



# ***AL642UL2ADA*** ***NAC Power Extender***

## ***Installation Guide***

**(See Application Guide for additional information)**



**Overview:**

The Altronix AL642UL2ADA is an extremely cost effective 6.5 amp voltage regulated remote NAC Power Extender. It may be connected to any 12 or 24 volt Fire Alarm Control Panel (FACP). Primary applications include Notification Appliance Circuit (NAC) expansion (supports ADA requirements) and will provide auxiliary power to support system accessories. The unit delivers regulated and filtered 24 or 12 volt power via up to four (4) Class B, four (4) Class A or combination of Class B and Class A Notification Appliance Circuits. Additionally, the unit can supply up to 1 amp from continuous AUX output and up to 1 amp from AC disconnected AUX output. The 6.5 amp rated supply current can be divided between the four (4) outputs for powering notification appliances and the AUX outputs. Each output is rated at 2.5 amp max (total not to exceed 6.5 amp), and can be independently programmed for Steady, Temporal Code 3 or Strobe Synchronization. All outputs may be programmed for Input to Output Follower Mode (output will follow input. i.e. March Time Input, March Time Output). An individual output of 4 amp is achieved by paralleling 2 outputs. In non-alarm condition units provide independent loop supervision for Class A and/or Class B FACP NAC circuits. In the event of a loop trouble the FACP will be notified via steered inputs (input 1 or input 2). In addition, there are common trouble output terminals [NC, C, NO] which are used to indicate general loop/system trouble. A common trouble input is provided for optional NC (normally closed) devices to report trouble to the FACP. Two (2) FACP signaling outputs can be connected to power extender inputs. These inputs can then be directed to control supervision and power delivery to any combination of the four (4) outputs.

**Specifications:****Agency Listings:**

- UL Listed Control Units and Accessories for Fire Alarm Systems (UL 864) and UL Standard for Safety Power Supplies for Fire Protective Signaling Systems (UL 1481).
- MEA - NYC Department of Buildings Approved.
- CSFM - California State Fire Marshal Approved.
- NFPA 72 Compliant.

**Input:**

- Power input 115VAC / 60 Hz, 3.2 amp.
- Two (2) Class A or two (2) Class B FACP input.
- Two (2) NC dry contact trigger inputs.
- Compatible with 12VDC or 24VDC fire panels.

**Output:**

- Class 2 Rated power limited outputs.
- Field selectable 24VDC or 12VDC voltage regulated power limited outputs.
- 24VDC or 12VDC rated @ 6.5 amp max.
- Each loop output rated @ 2.5 amp max.
- Two auxiliary outputs rated at 1 amp each (1 amp continuous and 1 amp AC disconnect).
- Two (2) outputs may be paralleled for more power on an indicating circuit (*see Application Guide*).
- Programmable supervised indicating circuit outputs: Four (4) Class B or Four (4) Class A or Two (2) Class A and Two (2) Class B (*see Application Guide*).
- Filtered and electronically regulated output.

**Battery Backup:**

- Built-in charger for sealed lead acid or gel type batteries.
- Automatic switchover to stand-by battery when AC Fails.
- Zero voltage drop when switching over to battery backup.

**Supervision:**

- AC fail supervision (form "C" contact, 1 amp / 28VDC). Factory set for 1 minute with optional 6 hour delay setting (field selectable).
- Battery presence and low battery supervision (form "C" contact, 1 amp / 28VDC).
- Output loop supervision steered to input 1 or input 2.

**Visual Indicators:**

- Input, output and trouble status LED indicators.

**Special Features:**

- 2-wire horn/strobe Sync mode allows audible notification appliances (horns) to be silenced while visual notification appliances (strobes) continue to operate.
- Input to Output Follower Mode (maintains synchronization of notification appliances circuit).
- Steady Mode, Temporal Code 3.
- Signal circuit trouble memory (helps identify intermittent loop problems).
- Common trouble input and output reporting.
- Ground fault detection.

**Added Features:**

- Unit includes power supply, logic board, enclosure, transformer and battery leads.
- Thermal and short circuit protection with auto reset.

**Enclosure Dimensions:****AL642UL2ADA**

18"H x 14.5"W x 4.5"D

**Product Weight:**

20 lbs.

**Power Supply Specifications:**

<b>AC Input:</b>	115VAC / 3.2 amp @ 60Hz.
<b>Output:</b>	12VDC - 24VDC. Maximum 2.5 amp per output (not to exceed unit total rating of 6.5 amp. Two AUX outputs, (1 amp continuous and 1 amp AC disconnected. Total of 6.5 amp in Alarm Condition ( <i>see note below</i> )).
<b>Battery:</b>	For 12VDC operation use one (1) 12VDC battery. For 24VDC operation use two (2) 12VDC batteries connected in series.
<b>Standby/Alarm Current Consumption:</b>	80mA / 175mA
<b>EOL Resistor (end of line):</b>	2.2K (2200 ohm).

**Stand-by Specifications:**

Stand-by Batteries	Stand-by Time Total Amp/Mins.	Alarm Output Output Current	Aux2 Standby Output Current	Aux2 Alarm Current
24VDC/12AH (use two (2) 12VDC batteries in series)	24 Hours	6.5 amp/15 Mins.	50mA	1 amp
	60 Hours	6.5 amp/5 Mins.	-	1 amp
24VDC/7AH	24 Hours	6.5 amp/5 Mins.	-	1 amp
12VDC/12AH	24 Hours	6.5 amp/15 Mins.	50mA	1 amp
	60 Hours	6.5 amp/5 Mins.	-	1 amp
24VDC/36AH Battery	24 Hours	6.5 amp/15 Mins.	1 amp	1 amp
12VDC/36AH Battery	24 Hours	6.5 amp/15 Mins.	1 amp	1 amp

**Note:** Unit is equipped with two (2) 1 amp max. auxiliary outputs: “AUX1” will automatically disconnect when AC is lost. “AUX2” will remain battery backed up during power outage. For loads connected to “AUX2” please, refer to battery “Stand-by Specifications” above for ratings. When loads are connected to the “AUX1” and or “AUX2” outputs during alarm condition, the remaining outputs may, not exceed 6.5 amp total alarm current. (example: AUX1 = 1 amp, AUX2 = 1 amp, outputs up to 4.5 amp).

**Installation Instructions:**

Wiring methods shall be in accordance with the National Electrical Code/NFPA 70/NFPA 72/ANSI, and with all local codes and authorities having jurisdiction. Product is intended for indoor use only.

1. Mount unit in desired location. Mark and predrill holes in the wall to line up with the top two keyholes in the enclosure. Install two upper fasteners and screws in the wall with the screw heads protruding. Place the enclosure’s upper keyholes over the two upper screws, level and secure. Mark the position of the lower two holes. Remove the enclosure. Drill the lower holes and install the three fasteners. Place the enclosure’s upper keyholes over the two upper screws. Install the two lower screws and make sure to tighten all screws (*Enclosure Dimensions, pg. 10*).  
Secure enclosure to earth ground.

**Carefully review:**

*Application Guide (for AL642UL2ADA, AL842UL2ADA, AL1042UL2ADA)*

*Power Supply and Stand-by Specifications* (pg. 3)

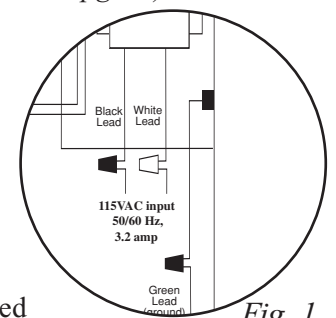
*Output Programming Selection Table* (pg. 4)

*Sync Mode Selection Table* (pg. 4)

*Terminal Identification Table* (pg. 5-6)

*LED Status Indication Table* (pg. 6)

2. Connect green lead to earth ground (*Fig 1*).  
Connect the black and white transformer leads of AL642UL2ADA to a separate unswitched AC circuit (115VAC, 60 Hz) dedicated to the Fire Alarm System.
3. Set switch SW1 on Power Supply Board for desired output voltage. Open for 24VDC (factory set), Close for 12VDC.
4. Measure output voltage before connecting devices. This helps avoid potential damage.
5. Connect battery to terminals marked [+ BAT -] on the Power Supply Board (battery leads included).  
Use two (2) 12VDC batteries connected in series for 24VDC operation.
6. Set output selection switches marked [OUT1 through OUT4] to follow corresponding input [IN1 & IN2] and desired output signal type (*Output Programming Selection Table, pg. 4*).
7. Connect FACP output to desired logic board inputs and notification appliances to desired logic board outputs (*see Application Guide*).



*Fig. 1*

**Note:** The 2-wire horn/strobe sync mode will only synchronize horns, horn strobes and strobes with synchronization capability.

8. For connection of smoke detectors, digital dialer (*Optional Hookup Diagram, pg. 7*).
9. To enable ground fault detection remove insulating washer between the board and stand-off (*Fig. 2, A/B, pg. 7*).
10. Separation of power limited wiring from non-power limited wiring must be at least 1/4".

**Output Programming Selection Table:**

*Outputs must be programmed independently (OUT1 - OUT4)*

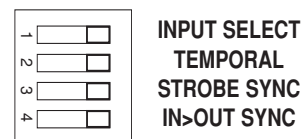
Function	Switch Positions		Descriptions
	ON	OFF	
Input to Output Follower Mode	1	2, 3	Output follows signal it receives from the corresponding input (i.e. FACP Sync module - maintains synchronization of notification appliance circuit ( <i>see note below</i> )).
Temporal Code 3 Mode	3	1, 2	Enables Temporal Code 3 signal generation output. This mode will accept a steady or a pulsing input.
Steady Mode		1, 2, 3	A steady output signal will be generated. This mode will accept steady or pulsing input.

**For the above modes Dip Switch 4 determines which Input controls the corresponding output:**

**Switch 4 in the ON position causes output(s) to be controlled by input 1.**

**Switch 4 in the OFF position causes output(s) to be controlled by input 2.**

**(AL842LGK Board)  
Output Dip Switches**



**Sync Mode Selection Table:**

Function	Switch Positions		Descriptions
	ON	OFF	
Amseco Sync Mode*	1, 3, 4	2	This mode is designed to work with the Amseco series of horns, strobes, and horn/strobes to provide a means of synchronizing the Temporal-coded horns, synchronizing the flash timing of the strobe, and silencing the horns of the horn/strobe combination over a two-wire circuit while leaving strobes active.
Faraday Sync Mode*	2, 4	1, 3	This mode is designed to work with the Faraday series of horns, strobes, and horn/strobes to provide a means of synchronizing the Temporal-coded horns, synchronizing the flash timing of the strobe, and silencing the horns of the horn/strobe combination over a two-wire circuit while leaving strobes active.
Gentex Sync Mode*  <small>Gentex is a registered trademark of Gentex Corporation.</small>	1, 2, 3, 4		This mode is designed to work with the Gentex® Commander GOS and ST/HS series of horns, strobes, and horn/strobes to provide a means of synchronizing the Temporal-coded horns, synchronizing the flash timing of the strobe, and silencing the horns of the horn/strobe combination over a two-wire circuit while leaving strobes active.
System Sensor Sync Mode*  <small>System Sensor is a registered trademark of Honeywell.</small>	1, 2, 4	3	This mode is designed to work with the SpectrAlert™ series of horns, strobes, and horn/strobes to provide a means of synchronizing the Temporal-coded horns, synchronizing the one-second flash timing of the strobe, and silencing the horns of the horn/strobe combination over a two-wire circuit while leaving strobes active.
Wheelock Sync Mode*	2, 3, 4	1	This mode is designed to work with the Wheelock series of horns, strobes, and horn/strobes to provide a means of synchronizing the Temporal-coded horns, synchronizing the one-second flash timing of the strobe, and silencing the horns of the horn/strobe combination over a two-wire circuit while leaving strobes active.

**Note:** The AL642UL2ADA will only synchronize horns, horn strobes and strobes that contain synchronization capability. Contact signal manufacturer for more detailed info. The same synchronization mode must be selected for all outputs.

**\* It is required to control visual notification appliances (strobes) via input 1 [IN1] and audible notification appliances (horns) via input 2 [IN2]. This allows audible notification appliances (horns) to be silenced while visual notification appliances (strobes) continue to operate.**

**Terminal Identification Table:  
AL842LGK Logic Board**

Terminal Legend	Function/Description
IN1+, IN1- IN2+, IN2-	These terminals connect to the 12 or 24VDC FACP notification appliance circuit outputs. (Class A or Class B) Input trigger voltage is 9-30VDC @ 5mA min. Terminal polarity is shown in alarm condition. During an alarm condition these inputs will cause the selected outputs chosen to drive notification appliances. The designated outputs are set by output switches [OUT1 through OUT4] ( <i>Output Programming Selection Table, pg. 4</i> ). A trouble condition on an output loop will cause the corresponding input to trip the FACP by opening the FACP loop. An alarm condition will always override trouble to drive notification appliances.
RET1+, RET1- RET2+, RET2-	For Class A hookups these terminal pairs return to FACP NAC1 and/or NAC2. For Class B hookups the FACP EOL resistor from the NAC1 and/or NAC2 outputs are terminated at these terminals. Optionally, other notification appliances or additional signaling circuit power supplies may be connected to these terminals. If this option is chosen the EOL resistor must be terminated at the last device.
C “DRY1” NC C “DRY2” NC (Dry input trigger)	An open across these inputs, will cause the selected outputs chosen to drive notification appliances. The designated outputs are set by output switches [OUT1 through OUT4] ( <i>Output Programming Selection Table, pg. 4</i> ). Note these inputs are unidirectional and will not report a trouble condition to the FACP.
+ OUT1 - + OUT2 - + OUT3 - + OUT4 -	Notification appliances are connected to these outputs ( <i>see Application Guide, pgs. 2-4</i> ). Each power limited output will supply 2 amp. Two (2) outputs may be connected in parallel for a maximum NAC output capability of 4 amp. Total supply current is 6.5 amp ( <i>see note below</i> ). Outputs are controlled by designated input 1 [IN1] or input 2 [IN2] ( <i>Output Prog. Selection Table, pg. 4</i> ).
+ Loop 1 - + Loop 2 - + Loop 3 - + Loop 4 -	Used for class A hook-ups to terminate loops originating on out 1, out 2, out 3 and out 4 respectively.
C “FAULT” NC (Common trouble input)	An open circuit across this pair of terminals will cause [IN1 and IN2] to simultaneously signal a trouble condition back to the FACP (Typically used to report AC or BAT Fail). ( <i>Fig. 2C, pg. 7</i> ).
NC, C, NO (Common trouble output)	These are dry contact trouble outputs that report any general loop/system trouble conditions. (Typically used to trigger a digital communicator or other reporting device). (form “C” contact 1 amp / 28VDC) ( <i>Fig. 2C, pg. 7</i> ).
- AUX1+	This separate auxiliary output supplies up to 1 amp continuous under normal AC powered conditions. It will be disconnected from its load during AC power failure ( <i>Fig. 2C, pg. 7</i> ).
- AUX2+	This separate 1 amp max. Auxiliary output will provide up to 1 amp stand-by current for 24 hours and up to 1 amp in alarm condition ( <i>Fig. 2, pg. 7</i> ). It supplies up to 1 amp continuous under normal AC powered conditions ( <i>Battery Calculation Worksheet, pg. 9</i> ).

**Note:** Unit is equipped with two (2) 1 amp max. auxiliary outputs: “AUX1” will automatically disconnect when AC is lost. “AUX2” will remain battery backed up during power outage. For loads connected to “AUX2” please, refer to battery “Stand-by Specifications” above for ratings. When loads are connected to the “AUX1” and or “AUX2” outputs during alarm condition, the remaining outputs may, not exceed 6.5 amp total alarm current. (example: AUX1 = 1 amp, AUX2 = 1 amp, outputs up to 4.5 amp).

## Power Supply Board\*

Terminal Legend	Function/Description
AC	Low voltage AC input.
- DC +	12VDC or 24VDC @ 6 amp continuous non-power limited output.
AC FAIL C, NC, NO	Form “C” dry contacts indicate the loss of AC, with AC present terminals marked [NO and C] are open, [NC and C] are closed. When loss of AC occurs terminals marked [NO and C] are closed, [NC and C] are open (Fig. 2, pg. 7).
BAT FAIL NO, NC, C	Form “C” dry contacts indicate low battery voltage or loss of battery voltage. Under normal conditions terminals marked [NO and C] are open, [NC and C] are closed. During a trouble condition terminals marked [NO and C] are closed, and [NC and C] are open (Fig. 2, pg. 7).
+ BAT -	Stand-by battery input (leads provided). Use two (2) 12VDC batteries wired in series for 24VDC operation (Fig. 2C, pg. 7).

### \*Power Board Parameter Specifications:

- AC Fail condition will report approximately thirty (30) seconds after loss of AC. To delay report for 6 hours cut jumper J1 on the Power Supply Board (AC trouble output delay option). If this mode is selected the Power Supply Board must be reset by removing all power to it for 30 seconds.
- Low battery condition will report at approximately 21VDC (24VDC output setting) or approximately 10.5VDC (12VDC output setting).
- Battery presence detection will report within 3 minutes after battery remains undetected (missing or removed). A restored battery will report within thirty (30) seconds.

### LED Status Indication Table: (for inputs, outputs & trouble memory status):

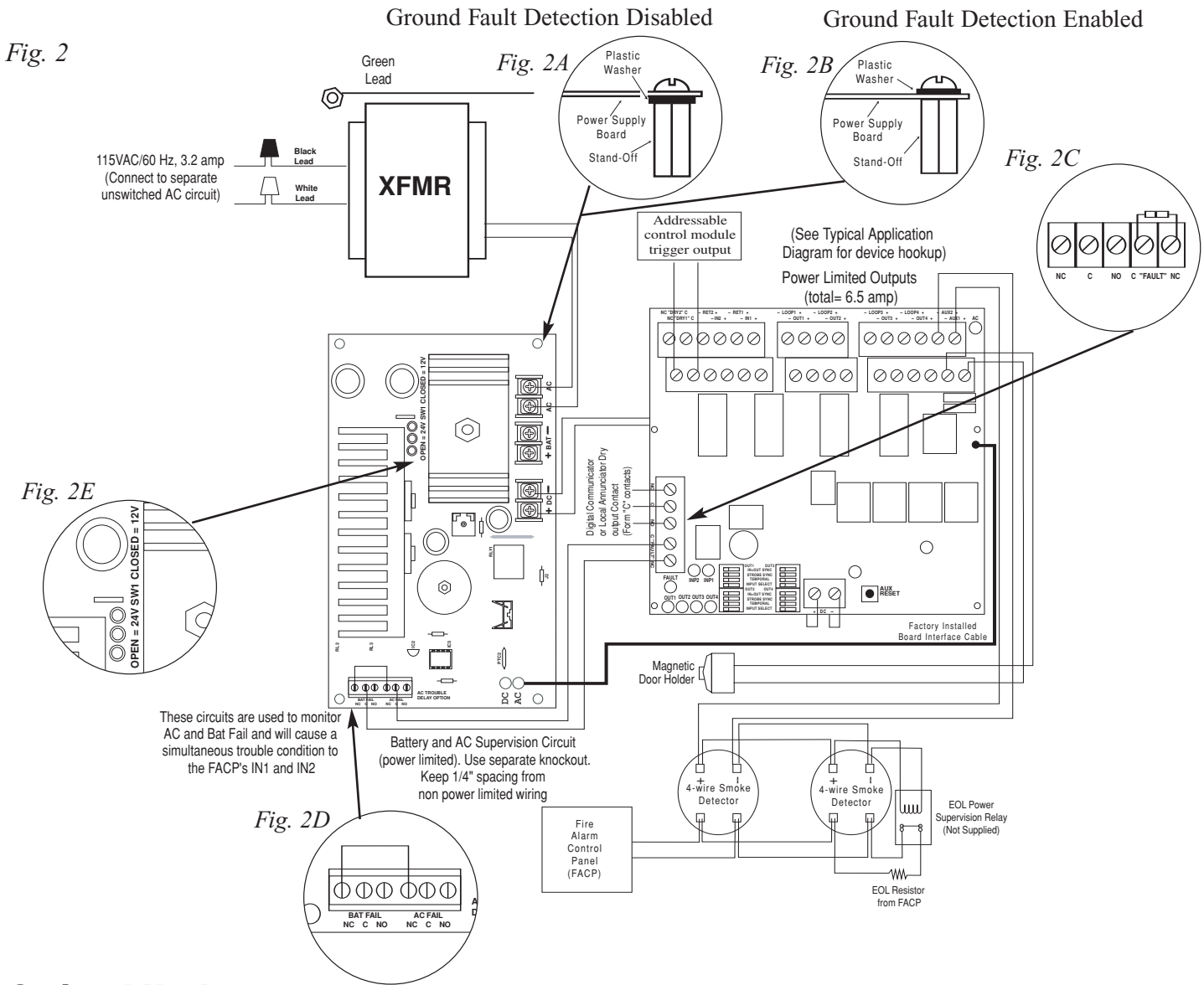
LED	OFF	ON	BLINK (LONG)*	BLINK (SHORT)**
Out 1	Normal	Alarm Condition	Trouble Condition	Trouble Condition Memory
Out 2	Normal	Alarm Condition	Trouble Condition	Trouble Condition Memory
Out 3	Normal	Alarm Condition	Trouble Condition	Trouble Condition Memory
Out 4	Normal	Alarm Condition	Trouble Condition	Trouble Condition Memory
Input 1	Normal	Alarm Condition	Trouble Condition	—
Input 2	Normal	Alarm Condition	Trouble Condition	—
Fault	Normal	System Trouble	—	—
AC	AC Loss	AC present	—	—
DC	No DC Output	DC present	—	—

\* Indicates trouble condition. When trouble (open, short or ground) occurs on a specific output, the corresponding red output LED, [OUT1-OUT4] will blink. The corresponding green input LED will blink as well. Loop trouble will report within 30 seconds.

\*\* Indicates trouble condition memory. When a trouble condition restores, the units red output LED, [OUT1-OUT4] will blink with a shorter and distinctly different duration. The green input LED(s) will be off (normal condition). To reset the memory, depress “Reset Button”. The LED(s) will extinguish.

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

## Optional Hookup Diagram:



### Optional Hookups:

- 1- Battery and AC monitoring: AC or Battery Fail condition will cause the common trouble input [C "FAULT" NC] to report back to the FACP via input 1 and input 2. The common trouble input may also be used for other optional supervisory monitoring.

To report AC and Battery Trouble connect the battery and AC Fail relay output (Fig. 2) to the common trouble input.

- 2- Dry contact input [C "DRY1" NC] [C "DRY2" NC] can be used to alarm output from an addressable module (these inputs are unidirectional and cannot report back to trigger module).

**Note:** If common trouble input, terminals marked [C "FAULT" NC] are not used, these terminals must be shorted (together) to remain inactive. For optional hookups, (Fig. 2).

- 3- Auxiliary outputs provide 12VDC or 24VDC at 1 amp max per output. The output voltage is determined by the setting of switch marked SW1 on the Power Supply Board. (Fig. 2) "AUX1" will be automatically disabled during power failure. (use this for non required backup power) "AUX2" will remain operational during allowable power failure. Refer to stand-by chart for stand-by and alarm current.

**Ground Fault Detect: Factory set disabled (Fig. 2A). To enable ground fault detection remove insulating washer between the board and standoff of the lower right power supply board mounting screw (Fig. 2B).**

## **Maintenance:**

Unit should be tested at least once a year for the proper operation as follows:

**Output Voltage Test:** Under normal load conditions, the DC output voltage should be checked for proper voltage level (*Power Supply Output Specifications Chart*).

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

**Note:** Maximum charging current is 700mA.

**Note:** Expected battery life is 5 years, however it is recommended changing batteries in 4 years or less if needed.

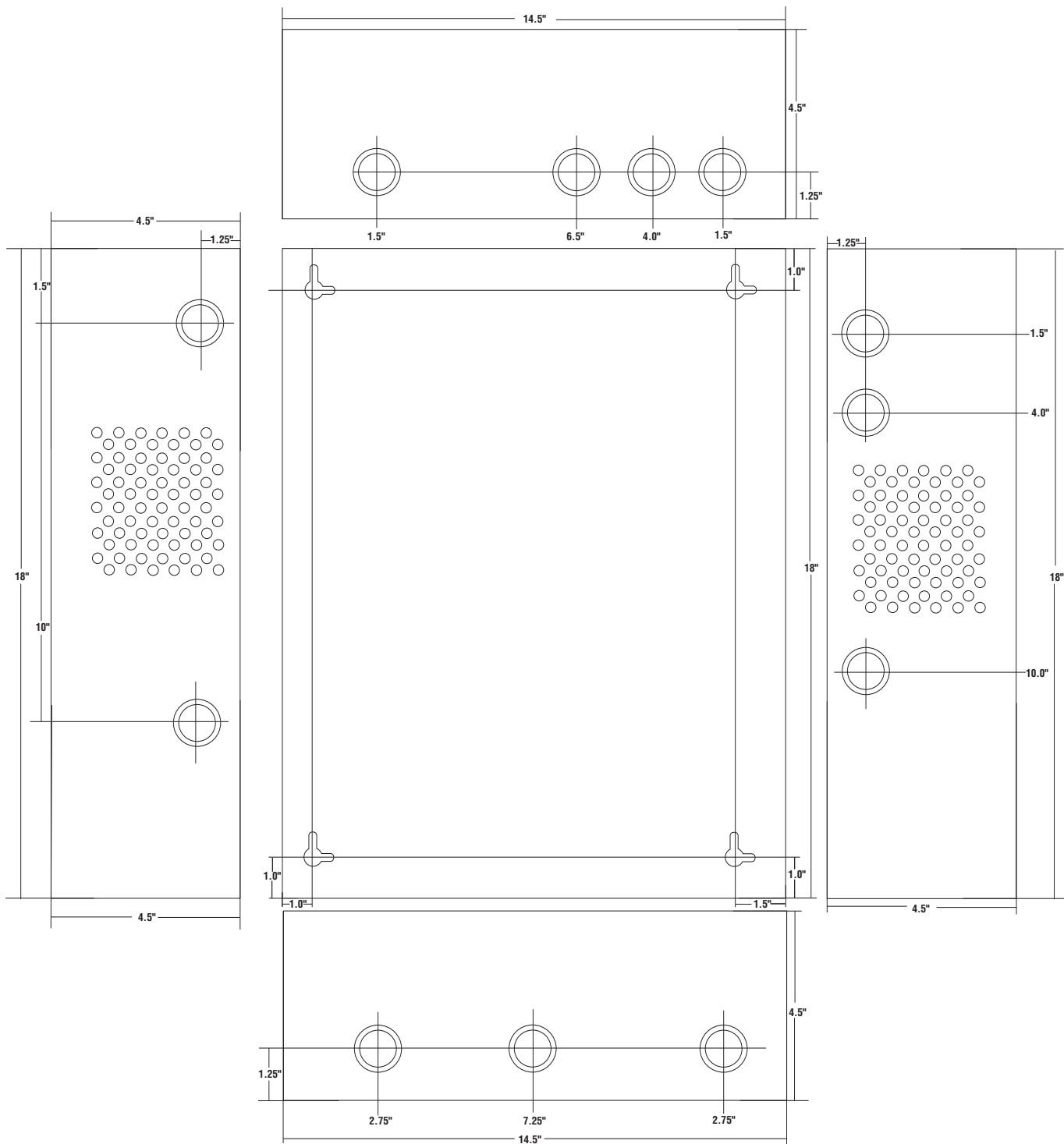
### Battery Calculation Worksheet

Device	Number of Devices	Current per Device		Stand-by Current	Alarm Current
For each device use this formula:	This column	x	This column	=	Equals
AL642UL2ADA (Current draw from battery)	1	Stand-by:	80mA	80mA	
		Alarm:	175mA		175mA
<b>AL642 Current</b>				80mA	175mA
Auxiliary Devices/AUX2		Refer to device manual for current ratings.			
		Alarm/Stand-by	mA	mA	mA
		Alarm/Stand-by	mA	mA	mA
		Alarm/Stand-by	mA	mA	mA
		Alarm/Stand-by	mA	mA	mA
AUX2 Total					
Auxiliary Devices/AUX1		Alarm/Stand-by	mA	0mA	
				0mA	
				0mA	
				0mA	
AUX1 Total					
<b>Auxiliary Devices Current (must not exceed 1 amp)</b>					
Notification appliances		Refer to device manual for current ratings.			
		Alarm:	mA	0mA	mA
		Alarm:	mA	0mA	mA
		Alarm:	mA	0mA	mA
		Alarm:	mA	0mA	mA
Notification Appliances Current must not exceed 6.5 amp (6500mA)				0mA	mA
D Total alarm current				mA	mA
E Total current ratings converted to amperes (line D x .001)				A	A
F Number of standby hours (24 or 60 for NFPA 72, Chapter 1, 1-5.2.5).				H	
G Multiply lines E and F.		Total stand-by AH		AH	
H Alarm sounding period in hours. (For example, 5 minutes = .0833 hours.)					H
I Multiply lines E and H.		Total alarm AH			AH
J Add lines G and I.		Total stand-by and alarm AH		AH	
K Multiply line J by 1.3. (30% extra insurance to meet desired performance) Total ampere - hours required				AH	

Units are capable of recharging 36 AH battery max. If total ampere - hour required exceeds 27 AH, decrease AUX current to provide enough stand-by time for the application.

# Enclosure Dimensions:

18"H x 14.5"W x 4.5"D



**Notes:**

## **Notes:**

Altronix is not responsible for any typographical errors.

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IAL642UL2ADA D19G



**MEMBER**

AL642UL2ADA