ETA - RESI (Security-Surveillance) - 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 SECURITY-SURVEILLANCE 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 Security-Surveillance Endorsement

1.0 SIGNALS
- 1.1 Describe the types of signals used in telephone systems
- 1.2 Describe audio signals and indicate the types of wiring used for transport
- 1.3 Describe the composition of video signals and list the types of cabling used to transport video signals
- 1.4 Compare data signals with voice, video, and radio frequencies

2.0 Hardware Basics
- 2.1 Cameras: List the advantages and usage of each of the following:
  - 2.1.1 Security cameras
  - 2.1.2 Bullet
  - 2.1.3 Infrared
  - 2.1.4 Dome
  - 2.1.5 Pan-Tilt-Zoom
  - 2.1.6 Hidden & IP
  - 2.1.7 Miniature
  - 2.1.8 Types of lenses
  - 2.1.9 Requirements for security system power supplies
- 2.2 Describe each of the following sensors and their applications
  - 2.2.1 Sensors
  - 2.2.2 Temperature
  - 2.2.3 Smoke - Ionizing
  - 2.2.4 Driveway
  - 2.2.5 Window
  - 2.2.6 Motion
  - 2.2.7 Glass Break
  - 2.2.8 Armed & Unarmed
- 2.3 Explain how keypads are incorporated in security-surveillance systems
- 2.4 Discuss purposes and locations for security lights in residences
- 2.5 Diagram how batteries are incorporated in security systems and alarm circuits
- 2.6 Explain the technology and applications for the following contacts:
  - 2.6.1 Magnets
  - 2.6.2 Magnetic Switches
  - 2.6.3 Microswitches
  - 2.6.4 Reed Switches
  - 2.6.5 Pressure Mats
  - 2.6.6 Trip Wire
  - 2.6.7 End-Of-Line Resistor
  - 2.6.8 Sprinkler Systems
  - 2.6.9 Panic Button

3.0 Recorders
- 3.1 Describe the use of DVR units in security systems
- 3.2 Explain the purpose and options for using VCR systems for surveillance and evidence gathering
- 3.3 Explain how CD and DVR Systems may be utilized in alarm systems
- 3.2 Describe video surveillance equipment and applications
- 3.3 Explain how date-time generators are used and their purposes

4.0 Mounts & Enclosures
- 4.1 Compare different types of camera mounts
- 4.2 Explain optimum camera beam angles

4.3 Describe the usage of backlighting
4.4 Explain the need for premises restoration and methods used

5.0 Video - Audio
5.1 Explain video amplifier usage in security systems
5.2 Describe types of monitors and displays
5.3 List types of annunciate devices used in security systems
5.4 Explain how quad and other multi-scene displays are used
5.5 Describe voice monitoring equipment and applications

6.0 Cabling Systems
6.1 Describe the types of cabling used in security systems and the advantages of each
6.2 List types of cable connectors and which cable types they apply to
6.3 Explain the purpose of the cabling standards – TIA/EIA-568-A, TIA/EIA-568-B, and ANSI/TIA-568-C
6.4 Describe the RJ 31 jacks (8 position, 4 contact) and applications
6.5 Explain the differences in video and RF cables and indicate which types of wiring is used for different purposes

7.0 Computer Network systems
7.1 Describe home computer network basics and indicate how the security system may be incorporated
7.2 Explain how LANS – local area networks - work
7.3 Describe types of busses used in residential networks and their purposes
7.4 Explain the function of processors as utilized in security systems
7.5 Explain how security systems may link to the telephone system and how modems are incorporated
7.6 Describe the purpose and methods of providing entry delay for the system
7.7 Explain the methods of providing secure access control
7.8 Describe the purpose and methods of event recording and storing

8.0 Software
8.1 Discuss the advantages of using Windows-based security system software
8.2 List types of storage methods for security data
8.3 Explain how software can implement security and access control
8.4 Describe how the ‘Windows Media Center’ system is utilized in residential control
8.5 Explain how programming of security systems is done

9.0 Wireless Basics
9.1 Explain the advantages of wireless transmitters in security systems
9.2 Describe how wireless receivers may be incorporated in security systems

10.0 Distribution Systems
10.1 Compare coaxial cable with untwisted pair telecommunications cables and with plastic fiber optics and list where coaxial is preferred
10.2 Explain connectorization process for plastic fiber and methods of testing
10.3 Explain where copper cabling is best utilized in security systems and precautions in termination
10.4 List the components of wireless security system hardware
10.5 Explain the purpose and preferred locations for system distribution panels

11.0 System Design
11.1 Explain how to construct a needs assessment document for a residence
11.2 List the steps in planning the security system and in working with the builder and homeowner
11.3 Explain the sequences in implementation of the security system

12.0 Troubleshooting – Test Equipment

12.1 Explain common problems with system components
12.2 Describe methods of troubleshooting wiring in the system
12.3 Explain the legal and time problems with false alarms caused by system malfunctions
12.4 Explain the usage and precautions for multimeters

13.0 Documentation – Legal Issues

13.1 List liability the installation firm has for positive operation of the security system, interfacing with law enforcement agencies, safety and protection of residential property
13.2 Explain the purpose and extent of customer orientation and system Operation and availability of documentation
13.3 Discuss local, NEC, TIA/EIA, and UL985 Codes & Standards

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
RESI Basic Skills & Knowledge; eITPrep LLP, ISBN 1581220847
RESI Home Security and Surveillance Systems Endorsements; eITPrep LLP, ISBN 9781581221046
HTI+ Certification – Concepts and Practice, Chuck Brooks, 4th Edition; Pearson Prentice Hall; ISBN 0131147722

