SECTION 28 00 00

ELECTRONIC SECURITY

PART 1 – GENERAL

1.1 PURPOSE

A. This guideline is intended to provide useful information to the Professional Service Provider (PSP) to establish a basis of design. PSP is to apply the principles of this section such that the University of Texas at Arlington (UTA) may achieve a level of quality and consistency in the design and construction of their facilities. Deviations from these guidelines must be approved by UTA and may require justification through Life Cycle Cost (LCC) analysis and submitted to UTA for approval.

1.2 **LESSONS LEARNED AND DESIGN CONSIDERATIONS**

A. Refer to UTA's Office of Information Technology Network Services for sections 3.1 Installation and 3.4 Testing for additional information.

1.3 SUMMARY/OVERVIEW

A. This section provides specifications for the installation of Electronic Access Control (AC), Intrusion Detection (ID), video surveillance and related components.

B. Related Sections

1. Section 08 71 00 – Door Hardware
2. Section 26 00 00 – Electrical (including related sub-sections)
3. Section 27 00 00 – Communications
4. Section 28 00 00 – Electronic Security
5. Section 28 05 00 – Racks and Enclosures
6. Section 28 23 00 – Video Surveillance
7. Section 28 26 00 – Emergency Intercommunications and Duress
8. Section 28 31 00 – Fire Alarm and Smoke Detection

1.4 GENERAL REQUIREMENTS

A. Electronic security systems integrator (security subcontractor) manager/supervisor shall attend meetings arranged by the Contractor, Architect, Owner or other parties affected by the work of this Section 28 00 00.

B. If the manufacturer of security devices or connecting hardware has supplied post manufacture performance data, copies of such are to be kept for inclusion in the documentation and made available to the Owner upon request.

C. All materials are to be new, unused and of the latest series of model number, unless otherwise indicated by the Owner or security system designer.

D. All security integrator personnel must be manufacturer certified and capable of an installation that falls under the manufacturer's guidelines necessary to obtain a manufacturer warranty.

1. The integrator shall provide all components/materials essential for a complete and functional security access and surveillance system.

E. Security integrator shall issue a two (2) year warranty on installation and workmanship.

F. These Specifications and Drawings are intended for bidding purposes only, No part shall be copied or used for any purpose other than bidding on this project.

1. This package shall be contractual upon bid award.

G. Drawings and Specifications are to be used in conjunction with one another and to supplement one another.

1. In general Specifications determine the nature and quality of the materials and tests, and drawings establish the quantities, details and give characteristics of performance that should be adhered to in the installation of the security system components.
2. If there is an apparent conflict between the drawings and specifications, or within the specifications themselves, the items with greater quantity or quality shall be estimated and installed.
3. Clarification with the Owner/Designer about these items shall be made prior to purchase and installation.
4. Questions regarding the Specification or system requirements should be directed in writing to the Owner.

H. Security integrator shall adhere to Division 1 general requirements and written security Specifications and

Drawings within this construction package and shall be responsible for complying with all local, state and federal laws or regulations applicable to the work being performed, even though said law, rule or regulation is not identified herein.

I. Security integrator shall arrange and pay for any inspections required by the public agencies having jurisdiction in the area.

J. The security contractor shall procure and maintain for the duration of this agreement, insurance against claims for injuries to persons or damages to property which may arise from, or conjunction with, the performance of the work hereunder by the security integrator, his agents, representatives, or employees.
   1. The security integrator shall pay the cost of such insurance.

K. The security integrator will respect and protect the privacy and confidentiality of the Owner, his employees, processes, products, and intellectual property to the extent necessary, consistent with the legal responsibilities of the State of Texas and the Owner.

L. If required the security integrator shall sign a non-disclosure agreement and abide by its requirements to keep confidential all information concerning bid documents and this Project.

M. Furnish submittals and manuals in accordance with Division 01.

N. Furnish a detailed material list complete with suppliers (distributors) list of components and distributors name, address, and phone number.

O. Refer to Specifications issued by Architect, Division 01, for Project and cost payments.

1.5 REFERENCES

A. The publications listed below form a part of this Specification. The publications are referred to in the text by basic designation only.

B. Specific reference in Specifications to codes, rules, regulations, standards, manufacturer's instructions, or requirements of regulatory agencies shall mean the latest printed edition of each in effect at the date of contract unless the document is shown dated.

C. For conflicts between referenced requirements and contract documents comply with the one that is more stringent.
   1. Federal, State, and Local codes, regulations and ordinances
   2. NFPA 101: Life Safety Code
   3. NFPA 72: National Fire Alarm Code
   4. NFPA 730: Guide for Premises Security
   5. NFPA 731: Standard for the Installation of Electronic Premises Security
   6. National Electric Code (NEC), latest edition
   7. Building Codes (UBC) (IBC), latest editions
   8. Occupational Health and Safety Act (OSHA)
   9. Americans with Disabilities Act (ADA)
   10. Local Governing Authorities Having Jurisdiction
   11. Underwriters Laboratory (UL) Applicable Standards for Safety and Security
   12. Institute of Electrical and Electronics Engineers (IEEE) Applicable Standards
   13. Telecommunications Industry Association (TIA) Applicable Standards
   14. UTA standards for Security Systems

D. Related Documents
   1. Security Drawings
   2. General provisions of contract
   3. Uniform general conditions
   4. Supplementary general conditions
   5. Architectural plans & specifications
   6. Requirements of Division 01
   7. Electrical / Mechanical / Telecommunications specifications and plans.

1.6 DESCRIPTION OF SYSTEM WORK

A. Furnish and install all materials, tools, equipment, and services for all electronic security/surveillance devices to provide functioning systems in accordance with performance requirements specified and any modifications resulting from reviewed shop and field coordinated drawings.
   1. Access Control System
      a. This system replaces the typical mechanical key controlled door lock with a door locking system that uses an access card as the access credential.

b. The system includes an electric door-locking mechanisms, card reader located adjacent the door, door status sensor, door prop alarm and a request to exit device.
c. Typical system configuration is card or schedule controlled entry with free exiting.
d. This system shall utilize the existing access control head end system currently installed at UT Arlington Campus Card Operations and shall be integrated to the campus- wide access control system program.

2. Intrusion Detection System
   a. This system monitors areas for unauthorized entrance or intruder.
   b. This system can consist of motion sensors, door status sensors, glass break sensors and one or more control keypads.
   c. The keypad is used to arm/disarm system by entering a numeric code on the keypad.
3. Video Surveillance System
   a. This system is used to provide video surveillance through the use of cameras of security sensitive areas and target items.
   b. The system shall allow for the viewing and recording of images in High Definition resolution with H.264 compression.
4. Emergency Intercommunications and Duress Systems
   a. Duress Buttons
      1) These buttons are installed in locations where potential personal safety or security threats exist.
      2) Depressing the button sends a silent priority alarm signal to assigned monitor with location and specific alarm information
      3) The panic button is usually located in the knee space underneath a desk or service counter. These buttons should not be located near other buttons where inadvertent activation is possible. A latching button shall be used to ensure the user knows the signal has been transmitted to the UT Arlington Police.
   b. Emergency Phone / Intercom / Call Stations
      1) The device is typically a distinct box or pole with a single call button.
      2) Depressing the call button puts the individual in direct voice contact with assigned monitoring agency along with specific location information (i.e. Call Box
      3) #3, East Parking Lot).
   c. Cameras should be provided at duress locations to provide remote viewing of the situation prior to response. Inherent coverage from other nearby cameras can be used in lieu of a dedicated camera but should cover the area of the situation.

B. Provide all supplementary or miscellaneous items and devices incidental to or necessary for a sound and complete installation.
C. Drawings are representative and show general arrangement of systems and equipment, except when dimensioned or detailed.
   1. For exact locations refer to dimensioned architectural drawings.
      a. Field measurements take precedence over dimensioned drawings.
      b. Field verify locations and arrangement of all systems and equipment.
      c. Coordinate all work with other trades and Contractor.
D. Circuit Supervision
   1. Supervise all signal and data transmission lines, links with other systems, and sensors.
      a. Indicate circuit and detection device faults with both protected zone and trouble signals.
      b. Initiate an alarm in response to opening, closing, or shorting of a signal or data transmission line.
E. Electronics systems work as specified in this Section and Sections 281000, 282300, 282600 shall include:
   1. A project kick-off/pre-submittal meeting with the Architect, Designer, and Contractor to review security design package.
      a. Additional participants shall include:
         1) Division 08 subcontractors
         2) Division 26 subcontractors
   2. Preparation of pre-installation submittals, including point-to-point wiring information for security equipment to interface to work by others prior to start of any installation work. Include lock permit requests in submittals for review.
   3. Furnishing and installation of all security devices, components and accessories.
   4. The furnishing and coordination on installation of special back boxes for security equipment and field devices as required.

5. Equipment Racks and Enclosures shall to be furnished and installed by the Security contractor.
    a. Coordinate location, size and positioning of racks and enclosures with telecommunications contractor.
6. Furnishing, installation and termination of all copper wiring and cabling including any special purpose wire and cable for electronic security systems.
    a. Coordinate all network and fiber optic cable interface provided by telecommunications subcontractor.
7. Coordinate raceway and power distribution systems provided by Division 26.
8. Provide and install 12/24 VAC/DC input power to all field devices as required.
9. Coordination with other trades and Owner required to facilitate the installation of the security equipment including:
    a. Division 08 (doors)
    b. Division 26 (power, raceways, and fire alarms)
    c. Division 27 (telecommunications network interface).
10. Wiring and termination of electrified door hardware by security subcontractor shall be concurrent with the installation of these electrified components by the door hardware subcontractor.
11. Programming of all security control equipment and prior coordination with the Owner's security and telecommunications personnel.
12. Preparation of "As-Built" documentation.
13. Warranty service for completed work.

1.7 SUBMITTALS

A. See Division 01 for submittal procedures.

B. Pre-Installation Submittal Requirements

1. Submittals for electronic security shall be complete and submitted at the same time.
    a. No partial submittals will be accepted for review.
    b. Allow 2 weeks for consultant review of submittals.
2. General Requirements
    a. A functional description of each system.
    b. All cable and wiring types for each device type used.
    c. Certification that lock wiring and access control systems requirements have been coordinated with electrified door hardware, fire alarm systems, automatic door controls, and overhead door controls specified in other sections and other packages.
    d. Power supply points listing with devices and maximum loads to prevent overloading.
    e. Battery backup calculations to show load and back-up times for UPS and power supplies with batteries.
    f. Equipment schedules listing all system components, manufacturer, model number and quantities of each.
    g. Qualifications and proof of work history (with references).
3. Product Data Cut-sheets
    a. Complete manufacturer's technical data including manufacturer warranty information, descriptive literature, illustrations, and installation instructions for all components included within this project indicating compliance with applicable referenced standards, size, dimensions, model number, electrical characteristics, support requirements, connection requirements and all applicable information verifying that submitted components comply with Contract Documents.
4. Shop Drawings
    a. Floor plans necessary to identify specific device locations, cable routes and quantities, cable types, riser locations, and references to installation details and diagrams.
    b. Riser diagram showing routes between floors or other areas that are not easily identified on the floor plans.
    c. Security One-line diagrams showing all input and output points of the system.
        1) The Contractor shall make any corrections required by the consultant team, file with him two corrected copies and furnish such other copies as may be needed.
        2) The consultant's approval of such drawings or schedules shall not relieve the Contractor from responsibility for deviations from drawings or specifications, unless he has in writing called the Architect's attention to such deviations at the time of submission, nor shall it relieve him from responsibility for errors of any sort in shop drawings or schedules.
    d. Release of CAD Files
        1) Contractor may request to utilize UTA's AutoCAD floor plan files for assistance in producing

shop drawings.
2) Request shall be made by signing UTA's "Agreement for Release of CAD Files" letter.

5. Warranty
   a. The Contractor shall provide the appropriate documentation to comply with the requirements described in the WARRANTY section.
6. Qualifications
   a. The Contractor shall provide the appropriate documentation to comply with the requirements described in the QUALITY ASSURANCE section.

C. As-Built drawings shall be in current AutoCAD format, same version as used by the Architect.
1. Dimensions and scale of the drawing sheets submitted shall match the size of the drawing used for the contract documents, and shall include the following.
   a. Utilize normally recognized drafting procedures that match AutoCAD standards, Architect, and Designer guidelines and methodology.
   b. The As-Built drawings shall incorporate all changes made to the building identified in, but not limited to, Addenda, contemplated change notices, Site Instructions or deviations resulting from site conditions.
   c. Dimensioned plan and elevation views of all security components.
   d. Cable routing paths of security cables to identified infrastructure pathways.
   e. All rack, cabinet, and enclosure locations and labeling thereof.
   f. One-line diagrams of equipment/device interconnecting cabling of the security systems.
   g. Standard or typical installation details of installations unique to Owner's requirements.
   h. Submit one soft and one hard copy with project deliverables within 30 days of project completion.

D. Security integrator shall provide three (3) paper copies and one (1) electronic copy (PDF format) of a properly indexed O&M Manual at the conclusion of the project, which will include, but not be limited to the following requirements:
1. Ring binder with project title, properly indexed, and contractor's name on cover and spine including:
   a. Sequence of operations, design philosophy, and specific functions
   b. System block diagram
   c. Equipment list including:
      1) A brief description
      2) Model
      3) Total number of each item used in the project.
   d. Camera schedule including:
      1) Number
      2) Location
      3) Camera model/manufacturer
      4) View
      5) Lens
      6) Power source
      7) Multiplexer/input
      8) Settings entered on site
   e. Manufacturers' data sheet and O&M manual for associated equipment.
   f. Maintenance requirements for equipment, inspections and preventative maintenance schedules.
   g. As-built drawings for each floor plan layout and rack and wall elevation layouts. Each drawing shall show:
      1) Cable type and identifier
      2) Actual cable routing pathway
      3) Device number (camera, etc.),
      4) Device input/output number.
   h. Final test data (measured video levels, day & night camera snapshots in JPEG format and other significant operating parameters).
   i. List of system associated mechanical locking keys with key codes and tamper resistant hardware types.

1.8 QUALITY ASSURANCE

A. Electronic security systems integrator (security subcontractor) shall meet the following minimum requirements.

1. Maintain a valid Type B license from the Texas Commission on Private Security.
2. Have successfully completed three (3) projects of similar size and complexity that have been in proper operation for a period of one (1) year.
3. Technicians shall be factory trained and certified in specified systems.
4. The Project manager and supervising/lead technician shall have been regularly engaged in the installation and testing of the products specified for not less than five (5) years and maintain manufacturer certification.
5. The security integrator must maintain an operating facility in the local area (50 mile radius) of the Project location to provide service to the Owner for the warranty period.
    a. At the Owners request for service, the security integrator shall dispatch a service technician to the location to affect the required repairs or adjustments.
6. The contractor shall maintain a spare parts inventory necessary to resolve component failures of the system.
    a. Refer to individual specification section for a list of specifically required parts provided to the owner and stored on site. These parts will become the property of the owner.
        1) At the end of the warranty period the security integrator shall test the owner's spare parts and repair or replace as needed to bring the parts up to proper operation.
7. A BICSI RCDD shall approve all on-site work as a recognized member of the Contractor's installation team.
    a. All installation team members must demonstrate knowledge and compliance with all BICSI, TIA/EIA, UL, and NEC methods, standards and codes.

B. Security integrators desiring approval must comply with Division 1 requirements.

C. Security integrator must be cognizant of site conditions, verify locations of new and existing equipment, and determine exact requirements for connection and interface.

1.9 PRE-INSTALLATION MEETINGS

A. Attend and/or arrange a scheduled pre-installation conference prior to beginning any work of this section.
    1. Agenda
        a. This venue is to ask and clarify questions in writing related to work to be performed, scheduling, and coordination with the Project manager/Owner representative and consultant.
    2. Attendance
        a. The security project manager/supervisor shall attend meetings arranged by General Contractor, Owner's representatives, and other parties affected by work of this document.
        b. All individuals who will be installers of the electronic security system and equipment in an on-site supervisory capacity, including project managers and lead installers, shall be required to attend the pre-installation conference.
        c. Individuals who do not attend the conference will not be permitted to install, or supervise the installation of, any component of the security system.
            1) This includes supervisors, project managers, and lead installers of this project.

1.10 POST INSTALLATION MEETINGS

A. At the time of substantial completion the contractor shall call and arrange for a post installation meeting to present and review all submittal documents to include but not be limited to As-Built Drawings, Warranty paperwork, etc.
    1. Attendees to be invited shall include:
        a. Project manager/Owner representative
        b. General Contractor
        c. Other trades that the GC deems appropriate.
    2. At this meeting the contractor shall present and explain all documentation, asking for feedback on its completeness.
    3. Any discrepancies or deviations noted by and agreed to by participants shall be remedied by the contractor and resubmitted within one week of the meeting.

1.11 DELIVERY, STORAGE AND HANDLING

A. Equipment and components shall be delivered properly protected and undamaged with original containers, packaging, and labels intact.

B. Store, handle, and protect all related materials and equipment in accordance with Manufacturer's

recommendations.

C. Provide additional protection during handling as necessary to prevent breaking, scraping, marring, or otherwise damaging products or surrounding areas.
D. Equipment and components shall be protected from the weather, humidity, temperature variations, dirt, dust, or other contaminants.
   1. Equipment damaged prior to system acceptance shall be replaced at no cost to the owner.
E. Protect all equipment and components that are to be installed from theft, vandalism, or use by unauthorized persons.

1.12 PROJECT/SITE CONDITIONS

A. Security integrator is responsible for conducting a site survey prior to the commencement of work to determine locations of all existing security devices and verify the proposed locations of the new components to be installed.
B. Security integrator will coordinate all work through the Contractor and schedule work to cause as little interference or interruption of existing services as possible.
C. Security integrator will arrange and pay for all necessary permits, licenses, and inspections.
   1. Security integrator shall prepare all information necessary to obtain a permit for Electronic Locking Mechanisms in compliance with the Owner requirements.
D. Verify with Division 26 installer all conduits and special back box requirements in a timely manner.

1.13 WARRANTY

A. See requirements in Division 1 Specifications.
B. The Security Integrator shall warrant all completed work, including all materials and labor, to be free from defects in design, workmanship, and/or materials for a period of two (2) years from final acceptance date. This is in additional to the manufacturer's covered warranty on parts and labor, if provided.
   1. System acceptance is defined as the completion of all functional performance testing and the resolution of all punch list items.
C. Warranty Service
   1. In the event that defects in the materials and/or workmanship are identified during the warranty period, the contractor shall provide all labor and materials to correct the deficiency.
   2. All service work shall be performed by factory certified technicians.
   3. All warranty service shall include the replacement of all parts and or components as required to restore normal system operation.
      a. If parts or components need to be repaired, a loaner will be supplied and installed until the part or component can be repaired and reinstalled.
   4. Immediately following a warranty service request, the Contractor shall provide written documentation to Owner which details the service work completed, cause of trouble, and any outstanding work required to restore a complete and normal system.
D. Warranty service requests shall be responded to within 4 hours of notification with a qualified service technician on site.
E. All repairs shall be completed within 48 hours upon site arrival.
   1. If the failure exceeds 48 hours, the Owner reserves the right to require the contractor provide on-site manufacturer support at no additional cost to Owner.
F. Extended warranties on equipment components offered by the manufacturer shall be passed through to the Owner.
   1. Warranty provisions shall be fully transferable only at the direction of the Owner, in the event that ownership of the installed security systems is transferred.

1.14 SYSTEMS STARTUP AND TRAINING

A. After all systems have been tested, accepted and turned on for operation, the Security integrator shall provide "User Training" to Owner personnel.
   1. The onsite training shall cover all newly installed electronic security components, devices and systems. The training classes shall total a minimum of twenty (20) hours for up to eight (8) people of the Owner's choosing.
   2. Two (2) separate training sessions will be conducted, one for system operators and one for system administrators.
   3. The contents of the manuals will include:

a. Title page with subject, system name, owner's name, and an owner approved confidentiality notice.
b. Table of contents.
c. Manual that details system and sub-system operation.
d. Manuals that details system administration procedures and tasks.
e. Manuals that fully detail all programming commands.

4. Provide ten (10) Bound hardcopy System Operation training manuals and one electronic copy (PDF format).
5. Provide two (2) Bound hardcopy System Administration training manuals and one electronic copy (PDF format).

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable manufacturers are shown in individual specification sections.
B. Equipment manufacturers and model numbers indicated in individual specification sections are identified as minimum equipment requirements.
C. All substitutions shall meet or exceed these minimum requirements and must be approved by the Owner/Architect prior to purchase.
D. All manufacturers' equipment shall be available through a nationally recognized supplier network.

2.2 EQUIPMENT

A. Provide security fasteners on all equipment, device plates, etc. within public areas.
   1. Allen head with center pin, hardened steel.
   2. Provide four (4) fastener tools to Owner.
B. Equipment installed in exterior applications shall be fitted with fasteners and exposed surfaces of stainless steel or other corrosion resistant material.
C. All materials and equipment used must be new and unused, prime quality products.
D. All equipment or components installed on the exterior of a building where the equipment is subject to adverse weather/elements shall be enclosed in weatherproof enclosures.

2.3 WIRE AND CABLE

A. All wiring, cabling, patch-cables, etc. must be approved by UTA and must be in compliance with the UTA Standards of Installation for Network Cablings guide.
B. All wire and cable shall be U.L. approved for its intended application and shall meet or exceed manufacturer's recommendations for the components connected.
C. All conductors and cable shall meet individual security system manufacturer specifications.
   1. Provide shielded conductors and cable as required by the manufacturer or as required to provide for interference-free signals.
   2. Color coding shall be accomplished by using solidly colored insulation.
      a. Grounding conductors, where insulated, shall be colored solid green or identified with green color as required by NEC.
D. Increase conductor sizes on cables as required to be consistent with circuit current ratings, length of wire runs, and manufacturers' recommendations.
   1. Alarm device field wiring shall be in accordance with the equipment manufacturer's specifications.
   2. Low voltage power circuits shall use conductors as required by the equipment manufacturer's specifications.
   3. Plenum rated cable shall be used as required by code.
   4. Provide OSP rated wire and cable at exterior, below grade, in-slab and wet applications shall be rated for such usage.
E. Follow requirements as outlined in Division 27 Sections on Structured Cabling Systems (including pulling, terminating, and testing) for all telecommunications UTP cables.
   1. Intra-building data communications circuits shall utilize UTP cable as specified in Telecommunications specifications.
F. Patch Cables
   1. Provide pre-manufactured patch cables (cable, connectors, boots, etc.) as required to connect security systems to voice and data communication outlets.
   2. Patch cables shall be certified for their specific use to meet or exceed applicable industry specifications.

3. Provide cable lengths as necessary to neatly route cables through cable management systems and other cable organization systems.
4. Provide connectors as required for proper termination.
    a. Provide boots for connectors where applicable to prevent snagging.

G. The minimum conductor sizes are for distances as per the manufacturer's specifications from security device to security panel.
1. The contractor shall size the conductor accordingly for longer runs.
2. Minimum Conductor and Cable Types and Sizes.
    a. Alarm device field wiring shall be 18/20 AWG stranded copper conductors.
    b. Low voltage power circuits will use 18 AWG stranded copper conductors.
        1) Increase conductor gauge consistent with circuit current requirements.

PART 3 – EXECUTION

3.1 INSTALLATION

A. All personnel working on this project shall be experienced, highly skilled installers with a minimum of three (3) years' work on similar type projects.
B. Changes in location of any work require the written approval of the Architect/Owner prior to initiation.
C. Changes in indicated sizes shall not be made without the written approval of the Owner/Architect.
D. Install all equipment in accordance with manufacturer's recommendations.
E. All systems shall be designed and installed to provide 24 hour a day, 7 days a week operation.
F. Primary pathways
1. All security cabling run from rack/enclosure head-end equipment to security devices shall follow primary telecom routing pathways.
2. Security wire non-UTP cabling shall be kept separated from the data cabling
3. Security wire non-UTP cabling shall be routed in bridle rings secured to the outside of the telecom tray where applicable.
    a. Arlington loops or J hooks shall be used where telecom pathways are not present.
4. Provide all necessary anchoring devices and supports.
    a. Use structural supports suitable for equipment, or as indicated.
    b. Check loading and dimensions of equipment with shop drawings.
    c. Do not cut or weld to, building structural members.

G. Secondary pathways
1. Arlington loops or J hooks shall be used for secondary pathways
2. Security wire non-UTP cabling shall be kept separated from the data cabling
3. Provide all necessary anchoring devices and supports.
    a. Use structural supports suitable for equipment, or as indicated.
    b. Check loading and dimensions of equipment with shop drawings.
    c. Do not cut or weld to, building structural members.

H. Coordinate extension and connection to commercial, emergency/UPS power circuits provided by Division 26.
1. Make power connections in accordance with Division 26.

I. Shielded and/or screened cables shall be grounded per the hardware manufacturer's instruction.
1. Single point shield grounds shall be grounded at the field panel feeding the device or sub panel and insulated from ground at the termination end of the cable.

J. All installation of security systems shall be complete at least thirty calendar days prior to occupancy.

3.2 LABELING

A. Provide labeling for all security equipment components using waterproof, self-adhesive computer printed labels.
1. Coordinate with Owner on numbering/labeling scheme.

B. Provide labeling for all security cable/wiring using waterproof, self-adhesive computer printed labels.
1. Coordinate with Owner on numbering/labeling scheme.
2. Label all cables/wiring on both ends.
3. At multi conductor cable terminations label each conductor.
4. At a minimum, each cable/wire label shall designate:
    a. Origination Point
    b. Alarm point description

c. Opening description (if applicable)

C. Provide a complete cable/wire identification plan/list with project completion submittal.

D. Conduit and junction box exteriors may be identified with unique color paint, but shall not be identified with written words that easily identify the function of the conduit and boxes.

3.3 POWER REQUIREMENTS

A. 120 VAC emergency power dedicated to security will be provided. (By Electrical Contractor)

B. Back-up power for all equipment and devices shall be for at least 4 hours unless otherwise specified.
   1. When generator backup power is available, provide a UPS, rated to maintain the load for a minimum of 15 minutes for all 120VAC equipment.

C. Provide a UPS to support 120% of the required load to allow for future load expansion and age related deterioration of the battery performance.
   1. Provide the necessary data connection, hardware and software to remotely monitor the UPS.
   2. Provide user configurable computer operating system shutdown capability.

D. All electronic locks shall be 12/24VDC (By Division 08).

E. Connect to AC power and provide UL listed power supplies and transformers to distribute low voltage power to the system components as required.
   1. Provide uninterrupted battery backup power for the duration required above.

F. All equipment connected to AC circuits shall be protected from power surges.
   1. The devices shall be installed and grounded per manufacturer instructions.
   2. Equipment protection shall meet requirements of ANSI C62.41.
   3. Fuses shall not be used for surge protection.

G. All non-fiber optic data circuits that serve devices exterior to the buildings will be protected by surge protectors at the device and the termination.
   1. The devices shall be installed and grounded per manufacturer instructions.
   2. Equipment protection shall meet requirements of ANSI C62.41.
   3. Fuses shall not be used for surge protection.

3.4 TESTING

A. Ensure that all provisions and requirements of this specification are met.
   1. Verify through inspections, demonstrations and tests.

B. Perform required tests to demonstrate workmanship, operation, and performance.
   1. Conduct tests with Architect/Owner and if required, inspectors of agencies having jurisdiction present.
   2. Arrange test dates in advance and give all parties a minimum of 48 hours' notice.

C. Repair or replace equipment or systems found defective or inoperative and re-test until 100% satisfactory results are obtained.

D. Verification inspections will be made of all equipment components and installations for proper functioning of locking hardware and lock controls, mounting/placement of sensors, and cameras, etc. to guarantee requirements of the Contract Documents are complied with.
   1. The Owner's quality control representative shall have the opportunity to witness all inspections, or to conduct installation inspections of his own.

3.5 FUNCTIONAL PERFORMANCE TEST

A. The Functional Performance Test (FPT) will be conducted at the end of the project and prior to system acceptance by the Owner.
   1. The security integrator will provide all necessary staff and communications needed to fully test all functions of the system.
   2. The contractor will submit for approval by the Architect and Owner, a comprehensive test plan that will include testing of every function on every door and security device thirty (30) days prior to the scheduled start of the test.
   3. The system will not be considered for acceptance prior to the successful completion of the FPT and completion of punch list items.

B. Pre-Testing
   1. Following installation and prior to the FPT, the security integrator shall individually test each component and field device and verify the proper functioning of each component within a particular sub-system.
      a. The contractor shall also test each sub-system until all detection zones, alarm assessment components, alarm reporting, surveillance and display components; along with access control functions have been

verified.
   b. Prior to the FPT all deficiencies must be corrected.
   c. After sub-system verification is complete, test the entire system to assure that all elements and subsystems are compatible and function properly as a complete system.

C. Upon completion of the outlined tasks and tests the security integrator shall schedule the FPT with the Architect and Owner.
   1. The security contractor must demonstrate that the security system components and sub- systems operate together as a system and meet specification requirements in the "As- Installed" operating environment.
   2. On conclusion of the FPT the test report document will be submitted to the architect for approval.
   3. The FPT will be observed by the architect's and Owner's representatives.
   4. The FPT may be stopped at any time by these representatives if they believe the failure rate is too high or the system is not performing to contract document requirements.
   5. The FPT will only resume when all deficiencies have been corrected.
   6. Retesting will be required of all failed tests.

3.6 SYSTEM OPERATIONAL TEST

A. Upon completion of the FPT, conduct a formal test to be known as the System Operational Test (SOT), in which all components and sub-systems of the security system are demonstrated to operate error and failure free together as a system.
   1. This test is to be performed over a continuous seventy-two (72) hour period.
   2. A formal test plan and test procedures shall be prepared by the security subcontractor and submitted to the Owner/Architect for approval.
   3. The Security integrator must demonstrate that the system components and sub-systems meet specification requirements in the "As-Installed" operating environment and operate error and failure free for the duration of the test.
   4. If a system failure does occur, the failure must be documented and repaired, after which the seventy-two hour SOT period will restart.

B. In the event that the Owner, Architect, or Contractor are required to witness a retest at a later date because the Security integrator is not properly prepared to conduct the acceptance tests or because the systems being tested have failed such tests, which shall be solely determined by the Architect or Owner witnessing the tests, the cost of witnessing additional tests shall be borne exclusively by the Security integrator.
   1. Costs are to be based on time and materials at the established rates of the Architect or Owner.

END OF SECTION