



Classification System for the Advanced Electronic Systems Technician (EST)

I. Project Supervision

A. Read the required project documents in order to effectively and efficiently complete the project.

Knowledge of:

- Types of engineering documents
- Proposals
- Contracts
- Schedules
- Types architectural drawings

Skill in:

- Reading and communicating, and active listening
- Interpreting engineering documents, drawings
- Interpreting written instructions
- Interpreting architectural drawings
- Scheduling
- Identifying conflicts, errors, omissions

B. Assembles user documentation including creating client instructions (cheat sheets), to assist the client in operating the system.

Knowledge of:

- Client training (user interface, printing documents on the network, handling remotes).
- Product and system operation techniques

Skill in:

- Tailoring instruction method or style to match client's technical aptitude and demeanor
- Communicating effectively (Oral and written)
- Operating the systems as installed/intended.
- Basic computer skills (Word processor and presentation software)

C. Maintains on site project documentation control and relevant associated trade correspondence.

Knowledge of:

- Location of available resources
- Information "food chain"

Skill in:

- Using punch lists, time cards, work requests, daily service reports, etc. to track efforts and job progress.
- Collecting, organizing and interpreting data
- Using company's day-to-day tracking tools
- Updating system plans (wiring, as-builts, change orders)
- Red-lining drawings
- Communicating with project manager and others (general contractors, designers, owner, customers, etc.)

D. Ensure that the installation is executed as specified by provided project documentation through proper supervision.

Knowledge of:

- Know the profit parameters for this system (margins, scheduling prioritization, budgets, timeline of the project, accountabilities, available resources, etc.)
- The overall objectives of the design and the expectations from the buyer
- Construction processes and time lines
- The current and changing schedule.
- Inspection milestones
- Construction roles of others trades (Electricians, HVAC, Plumbing, Sheet Rockers, Framers, Insulation, Painting, Finish carpenters, Landscapers, Interior Decorators/Designers, ECT.)
- Local construction and electrical codes
- Project management techniques
- Product lead times and inventory availability
- Self patience and tolerance levels (what sets you the instructor off, never let them see you sweat, etc).

Skill in:

- Verifying that what you were told to install is installed in the manner you were told to do it.
- Making sure the crew is doing the job appropriately.
- Communicates with others (e.g., cabinet person , electrician, inspectors, contractors, potential new clients, etc.)
- Velocity assessments (how fast are you moving to expectations)
- Resourcefulness in blowing through barriers to execution
- Punctuality and time management
- Resolving conflicts

E. Train less experienced installers to assist in their professional development.

Knowledge of:

- Motivation techniques
- Teaching techniques
- Learner styles
- Job site etiquette
- Self patience and tolerance levels (what sets you the instructor off, never let them see you sweat, etc).
- Defined concrete expectations from the learner
- Applications (how is this info to be used?)
- Retention assessments

Skill in:

- reviewing activities and performance

- providing regular feedback about all relevant and applicable technical job duties
- ensuring they adhere to company policies and proceed
- Application to the job at hand
- Patience
- Presentation style matches learning styles

F. Manage on-site company resources to ensure efficient and effective workflow.

Knowledge of:

- Expectation and availabilities of (timelines, cost containment, realistic labor capabilities)
- Material/Inventory
- Labor
- Tools
- Vehicles
- Other projects priorities
- Roles and responsibilities
- Authority limits
- Skill sets of individuals within the team

Skills in:

- Managing the project with respect to other projects
- Maximizing the skills of available labor
- Being flexible to reprioritize based on unexpected events (flexibility with project delays, injuries, absences, lack of promised product, etc.)

II. Codes and Standards

A. Comply with FCC, TIA and IEEE codes and standards in order to meet or exceed minimum levels of performance

Knowledge of:

- FCC codes and standards
- TIA standards
- IEEE standards

Skill in:

- Reading and interpreting documents
- Following written instructions
- Recognizing code violations and standards deviations
- Correcting code violations and standards deviations

B. Comply with national and local building codes and standards in order to meet or exceed minimum levels of compliance

Knowledge of:

- Universal Building Code
- Local building practices
- CC&R's (codes, covenants and restrictions)
- Jobsite expectations (what the GC demands)
- Special construction considerations (plasma/projector backing, screen pockets, lift enclosures, etc.)
- Company's best practices or standard operating procedures (culture)

Skill in:

- Identifying need for and specifying special construction considerations
- Reading and interpreting documents
- Following written instructions
- Recognizing code violations and standards deviations
- Correcting code violations and standards deviations

C. Comply with NEC and/or local electrical code in order to meet or exceed minimum levels of compliance

Knowledge of:

- Current NEC guidelines
- Grounding and bonding
- Low-voltage installation restrictions
- Basic high-voltage power distribution, isolation and consumption
- Plenum considerations/restrictions
- Direct-burial considerations/restrictions

Skill in:

- Reading and interpreting documents
- Following written instructions
- Recognizing code violations
- Correcting code violations

D. Comply with OSHA to meet or exceed minimum levels of compliance

Knowledge of:

- Current OSHA
- Safe work habits
- Company's overall objective
- Potential liabilities
- Emergency procedures (who to call, where to go, etc)

Skill in:

- Reading and interpreting documents
- Following written instructions
- Recognizing code violations and standards deviations
- Correcting code violations and standards deviations
- Motivating the entire team to avoid injuries

III. Installation and Set-Up

A. Install components, racks, enclosures, boxes and brackets.

Knowledge of:

- Serviceability and maintenance requirements
- Ventilation/heat management
- System design parameters
- Component integration issues
- Ergonomics and space planning
- Wire Management Techniques
- Power management
- Sequence and schedule of installation
- Limitations of installation equipment
- Equipment stabilization techniques
- Proper attachment techniques
- Safety and stability issues (eg., finger guards on miter saws)
- Commonly accepted construction techniques and standards (types of walls, ceilings, floors, fillers, etc.)

Skill in:

- Mounting hardware and devices to the structure
- Verify system performance
- Assessing the need of construction hardware
- Matching the appropriate construction methods and hardware to the giving situation (mill spec, lag bolts, composite walls)
- Preparing the surface to maximize the mounting effectiveness
- Proper wire dressing

B. Connect and set up audio systems

Knowledge of:

- Cable type and length limitations
- Bend Radius
- Pull strength disciplines
- Interconnectivity Principles (eg, wire to connector, connector to component, jack and plug, pinnout configurations, impedance loads, resistance and reactance)
- Compression, crimp, solder, and twist types and techniques
- Audio wired infrastructure
- Speaker and drive types
- Crossover networks
- Speaker placements
- Multi-room Audio requirements
- Switchers and distribution
- Signal Types (Analog, digital)
- Sources (iPod, MP3, DVD-Audio, Media Servers, SACD, DTS-audio, CD-Rom, satellite radio, internet radio, gaming)
- Outdoor systems
- Verify system performance
- All necessary cabling in order to satisfy project requirements
- Signal contamination issues (shielding, twists, etc.)

Skill in:

- Connecting the equipment accurately and efficiently
- Identifying and documenting the wire and interconnects
- Roughing in the cable (eg, Drilling, cutting, pulling, protecting, etc)
- Documenting the as-built
- Choosing the appropriate input and output settings
- Critical listening (quality of sound)
- Placing speakers and devices (e.g., aesthetic considerations, spatial relations)
- Configuring components (menus, setup, etc.)

C. Connect and set up video systems

Knowledge of:

- Proper image expectations
- Cable type and length limitations
- Bend Radius
- Pull strength disciplines
- Interconnectivity Principles (eg, wire to connector, connector to component, jack and plug, pinnout configurations, impedance loads, resistance and reactance)
- Compression, crimp, solder, and twist types and techniques
- Video wired infrastructure
- Modulation
- Projector, screen and mirror setup
- RF and Satellite Distribution (cable sizes and types, passives, actives, bi-directionality, etc.)
- Switchers and distribution (Video distribution amp, control strings, etc.)
- Signal Types (Component/RGBHV/Composite, HDMI, DVI-D, optical, SDI, etc.)
- Sources (Blue-Ray, DVD-HD, Media Servers, Satellite, Cable, gaming devices, HTDV)
- Display types (LCD, OLED, Plasma, DLP, LCOS, Laser, rear and front projection)
- Verify system performance to meet specifications
- Sizing and scaling issues
- Proper equipment placement techniques
- Multi-room Video requirements
- Switchers and distribution
- Outdoor systems
- All necessary cabling in order to satisfy project requirements
- Signal contamination issues (shielding, twists, etc.)
- Cable egress containment (terminating correctly, backfeed)

Skill in:

- Connecting the equipment accurately and efficiently
- Identifying and documenting the wire and interconnects
- Roughing in the cable (eg, Drilling, cutting, pulling, protecting, etc)
- Documenting the as-built
- Sizing and scaling video (setup)
- Choosing the appropriate input and output settings
- Critical viewing (contrast, color imagery, resolution)
- Configuring components (menus, setup, etc.)

D. Connect and set up phone system

Knowledge of:

- Wired infrastructure
- Cable type and length limitations
- Bend Radius
- Pull strength disciplines
- Interconnectivity Principles (eg, wire to connector, connector to component, jack and plug, pinout and color coding configurations, impedance loads, resistance and reactance)
- Compression, crimp, solder, and twist types and techniques
- Proper equipment placement techniques
- Phone programming
- Signal contamination issues (shielding, twists, etc.)

Skill in:

- Connecting the equipment accurately and efficiently
- Identifying and documenting the wire and interconnects
- Roughing in the cable (eg, Drilling, cutting, pulling, protecting, etc)
- Documenting the as-built
- Choosing the appropriate input and output settings
- Verifying system performance to meet specifications
- Labeling of speed dial settings
- Configuring components (menus, setup, etc.)
- Punching down and cross-connecting

E. Connect and set up Data Network

Knowledge of:

- wired infrastructure
- Patch panels
- wireless protocols and setup techniques
- Communication security
- VOIP
- IPTV
- Cable type and length limitations
- Bend Radius
- Pull strength disciplines
- Interconnectivity Principles (eg, wire to connector, connector to component, jack and plug, pinout and color coding configurations, impedance loads, resistance and reactance)
- Compression, crimp, solder, and twist types and techniques
- Signal contamination issues (shielding, twists, etc.)

Skill in:

- Connecting the equipment accurately and efficiently
- Identifying and documenting the wire and interconnects
- Roughing in the cable (eg, Drilling, cutting, pulling, protecting, etc)
- Documenting the as-built
- Choosing the appropriate input and output settings
- Verifying system performance
- Configuring firewalls, routers, switches, hubs, bridges, modems and wireless access points

- Integrating computer hardware and devices (printers, web cameras, etc.)
- Punching down and cross-connecting
- Wire dressing

F. Connect, set up, and integrate Control Systems

Knowledge of:

- wired infrastructure
- Cable type and length limitations
- Bend Radius
- Pull strength disciplines
- Interconnectivity Principles (eg, wire to connector, connector to component, jack and plug, pinnout and color coding configurations, impedance loads, resistance and reactance)
- Compression, crimp, solder, and twist types and techniques
- IR and RF Devices, sensors
- Security Keypad and systems (motion sensor, water sensors, pet feeding automation)
- Lighting devices and control systems (sconces, can lights, ballasts, dimmable lights)
- HVAC control and systems
- Pool and Water Feature control
- Access control
- Shade, drapes and window coverings
- Motorized systems (lifts, drops, spinners, actuators, etc.)
- Non-code based Remote controls and keypads
- Verify system performance
- Signal contamination issues (shielding, twists, etc.)

Skill in:

- Connecting the equipment accurately and efficiently
- Identifying and documenting the wire and interconnects
- Roughing in the cable (eg, Drilling, cutting, pulling, protecting, etc)
- Documenting the as-built
- Choosing the appropriate input and output settings

G. Connect and set up CCTV

Knowledge of:

- proper lensing, backlight, power supply, aperture, focal length, direction of view, motorized, housings, PTZ, defogging, heaters, condensation management, dryers, etc)
- Cable type and length limitations
- Bend Radius
- Pull strength disciplines
- Interconnectivity Principles (eg, wire to connector, connector to component, jack and plug, pinnout configurations, impedance loads, resistance and reactance)
- Compression, crimp, solder, and twist types and techniques
- Modulation
- Front-door/pool/”nanny” camera, DVR
- wired infrastructure
- Verify system performance
- Signal contamination issues (shielding, twists, etc.)
- Switchers and distribution (Video distribution amp, control strings, etc.)

Skill in:

- Connecting the equipment accurately and efficiently
- Identifying and documenting the wire and interconnects
- Roughing in the cable (eg, Drilling, cutting, pulling, protecting, etc)
- Documenting the as-built
- Choosing the appropriate input and output settings

H. Install sound isolation and acoustics and modify to integrate them into the space

Knowledge of:

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- Product identification / Treatment types (Absorption, Diffusion, Reflecting)
- Basic room acoustic theory (First order reflection, standing waves, null points, etc.)
- Proper mounting techniques (buzz and rattle free, in accordance to plan or manufacturer specifications)

Skill in:

- Placing treatment to optimize system performance
- Identifying challenges to bring to designing party's attention
- Verify system performance
- Matching other architectural features
- Reading and comprehension of acoustical design and specialty construction plan-sets

I. Perform adjustments to installed devices for optimal performance quality (calibration)

Knowledge of:

- Proper use of Sound Pressure Level meter(speakers level)
- Proper use of PLUGE, color bars and grayscale generator
- Proper use of RF Field Strength Meter
- Proper use of Spectrum Analyzer
- Proper use of Real-time Analyzer
- Proper use of Satellite Meter
- Target performance level of systems
- Corrective actions as required

Skill in:

- Interpreting test data
- Performing a sweep test to identify rattles, buzzes, squeaks, whistles, and hums
- Correcting system performance deviations
- Critical listening (quality of sound)
- Alleviating rattles, buzzes, squeaks, whistles, and hums

IV. Troubleshooting

A. Identify the performance problems of the installed systems/devices.

Knowledge of:

- Performance expectations
- Equipment/system operation
- Client's ability to operate equipment (was the client properly trained?)
- Typical malfunctions/problems (hum bars, snowy image, buzzing speakers, etc) and their remedies.
- Hardware symptoms vs. Software symptoms

Skill in:

- Measuring differences between actual performance and expectations
- Differentiating between hardware and software issues
- Operating installed systems and components
- Communicating with clients in simple terms, concisely and effectively (via in-person, telephone and email)

B. Isolate the suspected system problems from the properly working components in order to arrive at a verifiable solution.

Knowledge of:

- Proper system operation (how should it work vs. how is it working)
- Divide and conquer technique
- Hardware symptoms vs. Software symptoms
- Environmental and mechanical factors (heat, moisture, EMI, animals, vibration, etc.)
- Proper use of test equipment (DMM, butt set, signal generators, signal strength meters)

Skill in:

- Assessing all possible causes and issues (internal and external)
- Interpreting results from test equipment
- Checking owner's manual and/or calling technical support

C. Correct the problem (by replacing components, interconnects, wire, programming, etc.) and verify repeatedly before leaving the property to ensure proper operation.

Knowledge of:

- Proper installation of components, racks, enclosures
- Proper installation of audio systems
- Proper installation of video systems
- Proper installation of phone systems
- Proper installation of data networks
- Proper installation of control systems
- Proper installation of CCTV
- Proper installation of sound isolation and acoustics
- Properly calibrating installed devices

Skill in:

- Removing and replacing equipment without causing additional problems
- Programming non-code based remotes and keypads
- Integrating new/different components into existing systems.
- Network configuration
- Critical listening (quality of sound)

D. Document the problem and solution in order to maintain project history and improve future project outcomes.

Knowledge of:

- System problem and resolution details
- Model/brand history (lessons learned)
- Proper technical verbiage

Skill in:

- Communicating effectively to designer, user, owner (both oral and written—lessons learned)
- Recommending preventative maintenance