

### FCP Battery Calculation

10/16/2014

PROJECT NAME: SHALOM HOUSE - PORTLAND  
 Required Standby Time: 24 Hours  
 Required Alarm Time: 5 Minutes

Regulated Load in Standby			
Device Type	Number of Devices	Current (Amps)	Total Current (Amps)
MS-9200UDLS Main Circuit Board	1	0.27500	0.27500
ANN-80 Remote Annunciator	1	0.01500	0.01500
MS355 Smoke Detector	6	0.00030	0.00180
MMF-300 Monitor Modules	2	0.00040	0.00080
BC-12LX Pull Stations	5	0.00030	0.00150
<b>TOTAL STANDBY LOAD</b>			<b>0.16410</b>

Regulated Load in ALARM			
Device Type	Number of Devices	Current (Amps)	Total Current (Amps)
MS-9200UDLS Main Circuit Board	1	0.27500	0.27500
ANN-80 Remote Annunciator	1	0.04000	0.04000
Max Alarm Draw - All Addressable Devices	1	0.40000	0.40000
MC-2 (See voltage drop calc for device quantity)	1	0.35000	0.35000
MC-3	1	0.35000	0.35000
<b>TOTAL ALARM LOAD</b>			<b>2.08200</b>

Battery Requirements			
Standby Load	0.16410	X	24.00000 = 3.93940
Alarm Load	2.08200	X	0.08533 = 4.11750
Total Ampere Hours (before derating factor)			4.11750
Derating Factor		X	1.2
<b>TOTAL AMPERE HOURS REQUIRED</b>			<b>4.93428</b>

**BATTERIES TO BE PROVIDED (2 - 12V) = 7 AH**

### NAC Circuit Voltage Drop Calculation

10/16/2014

SHALOM HOUSE - PORTLAND			
Project Name	Circuit Number	Nominal System Voltage	Minimum Device Voltage
SHALOM HOUSE - PORTLAND	NAC-1	20.4 volts	18 volts
		Wire Gauge	14
		Resistance Per 1000	6.14
		Max Output Current	1.51 amps
		Distance from source to 1st device	0.257 miles
		Wire Gauge for balance of circuit	14

Circuit is within limits			
Device	Current	Distance previous device	Voltage at Device
Device 1	0.212		20.38
Device 2	0.107	30	20.28
Device 3	0.017	17	20.23
Device 4	0.017	13	20.19
Device 5	0.017	13	20.15
Device 6	0.212	2	20.15
Device 7	0.017	17	20.14
Device 8	0.017	13	20.13
Device 9	0.017	21	20.13
<b>Totals</b>	<b>0.757</b>	<b>135</b>	<b>0.27</b>

NAC Circuit Voltage Drop Calculation			
Project Name	SHALOM HOUSE - PORTLAND	Circuit Number	NAC-2
Nominal System Voltage	20.4 volts	Minimum Device Voltage	18 volts
Distance from source to 1st device	50	Wire Gauge	14
Resistance Per 1000	6.14	Max Output Current	1.31 amps
Distance from source of circuit	0.305 miles	Total Circuit Current	0.305 amps

Circuit is within limits			
Device	Current	Distance previous device	Voltage at Device
Device 1	0.017		20.31
Device 2	0.017	21	20.27
Device 3	0.079	14	20.25
Device 4	0.079	14	20.23
Device 5	0.079	14	20.22
Device 6	0.017	14	20.22
Device 7	0.017	21	20.21
<b>Totals</b>	<b>0.305</b>	<b>148</b>	<b>0.19</b>

NAC Circuit Voltage Drop Calculation			
Project Name	SHALOM HOUSE - PORTLAND	Circuit Number	NAC-3
Nominal System Voltage	20.4 volts	Minimum Device Voltage	18 volts
Distance from source to 1st device	60	Wire Gauge	14
Resistance Per 1000	6.14	Max Output Current	1.31 amps
Distance from source of circuit	0.305 miles	Total Circuit Current	0.305 amps

Circuit is within limits			
Device	Current	Distance previous device	Voltage at Device
Device 1	0.017		20.27
Device 2	0.079	8	20.24
Device 3	0.079	19	20.23
Device 4	0.079	9	20.23
Device 5	0.079	9	20.22
Device 6	0.017	20	20.22
Device 7	0.017	8	20.22
<b>Totals</b>	<b>0.305</b>	<b>133</b>	<b>0.18</b>

### GENERAL NOTES:

- THESE DRAWINGS ARE DIAGRAMMATIC. REFER TO THE ARCHITECTURAL DRAWINGS FOR EXACT DIMENSIONS.
- INSTALLATION SHALL COMPLY WITH NEC, NFPA 72 AND ALL OTHER APPLICABLE CODES AS REQUIRED BY THE LOCAL AUTHORITY HAVING JURISDICTION.
- WIRING DEPICTED ON THESE PLANS IS SCHEMATIC - ACTUAL WIRE LOCATIONS MAY DIFFER FROM THESE PLANS. WIRING SHALL BE PERFORMED AS ACTUAL BUILDING CONSTRUCTION CONDITIONS ALLOW AND TO MINIMIZE PENETRATIONS THROUGH AREA LONG AS NO 110V OR HIGHER VOLTAGE CABLES ARE IN THE SAME RACEWAY.
- FIRE RATINGS SHALL BE MAINTAINED FOR ALL PENETRATIONS THROUGH FIRE-RATED CONSTRUCTION.
- POWER FOR ALL FIRE ALARM PANELS AND FIRE ALARM POWER SUPPLIES MUST BE PROVIDED BY A DEDICATED AC BRANCH CIRCUIT.
- POWER-LIMITED AND NONPOWER-LIMITED CIRCUIT WIRING MUST REMAIN SEPARATED IN CABINET. ALL POWER-LIMITED CIRCUIT WIRING FURTHERMORE AT LEAST 0.25" AWAY FROM ANY NONPOWER-LIMITED CIRCUIT WIRING. FURTHERMORE ALL POWER-LIMITED AND NONPOWER-LIMITED CIRCUIT WIRING MUST ENTER AND EXIT THE CABINET THROUGH DIFFERENT KNOCK OUTS AND/OR SEPARATE CONDUITS.
- WHEN UTILIZING CLASS "A" CIRCUITS SEPARATE OUTGOING AND RETURN CONDUCTORS OF CLASS "A" CIRCUITS BY A MINIMUM OF 12" WHERE RUN VERTICALLY AND 48" WHERE RUN HORIZONTALLY.
- WHEN UTILIZING SHIELDED CABLE THE SHIELDS THROUGH AND INSULATE AT EACH JUNCTION BOX, INSULATE AND TAP BACK AT END.
- ALL FIRE ALARM CABLING SHALL BE ACCEPTABLE TO THE FIRE ALARM EQUIPMENT MANUFACTURER FOR THE INTENDED PURPOSE.
- SMOKE DETECTORS SHALL NOT BE INSTALLED UNTIL AFTER CONSTRUCTION CLEAN-UP IS COMPLETED AND FINAL.
- LOCATE SMOKE DETECTORS A MINIMUM OF THREE (3) FEET FROM MECHANICAL DIFFUSERS, WALL-MOUNTED SMOKE DETECTORS SHALL BE LOCATED A MINIMUM OF 4" AND A MAXIMUM OF 12" FROM CEILING, CEILING-MOUNTED SMOKE DETECTORS SHALL BE MOUNTED ON CEILINGS AND NOT ON THE BOTTOMS OF BEAMS OR JOISTS.
- PROVIDE SYNCHRONIZATION OF ALL VISUAL NOTIFICATION APPLIANCE CIRCUITS. CONNECTION BETWEEN ALL SYNC MODULES, PROVIDE A MULTI-SYNC MODE SLAVE WITH FIRE ALARM CONTRACTOR.
- VERIFY ALL FIELD SELECTABLE AUDIBILITY SETTINGS OF NOTIFICATION APPLIANCES WITH FIRE ALARM CONTRACTOR.
- UPON COMPLETION OF THE FIRE ALARM SYSTEM INSTALLATION AND PROGRAMMING, THE INSTALLING CONTRACTOR SHALL PERFORM FINAL TESTING OF THE ENTIRE SYSTEM, PER ALL APPLICABLE CODES, AND SHALL COORDINATE AND PERFORM A FINAL FIRE ALARM SYSTEM INSPECTION.
- PROVIDE OFF-SITE MONITORING AS REQUIRED BY THE INTERNATIONAL FIRE CODE, SECTION 907.15 AND THE LOCAL AUTHORITY HAVING JURISDICTION.
- INSTALLING CONTRACTOR SHALL, PHYSICALLY LABEL ALL INITIATING DEVICES AND NOTIFICATION APPLIANCE CIRCUIT END OF LINE (WHEN WIRING CLASS "B"), THESE LABELS SHALL BE IN PLACE PRIOR TO START-UP AND TESTING.

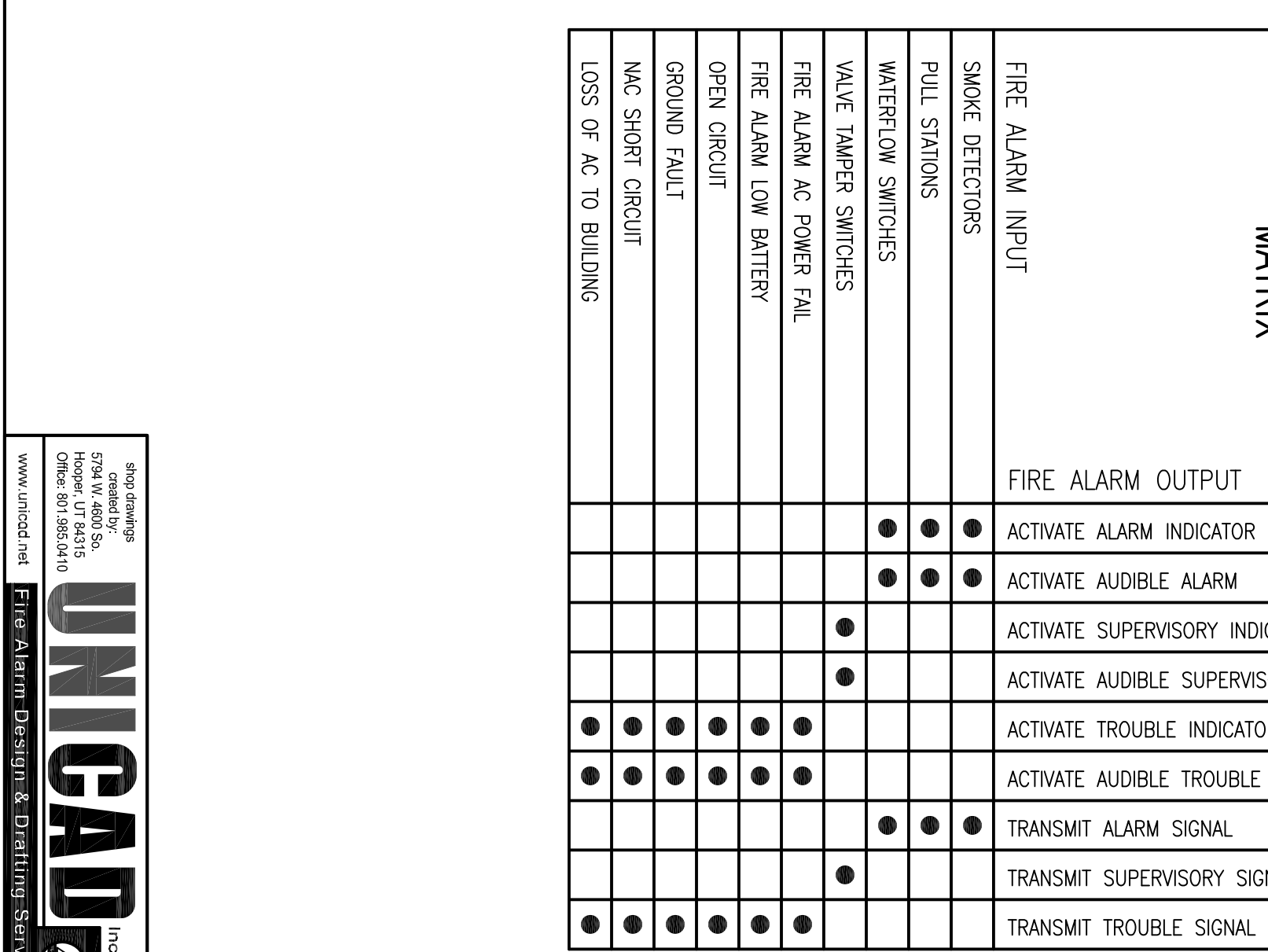
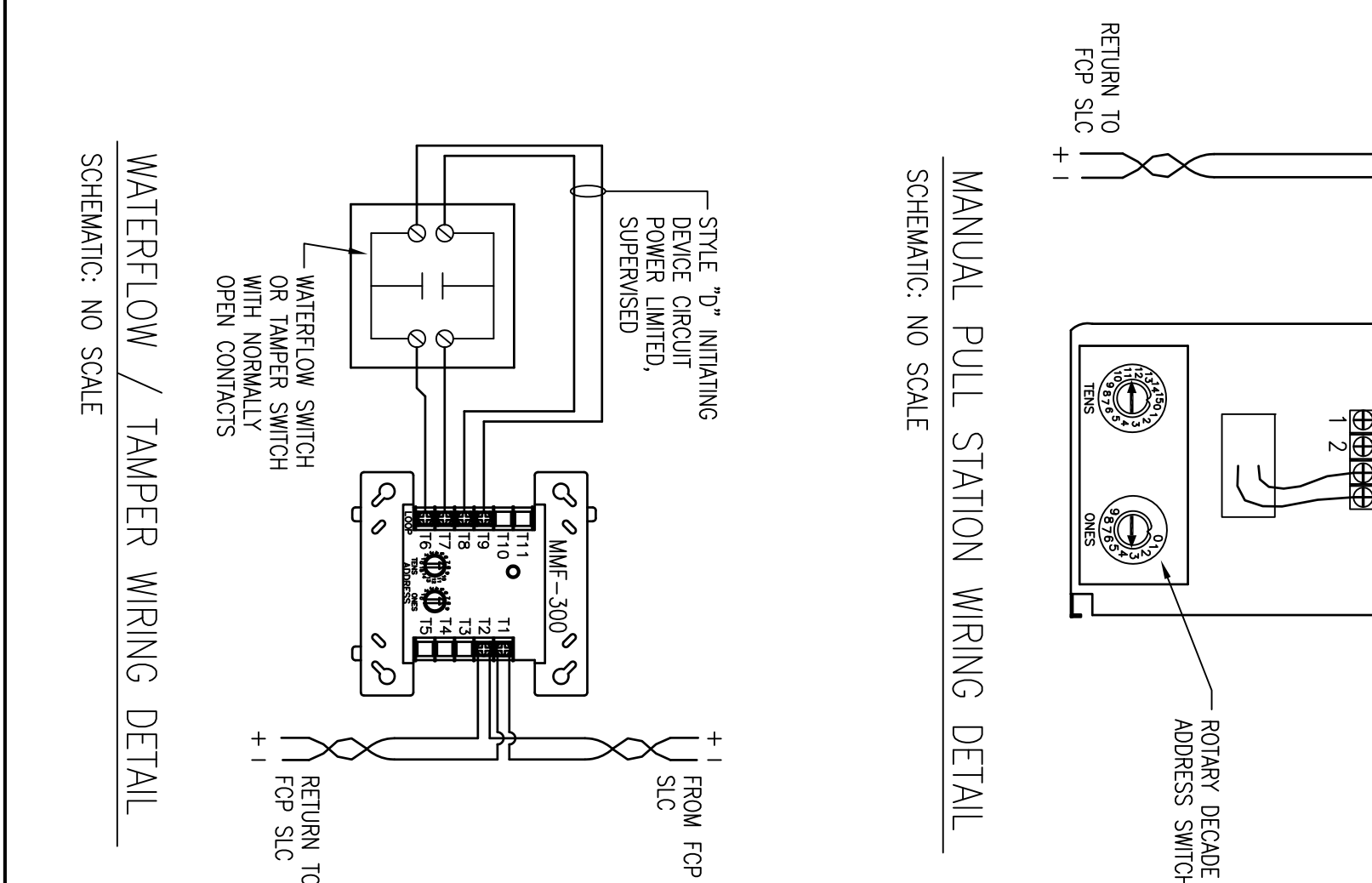
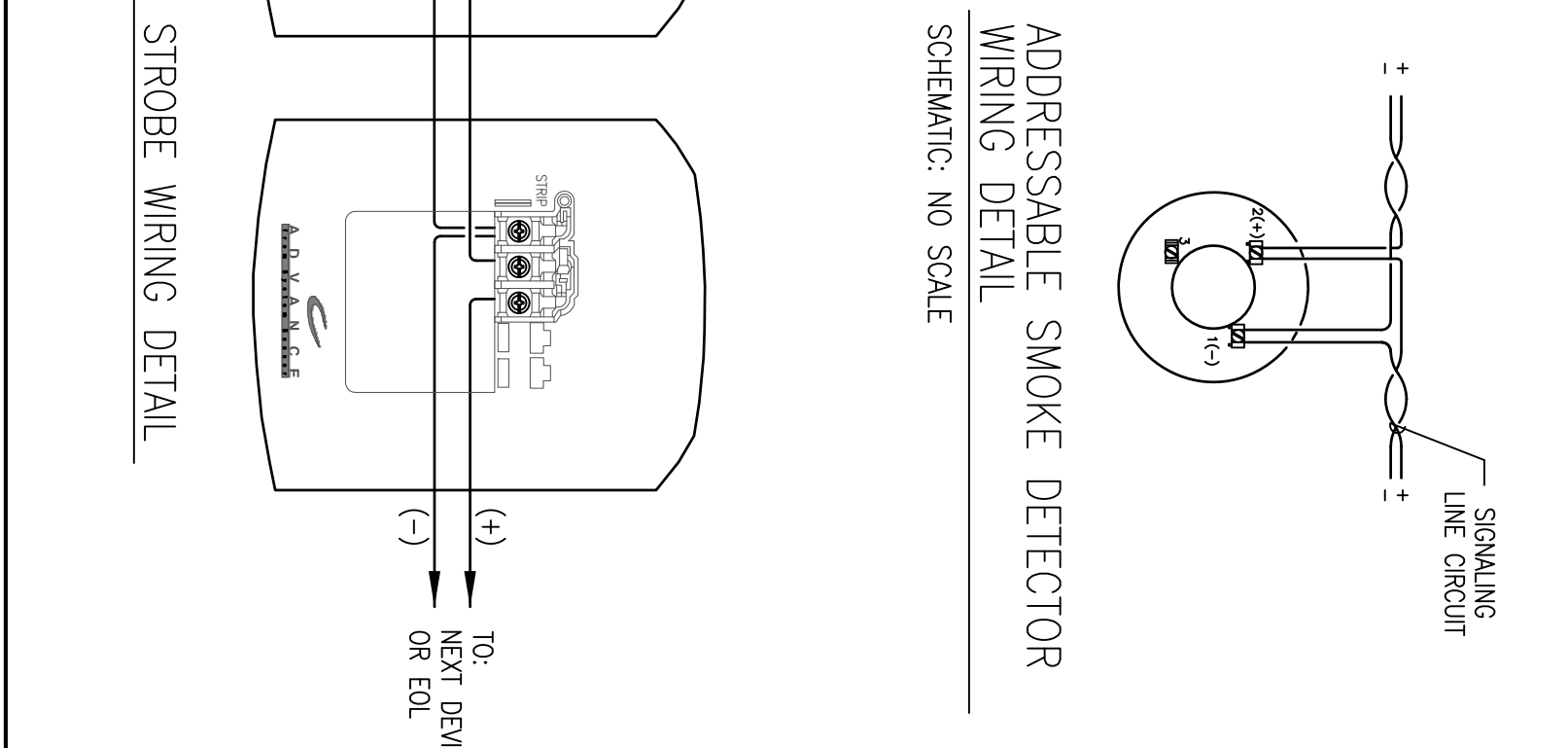
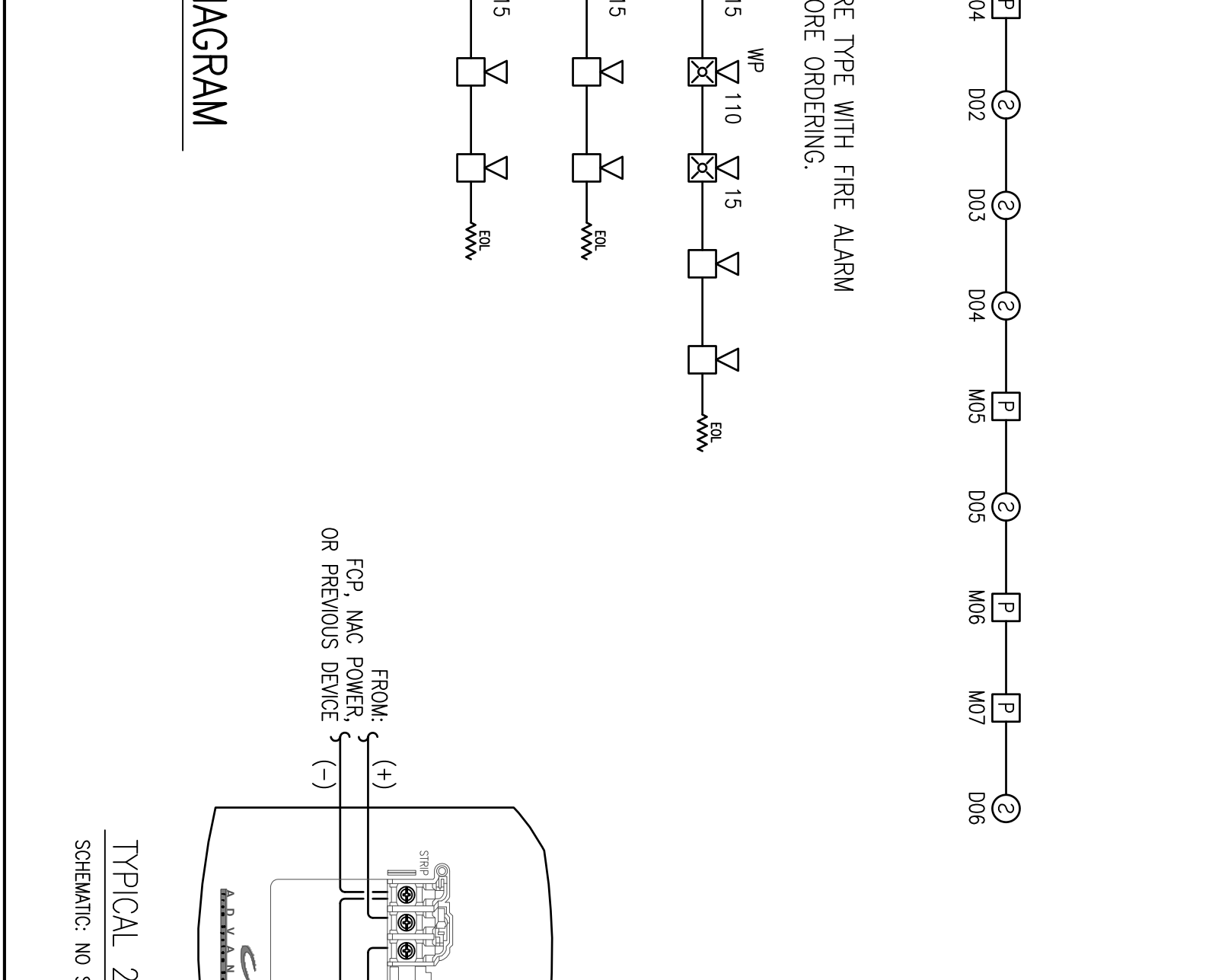
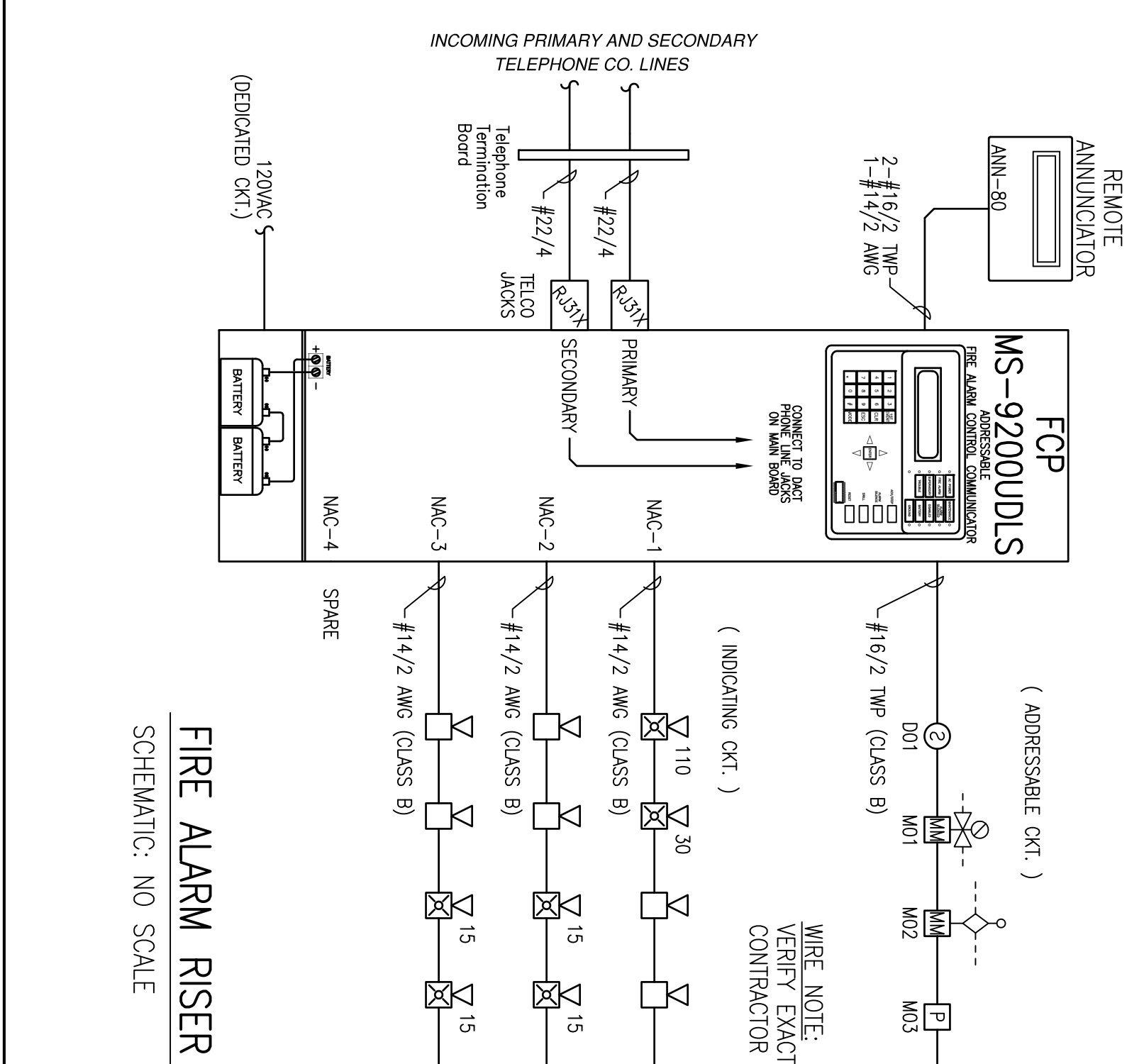
### FIRE ALARM SYMBOL LEGEND

SYMBOL	DESCRIPTION	MOUNTING
FCP	FIRE ALARM CONTROL PANEL	WALL-TOP @ 66"
FPS	FIRE ALARM POWER SUPPLY	FIELD VERIFY
FSA	FIRE SYSTEM ANNUNCIATOR	WALL-TOP @ 66"
FSD	FIRE/SMOKE DAMPER	BY OTHERS
SD	SMOKE DETECTOR	CEILING
SDS	DUCT SMOKE DETECTOR	BY OTHERS
①	HEAT DETECTOR	CEILING
AM	ADDRESSABLE CONTROL MODULE	FIELD VERIFY
MM	ADDRESSABLE MONITOR MODULE	FIELD VERIFY
P	MANUAL PULL STATION	FIELD VERIFY
FR	CONTROL RELAY (MULTI-VOLTAGE)	FIELD VERIFY
RM	ADDRESSABLE RELAY MODULE	FIELD VERIFY
MD	MAGNETIC DOOR HOLDER	FIELD VERIFY
WF	WATER FLOW SWITCH	BY OTHERS
TS	VALVE TAMPER SWITCH	BY OTHERS
CS	BELL	BY OTHERS
CS	CEILING MOUNT STROBE	FIELD VERIFY
CS	CEILING MOUNT HORN / STROBE	FIELD VERIFY
CS	CEILING MOUNT SPEAKER / STROBE	FIELD VERIFY
CS	HORN	WALL @ 10'-0"
CS	HORN / STROBE	WALL 80" -96"
CS	SPEAKER / STROBE	WALL 80" -96"
CS	SPEAKER	WALL @ 90"
CS	STROBE	WALL 80" -96"

### APPLICABLE CODES:

MAINE UNIFORM ENERGY & BUILDING CODE  
 PORTLAND CITY CODE CHAPTER 10, FIRE PREVENTION & PROTECTION  
 NFPA 1, FIRE CODE, & NFPA 101, LIFE SAFETY CODE

OPERATIONS MATRIX	
INPUT	OUTPUT
FIRE ALARM INPUT	FIRE ALARM OUTPUT
SMOKE DETECTORS	ACTIVATE ALARM INDICATOR
PULL STATIONS	ACTIVATE AUDIBLE ALARM
VALVE TAMPER SWITCHES	ACTIVATE SUPERVISORY INDICATOR
FIRE ALARM AC POWER FAIL	ACTIVATE AUDIBLE SUPERVISORY SIGNAL
FIRE ALARM LOW BATTERY	ACTIVATE TROUBLE INDICATOR
OPEN CIRCUIT	ACTIVATE AUDIBLE TROUBLE INDICATOR
GROUND FAULT	TRANSMIT ALARM SIGNAL
NAC SHORT CIRCUIT	TRANSMIT SUPERVISORY SIGNAL
LOSS OF AC TO BUILDING	TRANSMIT TROUBLE SIGNAL



<p><b>SHALOM HOUSE</b>                  214 DANFORTH STREET                  PORTLAND, MAINE 04102  <b>CALCS, DETAILS, LEGEND, MATRIX, NOTES</b></p>	<p><b>CUNNINGHAM</b>                  Security Systems                  10 Princes Point Road, Yarmouth, Maine 04096                  Office: 207.846.3350 • Fax: 207.846.6080</p>	<table border="1"> <thead> <tr> <th>REVISION</th> <th>DESCRIPTION</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>ISSUED FOR REVIEW &amp; APPROVAL</td> <td>10/17/2014</td> </tr> </tbody> </table>	REVISION	DESCRIPTION	DATE	0	ISSUED FOR REVIEW & APPROVAL	10/17/2014
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<p>DRAWN: JPB UNICAD JOB #14664                  CHECKED: WAYNE B. HAWK NCEIT IV 90496                  DATE: 10/17/2014                  SCALE: NONE</p>	<p>RESERVED FOR CITY STAMP</p>	<p>FA-1</p>						