ShipModul
Marine Electronics

MiniPlex-Lite NMEA-0183 multiplexer Manual

MiniPlex-Lite, V1.0
Firmware V1.20
Art.no.: 0107

Introduction

The MiniPlex-Lite is a three-channel NMEA multiplexer, enabling the connection of multiple NMEA-0183 instruments to a computer. Available are three NMEA inputs (*listener*-ports), one NMEA output (*talker*-port) and one USB port for connection with a computer.

Specifications:

Supply voltage:	$5V_{DC}$ from USB bus.
Current consumption:	30 mA (80 mA max. with fully loaded talker port).
Inputs:	3 x NMEA-183/RS-422, galvanically isolated.
Input resistance:	>800 Ohm.
Outputs:	1 x USB, 1 x NMEA-183/RS-422.
Buffers:	4 buffers of 128 characters (3 x NMEA, 1 x USB).
NMEA Out:	Data from computer.
Speed NMEA in:	4800 Baud. Input 3 autosenses from 4800 to 38400 Baud.
Speed over USB channel:	57600 Baud, regardless of setting on computer.
Speed NMEA out:	4800 Baud.
Indicators:	Data.
Dimensions:	98 x 79 x 28 mm.
Housing:	Flame retardant, automotive grade ABS.

Operation

The MiniPlex-Lite reads NMEA sentences from the listener ports and stores them in a buffer, one for each input. The sentences are then read from the buffers in a round robin fashion and sent to the computer via the USB port. Sentences that are received from the computer, are sent to the NMEA talker port (NMEA Out) , which can be used to control an autopilot.

Since the internal speed of the USB port is much higher than the speed of the talker port, sentences will be discarded when the computer sends a new sentence, while the current sentence is still being transmitted from the talker port. In normal situations where the computer sends an autopilot control sentence (XTE, cross track error), this will not be a problem since these sentences are usually sent only once a second. But when waypoints are uploaded to a connected GPS, all but the first waypoint sentence will be discarded because the transmission of the first sentence is still in progress. To prevent this situation, find the com port settings of your navigation software and enable "Hardware Flow Control". With this option on, the MiniPlex-Lite will will stop the flow of data temporarily after receiving a sentence, just to enable it again after the sentence has been transmitted from the talker port.
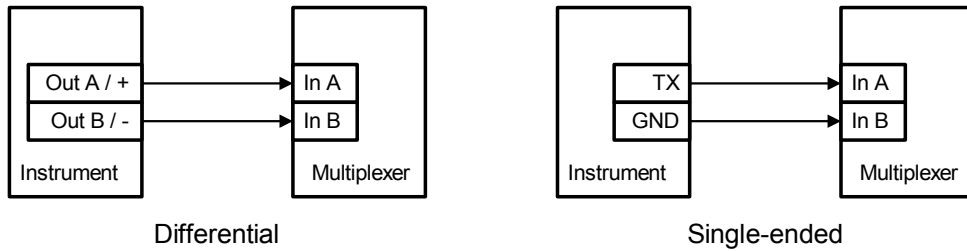
Connections

NMEA Listener Ports

The MiniPlex-Lite has three listener ports, 'In 1' to 'In 3'. 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.

NMEA In						NMEA Out1		
1a	1b	2a	2b	3a	3b	a	b	Com

Connect the 'a' and 'b' terminals of the listener port on the MiniPlex-Lite 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-Lite, and connect the 'b' terminal on the MiniPlex-Lite with the instrument ground.

Out A / +   →   In A
Out B / -   →   In B
Instrument   Multiplexer

TX   →   In A
GND →   In B
Instrument   Multiplexer

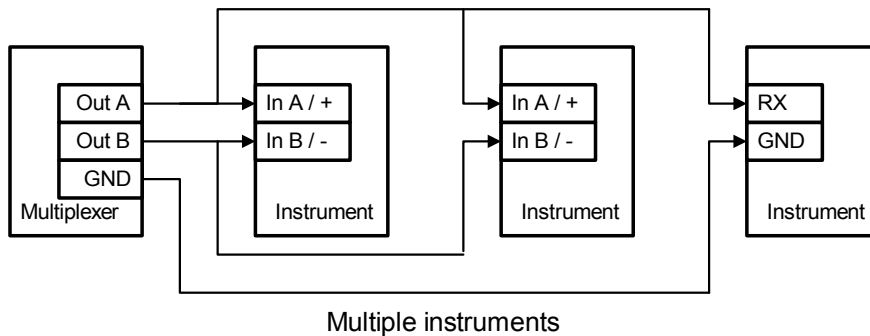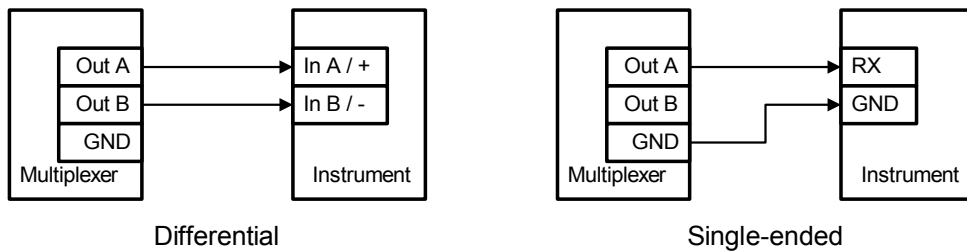Differential   Single-ended

AIS Receiver

NMEA Input 3 can also be used to connect an AIS receiver. AIS receivers send the NMEA data at high speed, 38400 Baud, as opposed to other instruments that communicate on 4800 Baud. Input 3 will detect this high speed data and automatically switches from 4800 Baud to 38400 Baud.

Input 3 can also be used for other devices that transmit on a non-standard speed. Input 3 will automatically switch to 4800, 9600, 19200 or 38400 Baud.

NMEA Talker Port

The talker port can be connected to up to four instruments and/or an autopilot. Connect the 'a' and 'b' terminals of the talker port on the MiniPlex-Lite 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-Lite, and leave the 'b' terminal on the MiniPlex-Lite unconnected. Connect the 'Com' terminal on the MiniPlex-Lite with the instrument ground.

Out A   →   In A / +
Out B   →   In B / -
GND
Multiplexer   Instrument

Out A   →   RX
Out B   GND
GND
Multiplexer   Instrument

Differential   Single-ended

Out A   →   In A / +   →   In A / +   →   RX
Out B   →   In B / -   In B / -   GND
GND
Multiplexer   Instrument   Instrument   Instrument

Multiple instruments

USB Port

The MiniPlex-Lite can be connected directly with the USB port of a computer or a USB hub with the supplied cable. The first time the MiniPlex-Lite is connected, the computer will detect new hardware and ask for a driver CD. Insert the driver Cd into the drive and click OK. Follow the directions on the screen to complete the installation. The installation on Windows 2000 and XP is a two step process. First, the driver for the MiniPlex-Lite will be installed. Next, Windows will detect a USB Serial device and will install a driver for that.

Power Supply

The MiniPlex-Lite operates from the power supplied by the USB port. There is no external supply connection needed.

Cable Terminals

The MiniPlex-Lite is equipped with cage-clamps. These are spring-loaded clamps which ensure a firm electrical contact at all times. Wires ranging from 0.08 mm^2 to 0.5 mm^2 (28-20 AWG) are accepted. To open the clamps, insert the supplied operating tool firmly in the upper hole at an almost 45 degree angle, as shown in the picture. The tool should stay in position when left alone. If it jumps out, lift it further up and firmly insert it further in the connector block. The clamp is now opened and a wire can be inserted in the lower hole. Remove the tool to close the clamp.

Driver Installation

The MiniPlex-Lite needs a device driver for proper operation which is supplied on the accompanying CD. When the MiniPlex-Lite is connected for the first time, Windows will detect new hardware and ask for a driver disk. Insert the CD into the drive and follow the instructions on your screen. The installation on Windows 2000 and XP is a two step process. First, the driver for the MiniPlex-Lite will be installed. Next, Windows will detect a USB Serial device and will install a driver for that.

The installed driver will provide a virtual serial port, which can be used by existing applications like any normal serial port. This port will be named 'COMx' were 'x' is the first number available after the existing serial ports. If for instance COM1 and COM2 are already present, the created virtual serial port will be named COM3.

To determine the number of the newly created port, go to the 'Device Manager' and open the branch 'Ports (COM & LPT)'. The port for the multiplexer is listed as 'USB Serial Port (COMx)' where 'COMx' is the name of the newly created serial port.

To change this port number, double click on the 'USB Serial Port (COMx)' entry to open the property page of this port. Next, select the 'Port Settings' tab and click on the 'Advanced...' button. In the appearing window the used port number can be changed. Do not change any other setting in this window.

It is possible to select a port number that is already present on the computer, like COM1. The original COM1 port will then be disabled als long as the MiniPlex-Lite is connected to the computer. This feature allows the port number to be set in a low range from COM1 to COM4, to accommodate software that only allows COM1 to COM4 to be selected.

More than one MiniPlex-Lite can be connected at the same time. Every new unit will create a new virtual serial port. The number of this port will always be assigned to the same unit.

Windows allows a maximum of 256 virtual serial ports. Not all software may be compatible however, with serial ports numbered above COM9.

When installing updated drivers, uninstall the original drivers first with the 'Add/Remove Programs' icon in the Control Panel or use the 'Update Driver' button on the 'Driver' page of the 'USB Serial Port' property-page.

When the driver installation is complete, the MiniPlex-Lite is ready for use. No further configuration is necessary.

LED Indicator

The MiniPlex-Lite has one green LED which indicates the reception of valid NMEA data on the listener ports or the USB 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. This LED can be found between the USB connector and the Input/Output terminal block.

Mounting

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

Declaration of Conformity

We,

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Declare under our sole responsibility that the product
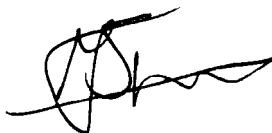
ShipModul MiniPlex-Lite

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

EN/IEC61000-6-1:1997 and EN/IEC61000-6-3:1996
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, 18-9-2005   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.