

### 1 Introduction

**NMEA-0183** is an electrical standard to connect GPS, SONAR, sensors, auto pilot units, etc. in ships and boats. In difference to the newer NMEA 2000 standard (based on CAN) the NMEA 0183 is based on EIA RS422 (some older and/or simple systems use RS-232, or a single wire).

We want to show you in this application note how to connect a Arduino to any NMEA-0183 device with differential output. Although the standard calls for isolated inputs and outputs its useful to use our RS422 / RS485 Shield with isolated interface.

**NMEA 0183**

**& Arduino**



# RS422/RS485 Shield



## Application Note: How to use NMEA 0183

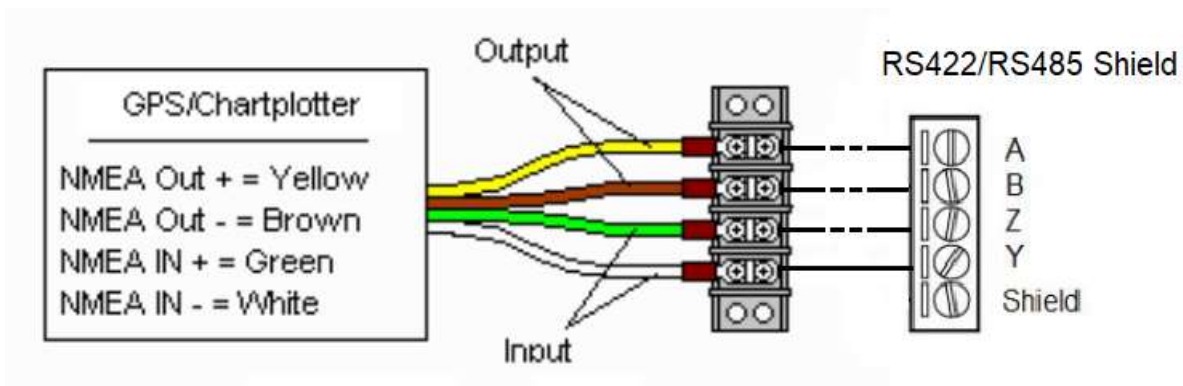
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### 2 Bill of Material

- Arduino UNO (or compatible)
- [RS422/RS485 Shield](#) (available in our webstore)
- NMEA-0183 device with differential output

### 3 Wiring

In the picture below you can see a typical device with differential output. The terminals are NMEA OUT+ and NMEA OUT- or TX+ or TX-. The NMEA IN+ and NMEA IN- wires are optional.



If you have a single transmit wire from your device (most likely labeled TX or NMEA OUT or something like that), then your device uses the RS-232 protocol. In this case you will need a simple RS232 converter.

## 4 DIP Switch Settings

Configuration for RS422 mode is mandatory needed. Receiver is always on:

SW1	
1	ON
2	OFF
3	OFF
4	ON

SW2	
1	ON
2	ON
3	OFF
4	OFF

Please switch SW1 (terminating resistor) to ON position:

SW3	
1	ON
2	OFF
3	OFF
4	OFF

# RS422/RS485 Shield



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## 5 Jumper Settings



- UART RX to position 2
- UART TX to position 3
- Voltage to position 5V

## 6 Firmware

You can find a lot of different NMEA-0183 software stacks for Arduino. A very good solution is the NMEA library by Justin R Cutler:

<https://github.com/jrcutler/NMEA0183>

It's necessary needed to change the pins for the software UART to pin 2 and 3! Take care that the baudrate of the software uart is the same as in your NMEAdevice – typical 4800 Baud.

## 7 Test

After compilation and uploading the program will decode incoming NMEA protocols. You can open the serial monitor to see the decoded protocols. If you have no NMEA device at home, you can also use a [Simulator](#) on your PC and a simple USB to RS485 adaptor instead of a real device.