# NORTHROP GRUMMAN

Sperry Marine R4 AIS
Class A Transponder System

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The International Maritime Organisation´s (IMO) carriage requirement for Automatic Identification System (AIS) will substantially enhance safety at sea giving ship´s officers an improved situation awareness for collision avoidance. AIS will also provide better land-based services for mariners from VTS as well as improved security, environment and safety in ports and along coasts. The Sperry Marine R4 AIS Vessel Transponder utilizes a fourth generation AIS product from Saab Transpondertech AB, using the latest technology to achieve the highest performance and reliability. The R4 Class A Transponder System is type-approved with Wheelmark and complies with all international standards for AIS ship systems.
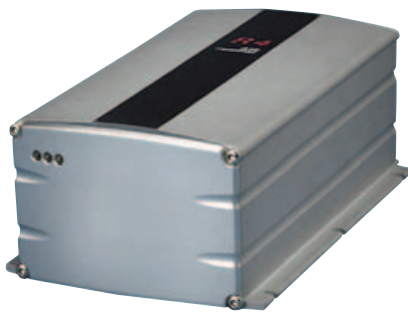
Sperry Marine R4 AIS Transponder

The Sperry Marine R4 AIS Class A Transponder

- Broadcast of Dynamic, Static, Voyage Related information and Short Safety Related Data.

- Standardized interface for connection to ship sensors e.g. GNSS, Gyro, Turn indicator, ECDIS, ECS, ARPA, Radar and Speed Log.

- High resolution 6" graphic day and night display providing a radar like presentation of up to 500 targets in the vicinity of own ship. Situation display with capability to show vessels by bearing, range, name and call sign. Messaging display for generation and presentation of safety related text messages. Configuration and engineering mode to manage the system without any extra tools. Also provided is a mandatory pilot plug so that installation cost can be reduced.

- Simple interface to the BridgeMaster E Radar and NaviECDIS

- Future upgrades possible without hardware changes using fully integrated DSP solution.

- VHF transceiver with one transmitter, three receivers.

- Internal 12 channel backup GPS ready to upgrade with DGPS, WAAS and EGNOS capability.

- Easy to install and meets IMO installation recommendations.

- Easy to operate with user-friendly Human Machine Interface developed by practicing mariners.

- Channel management capability for areas operating on AIS frequencies other than the standard worldwide allocated AIS frequencies.

- Possibility to generate Long Range AIS reply over SATCOM equipment e.g. Inmarsat C.

- Low power consumption

- Plug and play

Optional
- DGNSS capability (New DGNSS standard).

Sperry Marine

Sperry Marine provides the marine industry with the AIS solutions it requires.

The Sperry Marine R4 AIS Transponder consists of a radio transceiver unit, a GPS receiver, a controller unit and a separate display unit. The transceiver contains three independent VHF receivers (two) Time Division Multiple Access (TDMA) tunable receivers, and one DSC receiver, and one transmitter. The transmitter alternates its transmissions between the two operating TDMA channels, and can also be used to reply to a DSC interrogation (ITU-R M.825-3, Annex 1). The internal GPS receiver provides accurate time synchronization. It can also be used as a back-up source of Ship´s Speed-Over-Ground (SOG), Course-Over-Ground (COG) and position information in case of failure of main sensors. The controller creates and schedules data packets for transmission based on Dynamic, Static and Voyage Related data as defined in the IMO performance standard.

The Sperry Marine R4 AIS Transponder can easily be interfaced to the required sensors on the bridge e.g. Gyro, and GNSS. It has already been tested and interfaced with most available external navigation presentation systems (Radar, ECS/ECDIS). The R4 is prepared for connection to Long-Range systems like Inmarsat C. It has a user-friendly interface for plotting other ships on a radar like display. It can also display information about other vessels sorted by bearing or by range. The display also handles the sending/receiving of messages.

EQUIPMENT LIST STANDARD
R4 AIS Transponder
R4 Display unit
Integrated Pilot plug
Transponder connecting cable 2m
Display unit connecting cable 2m
Transponder power cable 2m
Display unit power cable 2m
Alarm relay
Installation and operation manuals
Gimbal Mounting.

OPTIONAL
Junction box
GPS Antenna
VHF Antenna
Connectors
Power converter
Gyro converter
Flush Mounting

Technical Specifications

Physical
Transponder:
Size WxHxL 144x85x226 mm, Weight: 2,3 kg
Display
Size WxHxL 102x207x270 mm, Weight: 1,1 kg

Power
Input 24V DC (230/110 vac with converter)
Power consumption
Transponder 15W (50W peak)
Display 7,5W

GPS Receiver (AIS internal)
Receiver 12ch (Ready for DGPS)
Frequency L1(1575,42 MHz)
Update rate: 1Hz
Position accuracy (SA off)
Position <1 m DGPS (CEP)
Position <16 m GPS (CEP)

Electrical Interfaces
8 data ports RS422
Port Default speed (bps)(configurable from 1 200 – 115 200 bps)
Pilot In/Out 38400
ECDIS In/Out 38400
Long Range In/Out 9600
Sensor 1 In 4800
Sensor 2 In 4800
Sensor 3 In 4800
Aux In 9600
Display In/Out 57600

Connectors
Transponder data port: 50 pin D-sub (M)
Transponder power: 9 pin D-sub (M)
GPS antenna connector TNC female (50_)
VHF antenna connector BNC female (50_)
Display data port: 18 pole Conxall Maxi-Con-X
Display power: 3-pole Mini-Con-X

Power and data interfaces to be connected on rail terminals or in junction box
Cables (recommended)
Antenna, VHF and GPS RG214/U
For sensors e.g Gyro RFE-HFI 2x2x0,75 mm2
Transponder to Display RFE-HFI 4x2x0,75 mm2
Power cables Transponder LKM-HF 3x2,5 mm2
and display

VHF Transceiver
Frequency 156–163MHz
Output power 2/12,5W (±1,5dB)
Channel bandwidth 25/12,5kHz
Channel step 12,5kHz
Bit rate 9600bps
Intervals between position reports 1–180s
Modulation FM-GMSK/GFSK
Transmitter 1
Receivers 3
DSP Based Transceiver
Sensitivity < -107dBm

Environmental
Protected environment (IEC 60945)
Operating temperature : -15° to +55°

Compliant with the following Standards
IMO Performance Standard for AIS (MSC 74(69) Annex 3)
ITU-R M. 1371-1
IEC 61993-2 (Standard for Class A mobiles)
IEC 61162-1/2 Edition 2 (NMEA 0183, Version 3.0)
INPUT: (ABM, ACA, ACK, AIQ, AIR, BBM, DTM, GBS, GGA, GLL, GNS, GSA, GSV, HDT, LRF, LRI, OSD, RMC, ROT, SSD, VBW, VSD, VTG, ZDA)
OUTPUT: (ABK, ACA, ACS, ALR, LRF, LRI, LR1, LR2 ,LR3, SSD, VDM, VDO, VSD, TXT)
IEC 60945 (ed 4)
IALA Technical clarifications on ITU R M.1371-1
IALA Guidelines on AIS

Approval
Type approved
Wheelmark
CE Approval

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Sperry Marine ServiceNet

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