



CYPHO-150

AIS Receiver

USER MANUAL



Automatic Identification System

i. Copyright

The entire contents of this instruction manual, including any future updates, revisions, and modifications, shall remain the property of AMEC at all times. Unauthorized copies or reproduction of this manual, either in part or whole, in any form of print and electronic media, is prohibited. The contents herein can only be used for the intended purpose of this manual.

ii. Disclaimer

AMEC is devoted to publish and maintain this product manual. As we continue to improve our AIS products to satisfy all customers' needs, information in this document is subject to change without notice. AMEC does not make any representations or warranties (implied or otherwise) regarding the accuracy and completeness of this document and shall in no event be liable for any loss of profit or any commercial damage, including but not limited to special, incidental, consequential, or other damage.

iii. Product Category

This product is categorized as “protected” in accordance with the requirements as defined in IEC 60945.

iv. Disposal Instruction

Do not dispose of this device with unsorted waste. Improper disposal may be harmful to the environment and human health. Please refer to your local waste authority for information on return and collection systems in your area.

WARNING!

WARNING: The AIS receiver must be installed and configured in conformity with the provided instructions in the manual in order to maximize the device performance.

WARNING: Please bear in mind that not all vessels are equipped with AIS transponders and therefore may not be visible to this receiver. Likewise, in the event of overcrowded port traffic, vessels equipped with AIS transponder may not be visible to this receiver.

WARNING: DO NOT DISASSEMBLE OR MODIFY THE EQUIPMENT. Improper disassembly or modification could cause personal injury and will invalidate the guarantee.

WARNING: While most of the installation can be performed by the owner or the crew, a final commissioning can be done by your local agent/dealer when needed or required. AMEC and the local agent/dealer will not bear any responsibilities over any damages resulted from improper installation by unauthorized agent/dealer.

FOREWORD

AMEC thanks you for the purchase of your new CYPHO-150 Automatic Identification System (hereinafter called “AIS”). Wherever you sail now, you can have a better control of your surrounding sea, and have an enjoyable voyage.

CYPHO-150 is strictly tested at the factory to meet the rigorous demands of the marine environment. With proper use, installation, and maintenance, the equipment will serve loyally and reliably at its optimum.

For sales, services, and technical supports, please contact your local AMEC representatives or Alltek Marine Electronics Corp at sales@alltekmarine.com or service@alltekmarine.com. You are always welcome to visit our website at www.alltekmarine.com for new product status and company update.

Thank you again. Be safe

Table of Content

1	SYSTEM OVERVIEW.....	8
1.1	Product Description	8
1.2	Comparison of CYPHO-150 Series	8
1.3	Equipment in the Box	10
1.4	External Connections	11
1.5	What is AIS?	12
1.6	AIS Message Type.....	13
2	INSTALLATION	15
2.1	CYPHO-150 Connection Interface.....	16
2.2	CYPHO-150S Connection Interface.....	17
2.3	Mounting Instructions.....	18
2.4	VHF Antenna Installation.....	20
2.5	Connecting to NMEA 0183 devices	22
2.6	Connecting to Power Supply	26
3	CONFIGURATION	27
3.1	USB Driver Installation	27
3.2	CYPHO Configuration Software	29
3.2.1	Connecting the Receiver to your PC	29

3.2.2	Baud Rate Setting:	32
3.2.3	Diagnosis	33
3.3	AMEC AIS Viewer Software Installation.....	35
3.4	Connecting your Receiver to Macintosh.....	36
4	GETTING STARTED	37
4.1	CYPHO-150 LED Indicators	37
4.2	CYPHO-150S LED Indicators.....	38
5	SPECIFICACIONES	39
5.1	Product Specifications.....	39
5.2	Dimensions	41
6	TROUBLESHOOTING	43
7	ABBREVIATIONS	44
8	FCC INTERFERENCE STATEMENT.....	45
	DECLARATION OF CONFORMITY.....	46
	AMEC WORLDWIDE WARRANTY	46

1 SYSTEM OVERVIEW

1.1 Product Description

The AMEC CYPHO-150/150S is an AIS receiver series. It receives AIS navigation data from AIS-equipped vessels nearby and improves navigation safety. CYPHO-150 series is designed to inter-operate with AIS Class A or Class B transponders, and any other AIS station operating on the AIS VHF data link.

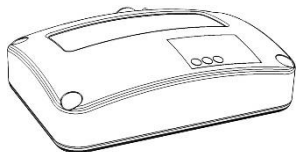
CYPHO-150 series is built with two parallel AIS receivers in one box with optimized sensitivity. Having CYPHO-150 series AIS receiver on board, you can monitor the status of the vessels equipped with AIS transponders in the surrounding area by receiving their dynamic information (position, speed, SOG, etc.), static information (ship name, MMSI, call sign, etc.), and voyage related information (cargo type, destination, etc.).

Equipped with USB2.0 and NMEA 0183, CYPHO-150 series enables connectivity to most available peripherals in the market. CYPHO-150S with integrated VHF splitter allows the usage of a single VHF antenna to combine AIS and VHF operation.

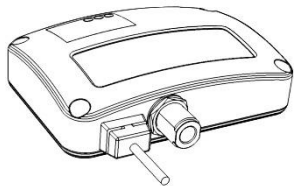
1.2 Comparison of CYPHO-150 Series

Description	CYPHO-150	CYPHO-150S
Number of AIS Channels	2	2
USB port	1	1
NMEA 0183	1 input, 1 output (baud rate independent)	1 input, 1 output (baud rate independent)
Built-in VHF Splitter	-	Yes

CYPHO-150

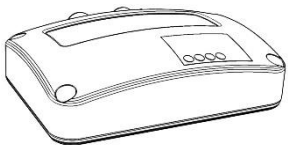


Front

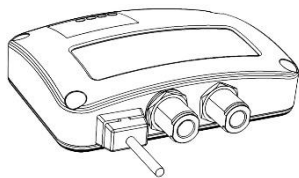


Back

CYPHO-150S

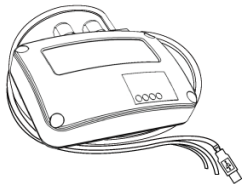


Front

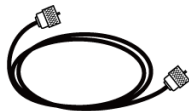


Back

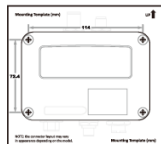
1.3 Equipment in the Box



AIS Receiver unit



VHF cable, 1m (150S only)
(with PL-259 male connectors)



Mounting Template



M3.5x25 Screws



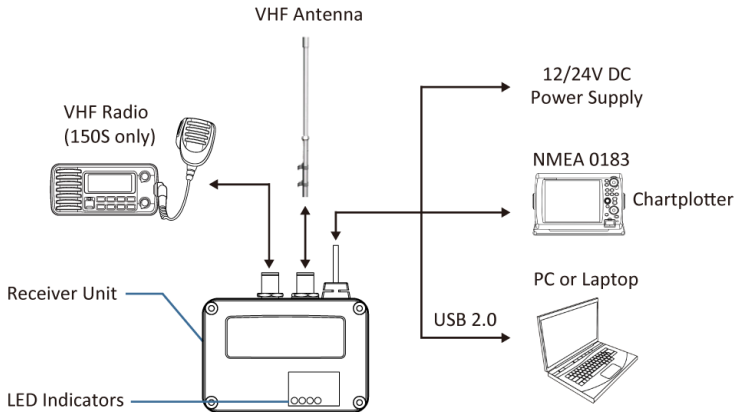
Software CD: USB driver,
configuration utility, user manual



User Manual

Please contact your supplier immediately if there is any item missing.

1.4 External Connections



1.5 What is AIS?

The Automatic Identification System (AIS) is a Very High Frequency (VHF) radio broadcasting system that transfers packets of data over the VHF data link (VDL) and enables AIS equipped vessels and shore-based stations to exchange identification information and navigational data. Ships with AIS transponders continually transmit their ID, position, course, speed and other data to all nearby ships and shore stations. Such information can aid greatly in situational awareness and provide a means to assist in collision avoidance.

AIS equipment is standardized by ITU, IEC, IALA and IMO and is subject to approval by a certification body. The following AIS devices have been developed for variant applications.

- **AIS Class A:**

mandated by the IMO for vessels of 300 gross tonnages and upwards engaged on international voyages, cargo ships of 500 gross tonnages and upwards, as well as passenger ships. It transmits typically on 12.5 watt output power.

- **AIS Class B:**

provides limited functionality and is intended for non-SOLAS commercial vessels and recreational vessels. It transmits typically on 2 watt output power.

- **AIS Receiver:**

only receives AIS signal and it does not have transmitter to send out AIS signal. Suitable for recreational vessel that does not want to send out its vessel information.

- **AIS Base Station:**

is provided by aids-to-navigation authorities to enable the ship to shore / shore to ship transmission of information. Networked AIS Base Stations can assist in providing overall maritime domain awareness.

- **AIS AtoN (Aids to Navigation):**

provides an opportunity to transmit position and status of buoys and lights through the same VDL, which can then show up on AIS-ready devices within the range.

- **AIS SART:**

Search and Rescue Transmitter using AIS can be used to assist in determining the location of a vessel in distress. It is typically used on life rafts.

- **AIS on Search and Rescue (SAR) Aircraft:**

used on airplanes and helicopters to assist search and rescue operation.

1.6 AIS Message Type

The CYPHO-150 models can receive AIS messages from both Class A and Class B AIS transponders as well as from AIS Base Station, AIS AtoN, and AIS SART/MOB. The message types are listed as below table. The messages in gray color are transmitted only from class A AIS device.

Type of Message	Data Details
Static Data	Maritime Mobile Service Identity (hereinafter called "MMSI") number IMO number Call sign and name Type of ship Length and beam GPS Antenna location
Voyage Related Data	Draught of the ship Cargo information Destination Estimate Time of Arrival (hereinafter called "ETA")
Dynamic Data	Position of the vessel Coordinated Universal Time (hereinafter called "Time in UTC".) Course Over Ground (hereinafter called "COG") Speed Over Ground (hereinafter called "SOG") Heading Rate of turn Navigational status
Dynamic Reports	Speed of the ship Status of the ship
SRM	Alarm Safety

2 INSTALLATION

Please note the following guidelines for selecting a suitable installation location for CYPHO-150.

- The surrounding temperature should be maintained between $-15^{\circ}\text{C}\sim 55^{\circ}\text{C}$.
- The receiver must be installed at least 0.5m away from a compass.
- The device is not designed to be fully waterproof. Therefore, is not recommended to install the device in a location that will be subjected to spray or water submersion.
- The device should not be installed in flammable or hazardous locations such as near a fuel tank.
- The device should be installed in a location where the indicator is easily visible in which the LED lights provides important information about the status of the receiver.

2.1 CYPHO-150 Connection Interface

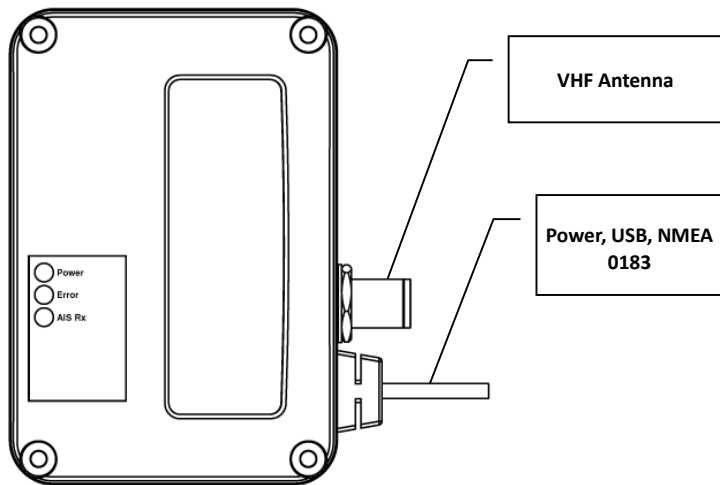


Figure 1 CYPHO-150 Connection Interface

2.2 CYPHO-150S Connection Interface

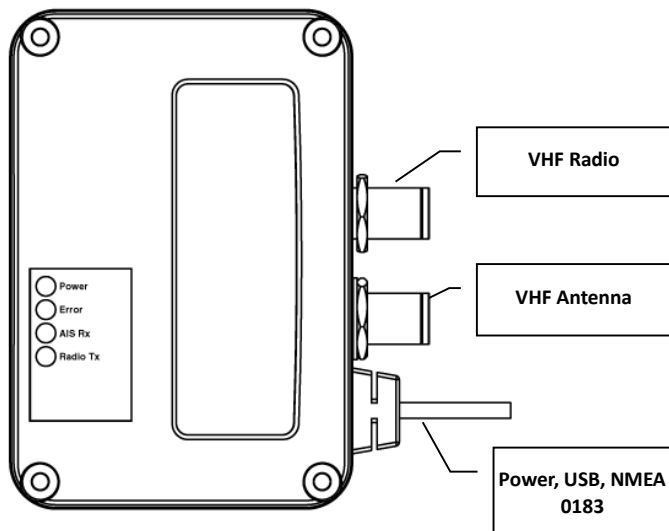


Figure 2 CYPHO-150S Connection Interface

2.3 Mounting Instructions

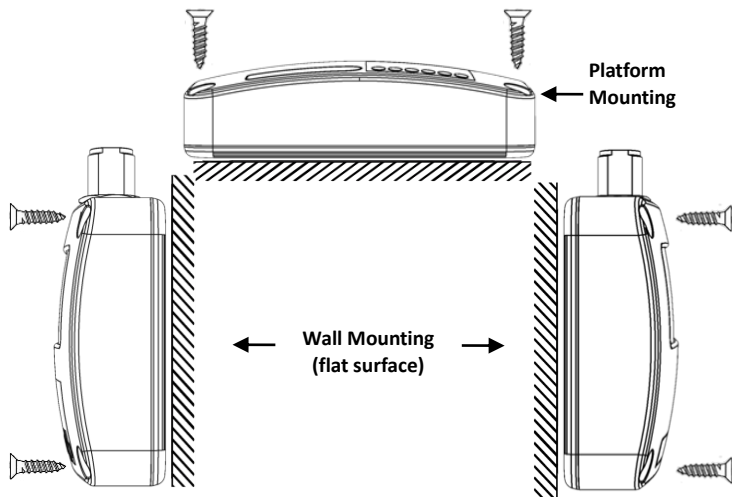


Figure 3 Mounting Instructions (1)

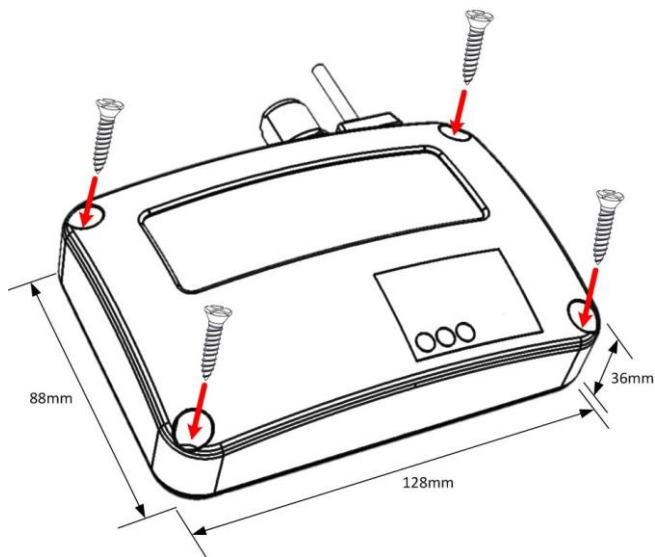


Figure 4 Mounting Instructions (2)

2.4 VHF Antenna Installation

The quality and positioning of the antenna is the most important factor dictating AIS performance. It is recommended that a VHF antenna with omni-directional vertical polarization and specifically tuned for AIS operation band is used. Since the range of VHF signals is largely decided by line of sight distance, AIS antenna should be placed as high as possible and at least 5 meters away from any constructions made of conductive materials.

To avoid interference, the VHF antenna location should be placed in accordance to Figure 5.



DISTANCE BETWEEN ANTENNAS

The safe distance from a transmitting VHF antenna is 60cm.

DO NOT BEND CABLES

Bending cables may cause damages to the inner wires and impair overall the performances.

USES OF CABLE TUBE

Each coaxial cable should be set up separately and can only be set up in a single cable tube.

INSULATION ON CONNECTING PORT

Connecting port of the coaxial cable should be insulated.

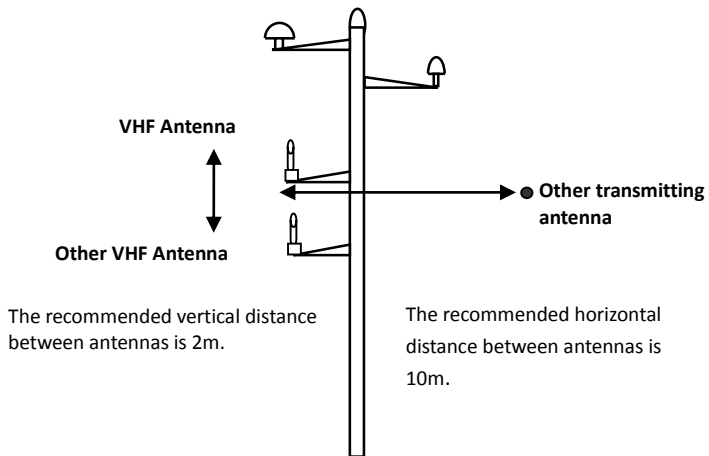


Figure 5 VHF Antenna Installation

2.5 Connecting to NMEA 0183 devices

CYPHO-150 is typically connected to an external chartplotter via NMEA 0183 output wiring connection. (please refer to Figure 8)

For the advanced multiplexing application, CYPHO-150 series gets input from one NMEA0138 device and pass it to another NMEA 0183 device together with AIS information. The input and output NMEA 0183 ports support independent baud rates.

CYPHO-150 series supports three baud rates: 4800, 9600, and 38400. The default baud rate is 38400. Use the provided configuration utility to change the baud rates.

See the illustration Figure 6.

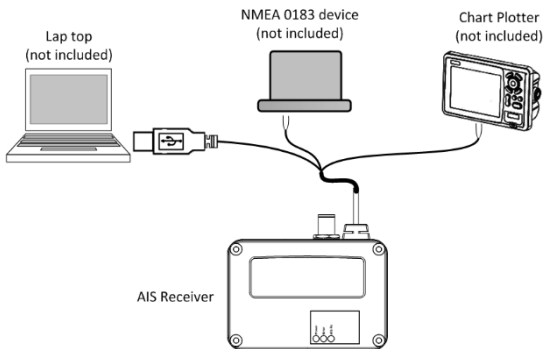


Figure 6 NMEA 0183 Connection

The figure below describes how to wire your AIS receiver with NMEA 0183 devices and power source.

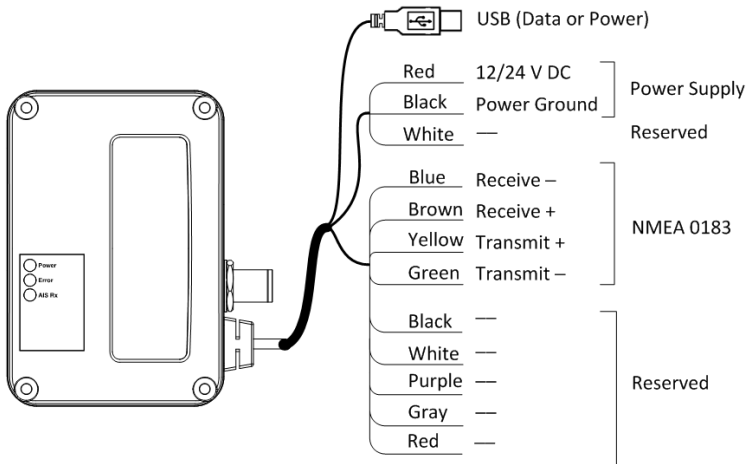


Figure 7 **Wiring Instructions**



Figure 8 NMEA 0183 Connection illustration

Core Color at CYPHO-150	NMEA 0183 Signal	Signal Direction (CYPHO-150)	External NMEA 0183 Device
Brown	Receive + (RXP)	Input	n/a
Blue	Receive – (RXN)	Input	n/a
Yellow	Transmit + (TXP)	Output	Data Input + (RXP)
Green	Transmit – (TXN)	Output	Data Input – (RXN)

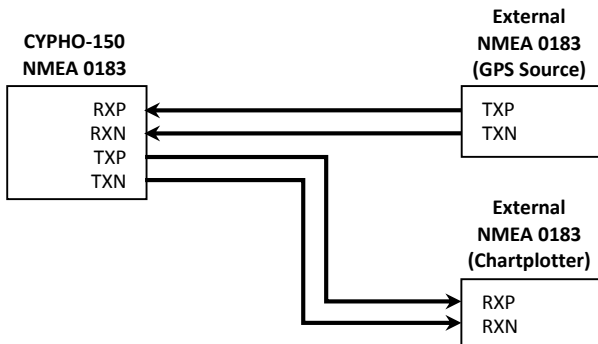


Figure 9 NMEA 0183 Multiplexing Connection

Core Color at CYPHO-150	NMEA 0183 Signal	Signal Direction (CYPHO-150)	External NMEA 0183 Devices
Brown	Receive + (RXP)	Input	Data Output + (TXP)
Blue	Receive - (RXN)	Input	Data Output - (TXN)
Yellow	Transmit + (TXP)	Output	Data Input + (RXP)
Green	Transmit - (TXN)	Output	Data Input - (RXN)

2.6 Connecting to Power Supply

All CYPHO-150 models are designed having no physical On/Off switch. Thus, the vessel's operation determines the unit's power status.

The AIS Receiver requires a 12V or 24V DC power supply (9.6 – 31.2V). The red wire and the black wire on the 12 pin cable are used to connect the power supply's positive and negative terminals. Practically, it is suggested to use the 2 amp fuse panel before connecting directly to the battery/power supply.

CYPHO-150 can also be powered via a standard PC USB port (5 volts at 500 mA) or an USB power adapter (5 volts at 500 mA).

Note: If PC could not recognize USB connection after a power restart on CYPHO-150, please re-plug the USB connector.

3 CONFIGURATION

3.1 USB Driver Installation

Your PC needs to install the USB driver in able to connect the AIS receiver. Locate the USB driver in the CD-ROM. Follow the instructions below to finish the installation.

Step 1: Open the USB Driver file and double click on USBDriverInstaller.exe to install the driver. Please click on Install Drivers to continue.

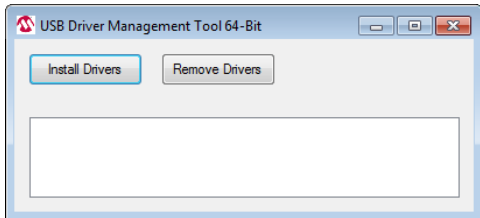


Figure 10 USB Driver Installation (1)

Step 2: A security reminder appears and asks for your confirmation. Click Install to proceed.

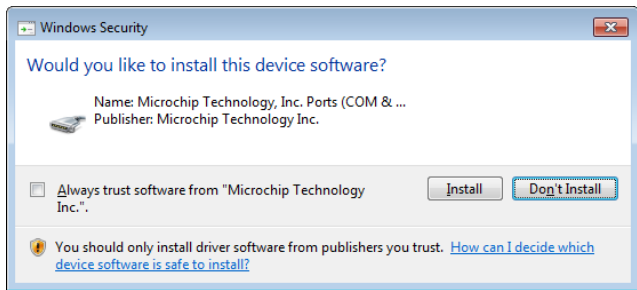


Figure 11 USB Driver Installation (2)

Step 3: Driver installation is completed. Close the window directly using the close window icon.

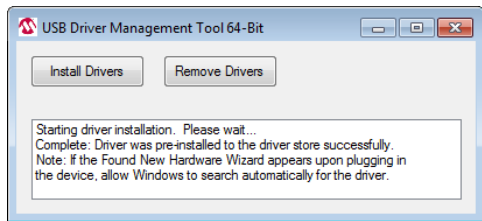


Figure 12 USB Driver Installation (3)

3.2 CYPHO Configuration Software

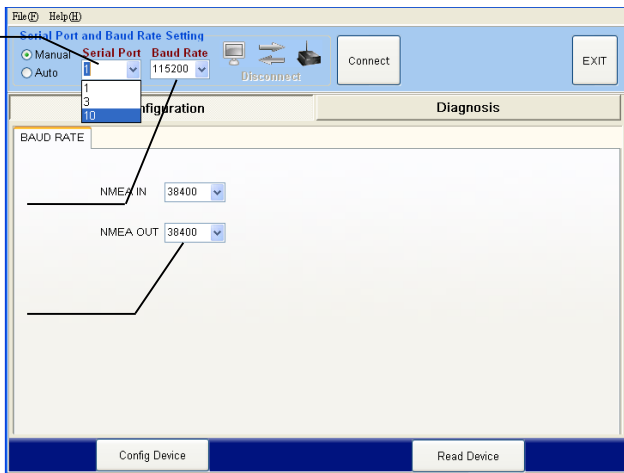
Install the AMEC Cypho Configuration Software from the CD-ROM by following the on-screen instructions.

3.2.1 Connecting the Receiver to your PC

There are 2 options to connect the software with your AIS receiver:

- **Auto:** The system will scan all connected ports and their available baud rates and establish connection automatically.
- **Manual:** Configure baud rate and serial port manually. The default baud rate is 115200.

**Serial port
number**



**Default
Baud Rate**

**NMEA 0183
Baud Rate**

Figure 13 Software Installation (1)

To find the serial port number, click Start → Control Panel → Device Manager. Expand the Ports section and look for USB Communications Port. In the sample picture below, the serial port number is 30.

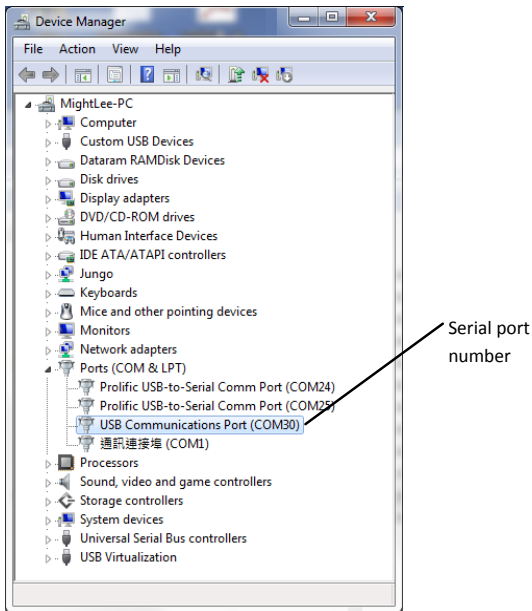


Figure 14 Software Installation (2)

Enter the value and hit "Connect" to link the computer to the receiver.

3.2.2 Baud Rate Setting:

Each CYPHO-150 model has one NMEA 0138 port and the baud rate of its input and output ports can be set independently.

To adjust the values, set the desired baud rates for the NMEA input and output and then click on “Config Device” to apply new the setting.

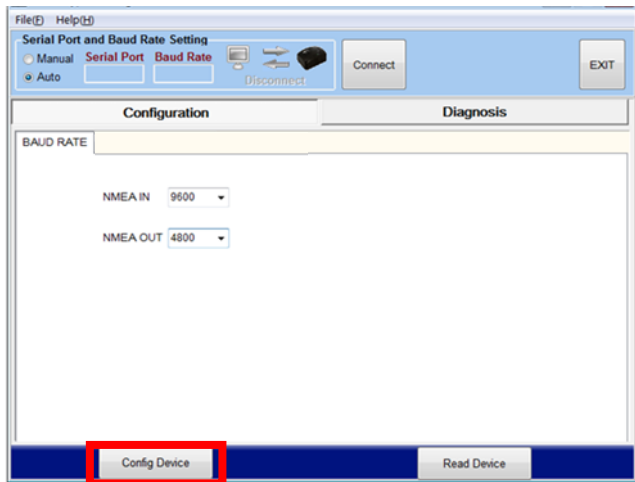


Figure 15 Baud Rates

3.2.3 Diagnosis

The Diagnosis tab has two submenus, System Check and Data Log.

System Check

System Check retrieves following information and statuses from the receiver: Firmware Version, Product Serial Number, RX position reports.

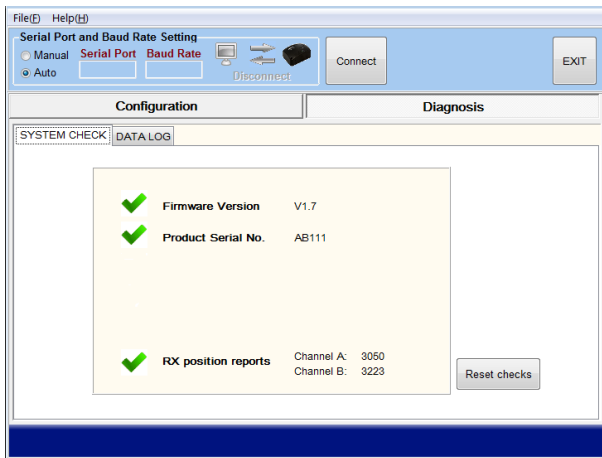


Figure 16 System Check

Data Log

The Data Log enables user to record received AIS information.

To enable or disable the recording of AIS information, use the “Enable Log” check box. Click “Save” to save the record at a preferred location on the PC via USB. To ensure the log is recorded the device must stay connected to the PC via USB and the AMEC CYPHO Configuration Software is running.

To clear the current listing, use the “Clear” button.

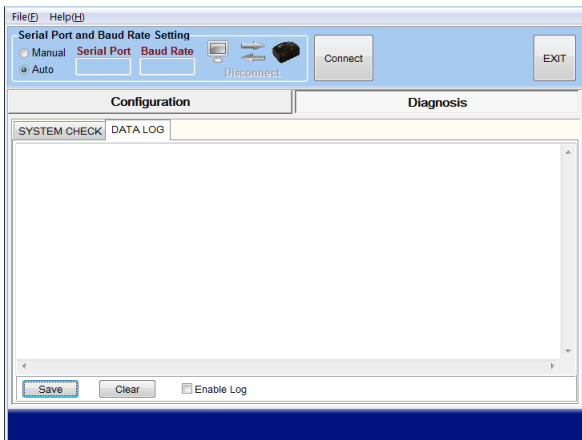


Figure 17 **Data Log**

3.3 AMEC AIS Viewer Software Installation

AIS Viewer is a complementary application that provides a simple access for user to view AIS information on PC. The application provides basic features to browse the relative positions of surrounding vessels and the dynamic and static information regulated by IMO. For professional uses, we recommend connecting AMEC CYPHO-150 Series with other marine electronic products such as ECS or Radar for better performances.

The AMEC AIS Viewer program and its operation manual are included in the CD-ROM.

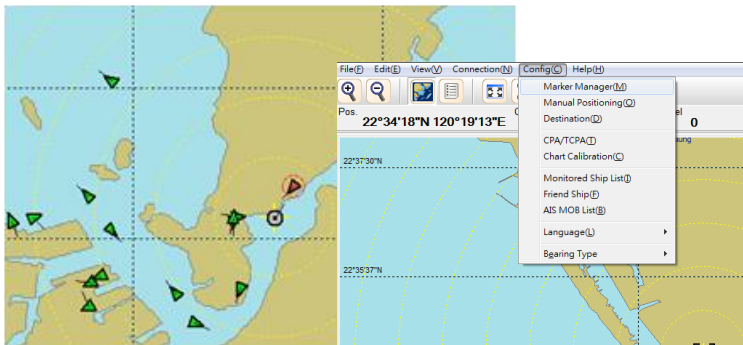


Figure 18 AMEC AIS Viewer

3.4 Connecting your Receiver to Macintosh

The instruction how to connect your AMEC AIS Receiver to your Macintosh (MAC) computer and display the received AIS Targets via OpenCPN as an example can be found on the CD attached as well as at <http://www.alltekmarine.com/support.php> in the category "FAQ/AIS Receiver: CYPHO-150".

4 GETTING STARTED

4.1 CYPHO-150 LED Indicators

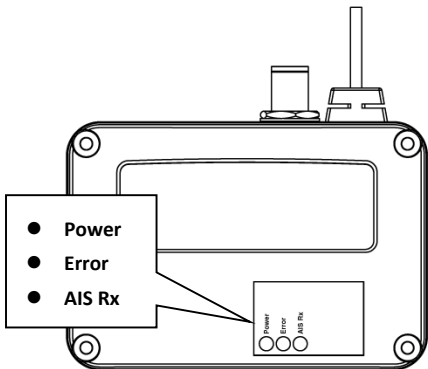


Figure 19 CYPHO-150 LED Indicators

LED INDICATIONS		
Indicator	Indication	Description
Power	Normal Steady Green	Device in normal operation
Error	Flashing Red	A system error is detected
AIS Rx	Flashing Green	Receiving of AIS message in either AIS Channel 1 or Channel 2

4.2 CYPHO-150S LED Indicators

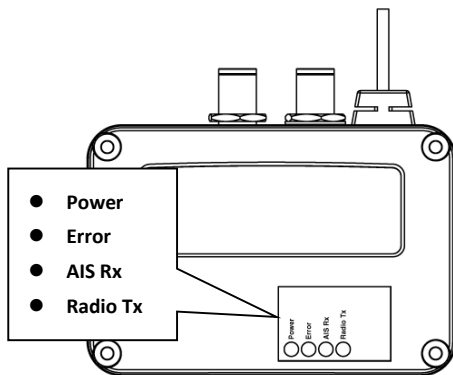


Figure 20 CYPHO-150S LED Indicators

LED INDICATIONS		
Indicator	Indication	Description
Power	Normal Steady Green	Device in normal operation
Error	Flashing Red	A system error is detected
AIS Rx	Flashing Green	Receiving of AIS message in either AIS Channel 1 or Channel 2
Radio Tx	Flashing Green	VHF radio is transmitting

5 SPECIFICACIONES

5.1 Product Specifications

APPLICABLE STANDARDS	
IEC 62287-1 (applicable parts)	
ITU-R M.1371 (applicable parts)	
IEC 60945 (applicable parts)	
IEC 61162 (applicable parts)	
AIS RECEIVER	
Number of AIS Receivers	2 channels
CH-1	Default CH 87B (161.975MHz)
CH-2	Default CH 88B (162.025MHz)
Channel Bandwidth	25KHz
Message Format	AIS Class A & B messages
Data Rate	9,600bps / per channel
AIS Receiver Sensitivity	-112dBm
Max. Usable Sensitivity	PER \leq 20% @ -107 dBm
POWER SUPPLY	
Supply Voltage	12 / 24V DC
USB Power	5V DC / 500 mA
Power Consumption	<1.50 Watt
LED INDICATION	
CYPHO-150	Power, Error, AIS Rx
CYPHO-150S	Power, Error, AIS Rx, Radio Tx

INTERFACE	
VHF Antenna Connector	SO-239 (Female)
NMEA 0183	38400 (default), 9600, 4800 bps
USB 2.0	Supported
VHF Radio Connector (CYPHO-150S only)	SO-239 (Female)
ENVIRONMENTAL	
Operating Temperature	-15°C~55°C
Storage Temperature	-25°C~70°C
Humidity Operation	0~95% RH at 40°C
Vibration	IEC 60945
Waterproof	IPX2
PHYSICAL	
Size in mm (w)	128 mm (4.99 inch)
Size in mm (h)	36 mm (1.40 inch)
Size in mm (d)	88 mm (3.43 inch)
Weight	210g (incl. cable)
Cable Length (power, USB, NMEA 0183)	1M
RF PERFORMANCE (CYPHO-150S only)	
Frequency Range	156.025 ~ 162.025 MHz
AIS Receiver Sensitivity	-110dBm (when not connecting to DSC)
VHF Port Insertion Loss	Receiver Path: 3.5dB Transmit Path: 1.2dB
Certification	
CE, FCC	

5.2 Dimensions

Applicable to all CYPHO-150 models.

Front View

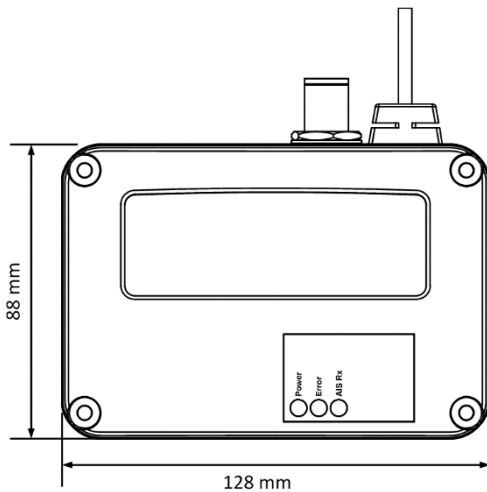


Figure 21 **Front View**

Side View

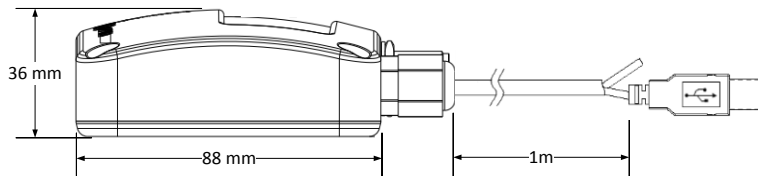


Figure 22 **Side View**

6 TROUBLESHOOTING

① Does CYPHO-150 work with my chartplotter?

- New chartplotters typically support AIS function. Be sure your chartplotter has the latest firmware update.
- Ensure the baud rate for the inbound NMEA port on the chartplotter is matched.

② How do I know the CYPHO-150 functions normally?

- The Power LED indicates in steady Green.
- The AIS Rx LED indicates in flashing Green.

③ Can CYPHO-150 pass the received AIS information to PC?

- Yes, the unit can pass the AIS message sentences through USB port to PC.

④ Why the unit does not power up?

- Check the unit has adequate power.
- Be sure that the polarities of the power wires are correct (red is positive, black is negative ground)

⑤ Can CYPHO-150 NMEA interface be connected to more than two external NMEA devices?

- Yes, through a NMEA multiplexing connection.

⑥ Can a VHF antenna other than AMEC VHF antenna be used for CYPHO-150?

- Yes, as long as it is a marine type VHF antenna.

7 ABBREVIATIONS

AIS	Automatic Identification System
COG	Course Over Ground
CPA	Distance to Closest Point of Approach
CSTDMA	Carrier-sense time division multiple access
DSC	Digital Selective Calling
ECS	Electronic Chart System
ETA	Estimated Time of Arrival
GPS	Global Positioning System
IMO	International Maritime Organization
MMSI	Maritime Mobile Service Identity
SOG	Speed Over Ground
SRM	Safety Related Message
TCPA	Time to Closest Point of Approach
TDMA	Time Division Multiple Access
UTC	Coordinated Universal Time
VHF	Very High Frequency
VTS	Vessel Traffic Service

8 FCC INTERFERENCE STATEMENT

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: 1) This device may not cause harmful interference, and 2) this device must accept any interference received, including interference that may cause undesired operation.

DECLARATION OF CONFORMITY

Hereby, Alltek Marine Electronics Corp. (AMEC) declares that this CYPHO-150/150S is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

AMEC WORLDWIDE WARRANTY

Limited warranty

Subject to the terms, conditions and limitations set forth in this Worldwide Limited Warranty (hereinafter the “Warranty”), AMEC warrants that its products, when properly installed and used, will be free from defects in material and workmanship for a period of twelve (12) months, from the date of first purchase (the ‘Warranty Period’)

For the purposes of this warranty, ‘date of first purchase’ means the date that the product was purchased by the first retail customer, or by the institutional customer, or in the case of a product installed on a new vessel or any other marine related platform by a certified AMEC original equipment manufacturer (a ‘AMEC OEM’), the date that such vessel was purchased by the first retail customer.

AMEC will, at its sole option, repair or replace any defective products or components returned during the Warranty Period in accordance with the terms, conditions and limitations set forth below. Such repairs or replacement will be the sole remedy of the customer under this Warranty.

Standard Warranty Service

To qualify for standard warranty service the product must be returned to a AMEC-certified service agent (i) within the Warranty Period, and (ii) within thirty (30) days of the alleged product failure. Any products returned must be securely packaged and sent pre-paid and insured to AMEC or to a AMEC-certified service agent. All products returned must be accompanied by a copy of the original sales receipt to be eligible for standard warranty service.

Other conditions

This Warranty is fully transferable provided that you furnish the original proof of purchase to the AMEC -certified service agent. This Warranty is void if the seal label is removed or defaced.

THE LIABILITY OF AMEC TO A CUSTOMER UNDER THIS WARRANTY, WHETHER FOR BREACH OF CONTRACT, TORT, BREACH OF STATUTORY DUTY OR OTHERWISE SHALL IN NO EVENT EXCEED AN AMOUNT EQUAL TO THE TOTAL PURCHASE PRICE OF THE PRODUCT GIVING RISE TO SUCH LIABILITY AND IN NO EVENT SHALL AMEC BE LIABLE FOR SPECIAL, INCIDENTAL, CONSEQUENTIAL OR INDIRECT DAMAGES OR LOST OF GOODWILL, REPUTATION, LOSS OF OPPORTUNITY OR INFORMATION, DATA, SOFTWARE OR APPLICATIONS.

In the event that any term or provision contained in this Warranty is found to be invalid, illegal or unenforceable by a court of competent jurisdiction, then such provision shall be deemed modified to the extent necessary to make such provision enforceable by such court, taking into account the intent of the parties.

All AMEC products sold or provided hereunder are merely aids to navigation. It is the responsibility of the user to exercise discretion and proper navigational skill independent of any AMEC product.

Alltek Marine Electronics Corporation

14F-2, No. 237, Sec. 1, Datong Rd.,
Xizhi Dist., New Taipei City, 22161, Taiwan

Tel: +886 2 8691 8568

Fax: +886 2 8691 9569

Email: service@alltekmarine.com

Website: www.alltekmarine.com