INSTALLATION AND OPERATION MANUAL

Document Number: 570-4010 Revision -

A Chelton Group company

24 Bit Address Programming Dongle

Model: DGL-1

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REGISTEREDTOISO9001
ANDAS9100
FILENUMBERA10217

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System Requirements

Emergency Locator Transmitter

Artex ELT with software version V133M, V134B or V135C. The ELT software version is displayed on the ELT product label.

The Artex ELT must be programmed with a 24 Bit Address Long Message Protocol. In general, an ELT programmed with 24 Bit Address Long Message Protocol will have a 999 extension on the part number. Example: 453-0000 (999). The 999 extension is applied at factory to indicate the 24 Bit Address Protocol. Subsequent field programming may have changed the protocol. To verify the protocol type, use the Sarsat Beacon Test Set, ARG Model 5410 or equivalent.

Aircraft

28 volt DC power source capable of providing 25mA

Test Equipment

406 Mhz uplink receiver. Artex recommends the Sarsat Beacon Test Set, Model ARG 5410, which is available for rent, or purchase from Artex.

VHF communication radio tuned to 121.5 Mhz.

Tools:

Standard phillips #2 screw driver

R TV 162 or equivalent silicone sealant

Crimp Tool, Molex 11-01-0008 or equivalent

Extraction Tool, Molex 11-03-0002 or equivalent

Heat gun for Raychem wire splice

Regulatory Requirements

Because of the critical nature of an ELT and dongle, it is important that the installation be performed according to the following instructions. Installation of the ELT and dongle requires experience with avionics and only licensed technicians should install this system.

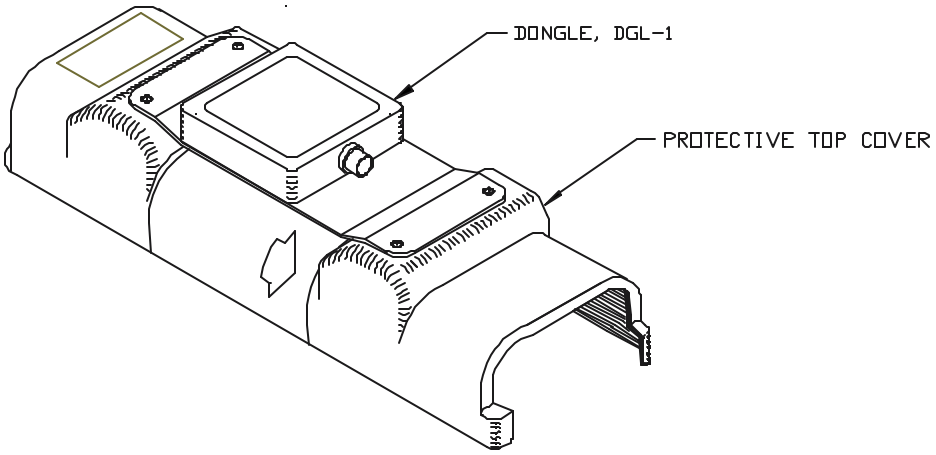
In addition to the procedures outlined in this manual, the installer must adhere to the guidelines established in FAA-Advisory Circular 43.13-2A, Chapters 1 through 3, 11 and 13 (Acceptable Methods, Techniques and Practices Aircraft Alterations).

By signing either the aircraft logbooks 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 in this manual.

Installation

Mechanical

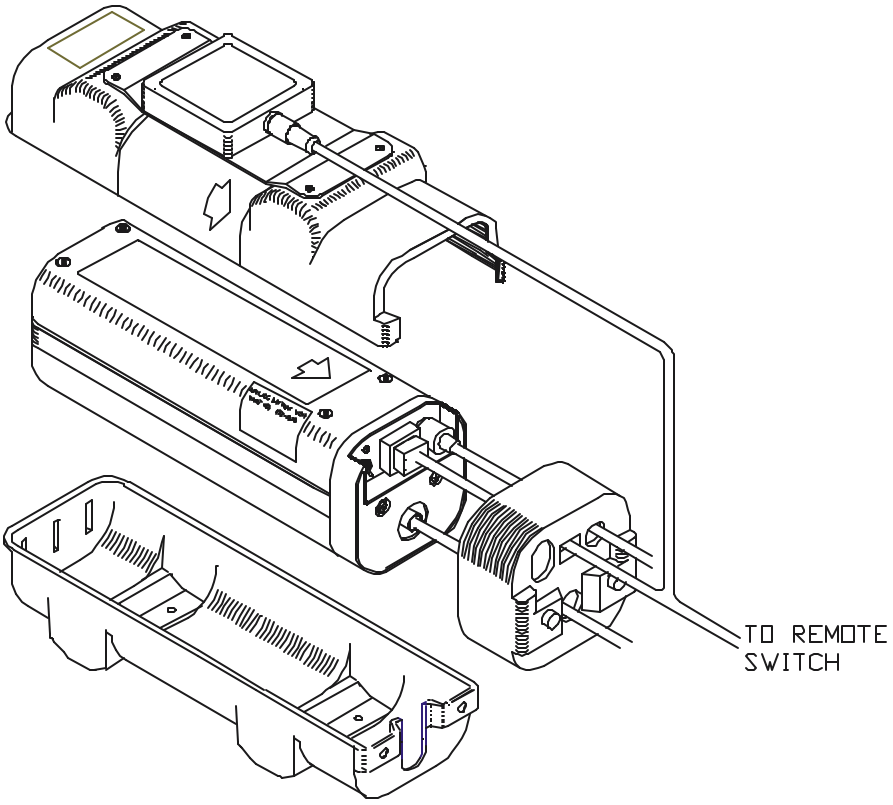
The dongle has been designed to mount to the protective top cover of the of the ELT with four 6-32 phillips head screws (Part Number 201-6324-01). If desired the dongle may be mounted directly to the airframe, but it must be located within a proximity of the ELT such that it can utilize the prefabricated cable assembly (Part Number 611-4010).



Electrical

The dongle is provided with a preassembled wiring harness (Part Number 611-4010). On one end of the harness is a black circular connector. This connector attaches to the dongle and requires no additional assembly. On the other end of the wiring harness is a 12 position rectangular connector. This connector attaches to the ELT. This connector is where the dongle, remote switch and horn connect to the ELT. All of the dongle connections have been preassembled, but the remote switch and horn will need to be

wired to this connector. Also at this end of the wire harness there are two loose wires that provide power and ground.

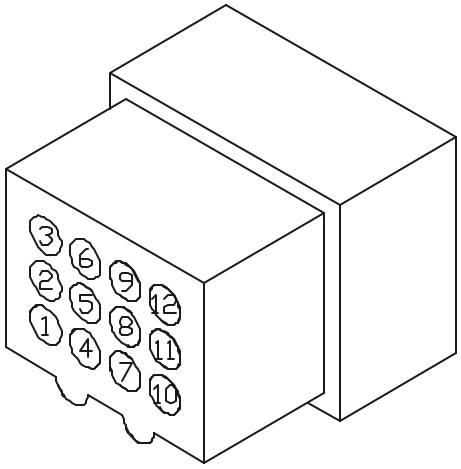


Dongle Wiring

Push the black circular connector through the rectangular hole in the ELT end cap as shown above. Push the circular plug onto the dongle circular receptacle. The circular plug is a push pull connector. To remove the connector simply pull the collar on the end of the connector.

Remote Switch/Horn Wiring

If the dongle is being installed on an aircraft that has been previously equipped with an Artex ELT, the 12 position rectangular connector on the aircraft will need to be disassembled using a Molex extraction tool (Molex part number 11-03-0002) or equivalent. The wiring harness will be reassembled using the dongle wire harness (Part Number 611-4010).



1 to Remote Switch, Pin 8 (LIGHT)
2 to Horn Power
3 to Remote Switch, Pin 5 (RST1)
4 to Horn Ground
5 to ELT, Pin 8 (Pre-Wired)
6 to Remote Switch, Pin 2 (RST2)
7 to Remote Switch, Pin 7 (EXT ON)
8 to ELT, Pin 5 (Pre-Wired)
9 to Dongle, Pin 2 (Pre-Wired)
10 to Dongle, Pin 3 (Pre-Wired)
11 to Dongle, Pin 5 (Pre-Wired)
12 to Dongle, Pin 1 (Pre-Wired)

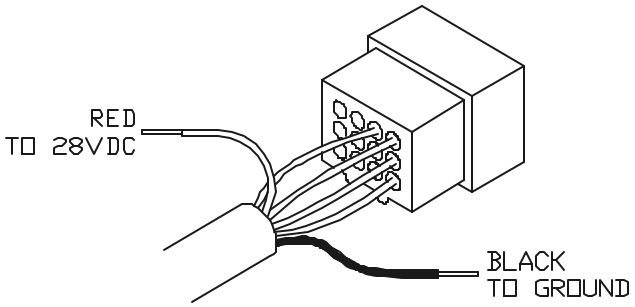
(NOTE: Remote Switch Pin numbers referenced above are for an Artex standard remote switch, part number 345-6197.)

Pin 11 is the grounding point for the ELT. The ELT installation and operation manual indicates that pin 11 is connected to aircraft ground. When using the dongle pin 11 is preassembled in the provided wire harness, and the ELT ground will be provided through the dongle. The system grounding is further defined in the Ground Wiring section of this manual.

The wires coming from the horn and the remote switch will need to be terminated with the male terminal pins provided (Part Number 151-6627). Strip about .150 in. of insulation, and tin the ends of the wires. Use a Molex crimp tool (Molex Tool # 11-01-0008) or equivalent to install the provided terminal pins. Insert the terminated wires into their applicable location in the rectangular 12 position connector.

Refer to the applicable ELT installation and operation manual for addition wiring information.

28 Volt Wiring



The dongle requires a 28 volt DC power source capable of supplying 25mA. The power source should be protected with a .5A fuse, or circuit breaker, and on a switched bus. Do not wire the dongle directly to the aircraft battery.

On the preassembled wire harness (Part Number 611-4010) there are two unterminated wires. Connect the 28 volt power source to

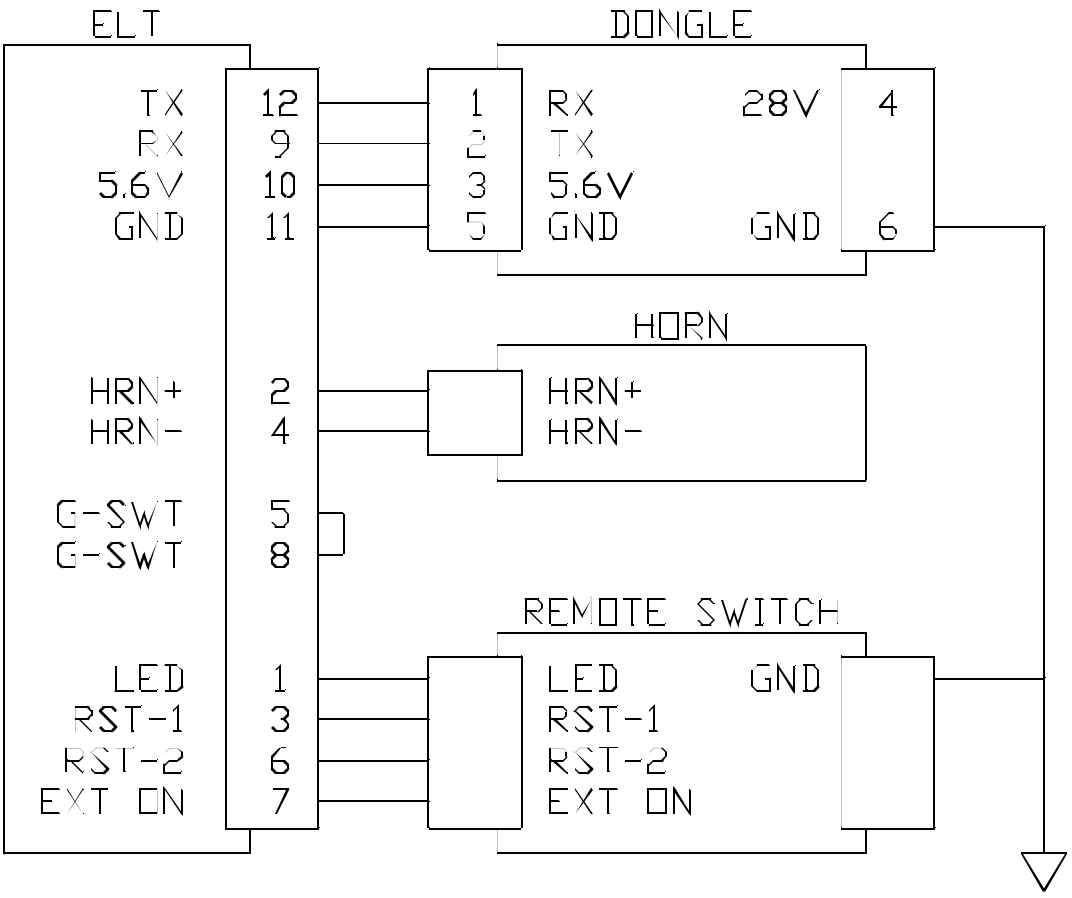
the red wire. A Raychem solder sleeve splice (Raychem # D-1744-01) is provided for this connection. Contact Raychem for specific instructions on the use of this splice. Alternate splices may be used if installed in accordance with *FAA AC 43.13.1A, Section 445, Splices in Electrical Wire*.

Ground Wiring

INSTALLING ELT AND DONGLE. For new ELT and dongle installations splice the unterminated black wire on the preassembled wire harness to an aircraft ground point near the ELT. A Raychem solder sleeve splice (Raychem # D-1744-01) is provided for this connection. Contact Raychem for specific instructions on the use of this splice. Alternate splices may be used if installed in accordance with *FAA AC 43.13.1A, Section 445, Splices in Electrical Wire*.

The ELT installation and operation manual will indicate that the remote switch ground is to be connected to pin 11 of the ELT. When installing the dongle pin 11 will not be available for remote switch grounding. It is recommended that either the ground splice, or the aircraft grounding point mentioned in the previous paragraph be used as a remote switch ground.

INSTALLING DONGLE TO PREVIOUSLY INSTALLED ELT. After disassembling and reassembling the 12 position rectangular ELT connector as described in the Remote Switch/Horn Wiring section of this manual, there will be an unterminated ground wire from the remote switch. Ground this wire as described in the paragraph above.


ELT
TX
RX
5.6V
GND
12
9
10
11
HRN+
HRN-
2
4
G-SWT
G-SWT
5
8
LED
RST-1
RST-2
EXT ON
1
3
6
7
DONGLE
1
2
3
5
RX
TX
5.6V
GND
28V
GND
4
6
HORN
HRN+
HRN-
REMOTE SWITCH
LED
RST-1
RST-2
EXT ON
GND

Aircraft Address

ICAO 24 Bit Address

The dongle will only operate with Artex ELT's that have software version V133M, V134B or V135C and programmed with COSPAS SARSAT 24 Bit Address Long Message Protocol. The aircraft must have a unique 24 bit address assigned by the International Civil Aviation Organization. The ICAO 24 bit address is commonly expressed in either an octal or hexadecimal format, and will need to be converted to binary. This conversion can be easily made with a scientific calculator, similar to those found on many personal computers.

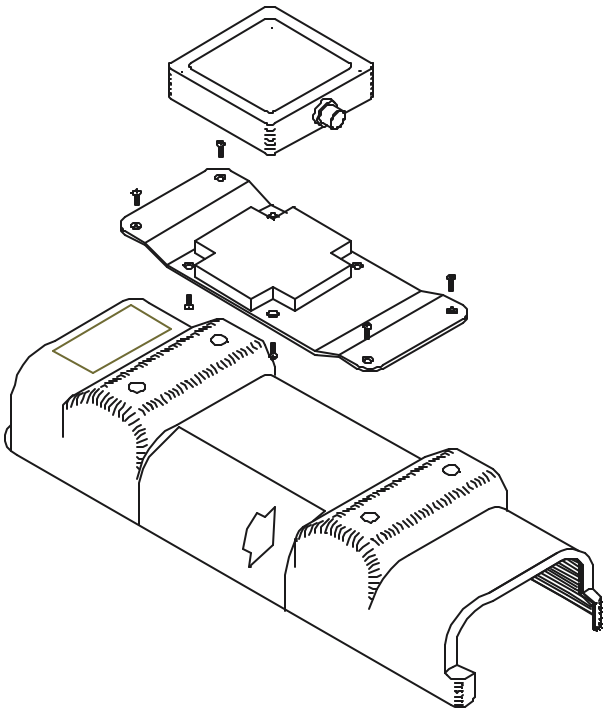
Example: Converting ICAO address 50134057 (octal) and A0B82F (hexadecimal) to binary 24 bit address:

MSB	ICAO Octal Address to 24 Bit Binary																								LSB
	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	1	0	1	1	1	1	

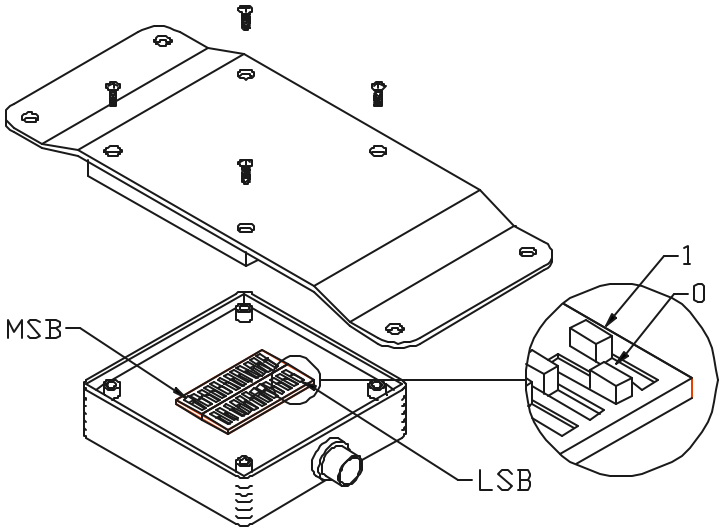
MSB	ICAO Hexadecimal Address to 24 Bit Binary																								LSB
	A				0				B				8				2				F				
	8	4	2	1	8	4	2	1	8	4	2	1	8	4	2	1	8	4	2	1	8	4	2	1	
	1	0	1	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0	1	0	1	1	1	1	

Setting 24 Bit Address

The aircraft 24 bit address is coded into the dongle by setting a series of small dip switches located inside the dongle. To access the switches, remove the four screws that attach the dongle to the ELT top cover. Then remove the four screws that attach the dongle to the mounting plate. Inside the dongle there are two rows of 12 switches. These 24 switches will be used to set the aircraft's 24 bit address.



The 24 bit address is comprised of binary "1's" and "0's". The "1's" are electrical ground and the "0's" are electrically open. After determining the aircraft's binary unique 24 bit address, configure the switches sequentially, starting with the Most Significant Bit (MSB), going left to right to the Least Significant Bit (LSB).



Operation

Power Up / Communication / Shut Down

When power is applied to the dongle, the dongle will verify that the 24 bit address set locally on its dip switches matches the 24 bit address stored in the memory of the ELT. If the dongle address matches the ELT address the dongle will shut down. If the ELT address does not match the dongle address, the dongle will program the ELT with its locally set address, and then shut down.

Failure Mode

The dongle will attempt to synchronize its locally set 24 bit address with the ELT for 2 minutes. If the dongle is unable synchronize its locally set 24 bit address with the ELT it will cause the ELT remote switch and local annunciator to continuously flash. For further information see the Test and Trouble Shooting sections of this manual.

Test

Setup

After the dongle has been installed, setup the test environment as follows:

- Ensure bus power to the dongle is off.
- Ensure all circuit breakers for the ELT system have been reset.
- Ensure the ELT local switch is in the OFF position, and the ELT is not transmitting.
- Ensure the ELT remote switch is in the ARM position.
- Attach a 406MHz uplink receiver to the 406MHz output of the ELT. Artex recommends the Sarsat Beacon Test Set, Model ARG 5410. **WARNING:** When using the ARG 5410, ensure there is 30db of attenuation between ARG 5410 and the ELT. Failure to attenuate the 406MHz signal will damage the ARG 5410.

Testing

- Apply bus power to the ELT/ dongle system and wait a minimum of 2 minutes. Once 2 minutes has elapsed, verify that neither the local ELT, nor remote switch annunciator are flashing. If the

annunciators are flashing, refer to the troubleshooting section of this manual.

- Turn on the uplink receiver. Refer to the uplink receiver operation manual for further information on the use of this test equipment.

- Use the local ELT switch to activate the ELT. Allow the ELT to transmit until the uplink receiver has received a 406 transmission, then deactivate the ELT.

- When the ELT is deactivated it will go through a self test. The ELT annunciator will flash five times to indicate a navigation data failure. This is because the dongle does not support the nav function of the ELT. The nav function of the ELT requires the use of the Artex Nav Interface Unit. If the ELT flashes any other failure codes, refer to the applicable ELT manual to troubleshoot the problem.

- Use the uplink receiver to verify that the ELT transmitted the dongle's locally set 24 bit address. Refer to the uplink receiver operation manual for further information on the use of this test equipment.

Installation Finalization

ELT Identification

After the functional test has been completed, the uplink receiver should have a 15 digit hex identification code stored from the ELT's 406MHz transmission. This 15 digit code comprises the ELT country code, 24bit address, beacon certification number, and other information. Label the ELT with this 15 digit code. *On new beacons there will be a blank area on the side of the ELT product lable where the code can be written. On older units the new label will have to be applied over the old 15 digit code.*

Connector Sealing

Once all tests have been satisfactorily completed, and all harness connections have been verified to be correct, the rectangular 12 position ELT connector should be sealed to prevent moisture from getting to the contact pins. This can be done by applying an electronic grade, non-corrosive RTV around the wires entering the rear of the connector. Artex recommends GE RTV 162.

Log Book / Form 337

By signing either the aircraft logbooks, or the FAA Form 337, you are stating that the installation has been performed in accordance with current FAR's and steps and procedures outlined in this manual.

Scheduled Maintenance

Inspection Schedule

The dongle is considered part of the ELT system and as part of the system should be on a yearly inspection schedule, or inspected whenever the ELT is inspected.

Inspection and Test

The inspection described in this manual is limited to the dongle. For detailed information about the inspection of the ELT system refer to the applicable ELT installation and operation manual.

- Remove the black circular connector from the dongle, and inspect both the plug and receptacle for corrosion.
- Remove the four screws that attach the dongle to the top cover. Then, remove the four screws that attach the dongle to the mounting plate. See the Aircraft Address section of this manual for an illustration.
- Inspect the physical integrity of the case, gasket and dip switches for wear, contamination and corrosion.
- Change the position of the Most Significant Bit (MSB) dip switch, and reconnect the black circular connector.
- Test the ELT in accordance with the Test section of this manual and the applicable ELT installation and operation manual.
- Verify that the ELT 15 digit hex identification code, and 24 bit address has changed as a result of changing the position of the MSB dip switch. The ELT 15 digit hex identification code should be recorded on the ELT product label.

- Change the position of the MSB dip switch back to its original position, and reassemble the dongle.

- Test the dongle again, and verify that the ELT 15 digit hex identification code, and 24 bit address have changed back to the original configuration. The ELT 15 digit hex identification code should match the code recorded on the ELT product label.

Troubleshooting

FAILURE:

ELT and Remote Switch Annunciators flash continuously when ELT is not transmitting.

CAUSE:

The dongle will attempt to synchronize its locally set 24 bit address with the ELT for 2 minutes. If the dongle is unable synchronize its locally set 24 bit address with the ELT it will cause the ELT remote switch and local annunciator to continuously flash.

If your ELT is not programmed with a 24 Bit Address protocol you will receive this failure indication. Use an uplink receiver to verify that the ELT protocol has been programmed with a 24 Bit Address protocol. Refer to the uplink receiver operation manual for further information on the use of this test equipment.

If the ELT has not been programmed with a 24 Bit Address protocol, contact the Artex Service Department for reprogramming information. If ELT has been programmed with a 24 Bit Address protocol, contact the Artex Service Department for further troubleshooting assistance.

CAUSE:

The communication between the ELT and dongle is made through the transmit and receive lines on pins 1 and 2 of the dongle. If

these lines are open, or shorted, the dongle will not synchronize its locally set 24 bit address with the ELT. This will cause the ELT remote switch and local annunciator to continuously flash.

Verify continuity between pin 1 of the circular connector and pin 12 of the rectangular connector. Verify continuity between pin 2 of the circular connector and pin 9 of the rectangular connector. Finally verify that these connections are not shorted to any other pins. If the wire harness is good, contact the Artex Service Department for further troubleshooting assistance.

Appendix A

System Part Numbers

151-6627	Crimp Terminal, Male
201-6324-01	Screw, 6-32 x 5/16
452-3052-03	Protective Top Cover
453-4010	DGL-1, Dongle
455-4010	Pack List Installation Kit
455-4010-01	Installation Kit
611-4010	Wire Harness, DGL-1
610-1744-01	Heat Shrink Splice .10 in.

System Approvals

FAA TSO-C126 System Component

JTSO-2C126 System Component

System Specifications

Physical Specifications	
Physical Characteristics	DGL-1 without mounting plate
Weight	0.2 lbs (.09KG)
Dimensions	2.5 x 2.5 x .625 in.(64 x 64 x 16 mm)

Physical Characteristics	Mounting Plate
Weight	0.1 lbs (.05KG)
Dimensions	2.5 x 6.1 x .05 in. (64 x 155 x 1.3 mm)

DGL-1 Electrical Characteristics		
Pin	Description	Specification
1	RX Input	TTL
2	TX Output	TTL
3	5.6VDC Output	5.6VDC ±0.3VDC
4	Power Input	28VDC ±10VDC
5	ELT Ground	ELT Pin 11
6	DGL-1 Ground	Aircraft Ground

Manual Revision History

11/06/02 - Release

12/18/02 - DCN 2124

02/17/03 - DCN 2147

04/21/03 - DCN 2188