Shake Shack # 1348

2051 NW Lowenstein Drive
Lee's Summit, MO 64081

Fire Alarm System Design

CODE ANALYSIS

GENERAL

DESCRIPTION	CODE REF.	REQUIREMENT	PROPOSED
CONSTRUCTION TYPE	TABLE 601	-	II-B
USE GROUP	303.3	A-2	A-2
SPRINKLERED	903.2.1.2	NOT REQUIRED IF FIRE AREA IS LESS THAN 5,000 SF	YES

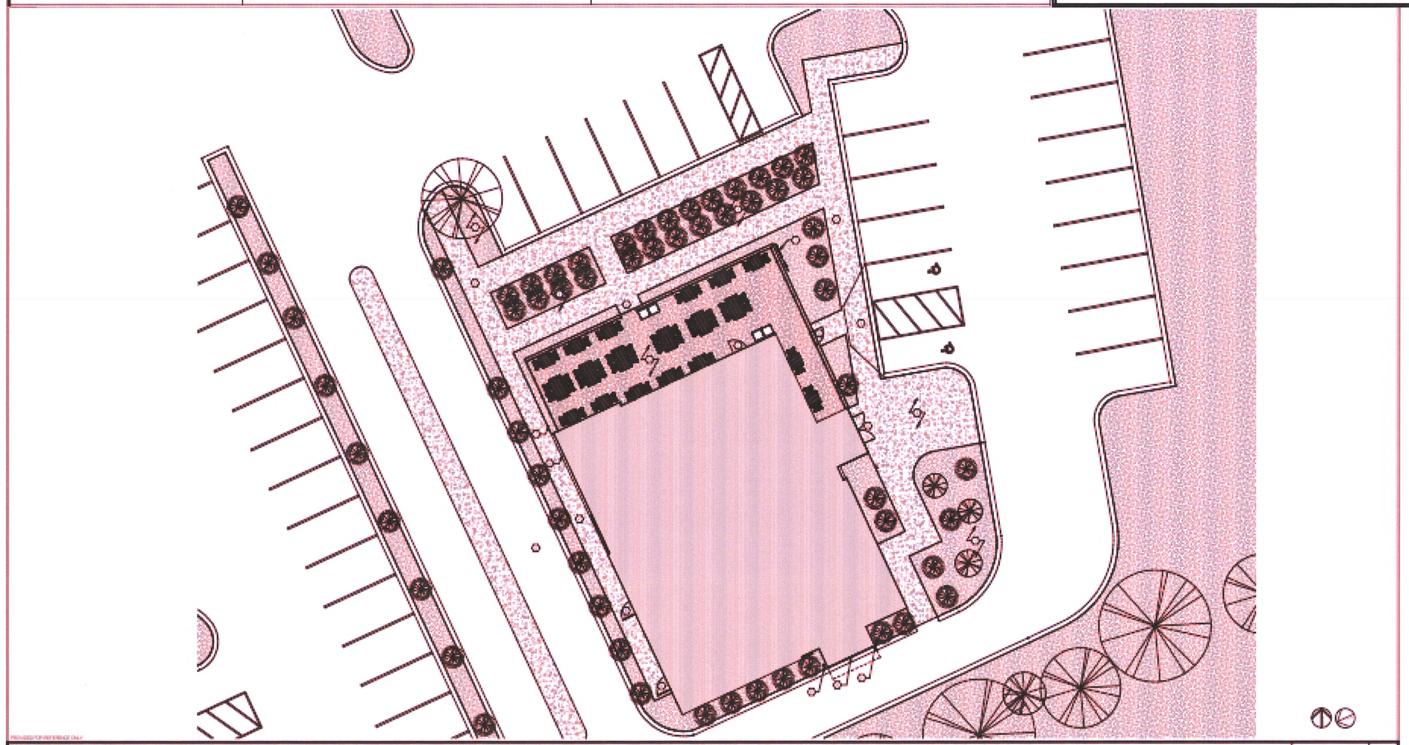
DESIGN OCCUPANCY LOAD

DESCRIPTION	CODE REF.	AREA	FACTOR (SQ.FT. / person)	TOTAL OCCUPANTS
ASSEMBLY, STANDING	TABLE 1004.1.2	86 SF	5 NET	18 OCCUPANTS
ASSEMBLY, SEATING - FIXED	1004.6	-	1 PER 24" OF BOOTH SEAT LENGTH, 1 PER 18" BENCH LENGTH	53 FIXED SEATS
ASSEMBLY, SEATING - NOT FIXED	TABLE 1004.5	-	15 NET	38 LOOSE SEATS
KITCHENS, COMMERCIAL	NFPA 101 TABLE 7.3.1.2	1542 SF	200 GROSS	8 (ACTUAL: 15 EMPLOYEES)
BUSINESS AREA	TABLE 1004.1.2	87 SF	150 GROSS	1 OCCUPANT
PATIO SEATING - FIXED	1004.4	-	1 PER 24" OF BOOTH SEAT LENGTH, 1 PER 18" BENCH LENGTH	-
PATIO SEATING - NOT FIXED	TABLE 1004.5	1039 SF	15 NET	50 LOOSE SEATS (ACTUAL: 70 OCCUPANTS)

TOTAL OCCUPANCY COUNTS	ACCESSIBLE SEATING REQUIREMENT: IBC 2018 - 1108.2.9.1 INTERIOR: 90 SEATS @ 5% ACCESSIBLE 5 ACCESSIBLE SEATS EXTERIOR: 50 SEATS @ 5% ACCESSIBLE 3 ACCESSIBLE SEATS	INTERIOR OCCUPANT LOAD: EXTERIOR OCCUPANT LOAD: TOTAL DESIGN OCCUPANT LOAD: PLUMBING FIXTURE COUNT DESIGNED FOR:	125 OCCUPANTS 70 OCCUPANTS 195 OCCUPANTS 300 OCCUPANTS (SEE PLUMBING FACILITIES BELOW)

BUILDING CODES

STATE BUILDING CODE:	2018 INTERNATIONAL BUILDING CODE WITH ORDINANCE 8536
FIRE / LIFE SAFETY CODE:	2018 INTERNATIONAL FIRE CODE WITH ORDINANCE 8537
ACCESSIBILITY CODE:	ICC/ANSI A117.1-2009. ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES
PLUMBING CODE:	2018 INTERNATIONAL PLUMBING CODE
FUEL GAS CODE:	2018 INTERNATIONAL FUEL GAS CODE
MECHANICAL CODE:	2018 INTERNATIONAL MECHANICAL CODE
ENERGY CODE:	ASHRAE 90.1 2016
ELECTRICAL CODE:	2017 NATIONAL ELECTRIC CODE



SITE PLAN - ARCHITECTURAL

General Fire Alarm Notes:

1. All smoke detectors shall be located a minimum of three (3) feet from any HVAC diffuser.
2. Operable part of manual pull stations shall not be located less than 42 inches or more than 48 inches above the finished floor.
3. All strobe and horn/strobes shall be located so the bottom of the device is not less than 80 inches above the finished floor and not greater the 96 inches above the finished floor.
4. All notification devices shall be located not less than 6 inches below the finished ceiling.
5. Candela rating of strobes and horn/strobes shall be shown on the drawings.
6. Location of notification devices shall be a uniform height for all notification devices.
7. Cables, conduits and wire mold shall be securely fastened to the structure.
8. Fire alarm devices are to be installed in accordance with; IFC 2018, NFPA72 2016, ADA and manufacture requirements.
9. Smoke detectors shall be located on the ceiling not less than 4 inches form a sidewall to the nearest edge of the detector.
10. Drawings indicate general fire alarm device locations. Field verify device locations with minimal deviations and document any changes.
11. FACP & Power Supplies shall be on a dedicated 120V circuit with 20amp circuit breaker marked red with lock-on position.
12. All fire alarm wiring shall be installed in accordance with NFPA 70 (NEC).
13. Fire Alarm wire paths are reserved for fire alarm cabling only.
14. Carbon monoxide detectors being installed as part of the fire alarm system, shall trigger an audible alarm signal that is distinctly different than the fire alarm signal.

STATE OF MISSOURI
JOHN WILLIAM COLE
NUMBER E-14378
REGISTERED PROFESSIONAL ENGINEER
5/10/2021

Eclipse Integrations LLC
21808 S Wheatfield Rd
Peculiar, MO 64079
816-716-1733

REVISION 1:

REVISION 2:

REVISION 3:

Shake Shack
2051 NW Lowenstein Drive
Lee's Summit, MO 64081

Fire Alarm Design Cover

DESIGNED BY:
S. Grey

DATE:
05/07/21

JOB NUMBER:
108

SHEET NUMBER:
FA 1.0
1 of 3

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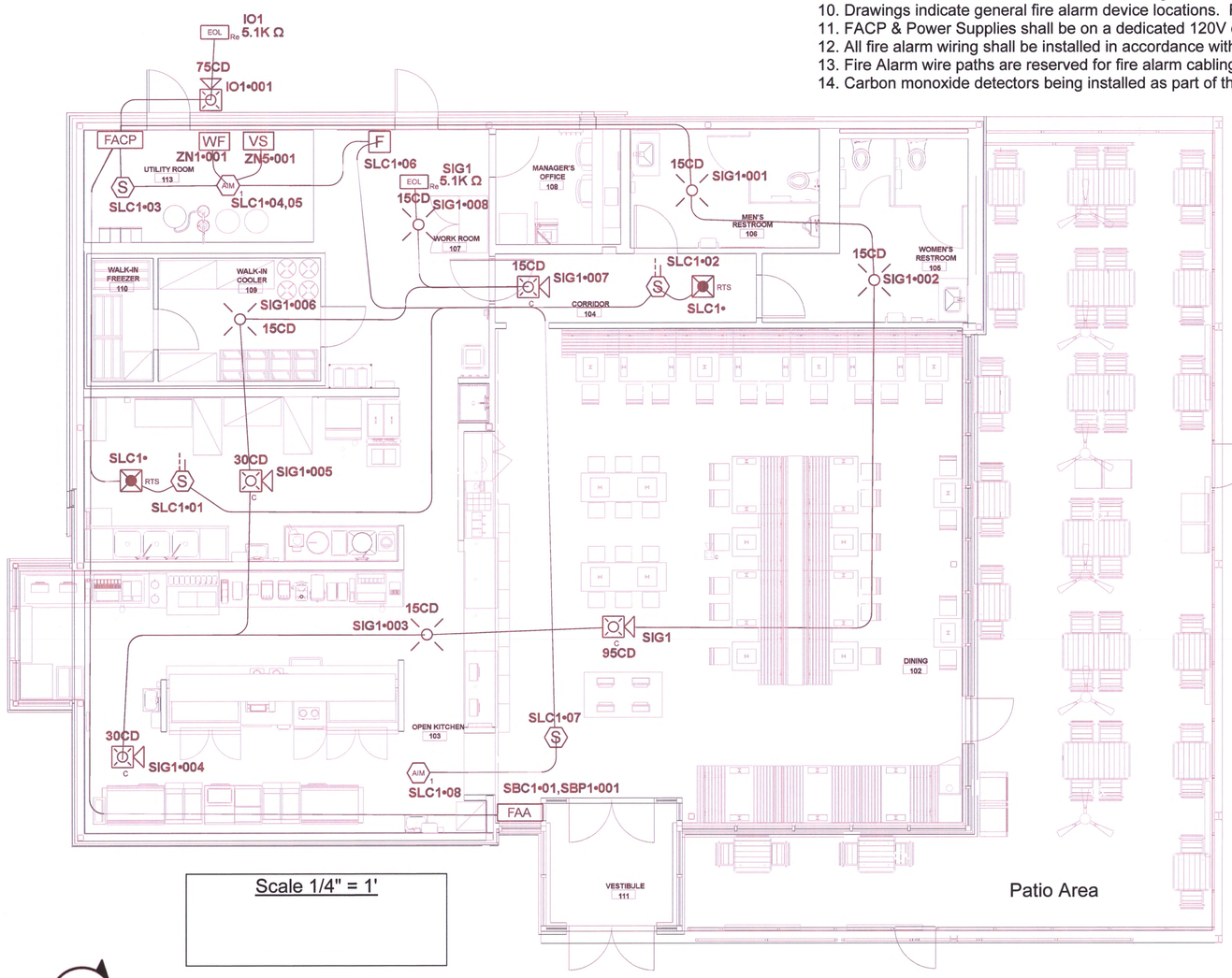
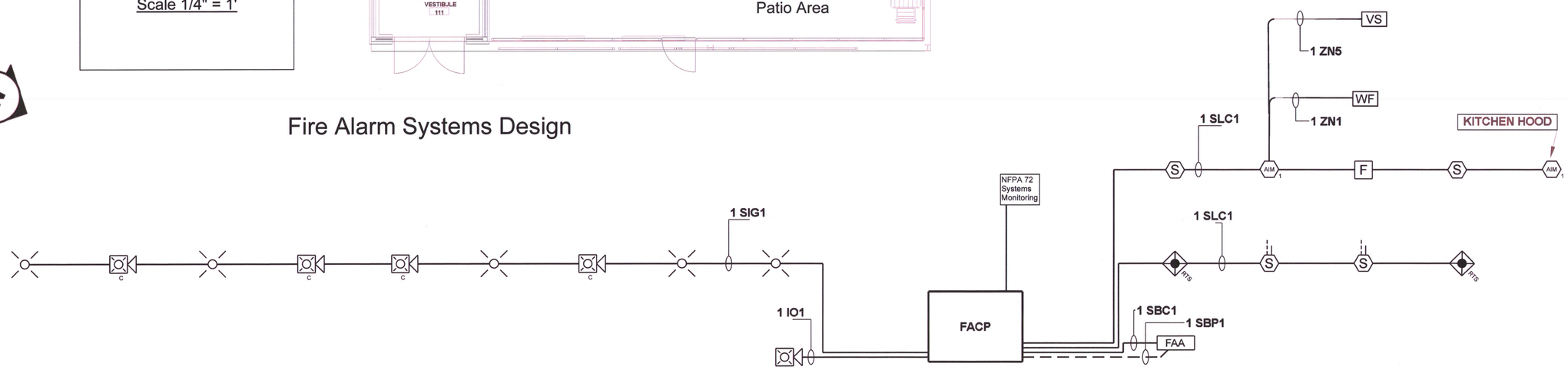


Scale 1/4" = 1'

Fire Alarm Systems Design

Symbol Legend			
SYMBOL	DESCRIPTION	MANUFACTURER	PART NUMBER
FACP	IPA-60, 60 POINT RELEASING FACP	POTTER ELECTRIC SIGNAL	IPA-60
FAA	4X40 LCD ANNUNCIATOR W KEY PAD LOCKED METAL ENCLOSURE	POTTER ELECTRIC SIGNAL	RA-6500R-F
S	PHOTO SMOKE SENSOR	POTTER ELECTRIC SIGNAL	PAD100-PD
AIM 1	DUAL INPUT MODULE	POTTER ELECTRIC SIGNAL	PAD100-DIM
F	ADDRESSABLE PULL STATION, DUAL ACTION	POTTER ELECTRIC SIGNAL	PAD100-PSDA
AIM 1	SINGLE INPUT MODULE	POTTER ELECTRIC SIGNAL	PAD100-SIM
RTS	DUCT REMOTE TEST SWITCH	POTTER ELECTRIC SIGNAL	PAD100-DRTS
S	ANALOG ADDRESSABLE DUCT DETECTOR	POTTER ELECTRIC SIGNAL	PAD100-DUCTR
	STROBE, M-C, WHITE, CEILING	POTTER ELECTRIC SIGNAL	CS-24R
C	HORN/STROBE, 2 WIRE, M-C, WHITE, CEILING	POTTER ELECTRIC SIGNAL	CHS-24PR
	HS-24WR-WP, 75CD,OUTDOOR HORN/STROBE,S/HS-WP SERIES	POTTER ELECTRIC SIGNAL	HS-24WR-WP
5.1K Ω	EOL 5.1K	POTTER ELECTRIC SIGNAL	EOL-5.1



Fire Alarm Riser Diagram

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2 of 3

STATE OF MISSOURI
JOHN WILLIAM CHADWELL
NUMBER E-14378
PROFESSIONAL ENGINEER
5/10/2021

Battery Calculations

Battery Calculations for Panel: P1

Part No:IPA-60 - IPA-60, 60 POINT RELEASING FACP

Job number: 108 Job name: Shake Shack
Address 1: 2051 NW Lowenstein Drive
Address 2: Lee's Summit, MO 64081
Phone: 816-716-1733 Fax:
Designing engineer: Shawn Grey

Part No.	Qty.	Description	Standby	Total Standby	Alarm	Total Alarm
		Panel Equipment				
IPA60_MB	1	IPA60_MB	160.0000mA	160.0000mA	200.0000mA	200.0000mA
			Total Panel Stby	160.0000mA	Total Panel Alarm	200.0000mA
		Peripheral Devices				
HS-24WR-WP	1	HS-24WR-WP, 75CD,OUTDOOR HORN/STROBE,S/HS-WP SERIES (Notification) 75CD 70dB	0.0000mA	0.0000mA	185.0000mA	185.0000mA
CS-24R	5	STROBE, M-C, CEILING (Notification) 15CD	0.0000mA	0.0000mA	120.0000mA	600.0000mA
CHS-24PR	1	HORN/STROBE, 2 WIRE, M-C, CEILING (Notification) 95CD 84dB	0.0000mA	0.0000mA	242.0000mA	242.0000mA
CHS-24R	2	HORN/STROBE, 2 WIRE, M-C, CEILING (Notification) 30CD 84dB	0.0000mA	0.0000mA	142.0000mA	284.0000mA
CHS-24R	1	HORN/STROBE, 2 WIRE, M-C, CEILING (Notification) 15CD 84dB	0.0000mA	0.0000mA	142.0000mA	142.0000mA
RA-6500R-F	1	4X40 LCD ANNUNCIATOR W KEY PAD LOCKED METAL ENCLOSURE (Power)	20.0000mA	20.0000mA	25.0000mA	25.0000mA
RA-6500R-F	1	4X40 LCD ANNUNCIATOR W KEY PAD LOCKED METAL ENCLOSURE (Serial)	0.0000mA	0.0000mA	0.0000mA	0.0000mA
PAD100-PD	2	PHOTO SMOKE SENSOR (Signaling line)	0.5000mA	1.0000mA	0.5000mA	1.0000mA
PAD100-DIM	1	DUAL INPUT MODULE (Signaling line)	0.2400mA	0.2400mA	0.2400mA	0.2400mA
PAD100-PSDA	1	ADDRESSABLE PULL STATION, DUAL ACTION (Signaling line)	0.2000mA	0.2000mA	0.2000mA	0.2000mA
PAD100-SIM	1	SINGLE INPUT MODULE (Signaling line)	0.2400mA	0.2400mA	0.2400mA	0.2400mA
PAD100-DRTS	2	DUCT REMOTE TEST SWITCH (Signaling line)	0.2000mA	0.4000mA	0.2000mA	0.4000mA
PAD100-DUCTR	2	ANALOG ADDRESSABLE DUCT DETECTOR (Signaling line)	0.5000mA	1.0000mA	0.5000mA	1.0000mA
VSR-2	1	2 IN WATERFLOW SW, VANE TYPE W/RETARD (Initiating)	0.0000mA	0.0000mA	0.0000mA	0.0000mA
OSYSU-2	1	GATE VALVE OSYSU-2 (Initiating)	0.0000mA	0.0000mA	0.0000mA	0.0000mA
			Total Peripheral Stby	23.0800mA	Total Periph Alarm	1481.0800mA
			Total Standby Amps	183.0800mA	Total Alarm Amps	1681.0800mA

Standby time: 24 Hrs	4.394Ah
Alarm time: 5 Min	0.14Ah
Battery requirement:	4.534Ah
Compensation Factors - Standby: 1.2 Alarm: 1.2 Requirement with compensation:	5.441Ah

Circuit Calculations Panel: P1 Card: 00 Circuit:IO1

Circuit Name: IO1
Circuit Type: Notification Terminal Voltage: 20.4V-NA Amperage: 1.0000A
Cable: 14/2 SOL JKT FPLR 1M RL RED #14
Calculations based on Running Total Length.
Design Criteria: Ambient temperature: 167°F Max. operating voltage drop: 18%

Device	Part No	Appliance Desc	Distance	Current	Voltage	Voltage Drop
	IPA-60	Panel			20.4V	
001	HS-24WR-WP	HS-24WR-WP, 75CD,OUTDOOR HORN/STROBE,S/HS-WP SERIES , 75CD	10'-0	185.0000mA	20.3888V	(0.0114V)
			10'-0	185.0000mA		
					Total Current: 185.0000mA	
					(Total VDrop Percent:0.06%)	Total Voltage Drop : 0.0114V

Circuit Calculations Panel: P1 Card: 00 Circuit:SBP1

Circuit Name: SBP1
Circuit Type: Power/RS-485 P-Link Pwr Terminal Voltage: 20.2V:DC Amperage: 1.0000A
Cable: 14/2 SOL JKT FPLR 1M RL RED #14
Calculations based on Running Total Length.
Design Criteria: Ambient temperature: 167°F Max. operating voltage drop: 18%

Device	Part No	Appliance Desc	Distance	Current	Voltage	Voltage Drop
	IPA-60	Panel			20.2V	
001	RA-6500R-F	4X40 LCD ANNUNCIATOR W KEY PAD LOCKED METAL ENCLOSURE	83'-0	20.0000mA	20.1986V	(0.0102V)
			83'-0	20.0000mA		
					Total Current: 20.0000mA	
					(Total VDrop Percent:0.05%)	Total Voltage Drop : 0.0102V

Circuit Calculations Panel: P1 Card: 00 Circuit:SBC1

Circuit Name: SBC1
Circuit Type: Serial/RS-485 P-Link Terminal Voltage: 20.2V:DC Amperage: 1.0000A
Cable: 18/2 SOL JKT FPLR 1M RL RED #18
Calculations based on Running Total Length.
Design Criteria: Ambient temperature: 167°F Max. operating voltage drop: 18%

Device	Part No	Appliance Desc	Distance	Current	Voltage	Voltage Drop
	IPA-60	Panel				
01	RA-6500R-F	4X40 LCD ANNUNCIATOR W KEY PAD LOCKED METAL ENCLOSURE	83'-0	0.0000mA		

Circuit Calculations Panel: P1 Card: 00 Circuit:SIG1

Circuit Name: SIG1
Circuit Type: Notification Terminal Voltage: 20.4V:DC Amperage: 3.0000A
Cable: 14/2 SOL JKT FPLR 1M RL RED #14
Calculations based on Running Total Length.
Design Criteria: Ambient temperature: 167°F Max. operating voltage drop: 18%

Device	Part No	Appliance Desc	Distance	Current	Voltage	Voltage Drop
	IPA-60	Panel			20.4V	
001	CS-24R	STROBE, M-C, CEILING, 15CD	48'-0	120.0000mA	20.0263V	(0.3737V)
002	CS-24R	STROBE, M-C, CEILING, 15CD	21'-0	120.0000mA	19.8783V	(0.148V)
	CHS-24PR	HORN/STROBE, 2 WIRE, M-C, CEILING, 95CD	47'-0	242.0000mA	19.6816V	(0.2967V)
003	CS-24R	STROBE, M-C, CEILING, 15CD	15'-0	120.0000mA	19.5092V	(0.0724V)
004	CHS-24R	HORN/STROBE, 2 WIRE, M-C, CEILING, 30CD	33'-0	142.0000mA	19.3743V	(0.1349V)
005	CHS-24R	HORN/STROBE, 2 WIRE, M-C, CEILING, 30CD	31'-0	142.0000mA	19.2745V	(0.0997V)
006	CS-24R	STROBE, M-C, CEILING, 15CD	13'-0	120.0000mA	19.244V	(0.0305V)
007	CHS-24R	HORN/STROBE, 2 WIRE, M-C, CEILING, 15CD	25'-0	142.0000mA	19.2038V	(0.0402V)
008	CS-24R	STROBE, M-C, CEILING, 15CD	13'-0	120.0000mA	19.1943V	(0.0096V)
			246'-0	1268.0000mA		
					Total Current: 1268.0000mA	
					(Total VDrop Percent:5.91%)	Total Voltage Drop : 1.2057V

Circuit Calculations Panel: P1 Card: 00 Circuit:SLC1

Circuit Name: SLC1
Circuit Type: Signaling line/Potter - SLC Terminal Voltage: 20.2V:DC Amperage: 1.0000A
Cable: 18/2 SOL JKT FPLR 1M RL RED #18
Calculations based on Running Total Length.
Design Criteria: Ambient temperature: 167°F Max. operating voltage drop: 18%

Device	Part No	Appliance Desc	Distance	Current	Voltage	Voltage Drop
	IPA-60	Panel			20.2V	
	PAD100-DRTS	DUCT REMOTE TEST SWITCH	27'-0	0.2000mA	20.1994V	(0.0006V)
01	PAD100-DUCTR	ANALOG ADDRESSABLE DUCT DETECTOR	4'-0	0.5000mA	20.1993V	(0.0001V)
02	PAD100-DUCTR	ANALOG ADDRESSABLE DUCT DETECTOR	52'-0	0.5000mA	20.1988V	(0.0006V)
	PAD100-DRTS	DUCT REMOTE TEST SWITCH	4'-0	0.2000mA	20.1988V	(0V)

03	PAD100-PD	PHOTO SMOKE SENSOR	4'-0	0.5000mA	20.1999V	(0.0001V)
04, 05	PAD100-DIM	DUAL INPUT MODULE	8'-0	0.2400mA	20.1997V	(0.0001V)
06	PAD100-PSDA	ADDRESSABLE PULL STATION, DUAL ACTION	15'-0	0.2000mA	20.1995V	(0.0002V)
07	PAD100-PD	PHOTO SMOKE SENSOR	59'-0	0.5000mA	20.1988V	(0.0007V)
08	PAD100-SIM	SINGLE INPUT MODULE	13'-0	0.2400mA	20.1988V	(0V)
			186'-0	3.0800mA		
					Total Current: 3.0800mA	
					(Total VDrop Percent:0.01%)	Total Voltage Drop : 0.0012V

SYSTEM OUTPUTS

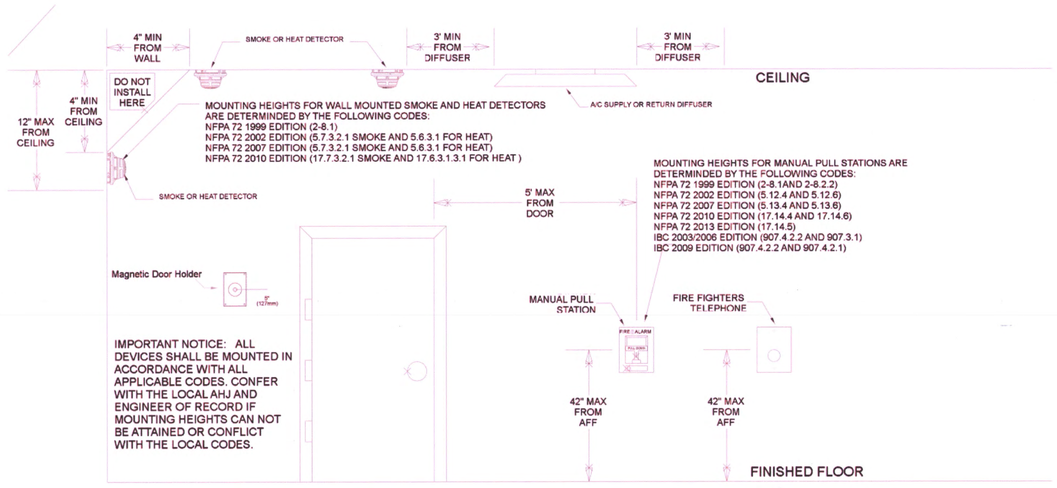
SYSTEM INPUTS

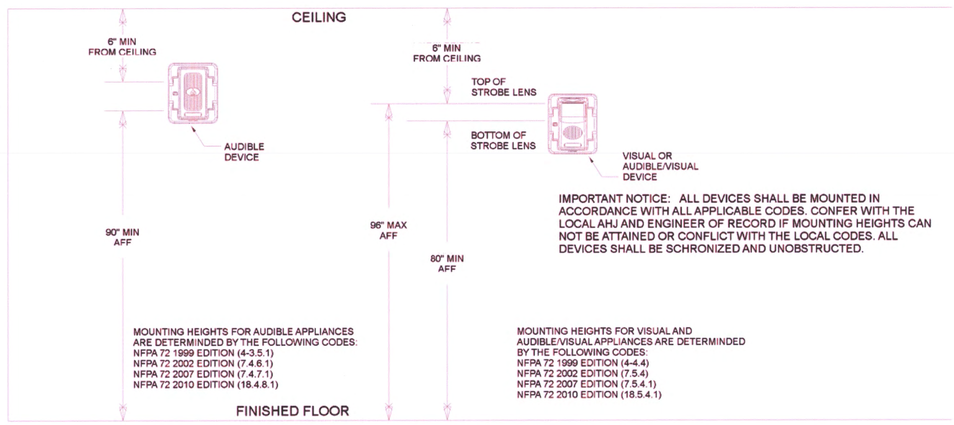
		A	B	C	D	E	F	G	H	I	
1	Manual Fire Alarm Boxes	●			●				●		1
2	Smoke Detectors	●			●	●			●		2
3	Waterflow	●			●	●			●	●	3
4	Kitchen Hood	●			●	●			●		4
5	IN-Duct Smoke Detectors		●							●	5
6	Sprinkler Control Valve		●				●				6
7	Fire Alarm AC Power Failure			●				●			7
8	Fire Alarm System Low Battery			●				●			8
9	Open Circuit			●				●			9
10	Ground Fault			●				●			10
11	Notification Appliance Circuit Short			●				●			11
		A	B	C	D	E	F	G	H	I	

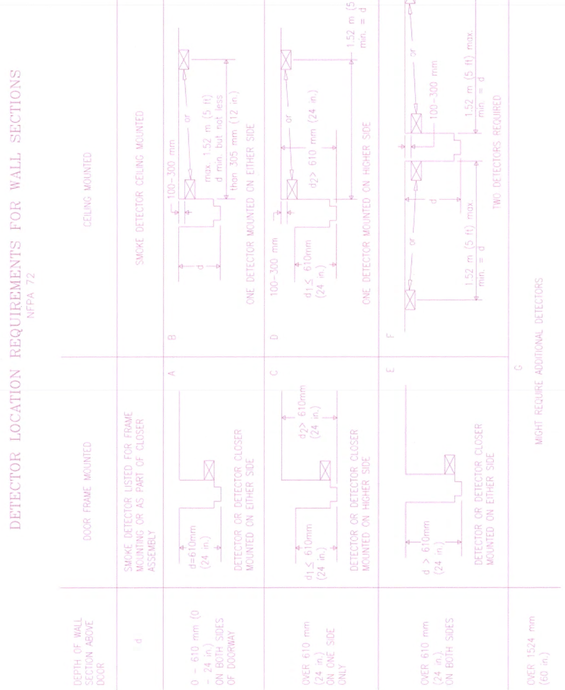
Control Unit Annunciation

- Actuate Common Alarm Signal Indicator
- Actuate Common Supervisory Signal Indicator
- Actuate Common Trouble Signal Indicator
- Actuate Evacuation Signals
- Transmit Fire Alarm Signal to Supervising Station
- Transmit Supervisory Signal to Supervising Station
- Transmit Trouble Signal to Supervising Station
- Actuate Exterior Strobe at FD Response Point
- HVAC Shutdown

OPERATIONAL MATRIX







NFPA 72 Device Reference

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