

# PRODUCT SUPPORT MANUAL

YX-xx-1234  
Rev. A



## TelluSART MK II

Search and Rescue Transponder

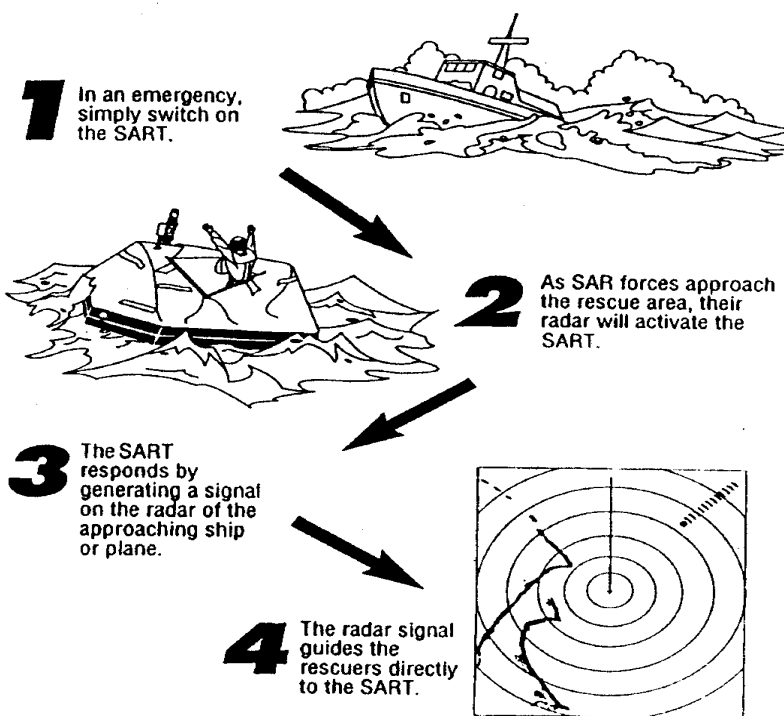
Product No. 0200-0000-DB0-0

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**NOTES**

# How the SART Works



## IMPORTANT NOTICE

**THE SART IS A KEY ELEMENT IN YOUR SHIP'S SURVIVAL SYSTEM; ITS PROPER OPERATION IN AN EMERGENCY DEPENDS ON THE CORRECT INSTALLATION OF THE UNIT, REGULAR MAINTENANCE AND A KNOWLEDGE OF THE METHODS OF OPERATION OF THE SART.**

This manual contains important information about

- restrictions in the use of SARTs,
- the correct installation of the unit,
- the necessary maintenance and care, and
- methods of operation of the SART in an emergency.

It is important that this manual be read and its content understood before attempting to install or operate the SART.

Keep this manual as a reference for the proper maintenance and operation of the SART.

If additional information is required or if problems are experienced, please contact an authorized dealer or:

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## NOTICE TO PURCHASERS, OWNERS AND USERS:

Purchasers, owners and other users of the SART use the device at their own risk. In no case shall ACR Electronics, Inc. be liable for any consequential or incidental damages, for breach of warranty, express or implied, or for any other reason.

chaser of the unit.

During the warranty period the manufacturer will repair or, at the manufacturer's option, replace a defective unit at no cost to the owner of the SART for materials and labor. Transportation charges are the responsibility of the owner of the SART. The unit must be packaged correctly and shipped prepaid to the manufacturer or an authorized service center; it will be returned via collect shipping.

The warranty is void if the unit has been damaged through accident, misuse, improper installation, or during transportation. The warranty is also void if the security seal on the SART has been broken.

The liability of the manufacturer shall be limited to the repair or replacement of a defective unit during the warranty period. The manufacturer shall not be liable for injuries or damages arising from the handling, possession or use of this product by the purchaser or others who obtain it through the purchaser.

For full and complete warranty language the owner is referred to the warranty card provided with the SART. To validate this warranty, the enclosed warranty card must be completed and mailed before putting the unit into service.

## Table of Contents

### 9.5 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 temperature).
Battery Life:	5 years

### 9.6 Environmental

Operating temperature:	-4 F to + 131 F (-20 C to +55 C)
Storage temperature:	-22 F to +140 F (-30 C to +65 C)

### 9.7 Physical

Length:	18 in (459 mm) excluding pole
Diameter:	3.5 in (90 mm) mid body
Weight:	4.4 lbs (2 kg) including pole

## 10. WARRANTY

The SART is guaranteed by the manufacturer to be free of defects in materials and workmanship for a period of one year from the date of the original purchase. This warranty is extended only to the original purchaser.

1	Introduction.....	6
2	Using the SART .....	7
	2.1 General .....	7
	2.2 Activation, Operation, Test .....	8
	2.3 Sequence of Operations .....	8
3	Installation.....	10
4	Operating Instructions .....	11
5	Battery Pack Replacement.....	12
6	Self-test .....	13
7	Routine Maintenance.....	14
8	Note on Serial Number.....	14
9	Technical Specification.....	15
	9.1 General .....	13
	9.2 Antenna .....	13
	9.3 Transmitter .....	14
	9.4 Receiver.....	16
	9.5 Battery .....	16
	9.6 Environmental .....	16
	9.7 Physical .....	16
10	Warranty.....	17
Figure 1:	Typical SART Response Signal .....	6
Figure 2:	SART - Outline Drawing.....	7
Figure 3:	Installing the SART.....	9
Figure 4:	ON-OFF-TEST Switch.....	11
Figure 5:	Mounting the SART in a life raft.....	12
Figure 6:	Serial Number Grid .....	14

## 1.0 INTRODUCTION

The 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 search radar of the search craft that causes a series of 12 equally spaced arcs to appear on the radar display (See Figure 1). The arcs indicate the direction to the SART location. The rescue craft follows the direction shown and proceeds to the SART.

To achieve the maximum useful range the SART must be mounted at least 3.3 feet (1 M) above sea level and the rescue craft antenna must be 50 feet (15 m) 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 to carry at least one SART and vessels 500 GRT and over must carry at least two SARTs.

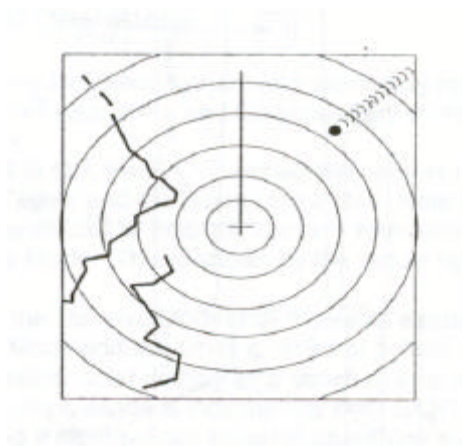


Figure 1:  
SART Re-

Typical  
sponse Signal

Meets the requirements of: Global Maritime Distress and Safety Systems. (GMDSS) according to IMO amendment to chap 111 of the 1974 SOLAS Convention, as well as part 80 of the FCC Rules.

International type approval in accordance with: IEC 1097-1 1992, I-ETS 300 151

Designed to meet: RTCM Paper 111-92/SC113-36 (Ninth Draft SART Standard)

Frequency: 9.2 GHz to 9.5 GHz

## 9.2 Antenna

Polarization: Horizontal

Azimuth beam width: Omni-directional within 2 dB

Vertical beam width:  $\pm 12.5^\circ$

## 9.3 Transmitter

Response delay: 0.5  $\mu$ s

Forward sweep time: 7.5  $\mu$ s  $\pm$  1.0  $\mu$ s

Return sweep time: 0.4  $\mu$ s  $\pm$  0.1  $\mu$ s

Power output 400 mW EIRP

## 9.4 Receiver

Effective sensitivity: -50 dBm

authorized dealer.

## 7. ROUTINE MAINTENANCE

Every month, carry out a self-test on the SART and check that battery date has not expired.

## 8. NOTE ON SERIAL NUMBER

The serial number on the SART is indicated by erased numbers on a grid. Read the grid from left to right. See figure 6. The serial number shown in Figure 6 is 435719.

0	0	0	0	0	0
1	1	1	1		1
2	2	2	2	2	2
3		3	3	3	3
	4	4	4	4	4
5	5		5	5	5
6	6	6	6	6	6
7	7	7		7	7
8	8	8	8	8	8
9	9	9	9	9	

Figure 6: Serial Number Grid

## 2. USING THE SART

### 2.1 General

Installation and use of the SART does not require special training. Normally, the SART will be mounted on a bulkhead using the bracket and clips provided. In an abandon ship situation, remove the SART from the bracket and take it to the survival craft. The next step is to activate the SART and install it in the survival craft.

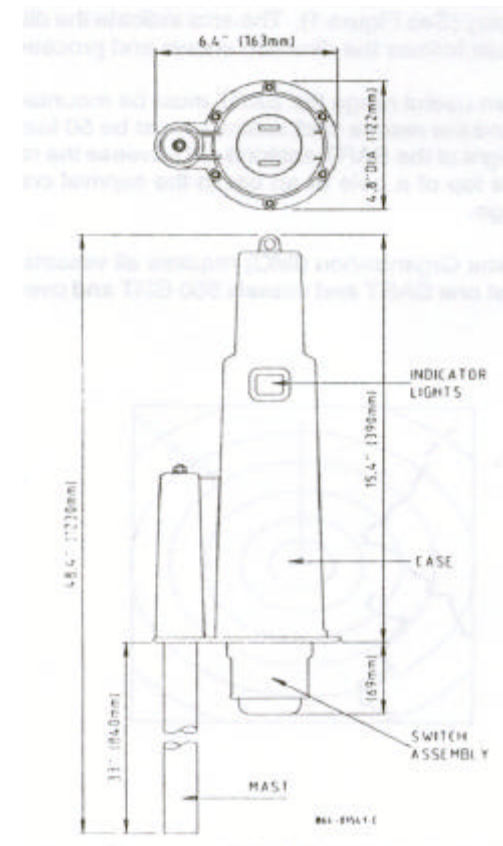


Figure 2:

Outline Drawing

SART -

## 9. TECHNICAL SPECIFICATIONS

### 9.1 General

## 2.2 Activation, Operation, Test

Activation of the SART is by a three-position switch (ON/OFF/Test), which is operated by pushing and rotating the spool on which the lanyard is wound.

Switching the SART to ON breaks a seal, showing that the unit has been operated. The TEST position allows the SART to be functionally tested without breaking the seal. Note that TEST on the switch is spring loaded to OFF. This ensures the switch is not left in the TEST position as this would drain the battery pack.

When activated the SART has three Modes of operation. These are:

Receive - waiting for a valid interrogation.

Reply - replying to a valid interrogation

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

## 2.3 Sequence of Operations

The SART has a primary indicating system and secondary indicating system. 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 yellow and green lights and the buzzer are tested. Note that in noisy environments it may be difficult to hear the buzzer. After about one second the SART goes to Receive Mode. This is shown by the yellow light flashing slowly.

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. The Reply Mode is indicated by both SART lights flashing rapidly and the buzzer emitting a rapid pulsed sound at about one second intervals. This sequence is repeated each time a radar interrogates the SART. When the interrogation stops the SART automatically returns to the Receive Mode.

With a fully charged battery pack the SART will operate in Receive

inadvertently.

**Caution:** The battery pack CANNOT be recharged; attempts to recharge the battery pack could result in an explosion.

Replacement at the SART battery pack must be performed by XXXXXX or by a authorized dealer; the cost of this replacement is the responsibility of the owner.

## 6. SELF TEST

Please note the TEST position on the SART is spring loaded to OFF and cannot be left in the TEST position.

To carry out a self-test:

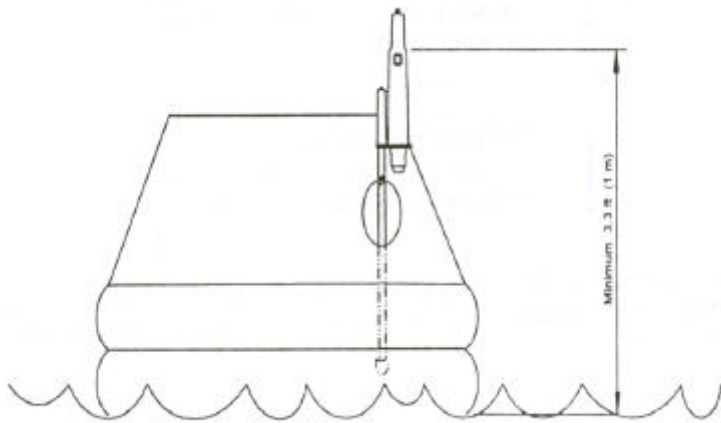
**Warning:** Keep Test time to a minimum as the SART is in Receive Mode and will respond to any X-bad radar transmission in the vicinity. In addition, the longer the test the greater the drain on the battery pack.

**Note:** The SART must be tested on a monthly basis.

1. Push switch in and turn against the spring to the TEST position.
2. Check that both lights flash rapidly and buzzer emits a rapid pulsed sound at about one second intervals.
3. After this the yellow light flashes slowly showing that the SART is in the Receive Mode.

**Note:** It is possible, when testing the SART, that it will be activated by an operating radar. If this is the case both lights will flash rapidly and the buzzer will emit a rapid pulsed sound showing that SART is in the Reply Mode. If this does happen then release the switch.

4. On completion of test, release the switch and check that it returns to OFF.  
**Note:** If the lights do not come on the battery pack voltage may be low or the SART may be defective. Contact ACR South Africa or an



3. Mount the SART in the survival raft. A typical installation in, for example, a life raft, would be as follows (see figure 5):
  - a. Push the SART through the circular observation port and place base of pole in the pocket beneath the observation port.
  - b. Using the lanyard, secure the SART pole to suitable points on the life raft canopy.
4. Observe the SART lights and listen for the buzzer sounding. When the SART replies to an interrogation, both lights flash and the buzzer sounds.

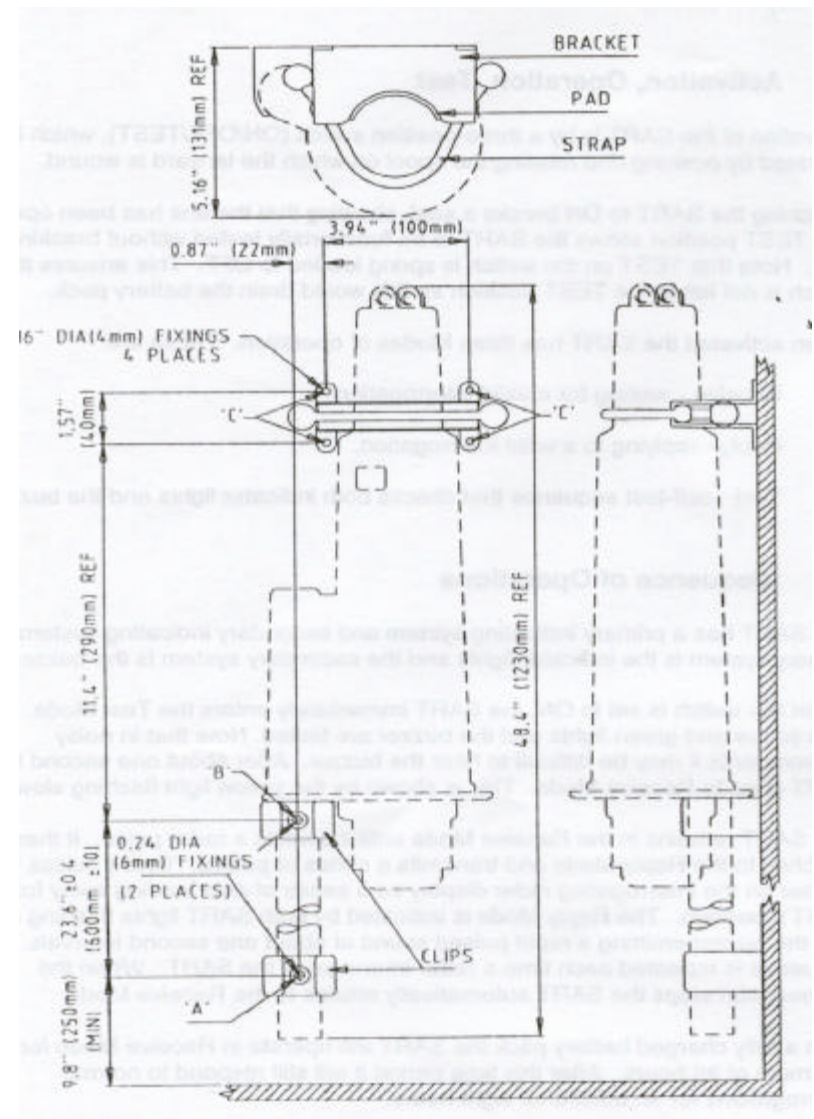
## 5. BATTERY PACK REPLACEMENT

Although the cells used in the battery pack of the SART have a shelf life in excess of 10 years, regulations require that the battery pack be replaced every 5 years. A label on the lower section of the SART housing shows the expiration date of the battery pack.

**Note:** the battery pack must be replaced if the SART has been used in an emergency or if the SART has been activated

Mode for a minimum of 96 hours. After this time period it will still respond to normal interrogation for an additional eight hours.

Figure 3: Installing the SART



## 3. INSTALLATION

In addition to the SART and 3.3 feet (1 m) pole, a mounting bracket for the body and two rubber clips for the pole are supplied. The equipment does not include mounting hardware for the bracket and the clips, as these will depend on the bulkhead material and its thickness. Bracket and clip mounting holes and SART mounting details are shown in Figure 3.

To install SART:

1. Remove SART from its packaging and check for shipping damage.
2. Perform the SART test (see Self-test Procedure on page xx).
3. Remove the two halves of pole and attaching parts from packaging and assemble to SART as follows:
  - a. Screw upper pole to lower pole. Tighten using suitable wrenches.
  - b. Push the upper pole into the pole holder on the SART and secure using the plain washer and 6 mm locknut supplied..
4. Select a position for SART Mounting allowing sufficient space for the assembled pole.

**Note:** *The SART contains magnetic material. Ensure that the position that you select is at least 7 feet (2m) away from compass installations.*

5. Drill holes A and B to dimensions shown on Figure 3. Hole B should be at least 3 feet above deck.
6. Place clips in position and secure them to bulkhead.
7. Mount SART on bulkhead as follows (see figure 3):
  - a. Insert SART pole into clips fitted in step 6.
  - b. Position bracket above stepped part of SART casing.
  - c. Mark position of four bracket fixing holes C.

- d. Remove bracket and SART
- e. Drill four holes C to suit attaching parts.
- f. Secure bracket to bulkhead
- g. Place SART mast in clips and retaining strap to bracket.

#### 4. OPERATING INSTRUCTIONS

To operate the SART:

1. Remove the SART (with installed pole) from the bracket.
2. Activate the SART as follows:
  - a. Push the lanyard spool in and turn it counter-clockwise until the seal breaks and the switch clicks into the ON position. Figure 4 shows switch in OFF position.



Figure 4: ON-OFF-

TEST Switch

- b. Both lights will flash twice and the buzzer will beep twice. After this the yellow light will flash slowly showing that the SART is in the Receive Mode.

Figure 5: Mounting the SART in a Life Raft