Roadstar v2 communication protocol

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Note:

This document refers to Roadstar v2 track and trace device if it's delivered to customer with software (firmware) which is provided from HCP d.o.o.

Otherwise, if Roadstar v2 is delivered to customer without software from HCP d.o.o then the communication protocol described in this document can be used as guide to create communication protocol but that is up to software developer.

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Communication

HCP Roadstar track and trace terminal communicates with server via GPRS based TCP connection.

New connection

At the beginning of every new TCP connection HCP Roadstar is identifying itself to server with HCPI sentence.

HCPI sentence – Identification

Description	Offset(bytes)	Length(bytes)	Type	
Sentence ID	0	1	Byte	100
TerminalID	1	8	String	Terminal (vehicle) identification
IMEI	9	15	String	IMEI of GSM Module
DummyBytes	24	6	Byte[ ]	DummyBytes for compatibility

Table 1. Identification

After receiveing HCPI sentence server must reponse to terminal with HCPO sentence.

HCPO sentence – Identification acknowledge

Description	Offset(bytes)	Length(bytes)	Type	
Sentence ID	0	1	Byte	21

Table 2. Identification acknowledge

After the server has responded HCP Roadstar begins sending track data.

Track record sending

Track record(s) are sent in two ways:

> HCPS – One Track sentence
> HCPP – Sentence(s) packet

Programmers Note:
Easy way to identify which type is coming to server is by first byte (if first byte is greater than 30 than HCPS is coming; if less than 30 than data packet is coming.

Packet are identified as HCPP sentence.

HCPS sentence – One track sentence

Description	Offset(bytes)	Length(bytes)	Type	
Track Data	0	30	Byte[]	Track Data

Table 3. One track sentence

HCPP sentence – data packet

Description	Offset(bytes)	Length(bytes)	Type	
Number of track sentences	0	1	Byte	<=20
Track Data	1	30	Track sentence	First track data
Track Data	31	30	Track Record	Second track data
Track Data	…	…		

Table 4. Data packet

Track data length is always 30 bytes
Maximum sentences per packet is 20
Number of data packets can be calculated with formula:

$$\textbf{(HCPPSentenceLength-1) / (TrackDataLength)}$$

Track data

Description	Offset(bytes)	Length(bytes)	Type	Unit/Description
Event	0	1	Byte	Event (why is data generated) see table
ControlByte	1	1	Byte	0xFF
DateTime	2	4	Int64	Date and time as number of seconds from 01.01.1980.00:00:00
Latitude	6	4	Float	degrees, floating point
Longitude	10	4	Float	degrees, floating point
Altitude	14	2	Int16	meters
Speed	16	2	Int16	km/h
Course	18	2	Int16	degrees
FIX	20	1	Byte	0 – No Fix 3 – Position valid
IO	21	1	Byte	Table 1.3.
ADC1	22	2	Short	mV
ADC2	24	2	Short	mV
Mileage	26	4	Int32	Current state of pulse counter of odometer

Table 5. Track data

When server successfully receive record packet or one sentence from device, it sends acknowledgement of receiving to HCP Hunter (HCPA sentence). HCPA Sentence can contain command to be executed on terminal.

This is the end of certain communication cycle which repeats for every received packet.
After command is executed HCP Hunter will generate new track data record which will contain "Command Executed Event"

HCPA Sentence – Server acknowledge - No Command

Description	Offset(bytes)	Length(bytes)	Type	
Sentence ID	0	1	Byte	21
Reserved	1	1	Byte	0x00

Table 6. Server acknowledge

HCPB Sentence – Server acknowledge - with IO Command

Description	Offset(bytes)	Length(bytes)	Type	
Sentence ID	0	1	Byte	22
OutPortState	1	1	Byte	New State Of Out Pins

Table 7. Server acknowledge

HCPPR Command Sentence – Send new operating parameters to device

Description	Offset(bytes)	Length(bytes)	Type	
Command ID	0	3	Byte[]	[0xE1] [0xA2] [0xB7]
Parameter sentence length	4	1	Byte	
PARSENT	5			
Note: After HCPPR Command Sentence is successfully received by terminal HCPPSS Sentence will be send to server as confirmation				

Table 8. Sending new parameters to device

HCPPRR Command Sentence – Ask terminal to send operating parameters to server

Description	Offset(bytes)	Length(bytes)	Type	
Command ID	0	3	Byte[]	[0xBC] [0xDF] [0x23]
Note: After HCPPRR Command Sentence is successfully received by terminal HCPPSS Sentence will be send to server				

Table 9. Sending operating parameters to server

PARSENT – Operating parameters

Description	Offset(bytes)	Length(bytes)	Type	
RunModeInterval	0	2	Int16	Interval (seconds) to generate and send track data while in RunMode
StopModeInterval	2	2	Int16	Interval (seconds) to generate and send track data while in StopMode
ScanAngle	4	2	Int16	Angle change in degrees to generate and send data. If ScanAngle is < 20 no scanning will be done.
DistanceTriger	6	2	Int16	Distance in meters to generate and send data. If DistanceTriger is <100 no scaning will be done
StopRunModeTriger	8	1	Byte	0 – RunStopMode will be switched by speed 1 – RunStopMode will be switched by state of input 1
DistanceByPulse	9	1	Byte	0 – Distance will be calculated by GPS 1 – Distance will be measured by pulse counter
PinDefaultMask	10	1	Byte	DefaultStateOffInput Pins
ExpandStillInterval	11	1	Byte	ExpandingStopModeInterval automatically 0 – No expanding 1 – Expanding
DefaultStateOfOutputPins	12	1	Byte	DefaultStateOfOutputPins
APNLength	14	1	Byte	Length of APN string
APN	15	APNLength	String	New GPRS APN
GPRSUsernameLength		1	Byte	Length of GPRS Username
GPRSUsername		GPRSUsername Length	String	New GPRS Username
GPRSPasswordLength		1	Byte	Length of GPRS Password
GPRSPassword		GPRSPassword Length	String	New GPRS Password
RemoteHostLength		1	Byte	Length of Remote Host String
RemoteHost		RemoteHost Length	String	Server IP or URL
RemotePortLength		1	Byte	Length of Remote Port
RemotePort		RemotePort Length	String	Remote Port sent as string
WorkInRoaming		1	Byte	Send data while in roaming 0 – No 1 – Yes
OTAPURLLength		1	Byte	Length of OTAP URL
OTAPURL		OTAPURL Length	String	URL for OverAirProgramming
PRGRef		4	Int32	Reference of parameters programming (sent to server after completing configuration)
NetworkAddress Length		1	Byte	Length of Network Address string
NetworkAddress		NetworkAddress Length	String	Network Address on which terminal is currently attached
IMSINumberLength		1	Byte	Length of IMSI Numer
IMSINumber		IMSINumber Length	String	IMSI Number of sim card in terminal

Table 10. Operating parameters

Parameters marked blue are only send in direction Terminal – Server.

HCPPSS Sentence – Send parameters from terminal to server

Description	Offset(bytes)	Length(bytes)	Type	
Sentence ID	0	1	Byte	25
Parameter sentence length	4	1	Byte	
PARSENT	5			

Table 11. Sending parameters from terminal to server

IO Byte Explained

IO Byte of track data consist states of 8 Inputs

Bit	Description	
0	Input PIN 1 state	0=low; 1=high
1	Input PIN 2 state	0=low; 1=high
2	Input PIN 3 state	0=low; 1=high
3	Spare bit	Reserver for future use
4	Output PIN 1 state	0=low; 1=high
5	Output PIN 2 state	0=low; 1=high
6	Output PIN 3 state	0=low; 1=high
7	Output PIN 4 state	0=low; 1=high

Table 12. IO States

HCP Roadstar Events

Event ID	Description
30	Stop Mode Interval Trigger
31	Transition from Stop Mode to Run Mode
32	Run Mode Interval Trigger
33	Transition from Run Mode to Stop Mode
34	Input PIN 1 transition from 0 to 1
35	Input PIN 1 transition from 1 to 0
36	Input PIN 2 transition from 0 to 1
37	Input PIN 2 transition from 1 to 0
38	Input PIN 3 transition from 0 to 1
39	Input PIN 3 transition from 1 to 0
40	Input PIN 4 transition from 0 to 1
41	Input PIN 4 transition from 1 to 0
42	Course changed
43	Distance trigger
44	Reserved
45	Reserved
46	Reserved
200	Command Executed

Table 13. Roadstar events