FMOC

Construction Specification Section 13852 Fire Alarm Systems

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Revision 6

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This document has undergone formal Review and Approval process and been reviewed by a Deriviative Classifier and its contents have been deemed unclassified/unlimited release.

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Change Log

Rev	By	Date	Type	Change Description	ID
0		4/22/02		Publish Document	
1		08/15/02	Subst	Updated format. Revised and updated requirements.	
2		12/01/02	Subst	Revised and clarified requirements. Added sections for "Design Criteria", "Programming, Remote Test Station," and "NAC Decibel Level Test" sections.	
3		09/01/04	Subst	Revised requirements throughout the document to better reflect current requirements. Eliminated Specification 13854, *Prefabricated Office Units Fire Alarm System.*	
4		12/01/06	Subst	Added information regarding reporting signals. Revised "References" section and definitions. Revised other sections to better reflect current requirements. Removed redundant Attachment 4. Revised definitions and added attachments. Eliminated "AutoCAD Requirements" section.	
5		12/18/07	Subst	Updated equipment model number for Notifier panel, deleted requirement for Fire Alarm System Quality Assurance Checklist; removed Impairment Permit in attachments, added new requirements for fire alarm network and audio circuits, minor editorial modifications.	
6	PS/KLB	1/19/12	Subst	Added FMOC cover and footers. Edited for grammar and punctuation. Changed title from “Intelligent Fire Alarm System” to “Fire Alarm Systems,” replaced NFPA 72 text with code references, added requirement for pre-acceptance and post-acceptance test meeting to review goals and results, deleted “Request for Acceptance Testing” and “FACP Program Revision Request” forms in attachments.	

PART 1 -GENERAL

1.01 SUMMARY

A. Design, install, test and place into service an addressable fire alarm system per the requirements of this Section and National Fire Protection Association (NFPA®) 72. The system shall include a control panel, manual pull stations, addressable/intelligent fire detection devices, alarm initiating devices, notification appliances, and the accessory equipment necessary for a complete functioning fire alarm system.

B. Fire alarm control panels (FACP) transmit signals via a Digital Alarm Communicator Transmitter (DACT) to Sandia National Laboratories/New Mexico (SNL/NM) fire alarm monitoring Proprietary Supervising Station (PSS) located in Building 887 utilizing dedicated phone lines or an AES Corporation IntelliNet radio subscriber unit if phone lines are not available. The communication format for the DACT is Ademco™ Contact ID. The phone lines at the building service entrance and the programming at the PSS will be provided by Sandia.

C. This section includes the requirements for modifications made to existing conventional and addressable fire alarm systems reporting by DACTs to the Sandia National Laboratories (SNL) fire alarm monitoring Proprietary Supervising Station.

D. This section includes the requirements for the design and installation of fire alarm systems in prefabricated office units.

E. All references to NFPA 72®, *National Fire Alarm and Signaling Code* in this document refer to the 2010 edition.

1.02 REFERENCES

A. The current editions of the following standards are part of this Section:

1. NFPA 70® – National Electrical Code
2. NFPA 72 – National Fire Alarm and Signaling Code
3. NFPA 75 – Standard for the Protection of Information Technology Equipment
4. NFPA 90A – Installation of Air-Conditioning and Ventilating Systems
5. NFPA 318 – Standard for the Protection of Semiconductor Fabrication Facility
6. International Fire Code
7. International Building Code

B. Related Construction Standard Specifications

1. Division 1, Section 01065, "ES&H for Construction Contracts”
2. Division 1, Section 01330, "Submittal Procedures”
3. Division 7, Section 07270, “Firestopping”

4. Division 9, Section 09900, “Painting”
5. Division 16, Section 16001, “Electrical Work”

C. Related Standard Drawings:
1. E-0006STD, “Standard Symbols List & General Notes”
2. FA7001STD, “Fire Alarm Wiring Diagrams”
3. FA7002STD, “Notification Appliance Wiring Diagrams”

D. SNL Facilities Design Standards Manual

E. Conflicts between the references and this Section shall be referred to the Sandia Delegated Representative (SDR), who will determine which standard shall govern.

1.03 DEFINITIONS

A. Addressable Fire Alarm System: A fire alarm system utilizing initiating devices and modules installed on a signaling line circuit (SLC) that have a discrete digital identification that can have each device’s status individually identified or that can be used to individually control other functions using site-specific programming at the fire alarm control panel. It is commonly referred to as an “intelligent” system.

B. Conventional Fire Alarm System: A fire alarm system utilizing initiating devices installed on an initiating device circuit (IDC), or “zone” circuit, that provides either alarm or normal status of the zone circuit to the fire alarm control panel. The specific device in alarm on an IDC containing multiple initiating devices is not specifically identified at the fire alarm control panel (FACP).

C. DACR: Digital Alarm Communicator Receiver

D. DACT: Digital Alarm Communicator Transmitter

E. Emergency Control Functions: Building, fire, and emergency control functions that are intended to increase the level of life safety for occupants or to control the spread of the harmful effects of fire.

F. FACP: Fire Alarm Control Panel

G. FATC: Fire Alarm Terminal Cabinet

H. FPE: Fire Protection Engineering personnel in the Building Safety & Assurance Department at SNL-NM.

I. IDC: Initiating Device Circuit

J. IDR: Intermediate Distribution Room (building red/black communication room)

K. NAC: Notification Appliance Circuit

L. NICET: National Institute for Certification of Engineering Technologies

M. SCO: Sandia Construction Observer

N. SLC: Signaling Line Circuit

O. SNL: Sandia National Laboratories, Albuquerque, New Mexico

P. PSS: Proprietary Supervising Station (located at Building 887)

Q. Definitions in NFPA 72 Section 3.3 apply to fire alarm terms used in this Section.

1.04 SUBMITTALS

A. General Submittal Requirements:

1. Provide the following submittals for acceptance by the SNL Fire Protection Engineer (FPE):

a. Pre-Construction Submittals

(1) Equipment Data Sheets (only for equipment not listed in this specification)

(2) For new or major fire alarm system installations, submit fire alarm shop drawings (full size drawing set and CAD/PDF files on CD)

(3) For minor modifications to building fire alarm systems, submit by e-mail the 11-inch x 17-inch PDF files and the CAD files of the fire alarm shop drawings.

(4) Calculations (electronic files by email or CD)

(5) Qualification Data

b. Pre-Acceptance Test Submittals

(1) As-build shop drawings or copy of red-lined as-build drawings.

(2) Fire Alarm Control Panel programming on electronic storage media or e-mail.

(3) "Fire Protection Systems – Request for Acceptance Testing" form completed for acceptance testing of fire alarm modifications occurring on line item, GPP, and major space renovation projects.

c. Contract Close-Out Submittals

(1) Record of Completion (for new and major fire alarm installations) [**72**:10.18.2]

(2) The final fire alarm control panel program file.

(3) E-mail or CD containing the CAD/PDF files of the as-build shop drawings to the FPE.

2. Acceptance of submittals by the SNL FPE is required prior to proceeding with the installation or modification of any SNL fire alarm system.

3. Submit AutoCAD files electronically in 2008 AutoCAD format for to permit interface with SNL-NM Bentley® Microstation software.

B. Equipment Data Sheets:

Submit equipment data sheets for all fire alarm components and cables used in the fire alarm system that are not specified in this Section. Identify the specific model

or part that will be installed on the submittal. If options are listed on the data sheets, the specific option for the project shall be clearly marked.

C. Shop Drawings:

1. Submit shop drawings using either AutoCAD or Bentley MicroStation. If using MicroStation, following the requirements in the Facilities CADD Standards Manual for preparing drawings.

2. For drawings prepared and reviewed by a National Institute for Certification in Engineering Technologies (NICET)-certified designer, provide copies of the NICET certificates with the drawings submitted for acceptance. For drawings prepared and reviewed by a registered professional Fire Protection Engineer, the drawings shall be stamped with the engineer's stamp.

3. For each new fire alarm system installation or modification to an existing fire alarm system, the shop drawings shall include, as a minimum, the following drawings:

   a. The floor plans required to define the fire alarm system work to be performed.

   b. The fire alarm riser wiring diagram defining how the new installation or modifications to the fire alarm system are electrically wired for each of the SLC, IDC, NAC, and emergency control function control circuits.

   c. Point-to-point termination wiring diagram for fire alarm networks and audio risers.

4. Floor Plans: Provide the following information on fire alarm floor plans:

   a. All fire alarm component locations, including location of addressable modules.

   b. Addressable Components: Identify on the floor plan the SLC address for all addressable modules and detectors on the circuit (e.g., D015, M126). If there is more than one SLC, indicate loop number with address (e.g., L2D015, L1M004). If the fire alarm system is networked, include the node address in the device address (e.g., N2L1D015, N5L2M076). The field devices will be labeled with these unique identifiers.

   c. Conventional Devices: Identify on the floor plan for each conventional device the Zone Card Number and the Zone Number (e.g., 1-01, 2-04). The field devices will be labeled with the identifier assigned on the floor plans.

   d. Notification Appliance Power Supplies: Identify on floor plan the location of all notification appliance power supplies. Identify each NAC power supply with the designation 'PS' and the floor the unit is installed on (e.g., PS-B, PS-1, and PS-2). If more than one power supply is installed on a floor add designation for location of unit in respect to the other power supplies on the floor (e.g., PS-1N, PS-1W).

   e. Notification Appliances: Identify notification appliances on shop drawings using the format Power Source – Power Source Output, where:

(1) Power Source = 'NAC' if powered from FACP; 'PS-1' if powered from NAC Power Supply PS-1.

(2) Output = The output from the power source, for example 1 or 2 if powered from the FACP NAC1 or NAC2 outputs; or 1 through 4 for the Wheelock PowerPath™ outputs (e.g., PS-1-2, NAC2).

Indicate on floor plans the candela settings for each strobe.

f. Show suggested routing of conduit and J-boxes to be installed and indicate areas acceptable for surface mounting of raceway. Note on drawings which field devices are to be flush-mounted or surface-mounted.

g. Show location and identification of power panels on plans that will be powering fire alarm system load. Indicate branch circuit number(s) utilized by fire alarm equipment.

h. Conduit sizes: Provide a general note stating "Fire alarm conduit size shall be ¾-inch, except for vertical drops to pull stations and notification appliances where ½-inch conduit is permitted."

i. Do not install SLC cables through notification appliances. Install J-boxes above drops to notification appliances to keep SLC cables out of notification appliances when fire alarm raceways contain both SLC and NAC cables.

j. Cable and wire types and sizes.

k. For projects requiring installation of a new fire alarm system or modifications to an existing fire alarm system that requires design by a Fire Alarm System Designer, the architect/engineer (A/E) shall identify the fire alarm devices required on the fire alarm floor plans, balloon the impacted areas on the floor plans, and include a reference note stating "The fire alarm system design/installation shall be performed per the requirements of Standard Specification Section 13852".

5. Fire Alarm Riser Wiring Diagram: Provide the following information on the fire alarm riser wiring diagram drawing:

a. Each FACP, annunciator, initiating device, addressable module, NAC power supply, and notification appliance with the address or identification number for each device and the location of each device.

b. Locate all initiation devices and notification appliances with candela settings on the riser diagram to reflect the general location in the building by floor, building section/wing, etc.

c. Device-to-device schematic wiring diagram. Include wiring diagram for fire alarm network interfaces and audio risers.

d. All addressable modules and the devices/equipment they are monitoring or controlling (e.g., flow switches, tamper switches, release panels, HVAC fans, dampers, elevator recall).

e. The 120 VAC panel and circuit number for each fire alarm power circuit.

f. Cable and wire types and sizes.

6. Control Ladder Diagrams: Provide the control ladder diagrams for non fire alarm building systems that will be controlled by the fire alarm system to indicate interface with addressable relay modules.

D. Calculations:

a. Batteries: Battery size calculations to provide 24 hours supervisory, 5 minutes alarm secondary backup power. [**72**:10.5.6.3.1]

b. NAC Calculations: Load and voltage drop calculations for each NAC. [**72**:10.18.1.2]

c. SLC Loop Calculations: Provide calculations to verify that the SLC loop is not exceeding the maximum permissible length or loop current per the fire alarm equipment manufacturer's specifications.

E. Pre-Acceptance Test Submittals:

1. As-Build Shop Drawings: Provide to the SNL FPE a full size copy of the red-lined as-build shop drawings for verification of the fire alarm installation during the Acceptance Test.

2. FACP Programming: Submit the FACP programming by electronic media (CD) to the SNL FPE for acceptance a minimum of 7 days prior to the acceptance test. The FPE will utilize the FACP programming for preparation of the acceptance test documentation and for programming at the fire alarm monitoring PSS.

3. Acceptance Test Forms:

a. Complete the "Fire Protection Systems – Request for Acceptance Testing" form (located at http://www.sandia.gov/engstds/forms.html) and deliver to the SCO.

G. Contract Closeout Submittals:

1. Record of Completion: Submit to the SNL FPE the "Record of Completion" per the requirements in NFPA 72 at the conclusion of the fire alarm system acceptance test. Upon satisfactory completion of the acceptance test, the "Record of Completion" shall be signed and dated by the AHJ. The acceptance date on the Record of Completion shall document the start date for the fire alarm installation warranty period. [**72**:10.18.2]

2. FACP Programming: Submit the as-built FACP programming by electronic media (CD) to the SNL FPE.

3. As-Build Drawings: Submit the electronic media (CD) AutoCAD and PDF files of the as-build shop drawings to the SNL FPE and to the Sandia CADD Coordinator for incorporation into the SNL ProjectWise document management system.

1.05 QUALITY ASSURANCE

A. Fire Alarm System Designer Qualifications: The designer of the fire alarm system shall meet the requirements listed below.

1. As a minimum, be NICET Fire Alarm Level III certified, or a Registered Professional Fire Protection Engineer in the State of New Mexico. [**72**:10.4.1.2(2)]

2. Factory trained and certified for the specific type and brand of system being designed. [**72**:10.4.1.2(3)]

B. Fire Alarm System Installer Qualifications: For the installation or modification of addressable fire alarm systems, the lead technician installer is factory trained and certified to install the specific type and brand of fire alarm system being installed. [**72**:10.4.2.2(3)]

C. Electrical Components, Devices, and Accessories:

1. All equipment and devices furnished shall be Factory Mutual (FM) approved or Underwriter Laboratories (UL) listed, unless specifically noted otherwise.

2. Approved or listed equipment shall be so noted in the latest edition of the FM Approval Guide or the UL Fire Protection Equipment Directory.

3. All initiating devices, addressable modules, and voice evacuation equipment shall be UL listed for use with the FACP.

4. Any fire alarm device or component exposed to voltage above the device's maximum rated voltage shall be replaced by the Contractor prior to commissioning the fire alarm system.

1.06 SYSTEM DESCRIPTION

A. Comply with NFPA 72 requirements.

B. The fire alarm control panel shall communicate with SNL/NM fire alarm Proprietary Supervising Station DACR using a DACT with Ademco Contact ID communication format.

C. Pathway Class Designations: [**72**:12.3]

1. Signaling Line Circuits (SLC) shall be wired as NFPA 72 Class A.

2. Initiating Device Circuits (IDC) shall be wired as NFPA 72 Class A.

3. Notification Appliance Circuits (NAC) shall be wired as NFPA 72 Class B.

D. Fire alarm signal initiation shall be by one or more of the following devices:

1. Manual pull stations

2. Heat detectors

3. Photoelectric smoke detectors

4. Automatic sprinkler system water flow detection switches

5. Automatic sprinkler system pressure switches

6. Air sampling control panels
7. Fire suppression release panels
8. UV/IR detectors
9. Hazard monitoring inputs (e.g., toxic gas, HPM inputs)

E. Fire alarm signal shall initiate the following actions:
1. Alarm notification appliances shall operate continuously.
2. Identify alarm at FACP and remote annunciators.
3. Transmit an alarm to the Sandia fire alarm Proprietary Supervising Station.
4. Unlock electric door locks in designated egress paths.
5. Recall of elevators.
6. Release fire doors held open by magnetic door holders.
7. Close fire/smoke dampers.
8. Switch HVAC equipment controls to fire alarm mode.
9. Actuate smoke removal equipment.
10. Activate power shunt-trip circuit breakers.
11. Actuate stairwell pressurization.
12. Record events in the FACP software memory.

F. Supervisory signal initiation shall be by one or more of the following devices:
1. Operation of a fire protection system valve tamper switch.
2. Alarm activation of the flow switch on the backflow preventer catastrophic failure drain pipe.
3. Alarm activation of low-pressure alarms on dry pipe and pre-action automatic sprinkler systems.
4. Alarm activation of duct smoke detector.

G. Supervisory signal shall initiate the following actions:
1. Transmit a Supervisory alarm to the Sandia fire alarm Proprietary Supervising Station.
2. Record events in the FACP system software memory.

H. System trouble signal initiation shall be by one or more of the following devices or actions:
1. Open circuits, shorts and grounds of wiring for initiation device, signaling line, and notification appliance circuits
2. Opening, tampering, or removal of alarm-initiating and supervisory signal-initiating devices

3. Loss of primary power at the FACP
4. Ground or a single break in FACP internal circuits
5. Abnormal ac voltage at the FACP
6. A break in standby battery circuitry
7. Failure of battery charging
8. Abnormal position of any switch at the FACP or annunciator
9. Failure of DACT to function properly
10. Failure of phone lines connected to DACT
11. Common input/output trouble, AC fail, low battery, and ground fault from the NAC power supply

I. Trouble signals shall initiate the following actions:

1. Transmit a Trouble alarm to the Sandia fire alarm Proprietary Supervising Station.
2. Record events in the FACP software memory.

J. Upon receipt of a fire alarm signal, the notification appliance circuits (NACs) shall:

1. Provide a continuous bell tone, 1560 Hz modulated (0.07 sec. On/Repeat) or similar signal, and be capable of operating 6-inch and 10-inch polarized vibrating bells.
2. Activate strobe appliances on the notification appliance circuits.
3. For buildings with a voice evacuation system, simultaneously activate the speaker circuits and the strobe circuits to evacuate the building.

1.07 DESIGN CRITERIA

A. Fire Alarm Control Panel

1. Location: Locate the FACP near the main building entrance in a location readily visible and accessible by emergency responders. Locate the FACP in an air-conditioned space in a location not exposed to direct sunlight to avoid high temperature extremes.
2. AC Power: Provide a dedicated 120 VAC, 20-amp branch circuit from the nearest power panel for FACP power. Do not terminate any 120 VAC circuits inside FACP other than the 120 VAC power input to the panel.
3. Telecommunications: Provide a CAT5 telephone cable (8-conductor) in a dedicated raceway from the FACP to the building IDR for the DACT primary and secondary phone numbers. Do not install the FACP phone lines in the same raceway or cable bundle with other telecommunication cables.
4. Provide a pull box or wire gutter in an accessible location in the ceiling above the FACP to minimize the number of conduit penetrations into the FACP. Refer to “FACP Installation Details” (Attachment 1) for further details.

5. Provide 120 VAC Surge Protection, circuit breaker, and utility outlet; and 24 VDC battery disconnect switches in the fire alarm control panel per the details in "NOTIFIER® NFS2-640 FACP Modification Details" (Attachment 2) and "Edwards Systems Technology (EST) QuickStart FACP Modification Details" (Attachment 3).
6. Auxiliary FACP Panel: Locate NAC strobe synchronizing modules, fault isolation modules, SLC addressable modules, and surge protection devices in a panel enclosure located immediately above the FACP. Locate any relays with 120 VAC circuits that control emergency control functions (e.g., smoke removal, fan shutdown) in the Auxiliary FACP Panel or install an addressable relay module on the SLC near the equipment controls. Refer to "FACP Installation Details" (Attachment 1) for further details.
7. Emergency Control Function/NAC Disable Switches: Provide disable switches in the FACP to allow maintenance personnel to service and test FACP without activating NACs, heating, ventilation, and air conditioning (HVAC) controls, door release controls, elevator recall/shunt trip controls, and smoke removal systems.
    a. EST QuickStart: Install a SL-30 LED/Switch Card programmed to disable NACs, HVAC controls, elevator controls, and smoke removal controls. Refer to "EST QuickStart SL-30 Annunciator Panel Programming Instructions" (Attachment 5) for further details.
    b. NOTIFIER NFS2-640: Install an ACM-24AT Annunicator programmed to disable NACs, HVAC controls, door release, elevator controls, and smoke removal controls.

B. Manual Pull Stations
1. Location: Provide manual pull stations at the following locations:
    a. Install manual pull stations at locations required in NFPA 72, Section 17.14.
    b. Each pedestrian exit door, including equipment rooms greater than 300 ft^2.
    c. At doors leading to stairways on floors above and below the main floor.
    d. In normal paths of exit in highly visible locations so the travel distance from any point in the building to a manual pull station does not exceed 200 feet. [**72**:17.14.8]

C. Photoelectric Smoke Detectors
1. Location: Provide photoelectric smoke detectors at the following locations:
    a. In locations required by applicable codes and standards (e.g., IBC, NFPA 75, NFPA 318). [**72**:17.7.1.6]
    b. In immediate vicinity of FACP and NAC power supplies. [**72**:10.15]
    c. Inside IDR.
    d. In elevator lobbies, at top of elevator hoistways, and in elevator machine rooms to initiate elevator recall. [**72**:21.3]

e. In areas not protected with an automatic sprinkler system.

f. Within 5 feet of fire/smoke dampers installed in unducted openings.

g. On both sides of doors used for smoke door release service. [**72**:17.7.5.6]

h. In unsprinklered locations, provide total (complete) smoke detection coverage. [**72**:17.5.3.1]

D. Heat Detectors

1. Location: Provide heat detectors at the following locations:

a. Within 2 feet of sprinkler head(s) in hoist ways when elevator shutdown is required prior to sprinkler activation. [**72**:21.4.2]

b. In mechanical rooms without automatic sprinkler system protection.

c. In locations required by applicable codes and standards.

2. Temperature Rating: Provide 190°F heat detectors in locations subject to high ambient temperatures, such as at top of high bays and in close proximity to heat generating equipment.

E. Duct Photoelectric Smoke Detectors

1. Location: Provide duct photoelectric smoke detectors at the following locations:

a. HVAC Supply: Downstream of the HVAC air filters and ahead of any branch connections in air supply systems having a capacity greater than 2,000 ft^3/min. [**90A**:6.4.2]

b. HVAC Return: At each floor level prior to the connection to a common return and prior to any recirculation or fresh air inlet connection in air return systems having a capacity greater than 15,000 ft^3/min and serving more than one story. [**90A**:6.4.2.2]

c. Fire/Smoke Dampers: Within 5 feet of a fire/smoke damper installed within a duct with no air outlets or inlets between the detector and the damper.

2. Remote Test Station: Provide a remote test station for each intelligent and conventional duct smoke detector installed. Locate remote test station near location of the duct smoke detector. Avoid installation of remote test stations in locations with restricted access (e.g., vaults, computer rooms).

F. Modules: Provide addressable input/output modules as listed below.

1. HVAC Air Handling Units: Provide addressable relay modules within three feet of the HVAC control units used to shutdown air handling equipment instead of using auxiliary contacts on addressable duct smoke detectors. [**72**:21.2.4]

2. Fire/Smoke Dampers: Provide addressable relay modules to close fire/smoke dampers whenever the spot-type or duct smoke detector goes into alarm.

3. Elevator Recall/Shunt Controls: Provide addressable relay modules within 3 feet of elevator controller for providing primary/alternate recall and elevator power shunt controls. [**72**:21.2.4]

4. Automatic Sprinkler System Initiating Devices: Provide an individual module input for each water flow, pressure switch, or tamper supervisory switch installed on the automatic sprinkler protection system. Coordinate location of monitor modules with the contractor installing the automatic sprinkler system. At sprinkler risers with 5 or more inputs, install a Notifier XP10-M ten-input monitor module to consolidate the multiple inputs into a compact monitoring module component to reduce the amount of wall space required for fire alarm components.

5. Ancillary Control Panels: Provide individual monitor module input for each ancillary control panels (e.g., fire suppression release panels, air-sampling control panels, toxic gas detection panels, ADA area refuge phones, etc.) to monitor the alarm and trouble status of each panel.

6 NAC Power Supplies: Provide a monitor module to supervise the NAC power supply's common trouble output.

G. Notification Appliances

1. Multitone Horns: Provide audible notification appliances throughout the building as required to achieve the decibel levels required by NFPA 72, Section 18.4.3. Do not install audible notification appliances in stairways or near exit discharges. The average and minimum decibel levels required for the various occupancies at SNL are listed below: [**72**:Table A.18.4.3]

Occupancy	Avg. Ambient dBA	Minimum dBA Required
Office Areas	55	70
Assembly Areas	55	70
Storage Areas	55	70
Computer Rooms	70	85
Labs	70	85
Low and High Bays	70	85
Clean Rooms	70	85
Mechanical Rooms	90	105

2. Strobes: Provide visual notification appliances in all common areas (e.g., restrooms, conference rooms, break areas, corridors, hallways, stairways, lobbies), open areas with calculated occupant loads of 10 or more occupants, and in locations with a high ambient sound level (e.g., mechanical rooms).

3. Emergency Responder Appliance: At the main entrance(s) to the building, provide a weatherproof outdoor-listed strobe on the exterior wall of the building that is readily visible to emergency responders for indicating when the building fire alarm system is in an ALARM condition.

4. NAC Power Supplies: Provide NAC power supplies throughout the building, as required, to provide power for the audible/visual appliances and to reduce voltage drop on NACs. Provide a dedicated 120 VAC, 20-amp branch circuit from the nearest power panel to power the NAC power supply. [**72**:10.5.5.1]. Locate NAC power supplies in accessible locations for maintaining the panels, preferably in equipment chases and electrical closets or rooms. Provide an addressable signal module to activate the NAC Power Supply outputs during an Alarm and a monitor module to monitor the panel common trouble output.

5. Zoning: The boundaries of NAC zones shall coincide with building outer walls, building fire or smoke compartment boundaries, floor separations, or other emergency control subdivision. Initially load each NAC zone with appliances that do not exceed 80 percent of the available NAC amperage to permit later addition of appliances to the circuit. [**72**:10.5.6.3.1(1)]

6. Voice Evacuation: If specifically required by the project scope of work, design a voice/evacuation system to comply with the requirements in NFPA 72 and to interface with the SNL-NM Emergency Management Tone Alert Radio System (TARS).

H. Emergency Control Functions

1. Provide the following emergency control function controls as required by applicable codes and standards:

   a. Elevator recall/shutdown

   b. Fire door release

   c. HVAC shutdown

   d. Closure of fire/smoke dampers

   e. Activation of smoke removal equipment

   f. Activation of shunt-trip circuit breakers

I. Raceway and Wiring

1. SLC and IDC Raceways:

   a. Do not route SLC and IDC cables through notification appliances. The frequent modifications to space at SNL typically require relocation of notification appliances. Separating NAC cables from SLC/IDC cables in below ceiling spaces simplifies the fire alarm modification design and minimizes disruption to the fire alarm system operation during the removal/relocation of notification appliances.

   b. Do not install the SLC cable in the following locations:

      (1) Outside of the building housing the FACP, unless approved by FPE. For detection devices exterior to the building (e.g., PIV tamper switches, detection devices in sheds) or IDCs in small connected buildings (≤ 4 conventional zones), install addressable modules inside

the building housing the FACP to connect the exterior devices and zones.

(2) Inside screen rooms or portable structures within a room.

(3) Through signal filters.

(4) Through fire alarm notification appliances.

2. NAC Raceways:

a. Install J-boxes above the vertical conduit routed down to notification devices to simplify the design and construction modifications required when notification appliances are relocated or removed. See details in "NAC Appliance Installation Detail" in Attachment 1.

b. NAC cables with mechanical bells or any other cable with device(s) on the circuit that will interfere with the data on the SLC shall not be installed in the same raceway as the SLC.

J. Prefabricated Office Units Design Criteria

1. Apply the following changes in the fire alarm design criteria to prefabricated office units.

a. Plenum-rated cables will be installed above the ceiling instead of using conduit.

b. Stub conduits from the FACP up into the ceiling space. No wire way or pull box is required above FACP.

c. No auxiliary FACP panel is required to be installed.

2. Smoke Detectors: Install smoke detectors to provide complete coverage protection unless a sprinkler system is installed in the units. With a sprinkler system installed, only the smoke detector in the IDR and by the FACP is required.

1.08 SEQUENCING AND SCHEDULING

A. FPE Submittal Acceptance: Do not proceed with the fire alarm system installation until fire alarm submittals have been accepted by Sandia Fire Protection Engineering.

B. Existing Fire Alarm Equipment: Maintain existing fire alarm equipment in service a long as possible while modifications to the fire alarm system are underway. Label manual pull stations with "NOT IN SERVICE" signs when they are not operative. Post temporary signs ("ATTENTION – In Case of Fire Call 911") at building entryways and all stairwells when the fire alarm system is not operative or impaired in the building. Refer to sample sign (Attachment 6) that can be photocopied to use as notification of fire alarm system impairment.

C. Fire Alarm Impairments: Submit a Fire Protection Impairment Permit (FPIP) (http://www.sandia.gov/engstds/forms.html) whenever an operational fire alarm system requires interruption of the full functionality of the system in order to install/remove fire alarm devices or to perform programming of the FACP.

D. DACT Phone Lines: Contact SCO no later than 14 days prior to final commissioning of new fire alarm systems to request phone line number assignments for the DACT. The FPE will issue the paperwork necessary to obtain telephone service to the DACT.

E. Acceptance Testing: Submit a "Fire Protection Systems – Request for Acceptance Testing" form (http://www.sandia.gov/engstds/forms.html) to the SCO for line item, GPP, and major space renovation projects impacting the fire alarm system. For minor fire alarm modifications, test new/relocated fire alarm devices when removing fire alarm impairment in the presence of SNL fire alarm maintenance personnel.

F. Equipment Removal: Remove existing disconnected fire alarm equipment and restore damaged surfaces. Package and deliver unused functional fire alarm equipment to the SNL Fire Alarm Maintenance Supervisor.

G. Coordination with Frame and Drywall Installation

1. Install FACP enclosure back box semi-flush inside wall and conceal conduits to FACP in wall prior to completing drywall installation. Coordinate framing with the installation of the FACP back box(es).

2. Flush-mount back boxes and J-boxes for annunciators, manual pull stations and notification appliances prior to completing drywall installation.

3. Install fire alarm devices on walls only after walls have been textured and finished.

H. Coordination with Sprinkler System Installation

1. Sprinkler water flow switches and valve tamper switches are installed by the sprinkler Contractor. Addressable modules will be provided by the fire alarm installer to connect these switches to the SLC.

2. Review the accepted fire protection shop drawings prior to installing fire alarm conduit and wiring to sprinkler system initiation devices to ensure all fire protection initiation devices are connected to fire alarm system and that fire alarm monitoring modules are installed in the proper location. Contact the mechanical SCO for location of accepted fire protection shop drawing set.

1.09 MODIFICATION TO EXISTING FIRE ALARM SYSTEMS

A. Submit fire alarm shop drawings depicting fire alarm modifications to FPE for approval.

B. Interruption of Existing Fire Alarm Service: Do not interrupt operational fire alarm systems until the following conditions have been met:

1. Submit a "Fire Protection Impairment Permit" request (http://www.sandia.gov/engstds/forms.html) for approval of the impairment to the fire alarm system.

2. Verify that the fire alarm system notification appliances have been disabled and the FACP put in "No Action" at the fire alarm Proprietary Supervising Station

when connecting new SLC and NAC cables to active circuits to avoid evacuating building occupants and prevent notification of emergency responders.

3. Maintain existing fire alarm system in service during non-standard working hours and over weekends. If unable to do so, notify SCO.

PART 2 -PRODUCTS

2.01 EXISTING FIRE ALARM SYSTEM

A. Compatibility with Existing Equipment: When modifying an existing building fire alarm system, the new components shall operate as an extension of the existing fire alarm system.

2.02 FIRE ALARM CONTROL PANEL

A. Description: Provide an addressable fire alarm control panel with the internal components required for a fully operational fire alarm detection and evacuation system meeting the requirements of NFPA 72.

B. Manufacturer/Model Number:

1. EST QuickStart Model QS4-12-G-1.
    a. Signature Loop Intelligent Controller, SLIC
    b. Dual Line Dialer, DLD
    c. Conventional Zone Card, ZA8-2 (only used when connecting conventional IDCs to QuickStart).
    d. Annunciator Module, Zones 1-30, SL30
2. EST Model EST-3X (use only for installations requiring FACP networking and/or a voice evacuation system).
3. NOTIFIER Model NFS2-640, with SBB-B4 and DR-B4 backbox/door assembly
    a. PD-NCA, 640-character display
    b. PD-2, 80-character display

C. Transmission to fire alarm Proprietary Supervising Station: Provide a DACT inside FACP utilizing Ademco Contact ID communication format to automatically transmit alarm, trouble, and supervisory signals to the SNL fire alarm PSS.

D. AES RF Subscriber Unit: AES IntelliNet RF Subscriber Unit, Model 7788 (cabinet color fire red), radio frequency 422.125 MHz; with IntelliTap Dialer Capture Module, Model 7067.

E. Primary Power: 24 VDC obtained from 120 VAC dedicated 20-amp branch circuit breaker from the nearest power panel. Initiating devices and DACT shall be powered by the 24 VDC source.

F. Secondary Power: 24 VDC supply system with batteries and automatic battery charger and an automatic transfer switch.

1. Batteries: Sealed, valve-regulated, recombinant lead acid

2. Battery and Charger Capacity: The batteries shall be sized to operate the system under the maximum normal load for 24 hours and then be capable of operating the system for 5 minutes in the alarm condition. [**72:**10.5.6.3.1]

G. Auxiliary FACP Enclosure Manufacturer/Model Number:

1. NOTIFIER FACPs: NOTIFIER, Model SBB-A4 and DR-A4B black backbox/door assembly with no window.

2. EST QuickStart FACPs: Hoffman Telephone Cabinet, 18-inch x 18-inch x 4-inch, Cat. # ATC18184S (surface mount) or ATC1884F (flush mount).

H. Voice Evacuation System: Voice evacuation system components shall be an integral part of and UL-listed for use with, the NOTIFIER NFS2-640 or the EST-3X fire alarm control panels.

I. Smoke Removal Controls: Fire alarm installations requiring smoke removal controls shall utilize the following components.

1. EST: Utilize the smoke removal control components that are UL-listed for use with the EST-3X and QuickStart panels.

2. NOTIFIER NFS2-640: Notifier SCS Series Smoke Control Station

J. Emergency Control Function/NAC Disable Switches:

1. EST QuickStart: SL-30 LED/Switch Card

2. Notifier NFS2-640: ACM-24AT Annunicator

K. Miscellaneous FACP Components: Refer to "EST QuickStart FACP Modification Details" (Attachment 3) and "NOTIFIER NFS2-640 FACP Modification Details" (Attachment 2) for specifications of Phoenix Contact circuit breakers, outlets, DIN rails, and switches.

2.03 MANUAL FIRE ALARM PULL STATIONS

A. Manufacturer/Model Number:

1. EST, Model SIGA-278, double action addressable fire alarm station.

2. NOTIFIER, Model NBG-12LX, dual-action addressable pull station.

3. Refer to Part 2.07 "Conventional Initiation Devices" for conventional pull station specifications.

B. Surface Mounting Boxes: If surface mounting of pull station is required, provide the following box:

1. EST, Model 276B-RSB, red surface mount box for SIGA-278 series pull station.

2. NOTIFIER, Model SB-10, surface back box for NBG-12LX pull station.

2.04 SMOKE DETECTORS

A. Photoelectric Smoke Detectors:

1. Manufacturer/Model Number:

a. EST, Model SIGA-PS, addressable, mounted on standard detector base SIGA-SB4.

b. NOTIFIER, Model FSP-851, addressable, mounted on standard detector base B710LP.

c. Refer to Part 2.07, *Conventional Initiation Devices* for conventional smoke detector specifications.

2. Detector Isolator Bases: Where required on drawings, provide the following detector isolator base:

a. EST, Model SIGA-IB4.

b. NOTIFIER, Model B224BI.

B. Duct Smoke Detectors:

1. Manufacturer/Model Number:

a. EST, Signature Series SuperDuct, Model SD.

b. NOTIFIER, Intelligent InnovairFlex Duct Smoke Detector Housing Model DNR with FSP-851 photoelectric smoke detector.

c. Refer to Part 2.07 "Conventional Initiation Devices" for conventional duct smoke detector specifications.

2. Weatherproof Duct Housing Enclosure: UL listed for use with the supplied detector for use in exterior locations.

a. EST, Model SD-GSK cover gasket kit for the Model SD SuperDuct duct detector.

b. Notifier, Model DNRW watertight, UV resistant enclosure.

3. Remote Test Station:

a. EST, Model SD-TRK, remote test station, keyed.

b. NOTIFIER, Model RTS151KEY with key reset switch.

4. Sampling Tubes: Design and dimensions as recommended by manufacturer for the specific duct size, air velocity, and installation conditions where applied.

2.05 HEAT DETECTORS

A. Heat Detector, Combination Type: Actuated by either a fixed temperature of 135ºF or rate-of-rise of temperature that exceeds 15ºF per minute, unless otherwise indicated.

1. EST, Model SIGA-HRS, mounted on standard detector base SIGA-SB4.

2. NOTIFIER, Model FST-851R, mounted on standard detector base B710LP.
3. Refer to Part 2.07 “Conventional Initiation Devices” for conventional heat detector specifications.

B. Heat Detector, 135ºF Fixed-Temperature Type: Actuated by temperature that exceeds a fixed temperature of 135ºF, unless otherwise indicated.

1. EST, Model SIGA-HFS, mounted on standard detector base SIGA-SB4.
2. NOTIFIER, Model FST-851, mounted on standard detector base B710LP.

C. Heat Detector, High Temperature Fixed-Temperature Type: Actuated by temperature that exceeds a high fixed temperature as indicated.

1. NOTIFIER, Model FST-851H, 190ºF, mounted on standard detector base B710LP.

D. Continuous Linear Heat-Detector System: Consists of detector cable and control unit manufactured by Protectowire®.

1. Detector Cable: Rated detection temperature 155ºF, unless otherwise indicated. Listed for "regular" service and a standard environment. Cable includes two steel actuator wires twisted together with spring pressure, wrapped with protective tape, and finished with PVC outer sheath. Each actuator wire is insulated with heat-sensitive material that reacts with heat to allow the cable twist pressure to short circuit wires at the location of elevated temperature.
2. Addressable Module: Provide FACP manufacturers standard addressable module to communicate detector status (normal, alarm, or trouble) to the FACP.

2.06 ADDRESSABLE MODULES

A. Description: Addressable modules shall be compatible and UL-listed for use with the FACP.

B. Monitor Modules:

1. EST
   a. SIGA-CT1, single input monitor module
   b. SIGA-CT2, dual input monitor module
   c. SIGA-UIO6, universal input/output module motherboard, 6 position; with SIGA-MAB universal Class A/B plug-in modules
2. NOTIFIER
   a. FMM-1, single input monitor module
   b. FMM-101, addressable mini-module
   c. XP10-M, ten-input monitor module

C. Control Modules:

1. EST, SIGA-CR, control relay module, contact rating 2A @24 VDC

2. NOTIFIER
    a. FRM-1, relay module
    b. XP6-R, six-relay control module

D. Signal Modules:
1. EST, SIGA-CC1, signal module
2. NOTIFIER, FCM-1, control module

E. Fault Isolator Modules:
1. EST, SIGA-IM, SLC isolator module
2. NOTIFIER, ISO-X, SLC isolator module

2.07 CONVENTIONAL INITIATION DEVICES

A. Manual Pull Station: EST Model 278B-1320 double action, key reset, double pole.

B. Smoke Detector: EST EC30U-3, conventional low-profile plug-in photoelectric smoke detector mounted on CSBU-1 standard detector base.

C. Duct Smoke Detector:
1. System Sensor®, Model D4120, 4-wire photoelectric duct smoke detector
2. System Sensor, Model D4120W, watertight 4-wire photoelectric duct smoke detector (use in exterior locations)
3. System Sensor, Model RTS151KEY, Remote Test Station with key lock.

D. Heat Detector:
1. Fixed Temperature 135F / rate-of-rise 15F: EST Model 281B-PL
2. Fixed Temperature 194F / rate-of-rise 15F: EST Model 282B-PL
3. Fixed Temperature 194F: EST Model 284B-PL

E. Flame Detector: Provide the FACP manufactures recommended UV/IR detector, or as indicated on drawings.

F. Beam Smoke Detector:
1. System Sensor, Model BEAM1224S, 4-wire 24 VDC conventional beam detector with 8-inch reflector and integral sensitivity test
2. System Sensor, RTS451KEY, Remote Test Station for testing beam detector.

2.08 NOTIFICATION APPLIANCES

A. Multitone Horn
1. Wheelock MT-12/24 multitone horn, 24 VDC

B. Multitone Horn Strobe
1. Wheelock MT-24MCW-FR multitone strobe, 24 VDC, multi-candela strobe

C. Strobe

1. Wheelock RSS-241575W-FR strobe, 24 VDC, 15/75 candela, wall mount
2. Wheelock RSS-24MCW-FR multi-candela strobe, 24 VDC, wall mount.
3. Wheelock RSS-24MCC-FW multi-candela strobe, 24 VDC, ceiling mount.
4. System Sensor SpectrAlert Advance, Model SRHK-R, multi-candela strobe, 24 VDC, weatherproof and outdoor-listed.

D. Surface Mounting Boxes: If surface mounting of NAC appliances is required, provide the following box:

1. Wheelock SHBB surface mount back box for Wheelock RSS series strobes.
2. Wheelock IOB-R surface mount back box for Wheelock MT series multitone appliances.

E. Synchronizing Module: Cooper Notification Wheelock DSM-12/24-R

F. Speaker/Strobes: Speaker notification appliances shall be System Sensor SpectrAlert Advance Model SPSR wall speaker/multi-candela setting strobe appliances.

G. Speakers: Indoor wall-mounted speakers shall be System Sensor SpectrAlert Advance Model SPR.

H. Backboxes: Mount Cooper Wheelock indoor audible/visual notification appliances on a Randl Industries, Inc. (www.randl-inc.com) 5 Square® Box, Model R-55015, for new notification appliance installations.

2.09 NOTIFICATION APPLIANCE POWER SUPPLY PANELS

A. NAC Power Supply: Cooper Wheelock PowerPath PS-8 power limited 8-ampere power supply/charger with batteries to provide a secondary backup power supply.

B. Batteries: Power-Sonic PS-12120 (or equal) 12 VDC, 7AH sealed lead-acid batteries (two required).

2.10 ALARM TERMINAL CABINET

A. Fire Alarm Terminal Cabinet: Hoffman® telephone cabinet, 18-inch x 18-inch x 4-inch, Catalog # ATC18184S (surface mount) or ATC1884F (flush mount).

2.11 MAGNETIC DOOR HOLDERS

A. Manufacturer/Model Number:

1. EST
   a. 1501-N5; single door holder, floor mounted, 120 VAC
   b. 1502-N5; double door holder, floor mounted, 120 VAC
   c. 1508-N5; single door holder, wall mounted, 120 VAC
2. NOTIFIER
   a. FM980-120; single door holder, floor mounted, 120 VAC
   b. FM996-120; single door holder, surface wall mounted, 120 VAC

c. FM998-120; single door holder, flush wall mounted, 120 VAC

2.12 REMOTE ANNUNCIATOR

A. Description: Duplicate annunciator functions of the FACP for alarm, supervisory, and trouble indications. Also duplicate manual switching functions of the FACP, including acknowledging, silencing, resetting, and testing.

B. Manufacturer/Model Number:

1. EST, Model QS4-CPU-1.

2. NOTIFIER, Model LCD-80TM, 80 character terminal mode.

C. Flush-Mounted Boxes: If flush mounting of annunciator is required, provide the following box:

1. EST, Model QSA-1-F, flush remote annunciator cabinet with space for one SL30 display.

2. NOTIFIER, Model ABF-1D, semi-flush mount backbox for one LCD-80TM annunciator.

D. Surface-Mounting Boxes: If surface mounting of annunciator is required, provide the following box:

1. EST, Model QSA-1-S, surface remote annunciator cabinet with space for one SL30 display.

2. NOTIFIER, Model ABS-1T, deep surface-mount box for one LCD-80TM annunciator.

2.13 SURGE PROTECTION

A. NAC Cables: Edco FAS-1-033HC 24V single pair surge suppressor

B. SLC / IDC Cables: EDCO FAS-2-033HC 24V two pair surge suppressor

2.14 WIRE AND CABLE

A. Wire and cable for fire alarm systems shall be UL listed and labeled as complying with NFPA 70, Article 760.

B Signaling Line Circuits:

1. Non-plenum Cable: SLC cables installed in conduit from FACP to and between addressable devices/modules shall be 2 twisted #16 American wire guage (AWG) solid copper, unshielded, NEC Type FPLR, conductors color-coded red and black, blue jacket, West Penn #990 or equivalent. Use #14 AWG SLC cable where required due to length of circuit.

2. Plenum Cable: SLC cables installed above ceiling without conduit from FACP to and between addressable devices/modules shall be 2 twisted #16 AWG solid copper, unshielded, NEC Type FPLP, conductors color-coded red and black, West Penn #60991B or equivalent.

C. Initiation Device Circuits:

1. IDC wiring from addressable modules to conventional zones and conventional initiation devices shall be 2 twisted #14 AWG solid copper, unshielded, NEC Type FPLR, conductors color-coded red and black, red jacket, West Penn #994 or equivalent.
2. IDC wiring installed in underground raceways shall be 2 twisted #14 AWG solid copper, unshielded, NEC Type FPL, conductors color-coded red and black, black jacket, West Penn #AQ226 or equivalent.

D. Notification Appliance Circuits:

1. Non-Plenum Cable: NAC cables installed in conduit shall be 2 twisted #14 AWG solid copper, unshielded, NEC Type FPLR, conductors color-coded red and black, red jacket, West Penn #994 or equivalent.
2. Plenum Cable: NAC cables installed above ceiling without conduit shall be 2 twisted #14 AWG solid copper, unshielded, NEC Type FPLP, conductors color-coded red and black, West Penn #60993B or equivalent.

E. DACT Telephone Circuit: 8-conductor CAT5 telephone cable. Cable installed above ceiling without conduit shall be plenum-rated.

F. Control Circuits: Control circuits shall be #12 AWG THWN solid copper, color-coded red and black.

G. AC Power Circuits: 120 VAC circuits shall be #12 AWG THWN solid copper.

1. Prefabricated Buildings: Type AC (BX) cable, with ground wire

H. Annunciator Circuits: Wiring from FACP to annunciator panels shall be the FACP manufacturers recommended cabling.

I. FACP Network Circuits: Wiring between multiple networked FACPs shall be the FACP manufacturers recommended cabling.

J. Cable Fasteners: B-Line® #BX6 flexible conduit/cable to stud fastener

PART 3 -EXECUTION

3.01 GENERAL REQUIREMENTS

A. Do not proceed with any fire alarm system installation or modifications work without drawings accepted by SNL Fire Protection Engineering.

B. For new fire alarm system installations, the Fire Alarm System Installer shall:

1. Furnish and install all fire alarm equipment and FACP components.
2. Install SLC, IDC, and NAC cables or assign task to the Electrical Contractor.
3. Perform all programming, tests, and commissioning required for a fully functional fire alarm system.
4. Label all fire alarm panels, NAC power supplies, initiating devices, modules, and NAC appliances.

5. During the acceptance test, demonstrate in the presence of SNL maintenance and the SCO that each input device/module operates and activates the output NACs and emergency control function systems per the design basis of the fire alarm system.

C. For new fire alarm system installations, the Electrical Contractor shall furnish and install the following:

1. All required raceways, j-boxes, initiating and notification device mounting boxes, and all associated hardware per the requirements on the shop drawings. Refer to Section 16001 "Electrical Work" for further requirements for raceway installations.

2. Install and terminate 120 VAC circuits.

3. Mount the fire alarm control panel, auxiliary FACP, NAC power supplies, and fire alarm terminal cabinets.

D. Install initiation devices and notification appliances at the elevations and locations specified on the shop drawings and as required per NFPA 72 and the manufacturers' requirements. Initiating devices shall be located where they are accessible for maintenance and testing. [**72**:17.4.2]

E. Firestopping: Firestopping shall be provided where conduit penetrates rated firewalls and all floors per the requirements in Section 07270.

F. Fire Alarm Keys: At the time of installation, remove all keys from the pull stations, fire alarm control panels, and NAC power supplies to prevent unauthorized use of keys. Deliver keys to SNL fire alarm maintenance.

3.02 EQUIPMENT INSTALLATION

A. Fire Alarm Control Panel (FACP):

1. Primary power, 120 VAC, for the panel shall be from a 20 amp dedicated branch circuit at the nearest power panel. The electrical breaker of the branch circuit shall be identified by a red paint dot and label "FA" adjacent to each breaker. [**72**:10.5.5.2]

2. Install ½-inch EMT from the FACP to the IDR room with telephone premises cable for DACT communication to the Sandia fire alarm PSS. The DACT communications cable can be routed in SLC raceway. Do not install DACT communications cable in same raceway or cable bundle as telecommunication cables.

3. Location: Mount the FACP at a location near the building entrance, or where indicated on drawings, that is readily visible to emergency responders. Install the FACP in space that is air-conditioned to prevent extremes in high and low temperatures. Avoid installing the FACP in locations exposed directly to sunlight where high ambient temperatures are possible.

4. Mounting Height: Semi-flush mount FACP, unless indicated otherwise on drawings, with top of cabinet not more than 72 inches above the finished floor. Surface-mount FACP on masonry and brick surfaces.

5. Install a pull box or wireway in the ceiling above the FACP in a concealed accessible location to minimize conduit penetrations into the FACP enclosure. Refer to"FACP Installation Details" (Attachment 1) for details.
6. Install NAC synchronizing modules, surge protection, and other serviceable equipment in an auxiliary FACP enclosure located above the FACP. Do not install serviceable equipment above the ceiling.
7. Install NOTIFIER PD-NCA display in NOTIFIER NFS2-640 FACP for buildings greater than 40,000 ft^2 or the main FACP in a networked system. Install a PD-2 display in buildings less than 40,000 ft^2.
8. Emergency Control Function/NAC Disable Switches: Install and program Emergency Control Function components in FACP to perform the following functions:
    a. Disable all NAC outputs, including NAC power supply outputs.
    b. Disable all HVAC controls that are activated when initiating devices are activated.
    c. Disable all elevator recall and shunt trip controls.
    d. Disable all power shunt trip outputs.
    e. Disable all door release relays.
    f. Manual activation of smoke removal system.

B. Manual Fire Alarm Pull Stations:
1. Install pull station semiflush in recessed back box unless otherwise indicated.
2. Mount manual pull station 4 feet above the finished floor in highly visible accessible locations on exit egress routes. Install pull station on the latch side of egress door within 5 feet of the door. [**72**:17.14]

C. Heat Detectors:
1. Location and Spacing: Locate and space heat detectors per the requirements in NFPA 72, Section 17.6.3.
2. Elevator Shutdown: Locate and space heat detectors per the requirements in NFPA 72, Section 21.4 for elevator shutdown emergency control functions.
3. Location Restrictions:
    a. Install heat detectors no closer than 3 feet to any part of any heat generating device in mechanical rooms such as flues, boilers, water heaters.
    b. Install heat detectors no closer than 12 inches to any part of any light fixture.

D. Smoke Detectors:
1. Location and Spacing: Locate and space spot-type smoke detectors per the requirements in NFPA 72, Section 17.7.3.2.

2. Raised Floors and Suspended Ceilings: Locate and space spot-type smoke detectors in raised floors and above suspended ceilings per the requirements in NFPA 72, Section 17.7.3.5.
3. Location Restrictions: No smoke detector shall be located closer than 3 feet to any air register or diffuser. [**72**:A.17.7.4.1, 17.7.6.3.2]
4. Beam-Type Smoke Detectors: Locate and space beam-type smoke detectors per the requirements in NFPA 72, Section 17.7.3.7.
5. Elevator Recall: Locate and space spot-type smoke detectors per the requirements in NFPA 72, Section 21.3 for elevator recall emergency control functions.
6. Door Release: Locate and install spot-type smoke detectors per the requirements in NFPA 72, Sections 17.7.5.6 and 21.8 for door release service.
7. Do not install smoke detectors until after cleanup of all construction trades is complete and final. Do not remove dust covers provided with detector until the time of the final acceptance testing of the fire alarm system. [**72**:17.7.1.11]

E. Duct Smoke Detectors:

1. Locate and install duct smoke detector per requirements in NFPA 72, Section 17.7.5.5 and NFPA 90A requirements. Install sampling tubes so they extend the full width of the duct with sampling holes facing into the air flow. Do not install duct smoke detector on top of duct.
2. Install duct smoke detector, duct housing and sampling tube in strict conformance with the manufacturer's installation instructions.
3. Install duct smoke detector housing in duct where it can be accessed for maintenance of smoke detector. For duct smoke detectors installed above a solid ceiling, provide an access door (minimum 24-inch x 24-inch) in close proximity to the components of the detector that require maintenance access. [**72**:17.4.4]
4. Provide a weatherproof enclosure to contain duct detectors installed in outdoor locations (unless the detector is rated for exterior installation).

F. Remote Test Station:

1. Install Remote Test Station (RTS) for each intelligent and conventional duct smoke detector installed.
2. Locate and group the RTSs in the nearest equipment room or electrical closet if duct detector is located nearby. For duct smoke detectors located in areas remote from an equipment room, install the RTS immediate below the duct detector in an accessible location. [**72**:17.4.8]
3. Mount the RTS at 48 inches AFF, measured from center of device, unless noted otherwise on shop drawings.
4. Label each RTS with the duct smoke detector address label and the air handling unit identifier the duct smoke detector it shuts down. [**72**:17.4.9]

G. Addressable Modules:

1. Do not install addressable modules above the ceiling or in inaccessible locations. Monitor and relay modules connected to components above a ceiling shall be mounted to wall a minimum of 12 inches below the ceiling.

2. Install individual relay modules within 3 feet of the equipment that is controlling the activation/shutdown of an Emergency Control Function. [**72**:21.2.4]

H. FATC: Surface mount, with top of enclosure not more than 72 inches above the finished floor.

I. Notification Appliances:

1. Locations: Install multitone horn appliances at locations shown on shop drawings.

2. Mounting Heights: Surface-mount notification strobe appliances on the wall between 80 and 96 inches above finished floor, and not less than of 6 inches below the ceiling. In computer rooms, high/low bays, and labs, install notification appliance at maximum height of 96 inches to prevent blockage by cabinets and equipment. [**72**:18.5.4.1]

3. Settings: Set multitone horn dipswitches for the bell tone and the decibel level at "STANDARD" setting (SW1=0) in office and assembly areas. Set decibel setting at "HI" (SW1=1) in all other locations. Factory default setting is at HIGH dBA Horn Tone.

Multitone Horn Settings	SW1	SW2	SW3	SW4
High dBA - Bell Tone	1	1	0	1
Standard dBA - Bell Tone	0	1	0	1

4. Replace factory installed 18 AWG jumpers on Wheelock horn/strobe appliances with #14 AWG jumpers with same insulation color code (red, black) to match

J. NAC Power Supply:

1. Mounting Height: Surface mount with top of power supply not more than 72 inches above the finished floor.

2. Settings:

   a. 24 VDC output.

   b. Steady output.

   c. IN>OUT SYNC Mode, or WHEELOCK SYNC Mode.

3. AC/DC Power Disconnect Switches:

   a. Install toggle switch inside the power supply where the 120 VAC enters panel to allow the incoming AC power to be disconnected. Install guard over 120 VAC termination points.

b. Install toggle switch to permit the battery DC power to be disconnected.

K. Annunciator:

1. Install annunciator semi flush in recessed back box unless otherwise indicated.

2. Mounting: Install with top of annunciator not more than 60 inches above the finished floor.

3.03 CONDUIT AND RACEWAYS

A. Conduit and raceways shall be installed in accordance with the National Electric Code (NEC) and Division 16, Section 16001 “Electrical Work.”

B. Conduits shall not enter the FACP, or any other remotely mounted annunciator or NAC power supply, except where permitted by the equipment manufacturer.

C. Install bushings on conduits 1-inch or larger when connected to a fire alarm panel.

D. Conduits used for fire alarm circuits, and equipment control wiring associated with the fire alarm system, may not contain any other wire or cable.

E. Paint fire alarm system junction box covers red.

F. Seal conduit exiting the building to prevent moisture from entering the building due to the weather or condensation.

G. SLC Conduits: Conduits for the Signaling Line Circuit (SLC) cables shall be installed as a Class A circuit per the requirements in NFPA72, Section 23.4.2.2.

H. NAC Conduits: Install a J-box in ceiling above the vertical conduit routed down to each notification appliance (see “NAC Appliance Installation Detail” in Attachment 1) to minimize design and construction modifications required when notification appliances are relocated or removed.

3.04 WIRING INSTALLATION

A. Wiring Method:

1. Install wiring in metal raceway according to Division 16 Section 16001 "Electrical Work."

2. Fire alarm circuits and equipment control wiring associated with the fire alarm system shall be installed in dedicated raceway. Fire alarm system raceway shall not be used for any non fire alarm wire or cable.

3. Terminations: All field wiring shall terminate on terminal blocks in FACP, fire alarm terminal cabinets, and at field devices and appliances. Splices are not permitted in field wiring except as specifically allowed. Connections using wire nuts are not permitted.

4. Signaling Line Circuits: SLC and IDC conductors shall not be smaller than 16 AWG. Power-limited fire alarm cables may be installed in the same cable or raceway as signaling line circuits.

5. Notification Appliance Circuits: NAC conductors shall not be smaller than 14 AWG.

B. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with minimal excess. For NAC cables, peel the jacket back 8 inches from the termination point to permit taking load readings. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

C. Cable Taps: Cable taps (T-taps) are not permitted on the SLC and NAC circuits.

D. Color-Coding:

1. Signaling Line Circuit (SLC): Red (+), Black (-), blue jacketed cable
2. Initiating Device Circuit (IDC): Red (+), Black (-), red jacketed cable
3. Notification Appliance Circuit (NAC): Red (+), Black (-), red jacketed cable
4. Control Circuit: Red (+), Black (-)
5. 120 VAC: Hot (Phase A – Black, Phase B – Red, Phase C – Blue), Neutral – White, and Ground – Green.

E. Notification Appliances:

1. Synchronize strobes per the requirements in NFPA 72 Section 18.4 and the manufacturer's requirements.
2. Adjust the strobe candela setting per the setting designated on the shop drawings and per the requirements in NFPA 72, Table 18.5.4.3.1(a) and Table 18.5.4.3.1(b).

3.05 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals according to Division 16, Section 16001, "Electrical Work."

B. Identify dedicated fire alarm circuit breakers with a red paint dot and label "FA". [**72**:10.5.5.2]

C. Install nameplates on outside door of Fire Alarm Terminal Cabinets and Notification Appliance Power Supply Panels in accordance with Standard Drawing E-0006STD.

D. EST QuickStart SLC Cable: At each termination point, label the SLC cable jacket "IN" and "OUT" to identify the SLC wiring data inputs/outputs.

E. IDC Cable: For conventional fire alarm systems, at each termination point label the card and point number on the cable jacket (e.g., 1-002).

F. NAC Cable: At each termination point, label the NAC circuit number on the cable jacket (e.g., NAC1, PS-1-2).

G. Network Cable: At each network and audio riser cable termination point, label the termination point on the other end of the cable. Labels identifiers shall match the labels on the network wiring diagram.

H. Initiating/NAC Devices:

1. Label the module/detector address (e.g., M126, D002) on each device, including water flow detection and tamper switches. For conventional fire alarm systems, label the card number/zone number on each device (e.g., 1-001, 2-004).
2. Identify heat detectors with Arial font, minimum size 18 label marked "HEAT" to distinguish detector from a smoke detector.
3. Labels shall be Arial font, minimum size 18, black letters on a white background.
4. For each device, place label(s) on a smooth surface in a location readily visible to identify the device.
5. Locate labels on NAC appliances on bottom left lip of appliance on smooth surface.
6. Label the last notification appliance on each NAC that has an end-of-line resistor with a label marked "EOLR".

I. Paint J-box and pull box covers red to identify as fire alarm equipment. Label the covers of enclosures containing exposed 120 VAC terminations "120 VAC INSIDE".

J. Conduit Labeling:

1. Brown ¾-inch tape (Scotch® #351) at each joint and termination for conduits containing initiating and notification circuits.
2. Install white ¾-inch tape (Scotch #351) adjacent to brown tape to identify communication conduit from DGP to IDR.
3. Install blue ¾-inch (Scotch #351) adjacent to brown tape for conduits containing fire alarm control circuits.
4. Do not install tape on fire alarm conduit surface-mounted in finished areas below the ceiling.

3.06 GROUNDING

A. Ground the FACP and associated circuits; comply with IEEE 1100. Provide grounding for the FACP and NAC power supplies as required by NFPA 70 and the manufacturer's recommendations.

3.07 PREFABRICATED OFFICE UNITS DESIGN/INSTALLATION

A. Fire Alarm Control Panel

1. Location: Install the FACP at the main entrance to the office units
2. AC Power: Provide a dedicated 120 VAC, 20-amp branch circuit from the nearest power panel for FACP power. Use BX cable for the circuit wiring.
3. Telecommunications: Provide a plenum-rated CAT5 telephone cable (8-conductor) from the FACP to the IDR for the DACT primary and secondary phone numbers.
4. Provide 120 VAC Surge Protection, circuit breaker, and utility outlet; and 24 VDC battery and NAC circuit disconnect switches in the fire alarm control panel per the details in "NOTIFIER NFS2-640 FACP Modification Details" (Attachment 2) and "EST QuickStart FACP Modification Details" (Attachment 3).

B. Manual Pull Stations: Install pull stations on surface-mounted back boxes 4 feet above finished floor in highly visible locations on exit egress routes. Install pull station on the latch side of egress door immediately adjacent to the door. [**72**:17.14]

C. Photoelectric Smoke Detectors: Install smoke detectors to provide complete coverage protection in the office complex units when there is no automatic sprinkler system installed. Install smoke detectors in locations and at the spacing listed in NFPA 72 and per the manufacturer's recommendations. If a sprinkler system is installed throughout the office complex units, install smoke detectors only in the IDR and in the immediate vicinity of the FACP.

D. Heat Detectors: Install heat detectors in rest rooms and other locations where the installation of smoke detectors is inappropriate due to the potential for nuisance alarms. Install heat detectors at the spacing listed in NFPA 72 and per the manufacturer's recommendations. If a sprinkler system is installed throughout the office units, do not install heat detectors.

E. Automatic Sprinkler System Initiating Devices: Provide individual monitor modules for each water flow, pressure switch, or tamper supervisory switch installed on the automatic sprinkler protection system. Coordinate location of monitor modules with the contractor installing the automatic sprinkler system.

F. Notification Appliances

1. Multitone Horns: Provide audible notification appliances throughout the building as required to achieve the decibel levels required by NFPA 72, Section 18.4.
2. Strobes: Provide visual notification appliances in all common areas (e.g., restrooms, conference rooms, break areas, corridors, hallways, and open areas with calculated occupant loads of 10 or more occupants.
3. Emergency Responder Appliance: At the main entrance(s) to the building, provide a weatherproof outdoor-listed strobe on the exterior wall of the building

that is readily visible to emergency responders for indicating when the building fire alarm system is in an ALARM condition.

G. Raceway and Wiring

1. Install 1-inch EMT from the FACP to 4 inches above the drop-in ceiling for installation of the SLC, and NAC, and telephone plenum-rated cables into the ceiling space.
2. Install 1-inch EMT from the FACP to 4 inches above the drop-in ceiling for installation of Type AC (BX) cabling to the power panel and the FACP grounding conductor.
3. Securely install mounting boxes for the mounting of pull stations, smoke detectors, heat detectors, multitone horns, and strobes. Install surface-mounted ½-inch EMT below the ceiling to protect the plenum-rated wiring to the manual pull stations and audio/visual appliances. Paint the raceway to match the wall-mounting surface.

3.08 PROGRAMMING

A. EST QuickStart:

1. Program each SLC and IDC detector/module to report its respective alarm and trouble signal to the SNL fire alarm Proprietary Supervising Station per the requirements in NFPA 72.
2. Refer to the "EST QuickStart Configuration Utility Programming Guidelines" (Attachment 4) for programming guidelines.
3. Install an SL-30 LED/Switch Card in QuickStart programmed to disable NACs, HVAC controls, elevator controls, power shunt trips, and door release control. Where smoke removal systems are installed, provide a means to manually activate the smoke removal system. Refer to "EST QuickStart SL-30 Annunciator Panel Programming Instructions" (Attachment 5) for further details.
4. Configure all sprinkler tamper switches as non-latching in the program.
5. For new FACP installations, use the current Operating System software for the QuickStart.

B. NOTIFIER NFS2-640:

1. Program each SLC detector/module to report its respective alarm and trouble signal to the SNL fire alarm Proprietary Supervising Station per the requirements in NFPA 72.
2. Install an ACM-24AT Annunicator programmed to disable NACs, HVAC controls, elevator controls, power shunt trips, and door release control. Where smoke removal systems are installed, provide a means to manually activate the smoke removal system.
3. Configure all sprinkler tamper switches as non-latching in the program.

4. For new FACP installations, use the current Operating System software for the NFS2-640.

5. Do not program a delay in the UDACT transmission time for AC power failures.

C. Software Modifications:

1. Prior to modifying the site-specific fire alarm panel programming, obtain the most current program revision from the FPE or upload the program from the fire alarm control panel. Save the program provided by the FPE or uploaded from the FACP and save as new program file and rename the modified program with the date program revisions are made.

2. Submit a "Fire Protection Impairment Permit" form (http://www.sandia.gov/engstds/forms.html) prior to uploading or downloading software into an operational fire alarm control panel.

3.09 ACCEPTANCE TESTING

A. Pre-Acceptance Test: The Fire Alarm System Installer shall perform the following field tests and inspections prior to requesting Acceptance Testing:

1. Perform each electrical test, and visual and mechanical inspections listed in NFPA 72, Chapter 14. Certify compliance with test parameters.

2. Visual Inspection: Conduct a visual inspection before any testing. Use as-build drawings and system documentation for the inspection. Identify improperly located, damaged, or nonfunctional equipment, and correct before beginning tests.

3. Testing: Follow procedure and record results complying with requirements in NFPA 72, Section 14.4.1.

a. Detectors that are outside their marked sensitivity range shall be replaced.

4. Complete "Fire Protection Systems – Request for Acceptance Testing" form (http://www.sandia.gov/engstds/forms.html) upon completion of the Pre-Acceptance Tests.

5. Decibel Tests: Perform the following activities during decibel level tests for multitone horn appliances.

a. Activate NACs and note decibel levels at locations where measured on the as-build shop drawings.

b. Adjust the multitone horn dipswitch "STANDARD" and "HI" settings as required to obtain the NFPA 72, Section 18.4 minimum requirement of 15 dBA above ambient.

c. For locations that are excessively loud, set the dipswitch setting to "STANDARD" and remeasure the dBA levels. If the dBA levels are still excessively loud, document on the as-build shop drawings the multitone horn appliance that exceeds the required dBA levels. At the conclusion of the dBA tests, submit to the SNL FPE a copy of the shop drawing as-build

drawings that indicate locations where excessively high dBA levels were measured.

d. For locations that do not comply with the NFPA 72 requirements for 15 dBA above the ambient dBA, the Fire Alarm Installer shall note the deficient area(s) on the as-build shop drawing floor plans and submit a copy of the shop drawings to the SNL FPE for review.

B. Acceptance Testing

1. Conduct a Pre-acceptance Test Meeting attended by the designated Fire Protection Engineer, Fire Protection Maintenance personnel, Construction Manager, Construction Inspector, and fire alarm contractor to review the specification and acceptance test objectives and checklists.
2. The fire alarm installer shall demonstrate, in the presence of SNL maintenance and the SCO, that each input device/module operates and activates the output NACs and emergency control function systems per the design basis of the fire alarm system.
3. Complete the Record of Completion shown in NFPA 72 Chapter 10 and get acceptance signature from the AHJ.
4. Conduct a Post-acceptance Test Meeting attended by the designated Fire Protection Engineer, Fire Protection Maintenance personnel, Construction Manager, Construction Inspector, and fire alarm contractor to review the deficiencies identified during the acceptance test and identify the action items required to resolve the deficiencies.

3.10 CLEANING

A. Cleaning: Remove paint splatters and other spots, dirt, and debris from fire alarm equipment. Touch up scratches and marred finishes to match original finish.

B. Clean the interior of FACP and other fire alarm system enclosures.

3.11 WARRANTY

A. All equipment, materials and installation shall be warranted by the Contractor/Manufacturer during construction and the manufacturer's warranty after the final acceptance testing of the fire alarm system installation as recorded on the Record of Completion.

PART 4 -ATTACHMENTS

4.01 Attachment 1 – FACP and NAC Appliance Installation Details

4.02 Attachment 2 – NOTIFIER NFS2-640 FACP Modification Details

4.03 Attachment 3 – EST QuickStart FACP Modification Details

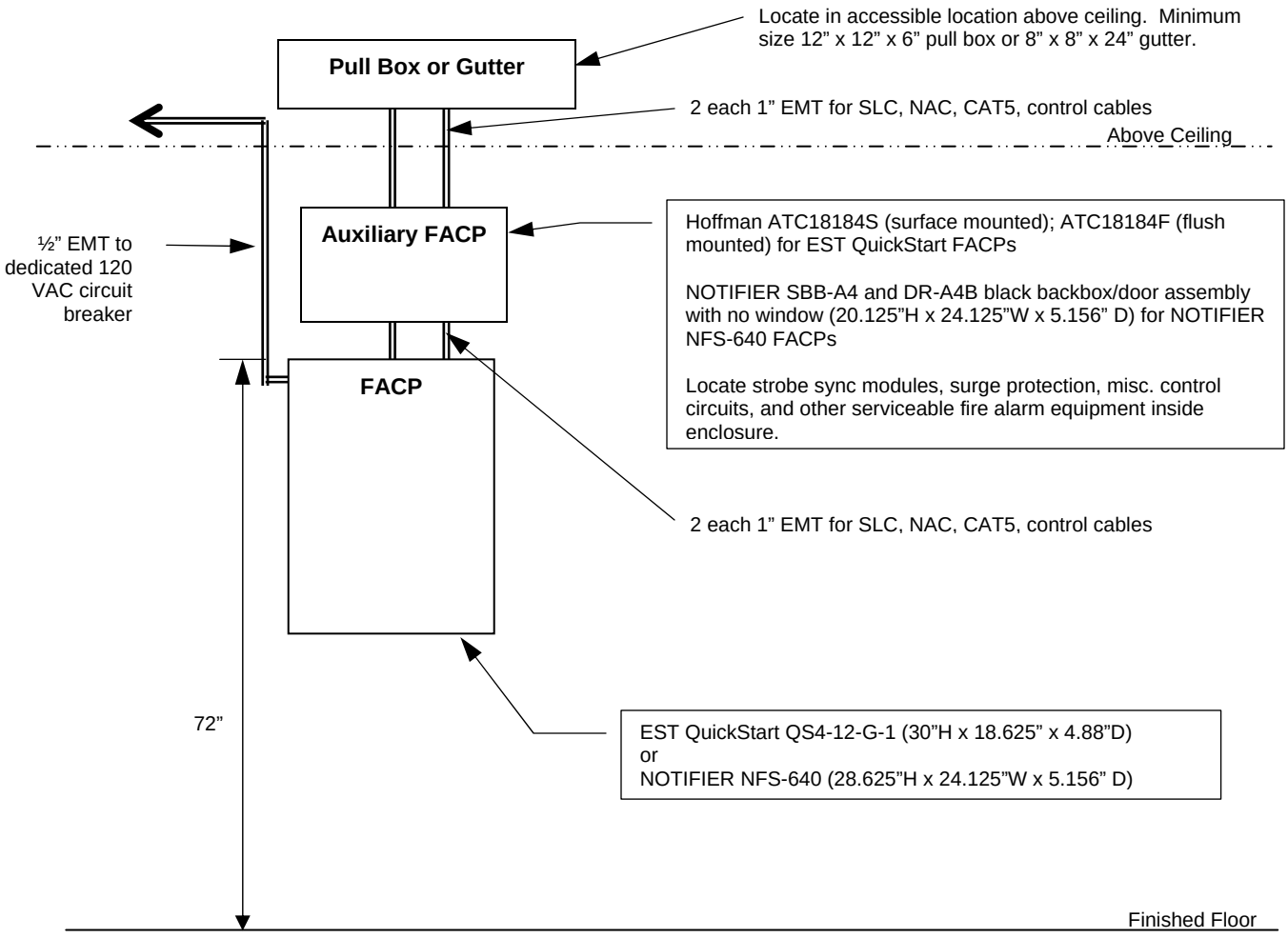
4.04 Attachment 4 – EST QuickStart Configuration Utility Programming Guidelines

4.05 Attachment 5 – EST QuickStart SL-30 Annunciator Panel Programming Instructions

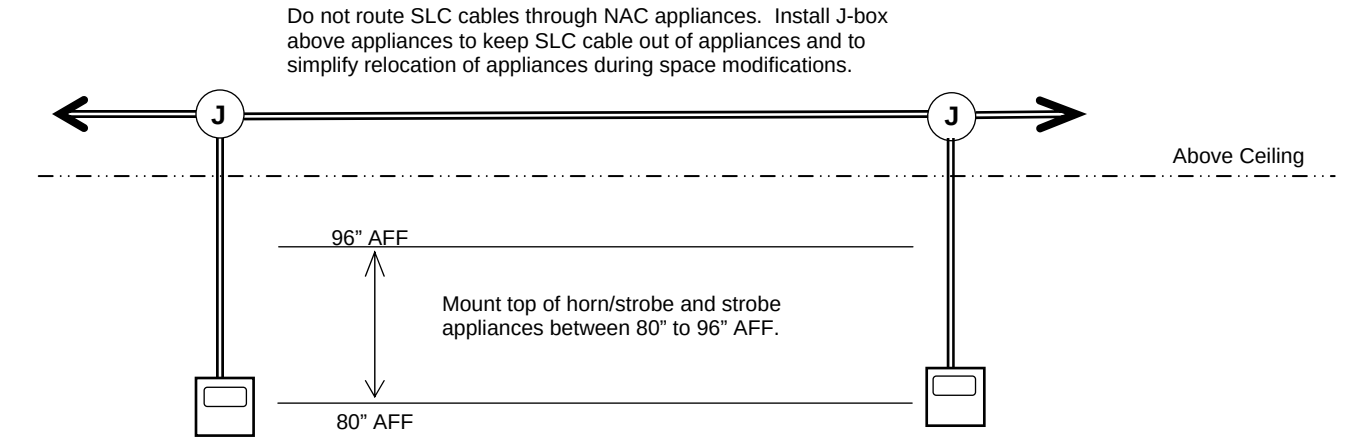
4.06 Attachment 6 – Signage for Fire Alarm Impairment

END OF SECTION 13852

ATTACHMENT 1
FACP and NAC Appliance Installation Details

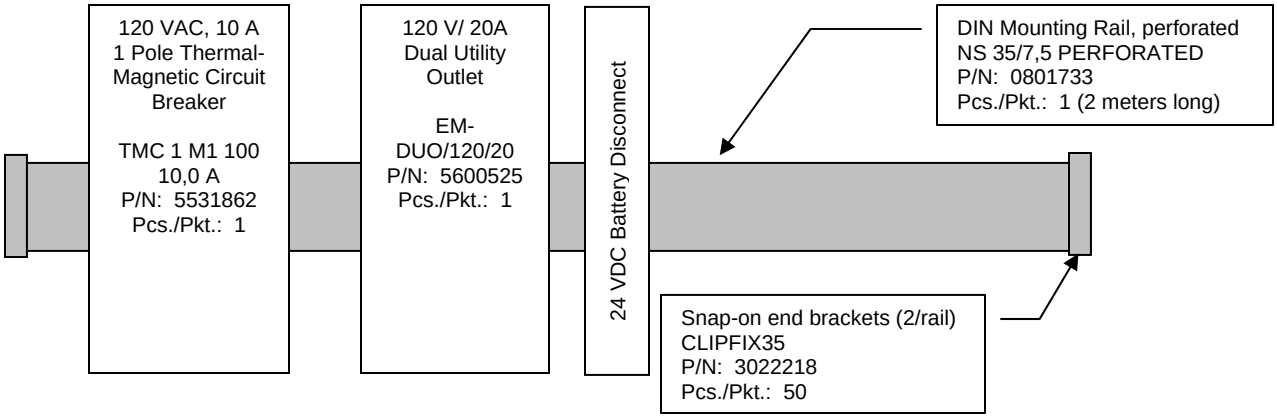


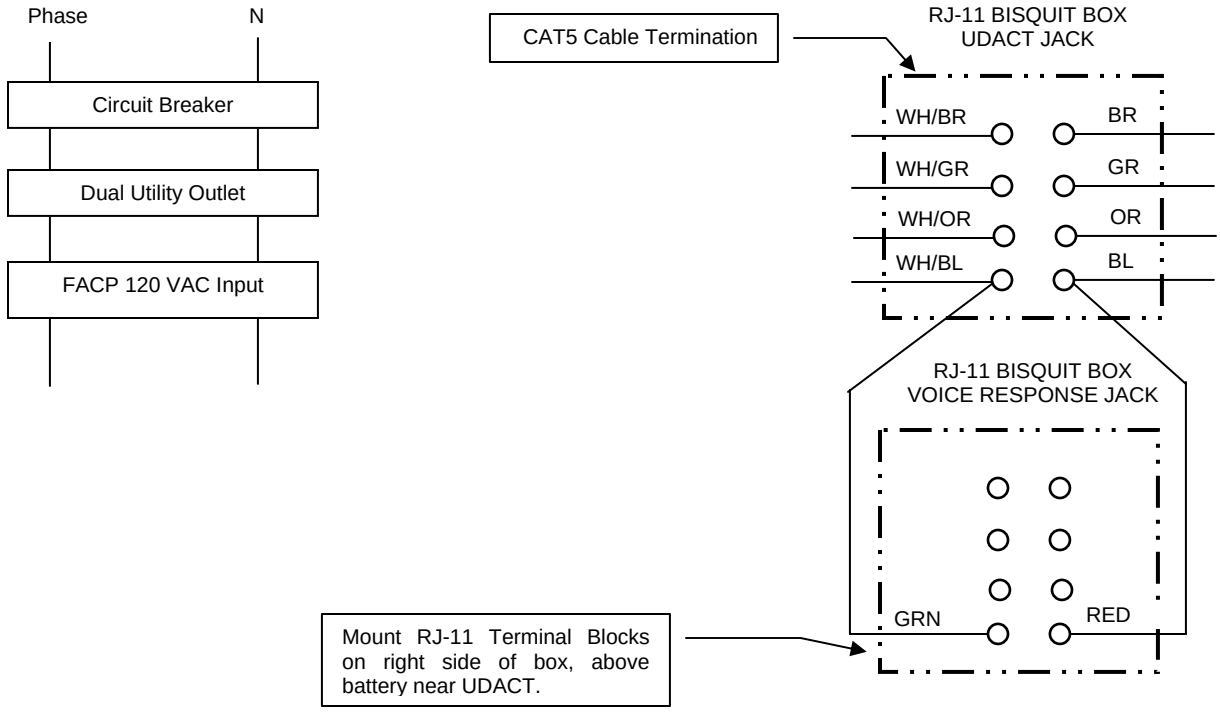
FACP INSTALLATION DETAIL



ATTACHMENT 2
NOTIFIER NFS-640 FACP Modification Details

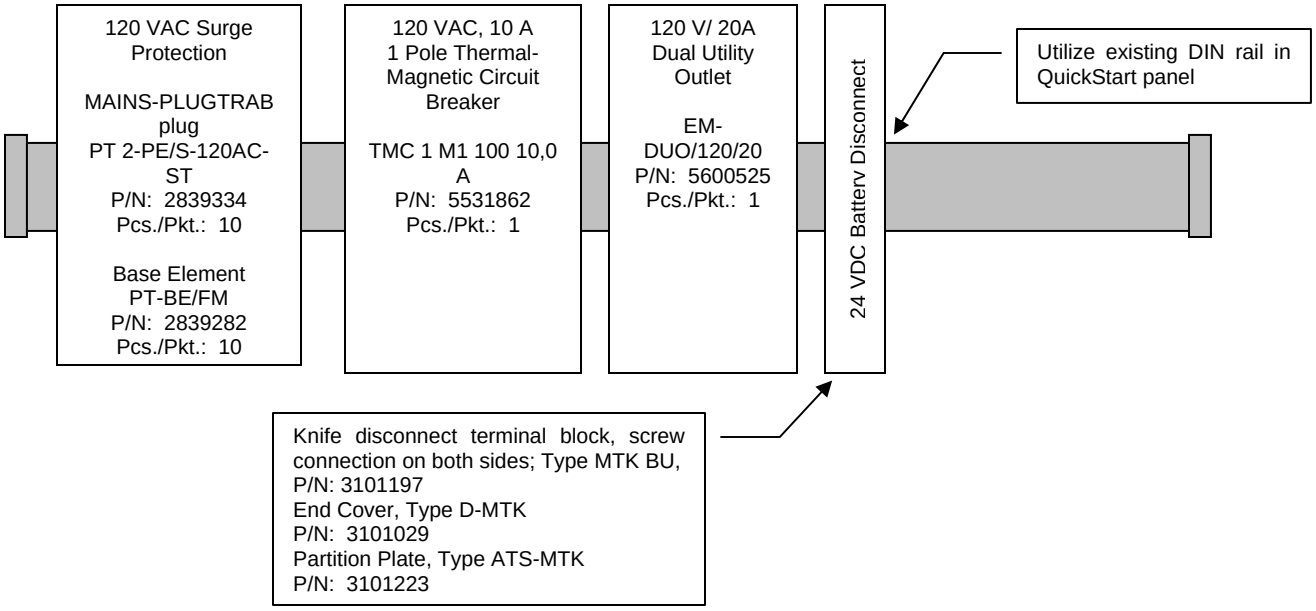
Manufacturer	Description	Type	P/N
Phoenix Contact	DIN Mounting Rail	NS 35/7,5 PERFORATED	0801733
Phoenix Contact	DIN Rail snap-on end brackets	CLIPFIX 35	3022218
Phoenix Contact	120 VAC, 20A Dual Utility Outlet	EM-DUO/120/20	5600525
Phoenix Contact	120 VAC, 10A, 1P Circuit Breaker	TMC 1 M1 100 10,0 A	5531862
Phoenix Contact	Knife disconnect terminal blocks	MTK	3101016
Phoenix Contact	Knife disconnect end covers	D-MTK	3101029
Phoenix Contact	Knife disconnect partition plates	ATS-MTK	3101223
Phoenix Contact	Knife disconnect terminal blocks blue	MTK BU	3101197

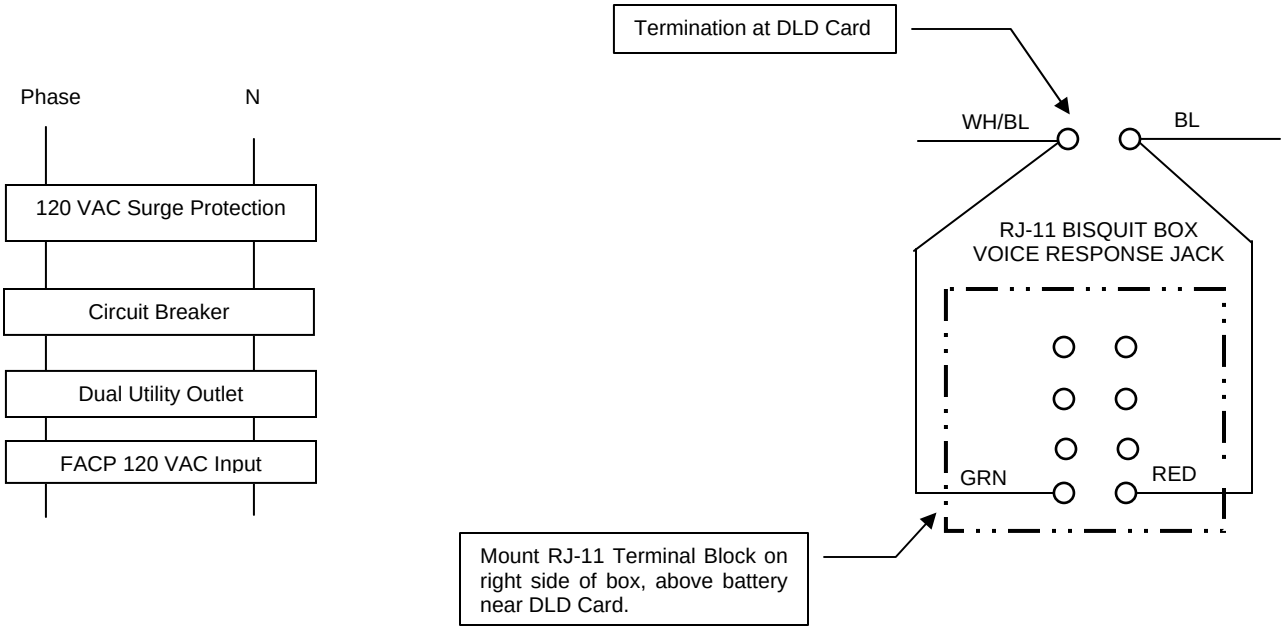




ATTACHMENT 3
EST QuickStart FACP Modification Details

Manufacturer	Description	Type	P/N
Phoenix Contact	120 VAC Surge Protection plug	PT 2-PE/S-120AC-ST	2839334
Phoenix Contact	120 VAC Surge Protection base	PT-BE/FM	2839282
Phoenix Contact	120 VAC, 20A Dual Utility Outlet	EM-DUO/120/20	5600525
Phoenix Contact	120 VAC, 10A, 1P Circuit Breaker	TMC 1 M1 100 10,0 A	5531862
Phoenix Contact	Knife disconnect terminal blocks	MTK	3101016
Phoenix Contact	Knife disconnect end covers	D-MTK	3101029
Phoenix Contact	Knife disconnect partition plates	ATS-MTK	3101223
Phoenix Contact	Knife disconnect terminal blocks blue	MTK BU	3101197
Phoenix Contact	RS232 Computer Connection	UM 45-D 9 SUB/B/ZFKDS	2293666





ATTACHMENT 4
EST QuickStart Configuration Utility Programming Guidelines

PROJECT

At the **Project Configuration** screen in the EST QuickStart Configuration Utility programming, perform the following data entry operations.

Options

Facility Name:	BLDG #### (list all bldgs. connected to FACP)	Installation Company:	_____
Level 3 Password (4 digits):	3333	Phone Number:	_____
		Programmer:	_____

Operations

Market Place:	NFPA 72	Annunciator Baud Rate:	9600
Language:	English (US)	Annunciator Comm Class:	Class B
Alarm Silence:		Drill Activation Type:	Steady
☐	Audible Only	☒	Allow Waterflow Silence
☒	Audible and Visual	☒	Inhibit Zone Resound
Drill:		☐	Enable 2 Stage Operation
☐	Audible Only	☐	Inhibit Zone Resound
☒	Audible and Visual	☐	Enable Trouble Reminder

Timing

Automatic Alarm Signal Silence:	Disabled (60 minutes in unoccupied buildings)
Alarm Signal Silence / Reset Inhibit:	Disabled
AC Power Trouble Delay:	Disabled
Panel Silence Resound Time:	Disabled

ATTACHMENT 4
EST QuickStart Configuration Utility Programming Guidelines

At the **Cabinet Configuration Form** screen in the EST QuickStart Configuration Utility programming, perform the following data entry operations.

Cabinet Selection

Panel: 1 Type: Intelligent – 12 Slot

Configure - SLIC Card Type (Cards Tab)

Retrieving data from the loop controller

Retrieving data from the loop controller copies the actual device configuration data into the configuration utility. The configuration utility uses this information to develop the loop diagram shown on the Mapping tab.

Tip: You should always retrieve the data from the loop controller after you make any changes to the loop and have a "clean" map (no conflicts). Doing so provides an accurate record of the loop configuration.

1. Connect the serial port on the service computer to the RS232 connections on the control panel.
2. Power up the laptop computer.
3. Click Start > Programs > QuickStart > QuickStart.
4. Open the project.
5. Open the loop controller configuration form
6. Click Configure > Cabinet.
7. Select the SLIC card then click Configure.
8. On the Controller tab, click the Port down arrow, and then select the COM port used to connect to the control panel
9. Click Retrieve Signature Data.

Controller Tab

Wiring Style:	
☒	Class A
☐	Class B
Mapping:	
☒	Enabled
☐	Disabled
Outputs:	
Output 1 Device Type:	Audible
Output 2 Device Type:	Audible

Communications:	
Port:	COM1
Baud Rate:	38400

Detectors Tab

Quantity:	1		
Primary Sensitivity:	Normal	Alternate Sensitivity:	Normal
Primary Verification:	None	Alternate Verification:	None
Primary Prealarm:	None	Alternate Prealarm:	None

Modules Tab

Add devices as required or use AutoLearn and AutoLoop utilities to upload system configuration to database.

ATTACHMENT 4
EST QuickStart Configuration Utility Programming Guidelines

MESSAGE TEXT FORMAT

Message Text 1: Detector/Module Address/ZA8-2 Card/Point (e.g., M126, D002, 1-01, 2-03);
Building (if different from where FACP is located);
Room Number

Message Text 2: Room Descriptor or Location within Room (e.g., East Exit, Rm ___ Hall);
Device Type (e.g., Smk Det, Pull)

Configure – ZA8-2 Card Type (CARDS Tab)

Typical guidelines for entering Device Types and Text Messages that appear in QuickStart LED display are shown below.

Address	Device Type	Text 1	Text 2
1	Water Flow	1-01 Sprinkler	Water Flow
2	Tamper	1-02 Mech Rm	Sprinkler Tamper
3	Pull	1-03 Room ###	(N, S, E, W) Exit Pull
4	Audible	1-04 NAC #1	South Wing
5	Smoke	1-05 Room ___	Hall Smoke
6	Alarm	1-06 Room ___	Pull/Heat Det
7	Supervisory	1-07 Mech Rm	AHU-# Duct Det
8	Audible	1-08 NAC #2	North Wing

Configure – ZR8 Card Type (CARDS Tab)

Configuration of a ZR8 card is not required.

ATTACHMENT 4
EST QuickStart Configuration Utility Programming Guidelines

Configure - DLD Card Type

In the EST QuickStart Configuration Utility software on the laptop, enter the information in **bold** print below to configure the dialer to transmit General Alarm, General Supervisory, and General Trouble information to the fire alarm Proprietary Supervising Station.

For the Account, #### is the transmitter number (e.g., Building 887 = 0887 transmitter #). Once entered in Account Information, it will automatically be entered in the Default Information data entry points.

Test Time can be any time (test time will change frequently when fire alarm system becomes operational)

When connecting to an AES IntelliNet radio subscriber unit, enter 555 for the phone number.

Receiver 1:		☐ Enable Receiver 2	Receiver 2:
Primary Telephone Number:	**2849195**	Retry Count: **10**	Primary Telephone Number:
Secondary Telephone Number:	**2849647**		Secondary Telephone Number:

Account Information					
Receiver	Account	Format	Test Time	Normal Test String	Abnormal Test String
1	**####**	**Contact ID**	**12:##:00 PM**	**160200000**	**160800000**

Default Alarm Information		Default Supervisory Information		Default Trouble Information	
Account:	####	Account:	####	Account:	####
Activation String:	**111000000**	Activation String:	**120000000**	Activation String:	**130000000**
Restoration String:	**311000000**	Restoration String:	**320000000**	Restoration String:	**330000000**

CABINET CONFIGURATION FORM (Filters Tab)

Events Displayed on LCD	Events displayed on Printer
☒ Alarm	☒ Alarm
☒ Supervisory	☒ Supervisory
☒ Trouble	☒ Trouble
☒ Monitor	☒ Monitor

ATTACHMENT 4
EST QuickStart Configuration Utility Programming Guidelines
CORRELATIONS

At the **Correlation Configuration** screen in the EST QuickStart Configuration Utility programming, perform the following data entry operations. NOTE: Two screens, one on left and one on right, appear in the **Correlation Configuration** screen which are used to correlate data selected in both screens to perform selected functions (e.g., activate NACs, send data to fire alarm Proprietary Supervising Station).

Creating Output Groups

Setting up an Output Group

Click Output Groups tab in left Logic Group Selection screen. Select Add Output Group. Enter the following data:

Descriptor: Output Group249 or other number generated from QuickStart programming upload
Address: 1 or default
Text 1: Building ____
Test 2: General Alarm

Delete unused Output Groups

Add an instruction that controls an output circuit

1. Click Output Group in the Logic Group Selection screen to which outputs (NACs) will be linked.
2. Click Outputs from right Response Selection screen.
3. In the Object Selection Form screen, select all outputs to be correlated with the Output Group highlighted in the Logic Group Selection screen. Click OK after highlighting each output.
4. Verify that the Action is "Activate" for each output.
5. Click the Priority arrow then select a priority of "High" for each output.

Correlating Output Groups with Inputs

Method #1

1. Click Devices in the Logic Group Selection screen. In the Device Selection screen, select device to be linked to an Output Group that will activate NACs upon going into alarm.
2. Click Add Output Group in right Output Group Selection screen. Select appropriate Output Group and click OK.
3. Repeat for all remaining devices in the Device Selection screen.

Method #2

1. Click Output Group in the Logic Group Selection screen to which inputs (points/zones that activate NACs) will be linked.
2. Click Responses in right Response Selection screen. Select Devices Activating Output Group, then Add Device. From the pop-up list of devices, add all devices that upon going into alarm will activate the building notification appliances for the Output Group selected in the Logic Group Selection screen.

Setting up QuickStart panel for First Alarm, Evacuation, and Drill outputs

1. Click on Devices in the Logic Group Selection screen and check Show Pseudo Points checkbox.
2. For First Alarm output, select Panel '0', Card '0', Address '2', "First Alarm". At Output Group Selection screen, click on Add Output Group and make selection. Click OK.
3. For Evacuation output, select Panel '0', Card '0', Address '6', "Evacuation". At Output Group Selection screen, click on Add Output Group and make selection. Click OK.
4. For Drill output, select Panel '0', Card '0', Address '7', "Evacuation". At Output Group Selection screen, click on Add Output Group and make selection. Click OK.

ATTACHMENT 4
EST QuickStart Configuration Utility Programming Guidelines

Listed below is the typical QuickStart programming for various outputs that activate NAC audio/visual appliances.

Panel	Card	Address	Type	Message	NAC Priority	Response Type	Command	Description
0	0	2	Alarm	First Alarm	High	Active	Activate	
0	0	6	Alarm	Evacuation	High	Active	Activate	
0	0	7	Monitor	Drill	High	Active	Activate	
1	ZA8-2 #	#			High	Active	Activate	Enter building specific descriptor
1	SLIC #	#			High	Active	Activate	Enter building specific descriptor

Service Groups

Removing a Service Group

1. Click Service Groups tab in left Logic Group Selection screen.
2. Select Service Group to remove and click on Remove Service Group. Delete unused Service Groups

ATTACHMENT 4
EST QuickStart Configuration Utility Programming Guidelines

CONTACT ID Programming for Alarm Inputs

1. Click on Devices tab on Logic Group Selection screen. Check Show Pseud. Points check box.
2. Select record in Device Selection list requiring Contact ID reporting to fire alarm Proprietary Supervising Station.
3. At the Output Group Selection screen click on Responses tab, which brings up a Response Selection screen.
4. Click on Dialer String tab. Enter Contact ID information requested on screen. In **Send on** data field, select "Activation Only". Refer to the data in the following tables for guidelines on what data to enter in the other data fields. Use arrows at right margin of the data entry form to adjust the sequence of events to be communicated to the fire alarm Proprietary Supervising Station. Click on Dialer String tab and repeat information with "Restoration Only" selected for the **Send on** data field.
5. Repeat for all remaining devices and points in the Device Selection list that will be sending signals to the fire alarm Proprietary Supervising Station.

Dialer String Instructions

In the Response Selection screen, the data entry fields requiring information are listed below.

Response Type	• Select Activate to send dialer string information when a device goes into alarm condition. • Select Trouble to send dialer string information when a device goes into trouble condition.
Account	Enter account (transmitter number) for panel.
Priority	• Select Life Safety to communicate a fire alarm or life-threatening emergency. • Select Property to communicate an off-normal condition with the fire suppression system or related equipment. • Select System Integrity to communicate an off-normal condition or wiring fault that compromises the integrity of the system.
Send on	Click the Send On arrow, then click when you want the dialer to send the character string. • Select Activation Only to send the string only when the input is activated. • Select Restoration Only to send the string only when the input is restored.

String

The dialer string provides information on what data to send to the fire alarm Proprietary Supervising Station and is characterized as follows:

Q XYZ GG CCC, where

Q Event Qualifier; 1 = New Event, 3 = New Restore

XYZ Contact ID Event Code

110 – Fire	200 – Fire Supervisory	300 – System Trouble
111 – Smoke	201 – Low Pressure	301 – AC Loss
112 – Combustion	203 – Valve Tamper	309 – Battery Test Failure
113 – Water Flow	161 – HVAC Shutdown	321 – NAC Circuit #1 Trouble
114 – Heat	154 – RPBFP Flow Switch	322 – NAC Circuit #2 Trouble
115 – Pull Station		326 – NAC Circuit #3 Trouble
116 – Duct Detector		327 – NAC Circuit #4 Trouble
117 – Flame		351 – Telco 1 Fault
151 – Toxic Gas		352 – Telco 2 Fault
385 – HSSD		354 – Failure to Communicate
		373 – Fire Trouble
		380 – Sensor Trouble

GG Group or Partition number. Use 00 to indicate that no specific group or partition information applies (typical). When using more than one SLIC board, use 01 for SLIC #1 and 02 for SLIC #2

CCC Zone number (for Event reports). Use 000 to indicate that no specific zone applies.

ATTACHMENT 4
EST QuickStart Configuration Utility Programming Guidelines

Listed below is the typical Contact ID programming for various detection devices requiring reporting to the fire alarm PPS.

Panel	Card	Address	FACP LED Text	Priority	Response Type	String	Send on
1	1 – 4 (SLIC) 5 – 9 (ZA8-2)	Point/Zone ###	Pull/Smk/Heat on same zone (FIRE)	Life Safety	Active	111000### 311000###	Activation Only Restoration Only
				System Integrity	Trouble	138000### 338000###	Activation Only Restoration Only
1	1 – 4 (SLIC) 5 – 9 (ZA8-2)	Point/Zone ###	Pull Stations	Life Safety	Active	111500### 311500###	Activation Only Restoration Only
				System Integrity	Trouble	138000### 338000###	Activation Only Restoration Only
1	1 – 4 (SLIC) 5 – 9 (ZA8-2)	Point/Zone ###	Smoke Detectors	Life Safety	Active	111100### 311100###	Activation Only Restoration Only
				System Integrity	Trouble	138000### 338000###	Activation Only Restoration Only
1	1 – 4 (SLIC) 5 – 9 (ZA8-2)	Point/Zone ###	HSSD	Life Safety	Active	138500### 338500###	Activation Only Restoration Only
				System Integrity	Trouble	138000### 338000###	Activation Only Restoration Only
1	1 – 4 (SLIC) 5 – 9 (ZA8-2)	Point/Zone ###	Heat Detectors	Life Safety	Active	111400### 311400###	Activation Only Restoration Only
				System Integrity	Trouble	138000### 338000###	Activation Only Restoration Only
1	1 – 4 (SLIC) 5 – 9 (ZA8-2)	Point/Zone ###	UV/IR Detectors	Life Safety	Active	111700### 311700###	Activation Only Restoration Only
				System Integrity	Trouble	138000### 338000###	Activation Only Restoration Only
1	1 – 4 (SLIC) 5 – 9 (ZA8-2)	Point/Zone ###	Duct Smoke (Supervisory)	Life Safety	Active	111600### 311600###	Activation Only Restoration Only
				System Integrity	Trouble	138000### 338000###	Activation Only Restoration Only
1	1 – 4 (SLIC) 5 – 9 (ZA8-2)	Point/Zone ###	Water Flow	Life Safety	Active	111300### 311300###	Activation Only Restoration Only
				System Integrity	Trouble	138000### 338000###	Activation Only Restoration Only
1	1 – 4 (SLIC) 5 – 9 (ZA8-2)	Point/Zone ###	Valve Tamper	Life Safety	Active	120300### 320300###	Activation Only Restoration Only
				System Integrity	Trouble	138000### 338000###	Activation Only Restoration Only
1	1 – 4 (SLIC) 5 – 9 (ZA8-2)	Point/Zone ###	Low Pressure	Life Safety	Active	120100### 320100###	Activation Only Restoration Only
				System Integrity	Trouble	138000### 338000###	Activation Only Restoration Only
1	1 – 4 (SLIC) 5 – 9 (ZA8-2)	Point/Zone ###	Toxic Gas	Life Safety	Active	115100### 315100###	Activation Only Restoration Only
				System Integrity	Trouble	138000### 338000###	Activation Only Restoration Only

Panel	Card	Address	Panel LED Text	Priority	Response Type	String	Send on
1	1 – 4 (SLIC) 5 – 9 (ZA8-2)	Point/Zone ###	HVAC Shutdown	Life Safety	Active	116100### 316100###	Activation Only Restoration Only
				System Integrity	Trouble	138000### 338000###	Activation Only Restoration Only
1	1 – 4 (SLIC) 5 – 9 (ZA8-2)	Point/Zone ###	RPBFP Flow Switch	Property	Active	115400### 315400###	Activation Only Restoration Only
				System Integrity	Trouble	138000### 338000###	Activation Only Restoration Only
1	1 – 4 (SLIC) 5 – 9 (ZA8-2)	Point/Zone ###	Isolation Module	System Integrity	Active	137300### 337300###	Activation Only Restoration Only
			Control/Relay Mod. (trouble only)	System Integrity	Trouble	138000### 338000###	Activation Only Restoration Only

In addition to the Contact ID data for each individual detection device (intelligent system) or zones (conventional system), the following QuickStart panel pseudo alarms shall be programmed to send alarms to the fire alarm Proprietary Supervising Station.

Panel	Card	Address	Text 1	Text 2	Priority	Response Type	String	Send on
1	0	27	Panel 01, Call	For Service	System Integrity	Trouble	130000000 330000000	Activation Only Restoration Only
1	ZA8-2 #	04	NAC #1	Trouble	System Integrity	Trouble	132100### 332100###	Activation Only Restoration Only
1	ZA8-2 #	08	NAC #2	Trouble	System Integrity	Trouble	132200### 332200###	Activation Only Restoration Only
1	ZA8-2 #	04	NAC #3	Trouble	System Integrity	Trouble	132600### 332600###	Activation Only Restoration Only
1	ZA8-2 #	08	NAC #4	Trouble	System Integrity	Trouble	132700### 332700###	Activation Only Restoration Only
1	SLIC #	270	NAC 270	Circuit #1	System Integrity	Trouble	132100270 332100270	Activation Only Restoration Only
1	SLIC #	271	NAC 271	Circuit #2	System Integrity	Trouble	132200271 332200271	Activation Only Restoration Only
1	14	1	Primary Phone	Line:check Telco	System Integrity	Trouble	135100000 335100000	Activation Only Restoration Only
1	14	2	Secondary Phone	Line:check Telco	System Integrity	Trouble	135200000 335200000	Activation Only Restoration Only
1	15	1	Battery	Charger Fault	System Integrity	Trouble	130900000 330900000	Activation Only Restoration Only
1	15	2	Battery Wiring	or Battery Fault	System Integrity	Trouble	131100000 331100000	Activation Only Restoration Only
1	15	7	Primary AC Power	Failure	System Integrity	Trouble	130100000 330100000	Activation Only Restoration Only
1	15	8	Excessive	Battery Current	System Integrity	Trouble	130900000 330900000	Activation Only Restoration Only

ATTACHMENT 5
EST QuickStart SL-30 Annunciator Panel Programming Instructions

FILE MENU	QUICKSTART PROGRAM	INSTRUCTIONS
Configure - Cabinet	Cabinet Configuration Form	Annunciators Annunciator Cards – Add Position: 1, Group: 1, Type: 30 Zone Filters Click on Monitor for both the LCD and Printer Displays
Configure – Switches	Switch Configuration Form	Type = Toggle Text 1, Text 2 = SW1 All NACs Disabled = SW2 HVAC Control Disabled = SW3 Pass. Elev. Control Disabled = SW4 Freight Elv Control Disabled = SW5 Smk Removal Control Disabled Primary Route = 00 All Cabinets (default is 01 No Cabinets) Alternate Route = 00 All Cabinets (default is 01 No Cabinets)
Configure – Correlations	Correlation Configuration	1. For the General Alarm Output Group, change the Priority to **Medium** for all Responses. LED Outputs will be assigned **High** priority. 2. Select Switches at Logic Group Selection. 3. Select Switch number to correlate. 4. At Output Group Selection, select Responses. Select Leds. 5. In Led Selection Form, select appropriate switch number with a response type of **Active** (do not select Alarm or Fault). Click on OK to add to Response Selection. Verify Action (Command) is set at 'Steady' with a priority of 'Low'. 6. In Response Selection, select Dialer Strings. Add 'Activation Only' and 'Restoration Only' dialer strings. Use Event #520 for disabled NACs and Event #530 for all other disabled controls. Start at Zone 901 for SW1, 902 for SW2, etc. 7. Correlate all outputs to be disabled when switch is activated. Set command at **Restore**, with a Priority of **High**.

CORRELATION CONFIGURATION FOR SL-30 ANNUNCIATOR PANEL

LED SELECTION FORM			RESPONSE SELECTION		
Group	**Switch**	**Led**	**Response Type**	**Action (Command)**	**Description**
1	1	Active	Active	Steady	01 01 Active, SW1 NAC Disabled, Priority Low
Disable NACs			Active	Dialer String	Event: 520 Zone: 901 1(3)52000901
			Active	Restore	Correlate all NAC Outputs, Priority High
1	2	Active	Active	Steady	01 02 Active, SW2 HVAC Control Disabled, Priority Low
Disable HVAC Control			Active	Dialer String	Event: 530 Zone: 902 1(3)53000902
			Active	Restore	Correlate all HVAC disable relays, Priority High
1	3	Active	Active	Steady	01 03 Active, SW3 Pass. Elev. Control Disabled, Priority Low
Disable Pass. Elev. Control			Active	Dialer String	Event: 530 Zone: 903 1(3)53000903
			Active	Restore	Correlate all Passenger Elevator control relays, Priority High
1	4	Active	Active	Steady	01 04 Active, SW4 Freight. Elev. Control Disabled, Priority Low
Disable Freight Elev. Control			Active	Dialer String	Event: 53 Zone: 904 1(3)53000904
			Active	Restore	Correlate all Freight Elevator control relays, Priority High
1	5	Active	Active	Steady	01 05 Active, SW5 Smoke Control Disabled, Priority Low
Disable Smoke Control			Active	Dialer String	Event: 530 Zone: 905 1(3)53000905
			Active	Restore	Correlate all Smoke Control relay outputs, Priority High

ATTENTION

IN CASE OF FIRE
CALL 911

FIRE ALARM SYSTEM IS NOT OPERATIONAL AS OF:

DATE: _____ TIME: _____