

GE Security, Technology
MobileView 4 Interface
Specification
J1587/J1708



Mobile Products
Video System Group
NS Engineering, Salem

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Approvals

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1 Introduction

1.1 Purpose

This document provides a summary of the optional J1587/J1708 interface utilized by the MobileView 4 Series DVR (MV4). The MV4 provides diagnostic and fault data in accordance with messaging protocols defined in SAE document J1587 and transmits this data across an electrical interface compliant with SAE document J1708. The MV4 does not implement broader network protocol standards such as those outlined in SAE document J1939.

This MV4 J1587/J1708 interface is optional, disabled by default, and requires peripheral equipment and interconnection apparatus to function completely.

1.2 Goals

This document is intended to define the current state of J1587/J1708 interface implementation on the MV4. Since methods of physical connection vary according to implementation specifics, this document does not provide detail on that subject.

1.3 Applicability

Information contained in this document applies to specific MobileView DVR software as identified below.

Information is applicable to MobileView Software Version 4.40.10.1250.

2 General Information

SAE document number J1587 is entitled "Electronic Data Interchange Between Microcomputer Systems in Heavy-Duty Vehicle Applications". The document defines a standard message format or protocol that vehicle modules use to exchange data. The SAE document is subject to change to keep current with technological and safety advances. The document defines the physical layer of the data connection.

2.1 J1587

The MV4 sends device status messages in a format adhering to SAE document J1587, "Electronic Data Interchange Between Microcomputer Systems in Heavy Duty Vehicle Applications" (Feb. 2002). Heavy-duty vehicles use this standard to share diagnostic and status information between electronic control units. Adherence to this standard ensures reliable data exchange between the MV4 and other on-vehicle fault monitoring devices.

2.2 J1708

The MV4 transmits data across an electrical interface adhering to SAE document J1708, "Serial Data Communications Between Microcomputer Systems in Heavy Duty Vehicle Applications" (Oct. 2003). This is an electrical interface utilizing a 2-wire RS485 bus for electrical communication. The 2-wire medium is 18AWG, twisted pair (1-turn

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per inch minimum), and a maximum wire length of 40 meters. Although the standard electrical connector used is either a 6 or 9 Pin Deutsch, others may be used as determined by the vehicle manufacturer.

3 J1587 Message Configuration

The J1587 document identifies in great detail various message types, criteria and other information. The MV4 implements a limited message type and data identification code or value set. These are provided in Section 4 below.

3.1 Message Construction

The J1587 protocol may contain 5 distinct data types

- MID – Message ID
- PID – Parameter ID
- SID – Status ID
- FMI – Fault ID
- CHECKSUM

Each message starts with a MID & PID identifier, followed by various data characters (SID, FMI, etc.) defining the message content, and is finished with a checksum to ensure message integrity. The message length may be 21 characters or less. Each character is 10 bits long and begins with a start bit.

4 J1587 Data Assignments

The MV4 uses specific MID, PID, SID, & FMI data to identify the DVR module and convey specific information. These values are identified in the sections below.

4.1 Message ID (MID) = 163

The default MV4 MID is 163. The MID is the logical address for the DVR on the J1587 bus. The MID value may be changed in Flt_Settings_GE.ini file if the default value is already utilized. The MID is transmitted once per report.

4.2 Parameter ID (PID) = 194

The default MV4 PID is 194. The PID tells devices on the J1587 bus what type of message is being transmitted. The PID value may be changed in Flt_Settings_GE.ini file if the interface system uses a different PID to transmit system fault status. The PID is transmitted one per report.

4.3 Message Length (LEN)

The fault message length will vary depending on the number of subcomponents being reported on. The length value is equivalent to the number of SID and FAULT message pairs following LEN byte. Since the maximum report length is 21 bytes, the LEN value will be an even number between 2 and 16. LEN is transmitted once per report.

4.4 Status ID (SID)

The SID identifies the subcomponent for which fault data is provided. The MV4 implements SID values for components identified in the table below.

SID		DESCRIPTION
HEX	DEC	
<u>1E</u> h	30	DVR Terminal Fault
<u>1F</u> h	31	DVR Power Monitor Sensor
<u>20</u> h	32	DVR Power Monitor Sensor
<u>21</u> h	33	DVR Temperature Sensor
<u>22</u> h	34	DVR Temperature Sensor
<u>23</u> h	35	DVR Camera System
<u>50</u> h	80	DVR Camera 1
<u>51</u> h	81	DVR Camera 2
<u>52</u> h	82	DVR Camera 3
<u>53</u> h	83	DVR Camera 4
<u>54</u> h	84	DVR Camera 5
<u>55</u> h	85	DVR Camera 6
<u>56</u> h	86	DVR Camera 7
<u>57</u> h	87	DVR Camera 8
<u>58</u> h	88	DVR Camera 9
<u>59</u> h	89	DVR Camera 10
<u>5A</u> h	90	DVR Camera 11
<u>5B</u> h	91	DVR Camera 12
<u>5C</u> h	92	DVR Camera 13
<u>5D</u> h	93	DVR Camera 14
<u>5E</u> h	94	DVR Camera 15
<u>5F</u> h	95	DVR Camera 16

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4.5 Fault Message ID (FMI)

The FMI identifies the type of component fault. The FMI is only ½ byte long (nibble). The MV4 implements the FMI values identified in the table below.

FMI		DESCRIPTION
Hex	DEC	
<u>C</u> h	12	Bad intelligent device or component
<u>4</u> h	4	Below voltage
<u>3</u> h	3	Above voltage
<u>B</u> h	11	Failure mode not identifiable

4.6 Fault Status

The Fault Status identifies the state of the fault message: **FAULT IN** or **FAULT OUT**. The Fault Status is only ½ byte long (nibble). The MV4 implements the Fault Status values identified in the table below.

Fault Status		DESCRIPTION
Hex	DEC	
<u>3</u> h	3	Fault IN
<u>7</u> h	7	Fault OUT

4.7 FAULT

Combine the ½ byte Fault Status and FMI values to create the single byte FAULT value. The Fault Status is the most significant nibble and the FMI is the least significant nibble. The MV4 implements the FAULT values identified in the table below.

FAULT		Fault Status		FMI		DESCRIPTION
HEX	DEC	Hex	DEC	Hex	DEC	
<u>3</u> Ch	60	<u>3</u> h	3	<u>C</u> h	12	Fault In – Bad intelligent device or component
<u>7</u> Ch	7	<u>7</u> h	7	<u>C</u> h	12	Fault Out - Bad intelligent device or component
<u>3</u> 4h	60	<u>3</u> h	3	<u>4</u> h	4	Fault In - Below voltage
<u>7</u> 4h	7	<u>7</u> h	7	<u>4</u> h	4	Fault Out – Below voltage
<u>3</u> 3h	60	<u>3</u> h	3	<u>3</u> h	3	Fault In - Above voltage
<u>7</u> 3h	7	<u>7</u> h	7	<u>3</u> h	3	Fault Out – Above voltage
<u>3</u> Bh	60	<u>3</u> h	3	<u>B</u> h	11	Fault In - Failure mode not identifiable
<u>7</u> Bh	7	<u>7</u> h	7	<u>B</u> h	11	Fault Out – Failure mode not identifiable

5 Message Construction

5.1 Query

The J1587 implementation used on MV4 series DVR is limited and does not include response to external data queries. All incoming data packets are ignored.

5.2 Periodicity

The MV4 does not respond to requests for device status. The unit sends out successive status messages when a verified state change of a monitored device has occurred. The minimum time between successive message transmissions is 1 second.

5.3 Message Format

The MV4 J1587 message is always constructed similar to the example shown below.

MID, PID, LEN, SID, FAULT, SID, FAULT, SID, FAULT, CHKSM

MID: Default 193

PID: Default 194

LEN: Value varies depending on SID/FMI message pairs
Maximum value is 10h

SID: Value varies depending on subcomponent

FAULT: Value varies depending on fault status and FMI coding (see section 5.3)

CHKSM: Calculated for each transmission

The J1587 standard allows modification to the above message structure. The MV4 does not implement any variations.

5.4 Message Byte Structure

The MV4 message byte structure is:

Byte 0	MID Value	Default is 163	
Byte 1	PID Value	Default is 194	
Byte 2	LEN Value	Varies by SID/Fault pairs	
Byte 3	SID value	See section 4.4	
Byte 4	FAULT value	See section 4.7	
	Bit 7	Always 0	Occurrence Count
	Bit 6	"0" = Fault "1" = No Fault	Fault Status Flag
	Bit 5	"0" = +256 to PID "1" = +0 to PID	+256 to PID Value Always "1"
	Bit 4	"0" = Byte 3 is PID "1" = Byte 3 is SID	SID/PID flag Always "1"
	Bits 3 - 0	1100 = FMI 12	FMI values from table in section 4.5
	Bits 3 - 0	0100 = FMI 4	
	Bits 3 - 0	0011 = FMI 3	
	Bits 3 - 0	1011 = FMI 11	
Byte 5	Checksum	Variable based on message content	

Notes:

- 1) Bytes 3&4 may repeat up to 8 times (16 bytes) in a single report.
- 2) The MV4 does not implement the Occurrence Count feature of Byte 4, Bit 7.
- 3) In the MV4 implementation, Byte 3 is always a SID. Therefore the SID/PID flag (Byte 4, Bit 4) is always "1".
- 4) Add all message bytes prior to the checksum byte and performing a 1's complement on the aggregated value to compute the checksum byte.

5.5 Report Example

Below are message outputs from a DVR with 12 active channels at boot time followed by an explanation of the output message. For clarity, SID/FAULT pairs have been underlined.

MSG1	A3 C2 08 <u>20 73 1F 74 22 7B 21 7B</u> 34
MID 163	Report from device ID 164
PID 194	Report on parameter ID 194, device status
LEN 8	Message byte length is 8 bytes
<u>SID/FAULT</u>	Fault Out on DVR Over Volt
<u>SID/FAULT</u>	Fault Out on DVR Under Volt
<u>SID/FAULT</u>	Fault Out on DVR Temperature Sensor
<u>SID/FAULT</u>	Fault Out on DVR Temperature Sensor
CHKSM	Calculated checksum value

MSG2	A3 C2 10 <u>23 7C 50 7C 51 7C 52 7C 53 7C 54 7C 55 7C 56 7C</u> 43
MID 163	Report from device ID 164
PID 194	Report on parameter ID 194, device status
LEN 16	Message byte length is 16 bytes
<u>SID/FAULT 1</u>	Fault Out on DVR System
<u>SID/FAULT 2</u>	Fault Out on DVR Camera 1
<u>SID/FAULT 3</u>	Fault Out on DVR Camera 2
<u>SID/FAULT 4</u>	Fault Out on DVR Camera 3
<u>SID/FAULT 5</u>	Fault Out on DVR Camera 4
<u>SID/FAULT 6</u>	Fault Out on DVR Camera 5
<u>SID/FAULT 7</u>	Fault Out on DVR Camera 6
<u>SID/FAULT 8</u>	Fault Out on DVR Camera 7
CHKSM	Calculated checksum value

MSG3	A3 C2 0A <u>57 7C 58 7C 59 7C 5A 7C 5B 7C</u> 68
MID 163	Report from device ID 164
PID 194	Report on parameter ID 194, device status
LEN 10	Message byte length is 10 bytes
<u>SID/FAULT 1</u>	Fault Out on DVR Camera 8
<u>SID/FAULT 2</u>	Fault Out on DVR Camera 9
<u>SID/FAULT 3</u>	Fault Out on DVR Camera 10
<u>SID/FAULT 4</u>	Fault Out on DVR Camera 11
<u>SID/FAULT 4</u>	Fault Out on DVR Camera 12
CHKSM	Calculated checksum value

6 Summary

While the J1587 implementation used on MV4 series DVR is limited, it may be expanded to include additional SID and FMI values. Inquiries on expanding the above implementation should be sent to the following address:

GE Security
Attention: MobileView Product Manager
4001 Fairview Industrial Drive
Salem OR, 97302