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AV-PALC-01

Pilot Activated Lighting Control
Installation & Service Manual

Version 1.0 (Rev F)

Version No.	Description	Date	Approved
1.0	Manual launch	May 2012	S. Turner

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Introduction

Congratulations! By choosing to purchase an Avlite light, you have become the owner of one of the most advanced solar LED airfield lights in the world.

Avlite Systems draws on more than 25 years experience in the design and manufacture of navigation aids, and particular care has been taken to ensure your light gives years of trouble free service.

As a commitment to producing the highest quality products for our customers, Avlite has been independently certified as complying with the requirements of ISO 9001:2008 quality management system.

By taking a few moments to browse through this booklet, you will become familiar with the versatility of your light, and be able to maximise its operating function.

Please remember to complete the Avlite warranty registration card accompanying your light.

Technology

Avlite Systems is a world-class solar lighting systems manufacturer with a proven reputation for rapid, innovative, and agile technology solutions designed specifically for defense, government, civil and humanitarian aid operations in the most remote, toughest environments.

Electronics
Avlite employs leading in-house electronic engineers in the design and development of software and related circuitry. All individual electronic components are sourced directly by Avlite procurement staff ensuring that only the highest quality components are used in our products.

LED Technology
All aviation lights use the latest advancements in LED (Light Emitting Diode) technology as a light source. The major advantage of LEDs over traditional light sources is well established in that they typically have an operational life in excess of 100,000 hours, resulting in substantial savings to maintenance and servicing costs.

Precision Construction
Commitment to investing in the design and construction of injection-moulded parts including optic lenses, light bases and a range of other components ensures that all Avlite products are of a consistent and superior quality.

Optical Performance
Avlite manufactures a range of aviation LED lenses moulded from multi-cavity dies. The company has superior in-house lens manufacturing capabilities to support outstanding optical performance.

Award-winning, Patented Technology
Several United States and Australian patent registrations are held on Avlite's range of innovative designs, with other regional patents pending in Canada, United Kingdom and Europe.

Safety Notice

Important

1. Dangerous voltages are present in airfield lighting equipment and only qualified personnel should service or install airfield lighting equipment.
2. Always read and understand the entire installation manual prior to connecting the radio receiver to any equipment. Comply with limitations of load and maximum current contained in this manual. Always follow all local electrical safety codes for the installation of this equipment.

Removing power from the radio receiver may not always remove control power from the device…always follow appropriate lock out and tag out procedures whenever servicing the radio receiver or associated control equipment.

AV-PALC-01

The Avlite Pilot Activated Lighting Control (PALC) has been integrated with the Avlite 2.4 GHz RF wireless network to allow approaching aircraft to activate Avlite's solar lighting on airfields and helipads. The Avlite PALC is ideal for solar lighting applications. The energy stored in the light is used only as needed increasing the overall autonomy of each light.

This lighting control system is specifically designed for use at airfields and helipads where Avlite's solar lighting is installed and on demand lighting is desired. The PALC allows the solar lighting to be off and commanded on only when needed by approaching aircraft. The system is set to a user specified field adjustable time-out period in order to extinguish the lights automatically after landing.

SPECIFICATIONS • *	AV-PALC-01-12	AV-PALC-01-24	AV-PALC-01-UM
	12VDC	24VDC	120–250VAC
General Characteristics			
Frequency	Field tuneable 118 – 136MHz	Field tuneable 118 – 136MHz	Field tuneable 118 – 136MHz
Intensity Adjustments	3 step	3 step	3 step
Time out Adjustments	4	4	4
Electrical Characteristics			
Voltage Nominal	12VDC	24VDC	90–264VAC
Current Draw Active (mA)	275	61	100
Current Draw Standby (mA)	155	59	88
Current Draw 100w Heater On (mA)	N/A	N/A	1400
Circuit protection	CB 10Amp	CB 10Amp	CB 10Amp
Operating Temperature	-20 to 55°C	-20 to 55°C	-55 to 55°C
Optional Solar Characteristics			
Solar Module Type	Multicrystaline	N/A	N/A
Output (watts)	90	N/A	N/A
Solar Module Efficiancy (%)	14	N/A	N/A
Charging Regulation		N/A	N/A
Optional Power Supply			
Battery Type	SLA (Sealed Lead Acid)	N/A	N/A
Battery Capacity (Ah)	80	N/A	N/A
Nominal Voltage (VDC)	12	N/A	N/A
Autonomy @ 5 x 30 minute activations and 80Ahr Battery	Up to 20 days	N/A	N/A
Physical Characteristics			
Body Material	Powder Coated Steel	Powder Coated Steel	Powder Coated Steel
Mounting	Wall Mount 4 x 10mm (⅜ inch) holes, 448 x 360mm (17¾ x 14¼ inches)	Wall Mount 4 x 10mm (⅜ inch) holes, 448 x 360mm (17¾ x 14¼ inches)	Wall Mount 4 x 10mm (⅜ inch) holes, 448 x 360mm (17¾ x 14¼ inches)
Height (mm/inches)	485 / 19	485 / 19	485 / 19
Width (mm/inches)	405 / 16	405 / 16	405 / 16
Depth (mm/inches)	320 / 12½	320 / 12½	320 / 12½
Mass (kg/lbs)	23 / 50	23 / 50	25 / 55
Product Life Expectancy	Up to 10 years	Up to 10 years	Up to 10 years
Certifications			
FAA	Complies to L-854 Radio Control Equipment	Complies to L-854 Radio Control Equipment	Certified to L-854 Radio Control Equipment
Quality Assurance	ISO9001:2008	ISO9001:2008	ISO9001:2008
Waterproof	NEMA 4	NEMA 4	NEMA 4
Intellectual Property			
Trademarks	AVLITE® is a registered trademark of Avlite Systems	AVLITE® is a registered trademark of Avlite Systems	AVLITE® is a registered trademark of Avlite Systems
Warranty *	1 year warranty	1 year warranty	1 year warranty
Options Available	• Solar power supply (12VDC only)		

• Specifications subject to change or variation without notice
* Subject to standard terms and conditions
† Intensity setting subject to solar availability

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Section 1: L-854 Introduction

Operators Notice:

Read the entire manual prior to installing or operating this equipment. Avlite Systems assumes no liability for installation, use or modifications completed by the installer.

Overview:

1. The L-854 is an air to ground radio receiver/decoder designed to reliably control airfield lighting over a preset VHF frequency by closing one of four single pole double throw dry contact relays in response to the “clicks” counted (3, 5 or 7) in a 5 second period. The controller has a selectable timeout feature of 1, 15, 30 and 60 minutes and will maintain the pilot commanded state until the preset timeout has expired or a new command set is received. An integrated heater is provided to allow operations in subzero environments.
2. This radio receiver is capable of a wide range of operating voltages from 12VDC, 24VDC or 90-264VAC, 60 or 50 Hz with no modifications through the use of a switching power supply. All input power is fused using a secondary panel mounted inline 5A fuse. Radio power, including the integrated heater, is controlled via a single on/off toggle switch on the face plate (see Figure 6).
3. This unique configuration allows the AV-PALC-01 to control a myriad of Avlite solar airfield equipment directly without any additional relay panels or logic boards.

Important Information:

1. **Read the entire manual before installing or operating!**
2. Avlite Systems reserves the right to revise the contents of this manual at any time.
3. Only qualified personnel should install, maintain and repair airfield electrical equipment and the equipment should only be utilized as designed. Field modifications will void all warrantees and may result in equipment damage, serious injury or death.
4. Follow all state, local and federal building and safety codes when installing or servicing this equipment. Always follow lock out and tag out procedures whenever working around or on airfield electrical equipment. Lethal voltages are present; removing radio power may not remove all control power to associated equipment. The radio is not intended to function as an electrical lock out.
5. Always ensure all equipment is properly grounded, appropriately fused and all antenna lines have the provided surge suppressors properly installed.

Equipment Orientation

Figure 1. Radio Layout

Section 2: L-854 Cabinet & Antenna Installation

Site Selection:

1. Radio control equipment should be located as close as possible to the antenna and secured to a sturdy structure. All antenna cabling should be routed in a conduit by itself, away from power and control wiring which may induce unintended radio signals through the cabling. Cable distances in excess of 75' induce high losses and reduce radio performance and thus should be avoided.
2. All mounting positions must have a power source (solar, AC or DC) and earth ground available. Grounding the unit to existing conduit or other devices may induce unwanted electrical interference and will not meet surge arrestor requirements. **ALWAYS use a primary earth ground.**

Indoor Cabinet Mounting / Conduit Entry:

The radio receiver is housed inside a NEMA 12/4 enclosure of the highest quality. Utilize all mounting holes for a secure wall mount.

1. Temporarily place the unit on the wall in the desired location and level the enclosure.
2. Mark locations for the four mounting holes.
3. Remove the enclosure and set aside.
4. Drill four holes in the pre-marked locations and install appropriate anchoring hardware.
5. Install the anchors in the wall.
6. Secure Radio to wall or other surface, in desired location.
7. Plumb electrical conduits as required using a separate conduit run for antenna cabling away from all other electrical cables to avoid interference. Avoid penetrating the top of the enclosure if you wish to maintain the NEMA 4 rating of the enclosure!

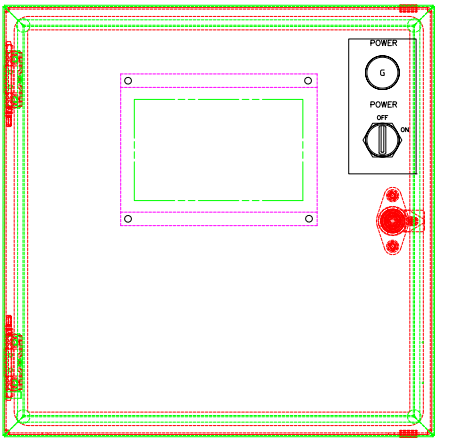
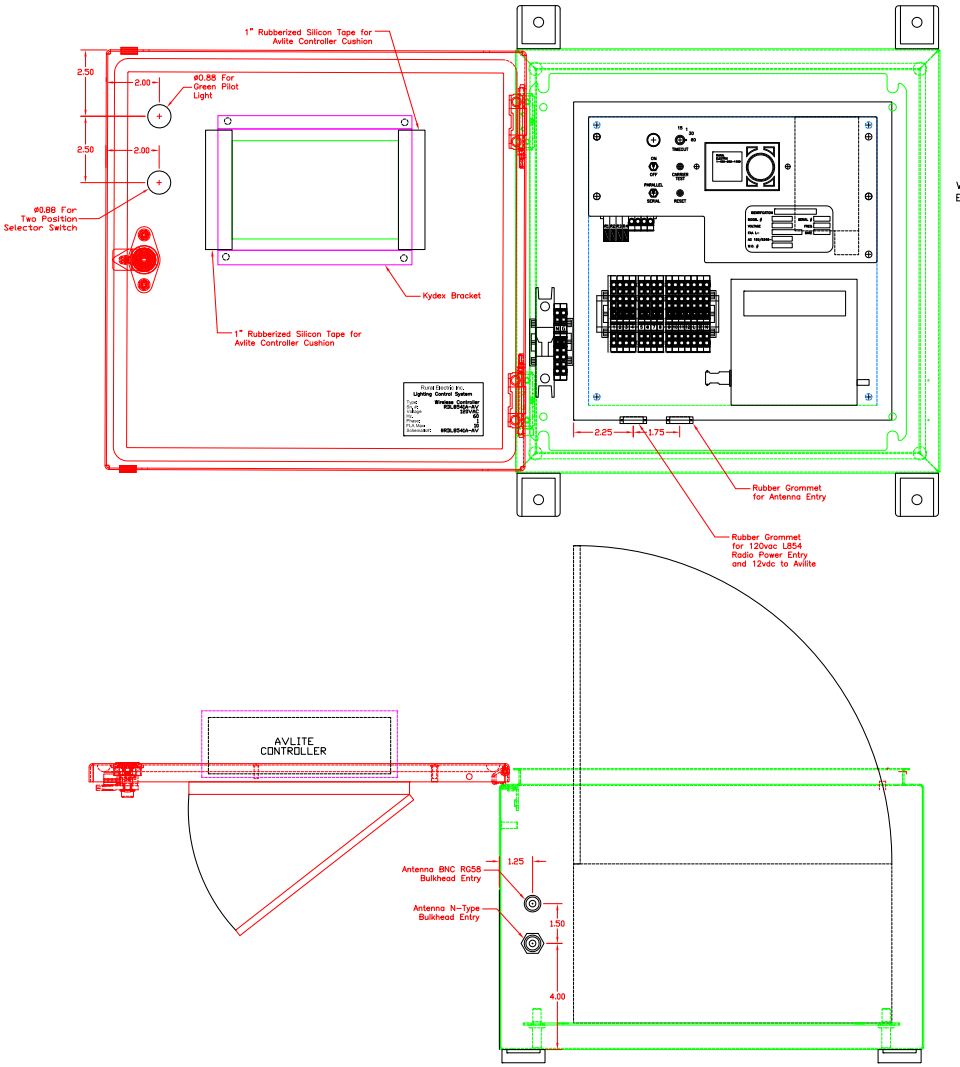


Figure 2. Cabinet Mounting


1" Rubberized Silicon Tape for Avlite Controller Cushion
2.50
2.00
ø0.88 For Green Pilot Light
2.50
2.00
ø0.88 For Two Position Selector Switch
Kydex Bracket
1" Rubberized Silicon Tape for Avlite Controller Cushion
WIEW WITH L854 ENCLOSURE DOOR OPEN
2.25
1.75
Rubber Grommet for Antenna Entry
Rubber Grommet for 120vac L854 Radio Power Entry and 12vdc to Avlite
AVLITE CONTROLLER
Antenna BNC RG58 Bulkhead Entry
Antenna N-Type Bulkhead Entry
1.25
1.50
4.00

Antenna Connections:

Any suitable air band antenna may be used with the L-854 receiver / decoder using these general procedures:

1. Ensure all antenna wiring is routed away from power and control cabling that may introduce noise and unwanted operations.
2. All antennas must have a lightning arrestor placed in line with the antenna cabling, preferably immediately below the antenna with a direct earth ground attached.
3. Antenna locations should be selected to allow line of sight to transmitting radios, either from the ground or air as appropriate. Failure to achieve line of sight to the antenna will create inconsistent control results.
4. Avoid grounding the antenna against a structure or other object. The antenna must stand in free space clear of vegetation, building materials or other items that may create a path to ground and lower antenna gain.
5. For Air to Ground communication, utilize a BNC connector to connect with the receiver plug located in the L-854 cabinet.
6. For PALC to solar lighting, utilize a SMA connector to connect the reciever plug location on the L-854 cabinet.
7. Connections are critical to efficient radio operations; avoid modifying the factory connectors on the radio or antennas.

If you are using the provided antenna please refer to the L-854 Antenna Information and Kit Installation Instructions in Appendix E of this manual.

Section 3: Wiring Connections

This section describes the required connections to place your L-854 Receiver/Decoder into service. These instructions assume the technician is familiar with airfield regulator control wiring and is not intended to replace a thorough review of technical documentation for all connected equipment. If you are unsure of any connections do not proceed!

Terminal Strips:

All field power connections are made using cage clamp style terminal blocks, see Figure 3. Additional terminal block entry points are provided for jumpers and field connections. Wire connections to these terminal blocks are made as follows

1. Strip the wire approximately 3/8" (9-10mm). Wire gauges from 12AWG-28AWG are suitable, either stranded or solid.
2. To open the terminal strip place a small flat blade screwdriver into the square opening and firmly push down. A spring cage clamp will open and the wire should easily move in or out of the receptacle.
3. To secure the wire remove the flat blade screwdriver.
4. Test each connection by gently pulling the wire.
5. To remove a wire simply reinsert the screwdriver and release the cage clamp. Terminals may be opened and closed an unlimited number of times.

Power Source Connections—Powering the Radio (AC Power):

Choose a suitable power source with a primary interrupt breaker or fuse. Any source from 90V to 264V AC, 50-60 Hz may be connected. Make the following connections: (see figure 3)

1. Line in to terminal "L"
2. Neutral to terminal "N"
3. Earth Ground to terminal "GND". Ensure that you use a dedicated ground conductor to a ground bus. Do not rely on conduit grounds or grounds that run through equipment generating substantial electrical noise.

Power Source Connections—Powering the Radio (DC Power):

Choose a suitable DC power source or solar power supply with a primary interrupt breaker or fuse. 12VDC or 24VDC depending on the model ordered.

1. 12VDC Positive to "+"
2. 12VDC Negatiive to "-"
3. Earth ground to terminal "GND". Ensure that you use a dedicated ground conductor to a ground bus. Do not rely on conduit grounds or grounds that run through equipment generating substantial electrical noise.

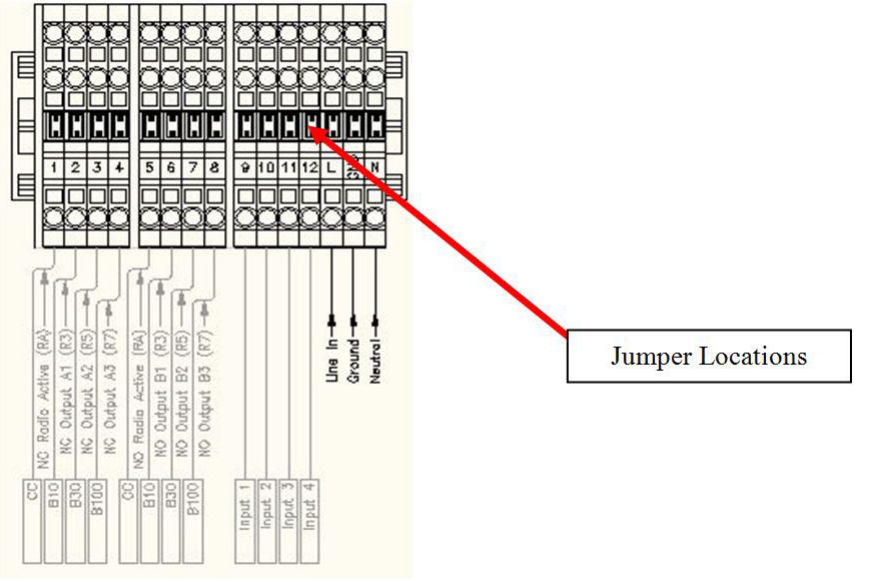


Figure 3. Power Connections

Section 4: Controls & Indicators

Operating Controls:

The radio is configured with a raised faceplate where all controls and indicators are positioned as depicted in Figure 6. Each labeled item is described below:

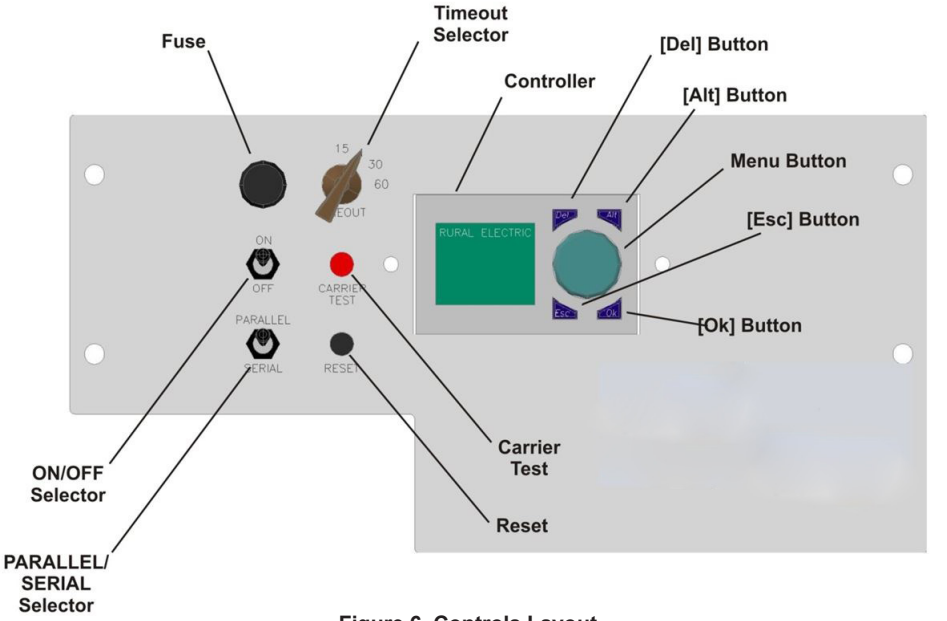


Figure 6. Controls Layout

Fuse:

A single 5A, 250V inline fuse is provided for supplementary protection of all components.

On / Off Selector:

This SPST switch removes all power from the receiver, encoder and heater assembly.

Parallel / Serial Selector:

This two position switch will place the radio outputs either in Serial (singular) or Parallel (cumulative) mode. See *Table 1: Relay Outputs* for a complete functional description.

Timeout Selector:

This rotary selector switch is used to vary the timeout of radio outputs. A 15 minute standard timeout is default in the 12 o'clock position with selectable values of 1, 30, and 60 minutes for unique site requirements. Changing this switch while a current timing scheme is underway will have no effect until the new radio input is received at which time the newly selected time will be used by the processor. A text display and timer countdown will appear in the controller display to show both the selected timeout as well as present time elapsed in that period.

Carrier Test Pushbutton:

This momentary contact pushbutton is designed to simulate the reception of a “click” on the tuned frequency. The words “Carrier Detect” will appear in the controller display whenever this pushbutton is used.

Reset Pushbutton:

Depressing the reset pushbutton will reset any active timing scheme underway, de-energize all relays, and clear the carrier detect count cycle. This is normally a maintenance function for troubleshooting purposes only. Using this button while the radio is in service will cancel any pilot commanded light settings...use caution!

Controller Display:

The controller display is used to pass information on the operating status of the radio receiver. The following messages are displayed

1. “Rural Electric 480 984-1488”—Default message when the controller is powered up and idle
2. “Carrier Detect” – Either the carrier test button was depressed or a valid “click” was detected. This message is displayed for a minimum of 300 milliseconds after the detection to aid operator viewing so individual clicks of a duration shorter than 300 milliseconds will result in “carrier detect” remaining in view steady.
3. “XX: XX” countdown timer appears whenever a valid series of clicks has been received and the decoder is executing the programmed timeout scheme. Directly below the countdown timer the programmed timeout is displayed. The fidelity of the countdown timer varies with the timeout setting
4. 1 Minute timeouts use a seconds and decimal seconds display
5. 15-60 Minute timeouts use a minutes and seconds display

Delete / Alt / Menu / OK / Esc Buttons:

These buttons are used during programming and factory maintenance. They are locked out during normal field use.

Relay Active Lights (not shown):

Each of the four output relays will illuminate when the output coil is energized. The relays are arranged from left to right as RA, R3, R5 and R7. Each relay has a normally open (NO) and normally closed (NC) contact sharing a common input. Energizing the relay will open the NC contact and close the NO contact.

Component Layout:

Figure 7 depicts the internal component connections within the L-854 receiver. Internal components connections are coupled using detachable connectors to aid in field service.

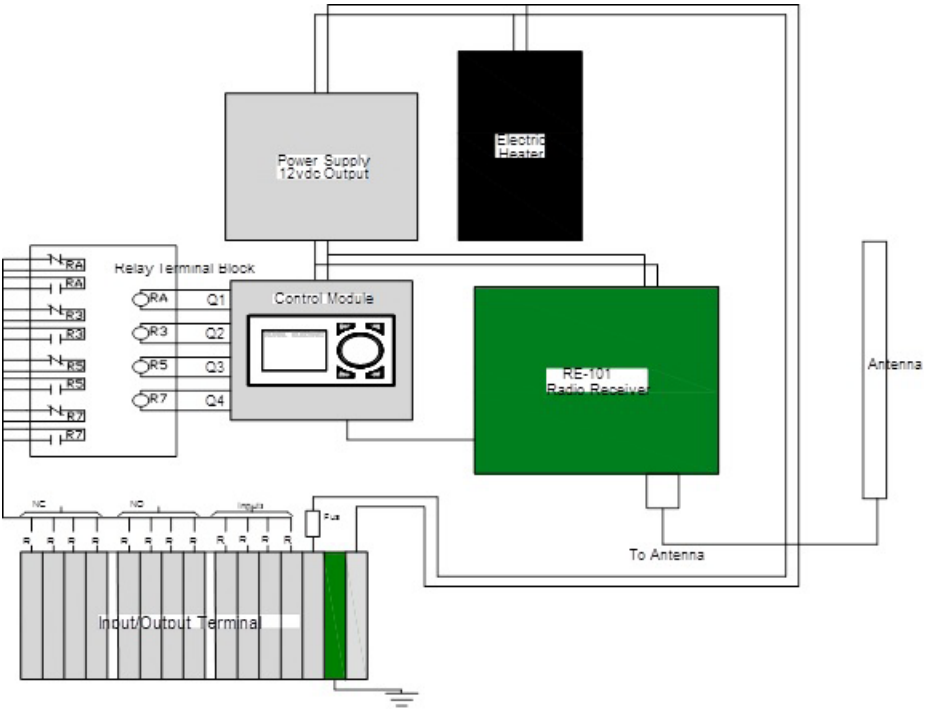


Figure 7. Component Layout Radio

Section 5: Trouble Shooting & Repair Radio

Quick Solutions Guide:

No power to controller display:

The controller display should always show some text, lack of a controller display is indicative of a power input problem or controller failure:

1. Check power inputs at each terminal strip for proper line and neutral orientation, repair as necessary.
2. Verify power switch is on.
3. Verify fuse continuity by removing the fuse from the canister (remove power first), repair as necessary.
4. Verify 12V power at the "+ "and"-"terminals beside relay R7. If DC power is present but still no display suspect controller failure.

Relays do not cycle with radio commands:

Relay cycling can be confirmed by viewing the output indicating lights atop each relay:

1. Confirm power to the controller display above, correct as necessary.
2. Confirm click count is > 3 in a 5 second period, correct as necessary.
3. Cycle "Carrier Test" and verify text appears in controller display, if no response from the carrier test but controller has a display suspect a controller or wiring failure.
4. If relays cycle normally using carrier test move on to "Verifying Radio Receiver Operations"

Verifying Radio Receiver Operations:

Either an appropriately tuned handheld radio or signal generator may be used to test for receiver operation:

1. Confirm power and relay cycling as listed above, correct power problems as necessary.
2. Confirm the receiver frequency matches the transmitter frequency. Correct as necessary, refer to Addendum A at the end of this manual for detailed instruction.
3. Remove the BNC connection at the small metal receiver box.
4. Verify the antenna cable has an "Open" circuit, between the Center Conductor (of the cable) and Shield (shell of the BNC connector). If a short is indicated investigate the cable, cable connectors, antenna mount method and lightning arrestor for the source of the short. Correct as necessary.
5. Using an appropriately tuned handheld radio near the open BNC connector, cycle the transmitter and observe for carrier detect. Alternatively connect a signal generator to the BNC connector and at 5 µV input signal and verify carrier detect on the controller screen. If no carrier detect and the appropriate frequency is used, suspect receiver failure.

CCR does not cycle with radio commands:

1. Verify CCR is in “Remote”, field wiring is correct per manufacturer and CCR is powered on. Correct as necessary.
2. Verify relays cycle with radio commands as listed above.
3. Verify intended input voltage is present at each relay input terminal strip, correct as necessary.
4. Verify output voltage is present at the output terminals to each CCR. If correct voltage is present problem exists in the regulator or regulator control wiring. If no output voltage exists...
5. Remove all relay input power connections and validate relay closure with ohmmeter between the input and NO contacts. If relay cycles but contacts do not close replace removable relay modules.

Replacing relay modules:

1. Remove control power and radio power sources.
2. Loosen the cover plate retaining screws (4) and cover plate.
3. Remove the faulty module by pressing the small release tab up while gently pulling the module out.
4. Insert a replacement module, depress until it “clicks” into place.
5. Replace the cover plate retaining screws (4) and cover plate.

Section 6: Maintenance Radio

Your AV-PALC-00 is a robust piece of equipment designed for harsh environments but, like any electronic device it should be routinely inspected for environmental conditions that may cause failures. Follow these guidelines to help prevent issues-

Annually:

1. Inspect the enclosure housing for evidence of dust or water penetration. Repair gaskets or conduit entries as required.
2. Cycle relays to confirm proper operation.
3. Inspect control wiring for failing insulation, open conductors or other wiring flaws.
4. Always leave the enclosure door closed for peak performance and environmental protection. Subjecting the interior components to environmental conditions by leaving the door open may void the warranty.

Section 7: Theory of Operation

L-854 General Components:

Your AV-PALC-01 radio receiver is a complete kit featuring (1) radio receiver, (1) antenna with mounting bracket, 20' RG58U coax cable terminated with BNC connectors, and (1) VHF lightning suppressor. No mast or other mounting hardware is provided.

L-854 Operation:

1. Major radio receiver subcomponents include the RE101 receiver, RE L12DWD controller; RE-TLD switched power supply, relays, terminal blocks and cabinet heater. Power inputs are made at the terminal block (see Figure 3) using any voltage source from 90-264Vac (50 or 60 Hz). A single on/off switch controls power to all receiver components and is supplementary protected by a 5A inline fuse.
2. When in operation the receiver awaits a squelch break on the tuned VHF frequency and begins counting "clicks" in a 5 second period to determine pilot intent. If the radio is keyed 3, 5, or 7 times the controller will process the click count and energize relay coils RA, R3, R5 and R7 depending upon the setting of the serial / parallel selector switch (see Figure 6 and Table 1). The pilot commanded output is held by the controller for a predetermined time interval (FAA standard is 15 minutes) that is adjustable by using the timeout selector knob (see Figure 6) to 15, 1, 30 or 60 minutes.
3. It is important to understand that the 5 second click count period begins upon receipt of the first squelch break and the control sequence will respond to the click counts from 3, 5, 7 and stop. As an example, cycling the microphone button rapidly 12 times in 5 seconds will command 3, 5 and 7. Similarly, slowly clicking 7 times may result in the 5 second timing period expiring prior to getting to the 7th input click.
4. After the expiration of the preset timeout the radio will reset itself to the idle state and await further inputs. Anytime during the timeout period the radio is capable of receiving additional commands and will begin another timeout period at the newly commanded state immediately. The ground operator may reset the radio at any time by either cycling the power switch or depressing the reset button.
5. Operator interfaces and maintenance controls are provided via the faceplate for selecting timeout length, operating mode, simulating radio reception and resetting control inputs. Detailed descriptions of these controls are provided in section 4.

Section 8: 118–136MHz Tuning & Squelch Guide

This L-854 has a receiver which is 100% field tunable throughout the airband, 118-136MHz, in .025MHz increments.

The unit is shipped from the factory set to 122.800MHz unless a different frequency is requested at the time of order. This frequency will be noted on a white label attached to the clear receiver faceplate.

To verify the frequency setting of your unit, or to change the desired frequency of operation, refer to *Tables: 3a-d DIP Switch Settings*.

NOTE THAT “0” ON THE CHARTS MEANS THE SWITCH IS “OFF” OR DOWN, AND THAT “1” MEANS THE SWITCH IS “ON”, OR UP.

Squelch is set to an optimum level at the factory. Should it be necessary to adjust the squelch, use the instructions & *Table 2: Squelch Settings*

IMPORTANT NOTE: NEVER ADJUST SWITCHES WITH THE POWER ON. TURN THE POWER SWITCH ON THE FRONT PANEL OFF BEFORE MAKING ANY CHANGES TO FREQUENCY OR SQUELCH SETTINGS!

1. DIP Switches:

The operating frequency and squelch (sensitivity) is set via DIP switches located on the receiver. Figure 8 shows the location and numbering for the switches and the Carrier Detect LED indicator.

SW1 (1-8), and SW2 (1-4) adjust the receiver's frequency. Refer to *Tables: 3a-d DIP Switch Settings* to find the correct switch settings for your particular frequency. The switches are set according to binary code and begin with SW1-1 as the least significant digit, increasing to the right with SW2-4 as the most significant digit. Refer to page 28 for SW2 (5-7) adjust the squelch. SW2-8 (Marked "X" on faceplate) is for factory use only and is inactive in normal operation. It should be left in the OFF position.

When you have the switches set according to the charts, test operation with a handheld or nearby mobile transmitter:

Turn the power switch of the L-854 to ON.

Set the transmitter to the correct frequency and press and hold the transmit button.

You should see the decoder display show "CARRIER DETECT" and the Red Carrier Detect LED on the Receiver Board will be energized (see Figure 8). This indicates that the receiver is operating on the correct frequency and receiving signals.

Providing you see the "CARRIER DETECT" display you can now test the decoder operation using short clicks of the transmitter.

If you don't see the display change, push the "CARRIER TEST" button on the front panel. You should see the display indicate "CARRIER TEST". If this is the case turn the unit OFF and check the frequency switch settings again.

If the frequency settings are correct and pushing the transmitter button doesn't show the "CARRIER DETECT" display, the squelch setting should be checked:

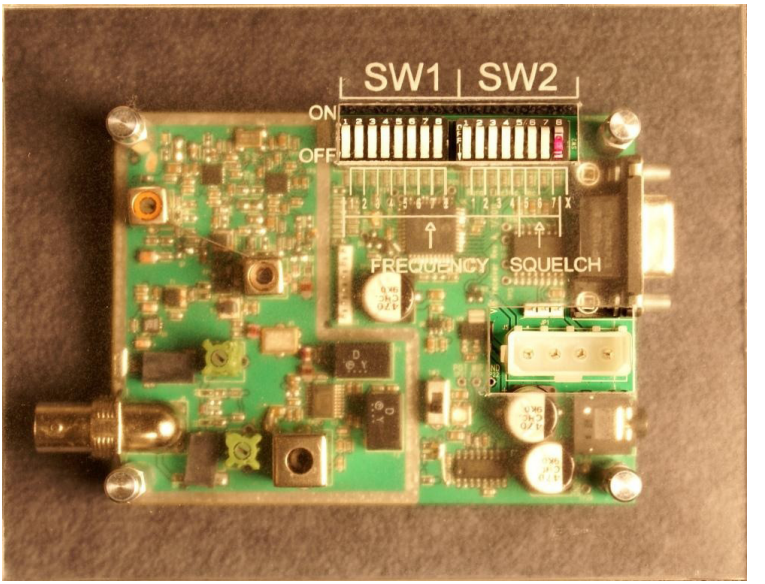


Figure 8. DIP Switch Locations (Frequency & Squelch)

2. Squelch Control:

SW2 5-7 adjust the squelch. The squelch will ship from the factory set at the optimum level. It is possible to increase or decrease the sensitivity as shown here:

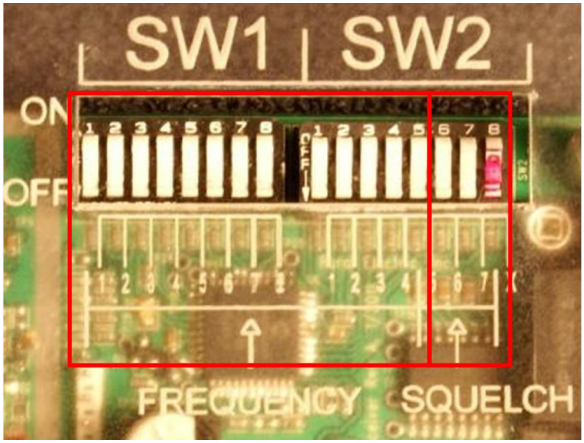
The switches are shown in the table below reading from left to right, SW2 (5, 6 and 7):

There are two settings below the factory setting to increase the sensitivity and five settings to decrease the sensitivity. Normally the factory setting will work well. If the sensitivity needs to be increased, the antenna connections and installation should be inspected. Refer to Appendix E for the recommended antenna installation instructions.

In some cases local interference may require decreasing the sensitivity to minimize unwanted operation.

Frequency Settings:

1. The frequency settings are shown in *Tables: 3a-d DIP Switch Settings*
2. Switch Settings are shown SW1 1-8 & SW2 1-4 From LEFT to RIGHT as shown on the FACEPLATE



Squelch Settings			
Sw2	**#5**	**#6**	**#7**
-6dB	1	1	1
-3dB	1	1	0
Nominal (Factory Setting)	1	0	1
+3dB	1	0	0
+6dB	0	1	1
+9dB	0	1	0
+12dB	0	0	1
15dB	0	0	0

Table 2: Squelch Settings

Frequency: 118.000 to 123.175							
118.000	111111111111	119.300	110100111111	120.600	111010011111	121.900	110001101111
118.025	011111111111	119.325	010100111111	120.625	011010011111	121.925	010001101111
118.050	101111111111	119.350	100100111111	120.650	101010011111	121.950	100001101111
118.075	001111111111	119.375	000100111111	120.675	001010011111	121.975	000001101111
118.100	110111111111	119.400	111000111111	120.700	110010011111	122.000	111110101111
118.125	010111111111	119.425	011000111111	120.725	010010011111	122.025	011110101111
118.150	100111111111	119.450	101000111111	120.750	100010011111	122.050	101110101111
118.175	000111111111	119.475	001000111111	120.775	000010011111	122.075	001110101111
118.200	111011111111	119.500	110000111111	120.800	111100011111	122.100	110110101111
118.225	011011111111	119.525	010000111111	120.825	011100011111	122.125	010110101111
118.250	101011111111	119.550	100000111111	120.850	101100011111	122.150	100110101111
118.275	001011111111	119.575	000000111111	120.875	001100011111	122.175	000110101111
118.300	110011111111	119.600	111111011111	120.900	110100011111	122.200	111010101111
118.325	010011111111	119.625	011111011111	120.925	010100011111	122.225	011010101111
118.350	100011111111	119.650	101111011111	120.950	100100011111	122.250	101010101111
118.375	000011111111	119.675	001111011111	120.975	000100011111	122.275	001010101111
118.400	111101111111	119.700	110111011111	121.000	111000011111	122.300	110010101111
118.425	011101111111	119.725	010111011111	121.025	011000011111	122.325	010010101111
118.450	101101111111	119.750	100111011111	121.050	101000011111	122.350	100010101111
118.475	001101111111	119.775	000111011111	121.075	001000011111	122.375	000010101111
118.500	110101111111	119.800	111011011111	121.100	110000011111	122.400	111100101111
118.525	010101111111	119.825	011011011111	121.125	010000011111	122.425	011100101111
118.550	100101111111	119.850	101011011111	121.150	100000011111	122.450	101100101111
118.575	000101111111	119.875	001011011111	121.175	000000011111	122.475	001100101111
118.600	111001111111	119.900	110011011111	121.200	111111101111	122.500	110100101111
118.625	011001111111	119.925	010011011111	121.225	011111101111	122.525	010100101111
118.650	101001111111	119.950	100011011111	121.250	101111101111	122.550	100100101111
118.675	001001111111	119.975	000011011111	121.275	001111101111	122.575	000100101111
118.700	110001111111	120.000	111101011111	121.300	110111101111	122.600	111000101111
118.725	010001111111	120.025	011101011111	121.325	010111101111	122.625	011000101111
118.750	100001111111	120.050	101101011111	121.350	100111101111	122.650	101000101111
118.775	000001111111	120.075	001101011111	121.375	000111101111	122.675	001000101111
118.800	111110111111	120.100	110101011111	121.400	111011101111	122.700	110000101111
118.825	011110111111	120.125	010101011111	121.425	011011101111	122.725	010000101111
118.850	101110111111	120.150	100101011111	121.450	101011101111	122.750	100000101111
118.875	001110111111	120.175	000101011111	121.475	001011101111	122.775	000000101111
118.900	110110111111	120.200	111001011111	121.500	110011101111	122.800	111111001111
118.925	010110111111	120.225	011001011111	121.525	010011101111	122.825	011111001111
118.950	100110111111	120.250	101001011111	121.550	100011101111	122.850	101111001111
118.975	000110111111	120.275	001001011111	121.575	000011101111	122.875	001111001111
119.000	111010111111	120.300	110001011111	121.600	111101101111	122.900	110111001111
119.025	011010111111	120.325	010001011111	121.625	011101101111	122.925	010111001111
119.050	101010111111	120.350	100001011111	121.650	101101101111	122.950	100111001111
119.075	001010111111	120.375	000001011111	121.675	001101101111	122.975	000111001111
119.100	110010111111	120.400	111110011111	121.700	110101101111	123.000	111011001111
119.125	010010111111	120.425	011110011111	121.725	010101101111	123.025	011011001111
119.150	100010111111	120.450	101110011111	121.750	100101101111	123.050	101011001111
119.175	000010111111	120.475	001110011111	121.775	000101101111	123.075	001011001111
119.200	111100111111	120.500	110110011111	121.800	111001101111	123.100	110011001111
119.225	011100111111	120.525	010110011111	121.825	011001101111	123.125	010011001111
119.250	101100111111	120.550	100110011111	121.850	101001101111	123.150	100011001111
119.275	001100111111	120.575	000110011111	121.875	001001101111	123.175	000011001111

Table 3a DIP Switch Settings (Frequencies 118.000 – 123.175)

Frequency: 123.200 to 128.375							
123.200	111101001111	124.500	110111110111	125.800	111000110111	127.100	110010010111
123.225	011101001111	124.525	010111110111	125.825	011000110111	127.125	010010010111
123.250	101101001111	124.550	100111110111	125.850	101000110111	127.150	100010010111
123.275	001101001111	124.575	000111110111	125.875	001000110111	127.175	000010010111
123.300	110101001111	124.600	111011110111	125.900	110000110111	127.200	111100010111
123.325	010101001111	124.625	011011110111	125.925	010000110111	127.225	011100010111
123.350	100101001111	124.650	101011110111	125.950	100000110111	127.250	101100010111
123.375	000101001111	124.675	001011110111	125.975	000000110111	127.275	001100010111
123.400	111001001111	124.700	110011110111	126.000	111111010111	127.300	110100010111
123.425	011001001111	124.725	010011110111	126.025	011111010111	127.325	010100010111
123.450	101001001111	124.750	100011110111	126.050	101111010111	127.350	100100010111
123.475	001001001111	124.775	000011110111	126.075	001111010111	127.375	000100010111
123.500	110001001111	124.800	111101110111	126.100	110111010111	127.400	111000010111
123.525	010001001111	124.825	011101110111	126.125	010111010111	127.425	011000010111
123.550	100001001111	124.850	101101110111	126.150	100111010111	127.450	101000010111
123.575	000001001111	124.875	001101110111	126.175	000111010111	127.475	001000010111
123.600	111110001111	124.900	110101110111	126.200	111011010111	127.500	110000010111
123.625	011110001111	124.925	010101110111	126.225	011011010111	127.525	010000010111
123.650	101110001111	124.950	100101110111	126.250	101011010111	127.550	100000010111
123.675	001110001111	124.975	000101110111	126.275	001011010111	127.575	000000010111
123.700	110110001111	125.000	111001110111	126.300	110011010111	127.600	111111100111
123.725	010110001111	125.025	011001110111	126.325	010011010111	127.625	011111100111
123.750	100110001111	125.050	101001110111	126.350	100011010111	127.650	101111100111
123.775	000110001111	125.075	001001110111	126.375	000011010111	127.675	001111100111
123.800	111010001111	125.100	110001110111	126.400	111101010111	127.700	110111100111
123.825	011010001111	125.125	010001110111	126.425	011101010111	127.725	010111100111
123.850	101010001111	125.150	100001110111	126.450	101101010111	127.750	100111100111
123.875	001010001111	125.175	000001110111	126.475	001101010111	127.775	000111100111
123.900	110010001111	125.200	111110110111	126.500	110101010111	127.800	111011100111
123.925	010010001111	125.225	011110110111	126.525	010101010111	127.825	011011100111
123.950	100010001111	125.250	101110110111	126.550	100101010111	127.850	101011100111
123.975	000010001111	125.275	001110110111	126.575	000101010111	127.875	001011100111
124.000	111100001111	125.300	110110110111	126.600	111001010111	127.900	110011100111
124.025	011100001111	125.325	010110110111	126.625	011001010111	127.925	010011100111
124.050	101100001111	125.350	100110110111	126.650	101001010111	127.950	100011100111
124.075	001100001111	125.375	000110110111	126.675	001001010111	127.975	000011100111
124.100	110100001111	125.400	111010110111	126.700	110001010111	128.000	111101100111
124.125	010100001111	125.425	011010110111	126.725	010001010111	128.025	011101100111
124.150	100100001111	125.450	101010110111	126.750	100001010111	128.050	101101100111
124.175	000100001111	125.475	001010110111	126.775	000001010111	128.075	001101100111
124.200	111000001111	125.500	110010110111	126.800	111110010111	128.100	110101100111
124.225	011000001111	125.525	010010110111	126.825	011110010111	128.125	010101100111
124.250	101000001111	125.550	100010110111	126.850	101110010111	128.150	100101100111
124.275	001000001111	125.575	000010110111	126.875	001110010111	128.175	000101100111
124.300	110000001111	125.600	111100110111	126.900	110110010111	128.200	111001100111
124.325	010000001111	125.625	011100110111	126.925	010110010111	128.225	011001100111
124.350	100000001111	125.650	101100110111	126.950	100110010111	128.250	101001100111
124.375	000000001111	125.675	001100110111	126.975	000110010111	128.275	001001100111
124.400	111111110111	125.700	110100110111	127.000	111010010111	128.300	110001100111
124.425	011111110111	125.725	010100110111	127.025	011010010111	128.325	010001100111
124.450	101111110111	125.750	100100110111	127.050	101010010111	128.350	100001100111
124.475	001111110111	125.775	000100110111	127.075	001010010111	128.375	000001100111

Table 3b DIP Switch Settings (Frequencies 123.200 – 128.375)

Frequency: 128.400 to 133.575							
128.400	111110100111	129.700	110101000111	131.000	111011111011	132.300	110000111111
128.425	011110100111	129.725	010101000111	131.025	011011111011	132.325	010000111111
128.450	101110100111	129.750	100101000111	131.050	101011111011	132.350	100000111111
128.475	001110100111	129.775	000101000111	131.075	001011111011	132.375	000000111111
128.500	110110100111	129.800	111001000111	131.100	110011111011	132.400	111111011111
128.525	010110100111	129.825	011001000111	131.125	010011111011	132.425	011111011111
128.550	100110100111	129.850	101001000111	131.150	100011111011	132.450	101111011111
128.575	000110100111	129.875	001001000111	131.175	000011111011	132.475	001111011111
128.600	111010100111	129.900	110001000111	131.200	111101111011	132.500	110111011111
128.625	011010100111	129.925	010001000111	131.225	011101111011	132.525	010111011111
128.650	101010100111	129.950	100001000111	131.250	101101111011	132.550	100111011111
128.675	001010100111	129.975	000001000111	131.275	001101111011	132.575	000111011111
128.700	110010100111	130.000	111110000111	131.300	110101111011	132.600	111011011111
128.725	010010100111	130.025	011110000111	131.325	010101111011	132.625	011011011111
128.750	100010100111	130.050	101110000111	131.350	100101111011	132.650	101011011111
128.775	000010100111	130.075	001110000111	131.375	000101111011	132.675	001011011111
128.800	111100100111	130.100	110110000111	131.400	111001111011	132.700	110011011111
128.825	011100100111	130.125	010110000111	131.425	011001111011	132.725	010011011111
128.850	101100100111	130.150	100110000111	131.450	101001111011	132.750	100011011111
128.875	001100100111	130.175	000110000111	131.475	001001111011	132.775	000011011111
128.900	110100100111	130.200	111010000111	131.500	110001111011	132.800	111101011111
128.925	010100100111	130.225	011010000111	131.525	010001111011	132.825	011101011111
128.950	100100100111	130.250	101010000111	131.550	100001111011	132.850	101101011111
128.975	000100100111	130.275	001010000111	131.575	000001111011	132.875	001101011111
129.000	111000100111	130.300	110010000111	131.600	111110111011	132.900	110101011111
129.025	011000100111	130.325	010010000111	131.625	011110111011	132.925	010101011111
129.050	101000100111	130.350	100010000111	131.650	101110111011	132.950	100101011111
129.075	001000100111	130.375	000010000111	131.675	001110111011	132.975	000101011111
129.100	110000100111	130.400	111100000111	131.700	110110111011	133.000	111001011111
129.125	010000100111	130.425	011100000111	131.725	010110111011	133.025	011001011111
129.150	100000100111	130.450	101100000111	131.750	100110111011	133.050	101001011111
129.175	000000100111	130.475	001100000111	131.775	000110111011	133.075	001001011111
129.200	111111000111	130.500	110100000111	131.800	111010111011	133.100	110001011111
129.225	011111000111	130.525	010100000111	131.825	011010111011	133.125	010001011111
129.250	101111000111	130.550	100100000111	131.850	101010111011	133.150	100001011111
129.275	001111000111	130.575	000100000111	131.875	001010111011	133.175	000001011111
129.300	110111000111	130.600	111000000111	131.900	110010111011	133.200	111110011111
129.325	010111000111	130.625	011000000111	131.925	010010111011	133.225	011110011111
129.350	100111000111	130.650	101000000111	131.950	100010111011	133.250	101110011111
129.375	000111000111	130.675	001000000111	131.975	000010111011	133.275	001110011111
129.400	111011000111	130.700	110000000111	132.000	111100111011	133.300	110110011011
129.425	011011000111	130.725	010000000111	132.025	011100111111	133.325	010110011011
129.450	101011000111	130.750	100000000111	132.050	101100111111	133.350	100110011011
129.475	001011000111	130.775	000000000111	132.075	001100111111	133.375	000110011011
129.500	110011000111	130.800	111111111011	132.100	110100111111	133.400	111010011011
129.525	010011000111	130.825	011111111011	132.125	010100111111	133.425	011010011011
129.550	100011000111	130.850	101111111011	132.150	100100111111	133.450	101010011011
129.575	000011000111	130.875	001111111011	132.175	000100111111	133.475	001010011011
129.600	111101000111	130.900	110111111011	132.200	111000111111	133.500	110010011011
129.625	011101000111	130.925	010111111011	132.225	011000111111	133.525	010010011011
129.650	101101000111	130.950	100111111011	132.250	101000111111	133.550	100010011011
129.675	001101000111	130.975	000111111011	132.275	001000111111	133.575	000010011011

Table 3c DIP Switch Settings (Frequencies 128.400 – 133.575)

Frequency: 133.600 to 136.000							
133.600	111100011011	134.900	110110101011				
133.625	011100011011	134.925	010110101011				
133.650	101100011011	134.950	100110101011				
133.675	001100011011	134.975	000110101011				
133.700	110100011011	135.000	111010101011				
133.725	010100011011	135.025	011010101011				
133.750	100100011011	135.050	101010101011				
133.775	000100011011	135.075	001010101011				
133.800	111000011011	135.100	110010101011				
133.825	011000011011	135.125	010010101011				
133.850	101000011011	135.150	100010101011				
133.875	001000011011	135.175	000010101011				
133.900	110000011011	135.200	111100101011				
133.925	010000011011	135.225	011100101011				
133.950	100000011011	135.250	101100101011				
133.975	000000011011	135.275	001100101011				
134.000	111111101011	135.300	110100101011				
134.025	011111101011	135.325	010100101011				
134.050	101111101011	135.350	100100101011				
134.075	001111101011	135.375	000100101011				
134.100	110111101011	135.400	111000101011				
134.125	010111101011	135.425	011000101011				
134.150	100111101011	135.450	101000101011				
134.175	000111101011	135.475	001000101011				
134.200	111011101011	135.500	110000101011				
134.225	011011101011	135.525	010000101011				
134.250	101011101011	135.550	100000101011				
134.275	001011101011	135.575	000000101011				
134.300	110011101011	135.600	111111001011				
134.325	010011101011	135.625	011111001011				
134.350	100011101011	135.650	101111001011				
134.375	000011101011	135.675	001111001011				
134.400	111101101011	135.700	110111001011				
134.425	011101101011	135.725	010111001011				
134.450	101101101011	135.750	100111001011				
134.475	001101101011	135.775	000111001011				
134.500	110101101011	135.800	111011001011				
134.525	010101101011	135.825	011011001011				
134.550	100101101011	135.850	101011001011				
134.575	000101101011	135.875	001011001011				
134.600	111001101011	135.900	110011001011				
134.625	011001101011	135.925	010011001011				
134.650	101001101011	135.950	100011001011				
134.675	001001101011	135.975	000011001011				
134.700	110001101011	136.000	111101001011				
134.725	010001101011						
134.750	100001101011						
134.775	000001101011						
134.800	111110101011						
134.825	011110101011						
134.850	101110101011						
134.875	001110101011						

Table 3d DIP Switch Settings (Frequencies 133.600 – 136.000)

Section 9: RF Controller Menu Operation

How Does the System Work?

The Avlite ALS System works by using a radio controller to activate and setup an entire airfield, airport or air base. The system utilises an embedded R/F module operating in the 2.4GHz ISM Band.

The lights can be configured for up to 15 different light groups. This allows the airfield to independently control different areas, such as multiple runways, taxiways and helipads.

The standard radio controller broadcasts a command message to all lights within range. This range is approximately 1.4km (0.8 miles). If a higher gain antenna is used the range can be extended. Each light within range will receive, decode and re-send the message to all surrounding lights. Each light also has an operational range of up to 1.4km.

For distances, greater than 1.4km there may be a delay in those lights receiving the command. The further away the lights are from the controller the longer it will take the command to propagate to all lights.

Standard Operating Procedure

To get the most from your ALS please use the following setup

1. Set the “Operation Mode” to STANDBY.
2. Set the “PALC Mode” Setting to ENABLE

This will allow the L-854 VHF PALC controller to operate the Avlite lights.

The standard Avlite controller commands may still be accessible from the menu.

Best Practice

It is best to locate the controller centrally about the runway when sending commands to achieve the minimum response time.

If the controller is situated at one end of a 3.2km (12 000’) runway, it will take longer to activate all lights than from a central position.

The battery inside the light will require extra charge time the following day if the lights are run at HIGH intensity for more than the recommended time. This can be negated by connecting the lights to an external power supply.

If these lights are plugged into an external power supply they can be run at any intensity for any length of time without depleting the battery.

Radio Controller Menu

This section of the document will provide a short explanation of all the menu screens on the control unit.

Modes of Operation

The operational Mode defines how the light will respond to different environmental conditions & user inputs. There are three operational modes that can be selected via the controller. *ALWAYS ON, STANDBY & DUSK till DAWN.*

ALWAYS ON Operational Mode

The light is *Always On*. The light will be lit both day & night. While the light is in this mode it will only turn off when the battery drops below the Flat Battery Voltage level.

STANDBY Operational Mode

The light is *Always Off*. While the light is in this mode it will still respond to and pass on commands, sent by the controller. This mode should be used if the lights have been installed outside but are not currently required.

Note: The light is not completely powered down in a manner suitable for storage. If the light is to be stored in a warehouse or other dark environment the ON/OFF switch should be turned off.

DUSK till DAWN Operational Mode

The light is turned on and off based on the light sensor internal to each light. If the light is in the darkness, it will turn on. If the light is in daylight, it will turn off.

Light Group

This menu is used to select the current light group. The light group of each light is selected via rotary switch A found on the bottom of the circuit board, in the Light Head. The controller can select any one of the 10 individual light groups
(0 -> 9) or select all radio lights at once.

Note: *The units are set with a light group of 0 in the factory.*

LED Intensity

Default = LOW

This menu is used to select the intensity of the LEDs on the light. The options include *Low, Medium & High.*

a. Low – LED intensity is set to low setting (approx 10%)

b. Medium - LED intensity is set to medium intensity (approx 30%).

c. High - LED intensity is set to high intensity (approx 100%)

Note: this menu will not be enabled if the selected operational mode is *STANDBY*

Timeout Mode

This menu is used to setup the LED high intensity timeout feature found in each light. The options include *Enabled LOW, Disable.*

a. Enabled LOW – The immediate LED intensity is selected via the LED Intensity menu, after Timer Duration the LED Intensity will revert back to the LOW setting

b. Disable – The high intensity LED timeout is disabled. The LED intensity will be selected via the LED intensity menu.

Note: this menu will not be enabled if the selected operational mode is *STANDBY*

Timeout Duration

This menu is only visible when the timeout Mode is enabled. This menu is used to select the timeout duration, the time before the LED intensity reverts back to its LOW intensity state. The timeout duration can be set from 1 minute to 60 minutes.

LED Bank Setup

All Avlite ALS systems can have the option of having the lights built with multiple colours, in different LED banks. This can allow a runway to be changed from Visible to I/R at the press of a button.

The options include *VISIBLE & IR*.

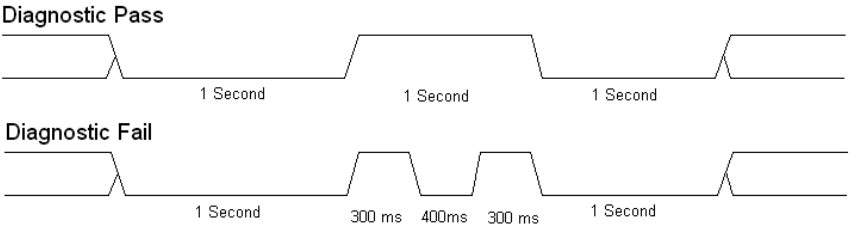
Note: this menu will not be enabled if the selected operational mode is *STANDBY*

Battery Diagnostic

Default = Disable

This feature can be used to check the battery voltage in every light in the ALS. The command can be sent any time and it will not affect the current state of the light. If the light is in STANDBY mode the light will turn on as shown below and revert to STANDBY mode after the diagnostic has been completed.

- If the battery voltage is within operational range the light will turn off for 1 second, flash once, then turn off for 1 second.
- If the battery voltage is low the light with turn off for 1 second, flash twice, then turn off for 1 second.



Sending Commands

Every time the SEND button is pressed a command is sent containing all the current settings in the Radio Controller.

The SEND button can be used after changing one setting or after changing multiple settings.

For further information see section under “How does the System Work”.

PALC Mode

Default = Enable

This is used to enable and disable Avlite responses to PALC commands received from the L-854 VHF controller.

9. Using the Radio Control to Activate the Airfield Lighting System (ALS)

The Radio Controller is very easy to use and by reading through the How To section below, all of the advanced features will be well within your grasp.

Make sure that all the lights in the same Light Group have had the rotary switches set correctly.

Turn All the Lights ON

- Turn the Radio Controller On
- Use the arrow keys to adjust the operational Mode to *ALWAYS ON*
- Press *MENU* button once to reach *Light Group*
- Set the Light Group to ALL
- Press *SEND* button
- Every radio light within range of the control unit will now turn on.

Setup the Lights to Operate in DUSK till DAWN mode

- Turn the Control unit On
- Use the arrow keys to adjust the operational Mode to *DUSK till DAWN*
- Press *MENU* button once to reach *Light Group*
- Set the Light Group to ALL
- Press *SEND* button
- Every radio light within range of the control unit will now turn on at night, during the day the lights will turn off automatically.

Runway B Only is to be HIGH Intensity, but Runway A will Remain in Current Configuration

- On Runway A, set the rotary switches to A=0 B=0 inside the light head.
- On Runway B, set the rotary switches to A=1 B=0 inside the light head. *Rotary Switch A can be set to any value that is different from Runway A.*
- Turn the Control unit On
- Use the arrow keys to adjust the operational Mode to *ALWAYS ON*
- Press *MENU* button once to reach *Light Group*
- Set the Light Group to 1
- Press *MENU* button once to reach *LED Intensity*
- Use the arrow keys to adjust the LED Intensity to *HIGH*
- Press *MENU* button until you reach *LED Bank Setup*
- Use the arrow keys to adjust the LED Bank to *Visible*
- Press *SEND* button
  - *Runway A will not change state.*
  - *Runway B will now be High Intensity.*

Runway B Only is to be HIGH Intensity, with a Timeout of 8 Minutes and Runway A will be I/R Low Intensity

- On Runway A, set the rotary switches to A=0 B=0 inside the light head.
- On Runway B, set the rotary switches to A=1 B=0 inside the light head. *Rotary Switch A can be set to any value that is different from Runway A.*
- Turn the Control unit On
- Use the arrow keys to adjust the operational Mode to *On*
- Press *MENU* button once to reach *Light Group*
- Set the Light Group to 1
- Press *MENU* button once to reach *LED Intensity*
- Use the arrow keys to adjust the LED Intensity to *HIGH*
- Press *MENU* button once to reach *Timeout Mode*
- Use the arrow keys to adjust the Timeout Mode to Enabled *LOW*
- Press *MENU* button once to reach *Timeout Duration*
- Use the arrow keys to adjust the Timeout Duration to *8 Minutes*
- Press *MENU* button once to reach *LED Bank Setup*
- Use the arrow keys to adjust the LED Bank to *Visible*
- Press *SEND* button
  - *Runway A will not change state.*
  - *Runway B will now be High Intensity. After 8 minute Runway will revert back to LOW intensity.*
- Press *MENU* button until you reach *Light Group*
- Set the Light Group to 0
- Press *MENU* button once to reach *LED Intensity*
- Use the arrow keys to adjust the LED Intensity to *LOW*
- Press *MENU* button until you reach *LED Bank Setup*
- Use the arrow keys to adjust the LED Bank to *IR*
- Press *SEND* button
  - *Runway A will be in LOW Intensity IR mode*
  - *Runway B will not change state. Lights on Runway B will still receive and pass on the message intended for Runway A.*

NOTE: For further operating instructions, refer to the manual supplied with your light(s).

Section 10: Trouble Shooting RF Controller

Problem	Remedy
Light will not activate.	• Ensure internal toggle switch on the light is set to the “ON” position • Wait at least 60 seconds for the program to initialise in darkness if the light is set for DUSK till DAWN Mode • Ensure battery is properly connected • Ensure battery is sufficiently charged. Refer to the user manual for your light.
Light will not operate for the entire night.	• Expose light to direct sunlight and monitor operation for several days Avlite products typically require 1.5 hours of direct sunlight per day to retain full autonomy. From a discharged state, the light may require several days of operational conditions to ‘cycle’ up to full autonomy • Reducing the light output intensity will reduce current draw on the battery • Ensure solar module is clean and not covered by shading, fouling or dust during the day
Lights are constantly on during the day.	• Ensure the Radio Controller is not set to ALWAYS ON (see “Modes of Operation” section of manual) & change the setting as required

Addendum A: FCC Part–15 Compliance

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

1. Reorient or relocate the receiving antenna
2. Increase the separation between the equipment and receiver
3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
4. Consult the dealer or an experienced radio technician for help

Modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment under FCC rules

Appendix A: Parts Lists, Required Parts & Tools Not Supplied

Bill of Materials:

Field replaceable components are listed below. Subassemblies are not field serviceable, see Figure 1 for the relative positioning of these parts.

Part Number	Description	Rating
RE-857-303	Relay Assembly	250VAC, 6A Max, 12V Coils
RE-857-150	Replaceable Relay Modules	250VAC, 6A Max, 12V Coil
RE-CSF060	Heater	120VAC/240VAC - 100 watt
RE-TLD-12	Switching Power Supply	Input 90-264VAC, 50-60 Hz Output 12VDC 3.3A 40 Watts Max
RE-101	VHF FM Receiver Assembly	12VDC, 118-136MHz
RE-L12DWD	Controller Assembly	12VDC
RE-854-681	Terminal Block Assembly	12-28AWG, 35A Max
RE-Ant	Antenna, VHF	22" ¼ dipole, 50Ω
RE-Arr1	Lightning Arrestor, VHF	70W, 20kA, 90-130V breakdown, 50Ω
RE-12126	Cabinet	NEMA 12/4, Flange Mount Polyester Powder Coated Finish
RG-58U	Cabling, VHF Antenna	PVC Jacket, Braided Coax, 50Ω
AV-ALS-	RF Controller	12VDC
PDN-28-000031	Antenna RF 2.4GHz	Omnidirectional, 4dBi, 2.4GHz, 50Ω, 20ft
PDN-28-001760	Surge Protector	600V, Co-axial, N-type Male, 50Ω
AV-CBL-RF-01	Cabling, RF Antenna	600V, Co-axial, N-Type Male, 50Ω, 20ft

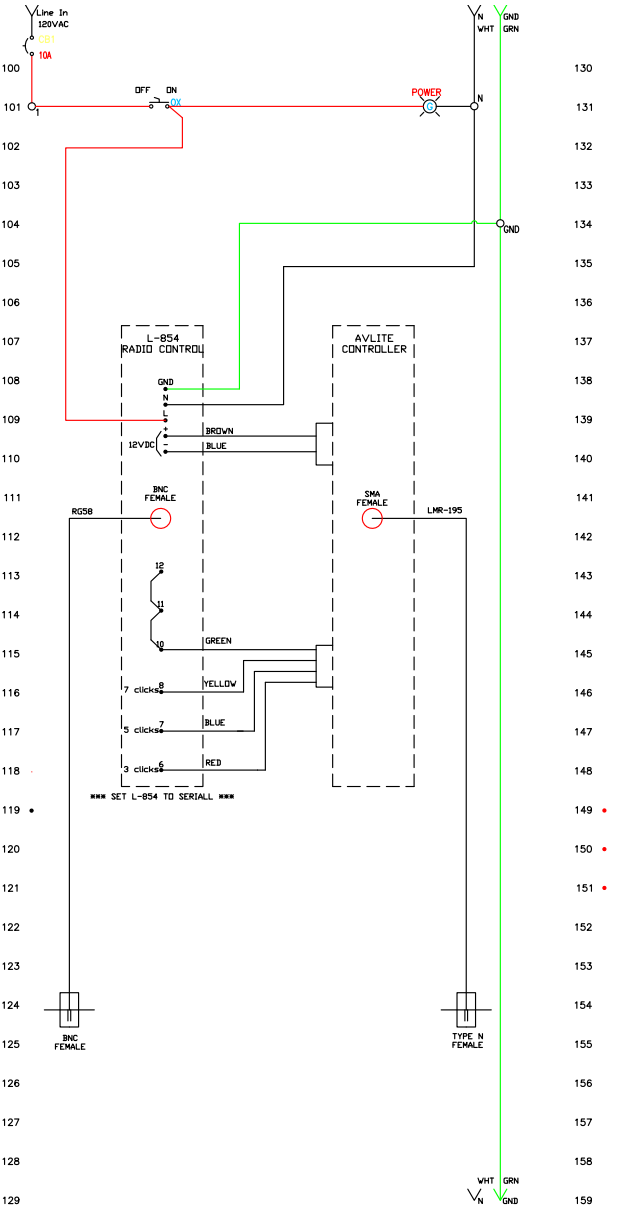
Table 4: Bill of Material

Required Parts & Tools Not Supplied:

Each installation will vary, below is a list of common parts not provided with the standard radio:

- Antenna Masts
- Antenna Mast Mounting Bolts (Bracket is designed for standard U-Bolt)
- Silicone Sealant for sealing building penetrations
- Conduit, Conduit hubs for control and communication wiring
- Cabinet Mounting Hardware
- Hand Tools for installation

Appendix B: Typical Wiring Diagram



Appendix C: Certificate of Conformance Radio

Intertek

PROGRAM ADMINISTRATOR
DEPARTMENT ALECP
INTERTEK
3933 U.S. ROUTE 11
CORTLAND, NY 13045-0950

ORIGINAL ISSUE DATE: January 29, 2010

Recertification due: May 2017

An Activity Sponsored and Administered by Intertek

Rural Electric Inc.
9502 E. Main St.
Mesa, AZ 85207

AIRPORT LIGHTING EQUIPMENT CERTIFICATION PROGRAM

CERTIFICATE OF CONFORMANCE

The product described below is hereby approved for listing in the next issue of the Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5345-53, Appendix 3 Addendum "Airport Lighting Equipment Certification Program. The approval is based on successful completion of tests in accordance with the specifications listed in, and the requirements for approval described in the Advisory Circular, and the reporting to the Program Administrator the results of such tests, accompanied by related documents by an Intertek recognized testing laboratory. The certification is not valid for a product modified with non-OEM replacement parts or non-production components.

L-854 – Radio Controls (AC 150/5345-49C)		
Manufacturer	Type	Manufacturer's Catalog Number
Rural Electric Inc.	I	RDL854-1A

1. This Equipment requires continuing validation in accordance with the requirements of AC 150/5345-53, and the Intertek Airport Lighting Equipment Certification Program.
2. Product tested and Report issued by: Intertek

(A) Report No: 3177139MIN004A; 3177139MIN-004F; 317139CRT-001 (B) Date of Report: 11/2009; 11/2009; 1/2010

NOTE: PLEASE REVIEW, AND ADVISE ADMINISTRATOR AT INTERTEK IMMEDIATELY IF DATA, AS SHOWN, NEED TO BE CORRECTED.

Approved for Certification by:

Jeremy N. Downs, P.E. Program Administrator

Date: January 29, 2010

Form AL-3 1/2006

Appendix D: Antenna Installation

SAFETY NOTICE: Antenna Installation

1. **READ ALL INSTRUCTIONS PRIOR TO BEGINNING ANY WORK**
2. Always keep the antenna away from any overhead or other power line source.
3. Always install an appropriate Lightning Discharge Element in-line with the antenna cable
4. Always ground the Lightning Arrestor directly to earth ground. Do not use conduits or building structures that are not directly grounded via an earth ground rod.
5. Never route antenna lines adjacent to power or control lines.

Installation Diagram:

Notes:
- Antenna base height should be approximately 6 feet above roof
- If a metallic supporting mast is used it must be connected to earth ground
- Longest-range reception is accomplished with this type of mounting
- Supporting mast and clamps are not provided
- Cable connection at bulkhead connector must be protected from the elements
- Heat-shrink is for waterproofing BNC Type Lightning Arrester
- BNC Type Arrester must be connected to an Earth Ground

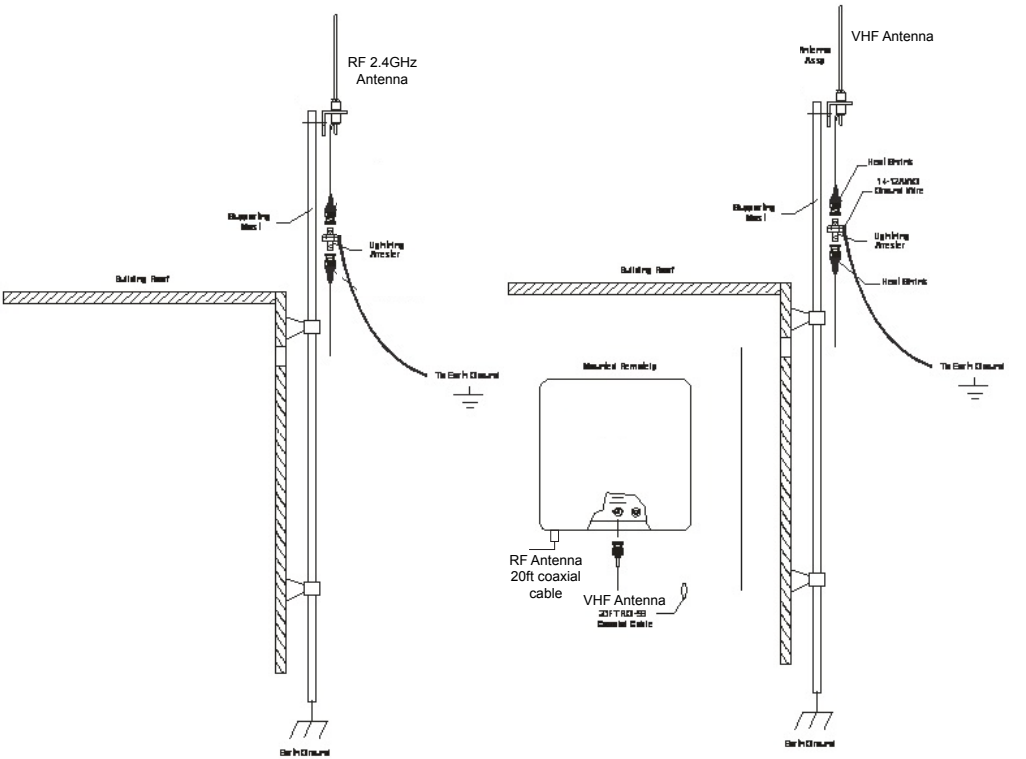


Figure 9. Antenna Installation (Typical)

Antenna Detail:

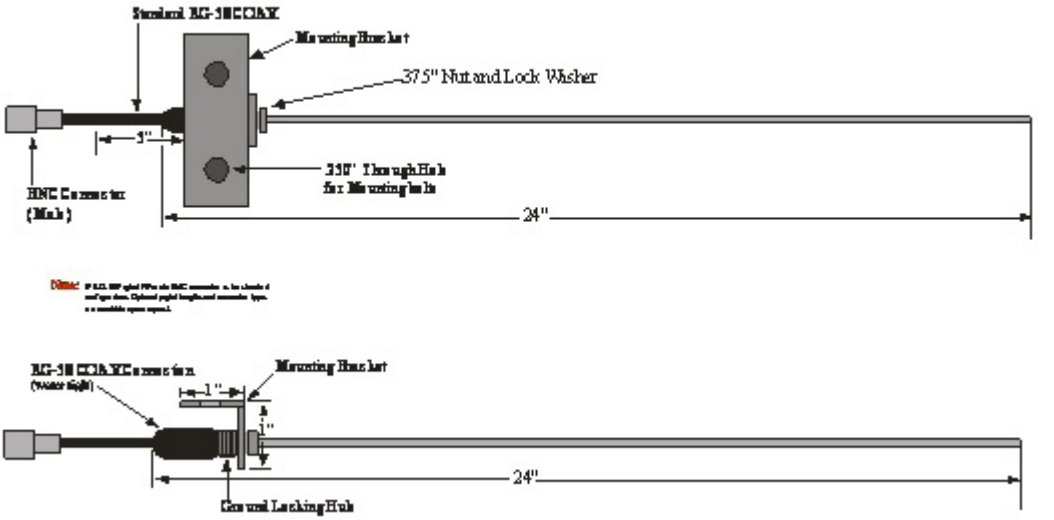


Figure 10. Antenna Details (VHF)

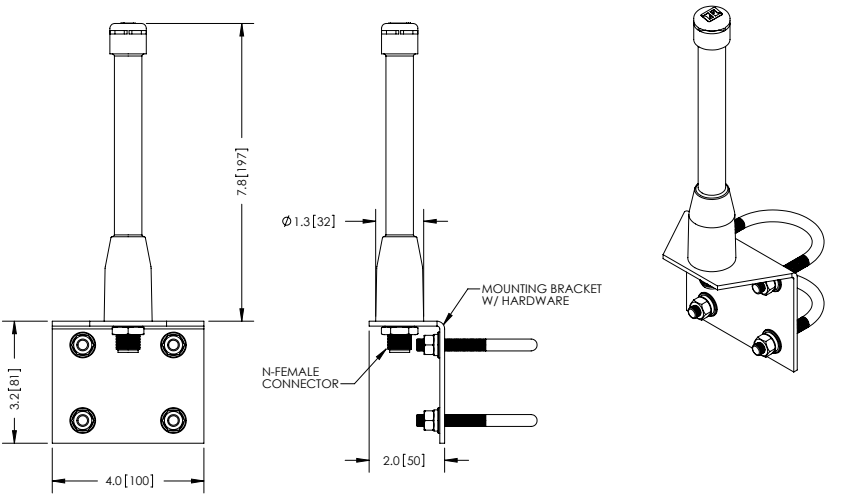


Figure 11. Antenna Details (RF 2.4GHz)

Notes

Avlite Light Warranty V1.2

Activating the Warranty

Upon purchase, the Avlite Systems warranty must be activated for recognition of future claims. To do this you need to register on-line. Please complete the Online Registration Form at:

www.avlite.com

Avlite Systems will repair or replace your lantern in the event of electronic failure for a period of up to three years from the date of purchase.

Avlite Systems will repair or replace any ancillary or accessory products in the event of failure for a period of up to one year from the date of purchase, as per the terms & conditions below.

The unit must be returned to Avlite freight prepaid.

Warranty Terms

1. Avlite Systems warrants that any Avlite aviation products fitted with telemetry equipment including but not limited to AIS, GSM, GPS or RF ("Telemetry Products") will be free from defective materials and workmanship under normal and intended use, subject to the conditions hereinafter set forth, for a period of twelve (12) months from the date of purchase by the original purchaser.
2. Avlite Systems warrants that any rotationally-moulded products ("Roto-Moulded Products") and accessory products ("Accessory Products") will be free from defective materials and workmanship under normal and intended use, subject to the conditions hereinafter set forth, for a period of twelve (12) months from the date of purchase by the original purchaser.
3. Avlite Systems warrants that any Avlite aviation products other than the Telemetry Products, Roto-Moulded Products and Accessory Products ("Avlite Products") will be free from defective materials and workmanship under normal and intended use, subject to the conditions hereinafter set forth, for a period of three (3) years from the date of purchase by the original purchaser.
4. Avlite Systems will repair or replace, at Avlite's sole discretion, any Telemetry Products, Roto-Moulded Products, Accessory Products or Avlite Products found to be defective in material and workmanship in the relevant warranty period so long as the Warranty Conditions (set out below) are satisfied.
5. If any Telemetry Products or Avlite Products are fitted with a rechargeable battery, Avlite Systems warrants the battery will be free from defect for a period of one (1) year when used within original manufacturer's specifications and instructions.

Warranty Conditions

This Warranty is subject to the following conditions and limitations;

1. The warranty is applicable to lanterns manufactured from 1/1/2009.
2. The warranty is void and inapplicable if:

a. the product has been used or handled other than in accordance with the instructions in the owner's manual and any other information or instructions provided to the customer by Avlite;
b. the product has been deliberately abused, or misused, damaged by accident or neglect or in being transported; or
c. the defect is due to the product being repaired or tampered with by anyone other than Avlite or authorised Avlite repair personnel.

3. The customer must give Avlite Systems notice of any defect with the product within 30 days of the customer becoming aware of the defect.
4. Rechargeable batteries have a limited number of charge cycles and may eventually need to be replaced. Typical battery replacement period is 3-4 years. Long term exposure to high temperatures will shorten the battery life. Batteries used or stored in a manner inconsistent with the manufacturer's specifications and instructions shall not be covered by this warranty.
5. No modifications to the original specifications determined by Avlite shall be made without written approval of Avlite Systems.
6. Avlite lights can be fitted with 3rd party power supplies and accessories but are covered by the 3rd

party warranty terms and conditions.

7. The product must be packed and returned to Avlite Systems by the customer at his or her sole expense. Avlite Systems will pay return freight of its choice. A returned product must be accompanied by a written description of the defect and a photocopy of the original purchase receipt. This receipt must clearly list model and serial number, the date of purchase, the name and address of the purchaser and authorised dealer and the price paid by the purchaser. On receipt of the product, Avlite Systems will assess the product and advise the customer as to whether the claimed defect is covered by this warranty.
8. Avlite Systems reserves the right to modify the design of any product without obligation to purchasers of previously manufactured products and to change the prices or specifications of any product without notice or obligation to any person.
9. Input voltage shall not exceed those recommended for the product.
10. Warranty does not cover damage caused by the incorrect replacement of battery in solar lantern models.
11. This warranty does not cover any damage or defect caused to any product as a result of water flooding or any other acts of nature.
12. There are no representations or warranties of any kind by Avlite or any other person who is an agent, employee, or other representative or affiliate of Avlite, express or implied, with respect to condition of performance of any product, their merchantability, or fitness for a particular purpose, or with respect to any other matter relating to any products.

Limitation of Liability

To the extent permitted by acts and regulations applicable in the country of manufacture, the liability of Avlite Systems under this Warranty will be, at the option of Avlite Systems, limited to either the replacement or repair of any defective product covered by this Warranty. Avlite Systems will not be liable to Buyer for consequential damages resulting from any defect or deficiencies in accepted items.

Limited to Original Purchaser

This Warranty is for the sole benefit of the original purchaser of the covered product and shall not extend to any subsequent purchaser of the product.

Miscellaneous

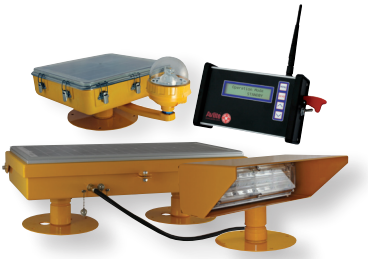
Apart from the specific warranties provided under this warranty, all other express or implied warranties relating to the above product is hereby excluded to the fullest extent allowable under law. The warranty does not extend to any lost profits, loss of good will or any indirect, incidental or consequential costs or damages or losses incurred by the purchaser as a result of any defect with the covered product.

Warrantor

Avlite Systems has authorised distribution in many countries of the world. In each country, the authorised importing distributor has accepted the responsibility for warranty of products sold by distributor. Warranty service should normally be obtained from the importing distributor from whom you purchased your product. In the event of service required beyond the capability of the importer, Avlite Systems will fulfil the conditions of the warranty. Such product must be returned at the owner's expense to the Avlite Systems factory, together with a photocopy of the bill of sale for that product, a detailed description of the problem, and any information necessary for return shipment.

Other Avlite Products Available

Solar Aviation Lighting



Helipad Lighting

Obstruction Lighting

Airfield Markers
& Accessories

Typical Applications

- Temporary & permanent airfield lighting
- Remote, emergency & defence airfield lighting
- Barricade, hazard & perimeter lighting
- Helipad lighting
- Obstruction lighting

For a complete list of product compliances including ICAO & FAA, please contact Avlite today

Area & Sign Lighting

Certified System
Quality
ISO 9001
SAI GLOBAL

ARMY AVIATION ASSOCIATION

AUSTRALIAN AIRPORTS ASSOCIATION

DEFENCE RECOGNISED SUPPLIER
Department of Defence

AOPA AUSTRALIA

AAMS

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