ETA - NCEE COMPETENCIES PROJECT
RESI (Environmental Control)

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 ENVIRONMENTAL CONTROL 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
RESI Environmental Control Endorsement

1.0 ENVIRONMENTAL CONTROL

1.0 Lighting
1.1 Describe basic lighting controls, on/off, dimmer and X10
1.2 Compare common remote control methods and list advantages or disadvantages of each
1.3 Explain time or event automatic control operation
1.4 Describe how lighting can be programmed for multiroom and zones control

2.0 Computer Interfacing
2.1 Describe a home local area computer network - LAN
2.2 Compare Bus, Star and Ring network configurations
2.3 List hardware components needed for home network systems
2.4 Compare available home automation software
2.5 List usage of wireless control of elements of the home automation/control system
2.6 Describe the role the RESI may assume in implementing the completed control installation and programming/configuration

3.0 Sensors & Actuators
3.1 Describe sensors (i.e., Rain, Temperature, Motion, etc.) and show where and how they are used
3.2 Describe actuators and relays and their applications

4.0 Computer Control
4.1 Name commercially available computer control programs for home control and automation
4.2 Describe the steps required to program the computer to control the home system

5.0 Needs Assessment
5.1 Explain the considerations involved in planning the control system and in tying it in with the other home technologies, with documentation and compliance with local or state codes
5.2 Explain the steps in establishing a timetable for customer approval, product procurement and installation sequences

6.0 HVAC Interfacing
6.1 Describe the advantages of interfacing the network with the heating, ventilation and cooling system of the home
6.2 Describe the options a control system may offer for programming thermostat control of living area HVAC processes

7.0 Event Recording - Storage
7.1 Describe why and how home events data may be accessed
7.2 Explain how event sequences can be incorporated into a home control system and the advantages of doing so

8.0   System Control
  8.1   Describe how programmable logic control (PLC) is utilized in home control systems
  8.2   Describe the features of Macro Designer
  8.3   Describe the X10 technology and how it may be the most practical control method for some applications
  8.4   Describe the HAI Omni Controller

9.0   Implementation
  9.1   Explain how lawn water sprinkler systems can be incorporated in the home control system, mechanically connected and programmed
  9.2   Explain how yard or in-home water fountains are interfaced and controlled by the home automation system
  9.3   Describe how spas and hot tubs may need different control algorithms than other home features
  9.4   Describe how the entire system can be controlled and accessed via wireless or phone connections from remote locations

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
RESI Basic Skills & Knowledge; eITPrep LLP, ISBN 1581220847
RESI Environmental Control Endorsement; eITPrep LLP, ISBN 9781581221053
HTI+ Certification – Concepts and Practice, Chuck Brooks, 4th Edition; Pearson Prentice Hall; ISBN 0131147722