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VECP-60

Installation Manual



4 Wheeling Ave. Woburn MA 01801 781-933-0998 www.sigcom.com

General Description

The VECP-60 is a 60 Watt Voice Evacuation Control Panel for use as an adjunct evacuation panel with listed Fire Alarm Control Panels to provide a complete listed emergency fire alarm voice/tone evacuation system. The VECP-60 can also be used as a stand-alone panel in emergency Mass Notification systems where live voice, tones, and pre-recorded messages are required.

The VECP-60 complies with UL Standards 864 and 1711 for Fire Emergency Evac, and with UL 2572 Standard for Mass Notification Systems.

The VECP-60 Evacuation Panel enclosure includes an integral Power Supply, a set of 12V batteries for back-up power, and an integral microphone for live voice announcements. The VECP-60 can interface with any control panel listed for fire alarm applications through a supervised 24V reverse polarity NAC activation input. The NAC activation input connector allows the connection of an end of line resistor to provide fault supervision by the FACP.

The system provides 2 class A or Class B, power limited, supervised speaker outputs rated at 25V rms 30W each for a total of 60 watts. For 70V rms systems, an external 25V to 70V audio power transformer is required. The transformer must be listed for fire alarm applications.

In addition to the 24V reverse polarity NAC activation input, the VECP-60 system has 5 additional supervised dry contact inputs for activation of various other tone/message combinations as needed.

System configuration and tone/message selection can be accomplished through a set of on-board DIP switches or connecting a laptop computer to the on-board mini USB plug and running VECP-60 configuration software.

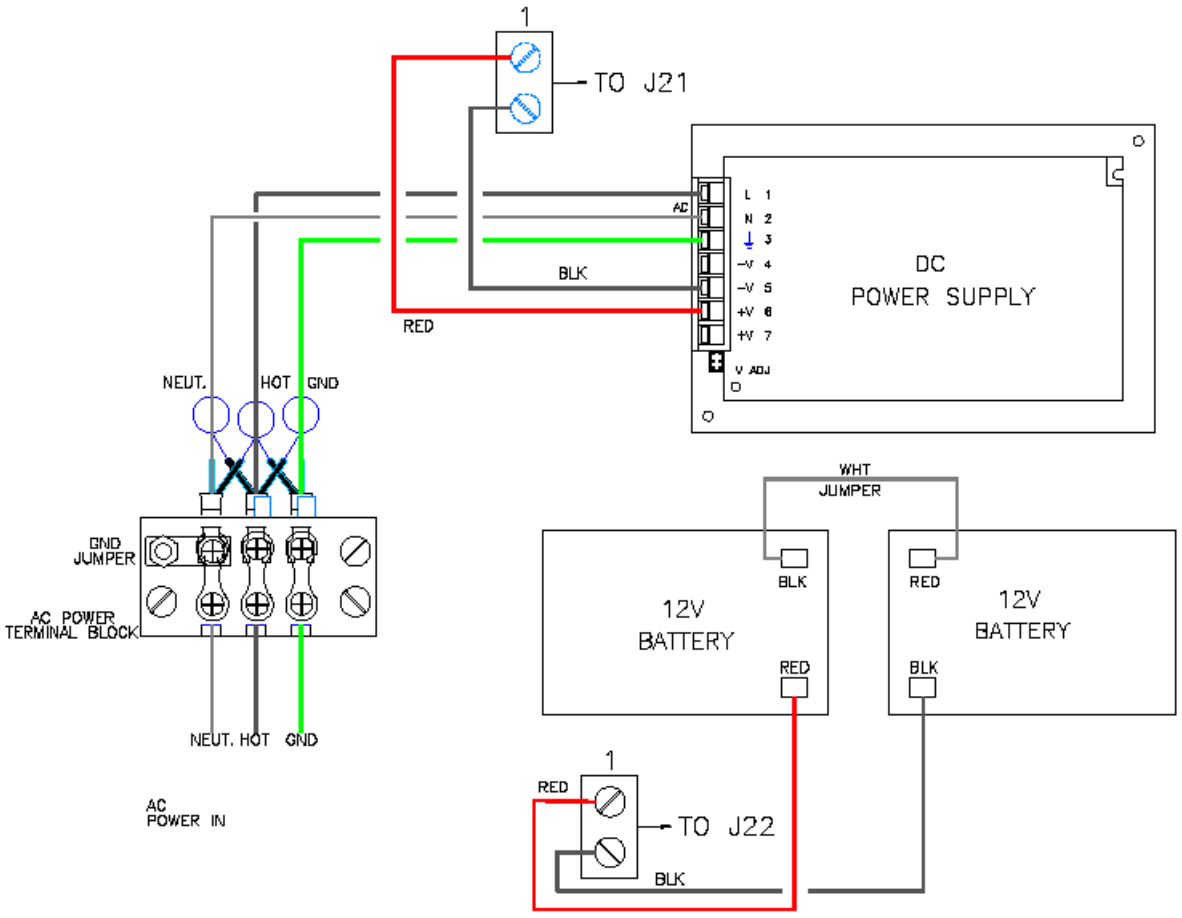
The system also includes a supervised 1Vrms auxiliary audio input that is activated using a dry contact PTT closure and a 24V reverse polarity output that is activated by the VECP-60 to indicate an active alarm condition.

Installation Note

Local code requirements must be followed when installing the VECP-60 system. Wiring is to be in accordance with National Electrical Code, ANSI/NFPA 70.

The VECP-60 system is preconfigured at the factory. Do not change any factory settings until after the system is connected, powered up, and tested. After verifying system operation, modifications to the settings can be made to meet the local / system requirements.

1. Power Supply



The VECP-60 panel comes standard with an integral 24 VDC (nominal) regulated power supply which supplies the required DC voltage to operate the system and charge the batteries. The charging circuit for the system batteries is on the main printed circuit board and it is continuously monitored to ensure proper operation.

The VECP-60 requires two 12V, 7 A-H batteries connected in series to provide the required 24 VDC back up power source. The back up batteries are capable of powering the system for a minimum of 48 hours in standby mode then 30 minutes of active alarm mode under the full 60 watt speaker load. Please note that battery output wiring is non-power limited.

Connect the AC supply to the AC terminal strip as shown above using minimum wire size of 14 AWG rated for 600V or higher. The non-power limited AC supply must be separated by 0.25 in from all other wiring. The AC wiring must use a separate conduit entry to the enclosure. The bottom knockout is recommended for the AC wiring.The Power-up sequence consists of turning on the AC power supply then connecting the red and black wires to the positive and negative terminals of the battery as shown above. Powering off the system starts with disconnecting the battery terminals at the batteries and then turning off the AC supply.

The 24 VDC power supply comes prewired from the factory and connects to J21 on the main printed circuit board (PCB). The 24 VDC backup battery connects to connector J22 on the main PCB. Disconnecting either plug from the Main PCB will cause a fault condition in the system.

The VECP-60 includes a battery charger circuit on the main printed circuit board. The battery charger output is available on J22 and is capable of fully recharging a depleted set of batteries within 48 hours. The battery charger circuit is monitored internally and will initiate a fault condition if the charger voltage output drops below the threshold required to charge the battery. The charger fault condition is indicated by the yellow System Fault LED and 3 flashes of the red Active LED.

The battery voltage is monitored every 25 seconds and will cause a low battery fault if the battery voltage drops below the 22.8 VDC threshold or if the battery is disconnected. The battery fault condition is indicated by the yellow System Fault LED and 2 flashes of the red Active LED.

In the case of AC power failure, the System Fault LED is lit and the red Active LED will flash once. While in AC failure condition, a “power save” mode is activated where the system supervision tone is turned on briefly and the green Signal LEDs at the top right corner of the board will only come on briefly every 20 seconds. This is to monitor the status of the amplifier and the audio message circuits.

The “power save” mode is stopped and the system is immediately activated if the microphone is keyed or an alarm signal is initiated.

2. Visual Annunciation

The VECP-60 includes multiple LEDs on the printed circuit board for visual annunciation of various fault and alarm conditions. Red LED D67 indicates system active or alarm condition. D67 will turn on along with 2 other red LEDs below it, D27 and D30, when the output speaker circuits are activated. D67 will also flash on and off to display fault codes in the VECP-60 system.

Green LED D44 indicates the presence of system power from AC power supply or system batteries.

A series of green LEDs, D11-D14, located near the top right corner of the board are used for audio signal volume level indication. During system standby, 2 of the 4 LEDs would be lit showing the amplifier supervision tone which is at half volume.

When the system is on battery power (AC supply failure), all signal LEDs will be off in order to conserve battery capacity. The LEDs will come on briefly every 15 to 20 seconds to check the status of the amplifier. This only occurs during standby status.

Note: The VECP-60 is an adjunct voice evacuation panel which is activated by a fire alarm control panel or system. The audible and visual fault conditions are primarily annunciated in the fire alarm control panel.

Yellow LED D21 is a system fault LED which turns on when any fault conditions exist in the VECP-60 system. In addition to D21, individual fault LEDs on the board will annunciate specific faults such as:

Speaker Circuit 1 Fault - D26
Speaker Circuit 2 Fault - D31
Microphone Fault – D19
Remote Mic Fault – D54
Auxiliary Audio input Fault – D25
NAC output Fault – no specific LED indication

All other fault conditions are identified by D67 LED flashing on and off to provide a code as indicated in the table below.

# of flashes	Fault Condition
1	AC Fault
2	Battery Fault
3	Charger Fault
4	Audio Fault
5	Mic Fault
6	Dry contact input or Gnd Fault
7	Aux input Fault
8	Not Used
9	Amplifier Fault
10 &11	(Unused) reserved
12	Amp Overload
13	Msg input Fault
14	NAC output Fault

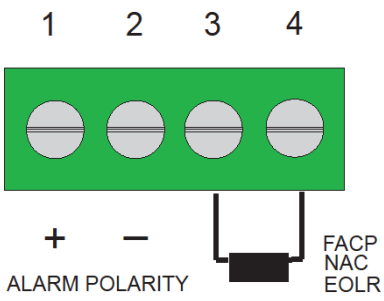
3. Input Activation Connections

a. Emergency Fire Alarm Evacuation Signal

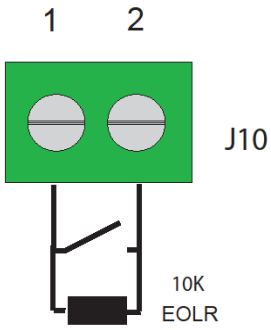
The VECP-60 system can be activated by multiple types of inputs. For Fire Alarm applications, the VECP-60 is activated by a 24V reverse polarity NAC circuit from a Listed Fire Alarm Control Panel (FACP) which connects to J8. The NAC input from the FACP must be a steady 24V reverse polarity input with **no** strobe synchronization pulses. The end of line resistor for the FACP NAC input connects to terminals 3 and 4 to allow the FACP to supervise the wiring between the two panels.

The 24V NAC input is the recommended alarm activation method for Fire Evacuation systems because it allows the FACP to supervise the wiring and provide annunciation of fault conditions in the VECP-60.

J8 NAC Input



J10 Dry Contact Input



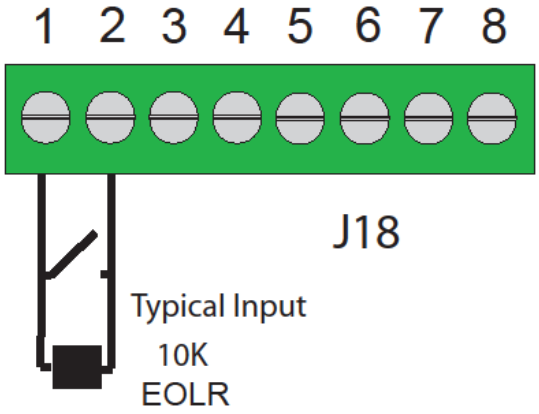
The end of Line resistor on pins 3 and 4 of J8 should match the value required by the NAC circuit in order to provide proper supervision. Any fault condition in the VECD-60 system will open the connection to the supervision resistor and create a fault condition in the Fire alarm panel.

The Dry Contact input on J10 will also activate the same emergency Fire Evacuation tone/message as the NAC input on J8. The dry contact input wiring is supervised by the VECP-60 and a fault condition will result if the 10K EOL Resistor is not connected across the two input terminals. The 10K resistor should be installed at the other end of the circuit wiring to J10 when the dry contact input is used for alarm activation.

b. Secondary Activation Inputs

In addition to the alarm activation inputs above, there are 4 other activation inputs that can be wired to J18. These are supervised dry contact inputs that can activate additional tone and voice message signals other than fire evacuation. The wiring to these inputs is supervised by a 10K EOL resistor that must be moved to the end of the circuit. These inputs are optional and are not always provided in the standard fire alarm voice evacuation systems.

The tone and message configurations can be programmed using the on-board DIP switches as described in table 1a further in this document. The alert tone selection, voice message, number of repeats, and tone duration are some of the programmable configurations available.



c. Auxiliary Audio Input

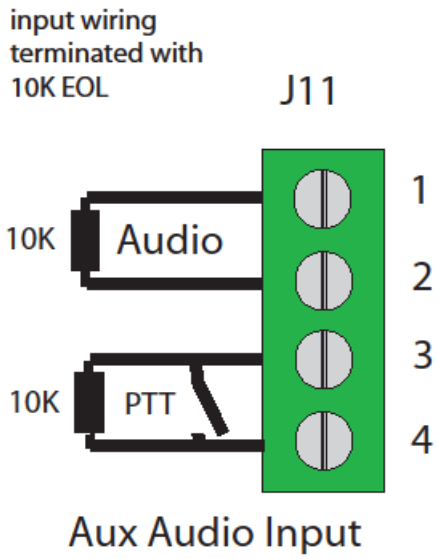
The VECP-60 provides an Auxiliary Audio input which is available on connector J11. The Aux Audio input wiring is supervised using 10K end of line resistors which must be removed from the connector and installed at the other end on the wires for each input pair. Inputs 1 and 2 of J11 are used for PTT (push to talk) dry contact activation of the aux audio input. Pins 3 and 4 of J11 are used to connect the audio source to the system.

The nominal Auxiliary Audio input source level is 1Vrms and is only broadcast on the speaker output when the PTT pair is closed on pins 1 and 2 of J11. A 1 Vrms input across pins 3 and 4 of J11 will result in a 25 Vrms output on the speaker circuit. if a 70 V external transformer is used, the 1 Vrms audio input across 3 and 4 of J11 will produce 70 Vrms on the speaker output.

An open circuit on either pair of connections to J11 will cause a system fault condition and will open the EOL resistor of the Fire Alarm Panel NAC circuit on J8 pins 3 and 4 to create a fault condition in the Fire Panel.

Nominal Audio input level 1Vrms

AC coupled audio input only



d. Local Microphone

The local microphone connects to connector J9 and is activated using a push-to-talk (PTT) switch on the side of the microphone. When the PTT switch is closed, the Red system active LED (D67) turns on and the mic audio is broadcasted over the output speakers circuits. The mic voice audio is displayed by the signal meter green LEDs D11-D14 located at the top right corner of the PCB.

The local microphone connection is supervised by the system. If the microphone is unplugged, the mic fault LED (D19) and the system fault LED (D21) will both turn ON. In

addition, the NAC end of line resistor on pins 3 and 4 of J9 will be disconnected to create a fault condition on the Fire Alarm control Panel.

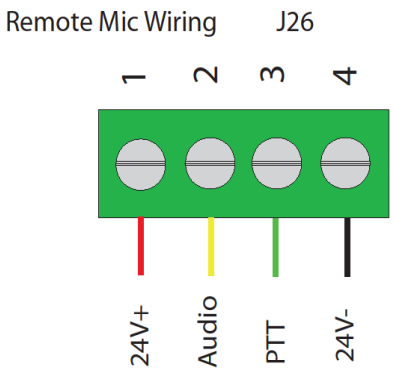
The local microphone has the highest priority over all system activation. Any other active signal will be interrupted when the microphone is keyed. Once the microphone is released the system will resume playing the initial alert tone signal. A voice message will not resume playing after the microphone is released.

e. Remote Microphone

A remote microphone connection is available on the VECP-60 to interface with model MNS-RM remote microphone assembly. The remote microphone activation will override any tone or message signals currently active in the system. Once the remote microphone is released the system will resume any previous tone signals but will not resume voice audio messages.

The remote microphone is powered by the VECP-60 system 24V DC power supply. The power circuit is protected by in-line fuse F3 to prevent damage to the 24V system power supply. Before replacing fuse F3, the high current condition must be resolved to ensure proper system operation and to prevent damage to other components in the system.

The wiring to the remote microphone is supervised by the VECP-60. Any open circuit will cause a system fault condition and LED D54 will turn on. The remote microphone wiring connection is shown below.



Note: The VECP-60 ships with 2 resistors installed on connector J26.
These resistors must be removed when a remote microphone is connected.

Do not connect to any device other than the VECP-60-RM series remote microphone

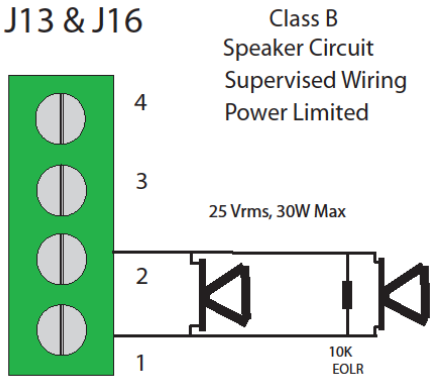
4. Output Circuits

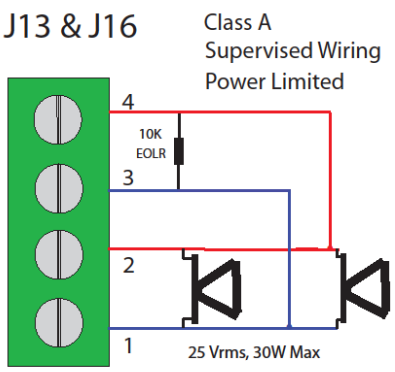
a. Speaker Circuits

The VECP-60 includes two supervised speaker output circuits. Each speaker circuit is rated for 30W rms output power for a total of 60W rms. Each speaker circuits provides a nominal 25V rms audio output and can be configured for Class A or Class B wiring.

Note: Only speakers listed for fire alarm applications are compatible with the VECP-60 speaker circuits. The use of other types of speakers will cause fault conditions and system malfunction.

The VECP-60 speaker circuits can each support class A or B wiring independently. Use minimum 18 gauge wire for all speaker circuit wiring. For class B wiring, remove the end of line resistor from connectors J13 and J16 and install it at the last speaker in each circuit. For class A wiring, loop the circuit back to positions 3 and 4 of J13 and J16 and install the 10k resistor across the 2 pins on each connector. Refer to wiring diagrams below.





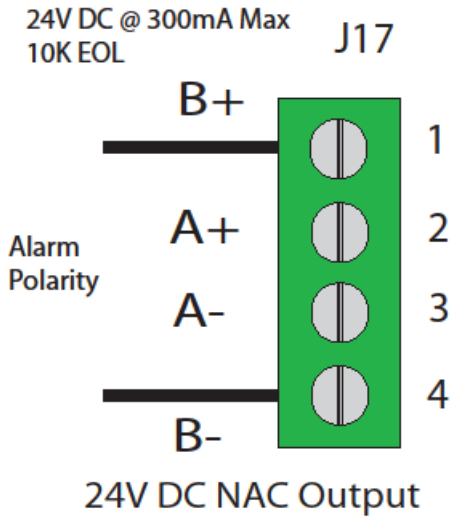
The VECP-60 speaker circuit wiring is supervised for open circuits, short circuits and ground faults. Any of these abnormal conditions will cause a fault condition and create a fault on the FACP NAC circuit controlling the VECP-60.

b. 24V DC NAC Control Output

J17 provides an output for the activation of external equipment and systems. The regulated DC voltage output available on J17 can be used to control strobe booster power supplies, audio power boosters, monitor modules and any listed equipment for monitoring reverse polarity 24V circuits.

The 24V DC output on J17 is current limited and rated for a maximum of 100mA during an alarm condition. The J17 output is a supervised 24V DC reverse polarity output. In standby condition, -12V DC is present across pins 1 and 4. The voltage switches to +24V DC nominal when the system is active as a result of Alarm, Aux PTT, or microphone activation. **Warning: Due to low power rating, the NAC output is not designed to directly power strobes or other Notification Appliance Circuits.**

J17 supports Class B wiring using pins 1 and 4 as well as Class A wiring configuration using all 4 pins. For class B wiring, use pins 1 and 4 and move 10K EOLR to the end of the circuit. For class A wiring, move 10K EOLR across pins 2 and 3 and loop the circuit back from B+ and B- to A+ and A- respectively.



24V DC NAC Output

c. 70V Transformer Connection

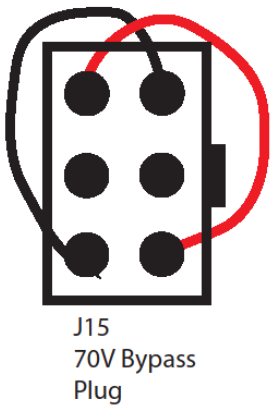
Connector J15 allows interface to external 70V transformer to step up the speaker circuit nominal voltage from 25Vrms to 70Vrms.

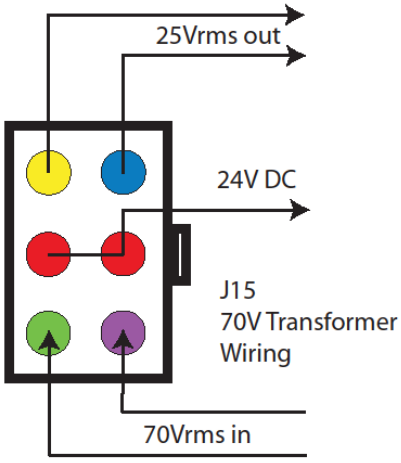
Note: for 70Vrms operation, use a 25V to 70V transformer that is listed for this purpose.

Model MNS-70V-XFMR is listed and approved for use in fire alarm applications.

In the standard 25Vrms application, the VECP-60 includes a bypass plug in connector J15. The bypass plug is shown below on the left. It allows the 25V signal to be fed directly into the speaker output circuits.

For installations requiring 70Vrms speaker output circuits, the bypass plug must be removed and replaced with the plug provided with the 70V transformer interface cable. The other end of the cable is wired as shown below on the right. The 70V transformer interface cable (part #590-xxxx) allows the VECP-60 to connect to the MNS-70V-XFMR. Simply connect the stripped wires at the other end of the cable to the terminal strip inside the MNS-70V-XFMR as described in the transformer installation manual.

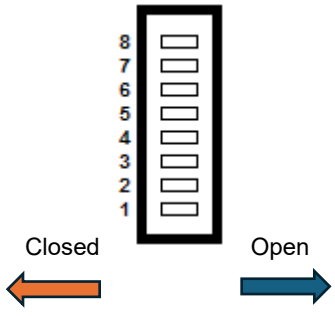




The pre-alert tone signal and message selections can be configured using 2 sets of switch arrays SW1 and SW2 located near the center left of the board. Each set of switches is labeled 1 to 8 from bottom to top.
Below is a table showing the dip switch selections for various alert tone and message configurations.

Control **SW1**	Switch	Temp 800	Temp 520	Slow Whoop	Horn	Temp4	No Tone	High Low	chime	1K tone
NAC	8	→	←	→	←					
	7	→	→	←	←					
	6	→	←	→	←	→	→	←	→	←
Alarm 1	5	→	→	←	←	→	→	→	←	←
	4	→	→	→	→	←	←	←	←	←
	3	→	←	→	←	→	→	←	→	←
Alarm 2	2	→	→	←	←	→	→	→	←	←
	1	→	→	→	→	←	←	←	←	←
SW2										
Alarm 3 & 4	8			←		→	→	→		←
	7			→		→	→	←		←
		Use PC Settings	Use Switches	5 Secs	10 Secs	Infinite	Infinite	7	5	3
Tone Length	6			→	←					
Number of	5					→		←	→	←
Playbacks	4					→		→	←	←
Not Used	3									
Temp4 / No tone	2					←	→			
PC/Switch Select	1	→	←							

- SW2 position 3 not used.
- Switch pushed to the left is closed, pushed to the right is open.
- Switch positions are numbered 1 to 8 from bottom to top.

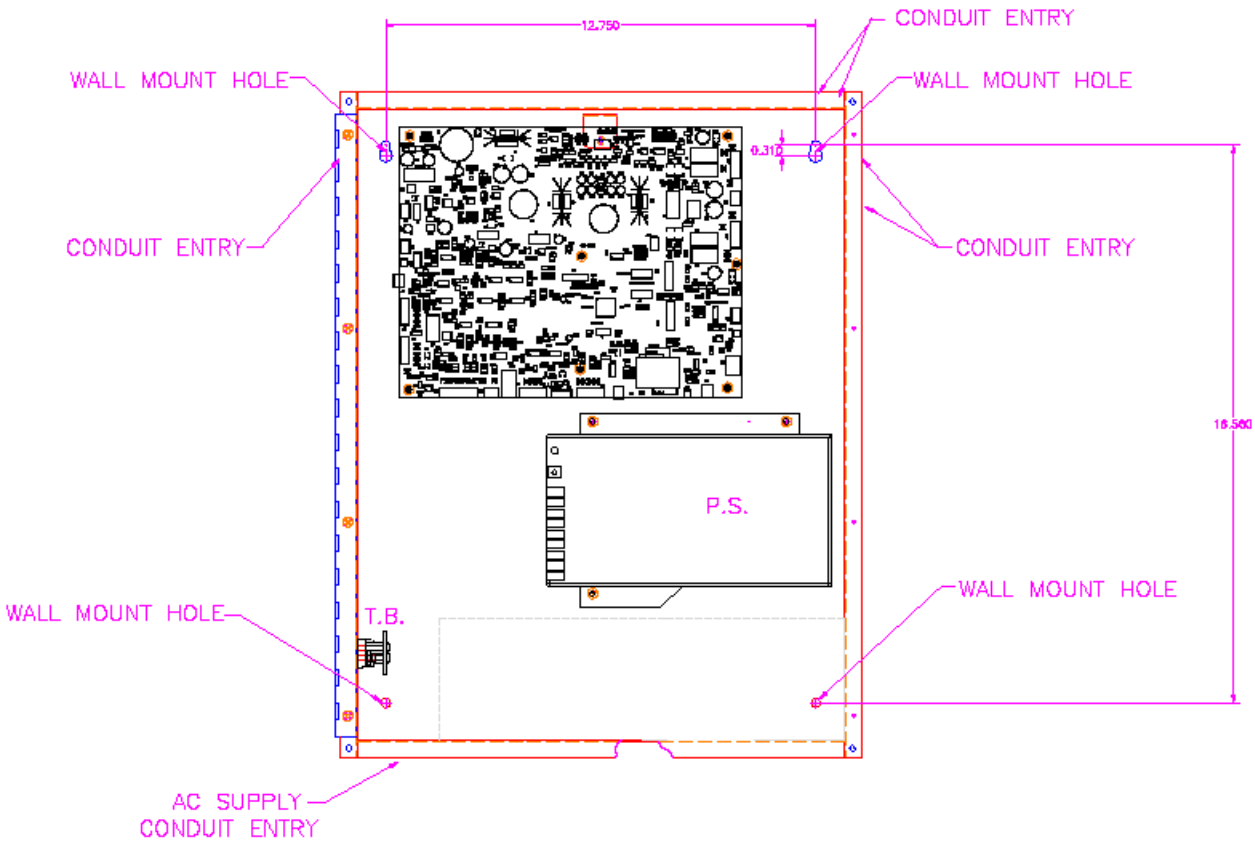


Specifications:

AC power supply:	120VAC, 2.5A, 60 Hz. Use terminal block at lower left. Minimum wire size 14 AWG, 600V insulation rating.
DC power supply:	24V DC nominal, 6A Min. Regulated power supply 24V DC battery backup 7AH minimum capacity.
Battery Backup:	24Hr minimum standby plus 15 minutes alarm under full load.
DC current:	Full load active current 3.2A @ 24Vdc Standby DC current: 0.25A with AC power present. Standby DC current: 0.14A on battery.
Speaker Circuits:	2 Class A or B (Style Y or Z) supervised with 10K, 1W EOL resistor. Speaker Audio Output Voltage 25Vrms nominal. 70V option with external listed transformer. Rated output power 30W each circuit, 60W total. Power Limited output circuit. 18AWG minimum wire size.
NAC Output:	Reverse polarity 24V DC @ 300mA Max. Class A or B wiring. 10K EOL resistor.
Activation Inputs:	Primary NAC alarm input on J8 with pass through EOL resistor for fault annunciation at FACP. Regulated 12V to 28V DC reverse polarity input. Primary contact closure alarm input on J10. Dry contact closure supervised wiring with 10K EOL resistor. 4 secondary dry contact inputs on J18 each supervised wiring using 10K EOL resistor.
Auxiliary Audio:	4 wire supervised input. 1 pair dry contact activation, 1 pair input audio 1Vrms nominal.
Microphone:	Front panel mounted microphone with supervised wiring. Microphone is activated with manual PTT side switch.
Dimensions:	Cabinet Overall 15.75” W X 20”H X 5” D Cut in Size 14.5” W X 18.75” H X 4” D
Environmental:	Operating temperature 32° F- 122° F (0°C – 50° C) Humidity 95% at 90° F (32° C)
Ground Fault:	Ground fault testing impedance threshold 100k or less.

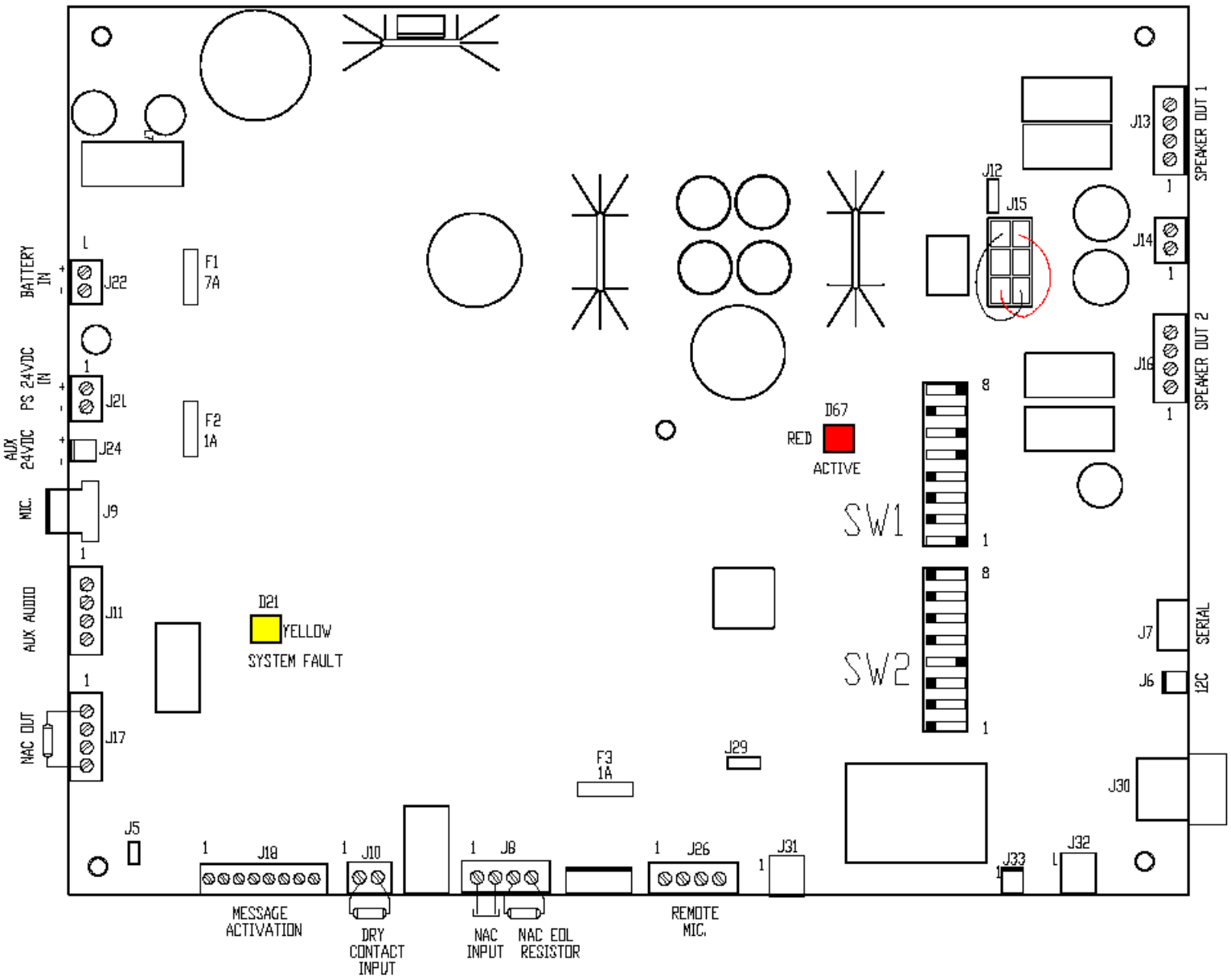
The VECP-60 cabinet can be wall mounted using the 4 mounting holes at the corners of the back of the enclosure. The top 2 holes can be used to hang the enclosure on pre-installed screws or wall anchors. See recommendations below for AC supply and speaker circuit conduit entries.

Enclosure Wall Mount Diagram



ENCLOSURE WALL MOUNT LAYOUT

Main PCB Layout



5. **Testing and Maintenance:**

Field replaceable components:

a. The system backup batteries should be tested during each scheduled maintenance test. To verify the battery condition, measure the DC voltage across the batterie terminals while disconnected from the system. The battery voltage should measure 24V DC or above for a good set of batteries. If the voltage is below 24V DC, the batteries may be old or damaged. Perform the following test:

- Using a DC voltmeter measure the voltage across J22 while battery is disconnected. The voltage should be 27V DC or above. If this is the case, the charging circuit is operational and the batteries must be replaced.
- If the voltage is below 27V DC, there may be a malfunction in the charging circuit.
- Turn off system power.
- Using a pair of tweezers or small needle nose pliers, remove fuse F1 located near the battery connector and use ohmmeter to verify continuity.
- If fuse F1 is not open, place it back in its holder, turn on system power, and measure J22 voltage again.
- If voltage is still below 27V DC, the charging circuit is defective and the main printed circuit board must be replaced.
- If Fuse F1 is open, contact the factory for a replacement part.

b. Fuse F3 protecting remote microphone is tested by removing it from its holder and using a voltmeter to verify continuity. If F3 fuse is open, contact factory for replacement.

Recommended test and maintenance schedule:

The VECP-60 system should be tested at least once every year. The batteries should be visually examined and tested as described above. System operation should be verified by operating the local and remote microphone to produce loud and clear audio announcements. In addition, the signal tone and pre-recorded message should be tested by activating the fire alarm system on the premises. The pre-recorded message and pre-tone should be loud and legible throughout the premises.

For technical support contact customer service - 781-933-0998