

# T112 / T112C

*TitanONE Smart Mainframe Power Amplifier*



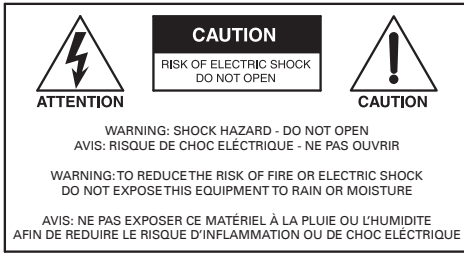
**Installation Manual**  
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**Document: 1225B**

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## Important Safety Instructions



Labeling on products and the Installation Instructions & User Manual may use safety related graphical symbols as shown below to note safety requirements.

Lightning Bolt: The lightning flash with arrowhead symbol, within an equilateral triangle, WARNING symbol, is intended to alert the user to the presence of un-insulated dangerous voltage within the product's enclosure that may be sufficient in magnitude to constitute a risk of electric shock to persons or domestic animals.

Exclamation Point: The exclamation point within an equilateral triangle, CAUTION symbol, is intended to alert the user to the presence of important operating and maintenance (servicing) instructions, or a hazard that can damage equipment.

Do not proceed beyond a WARNING or CAUTION notice until you have understood the hazardous condition and have taken appropriate steps.

Ne continuez pas avant d'avoir pris connaissance du danger et prendre les mesures appropriées.

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this device near water.
6. Clean only with dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other device that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the device.
11. Only use attachments / accessories specified by the manufacturer.
12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the device. When a cart is used, use caution when moving the cart / device combination to avoid injury from tip-over.



13. Unplug this device during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the device has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled, or objects have fallen into the device, the device has been exposed to rain or moisture, does not operate normally, or has been dropped.
15. This product is equipped with a three-wire grounding-type plug, a plug having a third (grounding) pin. This plug will only fit into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the grounding-type plug.
16. **WARNING:** To reduce the risk of fire or electric shock, this device should not be exposed to rain or moisture and objects filled with liquids, such as a vase, should not be placed on this device.
17. To completely disconnect this equipment from the mains, disconnect the power supply cord plug from the receptacle.
18. The mains plug of the power supply cord shall remain readily operable.
19. Protective earthing terminal. The apparatus should be connected to a mains socket with a protective earthing connection.

**WARNING:** To reduce the risk of fire or electric shock, do not expose this apparatus to rain, moisture, dripping, splashing, or place objects filled with liquids on the equipment.

**AVERTISSEMENT:** Afin de réduire le risque d'incendie ou de choc électrique, n'exposez pas cet appareil à la pluie, à l'humidité, à l'égouttement, aux éclaboussures, et ne posez pas des objets remplis de liquide sur l'appareil

**WARNING:** If apparatus is equipped with Class I grounding plugs for safety purposes, it must be connected to MAINS that employ a protective earth ground connection.

**AVERTISSEMENT:** si l'appareil est équipé de prises de terre classe I, pour des raisons de sécurité, il doit être branché sur un réseau ayant une prise de terre de protection.

**WARNING:** The MAINS plug on this device may be used as the DISCONNECT DEVICE for MAINS power and must remain readily operable.

**AVERTISSEMENT:** La prise principale de cet appareil peut être utilisé comme DISPOSITIF de DECONNEXION du courant principal et doit rester facilement accessible.

**WARNING:** Installation and maintenance of AtlasIED equipment is to be made by trained / qualified personnel and must conform to all applicable local codes.

**AVERTISSEMENT:** l'installation et la maintenance des équipements AtlasIED doit être faite par du personnel formé / qualifié et doivent être conformes à toutes les réglementations locales en vigueur.

**WARNING:** If unit contains a lithium battery, there is a danger of explosion. Replace only with the same or equivalent type.

**AVERTISSEMENT:** Si l'unité contient une pile au lithium, il y a un danger d'explosion. Remplacez-la uniquement avec un modèle identique ou équivalent.

## Safety Considerations

### Safety Precautions

Personnel properly qualified in the application and use of life safety equipment ("qualified personnel") shall read this manual carefully before performing any actions to specify, apply, install, maintain and perform operational tests of AtlasIED systems, and associated products in accordance with the instructions in this manual. This manual shall be made available to all qualified personnel who operate, test, maintain, or service AtlasIED systems, and associated products. It is strongly recommend that such personnel read and understand the entire manual.

**WARNING: IF SAFETY PRECAUTIONS, INSTALLATION AND TESTING ARE NOT PERFORMED PROPERLY, CONDITIONS COULD EXIST IN WHICH THE ATLASIED SYSTEM MAY NOT OPERATE, OR MAY OPERATE IMPROPERLY. THIS COULD RESULT IN PROPERTY DAMAGE AND SERIOUS INJURY OR DEATH TO YOU AND/OR OTHERS.**

**AVERTISSEMENT: SI LES MESURES DE SECURITE, L'INSTALLATION ET LES ESSAIS NE SONT PAS EFFECTUES CORRECTEMENT, CELA POURRAIT EMPECHER LE SYSTÈME ATLASIED DE FONCTIONNER, OU DE FONCTIONNER CORRECTEMENT. CELA POURRAIT PROVOQUER DES DEGATS MATERIELS ET DES BLESSURES GRAVES, OU LA MORT POUR LES AUTRES ET/OU VOUS-MEMES.**

It is very important that only responsible, trained personnel are allowed to operate and maintain these systems, and that they use only appropriate equipment and tools. If a person is not trained, they shall contact the AtlasIED factory for direction on how to operate and maintain an AtlasIED system.

Unauthorized personnel and equipment must be restricted from the areas of operation.

All operations should be performed carefully, methodically, and without hurrying. Greater effectiveness will be developed by increased familiarity of personnel with their assignments. During any maintenance operation, if a malfunction occurs or an incorrect indication appears, stop the operation and determine whether or not it is safe to proceed. Before performing any step in a procedure, be sure that the preceding step has been properly executed and correct results obtained. Cleanliness and good housekeeping in all installation areas are major factors in effective accident prevention. Tools and equipment should be maintained in good working order and should always be returned to their proper storage place after usage. Cleaning agents and other cleaning aids should be removed from the equipment areas immediately upon completing the task at hand.

### General Precautions

Changes, modifications, or additions in connection with the AtlasIED system equipment shall not be made without explicit authorization of AtlasIED.

Safety devices found on mechanical, and electrical and electronic equipment are put there for the protection of personnel and equipment. These devices must be maintained in good working order and operative at all times. Safety devices shall never be removed or bypassed unless specifically authorized by the AtlasIED factory. Where safety devices have been rendered inoperable by proper and specific authorization, adequate notices shall be posted to warn personnel of the potential hazard.

Avoid the use of flammable or toxic cleaning fluids, and the use of carbon tetrachloride is prohibited.

Maintenance of the equipment shall be at least what is specified in the AtlasIED manuals and literature, and performed only by qualified personnel.

Whenever operation and maintenance is ongoing, personnel in the equipment areas shall have an effective communication among these areas in order to protect people if any accident occurs.

### Preliminary Precautions

Precautions which are applicable to general electrical or electronic maintenance are as follows:

- A. Check yourself. Wear no article that might catch on equipment or that might act as a conductor.
- B. Check the working area. The equipment area shall be clean and dry. If possible, stand on a special insulator such as a rubber mat. There should be ample working space and good lighting.
- C. Check the tools. Always use proper tools and check them for their safe condition. Use screwdrivers with plastic handles. Check test equipment periodically and examine test leads carefully as the slightest break in insulation is dangerous.
- D. Check the procedures. Study the entire procedure before taking the first step. Consult the circuit diagram frequently to obtain an understanding of what is accomplished at each step. Know what is in the equipment and how it differs from others on which you have worked.
- E. Be aware that high voltages may be present across terminals that are normally low voltage, due to equipment breakdown. Be careful when measuring low voltages in equipment containing high voltage circuits.
- F. Do not make resistance measurements with power on.
- G. Do not work within the equipment without the presence of a person who is capable of rendering aid, and who is familiar with the procedure for emergency shutdown of the equipment.

### Precautions When Measuring High Voltage Potentials

Observe the following precautions when measurements must be performed on circuits with potentials over 48 volts.

- A. Do not measure potentials over 48 volts without the presence or assistance of a person who is capable of rendering aid, and who is familiar with the procedure for emergency shutdown of the equipment.
- B. Be sure you are not grounded when you are adjusting equipment or using measuring equipment. Stand on a rubber mat or other insulator if possible. Be sure the equipment area is clean and dry. In general, use only one hand when servicing live equipment.
- C. If a test meter must be held or adjusted while voltage is applied, ground the case of the meter before starting a measurement. Do not touch the live equipment or personnel working on live equipment while holding the meter. The "common" terminal on some A/C electronic voltmeters is at ground potential; never connect the "common" terminal to any point above ground potential.
- D. High-voltage, high-capacitance capacitors should be discharged before servicing is started.



**WARNING!** Discharging must be done carefully and judiciously. First ascertain whether there is a built-in bleeder network. If so, wait a minute or two for the capacitor to discharge through the network. Otherwise, use an external discharge network. This is most important in the case of high voltage or high capacitance capacitors. If one terminal is connected to ground, connect the discharge network between the other terminal and ground. If neither terminal of the capacitor is grounded, connect the network across the capacitor terminals. Connecting a short circuit across the terminals is not recommended. Doing so can produce extremely high currents and a flash which can injure the eyes, vaporize metals, and cause burns.



**AVERTISSEMENT:** La décharge doit être faite soigneusement et judicieusement. Vérifier d'abord si il y a un réseau de purgeur incorporé. Si c'est le cas, attendez une minute ou deux pour que le condensateur se décharge par le réseau. Sinon, utilisez un réseau de décharge externe. Ceci est très important en cas de haute tension ou des condensateurs à haute capacité. Si un terminal est relié à la terre, connecter le réseau de décharge entre l'autre terminal et la terre. Si aucun terminal de condensateur est fondé, relier le réseau au terminal du condensateur. La connexion d'un court-circuit entre les terminaux n'est pas recommandée. Cela peut créé des courants très élevés où des étincelles pourrait blesser les yeux, fondre les métaux et causer des brûlures.

### Precautions When Working on Energized Equipment

When it is necessary to work on energized equipment, think ahead and anticipate every hazard. Never work alone on energized equipment.

Interlock switches are installed on some of the doors and panels to break the power circuits when the enclosure is entered. When it is necessary to work within such an enclosure on energized equipment, the interlock may be bypassed. Extreme caution should then be exercised, as dangerous voltages are present within the unit.

### AC Power Circuits

Equipment obtaining power from a secondary distribution system should be grounded at all times by means of a third grounding wire on the power lines. Equipment permanently wired to a secondary distribution system should also be grounded separately by connection to a grounding bus or ground rod with a sufficiently large conductor to handle the current expected if the secondary source is accidentally shorted to the equipment.

The ground wire should be protected from mechanical damage and periodically inspected for good physical condition.

Personnel should never depend on a switch to remove power from equipment. If the equipment is connected to the secondary distribution system by means of a power cable, detach the cable from the receptacle before attempting any repairs of removal of chassis.

If the equipment is permanently wired to the secondary distribution system, remove the main fuses or open the power switch. Attach a suitable warning tag to the switch which will warn personnel not to operate the equipment; only the person who originally attaches the warning tag should be authorized to remove it.

### Resuscitation

Personnel working with or near high voltage should be familiar with modern methods of resuscitation. Such information and training is available from the Red Cross or local emergency response personnel such as the police and fire department.

## Introduction

The T112 Intelligent Amplified Digital Signal Processing System is designed to house, supply power to, and cool up to seven (7) Titan-One Series power amplifier cards. In addition, the mainframe provides digital audio network connections from an AtlasIED audio network controller such as a GLOBALCOM®.IP IP100 series ACS. There are two product models covered in this manual: the T112 which uses Dante™ for the audio transport and the T112C which uses CobraNet™. The only difference in the two models is which CPU card is inserted. For simplicity throughout the manual, the product will be referred to as the “T112” and it is understood that everything applies to both models. Local program or background music (BGM) inputs can connect to analog connections located on the back of the mainframe. Six of the amplifier cards function as primary cards to drive connected loudspeaker circuits. The seventh card functions as a backup that is automatically switched in to the speaker line of a failed card. The T112 may accept any of the following amplifier card models:

- T302-230V – T1 (TitanONE) 300W Total, 2 CH x 150W, 100V
- T302-120V – T1 (TitanONE) 300W Total, 2 CH x 150W, 70V
- T602-230V – T1 (TitanONE) 600W Total, 2 CH x 300W, 100V
- T602-120V – T1 (TitanONE) 600W Total, 2 CH x 300W, 70V
- T1202-230V – T1 (TitanONE) 1200W Total, 2 CH x 600W, 100V
- T1202-120V – T1 (TitanONE) 1200W Total, 2 CH x 600W, 70V

In addition, it may accept the following line driver card:

- T2LD - T1 (TitanONE) 2 CH Line Driver for T112 Mainframe

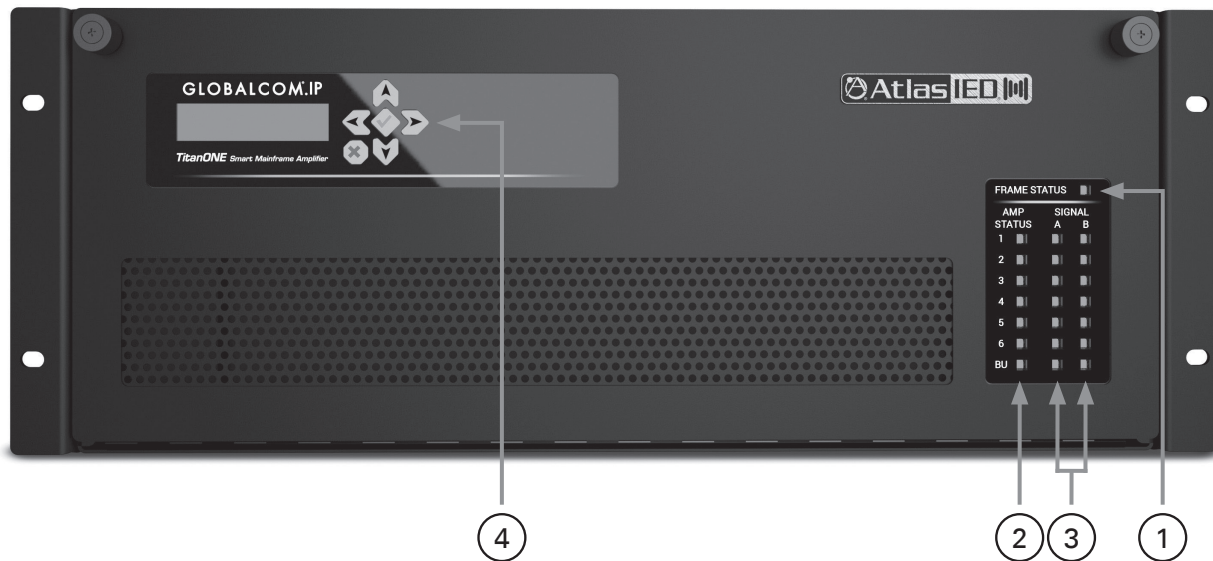
Digital signal processing (DSP) is provided on each of the 12 channels and includes level controls, page routing, automatic ducking of background music, equalization (up to eight (8) parametric bands per amplifier channel plus high-pass filter), signal delay, and AtlasIED’s patented technology for ambient analysis-based automatic level control, via built-in sensor connections on the rear.

**Note:** If this device is used as part of a life safety or mass notification system that is required to comply with standards such as UL 864, UL 2572 or ULC S576, or with building codes like NFPA 72, certain measures should be observed with how the device gets its power, how field wiring is done, how the device is supervised and how the device is configured via its software. There are notifications in gray boxes such as this one throughout the document which point out these areas. It is the installer’s responsibility to observe and take them into account in designing a complete system that meets the requirements of any of these standards / codes.

**Note for Mass Notification Systems:** The T112 and optional cards are listed for use with a Mass Notification System, but it is the responsibility of the installer to conduct tests on the completed system to determine compliance of the installation. These installation tests should include the following:

1. Operation Tests: Per Section 31 of UL 864, Section 10.2 of ULC S527, Sections 32 through 35 of UL 2572, and Sections 31 through 33 of ULC S576
2. Common Performance and Monitoring for Integrity: Communication Link: Per Section 41.5 of UL 2573 and Sections 39.7 and 39.8 of ULC S576
3. Charging Current Test: Per Section 69 of UL 864, Section 10.5 of ULC S527, Section 55 of UL 2572 and Section 53 of ULC S576

## Front Panel



1. **Overall Status Indicator** - This is a tri-color LED that indicates the following conditions:

- Slow Flash Green - The unit is powered up and operating normally.
- Solid Yellow - The unit has a fault of some kind (may be checked on LCD readout).
- Flashing Yellow - The case is open and the power amps have been powered off for operator safety.
- Off - The unit does not have power.

**Note:** If a solid green indication is seen, this should be considered an abnormal condition in which either the internal processor is not running normally or communication with the front panel indicators has failed.

2. **Amp Status Indicators** - This is a tri-color LED that indicates the following conditions:

- Solid Green - The amplifier is powered up and operating normally.
- Solid Yellow - The amplifier or one of the speaker lines attached to it has a fault condition. This includes conditions such as total amplifier failure (e.g., blown fuse or manual power switch in the off position), speaker line ground fault, speaker line short, and speaker line break.
- Solid Red - The amplifier is processing audio for an alarm (emergency / evacuation message).
- Off - The amplifier is powered off by the internal processor or no amplifier is inserted in that slot.

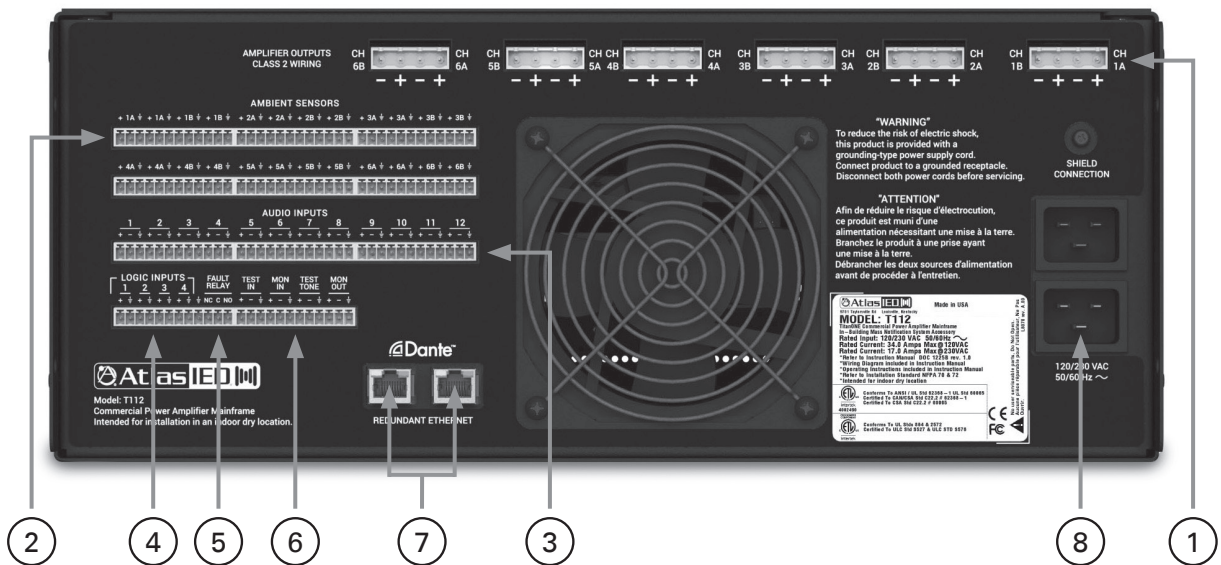
3. **Signal Presence / Clipping Indicators** - This is a tri-color LED for each amplifier channel A and B that indicates the following conditions:

- Flickering / Solid Green - This indicates signal presence above detection threshold. This can flicker as the signal goes above and below the threshold, becoming solid if (averaged) signal stays above the threshold.
- Flickering / Solid Yellow - This indicates signal is being clipped. This may be seen as alternating green-yellow as the signal goes above or below the clipping level, or solid yellow if it stays above the threshold.
- Flickering / Solid Red - This indicates signal presence above the detection threshold, and that the channel is processing audio for an alarm (emergency / evacuation message). This may alternate red-yellow as the signal goes above or below the clipping level.

4. **LCD Panel & Navigation Buttons** - This section provides a user interface for viewing faults or performing some settings / interactions with the mainframe.



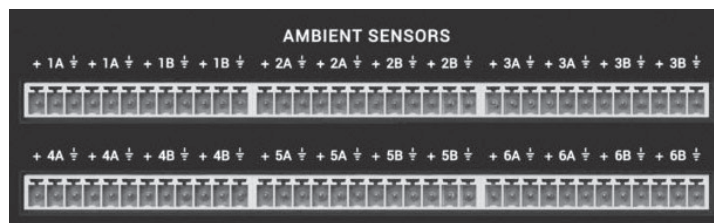
## Rear Panel



- 1. Speaker Connections** - The connections to field wiring for the distributed speakers are at a maximum of either 70V or 100V RMS depending on the model of amplifiers inserted into the frame. If wiring Class B speaker circuits and full supervision is needed, install a single end-of-line (EOL) module at the far end of each speaker line for best compliance with code standards. Two models of EOL modules are available from AtlasIED. Both modules act like a tuned load that presents a large load at frequencies near 20 kHz. Which module to use, depends on the maximum power rating of the amplifier driving that speaker line:
  - IED5410EOL – Presents ~100 Ohm load at 20 kHz, suitable for use with T302 and T602 model amplifiers.
  - IED5411EOL – Presents ~10 Ohm load at 20 kHz, suitable for use with T1202 model amplifiers.

**Equipment Note:** Using the 5411EOL on speaker lines with the lower power rating amplifiers may overload the amplifiers, causing stress and shortening their life.

**Note for Mass Notification Systems:** For UL 864, UL 2572 and ULC S576, the use of the end-of-line modules is required to provide Class B supervision of the speaker wiring. See the wiring diagram for such connections shown on page 15.



- 2. Ambient Sensor Connections** - The user may connect up to two ambient sensors per amplifier channel. The sensor input positions for each channel are denoted by the markings on the back (see above). There are two 1A connections, two 1B connections, etc. Sensors for the corresponding amplifier channels may be plugged into either or both of the connections. Be sure to wire each sensor to all three pins. The plus (+) pin is power (~27V) out to the sensor. The ground symbol denotes the ground pin for the sensor and the middle pin (labeled by amplifier channel) is for the sensor reading coming back from the sensor.
- 3. Audio Input Connections** - There are twelve balanced audio input connections on the rear of the T112. These are not hard coded to amplifier channels, but may be mapped to various functions via the configuration software such as background music inputs, priority over-ride audio inputs, etc.
- 4. Logic Input Connections** - Up to four dry contact closures may be connected to the logic inputs of the T112 as required.
- 5. Fault Relay Connection** - The fault relay connections have both common (C), normally open (NO), and normally closed (NC) pins. The user may connect to common and either of the other pins as needed.

## Rear Panel

6. **Monitor / Test Input / Output Connections** - The four connections available in this section may be used for the following:
- Test In - Input to be tested. The signal may come from an external monitor / test point selector such as a T9032MT frame from AtlasIED.
  - Mon In - Input to be routed to monitor speaker for listening. The signal may come from an external monitor / test point selector such as a T9032MT frame from AtlasIED.
  - Test Tone - Line level output tone from the T112 DSP that may be used to test external equipment.
  - Mon Out - Line level output to drive a local self-powered speaker for listening to the selected monitor point; which may be either an internal monitor / test point or one that came from the Mon In connection.
7. **Redundant Network Connections** - There are two network connections on the rear. Either may be used in a normal, non-redundant network installation. However, when redundant network switches are provided, one connection should be made to each switch. Each RJ-45 network connector has two LEDs on it, which indicate conditions as described in the table below.

LED	State	Condition
Link (left)	Off	LAN link is not established
	Yellow (solid)	LAN link is established
	Yellow (blinking)	LAN activity is occurring
Speed (right)	Off	10/100 Mb/s data rate
	Green	1000 Mb/s data rate

8. **Power Connections** - Power is provided via the two 20-Amp connections provided. Two connections are required to power the whole frame, with each connector powering half of the non-backup amp channels.

## Installing the T112

### Unpacking and Preparing the Unit

Unpack the unit from its shipping carton and identify any accompanying components that may have been included. The unit comes with rack ears for easy mounting into a 19" rack.

### Installing the Unit into a Rack

The T112 requires four rack units (4 RUs) of available space and a recommended mounting depth of 22" to allow adequate clearance for cabling. Select a location in the 19" rack for the unit based on ability to hold the weight of the T112 after amplifiers are installed. Mount the unit using suitable screws for the rack being used, two per rack mount ear. Please refer to any safety and installation instructions that came with the rack prior to assembly. Optionally, the frame may be given additional support by connecting the rear of the frame to extra side rails in the rack, as indicated in the figure below.

Cooling of the T112 is via front to back air flow, so there is no requirement for blank or vented panels above or below the T112. When mounted in a fully enclosed rack be sure there is sufficient air flow through rack, such as with a rack vent fan.



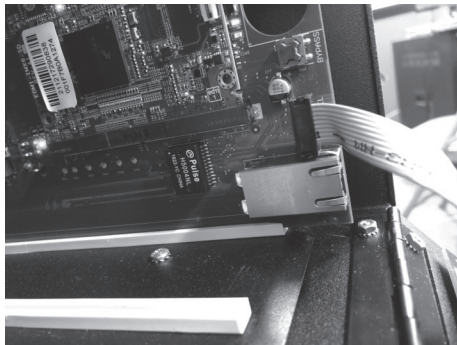
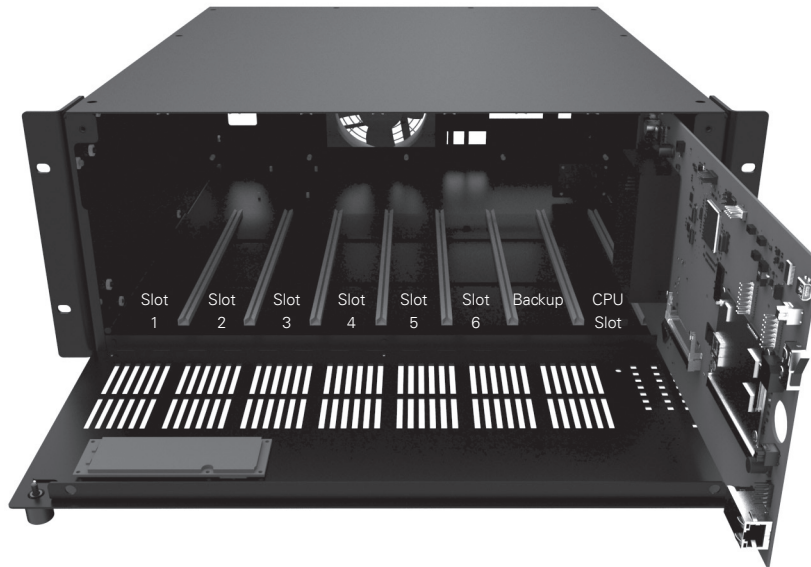
**For UL 864 and UL 2572 Installations:** This unit must be mounted in a rack with at least the rear portion enclosed, such as by side and rear panels on the rack into which it is mounted. This is to insure that the field wiring terminals present on the rear of the T112 unit are enclosed.

### Insert the CPU Card

Standard packaging is to ship the CPU card not installed, but in a separate box nestled into the foam atop the frame. One needs to carefully install the CPU card into the frame once it is mounted into the rack. This is done by first opening the front of the T112. Unscrew the two screws in the upper right and upper left corners, and then lower the front of the unit. The CPU card goes into the slot on the far right when facing the unit.

**Equipment Note:** To avoid possible damage to the T112 CPU card, only insert or remove this card when power is removed from the frame (rear power cords are unplugged).

After firmly seating the CPU card into the connectors in the rear, one should connect the ribbon cable between the CPU card and the front panel as shown in the photos below. In particular be sure to note the location of the pin 1 wire – red marking on the ribbon cable – and be sure it is at the end shown in the photos.



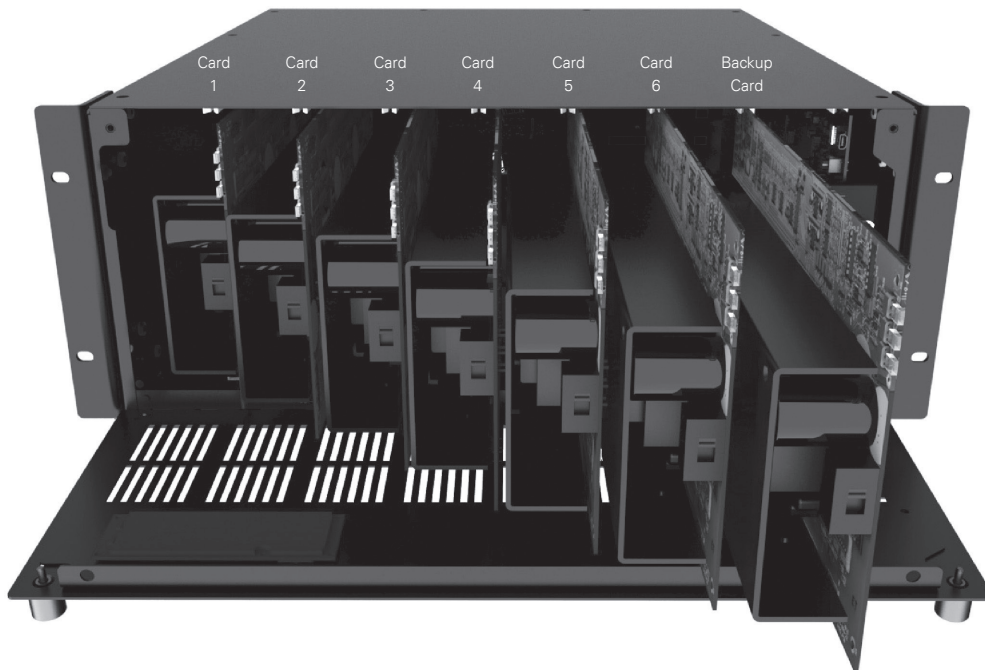
### Insert the Amplifier Cards

Amplifier cards (or line driver cards) are inserted into the frame from the front. To insert an amplifier card, start by opening the front of the T112 by unscrewing the two screws in the upper right and upper left corners, and then lowering the front of the unit. Amplifier slot #1 is on the far left when facing the unit. The CPU will automatically remove power from the amplifier card slots when the front is opened, but as a precaution, one should put the amplifier card power switch to the off position while inserting (or removing) a card. Then change the switch position to on after it has been well seated into its slot. One needs to get the top and bottom edges of the amplifier card circuit board into the top and bottom card guides for that slot, and then push the card until it contacts the connector in the rear. Then, push a little harder until the card pops into its final location. The amplifier card is fully inserted after one feels the resistance of the rear connector being overcome in one last quarter inch jump.

The backup amplifier slot is on the far right, next to the CPU card, when facing the unit. If using a backup amplifier card, one should insure that it is at least equal to the highest power of any of the other amplifier cards in the frame, so that it can provide sufficient power to any of the backed up speaker circuits.

**Equipment Note:** Using an undersized amplifier card in the backup position may cause damage to the card due to overloading, or may not provide sufficient sound pressure level to the speakers in that zone to meet system requirements.

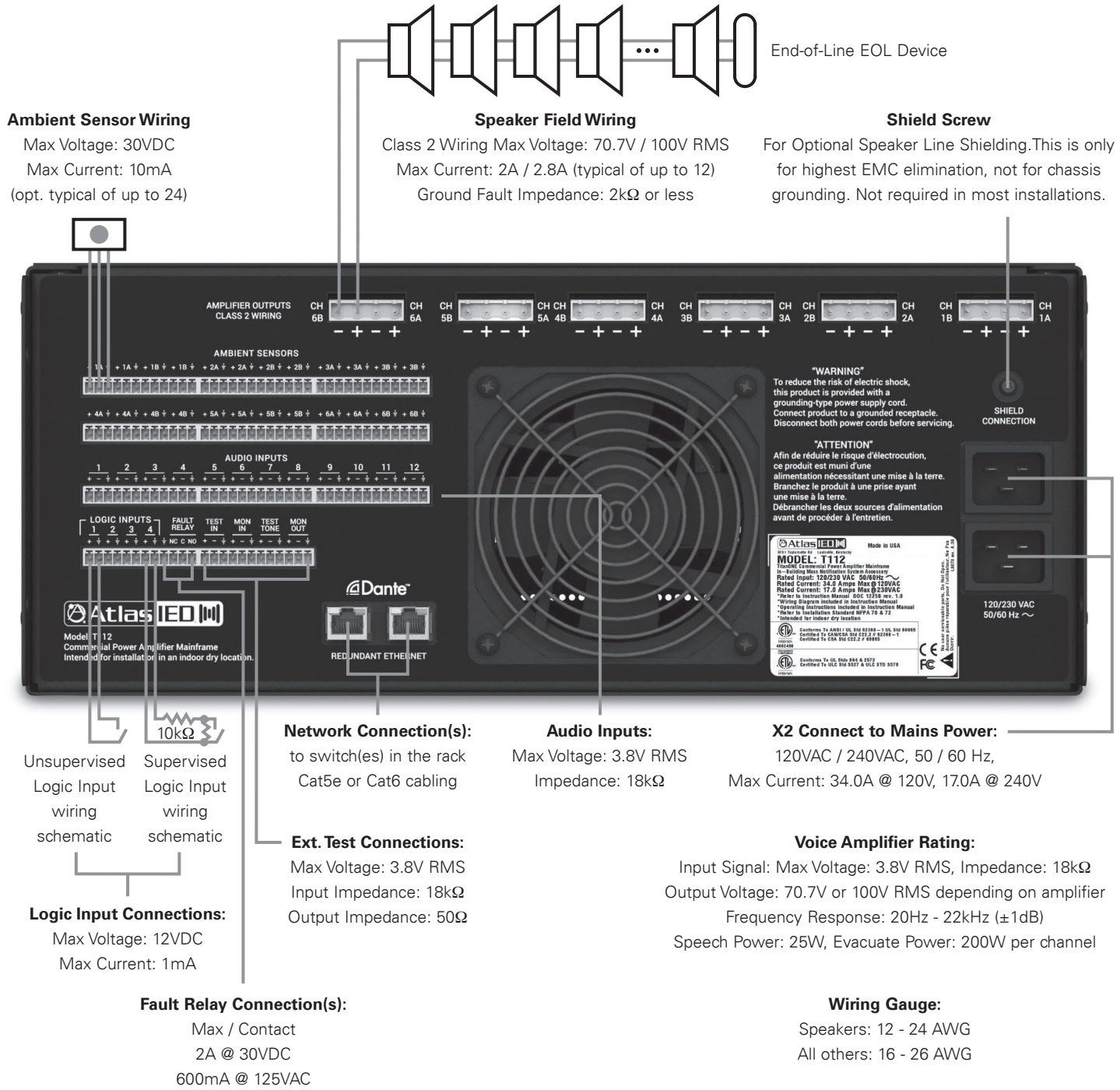
**Equipment Note:** The amplifier cards inserted into the frame are designed to only work at either 120VAC or 240VAC. Be sure to only insert amplifier cards which are compatible with the available line voltage.



## Wiring Diagram

The wiring connections to the T112 are all made on the rear as shown in the diagram below. Specifics of each of these connections are detailed in the sections which follow.

**Note:** For Class B supervision, on each output, speaker circuit must be one continuous run with no branching with an EOL Device at the end.



**For Life Safety or Mass Notification Installations:** Items shown as "optional" (or "opt.") are not required features of the system, but may be added as desired for non-emergency use of the system / equipment.

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### Connect Speaker Field Wiring

Speaker connections on the rear are grouped by amplifier card, channels A and B. When looking at the rear of the frame, connections for amplifier card 1 are on your right. Connections are made by inserting a properly sized mating captive screw connector into each speaker wiring plug as shown in the figure. One should observe the polarity markings on the connections when attaching the speaker field wiring.

If one is wiring Class B speaker circuits and needs full supervision, then for best compliance with code standards, one should install a single end-of-line (EOL) module at the far end of each speaker line. Available from IED are two models of EOL modules. Both modules act like a tuned load that presents a large load at frequencies near 20 kHz. Which module to use, depends on the maximum power rating of the amplifier driving that speaker line:

- IED5410EOL – Presents ~100 Ohm load at 20 kHz, suitable for use with T302 and T602 model amplifiers.
- IED5411EOL – Presents ~10 Ohm load at 20 kHz, suitable for use with T1202 model amplifiers.

**Equipment Note:** Using the 5411EOL on speaker lines with the lower power rating amplifiers may overload the amplifiers, causing stress and shortening their life.

**Equipment Note:** To avoid possible damage to amplifier cards, during a new installation the technician should verify that speaker wiring is sound. That is, that each circuit has no shorts and has a load less than or equal to the maximum power of the amplifier installed to drive that speaker circuit. This is best done via an impedance meter set to operate at a frequency in the range of human speech (e.g., 1000 Hz).

### Connect Ambient Sensor Field Wiring

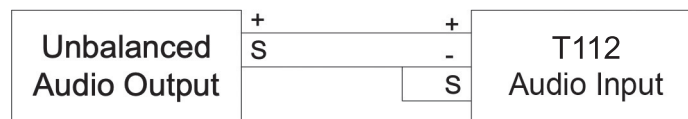
Each sensor connection consists of three wires: + for power to the sensor, the sensor reading line and ground. There are two sensor connections for the each amplifier channel, which are labeled the same, e.g., 1A, 1A, 1B, 1B, 2A, 2A, etc. to clearly identify which channels they are associated with. Connect all three pins for each field sensor used.

**Equipment Note:** To avoid possible damage to the ambient sensor power supply or input circuitry, before plugging in each sensor, one should use an Ohmmeter (or Ohms setting on a multi-meter) to check the resistance between pairs of pins of a connector before plugging it in to the back of the T112 frame. Readings should correspond to the values listed below. (**Note:** readings can vary for a second or so as capacitors in the sensor charge up.)

Wire Pair	Reading
Plus - Ground	10 - 40 kΩ
Reading - Ground	150 kΩ
Reading - Plus	150 kΩ

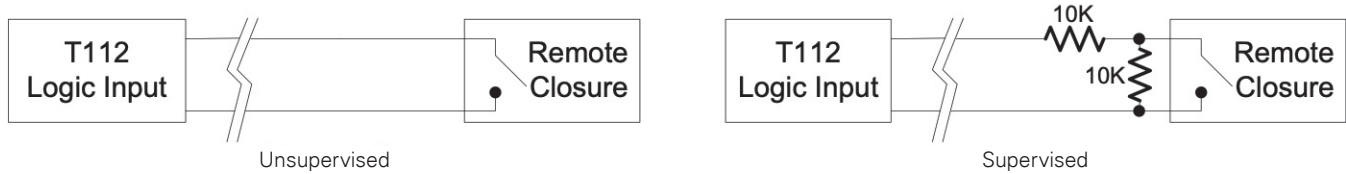
### Connect Audio Inputs

There are 12 analog audio inputs available on the rear of the T112, which may be connected for background music or audio to use in a page action, such as from a logic input closure. One makes connections to these inputs observing the plus, minus and shield (ground) indications on the pins for each input. **Note:** these inputs are balanced. If connecting unbalanced audio to these inputs, it may be done as shown in figure below.



### Connect Logic Inputs

Dry contact closures may be connected to logic inputs of the T112. These logic inputs may be supervised or not. When supervised, the T112 will be able to tell if the wire connecting to the remote device is open or shorted. In order to be supervised, the input must be configured with two 10kΩ resistors are shown in the figure below. **Note:** These resistors are located at the remote closure location, not at the T112 input. When the logic inputs are not to be supervised, no such resistors should be used.



**Figure:** Connecting Logic Inputs Without and With Supervision

### Connect Fault Relay

The fault relay connection has both normally open and normally closed pins. A typical connection is made between either of these outputs and the common pin as desired by the equipment receiving this connection.

**Note for Mass Notification Systems:** In order to comply with specifications on Monitoring for Integrity, it may be necessary to connect this fault relay to an appropriate status collector for the mass notification controller. Alternately, the unit can be supervised via its network connection, i.e., for network-centric controllers.

### Connect Network Cables

There are two network connections on the rear. Either may be used in a normal, non-redundant network installation. However, when redundant network switches are provided, one connection should be made to each switch. Connections are made by pushing in the 8-pin modular connector(s) into the available RJ-45 network jack(s).

### Connect Power Plugs

**Equipment Note:** While the T112 CPU card has a universal power supply for 120/240VAC operation, the modular amplifier and line driver cards inserted into the frame are designed to only work at either 120VAC or 240VAC. To avoid possible damage to these cards, before applying power be sure the frame only contains amplifier cards which are compatible with the available line voltage.

Connect two 20-Amp power cords to the two receptacles provided on the rear of the T112. The other end should go into suitable main power circuits, Uninterruptable Power Supply (UPS) or other backed up power supply.

### Providing Battery Backup for the Unit

The T112 does not have its own redundant power supply, but for life safety or mass notification applications, typically it must be connected to mains supplied by a UPS and / or other backed up power supply (e.g., diesel generators). When sizing batteries or other backup power, the information below can be used.

Total power consumed depends on many factors such as:

- Number of modular power amplifiers inserted into the T112 frame
- Speaker load on each power amplifier channel



The numbers provided assume that amplifiers are turned up to their maximum levels for announcements, speaker lines have the maximum loads for each model of amplifier, and that announcements are a mix of tone and voice averaging 1/8 power. There are three states of the amplifier frame:

- Quiescent – normal running on mains power, with no announcement activity
- Announcement / Alarm mode – amplifiers on and sending audio to speakers.

To compute battery reserve required, one needs to compute the power required to run the T112 for n hours on alternate (battery) power using the quiescent power figure. Then, for standards that require also being able to do voice alarms at the end of the n hours running on battery, use the announcement / alarm mode power figure for the required duration of time (e.g., one hour). The amount of power needed in alarm mode depends on whether the alarm signal is voice (typically uses 1/8 of the max power) or tonal. In the latter case, a pure, uninterrupted sine wave would draw the maximum power shown in the table. For voice or tones that are intermittent, of course the total power would be scaled down by the duty cycle. The total power in any of the three modes is the sum of the power for the base frame and the number and combination of modular amplifier cards inserted into the frame. **Note:** One should add a safety margin of 20% to computations made with the figures below when sizing a battery backup system.

Quiescent Mode Power	@ 120VAC / 60Hz	@ 240VAC / 50Hz
Base Frame	39.5W (63VA)	41.5W (127.8VA)
Any Modular Amp Card (multiply by number of amp cards)	41.2W (62.9VA)	47W (79.2VA)
T2LD (multiply by number of line driver cards)	4.4W (5.2VA)	4.5W (5.4VA)
Announcement / Alarm Mode		
Base Frame	39.5W (63VA)	41.5W (127.8VA)
T302 Modular Amplifier (Voice – 1/8 Power)	54.5W (82VA)	60.3W (100VA)
T302 Modular Amplifier (Tonal – Full Power)	156W (227VA)	157.5W (267VA)
T602 Modular Amplifier (Voice – 1/8 Power)	72.1W (102VA)	77.7W (125VA)
T602 Modular Amplifier (Tonal – Full Power)	268W (400VA)	273W (451VA)
T1202 Modular Amplifier (Voice – 1/8 Power)	99W (144VA)	104W (171VA)
T1202 Modular Amplifier (Tonal – Full Power)	505W (648VA)	546W (910VA)
T2LD (Tonal)	5.8W (6.7VA)	5.9W (6.8VA)

**Note for Mass Notification Systems:** In addition to designing for duration of backup (battery) power, the installation designer may have to account for battery charging current/time, as per the appropriate clauses of the applicable standard.

## Complete Unit Configuration

Once the unit is booted up, complete the system configuration using the supplied configuration software that comes with the public address control system (GLOBALCOM.IP System Management Center. Refer to the appropriate user guide for guidance on completing the unit setup.

When installing the T112 as part of a life safety or mass notification system that must comply to a standard such as UL 2572, some care should be taken in configuring features of the T112. These features are described in the table below.

T112 Feature	Permitted in UL 2572	Settings Permitted in UL 2572
Ambient Analysis	Yes, optional	Any setting
Automated Testing	Yes, required	1. Testing of amplifiers and speaker circuits enabled
Signal Processing (level control, equalization, delay)	Yes, optional / required	2. Testing interval less than required for notification time for trouble signals by any applicable standards or codes, such as NFPA 72.
T602 Modular Amplifier (Tonal – Full Power)	268W (400VA)	May be configured for triggering from a logic input to minimize battery draw when mains power is not available.

## Operation / Maintenance / Testing

This section covers the everyday operation of the T112 along with any periodic maintenance and testing that should be done on it.

### T112 Operation

Most operation is done from the associated Announcement Control System via the network connection. However, there are a few operations that can be done from the front panel of the T112. These are covered on the Operating Instruction sheets that appear at the end of this installation instruction.

**Note for UL 864 or UL 2572:** If this unit is installed as part of a life safety or mass notification system, it may be required that these operating instructions are printed out, framed and posted with the installed equipment. Prior to posting, the local service representative information should be filled in the space provided.

### T112 Maintenance

There is little maintenance required for these units. The one item of maintenance that should be done periodically is to check that air intakes on the front are free of obstructions and dust. In most indoor environments, this should only need to be done quarterly. In higher dirt/dust environments, one may wish to increase the maintenance interval to monthly. Of course, any time the unit reports an error over the network, actions should be taken at that time to remedy the problem.

**Fuse Replacement Note:** Fuses are located on the modular amplifier, line driver and CPU cards. Fuse Ratings are called out on the applicable cards and should only be replaced with a fuse of the exact same rating.

### T112 Testing

No manual testing of the T112 is required. The T112 firmware is constantly monitoring all components of the T112, plug-in modular cards and external speaker circuits (when properly wired with end-of-line modules and configured in the setup software). Therefore periodic manual testing is not required for this individual piece of equipment.

## FCC Notice

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

**Note:** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.



## Limited Warranty

All products manufactured by AtlasIED are warranted to the original dealer/installer, industrial or commercial purchaser to be free from defects in material and workmanship and to be in compliance with our published specifications, if any. This warranty shall extend from the date of purchase for a period of three years on all AtlasIED products, including SOUNDOLIER brand, and ATLAS SOUND brand products except as follows: one year on electronics and control systems; one year on replacement parts; and one year on Musician Series stands and related accessories. Additionally, fuses and lamps carry no warranty. AtlasIED will solely at its discretion, replace at no charge or repair free of charge defective parts or products when the product has been applied and used in accordance with our published operation and installation instructions. We will not be responsible for defects caused by improper storage, misuse (including failure to provide reasonable and necessary maintenance), accident, abnormal atmospheres, water immersion, lightning discharge, or malfunctions when products have been modified or operated in excess of rated power, altered, serviced or installed in other than a workman like manner. The original sales invoice should be retained as evidence of purchase under the terms of this warranty. All warranty returns must comply with our returns policy set forth below. When products returned to AtlasIED do not qualify for repair or replacement under our warranty, repairs may be performed at prevailing costs for material and labor unless there is included with the returned product(s) a written request for an estimate of repair costs before any nonwarranty work is performed. In the event of replacement or upon completion of repairs, return shipment will be made with the transportation charges collect.

EXCEPT TO THE EXTENT THAT APPLICABLE LAW PREVENTS THE LIMITATION OF CONSEQUENTIAL DAMAGES FOR PERSONAL INJURY, ATLASIED SHALL NOT BE LIABLE IN TORT OR CONTRACT FOR ANY DIRECT, CONSEQUENTIAL OR INCIDENTAL LOSS OR DAMAGE ARISING OUT OF THE INSTALLATION, USE OR INABILITY TO USE THE PRODUCTS. THE ABOVE WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

AtlasIED does not assume, or does it authorize any other person to assume or extend on its behalf, any other warranty, obligation, or liability. This warranty gives you specific legal rights and you may have other rights which vary from state to state.

## Service

Should your T112 TitanONE Smart Mainframe Power Amplifier require service, please contact the AtlasIED warranty department through the online warranty claim process.

Online Warranty Claim Processes

1. Warranty submissions are accepted at: [https://www.atlasied.com/warranty\\_statement](https://www.atlasied.com/warranty_statement) where the type of return Warranty or Stock return can be selected.
2. Once selected, you will be prompted to enter your login credentials. If you do not have a login, register on the site. If already logged-in, navigate to this page by selecting "Support" and then "Warranty & Returns" from the top menu.
3. In order to file a Warranty Claim, you will need:
  - A. A copy of the invoice / receipt of the purchased item
  - B. Date of Purchase
  - C. The product name or SKU
  - D. The serial number for the item (if no serial number exists, enter N/A)
  - E. A brief description of the fault for the claim
4. Once all required fields are completed, select the "Submit Button." You will receive 2 emails:
  1. One with a confirmation of the submission
  2. One with a case# for your reference should you need to contact us.

Please allow 2-3 business days for a response with a Return Authorization (RA) number and further instructions.

AtlasIED Tech Support can be reached at 1-800-876-3333 or [atlasied.com/support](https://www.atlasied.com/support).

Visit our website at [www.atlasied.com](https://www.atlasied.com) to see other AtlasIED products.

Local Service Representative (fill in before posting these instructions)

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Phone: \_\_\_\_\_

## Operating Instructions

The T112 is primarily controlled from the public address system controller. However, there are a few functions that can be done from the front panel LCD panel and navigation buttons. These functions are described here.

### LCD Summary Screen and Main Menu

There is a 16 character by 2 line LCD (Liquid Crystal Display) with navigation buttons on the left front of the T112, as shown by the highlight oval in the figure below. The up and down arrow buttons are used to navigate through lists, such as menu options and faults list. The left and right arrow buttons are only used to move forward or backward in position when entering data, such as the Level 2 password. The green check button is the select button. Typically pressing this button will select a menu item and if a sub-menu is available, move the user into that sub-menu. The red X button is used to go back one level / option (e.g., reverse of select).



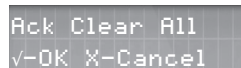
During boot-up, the LCD shows the product identity screen as shown below left. After the unit has fully started up, the display changes to the Summary Screen as shown below right.



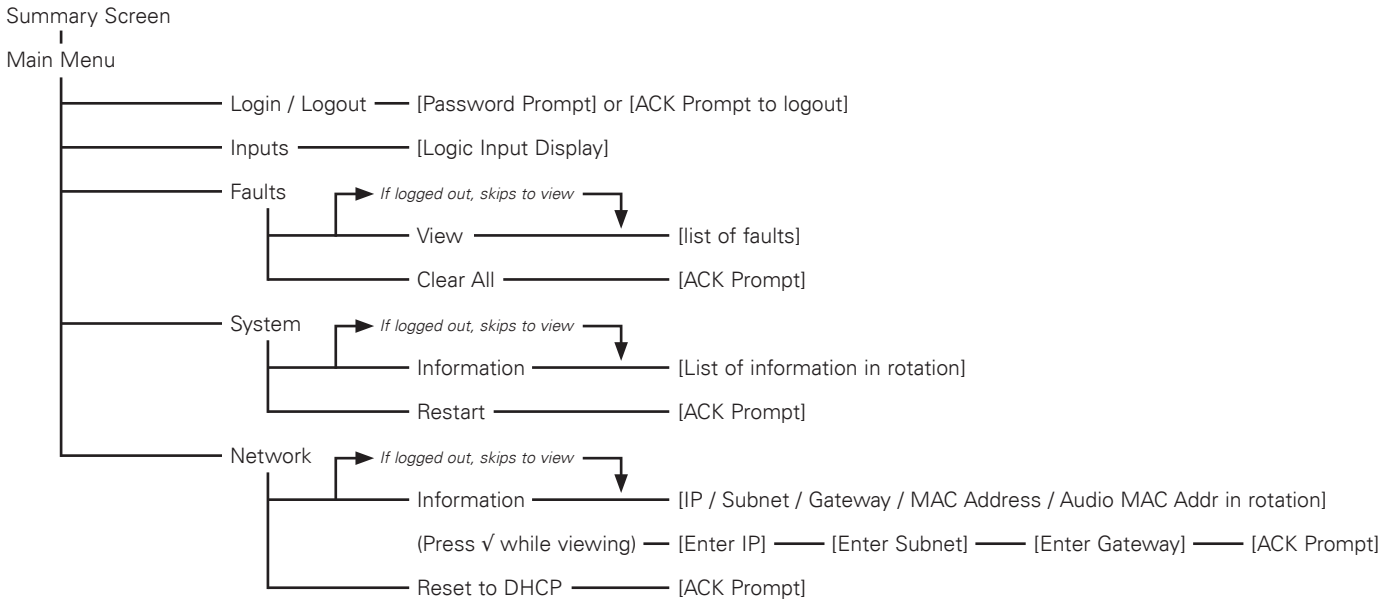
The Summary Screen appears when the menu is not in use. After two minutes of no navigation button activity, the LCD display will automatically return to the Summary Screen. Alternately, canceling out of the top level menu, returns to the Summary Screen. This screen lists any active faults on the T112.

The figure on the following page summarizes the menu tree available on this display. Features in *underline-italics* are only available to users who log in for level 2 access. The summary screen is what is shown when the menu is in its quiescent state. Pressing the select button while the summary screen is displayed moves the display into the top-level menu as shown down the left side of the figure. Pressing the select button at any other level moves one over to the right another step, e.g., to sub-menus or setting options.

An item that shows up frequently in the menu tree is the [ACK Prompt]. This is an acknowledgement prompt. The top line of this prompt is tailored to the operation that is being acknowledged. For example if clearing all faults, then the prompt may appear as below. One acknowledges (confirms) the operation by pressing the green check select button or cancels out by pressing the red X button.



Pressing the select button while the Summary Screen is displayed takes one to the Main Menu, described in the next section, followed by descriptions of the other menus that branch off the Main Menu in the sections that follow. While navigating the menus, the top line always shows the current location in the menu tree (e.g., Main Menu), and the second line shows the current option that will be taken if the Select button is pressed.



**Figure:** LCD Menu Structure

**Main Menu**

On the Main Menu the following options are available to select:

- Login / Logout - This is how access to the Level 2 features is obtained. When not currently logged in this shows Login. Selecting Login will present the user with a login prompt. If logged in, this menu item shows Logout. Selecting Logout will present the user with an acknowledge prompt to logout.
- Faults - Selecting Faults will present the Faults Menu. A Level 1 user will only be able to view faults in each category. A Level 2 user (entered the correct password) will be able to both view and clear faults.
- Inputs - This will display the current state of the logic inputs.
- System - Selecting System will present the System Menu. A Level One user will be able to view system information. A Level 2 user will also be able to reset / shutdown the system.
- Network - Selecting this menu will display the IP Address, Subnet Mask and default Gateway settings of the controller. A Level 2 user can select any of these and go into a sequence of three prompts to edit all three properties.

Since the convention is to show the menu location on the top line and the current option on the second line of the LCD display, when first entering the Main Menu, the display will appear as below. As one presses the down arrow button the second line will change to Faults, System I/O, System and Network with successive presses. One presses the Select button (√) when the desired menu option is displayed on the second line in order to enter that submenu.



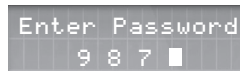
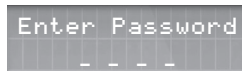
### Login / Logout

This option is used to login for Level 2 access or logout, depending on whether the user is currently logged out or in.

The LCD menu indicates whether currently logged in or not by showing an asterisk (\*) in the top right corner when logged in, e.g.,



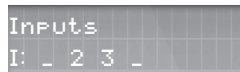
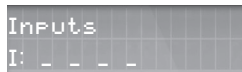
If logging in, the user will be presented with the Enter Password prompt such as shown below left. One selects the first digit of the password by pressing the up (▲) or down (▼) arrows until the correct value is shown. Then, one presses the right arrow button (▶) once to move to the second password digit, and use the up and down arrows to select that digit, etc. until all digits required are filled in. One can use the left arrow button (◀) to back up and correct any earlier digits as necessary. The digit currently being entered will flash between \_ or a number and a full box cursor (█). The example below right shows the first three digits of password entered, and the cursor on the fourth digit. When all digits are entered, the Select button (v) should be pressed to enter the password.



By default, systems ship with a Level 2 password of 7436. This may be used to access the LCD menu and set the unit's IP address to one that is compatible with the network it is on. Once the user accesses the SMC web pages via the unit's IP address, this default password may be changed.

### Inputs Menu

Selecting this menu option leads to a screen that shows the current status of the Logic Inputs of the T112. This brings up a screen such as the one below. If no logic inputs are active (shorted), the screen appears with a row of four dashes. Each dash is a position holder for input 1-4. If an input is active, then the dash in that position changes to the number of the position. For example, the second case at right shows logic inputs 2 and 3 active. The status updates to this display are not instantaneous, but update about every two seconds.

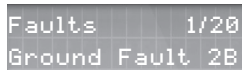


### Fault Menu

On the Fault Menu, the following options are available to select to view / manage the fault list:

- View - View a list of current faults in the system. If the user is logged out, this menu option is skipped and the display immediately goes to the fault list as described below.
- Clear All - [with Level 2 access] Clear all faults in the system. If the fault condition persists, the system will re-discover the faults and re-post them to the fault list. The user must press the Select button (v) when the ACK prompt is displayed before the faults are actually cleared.

When the View option is selected, the user will see the first fault in the list displayed on the second line of the LCD display. The top line will say "Fault n/m" where n is the index of the fault in the list and m is the total number of faults (length of the list). So, in the first example below left, the fault shown on the second line is the first of 20 faults. If there are no faults, then the second line appears as shown in the second example.



### System Menu

On the System Menu, the options that may be selected are:

- Information - View system information which currently consists of up time clock and version information for the various elements of the system. If the user is logged out, this menu option is skipped and the display immediately goes to showing the system information.



- Restart - [with Level 2 access] Reboot (restart) the system, after pressing the Select button (v) again at the ACK prompt.

## Network

On the Network Menu, the options that may be selected are:

- Information - View the IP address, subnet mask, gateway and MAC address of the T112 controller and Audio device. The user is logged out, the display immediately goes to showing the network information. These options appear such as in the examples below.

IP Address	Subnet Mask	Gateway	MAC Address	Audio MAC Addr
10.2.133.185	255.0.0.0	10.0.0.1	001F7B - 0A1193	001dc1 - 0e8ed2

- Reset to DHCP - [with Level 2 access] Clear any fixed IP address information and reset the controller to dynamic addressing, i.e., get its address from a DHCP server residing on the network.

If the user is logged in (has Level 2 access), then pressing the Select button while any of these views are present will go into a trio of edit screens that allow one to change these three settings. The process is the same as for entering the password: one uses the up / down arrows (▲/▼) to select numbers in each position and the left / right arrows (◀/▶) to move forward or backward in the entry. Pressing the Select button (√) moves to the next edit screen until all three are entered. If you do not wish to change an entry, simply hit the Select button on that screen to accept the value shown.

Enter IP	Enter Subnet	Enter Gateway
010.002.133.185	255.000.000.000	010.000.000.001