

JAVAD GNSS

CANopen profile

Revision 1.0

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1 General description

Javad GNSS receivers support CANopen Slave communication profile according to DS301 V4.02.

2 CAN-Bus Connection

M12 connector pin out

Pin number	Signal
1	Not connected
2	Not connected
3	Ground
4	CAN_H
5	CAN_L

There is no termination resistor between CAN_H and CAN_L.

3 Initial Startup

3.1 Bit rate

The following CAN bit rates are supported.

NN	Bit rate, kbit/s
1	50
2	125
3	250
4	500
5	1000

A bit rate is set by the command `set,/par/dev/can/a/rate,<bit rate>` sent via a communication port, RS232 port, for example.

Example: `set,/par/dev/can/a/rate,500`

It can be read by the command `print,/par/dev/can/a/rate` .

3.2 Node number (Node ID)

A node number is set by the command `set,/par/canopen/node ,<node number>` sent via a communication port, RS232 port, for example. The allowed range is 1-127.

The node number can be read by the command `print,/par/canopen/node`.

3.2 CAN port input mode

To operate with CANopen protocol, the receiver's CAN port must be set to 'canopen' mode by the command `set,/par/dev/can/[port]/imode,canopen` sent via a communication port, RS232 port, for example.

Example: `set,/par/dev/can/a/imode,canopen`

It can be read by the command `print,/par/dev/can/a/imode`

4 Communication

Supported protocols

According to DS301 Javad GNSS receiver supports the following protocols:

Protocol	Communication Model	Protocol Variation
PDO	Producer, consumer	Cyclic/acyclic synchronous
		Synchronous/asynchronous upon request (RTR)
		Asynchronous

SDO	Server	Expedited, segmented, block
SYNC	Producer, consumer	
EMCY	Producer	
NMT	Consumer	START
		STOP
		PRE-OPERATIONAL
		OPERATIONAL
Error control	Producer	Bootup Event
		Heartbeat Event
		Life Guarding Event

5 Default settings on delivery

Bit rate — 500 kbit/s

Node number — 123

Termination — No termination resistor

6 Communication Parameters

Data Length

In JAVAD GNSS receiver, CANopen protocol uses standard data types defined in DS301. Their lengths are shown in Table 1.

Table 1

Index according to DS301 (hex)	Data Type	Length, byte
0001	BOOLEAN	1
0002	INTEGER8	1
0003	INTEGER16	2
0004	INTEGER32	4
0005	UNSIGNED8	1
0006	UNSIGNED16	2
0007	UNSIGNED32	4
0008	REAL32	4
0011	REAL64	8

JAVAD GNSS receiver provides the length of the standard data types encoded as UNSIGNED32 at read access to the index that refers to the data type in Table 1.

7 Object Dictionary

Index (hex)	Subindex (hex)	Description	Data Type	Access Type
0040	00-0A	J_GNSS Complex Data Type	DEFSTRUCT	RO
1000		Device Type	UNSIGNED32	RO
1001		Error Register	UNSIGNED8	RO
1002		Manufacturer Status Register	UNSIGNED32	RO
1008		Manufacturer Device Name	VISIBLE_STRING	CONSTANT
1009		Manufacturer Hardware Version	VISIBLE_STRING	CONSTANT
100A		Manufacturer Software Version	VISIBLE_STRING	CONSTANT
1015		Inhibit Time Emergency	UNSIGNED16	RW
1018		Identity Object	Record	
	0	Number of Entries	UNSIGNED8	RO
	1	Vendor ID	UNSIGNED32	RO
	2	Product Code	UNSIGNED32	RO
	3	Revision number	UNSIGNED32	RO
	4	Serial number	UNSIGNED32	RO
1800-1803		Transmit PDO Communication Parameter		
	0	Number of entries	UNSIGNED8	RO
	1	COB ID	UNSIGNED32	RW
	2	Transmission Type	UNSIGNED8	RW
	3	Inhibit Time	UNSIGNED16	RW
1A00-1A03		Transmit PDO Mapping Parameter		
	0	Number of entries	UNSIGNED32	RW
	1 – 8	PDO Mapping Entries	UNSIGNED32	RW
2000		Time, Position, Velocity	J_GNSS Complex Data Type (0x40)	RO
2001		Time and Solution Type		
	0	Number of entries	UNSIGNED8	RO
	1	Time	INTEGER32	RO
	2	Type of Solution	UNSIGNED8	RO
2002		Cartesian coordinate X	REAL64	RO
2003		Cartesian coordinate Y	REAL64	RO
2004		Cartesian coordinate Z	REAL64	RO
2800		Lock Elevation Mask	REAL32	RWR

2801		Internal Receiver Time Grid	INTEGER32	RWR
2802		Position Update Rate	INTEGER32	RWR
2803		Position Computation Mode	UNSIGNED32	RWR
2804		RTK Position Computation Mode	BOOLEAN	RWR

8 Object Dictionary Detailed Description

Object 0040h: J_GNSS Complex Data Type

Subindex (hex)	Type	Value (hex)	Description
0	UNSIGNED16	000A	Number of Entries
1	UNSIGNED16	0007	UNSIGNED32
2	UNSIGNED16	0011	REAL64
3	UNSIGNED16	0011	REAL64
4	UNSIGNED16	0011	REAL64
5	UNSIGNED16	0008	REAL32
6	UNSIGNED16	0008	REAL32
7	UNSIGNED16	0008	REAL32
8	UNSIGNED16	0008	REAL32
9	UNSIGNED16	0008	REAL32
A	UNSIGNED16	0005	UNSIGNED8

Object 1000h: Device Type

Value: 0

Object 1001h: Error Register

Value: According to DS301

Object 1002h: Manufacturer Status Register

Type: UNSIGNED32

Object 1008h: Manufacturer Device Name

Type: Visible String

Object 1009h: Manufacturer Hardware Version

Type: Visible String

Object 100Ah: Manufacturer Software Version

Type: Visible String

Object 1015h: Inhibit Time Emergency

Value: 0

Object 1018h: Identity Object

Subindex 0: Number of Entries

Value : 4

Subindex 1: Vendor ID

Value: 0x000002A6

Subindex 2: Product Code

Subindex 3: Revision number

Subindex 4: Serial number

Object 2000h: Time, Cartesian Position, and Velocity

Type: J_GNSS Complex Data Type

Specification:

Type	Description	Unit of Measure
UNSIGNED16	Number of Entries	
UNSIGNED32	Time of day modulo 1 day	millisecond
REAL64	Cartesian coordinate X	meter
REAL64	Cartesian coordinate Y	meter
REAL64	Cartesian coordinate Z	meter
REAL32	Position SEP*	meter
REAL32	Cartesian Velocity X	meter/second
REAL32	Cartesian Velocity Y	meter/second
REAL32	Cartesian Velocity Z	meter/second
REAL32	Velocity SEP	meter/second
UNSIGNED8	Type of Solution	see [1]

Object 2001h:

Subindex 1: Number of entries

Type: UNSIGNED8

Value: 2

Subindex 1: Time of day modulo 1 day

Type: INTEGER32

Unit of Measure: millisecond

Subindex 2: Type of Solution

Type: UNSIGNED8

Value Range: 0...8

Object 2002h:

Subindex 0: Cartesian coordinate X

Type: REAL64

Unit of Measure: meter

* See [1]

Object 2003h:

Subindex 0: Cartesian coordinate Y
Type: REAL64
Unit of Measure: meter

Object 2004h:

Subindex 0: Cartesian coordinate Z
Type: REAL64
Unit of Measure: meter

Object 2800h:

Subindex 0: Lock Elevation Mask
Type: REAL32
Unit of Measure: degree

Object 2801h: Internal Receiver Time Grid

Type: INTEGER32
Unit of Measure: millisecond

Object 2802h: Position Update Rate

Type: INTEGER32
Unit of Measure: millisecond

Object 2803h: Position Computation Mode

Type: UNSIGNED32
Value Range: see [1]

Object 2804h: RTK Position Computation Mode

Type: BOOLEAN
Value Range: see [1]

9 References

[1] GNSS Receiver External Interface Specification (GREIS), <http://www.javad.com>