THE SCIENCE ACR OF SURVIVAL

PRODUCT SUPPORT MANUAL
PathFinder™₃
Search and Rescue Transponder

Model No.: SART-3
Product No.: 2714, 2714NH
Y1-03-0170 Rev. M1

About ACR Electronics

ACR Electronics www.acrartex.com, designs and manufactures a complete line of safety and survival products including EPIRBs, PLBs, AIS, SARTs, Strobe Lights, Life Jacket Lights, Search Lights and safety accessories. The quality systems of this facility have been registered by TUV to AS9100C. Recognized as the world leader in safety and survival technologies, ACR has provided safety equipment to the aviation and marine industries as well as to the military since 1956.

⚠️ **CAUTION:** Before proceeding to install, test or use your new ACR Electronics' product, please read this Product Support Manual in its entirety.

If you have questions regarding the contents of the manual, please contact our Technical Service Department at ACR Electronics, Inc., Telephone +1 (954) 981-3333. Please be ready to provide the technician with the page number you wish to discuss. If you have a question that is not covered in the manual, please visit our website and access the Frequently Asked Questions (FAQs) section for further information or call our Technical Service Department. The website address is www.acrartex.com. If in the future you lose this manual, you may access and print a replacement on the ACR website.

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> ⚠️ **PLEASE READ ALL WARNINGS, CAUTIONS AND NOTES CAREFULLY**

SECTION 1 - HOW THE PATHFINDER™₃ WORKS

The PathFinder™₃ helps search and rescue services to quickly locate a life raft in the event of a rescue at sea. The SART can either be stowed in a life raft, or mounted next to emergency exits and then carried to the life raft in an emergency.

During an emergency, simply switch the SART on. When a vessel or aircraft with marine X-band radar comes within 5 to 7 nautical miles of the life raft, the SART generates a distinctive "distress" pattern on the radar screen (see Figure 1). The ship's radar signal guides the rescuers directly to the SART.
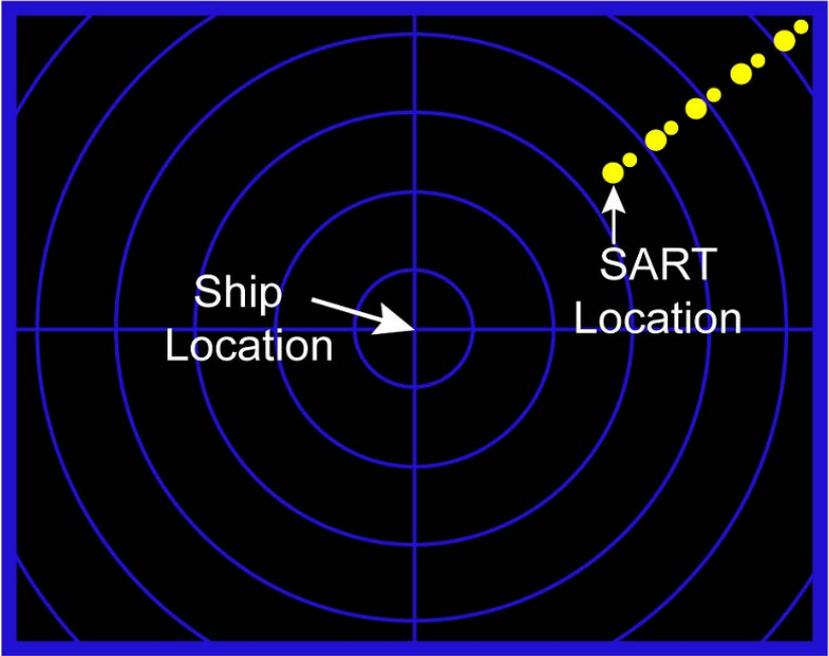
Figure 1- Radar Distress Pattern

A SART is a Search and Rescue Transponder that provides location information to search radars operating in the X-band (9.2 – 9.5 GHz). Once activated, the SART detects the radar signal of the search craft and sends a series of response pulses to the radar of the search craft, which in turn causes a series of 12 equally spaced arcs to appear on the radar display (see Figure 1). The arcs indicate the range to the SART location. The rescue craft follows the direction shown and proceeds to the SART. Note that the number of viewable "dots", as shown in Figure 1, is dependent on the radar setting, the range scale and the distance to the SART.

To achieve the maximum useful range, the SART must be mounted at least 3.3 feet (1 meter) above sea level. Increasing the height of the SART antenna will increase the range. For example, lashing the SART to the top of a pole or an oar in the survival craft will increase the height and thus the range.

The International Maritime Organization (IMO) requires all vessels of more than 300 GRT (Gross Registered Tonnage) to carry at least one SART and vessels 500 GRT and over must carry at least two SARTs, while RoRo Ferries are required to carry one SART for every four survival crafts.

Figure 2 shows the key features of your PathFinder™$_3$ SART. The blue activation switch ring is located under the white top cap. Located in the middle of the switch ring is a red pull tab that must be removed to activate your SART. The pull tab locks the switch ring in place and stops the SART from accidentally being placed in the ON position.

Turning the switch ring to the left allows you to test the SART. When held to the left, the SART will beep once and continue to flash every four seconds. When released, the switch ring will return to the OFF position. TEST mode is identical to ON mode and will generate a "distress" pattern on any radar within range. Use TEST mode carefully to avoid false alarms.

To activate your SART in times of emergency, turn the blue activation switch ring to the left into the test position and remove the red pull tab by pulling down on the lanyard attached to the tab. Turn the blue activation switch ring to the right and into the ON position (see the OPERATION section complete activation instructions).

When first turned ON, the SART will beep once and continue to flash every four seconds. The SART is now operational. When responding to radar, the red light flashes every 1 second and the SART will beep every second. For best results a telescopic pole is supplied in the base of your SART allowing mounting 1m (3.3 ft) above sea level.

SECTION 2 - PREPARING TO INSTALL

Unpacking the PathFinder™$_3$
Before proceeding with the installation of the PathFinder™$_3$, please verify that the content of the box includes the following:

Quantity	Item
1	PathFinder™$_3$ search and rescue transponder
1	Mounting bracket
1	Product Support Manual
1	Warranty card

If you do not have all of the items, please call ACR Technical Service at +1 (954) 981-3333.

Controls and indicators

Antenna

Pull Tab Lock

Activation Switch Ring

Test   OFF   On

Pull Tab

Control and Battery Housing

Hanging Lanyard

Lanyard Spool

Telescopic Pole

Rotate bottom cap to release lanyard and telescopic pole
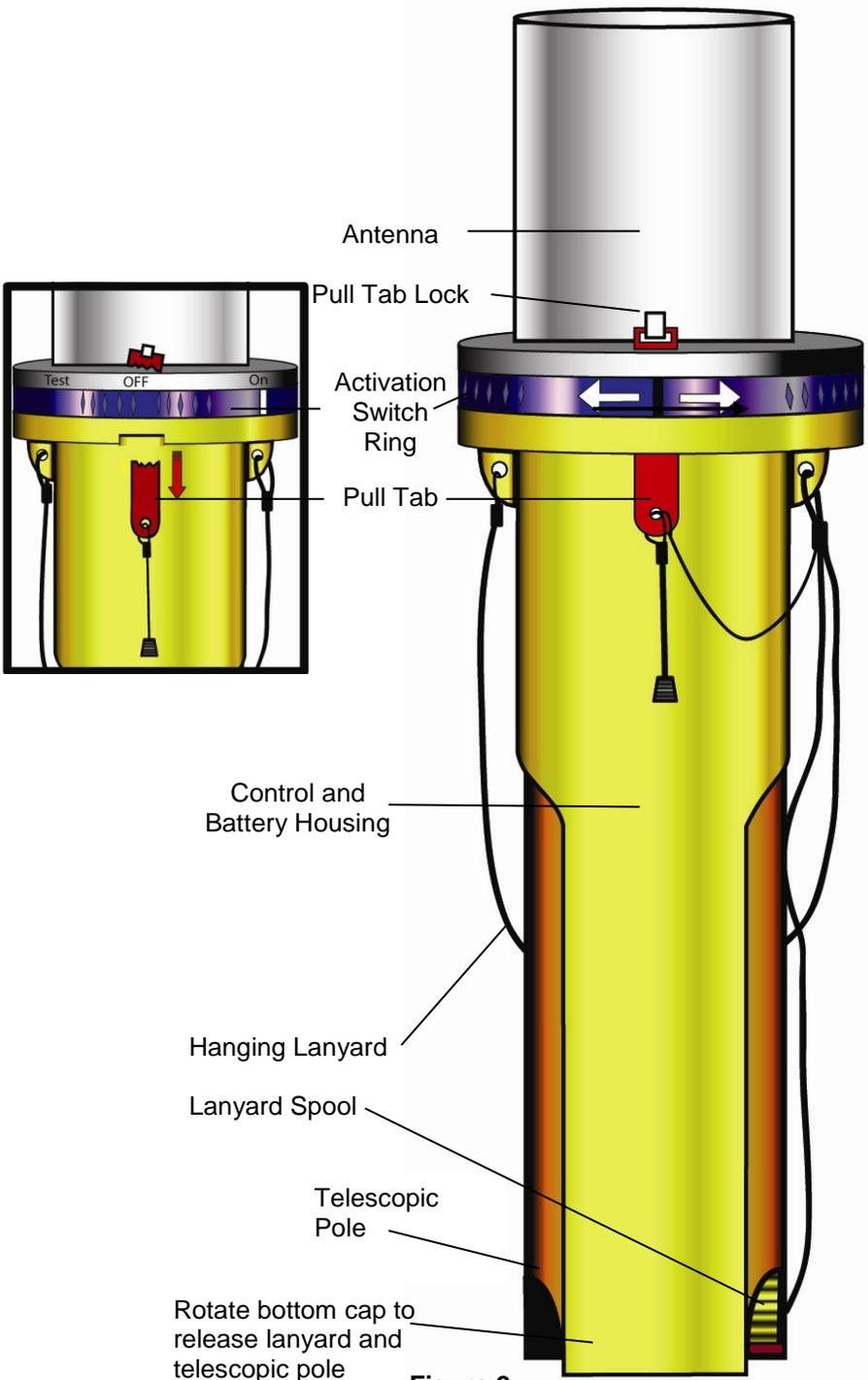
Figure 2

Vessel name

The SART label has a space where the vessel name is marked (see Figure 3). This can be done as follows.

With an indelible pen, write the vessel name directly onto the SART. Note, however, that some indelible inks will fade when exposed to strong sunlight, so a ultra-violet (UV) resistant pen is recommended.

If the full vessel name will not fit in the space provided, use a recognized abbreviation or the vessel's call sign instead.

Name/Vessel Registration
Nom/Enregistrement De Navire

Vessel Name Here
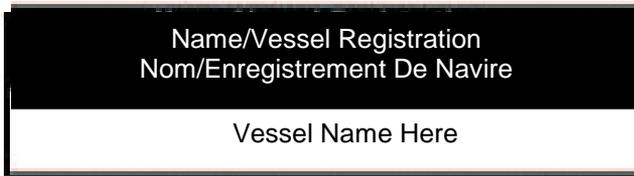
Figure 3

SECTION 3 - INSTALLATION

Life raft stowage

The SART can either be stowed in a life raft or lifeboat or it can be installed next to an emergency exit for carriage to the life raft in an emergency.

For life raft stowage the SART should be positioned for easy access in an emergency. If the SART is hidden from view then labels should be used to show its position. For inflatable life rafts the mounting bracket should be discarded to avoid the risk of damaging the life raft.

> ⚠️ **CAUTION:** Do not:
> - Tie lanyard to vessel
> - Cover or obscure the SART
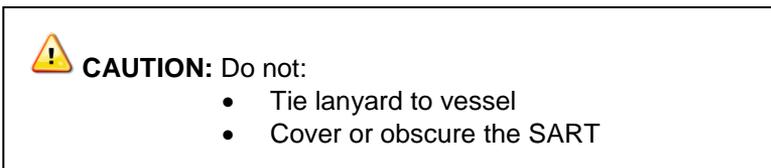
Vessel Mounting

To deploy the PathFinder™$_3$ on board a distressed vessel, rather than a life raft, hang SART near vertical as high as possible, with a clear view of the horizon. The SART must not be obscured by metal bulkheads etc.

<u>Site selection</u>

The SART should be mounted inside the vessel, next to an emergency exit. Some ships require 2 SARTs, one by a port exit and one by a starboard exit. Mount each SART as follows:

- Mount in plain view, at a convenient height, so that all crew can easily remove the SART.
- Position at least 1 meter from the ship's compass.

> ⚠️ **CAUTION:** Keep this SART at least 3 feet (1 meter) away from all magnetic sources, stereo speakers and compass installations.

<u>Installation</u>

The SART mounting bracket should be bolted to a bulkhead using four (4) suitable M6 (1/4") bolts. Mounting hardware for the bracket is not included. Hardware required depends on the bulkhead material and its thickness. Bracket mounting holes and SART mounting details are shown in figure 4.

To install the PathFinder™$_3$:

- Remove SART from its packaging and check for shipping damage.
- Perform the SART test (see Maintenance section for the procedure).
- Select a position for SART Mounting allowing sufficient space for the assembly.
- Drill holes to dimensions shown on Figure 4.
- Place bracket in position and secure to bulkhead as follows:
- Remove the SART from the bracket.
- Position bracket at the correct position for maximum visibility
- Mark position of bracket fixing holes.
- Drill holes to suit mounting fixtures.
- Secure bracket to bulkhead.
- Mount SART on the bracket (see figure 4).
- Secure SART with Velcro strap.

Not to Scale
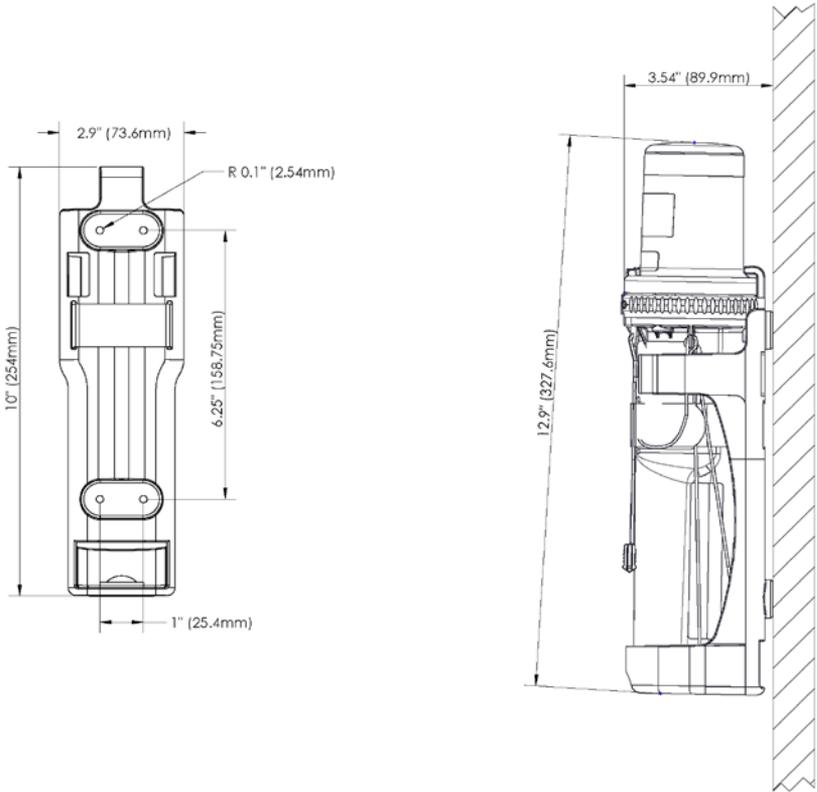
Figure 4: Installing the SART

SECTION 4 - OPERATION

Sequence of Operations
The SART has primary and secondary indicating systems: The primary system is the indicator lights and the secondary system is the buzzer.

When the switch is set to ON, the SART immediately enters the Test Mode. Here both the red light and the buzzer are tested. Note that in noisy environments it may be difficult to hear the buzzer. After approximately one second, the SART goes into receive mode.

The SART remains in the receive mode until it detects a radar pulse. It then switches to the reply mode and transmits a series of pulses. These pulses will appear on the interrogating radar display as a series of arcs leading away from the SART's position. Both SART lights flash rapidly and the buzzer emits a pulsed sound (beep) at approximately one- second intervals indicating the reply mode. This sequence is repeated each time a radar signal interrogates or transmits a valid radar signal to the SART. When the radar signal interrogation stops, the SART automatically returns to the receive mode.

With a fully charged battery the SART will operate in receive mode for a minimum of 96 hours. After this time period it will still respond to normal interrogation radar signals for an additional eight hours.

Activation
Remove the SART from the bracket. Activation of the SART is completed by using the three-position switch ring (TEST-OFF-ON), as shown in Figure 5.

1. Turn the blue activation switch ring to the left, placing the SART in test mode

2. Remove the red Pull Tab by pulling it down and completely out of the SART

3. Release the activation switch and guide it to the right until it is in the ON position
   i. The SART will beep once and flash every four seconds
   ii. The flashing red light indicates the SART is ON

4. Turn the bottom cap of the SART and deploy the telescopic pole to its maximum length of 3 ft. (1 meter).

5. Remove lanyard and secure it to the life raft.
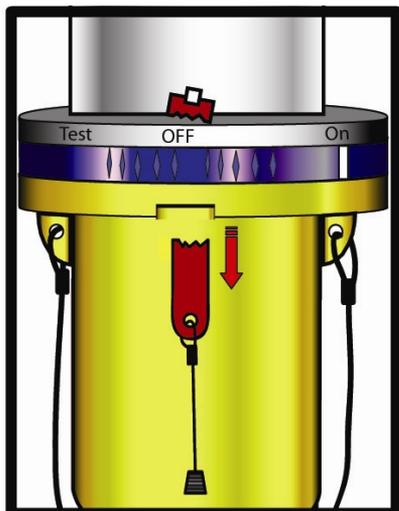
Figure 5

When activated the SART has three modes of operation:

Receive - waiting for a valid interrogation by a radar signal.

Reply - replying to a valid interrogation by a valid radar signal.

Test - self-test sequence that checks both indicator lights and the buzzer.

> ⚠️ **WARNING:** The SART must only be activated in situations of grave and imminent danger.

Pole Mounted SART

1. The PathFinder™₃ is supplied with a telescopic pole to raise the SART one meter above sea level (see figure 6).

2. To operate, simply turn the bottom cap of the SART to release the pole.

3. Pull the pole downward and extend it to its maximum length.

4. To lock pole in position pull firmly across pole joints while twisting slightly.

5. Tie lanyard to life raft to allow retrieval should the SART fall into the water.

6. Push SART through life raft observation port and place foot of pole in pocket at base of life raft.

7. Use life raft ties to hold SART pole near vertical.

8. Ensure SART is not obscured by metal objects or inflatable radar reflectors.

9. Periodically check to see if SART is still vertical.
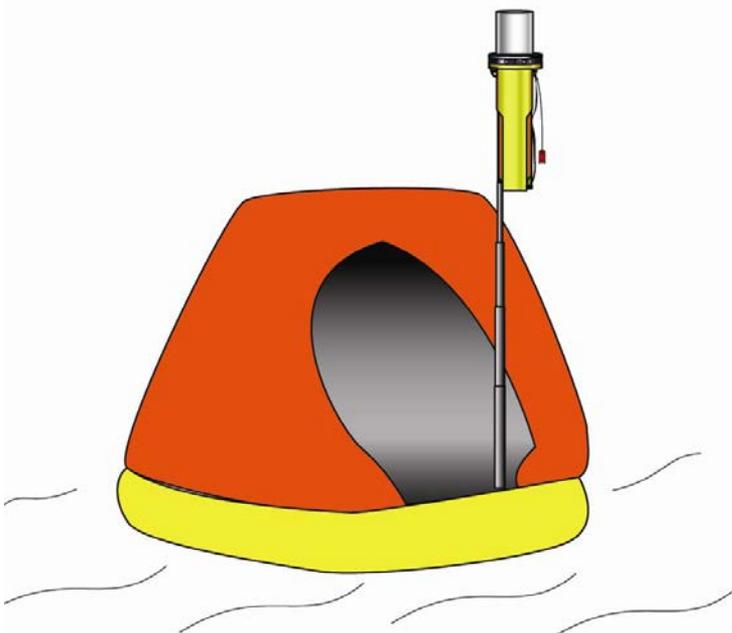
Figure 6

Hanging SART

1. If no pole is available, or if you prefer, you can suspend the SART from the canopy support using the additional lanyard loop provided (see Figure 7).

2. Loop the lanyard through the support strap in the life raft and secure firmly.

3. The SART should be as high as possible and at least 1m above sea level. Ensure SART is not obscured by metal objects or inflatable radar reflectors.
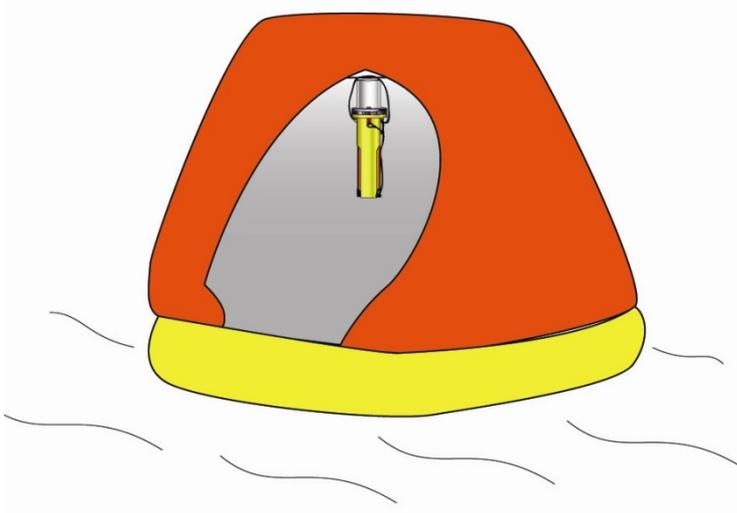
Figure 7

SECTION 5 - MAINTENANCE

This chart is a summary of the procedures described below.

Time interval	Maintenance to do
Every two months	Visual inspection
	Battery expiry date check
	Pole operation check
	Lanyard check
	Safety lock check
	Confidence check
Every year	Functional test

Every-two-months inspection

The SART is a safety device; it must be regularly checked at least every two months as follows.

1.) Visually inspect the casing for cracks & punctures.

2.) Extend the pole and check that it operates correctly, and then return the pole to its housing.

3.) Check to ensure the tether lanyard is neatly bundled and firmly secured to the SART. Ensure the lanyard is NOT tied to any part of the vessel.

4.) Check that the battery expiry label shows sufficient battery life to cover the next routine voyage.

5.) Ensure the safety lock is in place and the integrity seal is not broken.

Confidence check

Push the switch ring to the left and into the test position and hold it there for 10 seconds. Confirm the SART does either (a) or (b) below, then release the switch.

a)   Beeps once and the red light flashes continuously every 4 seconds (no Radar within range).

b)   Beeps and the red light flashes every 1 second (answering radar).

Multiple SART Interrogation Test

If your vessel has two PathFinder™$_3$ SARTs on board they may be used to test each other. This test requires that each SART is held independently, 5 meters away from one another. Turn and hold one SART into the TEST position. It will beep once and the red light flashes continuously every 4 seconds. Next place the 2nd SART into the test mode. Confirm that the 1st SART beeps once every time the 2nd SART is turned into the test mode.

Repeat this sequence to test the 2nd SART.

Functional Test
Perform this test at least once a year.

Get someone to watch the radar screen, while you take the SART to the ship's bow or other location, at least 150m minimum from the radar antenna to the SART. Hold the switch in its TEST position for no more than 10 seconds. Confirm a "distress" pattern is generated on the radar screen. At close range the pattern often appears as a series of concentric circles.

Servicing
If the SART fails any of its bimonthly checks, the SART must be returned to the supplier or an approved service agent for investigation and/or servicing.

If the battery is beyond its expiry date, the SART must be returned to a Battery Replacement Center for a battery change. The battery is NOT user serviceable; DO NOT attempt to change it.

If the SART has been used in an emergency or its integrity seal is broken, then the SART must be returned for a battery change.

Battery Pack Replacement
Regulations require that the battery pack be replaced every 5 years.

NOTE: The battery pack must be replaced if the SART has been used in an emergency or if the SART has been activated inadvertently (integrity seal broken).

⚠️ **WARNING:** The battery pack cannot be recharged; attempts to recharge the battery pack could result in an explosion or fire.

Replacement of the SART battery pack must be performed by ACR or by an authorized ACR Battery Replacement Center. The cost of this replacement is the responsibility of the owner. See the ACR website for contact information of Battery Replacement Centers.

Transportation
Your SART contains a lithium battery. For shipping and MSDS information, visit the ACR website at www.acrartex.com. You may also call ACR Technical Service at +1(954) 981-3333.

APPENDIX A - SPECIFICATIONS

Approvals	
Approvals	MED: EC Type Examination Certificate Number: QQ-MED-22/08-01
	FCC ID: B66ACR-SART-PF-3
	Industry Canada TAC No.:1322A-ACRSART3
Standards	Global Maritime Distress and Safety System (GMDSS) according to Chapter 3 of IMO SOLAS
	IMO Resolution A.802(19)
	IMO Resolution A.694(17), Relevant parts
	ITU-R M.628-3
	IEC 61097-1: 2007
	IEC 60945: 2002, EMC Clauses
	Part 80 of the FCC Rules

NOTE: For declaration of conformity and all other type approval information, please visit our website at www.acrartex.com

Antenna	
Polarization	Horizontal
Azimuth beam width	Omni-directional within 2 dB
Vertical beam width	± 12.5°

Transmitter	
Frequency	9.2 GHz to 9.5 GHz
Response delay	0.5 µs
Forward sweep time	7.5 µs ± 1.0 µs
Return sweep time	0.4 µs ± 0.1 µs
Power output	400 mW EIRP

Receiver	
Effective sensitivity	-50 dBm

Battery	
Receive mode operation	96 hours minimum
Reply mode operation	8 hours continuous while being interrogated by an X-band radar with a pulse repetition frequency of 1 kHz (at extreme temperatures).
Battery life	5 years

Environmental	
Operating temperature	-4°F to +131°F (-20°C to +55°C)
Storage temperature	-22°F to +149°F (-30°C to +65°C)

Physical	
Length	18 in (459 mm) excluding pole
Diameter	3.5 in (90 mm) mid body
Weight	1.5lbs (684 g) including pole
Lanyard Length	10 m
Electromagnetic compatibility	Meets the applicable requirements of (BS) EN 60945: 1997

APPENDIX B - WARRANTY, NOTICES

Limited Warranty

This product is warranted against factory defects in material and workmanship for a period of 1 (one) year* from date of purchase or receipt as a gift. During the warranty period ACR Electronics, Inc. will repair or, at its option, replace the unit at no cost to you for labor, materials and return transportation from ACR. For further assistance, please contact our Technical Service Department at ACR Electronics, Inc., 5757 Ravenswood Road, Fort Lauderdale, FL 33312-6603. Fax: +1 (954) 983-5087, Telephone: +1 (954) 981-3333, Email: service@acrartex.com,.

This warranty does not apply if the product has been damaged by accident or misuse, or as a result of service or modification performed by an unauthorized factory. Except as otherwise expressly stated in the previous paragraph, THE COMPANY MAKES NO REPRESENTATION OR WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, AS TO MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR ANY OTHER MATTER WITH RESPECT TO THIS PRODUCT. The Company shall not be liable for consequential or special damages.

To place the warranty in effect, register online at www.acrartex.com or return the attached card within 10 days.

*Five years for the following products: EPIRB, PLB.

Notices

ACR Electronics diligently works to provide a high quality Product Support Manual, however, despite best efforts, information is subject to change without notice, and omissions and inaccuracies are possible. ACR cannot accept liability for manual contents. To ensure that you have the most recent version of the Product Support Manual, please visit the ACR website at www.acrartex.com.

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ACR ELECTRONICS INC.

PRODUCT INFORMATION FOR PEOPLE'S REPUBLIC OF CHINA

NOTE TO USERS OF PATHFINDER₃ SART, TELLUSART

Table 1

Component Name	Toxic or Hazardous Substances or Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr6+)	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
Printed circuit assembly	X	O	O	O	O	O
Battery pack assembly	X	O	O	O	O	O
Antenna Assembly	X	O	O	O	O	O
O: Indicates that the toxic or hazardous substance contained in all of the homogeneous materials for this component is below the limit requirement in SJ/T11363–2006						
X: Indicates that the toxic or hazardous substance contained in at least one of the homogeneous materials used for this component is above the limit requirement in SJ/T11363–2006						
Assemblies include population of components, solder and interconnects.						

Product Marking Explanations

In accordance with the requirements specified in SJ/T11364–2006, all ACR EIPs sold in the People's Republic of China are marked with a pollution control marking. The following marking applies to ACR products.

This marking indicates that some homogeneous substance within the EIP contains toxic or hazardous substances or elements above the requirements listed in SJ/T11363–2006. These substances are identified in Table 1.

Environmentally Friendly Use Period

The number in the marking, shown as 20 in the illustration above, refers to the EIP's Environmentally Friendly Use Period (EFUP). The EFUP is the number of years from the date of manufacture that toxic or hazardous substances or elements contained in EIPs will not leak or mutate under the normal operating conditions described in the EIP user documentation, resulting in any environmental pollution, bodily injury, or damage to assets.

Note Except as expressly stated herein and as required under mandatory provisions of regulations of the People's Republic of China, ACR Electronics Inc. makes no representation or warranty of any kind, expressed or implied, with respect to the EFUP and expressly disclaims any representations or warranties, expressed or implied, with respect to the EFUP.

ACR ELECTRONICS INC.

中华人民共和国产品信息

PATHFINDER₃, SART用户须知

表1

产品说明

根据

标识

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr6+)	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印刷电路板组件	X	O	O	O	O	O
电池组件	X	O	O	O	O	O
天线组件	X	O	O	O	O	O
O: 表示该有毒有害物质在该部件所有均质材料中的含量均在SJ/T11363-2006 标准规定的限量要求以下。						
X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出SJ/T11363-2006 标准规定的限量要求。						
组件包含元器件, 焊接材料和连接件						

SJ/T11364-2006 的要求，中华人民共和国境内销售的所有ACR 电子信息产品均注明污染控制标识。 ACR 产品使用以下标识。

该标识表示该电子信息产品某一均质材料中有毒、有害物质或元素的含量超出SJ/T11363-2006 规定的限量。 相关物质见表1。

可能由于产品体积或功能等因素而未直接在产品上注明。 但产品仍符合SJ/T11364-2006 的要求，且其标识信息已在本文说明。

环保使用期限

标识中的数字（即上述图例中的"20"）指电子信息产品环保使用期限 (EFUP) 。 电子信息产品环保使用期限是指在正常使用的条件下，电子信息产品中含有的有毒、有害物质或元素不会发生外泄或突变并导致对环境造成严重污染或对人身、财产造成严重损害的期限。

注除根据中华人民共和国法规的强制性规定在此作出明示声明的以外，ACR Electronics Inc. 对电子信息产品环保使用期限不作任何形式的陈述或保证（无论是明示或默示），并且不对电子信息产品环保使用期限的任何陈述或保证（无论是明示或默示）承担任何责任。