HYPERSPIKE

Installation and Maintenance Manual
HyperSpike® Encompass LT System

DISCLAIMER AND WARNING

The information in this manual affects your safety and your legal rights and responsibilities. Read this entire manual carefully to ensure proper configuration before use. Failure to read and follow instructions and warnings in this manual may result in serious injury to yourself or others, or damage to other objects in the vicinity.

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SAFETY PRECAUTIONS

The HyperSpike® Encompass LT Cabinet uses high operating voltages and sound levels. The primary safety risks are: 1) electrical shock and 2) hearing damage or loss. Only properly trained personnel should operate the Encompass LT Cabinet and abide by the critical safety warnings identified in the manual to prevent injury or death during operation.

WARNING:

**LIFE-THREATENING ELECTRIC SHOCK BY ELECTROCUTION.
90-250 VAC IS PRESENT WHEN ENERGIZED.**

Always plug the unit into properly grounded electrical outlets.
Never allow any part of the system to sit in pooled water, or to be immersed in water.
Do not operate the device if the power cable is pinched, frayed, or cut.

AVERTISSEMENT:

**RISQUE DE MORT PAR ELECTROCUTION.
100-250 VAC PRÉSENT QUAND L'APPAREIL EST SOUS TENSION.**

Branchez toujours l'appareil sur des prises électriques correctement mises à la terre.
Ne laissez jamais aucune partie du système reposer dans l'eau de la piscine ou être immergée dans l'eau. N'utilisez pas l'appareil si le câble d'alimentation est pincé, effiloché ou coupé.

HYPERSPIKE

> ## WARNING:
>
> **ELECTRIC ARC FLASH HAZARD.**
> **WILL CAUSE SEVERE INJURY OR DEATH.**
>
> Wear proper protective equipment before opening or performing diagnostic measurements while energized. (See NFPA 70E)
>
> ## AVERTISSEMENT:
>
> **DANGER D'ÉCLAIR D'ARC ÉLECTRIQUE**
> **CAUSANT DES BLESSURES GRAVES OU LA MORT**
>
> Portez un équipement de protection approprié avant d'ouvrir ou d'effectuer des mesures de diagnostic sous tension. (Voir NFPA 70E)

IMPORTANT

The Encompass LT Cabinet contains parts and assemblies susceptible to damage by electrostatic discharge (ESD). Use proper grounding techniques when working in the cabinet.

1. OVERVIEW

1.1 Model Numbers

The following Encompass LT system model numbers are covered in this manual:

90250A-801	300W Single Channel
90250A-802	600W Dual Channel
90272A-801	300W Single Channel, IP Based
90272A-802	600W Dual Channel, IP Based

1.2 Description

The Encompass LT system is designed to power HyperSpike® and other 70V distributed audio speakers. Depending on the specific application, it is capable of outputting up to 300W through each of its two channels and automatically switching over to an optional battery backup should AC power fail. To interface with other equipment, the Encompass LT system features audio line-in, a user-activated input, and two sets of dry contact outputs that give feedback about equipment status. The Encompass LT system features a status/diagnostics LED which indicates faults in the system via a sequence of flashes.

The Encompass LT system is designed to self-protect should limited performance become necessary to avoid system failure. Diminished output power may be observed due to elevated cabinet temperature. Consult Section 1.6 and product's specification sheet for detailed information.

1.3 Included with the Package / Optional Accessories

Table 1: Items Included with Single Channel (-801) Encompass LT System

Part Number	Description	Quantity
90250A-MAN-ENCOMPASS	Installation and Maintenance Manual	1.00
72870B-801	End Of Line Module (Speaker Monitoring)	1.00

Table 2: Items Included with Dual Channel (-802) Encompass LT System

Part Number	Description	Quantity
90250A-MAN-ENCOMPASS	Installation and Maintenance Manual	1.00
72870B-801	End Of Line Module (Speaker Monitoring)	2.00

Table 3: Optional Accessories

Part Number	Description
72870B-801	End Of Line Module (Speaker Monitoring)
72899B-801	IP Module Accessory

1.4 Identification

To aid future troubleshooting and support, please record the following specifics about your installation:

Cabinet Model Number: _____

Cabinet Serial Number: _____

Cabinet Purchase Date: _____

IP Module MAC Address*: _____

* Optional Accessory on 90250A

1.5 Features

The Encompass LT cabinet comes standard in a NEMA 1 enclosure. The cabinet has ¼ turnkey lock.
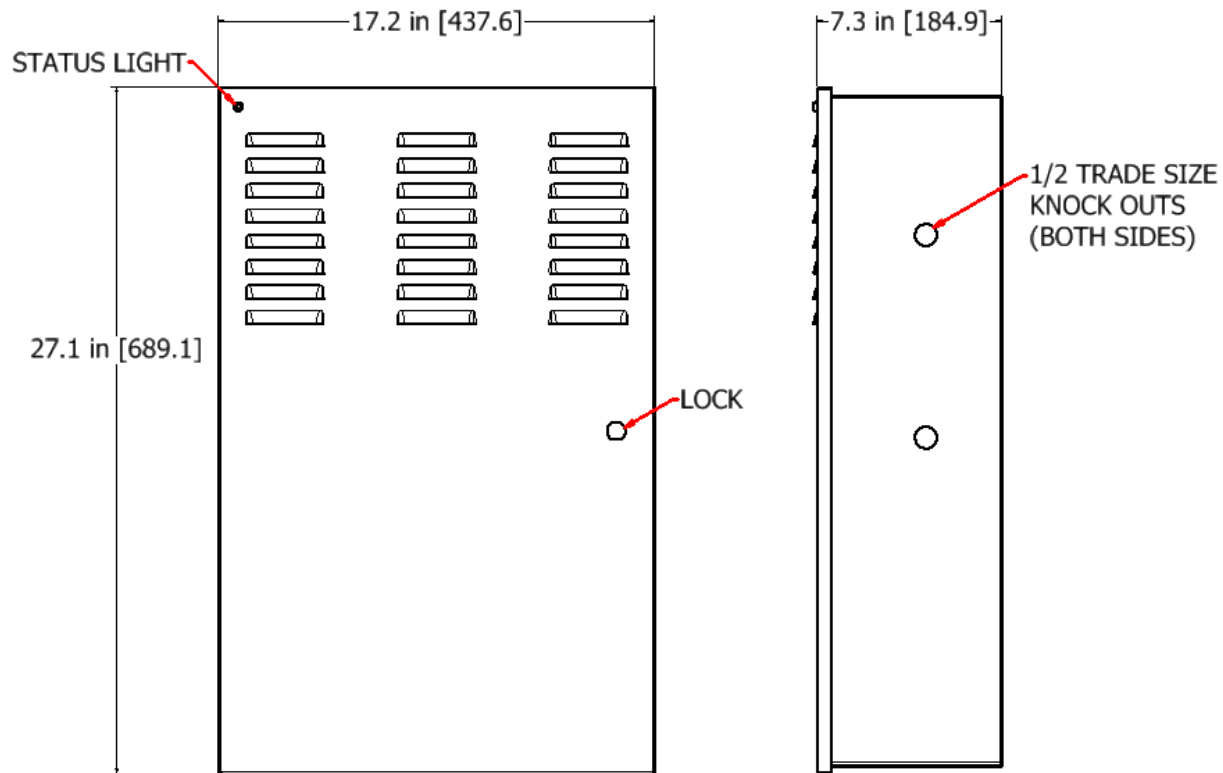
Figure 1: Encompass LT Cabinet

The inside of the cabinet contains a sophisticated system to power HyperSpike® and other 70V distributed audio speakers using AC power or backup batteries when needed (if installed). Knockouts are available on each side of the cabinet for all external connections (speaker out, line input, activate/status, and AC power input). If custom holes are needed, when drilling into the cabinet, use precaution to catch or remove metal shavings from drilling. Also, refer to the interface drawing 90250A-INT.
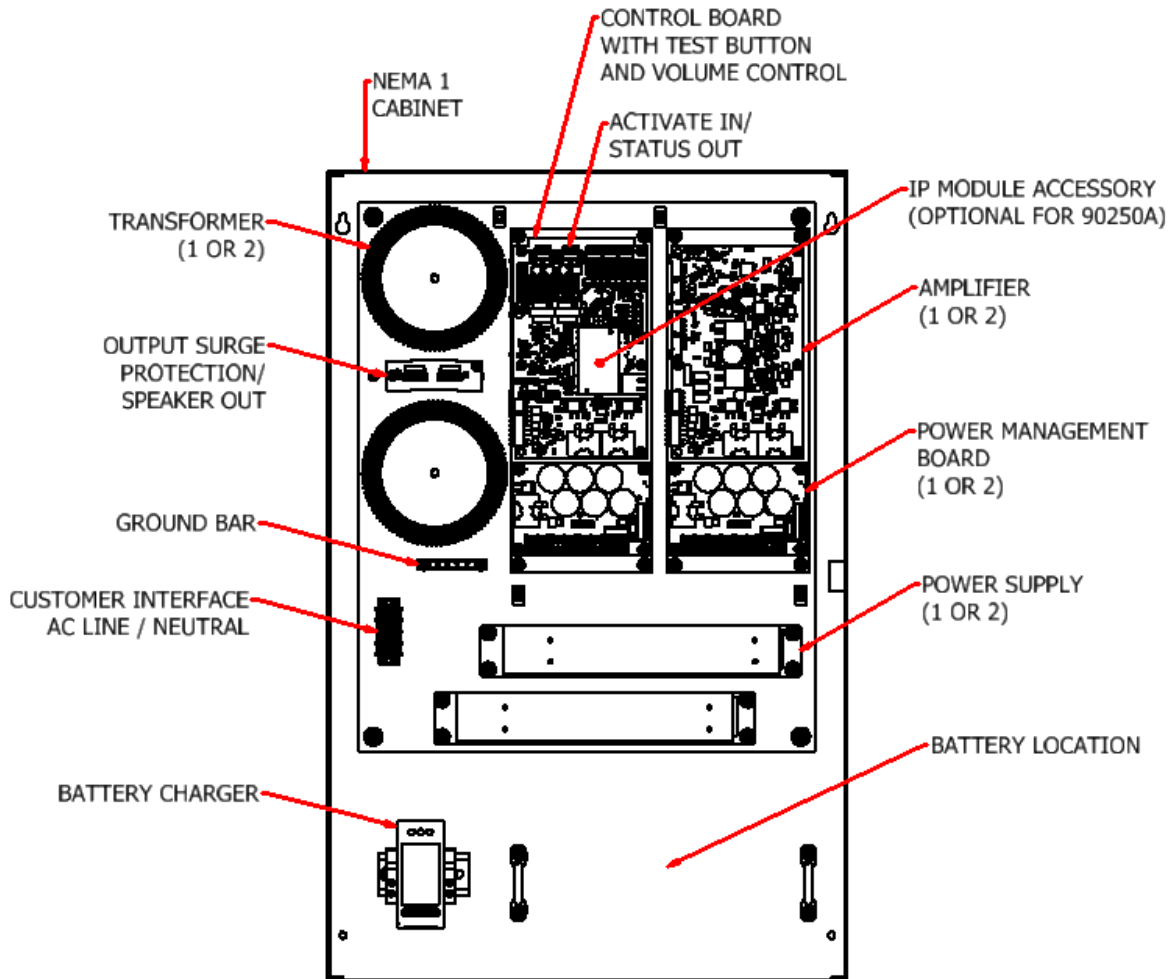
Figure 2: Internal Cabinet Detail

Labels in the figure:
- NEMA 1 CABINET
- CONTROL BOARD WITH TEST BUTTON AND VOLUME CONTROL
- ACTIVATE IN/ STATUS OUT
- IP MODULE ACCESSORY (OPTIONAL FOR 90250A)
- TRANSFORMER (1 OR 2)
- AMPLIFIER (1 OR 2)
- OUTPUT SURGE PROTECTION/ SPEAKER OUT
- POWER MANAGEMENT BOARD (1 OR 2)
- GROUND BAR
- POWER SUPPLY (1 OR 2)
- CUSTOMER INTERFACE AC LINE / NEUTRAL
- BATTERY LOCATION
- BATTERY CHARGER

4.00 in [101.6]

4.00 in [101.6]

1.57 in [39.8]

Figure 3: EOL Module

EOL MODULE

JUNCTION BOX COVER

TO SPEAKER CIRCUIT

Figure 4: EOL Module Internal Detail

1.6 Specifications

Dimensions	17" W x 27" H x 7" D (437mm W x 689mm H x 184mm D)
Enclosure	NEMA 1
Weight without Batteries	53 lbs. (90250A-802)
Temperature Range	0°C to 40°C
Compatible Speakers	70V distributed audio speakers up to 300W
Self-Protection	Automatic Independent Thermal Foldback for each Output Channel[1]; Line-in, Activate, and Status Isolation; Line-in and Output Transient Suppression; AC Surge Suppression; DC Fuses
AC Input Voltage	90-240 VAC
AC Input Current (max)	Single Channel (-801): 5A @120 VAC (2.5A @ 240 VAC) Dual Channel (-802): 10A @120 VAC (5A @ 240 VAC)
AC Efficiency (max)	78%
Battery Backup Voltage	24 VDC nominal (20.3-29.4 VDC)
Battery Backup Current[2] (max)	Single Channel (-801): 20 A Dual Channel (-802): 40 A
Battery Backup Efficiency (max)	82%
Output Voltage (max)	70 VRMS
Output Voltage (peak)	100V
Output Power (average)	300W per channel
Output Power (peak)	600W per channel
Line-in Voltage (audio)	1 VRMS & 25/70/100 VRMS
Line-in Input Impedance	10 k-ohms
Activate Voltage (min)	20.0 VDC
Activate Voltage (max)	25.2 VDC
Activate Current (nom)	8.3 mA
Test Tone	1 kHz
Output Bandwidth	Nominally 100 Hz – 10 kHz

Table 4: Specifications

[1] Individual Channel Output Voltage Limited for >70°C amplifier circuit temperature
[2] See Section 3.4 for typical battery draw and sizing specifications.

Other Specifications

Amplifiers have independent thermal foldback. Individual channels may have reduced output when internal cabinet temperatures approach 70°C (the amplifiers are the main heat generators and will tend to be hotter than the internal cabinet temperature).

The system may enter a shutdown mode when AC input voltage is less than 90 VAC and no battery backup is present. An AC Fault will be active when AC input voltage is insufficient to power the amplifiers.

The system will not begin operating from battery backup until an AC Fault is present. The system will automatically switch to battery backup when AC power can't sufficiently power the system.

2. MOUNTING THE ENCOMPASS LT SYSTEM

2.1 Mounting

The Encompass LT includes mounting holes as shown in Figure 5. Fasten the Encompass LT cabinet to the wall surface using appropriate fasteners for the wall. Always follow local codes and safety practices. *Wall fasteners not included.*

23.50 in [596.9]

16.00 in [406.4]
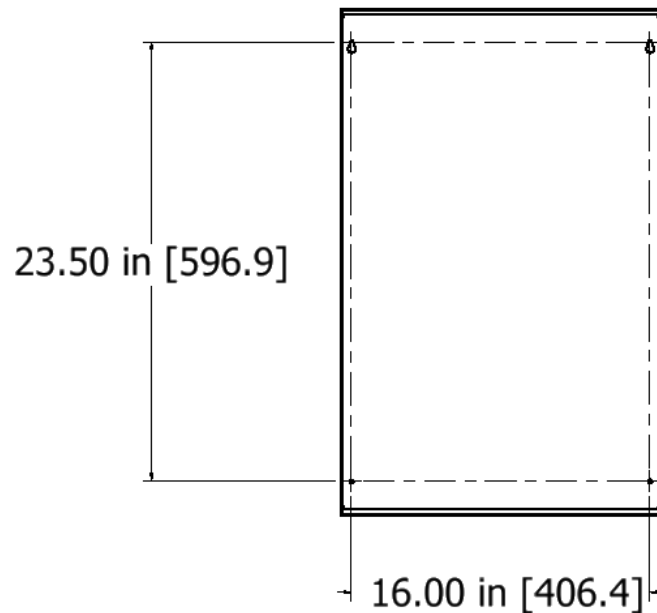
Figure 5: Mounting Hole Pattern

2.2 Location

The Encompass LT system uses a NEMA 1 housing and is to be located indoors in a climate-controlled building. This equipment is not suitable for use in locations where children are likely to be present. The system will self-protect if the temperature inside the cabinet gets too high. It does this by reducing the power output. Message will still be transmitted, but the effective coverage may be reduced. Cold temperatures may negatively affect battery run time.

3. MAKING CONNECTIONS

The Encompass LT system is configured such that connections are made through the left side of the cabinet. Although connections can be made in other locations, appropriate space and wire routing mechanisms are not provided when routing into other locations. **It is highly recommended that connections are made on the left side.**

See Appendix A for information related to IP addressable systems.

⚠️ **IMPORTANT**

External wiring connected to the Encompass LT cabinet is to be installed by qualified personnel only.

⚠️ **IMPORTANT**

An all-pole mains switch, in accordance with Annex L, shall be incorporated in the electrical installation of the cabinet.

⚠️ **CAUTION**

When making outside connections, ensure proper protection and damage prevention actions are taken to avoid impacting internal components. Tools making inadvertent impact with internal component or metal shavings could result in functional issues void of product warranty.

⚠️ **MISE EN GARDE**

Lors de l'établissement de connexions à l'extérieur, assurez-vous que des mesures de protection et de prévention des dégâts soient prises pour éviter d'endommager les composants internes. Des outils ayant un impact accidentel avec des composants internes ou des copeaux métalliques pourraient entraîner des problèmes fonctionnels qui ne seraient pas sous garantie.

3.1 Connecting HyperSpike® Speakers

Note: If you would like to test the cabinet without sounding the emitter, skip this section and do not connect emitter at this time. After powering on cabinet and testing amplifier outputs, power down cabinet and return to this section for proper speaker wiring.

All cabinets include output surge protection with a 4-position output connector. See Figure 6 for speaker output connection. The connector will accept wire gauge 12-22 AWG.

![HYPERSPIKE logo]

⚠️ IMPORTANT

Ensure wires are installed with proper polarity: red = positive, black = negative. Improper polarity between various channels will negatively impact speaker performance.
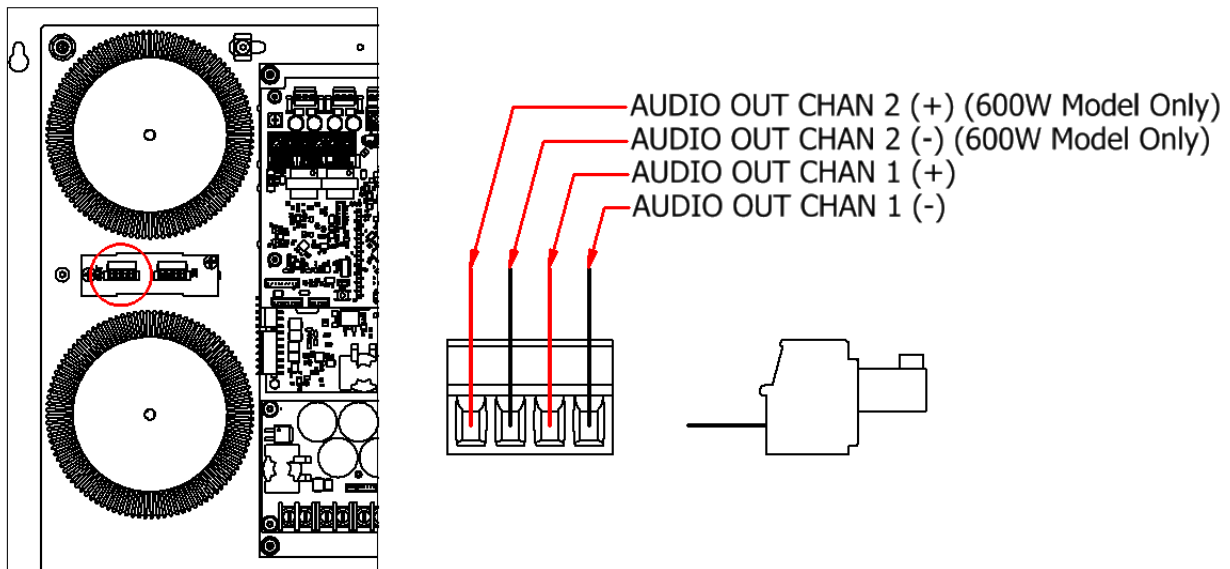

AUDIO OUT CHAN 2 (+) (600W Model Only)
AUDIO OUT CHAN 2 (-) (600W Model Only)
AUDIO OUT CHAN 1 (+)
AUDIO OUT CHAN 1 (-)

Figure 6: Speaker Terminal Block

The Encompass LT system supervises the integrity of the amplifier output circuits by measuring the high frequency impedance. The End of Line (EOL) module (72870B-801) applies a low impedance at high frequency and is installed at the end of the wiring branch. The Encompass LT cabinet includes 1 EOL module per channel. If additional EOL modules are required, they must but purchased separately. See optional accessory table for ordering information.

Note: The EOL module is not required for system operation. However, the ability to detect speaker faults will be greatly diminished if omitted from installation.

 During initial calibration, the amplifier measures the impedance and uses that value as the baseline. After calibration, the cabinet periodically repeats this process and compares the measured value to the original calibration measurement. If a significant impedance change is measured due to an open or short in the wiring, or a large enough change in the load (combination of speakers and EOL module), the system indicates a speaker/wiring fault.

For the system to operate properly, adhere to the following guidelines. **Note:** These guidelines must be applied to each channel individually.

- It is recommended the system is installed in a class-B wiring scheme. A single circuit of wiring, per channel, extends from the amplifier cabinet with the speakers connected along this single trunk. After the last speaker, the EOL module is installed.

If multiple branches are required, a maximum of 2 branches, per channel, should be run and the branches must be balanced:

- o Length and capacitance must be within 20% of each other.
- o An EOL module must be installed at the end of each branch.
- o The loudspeaker wattage load must be within 20% of each other on each branch

- Each branch of wiring (whether one or two are installed):
  - o Must not exceed 1200 feet in length
  - o Must not exceed 0.05 µF of capacitance.

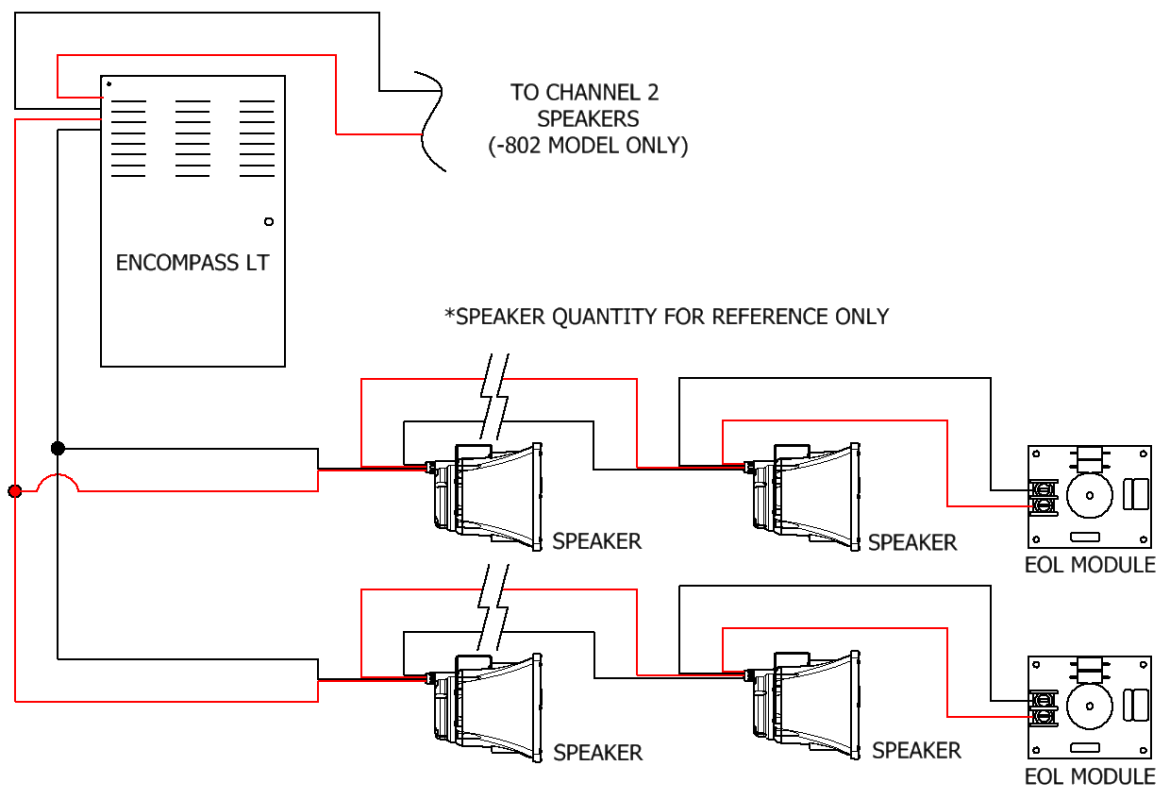Refer to **Figure 7** for example of speaker wiring with EOL module.

Figure 7: Speaker Wiring

3.2 Connecting Audio Line Input

The Encompass LT system can accept 1 Vrms line-level input or a high voltage distributed audio signal. Only one of the inputs may be used in the cabinet.

The cable carrying a mono input signal should be a shielded, two-conductor cable with 16-28 AWG wire. Connect this cable to the Control Card according to **Figure 8**. Connectors come pre-installed but can be removed to aid in the wiring process.

For high-voltage audio input, set audio input switch to desired setting per **Figure 9.**

If audio input lines need monitoring, connect an appropriate end-of-line (EOL) resistor between appropriate terminals as indicated in **Figure 10.**

The Encompass LT system uses dynamic signal processing to ensure that messages will have maximum output even when the input signal is not fully optimized. **Table 5** shows the minimum input signal that will output a full 70 V signal.

Table 5: Minimum Recommended Audio Input Voltage

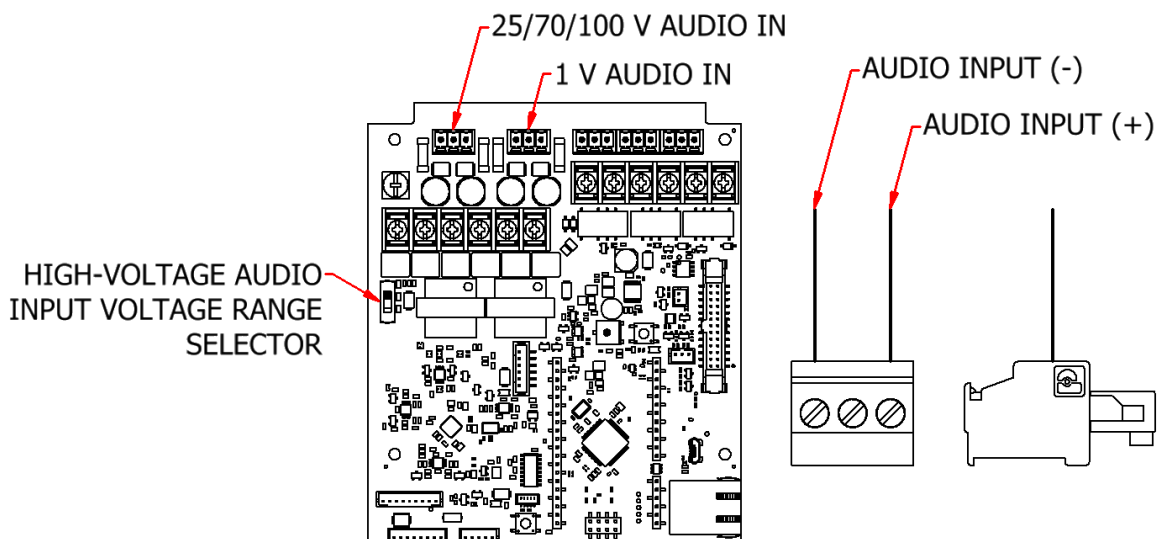| Input	Minimum Voltage
1 V Input	250 mVRMS
25 V Input	6.25 VRMS
70 V Input	17.5 VRMS
100 V Input	25 VRMS

Figure 8: Audio Line Input Wiring
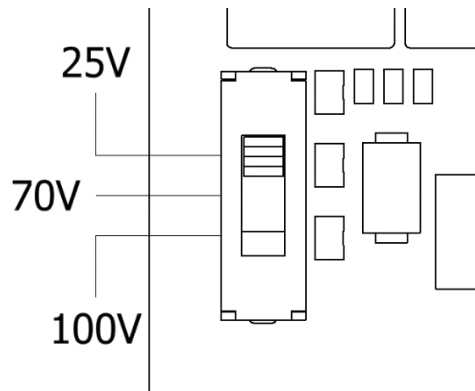
Figure 9: Audio Input Switch Settings

⚠️ **IMPORTANT**

Audio input switch shall only be changed when the Encompass LT is powered down.
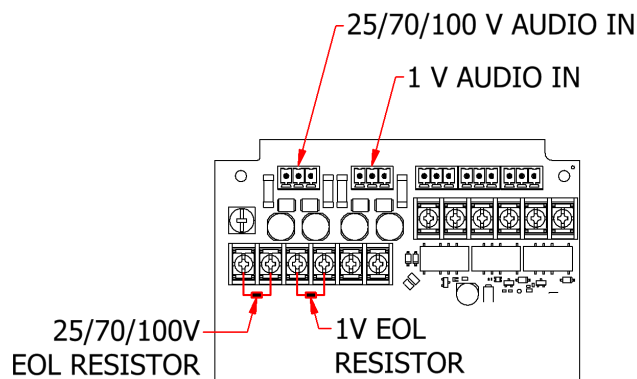
Figure 10 – Audio Input Terminals

3.3 System Activate and Monitoring

The Encompass LT system can be configured for automatic activation or manual activation. This is established by setting the Activation mode switch before powering the system on. Changing the switch while the system is powered will not change system operation.

In manual activation mode, the system **requires** a 24 VDC activation signal for the system to activate and play audio. Once the system is enabled, it will accept the audio input and broadcast it from the speaker output. Without a 24 V activation signal in manual activation mode, the system will not activate from a line-input signal. This prevents unwanted electrical noise from the audio line input wire from being broadcast during times of inactivity.

In automatic activation mode, no activation signal is required. An audio signal with a peak of 7% of the selected input will cause the system to go active and play audio.

Figure 11 – Activation Mode Dip Switch

⚠️ **IMPORTANT**

The cabinet requires a 24 VDC activation signal in manual activation mode to enable the system to accept the audio input.
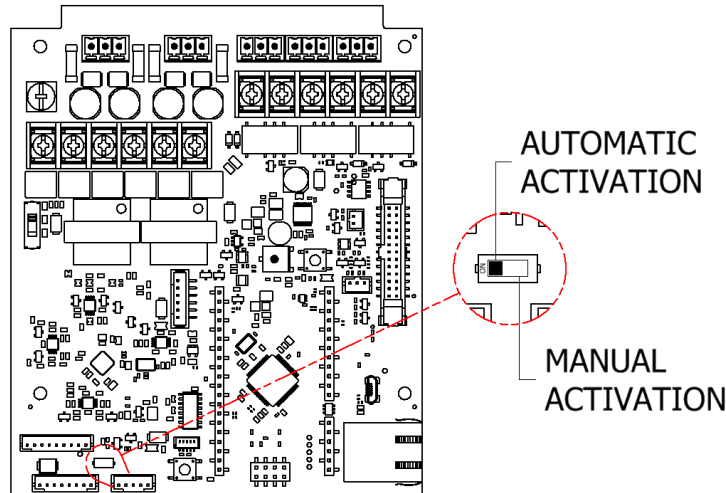
⚠️ **IMPORTANT**

Automatic activation mode may result in electrical noise being broadcast. Ensure input wiring is properly shielded and external sources do not supply unintended noise.

The Encompass LT system is equipped with form C output dry contacts on the Control Card for monitoring system status. Connect the relays according to **Figure 12** using 16-28 AWG wire. Connectors come pre-installed but can be removed to aid in the wiring process.

A description of each relay connection can be found in **Figure 12**. Activate is an input while confirm activate and master fault are outputs. Wiring as shown in **Figure 12** will provide open circuits when the system is in a normal, inactive state (no faults). If short-circuits are desired for normal operation, each circuit should be wired between the "C" and "NC" outputs. If open circuits are desired for normal operation, each circuit should be wired between the "C" and "NO" outputs.

Refer to **Section 5** for more details about fault conditions.

If user interface Input/Output lines need monitoring, connect an appropriate end-of-line (EOL) resistor between appropriate terminals as indicated in **Figure 13**.
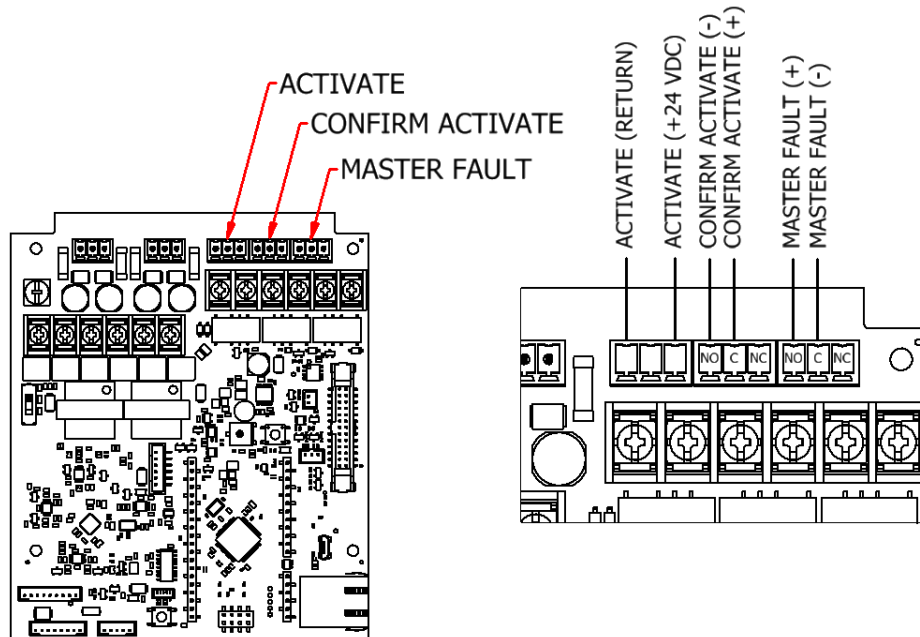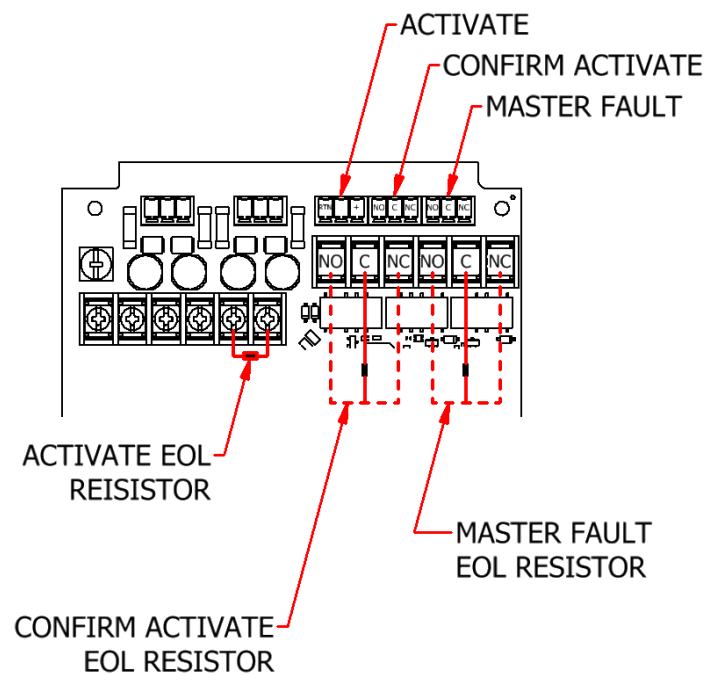
Figure 12: User Interface I/O Wiring

Figure 13: User Interface I/O Terminals

3.4 Batteries

The backup batteries in the Encompass LT system are stored in the bottom of the cabinet as shown in **Figure 14**. In the event of a power failure, the Encompass LT system will seamlessly switch to DC power if it is available. The DC power comes from two user-supplied AGM (Absorbent Glass Mat) or lithium ion batteries. AGM batteries do not vent like lead acid batteries and are more tolerant to high temperatures.
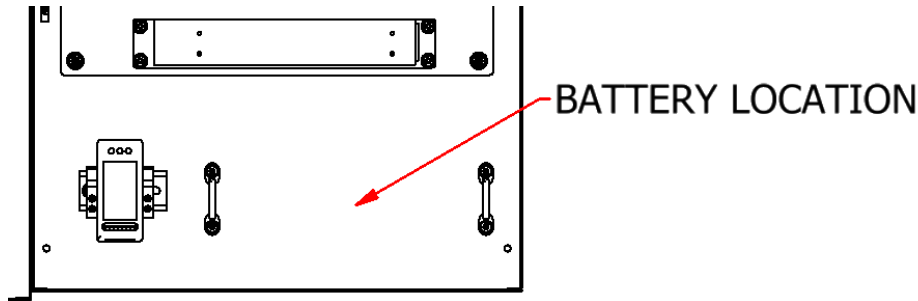
Figure 14: Battery Backup Location

Battery Selection

⚠️ **IMPORTANT**

Only install AGM or gel cell batteries in the Encompass LT cabinet.

The maximum battery size, including terminal bolts, is 8.13 L x 6.67 H x 3.50 W (inches). The terminal bolts must be size ¼" (Ø.250) or smaller. If your preferred battery is handed, choose the hand that has the positive (+) terminal on the left when the terminals are closest to you.

When choosing a battery, select a 12 Volt, deep cycle, AGM or gel cell with the highest capacity that does not exceed the maximum dimensions. A minimum capacity of 20AH is recommended. Do not mix batteries from different manufacturers or with differing capacities. Table 5 shows some suggestions as of the time of this writing.

Table 6: Suggested AGM Batteries

Manufacturer	Part Number
Duracell	CYL10007
Duracell	DURAGM-18L
Duralast	ETX18L
Xtreme	CYLA24HLBSXTA

If the required runtime of the system while on battery backup is known, the following equations can be used to determine the minimum Ah capacity (C_{MIN}) of each battery installed in the Encompass LT cabinet. First, determine the necessary runtime (in hours) of the system for each of the following: Hours of Standby (H_S),

Hours Playing Tone (H_T), and Hours Playing Voice (H_V). It is also necessary to know the total wattage of the load(s) installed. For a 2-channel system, the load for each channel must be known (L_1 and L_2 in Watts).

Table 7: Energy Calculation Formulas

USSI Part Number	S (Watts)	T (Watts)	V (Watts)
90250A-801*	2.7	$10 + 1.29 \times L_1$	$10 + 0.54 \times L_1$
60250A-802**	4.3	$18.9 + (1.29 \times L_1) + (1.29 \times L_2)$	$18.9 + (0.54 \times L_1) + (0.54 \times L_2)$
90272A-801	3.5	$10.8 + 1.29 \times L_1$	$10.8 + 0.54 \times L_1$
90272A-802	5.1	$19.7 + (1.29 \times L_1) + (1.29 \times L_2)$	$19.7 + (0.54 \times L_1) + (0.54 \times L_2)$

* If 72899B-801 IP Module Accessory is installed, use Energy Calculation Formulas for 90272A-801.

** If 72899B-801 IP Module Accessory is installed, use Energy Calculation Formulas for 90272A-802.

Using the following equations, and the corresponding values from Table 6, determine the energy required in each state:

$$E_S = S \times H_S$$

$$E_T = T \times H_T$$

$$E_V = V \times H_V$$

Use the following equation to determine the minimum battery capacity required:

$$C_{MIN}(Ah) = \frac{E_S + E_T + E_V}{24}$$

Connecting the Batteries

Note: Positive (+) battery wires have in-line blade fuses. Remove fuses before battery installation or maintenance is performed.

Note: Replace with same size and type fuse.

Note: 90250A-802 has two (2) sets of 10 AWG positive and negative power cables.

Position the first battery into the cabinet between the battery straps with the terminals facing towards the door. Carefully attach the 10 AWG red (+) power and 18 AWG red (+) battery charger cables to the first battery's positive (+) terminal.

Take extreme caution when connecting battery jumper wire as there is no in-line fuse. Connect the black end of the short 10 AWG red and black jumper cable to the first battery's negative (-) terminal. Position the second battery in front of the first with the battery terminals facing the door. Attach the red end of the short red and black cable to the second battery's positive (+) terminal.

Connect the 10 AWG black (-) power and 18 AWG black (-) battery charger cables to the second battery's negative (-) terminal.

Finally, securely strap both batteries into position in the bottom of the cabinet using the straps provided.

Figure 15: Battery Connections
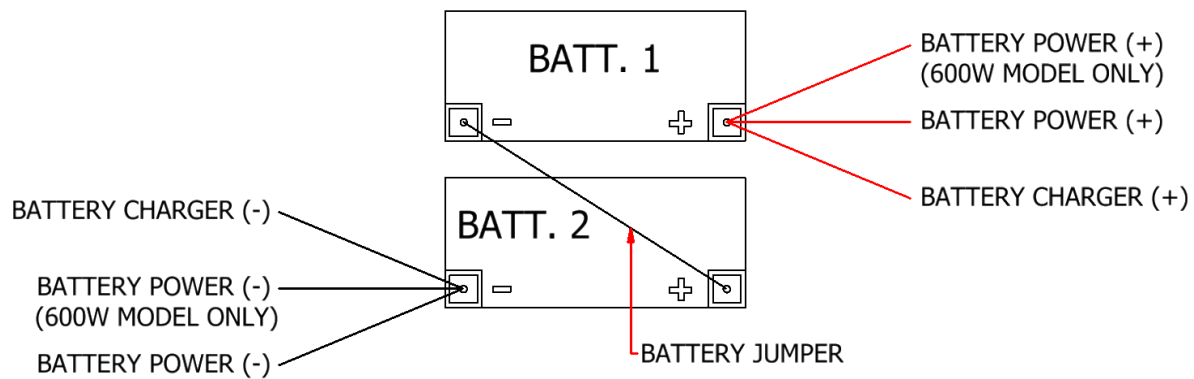
3.5 Connecting AC Power and Ground

⚠️ **IMPORTANT**

Only install AGM or gel cell batteries in the Encompass LT cabinet.

Run conduit from the AC power source to the left side of the Encompass LT cabinet. Conduit should never enter through the top of the cabinet.

The Encompass LT system will operate on 90-240 VAC (50/60 Hz). The terminal strip will accept wire from 14-22 AWG.
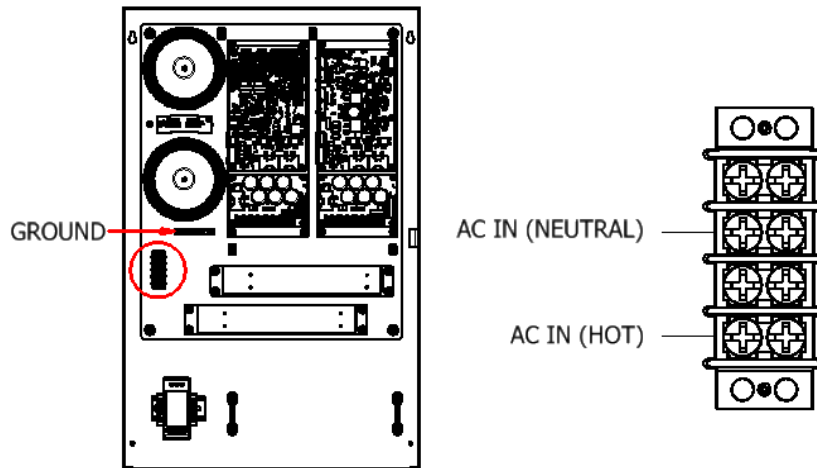
Figure 16: Location and AC Power Wiring

4. COMMISSIONING

4.1 Post Installation System Check

1) Check to ensure all wiring connections are secure:

    o   AC input wiring
    o   Battery wiring
    o   Audio input wiring
    o   I/O control and monitoring wiring

    o   Speaker wiring (check polarity of each speaker connection)

2) Verify audio source voltage is correct and it is wired to the correct input (250 mVRMS – 1 VRMS or proper 25/70/100 VRMS).

4.2 Power-up Sequence

1) Enable AC feeder circuit power.

2) Install battery fuses.

3) As system initializes, amplifiers will power up in sequence. Full system initialization may take up to 30 seconds.

4) Once system has fully initialized for the first time, a speaker calibration sequence must be run. In order to clear the calibration fault, this must be performed. Refer to section 4.3 for this procedure.

5) System status LED should show a steady green light. Refer to Section 5.1 for clarification of fault LED.

6) To verify battery operation, disable AC power. Wait 10 seconds for power supply to completely disable and verify that system is still running. Fault LED should indicate "AC FAULT".

4.3 Calibration

The first time the cabinet is powered on, there will be no calibration data stored and the calibration procedure must be performed. Any time changes are made to the speaker system, the calibration procedure should be performed. This includes changes to wiring, adding or subtracting speakers from the system, and changing tap settings on existing speakers. Failure to re-calibrate the system after changes have been made can result in false fault indications or failure to indicate an actual fault in the system.

1) Turn volume potentiometer to the lowest setting (full counter-clockwise position).

2) Press and hold test button until status LED begins rapidly flashing red (approximately 5 seconds)

3) Release the test button and the system will begin calibration.

4) After calibration is complete, the red LED will cease to flash rapidly and the system will return to normal operation.

5) Set volume potentiometer to desired position.
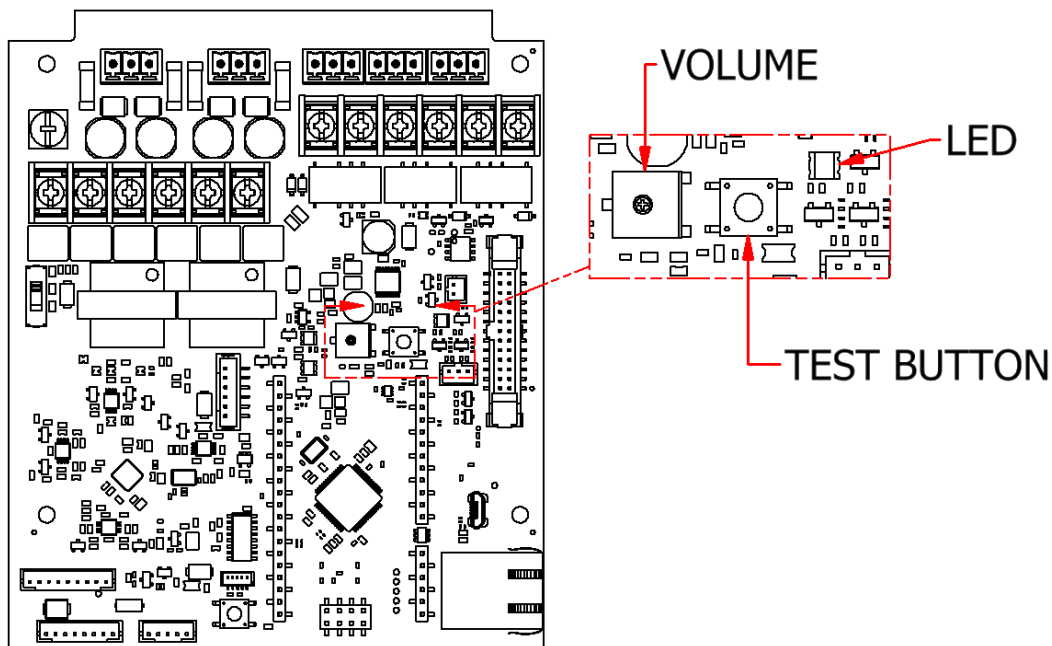
Figure 17: Calibration

If the system exhibits no faults, the system status LED will illuminate steady green. If the system contains a fault, it will flash red with the appropriate sequence. Refer to section 5.1 for a list of faults.

When performing a re-calibration, it is not necessary to clear the previous calibration data as the previous data will automatically be over-written when the calibration procedure is performed. However, if you would like to clear the calibration data, follow this procedure.

1) Turn volume potentiometer to the lowest setting (full counter-clockwise position).

2) Press and hold test button. After 5 seconds, red LED will be begin flashing rapidly. Continue to hold for another 5 seconds until red LED ceases rapid flashing.

3) Set volume potentiometer to desired position.

The system will return to normal operation and indicate a calibration fault as well as any other faults the system may exhibit. A calibration fault will not affect the output performance of the system.

4.4 Testing and Adjusting

A push-to-test (PTT) button is provided on the Control Board in the Encompass LT cabinet to allow for system testing independent of other audio input devices. Pressing the PTT button will output a 1 kHz tone.

The volume potentiometer is intended to allow installers to adjust the output level during installation by limiting the overall output to less than full power if desired.
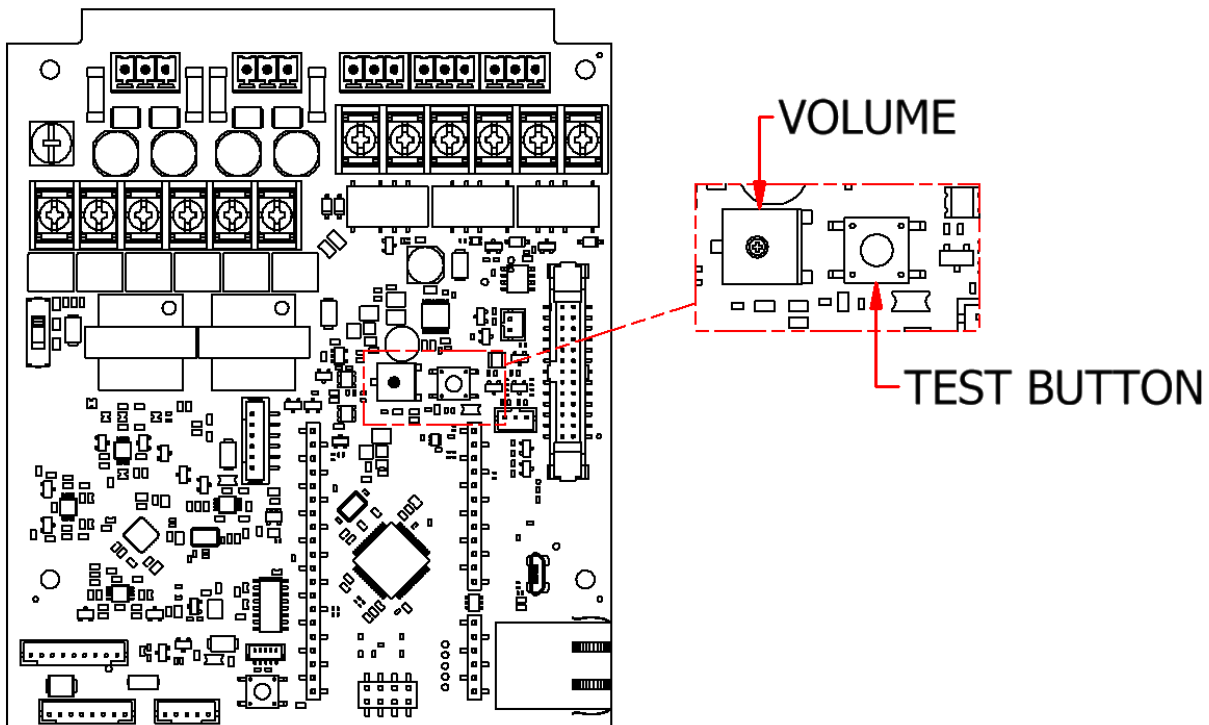
Figure 18: Test Button and Volume Adjustment

4.5 Amplifier Output Verification/Adjustment

If cabinet is to be tested without speakers, ensure speaker wires are disconnected before proceeding.

1) Turn volume knob fully clockwise.

2) Depress PTT button and measure output of each amplifier channel.

3) The volume potentiometer can be adjusted to turn the output level down if desired. The reduction in output SPL can be calculated using the following formula:

dB reduction = 20 x Log(Set Volume Voltage / Full Volume Voltage).

Note: Setting the volume potentiometer to the 9 o'clock position (approximate midpoint) will set the output to approximately 12 dB down from full power.

4) Turn off AC power and remove battery fuses. Wait until system is fully powered down (all LEDs inside cabinet will extinguish). Hook up speaker wires to terminal blocks per Section 3.2. Follow power-up sequence to bring system back online.

5. HEALTH AND STATUS MONITORING

Note: The Master Fault relay will indicate faults even if the cabinet is de-energized. This ensures that a total system failure will indicate a fault.

5.1 System Status LED

The Encompass LT system contains a status LED on the outside of the cabinet as well as one on the control card inside the cabinet. They both indicate the same status. When the system is fully operational and in good health, the status LED will indicate a sold green light. If there is a fault in the system, the LED will flash red in a sequence indicating the appropriate fault(s). If the system exhibits multiple faults, the system will cycle through, indicating each. Refer to

Table 6 for the list of faults and a brief description.

Table 8: System Faults

Number of Flashes	Fault	Description
1	AC Fault	The AC voltage is outside of the acceptable range, or the internal AC power supply has failed.
2	DC Fault	The battery voltage inside the cabinet is outside the acceptable range for proper operation.
3	Amplifier Fault	The amplifier has detected a fault in the amplifier circuitry.
4	Speaker Fault	The amplifier has detected a significant change in the impedance attached to the output of the cabinet.
5	Communication Fault	The Encompass LT cabinet has detected an internal communication fault.
6	Calibration Fault	The Encompass LT system does not have any calibration data stored internally.

During an AC fault, the system will be operating off battery backup power. While the cabinet will continue to operate on DC power, it is essential to diagnose and resolve the AC fault to ensure continued operation. Likewise, during a DC fault, the system will continue to operate, but is not guaranteed to continue operating upon AC power failure.

The Encompass LT system monitors the speaker load attached to its output when the system is inactive. If it detects a significant change in the impedance, it will indicate a speaker fault. For this to work correctly, the system must be calibrated after installation. When the system is first installed, there will be no calibration data stored internally and the red status LED will flash appropriately. Refer to Section 4.3 for the calibration procedure.

5.2 Power Management Board Status

The power management circuit board has a green status LED that indicates the system has bus voltage that is successfully being supplied by AC power. If this LED is not lit and the AC power is present, refer to section 0 for troubleshooting.
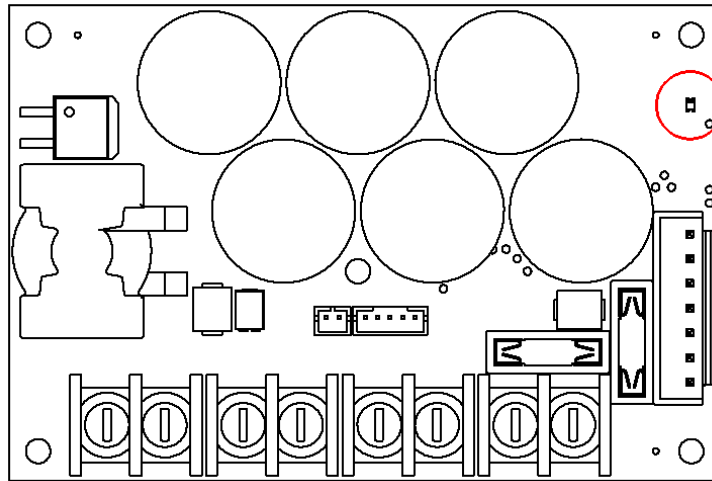
Figure 19: Power Management Board Status LED

5.3 Amplifier Status

Each amplifier circuit board has three (3) status LEDs. If the cabinet status LED is indicating an amplifier or speaker fault, the faulted amplifier will illuminate the red FAULT LED

When the system is functioning properly and idle, the green power LED should be illuminated. When the amplifiers are active, the green Enable LED will also illuminate. If the red LED is illuminated, there is a fault within the amplifier or speaker. Refer to section 0 for troubleshooting.

*note: One amplifier in the system is installed underneath the control card and the amplifier status LEDs may not be visible.
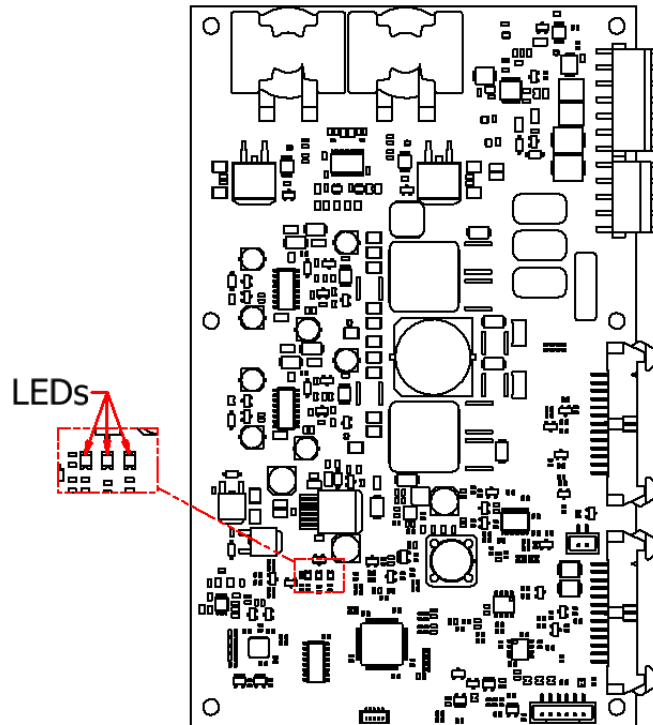
Figure 20: Amplifier Status LEDs

Table 9: Amplifier Status LED Definitions

LED Number	Color	Indicates
1	Green	Enable – The amplifier circuit is enabled.
2	Red	Fault – There is an amplifier system or speaker fault.
3	Green	Power – The circuit board is powered on.

6. MAINTENANCE AND TROUBLESHOOTING GUIDE

6.1 Recommended Maintenance

On a regular basis, check the system:

- Check cabinet for vandalism or natural damage.
- Check speaker wiring for frays, cuts, and kinks.
- Perform an operational test.
- For batteries, follow the battery manufacturer's maintenance schedule.

6.2 Wiring Diagram

A digital copy of the wiring diagram can be found at:

https://www.ultra-hyperspike.com/product/encompass-lt/

6.3 Troubleshooting Guide

Diagnose problems with the Encompass LT system with Table 8. Find the effect being experienced in the left-most column and eliminate possible causes using the troubleshooting steps. Start at the top of the list of possible causes for the effect being observed and move down. If the problem is not listed or persists after following the instructions, contact your dealer or service center.

For accurate and expedient customer service, please have the following information readily available when contacting Ultra: model number, serial number, and purchase date the cabinet. The cabinet model and serial number can be found on the label that is attached to the inside of the cabinet door. This information can be recorded at the beginning of this manual.

Table 10: Troubleshooting Guide

Observed Effect	Possible Cause	Troubleshooting Steps
No Output	Volume at minimum	Verify system output while increasing the volume with the test tone button depressed.
	AC Fault	Verify an AC Fault is present. See AC Fault to troubleshoot.
	DC Fault	Verify a DC Fault is present. See DC Fault to troubleshoot.
	Amp Fault	Verify an Amp Fault is present. See Amp Fault to troubleshoot.
	Speaker Fault	Verify a Speaker Fault is present. See Speaker Fault to troubleshoot.
	Power/Filter board fuse blown	Remove Power/Filter board fuse and inspect. Replace with same type/rating if necessary.
	Activate signal not present	Verify voltage at Activate Input connection is within activation range and has correct polarity. Green LED near activation input should illuminate when system acknowledges activation signal is present.
	Line-in signal of insufficient voltage	Verify AC voltage across input greater than 125 mVRMS.
	High Voltage Audio-in signal of insufficient voltage	Verify AC voltage across input greater than 3 VRMS for 25 V input, greater than 9 VRMS for 70 V input, and greater than 12 VRMS for 100V input. Also verify that proper input range is selected.
	Audio Input Transient protection fuse blown	Verify AC voltage across the appropriate EOL resistor terminals matches the voltage across the input and is greater than the minimum voltage required. If voltage is present at the input but does not match at the EOL resistor terminals, the transient suppression has tripped. Contact HyperSpike® Customer Service to obtain a replacement Control Card.
	Speaker Output Transient protection fuse(s) blown	For each speaker output transient suppressor, verify AC voltage across its output is within 100 mV as that across its input. If voltage is present at the input to a transient suppressor but is not at its output, that transient suppressor is faulty. Contact HyperSpike® Customer Service to obtain a replacement speaker output transient suppressor.

Observed Effect	Possible Cause	Troubleshooting Steps
No Output	Faulty activate relay	1. Verify Activate LED on control card lights when activated and activate voltage is within specified range. 2. If the Activate LED does not light when the activate signal is active, the Activate relay may be faulty. Contact HyperSpike® Customer Service to obtain a replacement Control Card.
	Battery power terminals loose/disconnected	Verify the battery power leads do not have intermittent, corroded, or otherwise poor connection to the batteries.
Reduced Speaker Output / Cuts Out in Loud Portions of Audio	DC Fault	Verify a DC Fault is present. See DC Fault to troubleshoot.
	Amp Fault	Verify an Amp Fault is present. See Amp Fault to troubleshoot.
	Speaker Fault	Verify a Speaker Fault is present. See Speaker Fault to troubleshoot.
	Thermal foldback	Self-protection can limit amplifier output level. Disable amplification and allow the cabinet internal temperature to decrease to below 40°C.
	AC Line Voltage at cabinet too low	Ensure AC line voltage is within cabinet rating.
	Amp ribbon cable disconnected	Verify the ribbon cables that connect the control card and amplifier cards to each other are all present, fully seated, and do not show obvious damage.
	Battery power terminals loose/disconnected	Verify the battery power leads do not have intermittent, corroded, or otherwise poor connection to the batteries.
	Batteries unable to supply power	Verify the batteries are in good health and are sized appropriately to supply full power to the system.
Works on AC but not DC	DC Fault	Verify a DC Fault is present. See DC Fault to troubleshoot.
	DC fuses blown	Remove DC power fuse(s) from battery power cable(s) and inspect. Replace with same type/rating if necessary.
	Batteries not charging	Verify charger LED is blinking. If not, see Batteries Not Charging to troubleshoot.
	Batteries beyond usable life	Verify the batteries can still take a charge and deliver at least 20 A for a single amplifier system, and 40 A for a dual amplifier system when fully charged. If not, replace the batteries.
Works on DC but not AC	AC Fault	Verify an AC Fault is present. See AC Fault to troubleshoot.
	Faulty Power Supply	Verify the LED near the power connections on the power supply is lit green. If not, and no AC Fault is reported, contact HyperSpike® Customer Service to obtain a replacement Power Supply.
Batteries Not Charging	AC Fault	Verify an AC Fault is present. See AC Fault to troubleshoot.
	Charger fuse blown	Remove battery charger in-line fuse and inspect. Replace with same type/rating if necessary.
	Batteries beyond usable life	Verify the batteries can still take a charge and deliver at least 20 A for a single amplifier system, and 40 A for a dual amplifier system when fully charged. If not, replace the batteries.

Observed Effect	Possible Cause	Troubleshooting Steps
Batteries Not Charging	Battery terminals loose/disconnected/wired incorrectly	Verify the battery charging leads do not have intermittent, corroded, or otherwise poor connection to the batteries and that they are connected to the battery with the correct polarity.
	Charger output cable disconnected	Verify the charger output cable is connected to the charger.
AC Fault	Feeder circuit breaker	Verify the breaker in the panel feeding AC power to the cabinet is closed and not tripped.
	Power supply nonoperational	**CAUTION**: Exposed AC Line Voltage will be present during the next step; **USE EXTREME CAUTION**. **MISE EN GARDE:** La tension de ligne AC exposée sera présente durant l'étape suivante, **UTILISER LA PLUS GRANDE PRUDENCE.** Verify the AC voltage at the input to the power supply is greater than 100 VAC. Verify the LED(s) near the power connections on (each) power supply is lit green. If it is not lit at all, contact HyperSpike® Customer Service to obtain a replacement Power Supply.
DC Fault	Battery fuse blown	Verify the battery fuse is still in good working order.
	Battery terminals loose/disconnected	Verify the battery power leads do not have intermittent, corroded, or otherwise poor connection to the batteries.
	Batteries not charging	Verify charger LED is blinking. If not, see Batteries Not Charging to troubleshoot.
	Batteries wired incorrectly	Verify battery input to the Switch Board is 26 VDC +/- 3 VDC and the polarity is correct per Section 3.4 (Connecting the Batteries).
	Batteries depleted – voltage too low	Verify battery voltage is greater than 23.0 VDC with system inactive, or greater than 21.5 VDC with system active.
Amp Fault	**CAUTION**: This step will expose the troubleshooter to AC Line voltage; **USE EXTREME CAUTION**. **MISE EN GARDE:** Cette étape exposera le dépanneur à la tension de ligne AC; **UTILISER LA PLUS GRANDE PRUDENCE**. Observe the inside of the cabinet with power supplied as under normal operating conditions. The faulted amplifier will either display a red fault LED or will be the first amplifier without any LEDs lit (follow the ribbon cables from the control card to determine the order of the amplifiers).	
	Temporary condition	If a red LED is lit on one of the amplifier boards, verify the Amp Fault is cleared on a subsequent activation of the system.
	Amp ribbon cable disconnected	Verify the ribbon cables that connect the amplifier cards to each other are all present, fully seated, and do not show obvious damage.

Observed Effect	Possible Cause	Troubleshooting Steps
Amp Fault	Shorted amp output wiring	Disconnect the speaker wiring and verify a short does not exist between the amplifier outputs for the faulted channel. Reconnect the speaker wiring.
	Shorted speaker wiring	Disconnect the speaker wiring and verify a short does not exist between the speaker wires for the faulted channel. Reconnect the speaker wiring.
Speaker Fault	**CAUTION**: This step will expose the troubleshooter to AC Line voltage; **USE EXTREME CAUTION**. **MISE EN GARDE:** Cette étape exposera le dépanneur à la tension de ligne AC; **UTILISER LA PLUS GRANDE PRUDENCE.** Observe the inside of the cabinet with power supplied as under normal operating conditions. The amplifier for the channel connected to the speaker fault will display a red fault LED.	
	Shorted amp output wiring	Disconnect the speaker wiring and verify a short does not exist between the amplifier outputs for the faulted channel. Reconnect the speaker wiring when troubleshooting is complete.
	Shorted speaker wiring	Disconnect the speaker wiring and verify greater than 4 Ohms exists between the speaker wires for the faulted channel. This measurement can be affected by wind on the speaker. Reconnect the speaker wiring when troubleshooting is complete.
	Open in speaker wiring	Disconnect the speaker wiring and inspect for problems. Reconnect the speaker wiring when troubleshooting is complete.
	Output Transient protection fuse blown	**CAUTION**: This step will expose the troubleshooter to AC Line voltage; **USE EXTREME CAUTION**. **MISE EN GARDE:** Cette étape exposera le dépanneur à la tension de ligne AC; **UTILISER LA PLUS GRANDE PRUDENCE.** With the cabinet powered as normal and active, verify the voltage measured across the input to the faulted channel's speaker output transient suppressor is greater than 1 VAC and within 100 mVAC of the voltage measured across the output of the same suppressor.
	Speaker failure	Verify the impedance of each channel of the emitter head is similar to the others. The channel with different impedance is likely the failed channel.
Power/Filter board Fuse Blown	Amp power shorted	For the channel with the blown fuse: verify the red wires in the wiring harness between the power/filter board and the amplifier are intact, have sound connection to the connectors at each end, and are not damaged. Verify no other conductor is shorting to the amplifier board.

Observed Effect	Possible Cause	Troubleshooting Steps
Power/Filter board Fuse Blown	Shorted amp output wiring	Disconnect the speaker wiring and verify a short does not exist between the amplifier outputs for the faulted channel. Reconnect the speaker wiring when troubleshooting is complete.
	Normal degradation	If none of the above apply, replace the fuse with the same type and size and apply power to the system. If the fuse continues to blow, contact HyperSpike® Technical Support for assistance.

7. WARRANTY

Ultra Electronics – USSI warrants that its products shall conform to the published specifications as of the date of order and shall be free from defects in material and workmanship.

Upon receipt of the returned product(s), Ultra Electronics – USSI will repair or replace any and all product(s) at its discretion. Ultra Electronics – USSI will not issue a credit for product(s) returned through the Return Authorization process. This warranty is extended to the original purchaser and all subsequent owners, provided a copy of the original dated bill of sale is presented when service is requested under warranty.

HyperSpike® Warranty Period

Such warranty shall extend for a period of one (1) year from the date of shipment from USSI's facility.

How to obtain service under this warranty

If your product(s) should require service, please write, phone, fax, or email us at:

Ultra Electronics – USSI
4868 East Park 30 Drive
Columbia City, Indiana, USA 46725
Phone: 260-248-3665
Email: ServiceDepartment@ultra-ussi.com

Ultra Electronics – USSI will provide a Return Material Authorization (RMA) number so that you can ship the product(s) to our factory. Do not ship the product(s) to us without first obtaining an RMA number. Place the RMA number on all boxes returned to the factory. You are responsible for transporting your product(s) to our factory. We will pay the return shipping charges on all product(s) repaired under warranty.

Failures not covered by this warranty

This warranty covers defects in manufacture only. It does not cover:

1. damage caused by accident, misuse, abuse, product modification, or neglect;
2. damage incurred during shipment (you must claim these damages from the carrier);
3. damage resulting from failure to operate the product in accordance with the instruction manual; or
4. damage resulting from attempted repairs by unauthorized personnel.

Exclusion of certain damages

Ultra Electronics – USSI's liability is limited to the repair or replacement, at our option, of any defective product(s) and shall in no event include indirect, consequential, incidental, punitive, or special commercial damages of any kind. Some states do not allow the exclusion or limitation of indirect, consequential, incidental, punitive, or special damages so the preceding limitation or exclusion may not apply to you.

Warranty after repairs

An additional warranty of ninety (90) days will be extended to any parts that were repaired or replaced. The original standard warranty or any extended warranty that was purchased at the original time of sale of the product(s) is still in effect for the remainder of the warranty term.

Appendix A – IP Based Setup (90272A-80X)

The Encompass LT when equipped with the ECM400 module, provides a network addressable solution to allow a user to play background music, deliver live announcements via standard SIP protocols, and tie into a variety of number of different IP emergency notification system protocols.

1. MAKING CONNECTIONS

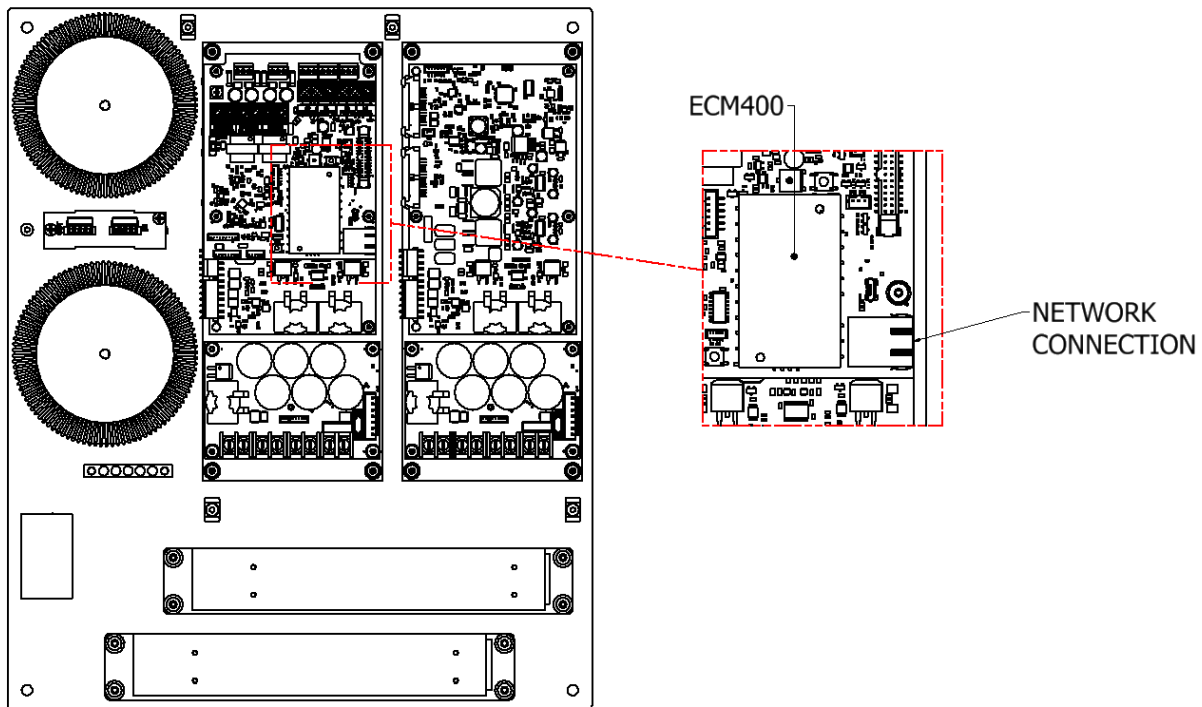The IP Based Encompass includes a standard RJ45 network jack and requires a standard Ethernet cable (CAT5e or better).

Figure 21 - Network Interface

2. COMMISSIONING

2.1 Post Installation System Check

3) Check to ensure all wiring connections are secure

4) Verify PoE Network connections and that a DHCP Server is available within the network.

2.2 Power-up Sequence

7) Enable Power

8) The Encompass LT will acquire an IP Address and announce it on the speaker output.

9) By default, the device will announce itself to a Syn-Apps System, System Status LED and Application Status LED turn solid.

2.3 Managing Sources and Use of the Encompass LT

1) **Login**

    a. Use your web browser to log into the Encompass LT Web Interface by typing the IP Address into your browser.

    b. Use the user "admin" and the appropriate password provided on the sticker on the backside of the device.

2) **Configure your Sources**

    For the configuration of your sources, the following source types are available:

    • Syn-Apps → Announces the Encompass LT as an audio device in a Syn-Apps system

    • Barix Radio → Plays Barix Radio as http stream without any further configuration

    • RTP → Configures the Encompass LT to receive an RTP stream

    • HTTP → Configures the Encompass LT to receive an HTTP stream

    • SIP → Configures the Encompass LT to be a SIP client

    • Local File →Allows to play audio files which are locally stored on the Encompass LT

    Please refer to the help description in the user interface to properly configure your sources.

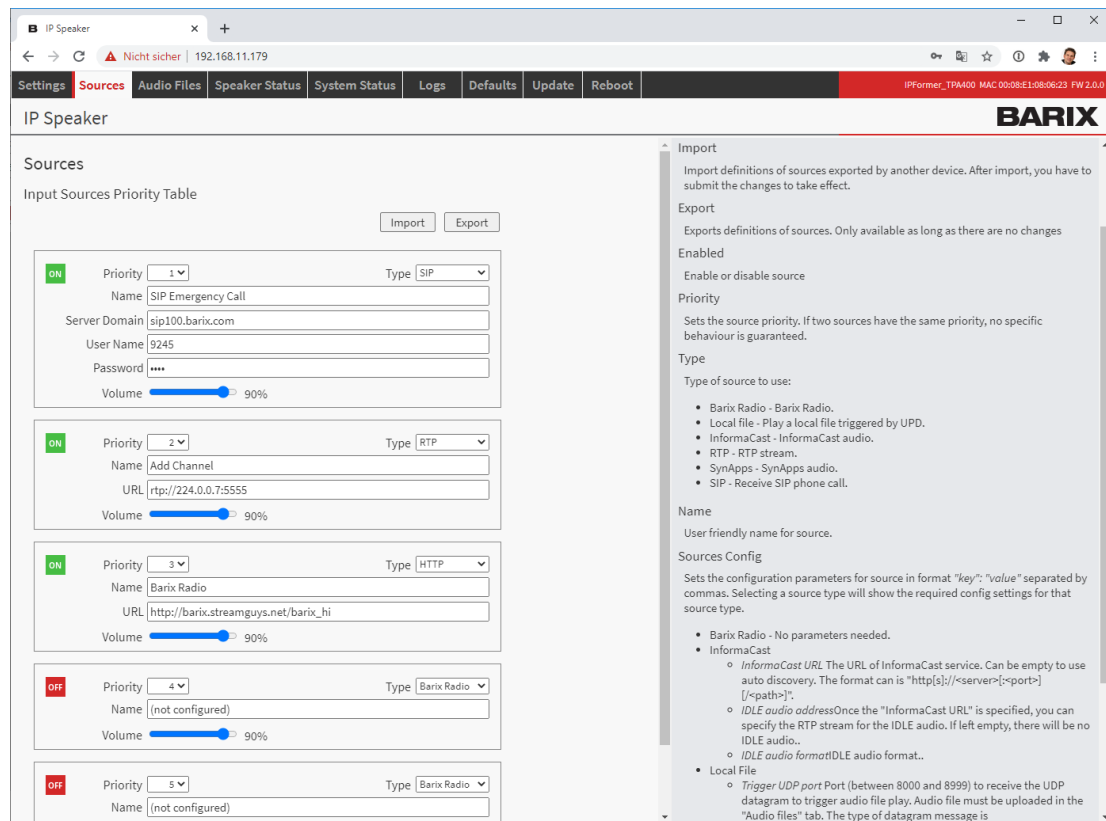Individual Volume can be set for each of the sources.

Figure 22 - Sources Page

3) **Prioritize your Sources**

Multiple sources can be configured at the same time and are played according to their given priority.

- Priority 1: Highest priority

- Priority 5: Lowest priority

Management of priority means that a present stream will be played over another configured stream.

Example of a Priority System

- Priority 3: HTTP Radio Stream playing Background music.

- Priority 2: RTP Streams playing adds over the background music. Background music will stop as soon as the RTP stream is present

- Priority 1: SIP call playing emergency calls. Background music or add will be stopped as soon as SIP call is present.

4) Manage Local Files

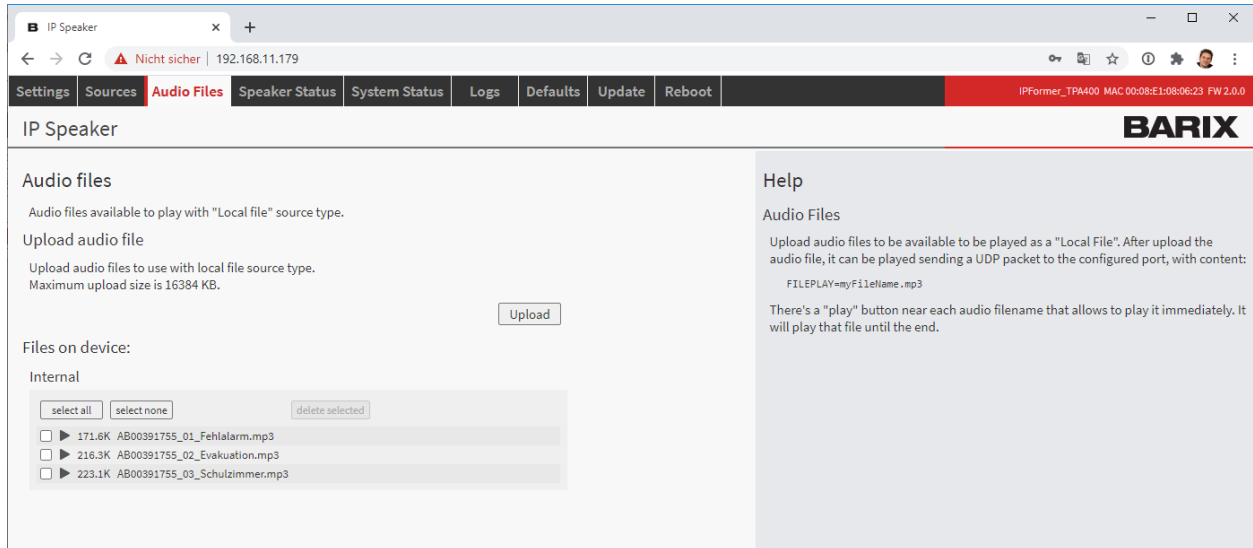Use the menu item "Audio Files" to manage your local files for the source type "Local Files".

Figure 23 - Audio Files Page

Note: Only MP3 Files are supported for Local Files at the time.

5) Control the Encompass LT

Once the sources are configured, the Encompass LT will start playing them accordingly. Master Volume of the Encompass LT can be controlled on the "Settings" page of the web interface.
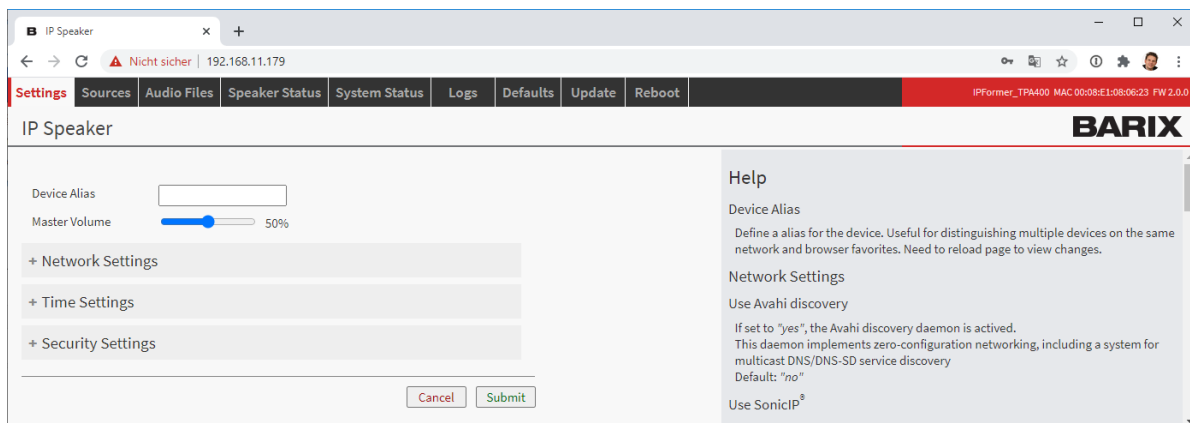

Figure 24 - Settings Page

6) Monitor the ENCOMPASS LT

The "Source Status" page on the web interface will show you the actual status of the sources of the Encompass LT. Every source status also includes a counter indicating how many times the actual source has been played.
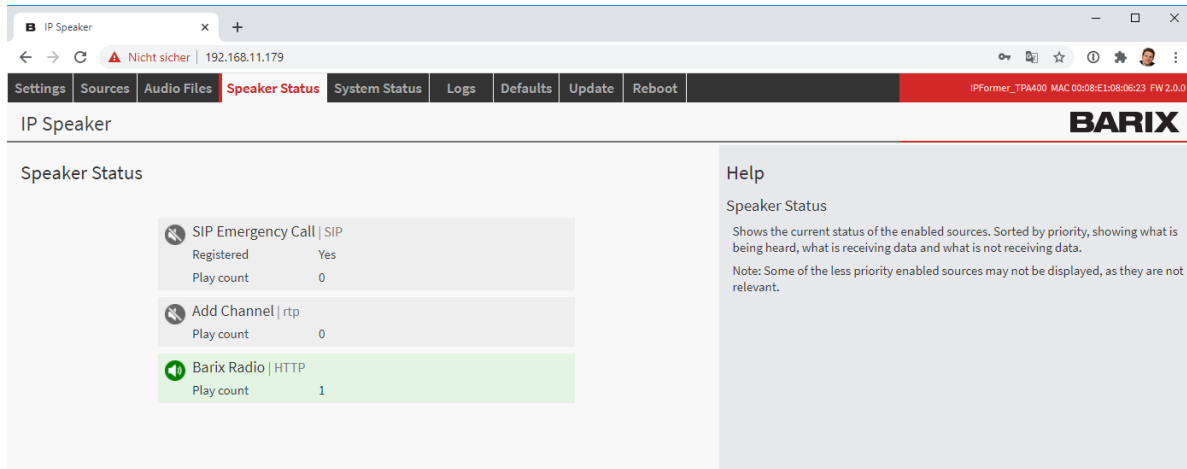

Figure 25 – Speaker Status Page

2.4 Security Settings

These settings are among the most important in the Settings page of the Encompass LT. In this section it is possible to Enable/Disable key functionalities:

- **Reboot:** Enable or disable the soft reboot from web user interface (button grayed out)

- **Reset Factory Default:** Enable or disable the possibility to reset the device to factory defaults from web user interface (button grayed out)

- **Update Function:** Enable or disable the possibility to update the device from web user interface (button grayed out)

2.5 Network Settings

In the Encompass LT Settings page there are parameters used to configure your device with the desired network settings. To set the network settings:

1) Wire your Encompass LT to a network where a DHCP server is available and switch it on, hear the IP announced over the audio output (SonicIP® function) and connect to its web browser.

2) Locate the Network Settings in the "Settings" menu.

3) Once settings are configured as desired click on Submit at the bottom of the page, the device will restart and if the IP is changed you must input the new address in the top bar
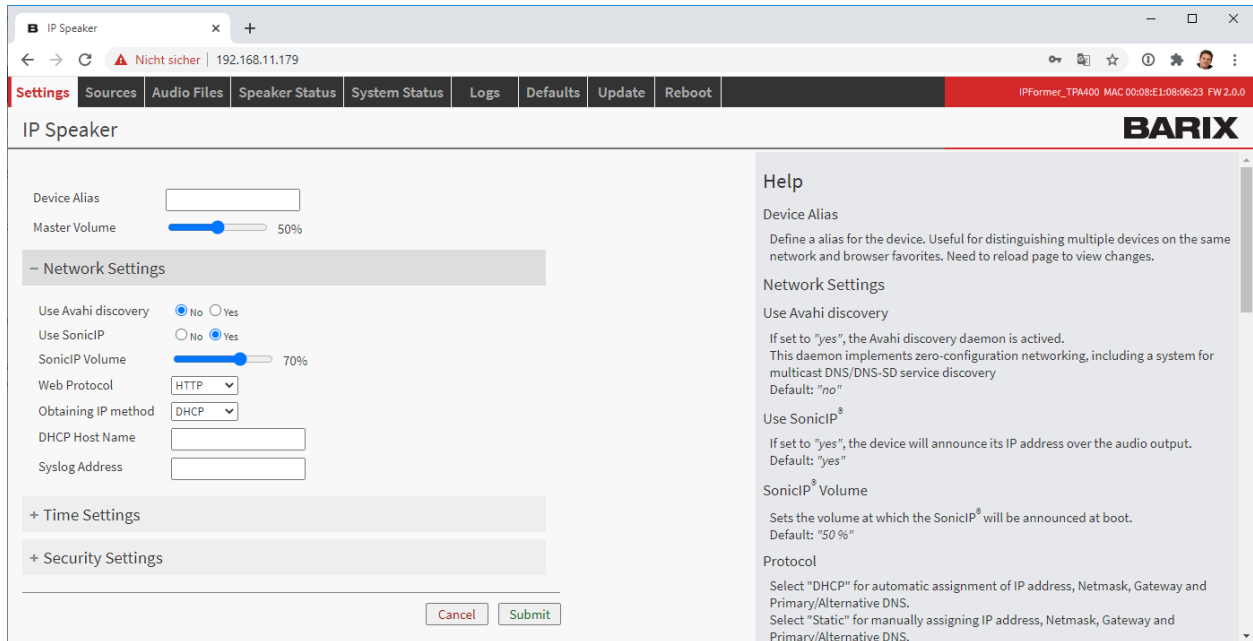
Figure 26 - Settings Page - Network Settings

2.6 Update the Firmware of ENCOMPASS LT

It is always good practice to run the latest firmware on the Encompass LT. The latest Firmware includes improvements and bug fixes. The firmware on the Encompass LT can be updated using the local web interface.

To update the firmware from the web user interface you need first to download the TAR package from the Barix website: www.barix.com/downloads (Firmware is under Products → Decoder → IP Former) or simply type: IP Former in the search bar in the same page. In this page, only the latest firmware from Barix is available.
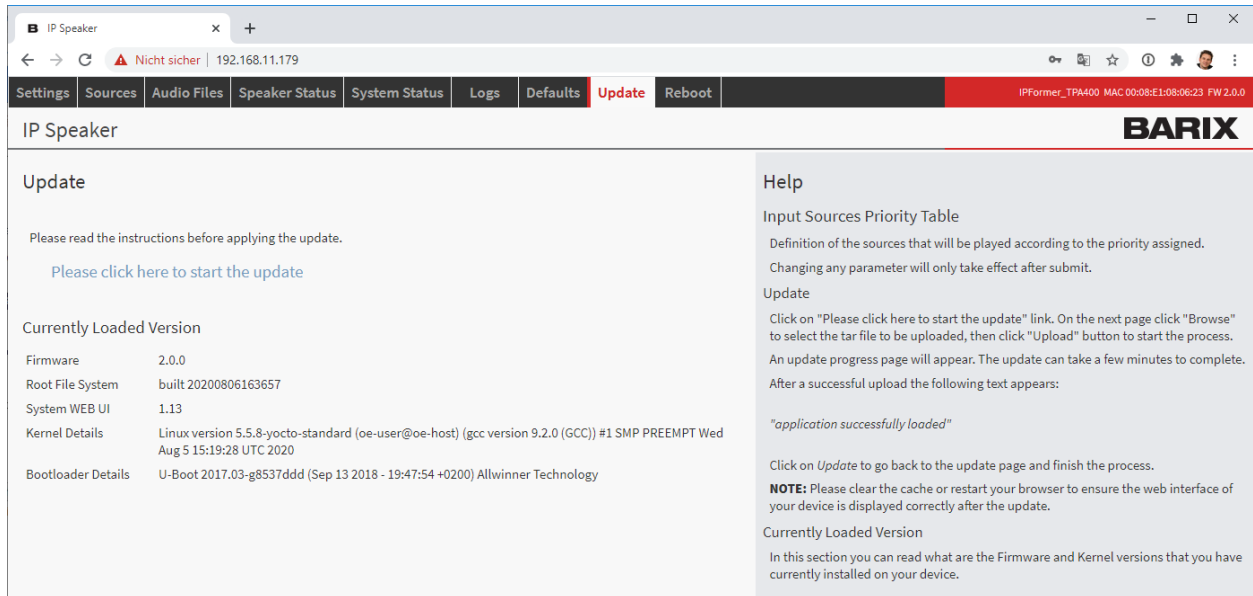
Figure 27 - Update Page

Once the package is downloaded:

1) Connect to the Encompass LT's web user interface

2) Navigate to UPDATE from the top bar

3) Click on "Please click here to start the update"

4) In the following page click on "Browse", locate the TAR package you just downloaded on your PC and open it

5) Click on "Upload" - Wait few minutes while the process moves forward. Do not switch off the device while the process is ongoing

6) When finished the message "Update completed" appears

7) The device will automatically reboot. After the device reboots, click on the home button and refresh the page. You may need to empty the cache of your browser to display the new application.

2.7 Restore Factory Defaults

There 2 reset methods available on the Encompass LT:

- Soft reset from web user interface

- Hard reset from the front Reset button on the device

Soft Reset

ultra-hyperspike

A soft reset restores all parameters except the network settings. To reset the device including network settings perform a Hard Reset.

1) Connect to the web user interface of the Encompass LT and navigate to the DEFAULTS tab.

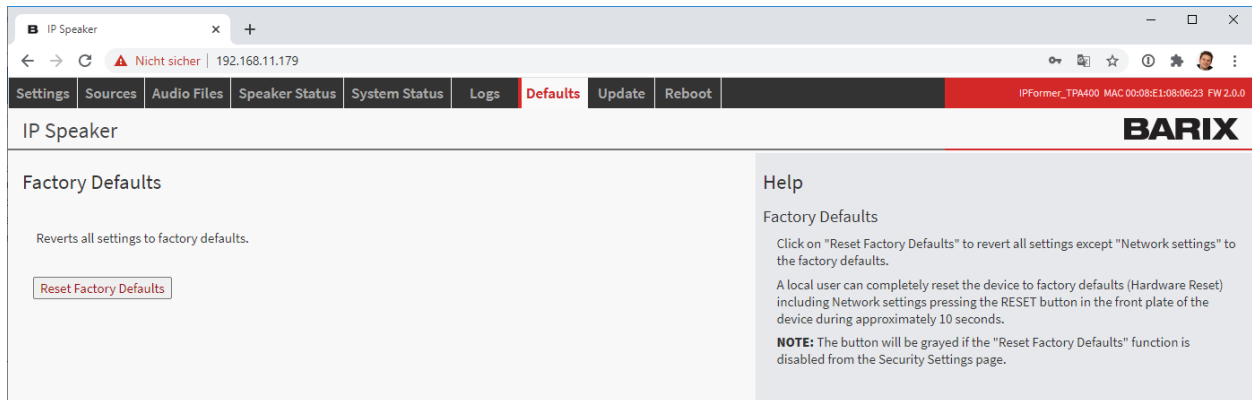2) Click on Reset Factory Defaults to perform a reset of the device.

Figure 28 - Defaults Page

Hard Reset

A hard reset restores all values and settings on the Encompass LT. To perform a hard reset:

1) Press the reset button located in the front panel of the device for approximately 10 seconds.

2) The green LED will flash 3 times to confirm reset operation.

3) Once the process is complete, the device will reboot.

4) The network settings will have been restored.

Note: The IP address may have changed, listen to the SonicIP® announced over the audio output to verify IP address.

3. HEALTH AND STATUS MONITORING

3.1 Status LEDs

The Encompass LT has 2 LEDs visible on the control CCA. These LEDs provide system and applications status. See Table 9 and Table 10 for status descriptions.
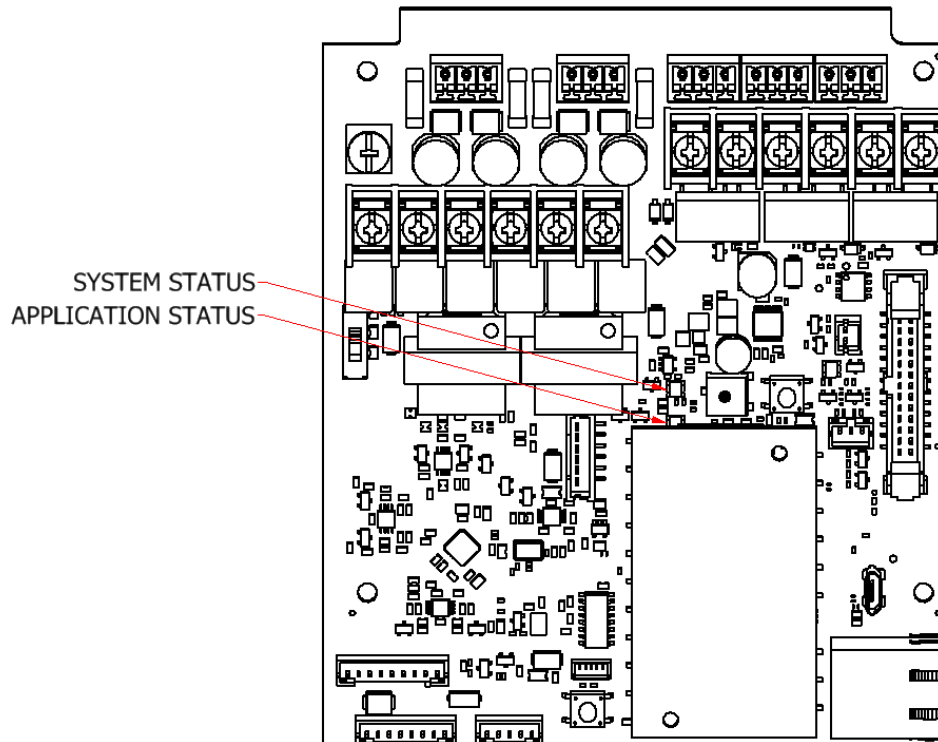

Figure 29 - LED Status

Table 11: System Status

LED Color	LED Status	Status Description
Red	Fast Flashing	Early Startup
Red	Slow Flashing	System Booting
Yellow	Flashing	System in Rescue Mode
Orange / Yellow	Flashing	Downloading / Installing Firmware
Green	Solid	System Ready

Table 12: Application Status

LED Color	LED Status	Status Description
Red	Solid	Application Not Running
Green	Solid	Application Running

4. MAINTENANCE AND TROUBLESHOOTING GUIDE

4.1 Recommended Maintenance

On a regular basis, check the system:

- Check for vandalism or natural damage.
- Check speaker wiring for frays, cuts, and kinks.
- Perform an operational test.

4.2 Troubleshooting Guide

- For amplifier module related issues:

    o Refer to Appendix A Section 3.1 to verify system status.

    o If no LEDs are illuminated, verify the ECM400 is properly installed onto the control card and verify power is provided to the Cabinet and to the control card.

    o Verify network is connected and configured properly. Refer to Appendix A Section 1

- For speaker related issues:

    o Verify speaker is properly connected to the Encompass LT. Refer to Section 3.1

    o For additional troubleshooting, refer to the associated product manual.

For any other issues, contact customer service. For accurate and expedient customer service, please have the following information readily available when contacting Ultra:

- Model number

- Serial number

- Purchase date