

INSTALLATION AND OPERATION MANUAL

DOCUMENT NUMBER: 570-4602 REV: E



ELT/NAV INTERFACE

ARTEX P/N: 453-6500



ARTEX AIRCRAFT SUPPLIES, INC.
REGISTERED TO ISO 9001
AND AS9100
FILE NUMBER A10217

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List of Effected Pages

Page #	Date	Reason For Change
Title	06/18/02	DCN 2033 (Added UL logo)
II-1	4/24/98	ECO 811
II-2	11/26/01	DCN 1848
1-1	4/24/98	ECO 811
1-2	10/15/99	ECO 1167
1-3	05/15/00	ECO 1394
1-4	4/24/98	ECO 811
1-5	05/15/00	ECO 1394
1-6	4/28/98	ECO 811
1-7	10/15/99	ECO 1067
2-1	4/24/98	ECO 811
2-2	11/26/01	DCN 1848
2-3	10/15/99	ECO 1067
2-4	4/24/98	ECO 811
3-1	4/24/98	ECO 811
3-2	4/24/98	ECO 811
3-3	11/26/01	DCN 1848
3-4	10/15/99	ECO 1167
3-5	11/26/01	DCN 1848
3-6	11/26/01	DCN 1848
3-7	11/26/01	DCN 1848

List of Effected Pages

Page #	Date	Reason For Change
3-8	11/26/01	DCN 1848
3-9	4/24/98	ECO 811
3-10	05/15/00	ECO 1394
3-11	05/15/00	ECO 1394
3-12	05/15/00	ECO 1394
3-13	11/26/01	DCN 1848
3-14	05/15/00	ECO 1394
3-15	05/15/00	ECO 1394
3-16	06/18/02	DCN 2033
3-17	05/15/00	ECO 1394
3-18	05/15/00	ECO 1394
3-19	05/15/00	ECO 1394
4-1	4/24/98	ECO 811
4-2	05/15/00	ECO 1394
4-3	10/15/99	ECO 1167
4-4	4/24/98	ECO 811
5-1	4/24/98	ECO 811
5-2	05/15/00	ECO 1394
5-3	05/15/00	ECO 1394
5-4	11/26/01	DCN 1848
6-1	4/24/98	ECO 811

List of Effected Pages

Page #	Date	Reason For Change
6-2	11/26/01	DCN 1848
A-1	11/26/01	DCN 1848
A-2	11/26/01	DCN 1848

REVISION HISTORY

REVISION	DOCUMENT CHANGE NOTICE	DATE
-	RELEASE	2/10/98
A	ECO 811	4/24/98
B	ECO 887	7/23/98
B	ECO 948	10/14/98
C	ECO 1167	10/15/99
D	ECO 1394	05/15/00
D	DCN 1748	07/19/01
D	DCN 1791	09/19/01
E	DCN 1848	11/26/01
E	DCN 1968	04/12/02
E	DCN 2033	06/18/02

Table Of Contents

System Description	1-1
Abstract	1-2
System Advantages	1-2
System Component Description	1-2
ELT	1-3
ELT/NAV Interface	1-3
Antenna	1-3
Remote Switch Panel	1-3
Coax Cables	1-3
Figure 1-1 Outline Drawing	1-4
Navigation System	1-5
Figure 1-2 System Diagram	1-7
System Operation	2-1
Power up	2-2
Normal	2-2
Programming	2-2
ELT w/o NAV Programming	2-3
NAV ELT Programming	2-4
Position Determination	2-4
Standard ELT Position Determination	2-4
NAV Position Determination	2-4
Installation	3-1
TSO C126 Paragraph D Requirements	3-2
Introduction.	3-2
FAA Requirements	3-2
Canadian Requirements	3-3
ELT/NAV Interface Mounting Locations.	3-3
Figure 3-1 Installation Overview	3-4
Installing the ELT/NAV Interface.	3-5
Figure 3-2 Installation Details	3-6
Wiring the ELT/NAV Interface (453-6500)	3-7
Figure 3-3 Wiring Details	3-7
Fabricate the Interface to ELT Cable	3-8

ELT/NAV Interface Manual

Figure 3-4 Connector Assembly 3-9
Connecting the Interface to 24-Bit Address 3-10
ARINC 429 Data Input 3-11
RS-232 Data Input 3-11

ELT/NAV Interface Installation Test . 3-12
Recommended Minimum Performance Test 3-12
24 Bit Address Installation Test 3-13
Figure 3-5 ICAO 24-Bit Address Conversion 3-17
Figure 3-6 ELT/NAV Interface Wiring Diagram 3-19

Periodic Maintenance 4-1
Connector Corrosion 4-2
Self-Test Check. 4-2

Specifications & Approvals. 5-1
Electrical Specifications. 5-2
Environmental Specifications 5-3
Physical Specifications 5-3
Approvals. 5-4

System Part Numbers 6-1
System Part Numbers 6-2

Appendix A A-1
List of Compatible ELT's. A-2

System Description

ELT/NAV Interface Manual

1.1 Abstract

This document provides operational and installation instructions for the ELT/NAV Interface unit. The ELT/NAV Interface unit has the capability to send position data (latitude & longitude) to the ELT for transmission to the satellite when activated. It also is able to reprogram the ELT 24-bit address in the event that the ELT is replaced with an other, usually during routine maintenance. The ELT/NAV Interface is available for three different installation configurations, these options are listed below:

- ELT/NAV with 24-bit auto re-programming and NAV position
- ELT/NAV with NAV position only
- ELT/NAV with 24-bit auto re-programming only

1.2 System Advantages

The ELT/NAV Interface system contains a number of significant advantages over older technology ELT systems.

- Instantaneous Display of Position through Geostationary Satellites
- Greater Position Accuracy
- Separate Determination of Beacon Position
- Position Data from a Single Beacon Transmission
- Allows 24 bit long message ELT's to be replaced without manual Reprogramming
- Resolution of Doppler Ambiguity from Polar orbiting Satellites.

1.3 System Component Description

The Artex ELT/NAV Interface system consists of the following components:

- ELT Transmitter
- ELT/NAV Interface
- ELT Antenna
- Remote Switch
- Coax Cables

ELT/NAV Interface Manual

In addition there must be a navigation system already installed onboard the aircraft with either an ARINC 429 or RS-232 output that the ELT/NAV Interface unit can be connected to.

1.3.1 ELT

In the event of a crash, the ELT will transmit the converted position information from the navigational system, GPS flight management computer, etc. Because the geostationary satellite constantly monitors the 406.025 MHz transmissions, the position of the crash site is instantly known. Without the navigation system's position it is necessary to wait for a Low Earth Orbit (LEO) satellite to pass overhead for the plane's position to be known. The ELT Installation and Operation Manual may be consulted for more detailed information.

1.3.2 ELT/NAV Interface

In order for the ELT to recognize the position information it must be in a format that the ELT can understand. A navigation system input to the ELT/NAV Interface must be provided that will support either ARINC 429 or RS-232. The ELT/NAV Interface function is to filter and convert the navigation system information to position data the ELT can recognize. The ELT/NAV Interface also may be utilized to automatically encode the aircraft's 24-Bit Address for ELT's programmed for 24-Bit Address long message protocol.

1.3.3 Antenna

Artex has several externally mounted antennas that may be used with Artex 406 MHz ELT's, including various Rod and Blade Antennas. The ELT Installation and Operation Manual may be consulted for more detailed information.

1.3.4 Remote Switch

The ELT system must contain a remote switch with an annunciator to reduce the chance of the ELT being activated without the pilot being aware of its activation. The ELT Installation and Operation Manual may be consulted for more detailed information. Consult the Artex Sales Department for information on remote switch options.

1.3.5 Coax Cables

The coax cables pass the RF energy from the ELT to the

ELT/NAV Interface Manual

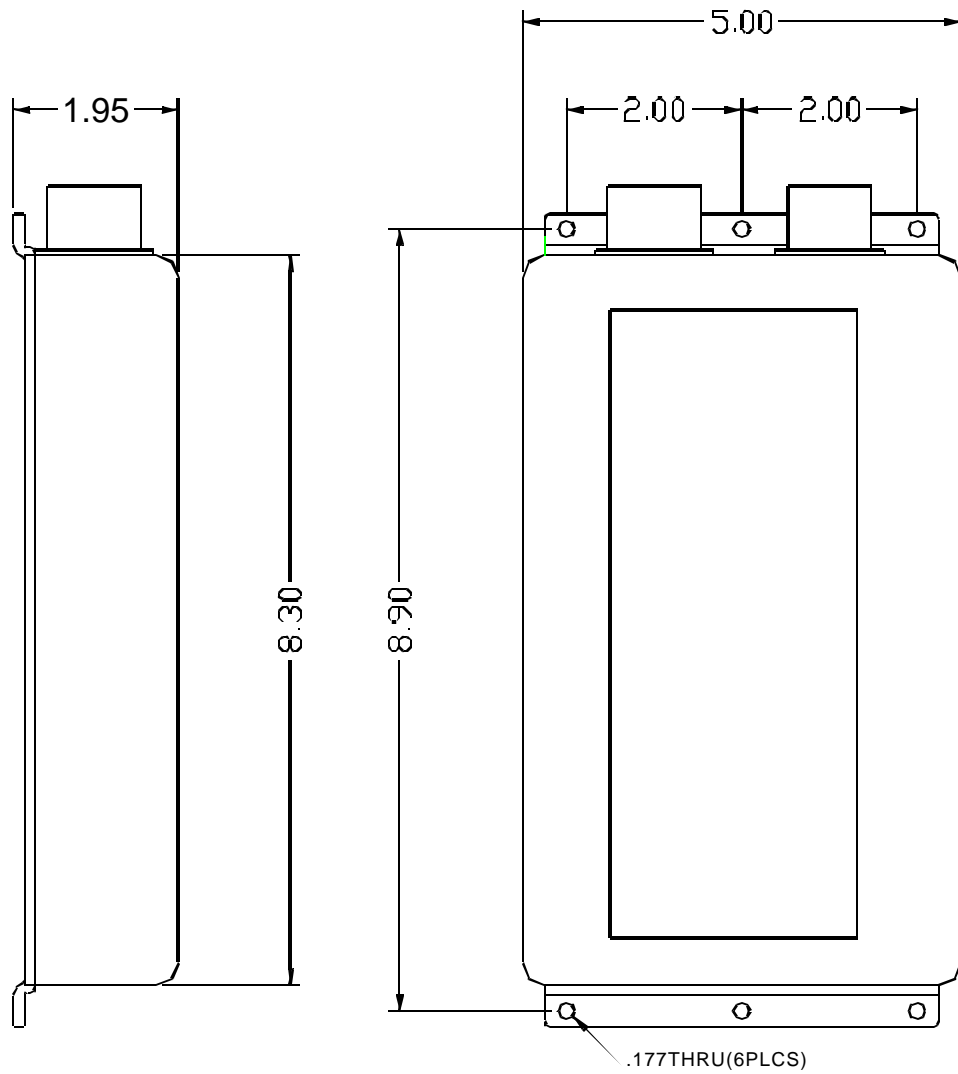


Figure1-1 ELT/NAV Interface OutlineDrawing

ELT/NAV Interface Manual

an antenna and must match the transmitter to the antenna. Artex coax cables contain fire resistant insulation that must withstand the TSO flame test and continue to operate. Optional coax cables with varying lengths can be supplied by Artex. The ELT/NAV Interface Installation and Operation Manual or the Artex Sales Department may be consulted for more detailed information.

1.3.6 Navigation System

The navigation system receiver receives satellite signals, information from ground stations, and onboard inertial navigational systems. With this information, the navigation system calculates a latitude and longitude position which is sent to the ELT/NAV Interface via the ARINC 429 or RS-232 data line.

ELT/NAV Interface Manual

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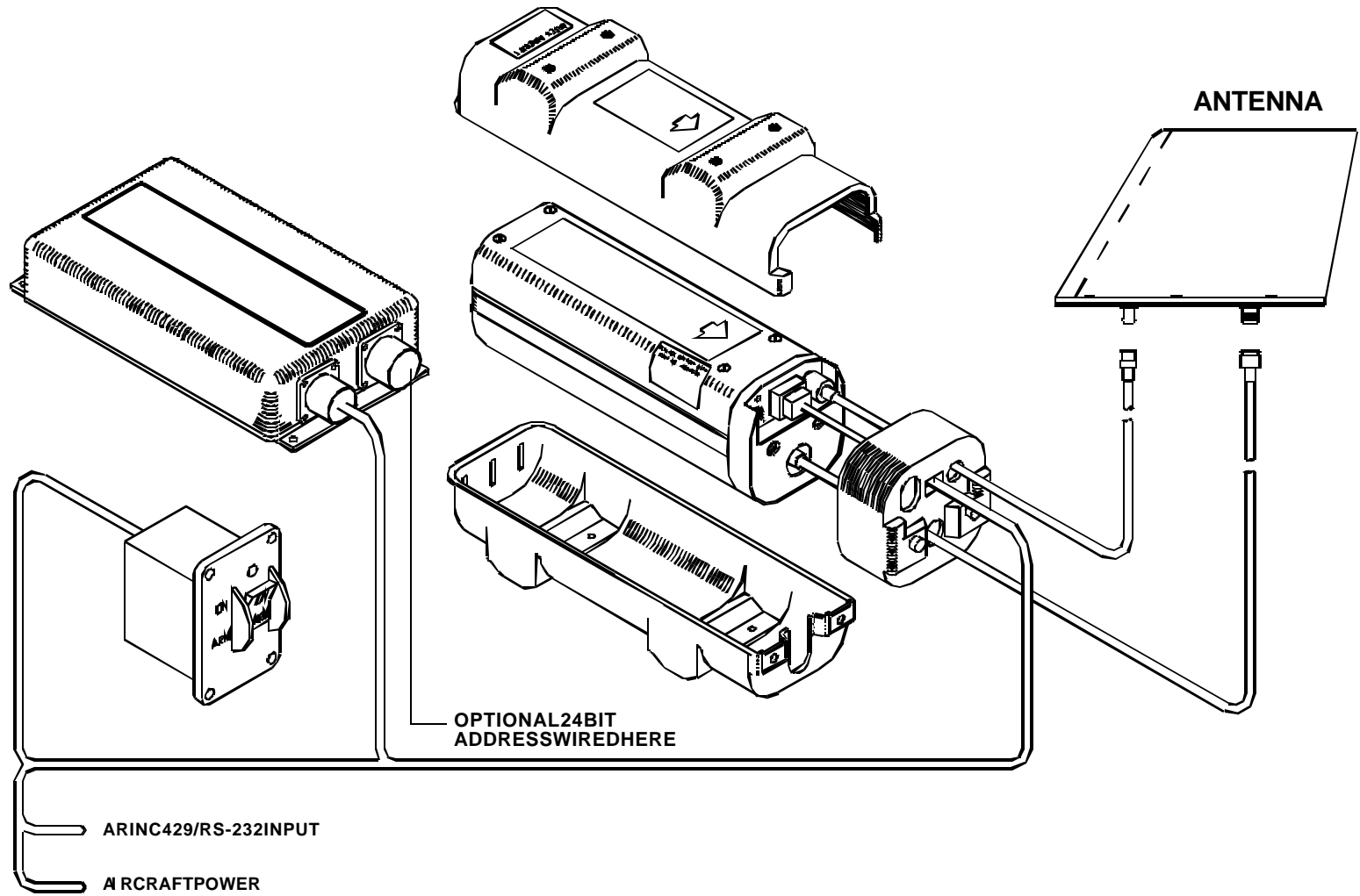


FIGURE 1-2 ELT/NAV System Diagram

System Operation

ELT/NAV Interface Manual

2.1 Power up

Upon power up the ELT/NAV Interface reads the ELT 24-bit address data and compares it to the 24-bit address data hard wired to the ELT/NAV Interface. If it finds a difference, the ELT/NAV Interface re programs the ELT to the data it read from the hard-wired installation. In the event that the two sets of data are identical, no action is taken. If the 24-bit address is not used, the ELT/NAV Interface will not attempt to read the 24-bit address on the ELT and will only program the ELT with the latest navigational position available.

2.2 Normal

The ELT/NAV Interface receives position data either from the ARINC 429 or RS-232 input and converts it to a format the ELT is able to read. After conversion, the data is forwarded to the ELT via a second RS-232 port. The ELT stores the position data in RAM and waits for an activation signal indicating: 1) that the aircraft has crashed, or 2) that the ELT has been manually turned on. If it receives an activation signal, the position data as well as the programmed identification data is transmitted to Search And Rescue (SAR) satellites. If the ELT does not receive an activation signal, then the next position update writes over the old position data and waits for the ELT to be turned on manually or by a crash signal. If power to the ELT/NAV Interface is lost, the ELT will hold the last known position data for 30 seconds and must be activated within that time to transmit position information.

2.3 Programming

2.3.1 ELT Programming without ELT/NAV Interface

The previous version of 406 ELT without the ELT/NAV Interface was programmed at the factory with one of four possible protocols listed below:

- ELT Serialized Identification
- Aircraft Nationality and registration Marking
- Aircraft Operator and Serial Number
- Aircraft 24-bit address

11/26/01

Page 2-2

The protocol used depends on the requirements of the country that the aircraft is registered in and the desires of the customer. The choice of protocol in most cases is left to the ELT customer. It is generally agreed upon, in the Search and Rescue community that the serialized protocol offers the most flexibility and as a result is the best choice. The other three protocols have the disadvantage of requiring the ELT be re-programmed under certain conditions and the registration be updated when ownership changes or a different ELT is installed. The serialized protocol does not require re-programming, but ownership changes or installing a different ELT still requires that a new registration form be filled out. This registration form is then sent to the government agency responsible for keeping the database in the country where the aircraft is registered. Keeping this database up to date and accurate is a major concern of the Search and Rescue Centers. Without accurate information in the database, valuable time may be lost attempting to locate the owner of the aircraft.

2.3.2 ELT Programming with ELT/NAV Interface

Fleet operators and several airlines have requested the ability to avoid re-programming the ELT and updating the registration database during routine maintenance when the ELT is replaced. Any Artex 406 MHz ELT with long message 24-bit address programming installed in the aircraft will be automatically re-programmed. If the ELT/NAV Interface is wired with the aircraft's 24-bit aircraft address, the registration database will not require updating unless the registration of the aircraft changes. This automatic re-programming of the ELT ensures that accurate information will be transmitted to the satellite in the event of an emergency. In addition to accurate registration information, the last known latitude and longitude being transmitted will greatly aid Search and Rescue efforts. The choice of protocols for the ELT when used with the ELT/NAV Interface is either 24-bit address or serialized (long message location protocol). 24-bit programming is the preferred protocol and utilizes the unique 24-bit address as signed to an aircraft by the International Civil Aviation Organization. For aircraft with no 24-bit address identification, serialized long message programming is used. Serialized programming does not use the 24-bit address but it provides the navigational position data as well as the ELT serial number.

2.4 Position Determination

2.4.1 Standard ELT Position Determination

An ELT's normal operating mode (ARMED) is a dormant state until the G-Switch senses a force high enough to activate the ELT. While activated, the ELT transmits a message to SAR satellites with the information that the ELT was programmed with at the factory. As a satellite passes overhead the position is determined from the Doppler shift of the transmitted frequency. The ELT continues to transmit until the batteries become too weak to continue transmitting or the aircraft is found and the ELT is turned off.

Standard 406 ELT operation does not include the capability of transmitting long messages (position information) with the normal message string. When used with a 406 ELT programmed with long message format, the ELT/NAV Interface enables the ELT to send detailed position information to the satellites.

2.4.2 ELT/NAV Position Determination

Position of the crash site is known within seconds through the geostationary satellites system that continuously monitor the earth for ELT signals. Without the latitude and longitude data being transmitted, it is necessary to wait for the polar orbiting satellites to pass overhead before position can be determined. A worst case scenario would be a 2-3 hour wait before a polar orbiting satellite passes overhead. Accuracy of the position fix is also much better with latitude and longitude data from the onboard navigation system. ELT position accuracy of the three currently used ELT systems is shown below:

- 100 meters - 406 MHz ELT with ELT/NAV Interface
- 1-2 Km - 406 MHz ELT
- 15-20 Km - 121.5/243.0 MHz ELT

Installation

ELT/NAV Interface Manual

3.1 TSO C126 Paragraph D Requirements:

“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. The article may be installed only if further evaluation by the applicant documents an acceptable installation and it is approved by the administrator.”

3.2 Introduction

Because of the critical nature of an ELT and ELT/NAV Interface, it is very important that the installation be performed according to the following instructions. Installation of the ELT and ELT/NAV Interface is somewhat unique; it requires experience in sheet metal work and avionics. Only licensed technicians should install the ELT/NAV Interface.

The same precautions that apply to ELT installations should be applied to the ELT/NAV Interface installation. These specific precautions can be referenced in the ELT Installation and Operation Manual.

3.3 FAA Requirements

In addition to the procedures outlined herein, the installer must adhere to the guidelines established in FAA-Advisory Circular 43.13-2A (Acceptable Methods, Techniques and Practices Aircraft Alterations). Specifically, Chapters 1 through 3, 11 and 13.

By signing either the Aircraft Log books or the FAA Form 337, you are stating that the installation has been performed in accordance with the current FARs and with the steps and procedures outlined herein.

3.4 Canadian Requirements

In Canada, all installations must be performed in accordance with the Canadian Aviation Regulations (CAR) Part V, Subparts 37, 51 and 71.

3.5 ELT/NAV Interface Mounting Locations

The preferred mounting location of the ELT/NAV Interface is in close proximity (within two feet of the ELT or where the ELT interconnect harness does not exceed 3 feet with appropriate strain relief). Many of the original ELT installations are inadequate as far as unit location and surface rigidity are concerned.

Statistics show that the tail section of an airplane is least likely to be damaged during a crash and, therefore, provides a good mounting environment for the ELT/NAV Interface unit.

Accessibility of the unit is an important factor in determining a mounting location. Mount the unit as far aft as practical, but where it can be easily retrieved for maintenance.

The mounting surface must be extremely rigid, therefore, mounting the ELT/NAV Interface unit directly to the aircraft skin is unacceptable.

The following are the FAA guide lines for mounting an ELT (ELT/NAV Interface) (per RTCA DO-204 Section 3.1.8).

- “The ELT shall be mounted to primary aircraft load carrying structures such as trusses, bulkheads, longerons, spars, or floor beams”.
- “The mounts shall have maximum static local deflection no greater than 2.5mm (0.1in) when a force of 450 Newtons (100lbs) is applied to the mount in the most flexible direction. Deflection measurements shall be made with reference to another part of the airframe not less than 0.3 meters (one foot) nor more than 1.0 meters (three feet) from the mounting location.”

ELT/NAV Interface Manual

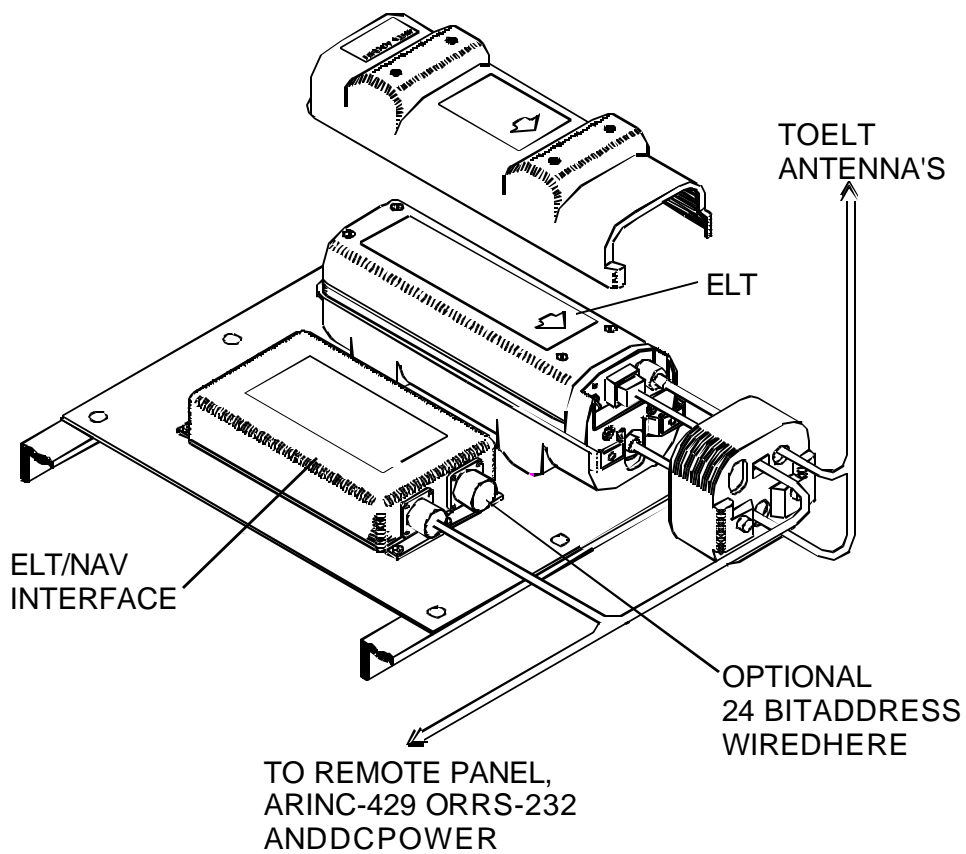


FIGURE 3-1 ELT/NAV Interface Installation Overview

- In addition, RTCA Document Number DO-182 recommends that “all ELT system components (ELT/NAV Interface) which must survive a crash intact,should be attached to the airframe in such a manner that the attachment system can support a 100 G load.... in the plus and minus directions of the three principal axes of the aircraft.”
- Further installation guidance can be found in FAA Advisory Circular 43.13-2A (Acceptable Methods, Techniques and Practices - Aircraft Alterations). Chapter 2, paragraph 28 deals specifically with Emergency Transmitter installations.

Finally, in selecting a location for the installation, the following cautionary advice should be taken into consideration:

CAUTION:

Avoid locating the ELT/NAV Interface where it will be subjected to unprotected exposure to harsh chemical fluids such as deicing compounds. They can promote cracking of electrical components as well as cause corrosion on electrical connections.

3.6 Installing the ELT/NAV Interface

Before installing the ELT/NAV Interface unit, be sure the mounting location meets the requirements established in the section on mounting location.

Mark the 6 holes needed for the ELT/NAV Interface using the unit as a guide. The ELT/NAV Interface should be located as close as possible to the ELT itself to make the wire runs as short as possible. The recommended mounting location is within 2 feet of the ELT or where the ELT interconnect harness does not exceed 3 feet with appropriate strain relief. See Figure 3-1.

If a reinforcement (doubler) plate is needed to meet the rigidity requirements, fabricate one using the unit as a guide.

ELT/NAV Interface Manual

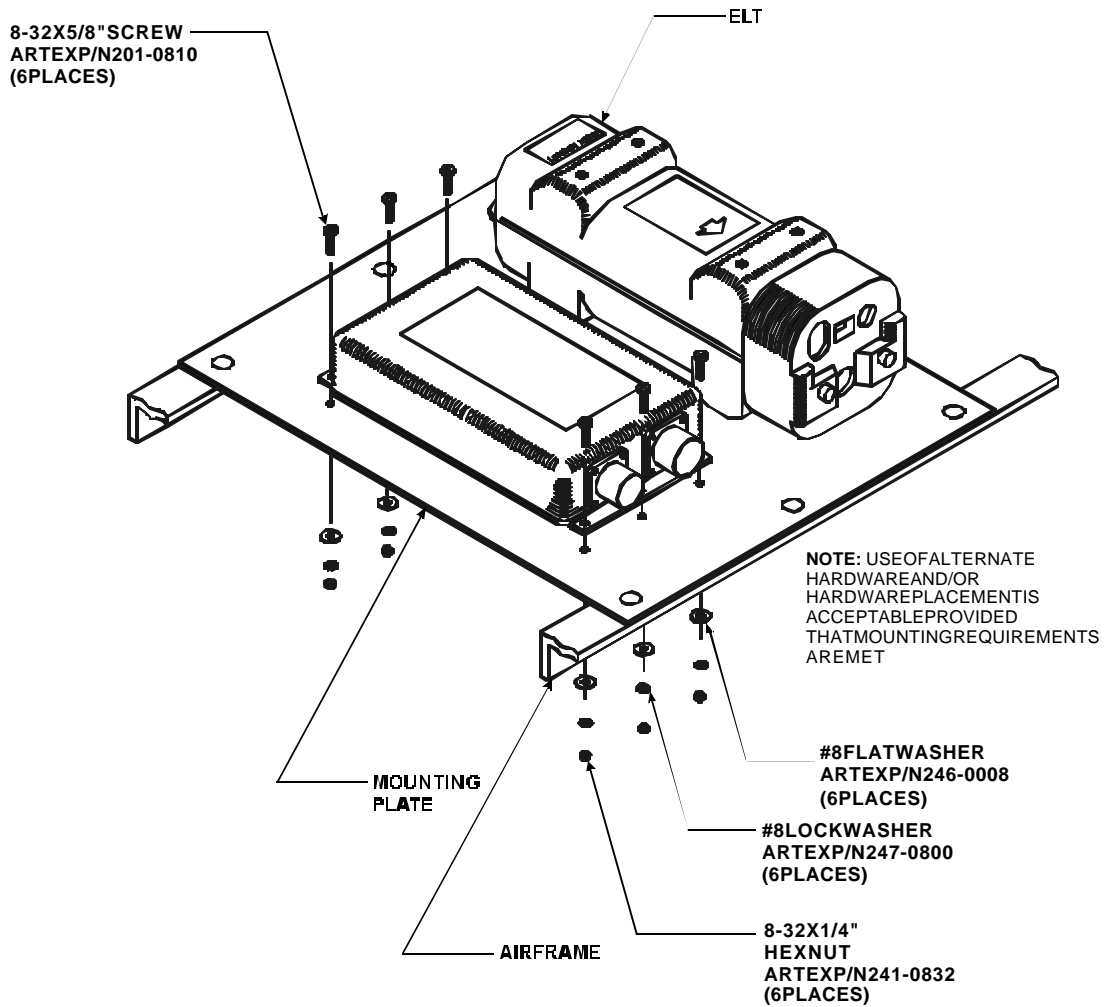


FIGURE 3-2 ELT/NAV Interface Installation Details

ELT/NAV Interface Manual

Drill the 6 marked holes with a #19 (.166) drill bit and install the unit with the 8-32 X 5/8" pan head Philips screws, nuts, flat washers and lock washers provided. All hardware is provided in the ELT/NAV Installation Kit (Artex P/N 455-0650). See Figure 3-2.

3.6.1 Wiring the ELT/NAV Interface(453-6500)

Although the Wiring Diagram (Figure 3-6) shows the entire ELT system, this section will only pertain to wiring the ELT/NAV Interface. Refer to the ELT Installation and Operation Manual for ELT wiring details.

NOTE: All wiring must be installed in accordance with AC 43.13-1A.

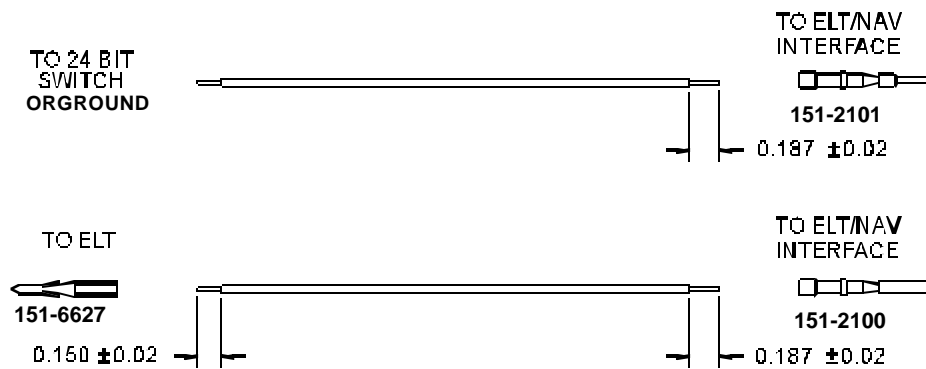


FIGURE 3-3 ELT/NAV Wiring Details

CAUTION

Prior to installing the wires to the ELT 12-Pin receptacle, feed the wires through the rectangular hole in the mounting frame cap.

3.6.2 Fabricate the Interface to ELT Cable

Fabricate a shielded 4 wire harness (22 Gauge minimum, including shield) long enough to reach between the ELT/NAV Interface installation location and the ELT. The maximum wire run from the ELT/NAV Interface to the ELT must be three feet or less with appropriate strain relief. See Figure 3-6.

Use twisted shielded pair wire (22 Gauge minimum) for the ARINC 429 Data cable. The maximum recommended cable length for the ARINC 429 data cable is 360 feet. Ground shield at all breaks. **Note:** The ELT/NAV Interface connector back shell is not an acceptable ground.

For RS-232 data the maximum recommended cable length is 50 feet. Use shielded cable with shield grounded. **Note:** RS-232 must not be used if ARINC 429 is already being used as a position source.

Strip about 0.150" of insulation from the ends of each of the cable wires that connect to the ELT. The other ends that connect to the ELT/NAV Interface circular connectors should be stripped to 0.187". Refer to AC 43.13-1A, for information on proper splicing methods and other wiring considerations.

On the ELT wire end, use a Molex crimp tool (Molex Tool #11-01-0008) and crimp the male Molex pins provided (Artex P/N: 151-6627) to each of the cable wires. Install the pins into the 12-pin receptacle which connects to the ELT.

On the ELT/NAV Interface end of the cable, crimp or solder the pins (Artex P/N: 151-2100) and install in the 24 pin circular connector. (Artex P/N: 150-6503). See Figure 3-4 and 3-6.

The +28 Volt DC power must be switched and should be provided through a 2 Amp breaker or fuse from a power bus (preferably one that will not be shut down during an emer-

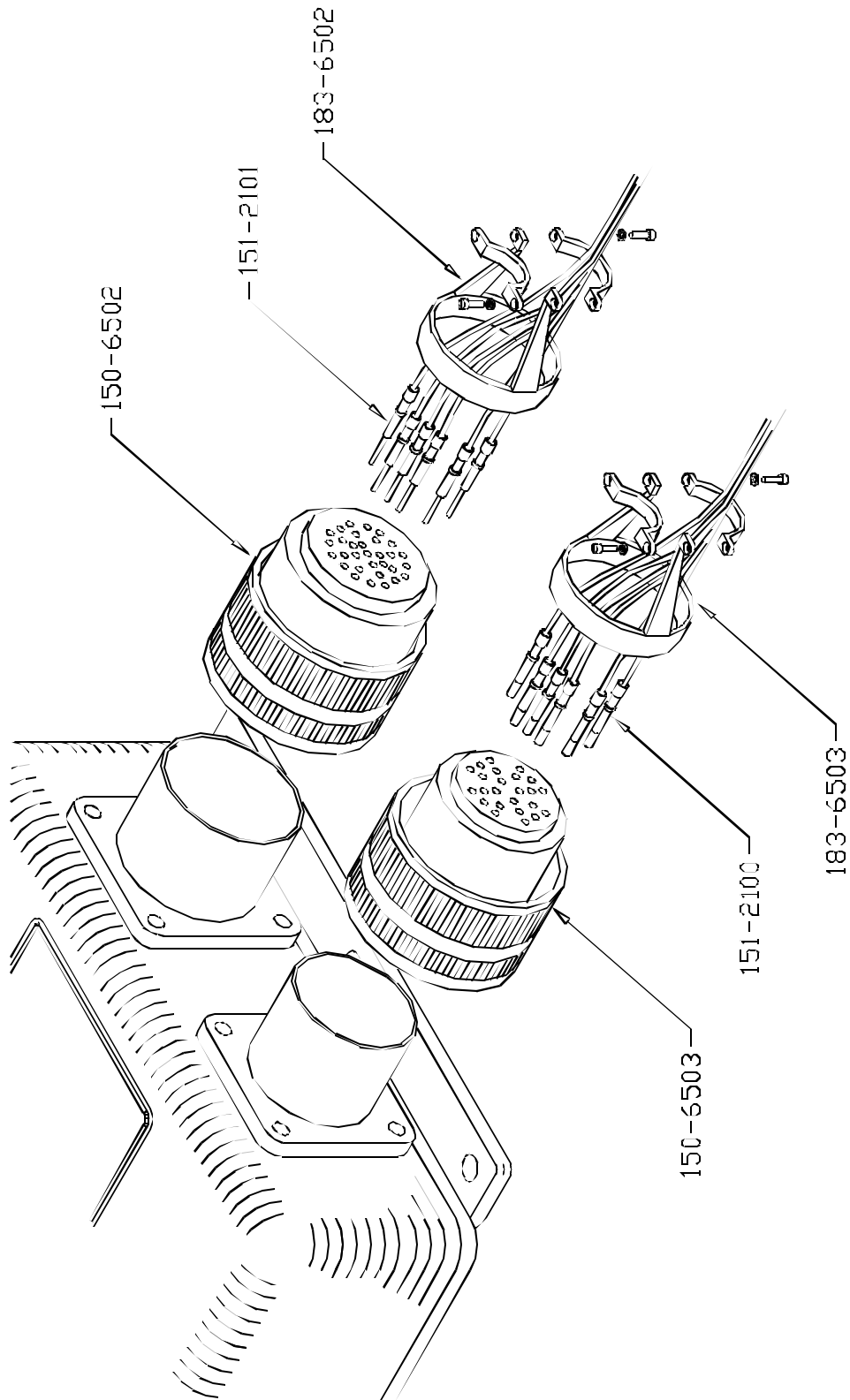


FIGURE 3-4 ELT/NAV Interface Connector Assembly

ELT/NAV Interface Manual

gency). Do not wire the ELT/NAV Interface directly to the aircraft battery, unit is active when power is applied. All grounds should be common to the airframe (for composite aircraft tie all grounds to electrical ground). Tie all shields to aircraft ground keeping shield drain as short as possible. Connector backshell is not an acceptable ground. Seal all unused connector positions with the spare pins and red plugs provided.

3.6.3 Connecting the Interface to 24-Bit Address (only for ELT's programmed for 24-Bit Long Message and using the auto-reprogramming feature)

The 24-bit address is composed of binary "1's" and "0's". The "1's" are electrical ground and the "0's" are electrically open. To encode the 24-bit addresses it is necessary to connect the binary "1's" to ground. This can be accomplished either by "hard wiring" the respective pins to ground or by using a 24-bit address switch block. Refer to Figure 3-5 for converting the octal ICAO aircraft address to the binary 24-bit address.

Strip about 0.187" of insulation from the end of each wire that connects to the ELT/NAV Interface 31 pin circular connector (Artex P/N: 150-6502). Crimp pins (Artex P/N: 151-2101) onto this end of the wire. See Figure 3-4.

The preferred method of encoding the 24-bit address is to "hard wire" each pin of the 31 pin circular connector that corresponds to a binary "1" of the 24-bit address to ground. Following the wiring diagram (Figure 3-6) insert the first wire into the 31 pin circular connector in pin one of the 31 pin circular connector. Only prepare wires for the binary "1's" of the 24-bit address. Connect the crimped wire ends to the 31 pin connector and connect the other end of each wire to pins P1-25 and P1-26 on the ELT/NAV Interface which are grounded through the chassis. Be sure to verify each pin connected to the 31 pin connector corresponds to the correct bit position as shown in Figure 3-6. Seal all unused connector positions with the spare pins and red plugs provided.

If using a switch block, cut 26 individual wires (24 AWG minimum) to a length under 3 feet that will connect the ELT/NAV Interface to the 24-bit address switch block. The switch block must be located within three feet of the Interface.

Follow the switch block manufacturer's installation instructions for connecting the wires to the switch block.

NOTE: For installations not using the 24-bit address auto re-programming feature with no cable connection to P1 (the 31 pin circular connector), install the connector cover (P/N 150-6504) to protect the unused connector.

3.6.4 ARINC 429 Latitude and Longitude Data Input

The ELT/NAV Interface will accept signals A and B from any ARINC 429 navigation system. The Interface looks for labels 310 and 311 which contain the latitude and longitude data. It is important to correctly connect the ARINC 429 A and B outputs to the ELT/NAV Interface. Refer to Figure 3-5 for connections to the Interface. Refer to your navigation system manufacturer's manual for information on the ARINC 429 A and B outputs. The ELT/NAV Interface will accept data at high speed, low speed, GAMA high speed and GAMA low speed and automatically detects the speed at turn on. Please note that the speed of the ARINC 429 output must not be changed during operation of the ELT/NAV Interface. For navigation systems that have both ARINC 429 and RS-232 outputs, use of ARINC 429 is preferred.

3.6.5 RS-232 Latitude and Longitude Data Input

For navigation systems that output only RS-232, the ELT/NAV Interface will accept only the following RS-232 format:

- Baud Rate (fixed): 9600
- Parity: None
- Data Bits: 8
- Stop Bits: 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 an END of Text (ETX). The format expects carriage returns but will not operate if there are line feeds. Consult your navigation system manufacturer's manual to determine if the RS-232 output is compatible.

3.7 ELT/NAV Interface Installation Test

ELT/NAV Interface Manual

3.7.1 Minimum Required Performance Test

After the Interface Unit has been installed per Figure 3-6 perform a self test on the system. Ensure that power is applied to the ELT/NAV Interface and that the on-board navigational system is active and has acquired a valid navigational position. Allow 30 seconds for ELT/NAV Interface to initialize. Tune a receiver (usually the aircraft radio) to 121.5MHz.

- Turn the ELT aircraft panel switch to “ON”, wait for 3 sweeps on the receiver, which takes about 1 second, and then turn the switch back to the “ARM” (OFF) position while paying special attention of the LED activity upon entering the “ARM” (OFF) condition.

To pass the test, you must hear the 3 sweeps AND see the front panel light immediately begin to flash continuously. During the ON to OFF transition, the micro processor in the ELT checks the following:

- “G-Switch” (automatic activation switch) latching circuit, pins 5 & 8 on the 12 pin connector at the ELT.
- 406.025 MHz transmitter for proper RF output.
- Valid position data to the ELT via the ELT/NAV Interface.
- ELT is programmed properly
- ELT Battery

If the ELT system is working properly, the sequence following entry to the “ARMED” (OFF) condition will result in the panel LED staying illuminated for approximately 1 second, then going off.

If a problem is detected, the LED provides a coded signal following the initial 1 second pulse. The coded signal and related problem are as follows:

- 1 flash indicates a G-Switch loop open failure.

- 3 flashes indicates a 406.025 MHz transmitter problem (i.e. a bad or unconnected coax cable, antenna problem, battery not connected to the 406.025 MHz module, or a problem with the ELT itself).
- 5 flashes indicates no navigational position data has been acquired.
- 7 flashes indicates a battery problem (i.e. battery usage time over an hour).

There is also an error condition where the LED on the ELT and the Remote Switch will flash rapidly (ELT is not transmitting) after the Interface has been active for 2 minutes. This is caused when the Interface is unable to reprogram the 24 bit address of the ELT either because of a wiring error or the ELT is not programmed for 24 bit address protocol. Verify ELT programming if this error is encountered.

3.7.2 24 Bit Address Installation Test (mandatory for installations using the 24 bit address auto re programming feature)

The following test sequence is required for new installations using the 24-bit address auto-reprogramming feature to test the wiring of the 24-bit address and to re-label the ELT. A Sartech 406MHz beacon test set (Artex part number 453-0131) is required to complete this test. First, locate the steps described in the Verification of Digital Message section of the ELT manual. This will instruct you how to extract the 15 digit hex code for your particular ELT model. Realize that the Artex 406MHz ELT transmits a 406MHz message upon reset, which is encoded such that it will be ignored by the SAR satellite system. Depending on the model, this message may or may not reflect the ELT's correct 15 digit hex code for labeling purposes. Artex ELT's labeled software version V133 transmit a fixed test message upon ELT reset, so the actual ELT 15 digit hex code must be derived from a live transmission done in a RF containment environment. On the other hand, Artex ELT's labeled software version V134 and V135 can transmit the appropriate 15 digit hex code during the ELT reset transmission. 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. Although a

ELT/NAV Interface Manual

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.

1. After the ELT/NAV Interface installation is complete and all wiring has been checked, apply power (+28 Vdc) to the ELT/NAV Interface (the ELT will remain OFF). The aircraft address will be automatically programmed into the ELT within the next 30 seconds. Monitor the ELT for the next 2 minutes. If the ELT/NAV Interface is unable to program the address to the ELT, the light on the ELT and cockpit panel will begin to flash rapidly after 2 minutes. If this error occurs, clear the ELT by cycling the switch from OFF to ON and back to OFF. This error occurs when either of these two conditions exist:

- 1) The ELT is not a "long message 24 bit address" programmed unit and is not able to accept the aircraft address. Verify that "999" follows the part number on the ELT product label.
- 2) There is a wiring error between the ELT/NAV Interface and the ELT. Verify the wiring.

2. If no error occurs, the ELT has been programmed with the new aircraft ID. The ELT now needs to be checked to determine the new 15 digit Hex ID that needs to be labeled and registered. The following steps may be performed with the ELT/NAV Interface powered OFF. The navigation source (if used) must be OFF. Latitude and longitude are not being checked at this time.

3. Disconnect both antenna coax cables at the ELT. Although part of the kit, the antenna provided with the Sartech 406MHz test set must not be used because the ELT transmission will reach the SAR satellite and could cause a false alarm.

4. Terminate 121.5 MHz (BNC) output with a 50-ohm terminator.

5. Connect Test Coax (611-9010) to 406 MHz (TPS) output.

6. Connect 30-dB attenuator (500-3000) to input of Sartech Tester.

7. Connect BNC end of Test Coax to 30-dB attenuator.

WARNING: Use of Test Set without 30-dB attenuator may damage Test Set.

ELT/NAV Interface Manual

8. Press the “ON” button on Test Set key pad. Main menu will appear.
9. For ELT’s marked, “software version V133” be sure that you are in a RF containing environment. Activate ELT by placing local switch to “ON”. After about 30 seconds press “R” on test set to receive the 406 MHz signal.
10. For ELT’s marked, “software version V134” or “V135” re set the ELT by turning the switch to “OFF” within 10 seconds or 3 sweeps of the 121.5 Mhz signal. For ELT’s marked, “software version V133”, wait for a live transmission. Watch the screen on the SARSAT Tester. When a 406 MHz signal is received the tester will beep and the screen will show “DecodingMessage”.
11. If the SARSAT Tester receives a good signal the receiver will beep again and show “OK” and then return to the original screen.
12. If the Tester doesn’t receive a good signal, it may display a message saying “BAD FRAME”. For ELT’s marked, “software version V134” or “V135”, start transmission sequence over again from step 9. For ELT’s marked, “software version V133”, allow the ELT to continue transmitting, and the Tester will continue to Receive. Wait for the next transmission. **NOTE:** For ELT’s marked, “software version V133”, be sure to not receive a self-test transmission upon ELT re set.
13. For ELT’s marked, “software version V133”, turn off the ELT by placing local switch in “OFF” position.
14. Press “V” for View on the SARSAT Tester.
15. Press the “right” arrow key twice to show the 15 digit ID. The 15 digit ID will be the last line on the screen (for this example “2DC75B534AFFBFF”). This is what needs to be on the label that is placed on the ELT and what is registered. Please note that the last 5 digits should always be “FFBFF”.
16. Press the “right” arrow key again to check the 24-bit address. The Aircraft # displayed on the last line is the Hexadecimal equivalent of the 24-bit address that the ELT/NAV Interface is

ELT/NAV Interface Manual

wired for (for this example "ADA9A5" is the same as octal 53324645).

17. There are additional screens that can be viewed but they are not required for purposes of this exercise and should be ignored.

18. To turn off the SARSAT Tester, press "Q" to get back to the main menu and then "Q" (for Quit).

Please note that the 15 digit hex code received ends with "FFBFF". This indicates the default value of "no position data", which is desired by the registration authority.

After obtaining the new 15 digit hex code from the steps performed above it is essential that the ELT be registered. Registration forms for the US can be obtained from Artex or by calling NOAA at 1-888-212-SAVE or visit the NOAA web site at www.sarsat.noaa.gov and click on "BeaconRegistrationForms". The ELT will also need to be labeled with this new 15 digit hex code. Enter the number in the space provided on the ELT product label or use the label (591-0999) provided in the install kit to place over any existing 15 digit hex code that may be on the ELT label. Enter country and country code in space provided on product label or use label 591-0429-01 (provided in the install kit or available from Artex) to place over any existing information.

Refer to Instruction 571-0999, 571-0999-01 or 571-0999-02 (depending on ELT model) for additional detailed instructions on testing an ELT/NAV Interface installation using the 24-bit aircraft address.

NOTE: The Sartech test set is available for sale or rental as part of a complete kit with the test set, coax cable, attenuator and instruction sheet. Contact the Artex Sales department for details at (800) 547-8901.

ICAO Air craft Ad dress Code Con ver sion TO 24-Bit Ad dress

Example #1: Con verting ICAO ad dress 50134057 (oc tal) to bi nary 24-bit ad dress:

ICAO Octal Address to 24 Bit Binary																							
5			0			1			3			4			0			5			7		
4	2	1	4	2	1	4	2	1	4	2	1	4	2	1	4	2	1	4	2	1	4	2	1
1	0	1	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0	0	1	0	1	1	1

MSB LSB

Example #2: Con verting ICAO ad dress A0B82F (hex a deci mal) to bi nary 24-bit ad dress:

ICAO Hex Address to 24 Bit Binary																							
A				0				B				8				2				F			
8	4	2	1	8	4	2	1	8	4	2	1	8	4	2	1	8	4	2	1	8	4	2	1
1	0	1	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0	0	1	0	1	1	1

MSB LSB

Figure 3-5 ICAO 24-Bit Ad dress Con ver sion

ELT/NAV Interface Manual

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Periodic Maintenance

ELT/NAV Interface Manual

The ELT/NAV Interface is considered part of the 406 ELT system and as part of the system should be inspected on a yearly schedule or whenever the ELT is inspected. The Periodic Maintenance procedure for the ELT/NAV Interface is simpler than for the ELT itself.

4.1 Connector Corrosion

Remove both circular connectors to the ELT/NAV Interface. (Note: Some Interface units may have a protective cap on the 31 pin connector if the 24-bit address is not used.) Visually inspect and confirm proper seating of all connector pins. Give each wire a slight tug to ensure they are seated in the connector properly and that the wires are securely attached to each pin.

CAUTION:

Do not use contact cleaner on ELT system components. Such chemical agents can be highly destructive to ELT housings, causing cracking, fracturing and breakage.

4.2 Self-Test Check

To self-test the ELT/NAV Interface, first activate the aircraft navigation system and allow it to acquire a valid position. Once the navigation system has acquired a valid position the ELT/NAV Interface can be self-tested by activating and resetting the ELT. Resetting the ELT should be completed within the first 15 seconds, before the ELT transmits its first distress signal.

If your ELT front panel indicator light is wired through either the aircraft master or the avionics master switch, make sure these switches are turned on.

Activate the ELT and ELT/NAV Interface by placing the ELT switch or the Remote Switch to "ON". Reset the ELT by placing the same switch back to "ARM". During the "ON" to "ARM" transition, the microprocessor in the ELT checks the following:

4/24/98

Page 4-2

ELT/NAV Interface Manual

- “G-Switch” (automatic activation switch) latching circuit, pins 5 & 8 on the 12 pin connector at the ELT
- 406.025 MHz transmitter for proper RF output:
- Valid position data from the ELT/NAV Interface
- ELT is programmed properly
- ELT Battery

If the ELT system is working properly, the sequence following entry to the “ARMED” (OFF) condition will result in the panel LED staying illuminated for approximately 1 second, then extinguishing.

If a problem is detected, the LED provides a coded signal following the initial 1 second pulse. The coded signal and related problem are as follows (in numerical order):

- 1 flash indicates a G-Switch loop open failure.
- 3 flashes indicates a 406.025 MHz transmitter problem (i.e. a bad or unconnected coax cable, an antenna problem, the battery is not connected to the 406.025 MHz module, or a problem with the ELT itself) or the ELT is improperly programmed.
- 5 flashes indicates that the ELT has not acquired a valid navigational position (Latitude and Longitude) from the ELT/NAV Interface.
- 7 flashes indicates a battery problem (i.e. battery usage time over an hour).

There is also an error condition where the LED on the ELT and the Remote Switch will flash rapidly after the Interface has been active for 2 minutes. This is caused when the Interface is unable to reprogram the 24 bit address of the ELT either because a wiring error has occurred or the ELT is not programmed for 24 bit address protocol.

ELT/NAV Interface Manual

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Specifications & Approvals

ELT/NAV Interface Manual

5.1 Electrical Specifications

ELT/NAV INTERFACE ELECTRICAL CHARACTERISTICS		
PIN	DESCRIPTION	SPECIFICATION
P2-1	POWER INPUT	+28VDC \pm 5 VDC 300 mA MAX.
P2-2	5.6 VDC Output	V _{max} =6.0 VDC V _{min} =5.3 VDC
P2-3	ARINC 429-A INPUT (AUTO SPEED SELECT)	ARINC 429 HIGH/LOW STANDARD OR GAMA
P2-4	ARINC 429-B INPUT (AUTO SPEED SELECT)	ARINC 429 HIGH/LOW STANDARD OR GAMA
P2-5	NOT USED	N/A
P2-6	NOT USED	N/A
P2-7	NOT USED	N/A
P2-8	RS-232 RX	RS-232
P2-9	TX Output	RS-232
P2-10	RX Input	TTL
P2-11	ELT/NAV GROUND	Aircraft Ground
P2-12	ELT GROUND	Aircraft Ground
P1-1 through 24	24 Bit Address Input	Ground = 1 Open = 0
P1-25 and 26	24 Bit Address Return	24 Bit Ground

5.2 Environmental Specifications

SPECIFICATIONS	
ENVIRONMENTAL CHARACTERISTICS	ELT/NAV INTERFACE
Temperature (Storage)	-55°C to +85°C
Temperature (Operating)	-20°C to +55°C
Altitude	55,000 Feet
Vibration	10 G's from 5 Hz to 2000 Hz
Shock Test	500 G's for 4 mS
Crashworthiness	100 G's for 23 mS
Humidity	95% for 50 hours
Impact	55 lbs from 6 inches
Crush Test	1000 lbs
Spurious Emissions	As per RTCA DO-204
Flammability	Self extinguishing

5.3 Physical Specifications

SPECIFICATIONS	
PHYSICAL CHARACTERISTICS	ELT/NAV INTERFACE
Weight	2.7 lbs (1.22 KG)
Dimensions	9.25" X 5" X 1.95"

ELT/NAV Interface Manual

5.4 Approvals

- FAA TSO C126
- JTSO-2C126
- DO-160C Environmental Categories
C1-204A204XRXXXXXBABA204BXXX

System Part Numbers

ELT/NAV Interface Manual

6.1 SYSTEM PART NUMBERS

The ELT/NAV Interface pack list part number is 455-6500. The above part number is for a complete system which includes the ELT to NAV Interface, ELT to NAV Interface installation kit, an Installation & Operation Manual and warranty card. Part numbers for each individual Line Replaceable component are listed below:

ELT/NAV INTERFACE PACK LIST 455-6500	
DESCRIPTION	PART NUMBER
ELT/NAV Interface, Main Assembly	453-6500
ELT/NAV Interface, Installation Kit	455-0650
Protective Cap, 31-Pin Connector	150-6504
Manual, Installation and Operation	570-4602

APPENDIX A

ELT/NAV Interface Manual

**LIST OF ARTEX ELT'S DIRECTLY COMPATIBLE
WITH THE ELT/NAV INTERFACE**

MODEL NUMBER	PART NUMBER
110-406 NAV*	453-0421
110-406HM NAV*	453-0422
110-406ED NAV*	453-0424
B406-2*	453-0003
C406-1	453-5002
C406-1HM	453-5003
C406-2	453-5000
C406-2HM	453-5001
B406-4	453-5004
G406-4	453-5012
G406-1	453-5100
G406-2	453-5102

***No Longer Available**