*857-201392 / AA000/6-12*

# *Attitude formats description*

This document describes the gyro and vru formats the HiPAP and HPR 400 Series can receive.

# Document revisions

| Rev | Documentation Department | | Hardware/Software design | | Project/Product Management | |
|---|---|---|---|---|---|---|
| | **Date** | **Sign** | **Date** | **Sign** | **Date** | **Sign** |
| A | | | 08.08.97 | OB | | |
| B | 27.02.98 | GM | 27.02.98 | OB | 27.02.98 | JEF |
| C | 02.05.01 | GM | 02.05.01 | THG | 02.05.01 | JEF |
| D | | | | | | |

*(The original signatures are recorded in the company's logistic database)*

# Contents

# Document history

*(The information on this page is for internal use)*

**Rev. A** Original issue.

**Rev. B** Document updated to correct minor errors. Ref. EM 857-201392B.

**Rev. C** Removed DGR format for HiPAP. Corrections in the MRU serial line format. New layout. Ref. EM 857-201392C.

# 1 INTRODUCTION

This note is a technical documentation that may be changed. The connections between HPR and gyro's or vru's are not described here.

- HiPAP can receive the serial line formats, i.e. SKR, STL, NMEA, MRU and SEAPATH.
- HPR 400 can use all formats.

The note is divided in chapters like the install gyro and vru menu in the HSC.

## Abbreviations

| | |
|---|---|
| HPR | Hydroacoustic Positioning Reference system |
| HiPAP | High Precision Acoustic Position system |
| HSC | HPR system controller, the operator unit |
| rms | Root mean square |
| bps | Baud per second |
| ms | Millisecond |
| deg | Degrees |
| rad | Radians |
| m | Meter |

# 2 GYRO FORMATS

## SKR serial line format

Robertson SKR80 / 82 serial line format.

Interface format: RS-422.
9600 bps, 8 data bits, 1 stop bit, odd parity.
< 150 ms between each telegram.

Telegram format:4 bytes, LSD first and MSD last.

| Bit | Description | Values |
|---|---|---|
| 7 - 6 | Not used | 0 (ignored) |
| 5 - 4 | Address | 0 = tenths<br>1 = units<br>2 = tens<br>3 = hundreds |
| 3 - 0 | Data | 0 - 9, BCD-code |

Example: Course: 234.5 deg.
Telegram: 05 14 23 32

# STL serial line format

STL serial line format.

Interface format: RS-422.
9600 bps, 8 data bits, 1 stop bit, no parity.
< 5 seconds between each telegram.

Telegram format:

Telegram consists of 7, 8 or 13 ascii-coded bytes, starting with STX and ending with ETX, COMMA or CR. The 7 and 8 byte telegram contains course information, and the 13 byte telegram contains course and ships speed information. The speed is ignored.

| Byte | | | Description | Values |
|---|---|---|---|---|
| 1 | 1 | 1 | STX | 02h |
| | 2 | 2 | K (course) | 4Bh |
| 2 | 3 | 3 | hundreds | 30h-33h |
| 3 | 4 | 4 | tens | 30h-39h |
| 4 | 5 | 5 | units | 30h-39h |
| 5 | 6 | 6 | POINT | 2Eh |
| 6 | 7 | 7 | tenths | 30h-39h |
| | | 8 | L (speed) | 4Ch |
| | | 9 | tens | 30h-39h |
| | | 10 | units | 30h-39h |
| | | 11 | POINT | 2Eh |
| | | 12 | tenths | 30h-39h |
| 7 | 8 | 13 | ETX, COMMA or CR | 03h, 2Ch or 0Dh |

Examples: Course: 234.5 deg.

7 byte telegram: 02 32 33 34 2E 35 03

8 byte telegram: 02 4B 32 33 34 2E 35 2C

13 byte telegram: 02 4B 32 33 34 2E 35 4C 31 32 2E 33 0D

# DGR serial line format

DGR serial line format.

Interface format: RS422.
9600 bps, 7 data bits, 2 stop bit, no parity. Any length between each telegram.

Telegram format: Telegram consists of 6 ascii-coded bytes.

| Byte | Description | Values |
|---|---|---|
| 1 | Hundreds | 30h-33h |
| 2 | Tens | 30h-39h |
| 3 | Units | 30h-39h |
| 4 | Tenths | 31h-36h<br>31h: 0 deg.<br>32h: 2/6 deg. ~ 0.3<br>33h: 1/6 deg. ~ 0.2<br>34h: 4/6 deg. ~ 0.7<br>35h: 5/6 deg. ~ 0.8<br>36h: 3/6 deg. = 0.5 |
| 5 | Anything | Ignored |
| 6 | LF | 0Ah |

Example: Course: 234.5 deg.
Telegram: 32 33 34 36 0D 0A

# NMEA serial line format

NMEA serial line format.

Interface format: RS-422.
2400-9600 bps auto detect,
8 data bits, 1 stop bit, no parity.
< 5 seconds between each telegram.

Telegram format: Contains ascii characters.

*$ address ,data, … ,data *checksum "CRLF"*

These sentence formatters are decoded.

| | |
|---|---|
| Approved: | HDT, VHW. |
| Special: | HRC (Yokogawa). |
| Proprietary: | SXN (Seatex Norway). |

Seatex proprietary MRU NMEA telegram:

*$PSXN ,id ,token ,roll ,pitch , , , , ,*checksum "CRLF"*

| | |
|---|---|
| Id: | 10 or 11. 10 if valid data, 11 if invalid data. |
| Token: | Not decoded. |
| Roll / pitch: | Scientific float data, i.e. 1.23e-1. [rad] |

Example: $SPSXN,10,014,-9.100e-3,-1.823e-2,,,,,*20"CRLF"

## MRU serial line format

Seatex Simrad EM1000 and EM3000 serial line format. EM1000 format is only decoded by HPR 400. EM3000 is the preferred format.

Interface format: RS-422.
9600 bps, 8 data bits, 1 stop bit, no parity.
Any length between each telegram.

Telegram format:The telegram consists of 10 bytes.

Note ! *For each of the data groups, LSB first and MSB next.*

| Byte | Description | Values |
|---|---|---|
| 1 | Status | EM1000 format: 00h.<br>EM3000 format:<br>90h: valid data, full accuracy.<br>91h - 99h: valid data, reduced acc.<br>9Ah - 9Fh: non-valid data, normal operation<br>A0h - AFh: error. |
| 2 | | 90h |
| 3, 4 | Roll lsb, msb | +/-179.99 deg. Positive port up. Negative data as 2's complement. |
| 5, 6 | Pitch lsb, msb | +/-179.99 deg. Positive bow up. 2's complement. |
| 7, 8 | Heave lsb, msb | +/-9.99 m. Positive up. 2's complement. |
| 9, 10 | Heading lsb, msb | 0 - 359.99 deg. |

Example: Roll: 2.0, Pitch: -2.0, Heave: 0.9, Course: 155.1
Telegram: 9090 C800 38FF 5900 963C

## Seapath serial line format

Seatex Simrad EM1000 and EM3000 serial line format.

Further details see chapter *Gyro formats MRU serial*.

## Synchro

Format: Synchronous 16-bit.

Signal: 11.8 / 90 Vrms.

Reference: 26 / 115 Vrms, 400 hz.

## Sin Cosin

Not Implemented.

## 4-20 mA

Compass 4-20 mA current loop.

Format: 4 – 20 mA = 0 - 360 deg.

## Sync spare

Connected to SDCM synchro 0 in spare position.

Format: Synchronous 16-bit.

Signal: 11.8 / 90 Vrms.

Reference: 26 / 115 Vrms, 400 hz.

# 3 VRU FORMATS

## NMEA serial line format

NMEA serial line format.

Further details see chapter *Gyro formats NMEA serial*.

## MRU serial line format

Seatex Simrad EM1000 and EM3000 serial line format.

Further details see chapter *Gyro formats MRU serial*.

## Seapath serial line format

Seatex Simrad EM1000 and EM3000 serial line format.

Further details see chapter *Gyro formats MRU serial*.

## Piro40 90°

Piro40 - 90.

Type: Analogue sinus vru.

Format: +/-10 V = +/-90 deg.

## Piro40 15°

Piro40 - 15.

Type: Analogue sinus vru.

Format: +/-10 V = +/-15 deg.

## Sync spare

Connected to SDCM synchro 1 and 2 in spare position.

Format: Synchronous 16-bit.

Signal: 11.8/90 Vrms.

Reference: 26/115 Vrms, 400 hz.

## Sperry analogue

Sperry accustar. This vru is mounted in the PMT transducer.

Type: Analogue linear vru.

Format: +/- 10 V = +/-60 deg.

## Schaevitz

Schaevitz LSRP - 14.5.

Type: Analogue linear vru.

Format: +/-5 V = +/-14.5 deg.

## MRU 20° 10v

Seatex MRU.

Type: Analogue linear vru. Use the MRC programme to program the unit.

Format: +/-10 V = +/-20 deg.

## Vru 200A

Honeywell VRU200A.

Type: Analogue linear vru.

Format: +/-15 V = +/-67.5 deg.

Blank page