

...a significant advance in marine safety!

ECHOMAX

Active-XS-Dual Band

Radar Target Enhancer

OPERATION MANUAL



CE ⓘ



**Manufactured by
Echomax Products in the UK
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Active-XS-Dual Band

Radar Target Enhancer

GENERAL INTRODUCTION

The Echomax Active-XS-Dual Band Radar Target Enhancer (RTE) is designed to respond to interrogating both X (9.3 - 9.5 GHz) and S band radar (2.9 - 3.1 GHz) by receiving a transmitted pulse, amplifying and re-transmitting the pulse back to the radar at the same frequency with minimum delay, thereby improving the radar detection range and visibility of small targets. It will not enhance significantly vessels with large radar cross section.

The Active-XS-Dual Band Radar Target Enhancer is suitable for all vessels up to 150 gross tonnage.

SOLAS V Regulation 19 2.1.7 states (Radar reflector): All ships irrespective of size shall have: if less than 150 gross tonnage and if practicable, a radar reflector, or other means to enable detection by ships navigating by radar at both 9 GHz (X Band) and 3 GHz. (S Band). The Active-XS-Dual Band Radar Target Enhancer will typically enhance the RCS (radar cross section) of vessels up to 25M in length. For small craft/rigid inflatables improvements will start to be seen at around 1-2 miles extending to 8-10 miles or more depending on prevailing conditions. The response of the RTE will vary according to range, RTE and radar height above sea level, radar power and condition. Poor weather, sea state and precipitation will greatly reduce the response.

IMPORTANT

The fitting of the Active-XS-Dual Band RTE does not exclude you from exercising safe navigational judgement for your vessel under the International Regulations for the Prevention of Collisions at Sea and to keep a proper look out at all times

All radars emit irregular vertical side lobes (spikes) and should the Active-XS be installed in the path of a spike it will think that it is being painted by another ships radar. Movement of the Active-XS radome to another position may remedy this, if not, the ships radar will need to be switched off. Identical radar may have a different side lobe pattern.

LICENSING REQUIREMENTS

Many countries and administrations require a ships radio license or modification of your existing ships radio licence before the Active-XS can be used for maritime use. Contact your local administration for details.

ECHOMAX ACTIVE-XS COMPONENTS, CONSTRUCTION, use and installation

If you are not able to safely install the unit yourself you are advised to seek the services of a competent person or company to install the RTE.

COMPONENTS

Echomax Active-XS mast head radome fitted with 24 meters of 3 core cable
Control box Operation manual

RADOME FITTING

The antenna has provisions in the base for a 1 inch -14 NF female thread mast fitting or deck mount bracket. Plastic mounts should not be used. To ensure a permanent fixing 'LOCTITE' or PTFE or plumbers tape should be used and the RTE must be screwed down tightly. Care must be taken to ensure that as the RTE is tightened on the base the cable is allowed to turn freely.

For mast fitting the radome must be fitted vertically as high as possible. The receive/ transmit antennas positioned 70mm from the base of the radome must have a clear 360 degree azimuth. It should be fitted at least 6 inches/150mm from the mast on the offset bracket. It should not be fitted on a back stay or where its vision is obscured or is close to any metal object otherwise performance could be significantly impaired.

The radome unit must never be painted as this will seriously impair performance. The radome must not be fitted in or close to the vessels radar vertical or horizontal transmitting beam as this may seriously damage the PCB. The RTE should be fitted above the radar. It is possible to shorten the cable or extend by a further 25 meters without affecting the performance using extension cable rated at 3A at 300V.



ECHOMAX CONTROL BOX for surface fitting or flush mount with optional new flush mount kit

Use and wiring instructions

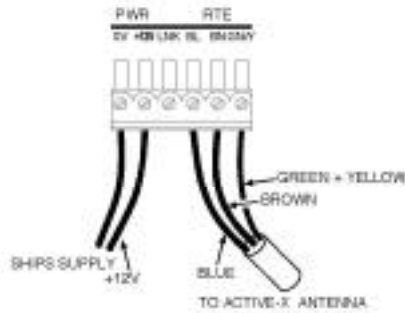
The control box must be fitted internally as it is not waterproof and can be wired from the base or back as required. A 12v fused or circuit breaker supply of 3-5A is required.

The control box has a quadruple alarm facility. Once the red power switch is turned on the unit is in the quiescent mode and will consume up to 23mA. When interrogated by an X Band radar the green LED light will flash every 2.4 seconds. If the flash lengthens then this indicates that more than one radar is painting the antenna. If painted by a high speed radar which rotates every 1.5 seconds then the LED light will flash quicker. When painted by an S Band radar the yellow light will flash. It should be borne in mind that vessels with S Band radar are very large and in most cases over 3000GT and can neither stop nor change course quickly. Turning on the green switch will mobilize the internal buzzer, which is set to actuate at approximately half a second intervals. The control box also has facilities for a 8A external volt free alarm. THIS IS NOT A POWER SOURCE and must be initialised as shown in the wiring diagram. The control box has an externally replaceable 2 Amp fuse and is surge and cross polarity protected.

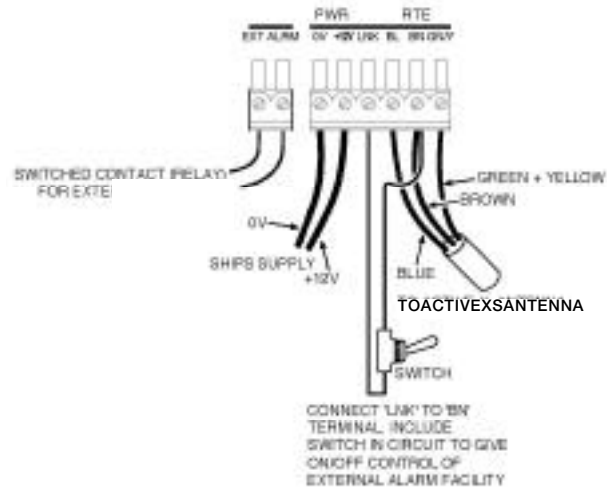
RTE CONNECTIONS

The diagrams show the correct wiring installation

BASIC OPERATION - NO EXTERNAL ALARM



OPERATION - WITH EXTERNAL ALARM



PERFORMANCE CHECK

As the RCS of your vessel may exceed the RCS of the RTE, the trial is best carried out at 0.5 nm as the target can be easily identified. The range should then be increased at intervals of 0.5 nm and the RTE switched on and off noting the change in response. As the range increases the bare target will not be seen and whilst moving the RTE is left on so that the test target can be seen at all times. This is important in busy waters to avoid confusion with other vessels.

If the target is lost it can be acquired by turning the RTE on and off and watching the display for change in target response. In normal weather and sea conditions, with RTE and interrogating radar mounted at four meters above sea level should respond on the radar screen as shown below. If the mounting heights, including that of the interrogating radar vary so will the response due to curvature of the earth. These figures are for guidance only and should not be relied upon.

2KW radar up to 4 nm : 5KW radar up to 10 nm : 10-25KW radar up to 15-20 nm

FAULT FINDING CHART

No Red LED light when red switch is turned on	Check fuse or circuit breaker Check polarity of wiring Check power supply at control box Damaged cable or wrong connection
Unit switched on and continuous green LED light shows, in harbour or when saturating RTE	Local radar on, or radar operating moored nearby (<15M) Moored close to large metal object Check polarity of radome wiring Being actuated by ships own radar – turn off radar and if necessary relocate Active-X Relocate vessel to more suitable position
Unit on and buzzer on and unit fails to operate when it clearly is interrogated	Check all above faults. Is RTE in shadow of interrogating radar as it will not operate if masked
Buzzer switched on but does not sound when painted by radar	Buzzer faulty – return control box to Echomax for inspection
Green LED light or alarm sounds when ships own radar is switched on	Radars emit irregular vertical side lobes (spikes) and should the Active-XS be installed in the path of a spike it will think that it is being painted by another ships radar. Movement of the Active-XS radome to another position may remedy this, if not the ships radar will need to be switched off. Identical radar may have a different side lobe pattern.

TECHNICAL SPECIFICATION

Reception frequency:	X Band Radar 9.3 - 9.5 GHz S Band Radar 2.9 - 3.1 GHz
Operating Temperature:	- 20 to + 60 degrees C
Voltage:	12V DC - + 30% - 10% (voltage surge and cross polarity protected)
Current consumption in quiescent state:	<23mA
Current consumption when transmitting typically:	X Band Radar 190mA S Band Radar 155mA
Position accuracy:	Within 1 metre
EIRP:	1W (typically)

DIMENSIONS and WEIGHTS

Antenna length:	685mm
Antenna width:	40.5mm
Antenna weight:	573gms (excluding cable)
Control Box width:	92mm
Control Box height:	51mm
Control Box depth:	38mm
Control Box weight:	99gms
Cable length:	24m 3 core 0.5mm ²
Cable weight:	967gms

STATED PERFORMANCE LEVEL SPL

Exceeds ISO 8729-2 effective July 09 - X Band Radar 7.5m² and S Band Radar 0.5m² at Zero, +/-10 and 20 degrees of heel maintained over a total angle of 280 degrees.

Typical performance – QinetiQ Funtington Anechoic Chamber March 2010

X BAND RADAR SPL (ISO Standard 7.5m²)
Zero degrees: 118.33m²
+/- 10 degrees: 65.07m²
+/- 20 degrees: 19.49m²

S BAND RADAR SPL (ISO Standard 0.5m²)
Zero degrees: 6.26m²
+/- 10 degrees: 6.44m²
+/- 20 degrees: 5.36m²

NB. Production units will have the following

S Band SPL
Zero degrees: 15.75m²
+/- 10 degrees: 16.20m²
+/- 20 degrees: 13.40m²

Specifications given in this manual are subject to change without notification.

Production units comply with:

EN 302 752 V1.1.1. (2009-02)
EN 60945: 2002 (Clauses 9, 10 & 12)
Complies with essential requirements of R & TTE Directive 1999/5/EC. CE 0191: Performance requirements of ISO 8729-2 X and S Band Radar.

OPTIONAL FITTINGS

Base fitting: female 1 inch – 14 NF thread
Mast Bracket: 26cm reach and female 1 inch – 14 NF thread
Flush Mount Kit for Control Box



GUARANTEE

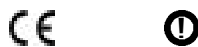
The Echomax Active-XS-Dual Band RTE is guaranteed for 12 months from the date of purchase and provides for the complete replacement at our discretion of the complete unit or any of the components providing failure is attributed to component failure or defect which is not attributed to accidents, misuse, fair wear or tear or neglect.

The guarantee is invalidated by any attempt whatsoever to open up or interfere in any way with the unit.

It is the users responsibility to return the unit at his expense to us to inspect and report on the reason for failure. No exchange unit will be given until a full inspection and report is issued.

This guarantee does not affect your statutory consumer rights or those governed by local Law.

For comparison with competing products see www.echomax.co.uk.



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Declaration of Conformity

(As required by Article 6.3 of Directive 1999/5/EC- RTTE Directive)
Declares under his sole responsibility that the active radar target enhancer manufactured by:

AQUAMATE PRODUCTS LTD.
also trading as ECHOMAX
PO Box 6032
Dunmow
Essex CM6 3AS U.K.
Telephone + 00 44 (0) 1371 830216 Fax 831733

Email: echomaxsales@aol.com

Intended for Worldwide use as an S and X Band active radar target enhancer aboard non SOLAS vessels and identified by the type number Active-XS to which this declaration refers has been tested to the essential radio, EMC & safety test suites required by the notified body and is in conformity with the standards

EN 302 752 V1.1.1 (2009-02)
EN 60945: 2002 (Clauses 9, 10 & 12)
And complies with the essential requirements of Directive 1999/5/EC

Conformity procedure under Annex IV of 1999/5/EC (Technical Construction File) has been undertaken by QinetiQ (0191) of Cody Technology Park, Ively Road, Farnborough GU14 0LX UK

The Technical Construction File is held by:-
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Signed

John H. Simpson
Managing Director

May 2010

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