ShipModul
Marine Electronics

MiniPlex-AIS NMEA-0183 multiplexer
Manual

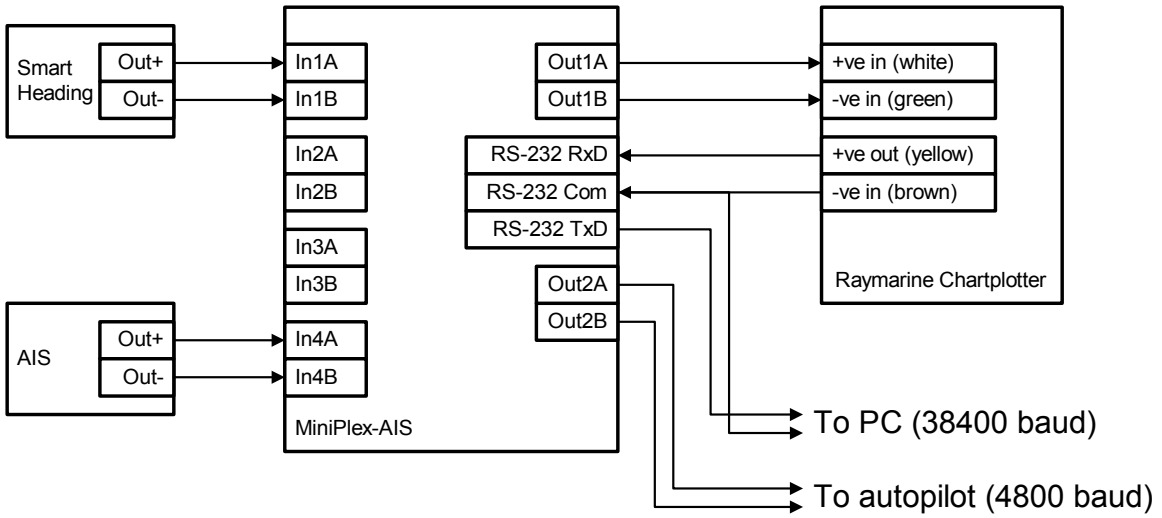
MiniPlex-AIS, V2.0
Firmware V2.10

Introduction

The MiniPlex-AIS is a four-channel NMEA multiplexer, enabling the connection of multiple NMEA-0183 instruments to a chartplotter. One input is dedicated to AIS, allowing the connection of an AIS receiver/transponder operating at 38400 baud. Available are four NMEA inputs (*listener*-ports), two NMEA outputs (*talker*-ports) and one serial (RS-232) port.

Operation

The MiniPlex-AIS reads NMEA sentences from the listener ports and forwards them to talker port Out 1 and the serial port with equal priority. When NMEA sentences are received simultaneously, they are stored and transmitted sequentially. This basic function allows data of several instruments to be combined into one integral stream of data, to be sent to a chartplotter.



The picture above shows a typical configuration where the data of a heading sensor operating at a standard NMEA communication speed of 4800 baud is combined with the data of an AIS receiver/transponder operating at a communication speed of 38400 baud. The combined data is sent from NMEA Out 1 to the NMEA input of a Raymarine® chartplotter, which the NMEA port set to AIS.

The serial RS-232 port operates in parallel with NMEA Out 1 and can be used to send the same combined data to a computer at 38400 baud.

NMEA Out 2 operates at 4800 baud and outputs NMEA data that is sent to the multiplexer through the serial port at 38400 baud. This feature can be used to send NMEA data from the chartplotter back to an autopilot or other device at 4800 Baud. This data path (RS-232 In to NMEA Out 2) then effectively operates as a speed translator from 38400 to 4800 baud.

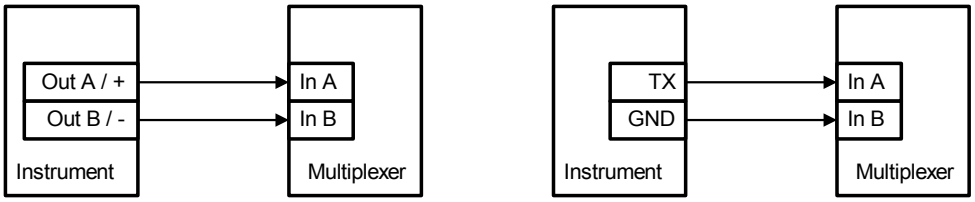
Connections

NMEA Listener Ports

The multiplexer has four listener ports, 'In 1' to 'In 4'. Each listener port should be connected to one instrument only. These inputs are galvanically isolated from the multiplexer, as specified in the NMEA-0183 standard.

Connect the 'a' and 'b' terminals of the listener port on the multiplexer to the 'a' and 'b' terminals of the talker port on the instrument. Other designations used are for instance 'Data+' and 'Data-', 'TX+' and 'TX-' , 'Out+' and 'Out–' or 've+' and 've-'.

Some instruments have single ended talker ports, with only one data terminal. Connect this terminal to the 'a' terminal on the multiplexer, and connect the 'b' terminal on the multiplexer with the ground of the instrument. The latter is often combined with the power supply ground.

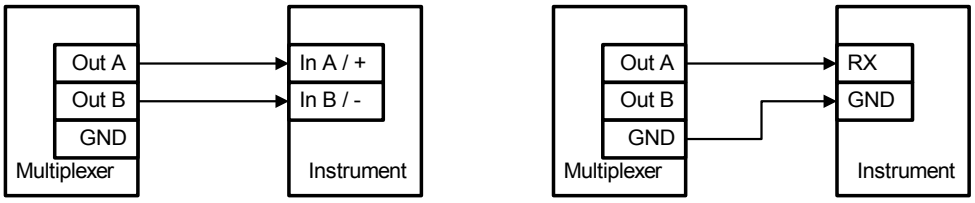


Differential Single-ended

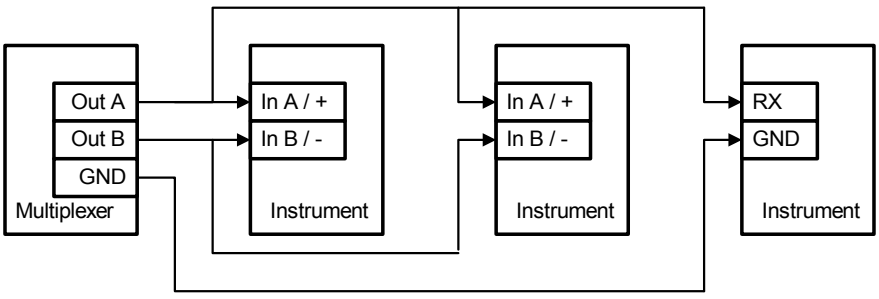
NMEA Talker Ports

Both talker ports can be connected to up to four instruments. Connect the 'a' and 'b' terminals of the talker port on the multiplexer to the 'a' and 'b' terminals of the listener port(s) on the instrument(s). Other designations used are for instance 'Data+' and 'Data-', 'TX+' and 'TX-' , 'Out+' and 'Out–' or 've+' and 've-'.

Some instruments have single ended listener ports, with only one data terminal. Connect this terminal to the 'a' terminal on the multiplexer, and leave the 'b' terminal on the multiplexer unconnected. Connect the 'Com' terminal on the multiplexer with the instrument ground.



Differential Single-ended

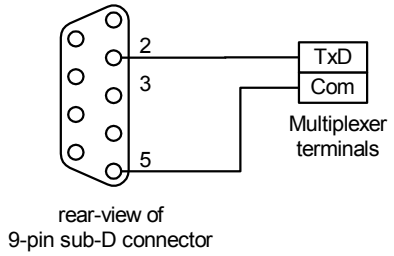


Multiple instruments

The shield terminals (Shld) can be connected to the screen/shield of the cable if present. This should always be done on one end of the cable only, preferable on the talker side.

RS-232 Serial Port

The RS-232 serial port can be used to connect the multiplexer to a computer, as shown in the diagram below. The serial port is bi-directional: TxD and Com can be used to send data to a computer while at the same time RxD and Com can be used to receive data from a chartplotter. This data is available on NMEA Out 2.



The serial port is galvanically isolated from the multiplexer to prevent ground loops and excessive currents that could otherwise destroy the multiplexer or the serial port of the connected computer.

The communication speed of the serial port is fixed at 38400 baud.

Power Supply

The MiniPlex-AIS must be powered from an externally supplied DC voltage from 8 to 35V. The power supply connection is protected against reversed polarity.

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Configuration

Unlike other MiniPlex models, there is nothing to be configured on the MiniPlex-AIS. The unit operates 'out of the box' as a 4-to-1 multiplexer with fixed baud rates.

Indicators

The MiniPlex-AIS has two LED's. The green LED indicates the reception of valid NMEA data on the listener ports or the RS-232 port. The LED only blinks on valid NMEA sentences that start with a '$' or '!' and end with a LF character, thus indicating a proper connection and polarity of the connected instrument. In case of a reverse polarity, the green LED will not blink.

The red LED indicates a buffer overflow, in case more data is coming in than can be transmitted. Such a situation can arise when all inputs are used and the connected instruments send data in a continuous stream. This is a very unlikely situation since it is not according to the NMEA standard.

Another case in which the overflow LED can blink is when data is sent back to the multiplexer through the RS-232 port and the buffer for that channel is filled completely. This situation can arise because of the high speed of the RS-232 port and the low speed of NMEA Out2. When this output is used to drive an autopilot, the chartplotter or navigation software should be configured to send less data to the multiplexer. The total throughput of data should not exceed 480 chars/sec.

Mounting

The MiniPlex-AIS is not waterproof. It should be mounted at a dry place, like behind the instrument panel, on a flat surface.

Technical Reference

Technical Specifications

Supply voltage:	8 – 35 V_{DC}, protected against reversed polarity.
Current consumption:	40 mA (70 mA max. with fully loaded talker ports).
Inputs:	4 x NMEA-183/RS-422, galvanically isolated.
Input resistance:	>800 Ohm.
Outputs:	1 x RS-232, 2 x NMEA-183/RS-422.
Buffers:	5 buffers of 800 characters (4 x NMEA, 1 x RS-232).
NMEA Out1:	Combined data from NMEA inputs at 38400 baud.
NMEA Out2:	Data from RS-232 input at 4800 baud.
Speed NMEA In1,2,3:	4800 baud.
Speed NMEA In4:	38400 baud.
Speed NMEA Out1:	38400 baud.
Speed NMEA Out2:	4800 baud.
Speed RS-232 In/Out:	38400 baud.
Indicators:	Overflow and Data.
Dimensions:	138 x 72 x 33 mm.
Housing:	Flame retardant ABS.

Declaration of Conformity

We,

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Declare under our sole responsibility that the product

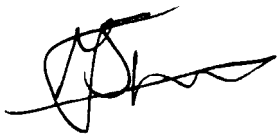
ShipModul MiniPlex-AIS

to which this declaration relates is in conformity with the following specifications:

EN/IEC60945:2002 and EN/IEC61162-1:2000
FCC Title 47 CFR, Part 15 Class B

The product herewith complies with the requirements of the EMC Directive 89/336/EEC and carries the CE-marking accordingly.

Assen, 13-10-2009 M. Sprang



This device complies with Part 15 of the FCC Rules. Operation is subject to the following 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.

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