Flytec 6020/6030
Bräuniger Compeo+/Competino+

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Communication Definition

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Flytec 6020/6030
Bräuniger Compeo+/Competino+

Version Control
Begin of version control of this document 6.9.2005

30.11.12 Update of memory definition “Address of Configuration data”

Introduction
This document is valid for the following instruments: Flytec 5020/5030 and Bräuniger Compeo/Competino. The term “Instrument” is used, where the definition is valid for every device mentioned before. In case of differences between devices, every definition is referenced by the device name.

The instrument is equipped with special communication features, in order to communicate with external devices.
It is possible to transfer data in both directions, so efficient handling during competitions is guaranteed.
The high speed interface with 57.600 baud allows quick transfers with only short delays.

Via RS232 it is possible to communicate with the instrument.
Communication includes:

- Get Serialnumber and pilotname
- Get the actual stored waypointlist
- Get the actual stored routeslist
- Get a selected track, tracklist
- Put waypoints into the instrument
- Put routes into the instrument
- Handle Flight restricted areas (CTRs)

Interface Settings
The instrument receives and transmits data with the following format:

- 57.600 baud
- 1 start bit
- 8 data bit
- 1 stop bit
- no parity
- Software handshake XON / XOFF for flow control

Flytec 6020/6030
Bräuniger Compeo+/Competino+

General dataformat

ASCII data are accepted and transmitted as the only valid data format. All data are packed into different NMEA-sentences with a propriatary identifier. The only exception are the track data, which are sent directly in the IGC-format, which is requested by the FAI.

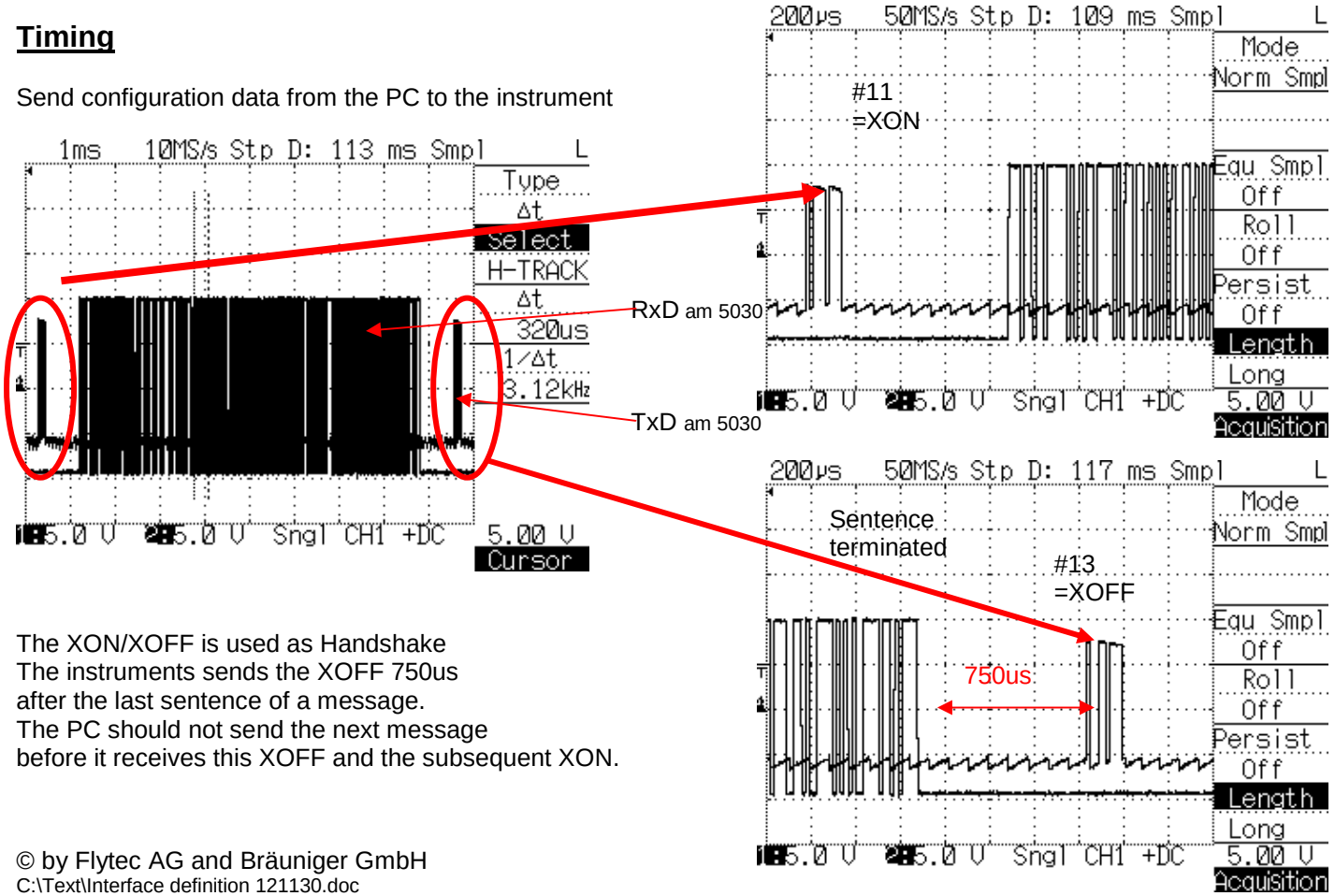
Handshake

XON / XOFF is used to control data flow in both directions.

If the instrument receives a valid command from the PC, it sends an XOFF (13h) character. After the command is completely processed, (e.g. an IGC-file is sent) the instrument sends the XON (11h) character

Timing

Send configuration data from the PC to the instrument



The XON/XOFF is used as Handshake
The instruments sends the XOFF 750us
after the last sentence of a message.
The PC should not send the next message
before it receives this XOFF and the subsequent XON.

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Requesting the Serialnumber and the Pilotname

The instrument has to be set into MENU-mode.

1	2	3	4	5	6	7	8	9	0	1	2	3
$	**P**	**B**	**R**	**S**	**N**	**P**	**,**	*****	**Z**	**Z**	**CR**	**LF**

$PBRSNP	Identifier
*ZZ	Checksum as defined by NMEA

Reply of the instrument:

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
$	**P**	**B**	**R**	**S**	**N**	**P**	**,**	**5**	**0**	**3**	**0**	**,**	**J**	**I**	**M**	**I**		**H**	**E**	**N**	**D**	**R**	**I**	**X**						**,**	**0**	**1**	**0**	**0**	**1**	**,**	**2**	**.**	**0**	**0**	*****	**Z**	**Z**	**CR**	**LF**

$PBRSNP	Identifier
5030 / Compeo	Instrument Identifier (fix)
JIMI HENDRIX	Pilotname (17 char, if shorter, filled with spaces)
01001	Serialnumber (5 char)
2.00	SW-Version (4 char)
*ZZ	Checksum as defined by NMEA

Requesting the waypointlist

The instrument has to be set into MENU-mode.

1	2	3	4	5	6	7	8	9	0	1	2	3
$	**P**	**B**	**R**	**W**	**P**	**S**	**,**	*****	**Z**	**Z**	**CR**	**LF**

$PBRWPS Identifier
*ZZ Checksum as defined by NMEA

Reply of 5030 / Compeo:

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3
$	**P**	**B**	**R**	**W**	**P**	**S**	**,**	**4**	**7**	**5**	**0**	**.**	**7**	**6**	**0**	**,**	**N**	**,**	**0**	**1**	**1**	**0**	**8**	**.**	**5**	**0**	**0**	**,**	**E**	**,**	**B**	**R**	**A**	**0**	**5**	**5**	**,**	**B**	**R**	**A**	**E**	**U**	**N**	**I**	**G**	**E**	**R**							**,**	**0**	**5**	**5**	**0**	*****	**Z**	**Z**	**CR**	**LF**

$PBRWPS Identifier
4750.760,N Latitude (47°50.760min N)
01108.500,E Longitude (011°08.500min E)
BRA055 Name, Altitude in compatible format 550m (6 char)
BRAEUNIGER Waypoint name (17 char, if shorter, filled with spaces)
0550 Waypoint altitude in meter (4 char)
*ZZ Checksum as defined by NMEA

other examples:

```
$PBRWPS,4743.564,N,01121.571,E,URT062,Urthaler Hof     ,0620*03
$PBRWPS,4754.426,N,01110.212,E,PAE058,Paehl            ,0580*35
$PBRWPS,4736.338,N,01104.378,E,OBE083,Oberammergau     ,0830*62
$PBRWPS,4548.429,N,01147.065,E,BAS018,Bassano          ,0180*22
$PBRWPS,4726.020,N,01053.042,E,DAN234,Daniel           ,2340*77
$PBRWPS,4549.637,N,01146.259,E,PUP085,PUPPULO          ,0853*34
$PBRWPS,4548.571,N,01145.714,E,DEL017,DELLA-MENA       ,0176*3F
```

The instrument may transmit up to 200 waypoints in sequence.

Requesting the extended waypointlist

The instrument has to be set into MENU-mode.

1	2	3	4	5	6	7	8	9	0	1	2	3	4
$	**P**	**B**	**R**	**W**	**P**	**S**	**E**	**,**	*****	**Z**	**Z**	**CR**	**LF**

$PBRWPS Identifier
*ZZ Checksum as defined by NMEA

Reply of 5030 / Compeo:

1	2	3	4	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2
$	**P**	**B**	**R**	**W**	**P**	**S**	**E**	**,**	**4**	**7**	**5**	**0**	**.**	**7**	**6**	**0**	**,**	**N**	**,**	**0**	**1**	**1**	**0**	**8**	**.**	**5**	**0**	**0**	**,**	**E**	**,**	**B**	**R**	**A**	**0**	**5**	**5**	**,**	**B**	**R**	**A**	**E**	**U**	**N**	**I**	**G**	**E**	**R**							**,**	**0**	**5**	**5**	**0**	**,**	**T**
3	4	5	6	7	8						

Requesting the routeslist

The instrument has to be set into MENU-mode.

1	2	3	4	5	6	7	8	9	0	1	2	3
$	**P**	**B**	**R**	**R**	**T**	**S**	**,**	*****	**Z**	**Z**	**CR**	**LF**

$PBRRTS	Identifier
*ZZ	Checksum as defined by NMEA

Reply of the instrument:
The answer of the instrument consists of several sentences: the first sentence describes the route name, while the others defines the waypoints of the route.

First sentence

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
$	**P**	**B**	**R**	**R**	**T**	**S**	**,**	**A**	**A**	**,**	**B**	**B**	**,**	**C**	**C**	**,**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	*****	**Z**	**Z**	**CR**	**LF**	

$PBRRTS	Identifier
AA	internal route number (for information only)
BB	total number of sentences of route
CC	actual sentence of the route: 00 indicates route name
NNNN	route name (17 char, if shorter, filled with spaces)
*ZZ	Checksum as defined by NMEA

following sentences

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
$	**P**	**B**	**R**	**R**	**T**	**S**	**,**	**A**	**A**	**,**	**B**	**B**	**,**	**C**	**C**	**,**	**X**	**X**	**X**	**X**	**X**	**X**	**,**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	*****	**Z**	**Z**	**CR**	**LF**	

$PBRRTS	Identifier
AA	internal route number (for information only)
BB	total number of sentences of route
CC	actual sentence of the route 01 – (BB-1) indicates members (waypoints)
XXXXXX	compatible name coded altitude
NNNN	waypoint name (17 char, if shorter, filled with spaces)
*ZZ	Checksum as defined by NMEA

Examples of routes:

```
$PBRRTS,01,05,00,Route 123                *58
$PBRRTS,01,05,01,PUP085,PUPPULO           *2A
$PBRRTS,01,05,02,DEL017,DELLA-MENA        *23
$PBRRTS,01,05,03,BAS018,Bassano           *39
$PBRRTS,01,05,04,DEL017,DELLA-MENA        *25
```

Sending waypoints to the instrument

The instrument has to be set into MENU-mode.

Inside the instrument, all waypoints are referenced by its name, which is always 17char long. If a waypoint is received, its name is compared with the internal waypoints. If a name matches, the original waypoint is overwritten.
If no match is found, the new waypoint is added to the internal list.
If a waypoint is stored, a short acceptance beep is output. The acoustic therefore should not be switched off!
The XON / XOFF protocol allows a transfer of up to 200 waypoints in sequence.
Waypoints may be transmitted in compatible or in native notation.

1. Compatible notation:

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2
$	**P**	**B**	**R**	**W**	**P**	**R**	**,**	**4**	**7**	**5**	**0**	**.**	**7**	**6**	**0**	**,**	**N**	**,**	**0**	**1**	**1**	**0**	**8**	**.**	**5**	**0**	**0**	**,**	**E**	**,**	**B**	**R**	**A**	**0**	**5**	**5**	*****	**Z**	**Z**	**CR**	**LF**

$PBRWPR	Identifier
4750.760,N	Latitude (47°50.760min N)
01108.500,E	Longitude (011°08.500min E)
BRA055	Name, Altitude in compatible format 550m (6 char)
*ZZ	Checksum as defined by NMEA

2. Native notation with long name:

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
$	**P**	**B**	**R**	**W**	**P**	**R**	**,**	**4**	**7**	**5**	**0**	**.**	**7**	**6**	**0**	**,**	**N**	**,**	**0**	**1**	**1**	**0**	**8**	**.**	**5**	**0**	**0**	**,**	**E**	**,**	**,**	**B**	**R**	**A**	**E**	**U**	**N**	**I**	**G**	**E**	**R**								**,**	**0**	**5**	**5**	**0**	*****	**Z**	**Z**	**CR**	**LF**

$PBRWPR	Identifier
4750.760,N	Latitude (47°50.760min N)
01108.500,E	Longitude (011°08.500min E)
BRAEUNIGER	Waypoint name (17 char, if shorter, filled with spaces)
0550	Waypoint altitude in meter (4 char)
*ZZ	Checksum as defined by NMEA

Examples for waypoints in native notation:

```
$PBRWPR,4743.564,N,01121.571,E,,Urthaler Hof ,0620*ZZ
$PBRWPR,4754.426,N,01110.212,E,,Paehl ,0580*ZZ
$PBRWPR,4736.338,N,01104.378,E,,Oberammergau ,0830*ZZ
```

```
$PBRWPR,4743.564,N,01121.571,E,URT062*ZZ
```

```
$PBRWPR,4754.426,N,01110.212,E,PHL058*ZZ
$PBRWPR,4736.338,N,01104.378,E,OGA083*ZZ
```

3. Extended notation with long name and Type:

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3
$	**P**	**B**	**R**	**W**	**P**	**R**	**E**	**,**	**4**	**7**	**5**	**0**	**.**	**7**	**6**	**0**	**,**	**N**	**,**	**0**	**1**	**1**	**0**	**8**	**.**	**5**	**0**	**0**	**,**	**E**	**,**	**,**	**B**	**R**	**A**	**E**	**U**	**N**	**I**	**G**	**E**	**R**								**,**	**0**	**5**	**5**	**0**	**,**	**T**	**T**	**T**	*****	**Z**	**Z**	**CR**
4																																																												
LF																																																												

$PBRWPRE	Identifier
4750.760,N	Latitude (47°50.760min N)
01108.500,E	Longitude (011°08.500min E)
BRAEUNIGER	Waypoint name (17 char, if shorter, filled with spaces)
0550	Waypoint altitude in meter (4 char)
TTT	Waypoint Type (000-255) 8 types are possible
*ZZ	Checksum as defined by NMEA

Deleting Waypoints

Waypoints, which are not used in any stored route, can be deleted!

Deleting one single Waypoint:

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
$	**P**	**B**	**R**	**W**	**P**	**X**	**,**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	*****	**Z**	**Z**	**CR**	**LF**

$PBRWPX	Identifier
NNNN	Waypoint name (17 char),
*ZZ	Checksum as defined by NMEA

Deleting all Waypoints:

1	2	3	4	5	6	7	8	9	0	1	2	3	4
$	**P**	**B**	**R**	**W**	**P**	**X**	**,**	**,**	*****	**Z**	**Z**	**CR**	**LF**

$PBRWPX Identifier
*ZZ Checksum as defined by NMEA

Reply of the instrument:

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
$	**P**	**B**	**R**	**S**	**N**	**P**	**,**	**5**	**0**	**3**	**0**	**,**	**J**	**I**	**M**	**I**		**H**	**E**	**N**	**D**	**R**	**I**	**X**					**,**	**0**	**1**	**0**	**0**	**1**	**,**	**2**	**.**	**0**	**0**	*****	**Z**	**Z**	**CR**	**LF**

$PBRSNP Identifier
5030 / Compeo Instrument Identifier (fix)
JIMI HENDRIX Pilotname (17 char, if shorter, filled with spaces)
01001 Serialnumber (5 char)
2.00 SW-Version (4 char)
*ZZ Checksum as defined by NMEA

Sending routes to the instrument

The instrument has to be set into MENU-mode.
Before sending any route, be sure that the waypoints are known by the instrument. So transmit the waypoints before they are referenced by any route.
Inside the instrument, all waypoints are referenced by its name, which is always 17char long. If a valid route is received, its name is compared with the internal route names. If a name matches, the original route is overwritten.
If no match is found, the new route is added to the internal list.
If a route is stored, a short acceptance beep is output. The acoustic therefore should not be switched off!
The XON / XOFF protocol allows a transfer of up to 20 routes with up to 30 waypoints in sequence.

Important: Route No 00 is defined as COMPETITION-ROUTE and is specially treated inside the instrument. Please inform yourself inside the owners manual for further information.

First sentence

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
$	**P**	**B**	**R**	**R**	**T**	**R**	**,**	**A**	**A**	**,**	**B**	**B**	**,**	**C**	**C**	**,**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	*****	**Z**	**Z**	**CR**	**LF**

$PBRRTR	Identifier
AA	internal route number (for information only)
BB	total number of sentences of route
CC	actual sentence of the route: 00 indicates route name,
NNNN	route name (17 char, if shorter, filled with spaces),
*ZZ	Checksum as defined by NMEA

If AA is equal 00, NNNN is ignored, because it is fixed to COMPETITION-ROUTE.
If NNNN is omitted, the instrument uses AA to use the name as --------AA-------.

following sentences

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
$	**P**	**B**	**R**	**R**	**T**	**R**	**,**	**A**	**A**	**,**	**B**	**B**	**,**	**C**	**C**	**,**	**,**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	*****	**Z**	**Z**	**CR**	**LF**

$PBRRTR	Identifier
AA	internal route number (for information only)
BB	total number of sentences of route
CC	actual sentence of the route: 01 – (BB-1) indicates members (waypoints)
NNNN	waypoint name (17 char, if shorter, filled with spaces)
*ZZ	Checksum as defined by NMEA

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Examples of routes, which are accepted by the instrument

```
$PBRRTR,01,05,00,Route 123         *ZZ
$PBRRTR,01,05,01,,PUPPULO           *ZZ
$PBRRTR,01,05,02,,DELLA-MENA        *ZZ
$PBRRTR,01,05,03,,Bassano           *ZZ
$PBRRTR,01,05,04,,DELLA-MENA        *ZZ

$PBRRTR,00,05,00,Route 123         *ZZ          Name is converted internal to FAI-ROUTE
$PBRRTR,00,05,01,,PUPPULO           *ZZ
$PBRRTR,00,05,02,,DELLA-MENA        *ZZ
$PBRRTR,00,05,03,,Bassano           *ZZ
$PBRRTR,00,05,04,,DELLA-MENA        *ZZ

$PBRRTR,02,06,00,*ZZ                          Name is set to  -------02-----
$PBRRTR,02,06,01,,PUPPULO           *ZZ
$PBRRTR,02,06,02,,DELLA-MENA        *ZZ
$PBRRTR,02,06,03,,Bassano           *ZZ
$PBRRTR,02,06,04,,DELLA-MENA        *ZZ
$PBRRTR,02,06,05,,PUPPULO           *ZZ
```

Options for the Competition Route

Route No 00 is the Competition Route, which will have several options:

Setting the Radius of the waypoints of a Competition Route:

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2
$	**P**	**B**	**R**	**R**	**T**	**R**	**R**	**,**	**A**	**A**	**,**	**B**	**B**	**B**	**B**	**B**	*****	**Z**	**Z**	**CR**	**LF**

$PBRRTRR	Identifier
AA	index of waypoint of the competition route, where 00 is the first waypoint
BBBBB	radius in 10m resolution, 5 char (00002-20000)*10m
*ZZ	Checksum as defined by NMEA

Requesting the Radius of the waypoints of a Competition Route:

1	2	3	4	5	6	7	8	9	0	1	2	3	4
$	**P**	**B**	**R**	**R**	**T**	**L**	**R**	**,**	*****	**Z**	**Z**	**CR**	**LF**

$PBRRTLR Identifier
*ZZ Checksum as defined by NMEA

Reply of the instrument:

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	2	3	4	5	6
$	**P**	**B**	**R**	**R**	**T**	**L**	**R**	**,**	**A**	**A**	**,**	**B**	**B**	**,**	**C**	**C**	**C**	**C**	**C**	*****	**Z**	**Z**	**CR**	**LF**

$PBRRTLR Identifier
AA index of the wayoint, beginning with 0
BB total waypoints of the competition route
CCCCC radius in 10m resolution (00002-20000)*10m
*ZZ Checksum as defined by NMEA

Up to 30 sentences are transmitted in sequence.

Setting the waypoint mode of a Competition Route:

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8
$	**P**	**B**	**R**	**R**	**T**	**M**	**S**	**,**	**A**	**A**	**,**	**B**	*****	**Z**	**Z**	**CR**	**LF**

$PBRRTMS Identifier
AA index of waypoint of the competition route, where 00 is the first waypoint
B waypoint mode: E enter, X exit, L line for last waypoint of the route
the waypoint mode for an already defined start waypoint is ignored.
*ZZ Checksum as defined by NMEA

Requesting the waypoint mode of the waypoints of a Competition Route:

1	2	3	4	5	6	7	8	9	0	1	2	3	4
$	**P**	**B**	**R**	**R**	**T**	**M**	**R**	**,**	*****	**Z**	**Z**	**CR**	**LF**

$PBRRTMR Identifier
*ZZ Checksum as defined by NMEA

Reply of the instrument:

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	2	3	4	5	6
$	**P**	**B**	**R**	**R**	**T**	**M**	**R**	**,**	**A**	**A**	**,**	**B**	**B**	**,**	**C**	**C**	**C**	**C**	**C**	*****	**Z**	**Z**	**CR**	**LF**

$PBRRTMR Identifier
AA index of the wayoint, beginning with 0
BB total waypoints of the competition route

C	waypoint mode: S start, E enter, X exit, L line for last waypoint of the route
*ZZ	Checksum as defined by NMEA

Up to 30 sentences are transmitted in sequence.

Setting an optional Start-Waypoint

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
$	**P**	**B**	**R**	**R**	**T**	**S**	**S**	**,**	**A**	**A**	**,**	**B**	**B**	**B**	**B**	**,**	**D**	**D**	**,**	**E**	**E**	**,**	**T**	*****	**Z**	**Z**	**CR**	**LF**

$PBRRTSS	Identifier
AA	waypoint index inside the route
BBBB	local starttime (0000-2359)
DD	number of startgates (01-10)
EE	time gap between startgates (05-60)min
T	Startmode: E (ENTER) or X (EXIT) or N (no startgate, default)
*ZZ	Checksum as defined by NMEA

Note: only one Start-Waypoint is allowed.

Requesting the optional Start-Waypoint of a Competition Route:

1	2	3	4	5	6	7	8	9	0	1	2	3	4
$	**P**	**B**	**R**	**R**	**T**	**S**	**L**	**,**	*****	**Z**	**Z**	**CR**	**LF**

$PBRRTSL	Identifier
*ZZ	Checksum as defined by NMEA

Answer from the instrument

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
$	**P**	**B**	**R**	**R**	**T**	**S**	**L**	**,**	**A**	**A**	**,**	**B**	**B**	**B**	**B**	**,**	**D**	**D**	**,**	**E**	**E**	**,**	**T**	*****	**Z**	**Z**	**CR**	**LF**

$PBRRTSL	Identifier
AA	waypoint index inside the route (-1 indicates no startgate)
BBBB	local starttime (0000-2359)
DD	number of startgates (01-10)
EE	time gap between startgates (05-60)min
T	Startmode: E (ENTER) or X (EXIT) or N (no startgate, default)
*ZZ	Checksum as defined by NMEA

Deleting Routes

All routes, except the COMPETITION-route, can be deleted

Deleting one single Route:

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0
$	**P**	**B**	**R**	**R**	**T**	**X**	**,**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	*****	**Z**	**Z**	**CR**	**LF**

$PBRRTX Identifier
NNNN Route name (17 char),
*ZZ Checksum as defined by NMEA

Deleting all Routes:

1	2	3	4	5	6	7	8	9	0	1	2	3	4
$	**P**	**B**	**R**	**R**	**T**	**X**	**,**	**,**	*****	**Z**	**Z**	**CR**	**LF**

$PBRRTX Identifier
*ZZ Checksum as defined by NMEA

Reply of the instrument:

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
$	**P**	**B**	**R**	**S**	**N**	**P**	**,**	**5**	**0**	**3**	**0**	**,**	**J**	**I**	**M**	**I**		**H**	**E**	**N**	**D**	**R**	**I**	**X**						**,**	**0**	**1**	**0**	**0**	**1**	**,**	**2**	**.**	**0**	**0**	*****	**Z**	**Z**	**CR**	**LF**

$PBRSNP Identifier
5030 / Compeo Instrument Identifier (fix)
JIMI HENDRIX Pilotname (17 char, if shorter, filled with spaces)
01001 Serialnumber (5 char)
2.00 SW-Version (4 char)
*ZZ Checksum as defined by NMEA

Requesting track data of a selected flight

The instrument has to be set into MENU-mode. Additional, a stored flight has to be selected (FLIGHT-ANALYSIS Page)

1	2	3	4	5	6	7	8	9	0	1	2	3
$	**P**	**B**	**R**	**I**	**G**	**C**	**,**	*****	**Z**	**Z**	**CR**	**LF**

$PBRIGC Identifier
*ZZ Checksum as defined by NMEA

Note: This command is not recommended for actual interfacing systems. Please use the commands for requesting the track list and request a specific track

Requesting the track list

The instrument has to be set into MENU-mode.

1	2	3	4	5	6	7	8	9	0	1	2
$	**P**	**B**	**R**	**T**	**L**	**,**	*****	**Z**	**Z**	**CR**	**LF**

$PBRTL Identifier (request track list)
*ZZ Checksum as defined by NMEA

Reply of the instrument:
The answer of the instrument consists of several sentences: every sentence indicates one flight

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4
$	**P**	**B**	**R**	**T**	**L**	**,**	**A**	**A**	**,**	**B**	**B**	**,**	**D**	**D**	**.**	**M**	**M**	**.**	**Y**	**Y**	**,**	**h**	**h**	**:**	**m**	**m**	**:**	**s**	**s**	**,**	**H**	**H**	**:**	**M**	**M**	**:**	**S**	**S**	*****	**Z**	**Z**	**CR**	**LF**

$PBRTL Identifier
AA total number of stored tracks
BB actual number of track (0 indicates the most actual track)
DD.MM.YY date of recorded track (UTC)(e.g. 24.03.04)
hh:mm:ss starttime (UTC)(e.g. 08:23:15)
HH:MM:SS duration (e.g. 03:23:15)
*ZZ Checksum as defined by NMEA

Requesting the extended track list

The instrument has to be set into MENU-mode.

1	2	3	4	5	6	7	8	9	0	1	2	3
$	**P**	**B**	**R**	**T**	**L**	**E**	**,**	*****	**Z**	**Z**	**CR**	**LF**

$PBRTLE Identifier (request track list extended)
*ZZ Checksum as defined by NMEA

Reply of the instrument:
The answer of the instrument consists of several sentences: every sentence indicates one flight

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
$	**P**	**B**	**R**	**T**	**L**	**E**	**,**	**A**	**A**	**,**	**B**	**B**	**,**	**D**	**D**	**.**	**M**	**M**	**.**	**Y**	**Y**	**,**	**h**	**h**	**:**	**m**	**m**	**:**
0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8

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s	s	,	H	H	:	M	M	:	S	S	,	I	I	I	I	I	,	J	J	J	J	J	,	K	K	K	K	K
9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1						
,	L	L	,	M	M	M	M	,	N	N	N	N	N	,	O	O	O	*	Z	Z	CR	LF						

$PBRTLE	Identifier
AA	total number of stored tracks
BB	actual number of track (0 indicates the most actual track)
DD.MM.YY	date of recorded track (UTC)(e.g. 24.03.04)
hh:mm:ss	starttime (UTC)(e.g. 08:23:15)
HH:MM:SS	duration (e.g. 03:23:15)
IIIII	Max A1 in m
JJJJJ	Max A2 in m
KKKKK	Max A3 in m
LL	Scan Interval in s
MMMM	Max Vario in m/s
NNNNN	Min Vario in m/s
OOO	Max Speed in km/h
*ZZ	Checksum as defined by NMEA

Requesting the specific track number

The instrument has to be set into MENU-mode.
Please request the track list before, in order to get the valid range

1	2	3	4	5	6	7	8		9	0	1	2	3
$	P	B	R	T	R	,	A	A	*	Z	Z	CR	LF

$PBRTR	Identifier (track request)
AA	specific track number (0 indicates the most actual track)
*ZZ	Checksum as defined by NMEA

Reply of the instrument:
The answer of the instrument consists of data defined in IGC-format. Every line is ended with CrLf sequence.
Be sure to store every received character into a file with the ending .IGC . If data are altered or added, the G-record will indicate manipulation. Exceptions: HP- and HO-records. L-records with as LBRA – origin.

Transmission is framed with a start and stop beep. The acoustic therefore should not be switched off!
Use timeout of e.g. 0.5s for ending reception.

Example:

AFLY00245NO:01
HFDTE230202
HFFXA100
HFPLTPILOT:Herbert L.
HFGTYGLIDERTYPE:ATOS-C
HFGIDGLIDERID:D-NABC
HFDTM100GPSDATUM:WGS84
HFGPSGPS:FURUNO_GN-79L
HFRFWFIRMWAREVERSION:0.01
HFRHWHARDWAREVERSION:1.00
HFFTYFRTYPE:FLYTEC,5030 / Compeo
I013638TAS
B1303104549457N01146295EA0085400879048
B1303154549439N01146336EA0086100877040
B1303204549417N01146372EA0085700877036
B1303254549400N01146418EA0086200876054
B1303304549407N01146468EA0086700877046
B1303354549446N01146468EA0087100879042
B1303404549447N01146412EA0087600881050
B1303454549412N01146415EA0088200882046
B1303504549416N01146463EA0088600883044
B1303554549453N01146472EA0089400886038
B1304004549475N01146423EA0089800890044
B1304054549471N01146367EA0090100895042
B1304104549446N01146336EA0090100902040
B1304154549414N01146355EA0090100911044
B1304204549407N01146412EA0090200918048
B1304254549443N01146427EA0090400922044
B1304304549441N01146380EA0091000923042
B1304354549407N01146381EA0090700923050
B1304404549410N01146430EA0090500924046
B1304454549444N01146408EA0090900924044

B1304504549433N01146361EA0090400924044
B1304554549398N01146349EA0091000923044
….
….
GBB66E7B044E4CD98554FDAA04DA0802D
G263D1F65D25FDDE22B10CC5EE0BA7EA8
G83A27570777B3093006BE2F901A80858
G201D8AC134412BA90078000000009429
The format definition and other useful information can be found in www.fai.org/gliding/gnss

Requesting the CTR-list

The instrument has to be set into MENU-mode.

1	2	3	4	5	6	7	8	9	0	1	2	3
$	**P**	**B**	**R**	**C**	**T**	**R**	**,**	*****	**Z**	**Z**	**CR**	**LF**

$PBRCTR Identifier
*ZZ Checksum as defined by NMEA

Reply of the instrument:
The answer of the instrument consists of several sentences: the first sentence describes the CTR name, while the second defines a remark, while the rest defines the waypoints (points), or circle segments.

First sentence

$	**P**	**B**	**R**	**C**	**T**	**R**	**,**	**A**	**A**	**A**	**,**	**0**	**0**	**0**	**,**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**,**	**D**	**D**	**D**	**D**	*****	**Z**	**Z**	**CR**	**LF**

$PBRCTR Identifier
AAA total number of sentences of CTR
NNNN CTR name (17 char, if shorter, filled with spaces)
DDDD warning distance in meter
*ZZ Checksum as defined by NMEA

Second sentence

$	**P**	**B**	**R**	**C**	**T**	**R**	**,**	**A**	**A**	**A**	**,**	**0**	**0**	**1**	**,**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	*****	**Z**	**Z**	**CR**	**LF**

$PBRCTR Identifier
AAA total number of sentences of CTR
NNNN remark (17 char, if shorter, filled with spaces)
*ZZ Checksum as defined by NMEA

following sentences:

Type Point:

$	**P**	**B**	**R**	**C**	**T**	**R**	**,**	**A**	**A**	**A**	**,**	**B**	**B**	**B**	**,**	**P**	**,**	**4**	**7**	**5**	**0**	**.**	**7**	**6**	**0**	**,**	**N**	**,**	**0**	**1**	**1**	**0**	**8**	**.**	**5**	**0**	**0**	**,**	**E**	*****	**Z**	**Z**	**CR**	**LF**

$PBRCTR	Identifier
AAA	total number of sentences of CTR
BBB	actual sentence of the CTR: 002 – (AAA-1) indicates members
P	indicates point (DAFIF)
4750.760,N	Latitude (47°50.760min N) of point
01108.500,E	Longitude (011°08.500min E) of point
*ZZ	Checksum as defined by NMEA

Type Circle :

$	**P**	**B**	**R**	**C**	**T**	**R**	**,**	**A**	**A**	**A**	**,**	**B**	**B**	**B**	**,**	**C**	**,**	**4**	**7**	**5**	**0**	**.**	**7**	**6**	**0**	**,**	**N**	**,**	**0**	**1**	**1**	**0**	**8**	**.**	**5**	**0**	**0**	**,**	**E**	**,**	**D**	**D**	**D**	**D**	**D**	*****	**Z**	**Z**	**CR**	**LF**

$PBRCTR	Identifier
AAA	total number of sentences of CTR
BBB	actual sentence of the CTR: 002 – (AAA-1) indicates members
C	indicates circle
4750.760,N	Latitude (47°50.760min N) of center
01108.500,E	Longitude (011°08.500min E) of center
DDDDD	Radius in meter
*ZZ	Checksum as defined by NMEA

Type Center :

$	**P**	**B**	**R**	**C**	**T**	**R**	**,**	**A**	**A**	**A**	**,**	**B**	**B**	**B**	**,**	**X**	**,**	**4**	**7**	**5**	**0**	**.**	**7**	**6**	**0**	**,**	**N**	**,**	**0**	**1**	**1**	**0**	**8**	**.**	**5**	**0**	**0**	**,**	**E**	*****	**Z**	**Z**	**CR**	**LF**

$PBRCTR	Identifier
AAA	total number of sentences of CTR
BBB	actual sentence of the CTR: 002 – (AAA-1) indicates members
X	indicates center
4750.760,N	Latitude (47°50.760min N) of center
01108.500,E	Longitude (011°08.500min E) of center
*ZZ	Checksum as defined by NMEA

Note: Start- and Stop Segmentcoordinates will follow

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Type Start-Segmentboarders:

$	P	B	R	C	T	R	,	A	A	A	,	B	B	B	,	T	,	4	7	5	0	.	7	6	0	,	N	,	0	1	1	0	8	.	5	0	0	,	E	,	X	*	Z	Z	CR	LF

$PBRCTR	Identifier
AAA	total number of sentences of CTR
BBB	actual sentence of the CTR: 002 – (AAA-1) indicates members
T	indicates Start Segmentboarder
4750.760,N	Latitude (47°50.760min N) of segmentbo arder
01108.500,E	Longitude (011°08.500min E) of segment boarder
X	'+':indicates clockwise counting of segment, '-': indicates counterclockwise counting of segment
*ZZ	Checksum as defined by NMEA

Type Stop-Segmentboarders:

$	P	B	R	C	T	R	,	A	A	A	,	B	B	B	,	Z	,	4	7	5	0	.	7	6	0	,	N	,	0	1	1	0	8	.	5	0	0	,	E	,	X	*	Z	Z	CR	LF

$PBRCTR	Identifier
AAA	total number of sentences of CTR
BBB	actual sentence of the CTR: 002 – (AAA-1) indicates members
Z	indicates Stop Segmentboarder
4750.760,N	Latitude (47°50.760min N) of segmentbo arder
01108.500,E	Longitude (011°08.500min E) of segment boarder
X	'+':indicates clockwise counting of segment, '-': indicates counterclockwise counting of segment
*ZZ	Checksum as defined by NMEA

The Ctr list is completed with an ACK of the instrument:

Example:

```
$PBRCTR,008,000,Kreisbogen      ,3440*09
$PBRCTR,008,001,Remark Kreisbogen*05
$PBRCTR,008,002,P,4710.001,N,01104.700,E*48
$PBRCTR,008,003,P,4711.002,N,01055.600,E*4F
$PBRCTR,008,004,X,4712.003,N,01100.500,E*40
$PBRCTR,008,005,T,4703.004,N,01110.400,E,+*4D
$PBRCTR,008,006,Z,4714.005,N,01148.300,E,+*4D
$PBRCTR,008,007,P,4710.002,N,01104.704,E*4A
```

```
$PBRCTR,003,000,Kreis          ,3440*43
$PBRCTR,003,001,Remark Kreis     *4F
$PBRCTR,003,002,C,4710.001,N,01104.700,E,12345*4D
$PBRCTR,009,000,Engadin        ,1234*46
$PBRCTR,009,001,abcdefghijklmnopq*40
$PBRCTR,009,002,P,4710.001,N,01104.700,E*49
$PBRCTR,009,003,P,4711.002,N,01055.600,E*4E
$PBRCTR,009,004,P,4712.003,N,01100.500,E*49
$PBRCTR,009,005,P,4703.004,N,01110.400,E*4F
$PBRCTR,009,006,P,4714.005,N,01148.300,E*41
$PBRCTR,009,007,P,4725.006,N,01144.200,E*4C
$PBRCTR,009,008,P,4716.007,N,01113.103,E*40
$PBRANS,1*01
```

Sending CTRs to the instrument:

The instrument has to be set into MENU-mode.
Inside the instrument, all CTRs are referenced by its name, which is always 17char long. If a valid CTR is received, its name is compared with the internal CTR names. If a name matches, the original CTR is overwritten.
If no match is found, the new CTR is added to the internal list.
If a CTR is stored, a short acceptance beep is output. The acoustic therefore should not be switched off!
Up to 500 CTRs with up to 100 waypoints in sequence are accepted. (depends on available memory)
Be sure that the points and segments describe a surrounding polygon!

First sentence

$	**P**	**B**	**R**	**C**	**T**	**R**	**W**	**,**	**A**	**A**	**A**	**,**	**0**	**0**	**0**	**,**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**,**	**D**	**D**	**D**	**D**	*****	**Z**	**Z**	**CR**	**LF**

$PBRCTRW	Identifier
AAA	total number of sentences of CTR
NNNN	CTR name (17 char, if shorter, filled with spaces)
DDDD	warning distance in meter
*ZZ	Checksum as defined by NMEA

Second sentence

$	**P**	**B**	**R**	**C**	**T**	**R**	**W**	**,**	**A**	**A**	**A**	**,**	**0**	**0**	**1**	**,**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	*****	**Z**	**Z**	**CR**	**LF**

$PBRCTRW	Identifier
AAA	total number of sentences of CTR
NNNN	remark (17 char, if shorter, filled with spaces)
*ZZ	Checksum as defined by NMEA

following sentences:

Type Point:

$	**P**	**B**	**R**	**C**	**T**	**R**	**W**	**,**	**A**	**A**	**A**	**,**	**B**	**B**	**B**	**,**	**P**	**,**	**4**	**7**	**5**	**0**	**.**	**7**	**6**	**0**	**,**	**N**	**,**	**0**	**1**	**1**	**0**	**8**	**.**	**5**	**0**	**0**	**,**	**E**	*****	**Z**	**Z**	**CR**	**LF**

$PBRCTRW	Identifier
AAA	total number of sentences of CTR
BBB	actual sentence of the CTR: 002 – (AAA-1) indicates members
P	indicates point (DAFIF)
4750.760,N	Latitude (47°50.760min N) of point
01108.500,E	Longitude (011°08.500min E) of point
*ZZ	Checksum as defined by NMEA

example: (checksum not valid!)

$PBRCTRW,009,000, Muenchen ,8888*74
$PBRCTRW,009,001,Franz-J. Strauss *74
$PBRCTRW,009,002,P,4710.503,N,01104.700,E*1B
$PBRCTRW,009,003,P,4711.002,N,01055.600,E*1C
$PBRCTRW,009,004,P,4712.003,N,01100.500,E*1A
$PBRCTRW,009,005,P,4703.004,N,01110.400,E*15
$PBRCTRW,009,006,P,4714.005,N,01148.300,E*1F
$PBRCTRW,009,007,P,4725.006,N,01144.200,E*1F
$PBRCTRW,009,008,P,4716.707,N,01113.101,E*15

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Type Circle :

$	**P**	**B**	**R**	**C**	**T**	**R**	**W**	**,**	**A**	**A**	**A**	**,**	**B**	**B**	**B**	**,**	**C**	**,**	**4**	**7**	**5**	**0**	**.**	**7**	**6**	**0**	**,**	**N**	**,**	**0**	**1**	**1**	**0**	**8**	**.**	**5**	**0**	**0**	**,**	**E**	**,**	**D**	**D**	**D**	**D**	**D**	*****	**Z**	**Z**	**CR**	**LF**

$PBRCTR	Identifier
AAA	total number of sentences of CTR
BBB	actual sentence of the CTR: 002 – (AAA-1) indicates members
C	indicates circle
4750.760,N	Latitude (47°50.760min N) of center
01108.500,E	Longitude (011°08.500min E) of center
DDDDD	Radius in meter
*ZZ	Checksum as defined by NMEA

example: (checksum not valid!)
$PBRCTRW,003,000,Kreis ,3440*74
$PBRCTRW,003,001,Remark Kreis *74
$PBRCTRW,003,002,C,4710.001,N,01104.700,E,12345*1B

Type Center:

$	**P**	**B**	**R**	**C**	**T**	**R**	**W**	**,**	**A**	**A**	**A**	**,**	**B**	**B**	**B**	**,**	**X**	**,**	**4**	**7**	**5**	**0**	**.**	**7**	**6**	**0**	**,**	**N**	**,**	**0**	**1**	**1**	**0**	**8**	**.**	**5**	**0**	**0**	**,**	**E**	*****	**Z**	**Z**	**CR**	**LF**

$PBRCTRW	Identifier
AAA	total number of sentences of CTR
BBB	actual sentence of the CTR: 002 – (AAA-1) indicates members
X	indicates center
4750.760,N	Latitude (47°50.760min N) of center
01108.500,E	Longitude (011°08.500min E) of center
*ZZ	Checksum as defined by NMEA

Note: Start- and Stop- Segmentcoordinates have to follow

Type Start-Segmentboarders:

| | | |

Reply of the instrument:

1	2	3	4	5	6	7	8	9	0	1	2	3	4
$	**P**	**B**	**R**	**A**	**N**	**S**	**,**	**C**	*****	**Z**	**Z**	**CR**	**LF**

$PBRANS	Identifier	
C	Status:	
	Acknoledge	1
	Plausibility Error	2
	No further memory	3
	No more writing allowed	4
	NMEA syntax error	5
*ZZ	Checksum as defined by NMEA	

Deleting CTRs

Deleting one single CTR:

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
$	**P**	**B**	**R**	**C**	**T**	**R**	**D**	**,**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	*****	**Z**	**Z**	**CR**	**LF**

$PBRCTRD	Identifier	
NNNN	CTR name (17 char),	
*ZZ	Checksum as defined by NMEA	

Reply of the instrument:

1	2	3	4	5	6	7	8	9	0	1	2	3	4
$	**P**	**B**	**R**	**A**	**N**	**S**	**,**	**C**	*****	**Z**	**Z**	**CR**	**LF**

$PBRANS	Identifier	
C	Status:	
	Acknoledge	1
	Plausibility Error	2
	No further memory	3
	No more writing allowed	4
	NMEA syntax error	5
*ZZ	Checksum as defined by NMEA	

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Deleting all CTRs:

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
$	**P**	**B**	**R**	**C**	**T**	**R**	**D**	**,**	**,**	*****	**Z**	**Z**	**CR**	**LF**

$PBRCTRD Identifier
*ZZ Checksum as defined by NMEA

Reply of the instrument:

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
$	**P**	**B**	**R**	**S**	**N**	**P**	**,**	**5**	**0**	**3**	**0**	**,**	**J**	**I**	**M**	**I**		**H**	**E**	**N**	**D**	**R**	**I**	**X**					**,**	**0**	**1**	**0**	**0**	**1**	**,**	**2**	**.**	**0**	**0**	*****	**Z**	**Z**	**CR**	**LF**

$PBRSNP Identifier
5030 / Compeo Instrument Identifier (fix)
JIMI HENDRIX Pilotname (17 char, if shorter, filled with spaces)
01001 Serialnumber (5 char)
2.00 SW-Version (4 char)
*ZZ Checksum as defined by NMEA

Requesting CTR Information

1	2	3	4	5	6	7	8	9	0	1	2	3
$	**P**	**B**	**R**	**C**	**T**	**R**	**I**	*****	**Z**	**Z**	**CR**	**LF**

$PBRCTRI Identifier
*ZZ Checksum as defined by NMEA

Reply of the instrument:

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
$	**P**	**B**	**R**	**C**	**T**	**R**	**I**	**,**	**N**	**N**	**N**	**,**	**M**	**M**	**M**	**,**	**O**	**O**	**O**	*****	**Z**	**Z**	**CR**	**LF**

$PBRCTRI Identifier
NNN No of actual stored CTRs
MMM No of max. allowed CTRs
OOO No of free elements (Cirle, center, …) The header of every CTR (Name, Remark, etc) consumes appr. 3 elements!
*ZZ Checksum as defined by NMEA

Output of cyclic NMEA-Data

You need a release code to get this function working.
The instrument allows the cyclic output of different NMEA sentences for interfacing other devices like cardplotters, autopilots, etc. via Bluetooth, using the Serial Port Profile (SPP). The following sentences are selectable in the instrument settings using the Bluetooth menu
$GPRMC
$GPGGA
$FLYSEN

Restrictions: The cyclic output is interrupted, if in Menu-mode. If a flight track is redrawn in the realtime track, no data are output during a complete redraw. No output is produced, if the GPS-module is switched off.

$GPRMC
Example:
$GPRMC,175956,A,4754.8316,N,01110.6332,E,031.8,278,030203,,*38

Definition	Example	Unit/Definition
Identification	$GPRMC,	
UTC	175956,	17:59:16
Valid / not valid	A,	A: Valid, V unvalid GPS data
Latitude	4754.8316,N,	47°54,8316 N
Longitude	01110.6332,E,	011°10,6332 E
Speed over ground	031.8,	31.8 kn (kn for compatibility)
Track	278,	278°
Date	030203,,	03.02.2003
Checksum	*38	As defined by NMEA

$GPGGA
Example:
$GPGGA,161618, 4754.8316,N, 01110.6332,E,1,04,3.5,137.5,M,0.0,M,,0000*38

Definition	Example	Unit/Definition
Identification	$GPGGA,	
UTC	161618,	16:16:18
Latitude	4754.8316,N,	47°54,8316 N
Longitude	01110.6332,E,	011°10,6332 E

Position Valid	1,	1 Valid, 0 no Fix
Sats used	04,	
DOP	3.5,	Fixed value
GPS Altitude	137.5	In meter above sea level
Fixed data	,0.0,M,,0000	
Checksum	*38	As defined by NMEA

$FLYSEN

Example

$FLYSEN,200311,161618,4754.831,N,01110.633,E,278,02334,00137,A,04,003456,00567,-0345,00123,P,020,,056,099,00845,01045,800*65

Definition	**Example**	**Unit/Definition**
Identification	$FLYSEN,	
Date	200311,	Meter
UTC	161618,	16:16:18
Latitude	4754.831,N,	47°54,831 N
Longitude	01110.633,E,	011°10,633 E
Track	278,	278°
SOG	02334,	2334 cm/s
GPS Altitude	00137,	In meter above sea level
Valid / not valid	A,	A: Valid, V unvalid GPS data
Sats used	04,	
Raw Pressure	003456,	3456Pa
Pressure Altitude	00567,	-9999 to 99999m based on 1013,25hPa
Vario	-0345,	-9999 to 9999cm/s
Airspeed	00123,	00000 to 99999cm/s
Airspeed Source	P,	P=Pitot V=Vane
Temperature PCB	020,,	-99 to 999 °C
Batterylevel Bank1	056,	000 – 100%
Batterylevel Bank2	099,	000 – 100%
Speed to Fly 1 (McCready 0)	00845,	845 cm/s
Speed to Fly 2 (McCready)	01045,	1045 cm/s
Keypress Code	800	Hexadecimal value: Bit 0: OK Menu Bit 1: Info H/Twind

		Bit 2: Down Bit 3: Left Bit 4: Volume Goto Bit 5: Sink Route Bit 6: McC Wp Bit 7: F1 Alt/Mrk Bit 8: Page/ESC On/Off Bit 9: Right Bit10: F2 Alt2 Bit11: Up
Checksum	*65	As defined by NMEA

Using VALI-BRA.EXE

The Console application allows official observers to test the integrity and possible manipulation of IGC- files, transferred from the instrument.
VALI-BRA uses all data of the file except the following additional records:

- HO and HP- records, where official observers or pilots can make input in the header section
- L –records, which following 3 characters are not BRA. This allows individual logbook-entries.

Calling convention:
VALI-BRA “igc-file”

The text out informs about validity or manipulation or corrupt files.

In order to execute VALI-BRA in batch- mode, the return value can be evaluated:
0: data are valid
1: data are not valid, corruption or manipulation
2: bad or missing file when VALI-BRA is called

Reading and writing EEPROM-memory

The instrument has to be set into Menumode.

Requesting memory dump:

PC sends request:

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8
$	**P**	**B**	**R**	**M**	**E**	**M**	**R**	**,**	**A**	**A**	**A**	**A**	*****	**Z**	**Z**	**CR**	**LF**

$PBRMEMR	Identifier
AAAA	EEPROM-startaddress in hex notation
*ZZ	Checksum as defined by NMEA

Answer from the instrument:

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2
$	**P**	**B**	**R**	**M**	**E**	**M**	**R**	**,**	**A**	**A**	**A**	**A**	**,**	**X**	**X**	**,**	**X**	**X**	**,**	**X**	**X**	**,**	**X**	**X**	**,**	**X**	**X**	**,**	**X**	**X**	**,**	**X**	**X**	**,**	**X**	**X**	*****	**Z**	**Z**	**CR**	**LF**

$PBRMEMR	Identifier
AAAA	EEPROM-startaddress in hex notation
XX	8 byte of memory beginning with startaddress, hex notation
*ZZ	Checksum as defined by NMEA

Writing memory:

Caution: Writing to memory allows the modification of any configuration data. Writing to unknown addresses may cause damage to the instrument!

PC sends request:

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4
$	**P**	**B**	**R**	**M**	**E**	**M**	**W**	**,**	**A**	**A**	**A**	**A**	**,**	**Y**	**,**	**X**	**X**	**,**	**X**	**X**	**,**	**X**	**X**	**,**	**X**	**X**	**,**	**X**	**X**	**,**	**X**	**X**	**,**	**X**	**X**	**,**	**X**	**X**	*****	**Z**	**Z**	**CR**	**LF**

$PBRMEMW	Identifier
AAAA	EEPROM-startaddress in hex notation
Y	number of bytes to be written, valid inputs:1 - 8
XX	up to 8 bytes of memory beginning with startaddress will be written, hex notation
*ZZ	Checksum as defined by NMEA

Answer from the instrument:

1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2
$	**P**	**B**	**R**	**M**	**E**	**M**	**R**	**,**	**A**	**A**	**A**	**A**	**,**	**X**	**X**	**,**	**X**	**X**	**,**	**X**	**X**	**,**	**X**	**X**	**,**	**X**	**X**	**,**	**X**	**X**	**,**	**X**	**X**	**,**	**X**	**X**	*****	**Z**	**Z**	**CR**	**LF**

$PBRMEMR	Identifier
AAAA	EEPROM-startaddress in hex notation
XX	8 byte of memory beginning with startaddress, hex notation
*ZZ	Checksum as defined by NMEA

Example of writing 4 bytes (0xA1, 0xBF, 0x12,0x4F) beginning with address 0x04FC
$PBRMEMW,04FC,4,A1,BF,12,4F,,,,*ZZ CR LF
The instrument answers:
$PBRMEMR,04FC,A1,BF,12,4F,00,00,00,00*ZZ CR LF

Addresses of Configuration Data:
Char- types are one byte-types.
Int-Types are two byte types (big endian).

Addresses of 6030/Compeo+:

Address (dez)	Type	Definition	Valid range	Remarks
0	Unsigned char (16)	Pilotname	0- terminated string	
32	Unsigned Int	Contrast of LCD	0 – 100	1 % resolution
54	Int	QNH-Correction of A1	-2000m - +1000m	
72	Unsigned char	Speedgain pitot	90 – 150%	
73	Unsigned char	Bluetooth Mode	0: disabled 1: GPRMC 2: GPGGA 3: FLYSEN 4: SMS (Dun)	
74	Unsigned char	Base volume of beeper	0, 25, 50, 75, 100%	
75	Unsigned char	TEC	0 – 99%	
76	Unsigned char	Variooffset (acoustic threshold)	0 – 20 cm/s	
77	Char	Sink acoustic	-1 - -99cm/s	
85	Unsigned char	Polare Sink[0] of set 1	1 – 200cm/s	Means –1 - -200cm/s
86	Unsigned char	Polare Sink[1] of set 1	1 – 200cm/s	Means –1 - -200cm/s
87	Unsigned char	Polare Speed[0] of set 1	20 – 120km/h	
88	Unsigned char	Polare Speed[1] of set 1	20 – 120km/h	
89	Unsigned char	Recording Stop mode	0: manual recording stop 1: autom. Recording stop 2: half autom.	

90	Unsigned char	Speed-Displaymode	1: True 0: indicated	
91	Unsigned char	Polare Altitude of set 1	0 – 3000m	100m increments
92	Char	UTC-Offset	-13 - +13h	
94	Unsigned char	Stallspeed	0 – 99km/h	
95	Unsigned int	Stallaltitude	0 – 8000m	
97	Unsigned char	Recording interval	1 – 60s	
100	Unsigned char	Acoustic Intergration	1 – 35	Increments of 40ms
102	Unsigned int	UpBaseFrequency	700 – 1400Hz	
104	Unsigned int	DownBaseFrequency	300 – UpBaseFrequency	
110	Unsigned char	Frequency Modulation	2 – 9	
119	Unsigned char	Sink acoustic on/off	0: off 1: on	
120	Unsigned char	Variomode	0: integrating 1: netto 2: integrating/netto	
121	Unsigned char	Vario integration time	1 – 30s	
122	Unsigned char	Polare Sink[0] of set 2	1 – 200cm/s	Means –1 - -200cm/s
123	Unsigned char	Polare Sink[1] of set 2	1 – 200cm/s	Means –1 - -200cm/s
124	Unsigned char	Polare Speed[0] of set 2	20 – 120km/h	
125	Unsigned char	Polare Speed[1] of set 2	20 – 120km/h	
126	Unsigned char	Polare Altitude of set 2	0 – 3000m	100m increments
127	Unsigned char	Polare usage	0: Set 1 1: Set 2	
128	Unsigned char	Speedgain windwheel	70 – 150%	
137	Unsigned char	Speedoffset Pitot	0 – 10 km/h	
138	Unsigned char (3)	Index for Userfields in Autozoom Mode in Map	0 - 41	See Addr 385 for definition
141	Unsigned char	Units	bit 0: 0: m 1: ft bit 1: 0: m/s 1: fpm bit 2,3: 00: km/h 01: mph 10: kn bit 4: 0: GradC 1: GradF	

142	Unsigned char	Waypoint format	0: dd'mm.mm 1: dd.ddddd 2: dd'mm"ss 3: UTM 4: Swiss Grid	
145	Unsigned int	FAI Starttime	0 – 1439min	00:00 – 23:59
147	Int	QNH-Correction of A2	-8000 - +8000m	
149	Unsigned char	Pressure Speed usage	1: Yes 2: No	
150	Unsigned char	User Set Page	0 – 2	
151	Unsigned char	Daytypical rising average	1 – 20	Increments of 30s
158	Unsigned char	Acoustic Pitch	1 – 7	
159	Unsigned int	SW-Version	214 = V2.14	Read only
181	Unsigned char	Start Wp in der C-Route		
182	Unsigned char	McCreadyDelay	0 – 30s	
183	Unsigned char	McCready Gap	0 – 50 cm/s	
185	Unsigned char	Last Thermal Threshold	5 – 30 dm/s	
186	Unsigned char	Company	0x24: Flytec 0:Bräuniger	
187	Unsigned char	Language	0: English 1: German 2: French 3: Spanish 4: Italien 5: Hungarien	
188	Unsigned char	Speed Scaling	1: 30 – 80km/h 0: 20 – 70km/h	
189	Unsigned char (3)	Userfield[0] Userfield[1] Userfield[2]	1: small char 0: large char	
192	Unsigned char (16)	Glidertype	0- terminated string	
224	Unsigned char (16)	Glider-ID	0- terminated string	
256	Unsigned int (30)	FAI-Radius	20 – 50000m	Index of Wayoint in FAI-Route
316	Unsigned char	Geodetic ID	1 – 192	1:WGS84, see user manual
352	Unsigned char	Batterytype	0: Alcali 1: NiMH	

			2: Golden Power	
353	Unsigned char (24)	SMS-receiver no.	e.g. 491718212440	
378	Unsigned char	SMS Competition Mode	0: no 1: yes	
379	Unsigned char	SMS cyclic rate	0 – 15 min	0: disabled
380	Unsigned char	SMS Emergency	0: no 1:yes	
382	Unsigned char	No of Startgates in C-Route	0 – 9	
383	Unsigned char	Time Difference of Gates in min	5 – 60	
384	Unsigned char	Add 0.5h to UTC	0: no 1: yes	
385	Unsigned char (7)	Index of Dataitem in 7 Userfields on Page 1	0 – 41	Definition of Dataitem: " Time", // 00 " Flt Time", // 01 " Vario", // 02 " Alt 1", // 03 "Alt 1 (ft)", // 04 " Alt 2", // 05 " Alt 3", // 06 " FL (ft)", // 07 " QNH hPa", // 08 " Gnd Spd", // 09 " Air Spd", // 10 " Wind Spd", // 11 " Wind Comp", // 12 " Track", // 13 " Bearing", // 14 " XT Error", // 15 " Dist WP", // 16 " Dist goal", // 17 " Dist Toff", // 18 " Dist Cyl", // 19 "Dist therm", // 20 " Dist CTR", // 21 " L/D gnd", // 22 " L/D air", // 23 " L/D req", // 24 " L/D goal", // 25 " A BG WP", // 26 " Alt a WP", // 27

				" A BG Goal", // 28 " Temp", // 29 " SMS p/t", // 30 " ", // 31 "Start Race", // 32 "Dist StCyl", // 33 " Alt GPS", // 34 "CylArrival", // 35 " QNH inHg", // 36 " FlyLink", // 37 " FLARM", // 38 " Spd StCyl", // 39 "Dst opt WP", // 40 "Alt Alowed" // 41
399	Unsigned char (7)	Index of Dataitem in 7 Userfields on Page 2	0 – 41	
413	Unsigned char (7)	Index of Dataitem in 7 Userfields on Page 3	0 – 41	
452	Unsigned char	Variofilter	0 (slow) – 4 (fast)	
458	Unsigned char	FlyLink Channel No	0 – 200	
459	Unsigned char	FlyLink Master Device Type	0 – 6	
460	Unsigned char	FlyLink Network	0 – 200	
461	Unsigned char	Use FlyLink	0: no 1: yes	
464	Unsigned char	CTR Acoustic Alarm	0: no 1: yes 2: double	
465	Unsigned char	Use no of Glider ID as SMS keyword	0 (no) - 16	
466	Unsigned char	Use FLARM	0: no 1: yes	
467	Unsigned char	Use optimized C-Route	0: no 1: yes	
468	Unsigned char	Map Orientation	0: North up 1: Course up	
469	Signed char	Near Thermal Threshold	-10 – 0 (dm/s)	
470	Unsigned char	Use Near Thermal Tone	0: no 1: yes	
471	Unsigned char	Goal Mode in C-Route	5: ENTER 6: LINE 7: EXIT	
472	Unsigned int	Distance threshold for zoom in C-Route	30 – 180m	
474	Unsigned char	Use Autozoom	0: no, 1: Map only 2: Full	
475	Unsigned char	Near Thermal Cycle	10 – 100%	
476	Unsigned char (30)	Waypoint Mode in C-Route	0: ENTER 1: EXIT	

507	Unsigned char	FLARM acoustic Warning	0: no 1: yes	
508	Unsigned char (3)	Index of userfieds in Mapmode	0 - 41	See Addr 385 for definition
512	Unsigned char (20)	File Name of selected .faf file	0 terminated string	
532	Unsigned int	Bit coded selection of CTR type	Bit 0: D Bit 1: AWY Bit 2: FIZ Bit 3: CTR Bit 4: TMA Bit 5: R Bit 6: TSA Bit 7: VZ Bit 8: FLF Bit 9: HPO Bit 10: GG Bit 11: HI Bit 12: SZ Bit 13: BB Bit 14: W	

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Addresses of 6020/Competino+:

Address (dez)	Type	Definition	Valid range	Remarks
0	Unsigned char (16)	Pilotname	0- terminated string	
32	Unsigned Int	Contrast of LCD	0 – 100	1 % resolution
54	Int	QNH-Correction of A1	-2000m - +1000m	
73	Unsigned char	Bluetooth Mode	0: disabled 1: GPRMC 2: GPGGA 3: FLYSEN 4: SMS (Dun)	
74	Unsigned char	Base volume of beeper	0, 25, 50, 75, 100%	
76	Unsigned char	Variooffset (acoustic threshold)	0 – 20 cm/s	
77	Char	Sink acoustic	-1 - -99cm/s	
89	Unsigned char	Recording Stop mode	1: autom. Recording stop 0: manual recording stop	
92	Char	UTC-Offset	-13 - +13h	
94	Unsigned char	Stallspeed	0 – 99km/h	
95	Unsigned int	Stallaltitude	0 – 8000m	
97	Unsigned char	Recording interval	1 – 60s	
100	Unsigned char	Acoustic Intergration	1 – 35	Increments of 40ms
102	Unsigned int	UpBaseFrequency	700 – 1400Hz	
104	Unsigned int	DownBaseFrequency	300 – UpBaseFrequency	
110	Unsigned char	Frequency Modulation	2 – 9	
119	Unsigned char	Sink acoustic on/off	0: off 1: on	
120	Unsigned char	Variomode	0: integrating 1: netto 2: integrating/netto	
121	Unsigned char	Vario integration time	1 – 30s	
128	Unsigned char	Speedgain windwheel	70 – 150%	
141	Unsigned char	Units	bit 0: 0: m 1: ft bit 1: 0: m/s 1: fpm bit 2,3:	

			00: km/h 01: mph 10: kn bit 4: 0: GradC 1: GradF	
142	Unsigned char	Waypoint format	0: dd'mm.mm 1: dd.ddddd 2: dd'mm"ss 3: UTM 4: Swiss Grid	
145	Unsigned int	FAI Starttime	0 – 1439min	00:00 – 23:59
147	Int	QNH-Correction of A2	-8000 - +8000m	
156	Unsigned char	User Set in Vario Page	0 – 2	
157	Unsigned char	User Set in Glide Page	0 – 2	
158	Unsigned char	Acoustic Pitch	1 – 7	
159	Unsigned int	SW-Version	214 = V2.14	Read only
181	Unsigned char	Start Wp in der C-Route		
185	Unsigned char	Last thermal threshold	10=1m/s	
186	Unsigned char	Company	0x24: Flytec 0: Brauniger	
187	Unsigned char	Language	0: English 1: German 2: French 3: Spanish 4: Italien 5: Hungarien	
192	Unsigned char (16)	Glidertype	0- terminated string	
224	Unsigned char (16)	Glider-ID	0- terminated string	
256	Unsigned int (30)	FAI-Radius	20 – 50000m	Index of Wayoint in FAI-Route
316	Unsigned char	Geodetic ID	1 – 192	1:WGS84, see user manual
320	Unsigned char (3)	Index of Dataitem in Userfield 0	0 – 37	" Time", // 00 " Flt Time", // 01 " Vario", // 02 " Alt 1", // 03 "Alt 1 (ft)", // 04 " Alt 2", // 05 " Alt 3", // 06 " FL (ft)", // 07 " QNH hPa", // 08

				" Gnd Spd", // 09 " Air Spd", // 10 " Wind Spd", // 11 " Wind Comp", // 12 " Track", // 13 " Bearing", // 14 " Dist WP", // 15 " Dist goal", // 16 " Dist Toff", // 17 " Dist Cyl", // 18 "Dist therm", // 19 " L/D gnd", // 20 " L/D air", // 21 " L/D req", // 22 " A BG WP", // 23 " A BG Goal", // 24 " Temp", // 25 " SMS p/t", // 26 " ", // 27 "Start Race", // 28 " Alt GPS", // 29 " L/D goal", // 30 " Dist CTR", // 31 " FLARM", // 32 "Dst opt WP", // 33 " XT Error", // 34 "Dist StCyl", // 35 " Spd StCyl", // 36 "Alt Alowed" // 37
330	Unsigned char (3)	Index of Dataitem in Userfield 1	0 – 37	See above
340	Unsigned char (3)	Index of Dataitem in Userfield 2	0 – 37	See above
350	Unsigned char	Best L/D	20-150 =(2.0-15.0)	
351	Unsigned char	Speed at best L/D	20-80	Resolution:1 km/h
352	Unsigned char	Batterytype	0: Alcaline 1: NiMH 2: Golden Power	
353	Unsigned char (25)	SMS-Receiver number		In ASCII

378	Unsigned char	SMS Competition mode	0 : no competition mode 1 : competition mode	
379	Unsigned char	SMS Cyclic Rate	0 – 60 0: no SMS cyclic transmission	Resolution 1 min
380	Unsigned char	SMS Emergency	0: no emergency SMS 1: emergency SMS activ	
382	Unsigned char	No of Startgates in C-Route	0 – 9	
383	Unsigned char	Time Difference of Gates in min	5 – 60	
384	Unsigned char	Add 0.5h to UTC	0: no 1: yes	
452	Unsigned char	Variofilter	0 (slow) – 4 (fast)	
453	Unsigned char	Use Autozoom	0: no, 1: Map only 2: Full	
455	Unsigned char	CTR Acoustic Alarm	0: no 1: yes 2: double	
457	Unsigned char	Use FLARM	0: no 1: yes	
458	Unsigned char	Use optimized C-Route	0: no 1: yes	
459	Unsigned char	Map Orientation	0: North up 1: Course up	
460	Unsigned char	Goal Mode in C-Route	5: ENTER 6: LINE 7: EXIT	
461	Unsigned int	Distance threshold for zoom in C-Route	30 – 180m	
463	Unsigned char	Use Autozoom	0: no, 1: Map only 2: Full	
464	Unsigned char (30)	Waypoint Mode in C-Route	0: ENTER 1: EXIT	
490	Signed char	Near Thermal Threshold	-10 – 0 (dm/s)	
491	Unsigned char	Use Near Thermal Tone	0: no 1: yes	
492	Unsigned char	Near Thermal Cycle	10 – 100%	
495	Unsigned char	FLARM acoustic Warning	0: no 1: yes	
496	Unsigned char (2)	Index of userfieds in Mapmode	0 - 37	See Addr 320 for definition
498	Unsigned char (2)	Index for Userfields in Autozoom Mode in Map	0 - 37	See Addr 320 for definition
490	Signed char	Near Thermal Threshold	-10 – 0 (dm/s)	
491	Unsigned char	Use Near Thermal Tone	0: no 1: yes	
492	Unsigned char	Near Thermal Cycle	10 – 100%	
512	Unsigned char (20)	File Name of selected .faf file	0 terminated string	
532	Unsigned int	Bit coded selection of CTR type	Bit 0: D Bit 1: AWY Bit 2: FIZ Bit 3: CTR	

			Bit 4: TMA Bit 5: R Bit 6: TSA Bit 7: VZ Bit 8: FLF Bit 9: HPO Bit 10: GG Bit 11: HI Bit 12: SZ Bit 13: BB Bit 14: W	

Update Configuration:
When the instrument receives the request, all configuration data are updated from EEPROM
PC sends request:

1	2	3	4	5	6	7	8	9	0	1	2	3	4
$	**P**	**B**	**R**	**C**	**O**	**N**	**F**	**,**	*****	**Z**	**Z**	**CR**	**LF**

$PBRCONF Identifier
*ZZ Checksum as defined by NMEA