ShipModul
Marine Electronics
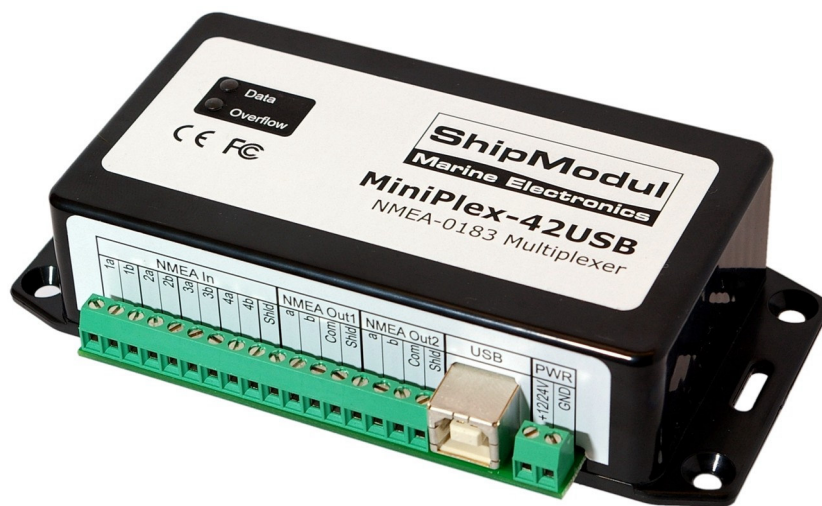
MiniPlex-42USB NMEA-0183 multiplexer
Manual

MiniPlex-42USB, V2.0
Firmware V2.3.0
Art.no.: 104

Introduction

The MiniPlex-42USB is a four-channel NMEA multiplexer, enabling 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 USB port for connection with a computer. The MiniPlex-42USB offers many features for manipulating incoming NMEA data like sentence filtering, real time mode, talker ID modification etc.

Specifications:

Supply voltage:	$5V_{DC}$ from USB bus or
	$8 - 30\ V_{DC}$, protected against reversed polarity.
Current consumption:	50 mA (100 mA max. with fully loaded talker ports).
Inputs:	4 x NMEA-183/RS-422, galvanically isolated.
Input resistance:	>800 Ohm.
Outputs:	1 x USB, 2 x NMEA-183/RS-422.
Buffers:	5 buffers of 1000 characters (4 x NMEA, 1 x USB).
Filter list size:	50 sentence types
Priority list size:	50 sentence types
NMEA Out1:	Combined data from NMEA inputs.
NMEA Out2:	Combined data from NMEA and USB inputs
	or only from USB input.
Speed NMEA in:	4800 Baud.
Speed NMEA1/USB out:	4800, 9600, 19200 or 38400 Baud.
Speed NMEA2 out:	4800 Baud.
Indicators:	Overflow and Data.
Dimensions:	138 x 72 x 33 mm.
Housing:	Flame retardant ABS.

Operation

The MiniPlex-42USB 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 USB port.

The speed of the listener ports is fixed to 4800 Baud (= bits per second), which equals 480 characters per second. When all listener ports receive data at this rate, the buffers will not be emptied in time and an overflow situation occurs. The red LED indicates this situation. When a buffer is full, a partially received sentence will be discarded, to ensure that the MiniPlex-42USB only sends complete and valid NMEA sentences.

There are three ways to resolve this overflow situation:

1. Configure the instruments on the listener ports to send less data or with greater intervals. It is often possible to disable non-relevant sentences.

2. Many instruments do not allow selection of NMEA sentences to be output. In this case, use the NMEA sentence filter in the multiplexer to block unwanted sentences. Unwanted sentences are discarded immediately.

3. Increase the speed of the USB port on the MiniPlex-42USB. The maximum speed is 38400 Baud. From 19200 Baud and up (4 x 4800!) an overflow will never occur (except when in Hub Mode).

The MiniPlex-42USB has two talker ports, 'Out 1' and 'Out 2'. All received sentences from the listener ports are available on talker port 'Out 1'. Talker port 'Out 2' can be configured either to output all received sentences from the listener ports and the USB port (Hub Mode), or only sentences from the USB port (Server Mode).
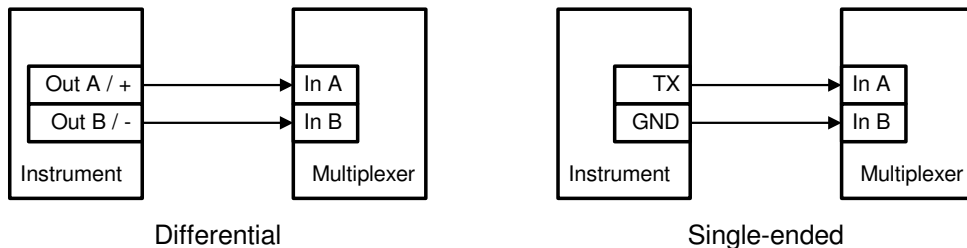
Connections

NMEA Listener Ports

The MiniPlex-42USB 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 MiniPlex-42USB 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 −'.
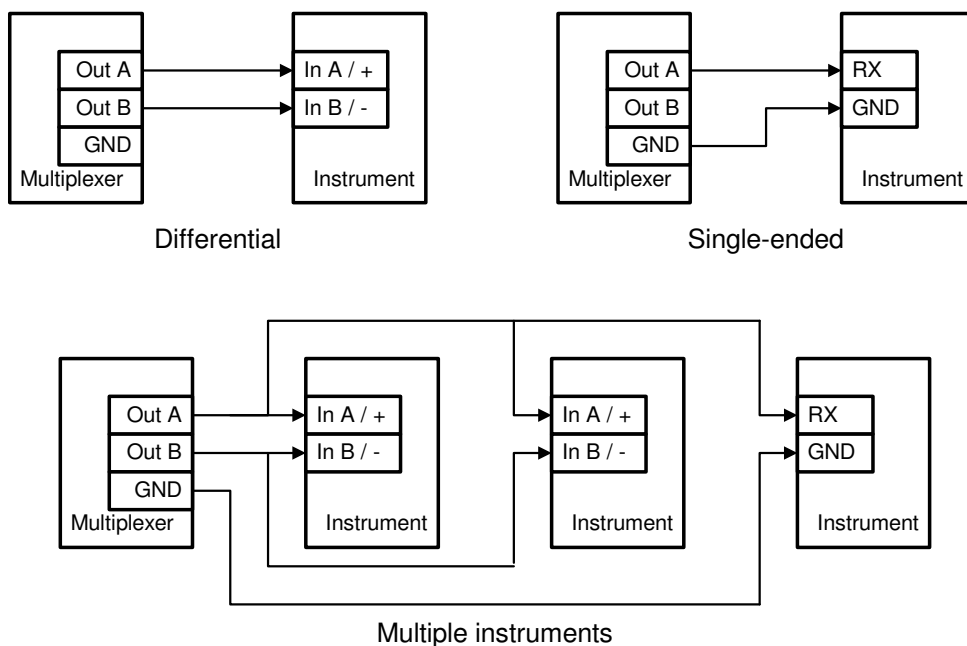
Some instruments have single ended talker ports, with only one data terminal. Connect this terminal to the 'a' terminal on the MiniPlex-42USB, and connect the 'b' terminal on the MiniPlex-42USB with the instrument ground.

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

TX	→	In A
GND	→	In B
Instrument		Multiplexer

Differential   Single-ended

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-42USB 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-42USB, and leave the 'b' terminal on the MiniPlex-42USB unconnected. Connect the 'Com' terminal on the MiniPlex-42USB 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-42USB can be connected directly with the USB port of a computer or a USB hub with the supplied cable. The first time the MiniPlex-42USB is connected, the computer will detect new hardware and ask for a driver disk. Insert the 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-42USB will be installed. Next, Windows will detect a USB Serial device and will install a driver for that.

Power Supply

The MiniPlex-42USB can be powered from the USB bus and from an external power supply. The external power input takes precedence over the USB power and switchover happens automatically. When the MiniPlex-42USB is connected to a computer and to the power system, it will operate as soon as either the computer or the power system is switched on. The external power input accepts any DC voltage between 8 and 30V and is protected against reversed polarity.

Driver Installation

The MiniPlex-42USB needs a device driver for proper operation which is supplied on the driver CD. When the MiniPlex-42USB is connected for the first time, Windows will detect new hardware and ask for a driver disk. Insert the supplied 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-42USB 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-42USB 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-42USB 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.

Configuration

Various options can be configured on the MiniPlex-42USB, using the supplied configuration program MPX-Config. There is no installation procedure for this utility, just start it from the CD or copy it to a suitable folder on the harddisk of your computer. The top part of MPX-Config shows the NMEA sentences which are received by the multiplexer. The bottom part shows the configuration controls. The File menu allows you to store the configuration settings of the multiplexer to a file or load the configuration from a file. This file format is similar to the Windows INI file format, allowing editing the files with a text editor. Appendix A shows an example of a configuration file.

The MiniPlex-42USB is configured with proprietary NMEA sentences. MPX-Config sends these sentences to the multiplexer but they can also be issued with a terminal program. See Appendix B for a complete reference of the supported proprietary sentences.
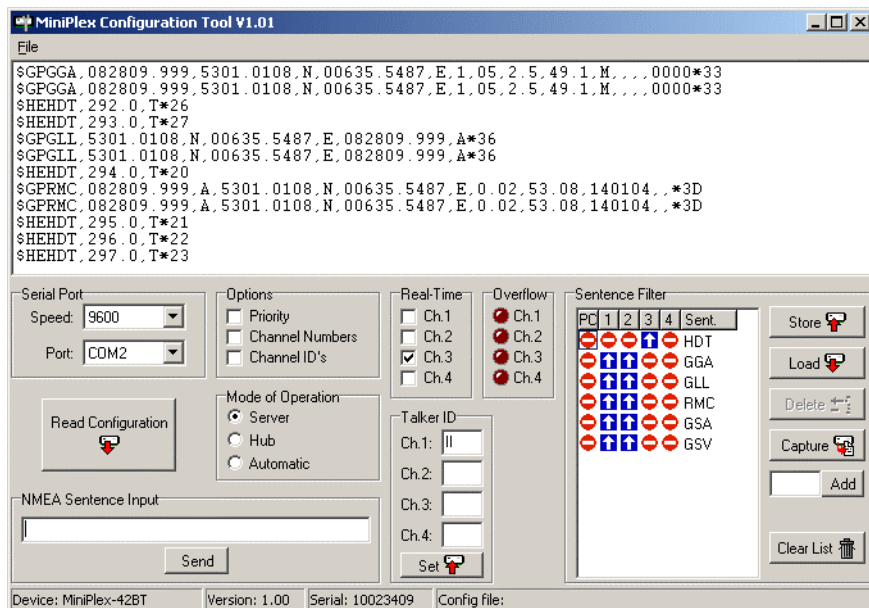

Screenshot of MPX-Config

Serial Port

Before being able to configure the MiniPlex-42USB, select the COM port to which the multiplexer is connected. The virtual port created by the driver is marked with '(vcp)'. When selecting the baudrate, either choose 4800 (factory default) of choose 'Automatic' to let MPX-Config detect to what speed the multiplexer has been set. This may take a few seconds, especially when instruments are sending data to the multiplexer. When a 'Multiplexer does not respond' - message appears, disconnect or shut down any connected instrument. Another option is to try every possible setting from 4800 to 38400 baud, until NMEA data appears in the top window of MPX-Config. When the right baudrate has been found, the multiplexer will follow any change you make: when you set MPX-Config to 38400 baud, the multiplexer will also be set to this value, in order to keep 'synchronized' with MPX-Config. If you exit MPX-Config, the settings will be saved.
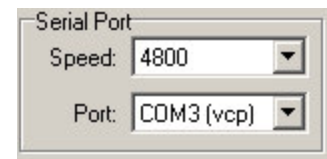
Read Configuration

Every time you start MPX-Config, it will request the current configuration from the MiniPlex-42USB. When this is unsuccessfull (various controls on the MPX-Config window are greyed), you can manually request the current configuration with this button.
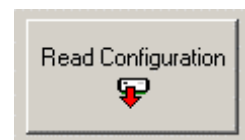
The status line on the bottom of the MPX-Config window will show the name of the multiplexer, the internal software version, the serial number and the optinally loaded configuration file.

Priority

The Priority option assigns priority to incoming NMEA data, based on which input channel it is received. The USB input has the highest priority, followed by NMEA In 1, 2, 3 and 4 in descending order. If for instance two GPS receivers are connected to input 1 and 2 and both GPS receivers output a GPRMC sentence, only the one from the GPS on input 1 is passed. The multiplexer only uses the sentence formatter (the 'RMC' part) to compare. Another useful application is when a Loran-C receiver is used as a backup for the GPS.

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With the GPS connected to input 1 and the Loran-C receiver connected to input 2, the NMEA data from the GPS is passed while similar NMEA sentences (eg. LCRMB, LCGLL) from the Loran-C are blocked. When the GPS fails, a timeout mechanism ensures that after 10 seconds the NMEA data from the Loran-C is passed through the multiplexer.

Please note that not every sentence from a lower priority input is blocked. When for instance the Loran-C outputs GLC sentences (which a GPS definately does not), these are passed through the multiplexer too. The priority mechanism only works on sentences with a similar formatter (characters 3 to 5).

The following example shows what is passed and what not. The left column in the table shows the sentences from an imaginairy GPS and the right column the sentences from an imaginairy Loran-C. The sentences that are greyed in the table are blocked by the priority mechanism. The table shows that only the GLL and RMB sentences from the Loran-C are blocked. If it is necessary to block the remaining sentences from the Loran-C, the Sentence Filter can be used.

GPS (In 1)	Loran-C (In 2)
GPGLL	LCGLL
GPRMB	LCRMB
GPGGA	LCGLC
GPRMC	LCBOD

The priority mechanism can store up to 50 sentence types to determine their priority. The list is scanned every second and entries older than 10 seconds are removed. This ensures that sentence types on lower priority inputs are passed when their counterparts on higher priority inputs are no longer received.

Channel Numbers

This option inserts channel number information in the NMEA stream output by the MiniPlex-42USB. Each NMEA sentence that is output on the USB interface is preceded by a proprietary NMEA sentence '$PSMDCN', to indicate on which NMEA input the following sentence was received. The following example shows that the IIGGA sentence was received on input 1, the GPGGA sentence on input 2, the IIGLL sentence on input 1 and the HEHDT sentence on input 3.

```
$PSMDCN,1*1A
$IIGGA,143357.999,5301.0061,N,00635.5479,E,1,06,1.9,90.0,M,,,,0000*2E
$PSMDCN,2*19
$GPGGA,143357.999,5301.0061,N,00635.5479,E,1,06,1.9,90.0,M,,,,0000*39
$PSMDCN,1*1A
$IIGLL,5301.0061,N,00635.5479,E,143357.999,A*22
$PSMDCN,3*18
$HEHDT,67.0,T*1E
```

This channel number information is used by our utility VirtualPlex-1 to send NMEA sentences from a certain input port on the MiniPlex-42USB to a specific virtual serial port.

In the example on the right, VirtualPlex-1 is configured to create a virtual serial port COM3, which is assigned to input channel 2 on the multiplexer. Applications that open COM3 will thus only receive NMEA sentences from input channel 2 on the multiplexer.
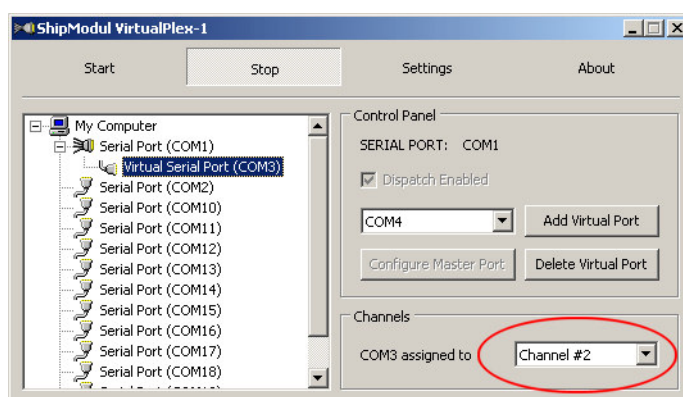
Channel ID's

The Channel ID's option changes the talker ID of incoming NMEA sentences into 'Mx' where 'x' represents a number from 1 to 4. This number corresponds with the input channel on which the sentence was received. If for instance a GPS is connected to input channel 1 and this GPS sends a GPRMC sentence, the multiplexer will change this into M1RMC. This is a useful feature for navigation software that allows selection of NMEA sentences based on the talker ID part.

Mode of Operation

The MiniPlex-42USB can operate in three different modes: Server, Hub and Automatic. Basically, these modes determine which NMEA data is available on NMEA Out2.
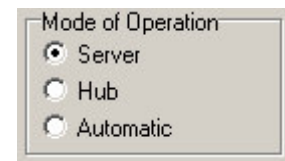
Server mode: In this mode, the combination of computer and multiplexer acts as an NMEA server. Incoming NMEA data from NMEA In1 to In4 is sent to the computer on the USB port. Only NMEA data from the computer is available on NMEA Out2.

Hub mode: In Hub mode, the multiplexer acts as a hub where all NMEA data comes together and is sent out again. All incoming NMEA data, from NMEA In1 to In4 and the computer, is available on NMEA Out2.
This mode has one limitation: since the NMEA data is sent to the USB port *and* NMEA Out2, the total throughput is limited by the speed of NMEA Out2, which is fixed to 4800 baud. Even when the USB port is set to 38400, the throughput will be 480 characters per second, the same as on NMEA Out2.

Auto mode: When Auto mode is selected, the multiplexer automatically switches between Hub- and Server mode, depending on the presence of computer generated data. When the computer sends NMEA data to the multiplexer (on the USB interface), the multiplexer is in Server mode. When no data is received on the USB interface, the multiplexer will switch to Hub mode after a time out of 10 seconds.

Auto mode is very useful when sailing alternately with our without a laptop. Consider a typical setup as shown below:
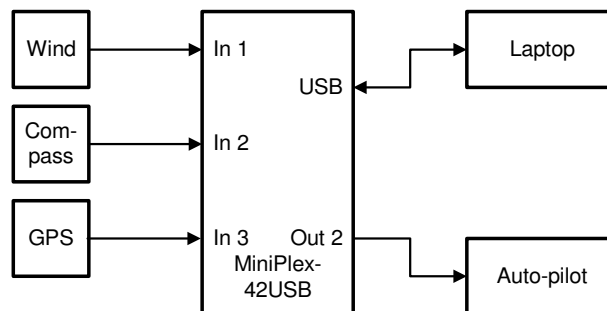
When the laptop is connected, it will receive all information from the instruments and the running navigation software is able to calculate the course to steer and drive the autopilot accordingly. Because the laptop is sending NMEA data, the multiplexer is in server mode and the autopilot will therefore receive information from the laptop only.

When the laptop is not connected, the multiplexer switches to in hub mode and sends all data from the intruments directly to the autopilot. This way, the autopilot will receive course information directly from the GPS.

NMEA Out1 is not affected by the mode setting. On this output, only NMEA data from the NMEA inputs is available. Since this output is connected in parallel with the USB port, it will operate at the same speed as the USB port. When the USB port is set to 38400 baud, NMEA Out1 will also run at 38400 baud.

Real-Time

The Real-Time option bypasses the buffer on a specific channel. In normal operation, all incoming NMEA sentences are stored in a buffer, one for each channel, which holds approximately 2 seconds of NMEA. In situations with heavy NMEA traffic, these buffers can be filled up quite rapidly until an overflow occurs (read LED blinks). Normally an overflow situation is not dangerous, it only means that every now and then an incoming NMEA sentence is discarded because the buffer has no room left to store the entire sentence.
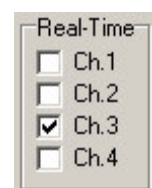
However, when a fluxgate or gyrocompass is connected, which sends it's position 10 or 20 times per second, the corresponding input buffer on the multiplexer is filled up constantly. Together with NMEA data from other instruments, the total amount of data passing through the multiplexer gets so high that almost all used inputs are in constant overflow, resulting in an unacceptable delay of information of up to 12 seconds. This makes it impossible for an autopilot to steer on a compass course.

By enabling the Real-Time option on a channel that is connected to a compass, the buffer on that channel is bypassed and the NMEA data from the compass is passed through the multiplexer immediately. Some NMEA sentences will be discarded when the multiplexer is servicing another channel, but this is far less a problem than having a 12 second delay in the course information.

The overflow indicators on the MPX-Config screen can also be used to determine which channel is causing the overflow. The LED corresponding to the compass channel will be lit almost continuously.

Running the multiplexer at a serial port speed of 19200 baud or higher will never result in overflow or long delays.
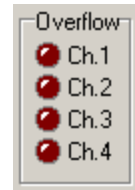
Talker ID

The MiniPlex-42USB allows you to change the talker ID of incoming sentences. The effect is the same as with the Channel ID option, but here you can specify the talker ID per input channel. Enter the desired talker ID in the edit box of the desired channel and press the Set button to send the setting to the multiplexer. Pressing the Read Configuration button will read the Talker ID settings from the multiplexer. To clear a talker ID, simply clear the edit box(es) and press the Set button. Please note that any combination of two characters can be used as talker ID, including spaces. Therefore, make sure you clear the edit box and not fill it with spaces if you want to clear a talker ID. With the setting as shown on the right, any NMEA sentence received on input channel 1 will get talker ID 'II'. Thus a GPRMC sentence from a GPS will be changed into IIRMC.
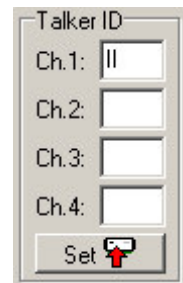
Sentence Filter

The sentence filter is a powerful feature that allows you to specifiy exactly which NMEA sentence may be received on any channel, including the USB interface. Up to 50 rules can be entered, either manually or by capturing the NMEA sentences that are received by the multiplexer.

Each filter rule constists of the formatter part of an NMEA sentence (eg. the 'RMC' part in 'GPRMC') and an indicator for each channel (Inputs 1 to 4 and the PC). The indicator can be toggled between a pass sign (⬆) and a block sign (⛔) by clicking on it and determines whether that specific sentence will be passed or blocked by the multiplexer.

An Example
The first step is to fill the list with NMEA sentences to be filtered. This can be done automatically by pressing the 'Capture' button. All controls will be disabled during capture and the 'Capture' button changes to 'Stop'.

Leave the capture mode running for approximately 10 seconds. By that time, all connected instruments will have sent NMEA sentences. Press 'Stop' to end capture mode.

To make sure all sentences are captured, no Talker ID's may be specified for input channels 1 to 4.

After the capture process, the list may look like the example on the right: the list shows received sentences GGA, GLL, RMC, GSA and GSV on inputs 1 and 2 and a HDT sentence on input 3.

If for instance the GGA and GLL sentences have to be blocked, simply click on the pass signs of both sentences, to change them into a block sign. Pressing the Store button sends the list to the multiplexer. Now the filter is operational.
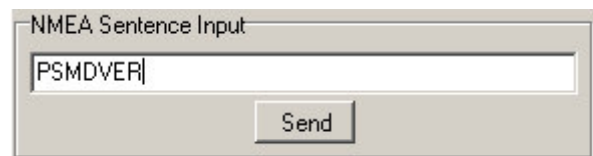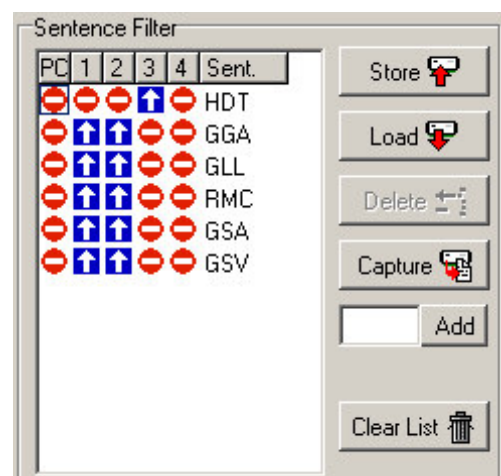
Managing the list

The filter list is managed in MPX-Config and can be stored to or retrieved from the MiniPlex-42USB. Clicking on a traffic sign toggles it between a pass sign (🔵) and a block sign (⛔), which determines whether that specific sentence will be passed or blocked on that channel. Each column represents an input of the multiplexer, including the input from the computer (PC). The following management functions are available:

Store Stores the filter list from MPX-Config into the multiplexer. Any existing filter rules in the multiplexer are overwritten with the ones in the list.

Load Loads the filter list from the multiplexer into MPX-Config. The loaded filter rules are added to any existing rules in the list. If you do not want this, clear the list by pressing the Clear List button first.

Delete Delete a filter rule from the list. Select the filter rule to be deleted by clicking on the formatter (e.g. 'RMC') and press the Delete button.

Capture Enables the capture mode. The filter list will be filled automatically with the NMEA sentences that are received by the multiplexer. For this function to work, it is necessary that any 'Talker ID' settings be cleared first, since MPX-Config enables the 'Channel ID's' option to determine the input channel on which sentences are received. Any programmed Talker ID overrules the Channel ID for that channel, effectively blocking that channel for capturing.

Add Add a filter rule. Type the desired sentence formatter into the edit box left of the Add button and press Add or the enter key. This will enter a new filter rule with all channels blocked (⛔). The input is case-insensitive; every entered sentence formatter will be converted into uppercase.

Clear List This button clears the filter list in MPX-Config (not the multiplexer!). To clear the list in the multiplexer, press the Store button after clearing the list in MPX-Config.

Manual NMEA input

MPX-Config allows manual entry of NMEA sentences for testing, configuration etc. Type the desired NMEA sentence in the edit box as shown on the right and press the Send button or the enter key. Do not precede the NMEA sentence with a '$' as MPX-Config will do this for you. The input is case sensitive, so whatever you type will be sent literally to the multiplexer. Since all NMEA commands are uppercase, you have to enter them as uppercase.

Indicators

The MiniPlex-42USB has two LED's. The green LED 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.

The red LED indicates a buffer overflow, in case more data is coming in than can be transmitted. When a buffer is full, a partially received sentence will be discarded, to ensure that the MiniPlex-42USB only passes complete and valid sentences.

There are three ways to resolve this overflow situation:

1. Configure the instruments on the listener ports to send less data or with greater intervals. It is often possible to disable non-relevant sentences.

2. Many instruments do not allow selection of NMEA sentences to be output. In this case, use the NMEA sentence filter in the multiplexer to block unwanted sentences. Unwanted sentences are discarded immediately.

3. Increase the speed of the talker port and the USB port on the MiniPlex-42USB. The maximum speed is 38400 Baud. From 19200 Baud and up (4 x 4800!) an overflow will never occur (except when in Hub Mode).

Both LED's will blink once when the power is applied to the MiniPlex-42USB. When the red LED stays lit, a hardware error is found during execution of the self-test.

Mounting

The MiniPlex-42USB is not waterproof. It should be mounted at a dry place, like behind the instrument panel, on a flat surface.

Appendix A:

MPX-Config INI file format

The configuration file format of MPX-Config resembles the standard Windows INI file format. Below is an example with has all possible options listed. The example corresponds with the settings shown on the MPX-Config screenshot on page 5.

```
[Configuration]
Priority=0
Channel Numbers=0
Channel IDs=0
Mode=0
RealTime Ch.1=0
RealTime Ch.2=0
RealTime Ch.3=1
RealTime Ch.4=0
Talker ID1=II
Talker ID2=
Talker ID3=
Talker ID4=
[Filter]
HDT=00010
GGA=01100
GLL=01100
RMC=01100
GSA=01100
GSV=01100
```

The serial port settings of MPX-Config are not stored in the configuration file. They are stored in the Windows registry, using the following keys:

```
HKEY_CURRENT_USER\Software\CustomWare\MPXConfig\BaudRate
HKEY_CURRENT_USER\Software\CustomWare\MPXConfig\SerialPort
```

Appendix B:

MiniPlex-42USB Proprietary NMEA commands

The MiniPlex-42USB multiplexers support some NMEA commands through proprietary NMEA sentences. They also generate certain proprietary NMEA sentences in some modes of operation or as a response to NMEA commands.

All commands have the following format:

$PSMDxx

$P: Start of a proprietary command. Dictated by the NMEA standard.
SMD: ShipModul manufacturer's mnemonic.
xx: Two- or three-character command code.

For ease of manual configuration, the commands issued to the multiplexer do not require a checksum. Sentences output by the multiplexer always contain a checksum. Sentences output by the multiplexer always contain a checksum, denoted with *hh in the descriptions below.

Command reference

VER – Get Version

Retrieves version information from the multiplexer. The multiplexer responds with the following version sentence:

$PSMDVER,1.00,MiniPlex-42USB,10025943*hh<CR><LF>

1.00:   software version number
MiniPlex-42USB: product descriptor
10025943:   serial number

CN - Channel Number indicator

This sentence precedes an NMEA sentence to indicate through which input channel the sentence was received.

$PSMDCN,x*hh<CR><LF>

x: channel number 1,2,3 or 4.

Example: $PSMDCN,1*1A<CR><LF>

CF – Configuration

This sentence sets the configuration of the multiplexer. The same sentence is sent by the multiplexer in response to a CFQ sentence.

Command: $PSMDCF,b,m,p,n,i,rrrr<CR><LF> or
             $PSMDCF,b,m,p,n,i,rrrr*hh<CR><LF>

b: baudrate selector: 0 = 4800 baud
                        1 = 9600 baud
                        2 = 19200 baud
                        3 = 38400 baud

m: mode selector: 0 = Server mode
                        1 = Hub mode
                        2 = Auto mode

p: Channel priority: 1 = on, 0 = off

n: Channel numbers: 1 = on, 0 = off

i: Channel ID's: 1 = on, 0 = off

r: real-time mode: 1 = on, 0 = off. Four digits, one digit channel, numbered from 1 to 4

When sending this command to the multiplexer, it is not necessary to specify every field when only one configuration parameter has to be changed. Fields preceeding the one to be changed can be left blank. Fields after the one to be changed may be omitted. When for example only the channel priority must be changed, the command '$PSMDCF,,,1' may be sent. The fields 'b' and 'm' are left blank while the fields for 'n' and 'i' are omitted.

CFQ – Request current configuration

This sentence requests the current configuration settings from the multiplexer.

$PSMDCFQ<CR><LF>

The multiplexer responds with a CF sentence.

FL – Filter

This sentence specifies a filter rule that is applied on every incoming NMEA sentence. Sentences for which a rule is specified, will only be transferred if the input on which they are received matches the input specified in the filter rule.
Filter rules are specified by the formatter part of the NMEA address field, for instance the 'RMC' part of a GPS '$GPRMC' sentence. For each filter rule, the inputs to be passed can be specified. Sentences for which no rule exists are passed unrestricted.

$PSMDFL,ccc,xxxxx<CR><LF>

ccc: Sentence formatter of the filter rule (e.q. 'RMC', 'MWV', etc).

xxxxx: Inputs to pass. Each 'x' represents an input to assign to this rule, numbered from 0 to 4, where input 0 is the computer interface (serial or USB) and 1 to 4 represent NMEA inputs 1 to 4. A '1' means to pass, a '0' means to block. When all x'es are '1', the filter rule is removed.

A FL sentence without any parameters will erase all rules.

Example: $PSMDFL,RMC,10011<CR><LF>

This sentence specifies a rule for all sentences that have the 'RMC' sentence formatter. When this rule is applied, only 'RMC' sentences on inputs 0 (the computer), 3 and 4 are transferred.

FLQ – Request filter list

This sentence requests the filter list from the multiplexer. The multiplexer responds by sending FL sentences, one for each list entry. An empty FL sentence denotes the end of the list.

Example:

```
$PSMDFL,RMC,10011*hh<CR><LF>
$PSMDFL,GGA,10001*hh<CR><LF>
$PSMDFL,VWT,01000*hh<CR><LF>
$PSMDFL,GSV,00001*hh<CR><LF>
$PSMDFL,*hh<CR><LF>
```

The sentences may not be dumped as one contiguous block. In case of heavy NMEA traffic, they may be interspersed with other NMEA sentences.

ID – Talker ID

Enables a Talker ID to be set for a specific channel. If the talker ID is set for a specific channel, the specified ID, before sending the sentence to the computer, replaces the original talker ID in the sentences received on that channel.

$PSMDID,aa,bb,cc,dd<CR><LF>

aa: Talker ID for channel 1
bb: Talker ID for channel 2
cc: Talker ID for channel 3
dd: Talker ID for channel 4

An empty field clears the ID and disables the translation for that specific channel. Sending PSMDID without any fields clears all translations.

IDQ – Request talker ID's

Requests the Talker ID Translation settings. The multiplexer responds with an ID sentence.

OV – Overflow

In case of a buffer overflow (blinking red LED on the multiplexer), an overflow sentence is output, to indicate on which input buffer the overflow occurred. To conserve bandwidth, this sentence has no checksum.

$PSMDOV,x<CR><LF>

x: Binary field. The first four bits indicate on which input buffer the overflow occurred.

Declaration of Conformity

We,

CustomWare
Roggehullen 8
9403 WG Assen
The Netherlands
Tel.: +31 592 375700
Fax: +31 592 375550

Declare under our sole responsibility that the product
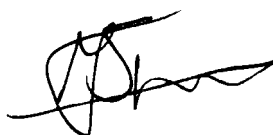
ShipModul MiniPlex-42USB

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

EN 61000-6-1:1997 and EN/IEC61000-6-3:1996
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, 5-6-2003   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.

ShipModul / CustomWare
Roggehullen 8
9403 WG Assen
The Netherlands

Tel.:   +31 592 375700
Fax: +31 592 375550

web: www.shipmodul.com
e-mail: info@ shipmodul.com