at each task. These tasks are the focus of the test questions that make up the Level I exam.

The tasks are grouped into larger areas of responsibilities, or “domains”. The domains are:

- Project Planning (No tasks at Level I)
- System Installation
- System Testing and Commissioning
- Troubleshooting
- Planning and Conducting User Training (No tasks at Level I)
- Documentation
- Project Management (No tasks at Level I)

A general description or profile of a Level I Technician includes the following characteristics:

**Education:** Formal education not required but educational experiences at least equivalent to a high school diploma are expected.

**Work Experience:** A minimum of 3 months of video systems installation and maintenance activities in an employment setting.

**Responsibility:** Work under direct supervision. Scope of work is restricted to assisting a more experienced technician.

**Acquired Competencies:** Assist in simple installation tasks such as camera mounts and cable runs. Read plans. Use simple hand and power tools and basic electronic test equipment.

August, 2004
Tasks Performed by the Level I Technician

1.1 “Project Planning” Tasks

None at this Level

1.2 “System Installation” Tasks

1.2.1 Follow safe worksite practices.
   Knowledge:
   OSHA publication 2202 – “Construction Industry Digest”
   OSHA publication 3080 – “Hand and Power Tools”
   Skills:
   Safely place and use ladders and scaffolding
   Safely use power tools in Level I Tool Kit

1.2.2 Follow safe low voltage electrical practices.
   Knowledge:
   Personal safety implications of class 1, 2, and 3 voltages
   OSHA publication 3007 – “Ground Fault Protection”
   Skills:
   Recognize wires carrying different voltage classes.
   Safely use soldering equipment.

1.2.3 Install correct coaxial and twisted pair video cables with terminations.
   Knowledge:
   Proper cable pulling techniques and tools, including maximum cable strength in lbs. for coaxial cable, category 5, and power lines (16, 18, and 22 Awg twisted pair), and maximum bend recommendations
   Difference between coaxial cable for CCTV and for modulated signals
   Difference between cables for plenum and non-plenum areas
   Distance limitations of cable types
   Connectors required for termination of video cables, including BNC, RCA, and PL2
   Which crimping tools to use in properly terminating video cables
   Skills:
   Read and interpret shop plans, architectural drawings, and blueprints as necessary for cable location and identification.
Recognize inappropriate cable hangers.
Recognize physical hazards that could threaten the integrity or function of the cable
Identify cable by name, type, number, and suffix.
Use a tone generator and inductive probe to identify cables.
Properly use crimping tools for terminating video cables.
Properly select and use tools from the Level I toolkit for cable installation.
Recognize and report problems

1.2.4 **Install camera mounts.**

Knowledge:
- Properties of wood, steel, concrete, and drywall mounting surfaces and the appropriate hardware for each
- OSHA publication 3080 – “Hand and Power Tools”

Skills:
- Apply basic construction techniques necessary to mount cameras and associated hardware.
- Properly select and use tools from the Level I toolkit.
- Recognize and report problems

1.2.5 **Assemble camera hardware and place assembled camera on mount.**

Knowledge:
- Correct orientation of lens and camera for proper functioning
- Basic mechanical requirements for mounting a fixed camera

Skills:
- Properly select and use tools from the Level I toolkit.
- Properly mate a lens to a camera.
- Properly adjust lens focus on camera for best image.
- Recognize and report problems

1.2.6 **Make low voltage power connections.**

Knowledge:
- Applications of series and parallel circuits
- Electrical units such as volt, ohm, amp, watt, and hertz
- Proper equipment applications for various power connectors (see Appendix)
- Power connection requirements for proper phasing of cameras

Skills:
- Identify the proper cable and connection point for the requested connection.
- Use a tone generator and inductive probe to identify power cables.
Select and properly use the correct tools and equipment for general low voltage connection points and splice connectors.

Read and interpret shop plans, architectural drawings, and blueprints as necessary for proper power connections.

Properly protect connection points.

Recognize and report problems

1.2.7 **Make low voltage splices and junctions.**

Knowledge:
Types of low voltage splices and junctions and the function and proper assembly of each

Skills:
Properly select and use tools from the Level I toolkit to access, make, and manipulate splices and junctions.
Properly use VOM/DVM in checking slices and junctions.
Read shop plans to determine locations in facility.
Recognize and report problems

1.2.8 **Assemble cabinets and racks and mount equipment.**

Knowledge:
ANSI/EIA-310-D rack unit standards and how they affect cabinet dimensions and space requirements
Thermal and ergonomic considerations in the proper placement of equipment

Skills:
Properly select and use tools from the Level I toolkit.
Provide proper service loops.
Label and organize power, data, video, and other cables within a control panel or splice box to insure easy access and identification.
Recognize and report problems

1.3 **“System Testing and Commissioning” Tasks**

1.3.1 **Verify cable labeling and check cable continuity and point-to-point continuity**

Knowledge:
Characteristics of series, parallel, closed, open, short, and grounded circuits

Skills:
Read and interpret shop plans as necessary for cable location and identification.
Identify the proper points on the electrical pathway to take requested measurements.
Determine cable path, length, and purpose.
Locate splices, taps, and patch points.
Use a VOM/DVM, toner and inductive probe, and/or telephone test set in testing and checking continuity.

1.4 “Troubleshooting” Tasks

1.4.1 Locate basic cable faults.

Knowledge:
Characteristics of low voltage circuits, including series and parallel, open, short, and grounded circuits
Electrical units including volt, amp, and ohm
Factors that can cause various types of cable faults

Skills:
Properly select and use tools from the Level I toolkit to access and manipulate cable.
Properly use multimeters, toner and inductive probes, telephone test sets, and/or portable monitors for finding faults in cables, including junctions, splices and termination connection points.
Determine cable path from shop plans.

1.5 “Planning and Conducting User Training” Tasks

None at this level

1.6 “Documentation” Tasks

Note: The letters following some tasks indicate for whom the documentation is required:
S = Shop, C = Customer, G = Government

1.6.1 Locate standard job documentation needed for the installation process.

Knowledge:
Purposes of blueprints, shop drawings, wiring legends, schematics, installation and operation manuals, and related technical bulletins and updates

Skills:
Identify each of the documents listed above.
1.6.2  Temporarily mark cable for construction  (S)

Knowledge:
Conventional methods for properly labeling cables

Skills:
Read and interpret the appropriate shop drawings, blueprints, and wiring legends to determine cable runs and assigned cable markings.
Correctly and legibly mark cables.

1.6.3  Record serial numbers of installed devices.  (SC)

Knowledge:
Purpose for recording serial numbers

Skills:
Locate and recognize serial numbers on various pieces of equipment.

1.6.4  Recover and store equipment documents.

Knowledge:
Purpose for recovering and storing equipment documents

Skills:
Identify O&E manuals and warranty cards.

1.7 “Project Management” Tasks

None at this Level
# Appendix A: Acronyms and Abbreviations

## Codes and Standards

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>BICSI</td>
<td>Building Industry Consulting Service International</td>
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<tr>
<td>CSI</td>
<td>Construction Specification Institute</td>
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<tr>
<td>FCC</td>
<td>Federal Communications Commission</td>
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<tr>
<td>IEEE</td>
<td>Institute of Electrical and Electronics Engineers</td>
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<td>NEC</td>
<td>National Electrical Code</td>
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<td>NEMA</td>
<td>National Electrical Manufacturers Association</td>
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<td>NFPA</td>
<td>National Fire Protection Association</td>
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<td>SIA</td>
<td>Security Industry Association</td>
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<td>UL</td>
<td>Underwriters Laboratories</td>
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## General

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>AGC</td>
<td>Automatic Gain Control</td>
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<tr>
<td>dB</td>
<td>deciBel</td>
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<tr>
<td>DSS</td>
<td>Digital Slow Shutter</td>
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<td>DVD</td>
<td>Digital Video Disk</td>
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<tr>
<td>DVM</td>
<td>Digital Volt Meter</td>
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<tr>
<td>DVR</td>
<td>Digital Video Recorder</td>
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<tr>
<td>GLC</td>
<td>Ground Loop Correction</td>
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<tr>
<td>HD</td>
<td>High Density</td>
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<tr>
<td>HVAC</td>
<td>Heating, Ventilating, and Air Conditioning</td>
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<tr>
<td>I/O</td>
<td>Input/Output</td>
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<tr>
<td>IR</td>
<td>InfraRed</td>
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<td>IRE</td>
<td>Institute of Radio Engineers (unit of measure)</td>
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<td>IT</td>
<td>Information Technology</td>
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<td>LAN</td>
<td>Local Area Network</td>
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<td>MATV</td>
<td>Master Antenna TeleVision</td>
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<tr>
<td>OTDR</td>
<td>Optical Transducer Directional Reflectometer</td>
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<tr>
<td>PIR</td>
<td>Pulsed InfraRed</td>
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<tr>
<td>RF</td>
<td>Radio Frequency</td>
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<td>SVHS</td>
<td>Super Video Home System</td>
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<tr>
<td>UHF</td>
<td>Ultra High Frequency</td>
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<tr>
<td>VCR</td>
<td>Video Cassette Recorder</td>
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<tr>
<td>VHF</td>
<td>Very High Frequency</td>
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<tr>
<td>VHS</td>
<td>Video Home System</td>
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<tr>
<td>VOM</td>
<td>Volt-Ohm Meter</td>
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<tr>
<td>WAN</td>
<td>Wide Area Network</td>
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Appendix B: Level I Installer’s Toolkit

The NICET Level I task descriptions assume that Level I video systems installers would be familiar with the names, proper usage, and safety considerations for the following tools:

Hand-Tools:
Screwdrivers:
   # 1, 2, 3 flat blades
   # 1, 2, 3, Phillips
   Jeweler’s flat blades
   Jeweler’s Phillips
Hammer
12” bubble level
Standard set sockets
Razor knife
Flashlight
Wire Snake
Flexible wire-puller
Pliers/wire cutters

Power Tools:
Professional, Heavy duty ½” Hammer Drill
   Set of concrete bits: 1/8” to ½”
½ Standard power drill
   Set of paddle wood bits: 1/4” to 1"
   Set of metal bits: 1/8" to ½"
   Screwdriver bits
Solder Iron (electric)
Solder Iron (Butane)

Specialty tools:
BNC Crimper (RG59, RG6 3-Piece Dies)
BNC cable stripper
Tone generator/inductive probe
Medium duty 2" needle nose pliers
Light duty 3" needle nose pliers
General duty pliers
Adjustable channel lock
Heavy duty wire cutter
Light duty wire cutter
Spade/lug crimping tool

Meters:
Digital volt meter (DVM) and/or
   Digital volt/ohm meter (DVOM)
2.5” to 5” hand held video monitor or PDA