**PART 1 - GENERAL**

* 1. **SCOPE & RELATED DOCUMENTS**
     1. The work covered by this section of the specifications include the furnishing of all labor, equipment, materials and performance of all operations associated with the installation of the Fire Alarm System as outlined. All items required to complete the installation, whether detailed here in the specification or on the drawings shall be included in this contract.
     2. The requirements of the conditions of the Contract, Supplementary Conditions, and General Requirements apply to the work specified in this section.
     3. Related work in other sections or divisions:
        1. Water flow switches – Set for proper delay (by fire alarm company)
        2. Sprinkler valve supervisory switches – Set for proper activation (installed and adjusted by sprinkler contractor)
        3. HVAC Systems Controls – Ensure proper emergency shutdown interface (HVAC contractor will provide a clearly marked shut down contact point).
        4. Elevator monitor/control panel – Ensure proper emergency shutdown and recall interface
        5. Electrical (Section 26 05 13)
        6. Door and fire curtain release interface (a clearly marked release point will be provided by door or curtain contractor)
     4. The entire installation, including materials and equipment shall meet or exceed the minimum standards and requirements of the following:
        1. Underwriters Laboratory Inc.
        2. 2019 California Building Code, Part 2, Title 24, or current addition.
        3. 2019 California Building Code, Part 3, Title 24, or current addition.
        4. 2019 California Building Code, Part 4, Title 24, or current addition.
        5. 2019 California Mechanical Code.
        6. 2019 California Electrical Code.
        7. 2019 California Fire Code, Part 9, Title 24, or current addition.
        8. Current California Referenced Standards Code, Part 12, Title 24.
        9. Current Public Safety, Title 19, C.C.R. State Fire Marshall Regulations.
        10. Current Division of Industrial Safety, State of California, latest edition of Electrical Safety Orders.
        11. National Fire Protection Association #72, Local Alarm Systems, 2019 Edition with California Amendments – California Building Code 6004(a).
        12. NFPA 90-Air-Conditioning and Ventilating Systems.
        13. NFPA 92A-2000 Smoke Control Systems.
        14. All rules and regulations of local codes having jurisdiction.
        15. Title 21 and 24 of California Code of Regulations.
        16. Manufacturer’s recommendations.
        17. Authority having jurisdiction.
  2. **SUBMITTALS (ADDITIONAL REQUIREMENTS)**
     1. The plans have already been approved by DSA-FLS. The Contractor shall prepare eight (8) sets of blue-line drawings, eight (8) sets of submittal booklets and one (1) set of reproducible sepia drawings for submittal to the Engineer for approval. Pursuant to Public Contract Code Section 3400(b), the materials, products, things or services in this Specifications section 16720 are designated by specific brand name or trade name for the purposes of matching other products in existing District projects to establish District-wide uniform, complete and compatible systems in order to facilitate the most technologically competitive and feasible education for school children in the District. As such, no substitutions or alternates will be accepted by the District except under specific circumstances (for example, the specified product is no longer commercially available) at the District’s sole discretion. A copy of the District findings and Resolution in accordance with Public Contract Code Section 3400(b) is available upon written request at the District.
     2. The following shall be included on all drawings:
        1. Building floor plan of each building drawn to 1/8" scale minimum. Building floor plan shall show location of all devices, conduit and interconnecting wires. Device symbols shall be the same as on the original bid set of drawings. Show all fire rated corridors, occupancy separations and area separation walls. Show all Room Identification Numbers/Use.
        2. Site plan showing all buildings, conduit and interconnecting wires.
        3. Complete symbol legend (same symbols as bid set), showing all symbols, wire, manufacturer, model number, back-box, mounting details and CSFM Listing Numbers.
        4. Typical mounting height details.
        5. Voltage drop calculations using point to point or OHMS Law calculations. NAC voltage drop shall not exceed 10% per circuit.
        6. Battery calculations with batteries used:
           1. Normal: 100% for applicable equipment and devices for a period of 24 Hours.
           2. Alarm: 100% for applicable equipment and devices for a period of 5 Minutes.
        7. Codes as used in the design of this project.
        8. DSA Application Number and District File Number.
        9. Classification per building. Example: Manual, Automatic, etc.
        10. Typical fire penetration detail showing methods, codes, and UL listing used.
        11. Wiring riser diagram including but not limited to, devices, wiring, zoning, EOLs, etc.
        12. Sequence of operations schedule.
        13. General notes pertaining to this project.
     3. The following shall be included in the submittal book:
        1. Cover Sheet: Project Name, Project Location, Architect/Engineer of record, System Supplier/System Installer with C 10 License Number.
        2. Table of Contents: Page numbers of all specification sheets and CSFM Listing Numbers.
        3. Specification Sheets for each piece of equipment.
        4. CSFM Listing Sheets.
  3. **EQUIPMENT QUALIFICATION**
     1. The specification is based upon equipment as manufactured by Edwards Systems Technology as approved by the District. The equipment specified is a District Standard (no substitutions).
     2. All equipment shall conform to all applicable codes and ordinances, and shall be listed by Underwriters Laboratories and the California State Fire Marshall.
  4. **QUALIFICATION OF BIDDERS**
     1. To qualify as an acceptable bidder, whether the bid is submitted to the Owner, his agent, a general contractor or a sub-contractor, the system bidder or contractor shall hold a valid C 10 License issued by the Contractors State License Board of California. The system bidder or installing contractor shall herein be referred to as the Contractor. The Contractor shall also hold a valid State of California Consumer Affairs License Bureau of Collection and Investigative Services. The Contractor shall also have on staff, a minimum of three NICET Certified Technologists and California State Certified Fire Alarm Technicians. This is to insure that licensed installers familiar with this type of installation will be used on this project. The Contractor shall be the factory authorized distributor for the brand of equipment being installed. The Contractor shall have been in the business of supplying, installing and servicing Addressable Fire Alarm Systems for the past 5 years in the State of California. The Contractor shall be able to refer to at least 20 projects of this nature rendering satisfactory service with contact persons, phone numbers and addresses. The Contractor shall maintain a fully equipped service organization capable of furnishing adequate repair service to the equipment. The Contractor shall maintain an inventory of all major components in stock at all times. The Contractor shall have no less than a one EST 3 Certified Installer to one Non EST 3 Certified Installer on site ratio during the duration of the project.
     2. EST 3 Certified Install QUALIFICATIONS
     3. All work specified in this Section shall be performed (furnished, installed and connected) by a qualified fire alarm contractor. The fire alarm contractor or sub-contractor (regardless of tier) performing the work under this Section shall at the time of bid provide the following documentation to show compliance with the contractor qualifications in the bid package. Failure to provide all required documentation below shall render the bid non­responsive.
     4. Authorization Letters: Letters from the fire alarm equipment manufacturer stating that the Fire Alarm Contractor is an Authorized EST Strategic Partner authorized to sell, order, install, maintain and service the specified products, and is trained and certified for the equipment proposed on this project and is licensed to purchase and install the software required to provide the specified functions.
     5. Certifications:
  5. Provide a copy of the National Institute for Certification in Technologies (NICET) Technician Level 4 Certificate for the employee actively involved in this project.
  6. Documentation that ALL Fire Alarm Contractor personnel installing cabling, conductors, equipment and programming are factory-trained and certified for the equipment proposed for this project.
  7. Provide a copy of the Fire-Life Safety Technician (Fire Alarm) License by the State of California for ALL personnel providing work under this Section.
     1. The responsibility of the installing Contractor is to provide all drawings, submittals, wire, devices, equipment, installation to conduit system furnished and installed under Section 16000, programming, final test out and certification. All specialty Fire Alarm Back-boxes for the conduit system shall be provided under this section.
  8. **SYSTEM DESIGN**
     1. Fire alarm system plans and specifications shall be developed in accordance with this code by qualified persons who are experienced in the proper design, application, installation, and testing of fire alarm systems. The system designer shall be identified on the system design documents. Evidence of qualifications shall be provided when requested by the authority having jurisdiction. Examples of qualified personnel include individuals who can demonstrate experience on similar systems and have the following qualifications:
     2. Factory trained and certified in fire alarm system design.
     3. National Institute of Certification in Engineering Technologies (NICET) fire alarm certified – minimum level III.
     4. Licensed or certified by a state or local authority.
  9. **SYSTEM INSTALLATION**
     1. Installation personnel shall be supervised by persons who are qualified and experienced in the installation, inspection, and testing of fire alarm systems. Examples of qualified personnel shall include, but not be limited to, the following:
        1. Factory trained and certified personnel.
        2. National Institute of Certification in Engineering Technologies (NICET) fire alarm level II certified personnel.
        3. Personnel licensed or certified by state or local authority.

**PART 2 - SYSTEM LAYOUT**

1. **SYSTEM DESCRIPTION**
   * 1. The Fire Alarm System as outlined on the drawings, shall be a Life Safety System as manufactured by Edwards Systems Technology. It shall be complete with all necessary hardware, software and memory specifically tailored for this project.
     2. Provide a new Fire Alarm Network System, Remote Panels, Remote Annunciators, Printers, Devices, Power Supplies, etc. in accordance with specifications and drawings. Counts for devices to be in accordance with engineered drawings.
     3. All equipment needed for a complete operable system, (whether specifically indicated or not) shall be included in this section. It shall be the Installing Contractor’s responsibility for a COMPLETE AND OPERABLE SYSTEM upon completion of this project.
     4. The EST 3 Fire Alarm Panel shall communicate with the existing UTC EST Firework monitoring system via District’s LAN Network. The existing EST Fireworks was installed under separate contract and is under warranty.
2. **AUTOMATIC ALARM OPERATIONS**
   * 1. The system alarm operation subsequent to the alarm initiation via pull station, smoke detector, heat detector, sprinkler flow switch, etc., shall be as follows:
        1. All audible alarm indicating devices shall sound the Temporal Signal Code in synchronization with each other, until silenced at the control panel or at the remote annunciator
        2. All visual alarm indicating devices shall flash per NFPA requirements in synchronization with each other, until reset or silenced at the control panel or at the remote annunciator.
        3. Alarm audible devices and alarm visual devices shall operate on the same circuit.
        4. The alarm signals shall be inhibited from being silenced for a period of at least 1 minute after commencing operation. This rate is to be field programmable for actual AHJ requirements.
        5. Display type and location of alarm on the Main FACP LCD display.
        6. Display type and location of alarm on Remote LCD Annunciator.
        7. Subsequent alarms are to report to the FACP and indicate to the operator that a subsequent alarm is present, and also indicate the number of subsequent alarms.
        8. Shut down all associated air handlers in smoke compartments.
        9. De-energize door holders to release fire doors in smoke compartments.
        10. Recall elevators as required.
3. **AUTOMATIC SUPERVISORY OPERATION**
   * 1. All data, initiating, indicating and supervisory lines shall be constantly monitored for integrity. Indicate activation opens, shorts, grounds at Main FACP and at Remote Annunciator.
4. **OPERATION**
   * 1. During the normal state, the NORMAL LED (green) shall flash. The first line of the LCD shall display the time in (HH:MM:SS) as well as the number of active points (AP) and the number of disabled points (DP) in the system.
     2. When the control panel goes into alarm condition, the NORMAL LED (green) extinguishes and the ALARM LED (red) shall light, the buzzer pulsates and the LCD indicates the time, the number of messages waiting, the type of alarm, the alarm zone or device number, and the time that the alarm occurred. The second line is dedicated to the user specified message.
     3. To silence the panel buzzer, the operator shall press the LOCAL SILENCE button and the buzzer will silence.
     4. To silence the audible devices, the operator shall press the ALARM SILENCE button. A new alarm shall cause the audibles to resound.
     5. During the TROUBLE condition, the amber TROUBLE LED shall light, the NORMAL LED shall go out, and the buzzer shall pulsate. The display shall indicate the type of event, the time the event occurred and up to a 40 character custom user description.
     6. During the MONITOR or SUPERVISORY condition, the appropriate LED shall light, the NORMAL LED shall go out, and the buzzer shall pulsate. The display shall indicate the type of event, the time the event occurred and up to a 40 character custom user description.

**PART 3 - MATERIALS**

1. **MAIN OR REMOTE FIRE ALARM PANEL EST 3 W/CAB14/CAB21**
   * 1. Control Panel construction shall be modular with solid state, micro - processor based electronics. It shall display only those primary controls and displays essential to operation during a fire alarm condition. Keyboards or Keypads shall not be required to operate the system during fire alarm conditions.
     2. A local audible device shall sound during Alarm, Trouble, Monitor or Supervisory conditions. This audible device shall sound differently at each condition, to distinguish one condition from another without having to view the panel.
     3. 8-Channel Audio Source Unit (3-ASU)
     4. Primary Keys, LED's, LCD Display
        1. The following primary controls shall be visible through a front access panel:
           1. 8 Line by 21 Character LCD display
           2. Individual System ALARM LED and Switch
           3. Individual SUPERVISORY LED and Switch
           4. Individual TROUBLE LED and Switch
           5. Individual MONITOR LED and Switch
           6. Individual RESET LED and Switch
           7. Individual ALARM SILENCE LED and Switch
           8. Individual PANEL SILENCE LED and Switch
           9. Individual DRILL LED and Switch
           10. Individual LED’S for Power, Test, CPU Fall, Gnd Fault, Disable
           11. NEXT/BACK Switch Per Condition
     5. The Master Controller shall be capable of supporting up to 64 supervised system nodes per single line network without any change in hardware. Each controller shall contain a RS 232 Printer/Programming Port for programming locally via an IBM PC.
     6. Each controller shall support up to 10 Intelligent Loop Cards (SDCs). Each card shall support (125) Intelligent Sensors and (125) Intelligent Modules. Each sensor shall respond to a panel poll for information with an analog representation of measured fire related phenomena (smoke density, particles of combustion, temperature). Such response proves end to end sensor response including the operation of the sensor electronics. Systems which only monitor the presence of a conventional detector in an addressable base shall not be acceptable.
     7. The Master Controller shall have the following additional features without any changes in hardware or firmware:
        1. Auto Programming and Electronic Addressing of Field Devices.
        2. Logic Statements.
        3. Time Controls.
        4. Sequences.
        5. Actions.
        6. Analog Value Reporting of all analog sensors and traditional zones.
        7. Maintenance Reporting by Intelligent Sensor.
        8. Sensitivity Setting by Sensor (Within UL Limits).
        9. Sensitivity Setting changed by time (Day/Night Mode).
        10. Alarm Verification by point or zone. (0 60 Seconds).
        11. Print a history of Sensors Activating the Verification Cycle.
        12. On demand system condition printouts (status).
        13. Enabling and Disabling of any system device or function.
        14. Ground Fault Detection by Panel, by Signature Data Circuit, and by Device Module.
        15. Voice, Data and Signaling Circuit Modular Surge Protection.
        16. Parallel Connected Surge Protection Protective Device.
        17. Normal and Silent One Man Test.
        18. Windows Based Programming.
        19. Network Response Time Under 3 Seconds.
        20. Loop Response Time Under 750 Milliseconds.
        21. Device Mapping Feature for As-Builts.
        22. Up to 1750 History Events
        23. Security and Access Control shall be capable of being INTEGRATED with the Fire Alarm Panel, through the use of Synergy Devices. All devices shall be UL and CSFM listed and cross listed with the EST3 Panel. Security and Access Control devices that are not UL, CSFM listed and cross listed, will not be acceptable. INTERFACED Security and Access Systems will not be accepted.
        24. System shall be capable of being interfaced to the Fireworks System. System shall report through graphics, all actions of the fire, security or access system. All changes to the security or access system shall be capable of being made from the Fireworks computer. All changes made, shall be capable of being global changes to all the systems on the Network.
     8. Laptop computer – 1 GHZ capacity.
2. **REMOTE ANNUNCIATOR 3-LCDANN**
   * 1. Remote Annunciator to accommodate all buildings for the Fire Alarm System. Annunciator zoning shall have the following displays as a minimum:
        1. Type of device per building/per floor or section.
        2. Zone of type of device per building/per floor or section.
        3. Common Controls Features
     2. The remote annunciator shall contain the following:
        1. 8 Line by 21 Character LCD Display.
        2. Individual System ALARM LED and Switch.
        3. Individual SUPERVISORY LED and Switch.
        4. Individual TROUBLE LED and Switch.
        5. Individual MONITOR LED and Switch.
        6. Individual RESET LED and Switch.
        7. Individual ALARM LED and Switch.
        8. Individual TROUBLE LED and Switch.
        9. Individual DRILL LED and Switch.
        10. Individual LED'S For Power, Test, CPU Fail, Gnd Fault, Disable.
3. **SIGNATURE SERIES DEVICES - GENERAL**
   * 1. Each remote device shall have a microprocessor with non-volatile memory to support its function and serviceability. Each device shall store as required for its functionality the following data: device serial number, device address, device type, personality code, date of manufacture, hours in use, number of alarms and troubles, time and date of last alarm, amount of environmental compensation left/used, last maintenance date, job/project number, current detector sensitivity values, diagnostic information (trouble codes) and algorithms required to process sensor data and perform communications with the loop controller.
     2. Dependent on its functionality, each device shall be capable of monitoring up to 32 diagnostic codes. This data shall be stored at the device and available for system maintenance.
     3. Each device shall be capable of performing its intended function dependent of the control panel, to lower loop data traffic. Each device shall immediately alert the loop controller of a status change to achieve a loop response time of less than 750ms.
     4. Each device shall be capable of electronic addressing, either automatically or application program designed, to support physical/electrical mapping and supervision by location. Setting a device's address by physical means shall not be necessary.
4. **ANALOG PULL STATIONS - SIGA-278**
   * 1. Provide pull stations as indicated on the drawings.
     2. Pull station shall be double action with terminals for field wiring. Pull station shall be constructed of Red Lexan with White Letters, Key resettable with break glass rod.
     3. Station shall be equipped with a STI 1100 Protective Cover without horn, if indicated on drawings.
     4. For flush mounting applications Use 4S 2 1/8" box with 1/2" Single Gang Ring. (Furnished and Installed under Section 26 05 13).
     5. For surface mounting applications, use 276B RSB Backbox with STI 3100 Conduit Spacer. (Furnished under Section 28 31 00, Installed under Section 26 05 13).
5. **ANALOG SMOKE DETECTORS SIGA-PHCD W/SIGA-SB 4BASE**
   * 1. Provide Intelligent Multi-Sensor Detector where indicated on the drawings.
     2. Units shall incorporate three (3) sensing technologies. It shall process and analyze information from each technology (photo/heat/co) separately using dynamic filters, then apply a sophisticated algorithm for optimum detection accuracy.
     3. Each sensing element self-compensates for changes in the detectors installed environment to maintain the sensitivity setting and prevent unwanted alarms. The detector reports when it cannot compensate any further.
     4. Units shall incorporate twin status LED's. Flashing green shows normal; flashing red shows alarm state; steady red and steady green show alarm state in stand-alone mode, visible from any direction.
     5. Units shall incorporate a stand alone operation mode. The detector makes decisions and inputs an alarm even if the loop controller fails. The detector reverts to an intelligent "conventional" detector when polling interrogation stops.
     6. Units shall mount to the SIGA-SB4, SIGA-RB4 or SIGA-IB4 bases as required.
     7. Base shall mount to a 4S 2 1/8" box with 3-0 1/2" ring. (Furnished and Installed under Section 26 05 13).
6. **DUCT DETECTOR SIGA-SD, CSFM 3242-1657:223**
   * 1. Provide intelligent addressable photoelectric duct smoke detectors SIGA-SD. The analog photoelectric detector shall utilize a light scattering type photoelectric smoke sensor to sense changes in air samples from its surroundings. The integral microprocessor shall dynamically examine values from the sensor and initiate an alarm based on the analysis of data. Systems using central intelligence for alarm decisions shall not be acceptable. The detector shall continually monitor any changes in sensitivity due to the environmental affects of dirt, smoke, temperature, aging, and humidity. The information shall be stored in the integral processor and transferred to the analog loop controller for retrieval using a laptop.
     2. The percent smoke obscuration per foot alarm set point shall be field selectable to any of five sensibility settings ranging from 0.79% to 2.46%. The duct detector shall be suitable for operation in the following environment:
        1. Temperature: -20°F to 158°F (-29°C to 70°C)
        2. Humidity: 0-93% RH, non-condensing
        3. Air velocity: 100 to 4000 ft/min
     3. Provide an air exhaust tube and an air sampling inlet tube, which extends into the duct air stream up to ten feet. The sampling tube can be installed with or without the cover in place and can be rotated in 45 degree increments to ensure proper alignment with the duct airflow.
     4. Status LED’s shall remain visible through a clear assembly cover.
     5. The unit shall contain a magnet activated test switch.
     6. One integral form C auxiliary alarm relay shall be provided. The relay contact shall be capable of being individually programmed from the control panel. The contact shall be rated for 2.0A at 30VDC.
     7. Provide SD-TRK4-Key-activated Remote Test station w/integral remote alarm led indicator, where detectors must be accessed by ladder.
7. **HEAT DETECTORS SIGA-HFS or SIGA-HRS W/SIGA-SB4 BASE**
   * 1. Provide Heat Detectors where indicated on the drawings.
     2. Detectors shall gather analog information from their fixed temperature and/or rate-of-rise heat sensing elements and convert it into digital signals. The detectors on board microprocessor measures and analyzes these signals. It compares the information to historical readings and time patterns to make an alarm decision. Digital filters remove signal patterns that are not typical of fires.
     3. Units shall incorporate twin status LED's. Flashing green shows normal; flashing red shows alarm state; steady red and steady green show alarm state in stand alone mode, visible from any direction.
     4. Units shall mount to the SIGA-SB4, SIGA-RB4 or SIGA-IB4 bases as required.
     5. Base shall mount to a 4S 2 1/8" box with 3 0 Ring. (Furnished and Installed under Section 26 05 13).
8. **ATTIC HEAT DETECTORS 284B PL W/SIGA-CT1**
   * 1. Provide Heat Detectors where indicated on the drawings.
     2. Units shall incorporate single pole, normally open contacts and a SIGA-CT1 Monitor Module.
     3. Fixed Temperature Rating shall be 194 Degrees Fahrenheit.
     4. Units shall mount to a 4S 2 1/8" box with 3 0 Ring (Furnished and Installed under Section 26 05 13).
     5. Monitor modules shall mount to a 4-S 2-1/8" box with 1-Gang Ring (Furnished and Installed under Section 26 05 13).
9. **STROBES – Genesis Series GIRF-VM (wall) or GCF-VM (ceiling)**
   * 1. Provide Strobes as indicated on the drawings.
     2. Strobes shall be rated 15cd, 30cd, 75cd, or 110cd as required. Strobes shall be synchronized and shall be capable of being on same circuit as audibles and be synchronized and flash per NFPA requirements. Units not capable of this feature shall install separate audible and visual circuits, conductors, synchronization modules, etc. All additional costs to be borne by contractor. Strobes shall be listed for indoor applications. Units shall be rated for 24VDC polarized operation. Units shall be red in color and mount to a single gang opening.
     3. For flush mount applications use 4S 2 1/8" boxes with 1-Gang Ring. (Furnished and Installed under Section 26 05 13).
     4. For surface mount applications use 27193-11 One Gang Box. GC series devices mount to North American 4” square x 2 1/8” deep electrical box. (Furnished under Section 28 31 00, Installed under Section 26 05 13).
   1. **EXTERIOR HORNS 757-1A-T**
10. Provide Horns as indicated on the drawings.
11. Horns shall be rated at 94dBA - low and 98dBA - high. Units shall be rated for 24VDC polarized operation. Units shall have screw terminals for input/output wiring, be red in color and be suitable for indoor or outdoor applications. Units shall be capable of being installed on the same circuit as visual devices and shall sound the Temporal Code in synchronization with all units. Units not capable of this feature shall install separate audible and visual circuits, conductors, synchronization modules, etc. All additional costs to be borne by contractor.
12. For flush mount applications, use 4S 2 1/8" boxes with 2-Gang Ring (Furnished and Installed under Section 26 05 13).
13. For surface mount applications outdoor, use 757A-WB Back-box w/gasket (Back-box furnished under Section 28 31 00, Installed under Section 26 05 13).
    1. **HORN/STROBES GENESIS SERIES GIRF-HDVM (WALL) OR GCFR-HDVM (CEILING)**
       1. Provide Horn/Strobes as indicated on the drawings.
       2. Horn/Strobes to be rated at 94dBA - low and 98dBA - high. Units shall incorporate a high and low setting position. Horn/Strobe to be rated at 15cd, 30cd, 75cd, or 110cd as required. Units shall have screw terminals for input/output wiring, be red in color and be suitable for indoor applications. Units shall be capable of being installed on the same indicating circuit. Units shall sound the Temporal Code in synchronization and strobes shall flash in synchronization per NFPA requirements. Units not capable of this feature shall install separate audible and visual circuits and conductors. All additional costs to be borne by contractor. Units to be rated for 24VDC polarized operation. Units shall be red in color and shall be suitable for indoor applications.
       3. For flush mount applications, use 4S 2 1/8" boxes with 1-Gang Ring. GC series devices mount to North American 4” square x 2 1/8” deep electrical box. (Furnished and Installed under Section 26 05 13).
       4. For surface mount applications, use 27193-11 Back-box (Furnished under Section 28 31 00, Installed under Section 26 05 13).
    2. **SPEAKER 757-1A-R70 (EXTERIOR)**
       1. Provide speakers as indicated on the drawings.
       2. Speaker shall be rated at 86dBA – low and 89dBA – high. Units shall be rated for 24VDC polarized operation. Units shall have screw terminals for input/output wiring, be red in color and be suitable for indoor or outdoor operations. Units shall be capable of being installed on the same circuit as visual devices and shall sound the Temporal Code in synchronization with all units. Units not capable of this feature shall install separate audible and visual circuits, conductors, synchronization modules, etc. All additional costs to be borne by the contractor.
       3. For flush mount applications indoor, use 4S 2 1/8” boxes with 2-Gang Ring (furnished and installed under section 26 05 13).
       4. For surface mount applications outdoors, use 757A-WB back-box w/gasket (furnished under section 28 31 00, installed under section 26 05 13).
    3. **SPEAKER/STROBE – GENESIS SERIES G4RF-57VM (WALL) OR GCF-57VM (CEILING)**
       1. Provide speaker/strobes as indicated on the drawings.
       2. Speaker/strobe shall be rated at 86dBA – low and 89dBA – high. Speaker/strobe to be rated at 15cd, 30cd, 75cd, or 110cd as required. Units shall be rated for 24VDC polarized operation. Units shall have screw terminals for input/output wiring, be red in color and be suitable for indoor applications. Units shall be capable of being installed on the same indicating circuit. Units shall sound the Temporal Code in synchronization and strobes shall flash in synchronization per NFPA requirements. Units not capable of this feature shall install separate audible and visual circuits and conductors. All additional costs to be borne by the contractor. Units shall be red in color and shall be suitable for indoor operations.
       3. For flush mount applications, use 4S 2 1/8” boxes with 1-Gang Ring. GC series devices mount to North American 4” square x 2 1/8” deep electrical box (furnished and installed under section 26 05 13).
       4. For surface mount applications, use 27193-11 Back-box (furnished under section 28 31 00, installed under section 26 05 13).
    4. **VOICE EVACUATION SPEAKERS-G4RF-S7/WG4RF-S**
       1. Speakers shall be provided for Voice Evacuation to meet code and as shown on plans.
    5. **ZONED AUDIO AMPLIFIER-3-ZA20A**

A. Includes two (2) speaker circuits, wired as Style Y (Class B) or Style Z (Class A).

B. Produces 20 watts of digital power @ 70.7Vrms.

C. Operating Voltage 27.3 to 20.4 VDC.

D. Alarm Current 1.12 amp max. at 50 Watts.

E. Selectable 70VRMS or 25VRMS speaker circuit output.

F. Power for the amplifier comes from the standard system power supply through the local rail.

G. Amplifier comes standard with one 24 VDC power limited Notification Appliance Circuit.

H. Back-up 1000hz temporal generator.

I. Ability to deliver up to 8 different signals simultaneously.

* 1. **MODULES SIGA-CT1/SIGA-CT2/SIGA-CR/SIGA-MM1/SIGA-WTM**

A. Provide modules as indicated on the drawings.

G. Units shall permanently store serial number, type of device, and job number. Each module shall be capable of having its own personality code. Use respected module for particular application. Modules shall use electronic addressing. Use of switches to set address will be prohibited.

H. Provide UL/ULC Release Device at each Roll-Up Door location. Release device to be activated via a Smoke Detector or an alarm relay from the controllers Form C dry contact relay. Firefly III Plus with Voiceboard.

I. Module for flush or surface mountings, use 4S 2 1/8" Boxes with One or Two Gang Ring as required. (Furnished and Installed under Section 26 05 13).

* 1. **EQUIPMENT ALLOWANCE**
     1. Allowance of $5,000 for owner-specified equipment to be provided prior to completion. Deliver specified equipment to the FUSD Maintenance Specialized Services Department.
  2. **COMMUNICATORS EST 3-MODCOM/MN-COM1S**
     1. Contractor to provide communicator and coordinate two (2) dedicated outside telephone lines to communicate to FUSD remote monitoring station. Communicator to be capable of transmitting alarm, trouble, and supervisory conditions to remote monitoring station. Contractor to provide UL listed 864 Fireworks Communications Ethernet Port, Command & Control Network Module to communicate to existing Fireworks Central System located at District’s M & O Complex. All Communications to be Control Panel and Fireworks is via Districts LAN Network. Contractor to test interconnections for Fireworks and verifiy communications from Control Panel to Fireworks prior to signing off of System.
  3. **REMOTE BOOSTER POWER SUPPLY – BPS10**
     1. Provide booster power supply as indicated on drawings.
     2. Output circuits to be labeled and identified on outside of power supply cover.
     3. Provide PAM1 relay for power supply monitor supervision.
  4. **OUTSIDE SUPERVISORY SWITCH-POTTER-OSYSU-1,-2**

A. Provide outside supervisory switch as indicated on drawings.

B. Wiring shall be installed in conduit as specified under the electrical section of the specification.

C. Wire termination and testing shall be performed per manufacture’s recommendation by the contractor.

D. Supervisory switch shall be install and correctly adjusted per manufacture’s recommendation by the contractor.

* 1. **PIV SUPERVISORY SWITCH- POTTER PCVS-2**

A. Provide outside supervisory switch as indicated on drawings.

B. Wiring shall be installed in conduit as specified under the electrical section of the specification.

C. Wire termination and testing shall be performed per manufacture’s recommendation by the contractor.

D. Supervisory switch shall be installed and correctly adjusted per manufacture’s recommendation by the contractor.

E. PIV pad lock to be Master Lock 500KABRK (short shank) or 500KABRKLHWWG (long shank). Shank size is determined by installation condition. All Locks use key #229-No exceptions.

* 1. **PIV SUPERVISORY SWITCH- POTTER PCVS-2**

**PART 4 - EXECUTION**

1. **INSTALLATION**
   * 1. Wiring shall be installed in conduit as specified under the electrical section of the specification.
     2. The sum of the cross sectional areas of individual conductors shall not exceed 40% of the interior cross sectional area of the conduit. Minimum conduit size shall be 3/4 inch trade size.
     3. Wiring shall be identified at terminal and junction locations to prevent unintentional interference with the circuits during testing and servicing.
     4. Junction, pull and terminal boxes/cabinets shall be labeled. Labels shall be permanently affixed to covers/doors. Labeling to be furnished and installed under Section 26 24 16.
     5. Wiring color code per this specification section shall be consistent throughout the system and shall allow for easy identification of initiating, indicating and auxiliary control circuits.
     6. Wiring at building terminal cabinets shall be terminated to screw barrier strips, with circuits identified.
     7. Wiring in control, terminal and junction cabinets shall be neatly arranged and bundled.
     8. Wiring shall test free of earth grounds or shorts between conductors.
     9. The contractor shall be responsible and assure the use of adequate numbers of skilled workmen per the ratio of this specification section, who are thoroughly experienced and trained/certified by mfg. Also completely familiar with the specified equipment and code requirements.
     10. The contractor shall be responsible for assuring that conduit size, wire type and color coding meets the specification, manufacturers and code requirements.
     11. All notification appliance devices will have the proper wire color code:
         1. Horn/Strobe & Horn-Strobe Odd Numbered Circuits – red/black #12 THHN solid
         2. Horn/Strobe & Horn-Strobe Even Numbered Circuits – blue/orange #12 THHN solid
         3. All Initiating Devices – will be twisted pair mid-cap Westpenn D 990 cable.
         4. Underground IDC wire will be Westpenn #AQ 245 unshielded cable.
            1. Underground is defined as below finished floor.
         5. Underground in conduit NAC wire will be Westpenn #AQC 227 unshielded cable.
            1. Underground is defined as below finished floor.
         6. NO WHITE WIRE
     12. All notification appliance devices will be clearly marked as the device that houses the end of line resistor and clearly marked on device with the circuit number and loop number.
2. **SYSTEM VERIFICATION**
   * 1. Upon completion of the installation, the fire alarm contractor shall place into operation and test all operational features, functions and devices.
     2. Upon completion of testing, and after the system has been in operation for a minimum of 5 days without failure, the fire alarm contractor shall schedule with the Authority Having Jurisdiction (DSA INSPECTOR), Architect and Engineer, a demonstration and field acceptance test.
     3. Field acceptance and approval of the fire alarm system shall be evidenced in writing by the Authority Having Jurisdiction.
     4. Prior to scheduling field acceptance, the fire alarm system contractor shall certify in writing, and record the method of testing, the results of all tests and certify that the system has been in operation a minimum of 5 days.
     5. All testing shall be conducted in accordance with NFPA 72, contract documents, manufacturer's instructions and per the requirements of the Authority Having Jurisdiction.
     6. Also the contractor must complete the inspection process utilizing a device-specific bar code inspection system. Bar codes shall be placed on all Fire, Life Safety and Security devices covered under this document. Mobile scanning devices shall be used to scan the barcodes and provide verification within the report via a time and date stamp for each Life Safety or Security device inspected or tested. Resulting Inspection Reports must be accessible without proprietary software via a secure online database within 24 hours of inspection completion. Access to reports must be available 24 hours a day, 365 days a year via password protected login. Due to the confidential nature of the inspection data, web reporting servers must be housed in secure co-location facilities, protected against power loss and the data backed up daily.
3. **GUARANTEE AND SERVICE**
   * 1. Fire alarm system contractor shall provide written guarantees for all fire alarm equipment and devices used on this project for a period of THREE (3) YEARS from the date of final acceptance.
     2. During the warranty period the contractor shall repair or replace any defective material at no additional cost to the Owner.
     3. Response time for warranty service calls shall not exceed four (4) hours.
        1. One year labor.
        2. Three years parts.
4. **IN-SERVICE TRAINING**
   * 1. The fire alarm contractor shall provide factory trained representatives to demonstrate the operation of the fire alarm system to the Owner's personnel. The representative shall have a thorough knowledge of the equipment and operation of the system. The contractor shall provide one (1), 4 hour in service training session coordinated through FUSD maintenance or construction department personnel.
     2. The fire alarm contractor shall provide to the Authority Having Jurisdiction a demonstration of system operation.
5. **OPERATION MAINTENANCE MANUALS**
   * 1. The fire alarm contractor shall provide to the Engineer, three (3) weeks after the field acceptance test, two (2) sets of operating/maintenance manuals and three (3) set of as built drawings.
     2. As built drawings shall indicate the location of all devices, appliances, coding, zoning, wiring sequences, wiring methods, color coding, identification, labeling and connections of the components of the fire alarm system as installed.
     3. The contractor shall supply the Fontana Unified School District with all codes, software, disks, etc. as required at end of 1-year warranty of installation period.
6. **SPARE PARTS-(\*Only applicable if parts are in this project)** 
   * 1. In addition to the $5000.00 equipment allowance in section 3.13, deliver the spare parts to the Specialized Equipment Department located at 9851 Catawba Ave., Fontana CA 92335.
     2. 5 each SIGA-PDC Smoke/CO Sensors
     3. 5 each SIGA-278 Pull Stations
     4. 3 each 757-1A-T Horns
     5. 3 each Genesis G1-HDVM- Horn/Strobes\*
     6. 3 each Genesis G1-VM Strobes\*
     7. 2 each GCF-HDVM Horn/Strobe ceiling mount\*
     8. 2 each GCG-VM Strobe Only Ceiling mount\*
     9. 1 each SIGA-CT1 Module
     10. 1 each SIGA CC1S Module
     11. 1 each SIGA CR Module
     12. 2 each G4RF-S7VM speaker/strobe\*
     13. 2 each GCF-S7VM speaker/strobe\*
     14. 2 each G4RF-S7 speaker/strobe wall mount\*
     15. 2 each WG4RF-S speaker only exterior wall mount\*

END OF SECTION