CHERY	Chery ERA diagnostic parameter specification	Chery Automobile

Chery ERA diagnostic parameter specification

V1.0 Issue

2016.8

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1 History

Date	Version	Comments	Author
15/8/2016	1.0 Issue	Initial version.	Pan Jianlong

Remark: All changes are marked in yellow

2 Introduction

This document gives the detailed description of parameters used by ERA CAN diagnostic functions .Definitions which don’t accord with this specification should be defined in《Chery XXX(project) ERA Diagnostic Parameter Configuration Specification》.

3 Reference

The document is based on the following standards:

1. QSQR E8-20-2016 Vehicle UDS Diagnostic CAN Standard
2. VEEA_v1.1 Platform Diagnostic Function Requirement　Version:00
3. QSQR B1-69-2014, 控制器软硬件版本格式编制规则.

4 Abbreviations

Terms	Descriptions
ERA	Emergency (urgent) Response for Accident
ICCID	Intergate circuit card idenitity
ASCII	American Standard Code for Information Interchange
CAN	Controller Area Network
ID/DID	Identifier/Data Identifier
DTC	Diagnostic Trouble Code
ECU	Electronic Control Unit
EOL	End Of Line
CNG	Compressed Natural Gas
LPG	Liquefied Petroleum Gas

5 CAN diagnostic ID

The following CAN diagnostic message ID will be used for ERA diagnostic implementation:

Parameter	Value
ERA Reception ID (Tester Transmit Request)	$768
ERA Transmission ID (Tester Receive Response)	$778
ERA Tester Transmit Functional Request	$7DF

6 Diagnostic services used

This section describes the diagnostic services used in ERA CAN diagnostic implementation. The following services and their sub-functions must be supported by ERA .

Diagnostic Service Name	Service	Sub-function (Hex)			Security Access Level Required
Diagnostic Session Control	10	01	02	03	-
ECU Reset	11	01	/	/	-
Clear Diagnostic Information	14	/	/	/	-
Read DTC Information	19	02	0A		-
Read Data By Identifier	22	/	/	/	-
Security Access	27	03/04	/	/	-
Write Data By Identifier	2E	/	/	/	03/04
Tester Present	3E	00	/	/	-

NOTE:

The details about the service and the sub-function in above table can be found in “QSQR E8-20-2016Vehicle UDS Diagnostic CAN Standard”.

7 Parameter convention

The presence of each parameter is described by one of the following convention (Cvt) values:

Type	Name	Description
R	Regulation	Requirement of regulation.
L	Learning	Requirement of ECU learning, e.g. key learning.
C	Calibration	Requirement of ECU calibration, e.g. steering angle sensor calibration.
I	Initialization	Requirement of ECU initialization, e.g. software configuration.
M	Maintenance	Requirement of ECU system maintenance.
O	Other	Other requirement

8 Data Identifier

The following Data Identifiers should be supported:

Hex	Description	Supported Service	Size (byte)	Data Type	Cvt
FD00	ERA parameter configuration	$22	4	Bitmap	O
FD01	Vehicle Type	$22	1	Bitmap	M
FD02	Fuel Type	$22	1	Bitmap	M
FD03	ICC ID	$22	8	Dec	M
F188	Vehicle Manufacturer ECU Software Version Number	$22	8	ASCII	M
F190	Vehicle Identification Number	$22/$2E	17	ASCII	M
F191	Vehicle manufacturer ECU hardware number	$22	5	ASCII	M

8.1 ERA parameter configuration (FD00h)

It is clear that the maximum range of ECU DID/RID is fixed, DIDs/RIDs used in each vehicle platform in Chery should be included in this maximum range. For one project, ECU with certain part number only support specified DIDs/RIDs that included in the maximum range. It can be realized by reading the parameter “ERA parameter configuration” to know what kinds of paramers are supported by ECU. You can get the corresponding relationship between ECU part number and DIDs/RIDs for certain project from 《Chery XXX(Project) XXX(ECU) diagnostic parameter configuration specification》.

Data Byte	Coding
Data #1	0b:Not supported 1b: Supported Bit7: FD01 Bit6: FD02 Bit5: FD03 Bit4: Reserved Bit3: Reserved Bit2: Reserved Bit1: Reserved Bit0: Reserved
Data #2~ Data #4	0b:Not supported 1b: Supported Reserved

8.2 Vehicle Type (FD01h)

Data Byte	Description	Coding	Example (hex)
Data #1	Vehicle Type	01h: M1 vehicle type 02h: M2 vehicle type 03h: M3 vehicle type 04h: N1 vehicle type 05h: N2 vehicle type 06h: N3 vehicle type	/

8.2 Fuel Type (FD02h)

Data Byte	Description	Coding	Example (hex)
Data #1	Fuel Type	01h: gasoline 02h: diesel 04h: CNG 08h: LPG 10h: electricity 20h: hydrogen	/

8.3 ICC ID (FD03h)

Data Byte	Description	Coding	Example (hex)
Data #1-Data#8	ICC ID	Hex→Dec	7C 7C 78 74 99 6F 37 93 à 8970177000000927635

9 ECU version information.

9.1 Vehicle Manufacturer ECU Software Version Number (F188h)

Data Byte	Description	Coding	Example (hex)
Data #1 - Data #8	Vehicle manufacturer ECU software number	ASCII	30 30 20 30 30 20 30 31 à 00.00.01

Note:

1. For Software number coding and updating rules, please refer to “QSQR B1-69-2014 控制器软硬件版本格式编制规则 ”.
2. This value should be written into ECU by supplier.

9.2 Vehicle Identification Number (F190h)

Data Byte	Description	Coding	Example (hex)
Data #1 - Data #17	Vehicle Identification Number	ASCII	4C 56 56 44 42 31 34 42 58 47 44 30 36 37 33 33 38 à LVVDB14BXGD067338

Note:

1. If the data length is less than 17, fill the last byte(s) with 0x20.
2. This value should be written into ECU by supplier.

9.3 Vehicle Manufacturer ECU Hardware Number (F191h)

Data Byte	Description	Coding	Example (hex)
Data#1-Data#5	Vehicle Manufacturer ECU Hardware Number	ASCII	30 20 30 20 31 à 0.0.1

Note:

1. For Hardware number coding and updating rules, please refer to “QSQR B1-69-2014 控制器软硬件版本格式编制规则 ”.
2. This value should be written into ECU by supplier.

Annex1 EOL dataflow

The following table shows the ERA EOL operations.

NO.	Description
1	Read ECU ID
2	Write the vehicle identification number
3	Read Data

1. Read ECU ID

No.	Manual Operation	Diagnostic Data	Remark
1	/	/	The EOL equipment gets the Vehicle Manufacturer ECU Software/Hardware Number
2	/	768 02 10 01 00 00 00 00 00 778 02 50 01 00 00 00 00 00	Start the default session
3	/	768 03 22 F1 88 00 00 00 00 778 10 0B 62 F1 88 XX XX XX 768 30 00 0A 00 00 00 00 00 778 21 XX XX XX XX XX 00 00	/
4	/	768 03 22 F1 91 00 00 00 00 778 10 08 62 F1 91 XX XX XX 768 30 00 0A 00 00 00 00 00 778 21 XX XX 00 00 00 00 00	/

2.Write the vehicle identification number

No.	Manual Operation	Diagnostic Data	Remark
1	/	/	The EOL equipment gets the vehicle identification number
2	/	768 02 10 01 00 00 00 00 00 778 02 50 01 00 00 00 00 00	Start the default session
3	/	768 02 10 03 00 00 00 00 00 778 02 50 03 00 00 00 00 00	Start the EOL session
4	/	768 02 27 03 00 00 00 00 00 778 04 67 03 Seed_1Seed_2 00 00 00 768 04 27 04 Key_1Key_2 00 00 00 778 02 67 04 00 00 00 00 00	Security Access
5	/	768 10 14 2E F1 90 XX XX XX 778 30 00 0A 00 00 00 00 00 768 21 XX XX XX XX XX XX XX 768 22 XX XX XX XX XX XX XX 778 03 6E F1 90 00 00 00 00	Write the vehicle identification number
6	/	768 02 10 01 00 00 00 00 00 778 02 50 01 00 00 00 00 00	Change to default session
7	/	768 03 22 F1 90 00 00 00 00 778 10 14 62 F1 90 XX XX XX 768 30 00 0A 00 00 00 00 00 778 21 XX XX XX XX XX XX XX 778 22 XX XX XX XX XX XX XX	Check the vehicle identification number: If the written VIN is not equal to that the EOL equipment got, give the error indication.

3. Read Data

No.	Manual Operation	Diagnostic Data	Remark
1	/	/	The EOL equipment gets the ECU data and print.
2	/	768 02 10 01 00 00 00 00 00 778 02 50 01 00 00 00 00 00	Start the default session
3	/	768 03 22 FD 01 00 00 00 00 778 04 62 FD 01 XX 00 00 00	Vehicle Type : 01h-M1, 02h-M2, 03h-M3, 04h-N1, 05h-N2, 06h-N3
4	/	768 03 22 FD 02 00 00 00 00 778 04 62 FD 02 XX 00 00 00	Fuel Type: 01h-gasoline, 02h-diesel, 04h-CNG, 08h-LPG, 10h-electricity, 20h – hydrogen

5	/	768 03 22 FD 03 00 00 00 00 778 10 0B 62 FD 03 XX XX XX 768 30 00 0A 00 00 00 00 00 778 21 XX XX XX XX XX 00 00	ICC ID: Hex→Dec
6	/	768 03 22 F1 90 00 00 00 00 778 10 14 62 F1 90 XX XX XX 768 30 00 0A 00 00 00 00 00 778 21 XX XX XX XX XX XX XX 778 22 XX XX XX XX XX XX XX	Vehicle Identification Number: ASCII
7	/	768 04 14 FF FF FF 00 00 00 778 01 54 00 00 00 00 00 00	Clear DTC
8	/	768 03 19 02 09 00 00 00 00 778 XX 59 02 09 XX XX XX XX …	Read DTC. If DTCs present, print the DTC list.

Annex2 Security access algorithm

This section describes the security access algorithm used in SecurityAccess ($27)service.

```
/* Function Name: Word calcKey(Word seed)
* Description: Calculate key to a given seed.
* Param: seed - Seed to which the key has to be calculated
* Return: Word - Calculated key*/
static Word calcKey(Word seed)
{
    #define TOPBIT 0x8000
    #define POLYNOM_1 0x8408
    #define POLYNOM_2 0x8025
    #define BITMASK 0x0080
    #define INITIAL_REMINDER 0xFFFE
    #define MSG_LEN 2 /* seed length in bytes */
    Byte bSeed[2];
    Word remainder;
    Byte n;
    Byte i;
    bSeed[0] = (Byte)(seed >> 8); /* MSB */
    bSeed[1] = (Byte)seed; /* LSB */
    remainder = INITIAL_REMINDER;
```



```
    for (n = 0; n < MSG_LEN; n++)
    {
        /* Bring the next byte into the remainder. */
        remainder ^= ((bSeed[n]) << 8);
        /* Perform modulo-2 division, a bit at a time. */
        for (i = 0; i < 8; i++)
        {
            /* Try to divide the current data bit. */
            if (remainder & TOPBIT)
                {
                    if(remainder & BITMASK)
                    {
                        remainder = (remainder << 1) ^ POLYNOM_1;
                    }
                    else
                    {
                        remainder = (remainder << 1) ^ POLYNOM_2;
                    }
                }
                else
                {
                    remainder = (remainder << 1);
                }
        }
    }
    /* The final remainder is the key */
    return remainder;
}
```