SECTION 16721

FIRE ALARM SYSTEM SPECIFICATION

PART 1 - GENERAL

1.1 SCOPE & RELATED DOCUMENTS

A. The requirements of the conditions of the Contract, Supplementary Conditions and General Requirements, apply to the work specified in this section.

B. The work covered by this section of the specifications includes the furnishing of all labor, equipment, materials, and performance for the installation, programming and configuration of a complete digital protocol analog addressable fire alarm system, equal to Silent Knight IFP-1000 upon which this specification is based. This system shall include, but not be limited to, system cabinet, power supply, built in Signaling Line Circuit (SLC), 80 character LCD annunciator, six programmable Flexputs, built in dual line Digital Communicator associated peripheral devices, batteries, wiring, conduit and other relevant components and accessories required to furnish a complete and operational Life Safety System.

C. System shall be a 24 VDC, electrically supervised, analog addressable fire alarm system as specified herein and indicated on the drawings. The system shall include but not be limited to all control panels, power supplies, initiating devices, audible and visual notification appliances, alarm devices, and all accessories required to provide a complete operating fire alarm system.

D. All fire alarm system equipment shall be listed for it's intended purpose and be compatibility listed to assure the integrity of the complete system and be ISO 9002 certified.

E. The complete installation is to conform to the applicable sections of NFPA-70, NFPA-72, NFPA-760, NFPA-101, and Local Code Requirements.

F. All equipment shall be approved by Underwriters Laboratories, Inc. for its intended purpose, listed as power limited by Underwriters Laboratories, Inc., for the following standards as applicable:

UL 864	UOJZ Control units for Fire Protective Signaling Systems Local Signaling Unit Central Station Signaling Protected Premises Unit Remote Signaling Protected Premises Unit.
UL 268	Smoke Detectors for Fire Protective Signaling systems.
UL 268A	Smoke Detectors for duct applications
UL 217	Smoke Detectors for Single Stations

UL 521 Heat Detectors for Fire Protective Signaling systems.
UL 228 Door Holders for Fire Protective Signaling systems.
UL 464 Audible Signaling appliances
UL 1638 Visual Signaling appliances
UL 38 Manually Activated Signaling Boxes
UL 346 Waterflow indicators for Fire Protective Signaling systems.
UL 1481 Power Supplies for Fire Protective Signaling systems.

G. All visual Notification appliances and manual pull stations shall comply with the requirements of the Americans with Disabilities Act (ADA).

H. Additionally, the entire installed system and all integrated system operations shall be within the guidelines of the SBCCI Standard Building Code as approved by the jurisdiction of the project location.

I. The work covered by this section of the specifications is to be coordinated with the related work as specified elsewhere under the project specifications.

NOTE: Note that telephone wiring to main telephone backboard shall also be included with connection to telephone system by Owner's telephone system provider.

1.2 QUALITY ASSURANCE: A factory trained service technician shall provide the following supervision from the distributor of the fire alarm equipment:

1. The technician shall be certified and shall have a minimum of two (2) years of service experience in the fire alarm industry.
2. The technicians name shall appear on equipment submittals and a copy of his manufactures certification shall be sent to the project engineer.
3. The technician shall be responsible for the following items:

   a. A pre installation visit to the job site to review equipment submittals and to verify the method by which the system is to be wired.
   b. During the installation the certified technician shall be on site or make periodic visits to verify installation and wiring of the system. He shall also supervise the completion of conduit rough, wires pulled into conduit and wiring rough, and ready for trim.
   c. Upon completion of wiring, final checkout and certification of the system shall be made under the supervision of this technician.
   d. At the time of the formal checkout, technician shall give operational instructions to the owner and or his representative on the system. **Contractor and Fire Alarm Subcontractor must coordinate the scheduling of technical and operational instructions, in advance, with the Owner.**

1.3 GENERAL REQUIREMENTS

A. Submittals

1. The contractor shall submit three (3) complete sets of documentation within thirty (30) calendar days after award of the purchase order. Indicated in the document will be the type, size, rating, style, catalog number, manufacturers names, photos, and /or catalog data sheets for all items proposed to meet these specifications. The proposed equipment shall be subject to the approval of the Architect/Engineer and no equipment shall be ordered or installed on the premises without that approval.
2. NOTE: DOCUMENTATION - Submittal of shop drawings shall contain at least three (3) copies of original manufacturer specification and installation instruction sheets. Subsequent information may be copies. All equipment and devices on the shop drawings to be furnished under this contract shall be clearly marked in the specification sheets.
3. Suppliers qualifications shall be submitted indicating years in business, service policies, warranty definitions, NICET certification, and completion of factory training program and a list of similar installations.
4. Contractor qualifications shall be supplied indicating years in business and prior experience with installations that include the type of equipment that is to be supplied.
5. The contractor shall provide hourly Service Rates, performed by a factory certified technician for this installed Life Safety System with the submittal. Proof of training and authorization shall be included with the submittal. These hourly service rates shall be guaranteed for a 1-year period.

B. Products

1. This Life Safety System Specification must be conformed to in its entirety to ensure that the installed and programmed Life Safety System will accommodate all of the requirements and operations required by the building owner. Any specified item or operational feature not specifically addressed prior to the bid date will be required to be met without exception.
2. Submission of product purported to be equal to those specified herein will be considered as possible substitutes only when all of the following requirements have been met:

    a. Any deviation from the equipment, operations, methods, design or other criteria specified herein must be submitted in detail to the specifying Architect or Engineer a minimum of ten (10) working days prior to the scheduled submission of bids. Each deviation from the operation detailed in these specifications must be documented in detail, including page number and section number, which lists the system function for which the substitution is being proposed.
    b. A complete list of such substituted products with three (3) copies of working drawings thereof shall be submitted to the approved Architect and/or Consulting Engineer not less than ten (10) working days prior to the scheduled submission of bids.

c. The contractor or substitute bidder shall functionally demonstrate that the proposed substitute products are in fact equal in quality and performance to those specified herein.

C. General Equipment and Materials Requirements: All equipment furnished for this project shall be new and unused. All components shall be designed for uninterrupted duty. All equipment, materials, accessories, devices and other facilities covered by this specification or noted on the contract drawings and installation specification shall be best suited for the intended use and shall be provided by a single manufacturer. If any of the equipment provided under this specification is provided by different manufacturers, then that equipment shall be "Listed" as to its compatibility by Underwriters Laboratories (UL), if such compatibility is required by UL standards. The equipment manufacturing facility and manufacturing process shall be **ISO 9002** certified and listed by U.L. CSFM and MEA.

D. Satisfying the Entire Intent of these Specifications

1. It is the contractor's responsibility to meet the entire intent of these specifications.
2. Deviations from the specified items shall be at the risk of the contractor until the date of final acceptance by the architect, engineer, and owner's representative.
3. All costs for removal, relocation, or replacement of a substituted item shall be at the risk of the electrical contractor.

PART 2 - PRODUCTS

2.1 GENERAL

A. FIRE ALARM CONTROL PANEL

1. The Fire Alarm Control Panel (FACP) shall be the Silent Knight IFP-1000 analog addressable control panel. The FACP must have a 5 amp power supply and be capable of expansion to a maximum of 45 total amps via bus connected expander modules that supervise low battery, loss off AC and loss of communication.
2. The FACP must have Day/Night sensitivity capabilities on detectors and be capable of supporting 127 analog addressable points and expandable to a maximum of 1016 analog addressable points. This shall be accomplished via eight signaling line circuits (SLC) capable of supporting a minimum of 127 devices each. The communication protocol on the SLC loop must be digital.
3. The FACP must support a minimum of six programmable "Flexputs". The panel must have a built in 80 character LCD annunciator with the capability of having an additional eight supervised remote annunciators connected in the field.
4. The FACP must have a built in UL approved digital communicator. The communicator must allow local and remote up/downloading of system operating options, event history, and detector sensitivity data.

5. The FACP must automatically test the smoke detectors in compliance with NFPA standards to ensure that they are within listed sensitivity parameters and be listed with Underwriters Laboratories for this purpose.
6. The FACP must compensate for the accumulation of contaminants that affect detector sensitivity. The FACP must have day/night sensitivity adjustments, maintenance alert feature (differentiated from trouble condition), detector sensitivity selection, auto-programming mode (Jumpstart) and the ability to upgrade the core operating software on site or over the telephone.
7. The FACP shall have a Jumpstart feature that can automatically enroll all properly connected accessories into a functional system within 60 seconds of powering up the panel. Panels that do not have these capabilities will not be accepted.
8. The main communication bus (S-Bus RS485) shall be capable of class A or class B configuration with a total Bus length of 6,000 feet.

B. System Wiring: The signaling The Fire Alarm Control Panel (FACP) shall be the Silent Knight IFP-1000 analog addressable control panel. The FACP must have a 5 amp power supply and be capable of expansion to a maximum of 45 total amps via bus connected expander modules that supervise low battery, loss off AC and loss of communication.

C. Signaling Line Circuits: Each SLC shall be capable of a wiring distance of 10,000 feet from the SLC driver module (5815XL) and be capable of supporting 127 devices. The communication protocol to SLC devices must be digital. Any SLC loop device, which goes into alarm, must interrupt the polling cycle for priority response from the FACP. The FACP must respond consistently to a device that goes into alarm on an SLC in under 3 seconds. The auxiliary 5815XL SLC loop module must be capable of being located up to 6000 feet from the FACP on an RS-485 bus, which is separate from the SLC bus. The SLC shall be capable of functioning in a class A or class B configuration.

D. SLC loop devices: Devices supported must include analog photoelectric, ionization smoke detectors, analog heat detectors, addressable input modules, relay output modules or addressable notification modules. There is to be no limit to the number of any particular device type up to the maximum of 127 that can be connected to the SLC.

E. Analog detector functions: The products of combustion detectors must communicate analog values using a digital protocol to the control panel for the following functions:

1. Automatic compliance with NFPA 72 standards for detector sensitivity testing.
2. Drift compensation to assure detector is operating correctly.
3. Maintenance alert when a detector nears the trouble condition.
4. Trouble alert when a detector is out of tolerance.
5. Alert control panel of analog values that indicate fire.

F. Sensitivity function: The FACP shall have the ability to set three different sensitivity levels. A zone can be programmed to a day and a night sensitivity value. The

day/night schedule shall allow for 16 holiday dates that are user programmable to allow the FACP to respond at the night level on those days.

G. Programmable Flexputs: The FACP shall support six programmable Flexput circuits that are capable of being programmed as supervised reverse polarity notification circuits or supervised auxiliary power circuits that can be programmed as continuous, reset able or door holder power. The circuits shall also be programmable as input circuits in class A or B configurations to support dry contact or compatible two wire smoke detectors.

H. Addressable Notification Module: The contractor shall furnish and install where indicated on the plans, addressable notification modules, Silent Knight model #SD500-ANM. The modules shall be U.L. listed compatible with Silent Knight's IFP-1000 fire alarm control panel. The notification module must provide one class A (Style Z) or class B (Style Y) notification output with one auxiliary power input. The notification module must be suitable for mounting in a standard 4 square electrical box and must include a plastic cover plate. The notification module must provide an LED that is visible from the outside of the cover plate. The notification module must be fully programmable for such applications as required by the installation. The ANM shall reside on the SLC loop and can be placed up to 10,000ft. from the control or 5815 SLC loop module.

I. Annunciators: The main control must have a built in annunciator with an 80-character LCD display and feature LED's for General alarm, Supervisory, System trouble, System Silence and Power. When in the normal condition the LCD shall display time and date based on a 200 year clock which is capable of automatic daylight savings time adjustments. All controls and programming keys are silicone mechanical type with tactile and audible feedback. Keys have a travel of .040 in.. No membrane style buttons will be permissible. The annunciator must be able to silence and reset alarms through the use of a keypad-entered code, or by using a firefighters key. The annunciators must have two levels of user codes that will allow the limitation of operating system programming to authorized individuals

J. Remote Annunciators:

1. The fire system shall be capable of supporting up to eight remote annunciators. LCD Remote annunciator Model RA-1000 shall have the same control and display layout so that they match identically the built in annunciator. Remote annunciators shall be available in two colors, red and light gray. Remote annunciators shall have the same functionality and operation as the built in annunciator. All annunciators must have 80-character LCD displays and must feature five LED's for general alarm, supervisory, system trouble, system silence, and system power. All controls and programming keys are silicone mechanical type with tactical and audible feedback. Keys shall have a travel of .040 inches. No membrane style buttons will be permitted.

2. The annunciator must be able to silence and reset alarms through the use of a code entered on the annunciator keypad or by using a firefighter key. The annunciator must have two levels of user codes that will limit the operating system programming to authorized individuals. The control panel must allow all annunciators to accommodate multiple users input simultaneously. Remote annunciators shall be capable of operating at a distance of 6000 feet from the main control panel on unshielded non-twisted cable.

K. The fire system shall be able to support up to eight I/O modules (SK5880) that shall be used to drive remote LED graphic style displays and accommodate up to eight dry contact type switch inputs. The I/O modules shall each drive up to 40 LEDs without requiring external power connections. The I/O module inputs shall be supervised and be suitable for alarm and trouble circuits as well as reset and silence switches.

L. Serial/Parallel interface: The fire system shall be capable of supporting up to two serial / parallel interfaces (SK5824) that are capable of driving standard computer style printers. The interface shall be programmable as to what information is sent to it and shall include the ability to print out Detector Status by point, Event History by point and System Programming. System shall be furnished with a color ink jet printer, Cannon BJC4550 or approved equal.

M. Distributed Power Module:

1. The contractor shall supply a power module #RPS-1000 compatible with the IFP1000 fire alarm control panel. The power module must have 5 amps of output power, six flexput circuits rated at 3amps each, and two form C relay circuits rated at 2.5 amps at 24 volts DC. The fire system shall be capable of supporting up to eight (8) RPS-1000 power modules. The six flexput circuits shall have the same functionality as the flexput circuits on the main panel. The Distributed Power Supply shall be capable of being connected via an RS-485 system bus (SBUS) at a maximum distance of 6000ft. from the main control panel. The power module shall contain an additional RS-485 bus that is completely compatible with all IFP-1000 add on modules; including 5815XL SLC expanders, RA-1000-SK5865-SK5880 annunciators, 5824 serial/parallel module and addressable devices. The power module will also act as a bus repeater so that additional RS-485 (modules) devices can be connected at a maximum distance of 6000ft. from the power module.
2. The power module's RS-485 bus shall be electrically isolated providing ground loop isolation and transient protection.

N. Digital Communicator:

1. The digital communicator must be an integral part of the control panel and be capable of reporting all zones of alarm, supervisory, and trouble as well as all system status information such as loss of AC, low battery, ground fault, loss of supervision to any remote devices with individual and distinct messages to a central station or remote station. The communicator must also be capable of

up/downloading of all system programming options, Event history and Sensitivity compliance information to a PC on site or at a remote location.

2. The communicator shall have an answering machine bypass feature that will allow the panel to respond to communication even on phone lines that have other communication equipment present. The communicator must be capable of reporting via SIA and Contact ID formats. The communicator shall have a delayed AC loss report function which will provide a programmable report delay plus a 10-25 min random component to help ease traffic to the central station during a power outage. No controls that use External modems for remote programming and diagnostics shall be accepted.
3. **Telephone wiring for two (2) line connections shall be run in conduit to the telephone backboard as work of this contract. Final connections to telephone system shall be by telephone system vendor.**

O. Dry Contacts: The FACP will have three form "C" dry contacts, one will be dedicated to trouble conditions, the other two will be programmable for alarm, trouble, notification, pre-alarm, waterflow, manual pull, aux. 1 or aux. 2. The trouble contact shall be normal in an electrically energized state so that any total power loss (AC and Backup) will cause a trouble condition. In the event that the Microprocessor on the FACP fails the trouble contacts shall also indicate a trouble condition.

P. Ground Fault Detection: A ground fault detection circuit, to detect positive and negative grounds on all field wiring. The ground fault detector shall operate the general trouble devices as specified but shall not cause an alarm to be sounded. Ground fault will not interfere with the normal operation, such as alarm, or other trouble conditions.

Q. Over current Protection: All low voltage circuits will be protected by microprocessor controlled circuit breakers or have a self restoring circuit breaker for the following: smoke detector power, main power supply, indicating appliance circuits, battery standby power and auxiliary output.

R. Test Functions:

1. A "Lamp Test" mode shall be a standard feature of the fire alarm control panel and shall test all LED's and the LCD display on the main panel and remote annunciators.
2. A "Walk Test" mode shall be a standard feature of the fire alarm control panel. The walk test feature shall function so that each alarm input tested will operate the associated notification appliance for two seconds. The FACP will then automatically perform a reset and confirm normal device operation. The event memory shall contain the information on the point tested, the zone tripped, the zone restore and the individual points return to normal.
3. A "Fire Drill" mode shall allow the manual testing of the fire alarm system notification circuits. The "Fire Drill" shall be capable of being controlled at the main annunciator, remote annunciators and via a remote contact input.

4. A "Bypass Mode" shall allow for any point or nac circuit to be bypassed without effecting the operation of the total fire system.

S. Remote Input Capabilities: The control panel shall have provisions for supervised switch inputs for the purpose of Alarm reset and Alarm and trouble restore.

T. Notification Appliance Mapping Structure: All notification circuits and modules shall be programmable via a mapping structure that allows for a maximum of 250 output groups. Each of these groups shall have the ability to be triggered by any of the panels 125 Zones. A zone may trigger from groups individually, or may contain a global trigger for manual pull stations, fire drills and two different system alarms. Additionally each Zone will individually control the cadence pattern of each of the Groups that it is "Mapped" to so that sounders can indicate a variety of conditions. The Zone shall be capable of issuing a different cadence pattern for each of the Groups under it's control. The mapping structure must also allow a group to be designated to "ignore cadence" for use with strobes and other continuous input devices. Zones shall have eight different output categories; Detector alarm, Trouble, Supervisory, Pre-alarm, Waterflow, Manual pull, Zone auxiliary one and Zone Auxiliary two. Each of the categories shall have the ability to control from 1 to 8 output groups with a cadence pattern. The patterns are; March code, ANSI 3.41, Single Stroke Bell Temporal, California code, Zone 1 coded, Zone 2 coded, Zone 3 coded, Zone 4 coded, Zone 5 coded, Zone 6 coded, Zone 7 coded, Zone 8 coded, Custom output pattern 1, Custom output pattern 2, Custom output pattern 3, Custom output pattern 4, and Constant. This mapping/cadence pattern shall be supported by all system power supplies and Notification Expander Modules.

U. On board programmer: The FACP shall have an on board programmer which will allow for all system functions and options to be programmed via the on board annunciator keypad. Any panel that does not have this capability will not be accepted.

V. Downloading Software: The fire alarm control panel must support up/downloading of system programming from a PC under Windows 3.1 or Windows 95, 98 & Windows N/T. The FACP must also be able to download the detector sensitivity test results and a 1000 event system event buffer to the PC. Communication shall take place over a direct connection to the PC and/or via the same telephone lines as the built in digital communicator and shall not require an external modem to be connected to the panel. The downloading software shall contain a code that will block unauthorized persons from accessing the panel via direct connection or over the phone lines.

W. Facility Management Software: The FACP must support a facility management software capable of providing off site access to FACP data that is necessary to manage fire system operation. A software package capable of uploading the detector sensitivity test results and the 1000 event system event buffer to the PC shall be required as part of the bid package. Communication shall take place over a direct connection to the PC and/or via the same telephone lines as the built in digital communicator. The facility

management package must be separate from the down loader package and must not be capable of affecting programmed system options.

X. Service reminder: The FACP shall be capable of automatically generating textual service reminder and the main and remote annunciator LCD's to inform the user of required testing or service. The service reminder shall not interfere with the normal operation of the FACP.

Y. English language descriptions: The FACP shall provide the ability to have a text description of each system device, input zone and output group on the system. The use of individual lights to provide descriptions will not be acceptable.

Z. Fire alarm live voice and pre-recorded digital message repeater voice evacuation system: The voice evacuation system shall be a Silent Knight/EVAC 200 or approved equal. The evacuation system shall be microprocessor based, and shall contain an integral microphone, two (2) 100-watt solid-state audio amplifiers, tone generator, and digital message repeater. A 120 VAC power supply and battery charger for standby batteries shall be included. The voice evacuation message shall be broadcast until the FACP is reset, or until the fire emergency personnel interrupt the broadcast with a manual page message. A secondary message shall be provided which can be triggered by the closure of a contact in the fire alarm control panel. The EVAX panel shall be provided with twenty (20) active paging zone selector switches.

2.2 SYSTEM OPERATION

A. Alarm:

1. When a device indicates any alarm condition the control panel must respond within 3 seconds. The General Alarm or Supervisory Alarm LED on the annunciator(s) should light and the LCD should prompt the user as to the number of current events. The alarm information must be stored in event memory for later review. Event memory must be available at the main and all remote annunciators.
2. When the alarmed device is restored to normal, the control panel shall be required to be manually reset to clear the alarm condition, except that the alarms may be silenced as programmed.
3. An alarm shall be silenced by a code or Firefighter key at the main or remote annunciators. When silenced, this shall not prevent the resounding of subsequent events if another event should occur (subsequent alarm feature). When alarms are silenced the silenced LED on the control panel, and on any remote annunciators shall remain lit, until the alarmed device is returned to normal.

B. Troubles

1. When a device indicates a trouble condition, the control panel System Trouble LED should light and the LCD should prompt the user as to the number of current

events. The trouble information must be stored in event memory for later review. Event memory must be available at the main and all remote annunciators.

2. When the device in trouble is restored to normal, the control panel shall be automatically reset. The trouble restore information must be stored in event memory for later review. Event memory must be available at the main and all remote annunciators. A trouble shall be silenced by a code or Firefighter key at the main or remote annunciators. When silenced, this shall not prevent the resounding of subsequent events if another event should occur.

C. Supervision methods

1. Each SLC loop shall be electrically supervised for opens and ground faults in the circuit wiring, and shall be so arranged that a fault condition on any loop will not cause an alarm to sound.
2. Additionally, every addressable device connected to the SLC will be supervised and individually identified if in a fault condition. The occurrence of any fault will light a trouble LED and sound the system trouble sounder, but will not interfere with the proper operation of any circuit which does not have a fault condition.
3. Each indicating appliance circuit shall be electrically supervised for opens, grounds and short circuit faults, on the circuit wiring, and shall be so arranged that a fault condition on any indicating appliance circuit or group of circuits will not cause an alarm to sound. The occurrence of any fault will light the trouble LED and sound the system trouble sounder, but will not interfere with the proper operation of any circuit which does not have a fault condition.

2.3 CONTROL UNIT

A. System Cabinet

1. Mounting: The system cabinet shall be red and can be either surface or flush mounted. The cabinet door shall be easily removable to facilitate installation and service.
2. Audible System Trouble Sounder: An audible system trouble sounder shall be an integral part of the control unit. Provisions shall also be provided for an optional supervised remote trouble signal.

B. Power Supply and Charger:

1. The entire system shall operate on 24 VDC, filtered switch mode power supply with the rated current available of 5 Amps. The FACP must have a battery charging circuit capable of complying with the following requirements: Sixty (60) hours of battery standby with fifteen (15) minutes of alarm signaling at the end of this sixty (60) hour period (as required per NFPA 72 remote station signaling requirements) using rechargeable batteries with automatic charger to maintain standby gel-cell batteries in a fully charged condition.

2. The power supply shall comply with U.L. Standard 864 for power limiting. The FACP will indicate a trouble condition if there is a loss of AC power or if the batteries are missing or of insufficient capacity to support proper system operation in the event of AC failure. A "Battery Test" will be performed automatically every minute to check the integrity of the batteries. The test must disconnect the batteries from the charging circuit and place a load on the battery to verify the battery condition.
3. In the event that it is necessary to provide additional power one or more of the model RPS-1000 Distributed Power Modules shall be used to accomplish this purpose.

C. Connections and Circuits:

1. Connections to the light and power service shall be on a dedicated branch circuit in accordance with the National Fire Alarm Code NFPA 72, National Electrical Code (NEC) NFPA 70, and the local authority having jurisdiction (AHJ).
2. The circuit and connections shall be mechanically protected.
3. A circuit disconnecting means shall be accessible only to authorized personnel and shall be clearly marked "FIRE ALARM CIRCUIT CONTROL".

2.4 ACCESSORY COMPONENTS

A. The FACP shall support the following devices on the RS-485 data bus:

5815XL	Signaling Line Circuit Expander (SLC) Module
5824	Printer Interface Module
RA-1000	LCD Remote Annunciator
5865-3	LED Remote Annunciator
5865-4	LED Remote Annunciator with reset and silence switches
5880	LED I/O module
RPS-1000	Intelligent Distributed Power Module
5395	Remote Power Supply

B. The FACP shall support the operation of 127 total devices per SLC loop without regard to device type. The following devices shall be supported:

SD505-APS	Analog Photoelectric Smoke detector
SD505-AIS	Analog Ionization Sensor
SD505-AHS	Analog Heat Sensor
SD505-ARM	Addressable Relay Module
SD505-ADH	Duct Detector Enclosure
SD500-AIM	Addressable Input Module (replaces the SD505-FRCM-4)
SD500-MIM	Mini Input Module (replaces the SD505-FRCM)
SD500-ARM	Addressable Relay Module (replaces the SD505-ARM)
SD500-ANM	Addressable Notification Module

C. The FACP shall support these other Silent Knight devises via addressable input, addressable Notification, or Addressable Output Modules.

PS-DATK	Dual action Manual Pull Station – Key Reset
HS or ST Series	Combination Horn Strobe or Strobe Only Devices

D. Furnish and install, where shown on the drawings, the following devices

1. Manual Fire Alarm Stations

   a. Manual Fire Alarm Stations shall be non-coded, break glass, double action type, with a key operated test-reset lock in order that they may be tested, and so designed that after actual Emergency Operation, they cannot be restored to normal except by use of a key. The reset key shall be so designed that it will reset Manual station and open FACP without use of another key.
   b. An operated station shall automatically condition itself so as to be visually detected, as operated, at a minimum distance of fifty feet, front or side. Manual Stations shall be constructed of die cast metal with clearly visible operating instructions on the front of the stations in raised letters.
   c. Stations shall be suitable for surface mounting on matching backbox, or semi-flush mounting on a standard single-gang box, and shall be installed within the limits defined by the Americans with Disabilities Act (ADA) dependent on Manual Station accessibility or per local requirements. Manual Stations shall be installed in conjunction with an Addressable Input Module (AIM) or Mini Input Module (MIM). Manual Stations shall be Silent Knight Model PS-DATK or PS-SATK and Underwriters Laboratories listed.
   d. Furnish and install alarmed covers, Watt Stopper or approved equal, for all Manual Stations located in public areas.

2. Remote Power Supplies

   a. Any Remote Power Supplies (RPS) required for Notification appliances shall be the Silent Knight Mod. RPS 1000. The Model RPS 1000 Intelligent Power Supply shall hang on the main S-Bus and be programmed through the IFP 1000 control. It will support 5amps of 24-volt DC power, with 6 Flexput circuits, rated at 3amps each. Two additional 5815 SLC loop expanders shall be capable of be install in the cabinet, to allow an additional 254 points. The power supply will also regenerate the S-Bus for an additional 6000’.
   b. The remote power supply model 5395 or 5495 may also be used on the system. These power supplies are activated by the SD500-ANM module and support 6amps of 24VDC power, with 4 notification circuits, rated at 3amps each. These power boosters may also be activated from another notification circuit from either the fire alarm control, a distributed power supply (RPS-1000). An AIM device shall be needed to monitor the power booster for trouble.
   c. Provide dedicated 20 amp, 120 volt circuit to each RPS furnished from nearest 120 volt panel.

3. Notification Devices (Voice Evacuation Speaker/Strobes)

    a. The visible and audible/visible signal shall be Silent Knight Model SSSP2W2415-110 series signal devises and be listed by Underwriters Laboratories Inc. per UL 1971 and/or 1638 for the ST and also UL464 for the HS.
    b. The notification appliance (combination audible/visible units only) shall produce a peak sound output of 90dba or greater as measured in an anechoic chamber. The signaling appliance shall also have the capability to silence the audible signal while leaving the visible signal energized with the use of a single par of wires Additionally, the user shall be able to select either continuous or temporal tone output with the temporal signal having the ability to be synchronized.
    c. The visible signaling appliance shall maintain a minimum flash rate of 1Hz or greater regardless or power input voltage. The appliance shall also be capable of meeting the candela requirements of the blueprints presented by the Engineer and ADA. The appliance shall have an operation current of 57ma or less at 24VDC for the 15/75Cd
    d. The appliance shall be polarized to allow for electrical supervision of the system wiring. The unit shall be provided with terminals with barriers for input/output wiring and be able to mount to a single gang or double gang box or double workbox with the use of an adapter plate. The unit shall have an input voltage range of 20-30 volts with either direct current or full wave rectified power.
    e. Finish color of all audio/visual device plates shall be white.

4. Smoke Detectors

    a. Smoke detectors shall be Silent Knight Model SD505-APS ceiling mounted, Analog/Addressable photoelectric smoke detectors. The combination detector head and twist lock base shall be U.L. listed compatible with the Silent Knight IFP-1000 fire alarm control panel.
    b. The base shall permit direct interchange with Silent Knight's SD505-AIS ionization smoke detector or the SD505-AHS neat detector. The base shall be the appropriate twist lock base SD505-6AB.
    c. The smoke detector shall have a flashing status LED for visual supervision. When the detector is actuated, the flashing LED will latch on steady at full brilliance. The detector may be reset by actuating the control panel's reset switch. The sensitivity of the detector shall be capable of being selected and measured by the control panel without the need for external test equipment.
    d. The vandal security-locking feature shall be used in those areas as indicated on the drawing. The locking feature shall be field selectable when required. It shall be possible to perform a sensitivity test of the detector without the need of generating smoke. The test method shall simulate the effects of products of combustion in the chamber to ensure testing of the detector circuits.

e. Detectors shall have completely closed back to restrict entry of dust and air turbulence and have a 30 mesh insect screen. Electronics of the unit shall be shielded to protect against false alarms from E.M.I. and R.F.I.

5. Heat Detectors

a. Furnish and install analog/addressable heat detectors, Silent Knight model SD505-AHS. The combination heat detector and twist lock base shall be U.L. listed compatible with the Silent Knight IFP-1000 fire alarm control panel.
b. The base shall permit direct interchange with the Silent Knight SD505-AIS Ionization smoke detector and the SD505-APS photoelectric smoke detector. The base shall be appropriate twist lock base SD505-6AB.
c. The heat detector shall have a flashing status LED for visual supervision. When the detector is actuated, the flashing LED will latch on steady at full brilliance. The detector may be reset by actuating the control panel's reset switch. The vandal security-locking feature shall be used in those areas as indicated on the drawings. Electronics of the unit shall be shielded to protect against false alarms from E.M.I. and R.F.I.

6. Duct Detectors: Duct Detector shall be Silent Knight Model SD505-ADH Housing and the Model SD505-APS Smoke detectors.

E. Provide 10% spare notification appliances (strobes, speakers, Combination Devices; Smoke, Heat and Duct Detectors) and deliver to Owner at project closeout. Active and spare devices shall be quantified in the shop drawing submittal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Provide and install the system in accordance with the plans and specifications, all applicable codes and the manufacturer's recommendations. All wiring shall be installed in strict compliance with all the provisions of NEC - Article 760 A and C, Power-Limited Fire Protective Signaling Circuits or if required may be reclassified as non-power limited and wired in accordance with NEC-Article 760 A and B. Upon completion, the contractor shall so certify in writing to the owner and general contractor.

NOTE: Note in this regard that inspection by and approval of the system by the State Fire Marshal is a prerequisite for the system to be considered complete.

B. Installer's Responsibilities

1. The installer shall coordinate the installation of the fire alarm equipment.
2. All conductors and wiring shall be installed according to the manufacturer's recommendations. All conductors and wiring shall be installed in metal (EMT) raceway system.

3. It shall be the installer's responsibility to coordinate with the supplier, regarding the correct wiring procedures before installing any conduits or conductors.

C. All junction boxes shall be sprayed red and labeled "Fire Alarm". Wiring color code shall be maintained throughout the installation.

3.2 TESTING

A. Before the installation shall be considered completed and acceptable by the awarding authority, a test of the system shall be performed as follows**, in the presence of the Engineer of Record**:

1. The contractor's job foreman, a representative of the owner, and the fire department shall operate every building fire alarm device to ensure proper operation and correct annunciation at the control panel.
2. At least one half of all tests shall be performed on battery standby power.
3. Where application of heat would destroy any detector, it may be manually activated.
4. The communication loops and the indicating appliance circuits shall be opened in at least two (2) locations per circuit to check for the presence of correct supervision circuitry.

B. When the testing has been completed to the satisfaction of both the contractor's job foreman and owner, a notarized letter cosigned by each attesting to the satisfactory completion of said testing shall be forwarded to the owner and the fire department.

C. The contractor shall leave the fire alarm system in proper working order, and, without additional expense to the owner, shall replace any defective materials or equipment provided by him under this contract within one year (365 days) from the date of final acceptance by the awarding authority.

D. A mandatory one (1) year inspection for both sensitivity and functional testing shall be performed during the ninety (90) day period preceding the one (1) year anniversary of the initial warranty period. Immediately after this inspection, Contractor shall make all repairs to correct deficiencies at no cost to Owner under the original warranty.

3.3 WARRANTY

A. The contractor shall warrant the completed fire alarm system wiring and equipment to be free from inherent mechanical and electrical defects for a period of one (1) year from the date of the completed and certified test or from the date of first beneficial use.

B. **The equipment manufacturer shall include in the Base Bid a maintenance contract** through the second full year of system operation providing a minimum of two (2) inspections and tests per year in compliance with NFPA-72 guidelines. A proposal for

extension of that maintenance contract shall be provided to the Owner at the end of that contract term.

3.4 CLOSE-OUT SUBMITTALS: Deliver two (2) copies of the following to the owner's representative within Thirty (30) days of system acceptance. The closeout submittals shall include:

A. Installation and Programming manuals for the installed Life Safety System.

B. Point to point diagrams of the entire Life Safety System as installed. This shall include all connected Smoke Detectors and addressable field modules.

C. All drawings must reflect device address as verified in the presence of the engineer and/or end user.

END OF SECTION