

MiniPlex-AIS NMEA-0183 multiplexer Manual

MiniPlex-AIS, V1.0
Firmware V2.3.1

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Introduction

The MiniPlex-AIS is a four-channel NMEA multiplexer with a dedicated input for AIS receivers operating at 38400 baud. It enables the connection of multiple NMEA-0183 instruments to each other and a computer. Available are four NMEA inputs (*listener*-ports), two NMEA outputs (*talker*-ports) and one RS-232 port for connection with a computer.

Specifications:

Supply voltage:	8 – 30 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 In1,3,4:	4800 Baud.
Speed NMEA In2:	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.

Operation

The MiniPlex-AIS reads NMEA sentences from the listener ports and stores them in a buffer, one for each input. The sentences are read from the buffers in a round robin fashion, one sentence at a time, giving each listener port equal priority. Each sentence is then sent to the talker ports and the RS-232 port. The RS-232 port can be used to connect the MiniPlex-AIS to a computer.

The speed of the listener ports In1, In3 and In4 is 4800 Baud for ordinary instruments while In2 is operating at 38400 baud as a dedicated input for AIS receivers.

Talker port 'Out 1' operates in parallel with the RS-232 port and is fixed to 38400 baud. This port is used to connect the MiniPlex-AIS to a chartplotter with AIS support such as the Raymarine C and E series plotters.

Talker port 'Out 2' operates at 4800 baud and outputs NMEA data which has been sent to the multiplexer through the RS-232 port. This feature can be used to send NMEA data from the plotter back to an autopilot or other device at 4800 Baud. This channel (RS-232 In to NMEA Out2) then effectively operates at a speed translation from 38400 Baud back to 4800 Baud.

Connections

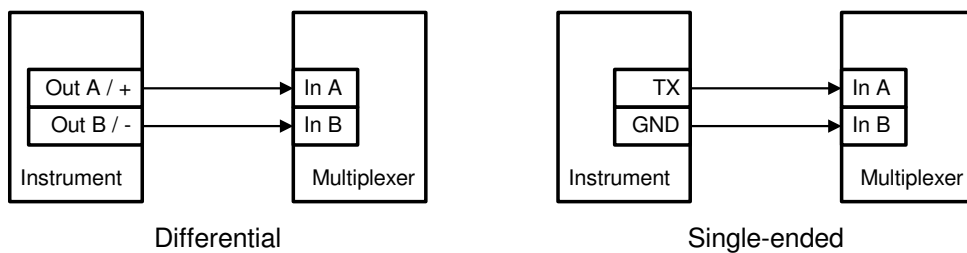
NMEA Listener Ports

The MiniPlex-AIS 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.

Ports 'In 1', 'In 3' and 'In 4' operate at 4800 baud for ordinary NMEA instruments. Port 'In 2' operates at 38400 baud and should be used to connect an AIS receiver.

Connect the 'a' and 'b' terminals of the listener port on the MiniPlex-AIS to the 'a' and 'b' terminals of the talker port on the instrument. Other designations used are 'Data +' and 'Data -', 'TX+' and 'TX-' or 'Out +' and 'Out -'.

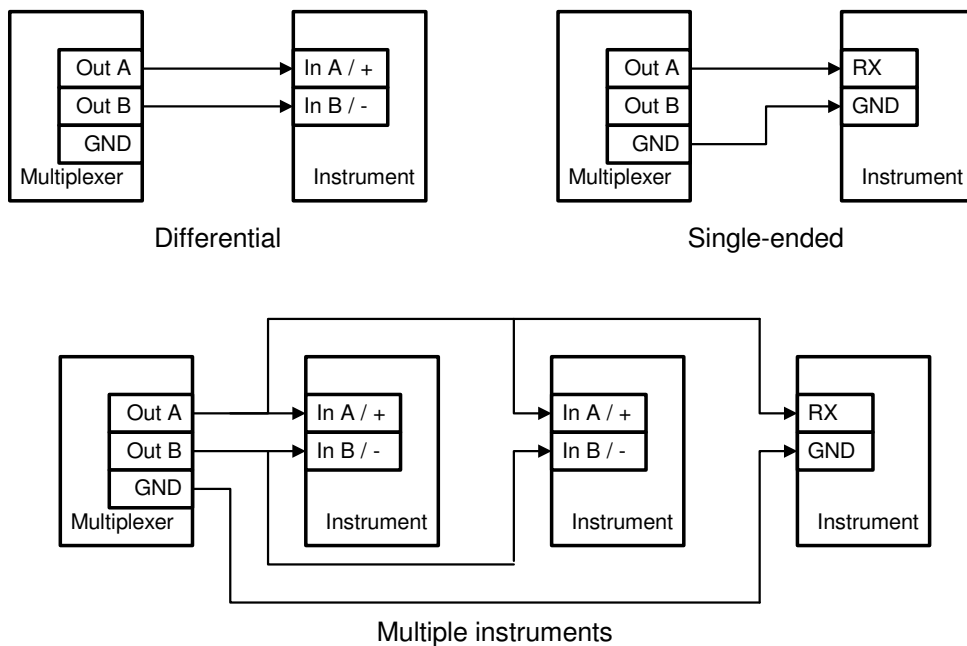
Some instruments have single ended talker ports, with only one data terminal. Connect this terminal to the 'a' terminal on the MiniPlex-AIS, and connect the 'b' terminal on the MiniPlex-AIS with the instrument ground.



NMEA Talker Ports

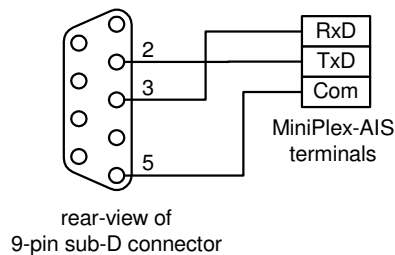
Both talker ports can be connected to up to four instruments. Connect the 'a' and 'b' terminals of the talker port on the MiniPlex-AIS to the 'a' and 'b' terminals of the listener port(s) on the instrument(s). Other designations used are 'Data +' and 'Data -', 'RX+' and 'RX-' or 'In +' and 'In -'.

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



RS-232 Computer Port

The RS-232 port on the MiniPlex-AIS can be connected directly with the serial port of a computer, as shown in the diagram below.



Power Supply

The MiniPlex-AIS operates from a DC supply voltage from 8 to 30V and is protected against reversed polarity. It is recommended to connect the MiniPlex-AIS to the same power source or circuit breaker as the ships instruments and/or computer.

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 baudrates.

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 used navigation software should be configured such that 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.