VT140 AIS140 Communications Protocol

Ver.: V1.0

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Contents

1. AIS-140 CDAC Protocol Description

Normal Packet

When device is working in normal state, there are no alerts and no emergency. Update rates in normal condition.

Emergency Packet

When SOS/Emergency button is pressed, device enters in emergency mode. Update rate during emergency is defined by URE.

Alert Packet

In Normal mode of operation some alerts are not considered as critical. Those are classified as Normal alerts.

Health Monitoring Packet

This packet is like what is requested in AIS140 document. This packet consists device health related parameters.

Login packet

Device transmit the Login message whenever it establishes (re-establishes after disconnection) its connectivity with Server with the specified fields.

2. AIS-140 Protocol Description

Device sends data to secondary server (customer server) over TCP. This section provides detail information on the various packet formats as described by AIS-140 standard. There are total six types of packets as mentioned below:

1. Login Packet

2. Health Monitoring Packet

3. Location/Alert Information Packet

4. Emergency Packet

All the fields mention in protocol format are comma separated.

2.1. Login Packet

A login packet is sent to server whenever there is a new TCP connection made by device to server.
Example:
$,LGN,istartracker,andy123456,867458047932167,V100,AIS140,22.678880,N,114.047001,E

Field field	Description Description	Example
Start Character	$	$
Packet Header	LGN	LGN
Vendor ID	Manufacturer's Name	istartek
Vehicle Registration No.	Vehicle number on which the device is installed	Car123456
IMEI	IMEI	123456789012345
Firmware Version	Version of the firmware used in the hardware.	V100
Protocol Version	Version of the frame format protocol.	AIS140
Latitude	The current setpoint value of the latitude	12.896545
Latitude Direction	N/S	N
Longitude	The current setpoint value longitude	76.358759

Longitude Direction	E/W	E

2.2. Health Monitoring Packet

This packet defines status or health of device. Following is the packet format.
Example:
$,HBT,istartracker,V100,HP,867458047932167,94%,20%,0.00%,20,30,0000,00,0.0,0.0*

Field field	Description Description	Example
Start Character	$	$
Packet Header	LGN	LGN
Vendor ID	Manufacturer's Name	istartek
Firmware Version	Version of the firmware used in the hardware.	V100
IMEI	IMEI	123456789012345
Internal Battery Percentage	Built-in battery percentage.	90%
Low battery threshold Percentage	Low battery alarm threshold percentage.	20%
Memory percentage	Indicates flash memory used in percentage.	0.2%
Data update rate when ignition ON	ACC ON data upload interval (s).	10
Data update rate when ignition OFF	ACC OFF data upload interval (s).	60
Digital Input status	Digital input status.	0001 (DIN1 = 0, DIN2 = 0, DIN3 = 0, DIN4 = 1)
Analog Input status	Analog input status (in V)	12.6
End Character	End character	*

2.3. Location/Alert Information Packet

This is a periodic location information packet sent by device to server.
Example:
**$,NRM,istartracker,V100,NR,01,L,867458047932167,car123456,1,02012020,055911,22.676878,N,114.0
46491,E,0,0,4,82,6.0,4.7,China
Mobile,0,0,19.3,4.1,0,C,31,460,0,249F,10C5,249F,1093,74,249F,0F5C,81,249F,1091,84,249F,10C4,88,000
0,00,0.0,0.0,1684,000022,12***

Field field	Description Description	Example
Start Character	$	$
Packet Header	NRM	NRM
Vendor ID	Manufacturer's Name	istartek
Firmware Version	Version of the firmware used in the hardware.	V100
Packet Type	2 Byte information specifying type of packet. See Packet Types Table for more information.	NR
Alert ID	2 Byte alert ID indicating type of packet see Alert ID Table List for more information.	01

Packet Status	Status of packet L = Live Packet H = History Packet	L
IMEI	Device unique IMEI	867458047932167
Vehicle Registration No.	Mapped Vehicle Registration Number	car123456
GPS Fix	GPS Fix information 1 = GPS Fix 0 = GPS Invalid	1
Date	Date value as per GPS in DDMMYYYY format	01012019
Time	Time value as per GPS in HHMMSS format	093512
Latitude	Latitude value upto 6 decimal places	12.896545
Latitude Direction	North or South	N
Longitude	Longitude value upto 6 decimal places	76.358759
Longitude Direction	East or West	E
Speed	Speed of vehicle upto 1 decimal place in km/h	25
Heading	Course over ground in degrees.	135
No. of Satellites	No. of satellite in view for location fix	10
Altitude	Altitude of device in meters	76
PDOP	Positional dilution of precision	2.5
HDOP	Horizontal dilution of precision	1.9
Operator Name	Name of network operator	Airtel
Ignition	Status of Ignition 1 – Ignition On 0 – Ignition Off	1
Main Power Status	0 – Vehicle Battery Disconnected 1 – Vehicle Battery Connected	1
Main Input Voltage	Indicator showing source voltage in Volts (Upto 1 decimal place)	12.4
Internal Battery Voltage	Indicator of battery charge in volts (upto 1 decimal place)	4.2
Emergency Status	0 – Emergency Off 1 – Emergency On	0
Temper Alert	O – Box open C – Box Closed	C
GSM Strength	Value range from 0 – 31	31
MCC	Mobile Country Code	404
MNC	Mobile Network Code	98
LAC	Location Area Code	XXXX
Cell ID	GSM Cell ID	XXXX
NMR (Network Measurement Report)	Cell ID, LAC and Signal Strength of 4 Neighboring cells	(24,XXXX,XXXX)*4 times
Digital Input Status	Status of 4 Digital Inputs in order: [DIN3, DIN2, DIN1, DIN0] 0 – Off, 1 – On	0000
Digital Output Status	Status of 2 Digital Outputs in order: [DOUT1, DOUT0]	00

	0 – Off, 1 – on	
Analog Input 1	Analog Input 1 voltage in V	6.7
Analog Input 2	Analog Input 2 voltage in V	2.5
Odometer	Odometer value in m	123456
Frame Number	Sequence number of packet (from 000001 to 999999)	000005
Checksum	Packet checksum (CRC32)	ABCDABCD
End Character	*	*

2.4. Emergency Packet

When SOS button is pressed, device send following emergency packet to server.
Example:
$,EPB,istarttracker,EMR,867458047932167,NM,02012020062650,A,22.678373,N,114.046198,E,80,1,1863, G,car123456,,*473A0F35

Field field	Description Description	Example
Start Character	$	$
Packet Header	EPB, The unique identifier for all messages from VLT. EPB, a fixed value.	EPB
Vendor ID	Manufacturer's Name	istartek
Packet Type	Emergency Packet type EMR – Emergency Message SEM – Stop Message	EMR
IMEI	IMEI	123456789012345
Packet Status	Status of packet NM = Normal Packet SP = Stored Packet	NM
Date&Time	Date value as per GPS date time per GPS time (DDMMYYYYhhmmss)	18122017124850
GPS Fix	GPS Fix information A = GPS Fix V = GPS Invalid	A
Latitude	Latitude value upto 6 decimal places	12.896545
Latitude Direction	North or South	N
Longitude	Longitude value upto 6 decimal places	76.358759
Longitude Direction	East or West	E
Altitude	Altitude of device in meters	123
Speed	Speed of vehicle upto 1 decimal place in km/h	25
Distance	Distance calculated from previous GPS data	12345
Provider	G – Fine GPS N – Coarse GPS or data from NW	G
Vehicle Registration No.	Vehicle Registration Number	XX12XX1234
Reply Number	The mobile number to which Test response needs to be sent	NA
End Character	End character	*

Terminator		
Checksum	The 32 bit checksum of all the characters from the header up to the CRC field	FFFFFF96

2.5. Packet Types

Type	Discription
EA	Emergency Alert
TA	Temper Alert
HP	Health Packet
IN	Ignition On
IF	Ignition Off
BD	Vehicle Battery Disconnected
BR	Vehicle Battery Reconnected
BL	Internal Battery Low
HB	Harsh Breaking
HA	Harsh Acceleration
RT	Rash Turning
WD	SOS/Emergency Button Wire Disconnect
OS	Overspeed Alert

2.6. Alert ID List

Alert	Name	Discription
01	Location Update	Default Message from device
02	Location Update (History)	If GPRS is not available at time of sending message
03	Mains off	When device is disconnected from vehicle battery
04	Low Battery	Device internal battery low alert
05	Low Battery removed	Device internal battery ok
06	Mains On	Device is reconnected to vehicle battery
07	Ignition On	Vehicle ignition on alert
08	Ignition Off	Vehicle Ignition off alert
09	Temper Alert	Device box open
10	Emergency On	Emergency on alert
11	Emergency Off	Emergency off alert
12	OTA Alert	Parameter change/query alert packet
13	Harsh Breaking	Alert indication a hash break
14	Harsh Acceleration	Alert indicating harsh acceleration
15	Rash Turning	Alert indicating rash turn
16	Wire Disconnect	SOS/Emergency button wire disconnect alert
17	Overspeed	Alert indicating overspeed

2. Command Description

Device supports configuration that can be done from either server or via SMS. As per AIS-140 standard

device must support commands to SET, GET and CLR for setting, getting and clearing a device configuration. Command format for setting parameter is
[SET]<space>[Key:Value]
To get parameter value:
[GET]<space>[Key]
To clear parameter:
[CLR]<space>[Key]

Configuration Keys

3.1. PIP – Primary Server IP

Set Primary server URL for sending data
Usage:
PIP:[IP/Domain]
E.g. – SET PIP:example.com   or   SET PIP:123.123.123.123

3.2. PPT –Primary Server Port

Set Primary server port
Usage:
PPT:[Port Number]
E.g. –   SET PPT:8011

3.3. SIP – Secondary Server IP

Set Secondary server IP for sending data
Usage:
SIP:[IP/Domain]
E.g. –   SET SIP:example.com   or   SET SIP:123.123.123.123

3.4. SPT – Secondary Server Port

Set Secondary server port
Usage:
SPT:[Port Number]
E.g. –   SET SPT:8011

3.5. EO – Emergency OFF

Emergency OFF or stop emergency message. Only set is allowed with this key.
Usage:
SET EO

3.6. ED – Emergency Duration

Emergency timeout duration in minutes. Default is 30 minutes
Usage:
ED:[Duration in minutes]
Minimum allowed value for duration is 1 minute.

E.g. –   SET ED:50

3.7. APN – Network APN

Set network access point name, default automatic
Usage:
APN:[Network APN]
E.g. –   SET APN:CMNET

3.8. SL – Speed Limit

Set Speed limit in km/h. Default 70km/h
Usage:
SL:[Speed Limit]
E.g. –   SET SL:120

3.9. VN – Vehicle Registration Number

Vehicle registration number
Usage:
VN:[Registration Number]
E.g. –   SET VN:666

3.10. UR – Update Rate

Update duration/data rate in seconds when Vehicle in motion.
Usage:
UR:[Value in sec]
E.g. –   SET UR:10

3.11. URE – Update Rate Emergency

Update duration or data rate in seconds for emergency packet. Default 60 seconds.
Usage:
URE:[Value in sec]
E.g. –   SET URE:20

3.12. URH – Update Rate Health Packet

Update duration or data rate in minutes for health monitoring packet. Default 60 minutes.
Usage:
URH:[Value in Minutes]
E.g. –   SET URH:5

3.13. VID – Vendor ID

Set vendor ID as per AIS-140.
Usage:
VID:[vendor ID]
E.g. –   SET VID:ISTARTEK

3.14. ODM – Set Odometer

This command can be used to reset odometer or set odometer to a value. The value is in kilometers and can be floating point.
Usage:
ODM:<value>
E.g.:   SET ODM:123 To reset, simply set value to 0. e.g.: SET ODM:0