GK9501 Input and Output Format Documentation

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1. GKC interface data format

The Goke Command (GKC) interface is the interface for interaction between the user and GK9501. The command format is as follows:

$PGKC Command	Arguments		*	CheckSum	CR	LF

Command: Indicates the sent command number, the specific value refers to the following.

Arguments: Indicates the parameters required to send the command. There can be multiple parameters. Different commands correspond to different data. For specific values, refer to the following.

*ÿ end of data sign

CheckSum: Check data of the whole command, CheckSum value is the XOR value of the argument from PGKC to before * in the whole command, such as "$PGKC030,3,1", the check value is "PGKC030,3, 1" XOR value, its XOR value is 2E

CR, LF: Sample data of packet end mark:

$PGKC030,3,1*2E <CR><LF>

2. GKC commands

1ÿCommand:001

Response message, responding to the processing result of the message sent by the other party

Arguments:

Arg1: The command of the message that this message replies to.

Arg2: "1", message received is not supported

"2", valid message, but executed incorrectly

"3", valid message, and executed correctly

Example:

Send single GPS command: $PGKC115,1,0,0,0*2B<CR><LF> Reply message:

$PGKC001,115,3,1,0,0,0,0,1*28<CR>< LF>

2ÿCommand: 030

System restart command

Arguments:

Arg1: "1", hot start "2",

warm start "3",

cold start "4",

all cold start

Arg2: "1", software restart "2",

hardware restart

"3", clear nvram, keep flash and restart

Example:

All cold start command: $PGKC030,4,2*2A<CR><LF> Hot start

command: $PGKC030,1,1*2C<CR><LF> Remarks: Both hot

start and warm start Arg2 are set to 1, There are three situations where Arg2 is 1, 2, and 3 in full cold start.

Normally, cold start is the full cold start mode, Arg1 is set to 4, Arg2 is set to 2, hardware start

The way of moving, do not use the way of software start.

3ÿCommand:040

Erase auxiliary information in flash

Arguments:

none

Example:

$PGKC040*2B<CR><LF>

4ÿCommand: 051

Enter standby low power mode

Arguments:

Arg1: "0", stop mode

Example:

$PGKC051,0*37<CR><LF>

This command can be woken up by sending any command, invalid commands are also available, the hardware can be woken up by plugging and unplugging the serial port, and the original low-power command can be sent directly.

5ÿCommand: 101

Configure the interval for outputting NMEA messages (in ms)

Arguments:

Arg1: 100-10000

Example:

$PGKC101,1000*02<CR><LF>

This command is set to output NMEA data every 1000ms, that is, 1s.

Remarks: When setting the message interval output above 2HZ, first increase the baud rate to above 115200 to ensure high-frequency NMEA message output. This command is not saved in Flash, and it will be restored to the original state after power off NMEA output frequency.

6ÿCommand: 105

Enter Periodic Low Power Mode

Arguments:

Arg1: "0", normal working mode "1", cycle

ultra-low power tracking mode "4",

directly enter ultra-low power tracking mode

"8", low power mode, can be woken up by sending commands

through the serial port Arg2: Running time (milliseconds), this parameter takes effect in the periodic mode when Arg1 is 1.

Arg3: sleep time (milliseconds), this parameter takes effect in periodic mode when Arg1 is 1.

Example:

$PGKC105,8*3F<CR><LF

$PGKC105,1,5000,8000*3B<CR><LF

7ÿCommand: 115

Set star search mode

Arguments:

Arg1: “1”ÿGPS on

“0”ÿGPS off

Arg2: “1”ÿGlonass on

“0”ÿGlonass off

Arg3: “1”ÿBeidou on

“0”, Beidou off

Arg4: “1”ÿGalileo on

“0”ÿGalileo off

Example: To

set the satellite search mode to single GPS mode, the

command is as follows: $PGKC115,1,0,0,0*2B<CR><LF>

Note: Although the single Galileo mode command is set to $PGKC115,0,0,0,1* 2B can be sent successfully

but the current GK9501 firmware does not support Galileo star search mode.

8ÿCommand: 121

Set the star search mode and save it to flash

Arguments:

Arg1: “1”ÿGPS on

“0”ÿGPS off

Arg2: “1”ÿGlonass on

“0”ÿGlonass off

Arg3: “1”ÿBeidou on

“0”, Beidou off

Arg4: “1”ÿGalieo on

“0”ÿGalieo off

Example: Set

the star search mode to single GPS mode

$PGKC121,1,0,0,0*2C<CR><LF>

The difference between Command115 and 121 is that the 115 command will not be saved in the flash after setting, and the set star search mode will disappear after restarting. The 121 command will be saved in flash after setting, and the set star search mode will be retained after restarting. Neither 115 nor 121 supports Galilean galaxies.

9ÿCommand: 146

Set the serial port input and output format and baud rate

Arguments:

Arg1: "3", NMEA format

Arg2: "3", NMEA format

Arg3: 9600ÿ19200ÿ38400ÿ57600ÿ115200……921600.

Example:

$PGKC146,3,3,9600*0F<CR><LF>

10ÿCommand: 147

Set NMEA output baud rate

Arguments:

Arg1: 9600ÿ19200ÿ38400ÿ57600ÿ115200……921600.

Example:

$PGKC147,115200*06<CR><LF>

11ÿCommand:047

Delete GPD file in Flash

Arguments:

none

Example:

$PGKC047*2C<CR><LF>

12ÿCommand: 149

Set NMEA serial port parameters

Arguments:

Arg1: "0", NMEA data

"1", Binary data

Arg2: 9600ÿ19200ÿ38400ÿ57600ÿ115200……921600.

Example:

$PGKC149,0,38400*2C<CR><LF>

$PGKC149,1,115200*15<CR><LF> Note:

This command is usually used in AGPS to load GPD files into Flash.

13ÿCommand: 161

PPS settings

Arguments:

Arg1: "0", turn off PPS output

"1", the first fix

“2”ÿ3D fix

“3”ÿ2D/3D fix

"4", always on

Arg2: PPS pulse width (ms)

Arg3: PPS pulse period (ms)

Example:

$PGKC161,2,500,2000*0<CR><LF>

Remarks: Among them, the maximum pulse width of PPS is 998ms, the minimum is 1ms, and the minimum range of pulse cycle is 1000msÿ

14ÿCommand: 201

Interval for querying NMEA messages

Arguments:

none

Example:

$PGKC201*2C<CR><LF>

15ÿCommand: 202

Interval at which NMEA messages are returned (response to 201 command)

Arguments:

none

Example:

$PGKC202,1000,0,0,0.0,0.0*02<CR><LF>

16ÿCommand: 239

Turn on or off the SBAS function

Arguments:

Arg1: "0", off "1", on

Example:

$PGKC239,1*3A<CR><LF>

17ÿCommand: 240

Query whether SBAS is enabled

Arguments:

none

Example:

$PGKC240*29<CR><LF>

18ÿCommand: 241

Return whether SBAS is enabled (response to 240 command)

Arguments:

Arg1: "0", off "1",

on

Example:

$PGKC241,1*35<CR><LF>

19ÿCommand: 242

Set NMEA sentence output frequency

Arguments:

Rec1: GLL

Arg2: RMC

Arg3: VTG

Arg4: GGA

Arg5: GSA

Arg6: GSV

Arg7: GRS

Arg8: GST

Arg9~Arg21: reserved

Example:

$PGKC242,1,1,1,1,1,1,0,0,0,0,0,0,0,0,0,0,0,0,0,0*37 <CR><LF>

20ÿCommand: 243

Query the output frequency of NMEA sentences

Arguments:

none

Example:

$PGKC243*2A<CR><LF>

21ÿCommand: 244

Returns NMEA sentence output frequency (response to 243 command)

Arguments:

Args: Refer to 242 command

Example:

$PGKC244,1,1,1,1,1,1,0,0,0,0,0,0,0,0,0,0,0,0,0,0*31<CR><LF>

22ÿCommand: 269

Set the reference coordinate system

Arguments:

Arg1: “0”ÿWGS84

Example:

$PGKC269,0*3E<CR><LF>

23ÿCommand: 270

Query Reference Coordinate System

Arguments:

none

Example:

$PGKC270*2A<CR><LF>

24ÿCommand: 271

Return to the reference coordinate system (response to the 270 command)

Arguments:

Arg1: Refer to 269 command

Example:

$PGKC271,0*37<CR><LF>

25ÿCommand: 279

Query RTC time

Arguments:

none

Example:

$PGKC279*23<CR><LF>

26ÿCommand: 280

Return RTC time (response to 279 command)

Arguments:

Args: Refer to 278 command

Example:

$PGKC280,2017,3,15,12,0,0*15<CR><LF>

27ÿCommand: 284

Set the speed threshold, when the speed is lower than the threshold value, the output speed is 0

Arguments:

Arg1: Threshold value

Example:

$PGKC284,0.5*26<CR><LF>

Remarks: The speed unit is m/s, if the speed is set to a negative number, the command will not take effect, keep the original Speed threshold output.

28ÿCommand: 356

Set the HDOP threshold, when the actual HDOP is greater than the threshold, no positioning

Arguments:

Arg1: Threshold value

Example:

$PGKC356,0.7*2A<CR><LF>639

29ÿCommand: 357

Get HDOP Threshold

Arguments:

none

Example:

$PGKC357*2E<CR><LF>

30ÿCommand: 462

Query the version number of the current software

Arguments:

none

Example:

$PGKC462*2F<CR><LF>

31ÿCommand: 463

Returns the version number of the current software (response to the 462 command)

Arguments:

none

Example:

$PGKC463,GK9501_2.0_Aug 10 2020,GOKE microsemi *3F<CR><LF>

32ÿCommand: 639

Set approximate location information and time information to speed up positioning

Arguments:

Arg1: Latitude, eg: 28.166450 Arg2:

Longitude, eg: 120.389700 Arg3: Altitude, eg:

0 Arg4: Year Arg5: Month

Arg6: day

Arg7: When, the time is UTC time

Arg8: points

Arg9: seconds

Example:

$PGKC639,28.166450,120.389700,0,2017,3,15,12,0,0*33<CR><LF>

Remarks: Among them, the unit of longitude and latitude is degree, and the unit of altitude is meter

33ÿCommand: 786

set location mode

Arguments:

Arg1: "0", normal mode "1",

fitness mode, suitable for walking and jogging

"2", aviation mode, suitable for high-speed sports

mode "3", balloon mode, suitable for elevation mode

Example:

$PGKC786,1*3B<CR><LF>

34ÿCommand: 490

Query current FLASH unique ID information.

Arguments:

none

Example:

$PGKC490*22<CR><LF>

35ÿCommand: 491

Return current FLASH unique ID information (reply 490 command)

Arguments:

Arg1: ManufacturerID and DeviceID of FLASH, for example: 1351

Arg2: UniqueID1, for example: 32334C30,AE000230

Arg3: UniqueID2, for example: FF507900,FFFFFFFF

Example:

$PGKC491,1351,32334C30,AE000230,FF507900,FFFFFFFF,*5E<CR><LF>

27. Support NMEA0183 protocol

GK9501 supports NMEA0183 V4.1 protocol and is compatible with previous versions. For more information about NMEA0183 V4.1

For more information, please refer to the official NMEA 0183 V4.1 document.

Common output formats are as follows:

GGA: time, location, number of satellites

GSA: GPS receiver operating mode, satellites used for positioning, DOP value, positioning status

GSV: Visible GPS satellite information, elevation angle, azimuth angle, signal-to-noise ratio

RMC: time, date, position, speed

VTG: ground speed information

Statement identifier:

identifier	meaning
BD	BDS, Beidou second generation satellite system
GP	GPS
GL	GLONASS
GA	Galileo
GN	GNSS, global navigation satellite system

GGA

$--GGA,hhmmss.ss,llll.ll,a,yyyyy.yy,a,x,xx,xx,xx,M,xx,M,xx,xxxx*hh Sample data:

$GPGGA,065545.789,2109.9551 ,N,12023.4047,E,1,9,0.85,18.1,M,8.0,M,,*5E

name	sample	unit	describe
message ID	$GPGGA		GGA protocol header
UTC time	065545.789		hhmmss.sss
latitude	2109.9551		ddmm.mmmm
N/S indication	N		N=North, S=South
longitude	12023.4047		dddmm.mmmm
E/W indication	AND		W=west, E=east

positioning instructions			0: not positioned 1: SPS mode, positioning is valid 2: Differential, SPS mode, valid positioning 3: PPS mode, positioning is valid
number of satellites	9 1		Range 0 to 12
HDOP	0.85		Horizontal accuracy
MSL amplitude	18.1	rice	
unit	M	rice	
the earth	-2.2	rice	
unit	M		-
differential time	8.0	Second	Invalid when there is no DGPS
Differential ID	0000		
checksum	*5E		
<CR><LF>			end of message

GSA

$--GSA,a,a,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x*hh

Sample data: $GPGSA,A,3,10,24,12,32,25,21,15,20,31,,,,1.25,0.85,0.91*04

name	sample	unit	describe
message ID	$GPGS		GSA protocol header
mode 1	A A		M=Manual, forced in 2D or 3D mode A=Auto

mode 2	3		1: Positioning is invalid 2: 2D positioning 3: 3D positioning
satellite use	10		channel 1
satellite use	24		channel 2
satellite use	12		channel 3
satellite use	32		channel 4
satellite use	25		channel 5
satellite use	21		channel 6
satellite use	15		channel 7
satellite use	20		channel 8
,,,	,,,	,,,	,,,
satellite use			channel 12
PDOP	1.25		Position accuracy
HDOP	0.85		Horizontal accuracy
VDOP	0.91		vertical accuracy
checksum	*04		
<CR><LF>			end of message

GSV

$--GSV,x,x,x,x,x,x,x,...*hh

Sample data:

$GPGSV,3,1,12,14,75,001,31,32,67,111,38,31,57,331,33,26,47,221,20*73

$GPGSV,3,2,12,25,38,041,29,29,30,097,32,193,26,176,35,22,23,301,30*47

$GPGSV,3,3,12,10,20,185,28,44,20,250,,16,17,217,21,03,14,315,*7D

name	sample	unit	describe
message ID	$GPGSV		GSV protocol header
number of messages	3		Range 1 to 3
message number	1		Range 1 to 3
number of satellites	12		
Satellite ID	14		Range 1 to 32
elevation angle	75	Every time	up to 90°
Azimuth	001	Every time	Range 0 to 359°
Carrier-to-noise ratio (C/No) 31		dBHz range 0 to 99, blank if no tracking	
Satellite ID	32		Range 1 to 32
elevation angle	67	Every time	up to 90°
Azimuth	111	Every time	Range 0 to 359°
Carrier-to-noise ratio (C/No) 38		dBHz range 0 to 99, blank if no tracking	
Satellite ID	31		Range 1 to 32
elevation angle	57	Every time	up to 90°
Azimuth	331	Every time	Range 0 to 359°
Carrier-to-noise ratio (C/No) 33		dBHz range 0 to 99, blank if no tracking	
Satellite ID	26		Range 1 to 32
elevation angle	47	Every time	up to 90°
Azimuth	221	Every time	Range 0 to 359°
Carrier-to-noise ratio (C/No) 20		dBHz range 0 to 99, blank if no tracking	

checksum	*73		
<CR><LF>			end of message

RMC

$--RMC,hhmmss.ss,A,llll.ll,a,yyyyy.yy,a,xx,xx,xxxx,xx,a*hh Sample data:

$GPRMC,100646.000,A,3109.9704,N,12123.4219,E,0.257,335.62,291216,,,A*59

name	sample	unit	describe
message ID	$GPRMC		RMC protocol header
UTC time	100646.000		hhmmss.ss
state	A		A=valid data; V=invalid data
latitude	2109.9704		ddmm.mmmm
N/S indication	N		N=North, S=South
longitude	11123.4219		dddmm.mmmm
E/W indication	AND		W=west, E=east
ground speed	0.257	Knot (section)	
position	335.62	Every time	
date	291216		ddmmyy
magnetic variable			
checksum	*59		
<CR><LF>			end of message

VTG

$--VTG,x.x,T,x.x,M,x.x,N,x.x,K*hh

Sample data: $GPVTG,335.62,T,,M,0.257,N,0.477,K,A*38

name	sample	unit	describe
message ID	$GPVTG		VTG protocol header
position	335.62	Every time	
reference	T		True
position	335.62	Every time	
reference	M		Magnetic
speed	0.257	Knot (section)	
unit	N		Festival
speed	0.477	km/h	
unit	K		km/h
unit	A		Positioning system mode indication: A—autonomous mode; D—differential mode; E—Estimation (dead reckoning) mode; M—manual input mode; S—simulator mode; N—Invalid data.
checksum	*10		
<CR><LF>			end of message