



APPLICABILITY

Model/Part No.:	Fixed Whip Antenna 451017-1B 406/121.5 MHz	Or Fixed Rod Antenna 451017-2A 406/121.5/243 MHz	Or Fixed Blade Antenna 451017-3A 406/121.5/243 MHz	Portable Whip Antenna 451017-4S 406/121.5/243 MHz
AK- 451- (AF)	S	S	S	-
AK- 451- (AF)(AP)	S	S	S	M
AK - 451- (AP)	-	-	-	M
AK - 451-(S)	-	-	-	M

**M: Mandatory. The respective model must be accompanied by this antenna.**  
**S: Selective. The respective model must be accompanied by at least 1 of these antennas.**  
**- : Not applicable**

**4500010-1:** Battery Package, Lithium, LiMnO<sub>2</sub>, 90 Hrs Lasting.

**TS-451:** Computer Test Set and ELT Coding Equipment for AK-451



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# SECTION I GENERAL INFORMATION

## 1.1 SCOPE

This manual contains information necessary for the Operations and Instructions for Continued Airworthiness (ICA) of the model AK-451, Emergency Locator Transmitter, manufactured by Ameri-King Corporation, California, U.S.A.

## 1.2 OVERVIEW

The Ameri-King AK-451-( ) Series is a FAA TSO C-126/91a approved, EASA ETSO approved, 406 MHz ELT Emergency Locator Transmitter, Types (AF) Automatic Fixed, (AP) Automatic Portable, (S) Survival. It may transmit aircraft GPS/NAV position data, immediately and accurately, on triple (406 Satellite /243 Military /121.5 Civilian) MHz frequencies.

### 1.2.1 Application and Equipment Limitation.

This manual constitutes FAA approved data as described in AC 43.9-1E, paragraph (h)(2) and AC 43-201, chapter 2, paragraph 201(a)(6) for major alterations. Not all installations are “major”; consult your local FAA ACO for clarification.

In Canada, Installation of an ELT in an aeronautical product is carried out under a Supplemental Type Certificate (STC). This is a separate regulatory requirement and should therefore be in a separate document manual for the Operations and Instructions for Continued Airworthiness (ICA).

**The conditions and tests required for TSO approval of this article are minimum performance standards. It is the responsibility of those desiring to install this article on a specific type or class of aircraft to determine that the aircraft installation conditions are within the TSO standards. TSO articles must have separate approval for installation in an aircraft. The article may be installed only if further evaluation by the applicant documents an acceptable installation and it is approved by the FAA Administrator. The article may be installed only if performed under 14 CFR parts 43 or the applicable airworthiness requirement. For installations outside of the US, contact your local civil aviation authority for guidance (Ref. TSO-C126 paragraph D).**

**Lithium battery safety concerns include the possibility of fire, venting violently, and venting of toxic gases (Ref. TSO-C126 paragraph 5.a.(2)).**

The AK-451 ELT described in this manual was designed, tested and certified as a complete system including the following components:

- ELT Transmitter w/ integral battery
- ELT Mounting Tray and Velcro Holder
- ELT Antenna and Coaxial Cable Assembly
- ELT Remote Switch and Remote Wiring Cable Assembly
- ELT Audible Buzzer Monitor unit and T-Adapter Connector

### Note:

Only Ameri-King approved system components may be used for a TSO approved system.

### 1.2.2 Certification:

The AK-451 has been certified to the following:

- FAA TSO-C126
- FAA TSO-C91a
- ETSO-2C126 per European Aviation Safety Agency (EASA)
- FAR Part 91 – mandatory automatic ELT requirements
- Cospas-Sarsat T.001

47 CFR Part 87 (FCC requirements) Note: Per FCC regulations 47 CFR § 2.902, the ELT is tested per “Verification” method.

### Note:

The AK-451 is certified to meet the requirements of FAA TSO-C126, TSO-C91a and EASA ETSO-2C126 per EUROCAE ED-62. For use outside the US or EASA member states, contact your local civil aviation authority for ELT requirements.

### Note:

There is no electronic connection between TCAS or Mode S systems and the ELT, only the ID number is common. The ELT may accept aircraft GPS/NAV Lat/Long position data, then transmits the position data on the 406 MHz digital long messages..

## 1.3 TECHNICAL CHARACTERISTICS

### SPECIFICATIONS:

APPROVALS:

### CHARACTERISTICS:

FAA TSO-C126 / C91a,  
and EASA ETSO-2C126/2C91a

### BATTERIES:

**4500010-1:** Battery Pack, Lithium, LiMnO<sub>2</sub>, 90 Hrs lasting, 4D cells

## PHYSICAL CHARACTERISTICS:

### • SIZE AND WEIGHT:

Main Unit:	(4.27"Wx2.95"Hx5.64"L) 1lbs 14oz
Remote Unit:	(1.58"W x 0.65"H x 2.00"L) 1.0 oz
Transport Blade type, 451 017-3:	600 Knots airspeed, 1.4 lbs
Business Rod type, 451 017-2:	350 Knots airspeed, 0.5 lb
General Aviation whip type, 451 017-1:	250 Knots airspeed, 0.25 lb
Portable Antenna, 451 017-4:	(17"L) 4.0 oz
Mounting Tray & Velcro holder:	(4.51"W x 0.75"H x 5.87"L) 4.0 oz

### • MOUNTING HOLE SPACING:

Mounting Tray:	4 Trapezoid Corners (L1=2.76"; L2=1.76"; H=2.01")
Remote Unit:	4 Rectangular Corners (1.825"W x 0.490"H)
Fixed Antenna:	7 / 5 / 1 Holes (0.500" Diameter) for Blade / Rod / Whip respectively

### • CASE AND COLOR:

No Sharp Edges, High Impact, Flame Retorted, Fire Resistant, Waterproof, High, Temperature ABS Plastic. Safety International Orange Color.

### • GENERAL SPECIFICATIONS (STANDARD CONDITIONS):

#### • TRANSMITTER:

Operating Frequencies:	406.028 MHz ± 0.001 MHz 121.500 MHz ± 0.0025 % 243.000 MHz ± 0.0025 %
	Short term stability $\leq 2 \times 10^{-9}$ /100ms
	Medium slope -1 to $+1 \times 10^{-9}$ /min
	Medium Residual variant $\leq 3 \times 10^{-9}$
Modulation Characteristics:	Audio Sweep Frequency: Download Sweeping: (1600-300) Hz Sweep Rate: 3 Hz ± 1 Hz Modulation Factor: More than 0.85 Occupied Bandwidth: Less than 25 Hz Voice Modulation: Included
Modulation Duty Cycle:	(33-55) % Square Wave AM Continuous Peak Effective Radiated 50mW @ 121.5 MHz
RF Power (PERP):	50mW @ 125/243.0 MHz 5W @ 406.028 MHz

Equivalent Isotropic 100mW (-10dBW) @121.5/243.0 MHz (min)

Radiated Power (EIRP): 6dBW ± 4dB @406.028 MHz (max)

### • BATTERY REQUIREMENTS:

Transmitter Main Unit:	Battery Pack consists of 4 cells LiMnO <sub>2</sub> or LiSO <sub>2</sub> "D" Size
Remote Unit:	DURACELL DL 1/3 NB, Lithium Cell

### • AUTOMATIC CRASH ACTIVATION:

Velocity Change of  $2.3 \pm 0.3$  G ( $4.5 \pm 0.5$  FPS) per TSO C-126 (DO-204A) and ETSO-2C126 (EUROCAE ED-62) requirement.

### • ANTENNA RADIATION CHARACTERISTICS:

Radiation on 121.5, 243.0 MHz, and 406.028 MHz Vertically polarized & Omni directional in the Horizontal Plane.

• CRASHWORTHINESS: 100g, 23 ms, 6 directions

### • ACTIVATION MONITOR:

Manual ON and RESET functions are located on both ELT Main Unit and Remote Unit. The two Green ON lights flashing, located on the ELT Main Unit and Remote Switch Unit and a buzzer are to indicate when the ELT is transmitting. Both ELT Main Unit and Remote Unit are self-powered by their internal batteries. Automatic activation is remained, regardless whether the Cable Interconnect between the Main Unit and the Remote Unit is open or shorted.

**GPS INTERFACE PROTOCOL:**  
(Latitude/ Longitude Insert Messages)

**Aviation RS-232**  
**Baud Rate (fixed):** 9600  
**Parity:** None  
**Data Bits:** 8  
**Stop Bits:** 1

### Garmin International Inc.:

• All Series: 150/ 250/ 400/420/430/ 500/520/530

### Honeywell Bendix-King Inc.:

• KLN 88, KLN89, KLN89B, KLN 90, KLN90B, KLN94, KLN900.

## Arnav Systems Inc.:

- R50, R50i, STAR 5000, FMS 5000, MFD (Multi-Functional Display).

## II Morrow:

- FLYBUDDY, 2001 NMS

## Trimble Nav Inc.:

- NAV 1000, NAV 2000, TNL 2100, and TNL3100. The following Trimble systems all require a RS-422 to RS-232 adapter: NAV 3000, TNL 1000, TNL 2000, TNL 2000A, TNL 3000, 2000 APPROACH, 2000 APPROACH PLUS, 2101 APPROACH, 2101 APPROACH PLUS, 2101 I/O APPROACH, 2101 I/O APPROACH PLUS.

## ENVIRONMENTAL TEST SPECIFICATIONS:

- **RTCA DO-204A; DO-183**
- **TSO-C126/C91a, RTCA DO-160E ENV. CAT.:** F1XBA (204/183)  
(204/183)XR(204/183)XXSXXXXAC(204/183)BXXXX (204)
- **TEMP. AND ALTITUDE:** Category F1  
Low Temperature: -20°C Operating; -55°C Storage.  
High Temperature: +55°C Operating; +85°C Storage.
- **OPERATING LIFE:** 5W @ 406.208 MHz for 24 hrs @ 20°C  
50mW @ 121.5 MHz  
50mW @ 243.0 MHz  
(Minimum Requirement throughout a 50 hour period at -20°C)
- **TEMP VARIATION:** Category B, 10°C minimum per minute
- **HUMIDITY:** Category A, 95% RH, 50 hours operating
- **SHOCK:** 500G, 4 ± 1msec
- **IMPACT:** Penetration of 55 lbs mass, 6 drops, 4 surfaces
- **CRUSH:** 1000 lbs, 4 surfaces
- **VIBRATION:** 10G, Sinusoidal, (5-2000) Hz, 3 axes
- **WATERPROOF:** Category R, 15 minutes Spray, 6 sides
- **IMMERSION SALT WATER:** Category S, 24 hours Immersion, 160 hours at + 55°C
- **SALT SPRAY:** Category S, 48 hours exposure to the Salt Fog, and 48 hours drying

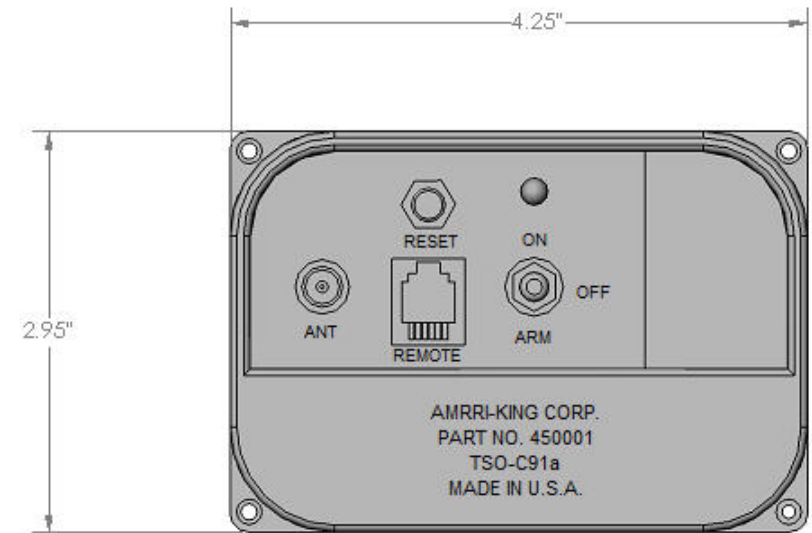


Figure 1: Front view of ELT

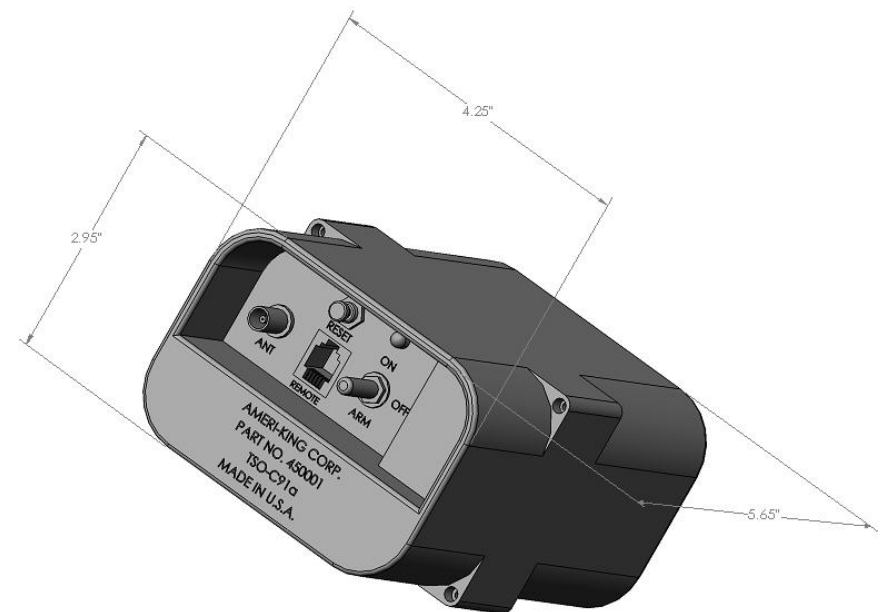


Figure 2: 3-D view of ELT

**1.4 BATTERY REPLACEMENT INSTRUCTIONS**  
**1.4.1 ELT MAIN UNIT BATTERY REPLACEMENT INSTRUCTIONS**

All batteries are strongly advised to be serviced by Ameri-King or its authorized service centers. End users may return the entire ELT for replacing the batteries and post functional tests.

The Ameri-King Corp. Model AK-451 ELT is designed to use only with Ameri-King lithium battery packages which have been tested per TSO-C126, TSO-C91a requirements.

**The use of any other battery will void all warranties of the ELT by Ameri-King Corp. The ELT does not meet the requirements of TSO-C126, and TSO-C91a or FAR 91.52 if used with any other type of battery. Using any other battery is not allowed (forbidden).**

The Ameri-King Battery Pack has a 10 years shelf life and 5 years useful life. It will last for 78 hours at -20 deg C, at end of 5 years battery life. FAR 91.52 (d) (i) requires that ELT batteries be replaced when the transmitter has been in use for more than one cumulative hour.

**The label sticker for expiration date of the batteries must be affixed on the outside of the ELT battery case and recorded in the aircraft logs.**

**\*\*\* WARNING \*\*\***  
**USE ONLY DURING SITUATIONS OF GRAVE AND IMMINENT DANGER!**

**LITHIUM BATTERY PACK – NON-RECHARGEABLE**  
P/N 4500010 -1 FOR USE ON Model AK-451-(AF)(AP)(S)  
RTCA DO-160E Environmental Categories  
F1XB(227)(227)(227)XXXXXXXXXXXXXXXXXXXX

Replace battery pack after one cumulative hour of use or by date shown:  
*\*Battery type: Lithium LiMnO2*

Replace Main Batteries  
By Date: \_\_\_\_\_

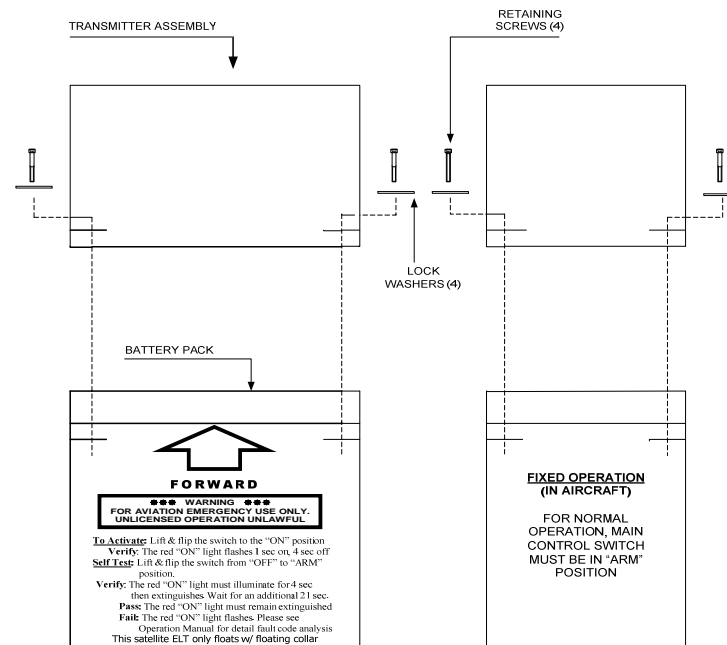
**NEVER CHARGE, SHORT CIRCUIT, PUNCTURE, DEFORM, INCINERATE, OR OPEN. DO NOT SUBMERGE IN WATER OR HEAT ABOVE 85°C. REMOVE WHEN DISCHARGED**

**Battery Box Silkscreen**

The owner or operator may perform Battery replacement provided that the accessibility, removal and reinstallation of the ELT can be considered “simple” as prescribed in Advisory Circular 91-44A, Paragraph 8.a (See Appendix B).

**The following is a step-by-step instruction for replacing ELT Battery Pack P/N 4500010-() Series:**

1. Using the 3/32” Hex Driver supplied with the ELT, remove the 4 retaining screws and split lock washers that attach the battery case to the ELT Transmitter Assembly (See Figure15).
2. Insure both battery connectors are locked-in properly by its tab. Verify the battery pack voltage is 13 +/- 0.5 VDC Ensure that the gasket is in place (See Figure 4).
3. Place the Transmitter Assembly face down on a bench. Press down on the battery case to compress the battery contact springs. Replace the four battery retaining screws and lock washers and evenly tighten until the battery case is pulled flat against the Transmitter Assembly.
4. Remove any existing battery replacement date labels from the battery case and install the new label you prepared in step 3 above in a readily visible location on the ELT.
5. After battery replacement, a transmitter function test must be performed as described in section 2.3 of this manual.



**Figure 3: Battery Replacement for ELT Main Unit**



**Figure 4: Battery Replacement for ELT Main Unit (Actual View)**

## 1.4.2 ELT REMOTE UNIT BATTERY REPLACEMENT INSTRUCTIONS

The ELT Remote Unit is designed to be powered by a Duracell DL1/3NB 3 Volt Lithium Batteries. Under normal operating conditions, the Lithium battery must be replaced every five years. If the ELT is activated for an unknown period of time, the lithium battery must be replaced.

### To install or replace the Remote Unit Battery, follow these steps:

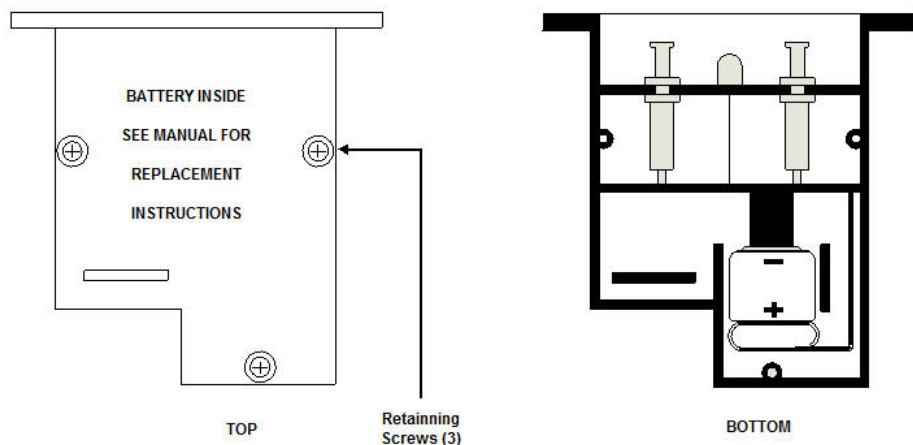
Remove the three Retaining Screws that secure the top and bottom half of the remote unit (Figure 5). Loosen the two Switch Retaining nuts located on the front of the unit (Figure 5).

Carefully remove the top half of the Remote unit, exposing the battery compartment (Figure 5). If replacing an old battery, carefully inspect the battery contacts for dirt or corrosion. IF the contacts need cleaning, use only non-abrasive electrical contact cleaner and a stiff brush. Badly corroded contacts should be replaced.

Insert the battery with the polarity as shown in Figure 5. The polarity is also engraved on the bottom of the battery compartment.

Replace the top half of the remote unit and replace the three retaining screws and tighten the two switch retaining nuts.

The next remote battery replacement date should be recorded on one of the adhesive labels supplied and affixed to the ELT in a readily visible location.



**Figure 5:** Battery Replacement for ELT Remote Unit

## SECTION II OPERATIONS

### 2.1 GENERAL

This section describes the operation of the ELT, Emergency Locator Transmitter, model AK-451.

The following types are applicable for the model AK-451:

#### a. Automatic Fixed - Fixed ELT (AF):

See paragraph 1.2.1 (a)

#### b. Automatic Portable - ELT (AF) (AP) with dual antennas:

See paragraph 1.2.1 (b)

#### c. Automatic Portable - ELT (AP):

See paragraph 1.2.1 (c)

#### d. Survival-ELT (S):

See paragraph 1.2.1 (d)

The AK-451 is a "third generation ELT," transmitting on 406.028, 121.5 and 243.0 MHz. The ELT is designed to meet or exceed the requirements of TSO-C126 and TSO-C91a and the mandatory automatic ELT requirements of FAR Part 91. The ELT meets the requirements of DOT Aviation Regulations, Section 3, Chapter 3, Part 2.

The ELT automatically activates during a crash and transmits the standard swept tone.

The Green ON lights flashing located on both the ELT Main Unit and the Cockpit Remote Switch unit and the buzzer sound periodically indicates when the ELT is activated. The ON switch on the Remote Switch Unit allows you to turn on the ELT for testing. The RESET Switch on the Remote Switch Unit enables to reset the ELT. In normal operation, the Main Switch on the ELT Unit must be selected at "ARM" position.

#### **Note:**

You cannot "disarm" or disable the unit from the cockpit; you can only deactivate the ELT after it has been activated.

The ELT unit is able to withstand extremely harsh environments. Units exactly like yours have been subjected to numerous 500G shock pulses; 1000 pounds crash



weights and severe penetrator tests, and continue to operate normally. Continued operation in a temperature range of -20 degrees Celsius to +55 degrees Celsius is assured.

## 2.2 OPERATION

The AK-451 ELT, Emergency Locator Transmitter, is a state of the art Micro controller technology, long lasting, solid state based equipment. It is an extremely reliable, highest standard of quality, designed to meet TSO-C126 and TSO-C91a requirements for critical application.

Both ELT main unit and Remote Switch are self-powered by their own internal batteries. Interface with aircraft electrical power system is not required.

With the main switch, located on the ELT main unit, set at "ARM" position, the AK-451 ELT is automatically activated upon sensing a change of velocity of  $4.5 \pm 0.5$  Feet/Second, along its longitudinal axis (Automatic Fixed-ELT (AF) Configuration). It is also designed to be removed from the aircraft and used as a personal locating device when it is necessary to leave the scene of the accident (Automatic Portable ELT (AP) Configuration) and survival ELT(s) configuration.

In the event of a crash, the AK-451 activates automatically, and transmits the standard swept tone on 243/121.5 MHz lasting until battery power is gone. This 243/121.5 MHz signal is mainly used to pinpoint the beacon during search and rescue operations.

For the first 24 hours of operations, a 406 MHz signal is transmitted at 50-second intervals. This transmission lasts 520 ms and contains identification data programmed into the beacon and is received by COSPAS-SARSAT satellites. The aircraft GPS/NAV latitude/longitude data position will also be transmitted (if GPS/NAV is connected with the ELT). The transmitted data is referenced in a database (maintained by the national authority responsible for ELT registration) and used to identify the beacon and owner.

### Accuracy:

Doppler positioning is employed using both 121.5 MHz and 406 MHz signals. Position accuracy of the 121.5 MHz signal is within an area of approximately 15-20 km radius about the transmitter. Due to the better signal integrity of the 406 MHz, its location accuracy is within about a 1-2 km radius. If the GPS/NAV position data is transmitted, the accuracy of the AK-451 will narrow to 22 meters (typically).

## 2.3 TRANSMITTER FUNCTIONAL TEST

The ELT should be tested every month.

### WARNING

**Do not allow test duration to exceed 5 seconds. A false alarm may be generated. Any time the ELT is activated, it is transmitting a 121.5 MHz and 243.0 MHz distress signal. If the ELT operates for approximately 50 seconds, a "live" 406 MHz distress signal is transmitted and is considered valid by the Cospas-Sarsat satellite system.**

**Any time that the ELT Main Switch is lifted and flipped from "OFF" to "ARM", a 406 MHz self test signal is transmitted (after 25 seconds), however it is specially coded as a "self test" signal that is ignored by the COSPAS-SARSAT satellites.**

### 2.3.1 Main Switch ON/OFF/ARM Operation:

In normal operation, the Main Switch, located on the ELT main unit, must be in the "ARM" position. In the event of a crash, an acceleration activated crash censor (G-switch) turns the ELT 'on' automatically when the ELT experiences a change in velocity (or deceleration) of  $4.5 \text{ fps} \pm 0.5 \text{ fps}$ . Activation is also accomplished by means of the cockpit mounted remote control unit or the "ON" switch on the ELT main unit. To reset the ELT press either "RESET" switch on the remote control panel or on the main unit.

The ELT has an "OFF" position. This allows the beacon to be handled or shipped without 'nuisance' activation. Care should be taken when transporting or shipping the ELT not to move the switch or to allow packing material to become lodged such as to toggle the switch.

Main switch, alternate positions:

- **"ON:"** ELT transmits immediately. Both Green ON lights on the main unit and remote switch unit flash and the buzzer sound, at rate of 1 second ON, 4 seconds OFF.
- **"OFF:"** The ELT is turned off.
- **"ARM:"** ELT self-test is confirmed after 24 seconds. If the self-test is passed, the 2 Green ON lights and the buzzer sound must be extinguished. The ELT system is then in the "ARM" mode.

### 2.3.2 Transmitter ID Programming and Self-Test:

Turn the main switch from the "OFF" position to the "ARM" position. The Buzzer sound and the 2 Green ON lights shall illuminate for 4 seconds, then extinguish. This is to allow coding programming during the next 20 seconds window and self-test for 1 second thereafter.

The ELT may be ID coding programming during the aforementioned 20 seconds window period. If no programming happened the ELT will then enter the Self Test Mode for 1 second thereafter.

Self-test results (after 25 seconds), is:

**If the self-test is passed:** the Green ON lights are steadily extinguished and no buzzer sound.

**If the self-test is failed:** the Green ON LIGHTS flashes as defined below:

- 1 flash:** Internal Data stored in Memory at fault.
- 2 flashes:** Distress ID stored in Memory at fault.
- 3 flashes:** Battery voltage is low < Useful Life Battery Voltage setting.
- 4 flashes:** Vcc supplies for F3, F2, or F1 at fault.
- 5 flashes:** F3 RF power level < 33 dbm @ 406.028 MHz
- 7 flashes:** F1/F2 VHF RF power level < 17 dbm @ 121.5/243 MHz.
- 9 flashes:** PLL locked in F3 or F1 or F2 at fault.
- Continuous flash:** no F3/F2/F1 RF output power, ELT shuts down completely

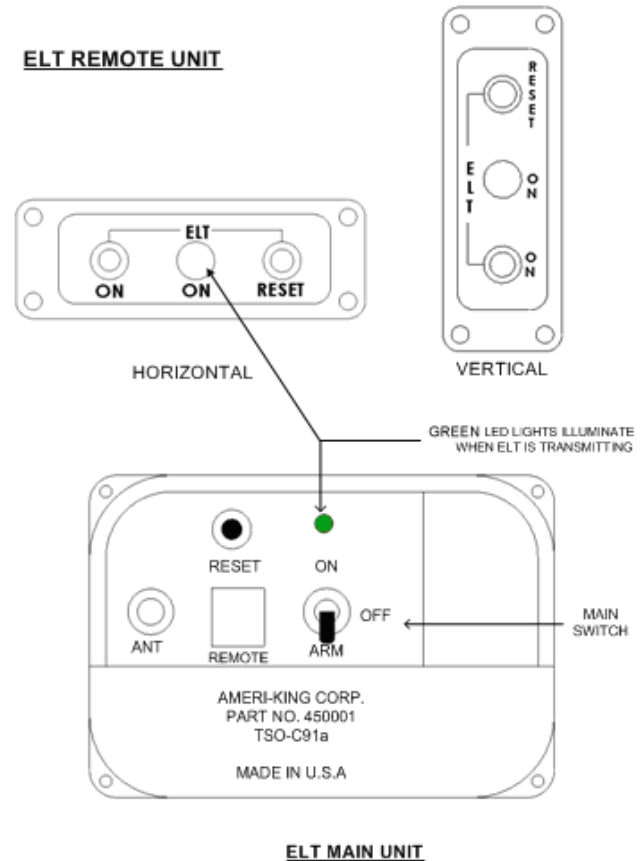
**Note:**

The self-test mode that transmits a 406 MHz test code pulse monitors certain system functions before returning to the ARM mode. The 406 MHz test pulse is ignored by any satellite that receives the signal, but the ELT uses this output to check output power and correct frequency.

- Self-test is 520 ms long message burst on the 406 MHz signal. Synchronization pattern is 011 010 000.
- Self-test is then 121/243 MHz (VHF) Continuous Wave during 1s.

**2.3.3 System Integration Test:**

The test consists of turning the unit “ON” and then “resetting” it to verify that the Transmitter, Latch Circuit, Batteries, and associated equipment are operating properly. Regulations require that Transmitter tests only be done during the first 5 minutes of each hour and must not last for more than 3 Audio sweeps (1.5 seconds). If you are at a location where there is an FAA Control Tower or other monitoring facility, notify the facility before beginning the tests. **Never activate the ELT while airborne for any reason.** See Figure 18 for the ELT Front Panels for both ELT Main Unit and Remote Unit.



**Figure 6:** ELT Front Panels-Main Unit and Remote Unit.

**2.3.3.1** Monitor 121.5 MHz using the Aircraft Com Receiver or Portable Hand Held Receiver. Turn the Squelch all the way up or ON.

**2.3.3.2** Ensure that the main switch on the ELT is on "ARM" position.

- Push the "ON" button on the Cockpit Remote Switch Unit. Verify that both the Green ON lights, located on the Main Unit and the Cockpit Remote Switch Unit, are flashing. Verify the Buzzer sound periodically. Verify the ELT audio sweep tone can be heard on the Com Receiver.
- Push the RESET button on the Remote Switch unit. Verify that the two Green ON lights are extinguished. Verify the Buzzer sound ceased. Verify the ELT audio sweep tone ceased.

**G Switch Check:** Activate the G switch by using a rapid forward (throwing) motion coupled by a rapid reversing action. Verify that the ELT has been activated by use of the Wattmeter, the Airplane's VHF Radio Communications Receiver when tuned to 121.5 MHz, or other means (see Note 1). The ELT must then be reset by pressing either the RESET push button located on the ELT main unit or the ELT Remote Unit.

**Note:**

This is not a measured check. It only indicates that the G-Switch is working.

**Note:**

In normal configuration, the main switch on the ELT Main Unit must be selected to the "ARM" position. Whenever both the Green ON lights (located on the Main Unit and the Remote Switch Unit) flash and the Buzzer sound periodically, they indicate the ELT is transmitting.

If the ELT be accidentally activated by turbulence, hard landing, etc., or if this occur under any conditions other than an accident requiring immediate assistance, pressing the RESET button on the Remote Switch Unit.

If the Aircraft is on the ground and the RESET button on the Remote Unit does not cause the Green ON light to extinguish, the RESET button on the Main Unit should be pressed. If airborne and the RESET button on the Remote unit does not cause the Green ON LIGHT to extinguish, the main switch on the ELT should be set to the OFF position, if the ELT is accessible.

If the ELT is not accessible in flight, you should land at the nearest suitable airport and set the Main Switch to the OFF position. In either case, the unit should be inspected by qualified facility as soon as possible.

The Aircraft may be operated with the ELT removed for inspection or repair subject to the conditions of FAR 91.52.

In the event of an accident, ensure that the External Aircraft Antenna has no damage.

**Important:**

**If the ELT is accessible after the accident, place the Main Switch in the ON position and monitor it on 121.5 MHz for proper operation if possible.** If the Antenna is broken off of the Aircraft, the ELT Unit should be removed and the portable antenna to be used. If the ELT Unit is to remain at the Aircraft site, it should be placed on a large metallic portion of the airframe with its Antenna pointing skyward. The Green ON lights should be flashing after the accident.

If the ELT is to be taken along as the Portable Unit when leaving the scene of the accident, place the Main switch in the ON position and keep the Antenna vertically oriented as much as possible. The ELT Green ON light should be flashing.

**2.3.4 Green ON Lights and Buzzer Sound Functions:**

Green ON lights, located on the ELT main unit and remote switch unit:

- In **ON** mode: Green ON LED flashes continuously (1 second ON, 4 second OFF) and the Buzzer sound periodically. This is to indicate that the ELT has been manually activated.
- In **ARM** mode: Green ON light flashes continuously (1 second ON, 4 second OFF) and the Buzzer sound periodically. This is to indicate that the ELT has been automatically activated by the G switch.

**2.3.5 TRANSMITTER FUNCTIONAL TEST FOR ELT-(S) ONLY:**

The ELT-(S) should be tested every month.

**2.3.5.1 Main Switch ON / OFF / SELF TEST Operation:**

The ELT-(S) has an "OFF" position. This allows the beacon to be handled or shipped without 'nuisance' activation. Care should be taken when transporting or shipping the ELT-(S) not to move the switch or to allow packing material to become lodged such as to toggle the switch.

Main Switch, alternate / alternate / momentary positions:

- **"ON:"** Alternate position. ELT-(S) transmits immediately. Green ON light on the main unit flashes, 1 second ON, 4 seconds OFF.
- **"OFF:"** Alternate position. The ELT-(S) is turned off.
- **"SELF TEST:"** Momentary position. ELT-(S) self-test is confirmed after the switch is held for 25 seconds. If the self-test is passed, the Green ON light must be extinguished. The ELT-(S) system is fully self-tested.

### 2.3.5.2 Transmitter Self-Test:

Turn and hold the main switch, from the "OFF" position to the "SELF TEST" position. The Green ON light shall illuminate for 4 seconds then extinguish. This is to allow coding programming during next 20 seconds window and self-test for 1 second thereafter.

The ELT-(S) may be coding programming during the aforementioned 20 seconds window period. If no programming happened the ELT will then enter the Self Test Mode for 1 second thereafter.

Self-test results after  $(4+20+1) = 25$  seconds, is:

**If the self-test is passed**, the Green ON LIGHT is steadily extinguished.

**If the self-test is failed**, the Green ON LIGHT flashes as shown below:

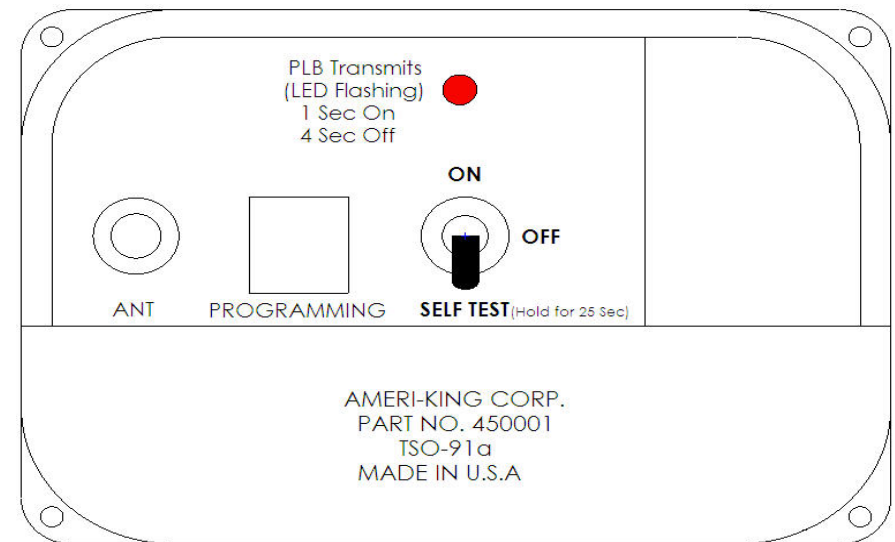
- 
- 1 flash:** Internal Data stored in Memory at fault.
- 2 flashes:** Distress ID stored in Memory at fault.
- 3 flashes:** Battery voltage is low < Useful Life Battery Voltage setting.
- 4 flashes:** Vcc supplies for F3, F2, or F1 at fault.
- 5 flashes:** F3 RF power level < 33 dbm @ 406.028 MHz
- 7 flashes:** F1/F2 VHF RF power level < 17 dbm @ 121.5/243 MHz.
- 9 flashes:** PLL locked in F3 or F1 or F2 at fault.
- Continuous flash:** no F3/F2/F1 RF output power, ELT shuts down completely.

#### Note:

The self-test mode that transmits a 406 MHz test code pulse monitors certain system functions before returning to the SELF TEST mode. The 406 MHz test pulse is ignored by any satellite that receives the signal, but the ELT-(S) uses this output to check output power and correct frequency.

- Self-test is 520 ms long message burst on the 406 MHz signal. Synchronization pattern is 011 010 000.
- Self-test is then 121/243 MHz (VHF) Continuous Wave during 1s.

The ELT-(S) may accept GPS position input by connecting the external GPS to the Remote connector



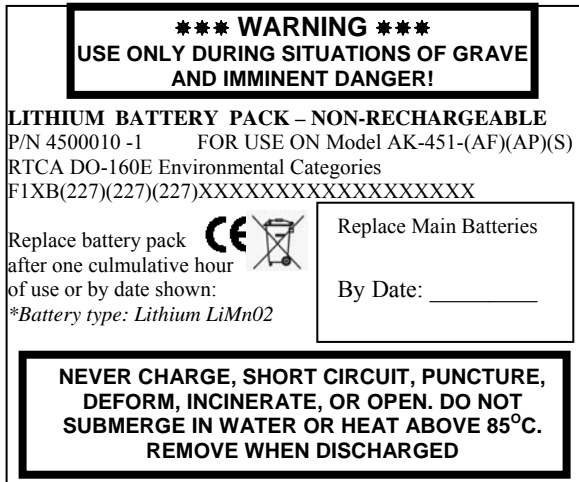
ELT-(S) Top Label



**Figure 7:** ELT-(S) complete assembly with antenna



Front label



Back label

## SECTION III INSTRUCTIONS FOR CONTINUED AIRWORTHINESS (ICA):

### 3.1 PERIODIC MAINTENANCE (INSTRUCTIONS FOR CONTINUED AIRWORTHINESS):

**REFERENCES:** FAR Part 91.52, Part 91.169, Part 43 Appendix D (i).  
FAR Part 91.207 Paragraph (d)  
FAR Part 91.407 Appendix D (i)

**PURPOSE:**  
To insure continued reliability of your ELT, it must be inspected for damage and wear which could be caused by age, exposed elements, vibrations, etc. Even the best designed equipment, if not properly maintained and cared for, will eventually fail.

**IMPORTANT NOTES:**  
The following inspections must be performed, **a minimum of one time every year:**

**3.1.1 Secure Inspection:** Inspect the ELT Main Unit and Mounting Tray to insure all fasteners and mechanical assemblies are secure.

**3.1.2 Corrosion Inspection for Coaxial Cable:** Inspect the Coaxial Cable connecting the ELT Main Unit to the Antenna for cuts or abrasions on its outer jacket. Disconnect the BNC connectors on each end. Examine both the BNC connectors and the mating plug on the Antenna and the ELT Main Unit for any signs of corrosion.

**3.1.3 Corrosion Inspection for Remote Wiring Modular Cable:** Inspect the Remote Wiring Modular Cable, connecting the ELT Main Unit to the Remote Unit of signs of wear or abrasion on its outer jacket. Remove the Modular Connecting Cable and inspect and jack and plug assembly for corrosion.

**3.1.4 Expiration Date Check:** Check the expiration date of the ELT Main Unit and the Remote Unit Batteries. Replace if necessary.

**3.1.5 Battery Leakage Check:** Disassemble the ELT to inspect the Battery Compartment for signs of corrosion or battery leakage. If any battery leakage is present, the battery Assembly must be replaced. **The Battery useful life is 5 years.**

**3.1.6 Operational Test:** After completing the above inspections, a Functional Test as described in Paragraph 2.3 must be performed to verify proper operation.

**3.1.7.1 G-Switch Check:** Ensure that the Main Switch on the ELT main unit must be selected at “ARM: position at all times. Activate the ELT using applied force. The direction for mounting and force activation is indicated on the ELT. The AK-451-(AF)(AP) ELT can be activated by using a rapid forward (throwing) motion coupled

by a rapid reversing action. Verify that the ELT has been activated by use of the Wattmeter, the Airplane's VHF Radio Communications Receiver when tuned to 121.5 MHz, or other means (see Note 1). The ELT must then be reset by pressing either the RESET push button located on the ELT main unit or the ELT Remote Unit.

**Note 1:**

This is not a measured check. It only indicates that the G-Switch is working.

**3.1.7.2 Antenna Check:** A low quality AM Broadcast Radio Receiver should be used to determine if energy is being transmitted from the Antenna. When the Antenna of this Radio (tuning dial on any setting) is held about 6 inches from the activated ELT Antenna, the ELT Aural tone will be heard (see notes 2 and 3). The ELT must be reset by pressing either the RESET push button located on the ELT Main unit or the ELT Remote Unit.

**Note 2:**

This is not a measured check, but it does provide confidence that the Antenna is radiating with sufficient power to aid search and rescue. The Aircraft's VHF Receiver, tuned to 121.5 MHz, may also be used. This Receiver however is more sensitive and could pick up a weak signal even if the radiating ELT's Antenna is disconnected. Thus, it does not check the integrity of the ELT System or provide the same level of confidence as does an AM Radio.

**Note 3:**

Because the ELT radiates on the emergency frequency, the Federal Communications Commission allows these tests to be conducted only within the first 5 minutes after any hour and limits the tests to 3 sweeps of the Transmitter Audio Modulation.

**IMPORTANT NOTE:**

IN NORMAL CONFIGURATION, THE MAIN SWITCH, LOCATED ON THE ELT MAIN UNIT, MUST BE SELECTED AT "ARM" POSITION AT ALL TIMES.

**3.1.8 Verification of Digital Message**

**Note:**

**This test is not mandatory per FAR 91.207(d) however Ameri-King strongly recommends that it be performed as part of periodic maintenance, at least every year.**

Verify the 406 MHz digital message using a Computer Test Set capable of receiving and decoding the message. Ameri-King suggests the Ameri-King ELT Computer Test Set P/N TS-451. Contact your local Ameri-King dealer for availability of the Computer Test Set or call Ameri-King. Follow instructions provided with the computer test set.

The AMERI-KING AK-451 has a self-test feature, which is encoded such that it will be ignored by the SAR satellite system. This 15-digit number is used to register the ELT with the appropriate 406 MHz ELT registration authority. In the US, the National Oceanic and Atmospheric Administration (NOAA) maintain the database of registered ELT's.

**Note:**

For the following example, the programming protocol is assumed to be Standard Location Protocol, ELT with C/S type approval number and Serial Number (Long Message.) Other protocols are possible and the exact read-outs of the Computer Test Set will vary. Refer to the applicable operation manual included with the Computer Test Set or contact AMERI-KING for assistance.

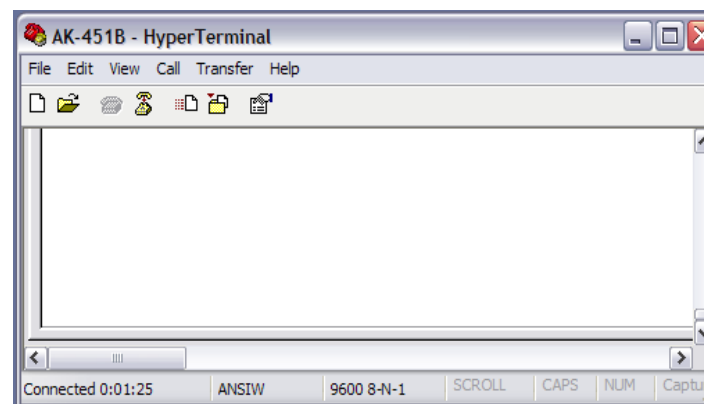
To verify the digital message, perform the following steps:

**Setup**

Use provided cable to connect the ELT (RJ-12 port) to the PC (USB port)

**3.1.8.1 ELT ID Reading**

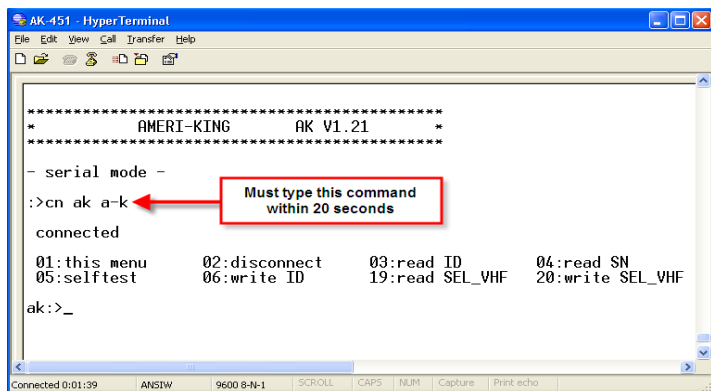
Step 1: Double-Click AK451 Icon to run the program. The programming window appears as below:



**Note:** If you don't see the window above, you may try the other USB port.

- Step 2: Set the ELT main switch to "ARM" position.
- Step 3: Verify the LED 'ON' light illuminates for 4 seconds.
- Step 4: At the ":>" prompt, type: "Password" command then press "Enter" to go to main menu. Must type this command within next 20 seconds after the command prompt appears.

**Note:** If there is no programming command input in this time window, the ELT will enter the Self-Test mode, and you cannot program the ELT. In this case, set the ELT switch to “OFF” position and start again from step 2.2.



Step 5: To read ELT ID: Use command “ 03 “

Step 6: View message, ensure that all applicable information is correct (country code, aircraft ID, etc.).

Step 7: The 15 digit ID hex ID (for example "2E28598228FFBFF") should match what is shown on the ELT product label. This is the 15 digit hex ID (Unique Identification Number or "UIN") that is used to register the ELT.

### 3.1.9 Verification of Registration

#### **Note:**

**This verification is not mandatory per FAR 91.207(d) however Ameri-King strongly recommends that it be performed as part of periodic maintenance, at least every year.**

Check ELT for signs of registration.

In the US, NOAA supplies a beacon registration label that is applied to the ELT when it is registered. The following address should be used to register and obtain information on how to register 406 MHz ELT's in the United States:

SARSAT BEACON REGISTRATION  
E/SP3, RM 3320, FB-4  
NOAA/NESDIS  
5200 Auth Rd.  
Suitland, MD 20746-4304  
<http://www.sarsat.noaa.gov/>

The Ameri-King website also contains information on registering beacons in other countries

<http://www.Ameri-King.com>

NOTICE; FOR ELTS THAT HAVE A COUNTRY OF REGISTRATION OTHER THAN THE USA, PLEASE CONTACT THE APPROPRIATE CIVIL AVIATION AUTHORITY IN THAT COUNTRY FOR GUIDELINES AND DOCUMENTATION NEEDED TO ASSURE PROPER REGISTRATION

#### **Logbook Entry:**

Enter the date the test technician's initials and whether the ELT passed or failed into the aircraft's logbook.

### 3.1.10 Verification of ELT/GPS interface (if equipped)

#### **Note:**

**This test is not mandatory per FAR 91.207(d) however Ameri-King strongly recommends that it be performed as part of periodic maintenance, at least every year.**

#### 3.1.10.1 ELT to GPS Interface Information

For details on the operation and use of the ELT Computer Test Set TS-451, please contact Ameri-King Corporation to request the brochures and Operation Manual for the ELT Computer Test Set.

When used with ELT's that are programmed for Standard Location 24 bit protocol, the ELT to be program itself to the aircraft's 24 bit address. This feature will allow the ELT to be transferred between aircraft. This makes maintenance of the ELT a simple matter of replacing the ELT. Note: There is no electronic connection between TCAS or Mode S systems and the ELT, only the ID number is common.

The AK-451 receives position data (longitude and latitude) from the aircraft's on-board GPS system. The ELT may be programmed with the aircraft's 24 bit address. When used with ELT's that are programmed for long message 24 bit protocol, which is set up to match the 24 bit address parity of the Mode S surveillance and communications system switch block.

Note: There is no electronic connection between TCAS or Mode S systems and the ELT, only the ID number is common. This feature was implemented in the ELT with fleet operators in mind. ELT's are programmed with either a serialized or 24 bit protocol. The ELT transmits position data as part of the 406.025 MHz distress message.

In the event of a crash, the ELT will transmit the converted position information from the navigation system, such as the GPS flight management computer, loran, etc. Geostationary satellites constantly monitor the 406.025 MHz transmissions. The crash

site is instantly known due to the aircraft's navigation system position data communication with the ELT. Without the position data being transmitted, it is necessary for the polar orbiting satellites to pass overhead, using Doppler Shift technology to determine position. In a worst case scenario this could be a 3 to 4 hour wait for a polar orbiting satellite to pass over. In addition, the accuracy of the position fix is much better i.e. 22 meters (with GPS/Nav Position data) versus 1 to 2 kilometers for the standard 406.028 MHz system (without GPS/NAV Position data).

The ELT accept Aviation RS-232 data bus formats. By reprogramming the ELT with the aircraft's 24 bit identification or serialized (long message format), this facilitates moving the ELT from one aircraft to another when performing routine maintenance, etc

**WARNING:** The programming and labeling of the ELT must match the aircraft it is installed in. The product label will have to be re-marked to reflect the new programming and/or country of registry if a 24-Bit address long message protocol ELT is reprogrammed .

Re-registration may not be required if the contact information does not change, however, contact your local civil aviation or beacon registration authority when in doubt.

**Both serialized long message and 24-Bit address long message, re-programmed ELT, that is moved to another aircraft, shall need to be re-registered via On line or via Post mail.**

The user must specify 24-bit long message programming when ordering the ELT. Changing the programming protocol of the ELT can only be done at Ameri-King or an authorized Ameri-King Repair Station.

### 3.1.10.2. ELT/GPS Interface Communication Formats

The only Aviation RS-232 format which is supported is limited to the following conditions:

<b>Baud Rate (fixed):</b>	9600
<b>Parity:</b>	None
<b>Data Bits:</b>	8
<b>Stop Bits:</b>	1

In addition the RS-232 format must have a Start of Text (STX): an "A" identifier for latitude; a "B" identifier for longitude and END of Text (ETX). The format expects carriage returns but will not operate if there are line feeds.

The following manufacturer's navigation systems are known to interface with the AK-451:

#### **GARMIN INTERNATIONAL INC.:**

- All Series: 150/ 250/ 400/420/430/ 500/520/530

#### **HONEYWELL BENDIX-KING INC.:**

- KLN 88, KLN89, KLN89B, KLN 90, KLN90B, KLN94, KLN900.

#### **ARNAV SYSTEMS INC.:**

- R50, R50i, STAR 5000, FMS 5000, MFD (Multi-Functional Display).

#### **II MORROW:**

- FLYBUDDY, 2001 NMS

#### **TRIMBLE NAV INC.:**

- NAV 1000, NAV 2000, TNL 2100, and TNL3100. The following Trimble systems all require a RS-422 to RS-232 adapter: NAV 3000, TNL 1000, TNL 2000, TNL 2000A, TNL 3000, 2000 APPROACH, 2000 APPROACH PLUS, 2101 APPROACH, 2101 APPROACH PLUS, 2101 I/O APPROACH, 2101 I/O APPROACH PLUS.

For other equipment models contact that equipment manufacturer to determine if their equipment supports the Aviation RS-232 format specified above.

### 3.1.10.3 ELT/FMC Interface and Checkout Process

All installation processes and interconnections to navigation systems should adhere to the guidelines set forth in the FAA Advisory Circulars AC43.13-1A, 43.13-2A, 20-130A and 20-138, or later revisions of these documents. It is very important that the Global Positioning System/Flight Management Computer (GPS/FMC) manufacturer's installation instructions be consulted regarding installation details that may be specific to the GPS/FMC. Refer to the installation instructions specific to the GPS/FMC that you are connecting the ELT for specific instructions.

For all testing of the 406 MHz output, only the "test message" that is transmitted at turn off is required to verify the ELT and ELT/GPS Interface function.

Note: It is extremely important that the ELT/GPS Interface installation not be in conflict with the GPS/FMC manufacturer's installation instructions in order to avoid an installation that may degrade the GPS/FMC performance. As a result, the Post Installation checkout in the GPS/FMC Installation Manual may be followed after installing the ELT.



### 3.1.10.4 24-Bit Address Installation Test (mandatory for Installations reprogramming by Ameri-King's authorized dealer):

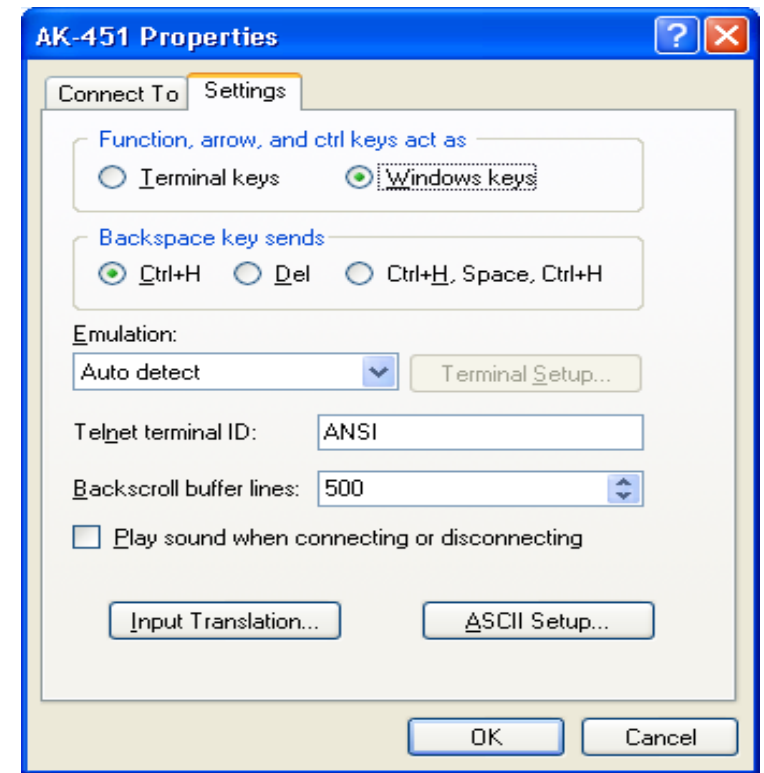
Verify the 24 Bit Address by using the ELT Computer Test Set TS-451. The 15 digit hex code shall be extracted by using the Computer Test Set or equivalent. Realize that the AK-451 transmits a 406 MHz test message, which is encoded such that it will be ignored by the SAR satellite system. This 15-digit number is used to register the ELT with the appropriate 406 MHz ELT registration authority. In the US, the National Oceanic and Atmospheric Administration (NOAA) maintains the database of registered ELT's.

**Note:** Although a typical 15 digit hex code can contain position data, the 15-digit ID used for registration purposes shall contain the "default" value of no position data instead (this is indicated by the last 5 digits of the 15 digit hex code being "FFBFF").

### 3.1.10.5 GPS Position Test, (if equipped) (for using TS-451 Computer Test Set only) :

This test must be conducted inside a RF shielded room or an ELT RF shielded box. Connect the AK-451 with ELT Computer Test Set TS-451.

Turn the switch of the ELT to "ON" position.  
Verify the following setting (See Figure 20.) From the Hyper Terminal window (or the equivalent RS-232 window), Click File -> Properties -> Settings tab. Click OK of go back to Hyper Terminal window.



**Figure 8:** Verify parameter setting.

Waiting for 50s, verify the 36 Hex digits (ignore first 6 digits). The last 30 Hex digits will be used for Cospas-Sarsat Decode program, in order to see the Latitude, Longitude Position.

#### **Note:**

When used with ELT's that are programmed for Standard Location 24 bit protocol, the ELT to be program itself to the aircraft's 24 bit address. This feature will allow the ELT to be transferred between aircraft. Re-register the ELT with the Search and Rescue authority is required. This makes maintenance of the ELT a simple matter of replacing the ELT. Note: There is no electronic connection between TCAS or Mode S systems and the ELT, only the ID number is common.

### 3.2 PERIODIC MAINTENANCE (INSTRUCTION FOR CONTINUED AIRWORTHINESS FOR CANADIAN INSTALLATION):

#### REFERENCES:

Canadian Aviation Regulations CAR Standards: Part V – Airworthiness Manual AWM 571: Appendix G.

#### PURPOSE:

Instructions for continued airworthiness, which shall include as a minimum, details of approved batteries and sources of supply; battery replacement or recharge instructions; battery capacity test procedures, if applicable; transmission or functional test procedures; procedures necessary to accomplish the performance tests specified in Chapter 571 Appendix G ; and for 406 MHz ELTs, instructions to verify the aircraft 24 bit address or serialized protocol as applicable;

#### Appendix G

- (a) Corrosion Inspection
- (b) Operational Testing
- (c) Performance Testing
- (d) Battery Replacement and Recharging
- (e) Shipping

#### IMPORTANT NOTES:

The ELT must be “performance tested within the 12 month period preceding installation in an Aircraft and within 12 months intervals thereafter...”

**The following Supplemental Installation and Periodic Maintenance requirements must be complied with, when installing the Model AK-451 ELT in Canadian Aircraft:**

#### SUPPLEMENTAL INSTALLATION

Installation and maintenance of the ELT must comply with Transport Canada Airworthiness Manual Chapter AWM 551.104 (f)(4) Transmitter Remote Control

A Placard shall be fabricated and installed near the Remote Unit which states:

**FOR AVIATION EMERGENCY USE ONLY UNAUTHORIZED OPERATION PROHIBITED**

### PERIODIC MAINTENANCE (at least every year)

#### Note:

- \* These tests should be performed only within an RF Screen Room or Facility providing shielding of RF Emissions.
- \* Using of ELT Test set TS-451 or equivalent test equipment is acceptable

#### 3.2.1 Regular Periodic Maintenance Test

Perform Periodic Maintenance Test per paragraph 3.1 above, including all Test paragraphs 3.1.1 through 3.1.10.

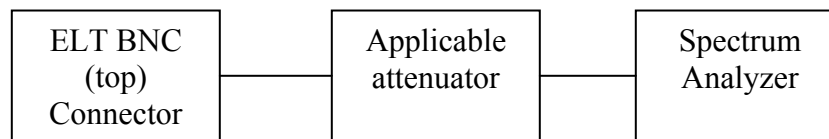
In addition to the Periodic Maintenance requirements prescribed in Paragraph 3.1, the following **Performance Testing** must be performed, at least every year, to comply with Canadian Aviation Regulations CAR Standards: Part V – Airworthiness Manual 571: Appendix G.

#### 3.2.2 Power Output Test, Performance Testing

**NOTE: Using of ELT Test set TS-451 or equivalent test equipment is acceptable**

##### 3.2.2.1 121.5/243.0 MHz Power Output:

Connect the equipment as shown below:



#### Note:

Use as fresh battery pack (12.5 ± 0.5 VDC nominal) or a 2 amp, 12.5 VDC power supply as power source.

The test equipment specified in the following steps is only a recommendation. The use of other manufacturer's models of test equipment capable of providing equivalent measurement results is acceptable.

Set the Spectrum Analyzer as follows:

- Center freq: 121.5 MHz
- Span: 1 MHz
- Resolution bandwidth: 1 MHz
- Vertical display: 10dB/Div
- Sweep: Auto
- Peak/Avg: Peak
- Reference level: 30 dBm
- Time/Div: 20ms

Adjust the reference amplitude to place the peak of the carrier slightly above the top graticule fine.  
 Enable the "fine" amplitude adjustment. Set the carrier peak to exactly the top of the reference line.  
 Read the displayed amplitude.

Repeat for the 243.0 MHz harmonic (change the "Center Frequency" to 243.0 MHz. All other settings remain the same).

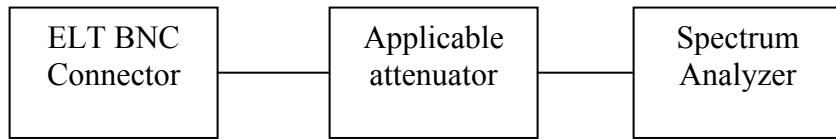
The minimum allowed amplitude on 121.5 MHz and 243.0 MHz is 20 dBm, after 3 minutes of operation.

**3.2.2.2 406.028 MHz Power Output:**

**Note:**

The power output is approximately (35 – 39) dBm. Ensure adequate attenuation is inserted in-line between the ELT's 406.028 MHz output and the input to the spectrum analyzer to protect the analyzer's input circuitry.

Connect the equipment as shown below:



Set the Spectrum Analyzer as follows:

- Center freq: 406.028 MHz
- Span: 1 MHz
- Resolution bandwidth: 1 MHz
- Vertical display: 10dB/Div
- Sweep: Auto
- Peak/Avg: Peak
- Reference level: 30 dBm
- Time/Div: 20ms
- Max hold: On
- Attenuator (as required) on Input

Turn the ELT on and wait approximately 50 seconds for the 406.028 MHz transmitter to turn on (transmitter sends out first signal at 50 seconds then every 50 seconds thereafter). Determine the power output from the stored waveform.

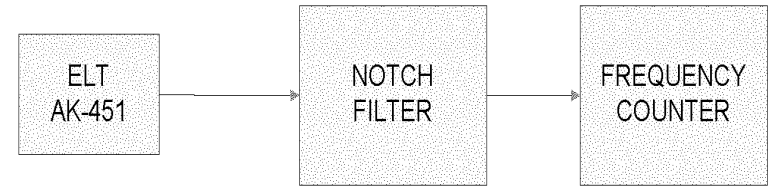
The 406.028 MHz power output should be (35-39) dBm (3.16 W min to 7.94 W max), after 3 minutes of operation.

**3.2.3 Frequency Test / Current Draw Test, Performance Testing:**

**NOTE: Using of ELT Test set TS-451 or equivalent test equipment is acceptable**

The ELT Transmitter frequency may be measured as follows:

**3.2.3.1 Connect the Frequency Counter as shown below:**



**3.2.3.2 Measure the 121.5 / 243.0 MHz frequency:**

Select the Notch filter as appropriate, i.e. 243 notch when measuring 121.5 MHz. The ELT should be within 50ppm ( $\pm 6.075$  KHz) of 121,500,000 Hz.

Repeat with the 121.5 MHz Notch Filter. The ELT frequency should be within 50 ppm ( $\pm 12.150$  KHz) of 243,000,000 Hz, after 3 minutes of operation.

**3.2.3.3 Measure the 406.028 MHz frequency:**

Ensure that adequate attenuation rated for 406.028 MHz, 37 dBm and 5 Watts is installed between the ELT's 406.028 MHz output and the input to the frequency counter to prevent damaging the frequency counter's input circuitry.

Set up the equipment as shown below:



Verify an initial frequency of 406.028 MHz +/- 1 KHz, after 3 minutes of operation.

**Note:**

Allow the unit to run 3 minutes, before making the measurement to allow the oscillator to stabilize.

### 3.2.3.4 Current draw tests:

**CAUTION:** The following tests involve measurement of the lithium battery pack. Exercise extreme caution to avoid causing a short circuit condition which will blow the fuse in the battery cell. It is recommended that only an experience technician perform these tests.

A test harness (P/N TS-451-HN-1) may be ordered from Ameri-King Corp. at 714-842-8555

All tests must be performed in an RF screen room or with the ELT in a shielded container that will substantially attenuate the RF signal.

All "ON" state current measurements must be made with the RF outputs loaded with 50 ohms rated for 5 watts (either a resistive load or equipment with 50 ohm impedance padded with 10 dB / 5 Watt attenuator, i.e. a spectrum analyzer).

**NOTE:** the ELT may activate (turn "ON") when the various connections are initially made during the following current tests. This is normal. Press the RESET Switch, to Reset the unit.

#### "OFF" Mode Current Measurement:

- Remove the battery pack as described in Section 2.5.1
- Disconnect the 2-pin harness
- Install the test harness P/N TS-451-HN-1 and inline ammeter as shown in Figure 4-2
- Ensure the ELT is "OFF"
- Measure the current with the ammeter. The measured current should be 0 microamps (uA).

#### "ARM" Mode Current Measurement:

- Measure the current with the ammeter. The measured current should be not more than 20 uA.

#### "ON" Mode Current Measurement:

##### **Note:**

Current draw during this test may exceed 2.0 Amps during the 406.028 MHz burst. Ensure the ammeter is set on the appropriate range to accommodate this level of current.

- Activate the ELT, allow to stabilize, by select ON.
- The measured steady state current should not exceed 150 milliamps (mA). When the 406.028 MHz module is on (generating the 406.028 MHz burst) the current may exceed 2.0 amps.
- Turn the ELT OFF
- Disconnect the test harness P/N TS-451-HN1
- Reconnect the 2-pin module power harness
- Reinstall the battery pack as described in Section 4.3.4

### 3.2.4 AUDIO MODULATION, PERFORMANCE TESTING:

Perform the transmitter tests by activating the ELT and listening on 121.5 MHz. The audio swept tone should "sound" like an ELT.

### 3.2.5 TRANSMITTER FUNCTIONAL TEST:

Perform Transmitter Functional Test per paragraph 2.3 above, including all Test paragraphs 2.3.1 through 2.3.4.

**Note:** All ELT "ON" tests should be performed within the first five minutes of the hour.

### 3.2.6 PERFORMANCE TEST MARKING AND LOG BOOK ENTRY:

Following satisfactory completion of all of the above Performance Testing, the date on which the test was performed shall be marked on the external casing in a legible and permanent manner.

Enter the test date and Technician Initials, as ELT Pass or Fail, into the aircraft Log Book.

### 3.2.7 SHIPPING:

In order to prevent accidental activation of the ELT during transit, the ELT ON/OFF/ARM Main Switch must be set in the "OFF" position.

**Note:** The ON/OFF/ARM Switch is lever locked type.

## PERIODIC MAINTENANCE CHECK LIST WITH COMPLIANCE CROSS REFERENCES

In the United States, minimum maintenance requirements for ELTs are stated in FAR 91.207 paragraph (d): *Each emergency locator transmitter required by paragraph (a) of this section must be inspected within 12 calendar months after the last inspection*. Inspections are also to take place annually per FAR Part 91.409. FAR 43, Appendix D(i) states in part that each person performing an annual or 100-hour inspection shall inspect the components of the ELT.

*In Canada, The periodicity of operational checks is at the operator's discretion, but the check shall only be conducted during the first five minutes of any UTC.*

**NOTE 1:** All references to maintenance requirements for the United States shall also apply to all ELT users outside of the US unless otherwise required by the installer / aircraft maintenance procedures or the relevant national regulations.

**NOTE 2:** Ameri-King suggests Functional Testing of the ELT every 1 to 2 months.

**WARNING :** Do not allow test duration to exceed 5 seconds. A false alarm may be generated.

Any time the ELT is activated, it is transmitting a 121.5 MHz and 243.0 MHz distress signal. If the ELT operates for approximately 50 seconds, a “live” 406 MHz distress signal is transmitted and is considered valid by the Cospas-Sarsat satellite system. Any time that the ELT Main Switch is lifted and flipped from “OFF” to “ARM”, a 406 MHz self test signal is transmitted (after 25 seconds), however it is specially coded as a “self test” signal that is ignored by the COSPAS-SARSAT satellites.

<p><i>FAR 91.207(d); 91.409 and 43 Appendix D.</i></p> <p><i>Transport Canada Civil Aviation Part V Airworthiness Standards Chapter 551.104 (d) (1) (VI)</i></p> <p><b>Battery replacement or recharge instructions</b></p> <p>(Checks are to be performed every year)</p>	<p>1.4.1 ELT Main Battery Replacement instructions</p> <p>1.4.2 ELT Remote Unit Battery Replacement instructions</p> <p>3.1.4 Expiration Date Check</p> <p><b>Note:</b> The Batteries for both Main ELT Unit and Remote Switch Unit are not rechargeable</p>	<p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p>	<p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p>
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REQUIREMENTS	TEST PROCEDURE Paragraphs	TEST RESULT	
		PASS	FAIL
<p><i>FAR 91.207(d); 91.409 and 43 Appendix D.</i></p> <p><i>Transport Canada Civil Aviation Part V Airworthiness Standards Chapter 551.104 (d) (1) (VI)</i></p> <p><b>Details of approved batteries and sources of supply</b></p> <p>(Checks are to be performed every year)</p>	<p><b>Approved Batteries:</b> Main ELT Unit: Ameri-King P/N 4500010 -1 Remote Switch Unit: Duracell DL1/3NB</p> <p><b>Source of Supply:</b> Ameri-King</p>	<p><input type="checkbox"/></p> <p><input type="checkbox"/></p>	<p><input type="checkbox"/></p> <p><input type="checkbox"/></p>



<b>(D) Battery Replacement And Recharging</b>  (Checks are to be performed every year)	1.4.1 ELT Main Battery Replacement Check	<input type="checkbox"/>	<input type="checkbox"/>
	1.4.2 ELT Remote Unit Battery Replacement Check	<input type="checkbox"/>	<input type="checkbox"/>
	3.1.4 Expiration Date Check	<input type="checkbox"/>	<input type="checkbox"/>
	3.1.5 Battery Leakage Check	<input type="checkbox"/>	<input type="checkbox"/>
<b>(E) Shipping</b>	3.2.7 Shipping	<input type="checkbox"/>	<input type="checkbox"/>
<i>Transport Canada Civil Aviation Part V Airworthiness Standards Chapter 551.104 (d) (1) (VI)</i>  <b>Verify the aircraft 24 bit address</b>  <b>This Test is required for Canadian compliance only</b>  (Tests are to be performed every year)	3.1.8* Verification of Digital Message	<input type="checkbox"/>	<input type="checkbox"/>
	3.1.10.4* 24-Bit Address Maintenance Test	<input type="checkbox"/>	<input type="checkbox"/>

- \* **Test Equipment: Test Set TS-451 or equivalent**
- \*\* **Test Equipment: Spectrum Analyzer or equivalent**
- \*\*\* **Test Equipment: DC Current Meter or equivalent**