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SeaTalk Technical Reference Revision 3.02

General Information

SeaTalk is a simple interface for networking Raymarine/Autohelm marine equipment so that all devices of a ship can exchange and share their data. SeaTalk is a proprietary solution of Autohelm and **not** compatible with NMEA or CAN. Unfortunately Raymarine keeps the technical details of SeaTalk secret. To assist users who want to develop hard- or software to connect their devices to the SeaTalk bus these pages uncover some of the mysteries. Part 3 adds hints how to interface SeaTalk with a PC. The information is unsupported by Raymarine and was found by watching the bits travelling on the bus. Therefore the description is incomplete inaccurate and may even be wrong. Corrections and contributions are welcome.

Content

The technical description of the SeaTalk protocol is divided into three parts:

Revision History:

Rev 3.02: [October 2002] Timer command 59 added thx Frank Wallenwein
Rev 3.01: [August 2002] Link added in Acknowledgement to Jon Fick's remote control project
Rev 3.00: [August 2002] Splits the information into parts 1-3 and includes the SeaSigma utility
Rev 2.20: [March 2002] Some additions to part 2 thx Harald Sammer
Rev 2.19: Minor additions for autopilot Vane Mode (command 84)
Rev 2.18: Minor corrections to datagrams 0x85 and 0x26
Rev 2.17: Many additions to part 2 thx Harald Sammer
Rev 2.16: Link added to Acknowledgement

Rev 2.15: Minor additions / corrections to part 2
Rev 2.14: MOB-commands 36 and 6E added to part

Acknowledgement

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Harald Sammer, Scotland
Ales Janhar, Slovenija (developed the SeaSigma utility)
Jon Fick, USA (developed another PIC-based remote control) and
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who contributed valueable information for this page.

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SeaTalk Technical Reference Part 1: How SeaTalk works

Hardware-Interface

SeaTalk uses three wires, connected in parallel to all devices on the bus:

1. +12V Supply, red
2. GND Supply, grey
3. Data Serial Data, yellow: +12V=Idle/Mark=1, 0V=Space/Data=0, 4800 Baud, pullup circuit in each device, talker pulls down to 0V (wired OR). For connection to a RS232 receiver voltage levels must be inverted.

Serial Data Transmission

11 bits are transmitted for each character:

- 1 Start bit (0V)
- 8 Data Bits (least significant bit transmitted first)
- 1 Command bit, set on the first character of each datagram. Reflected in the parity bit of most UARTs. Not compatible with NMEA0183 but well suited for the multiprocessor communications mode of 8051-family microcontrollers (bit SM2 in SCON set).
- 1 Stop bit (+12V)

Composition of Messages

Each datagram contains between 3 and 18 characters:

1. Type of command (the only byte with the command-bit set)
2. Attribute Character, specifying the total length of the datagram in the least significant nibble:

   Most significant 4 bits: 0 or part of a data value
   Least significant 4 bits: Number of additional data bytes = n =>
   Total length of datagram = 3 + n characters
3. First, mandatory data byte
4. - 18. optional, additional data bytes

No datagrams or devices carry addresses. This eliminates the need for an initialization or arbitration phase on the bus. Events (such as a keystroke) are published as soon as they occure. Measured data is repeatedly transfered, typically about once per second. So the current values are always available to all devices on the bus and there is no need (and no way) to request a particular information.

Collision Management

There is no master on the bus. Every device has equal rights and is allowed to talk as soon as it recognizes the bus to be idle (+12V for at least 10/4800 seconds). Low priority messages use a longer or randomly selected idle-bus-waiting-time. This allows messages from other devices with a higher priority to be transmitted first. The different waiting times of all devices make data collisions (two or more devices start talking at exactly the same moment) very rare. Since each device also listens to its own transmission it will recognize when its message is garbled by a second talker. In this case it abandons the remaining characters of the datagram. It waits for the bus to become free again and then retransmits the whole message. For listeners this means that messages which are shorter than expected are invalid and have to be cancelled totally.

Data Coding

Some characters are repeated with all bits inverted for noise or transmission error detection. Example: 0xA2 is followed by 0x5D. The sum of both bytes must always be 0xFF. The listing below shows repeated bytes in small letters (example: ZZ zz).

Numerical values are transmitted binary coded and with least significant data first. Example: 0x13 0x57 means 0x5713 = 22291

Some values are put together by certain bits of a byte or nibble. The meaningful bits can be isolated by a bitwise AND operation (&). Example: (U & 0x3) filters the least significant two bits of U.

The "distance to destination" value (ZZZ in command 0x85) uses a scaling factor of 1/10 or 1/100 nm depending on the shift indicator bit (LSBit of Y).

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SeaTalk Technical Reference Part 2:

Recognized Datagrams (in hexadecimal notation):

```
Com Att Dat Dat...

 00  02  YZ  XX  XX  Depth below transducer: XXXX/10 feet
                     Display units: Y=0 => feet, Y=4 => meter
                     Flags: Z&1 Shalow Depth Alarm   (Z=1)
                            Z&2 Transducer defective (Z=4)
                     Corresponding NMEA sentences: DPT, DBT

 01  05  00  00  00  60  01  00  Sent by course computer 400G shortly
                                 after power on.
 01  05  FA  03  00  30  07  03  Sent by ST80 Maxi Display shortly
                                 after power on.
 01  05  04  BA  20  28  01  00  Sent by ST60 Tridata shortly after power on


 10  01  XX  YY  Apparent Wind Angle: XXYY/2 degrees right of bow
                 Used for autopilots Vane Mode (WindTrim)
                 Corresponding NMEA sentence: MWV

 11  01  XX  0Y  Apparent Wind Speed: (XX & 0x7F) + Y/10 Knots
                 Units flag: XX&0x80=0    => Display value in Knots
                             XX&0x80=0x80 => Display value in Meter/Second
                 Corresponding NMEA sentence: MWV

 20  01  XX  XX  Speed through water: XXXX/10 Knots
                 Corresponding NMEA sentence: VHW

 21  02  XX  XX  0X  Trip Mileage: XXXXX/100 nautical miles

 22  02  XX  XX  00  Total Mileage: XXXX/10 nautical miles

 23  41  XX  YY  Water temperature (ST50): XX deg Celsius, YY deg Fahrenheit
                 Corresponding NMEA sentence: MTW

 24  02  00  00  XX  Display units for Mileage & Speed
                     XX: 00=nm/knots, 06=sm/mph, 86=km/kmh

 25  Z4  XX  YY  UU  VV AW  Total & Trip Log
                     total= (XX+YY*256+Z* 4096)/ 10 [max=104857.5] nautical miles
                     trip = (UU+VV*256+W*65536)/100 [max=10485.75] nautical miles

 26  04  XX  XX  YY  YY D1  Speed through water:
                     Sensor 1: XXXX/100 Knots, valid if D1&64=64
                     Sensor 2: YYYY/100 Knots, valid if D1&128=128
                     Corresponding NMEA sentence: VHW

 27  01  XX  XX  Water temperature: (XXXX-100)/10 deg Celsius
                 Corresponding NMEA sentence: MTW

 30  00  0X      Set lamp Intensity; X=0: L0, X=4: L1, X=8: L2, X=C: L3
                     (only sent once when setting the lamp intensity)
 36  00  01      Cancel MOB (Man Over Board) condition

 38  X1  YY  yy  Codelock data

 50  A2  XX  YY  YY  LAT position: XX degrees, (YYYY & 0x7FFF)/100 minutes
                     MSB of Y = YYYY & 0x8000 = South if set, North if cleared
                     Corresponding NMEA sentences: RMC, GAA, GLL

 51  A2  XX  YY  YY  LON position: XX degrees, (YYYY & 0x7FFF)/100 minutes
                  MSB of Y = YYYY & 0x8000 = East if set, West if cleared
                  Corresponding NMEA sentences: RMC, GAA, GLL

 52  01  XX  XX  Speed over Ground: XXXX/10 Knots
                 Corresponding NMEA sentences: RMC, VTG

 53  X0  XX      Course Magnetic: XXX/8 Degrees
                 Least significant 2 bits are always 0,
                 giving a resolution of 0.5 degrees
                 Corresponding NMEA sentences: RMC, VTG

 54  S1  SS  HH  GMT-time: HH hours, SSS seconds
                 Corresponding NMEA sentences: RMC, GAA, BWR, BWC

 55  X1  YY  yy  TRACK keystroke on GPS unit
                 keycodes identical with autopilot (command 86)

 56  M1  DD  YY  Date: YY year, M month, DD day in month
                 Corresponding NMEA sentence: RMC

 57  S0  DD      Sat Info: S number of sats, DD horiz. dillution of position
                 Corresponding NMEA sentences: GGA, GSA

 58  Z5  LA XX YY LO QQ RR   LAT/LON
                 LA Degrees LAT, LO Degrees LON
                 minutes LAT = XX*256+YY
                 minutes LON = QQ*256+RR
                 Z&1: South (Z&1 = 0: North)
                 Z&2: East  (Z&2 = 0: West)
                 Corresponding NMEA sentences: RMC, GAA, GLL

 59  22  SS MM XH  Set Count Down Timer
                   MM=Minutes ( 00..3B ) ( 00 .. 63 Min ), MSB:0 Count up start flag
                   SS=Seconds ( 00..3B ) ( 00 .. 59 Sec )
                   H=Houres  ( 0..9 )   ( 00 .. 09 Houres )
                   X= Counter Mode: 0 Count up and start if MSB of MM set
                                    4 Count down
                                    8 Count down and start
                   ( Example 59 22 3B 3B 49 -> Set Countdown Timer to 9.59:59 )
 59  22  0A 00 80  Sent by ST60 in countdown mode when counted down to 10 Seconds.

 6C  05  04 BA 20 28 2D 2D Second datagram sent by ST60 Tridata shortly after power
on

 6E  07  00  00 00 00 00 00 00 00 MOB (Man Over Board), (ST80), preceded
                 by a Waypoint 999 command: 82 A5 40 BF 92 6D 24 DB

 80  00  0X      Set Lamp Intensity: X=0 off, X=4: 1, X=8: 2, X=C: 3

 81  01  00  00  Sent by course computer during setup when going past USER CAL.
 81  00  00      Sent by course computer immediately after above.

 82  05  XX  xx YY yy ZZ zz   Target waypoint name
                 XX+xx = YY+yy = ZZ+zz = FF (allows error detection)
                 Takes the last 4 chars of name, assumes upper case only
                 Char= ASCII-Char - 0x30
                 XX&0x3F: char1
                 (YY&0xF)*4+(XX&0xC0)/64: char2
                 (ZZ&0x3)*16+(YY&0xF0)/16: char3
                 (ZZ&0xFC)/4: char4
                 Corresponding NMEA sentences: RMB, APB, BWR, BWC

 83  07  XX  00  00  00  00  00  80  00  00  Sent by course computer.
                 XX = 0 after clearing a failure condition, also sent once after
power-up.
                 XX = 1 failure, auto release error. Repeated once per second.

 84  U6  VW  XY 0Z 00 RR SS TT  Compass heading  Autopilot course and
                  Rudder position (see also command 9C)
                  Compass heading in degrees:
                    The two lower  bits of  U * 90 +
                    the six lower  bits of VW *  2 +
                    the two higher bits of  U /  2 =
                    (U & 0x3) * 90 + (VW & 0x3F) * 2 + (U & 0xC) / 8
                  Autopilot course in degrees:
                    The two higher bits of  V * 90 + XY / 2
                  Z & 0x2 = 0 : Autopilot in Standby-Mode
                  Z & 0x2 = 2 : Autopilot in Auto-Mode
                  Z & 0x4 = 4 : Autopilot in Vane Mode (WindTrim), requires regular
"10" datagrams
                  Rudder position: RR degrees (positive values steer right,
                    negative values steer left. Example: 0xFE = 2° left)
                  SS & 0x01 : when set, turns off heading display on 600R control.
                  SS & 0x02 : always on with 400G
                  SS & 0x08 : displays “NO DATA” on 600R
                  SS & 0x10 : displays “LARGE XTE” on 600R
                  SS & 0x80 : Displays “Auto Rel” on 600R
                  TT : Always 0x08 on 400G computer

 85  X6  XX  VU ZW ZZ YF 00 yf   Navigation to waypoint information
                  Cross Track Error: XXX/100 nautical miles
                   Example: X-track error 2.61nm => 261 dec => 0x105 => X6XX=5_10
                  Bearing to destination: (U & 0x3) * 90° + WV / 2°
                   Example: GPS course 230°=180+50=2*90 + 0x64/2 => VUZW=42_6
                   U&8: U&8 = 8 -> Bearing is true, U&8 = 0 -> Bearing is magnetic
                  Distance to destination: Distance 0-9.99nm: ZZZ/100nm, Y & 1 = 1
                                           Distance >=10.0nm: ZZZ/10 nm, Y & 1 = 0
                  Direction to steer: if Y & 4 = 4 Steer right to correct error
                                      if Y & 4 = 0 Steer left  to correct error
                  Example: Distance = 5.13nm, steer left: 5.13*100 = 513 = 0x201 =>
ZW ZZ YF=1_ 20 1_
                           Distance = 51.3nm, steer left: 51.3*10  = 513 = 0x201 =>
ZW ZZ YF=1_ 20 0_
                  Track control mode:
                     F= 0x1: Display x-track error and Autopilot course
                     F= 0x3: Enter Track Control Mode, i.e. lock on to GPS.
                             Display x-track error, autopilot course and bearing
                             to destination
                     F= 0x5: Display x-track error, distance to waypoint,
                             autopilot course and bearing to destination
           normal--> F= 0x7: Enter Track Control Mode, i.e. lock on to GPS.
                             Display x-track error, distance to waypoint,
                             autopilot course and bearing to destination
                     F= 0xF: As 0x7 but with x-track error alarm
                     F= 2, 4, 6, 8 ... causes data errors
                   Corresponding NMEA sentences: RMB, APB, BWR, BWC, XTE

86  X1  YY  yy  Keystroke
                 X=1: Sent by Z101 remote control to increment/decrement
                      course of autopilot
     11  05  FA     -1
     11  06  F9    -10
     11  07  F8     +1
     11  08  F7    +10
     11  20  DF     +1 &  -1
     11  21  DE      -1 & -10
     11  22  DD      +1 & +10
     11  28  D7     +10 & -10
     11  45  BA      -1        pressed longer than 1 second
     11  46  B9     -10        pressed longer than 1 second
     11  47  B8      +1        pressed longer than 1 second
     11  48  B7     +10        pressed longer than 1 second
     11  60  DF      +1 &  -1  pressed longer than 1 second
     11  61  9E      -1 & -10  pressed longer than 1 second
     11  62  9D      +1 & +10  pressed longer than 1 second
     11  64  9B     +10 & -10  pressed longer than 1 second (why not 11 68 97 ?)

                 Sent by autopilot (X=0: ST 1000+,  X=2: ST4000+ or ST600R)
     X1  01  FE    Auto
     X1  02  FD    Standby
     X1  03  FC    Track
     X1  04  FB    disp (in display mode or page in auto chapter = advance)
     X1  05  FA     -1 (in auto mode)
     X1  06  F9    -10 (in auto mode)
     X1  07  F8     +1 (in auto mode)
     X1  08  F7    +10 (in auto mode)
     X1  09  F6     -1 (in resp or rudder gain mode)
     X1  0A  F5     +1 (in resp or rudder gain mode)
     X1  21  DE     -1 & -10 (port tack, doesn´t work on ST600R?)
     X1  22  DD     +1 & +10 (stb tack)
     X1  23  DC    Standby & Auto (wind mode)
     X1  28  D7    +10 & -10 (in auto mode)
     X1  2E  D1     +1 & -1 (Response Display)
     X1  41  BE    Auto pressed longer
     X1  42  BD    Standby pressed longer
     X1  43  BC    Track pressed longer
     X1  44  BB    Disp pressed longer
     X1  45  BA     -1 pressed longer (in auto mode)
     X1  46  B9    -10 pressed longer (in auto mode)
     X1  47  B8     +1 pressed longer (in auto mode)
     X1  48  B7    +10 pressed longer (in auto mode)
     X1  63  9C    Standby & Auto pressed longer (previous wind angle)
     X1  68  97    +10 & -10 pressed longer (in auto mode)
     X1  6E  91     +1 & -1 pressed longer (Rudder Gain Display)
     X1  80  7F     -1 pressed (repeated 1x per second)
     X1  81  7E     +1 pressed (repeated 1x per second)
     X1  82  7D    -10 pressed (repeated 1x per second)
     X1  83  7C    +10 pressed (repeated 1x per second)
     X1  84  7B     +1, -1, +10 or -10 released

 87  00  0X        Set Response level
                  X=1  Response level 1: Automatic Deadband
                  X=2  Response level 2: Minimum Deadband

 88  03  WW  XX  YY  ZZ  Autopilot Parameter: Sent by AP every
                         second while in parameter setting mode.
                         (User or Dealer Calibration Mode)
                         WW Parameter Number
                         XX Current Setting
                         YY Max Parameter Value
                         ZZ Min Parameter Value
                         Known Paramters: Parameter (min-max) [default]
Number
                         rudder gain  (1-9) [2]
1
                         counter rudder (1-9) [2]
2
                         rudder limit  (10-40) [30]
3
                         turn rate limit  (1-30) [off]
4
                         speed  (4-60) [8]
5
                         off course limit  (15-40) [20]
```

```
6
                         auto trim  (0-4) [1]
7
                         power steer [Joy Stick] ON/OFF (not on new 400G)
9
                         drive type  (3,4,5) [3]
A
                         rudder damping  (1-9) [2]
B
                         variation: (full degrees)(-30 to +30) [0]
C
                         auto adapt: 0=Off,1=North,2=South [1]
D
                         auto adapt latitude (0-80) [0]
E
                         auto release (only for stern drive) ON/OFF
F
                         rudder alignment (-7 to +7) [0]
10
                         Wind Trim (Wind Response) (1-9) [5] (only for sail)
11
                         Response  (1-9) [5]
12
                         Boat type:1=displ,2=semi-displ,3=plan,4=stern,5=work,6=sail
13
                         Cal Lock:  0=OFF, 1=ON [0]
15
                         Auto Tack Angle (40-125) [100] (only for sail)
1d

 89  U2  VW  XY  2Z  Compass heading sent by ST40 compass instrument
                     (it is read as a compass heading by the ST1000(+) or ST2000(+)
autopilot)
                       Compass heading in degrees:
                         The two lower bits of  U  *  90   +
                         the six lower bits of VW  *   2   +
                         the two higher bits of U  /   2   =
                         (U & 0x3) * 90 + (VW & 0x3F) * 2 + (U & 0xC) / 2
                       Locked stear reference (only send by the ST40 compass):
                         The two higher bits of V * 90 + XY / 2
                       Z & 0x2 = 0 : St40 in Standby mode
                       Z & 0x2 = 2 : St40 in Locked stear mode
                     Corresponding NMEA sentences: HDM, HDG, HDT, VHW

 90  00  XX        Device Indentification
                   XX=02  sent by ST600R ~every 2 secs
                   XX=05  sent by type 400G course computer
                   XX=A3  sent by NMEA <-> SeaTalk bridge ~every 10 secs

 91  00  0X        Set Rudder gain to X

 92  02  XX  YY  00 Set Autopilot Parameter: Sent by the remote head
                    (e.g. ST600R) to set a particular parameter.
                    XX Parameter Number (see 88)
                    YY Value to set to.

 93  00  00         Enter AP-Setup: Sent by course computer before
                    finally entering the dealer setup. It is repeated
                    once per second, and times out after ten seconds.
                    While this is being sent, command 86 X1 68 97 is
                    needed for final entry into Setup. (600R generates
                    this when –1 & +1 are pressed simultaneously in this
                    mode).

 95  U6  VW  XY 0Z 00 RR 00 0T  Replaces command 84 while autopilot is in value
setting mode
                   e.g. lamp intensity or response level
 99  00  XX        Compass variation sent by ST40 compass instrument
                     or ST1000, ST2000, ST4000+ autopilot every 10 seconds
                     but only if the variation is set on the instrument
                     Positive XX values: Variation West, Negative XX values:
Variation East
                     Examples (XX => variation): 00 => 0, 01 => -1 west, 02 => -2
west ...
                                                 FF => +1 east, FE => +2 east ...
                   Corresponding NMEA sentences: RMC, HDG

 9A  09  L11  L12  L13  L14  L21  L22  L23  00  00  00  Version String:
                   L11 means line 1 char 1. There are two lines, line 1
                   Can have 4 characters and line two can have 3
                   Characters. Char: “A”= 0x00, “B”= 0x01,……..
                   Char: “0”= 0x25, “1”= 0x26, ……….
                   Some special characters are mapped to the range
                   Between alphas and numeric chars. It seems modulo
                   masked at 0x36, and wraps around from there.

 9C  U1  VW  RR     Compass heading and Rudder position (see also command 84)
                     Compass heading in degrees:
                       The two lower  bits of  U * 90 +
                       the six lower  bits of VW *  2 +
                       the two higher bits of  U /  2 =
                       (U & 0x3) * 90 + (VW & 0x3F) * 2 + (U & 0xC) / 8
                     Rudder position: RR degrees (positive values steer right,
                       negative values steer left. Example: 0xFE = 2° left)
                     The rudder angle bar on the ST600R uses this record

 9E  FC  49  49 03 XX AA BB YY OO PP GG HH II JJ   Waypoint definition
                   XX: Degrees LAT, YY: Degrees LON
                   min&sec LAT= AA+(BB&0x1F)*256, BB&0x80 = 0: North, BB&0x80 = 0x80:
South
                   min&sec LON= OO+(PP&ßx1F)*256, PP&0x80 = 0: West,  PP&0x80 = 0x80:
East
                   GG HH II JJ: Last four characters of waypoint name

 A1  XD  49  49 GG HH II JJ C1 C2 C3 C4 C5 C6 C7 C8  Destination Waypoint Info
                   GG HH II JJ: Last four characters of waypoint name
                   C1...C8: Up to 8 characters of WP name, unused are 0
                   Longer names (> 8 chars) create an additional record:
                   X=0: single record (short name)
                   X=1: 1st record, more follows
                   X=3: last record
                   Corresponding NMEA sentences: RMB, APB, BWR, BWC

 A2  X4  00  00 00 00 00 Arrival Info
                   X&0x2=Arrival perpendicular passed, X&0x4=Arrival circle entered
                   Corresponding NMEA sentences: APB, AAM

 A5                 GPS and DGPS Info

 A5  57  QQ  HH ?? AA GG ZZ YY DD   GPS and DGPS Fix Info
                   Signal Quality= QQ&0xF, QQ&0x10: Signal Quality available flag
                   HDOP= HH&0x7C, HH&0x80: HDOP available flag
                   Antenna Height= AA
                   Number of Sats= (QQ&0xE0)/16+(HH&0x1), HH&0x2: NumSats available
flag
                   GeoSeperation= GG*16 (-2048....+2047 meters)
                   Differential age=(ZZ&0xE0)/2+(YY&0xF), YY&0x10: Diff. age
available flag
                   Differential Station ID=(YY&0xC0)*4+DD, YY&0x20: Diff.St.ID
available flag
                   Corresponding NMEA sentences: GGA, RMC, GSV, GLL, GGA

 A5  74  ID  ID ID ID ID   GPS Info: ID numbers of satellites
 A5  XD  NN  AA EE SS MM BB FF GG OO CC DD XX YY ZZ   GPS Info: Sat Position and
Signal
```

Data of up to three sattelites [1,2,3] per datagram
Satellite number: [1] NN&0xFE, [2] (MM&0x70)/2+(BB&0x7), [3] CC&0x3F
Satellite azimuth:[1] AA*2+(EE&0x1), [2] (BB&0xF8)*2+(FF&0xF), [3] (CC&0xC0)*2+DD&0x7F
Satellite elevation:[1] (EE&0xFE)/2, [2] (FF&0xF0)/2+GG&0x7, [3] XX&0x7F
Satellite signal: [1] (SS&0xFE)/2, [2] (GG&0x80)/2+OO&0x3F, [3] (YY&0xFC)/2+ZZ&0x1

It seems that there will be 4 sat info datagrams generated, the first with X=0 carries the position and signal data of the 1st 3 satellites. The second also with X=0, but NN&0x1 set and a length of 0x0C carries the data of the next 2 satellites and then the ID numbers of the 1st 4 sats. A datagram like the 1st one, but with X=2 carries data of 3 more sats [6,7,8]. It was not possible to get more than 8 sats mapped to SeaTalk. Finally a datagram with X=7 carries the next 5 ID numbers.

Corresponding NMEA sentences: GSV, GSA

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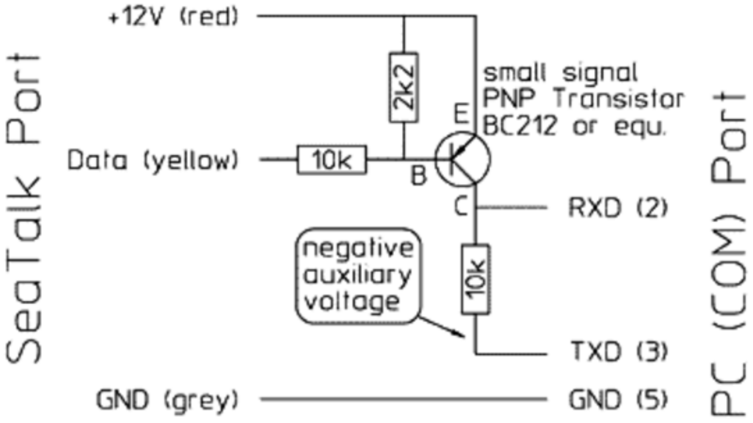
SeaTalk Technical Reference Part 3: Processing SeaTalk Data with a PC

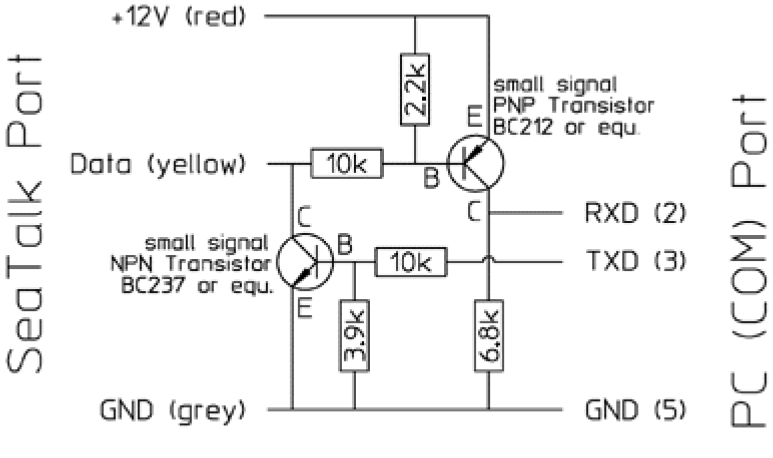
Unidirectional SeaTalk => RS232 Interface

This simple unidirectional interface circuit inverts the SeaTalk signal to make it readable by the PC serial port:



Bidirectional SeaTalk <=> RS232 Interface

For bidirectional communication the circuit has to be extended by a second transistor:



SeaTalk Monitor

The following piece of C-code gives an example of how to collect and process SeaTalk data. It monitors the SeaTalk bus and echoes the SeaTalk datagrams in hexadecimal notation to the screen.

```
#include <stdio.h>

/* Set Address of Serial Port: COM1=0x3F8, COM2=0x2F8 */
#define PORT 0x3F8

unsigned int collision_ctr,overrun_ctr;
char buffer[256],in_ptr,out_ptr,limit_ptr;
char line_status_reg,receiver_buf,byte_ctr;
char hex[]="0123456789ABCDEF";

main() {
  puts("SeaTalk Monitor Rev. 1.01    (c)2000 by Thomas Knauf\r\n");

 /* Serial Port Initialization */
 _outb(   0, PORT+1); /*IER Disable Interrupts */
 _outb(   1, PORT+2); /*FCR Enable Fifo */
 _outb(0x80, PORT+3); /*LCR Enable access to Divisor Latch */
 _outb(  24, PORT  ); /*DLL Set Baud Rate to 4800 LSB*/
 _outb(   0, PORT+1); /*DLM Baud Rate Divisor MSB */
 _outb(0x3B, PORT+3); /*LCR Stick Parity to 0, Enable Parity, 1 Stop bit, 8 bits/char
*/
 _outb(0x0F, PORT+4); /*MCR Disable LOOP Mode */
 _outb(   0, PORT+5); /*LSR Clear Error flags */

 while(1) { /* Continous data processing loop */
   if((line_status_reg= _inb(PORT+5)) & 1) { /* LSR New SeaTalk Data received ? */
     receiver_buf=_inb(PORT);  /* RBR Read SeaTalk Data Byte */
     if(line_status_reg & 2) overrun_ctr++; /* PC too slow, should not happen */
     if(line_status_reg & 4) { /* Parity bit set => Command Byte */
       if(byte_ctr) {         /* More characters expected => Collision */
         in_ptr=limit_ptr;    /* Discard last datagram, restart from beginning */
         collision_ctr++;     /* Count collision events */
       }
       buffer[in_ptr++]='\r';  /* Put new command on new line */
       buffer[in_ptr++]='\n';
       byte_ctr=255;           /* Undefined datagram length, wait for next character
*/
     } else
       if(byte_ctr==254)       /* Attribute byte ? */
         byte_ctr=(receiver_buf & 0xF) + 2; /* Read expected datagram length */
     if(byte_ctr) {            /* Process valid data bytes, should always be true */
       buffer[in_ptr++]=hex[receiver_buf >>  4]; /* Convert Data to hex */
       buffer[in_ptr++]=hex[receiver_buf & 0xF];
       buffer[in_ptr++]=' ';                     /* Seperate by space */
       if(! --byte_ctr) limit_ptr=in_ptr;        /* Complete datagram ready for
output */
     }
   } else
     if(out_ptr != limit_ptr)          /* Characters waiting for Output ? */
       putc(buffer[out_ptr++],stdout); /* Copy single character from buffer to screen
*/
     else if(scr_csts()) break;        /* Query keyboard, terminate if any key hit */
 }
 printf("\r\nSeatalk Collisions : %5u",collision_ctr);
 printf("\r\nUART Overrun Errors: %5u",overrun_ctr);
}
```

Compiled EXE-Files can be downloaded here as SEAMON1.EXE (using COM1:) or

SEAMON2.EXE (using COM2:). They run in any MS-DOS environment. Redirecting the output logs data to a file (example: SEAMON1 > LOGFILE). Pressing any key terminates the program.

SeaSigma: A simple SeaTalk command generator

The file SeaSigma.zip contains a MS-Windows program which allows to generate SeaTalk commands and to send them via COM1: or COM2: to the SeaTalk bus. Since SeaSigma is a contribution of Ales Janhar I cannot give support or take any responsibility for this software.

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