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GEMC-NAC7L / GEMC-NAC7S SUPERVISED NAC EXTENDER INSTALLATION INSTRUCTIONS

WI1821 08/10

The GEMC 7-Ampere NAC Extender includes 2 models: The **GEMC-NAC7L** (used with the large enclosure) and **GEMC-NAC7S** (used with the small enclosure).

Notification Appliance Circuits (NAC's)

A Notification Appliance Circuit is a circuit or path directly connected to a *notification appliance*, i.e. any audible, tactile or visual signal--or any combination thereof--employed to indicate a fire, supervisory or trouble condition.

The Gemini C-Series control panels comply with National Fire Protection Association (NFPA) requirements for temporal pulse sounding of fire notification appliances. Use only the specified UL Listed notification appliances. **Note:** For IN-DOOR / DRY LOCATION USE ONLY.

OVERVIEW

The GEMC-NAC7S or GEMC-NAC7L (referred to as "GEMC-NACXX" throughout this manual) can be used as either:

- A UL864 9th edition accessory to a Gemini C-Series Combination Fire & Burglary Alarm control panel

--or--

- A UL864 9th edition NAC Extender for use with any listed Fire Alarm Control Panel (FACP)

The dual nature of the GEMC-NACXX requires this manual be divided into two individual sections: When the GEMC-NACXX is used with the Gemini C-Series control panels, proceed to the next section named "**GEMINI C-SERIES OPERATION**" directly below. When used with a listed Fire Alarm Control Panel as a stand-alone NAC Extender, stop here and turn to page 21.

GEMINI C-SERIES OPERATION

INTRODUCTION

When used with a Gemini C-Series control panel, the GEMC-NACXX functions as if it were two separate modules, an **External Output** ("Fire NAC Extender" board) with 7 of the 8 outputs utilized (the first 4 supervised) and a **4-Zone EZM** (Expansion Zone Module) used to send the status of a device (AC ON/OFF, BATTERY GOOD/TBL, GROUND FAULT and TAMPER) to the C-Series control panel.

The GEMC-NACXX is wired to the 4-wire fire bus of the C-Series control panel, and provides:

- 4-Supervised Outputs suitable as 24V, maximum 2A each, combined 6.5A maximum regulated Notification Appliance Circuits. These outputs can be configured as:
 - 4 Class B or
 - 1 Class A and 2 Class B or
 - 2 Class A
- 3-Unsupervised Form-C Dry relay outputs activated by a programmed event generated by the Gemini C-Series control panel (the 8th output is not used)
- One supervised, isolated GEMC-Remote Bus interface
- One normally-closed (N/C) housing tamper input, identified by trouble on dedicated integral EZM zone
- Isolated integral ground-fault detection circuit (detects

1.25KΩ to ground or less)

- One isolated input (terminals 1-2) to synchronize "Smart" outputs (Listed *Wheelock* or *System Sensor* horns/strobes) with other outputs from the C-Series motherboard or other GEMC-NACXX devices
- Power supply contains integral battery charger capable of charging up to 4 pairs of 7AH / 7.5AH / 8AH sealed lead acid or gel type 12V batteries. **Note:** All batteries must be of the same AH rating.
- The system monitors for low battery, no battery, brown-out and monitors battery charging circuit voltage, identified by battery trouble on dedicated integral EZM zone
- Remote bus interface and two Inputs are isolated, thus allowing for separate ground fault detection and annunciation
- Allows audible notification appliances (horns) to be silenced while visual notification appliances (strobes) continue to operate
- Input allows synchronized *Wheelock/System Sensor* operation between the motherboard or other C-Series NAC circuits, allowing for multiple NAC circuits to be used within the same area
- Each of the 4 NAC circuits are individually supervised for opens or shorts, and will annunciate and report separately
- Solid State over-current protection on the four NAC's

- The maximum number of GEMC-NACXX's can be used on a Gemini C-Series control panel is five (5), thus allowing for a maximum of 20 additional NAC circuits
- Surface/semi-flush cabinet included
- Automatic switchover to stand-by battery when AC Fails
- When configured for 24V Auxiliary Power, it is a Special Application output only listed with the GEMC-24VR. The GEMC-24VR output is Regulated 24VDC, 1A maximum.

SPECIFICATIONS

Electrical Ratings

Input Power:

Primary input power: 120VAC, 50/60Hz, 3A, maximum 15A dedicated branch circuit.

Secondary power: 24V operation, up to eight 12V / 7AH / 7.5AH / 8AH batteries in pairs (7AH-32AH standby).

Fire Bus Input Power Rating: 12.0V Nominal, 8mA.

Output Power:

Total Output Power: 24VDC, 7A maximum, power limited outputs. Each NAC circuit output rated @ 2A maximum.

Optional Auxiliary Output Power: 2A maximum per circuit in alarm; 1.1A @ 24V maximum standby current (depending on batteries utilized) for 24 hours. Any of the 4 NAC's can be used for auxiliary outputs by programming the output with the feature "Reverse Polarity" (see the "NAC/Output Assignment" screen in PCD-Windows Quickloader software). Auxiliary power is 24V Special Applications for use with the GEMC-24VR; these auxiliary outputs are then 24V Regulated.

Supervision:

- AC fail supervision local annunciation, approximate 1 minute delay to prevent nuisance swingers
- Battery presence, low battery supervision and battery charger voltage supervision; combined to generate a common battery trouble
- Remote bus supervised for opens, shorts or ground faults

Additional GEMC-NACXX Specifications:

NAC End-of-Line Resistor: 2.2K ohms (NAPCO

EOL2.2K).

Common Trouble Relay ("Out Relay 5"): 30VDC @ 1A, 30VAC @ .5A Resistive, connect to power limited circuits only.

Common Trouble Relay ("Out Relay 6"): 30VDC @ 1A, 30VAC @ .5A Resistive, connect to power limited circuits only.

Common Trouble Relay ("Out Relay 7"): 10A / 120VAC; 2.5A / 30VAC / DC Resistive Load.

Input control circuit: 10-30VDC @ 20mA maximum.

Operating Temperature: 32°F to 120°F (0°C to 49°C).

Operating Humidity: Maximum 85% relative humidity @ 30°C.

Housing

The GEMC-NACXX comes complete with 7A power supply, enclosure and ample room for standby batteries. Two models are available, as determined by the size of the enclosure:

Enclosure Dimensions (W x H x D, Inches):

- The **GEMC-NAC7S** uses the small housing with sufficient room for two pair of 12V standby batteries (model **GEMC-HSKIT1416**, size 14.25" x 16" x 5.25")
- The **GEMC-NAC7L** uses the large housing with room for four pairs of 12V standby batteries (model **GEMC-HSKIT1425**, size 14.25" x 24" x 5.25")

Programming


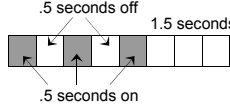
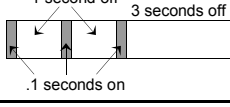

When used with a Gemini C-Series control panel, the GEMC-NACXX must be programmed using PCD-Windows Quickloader download software, and the GEMC-NACXX PC board must be configured correctly with its jumper options. For Programming, turn to page 6.

AGENCY LISTINGS:

- UL Listed Control Units and Accessories for Fire Alarm Systems (UL864 9th edition)*
- CSFM - California State Fire Marshal Approved*
- NFPA 72 compliant

*pending

C-Series Programmable Cadence Options

#	Name	Description (Patterns repeat until condition is cleared)
00	Constant	Continuous Sound (Note: This is the only pattern that can be used for relay circuits).
01	March Code	 .5 seconds on. 5 seconds off
02	ANSI 3.41	 .5 seconds on .5 seconds off 1.5 seconds off
03	Single Stroke	 1 second off 3 seconds off .1 seconds on
04	California	 5 seconds on 10 seconds off

GEMC-Series NAC Maximum Line Impedance: 1.8 ohms

AWG	RESISTANCE /1000 FEET	DISTANCE WITH 2A LOAD (FEET)	DISTANCE WITH 1A LOAD (FEET)	DISTANCE WITH 500MA LOAD (FEET)
18	6.6	125	250	500
16	4.2	200	400	800
14	2.6	325	650	1300
12	1.7	500	1000	2000

Coded Alarms / Cadences by Zone

An initiating zone can be individually programmed, using PCD-Windows Quickloader, to activate one of thirty available coded alarms/cadences on NAC circuits.

This feature is primarily used to assist in the identification of a particular area of a large facility, such as a hospital, where a certain section of the hospital will sound a particular code during an alarm to allow people to select the correct egress method or path. This feature can also be used to allow schools to prevent evacuations caused by inappropriate use of pull stations. If a pull station is activated, a person with the authority to unlock the GEMC-FK1 Fire keypad (such as a teacher) could quickly identify the location of the activated pull station and determine whether the alarm is warranted. If not, the authorized person would silence the alarm.

Program as follows:

1. Open the **NAC/Output Assignment** screen, click the **NAC/Output Options** tab, then check the **Coded Alarms by Zone** checkbox and the **Coded Alarm** column appears in the **Zone Assignment** screen (Ctrl + Shift + Z). Select a cadence for each zone, as required.
2. Program at least one silence-able NAC output (typically all NAC outputs) for Enable Cadence (in the **NAC/Output Assignment** screen, click the **NAC/Output Assignments** tab, then check the **Enable** checkbox for the selected output in the **Cadence** column.

Coded Alarm Type Options and Cadences

Note: Each pulse (on-off) is in total 500mS. Each inter-digit duration is 750mS. Each inter-round duration is 1.5 seconds.

In the table below, each "1" = [250mS on, 250mS off]. Each "." = [250mS off].

Short Format	Output (2 rounds shown)	Short Format	Output (2 rounds shown)
-	Steady	1-4-4	1...1111...1111.....1...1111...1111.....
1-1-1	1...1...1.....1...1...1.....	2-1-1	11...1...1.....11...1...1.....
1-1-2	1...1...11.....1...1...11.....	2-1-2	11...1...11.....11...1...11.....
1-1-3	1...1...111.....1...1...111.....	2-1-3	11...1...111.....11...1...111.....
1-1-4	1...1...1111.....1...1...1111.....	2-1-4	11...1...1111.....11...1...1111.....
1-2-1	1...11...1.....1...11...1.....	2-2-1	11...11...1.....11...11...1.....
1-2-2	1...11...11.....1...11...11.....	2-2-2	11...11...11.....11...11...11.....
1-2-3	1...11...111.....1...11...111.....	2-2-3	11...11...111.....11...11...111.....
1-2-4	1...11...1111.....1...11...1111.....	2-2-4	11...11...1111.....11...11...1111.....
1-3-1	1...111...1.....1...111...1.....	2-3-1	11...111...1.....11...111...1.....
1-3-2	1...111...11.....1...111...11.....	2-3-2	11...111...11.....11...111...11.....
1-3-3	1...111...111.....1...111...111.....	10-1	1111111111...1.....1111111111...1.....
1-3-4	1...111...1111.....1...111...1111.....	10-2	1111111111...11.....1111111111...11.....
1-4-1	1...1111...1.....1...1111...1.....		
1-4-2	1...1111...11.....1...1111...11.....	-	ANSI 3.41 / Temporal (required in UL 985 Residential Fire installations)
1-4-3	1...1111...111.....1...1111...111.....		

JUMPERS

When used with a Gemini C-Series control panel, the jumpers on the GEMC-NACXX circuit board are used as follows:

NAC OPTIONS: Only jumper 4 "Offset" is used if needed. When more than total combined 4A output is required for synchronized outputs, this jumper must be shunted. This offsets NAC's 3 and 4 from NAC's 1 and 2 to allow instantaneous current for the synchronized devices. However, note that when shunted, the strobes and horns must not be seen or heard from within the same area. In addition, it should be noted that if a SYNC input from the Gemini C-Series control panel is wired, NAC's 1 and 2 will follow that SYNC 1 (terminals 1 & 2 on the PC board), and NAC's 3 and 4 will be offset.

NAC ADDR: Allows the GEMC-NACXX to be controlled by the Gemini C-Series control panel. The type "Fire NAC Extender" board must be selected in Quickloader (**External Output Assignment** screen), and the corresponding address of the board selected in Quickloader must be configured into these jumpers (see chart). Only the first 40 outputs can be supervised, thus only the maximum number of GEMC-NACXX's can be used on a Gemini C-Series control panel is five (5).

"NAC ADDR" JUMPER BLOCK (J1)				
ADDRESS NUMBER	OUTPUTS	"NAC ADDR" JUMPER BLOCK (J1)		
		J1-1	J1-2	J1-3
0	FACP Operation*	•	•	•
1	1-8	ON	•	•
2	9-16	•	ON	•
3	17-24	ON	ON	•
4	25-32	•	•	ON
5	33-40	ON	•	ON

*These jumper settings should not be set when used with a Gemini C-Series control panel.

EZM ADDR: Use to configure the integral 4-Zone EZM to send the status of a device (AC ON/OFF, BATTERY GOOD/TBL, GROUND FAULT and TAMPER) to the C-

Series control panel. See page 8 for more information.

INSTALLATION

The GEMC-NACXX must be installed in accordance with NFPA 72 and with article 760 of The National Electrical Code as well as all applicable local codes.

When used with a Gemini C-Series control panel, install the GEMC-NACXX as follows:

1. Select a suitable indoor dry location for the GEMC-NACXX enclosure and 120VAC junction box, ensuring that adequate space is available for mounting the enclosure on a wall with no interference from wires, pipes, or other obstructions. Mount the enclosure using fasteners suitable for the mounting surface. The mounting surface must be capable of supporting the weight of the enclosure, the enclosure door, all batteries and all other items that may be added to the enclosure.
2. Install a 2-gang metal electrical box near the GEMC-NACXX enclosure (ensure the gang box includes a ground stud inside the box). A continuously-powered 120VAC source with a maximum 15A dedicated branch circuit with grounding conductor must be wired by a licensed electrician in accordance with all national and local electrical codes. The 120VAC wires must run into this gang metal electrical box; the three 120VAC wires are hot (black), neutral (white) and earth ground (green or bare copper). Be sure the electrician securely connects the earth ground wire to the ground stud located inside the gang box. (This branch circuit ground must always be first on and last off the ground stud). In addition, ensure the electrician leaves at least 6 inches of additional white and black wiring inside the Integral Gang Box to allow these connections to be made easily. Ensure the 120VAC branch circuit breaker is turned off before proceeding.
3. With the white and black wires in the gang box not yet connected, install the model GEMC-PS24V7A power supply board inside the GEMC-NACXX enclosure.
4. Connect the GEMC-120VACH harness from the wires

LED STATUS INDICATION TABLE (for inputs, outputs & trouble memory status)

LED NAME	OFF	ON	FLASH TYPE*
NAC 1	Normal	Alarm Condition	Trouble Condition (Pulse)
NAC 2	Normal	Alarm Condition	Trouble Condition (Pulse)
NAC 3	Normal	Alarm Condition	Trouble Condition (Pulse)
NAC 4	Normal	Alarm Condition	Trouble Condition (Pulse)
INPUT 1	Normal	Alarm Condition	---
INPUT 2	Normal	Alarm Condition	---
EZM STATUS	No Power	Power, but not receiving panel polls	(Pulse is "normal")**
GND FAULT	Normal	Earth Ground Fault	---
BATT TRB	Normal	Low Battery, no battery or charging circuit trouble	---
AC ON	AC Loss (running on battery)	AC present (with or without battery power)	---
PWR	No Power	Power present	---
POLL RESP	Not responding to panel polls	---	LED flickers when responding to remote bus poll
RLY 5 ACTIVE	Relay OFF	Relay ON	---
RLY 6 ACTIVE	Relay OFF	Relay ON	---
RLY 7 ACTIVE	Relay OFF	Relay ON	---

* May indicate trouble condition. When trouble (open, short or ground) occurs on a specific output, the corresponding red output LED, (NAC 1 - NAC 4) will blink. Loop trouble will report within 200 seconds.

Flashes every time the GEMC-NACXX responds to a poll; typically once every 5 seconds as a **4-Zone NAC EXT (EZM), and once every 1 minute as a **Fire NAC Extender**.

in the gang box to the 3-wire terminals located on the power supply PC board.

Maintenance

The GEMC-NACXX should be tested at least once a year for proper operation as follows:

Output Voltage Test: Under normal load conditions, the DC output voltage should be checked for proper voltage levels.

Battery Test: Under normal load conditions check that the battery is fully charged. Check the voltage at the battery terminal and at the board terminal marked [-BAT +] to insure there is no break in the battery connection wires.

Note: Maximum charging rate is 1.50A, 1.72A or 1.96A, depending on jumper setting. Expected battery life is approximately five years, however it is recommended changing batteries in 3 years or less if needed.

Fuse

Battery fuse is a UL Listed fuse rated 250VAC / 12.5A. If this fuse is blown, a battery trouble will be enunciated (refer to LED Diagnostic Table). Contact service representative for replacement or repair. **CAUTION: For continued protection against risk of fire, replace only with the same type and rating of fuse; see WI1653.**

TERMINAL DESCRIPTIONS

1. (+) INPUT 1

2. (-) INPUT 1

Isolated positive and negative synchronization inputs used to synchronize the output of Smart devices with the "master device" driving the input (the "master device" can be either the C-Series control panel or other NAC extenders).

If synchronizing to the C-Series control panel, wire one of the NAC outputs to the Input 1 terminal (maximum 1000' wire length from GEMC control panel).

If synchronization to a different NAC extender, wire one of the NAC outputs of this other NAC extender to the Input 1 terminal (maximum 1000' wire length from GEMC control panel). If synchronization is not needed, do not wire to these terminals.

Use PCD-Windows Quickloader ("External Output Assignment") to program at least one of the 4 GEMC-NACXX outputs as a "Smart" device. Any NAC "Smart" output will now be synchronized Input 1 terminal with INPUT 1. (See the Jumper "NAC OPTIONS" in the Jumper section).

3. (+) INPUT 2

4. (-) INPUT 2

Not used in this configuration.

5. (+) NAC 1

6. (-) NAC 1

7. (+) NAC 2

8. (-) NAC 2

9. (+) NAC 3

10. (-) NAC 3

11. (+) NAC 4

12. (-) NAC 4

Terminals 5 through 12 are NAC 24V, 2A *regulated* supervised output terminals (terminal polarity is shown in

when in an "active" alarm condition, polarity is reversed from what is shown in "normal" standby mode). These terminals are supervised outputs that provide low impedance output to drive devices such as strobes, bells and horns on any programmed event. In addition, these outputs can be used as Auxiliary outputs by programming them for Reverse Polarity (and no triggering event).

13. (COM) OUT RELAY 5

14. (NC) OUT RELAY 5

15. (NO) OUT RELAY 5

16. (COM) OUT RELAY 6

17. (NC) OUT RELAY 6

18. (NO) OUT RELAY 6

Terminals 13-18 (and 26-28) are fully programmable relays. Each relay can be programmed, using PCD-Windows Quickloader, to be triggered on any event. In addition, the output can be programmed for Reverse Polarity causing them to be normally energized, and thus de-energized during a programmed event.

19. (+) REM (FIRE BUS)

20. (-) PWR (FIRE BUS)

21. GREEN (FIRE BUS)

22. YELLOW (FIRE BUS)

Isolated 4-wire bus terminals wired from the Gemini C-Series control panel terminals 18-21 (maximum 1000' wire length from GEMC control panel).

23. (+) TAMPER

24. (-) TAMPER

Housing tamper terminals. Used with a zone dedicated to "Tamper" within the integral 4-Zone EZM; when a tamper is detected, a report will be sent to the control panel as the 3rd zone of the EZM through the 4-wire fire bus. Use front and back housing tamper switches, normally open when not installed, normally closed in the circuit, and open when activated (we recommend using a GEMC-TAMPERKIT).

Note: The activation of Tamper is reported to the panel using the 3rd zone of the NAC integral EZM; program the integral EZM using the Quickloader **EZM Assignment** screen and **Zone Assignment** screens, as shown in the section "PROGRAMMING", as follows:

Program Zone three of the EZM (Zone # = 8 + 4

(EZM#-1) + 3) for the following:

- Description line 1: "Tamper...OUTPUT BOARD XX" where XX = Output board address;
- Zone Type "Fire Tamper Monitor";
- Adv. Code "Fire Tamper Monitor";
- Area 1.

Note: Tamper can be disabled by not programming the associated zone for Area 1 (Fire), thus leaving the zone undefined with no area assigned.

25. (-) EARTH GND

This terminal is not required to be connected to earth ground. The panel earth ground connection is provided via the 110V ground connection to the housing through the mounting brackets. This terminal is available for future use.

This terminal can also be used to confirm the operation of

the ground fault circuit; a short from this terminal to any NAC circuit terminal should cause a ground fault, causing the ground fault LED to light and the keypad to display a Fire trouble ground fault with the associated zone.

26. (COM) OUT RELAY 7

27. (NC) OUT RELAY 7

28. (NO) OUT RELAY 7

These terminals are placed separately to allow high voltage/non-power limited wires to be connected and be isolated from power-limited wires in the housing.

For descriptions of terminals 26-28, see the above descriptions for terminals 13-18. **Note:** Non-power limited wires must be isolated from power limited wires inside the enclosure (at least a 1/4 inch spacing).

Battery Calculation Worksheet

Units are capable of recharging 32AH battery maximum.

PROGRAMMING

Before programming and configuring the GEMC-NACXX NAC circuits, we suggest you plan your installation by selecting the zones to be used if you plan to install an NAC Extender and / or an EZM. The usual practice is to select the lowest zone numbers available. The EZM programming instructions below use **EZM 1** (zones 9-12) as an example; be sure to select the address numbers suitable for your current installation.

Integral Fire NAC Extender

Configuring the integral External Outputs is performed using the "NAC ADDR" jumper block (J1) as shown on the chart above.

Programming the integral External Outputs must be performed using PCD-Windows Quickloader download software **NAC/Output Assignment** screen: Click the **Board Type** pull down and select **Fire NAC Extender**.

For programming the output options (such as Silenceable,

etc), see the section "NAC SYNCHRONIZATION RULES" further in this manual.

Use the Integral 4-Zone EZM to Monitor GEMC-NACXX Troubles

To program the integral EZM, PCD-Windows Quickloader download software must be used. Before programming, prepare PCD-Windows Quickloader as follows:

1. If not open already, open the **Zone Assignment** screen by pressing **Ctrl+Shift+Z** on the keyboard.
2. If not open already, click **View, Workspace** to open the Workspace panel. Notice the **Zone Assignment** field is highlighted in the Workspace.
3. If the **Zone Type** column is not already displayed, click the **Show Zone Types** button.

To program 4-Zone NAC Extender Troubles:

1. Open the **System Assignment** screen, **EZM Assignments** tab.
2. In the **Type** column for the selected EZM row, click the intersecting field and select **4-Zone NAC Ext** from the **Type** pull-down menu.
If **EZM 1** (zones 9-12) is selected, notice the **Zone Assignment** screen automatically populates each selected zone with its needed attributes, namely "zFire Monitor" for the **Zone Type** and a "1" for the **Area**, and the following for **Description** and **Adv. Code** (Point ID / SIA Reporting Code):

Description

Adv. Code

009-NAC Ext 01 AC Fail TBL	AC Fail
010-NAC Ext 01 Battery TBL	Low Battery
011-NAC Ext 01 Tamper TBL	Fire EZM Tamper
012-NAC Ext 01 Ground Fault TBL	Ground Fault

Note: Tamper zone monitoring is not required by UL or NFPA, and the zone can be changed back to an undefined state, without an Area assigned to the zone.

MAXIMUM AVAILABLE STANDBY CURRENT CALCULATIONS

Configuration	Batteries Used	Total 24V AH	Maximum Available 24V Standby Current (mA)	Maximum 24V Alarm + Standby Current (A)
Fire Only with GEMC-PS24V7A	2 12V 7AH	7	254	3.5
	2 12V 8AH	8	290	4
	4 12V 7AH	14	505	7
	4 12V 8AH	16	580	7
	6 12V 7AH	21	767	7
	6 12V 8AH	24	880	7
	8 12V 7AH	28	1030	7
	8 12V 8AH	32	1100	7

All values are calculated used 10% de-rating factor except for the 32AH configuration, that was evaluated through test

WIRING

Notification Appliance Circuit Supervision

Install a 2.2K end-of-line (EOL) resistor across the last notification appliance on each Notification Appliance Circuit to be supervised.

The Notification Appliance Circuits will not respond unless zones or events are assigned to them.

The Gemini C-Series control panel monitors the Notification Appliance Circuits wiring for open and short circuit faults while the output is inactive. If these troubles occur, a specific indication at the GEMC-FK1 keypad identifies the NAC number; in addition, if programmed, the control panel will send a report to the central station. These NAC circuits also have the ability to be disabled, and have their disabled status reported to the central station.

PROGRAMMING FOR CLASS A

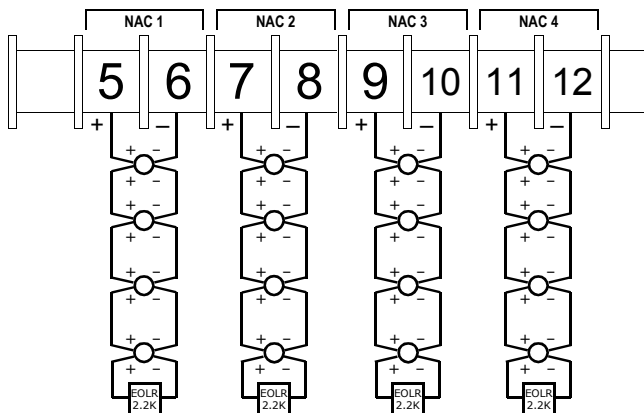
The External Output Assignment screen provides the ability to select Class A operation for NAC 1 / NAC 2 and/or Class A operation for NAC 3 / NAC 4. When selected, the associated NAC's (1 & 2 or 3 & 4) must be programmed to activate for identical events.

Each NAC circuit has a programmable 32 character description that can be associated with the circuit (displays on the Fire keypad when the menu option "Output Directory" or "Outputs Disabled" is selected).

All NAC Output circuits
Class B (Style Y)
Class A (Style Z)

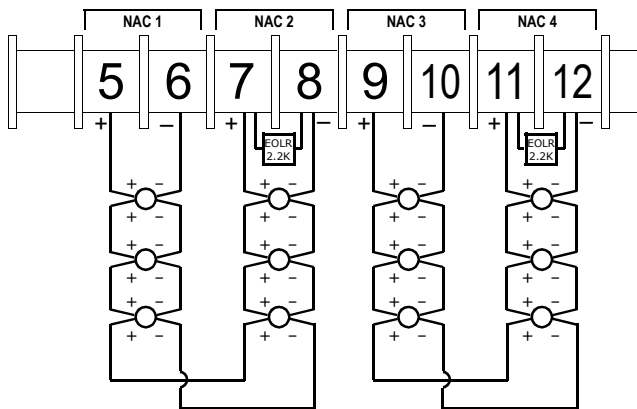
NAC Wiring--4 Class B Circuits

Notification Appliance Circuits, supervised and power-limited



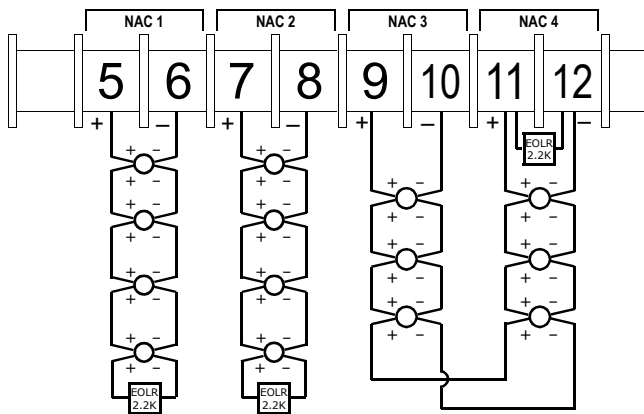
NAC Wiring--2 Class A Circuits

Notification Appliance Circuits, supervised and power-limited



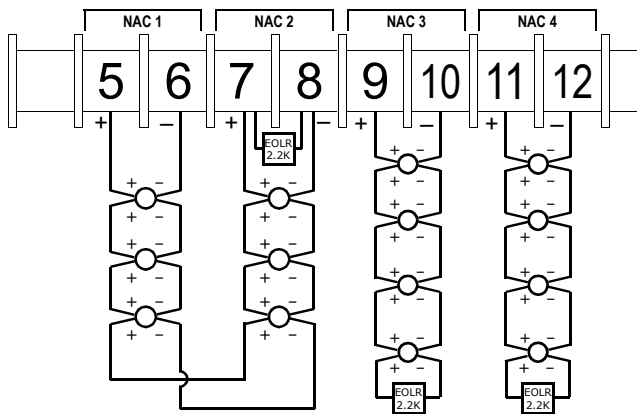
NAC Wiring--2 Class B & 1 Class A

Notification Appliance Circuits, supervised and power-limited



NAC Wiring--1 Class A & 2 Class B

Notification Appliance Circuits, supervised and power-limited

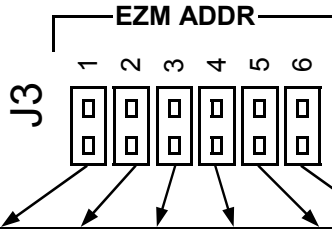


INTEGRAL EZM ADDRESS JUMPERS

The integral EZM Address must be selected for a valid address for the 4 system troubles to be sent back to the panel to be annunciated/ reported. Refer back to the section "PROGRAMMING" to determine the EZM Address to configure.

The expansion zones are divided into consecutively-numbered groups of four. Each 4-zone module comprises one group of zones. Every module must be assigned a unique base address. The base address number is the same as its group number.

Refer to the table below for the "EZM ADDR" address jumper settings. The **Base Address** columns indicate the address that must be configured with the EZM address jumpers below.



Base Address	1	2	3	4	5	6	Zones
1	ON	OFF	OFF	OFF	OFF	OFF	9-12
2	OFF	ON	OFF	OFF	OFF	OFF	13-16
3	ON	ON	OFF	OFF	OFF	OFF	17-20
4	OFF	OFF	ON	OFF	OFF	OFF	21-24
5	ON	OFF	ON	OFF	OFF	OFF	25-28
6	OFF	ON	ON	OFF	OFF	OFF	29-32
7	ON	ON	ON	OFF	OFF	OFF	33-36
8	OFF	OFF	OFF	ON	OFF	OFF	37-40
9	ON	OFF	OFF	ON	OFF	OFF	41-44
10	OFF	ON	OFF	ON	OFF	OFF	45-48
11	ON	ON	OFF	ON	OFF	OFF	49-52
12	OFF	OFF	ON	ON	OFF	OFF	53-56
13	ON	OFF	ON	ON	OFF	OFF	57-60
14	OFF	ON	ON	ON	OFF	OFF	61-64
15	ON	ON	ON	ON	OFF	OFF	65-68
16	OFF	OFF	OFF	OFF	ON	OFF	69-72
17	ON	OFF	OFF	OFF	ON	OFF	73-76
18	OFF	ON	OFF	OFF	ON	OFF	77-80
19	ON	ON	OFF	OFF	ON	OFF	81-84
20	OFF	OFF	ON	OFF	ON	OFF	85-88
21	ON	OFF	ON	OFF	ON	OFF	89-92
22	OFF	ON	ON	OFF	ON	OFF	93-96
23	ON	ON	ON	OFF	ON	OFF	97-100
24	OFF	OFF	OFF	ON	ON	OFF	101-104
25	ON	OFF	OFF	ON	ON	OFF	105-108
26	OFF	ON	OFF	ON	ON	OFF	109-112
27	ON	ON	OFF	ON	ON	OFF	113-116
28	OFF	OFF	ON	ON	ON	OFF	117-120
29	ON	OFF	ON	ON	ON	OFF	121-124
30	OFF	ON	ON	ON	ON	OFF	125-128
31	ON	ON	ON	ON	ON	OFF	129-132

Quickloader Zone Assignments

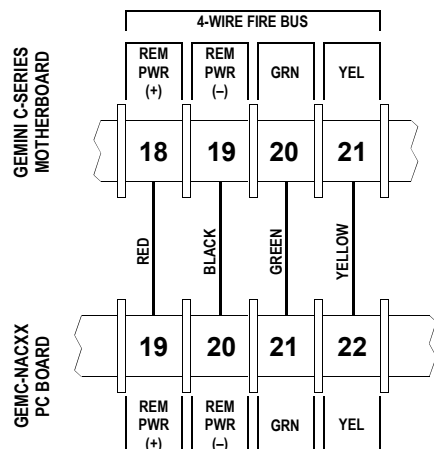
In the Quickloader, select the EZM type in the **System Assignment** screen, click the **EZM Assignments** tab and select the **Type** pull-down menu, select "4 Zone NAC Ext". This will cause the associated zones to be filled with the descriptions and features shown in the "Quickloader Zone Assignments (4 Zone NAC Ext)" table, below.

Quickloader Zone Assignments (4 Zone NAC Ext)			
Zn	Description	Zone Type	Adv. Code
13	013-NAC Ext xx AC Fail TBL	zFire Monitor	AC Fail
14	014-NAC Ext xx Battery TBL	zFire Monitor	Low Battery
15	015-NAC Ext xx Tamper TBL	zFire Monitor	Fire EZM Tamper
16	016-NAC Ext xx Ground Fault TBL	zFire Monitor	Ground Fault

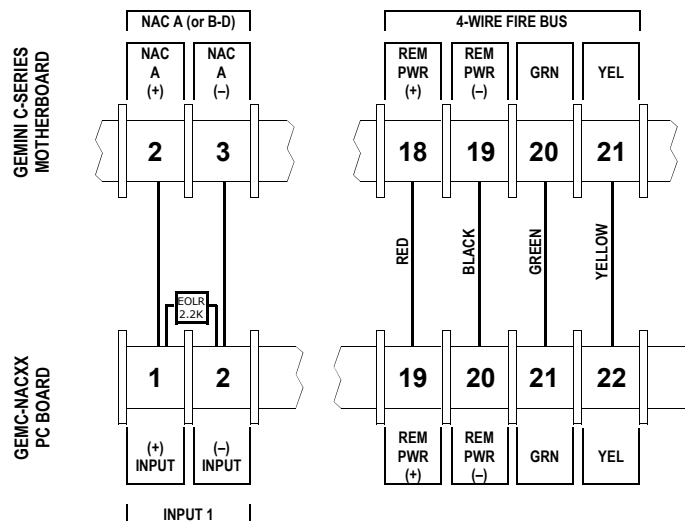
Base Address	1	2	3	4	5	6	Zones
32	OFF	OFF	OFF	OFF	OFF	ON	133-136
33	ON	OFF	OFF	OFF	OFF	ON	137-140
34	OFF	ON	OFF	OFF	OFF	ON	141-144
35	ON	ON	OFF	OFF	OFF	ON	145-148
36	OFF	OFF	ON	OFF	OFF	ON	149-152
37	ON	OFF	ON	OFF	OFF	ON	153-156
38	OFF	ON	ON	OFF	OFF	ON	157-160
39	ON	ON	ON	OFF	OFF	ON	161-164
40	OFF	OFF	OFF	ON	OFF	ON	165-168
41	ON	OFF	OFF	ON	OFF	ON	169-172
42	OFF	ON	OFF	ON	OFF	ON	173-176
43	ON	ON	OFF	ON	OFF	ON	177-180
44	OFF	OFF	ON	ON	OFF	ON	181-184
45	ON	OFF	ON	ON	OFF	ON	185-188
46	OFF	ON	ON	ON	OFF	ON	189-192
47	ON	ON	ON	ON	OFF	ON	193-196
48	OFF	OFF	OFF	OFF	ON	ON	197-200
49	ON	OFF	OFF	OFF	ON	ON	201-204
50	OFF	ON	OFF	OFF	ON	ON	205-208
51	ON	ON	OFF	OFF	ON	ON	209-212
52	OFF	OFF	ON	OFF	ON	ON	213-216
53	ON	OFF	ON	OFF	ON	ON	217-220
54	OFF	ON	ON	OFF	ON	ON	221-224
55	ON	ON	ON	OFF	ON	ON	225-228
56	OFF	OFF	OFF	ON	ON	ON	229-232
57	ON	OFF	OFF	ON	ON	ON	233-236
58	OFF	ON	OFF	ON	ON	ON	237-240
59	ON	ON	OFF	ON	ON	ON	241-244
60	OFF	OFF	ON	ON	ON	ON	245-248
61	ON	OFF	ON	ON	ON	ON	249-252

WIRING DIAGRAMS FOR SINGLE AND MULTIPLE NAC EXTENDERS

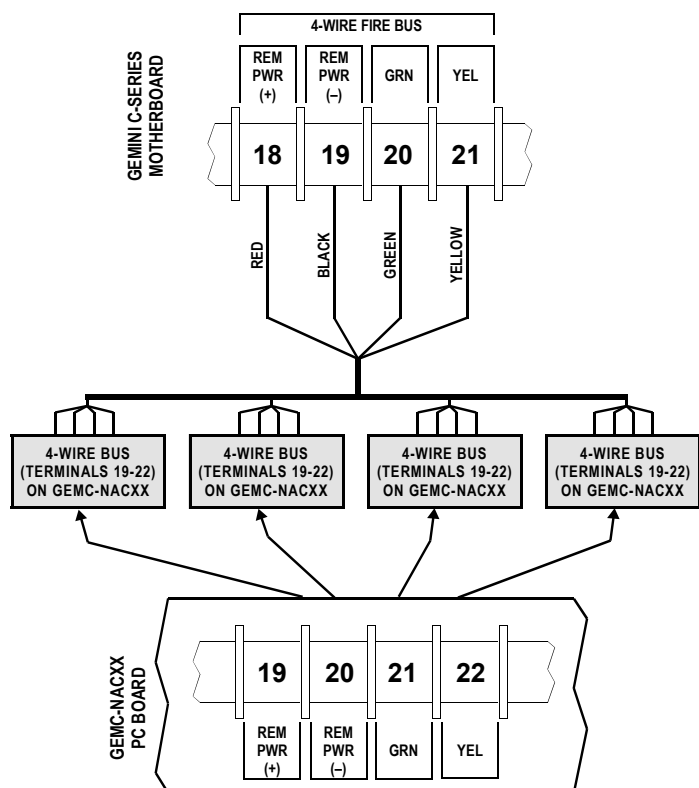
Single NAC Extender (Unsynchronized)



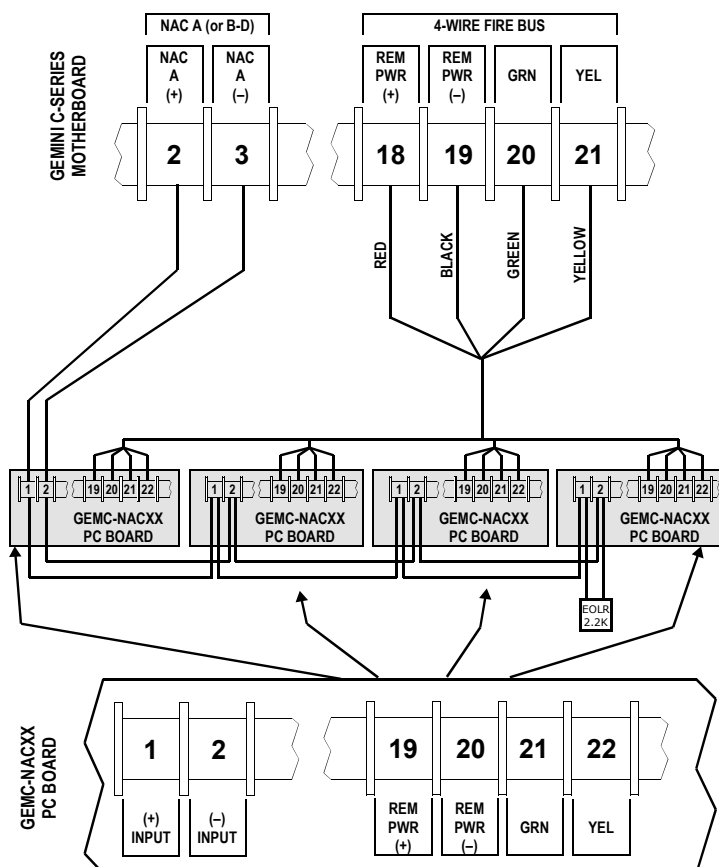
Single NAC Extender (Synchronized)



Multiple NAC Extenders (Unsynchronized)



Multiple NAC Extenders (Synchronized)



NAC SYNCHRONIZATION RULES

The UL 864 9th edition standard includes the requirement that *all visible notification appliances in the same field of view and all audible notification appliances in the same notification zone* operate in a synchronized manner.

The Gemini C-Series control panels and NAC extenders comply with this standard with three different methods that must be understood before a final installation method is selected.

DEFINITIONS

1. **NAC Circuit:** One of 4 possible outputs on either the GEMC-NACXX or GEMC-XXXMB. Each NAC circuit can deliver UP TO 2.0A.
2. **Notification Zone:** A common evacuation area. Multiple circuits can be in a zone.
3. **Field of View:** All the strobes that can be seen by an individual at any point WITHIN the protected premises.
4. **Sync Pattern:** The GEMC-NACXX or GEMC-XXXMB have two sync patterns: S1 and S2. A synchronized NAC output must be assigned to S1 or S2. The two sync patterns are ½ second apart as shown in Fig 1 below. S2 is referred to as the "offset" since it is offset ½ second from S1.
5. **Sync Group:** A collection of NAC circuits on the GEMC-XXXMB and one or multiple GEMC-NACXX's sharing the same sync pattern.
6. **Sync Input:** An input connection that allows a GEMC-NACXX to synchronize its sync patterns to the main panel or to another GEMC-NACXX.

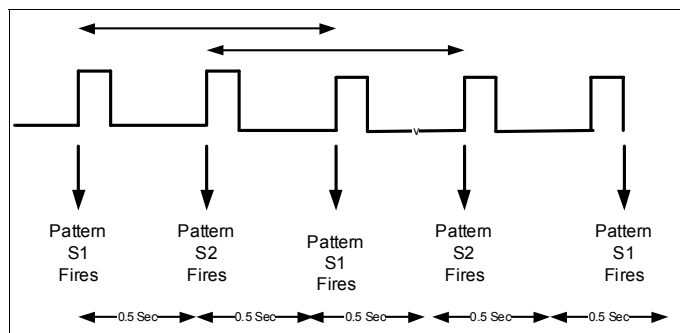


FIG. 1: TWO SYNC PATTERNS ARE ½ SECOND APART

Method 1 (Standard Temporal)

Most installations only require synchronized strobes and synchronized temporal sounding appliances. The easiest method used to comply with this requirement is to use either the compatible Wheelock or System Sensor "Smart" devices, as listed in the GEMC-XXXMB installation instructions (WI1653). When these are used, the strobes and horns can share the same NAC wires, reducing the number, length and complexity of wire runs. The following rules apply:

Rule 1: "Smart" devices must either be System Sensor or Wheelock, but both can not be used in the same system.

Rule 2: The total current from the combined NAC circuits on one GEMC-XXXMB or NAC7L/7S sharing the same sync pattern cannot exceed 4A. [Example: NAC A and B synched to S1 draw 4A and NAC C and D are off-

set using S2 for a total of 2.5A].

Rule 3: All notification appliances in the same field of view must use the same sync pattern.

The maximum current draw from "Smart" (Synchronized) circuits on either the GEMC-XXXMB or GEMC-NACXX can not exceed 4A (non-synchronized NAC circuits can draw a maximum 6.5A from the NAC's) if all visible notification appliances are in the same field of view and all audible notification appliances are in the same notification zone.

However, if there are two or more Sync Groups, then the full 6.5A maximum alarm current can be utilized by wiring one group to the first two NAC's, wiring the second group to the third and fourth NAC's and programming/configuring the GEMC-XXXMB / GEMC-NACXX for "NAC offset". This will cause the 2 pairs of NAC circuits to activate the strobes and horns ½ a second apart.

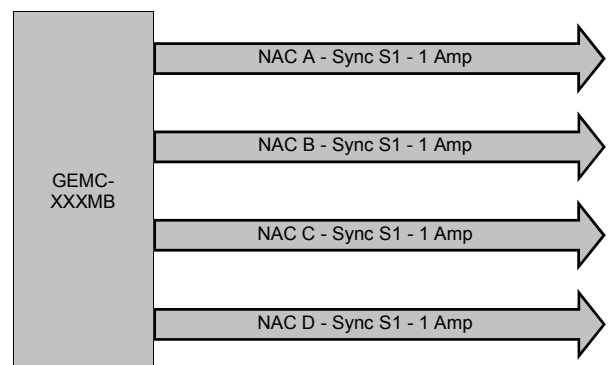
Note: Each NAC maximum current is 2A. **Warning:** Strobes not within the same sync group may never be within the same field of view.

Rule 4: If a group of notification appliances in the same field of view and all audible notification appliances in the same notification zone require more than 4A, an additional GEMC-NACXX must be used and synchronized using a dedicated NAC circuit from a master GEMC-XXXMB or GEMC-NACXX wired to the INPUT 1 of the slave GEMC-NACXX.

Rule 5: In large systems with multiple groups of notification appliances in the same field of view and all audible notification appliances in the same notification zone, the maximum alarm current of each GEMC-XXXMB / GEMC-NACXX can be utilized by programming / configuring the GEMC-XXXMB / GEMC-NACXX for "NAC offset" and grouping all non-offset outputs together and offset outputs together.

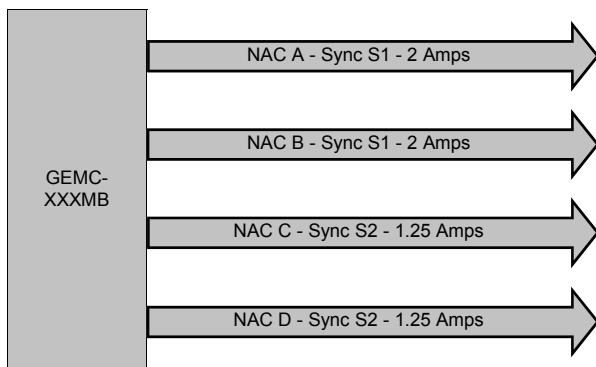
Small System – No NAC7L/7S Extender – Long Wire Runs

In this example, NAC A, B, C and D are one Sync Group using S1 supplying 4A on four circuits, with each circuit supplying 1A. This allows the longest wire runs but trades off against output power by limiting to 4A.



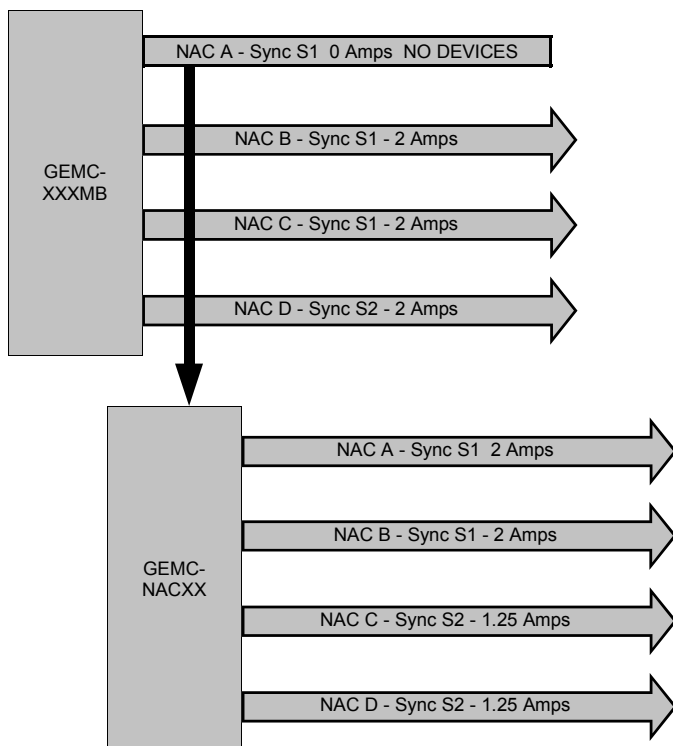
Small System – No NAC7L/7S Extender – Normal Runs

In this example, NAC A and B are one Sync Group using S1 supplying 4A and NAC C and D are a Sync Group using S2, offset from S1, supplying 2.5A:



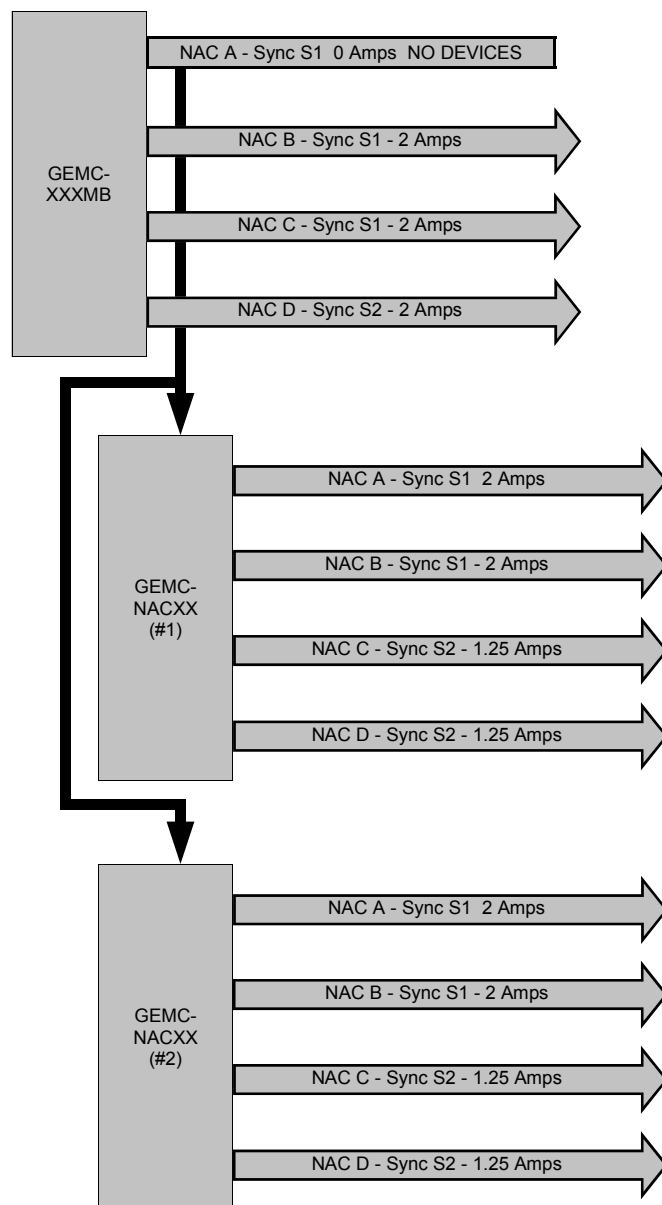
Large System - One GEMC-NACXX Extender

In this example, NAC A, B and C on the GEMC-XXXMB and NAC A and B on NAC7L/7S are one Sync Group using S1 supplying 8A on 4 circuits. NAC C and D on the GEMC-XXXMB and NAC C and D on the GEMC-NACXX are a Sync Group using S2, offset from S1, supplying 4.5A on 3 circuits.



Larger System - Two GEMC-NACXX Extenders

In this example, NAC A, B and C on the GEMC-XXXMB and NAC's A and B on each of the (2) GEMC-NACXX extenders are one Sync Group using S1 supplying 12A on 6 circuits. NAC C and D on the GEMC-XXXMB and NAC's C and D on each of the (2) GEMC-NACXX's are a Sync Group using S2, offset from S1, supplying 7.0A on 5 circuits.



Programming Method 1 (Standard Temporal):

In PCD-Windows Quickloader download software, program as follows:

1. Do not select option "Coded Alarms by Zone" in the **NAC/Output Options** screen;
2. Select "Silenceable" and "Smart" for each NAC;
3. Program the selected NAC to activate on fire alarm or specific zone alarms in the **By Zone feature** screen (A-D, 1-8) or the **NAC/Output Events** screen.

Wiring Method 1

Use only all "Smart" Wheelock or all "Smart" System Sensor Strobes and Horns. **Note:** Strobes and Horns may share NAC's.

Method 1 Operation (Standard Temporal)

When a fire zone programmed to activate any NAC goes into alarm, all horns on the NAC's will sound synchronized temporal and all strobes will activate synchronously. The horns will continue until a Fire keypad is unlocked and the **SILENCE** button is pressed. Subsequent alarms that occur after silence, but before all fire

zones are restored, will reinitiate the cadence alarm. The strobes will continue until the **RESET** button is pressed and all fire alarms are restored.

Method 2 (Non-standard Cadence)

The second method of synchronization uses non-standard cadences in place of the standard temporal audible alarm (this configuration is uncommon).

Because the system requires synchronized strobes, compatible Wheelock or System Sensor "Smart" strobes must be used. Conventional 24V sounding appliances may be used or listed Wheelock or System Sensor devices that provide for a synchronized strobe input and a separate conventional horn input (such as the Wheelock MT series).

Strobes and horns may not be shared on the same NAC, therefore each group of notification appliances in the same field of view and all audible notification appliances in the same notification zone will require at least 2 NAC's, one for the strobe device, the other for the conventional audible sounders.

Note: The strobe wiring, programming and configuring method is the same as method 1.

The horn will not be generating the temporal output and therefore does not require synchronization. Horns on the NAC circuits of the same GEMC-XXXMB or GEMC-NACXX will be synchronized to each other; but they will not be synchronized to horns wired to other GEMC-XXXMB's or GEMC-NACXX's. *It is therefore advised that horns wired to different GEMC-XXXMB's or GEMC-NACXX's not be placed too close together.*

Current requirements for the strobes are the same as method 1, rules 2, 3 and 4.

Programming Non-standard (Method 2) Cadences

In PCD-Windows Quickloader download software, program as follows:

1. Do not select option "Coded Alarms by Zone" in the **NAC/Output Options** screen;
2. Select "Silence-able", "Cadence "ENABLE" for each NAC and one of the four available cadence options in the **Cadence** column of the **NAC/Output Assignment** screen;
3. Program the selected NAC to activate on fire alarm or specific zone alarms in the **By Zone feature screen (A-D, 1-8)** or the **NAC/Output Events screen**

Note: All outputs selected for Cadence will only generate the single selected cadence type. NAC's can not have different cadences.

Non-standard (Method 2) Cadence Operation:

When a fire zone, programmed to activate any NAC programmed for Coded, goes into alarm, the NAC will produce the selected Cadence type until a keypad is unlocked and SILENCE is pressed. Subsequent alarms that occur after silence, but before all fire zones are restored will reinitiate the cadence alarm.

Method 3 (Coded Alarm by Zone)

The third method of synchronization uses *coded alarms*

by zone in place of the standard temporal audible alarm. This method is requested for schools and other institutions that would like to identify the device or zone that initiated the alarm to determine the proper egress route or to allow proper instructed authorities to quickly determine if a pull station had been improperly activated prior to evacuation.

Because the system requires synchronized strobes, compatible Wheelock or System Sensor "Smart" strobes must be used. Conventional 24V sounding appliances may be used or listed Wheelock or System Sensor devices that provide for a synchronized strobe input and a separate conventional horn input (such as the Wheelock MT series).

Strobes and Horns may not be shared on the same NAC, therefore each group of notification appliances in the same field of view and all audible notification appliances in the same notification zone will require at least 2 NAC's, one for the Strobe device, the other for the conventional audible sounders.

Note: The strobe wiring, programming and configuring method is the same as method 1.

The horn will not be generating the temporal output and therefore does not require synchronization. Horns on the NAC circuits of the same GEMC-XXXMB or GEMC-NACXX will be synchronized to each other, however, they will not be synchronized to horns wired to other GEMC-XXXMB's or GEMC-NACXX's. *It is therefore advised that horns wired to different GEMC-XXXMB's or GEMC-NACXX's not be placed too close together.*

Current requirements for the strobes are the same as method 1, rules 2, 3 and 4.

Coded Alarm by Zone (Method 3) Programming:

1. Select option "Coded Alarms by Zone" in the NAC/Output Options Screen
2. Select "Silence-able", "Cadence "ENABLE" for each NAC one of the 4 available cadence options in the Cadence column of the NAC/Output Assignment screen.
3. Program the selected NAC to activate on fire alarm or specific zone alarms in the By Zone feature screen (A-D, 1-8) or the NAC/Output Events Screen
4. Select one of the 31 cadences for each zone in the Zone assignment screen.

Note: "Smart" Synchronized Wheelock and System Sensor horns are NOT synchronized with conventional horns programmed for temporal; *they must never be placed in the same audible notification appliance notification zone because they will not be synchronized.*

Coded Alarm by Zone (Method 3) Function:

When a fire zone, programmed to activate any NAC(s) programmed with a coded alarm type, goes into alarm, the NAC(s) will produce the selected Coded sequence for the zone that initiated the alarm. The coded alarm will continue until a fire keypad is unlocked and the **SILENCE** button is pressed. Subsequent alarms that occur after silence, but before all fire zones are restored, will cause all NAC's programmed for cadence enable to generate the cadence programmed for the re-initiating alarm zone.

OVER-CURRENT PROTECTION GEMC-XXXMB AND GEMC-NACXX

GEMC-NACXX NAC Over-Current protection when connected to a Gemini C-Series Control Panel

When the NAC is active (turned on), it will detect a current above 6A and turn off the output within 100mS. The output will remain off until either:

- a. The load is removed from the circuit and a short is no longer detected;
- b. The fire keypad (GEMC-FK1) is unlocked and RESET pressed;
- c. The fire alarm has been reset and another alarm is detected.

If, after an over-current has been detected, the fire keypad (GEMC-FK1) is unlocked and **RESET** is pressed (or a subsequent alarm turns on the output), if the circuit detects a current above 6A the output will be turned off within 100mS.

Note: The system will display a NAC trouble within 200 seconds of detecting an over-current condition indicating a "**RlyTb/ E35 NN**" followed by the programmed description of the associated NAC. In addition, the associated NAC LED (1-4) on the GEMC-NACXX board will flash to indicate the output is in trouble.

Use of the GEMC-24VR

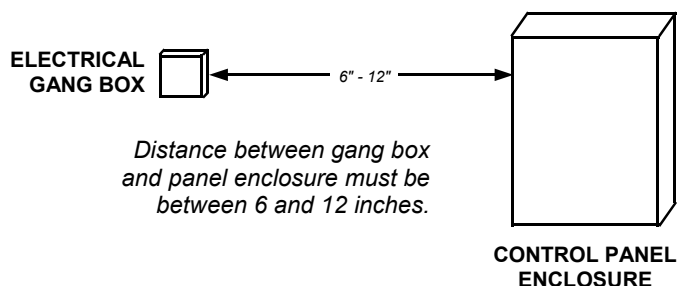
The GEMC-24VR allows one of the four NAC outputs to be a "regulated" 24V output supplying a constant voltage to Listed 24V Accessories as per the UL Standard for Safety for Control Units and Accessories for Fire Alarm Systems (UL 864).

To program, enable "**Invert Polarity**" on the selected NAC (see the "**NAC/Output Assignment**" screen in PCD-Windows Quickloader software). Refer to the "**MAXIMUM AVAILABLE STANDBY CURRENT CALCULATIONS**" chart earlier in this manual.

MOUNTING AND INSTALLATION

The images below show the installation instructions for the smaller enclosure (model GEMC-NAC7S); the larger enclosure diagrams are similar, except the larger enclosure (model GEMC-NAC7L) includes an additional battery shelf and tamper switches.

1. ROUTE CONTINUOUSLY POWERED 120VAC



If not already installed, mount a separate electrical gang box (single or double gang) located no closer than 6 inches and no further than 12 inches from the upper left side of the eventual mounting location of the control panel enclosure.

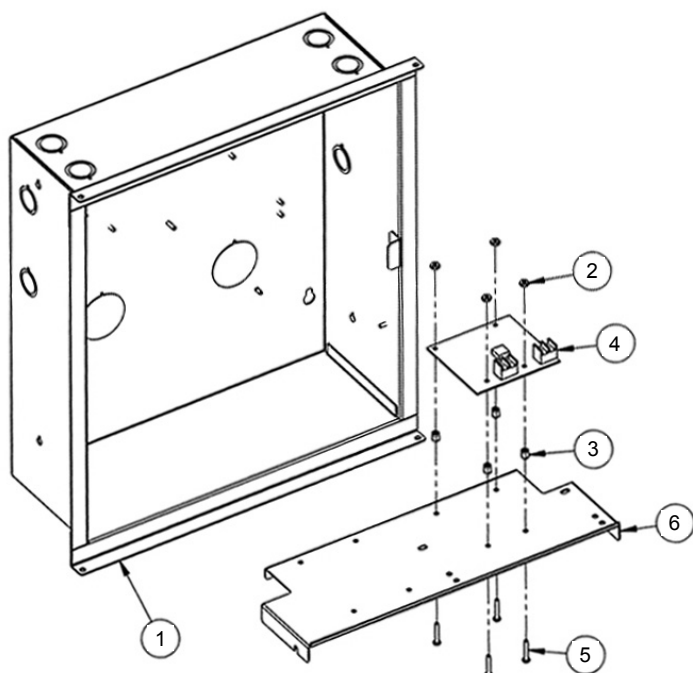
A continuously-powered (un-switched) 120VAC source with a maximum 15A dedicated branch circuit with grounding conductor must be wired into this gang box by a licensed electrician in accordance with all national and local electrical codes.

2. INSTALL THE GEMC-24VR CIRCUIT BOARD

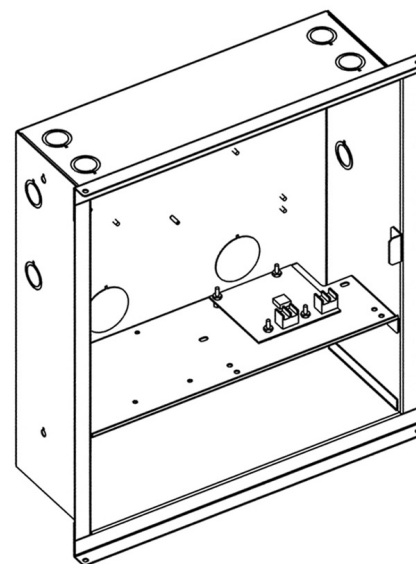
The GEMC-24VR allows one of the four NAC outputs to be a "regulated" 24V output supplying a constant voltage to Listed 24V Accessories as per the UL Standard for Safety for Control Units and Accessories for Fire Alarm Systems (UL 864). Secure the GEMC-24VR printed circuit board to the HW1489 battery "Shelf" as follows:

1. Insert four SC631 screws (item 5) such that the threads protrude from the bottom of the HW1489 battery Shelf (item 6) as shown. Secure the screws

- into the SO216 Spacers (item 3) as shown.
2. Place the GEMC-24VR PC Board on top of the SO216 Spacers and secure with the 6-32 kep nuts (item 2) as shown. Do not over-tighten nuts.



GEMC-24VR BOARD (EXPLODED VIEW)
SEE TABLE BELOW FOR NUMBER DESCRIPTIONS



GEMC-24VR BOARD (ASSEMBLED VIEW)
SEE TABLE BELOW FOR NUMBER DESCRIPTIONS

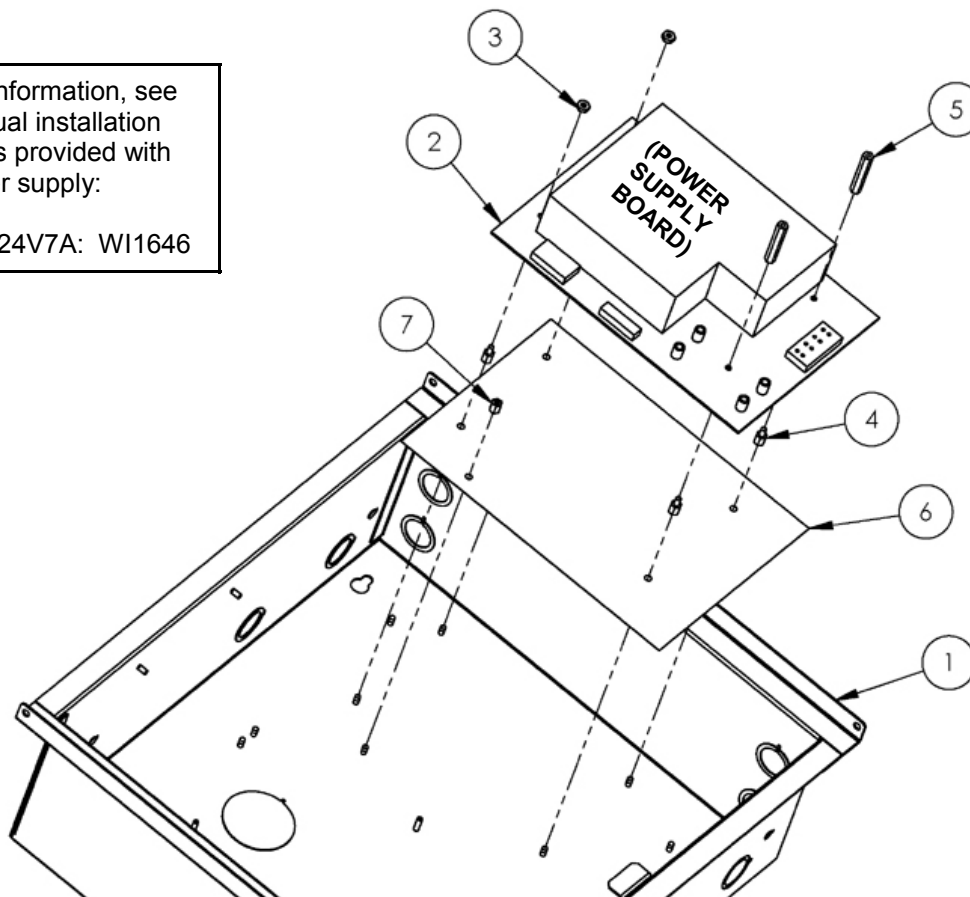
Item	Part No.	Description	Quantity
1	H448	Enclosure base	1
2	N101	6-32 kep nut	4
3	SO216	Spacer, 1/4" x .313, 6-32 tapped	4
4	PCB Boost Bus Circuit	PCB	1
5	SC631	Screw, 6-32 x 7/8 pph	4
6	HW1489	Battery Shelf	1

MOUNTING AND INSTALLATION (CONT'D)

3. INSTALL THE GEMC-PS24V7A POWER SUPPLY BOARD

For more information, see the individual installation instructions provided with each power supply:

GEMC-PS24V7A: WI1646



EXPLODED VIEW OF POWER SUPPLY BOARD.
SEE TABLE BELOW FOR NUMBER DESCRIPTIONS

Note: To ensure all hardware and component mounting holes are suitably aligned, loosen and re-tighten all pre-installed screws as needed. The electrical gang box supplying continuously-powered 120VAC must be located no closer than 6 inches and no further than 12 inches from the left side of the control panel housing.

Note that the power supply boards are mounted inside the enclosure under the control panel motherboard, and therefore must be the first board installed in the enclosure. Also note that the physical power supply used in your installation may differ slightly in appearance from the image of the power supply shown here.

Ensure the continuously-powered 120VAC source circuit breaker is turned off before proceeding.

Some items are pre-installed at the factory, but can be removed if required. If re-assembly is required, proceed as follows:

1. **Place the power supply fishpaper barrier** (item 6 in illustration at left) below the four male standoffs pre-installed into the Enclosure Base. This fishpaper provides an electrical barrier for the power supply board

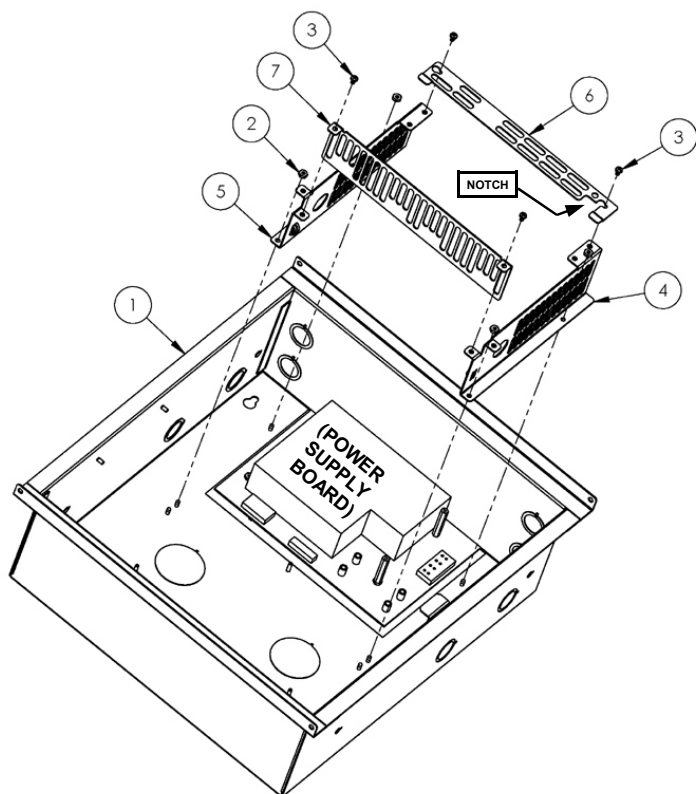
and **MUST** be installed.

2. **Install the four male/female standoffs** (item 4) as shown, securing the fishpaper. Install the spacer (item 7) as shown.
3. **Place the power supply board** over the four male/female standoffs (item 4) and secure the board with two locking nuts provided (item 3).
4. **Install the two long brass female/female standoffs** (item 5) into the two male/female standoffs as shown.

Item	Part No.	Description	QTY
1	H448 base assembly	Enclosure base	1
2	PCB Power Supply	Power Supply	1
3	N101	6-32 kep nut	2
4	SO211	Male / female standoff	4
5	SO133	Female / female standoff	2
6	SI175	fishpaper	1
7	SO216	Spacer, 1/4" x .313, 6-32 tapped	1

MOUNTING AND INSTALLATION (CONT'D)

4. INSTALL THE POWER SUPPLY SHIELDS



INSTALLATION OF POWER SUPPLY SHIELDS
SEE TABLE BELOW FOR NUMBER DESCRIPTIONS



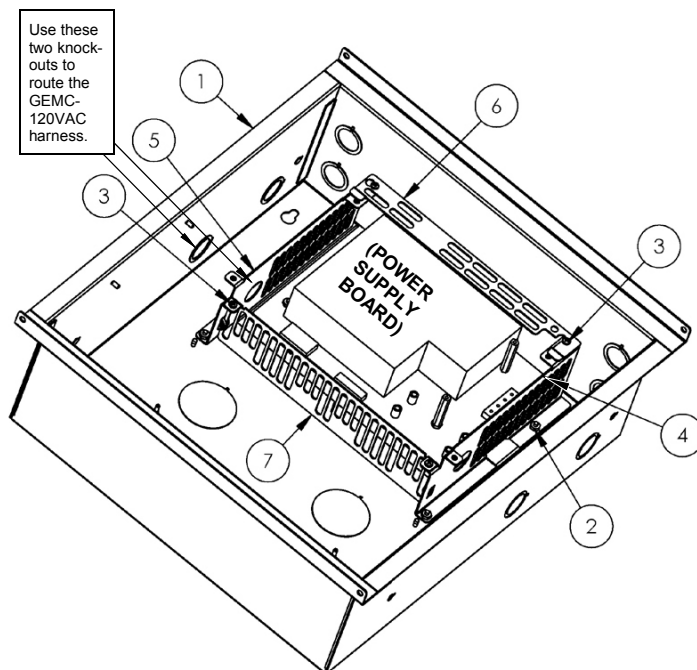
"KEYED" HOLES IN THE HW1764 POWER SUPPLY SHIELD
(ARROWS). NOTE LOCATION OF "NOTCH".

Item	Part No.	Description	QTY
1	H448	Enclosure base	1
2	N101	6-32 kep nut	4
3	SC270	Screw 6-32 x .25 with washer	4
4	HW1788	Right Side Plate Assy	1
5	HW1789	Left Side Plate Assy	1
6	HW1764	Top Power Supply Shield	1
7	HW1493	Front Power Supply Shield	1

Power Supply Shields and Other Hardware

IMPORTANT: In the steps that follow, always ensure all exposed metal surfaces are bonded to earth ground.

1. **Secure the HW1788 Right Side Plate (item 4) and the HW1789 Left Side Plate (item 5)** to the enclosure base with the 6-32 nuts (item 2). Tighten all nuts to ensure adequate ground.
2. **Secure the HW1493 Power Supply Shield (item 7)** to both the HW1788 Right Side Plate (item 4) and the HW1789 Left Side Plate (item 5) with the SC270 screws (item 3). Tighten all screws to ensure adequate electrical ground.
3. **Install the HW1764 Power Supply Shield (item 6)** to the Left and Right Side Plates with the pre-installed SC270 screws (item 3).
The keyed holes in the shield (see image below) allow you to place the shield over the two SC270 screws (item 3) without removing them. Loosen and re-tighten to secure. Be sure "Notch" is installed to the right as shown.
Hint: Through this "Notch" will run a harness (part "9GEMCPWRHARNESS") from the power supply board to the GEMC-NACXX PC board when this GEMC-NACXX PC board is installed in a future step (page 19).



CLOSE-UP VIEW OF INSTALLATION OF POWER SUPPLY SHIELDS.
NOTE LOCATION OF NOTCH

MOUNTING AND INSTALLATION (CONT'D)

5. ROUTING THE GEMC-120VACH HARNESS FROM THE GANG BOX INTO THE CONTROL PANEL ENCLOSURE & POWER SUPPLY BOARD

At this point, both the control panel and electrical gang box are mounted, and the electrical gang box contains 3 wires that provide a continuously-powered (un-switched) 120VAC source from a maximum 15A dedicated branch circuit and a grounding conductor. The electrical gang box must be located no closer than 6 inches and no further than 12 inches from the left side of the control panel housing. **IMPORTANT:** Turn off the 120VAC branch circuit breaker before proceeding.

GEMC-120VACH Harness

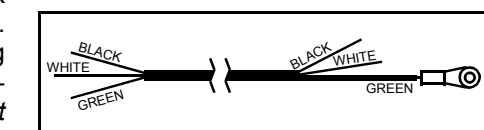
The GEMC-120VACH harness must run from the electrical gang box to the control panel enclosure inside either plastic or metal rigid conduit. Mount this conduit between the electrical gang box and the control panel enclosure using fasteners appropriate for the installation. Note that one end of the GEMC-120VACH harness contains three protruding wires (green, white and black); the other end contains a ring connector connected to the green (ground) wire. *Route the GEMC-120VACH into the conduit such that the end of the harness with the ring connector is located within the enclosure, and the other end (with the protruding wires) remain inside the electrical gang box.* The portion of the harness between the enclosure wall and Left Side Plate (HW1491) is protected by the harness tubing to ensure separation between power limited wires connected to the panel and the and non-power limited 120VAC wires of the harness.

Inside the electrical gang box are the three branch circuit 120VAC wires: hot (black), neutral (white) and earth ground (green or bare copper). As with the previous electrical connections, all of the following electrical connections must be performed by a licensed electrician in accordance with all national and local electrical codes.

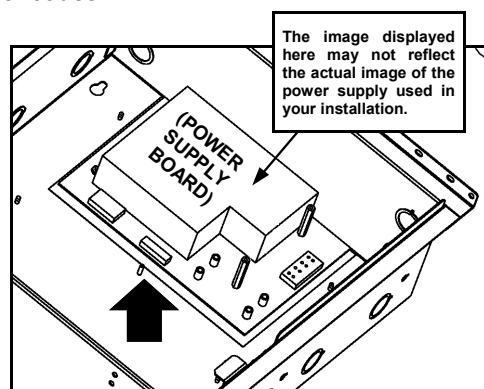
Connect Earth Ground

Inside the gang box, connect the branch circuit ground wire to the GEMC-120VACH harness protruding green ground wire using a suitable connector (such as a wire nut). Place the harness green ground ring connector (located inside the control panel enclosure) on the enclosure ground stud as shown in the illustration at right (this "branch circuit ground" *must always be first on and last off the enclosure ground stud*). Secure the ring connector to the stud with the 6-32 nut with star washer (tighten securely). Note that the ground stud is long enough for a second ring connector and nut, as described in the next step.

Locate the power supply ground wire (a short 14 AWG green pigtail splice wire with a ring connector). Place this ground pigtail ring connector on the same enclosure ground stud used in the previous step, and secure this ring connector to the stud with another 6-32 nut with star washer (tighten securely). Lift the plastic terminal block cover and connect the other end of the pigtail to the center terminal (marked with a ground symbol) of the GEMC-PS24V7A power supply board.



GEMC-120VACH



GROUND STUD LOCATION (ARROW)

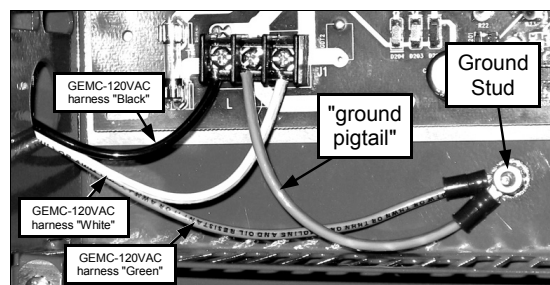
Connect Hot and Neutral Wires

Inside the electrical gang box, connect the branch circuit white neutral and black hot wires to the white and black wires of the GEMC-120VACH harness using suitable connectors (such as wire nuts).

At the other end of the GEMC-120VACH harness (located inside the control panel enclosure), connect each wire to the terminal block of the power supply board as follows: White neutral wire to "N" right terminal, black hot wire to "L" left terminal. Tighten all terminal screws securely and press the terminal block cover back in place.

Enclosure Door Ground

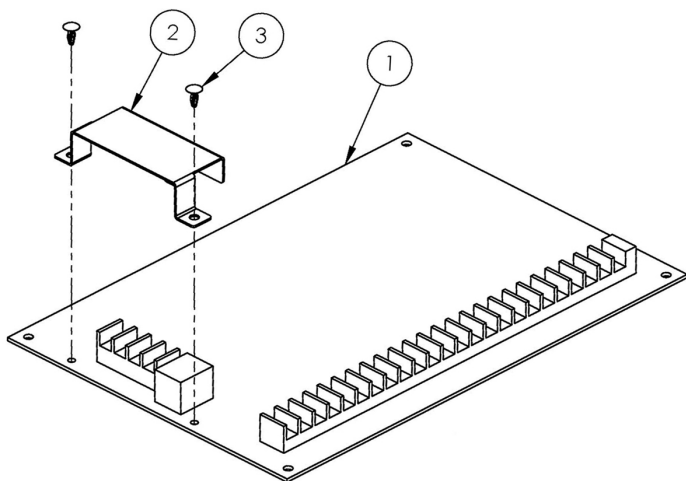
The enclosure cover must also be connected to ground. On the inside of the enclosure is a pre-installed ground cable. Connect this ground cable to the earth ground stud located inside the enclosure on top of the other ground wires previously installed.



MOUNTING AND INSTALLATION (CONT'D)

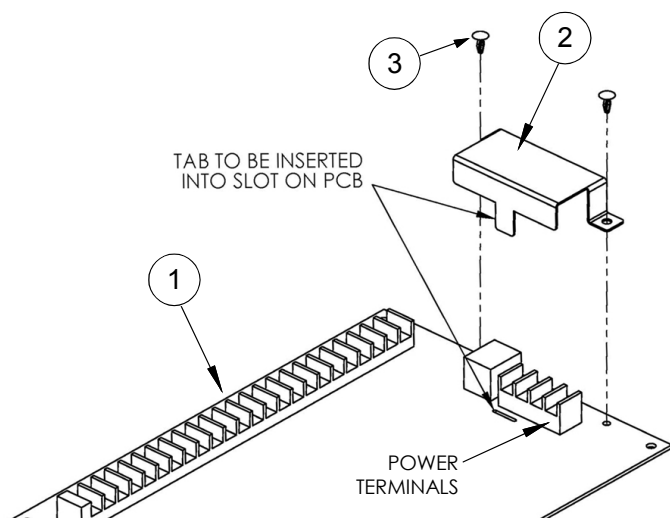
6. PREPARING THE GEMC-NACXX PC BOARD

A small folded fishpaper must be installed over the power terminals to electrically isolate the terminals and serve as an electrical barrier to ensure against accidental contact with high voltage wiring. **Note:** This Fishpaper is only required for non-power limited wiring (i.e. 120VDC). Install the fishpaper as follows:



FISHPAPER AND TWO MOUNTING BUTTONS
SEE TABLE BELOW FOR NUMBER DESCRIPTIONS

1. **Orient the SI178 Fishpaper** (item 2 in the illustration below) over the GEMC-NACXX power terminals such that the fishpaper tab is aligned with the slot in the GEMC-NACXX PC board. This slot is located next to the terminals (see illustration below).

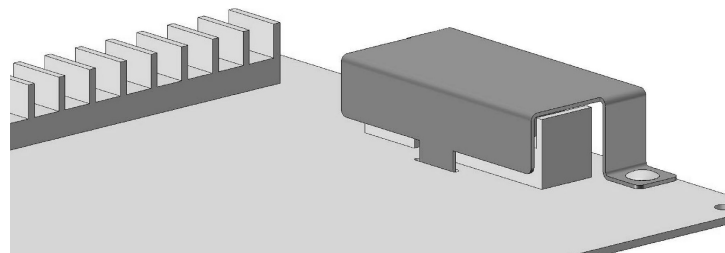


FISHPAPER ORIENTATION AND INSTALLATION
SEE TABLE AT RIGHT FOR NUMBER DESCRIPTIONS

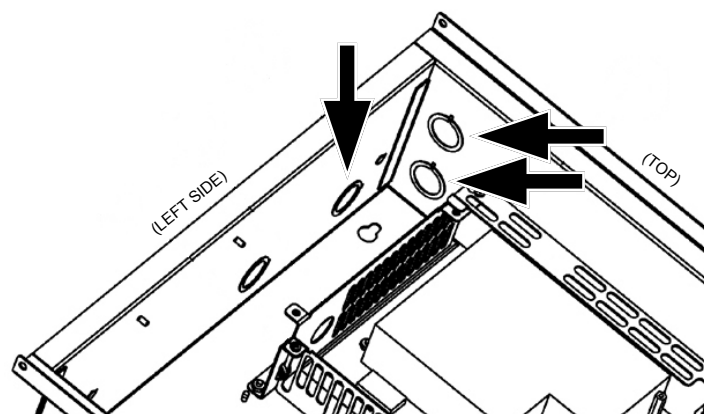
2. **Insert the SI178 Fishpaper tab** into the GEMC-NACXX PC board slot. Ensure the two mounting holes in the Fishpaper align with the mounting holes in the GEMC-

NACXX PC board.

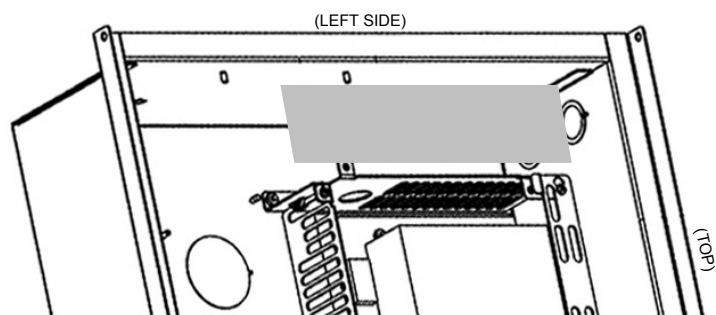
3. **Insert the two HW1829 Mounting Buttons** into the two mounting holes. Press the Mounting Buttons firmly to secure. The finished installation is shown in the image below.



FINISHED FISHPAPER INSTALLATION



USE KNOCKOUTS (ARROWS) FOR WIRING NON-POWER LIMITED WIRING TO RELAY 7



GRAY SHADED AREA IN ABOVE IMAGE: KEEP ALL POWER LIMITED WIRING OUTSIDE GRAY SHADED AREA WHEN RELAY 7 IS USED TO SWITCH NON-POWER LIMITED CIRCUITS.

Item	Part No.	Description	QTY
1	PCB	GEMC-NACXX PC Board	1
2	SI178	Fishpaper	1
3	HW1829	Mounting Button	2

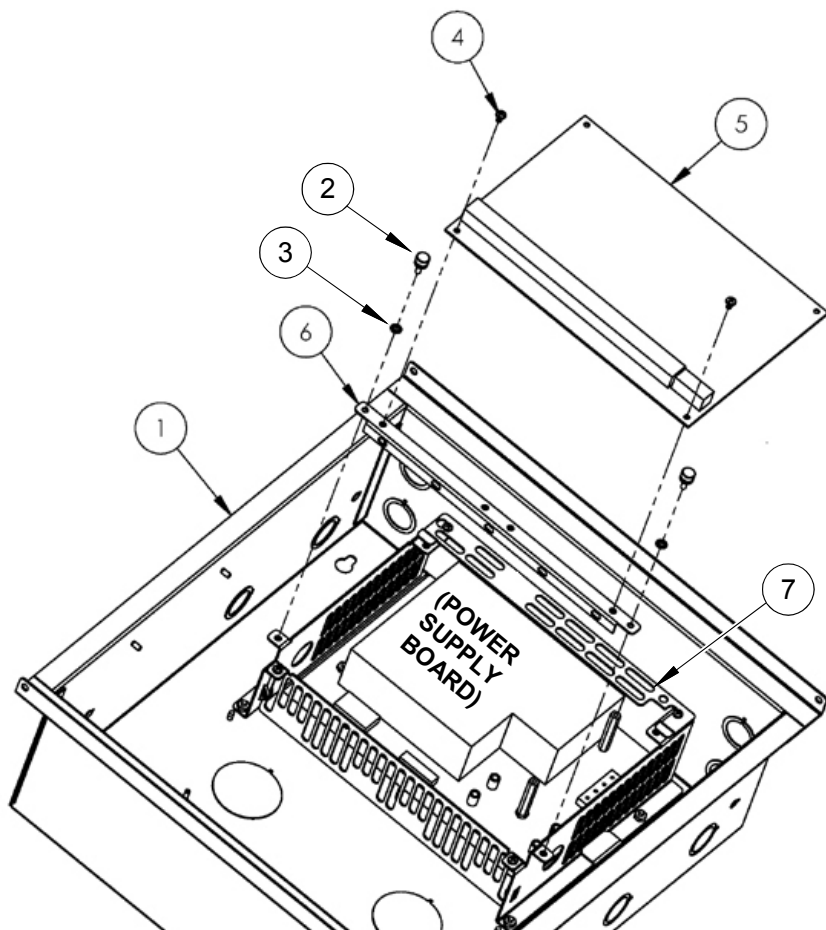
MOUNTING AND INSTALLATION (CONT'D)

7. INSTALLING THE GEMC-NACXX PC BOARD

Note: Some items are pre-installed at the factory. To ensure all hardware and component mounting holes are suitably aligned, loosen and re-tighten all pre-installed fasteners as needed.

1. **Install and secure the HW1490 Support Bar to the GEMC-NACXX PC board.** The HW1490 Support Bar is secured to the GEMC-NACXX PC board with two 6-32 screws (item 4) as shown. **Note:** The HW1490 Support Bar may be pre-installed.
2. **Connect the 9GEMCPWRHARNESS power supply harness** that runs from the power supply board to the socket located on the GEMC-NACXX PC board. As described on page 16, this power supply harness runs from the power supply board, through the "Notch" located on the **HW1764 Power Supply Shield** (item 7 at left), and to the GEMC-NACXX board.
3. **Slide the top edge of the GEMC-NACXX PC board under the tabs of the HW1764 Power Supply Shield** (item 7, also shown below). Secure the HW1490 Support Bar (now attached to the GEMC-NACXX PC board) to the HW1788 Right Side Plate and the HW1789 Left Side Plate using two thumbscrews (item 2) and two star washers (item 3) as shown.

Note the location of a second GEMC-NACXX PC board receptacle located on the top right side of the GEMC-NACXX PC board. In a future step, this receptacle will connect to the GEMC-BHMB battery harness.

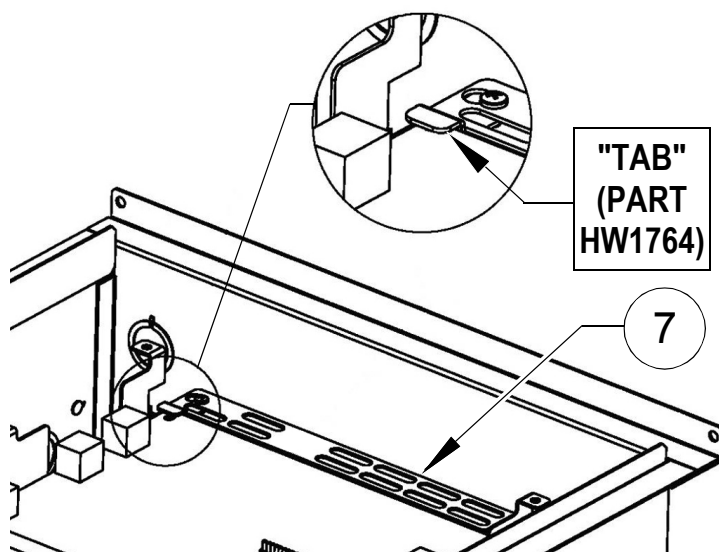


THE GEMC-NACXX PC BOARD INSTALLATION
SEE TABLE BELOW FOR NUMBER DESCRIPTIONS



THE HW1764 POWER SUPPLY SHIELD "TABS" (ARROWS).

Item	Part No.	Description	QTY
1	H448	Enclosure base	1
2	SC628	Thumbscrew	2
3	WA107	#6 External Tooth Star Washer	2
4	SC270	Screw 6-32 x .25 with washer (sems)	2
5	PCB	GEMC-NACXX PC Board	1
6	HW1490	Support bar	1
7	HW1764	Power Supply Shield	1

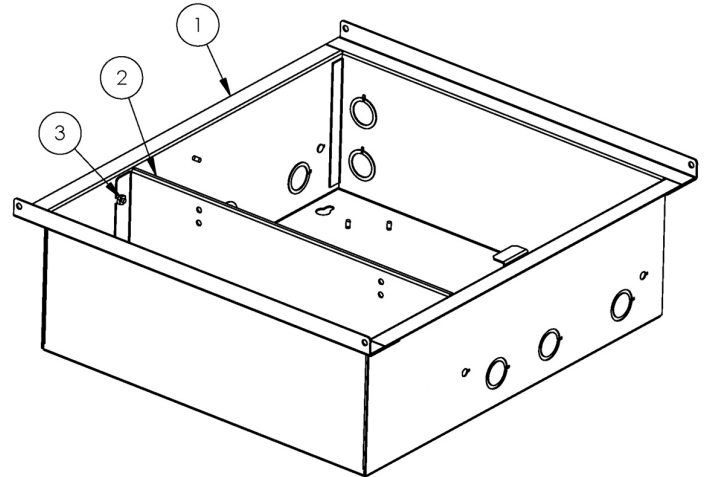
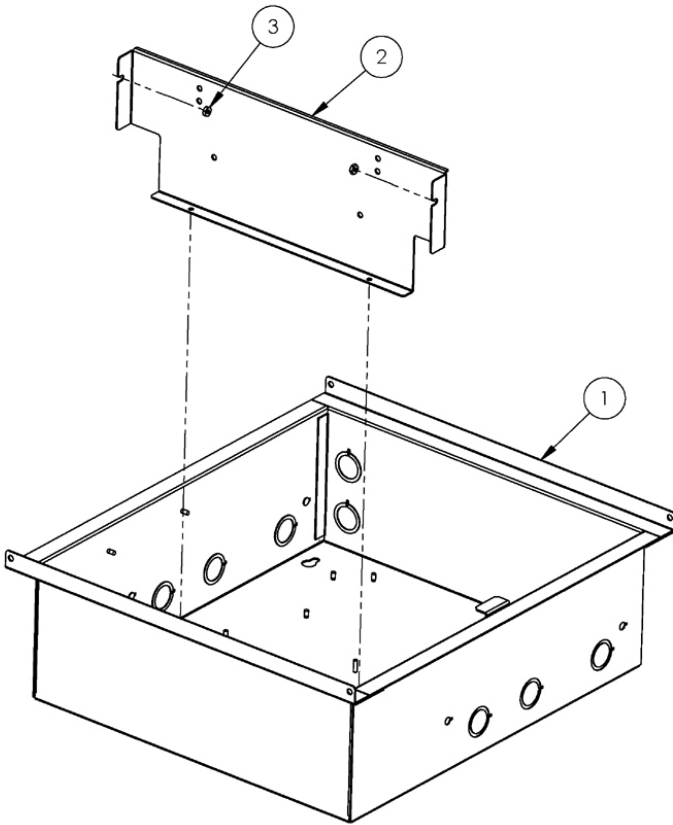


ASSEMBLED VIEW. THE EDGE OF THE GEMC-NACXX PC BOARD
SLIDES UNDER THE "TABS" OF THE HW1764 POWER SUPPLY
SHIELD (ITEM 7)

MOUNTING AND INSTALLATION (CONT'D)

8. INSTALL THE BATTERY SHELVES

If not already installed at the factory, install the HW1489 shelves for the batteries with the 6-32 nuts (N101).



ASSEMBLED VIEW
SEE TABLE BELOW FOR NUMBER DESCRIPTIONS

BATTERY SHELF (HW1489) INSTALLATION
SEE TABLE BELOW FOR NUMBER DESCRIPTIONS

Item No.	Part Number	Description	Quantity
1	H448 base assembly	Enclosure base	1
2	HW1489	Battery Shelf	1
3	N101	6-32 kep nut	2

FIRE ALARM CONTROL PANEL (FACP) OPERATION

INTRODUCTION

When additional notification appliances are required, the GEMC-NACXX supervised 7 ampere voltage-regulated NAC (Notification Appliance Circuit) Extender and relay module can expand existing fire alarm control panels by providing additional power needed to drive additional horns, strobes and bells. The GEMC-NACXX can be used to satisfy ADA (Americans with Disabilities Act) requirements by providing synchronization of these notification appliances.

When the GEMC-NACXX is used as a supervised NAC Extender wired to any listed Fire Alarm Control Panel (FACP), the GEMC-NACXX provides two Inputs used to activate the 4 NAC outputs as determined by the 5 "**NAC CONFIG**" jumper settings. In addition, the GEMC-NACXX provides:

- 4-Supervised Outputs suitable as 24V maximum, 2A maximum each 6.5A combined regulated Notification Appliance Circuits. These outputs can be configured as:
 - 4 Class B or
 - 1 Class A and 2 Class B or
 - 2 Class A
- 3-Unsupervised Form-C Dry relay outputs (labeled "**OUT RELAY 5**", "**OUT RELAY 6**" and "**OUT RELAY 7**"), are used as follows:
 - Relay #5 is used to indicate to the monitoring FACP if the AC is on or off. When AC is on, the relay is energized and the associated green LED is on.
 - Relay #6 is used to indicate to the monitoring FACP if the battery/charging circuit is good or low/trouble. When the battery/charging circuit is good, the relay is energized and the associated green LED is on.
 - Relay #7 is used to indicate to the monitoring FACP if the NAC Extender is good or in trouble. When the Extender is good (no troubles), the relay is energized and the associated green LED is on.

Note: The above listed Unsupervised Form-C Dry relay outputs may be supervised when properly wired to an associated FACP zone input.

- Two isolated inputs (terminals 1-4) used to activate the 4 NAC outputs as determined by the 5 "**NAC CONFIG**" jumper settings
- Power supply contains integral battery charger capable of charging up to 4 pairs of 12V sealed lead acid or gel type batteries
- Two Inputs are isolated (terminals 1-4), thus allowing for separate ground fault detection
- 2 wire horn/strobe Sync mode allows audible notification appliances (horns) to be silenced while visual notification appliances (strobes) continue to operate
- Input allows synchronized Wheelock/System Sensor operation between the motherboard or other C-Series NAC circuits, allowing for multiple NAC circuits to be used within the same area

- Each of the 4 NAC circuits are individually supervised for opens or shorts, and will annunciate and report separately
- Each of the 4 NAC circuits can be disabled/enabled separately at the GEMC-FK1 Fire keypad. In addition, these events could also be reported separately.
- Solid State over-current protection
- Integral housing tamper switch inputs to protect against the unauthorized opening of the housing cover and a rear tamper protecting removal of the housing from its mounting surface
- The maximum number of GEMC-NACXX's can be used on a Gemini C-Series control panel is five (5), thus allowing for a maximum of 20 additional NAC circuits.
- Surface/semi-flush cabinet included
- Automatic switchover to stand-by battery when AC Fails

SPECIFICATIONS

Electrical Ratings

Input Power:

Primary input power: 120VAC, 50/60Hz, 3A, maximum 15A dedicated branch circuit.

Secondary power: 24V operation, up to eight 12V batteries in pairs (7AH-32AH standby).

Fire Bus Power: 12VDC nominal, 8mA.

Output Power:

Total Output Power: 24VDC, 7A maximum. Each NAC circuit output rated @ 2A maximum.

Optional Auxiliary Output Power: 2A maximum per NAC circuit; 1.1A @ 24V maximum standby current for 24 hours. Any of the 4 NAC's can be used for auxiliary outputs by programming the output with the feature "Reverse Polarity" (see the "**NAC/Output Assignment**" screen in PCD-Windows Quickloader software). Auxiliary power is 24V special applications for use with the GEMC-24VR; these auxiliary outputs are then 24V Regulated.

Supervision:

- AC fail supervision local annunciation, approximate 1 minute delay to prevent nuisance swingers
- Battery presence, low battery supervision and battery charger voltage supervision; combined to generate a common battery trouble

Additional GEMC-NACXX Specifications:

NAC End-of-Line Resistor: 2.2K ohms.

Common Trouble Relay ("Out Relay 5"): 30VDC @ 1A, 30VAC @ .5A Resistive, connect to power limited circuits only.

Common Trouble Relay ("Out Relay 6"): 30VDC @ 1A, 30VAC @ .5A Resistive, connect to power limited circuits only.

Common Trouble Relay ("Out Relay 7"): 10A / 120VAC; 2.5A / 30VAC / DC Resistive Load.

Input control circuit: 10-30VDC @ 20mA minimum.

Operating Temperature: 32°F to 120°F (0°C to 49°C).

Operating Humidity Range: 10% to 90% relative humidity, from 32°F to 104°F (0°C to 40°C) non-condensing.

Housing

The GEMC-NACXX comes complete with 7A power supply, enclosure and ample room for standby batteries. Two models are available, as determined by the size of the enclosure:

Enclosure Dimensions (W x H x D, Inches):

- The **GEMC-NAC7S** uses the small housing with sufficient room for two pair of 12V standby batteries (model **GEMC-HSKIT1416**, size 14.25" x 16" x 5.25")
- The **GEMC-NAC7L** uses the large housing with room for four pairs of 12V standby batteries (model **GEMC-HSKIT1425**, size 14.25" x 24" x 5.25")

AGENCY LISTINGS:

- UL Listed Control Units and Accessories for Fire Alarm Systems (UL864 9th edition)*
- CSFM - *California State Fire Marshal* Approved*
- NFPA 72 compliant

*pending

JUMPERS

When used with a FACP, the jumpers on the GEMC-NACXX circuit board are used as follows:

NAC ADDR: Must be set to "zero" for this configuration (no shunts across any of the jumpers)

NAC OPTIONS: See chart on page 24. Each option is detailed as follows:

- **Option "Zero"** allows any synchronized "Smart" format to be passed through Input 1 to NAC's 1 & 2 directly and Inputs 2 to NAC's 3 & 4 directly
- **Option 1** allows Input 1 to be a strobe input and allows Input 2 to be a bell input where the bell causes

NAC's 1 & 3 to give a Temporal output and 3 & 4 to be a latched (strobe) output

- **Option 2** allows Input 1 to be a strobe input and allows Input 2 to be a bell input all NAC's 1 -4 will output the Wheelock synchronized horn/strobe format.
- **Option 3** allows Input 1 to be a strobe input and allows Input 2 to be a bell input with all NAC's 1 -4 will output the System Sensor synchronized horn/strobe format.

NAC OPTIONS Jumper 4 "Offset" must be shunted when more than total combined 4A output is required for synchronized outputs. Shunting Jumper 4 offsets NAC's 3 and 4 from NAC's 1 and 2 by .5 seconds to allow instantaneous current for the synchronized devices. However, note that when shunted, the strobes and horns must not be seen or heard from within the same area.

NAC OPTIONS Jumper 5 "AUX PWR" may be shunted when a single constant 24 auxiliary output is required. When shunted, NAC 4 will be on all the time, thus allowing auxiliary devices to be powered from the NAC 4 terminal. **Note:** Only one output may be used for Auxiliary power when using NAC configuration jumper option "zero" and wiring a constant power limited 12 or 24V to one or both inputs. Aux power outputs are 2A maximum in alarm. Maximum 1.1A standby. When configured for 24V Auxiliary Power, it is a Special Application output only listed with the GEMC-24VR. See battery charts for battery requirements.

EZM ADDR: Use to configure the integral 4-Zone EZM to send the status of a device (AC ON/OFF, BATTERY GOOD/TBL, GROUND FAULT and TAMPER) to the C-Series control panel.

LED STATUS INDICATION TABLE (for inputs, outputs & trouble memory status)

LED NAME	OFF	ON	FLASH (LONG)*	FLASH (SHORT)**
NAC 1	Normal	Alarm Condition	Trouble Condition	Trouble Condition Memory
NAC 2	Normal	Alarm Condition	Trouble Condition	Trouble Condition Memory
NAC 3	Normal	Alarm Condition	Trouble Condition	Trouble Condition Memory
NAC 4	Normal	Alarm Condition	Trouble Condition	Trouble Condition Memory
INPUT 1	Normal	Alarm Condition	---	---
INPUT 2	Normal	Alarm Condition	---	---
EZM STATUS	No Power	Power on	---	---
GND FAULT	Normal	Earth Ground Fault	---	---
BATT TRB	Normal	Low Battery, no battery or charging circuit trouble	---	---
AC ON	AC Loss (running on battery)	AC present (with or without battery power)	---	---
PWR	No Power	Power present	---	---

* Indicates trouble condition. When trouble (open, short or ground) occurs on a specific output, the corresponding red output LED, (NAC 1 - NAC 4) will blink. Loop trouble will de-energize the normally energized trouble relay (**OUT RELAY 7**) within 30 seconds.

** Indicates trouble condition memory. When a trouble condition restores, the units red output LED, (NAC 1 - NAC 4) will blink with a shorter and distinctly different duration. The green input LED(s) will be off (normal condition). To reset the memory, press and hold the "**CLEAR**" button (momentary-on) for two seconds. The LED(s) will extinguish.

Note: If indicating circuits have been restored, memory reset is not required for normal operation of the unit.

INSTALLATION

The GEMC-NACXX must be installed in accordance with NFPA 72 and with article 760 of The National Electrical Code as well as all applicable local codes.

When used with a Gemini C-Series control panel, install the GEMC-NACXX as follows:

1. Select a suitable location for the GEMC-NACXX enclosure and 120VAC junction box, ensuring that adequate space is available for mounting the enclosure on a wall with no interference from wires, pipes, or other obstructions. Mount the enclosure using fasteners suitable for the mounting surface. The mounting surface must be capable of supporting 14 pounds (6.3Kg) plus approximately 6 pounds per battery.
2. Install a 2-gang metal electrical box near the GEMC-NACXX enclosure (ensure the gang box includes a ground stud inside the box). A continuously-powered 120VAC source with a maximum 15A dedicated branch circuit with grounding conductor must be wired by a licensed electrician in accordance with all national and local electrical codes. The 120VAC wires must run into this gang metal electrical box; the three 120VAC wires are hot (black), neutral (white) and earth ground (green or bare copper). Be sure the electrician securely connects the earth ground wire to the ground stud located inside the gang box. (This branch circuit ground must always be first on and last off the ground stud). In addition, ensure the electrician leaves at least 6 inches of additional white and black wiring inside the Integral Gang Box to allow these connections to be made easily. Ensure the 120VAC branch circuit breaker is turned off before proceeding.
3. With the white and black wires in the gang box not yet connected, install the model GEMC-PS24V7A power supply board inside the GEMC-NACXX enclosure.
4. Connect the GEMC-120VACH harness from the wires in the gang box to the 3-wire terminals located on the power supply PC board.

Maintenance

The GEMC-NACXX should be tested at least once a month for proper operation as follows:

Output Voltage Test: Under normal load conditions, the DC output voltage should be checked for proper voltage levels.

Battery Test: Under normal load conditions check that the battery is fully charged. Check the voltage at the battery terminal and at the board terminal marked [-BAT +] to insure there is no break in the battery connection wires.

Note: Maximum charging rate is 1.5A, 1.72A or 1.96A, depending on jumper setting. Expected battery life is approximately five years, however it is recommended changing batteries in four years or less if needed.

Fuse

Battery fuse is a UL Listed fuse rated 250VAC / 12.5A. If this fuse is blown, a battery trouble will be enunciated (refer to LED Diagnostic Table). Contact service representative for replacement or repair. **CAUTION: For continued protection against risk of fire, replace only with the same type and rating of fuse.**

TERMINAL DESCRIPTIONS

1. (+) INPUT 1

2. (-) INPUT 1

Isolated positive and negative synchronization inputs used to synchronize the output of Smart or conventional devices with the "master device" driving the input (the "master device" can be either the FACP or other NAC extenders connected to a FACP). Refer to NAC configuration jumper options.

3. (+) INPUT 2

4. (-) INPUT 2

Isolated positive and negative synchronization inputs used to synchronize the output of Smart or conventional devices with the "master device" driving the input (the "master device" can be either the FACP or other NAC extenders connected to a FACP). Refer to NAC configuration jumper options.

5. (+) NAC 1

6. (-) NAC 1

7. (+) NAC 2

8. (-) NAC 2

9. (+) NAC 3

10. (-) NAC 3

11. (+) NAC 4

12. (-) NAC 4

Terminals 5 through 12 are NAC 24V, 2A *regulated* supervised NAC terminals (terminal polarity is shown in when in an "active" alarm condition, polarity is reversed from what is shown in "normal" standby mode). These terminals are supervised outputs that provide low impedance output to drive devices such as strobes, bells and horns by selecting the appropriate NAC configuration jumper option(s). Terminal 12 (NAC 4) can be configured for 24V aux power regulated using the GEMC-24VR "Regulated" Output Module.

13. (COM) OUT RELAY 5

14. (NC) OUT RELAY 5

15. (NO) OUT RELAY 5

Terminals 13-15 are labeled [AC ON].

16. (COM) OUT RELAY 6

17. (NC) OUT RELAY 6

18. (NO) OUT RELAY 6

Terminals 13-18 are labeled [BATT GOOD] and are used as follows:

- Relay #5 is used to indicate to the monitoring FACP if the AC is on or off. When AC is on, the relay is energized and the associated green LED is on.
- Relay #6 is used to indicate to the monitoring FACP if the battery/charging circuit is good or low/trouble. When the battery/charging circuit is good, the relay is energized and the associated green LED is on.

19. (+) REM (FIRE BUS)
20. (-) PWR (FIRE BUS)
21. GREEN (FIRE BUS)
22. YELLOW (FIRE BUS)

Isolated 4-wire bus terminals wired from the Gemini C-Series control panel terminals 18-22

23. (+) TAMPER
24. (-) TAMPER

Housing tamper terminals. Used with a zone dedicated to "Tamper" within the integral 4-Zone EZM; when a tamper is detected, a report will be sent to the control panel as the 3rd zone of the EZM through the 4-wire fire bus. Use front and back housing tamper switches, normally open when not installed, normally closed in the circuit, and open when activated (we recommend using a GEMC-TAMPERKIT).

Note: The activation of Tamper is reported to the panel using the 3rd zone of the NAC integral EZM; program the integral EZM using the Quickloader **EZM Assignment** screen and **Zone Assignment** screens, as shown in the section "**PROGRAMMING**", as follows:

Program Zone three of the EZM (Zone # = 8 + 4 (EZM#-1) + 3) for the following:

- a. Description line 1: "Tamper...OUTPUT BOARD XX" where XX = Output board address;
- b. Zone Type "Fire Tamper Monitor";
- c. Adv. Code "Fire Tamper Monitor";
- d. Area 1.

Note: Tamper can be disabled by not programming the associated zone for Area 1 (Fire), thus leaving the zone undefined with no area assigned.

25. (-) EARTH GND

This terminal is not required to be connected to earth ground. The panel earth ground connection is provided via the 110V ground connection to the housing through the mounting brackets. This terminal is available for future use.

This terminal can also be used to confirm the operation of the ground fault circuit; a short from this terminal to any NAC circuit terminal should cause a ground fault, causing the ground fault LED to light and the keypad to display a Fire trouble ground fault with the associated zone.

26. (COM) OUT RELAY 7

27. (NC) OUT RELAY 7

28. (NO) OUT RELAY 7

Terminals 26-28 (labeled [TBL]) are used to indicate to the monitoring FACP if the NAC Extender is good or in trouble. When the Extender is good (no troubles), the relay is energized and the associated green LED is on.

Optional Hookups:

Battery and AC monitoring: AC or Battery Fail condition will cause the common trouble input [C "FAULT" N.C.] to **FAIL AC FAIL** report back to the FACP via input 1 and input 2. The common trouble input may also be used for other optional supervision monitoring. To report AC and Battery Trouble, connect the battery and

AC Fail relay output (Fig. 2) to the common trouble input.

OVER-CURRENT PROTECTION GEMC-XXXMB AND GEMC-NACXX

GEMC-NACXX NAC Over-Current Protection when connected to a FACP

When the NAC is active (turned on), it will detect a current above 6A and turn off the output within 100mS. The output will remain off until either:

- a. The load is removed from the circuit and a short is no longer detected
- b. The RESET button on the GEMC-NACXX is pressed and held down for about 1 second, then released

If, after an over-current has been detected, the **RESET** button on the GEMC-NACXX is pressed and held down for about 1 second, then released and the circuit detects a current above 6A, the output will be turned off within 100mS.

When an over-current has been detected, the associated NAC LED (1-4) on the GEMC-NACXX board will flash to indicate the output is in trouble. Additionally, the Out Relay 7 [TBL] will change from energized to de-energized if wired as indicated on diagrams located on page 25 (the FACP will indicate a trouble).

"NAC OPTION" JUMPER OPTIONS

The **"NAC OPTION"** jumpers described in the table below are only used when the **"NAC ADDR"** jumper is set to 0 ("zero" no shunt connectors across any of the jumpers). When the **"NAC ADDR"** jumper is set to 0 ("zero"), the AUX relays are dedicated to the following tasks:

- AUX Relay 1 = NAC loop trouble (open or short on NAC 1-4 loop)
- AUX Relay 2 = Normally energized AC ON
- AUX Relay = Normally energized Battery Good

"NAC OPTION" JUMPER OPTIONS

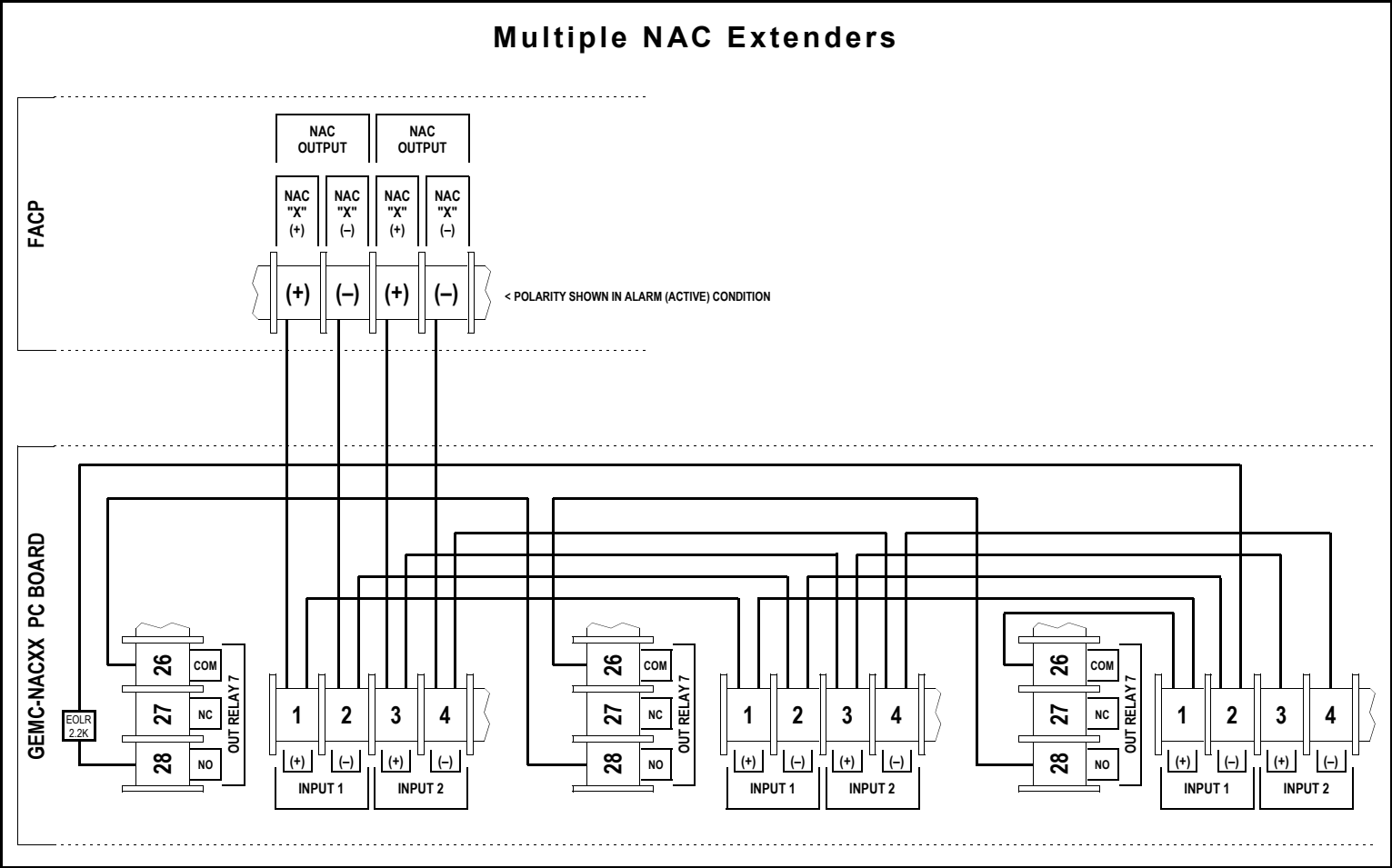
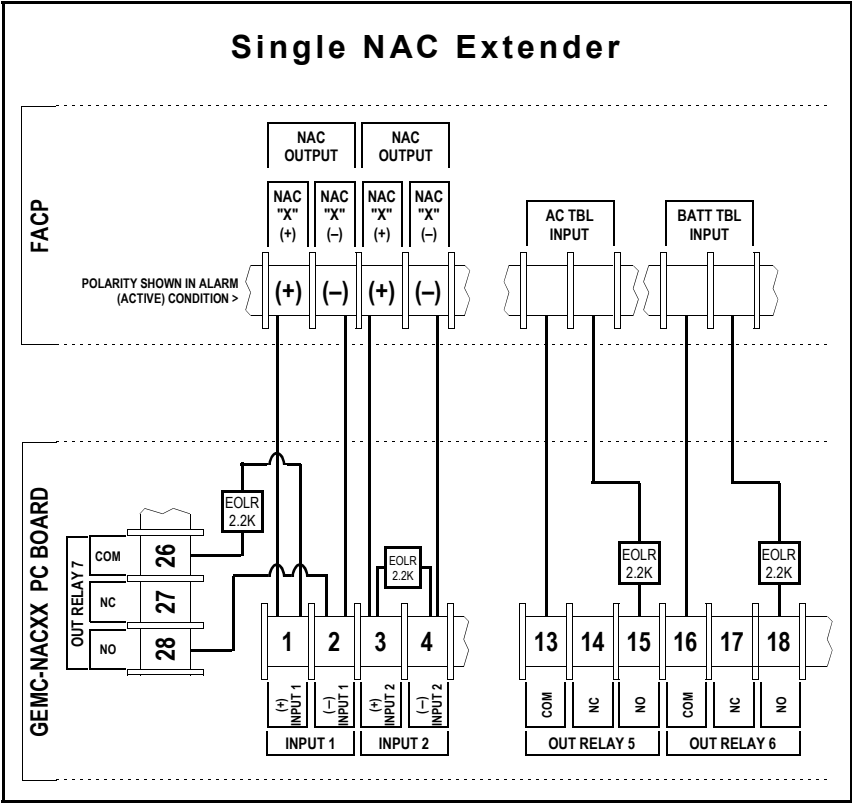
OPTION #	JUMPER	SHUNT	JUMPER NAME	DESCRIPTION
0	1	OFF	strobe/bell	NAC 1 and NAC 2 follow INPUT 1, NAC 3 and NAC 4 follow INPUT 2
	2	OFF	Wheelock	
	3	OFF	System Sensor	
	4	OFF	Offset	ON = Offset NAC 1/2 and NAC 3/4 by 1/2 second
	5	OFF/ON	AUX PWR	ON = NAC 4 is always on (24V auxiliary power)
1	1	ON	strobe/bell	Use INPUT 1 as bell and INPUT 2 as strobe NAC 1 and 2 temporal on bell (INPUT 1), NAC 3 and 4 follow strobe (INPUT 2)
	2	OFF	Wheelock	
	3	OFF	System Sensor	
	4	OFF	Offset	ON = Offset NAC 1/2 and NAC 3/4 by 1/2 second
	5	OFF/ON	AUX PWR	ON = NAC 4 is always on (24V auxiliary power)
2	1	ON	strobe/bell	Use INPUT 1 as bell and INPUT 2 as Strobe (Wheelock format)*
	2	ON	Wheelock	
	3	OFF	System Sensor	
	4	OFF	Offset	ON = Offset NAC 1/2 and NAC 3/4 by 1/2 second
	5	OFF/ON	AUX PWR	ON = NAC 4 is always on (24V auxiliary power)
3	1	ON	strobe/bell	Use INPUT 1 as bell and INPUT 2 as Strobe (System Sensor format)*
	2	OFF	Wheelock	
	3	ON	System Sensor	
	4	OFF	Offset	ON = Offset NAC 1/2 and NAC 3/4 by 1/2 second
	5	OFF/ON	AUX PWR	ON = NAC 4 is always on (24V auxiliary power)

*INPUT 1 can be steady or temporal.

CONFIGURING the GEMC-24VR

To use the GEMC-24VR for constant auxiliary regulated 24V power, place shunt on **NAC Options** jumper 5. Wire NAC 4 to input terminals 1 and 2, observing polarity.

WIRING DIAGRAMS FOR SINGLE AND MULTIPLE NAC EXTENDERS



SYSTEM SENSOR COMPATIBLE DEVICES

Listed below are **System Sensor** models that provide audible and visible (AV) notification and conform to required synchronization protocols:

WALL MOUNT	
P2R	2 Wire Horn/Strobe Std Candela Red
P2RH	2 Wire Horn/Strobe Hi Candela Red
P2W	2 Wire Horn/Strobe Std Candela White
P2WH	2 Wire Horn/Strobe Hi Candela White
P2RK	2 Wire Horn/Strobe Std Candela Red Outdoor
P2RHK	2 Wire Horn/Strobe Hi Candela Red Outdoor
P2WK	2 Wire Horn/Strobe Std Candela White Outdoor
P2WHK	2 Wire Horn/Strobe Hi Candela White Outdoor
P4R	4 Wire Horn/Strobe Std Candela Red
P4RH	4 Wire Horn/Strobe Hi Candela Red
P4W	4 Wire Horn/Strobe Std Candela White
P4WH	4 Wire Horn/Strobe Hi Candela White
P4RK	4 Wire Horn/Strobe Std Candela Red Outdoor
P4RHK	4 Wire Horn/Strobe Hi Candela Red Outdoor
P4WK	5 Wire Horn/Strobe Hi Candela White Outdoor
SR	Strobe Std Candela Red
SRH	Strobe Hi Candela Red
SW	Strobe Std Candela White
SWH	Strobe Hi Candela White
SRK	Strobe Std Candela Red Outdoor
SRHK	Strobe Hi Candela Red Outdoor
SWK	Strobe Std Candela White Outdoor
SWHK	Strobe Hi Candela White Outdoor
SW-ALERT	Strobe Std Candela White Amber Lens with ALERT
SWH-ALERT	Strobe Hi Candela White Amber Lens with ALERT
SW-CLR-ALERT	Stroe Std Candela White Clear Lens with ALERT

WALL SPEAKER STROBES	
SPSR	Wall, Red, Selectable Candela, Speaker/Strobe
SPSR-P	Wall, Red, Selectable Candela, Speaker/Strobe, plain
SPSRH	Wall, Red, Selectable Candela, Speaker/Strobe; Hi Cd
SPSRH-P	Wall, Red, Selectable Candela, Speaker/Strobe; Hi Cd, plain
SPSW	Wall, White, Selectable Candela, Speaker/Strobe
SPSW-CLR-ALERT	Wall, White, Selectable Candela, Speaker/Strobe, clear lens alert
SPSW-ALERT	Wall, White, Selectable Candela, Speaker/Strobe, amber lens alert
SPSW-P	Wall, White, Selectable Candela, Speaker/Strobe, plain
SPSWH	Wall, White, Selectable Candela, Speaker/Strobe; Hi Cd
SPSWH-P	Wall, White, Selectable Candela, Speaker/Strobe; Hi Cd, plain
SPSRV	Wall, Red, Selectable Candela, Speaker/Strobe, Hi dB
SPSRV-P	Wall, Red, Selectable Candela, Speaker/Strobe, Hi dB, plain
SPSWV	Wall, White, Selectable Candela, Speaker/Strobe, Hi dB
SPSWV-P	Wall, White, Selectable Candela, Speaker/Strobe, Hi dB, plain
SPSRK	Wall, Outdoor, Red, Selectable Candela, Speaker/Strobe
SPSRK-P	Wall, Outdoor, Red, Selectable Candela, Speaker/Strobe, plain
SPSRK-R	Wall, Outdoor, Red, Selectable Candela, Speaker/Strobe, replacement
SPSRHK	Wall, Outdoor Red, Selectable Candela, Speaker/Strobe, Hi Cd
SPSWK	Wall, Outdoor, White, Selectable Candela, Speaker/Strobe
SPSWK-P	Wall, Outdoor, White, Selectable Candela, Speaker/Strobe, plain
SPSWK-R	Wall, Outdoor, White, Selectable Candela, Speaker/Strobe, replacement

CEILING SPEAKER STROBES	
SPSCRH	Ceiling, Red, Selectable Candela, Speaker/Strobe; Hi Cd
SPSCW	Ceiling, White, Selectable Candela, Speaker/Strobe
SPSCW-CLR-ALERT	Ceiling, White, Selectable Candela, Speaker/Strobe, clear lens alert
SPSCW-P	Ceiling, White, Selectable Candela, Speaker/Strobe, plain
SPSCWH	Ceiling, White, Selectable Candela, Speaker/Strobe; Hi Cd
SPSCWH-P	Ceiling, White, Selectable Candela, Speaker/Strobe; Hi Cd, plain
SPSCRV	Ceiling, Red, Selectable Candela, Speaker/Strobe, Hi dB
SPSCRVH	Ceiling, Red, Selectable Candela, hi dB, Speaker/Strobe; Hi Cd
SPSCWV	Ceiling, White, Selectable Candela, Speaker/Strobe, Hi dB
SPSCWV-P	Ceiling, White, Selectable Candela, Speaker/Strobe, Hi dB, plain
SPSCWVH	Ceiling, White, Selectable Candela, Speaker/Strobe, Hi dB, Hi Cd
SPSCWVH-P	Ceiling, White, Selectable Candela, Speaker/Strobe, Hi dB, Hi Cd, plain
SPSCWK	Ceiling, Outdoor, White, Selectable Candela, Speaker/Strobe
SPSCWHK	Ceiling, Outdoor, White, Selectable Candela, Speaker/Strobe; Hi Cd

CHIMES & CHIME/STROBE	
CHR	Chime, Red
CHW	Chime, White
CHSR	Chime/Strobe, Red
CHSW	Chime/Strobe, White

HORNS	
HR	Horn, Red
HW	Horn, White
HRK	Horn, Red, Outdoor

MINI-HORN	
MHR	Mini-Horn, Red
MHW	Mini-Horn, White

SYSTEM SENSOR COMPATIBLE DEVICES (CONT'D)

SPANISH PAD PRINT "FUEGO"	
SR-SP	Strobe Std Candela Red - Fuego
SRH-SP	Strobe Hi Candela Red - Fuego
P2R-SP	2 Wire Horn/Strobe Std Candela Red - Fuego
P2RH-SP	2 Wire Horn/Strobe Hi Candela Red - Fuego
SCW-SP	Strobe Ceiling Std Candela White - Fuego
SCWH-SP	Strobe Ceiling Hi Candela White - Fuego
PC2W-SP	2 Wire Horn/Strobe Ceiling Std Candela White - Fuego
PC2WH-SP	2 Wire Horn/Strobe Ceiling Hi Candela White - Fuego

CEILING MOUNT	
PC2R	2 Wire Horn/Strobe Ceiling Std Candela Red
PC2RH	2 Wire Horn/Strobe Ceiling Hi Candela Red
PC2W	2 Wire Horn/Strobe Ceiling Std Candela White
PC2WH	2 Wire Horn/Strobe Ceiling Hi Candela White
PC2RK	2 Wire Horn/Strobe Ceiling Std Candela Red Outdoor
PC2RHK	2 Wire Horn/Strobe Ceiling Hi Candela Red Outdoor
PC2WK	2 Wire Horn/Strobe Ceiling Std Candela White Outdoor
PC2WHK	2 Wire Horn/Strobe Ceiling Hi Candela White Outdoor
PC4R	4 Wire Horn/Strobe Ceiling Std Candela Red
PC4RH	4 Wire Horn/Strobe Ceiling Hi Candela Red
PC4W	4 Wire Horn/Strobe Ceiling Std Candela White
PC4WH	4 Wire Horn/Strobe Ceiling Hi Candela White
PC4RK	4 Wire Horn/Strobe Ceiling Std Candela Red Outdoor
PC4RHK	4 Wire Horn/Strobe Ceiling Hi Candela Red Outdoor
PC4WK	4 Wire Horn/Strobe Ceiling Std Candela White Outdoor
PC4WHK	4 Wire Horn/Strobe Ceiling Hi Candela White Outdoor
SCR	Strobe Ceiling Std Candela Red
SCRH	Strobe Ceiling Hi Candela Red
SCW	Strobe Ceiling Std Candela White
SCWH	Strobe Ceiling Std Candela White
SCRK	Strobe Ceiling Std Candela Red Outdoor
SCRHK	Strobe Ceiling Hi Candela Red Outdoor
SCWK	Strobe Ceiling Std Candela White Outdoor
SCWHK	Strobe Ceiling Hi Candela White Outdoor

NO PAD PRINT "PLAIN"	
P2R-P	2 Wire Horn/Strobe Wall Std Candela Red - PLAIN
P2RK-P	3 Wire Horn/Strobe Wall Std Candela Red - PLAIN Outdoor
P2W-P	2 Wire Horn/Strobe Wall Std Candela White- PLAIN
P2WK-P	3 Wire Horn/Strobe Wall Std Candela White- PLAIN Outdoor
P2RH-P	2 Wire Horn/Strobe Wall Hi Candela Red - PLAIN
P2RHK-P	3 Wire Horn/Strobe Wall Hi Candela Red - PLAIN Outdoor
P2WH-P	2 Wire Horn/Strobe Wall Hi Candela White - PLAIN
P2WHK-P	3 Wire Horn/Strobe Wall Hi Candela White - PLAIN Outdoor
P4R-P	4 Wire Horn/Strobe Wall Std Candela Red - PLAIN
P4RH-P	4 Wire Horn/Strobe Wall Hi Candela Red - PLAIN
P4W-P	4 Wire Horn/Strobe Wall Std Candela White - PLAIN
P4WH-P	4 Wire Horn/Strobe Wall Hi Candela White - PLAIN
SR-P	Strobe Wall Std Candela Red - PLAIN
SRK-P	Strobe Wall Std Candela Red - PLAIN Outdoor
SW-P	Strobe Wall Std Candela White - PLAIN
SWK-P	Strobe Wall Std Candela White - PLAIN Outdoor
SRH-P	Strobe Wall Hi Candela White -PLAIN
SRHK-P	Strobe Wall Hi Candela White -PLAIN Outdoor
SWH-P	Strobe Wall Hi Candela White -PLAIN
SWHK-P	Strobe Wall Hi Candela White -PLAIN Outdoor
PC2R-P	2 Wire Horn/Strobe Ceiling Std Candela Red - PLAIN
PC2W-P	2 Wire Horn/Strobe Ceiling Std Candela White - PLAIN
PC2RH-P	2 Wire Horn/Strobe Ceiling Hi Candela Red - PLAIN
PC2WH-P	2 Wire Horn/Strobe Ceiling Hi Candela White - PLAIN
SCR-P	Strobe Ceiling Std Candela Red - PLAIN
SCW-P	Strobe Ceiling Std Candela White - PLAIN
SCRH-P	Strobe Ceiling Hi Candela Red - PLAIN
SCWH-P	Strobe Ceiling Hi Candela White - PLAIN

OUTDOOR	
P2RHK-R	Repl 2 Wire Horn/Strobe Wall Hi Candela Red Outdoor
P2RK-R	Repl 2 Wire Horn/Strobe Wall Std Candela Red Outdoor
P2WHK-R	Repl 2 Wire Horn/Strobe Wall Hi Candela White Outdoor
P2WK-R	Repl 2 Wire Horn/Strobe Wall Std Candela White Outdoor
P4RHK-R	Repl 4 Wire Horn/Strobe Wall Hi Candela Red Outdoor
P4RK-R	Repl 4 Wire Horn/Strobe Wall Std Candela Red Outdoor
SRHK-R	Repl Strobe Wall Hi Candela Red Outdoor
SRK-R	Repl Strobe Wall Std Candela Red Outdoor
SWHK-R	Repl Strobe Wall Hi Candela White Outdoor
SWK-R	Repl Strobe Wall Std Candela White Outdoor
HRK-R	Repl Horn Red Outdoor

COOPER-WHEELOCK COMPATIBLE APPLIANCES

The following tables list the appliances produced by Cooper Wheelock that are compatible with the Wheelock synchronization protocol:

COMPATIBLE WHEELOCK SYNCHRONIZING HORNS	
AH-12	AH-24
AH-12WP	AH-24WP
HS-24	MIZ-24S
NH-12/24	HN
ZNH	HNC

COMPATIBLE WHEELOCK SYNCHRONIZING HORN STROBES	
AS-121575W	AS-241575W
AS-24MCW	AS-24MCC
AS-24MCWH	AS-24MCCH
AS-2415C	AS-2430C
AS-2475C	AS-24100C
ASWP-2475W	-----
NS4-121575W	NS-121575W
HS4-241575W	NS-2-41575W
HS4-24MCW	NS-24MCW
HS4-24MCWH	HS4-24150C
-----	HS
-----	HSC
HS4-24185W	-----
ZNS-MCW	-----
ZNS-MCWH	-----

COMPATIBLE WHEELOCK SYNCHRONIZING STROBES	
RSS-121575W	RSSP-121575W
RSS-241575W	RSSP-241575W
RSS-24MCW	RSSP-24MCW
RSS-24MCC	-----
RSS-2415C	ST
RSS-2430C	STC
RSS-2475C	-----
RSS-24100C	-----
RSS-2415CR	-----
RSS-2430CR	-----
RSS-2475CR	-----
RSS-24100CR	-----
RSS-24150C	-----
RSS-24177C	-----
RSS-24150W	RSSP-24150W
RSS-24177W	RSSP-24177W
RSS-24185W	RSSP-24185W
RSS-24150CR	-----
RSS-24177CR	-----
RSSWP-2475W	-----
ZRS-MCW	-----
ZRS-MCWH	-----

COMPATIBLE WHEELOCK NON-SYNCHRONIZING APPLIANCES	
MB-G6-12	MB-G6-24
MB-G10-12	MB-G10-24
MIZ-TC12	MIZ-TC24

COMPATIBLE WHEELOCK APPLIANCES WITH SYNCHRONIZING STROBES	
AMT-241575W	AMT4-241575W
AMT-2475W	AMT4-2475W
AMT-241575W-NYC	AMT4-241575W-NYC
AMT-2475W-NYC	AMT4-2475W-NYC
MT-12575W	-----
MT-241575W	MT-2475W
MTWP-2475W	ET70WP-2475W
CH70-24MCW	CH90-24MCW
CH70-24MCC	CH90-24MCC
CH70-2415C	CH90-2415C
CH70-2430C	CH90-2430C
CH70-2475C	CH90-2475C
CH70-24100C	CH90-24100C
CH70-24150C	CH90-24150C
CH70-24177C	CH90-24177C
CH70-24150W	CH90-24150W
CH70-24MCWH	CH90-24MCCH
CH70-24185W	CH90-24185W
E70-24MCW	E90-24MCW
E70-24MCC	E90-24MCC
E70-2415C	E90-2415C
E70-2430C	E90-2430C
E70-2475C	E90-2475C
E70-24100C	E90-24100C
E70-24150C	E90-24150C
E70-24177C	E90-24177C
E70-24150W	E90-24150W
E70-24MCWH	E90-24MCCH
E70-24185W	E90-24185W
ET70-24MCW	ET90-24MCW
ET70-24MCC	ET90-24MCC
ET70-2415C	ET90-2415C
ET70-2430C	ET90-2430C
ET70-2475C	ET90-2475C
ET70-24100C	ET90-24100C
ET70-24150C	ET90-24150C
ET70-24177C	ET90-24177C
ET70-24150W	ET90-24150W
ET70-24MCWH	ET90-24MCCH
ET70-24185W	ET90-24185W
SA-70-24-SL	SA-90-24-SL
SA-70-24-SLM	SA-90-24-SLM

COMPATIBLE WHEELOCK CODED AUDIBLE APPLIANCES	
AMT-12/24	AMT4-12/24
AMT-12/24-NYC	AMT4-12/24-NYC
CH70	CH90
CSX10-24-DC	CSXG10-24-DC
MT-12/24	MT4-12/24

NOTES

NOTES

NAPCO LIMITED WARRANTY

NAPCO SECURITY SYSTEMS, INC. (NAPCO) warrants its products to be free from manufacturing defects in materials and workmanship for *thirty-six months* following the date of manufacture. NAPCO will, within said period, at its option, repair or replace any product failing to operate correctly without charge to the original purchaser or user.

This warranty shall not apply to any equipment, or any part thereof, which has been repaired by others, improperly installed, improperly used, abused, altered, damaged, subjected to acts of God, or on which any serial numbers have been altered, defaced or removed. Seller will not be responsible for any dismantling or reinstallation charges.

THERE ARE NO WARRANTIES, EXPRESS OR IMPLIED, WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. THERE IS NO EXPRESS OR IMPLIED WARRANTY OF MERCHANTABILITY OR A WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. ADDITIONALLY, THIS WARRANTY IS IN LIEU OF ALL OTHER OBLIGATIONS OR LIABILITIES ON THE PART OF NAPCO.

Any action for breach of warranty, including but not limited to any implied warranty of merchantability, must be brought within the six months following the end of the warranty period. IN NO CASE SHALL NAPCO BE LIABLE TO ANYONE FOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES FOR BREACH OF THIS OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, EVEN IF THE LOSS OR DAMAGE IS CAUSED BY THE SELLER'S OWN NEGLIGENCE OR FAULT.

In case of defect, contact the security professional who installed and maintains your security system. In order to exercise the warranty, the product must be returned by the security professional, shipping costs prepaid and insured to NAPCO. After repair or replacement, NAPCO assumes the cost of returning products under warranty. NAPCO shall have no obligation under this warranty, or otherwise, if the product has been repaired by others, improperly installed, improperly used, abused, altered, damaged, subjected to accident, nuisance, flood, fire or acts of God, or on which any serial numbers have been altered, defaced or removed. NAPCO will not be responsible for any dismantling, reassembly or reinstallation charges.

This warranty contains the entire warranty. It is the sole warranty and any prior agreements or representations, whether oral or written, are either merged herein or are expressly cancelled. NAPCO neither assumes, nor authorizes any other person purporting to act on its

behalf to modify, to change, or to assume for it, any other warranty or liability concerning its products.

In no event shall NAPCO be liable for an amount in excess of NAPCO's original selling price of the product, for any loss or damage, whether direct, indirect, incidental, consequential, or otherwise arising out of any failure of the product. Seller's warranty, as hereinabove set forth, shall not be enlarged, diminished or affected by and no obligation or liability shall arise or grow out of Seller's rendering of technical advice or service in connection with Buyer's order of the goods furnished hereunder.

NAPCO RECOMMENDS THAT THE ENTIRE SYSTEM BE COMPLETELY TESTED WEEKLY.

Warning: Despite frequent testing, and due to, but not limited to, any or all of the following; criminal tampering, electrical or communications disruption, it is possible for the system to fail to perform as expected. NAPCO does not represent that the product/system may not be compromised or circumvented; or that the product or system will prevent any personal injury or property loss by burglary, robbery, fire or otherwise; nor that the product or system will in all cases provide adequate warning or protection. A properly installed and maintained alarm may only reduce risk of burglary, robbery, fire or otherwise but it is not insurance or a guarantee that these events will not occur. CONSEQUENTLY, SELLER SHALL HAVE NO LIABILITY FOR ANY PERSONAL INJURY, PROPERTY DAMAGE, OR OTHER LOSS BASED ON A CLAIM THE PRODUCT FAILED TO GIVE WARNING. Therefore, the installer should in turn advise the consumer to take any and all precautions for his or her safety including, but not limited to, fleeing the premises and calling police or fire department, in order to mitigate the possibilities of harm and/or damage.

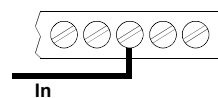
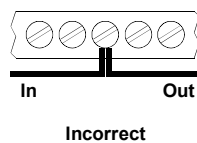
NAPCO is not an insurer of either the property or safety of the user's family or employees, and limits its liability for any loss or damage including incidental or consequential damages to NAPCO's original selling price of the product regardless of the cause of such loss or damage.

Some states do not allow limitations on how long an implied warranty lasts or do not allow the exclusion or limitation of incidental or consequential damages, or differentiate in their treatment of limitations of liability for ordinary or gross negligence, so the above limitations or exclusions may not apply to you. This Warranty gives you specific legal rights and you may also have other rights which vary from state to state.

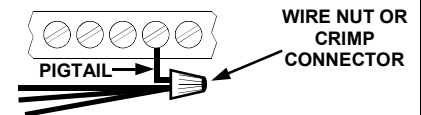
IMPORTANT WIRING METHODS



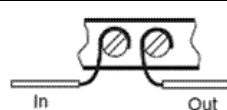
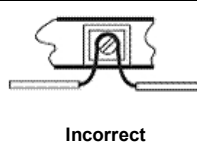
For single-conductor terminal blocks (like the type shown at left), to terminate more than one conductor to a terminal, use the wiring methods shown at right:



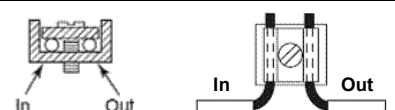
Correct -- Single incoming and/or pigtail with wire nut / crimp connectors



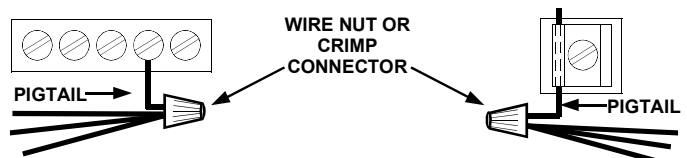
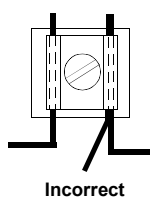
For "barrier" type terminal blocks (like the type shown at left), to terminate two conductors to a terminal, use the wiring methods shown at right:



Correct -- Separate incoming and outgoing conductors



To terminate more than two conductors or conductors of different wire sizes to a terminal, use the "pigtail" type wiring method as shown at right. Use insulated wire for the pigtail, and firmly secure the conductors to the pigtail using an appropriate wire nut or crimp connector for the number and gauge of conductors used.



Correct -- Use pigtail and wire nut / crimp connector