

1. Introduction

DA3100 is an on-board diagnostic (OBD-II) device that enables collection of data from vehicle OBD-II port, GPS and Accelerometer. It supports 2G/3G and Bluetooth 4.0 LE (optional) communication with telematics service terminal (TST) servers and smart phones respectively.

2. Objective

This manual provides users with guidance of DA3100's installation, viewing and processing of data collected. Section 3 describes viewing of data collected on Huawei's demo web portal. For performance evaluation proposes, section 4 outlines the steps to amend server address and message format decoding at the server of choice.

3. Functional Usage

3.1. DA3100 Installation

- i. Insert a valid 2/3G SIM into the SIM slot with the contact points facing the bottom as follow:



Note: only support GSM, GPRS and WCDMA

- ii. Plug it into the vehicle OBD-II connector with the ignition on. Location varies between vehicles. Normally, it is below the dashboard near the leg room area.

3.2. DA3100 Operation Steps

Step	Pre-condition	Action	Response	Remark
1	Ignition On and locate the OBD-II connection	Plug DA3100 into the vehicle OBD-II connection	All 3 LEDs will be On for 3 sec.	If any LED is off, it indicates that particular LED is faulty.
2	Step 1	DA3100 checking vehicle OBD-II protocol	a. OBD LED Flashing with Cellular and Power LED On for 20 sec.	a. Vehicle OBD-II supported
			b. OBD LED Off with Cellular and Power LED On for 20 sec.	b. Vehicle OBD-II not supported
3	Step 2	DA3100 registering network	a. Cellular LED Flashing with Power LED On and OBD LED status as in Step 2	a. Carrier network registration success
			b. Cellular LED Off with Power LED On and OBD LED status as in Step 2	b. Carrier network registration fails. Disconnect and repeat step 1
4	Step 3a	Setting APN through SMS as described in Section 3.3 (i)	a. SMS reply OK	a. APN set success
			b. SMS reply fail or no SMS reply	b. Repeat Step 4 after 5 sec. Possible fault: SIM does not support APN or server is down
5	Step 4a	Data view as described in Section 3.4	a. If vehicle OBD-II supported as in Step 2a	a. Data view display VIN code read from vehicle
			b. If vehicle OBD-II not supported as in Step 2b	b. Data view display VIN code as "OBD fail"
6	Ignition Off	DA3100 to go into sleep mode and heartbeat send according to SMS setting as described in Section 3.3 (iv)	All 3 LEDs Off and heartbeat send	Data view display VIN code as "Heartbeat"
7	Step 6	Ignition On	DA3100 back to status before ignition Off	



3.3. Configuration through SMS

Device can be configured via SMS commands. These commands are sent to the device SIM number and the device will reply with an SMS response. Below are the commands and responses.

- i. Set the APN according to the network carrier provided (Note: APN MUST be set upon initialization of device usage. There is no default setting)

SMS Command: **+MTP:1000,<USN>,<PWD>,<NAME>**

Response (via SMS): **Tips:APN UserName:<USN>,APN Password:<PWD>,APN Name: <NAME> setting ok!**

<USN>: APN user name, blank if not applicable

<PWD>: APN password, blank if not applicable

<NAME>: APN name

- ii. Set the data upload time (default is 30 second)

SMS Command: **+MTP:1001,<TIME>**

Response (via SMS): **Tips:MTP Report Period:<TIME> setting ok!**

< TIME >: upload time in seconds (min is 1 second)

- iii. Retrieve system parameters and status for settings confirmation

SMS Command: **+MTP:1002**

Response (via SMS): **Tips:SoftVer:<VER>,APN UserName:<USN>,APN Password:<PWD>,APN Name:<NAME>,IP:<IP>,PORT: <PORT>,Report Period: < TIME >,Server Connect Status:OK!**

<VER>: software version, eg. V1.000.20130108

<USN>: APN user name, blank if not applicable

<PWD>: APN password, blank if not applicable

<IP>: IP address, eg. 172.22.44.33 (Note: Huawei server IP address)

<PORT>: Port number, eg. 12001 (Note: Huawei server port number)

<TIME>: upload time in seconds

- iv. Set the heartbeat time (default is 1 second)

SMS Command: **+MTP:1004,<TIME>**

Response (via SMS): **Tips:Heartbeat Period:<TIME> setting ok!**

< TIME >: heartbeat time in seconds

3.4. Web Data View (TST)

- i. Log on to <http://124.238.215.168:8080/TSP-PORTAL/>



- ii. Enter the following:

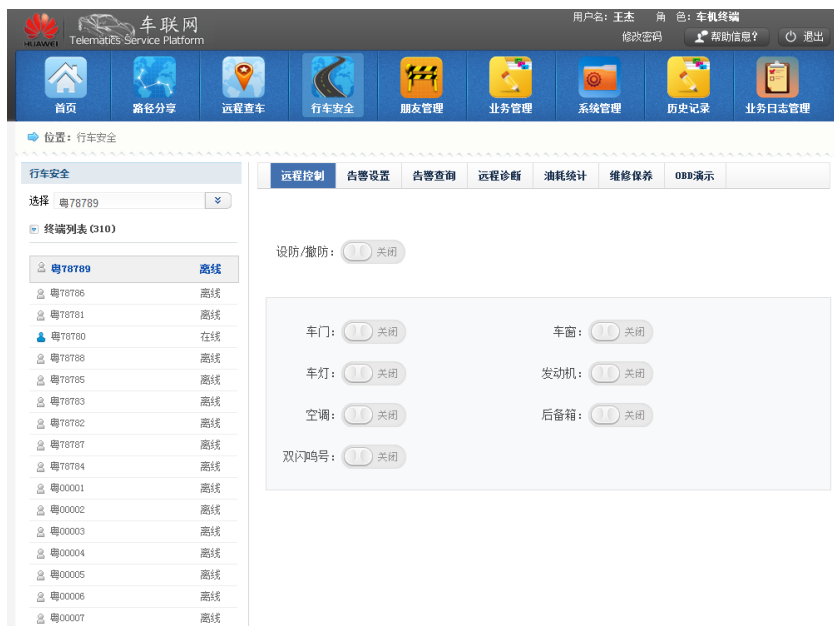
Username: 888888888888

Password: 11111111

- iii. Click on “Road Safety”



Screen change to the following:



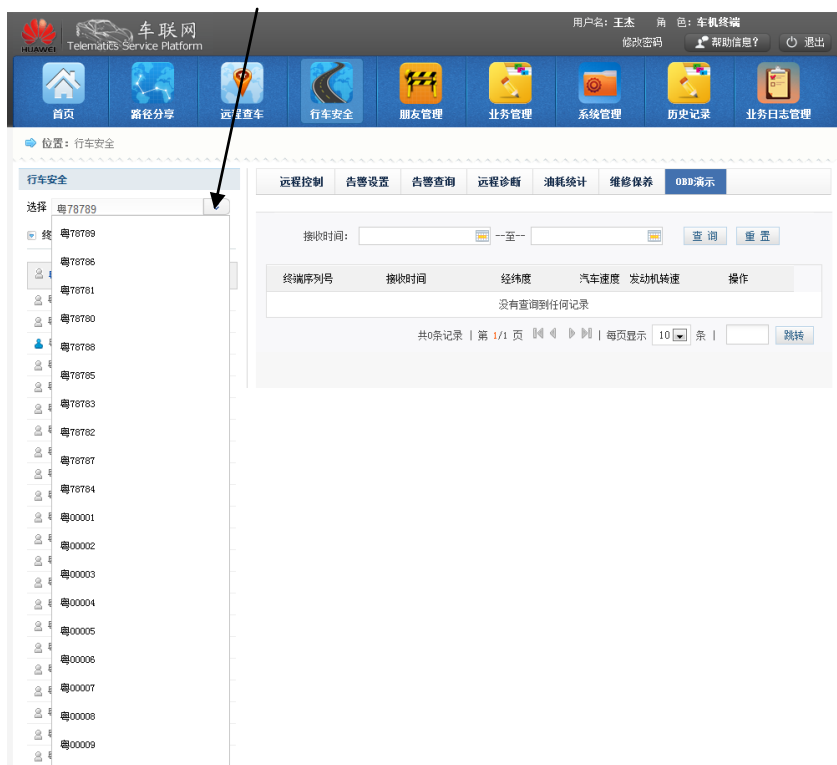
iv. Click on “OBD Display”

Click on “OBD Display”



- v. Select drop list for device serial and select as follows:

Drop list



- vi. Click on the “Detail” to view the other data



Note: Receive Time is based on the time the server received the data. Server time error could cause this to be inaccurate. For accurate timing, please refer to the UTC time under “Detail”

Detail data as follows:



4. Performance Usage

This section allows users to send data message to their server and decode it. The installation and configuration settings are identical as described in section 3.1 and 3.2 respectively. Additional SMS command is available to set the IP and Port number of the user server. This must be set before data can be sent to the server of choice.

4.1. Setting the IP and PORT

SMS Command: **+MTP:1003,<IP>,<PORT>,[TCP/UDP]**

Response (via SMS): **Tips:ip:<IP>,port:<PORT> setting ok!**

<IP>: IP address, eg. 172.22.44.33

<PORT>: Port number, eg. 12001

[TCP/UDP]: Optional field, default is TCP

TCP: 0, UDP: 1

Example (default TCP): **+MTP:1003,172.22.44.33,12001**

Example (UDP): **+MTP:1003,172.22.44.33,12001,1**

4.2. Message Decoding

The following enable user to decode device message on their server. Users can ignore the data in black and just focus on the red ones.

i. Log In

Log in message would be send from device to TST. TST needs to acknowledge this log in before device can continue to function.

Format of message send from Device to TST = 【Log In 29 Byte】

【Log In 29 Byte】 = 【Total Length 2 byte】 【Command Code 2 byte】 【Packet Serial Number 4 byte】

【Protocol Version 2 byte】 【Safety Mark 1 byte】 【Reserved Byte 1 byte】 【Device Serial Number 16 byte】

【Tmp Type 1 byte】

00 1D /* Total Length */

00 01 /* Command Code */

00 00 00 01 /* Packet Serial Number */

03 00 /* Protocol Version */

00 /* Safety Mark */

10 /* Reserved Byte */

4D 30 30 31 30 41 30 31 31 32 38 37 38 37 38 30 /* Device Serial Number */

00 /* Tmp Type */



Format of message send TST to Device = 【Log In Ack 30 Byte】

**【Log In Ack 30 Byte】 = 【Total Length 2 byte】 【Command Code 2 byte】 【Packet Serial Number 4 byte】
【Protocol Version 2 byte】 【Safety Mark 1 byte】 【Reserved Byte 1 byte】 【Device Serial Number 16 byte】
【Device Type 1 byte】 【Result 1 byte】**

00 1E /*Total Length*/

80 01 /* Command Code, Byte 1=0x80, Byte 2 according to what is received, in this case is 0x01 */

00 00 00 01 /* Packet Serial Number, according to what is received */

03 00 /* Protocol Version, according to what is received */

00 /* Safety Mark, according to what is received */

10 /* Reserved Byte, according to what is received */

4D 30 30 31 30 41 30 31 31 32 38 37 38 37 38 30 /* Device Serial Number, according to what is received */

00 /*Device Type, 0x00: DA3100*/

00 /*Result, 0x00: Success, 0x01: Failed*/

ii. Vehicle Data

Vehicle data is a one way message where TST just need to decode it and no acknowledge required.

Format of message send from Device to TST = 【Header 28 Byte】 + 【Message Content 0-65507 Byte】

【Header 28 Byte】 = 【Total Length 2 byte】 【Command Code 2 byte】 【Packet Serial Number 4 byte】

【Protocol Version 2 byte】 【Safety Mark 1 byte】 【Reserved Byte 1 byte】 【Device Serial Number 16 byte】

【Message Content 0 -65507 Byte】 = 【TAG Number (0x9010)】 【Message Content Length 2 Byte】

【Message Content】 【MD5 Checksum 20 byte】

【Message Content】 :

<D>,<T>,<LT>,<LN>,<AL>,<SP>,<RPM>,<MAF>,<MIL>,<TMP>,<THR>,<HD>,<SV>,<HP>,<BV>,<CQ>,<ODO>,<GS>,<GT>,<AC>,<DC>,<TN>,<IG>,<VIN>,<FuelLevel>

<D>: UTC Date of trigger (10 characters – YYYY-MM-DD)

<T>: UTC Time of trigger (8 characters – HH:MM:SS)

<LT>: Latitude (5 digits after decimal point)

<LN>: Longitude (5 digits after decimal point)

<AL>: Altitude (meters)

<SP>: Speed (kph)

<RPM>: Engine RPM (rpm)

<MAF>: MAF air flow rate

<MIL>: MIL malfunction indication light

<TMP>: Coolant temperature (°C)

<THR>: Throttle position (%)

<HD>: Heading (degrees)

<SV>: Number of satellites used for position fix

<HP>: HDOP (GPS accuracy figure of merit, 2 decimal place)

<BV>: Battery voltage (V, 2 decimal place)

<CQ>: GSM receive signal strength (0-31, 31 best signal)

<ODO>: KMs (100m resolution) driven since last reset or power cycle.

<GS>: GPS status where 0=not locked, 1=locked, 2= no com and 3=GPS OFF power saving mode

<GT>: GPS lost lock time (yyyy-mm-dd hh:mm:ss, used to determine the time increments from the last time on GPS Lock –

ex : Events in underground parking)

<AC>: Accelerometer X axis- mg

<DC>: Accelerometer Y axis- mg

<TN>: Accelerometer Z axis- mg

<IG>: Ignition status: 0 = OFF, 1 = ON

<VIN>: VIN code

<FuelLevel>: Fuel level (%)

***All data are in string format**

Example as below:

00 A3 /* Total Length */
00 07 /* Command Code */
00 00 00 01 /* Packet Serial Number */
03 00 /* Protocol Version */
00 00 /* Safety Mark */
4D 30 30 31 30 41 30 31 31 32 38 37 38 37 38 30 /* Device ID */
90 10 /* TAG */
00 6F /* Message Length */
32 30 31 33 2D 30 33 2D 32 31 /* UTC Data 2013-03-21 */
2C
30 32 3A 33 31 3A 34 38 /* UTC Time 02:31:48 */
2C
30 2E 30 30 30 30 /* Latitude 0.00000 */
2C
30 2E 30 30 30 30 /* Longitude 0.00000 */
2C
2C /* No altitude available in this case */
31 30 33 /* Speed 103 kph */
2C
35 31 39 37 /* RPM 5197 r/min */
2C
32 30 38 /* MAF 208 g/sec */
2C
30 /* 0 */
2C
34 30 /* Coolant 40 °C */
2C
33 31 /* Throttle Position 31 % */
2C
2C /* No heading available in this case */
2C /* No satellites available in this case */
2C /* No HDOP available in this case */
31 31 2E 37 33 /* Battery 11.73 V */
2C
33 31 /* GSM Strength 31 */
2C
32 37 30 30 /* Driven 2700 Km */
2C
30 /* 0 */
2C
2C /* No GPS lost lock time available in this case */
2D 33 /* X-axis -3 mg */



2C

2D 39 39 33 /* Y-axis -993 mg */

2C

31 31 /* Z-axis 11 mg */

2C

31 /* Ignition 1 */

2C

31 47 31 4A 43 35 34 34 34 52 37 32 35 32 33 36 37 /* VIN Code 1G1JC5444R7252367 */

2C

33 31 /* Fuel 31 %*/

E0 21 00 10 09 95 8D 08 E6 DB 82 D7 7D 9F 08 67 28 C0 3B 95 /*MD5 Checksum*/