

NMEA

NMEA stands for National Marine Electronic Association.

NMEA created the only uniform interface standard for digital data exchange between different marine electronic products back in the early eighties. The NMEA 0183 Interface Standard is widely accepted by manufacturers and is recognized by maritime agencies worldwide. The standard was adopted as the basis of an international standard by the International Electrotechnical Commission in Europe. The updating and expanding of the protocol and development of future standards is continued today by a committee of NMEA volunteers.

More information can be obtained at : www.nmea.org

To intercommunicate with a GPS equipment, Arquimedes uses a \$GPRMC sentence from the NMEA 0183 communication protocol.

• Data from GPS equipment to Arquimedes

The standard NMEA (National Marine Electronics Association) \$GPRMC sentence should be used to send GPS data to Arquimedes once per second at 4800 BAUD, No parity, one start bit, one stop bit in the following RS485 format:

\$GPRMC,time (hhmmss),(A or V),latitude (ddmm.mmm),(South or North),longitude (dddmm.mmm),(East or West), ground speed in knots (kkk.k),direction (ddd.d),date (ddmmyy),, *CS

example: \$GPRMC,040113,A,3653.10,S,17437.47,E,000.6,074.4,190903,,*03

Where:

hhmmss in hours, minutes, seconds UTC

A = Data valid

V = Navigation receiver warning - data may be not valid

ddmm.mmm = latitude in degrees minutes and thousandths of minutes

North or South = N or S latitude

dddmm.mmm = longitude in degrees minutes and thousandths of minutes

East or West = E or W longitude

kkk.k = speed over ground in nautical miles per hour

ddd.d = course over ground, degrees true (or leave this as a null field ",", see example below)

ddmmyy = date in days, months, year

,, = nul field

CS is check sum (8 bit exclusive OR of all data in the sentence, including ",", delimiters, between but not including the "\$" and "" delimiters.

• **Data from Arquimedes to GPS equipment**

Arquimedes will send the GPS equipment the following proprietary NMEA data sentence using RS485 at 4800 BAUD, 8 bits, one start bit, one stop bit, no parity at intervals to be defined by the Arquimedes operator (once every 30 seconds up to once every 5 minutes, on change of status such as loss of +12VDC power, sender line cut, etc.):

\$PBVE,Zxy,xxxx.x,yyyy.y,zzzz.z,ABCDErrr,IJKLMrrr*CS

Where:

"PBVE" is a proprietary data sentence has already been assigned to BV Engineering by the National Marine Electronic Association in 1997 and is a legally registered NMEA proprietary sentence for BVE's generic use.
 Zxy = instrument identification,

- Z = GPS equipment
- x = software version (0-9, A to Z)
- y = hardware version (0-9,A to Z)

- xxxx.x = total fuel remaining in liters in tank 1
- yyyy.y = total fuel remaining in liters in tank 2
- zzzz.z = total fuel remaining in liters in tank 3

ABCDErrr = status word 1 (1's and 0's such as 11110111) status of various parameters :

- A 12V line cut ("0"=No, "1"=Yes) 00000000/10000000
- B Ignition line cut ("0"=No, "1"=Yes) 00000000/01000000
- C Tamper switch ("0"=Closed, "1"=Open) 00000000/00100000
- D Motor status ("0" = off, "1" = on) 00000000/00010000
- E Reserved and active ("0" = No, "1" = Yes) 00000000/00001000
- rrr RESERVED (always "000")

IJKLMrrr = status word 2 (1's and 0's such as 01110111) status of various parameters:

- I Sender Tank_1 cut ("0"=No, "1"=Yes) 00000000/10000000
- J Sender Tank_2 cut ("0"=No, "1"=Yes) 00000000/01000000
- K Sender Tank_3 cut ("0"=No, "1"=Yes) 00000000/00100000
- L GPS lost * ("0"=No, "1"=Yes) 00000000/00010000
- M Fuel consumption/refueling over limit ("0"=No, "1"=Yes) 00000000/00001000
- rrr RESERVED (always "000")

*CS = Checksum (8-bit exclusive OR for all characters in the sentence, including the "," data delimiters but not including the \$ and * delimiters).

• **Arquimedes GPS configuration**

The Route Collect software will allow to configure the control box with a GPS connection (See Route Collect manual v0508en).

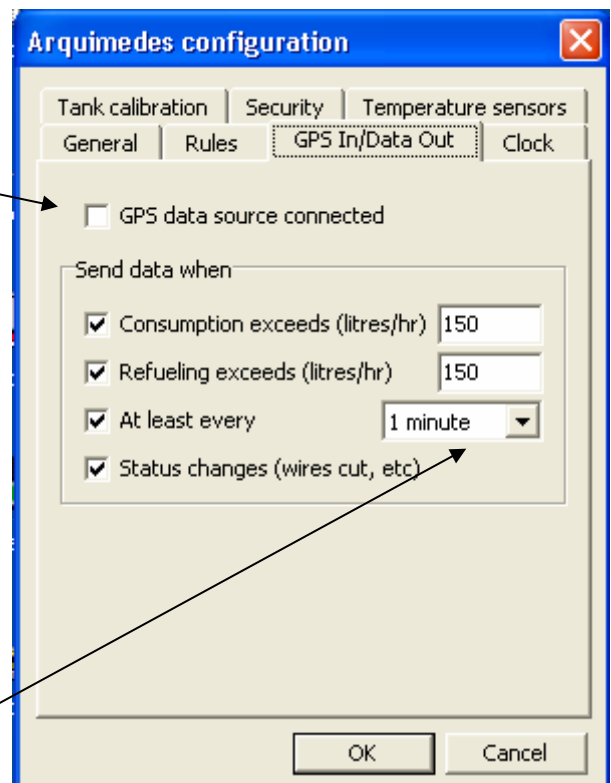
Open Route Collect once it is connected to the system control box and from the Route Collect main menu select Tools and then Arquimedes Configuration.

In the window Arquimedes Configuration select GPS In / Data Out

When the GPS data source is activated, the control box will receive data from the GPS equipment and will register in each data line the latitude and longitude.

The control box will send data using the NMEA protocol to a receiving equipment based on any of the following rules:

- At least every:
- 90 seconds
- 2 minutes
- 5 minutes
- 10 minutes



For more information on this \$GPRMC sentence : vts@arquimedes.com.mx