

ETA - RESI **CCTV (Closed-Circuit TV)** - 2009 NCEE COMPETENCIES PROJECT

RESIDENTIAL ELECTRONICS SYSTEMS INTEGRATOR – RESI

(There are two levels of expertise proposed for those workers who install electronics cables in residences and interconnect electronics communications, computer, control or entertainment equipment. **RESI, the Residential Electronics Systems Integrator**; and the **Master RESI, Residential Electronics Systems Integrator.**)

The **BASIC RESI** is proficient in the design of pre-wiring for home theater and telecommunications equipment interconnection. He/she will install network wiring for cable TV, satellite and antenna outlets, telephone equipment outlets, audio and video entertainment, and computer equipment in such a manner that all control and communication signals can be integrated at the home controller and converged into one cogent IP bit stream, to either be used within the residence or to be passed back and forth through the home gateway. He/she will be proficient in the many protocols used over diverse media to communicate with and control residential electronics systems, in addition to the skills required for low voltage wiring installation. He/she will work from house telecommunications wiring plans, installing cable fittings and selecting the specified cabling for each technology. He/she will test, mark and document all cabling and will have the ability to troubleshoot and restore pre-existing cabling systems. RESI Integrators typically will also be qualified in one or more of the five (5) endorsement specialty areas listed below.

The **MASTER RESI** will be proficient at all of the RESI skills and knowledge as well as in planning and designing electronics and communications equipment systems and layout for new and existing construction. The MASTER RESI is capable of designing the entire system and network for audio, video, data and control of security and environment. He/she also is capable of troubleshooting and debugging the system and planning installation or modifications. The MASTER RESI has extensive knowledge of the operation and technology and is proficient in **each** of the basic five subcategories of residential electronics.

Integrators who hold the Basic RESI Certification can also add one or more of the endorsements such as the below listed CCTV (CLOSED-CIRCUIT TV) specialty.

- **RESI (Basic Core Integrator)**
- **RESI Endorsements:**
 1. **Audio/Video**
 2. **Computer Networking**
 3. **Security-Surveillance**
 4. **CCTV (Closed-Circuit TV)**
 5. **Environmental Control**
- **MASTER RESI**

The **MASTER RESI** certification prerequisites include successfully completing the core RESI certification requirements, plus holding **each** of the five (5) RESI subcategory endorsements.

To qualify for the ETA **MASTER RESI**, Residential Electronics Systems Integrator, a technician must:

- Hold the RESI Basic certification
- Pass each of the five (5) specialty endorsements
- Pass a separate Master RESI examination

ETA COMPETENCIES – 2009
RESI CCTV (Closed-Circuit TV) Endorsement**1.0 SIGNALS**

- 1.1 Describe and compare telephone voice, video and data signals
- 1.2 Describe telephone system audio bandwidth
- 1.3 Describe telephone service video services
- 1.4 List types of data signals now provided via telephone lines

2.0 Hardware Basics

- 2.1 List types of cameras used by CCTV systems in homes
- 2.2 Describe security camera types, mounts, and lighting
- 2.3 Describe bullet-type surveillance cameras
- 2.4 Explain infrared camera technology
- 2.5 Describe dome cameras and explain how they are used
- 2.6 Explain the Pan-Tilt-Zoom functions of CCTV cameras
- 2.7 Discuss hidden & covert camera technology
- 2.8 List types of miniature cameras and their applications
- 2.9 Compare different lenses utilized for CCTV systems
- 2.10 Explain power supply requirements for CCTV operations

3.0 Recorders

- 3.1 Relate how DVR security systems operate
- 3.2 Describe VCR system usage in CCTV applications
- 3.3 Explain how the computer system and DVR equipment interconnects
- 3.4 List ways video is recorded and archived in CCTV systems
- 3.5 Explain the value and methods used for Date-Time Generators

4.0 Mounts & Enclosures

- 4.1 List common types of camera mounts
- 4.2 Compare the choices for camera beam angle selection
- 4.3 Explain the purpose and use of backlighting
- 4.4 Explain premises restoration purpose and methods

5.0 Video

- 5.1 Explain how video amplifiers differ from sound or RF types
- 5.2 Compare types of video monitors and displays used in CCTV

6.0 Cabling Systems

- 6.1 List cable types and usage in CCTV systems
- 6.2 Describe and name common cable connectors
- 6.3 Explain the use of cabling standards and the purposes of TIA/EIA-568-A, TIA/EIA-568-B, and ANSI/TIA-568-C

7.0 Computer Network systems

- 7.1 Explain how to draw a block diagram of a residential computer network and explain the basic uses
- 7.2 Explain the differences between LANS (local area networks) and WANS (wide area networks), or no home computer-control network
- 7.3 Explain the importance of the residential cabling ANSI/TIA/EIA wiring standards
- 7.4 Describe the purpose of a computer bus and how it is used with CCTV
- 7.5 Discuss how Internet connection can be integrated into the CCTV system
- 7.6 Explain how processors control different residential systems

8.0 Software

- 8.1 List advantages of Windows-based control programs
- 8.2 Explain different storage methods for CCTV images and evidence
- 8.3 Describe the need for CCTV security and access Control
- 8.4 Explain how Windows Media Center is utilized for multiple systems

9.0 Wireless Basics

- 9.1 Explain the advantages of wireless transmitters versus hard wiring
- 9.2 Explain how wireless receivers operate within the CCTV system

10.0 Distribution Systems

- 10.1 Demonstrate prepping and crimping of coaxial cable fittings
- 10.2 Demonstrate prepping and use of plastic optical fiber in the home
- 10.3 Demonstrate prepping and installation of RJ 45 CAT cabling fittings
- 10.4 Describe wireless hardware that may be used in CCTV systems
- 10.5 Describe the use of signal distribution panels to interconnect cables

11.0 Residential Security-Surveillance

- 11.1 Explain the need for alarm interface units
- 11.2 Relate where infrared lighting is applicable in CCTV systems
- 11.3 Explain the use of control keypads

12.0 Environmental Control

- 12.1 Explain the needs or options for CCTV equipment lighting
- 12.2 Explain the relevance of event recording and evidence storage

13.0 System Design

- 13.1 Explain how to develop a needs assessment document for a CCTV installation
- 13.2 List the steps in planning a CCTV original or retrofit installation
- 13.3 Explain the steps in implementation of the planned CCTV system

14.0 Troubleshooting – Test Equipment

- 14.1 Describe common components required for CCTV systems
- 14.2 List equipment valuable in testing the CCTV system such as test cameras, signal generators, switches and software

15.0 Documentation – Legal Issues

- 15.1 Explain the various types of liability CCTV, alarm and security firms may experience
- 15.2 Explain customer orientation and operation documents

Recommended Study Material:

Introduction to Residential Technologies, Bedrock Learning – Course Guides/Online Training
Home Theater Design and Installation, Bedrock Learning – Course Guides/Online Training
Home Networking for Installers, Bedrock Learning – Course Guides/Online Training
Fundamentals of Structured Wiring, Bedrock Learning – Course Guides/Online Training
Residential Lighting Control, Bedrock Learning – Course Guides/Online Training
Whole House Audio Technology and Distribution, Bedrock Learning – Course Guides/Online Training
RESI Basic Skills & Knowledge; eITPrep LLP, ISBN 1581220847
RESI Audio/Video; eITPrep LLP, ISBN 1581220871
RESI Computer Networking Endorsement; eITPrep LLP, ISBN 9781581221022
RESI Audio and Video Systems Endorsement; eITPrep LLP, ISBN 9781581221039
RESI Home Security and Surveillance Systems Endorsements; eITPrep LLP, ISBN 9781581221046
RESI Environmental Control Endorsement; eITPrep LLP, ISBN 9781581221053
HTI+ Certification – Concepts and Practice, Chuck Brooks, 4th Edition; Pearson Prentice Hall; ISBN 0131147722
CCTV Networking and Digital Technology, 2nd Ed.; Vlado Damjanovski; Elsevier Inc.; ISBN 9780750678001; 2005; hardcover; 578 pgs