

Integrated Navigation & GNSS Command and Programming Manual

Rev 1.0

Applicable to the CH3xx / HI30 / HI32 series



Document Revision History

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1. Module Configuration Commands

Module configuration uses ASCII string commands. Each command must end with a carriage return + line feed `\r\n` (similar to AT commands) before the system can recognize it.

1.1 Command Overview

Command	Description
REBOOT	Reset
LOG	Request message output from the device
CONFIG	Configure the module
UNLOGALL	Cancel all message output
SAVECONFIG	Save configuration to Flash
SETBASELINE	Set the dual-antenna baseline length / tilt constraint, lever-arm compensation, etc.; takes effect after save + reboot.
SERIALCONFI G	Set the serial-port baud rate

1.2 Command Reference

1.2.1 REBOOT

Reset and reboot, effective immediately. Equivalent to a power cycle.

1.2.2 LOG

1.2.2.1 ENABLE/DISABLE: turn data output on/off globally

- `LOG ENABLE` - globally enable data-frame output (default)
- `LOG DISABLE` - globally disable data-frame output

1.2.2.2 VERSION: show module version

`LOG VERSION` - print firmware version information

1.2.2.3 COMCONFIG: show serial-port configuration

`LOG COMCONFIG` - print serial port and output-protocol configuration

1.2.2.4 INSCONFIG: show integrated-navigation configuration

`LOG INSCONFIG` - show the integrated-navigation configuration, including the current kinematic model, dual-antenna parameters and the NMEA Talker ID.

```

MOTION_MODEL=CAR
ANTA=0.0,0.0,0.0
ANTB=0.0,1.0,0.0
NMEATID=GP
OK

```

1.2.2.5 MSG: configure data-frame output and rate

Format: `LOG <MSG> <TYPE> <PERIOD>`

- MSG: GGA, RMC, SXT, HI81, etc.
- TYPE: ONTIME means periodic output
- PERIOD: output-frame period in seconds; allowed values: 1 (1 Hz), 0.5 (2 Hz), 0.1 (10 Hz), 0.02 (50 Hz), 0.01 (100 Hz), 0.005 (200 Hz)

Examples:

- `LOG HI81 ONTIME 0.01` - set the HI81 packet output period on the current serial port to 0.01 s (100 Hz)
- `LOG SXT ONTIME 0.05` - set the SXT packet output period on the current serial port to 0.05 s (20 Hz)
- `LOG SXT ONTIME 0` - turn off SXT packet output on the current serial port

1.2.3 CONFIG

Configures the module's working parameters. Most commands take effect immediately, and `SAVECONFIG` is required to persist them across power cycles.

1.2.3.6 Configure the integrated-navigation kinematic model

- `CONFIG MODEL CAR` (factory default) - set the model constraint to vehicle mode. In this mode the solver applies NHC (non-holonomic constraints), which significantly reduces accumulated error in GNSS-outage scenarios such as tunnels and underground garages.
- `CONFIG MODEL SHIP` - set the model constraint to marine/ship mode, reducing accumulated error during outages on ships.
- `CONFIG MODEL PLANE` - set the model constraint to aircraft mode. This mode applies no kinematic constraint and suits airborne use.
- `CONFIG MODEL BASE` - set the module to base-station mode. After this, the module locks its own position within 60 s (position no longer changes); commonly used to build a self-hosted RTK base station. The antenna must be in a good observation environment when configuring base mode.

Use `LOG INSCONFIG` to view the current user configuration.

1.2.3.7 Configure NTRIP differential account

This device can drive certain vendors' 4G DTU terminals or an Ethernet interface to provide network RTK: it automatically configures the DTU/Ethernet interface and feeds in RTK differential data. Steps:

1. Connect COM2 to the DTU. COM2 is dedicated to the DTU and uses the 4G DTU for NTRIP RTK differential.

- The currently supported DTU model is TAS-LTE-364 (Tas 4G transparent DTU). Make sure the model is correct and that a working 4G SIM card is inserted.
- Configure the differential account: `CONFIG NTRIP <SERVER_IP> <PORT> <MNT_POINT> <USER_NAME> <PASSWD>`, where:

- `SERVER_IP` : CORS server address, a domain name or IP.
- `PORT` : CORS server port
- `MNT_POINT` : mount point, e.g. `AUTO` for Qianxun, or `RTCM33_GRCE` for China Mobile.
- `USER_NAME` : CORS account username
- `PASSWD` : CORS account password

Example - configure a Qianxun CORS account (sample username `qxrxrli003`, password `123456`):

Example: `CONFIG NTRIP rtk.ntrip.qxwz.com 8002 AUTO qxrxrli003 123456`. This is saved across power cycles; configure it once.

- Restart the module.
- Use `LOG NTRIPCONFIG` to view the current configuration. If `DTU_NAME` shows `TAS-LTExxx`, the module has established a link with the DTU (the module auto-negotiates the baud rate; an empty NAME means the DTU link failed). Note that a non-empty NAME only confirms the module-to-DTU link, not whether the DTU-to-network link is healthy.

```
DTU      NAME: Revision: TAS-LTE-C_C4002L242_
NTRIP SERVER: xxxxxxxx.com:xxxx
NTRIP MOUNT: AUTO
NTRIP UNAME: xxxxxxxx
NTRIP PASSWD: xxxxxxxx
```

- If the RTK IP/account details are correct, RTK is typically reached within ~30 s.

Save the configuration and reboot for it to take effect.

1.2.3.8 Enable the built-in SD-card data logging

Some products have an internal SD card for data logging. On each power-up a `.jog` file named after the power-up UTC time is created automatically. You can use an FTP tool (e.g. FileZilla) to view all files on the internal card.

- `CONFIG FLOG COM1 1` - enable COM1 logging; all data output on the main serial port COM1 is also copied to a log file on the SD card.
- `CONFIG FLOG COM1 0` - disable COM1 logging.

1.2.4 UNLOGALL

Set the output rate of all periodic messages to 0 (no output).

1.2.5 SAVECONFIG

Save all configuration to Flash. Usually used together with `REBOOT`, i.e. save everything then reboot to apply.

1.2.6 SETBASELINE

Sets antenna A's position relative to the IMU (lever-arm compensation) and the angle of the secondary (B / heading) antenna relative to antenna A, for dual-antenna installation.

Set antenna A's position relative to the IMU (lever-arm compensation): X, Y, Z are antenna A's position relative to the IMU in the IMU body frame, in meters.

```
SETBASELINE ANTA <X,Y,Z>
```

Set the B (heading) antenna position: like antenna A, X, Y, Z are the antenna's position relative to the IMU in the IMU body frame, in meters.

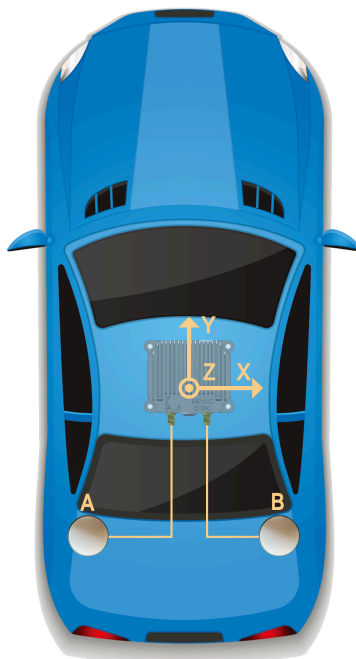
```
SETBASELINE ANTB <X,Y,Z>
```

Example: to set the angle between the A→B vector and the vehicle forward direction (IMU +Y axis) to 90° (clockwise positive, as shown below), where antenna A relative to the IMU is `X=-1.5,Y=-1.2,Z=-0.3` and antenna B relative to the IMU is `X=1.5,Y=-1.2,Z=-0.3`:

```
SETBASELINE ANTA -1.5,-1.2,-0.3
```

```
SETBASELINE ANTB 1.5,-1.2,-0.3
```

After installing/setting the antenna positions, power-cycle or reboot the module.



1. After setting antenna parameters, use `LOG INSCONFIG` to verify.
2. Integrated navigation also works without lever-arm compensation, but correct, valid compensation greatly improves position accuracy when turning after a GNSS outage.

1.2.7 SERIALCONFIG

Set the serial-port baud rate; 115200 / 460800 / 921600 are supported.

```
SERIALCONFIG <BAUD>
```

Example - set the current port to 115200: `SERIALCONFIG 115200` .

2. Output Data Protocol (RS232/422, Ethernet)

2.3 Overview

This product supports two output protocol families: ASCII and binary. ASCII messages use the NMEA format; binary messages use HiPNUC's custom binary format. The NMEA format follows NMEA 0183.

- Output latitude/longitude is referenced to antenna A.
- Antenna B is used only for dual-antenna heading and is unrelated to positioning.

2.4 Hardware Interfaces

- RS232 / RS422 / RS485: essentially all serial ports; both ends must use the same baud rate. Factory default is 115200.
- Ethernet: some products have Ethernet with an internal TCP/IP stack and DHCP client enabled by default. Connect the Ethernet port to a router LAN port on the same subnet as the PC; it obtains an IP automatically after connecting. Connect as a TCP client on default port 5944. Once connected, all commands and behavior are identical to the serial port.

2.5 Factory Default Output

By default this product outputs the binary HI81 protocol at 100 Hz.

2.6 NMEA Messages (ASCII)

The NMEA protocol starts with `$` , followed by the descriptor, ID and data fields. The data section ends with `*` , followed by a two-digit checksum and finally a carriage return + line feed (`0x0D` , `0x0A`).

NMEA message format (ASCII structure):

```
$--<message-id>,<field>,<field>,...,<field>*<checksum><CR><LF>
```

Field	Description
\$	Start delimiter (ASCII 0x24). Marks the beginning of a message.
---	Satellite-system class, used to distinguish BeiDou / GPS / combined output. BD - BeiDou GP - GPS GN - combined
messag e-id	Identifies the message type and function. Fixed 3-character ASCII; uppercase letters recommended.
,	Field delimiter (ASCII 0x2C). Separates multiple fields in a message.
data field	Each message can contain multiple fields separated by <code>,</code> . Unless noted otherwise, only printable ASCII is allowed in fields. Field position within a message is determined by counting the <code>,</code> delimiters.
*	Checksum delimiter, between the data content and the checksum field.
checksu m	The checksum is the byte-wise XOR of all characters between <code>\$</code> and <code>*</code> (exclusive). The high and low nibbles are each expressed as a hex ASCII character (0-9, A-F), high nibble first.
<CR> <LF>	Terminator (ASCII 0x0D, 0x0A). Marks the end of a message.

2.6.8 NMEA Message List

NMEA	Description	Source
GGA	Fix data, RTC time, fix quality, satellites in view	GNSS only
RMC	Recommended minimum positioning information	GNSS only
VTG	Current ground speed	GNSS only
SXT	Integrated-navigation information	Integrated nav

2.6.9 GGA

Receiver time, position and fix-related data. Note: this sentence outputs the GNSS-only fix, not the integrated-navigation result.

```
$GPGGA,062134.00,2813.9908005,N,11252.6285300,E,1,28,0.5,83.684,M,-17.038,M,0.000,0000*60
```

ID	Example	Format	Description
1	\$GPGGA	header	
2	062134.00	hhmmss.ss	UTC time
3	2813.99080 05	ddmm.mm mm	Latitude, 28°13.9908005', range 0°-90°. First two digits are degrees, the rest minutes.
4	N	-	Latitude direction N/S (N = north, S = south)
5	11252.6285 300	ddmm.mm mm	Longitude, 112°52.6285300', range 0°-180°. First three digits are degrees, the rest minutes.
6	E	-	Longitude direction E/W (E = east, W = west)
7	1	x	0: invalid; 1: single-point; 2: pseudorange differential; 4: fixed; 5: float or PPP.
8	28	xx	Number of satellites used in the fix
9	0.5	x.x	HDOP: horizontal dilution of precision
1 0	83.684	x.xxx	Altitude
1 1	M	U	Altitude unit: m
1 2	-17.038	x.x	Geoid undulation: difference between the WGS84 ellipsoidal height and altitude; "-" means the geoid is below the WGS84 ellipsoid.
1 3	M	U	Undulation unit: m
1 4	0.000	xxxx	Differential age, in s
1 5	0000	x.x	Differential station ID
1 6	60	hh	Checksum

About the lat/long format in GGA:

Latitude: expressed as degrees and minutes (no seconds), as `ddmm.mmmm`, where `dd` is degrees (two digits) and `mm.mmmm` is minutes (two integer digits and up to four decimals), followed by N (north) or S (south). **Longitude:** similar to latitude, but degrees are three digits, as `dddmm.mmmm`, followed by E (east) or W (west).

Converting to decimal degrees: although GGA natively uses degrees and minutes, you sometimes need decimal degrees. The formula:

- decimal degrees = degrees + (minutes / 60)

For example, converting 4807.038 to decimal degrees: $48 + (07.038 / 60) = 48.1173^\circ$

2.6.10 RMC

Recommended minimum navigation data. Note: this sentence outputs the GNSS-only fix, not the integrated-navigation result.

```
$GPRMC,020550.00,A,2813.9891299,N,11252.6278784,E,0.033,315.7,161117,0.0,E,A,V*4A
```

ID	Example	Format	Description
1	\$GPRMC	header	Start delimiter + message ID
2	020250.00	hhmmss.ss	UTC time
3	A	x.x	Fix status: A = valid, V = invalid
4	2813.9891299	ddff.ff	Latitude, same format as GGA
5	N	-	Latitude direction, same as GGA
6	11252.6278784	dddff.ff	Longitude, same format as GGA
7	E	-	Longitude direction, same as GGA
8	0.033	x.x	Ground speed, in knots
9	315.7	x.x	Ground course, referenced to true north, clockwise (0°-360°)
10	161117	ddmmyy	Date (day, month, year)
11	0.0	x.x	Magnetic declination, in degrees
12	E	-	Declination direction
13	A	-	Mode indicator: N = invalid; A = autonomous; E = estimated; D = differential; M = manual input
14	V	-	S = Safe, C = Caution, U = Unsafe, V = Not valid
15	4A	hh	Checksum

2.6.11 VTG

Outputs ground-speed information.

```
$GPVTG,134.395,T,134.395,M,0.019,N,0.035,K,A*33
```

ID	Example	Format	Description
1	\$GPVTG	header	
2	134.395	xxx.xxx	Ground course referenced to true north, 000-359.999°
3	T	U	True-north indicator
4	134.395	xxx.xxx	Ground course referenced to magnetic north, 000-359.999°
5	M	U	Magnetic-north indicator
6	0.019	xxx.xxx	Horizontal speed 000-999, in knots
7	N	U	Unit: N = knots
8	0.035	xxx.xxx	Horizontal speed 000-999, in km/h
9	K	U	Unit: K = km/h
10	A	U	A = autonomous; D = differential; E = estimated; M = manual input; N = invalid.
11	33	hh	Checksum

2.6.12 SXT

Outputs integrated-navigation information.

```
$GPSXT,20230310090529.59,116.45784882,39.90572287,158.2289,359.87,-4.99,359.87,0.001,171.25,1,0,15,15,0  
.056,-0.040,0.017,-0.001,-0.000,0.002,8,0*43
```

ID	Example	Format	Description
1	\$GPSXT	header	
2	202303100905 29.59	yyyy/mm/dd/hh/m m/ss.ss	UTC time
3	116.45784882	ddd.dddddddd	Fused longitude (deg)
4	39.90572287	ddd.dddddddd	Fused latitude (deg)
5	158.2289	ddd.dddd	Fused altitude (m)
6	359.87	ddd.dd	Yaw (deg), 0-360°
7	-4.99	ddd.dd	Pitch (deg), -90:90°
8	359.87	ddd.dd	Velocity course (deg)
9	0.001	ddd.ddd	Horizontal speed (m/s)
1 0	171.25	ddd.dd	Roll (deg), -180:180°
1 1	1		GNSS-only fix flag: 0 invalid; 1 single-point; 2 pseudorange differential; 4 fixed; 5 float/PPP. Relates to antenna A only, not B.
1 2	0		GNSS-only heading flag: 4 fixed (heading valid); other values: heading not locked, invalid. Relates to antennas A and B; heading is meaningful only with a fixed solution (4).
1 3	15		Satellites used by antenna A (positioning)
1 4	15		Satellites used by antenna B (heading)
1 5	0.056		X-axis angular rate (deg/s)
1 6	-0.040		Y-axis angular rate (deg/s)
1 7	0.017		Z-axis angular rate (deg/s)
1 8	-0.001	ddd.ddd	East velocity (m/s)
1 9	-0.000	ddd.ddd	North velocity (m/s)
2 0	0.002	ddd.ddd	Up velocity (m/s)
2 1	8		Integrated-navigation status: 0: invalid - no GNSS, cannot initialize position 1: aligning - position initialized, but some motion is needed to finish filter initialization and enter integrated navigation 3: navigating - integrated navigation engaged 6: inertial dead-reckoning - integrated navigation engaged but GNSS lost, in pure-inertial mode (tunnel, garage, etc.)

ID	Example	Format	Description
			0: A normal, B normal
2	antenna status		1: A abnormal (not inserted, feeder open/short), B normal
2			2: A normal, B abnormal
2			3: A abnormal, B abnormal
			Valid only with our dedicated measurement antenna.
2	08	hh	Checksum
3			

2.7 Binary Messages (HiPNUC)

This is HiPNUC's custom binary protocol. It can output all sensor information and is supported by products with UART (RS-232/TTL), USB and RS-485 interfaces. Default serial format is N-8-N-1 (8 data bits, 1 stop bit, no parity).

2.7.13 Frame Format

After power-up, the module outputs frame data at the default rate (100 Hz). The frame format:

Field	Value	Length (bytes)	Description
Frame header	0x5A	1	0x5A
Frame type	0xA5	1	0xA5
Payload len	1-512	2	Length of the payload, LSB first. Counts the payload only (excludes header, type, length, CRC).
CRC	-	2	16-bit CRC over all fields except CRC itself (header, type, length, payload). LSB first.
Payload	-	1-512	Data carried in one frame, made of several sub-packets. Each packet has a tag and data; the tag determines the data type and length.

2.7.14 Payload Content

2.7.14.9 Integrated Navigation Data (HI81)

The payload is 104 bytes and contains all navigation information.

Offset	Name	Type	Size (Byte)	Unit	Scale	Description
0	tag	uint8_t	1	-	-	Packet tag: 0x81
1	status	uint16_t	2	-	-	Status word, reserved
3	ins_status	uint8_t	1	-	-	Integrated-navigation status: 0: invalid - no GNSS, cannot initialize position 1: aligning 3: navigating 6: inertial dead-reckoning (GNSS lost)
4	gpst_wn	uint16_t	2	week	1	GPS time, week
6	gpst_tow	uint32_t	4	s	0.001	GPS time, time of week
10	reserved	uint16_t	2	-	-	Reserved
12	gyr_b	int16_t*3	6	rad/s	0.001	Body-frame angular rate: X, Y, Z (factory calibrated)
18	acc_b	int16_t*3	6	m/s ²	0.0048828	Body-frame acceleration: X, Y, Z (factory calibrated)
24	mag_b	int16_t*3	6	uT	0.030517	Body-frame magnetic field: X, Y, Z (factory calibrated)
30	air_pressure	int16_t	2	Pa	1	Air pressure + 100000 Pa: e.g. 2000 means 102000 Pa
32	od_speed	int16_t	2	m/s	0.01	Odometer speed (vehicle OBD-II speed)
34	temperature	int8_t	1	°C	1	System average temperature
35	utc_year	uint8_t	1	year	1	UTC year, e.g. 24 = 2024
36	utc_month	uint8_t	1	month	1	UTC month
37	utc_day	uint8_t	1	day	1	UTC day
38	utc_hour	uint8_t	1	hour	1	UTC hour
39	utc_min	uint8_t	1	min	1	UTC minute
40	utc_sec	uint16_t	2	s	0.001	UTC second
42	roll	int16_t	2	deg	0.01	Integrated-nav roll, range -180:180
44	pitch	int16_t	2	deg	0.01	Integrated-nav pitch, range -90:90
46	yaw	uint16_t	2	deg	0.01	Integrated-nav yaw, range 0-360, north-to-east positive
48	quat	int16_t*4	8	-	0.0001	Quaternion: W, X, Y, Z
56	ins_lon	int32_t	4	deg	1e-7	Fused longitude
60	ins_lat	int32_t	4	deg	1e-7	Fused latitude

Offset	Name	Type	Size (Byte)	Unit	Scale	Description
64	ins_msl	int32_t	4	m	0.001	Fused altitude
68	pdop	uint8_t	1	-	0.1	GNSS position dilution of precision
69	hdop	uint8_t	1	-	0.1	GNSS horizontal dilution of precision
70	solq_pos	uint8_t	1	-	-	GNSS-only fix flag: 0 invalid; 1 single-point; 2 pseudorange differential; 4 fixed; 5 float/PPP. Antenna A only.
71	nv_pos	uint8_t	1	-	-	Satellites used for GNSS positioning
72	solq_heading	uint8_t	1	-	-	GNSS-only heading flag: 4 fixed (heading valid); other values: not locked. Relates to A and B; only fixed makes heading meaningful.
73	nv_heading	uint8_t	1	-	-	Satellites used for GNSS heading
74	diff_age	uint8_t	1	s	1	RTK differential age
75	undulation	int16_t	2	m	0.01	Geoid undulation
77	ant_status	uint8_t	1	-	-	Antenna status flag 0: A normal, B normal 1: A abnormal (not inserted, feeder open/short), B normal 2: A normal, B abnormal 3: A abnormal, B abnormal Valid only with our dedicated measurement antenna.
78	vel_enu	int16_t*3	6	m/s	0.01	ENU velocity in the navigation frame (integrated-nav output)
84	acc_enu	int16_t*3	6	m/s ²	0.00488/28	ENU acceleration in the navigation frame (integrated-nav output)
90	reserved	int16_t	2			Reserved
92	reserved	int16_t	2			Reserved
94	reserved	int16_t	2			Reserved
96	reserved	int16_t	2			Reserved
98	reserved	-	6	-	-	Reserved

2.7.15 CRC

16-bit CRC reference implementation:

```

/*
    correctCrc: previous crc value, set 0 if it's first section
    src: source stream data
    lengthInBytes: length
*/
static void crc16_update(uint16_t *correctCrc, const uint8_t *src, uint32_t lengthInBytes)
{
    uint32_t crc = *correctCrc;
    uint32_t j;
    for (j=0; j < lengthInBytes; ++j)
    {
        uint32_t i;
        uint32_t byte = src[j];
        crc ^= byte << 8;
        for (i = 0; i < 8; ++i)
        {
            uint32_t temp = crc << 1;
            if (crc & 0x8000)
            {
                temp ^= 0x1021;
            }
            crc = temp;
        }
    }
    *correctCrc = crc;
}

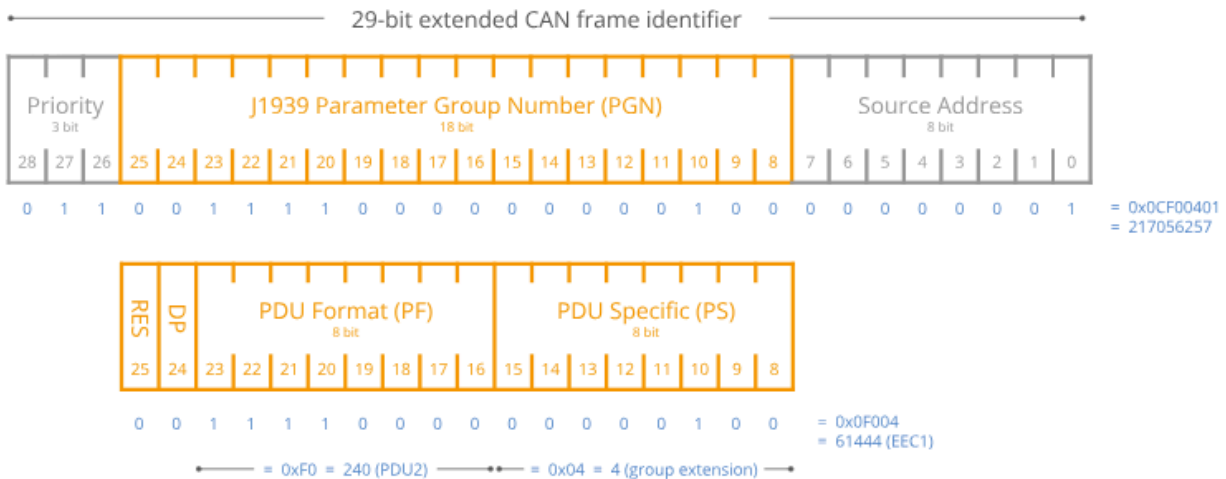
```

3. Data Protocol (CAN - SAE J1939)

The CAN interface supports both CANopen and SAE J1939. The module defaults to SAE J1939; contact technical support for a CANopen version. The default CAN baud rate is 500 Kbps.

3.8 SAE J1939 Protocol

J1939 uses a 29-bit extended frame ID: 3 bits of priority, 1 reserved bit, an 8-bit page that defines its function via the PGN, with the first 8 of the lower 24 bits being the source address (SA), the middle 8 the specific PGN (describing the data function/content), and the last 8 the destination address (DA) or a further-refined PGN. This structure supports prioritized message transmission, a wide range of parameter-group identifiers, and source/destination addressing on the network.



blue: Example values

RES: Reserved | DP: Data Page | PDU: Protocol Data Unit (message format)

PF < 240: Message is PDU1 (addressable message, PS contains destination address)

PF >= 240: Message is PDU2 (broadcast message, PS contains group extension)

PGN	Description
Communication mode	Broadcast
Default interval	100 ms
Data length	8 bytes per PGN
PF (PDU format)	0xFF
PS (PDU specific)	Extended PGN address (GE) when PF > 0xF0, otherwise the destination address (DA)
Priority	3
Default J1939 address	0x08
Data format	All frames use LSB (little-endian); unless noted, signed integers

3.9 PGN Message List

3.9.16 PGN65296 (FF10) Latitude/Longitude

CANID=0x0CFF1008

SPN name	SPN position (byte)	Description
Latitude	0-3	Unit: deg, scale: 0.0000001
Longitude	4-7	Unit: deg, scale: 0.0000001

3.9.17 PGN65300 (FF14) Altitude and Differential Age

CANID=0x0CFF1408

SPN name	SPN position (byte)	Description
Altitude	0-3	Unit: m, scale: 0.01
UNDULATION	4-5	Unit: m, scale: 0.01
Diff age	6-7	Unit: s, scale: 0.01

3.9.18 PGN65304 (FF18) Fix Status and Satellite Count

CANID=0x0CFF1808

SPN name	SPN position (byte)	Description
GNSS-only fix quality	0	0 invalid; 1 single-point; 2 pseudorange differential; 4 fixed; 5 float/PPP.
GNSS-only heading qual	1	0 invalid; 4 fixed (only a fixed solution makes heading meaningful)
Positioning sat count	2	Satellites used for positioning
Heading sat count	3	Satellites used for heading
Integrated-nav status	4	1: aligning, 3: navigating
Reserved	5-7	-

3.9.19 PGN65318 (FF26) Velocity

CANID=0x0CFF2608

SPN name	SPN position (byte)	Description
East velocity	0-1	Unit: m/s, scale: 0.01
North velocity	2-3	Unit: m/s, scale: 0.01
Up velocity	4-5	Unit: m/s, scale: 0.01
Ground speed (E/N resultant magnitude)	6-7	Unit: m/s, scale: 0.01

3.9.20 PGN65327 (FF2F) Time

CANID=0x0CFF2F08

SPN name	SPN position (byte)	Description
UTC year	0	20 = 2020, and so on
UTC month	1	
UTC day	2	
UTC hour	3	
UTC min	4	
UTC sec	5	
UTC ms	6-7	Unit: ms, scale: 1

3.9.21 PGN65332 (FF34) Acceleration

CANID=0x0CFF3408

SPN name	SPN position (byte)	Description
Accel X	0-1	Unit: G (1G = gravity), scale: 0.00048828
Accel Y	2-3	Unit: G (1G = gravity), scale: 0.00048828
Accel Z	4-5	Unit: G (1G = gravity), scale: 0.00048828
Reserved	6-7	-

3.9.22 PGN65335 (FF37) Angular Rate

CANID=0x0CFF3708

SPN name	SPN position (byte)	Description
Rate X	0-1	Unit: deg/s, scale: 0.061035
Rate Y	2-3	Unit: deg/s, scale: 0.061035
Rate Z	4-5	Unit: deg/s, scale: 0.061035
Reserved	6-7	

3.9.23 PGN65341 (FF3D) Integrated-Nav Attitude (Pitch/Roll)

CANID=0x0CFF3D08

SPN name	SPN position (byte)	Description
Roll	0-3	Unit: °, scale: 0.001
Pitch	4-7	Unit: °, scale: 0.001

3.9.24 PGN65345 (FF41) Integrated-Nav Attitude (Heading)

CANID=0x0CFF4108

SPN name	SPN position (byte)	Description
Yaw	0-3	0-360, unit: °, scale: 0.001
Reserved	4-7	

3.9.25 PGN65347 (FF43) Temperature and Air Pressure

CANID=0x0CFF4308

SPN name	SPN position (byte)	Description
Temperature	0-1	Unit: °C, scale: 0.01
Reserved	2-3	
Air pressure	4-7	Unit: Pa, scale: 0.01

3.10 Module Configuration (CAN)

3.10.26 Configuration Format

Host sends: ADDR + CMD + STATUS + VAL ; device replies: ADDR + CMD + STATUS + VAL .

Field	Size (Byte)	Description
ADDR	2	Register address
CMD	1	0x06: write, 0x03: read
STATUS	1	Reserved
VAL	4	Value written or read

3.10.27 Common Command Examples

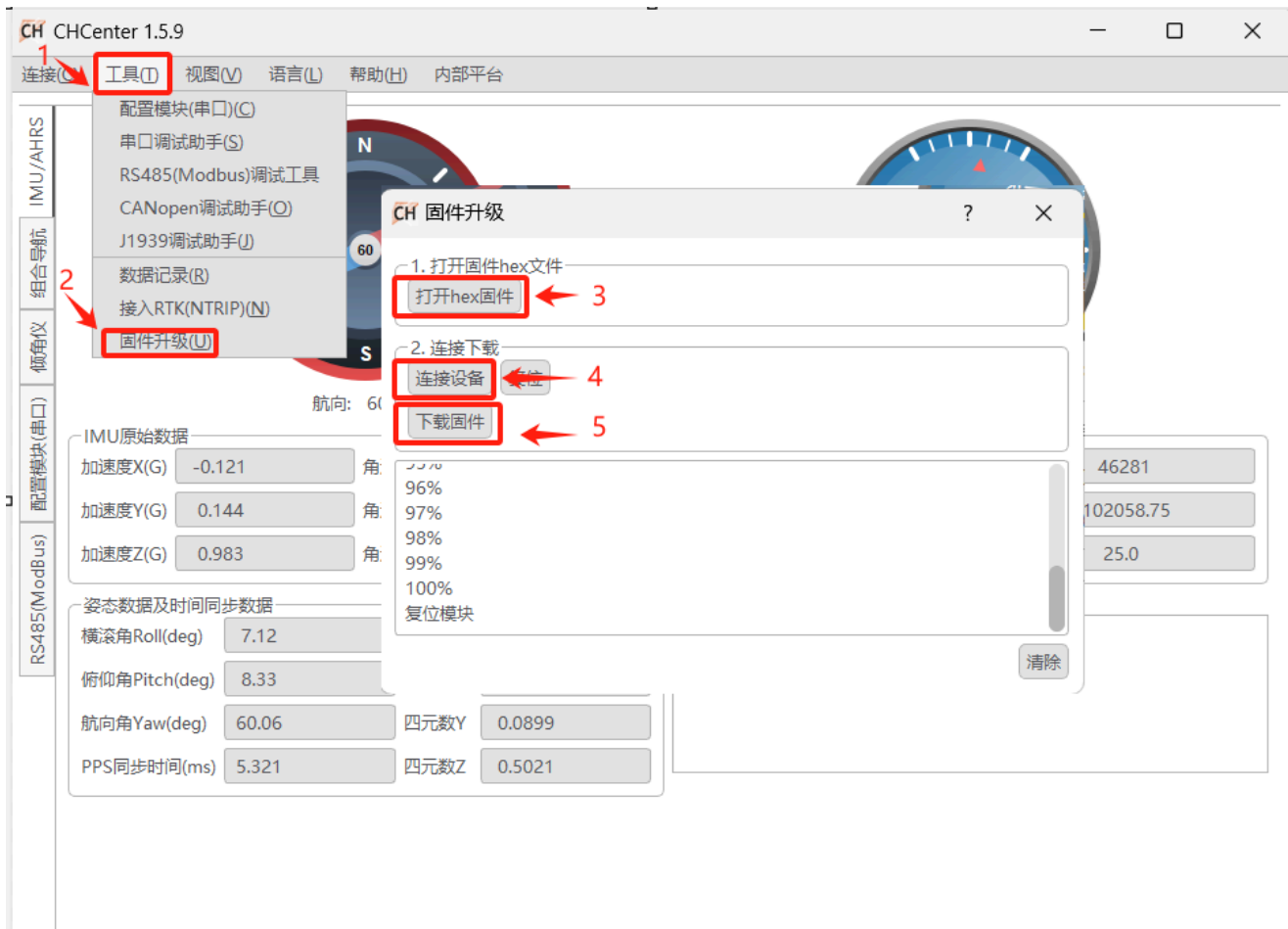
29-bit CAN ext. frame ID	CAN data	Description	Notes
0x0CEF08xx	10 01 06 00 [VAL]	VAL: 4 bytes (LE)	PGN FF10 (lat/long) interval, ms, range 10-1000
0x0CEF08xx	14 01 06 00 [VAL]	VAL: 4 bytes	PGN FF14 (altitude & diff age) interval, ms, range 10-1000
0x0CEF08xx	18 01 06 00 [VAL]	VAL: 4 bytes	PGN FF18 (fix status & sats) interval, ms, range 10-1000
0x0CEF08xx	2F 01 06 00 [VAL]	VAL: 4 bytes	PGN FF2F (time) interval, ms, range 10-1000
0x0CEF08xx	34 01 06 00 [VAL]	VAL: 4 bytes	PGN FF34 (acceleration) interval, ms, range 10-1000
0x0CEF08xx	37 01 06 00 [VAL]	VAL: 4 bytes	PGN FF37 (angular rate) interval, ms, range 10-1000
0x0CEF08xx	3D 01 06 00 [VAL]	VAL: 4 bytes	PGN FF3D (pitch/roll) interval, ms, range 10-1000
0x0CEF08xx	41 01 06 00 [VAL]	VAL: 4 bytes	PGN FF41 (heading) interval, ms, range 10-1000
0x0CEF08xx	43 01 06 00 [VAL]	VAL: 4 bytes	PGN FF43 (temp & pressure) interval, ms, range 10-1000
0x0CEF08xx	9A 00 06 00 [VAL]	VAL: 4 bytes	Set baud rate (saved, effective on reset): 0:1000K, 1:800K, 2:500K, 3:250K, 4:125K
0x0CEF08xx	9C 00 06 00 [VAL]	VAL: 4 bytes	J1939 device ID, 1-64 (default 8). Caution: changing the ID also requires updating the destination address in all J1939 frame IDs.
0x0CEF08xx	00 00 06 00 00 00 00 00	-	Save all configuration to Flash
0x0CEF08xx	00 00 06 00 01 00 00 00	-	Restore factory defaults
0x0CEF08xx	00 00 06 00 FF 00 00 00	-	Reset

xx in the ID field: the J1939 source address, any byte. xx in the data field: any byte.

Example: ID=0x0CEF0855, DATA = 37 01 06 00 64 00 00 00 sets PGN FF37 to a 100 ms period (10 Hz).

4. Firmware Upgrade

This product supports firmware upgrades. Use the CHCenter host software and follow the steps below; request the firmware file (.hex) from our technical support.



5. Technical Support

New product and document information is available via our website and WeChat official account. WeChat:



Telegram:

