Drive Video Record

UART Communication PROTOCOL

V1.2

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Revision History

Date	Ver	Notes	
June. 17, 2022	1.0	• Initial Release	Niu, Kobe (Y.) initial.
Dec. 03, 2022	1.1	• Update all sections according to UE V4.0.0	Niu, Kobe (Y.) update.
Feb. 17, 2023	1.2	• Section 3 update baud rate to 115200 • Section 7.5.1 byte position bugfix • Update IDCM_Heartbeat_Int [Type:0x01][Subtype:0x01] • Add DVR Display Status in Section 7.1.1 • Add IDCM_PlaybackRsp_Int [Type:0x02][Subtype:0x05] • Update Message Frame Structure design • Update section 5.1 and 5.2	Niu, Kobe (Y.) update.

1. Overview

The interaction between DVR user and DVR system mainly depends on APIM HMI, communication between IDCM and APIM is based on a UART channel over FPD-Link, UART will be used to synchronize DVR system work status and HMI command control, this document defines the UART message layout.

2. Message Frame Structure

Message frame consists of below elements:

1. Frame Head: 0xAA, 0x55
2. Data Block

And data block consists of below elements:

ID	Length (BYTE)	Flag	Description
1	1	Type	Data type to Synchronize the purpose of the data usage
2	1	Sub Type	Sub data type to Synchronize the purpose of the data usage
3	1	Data Length	The whole data block length
4 ~ 3+N	N	Data	Content of data, length is N, N>0
4+N	1	Checksum	Checksum for other bytes in the message frame

Message frame example:

Position	#1	#2	#3	#4	#5	#6	#7	#8
Flag	Frame Head	Frame Head	Type	Sub Type	Data Length	Data	Data	Checksum
Example	0xAA	0x55	0x03	0x01	0x02	0x21	0x36	0x5C

3. UART Configuration

UART configuration:

- Baud Rate: 115200
- Stop Bit: 1
- Data Bits: 8
- Parity Check: No

4. Heartbeat Message Requirement

Heartbeat message is used to synchronize the alive status of IDCM and APIM, IDCM and APIM will handshake periodically, heartbeat message will also include DVR working status and error status to make sure the synchronization between IDCM and APIM HMI.

4.1. First Time Connection Strategy

As APIM may need long time to startup, the first heartbeat message should be initialed by APIM, once IDCM receive it, IDCM should start to send heartbeat message <IDCM_Heartbeat_Enum>, and APIM should feedback heartbeat message <APIM_Heartbeat_Enum> immediately. Heartbeat message should contain an increasing counter number to label the message sequence.

4.2. Heartbeat Message Timeout Strategy

If IDCM could not receive APIM heartbeat feedback msg in 1 seconds, IDCM should record the error status and keep sending IDCM heartbeat msg until get feedback, the heartbeat counter should keep increasing.
If APIM could not receive DVR heartbeat msg in 1 seconds, APIM should record error status and DTC code, then pop up Error msg to customer, all DVR HMI control should not be available.

5. Application Message Requirement

Application message is used to support data exchange between IDCM and APIM, which defined in section 6 and section 7.

5.1. HMI Command Message Strategy

If a command msg <APIM_HMICommand_Enum> is sent from APIM to IDCM, and DVR Command Result == Command Reception Failed or APIM could not receive this response in 2 seconds (reception timeout), APIM should try to send the command another 3 times, and if still get DVR Command Result == Command Reception Failed or reception timeout, APIM should pop up a command failure result to customer.

If APIM receives the Command Result == Command Reception Succeed, then APIM should wait the Command Execution Result, if Command Result == Command Execution Failed, then APIM should give corresponding reminder to customer.

5.2. DVR Request & Response Message Strategy

If APIM send a “request type” message to IDCM, IDCM should give response in 2 seconds(reception timeout), and APIM should try to send the request another 3 times if IDCM response timeout, and if still timeout APIM should give corresponding reminder to customer.

5.3. Key Performance Strategy

Below strategy should be met:

Wakeup / Sleep	Once ECU boots up, message should be published. Once ECU falls asleep, message publishing should stop.
ECU Reset	Fresh data on ECU Reset.
Missing/Invalid	Missing Strategy: ECU should record an error status until recover. Invalid Strategy: Ignore message value.

6. Message from IDCM to APIM

Type	Sub Type	Name	TX Model	Interval (ms)
0x01	0x01	IDCM_Heartbeat_Int	Event & Periodic	1000
0x02	0x01	IDCM_CommandRsp_Enum	Event	/

	0x02	IDCM_RecordProgress_Int	Event & Periodic	1000
	0x03	IDCM_FileOptProgress_Int	Event & Periodic	500
	0x04	IDCM_BrowseLocation_Int	Event & Periodic	500
	0x05	IDCM_PlaybackRsp_Int	Event & Periodic	500
0x03	0x01	IDCM_EmergencyVideoInfo_Int	Event & Periodic	1000
0x04	0x01	IDCM_NormalVideoSwitch_Enum	Event	/
	0x02	IDCM_VehicleMonitorSwitch_Enum	Event	/
	0x03	IDCM_SetEmergencyDuration_Enum	Event	/
	0x04	IDCM_SetCollideSensitive_Enum	Event	/
0x05	0x01	IDCM_WiFiHotspotSwitch_Enum	Event	/
	0x02	IDCM_WiFiSSID_ASCII	Event	/
	0x03	IDCM_WiFiPASSWD_ASCII	Event	/
0x06	0x01	IDCM_SystemInfoRsp_Int	Event	/
0x07	0x01	IDCM_UpgradeStatus_Enum	Event & Periodic	1000
0x08	0x01	IDCM_VINCodeReq_Enum	Event	/
0x09	0x01	IDCM_BackDoorRsp_Enum	Event	/
0x0A	0x01	IDCM_DVRDiagRsp_Enum	Event	/
0x0B	0x01	IDCM_LoadshedRsp_Enum	Event	/

6.1. IDCM Heartbeat Message [Type:0x01]

6.1.1. IDCM_Heartbeat_Int [Type:0x01][Subtype:0x01]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments
1	Heartbeat Count	0x00~0xFF	8	1	7	0x00	Cycle from 0x00 to 0xFF, start from 0x00
2	Video Output Page	1. Liveview Page 2. Normal Data List Page 3. Key Data List Page 4. TF Data List Page 5. Video Playing Page 6. Photo Playing Page Other: Reserved	4	2	7	0x01	IDCM LVDS video output page
3	Video Record Status	1. Normal Recording 2. Emergency Recording 3. Manual Recording 4. No Recording 5. System Failure Other: Reserved	4	2	3	0x04	IDCM video recording status
4	Engineering Mode Status	1. Disabled 2. Enabled Other: Reserved	2	3	7	0x01	IDCM should disable most of the function in Engineering mode
5	Wi-Fi Connection Status	1. Hotspot Disabled 2. No Connection 3. Connection Successful 4. Initializing 5. Error	4	3	5	0x01	IDCM Wi-Fi connection status

		Other: Reserved					
6	G-Sensor Status	0. Normal 1. Error Other: Reserved	2	3	1	0x00	G-Sensor failure status
7	Lens Block Status	0. Normal 1. Blocked	1	4	7	0x00	IDCM lens block status
8	Image Sensor Status	0. Normal 1. Error	1	4	6	0x00	IDCM image sensor status
9	eMMC Status	0. Normal 1. EOL (End of Life) 2. Error 3. Reserved	2	4	5	0x00	IDCM eMMC status
10	TF Card Status	1. TF Pull Out 2. TF Inserted 3. TF Full 4. TF Need Format 5. TF Error 6. TF Format Ongoing Other: Reserved	4	4	3	0x01	TF card status

6.2. IDCM Operation Feedback Message [Type:0x02]

6.2.1. IDCM_CommandRsp_Enum [Type:0x02][Subtype:0x01]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments
1	DVR Command Response	1. Enter Live View Page 2. Enter Normal Data Page 3. Enter Key Data Page 4. Enter TF Data Page --- 5. Photo Capture 6. Video Capture 7. Stop Video Capture 8. Smart Copy(一键锁存) --- 9. Scroll to Previous Page 10. Scroll to Next Page 11. File Edit Mode 12. File List Mode 13. Select All File 14. Unselect All File 15. TF Card Copy 16. TF Card Copy Stop 17. TF Card Delete 18. TF Card Delete Stop --- 19. Play Previous File (reserve) 20. Play Next File (reserve) 21. Video Screenshot --- 22. Format TF Card 23. DVR Setting Reset 24. Start SW Update (reserve) Other: Reserved	8	1	7	0xFF	Command type feedback to APIM
2	DVR Command Result	1. Command Reception Succeed 2. Command Reception Failed 3. Command Execution Succeed 4. Command Execution Failed Other: Reserved	8	2	7	0xFF	Command reception and execution result feedback to APIM
* If all the other command control logic in this FIS should follow the same command reception strategy: If DVR Command Result == Command Reception Failed or APIM could not receive this response in 2 seconds (reception timeout), APIM should try to send the command another 3 times, and if still get DVR Command Result == Command Reception Failed or reception timeout, APIM should pop up a command failure result to customer.							

6.2.2. IDCM_RecordProgress_Int [Type:0x02][Subtype:0x02]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments
1	Video Recording Timer	0x00~0xB4 Other: Reserved	8	1	7	0xFF	Video recording timer, unit is second, which is used to update manual or emergency video recording timestamp

6.2.3. IDCM_FileOptProgress_Int [Type:0x02][Subtype:0x03]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments
1	Operation Type	1. File Copy 2. File Deletion Other: Reserved	8	1	7	0xFF	File operation type
2	Total Files Selected	0x0000~0xFFFF	8*2	2	7	0xFFFF	The quantity of file selected to operation
3	Qty of Complete	0x0000~0xFFFF	8*2	4	7	0xFFFF	The quantity of operation complete
4	Operation Progress	0x00~0x64 (0%~100%) Other: Reserved	8	6	7	0xFF	Operation complete progress

6.2.4. IDCM_BrowseLocation_Int [Type:0x02][Subtype:0x04]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments
1	File List Mode	1. List Mode 2. Edit Mode Other: Reserved	8	1	7	0x01	File list mode send to APIM
2	File Folder Status	1. Empty 2. Not Empty Other: Reserved	8	2	7	0xFF	Identify current file folder status
3	File Selected Status	1. All Selected 2. All Unselected 0xFF=Invalid Other: Reserved	8	3	7	0x02	Identify current file selection status
4	Qty of Files Selected	0x0000~0xFFFF	8*2	4	7	0xFFFF	The quantity of file selected by customer

6.2.5. IDCM_PlaybackRsp_Int [Type:0x02][Subtype:0x05]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments
1	Gear P Protection	1. Yes 2. No Other: Reserved	8	1	7	0xFF	Identify if video playback is blocked by Gear position P protection strategy.

6.3. IDCM Emergency Video Message [Type:0x03]

6.3.1. IDCM_EmergencyVideoInfo_Int [Type:0x03][Subtype:0x01]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments
1	Qty of Video	0x01~0x0A Other: Reserved	8	1	7	0xFF	Synchronize the number of video captured as emergency video record or vehicle monitor result
2	Type of Video	1. Emergency Video	8	2	7	0xFF	Synchronize the type of

		2. Vehicle Monitor Video Other: Reserved					video captured

6.4. IDCM Setting Feedback Message [Type:0x04] + 加 IVI 反馈？

6.4.1. IDCM_NormalVideoSwitch_Enum [Type:0x04][Subtype:0x01]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments
1	Normal Video Switch Response	1. Enabled 2. Disabled Other: Reserved	8	1	7	0xFF	IDCM feeds back the normal video switch status

6.4.2. IDCM_VehicleMonitorSwitch_Enum [Type:0x04][Subtype:0x02]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments
1	Vehicle Monitor Switch Response	1. Enabled 2. Disabled Other: Reserved	8	1	7	0xFF	IDCM feeds back the vehicle monitor switch status

6.4.3. IDCM_SetEmergencyDuration_Enum [Type:0x04][Subtype:0x03]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments
1	Emergency Video Duration Response	1. 15 seconds 2. 30 seconds 3. 45 seconds Other: Reserved	8	1	7	0xFF	IDCM feeds back the emergency video duration

6.4.4. IDCM_SetCollideSensitive_Enum [Type:0x04][Subtype:0x04]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments
1	Collision Detection Sensitive Level	1. High 2. Middle 3. Low Other: Reserved	8	1	7	0xFF	IDCM feeds back the collision detection sensitive level

6.5. IDCM WiFi Information Message [Type:0x05]

6.5.1. IDCM_WiFiHotspotSwitch_Enum [Type:0x05][Subtype:0x01]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments
1	Wi-Fi Hotspot Switch Response	1. Enabled 2. Disabled Other: Reserved	8	1	7	0xFF	IDCM feeds back the DVR Wi-Fi hotspot function switch status

6.5.2. IDCM_SetWiFiSSID_ASCII [Type:0x05][Subtype:0x02]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments
1	DVR Wi-Fi SSID Response	0x21~0x7E Other: Invalid Value	8*12	1	7	0xFF*12	IDCM feeds back the DVR Wi-Fi hotspot SSID in ASCII format

6.5.3. IDCM_SetWiFiPSWD_ASCII [Type:0x05][Subtype:0x03]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments

1	DVR Wi-Fi Password Response	0x21~0x7E Other: Invalid Value	8*8	1	7	0xFF*8	IDCM feeds back the DVR Wi-Fi hotspot password in ASCII format

6.6. IDCM System Information Message [Type:0x06]

6.6.1. IDCM_SystemInfoRsp_Int [Type:0x06][Subtype:0x01]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments
1	IDCM SW Version	0x00~0x63 Other: Invalid Value	8*2	1	7	0xFF*2	Example: vXX.YY Byte #1 is XX. Byte #2 is YY.
2	IDCM eMMC Storage	0x00~0x64 Other: Invalid Value	8*5	3	7	0xFF*5	Byte #1: Percent of normal video Byte #2: Percent of Emergency video Byte #3: Percent of manual video Byte #4: Percent of manual photo Byte #5: Percent of idle space
3	IDCM TF Card Storage	0x00~0x64 Other: Invalid Value	8*5	8	7	0xFF*5	Byte #1: Percent of normal video Byte #2: Percent of Emergency video Byte #3: Percent of manual video Byte #4: Percent of manual photo Byte #5: Percent of idle space
4	TF Card Size	0x08~0x100 Other: Invalid Value	8	13	7	0xFF	Size of TF card (GB)

6.7. IDCM Software Update Message [Type:0x07]

6.7.1. IDCM_UpgradeStatus_Enum [Type:0x07][Subtype:0x01]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments
1	IDCM Upgrade Status	1. Need To Update S/W 2. MCU Updating 3. DSP Updating 4. Update Succeed 5. Update Failed Other: Reserved	8	1	7	0xFF	IDCM SW update status
2	IDCM Upgrade Progress	0x00~0x64 Other: Reserved	8	2	7	0xFF	IDCM SW update progress

6.8. IDCM VIN Request Message [Type:0x08]

6.8.1. IDCM_VINCodeReq_Int [Type:0x08][Subtype:0x01]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments
1	Request VIN	1. Request 0xFF=Invalid Other: Reserved	8	1	7	0xFF	IDCM requests VIN from APIM

6.9. IDCM Backdoor Response Message [Type:0x09]

6.9.1. IDCM_BackDoorRsp_Int [Type:0x09][Subtype:0x01]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments
1	Engineering Mode Response	1. Disabled 2. Enabled Other: Reserved	8	1	7	0x01	Feedback to APIM if entered engineering mode
2	Clear Data Response	1. Succeed 2. Failed Other: Reserved	8	1	7	0x01	Feedback to APIM if all data in eMMC are cleared.
3	Veh_Monitor Timer Response	0x00~0x1E Other: Reserved	8	1	7	0x05	Feedback to APIM the vehicle monitor function days timer
4	Veh_Monitor Counter Response	0x00~0x3C Other: Reserved	8	1	7	0x0A	Feedback to APIM the vehicle monitor function times counter

6.10. IDCM Diagnostic Response Message [Type:0x0A]

6.10.1. IDCM_DVRDiagRsp_Int [Type:0x0A][Subtype:0x01]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments
1	G-Sensor Diagnostic	1. Normal 2. Error Other: Reserved	2	1	7	1	Diagnostic feedback to IVI
2	WiFi Module Diagnostic	1. Normal 2. Error Other: Reserved	2	1	5	1	
3	eMMC Diagnostic	1. Normal 2. Error Other: Reserved	2	1	3	1	
4	Image Sensor Diagnostic	1. Normal 2. Error Other: Reserved	2	1	1	1	
5	TF Card Diagnostic	1. Normal 2. Error Other: Reserved	2	2	7	1	
6	Reserved	Reserved	6	2	5	0	

6.11. IDCM Loadshed Response Message [Type:0x0B]

6.11.1. IDCM_LoadshedRsp_Enum [Type:0x0B][Subtype:0x01]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments
1	Vehicle load shed Response	1. Received 0xFF=Invalid Other: Reserved	8	1	7	0xFF	Feedback to APIM if received load shed status

7. Message from APIM to IDCM

Type	Sub Type	Name	TX Model	Interval (ms)
0x11	0x01	APIM_Heartbeat_Enum	Event & Periodic	1000
0x12	0x01	APIM_VehicleSpeed_Int	Periodic	20
	0x02	APIM_Brake_Enum	Event + Periodic	200
	0x03	APIM_VIN_ASCII	Event	/
	0x04	APIM_Watermark_Enum	Periodic	500
0x13	0x01	APIM_HMICommand_Enum	Event	/

	0x02	APIM_HMICoordinate_Int	Event + Periodic	100
0x14	0x01	APIM_NormalVideoSwitch_Enum	Event	/
	0x02	APIM_VehicleMonitorSwitch_Enum	Event	/
	0x03	APIM_SetEmergencyDuration_Enum	Event	/
	0x04	APIM_SetCollideSensitive_Enum	Event	/
	0x05	APIM_WiFiHotspotSwitch_Enum	Event	/
	0x06	APIM_SetWiFiSSID_ASCII	Event	/
	0x07	APIM_SetWiFiPSWD_ASCII	Event	/
	0x08	APIM_ReqDVRInformation_Enum	Event	/
0x15	0x01	APIM_BackDoorReq_Enum	Event	/
0x16	0x01	APIM_DVRDiagReq_Enum	Event	/
0x17	0x01	APIM_LoadshedReq_Enum	Event	/
0x18	0x01	APIM_EmergencyVideoRsp_Enum	Event	/

7.1. APIM Heartbeat Message [Type:0x11]

7.1.1. APIM_Heartbeat_Enum [Type:0x11][Subtype:0x01]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments
1	Heartbeat Count	0x00~0xFF	8	1	7	0x00	Cycle from 0x00 to 0xFF, start from 0x00
2	GPS Year Data	0x00~0x63 0xFF: Invalid Other: Reserved	8	2	7	0xFF	Actual display year data = 0x7D0 (2000) + GPS Year Data
3	GPS Month Data	0x01~0x0C 0xFF: Invalid Other: Reserved	8	3	7	0xFF	Month data value: 1~12
4	GPS Day Data	0x01~0x1F 0xFF: Invalid Other: Reserved	8	4	7	0xFF	Day data value: 1~31
5	GPS Hour Data	0x00~0x17 0xFF: Invalid Other: Reserved	8	5	7	0xFF	Hour data value: 0~23
6	GPS Minute Data	0x00~0x3B 0xFF: Invalid Other: Reserved	8	6	7	0xFF	Minute data value 0~59
7	GPS Second Data	0x00~0x3B 0xFF: Invalid Other: Reserved	8	7	7	0xFF	Second data value 0~59
8	DVR Display Position	1. Driver_Side 2. Passenger_Side 3. Hide_Minimize 0xFF: Invalid Other: Reserved	8	8	7	0xFF	Update the DVR APP display position on APIM screen
*If APIM could not get GPS data from CAN, APIM should send customer setting value to IDCM.							

7.2. APIM Vehicle Data Collection [Type:0x12]

7.2.1. APIM_VehicleSpeed_Int [Type:0x12][Subtype:0x01]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default	Comments

						Value	
1	Vehicle Speed	0x0000~0xFFFF	8*2	1	7	0x0000	Vehicle speed input Unit: kph

7.2.2. APIM_Brake_Enum [Type:0x12][Subtype:0x02]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments
1	Vehicle Brake Pedal Status	1. Driver_Braking 2. Driver_Not_Braking 0xFF: Invalid Other: Reserved	8	1	7	0xFF	FNV2.1 CAN signal name: BpedDrvAppl_D_Actl FNV2.1 CAN msg name: HS3-0x165 EngBrakeData (Press brake pedal fully and release Signal has value "Driver_Braking" when brake pedal fully pressed and "Driver_not_braking" when released)

7.2.3. APIM_VIN_ASCII [Type:0x12][Subtype:0x03]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments
1	VIN Code	0x30~0x39 or 0x41~0x5A	8*17	1	7	0x41*17	VIN number input, ASCII format

7.2.4. APIM_Watermark_Enum [Type:0x12][Subtype:0x04]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments
1	Vehicle Gear Position	1. P 2. R 3. N 4. D 0xFF: Invalid Other: Reserved	8	1	7	0xFF	Gear Position input
2	Cluster Cornering Lamp Status	1. Left 2. Right 3. Left & Right 4. Off 0xFF: Invalid Other: Reserved	8	2	7	0x04	Cornering lamp status input
3	Cluster Seatbelt Lamp Status	1. On 2. Off 0xFF: Invalid Other: Reserved	8	3	7	0x02	Seatbelt lamp status input

7.3. APIM Command Control Message [Type:0x13]

7.3.1. APIM_HMICommand_Enum [Type:0x13][Subtype:0x01]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments
1	HMI Command	1. Enter Live View Page 2. Enter Normal Data Page 3. Enter Key Data Page 4. Enter TF Data Page ---------- 5. Photo Capture 6. Video Capture 7. Stop Video Capture 8. Smart Copy(一键锁存) ----------	8	1	7	0xFF	Command sent from APIM to IDCM

		9. Scroll to Previous Page 10. Scroll to Next Page 11. File Edit Mode 12. File List Mode 13. Select All File 14. Unselect All File 15. TF Card Copy 16. TF Card Copy Stop 17. TF Card Delete 18. TF Card Delete Stop ---------- 19. Play Previous File (reserve) 20. Play Next File (reserve) 21. Video Screenshot ---------- 22. Format TF Card 23. DVR Setting Reset 24. Start SW Update (reserve) Other: Reserved					

7.3.2. APIM_HMICoordinate_Int [Type:0x13][Subtype:0x02]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments
1	Finger Action Type	1. Pressed 2. Moving 3. Released 0xFF: Invalid Other: Reserved	8	1	7	0xFF	Customer finger action type input to IDCM
2	X-Axis Coordinate	0x00~0xFFFF	8*2	2	7	0xFFFF	X-Axis Coordinate of finger touch
3	Y-Axis Coordinate	0x00~0xFFFF	8*2	3	7	0xFFFF	Y-Axis Coordinate of finger touch

7.4. APIM Setting Message [Type:0x14]

7.4.1. APIM_NormalVideoSwitch_Enum [Type:0x14][Subtype:0x01]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments
1	Normal Video Record Switch	0x01: Enable 0x02: Disable Other: Reserved	8	1	7	0xFF	Enable or disable normal video record function

7.4.2. APIM_VehicleMonitorSwitch_Enum [Type:0x14][Subtype:0x02]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments
1	Vehicle Monitor Function Switch	0x01: Enable 0x02: Disable Other: Reserved	8	1	7	0xFF	Enable or disable vehicle monitor function

7.4.3. APIM_SetEmergencyDuration_Enum [Type:0x14][Subtype:0x03]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments
1	Emergency Video Duration	0x01: 15 seconds 0x02: 30 seconds 0x03: 45 seconds Other: Reserved	8	1	7	0xFF	DVR user could modify emergency video duration via this configuration

7.4.4. APIM_SetCollideSensitive_Enum [Type:0x14][Subtype:0x04]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments

1	G-Sensor Collide Sensitive	0x01: Low 0x02: Middle 0x03: High Other: Reserved	8	1	7	0xFF	DVR user could modify collide sensitive via this configuration, works for emergency video capture and vehicle monitor functions

7.4.5. APIM_WiFiHotspotSwitch_Enum [Type:0x14][Subtype:0x05]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments
1	Wi-Fi Hotspot Switch	0x01: Enable 0x02: Disable Other: Reserved	8	1	7	0xFF	DVR user could enable or disable DVR Wi-Fi hotspot function via this configuration

7.4.6. APIM_SetWiFiSSID_ASCII [Type:0x14][Subtype:0x06]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments
1	DVR Wi-Fi SSID	0x21~0x7E 0xFF: Invalid	8*8~8*12	1	7	0xFF*8~ 0xFF*12	DVR user could set DVR Wi-Fi hotspot SSID via this configuration, the SSID could contain max to 12 ASCII characters

7.4.7. APIM_SetWiFiPSWD_ASCII [Type:0x14][Subtype:0x07]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments
1	DVR Wi-Fi Password	0x21~0x7E 0xFF: Invalid	8*8	1	7	0xFF*8	DVR user could set DVR Wi-Fi hotspot password via this configuration, the password could contain max to 8 ASCII characters

7.4.8. APIM_ReqDVRInformation_Enum [Type:0x14][Subtype:0x08]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments
1	Request Type	0x01: Request DVR Parameter 0x02: Request DVR WiFi Information 0x03: Request System Information 0xFF=Invalid Other: Reserved	8	1	7	0xFF	APIM requests DVR key information from IDCM

7.5. APIM Backdoor Request Message [Type:0x15]

7.5.1. APIM_BackDoorReq_Enum [Type:0x15][Subtype:0x01]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments
1	Engineering Mode Request	1. Disable 2. Enable 0xFF=Invalid Other: Reserved	8	1	7	0x01	APIM requests to entere engineering mode
2	Clear Data Request	0x01: Request 0xFF=Invalid Other: Reserved	8	2	7	0xFF	APIM requests to clear all data in eMMC or TF card of IDCM
3	Veh_Monitor Timer Request	0x00~0x1E 0xFF=Invalid Other: Reserved	8	3	7	0x05	APIM requests to change vehicle monitor function continue days
4	Veh_Monitor Counter Request	0x00~0x3C 0xFF=Invalid Other: Reserved	8	4	7	0x0A	APIM requests to change vehicle monitor function video counter

7.6. APIM DVR Diagnostic Request Message [Type:0x16]

7.6.1. APIM_DVRDiagReq_Enum [Type:0x16][Subtype:0x01]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments
1	Request IDCM Diagnostic	0x01: Request 0xFF=Invalid Other: Reserved	8	1	7	0xFF	APIM requests IDCM Diagnostic

7.7. APIM DVR Loadshed Request Message [Type:0x17]

7.7.1. APIM_LoadshedReq_Enum [Type:0x17][Subtype:0x01]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments
1	Request Loadshed Status	0x01: Request 0xFF=Invalid Other: Reserved	8	1	7	0xFF	APIM reports vehicle Loadshed Status to IDCM

7.8. APIM EmergencyVideoRsp Message [Type:0x18]

7.8.1. APIM_EmergencyVideoRsp_Enum [Type:0x18][Subtype:0x01]

Data structure:

ID	Name	Value	Size (Bits)	Byte Position	Bit Position	Default Value	Comments
1	Qty of Video	0x01~0x0A Other: Reserved	8	1	7	0xFF	Response the number of video captured as emergency video record or vehicle monitor result
2	Type of Video	1. Emergency Video 2. Vehicle Monitor Video Other: Reserved	8	2	7	0xFF	Response the type of video captured