

# Android 9.0 API – BMW

## Logcat Events

CAN Type: F1X(2011-2012) CIC 8.8/10.25inch

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# Serial port message decoding

Android HU communicates with the Car through MCU using serial port using a set of (n+1) bytes.

Every log have been made for Cartype: F1X(2011-2012) CIC 8.8/10.25inch. These are all starting with 0xF2.

## Events message structure

	Header byte[0...2]	Function byte[3...4]	Message {bytes}	Checksum byte[n]
byte[0]	0xF2	MCU_KEY_MUSIC = 0xF2 = -14		
byte[1]	0x00			
byte[2]	Event Function	0xa1, 0x11		
byte[3]	Sub-function	Example: 0xa1 0x03 0x12: Vehicle doors status		
byte[4]				
byte[q]	Message	Length depends on Function: $1 \leq q \leq 16$		
byte[n]	0xNN	Checksum		

## Checksum formula

& is Boolean AND      ^ is Boolean XOR  
 byte = 0x00...0xFF

$$NN = (\text{byte}[1] + \text{byte}[2] + \text{byte}[3] \& 0xFF + \text{byte}[4] + \dots + \text{byte}[n]) \wedge 0xFF$$

## Examples: Action & Event serial port message

Event : example of a serial port message which contains vehicle states.

Event	Vehicle state information (msg >= 20 bytes)		
Logcat Filter	ksw_0x00_0xA1_0x19_refreshData: bydata =		
Example	ksw_0x00_0xA1_0x19_refreshData: bydata = 0xf2 0x00 0xa1 0x10 0x19 0x01 0x27 0x00 0x5d 0x01 0x68 0x00 0x3b 0x05 0xa9 0x00 0x17 0x00 0x87 0x01 0xbf		
bytes	Value	Comment	
byte[0]	0xF2	MCU KEY MUSIC	Header: 0xf2 0x00 0xa1
byte[1]	0x00		
byte[2]	0xa1	CAN Information	
byte[3]	0x10		Vehicle Information sub-function: 0x10 0x19
byte[4]	0x19		
byte[5]	0x01	Vehicle Range = 295 km	((bydata[5] & 255) * 256) + (bydata[6] & 255)
byte[6]	0x27		
byte[7]	0x00	Average consumption/km 9,3 liter / 100km	((bydata[7] & 255) * 256) + (bydata[8] & 255)
byte[8]	0x5d		
byte[9]	0x01	Average speed 360 = 36,0 km/h	((bydata[9] & 255) * 256) + (bydata[10] & 255)
byte[10]	0x68		
byte[11]	0x00	Vehicle speed 59 km/h	((bydata[11] & 255) * 256) + (bydata[12] & 255)
byte[12]	0x3b		
byte[13]	0x05	Tachometer 1449 rpm/min	((bydata[13] & 255) * 256) + (bydata[14] & 255)
byte[14]	0xa9		
byte[15]	0x00	Tank 23 liters	((bydata[15] & 255) * 256) + (bydata[16] & 255)
byte[16]	0x17		
byte[17]	0x00	External Temperature 135 = 13,5 °C	((bydata[17] & 255) * 256) + (bydata[18] & 255)
byte[18]	0x87		
byte[19]	0x01	Unit km / mile Unit °C / °F	(bydata[19] & 8) > 0 true = Mile (bydata[19] & 4) > 0 true = Fahrenheit
byte[20]	0xbf	Checksum	0xbf = (b0 + b1 + b3 & 0xff + b4 + ... + b19) ^ 0xff

# 0xf2 0x00 0xa1 : Events

## 0x03 0x17 : iDrive & Steering Wheel buttons

### Steering Wheel buttons

Event	Steering Wheel Tel Button Pressed (0x11 0x01)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x17 0x11 0x01 0x32

Event	Steering Wheel Tel Button Released after pressed (0x11 0x00)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x17 0x11 0x00 0x33

Event	Steering Wheel Prev Key Pressed (0x17 0x00)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x17 0x17 0x00 0x2d

Event	Steering Wheel Prev Key Released after pressed (0x17 0x01)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x17 0x17 0x01 0x2c

Event	Steering Wheel Next Key Pressed (0x18 0x00)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x17 0x18 0x00 0x2c

Event	Steering Wheel Next Key Released after pressed (0x18 0x01)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x17 0x18 0x01 0x2b

### iDrive Knob Rotary

Event	iDrive knob rotary Click up: (0x01 0x01)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x17 0x01 0x01 0x42

Event	iDrive knob rotary Release after Click up: 0x01 0x00 0x43
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x17 0x01 0x00 0x43

Event	iDrive knob rotary Click down: (0x02 0x01)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x17 0x02 0x01 0x41

Event	iDrive knob rotary Release after Click Down: (0x02 0x00)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x17 0x02 0x00 0x42

Event	iDrive knob rotary Click left: (0x03 0x01)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x17 0x03 0x01 0x40

Event	iDrive knob rotary Release after click left: (0x03 0x00)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x17 0x03 0x00 0x41

Event	iDrive knob rotary Click right: (0x04 0x01)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x17 0x04 0x01 0x3f

Event	iDrive knob rotary Release after Click right: (0x04 0x00)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x17 0x04 0x00 0x40
Event	iDrive knob rotary Pressed: (0x05 0x01)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x17 0x05 0x01 0x3e
Event	iDrive knob rotary Released after Pressed: (0x05 0x00)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x17 0x05 0x00 0x3f
Event	iDrive knob rotary Turn right: (0x06 0x01)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x17 0x06 0x01 0x3d
Event	iDrive knob rotary Turn left: (0x07 0x01)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x17 0x07 0x01 0x3c
<b>iDrive buttons</b>	
Event	iDrive Menu button Pressed: (0x08 0x01)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x17 0x08 0x01 0x3b
Event	iDrive Menu button Released after Pressed: (0x08 0x00)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x17 0x08 0x00 0x3c
Event	iDrive Telephone long press button Pressed: (0x0b 0x01)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x17 0x0b 0x01 0x38
Event	iDrive Telephone long press button Released after Pressed: (0x0b 0x00)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x17 0x0b 0x00 0x39
Event	iDrive Back button Pressed: (0x0c 0x01)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x17 0x0c 0x01 0x37
Event	iDrive Back button Released after Pressed: (0x0c 0x00)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x17 0x0c 0x00 0x38
Event	iDrive Options button Pressed: (0x0d 0x01)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x17 0x0d 0x01 0x36
Event	iDrive Options button Released after Pressed: (0x0d 0x00)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x17 0x0d 0x00 0x37
Event	iDrive Navigation button Pressed: (0x0e 0x01)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x17 0x0e 0x01 0x35

Event	iDrive Navigation button Released after Pressed: (0x0e 0x00)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x17 0x0e 0x00 0x36

### 0x02 0x1a : Screen Switch OEM – Android

Event	OEM 2 ARM Screen (via Touch Screen, iDrive button switched: Home longPress, Navigation): (0x02 0x1a 0x01)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x02 0x1a 0x01 0x41

Event	ARM to OEM Screen via (iDrive buttons switched: media, radio, home long press, phone): (0x02 0x1a 0x02)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x02 0x1a 0x02 0x40

### 0x03 0x10 : Vehicle Status: Parking Brake & Belt

Event	Parking Brake Released: (0x00 0x00)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x10 0x00 0x00 0x4b

Event	Parking Brake ON & Belt Off: (0x08 0x00)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x10 0x08 0x00 0x43

Event	Belt on for Front driver AND passenger: 0x08 0x01
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x10 0x08 0x01 0x42

### 0x03 0x12 : Vehicle status: doors

Event	All doors closed: (0x08 0x00)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x12 0x08 0x00 0x41

Event	Front Left door opened: 0x18 0x00)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x12 0x18 0x00 0x31

Event	Front Right door opened: 0x28 0x00
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x12 0x28 0x00 0x21

Event	Front Right & Left doors opened: (0x38 0x00)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x12 0x38 0x00 0x11

Event	Trunk opened: (0x0c 0x00)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x12 0x0c 0x00 0x3d

Event	Trunk & Front Left door opened: (0x1c 0x00)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x12 0x1c 0x00 0x2d

Event	Trunk & Front Right door opened: (0x2c 0x00)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x12 0x2c 0x00 0x1d

Event	Trunk & Front Left & Right door opened: (0x3c 0x00)
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0xa1 0x03 0x12 0x3c 0x00 0x0d

## 0xf2 0x00 0x11 : Events

### 0x02 0x03 : Parking Radar

Event	Parking Radar view on
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0x11 0x02 0x03 0x01 0xe8

Event	Parking Radar view off
Logcat Filter	onCmdKSWDataType0x00Event: bydata = 0xf2 0x00 0x11 0x02 0x03 0x00 0xe9

## MISC

Event	External Temperature (example for 23.0°C)
Logcat Filter	---->>> 正温度 = 230

## Version

Date	2020-06-19
Author	VincentZ4
Dictionary Version	1.08
HU & Android Version	PX6-9.0
APP Version	2019111801T_1280x480_970
Framework Version	9 PQ2A 190305.002 eng.work2.20191104.14853
MCU Version	615043bALS-CIC-HW7-200504 B1280
CarType	F1X(2011-2012) CIC 8.8/10.25inch
	1.08 Reformat document structure
	1.07 Updated Doors logs, Parking brake status, Belt Status.
	1.06 Added: iDrive rotary, iDrive btn Menu, Tel, Back, Nav, Options. Steering Wheel buttons: Tel
	1.02 Added Belt on/off Event
	1.01 Added Car door Events (Front & Trunk)
	1.00 iDrive detection Events (Pressed) + Steering Wheel Next / Prev.