Android 9.0 API – BMW

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

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For my tasker project, I needed to find out **Events & Commands.**

The Android system is communicating with the car through MCU using the serial port. I needed to decode messages sent/received by/from my Android 9.0 HU to be able to control it. Everything is described in EventCenter APK but it is a bit hard to read raw java code.

I have put everything in a kind of API "dictionary" in which I have tried to summarize my thoughts & research.

So, I have tried to describe every **Command** in a more understandable way than just raw java code. I have also described logcat **Events** I have found interesting for my usage in Tasker.

This doc content is working with my BMW car, but there are still some unknown functions.

Cartype in PX6-9.0 settings: 6 F1X(2011-2012) CIC 8.8/10.25inch.

For other cars, the main difference is mainly in the checkSum formula, described in EventService.java, format used to communicate with MCU.

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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.

Actions message structure

	Header	Function	Message	CheckSum
	byte[0…1]	byte[2…3]	{bytes}	byte[n]

byte[0]	0xF2	MCU_KEY_MUSIC = 0xF2 = -14
byte[1]	0x00	
byte[2] byte[3]	Action Function	Exemple: Set Music Status function 0xF2 0x00 0x62 0x04:
byte[q]	Message	Length depends on Action Function: 1 ≤ q ≤ 10
byte[n]	0xNN	CheckSum

Events message structure

	Header	Function	Message	CheckSum
	byte[0…2]	byte[3…4]	{bytes}	byte[n]

byte[0]	0xF2	MCU_KEY_MUSIC = 0xF2 = -14
byte[1]	0x00	
byte[2]	Event Function	0xa1, 0x11
byte[3] byte[4]	Sub-function	Example: 0xa1 0x03 0x12: Vehicle doors status
byte[q]	Message	Length depends on Function: 1 ≤ q ≤ 16
byte[n]	0xNN	CheckSum

CheckSum formula

& is Boolean AND
^ is Boolean XOR

byte = 0x00…0xFF

NN = (byte[1] + byte[2] + byte[3] & 0xFF + byte[4] + … + byte[n]) ^ 0xFF

Examples: Action & Event serial port message

Action : example of a serial port message

Action	Shut off the HU Screen	
bytes	Value	Comment
byte[0]	0xF2	MCU_KEY_MUSIC
byte[1]	0x00	
byte[2]	0x6a	
byte[3]	0x02	
byte[4]	0x0d	
byte[5]	0x00	
byte[6]	0x86	checkSum

checkSum = 0x86 = (0x00 + 0x6a + (0x02 & 0xff) + 0x0d + 0x00) ^ 0xff

"/dev/ttyS3" is the serial port used on Android-9.0 (PX6).

Shell cmd: # echo -e "\xf2\x00\x6a\x02\x0d\x00\x86" > /dev/ttyS3

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

iDrive buttons

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

0xF2 0x00 : Commands

0x60 : Set AirCond: temperature +1

Action	AirCond: temperature +1	
byte[0]	0xF2	MCU_KEY_MUSIC
byte[1]	0x00	
byte[2]	0x60	
byte[3]	0x01	
byte[4]	0x01	
byte[5]	0x9d	checkSum

0x61 : Set AirCond : temperature -1

Action	AirCond: temperature -1	
byte[0]	0xF2	MCU_KEY_MUSIC
byte[1]	0x00	
byte[2]	0x61	
byte[3]	0x02	
byte[4]	0x01	
byte[5]	0x81	
byte[6]	0x1a	checkSum

0x62 : Set Sound Status : mute, volume, type

Action	Set Sound Status : mute, volume, type	
byte[0]	0xF2	MCU_KEY_MUSIC
byte[1]	0x00	
byte[2]	0x62	
byte[3]	0x04	
byte[4]	0x00 (mute) | 0x01 (unMute)	muteMode
byte[5]	0x01 – 0x0d	Device Mode
	0x01 *0x02* *0x03* *0x04* *0x05* *0x06* *0x07* *0x08* *0x09* *0x0a* *0x0d*	*SRC_MUSIC* *SRC_MOVIE* *SRC_BT* *SRC_BTMUSIC* *SRC_DVR* *SRC_AUX* *SRC_MOBILE_APP* *SRC_DVD* *SRC_CMMB* *SRC_RADIO* *SRC_ATSL_AIRCONSOLE*
byte[6]		Vol Type
byte[7]	0x00 – 0x28	Volume Value from 0 to 40
byte[8]		checkSum

0x63 : Bluetooth State

Action	Bluetooth state	
byte[0]	0xF2	MCU_KEY_MUSIC
byte[1]	0x00	
byte[2]	0x63	
byte[3]	0x02	
byte[4]	0x00	
byte[5]		Bt State
byte[6]		checkSum

0x64 : Set Time

Action	Set Time	
byte[0]	0xF2	MCU_KEY_MUSIC
byte[1]	0x00	
byte[2]	0x64	
byte[3]	0x07	
byte[4]	2020 = 0x14	RealYear – 2000: 2020 = 20
byte[5]	0x01 - 0x0c	Month 1 - 12
byte[6]	0x01 – 0x1f	Day: 1 - 31
byte[7]	0x00 – 0x17	Hour : 0 – 23
byte[8]	0x00 – 0x3c	Min : 0 – 60
byte[9]	0x00 – 0x3c	Sec: 0 - 60
byte[10]	24h = 0x00 | 12h = 0x01	Time type: 24h | 12h
byte[11]		checkSum

0x65 : Set Brightness

Action	Set Brightness	
byte[0]	0xF2	MCU_KEY_MUSIC
byte[1]	0x00	
byte[2]	0x65	
byte[3]	0x05	
byte[4]	0 - 0x64	Brightness 0…100
byte[5]	0 - 0x64	Saturation 0…100
byte[6]	0 - 0x64	Contrast 0…100
byte[7]	0 - 0x64	Chroma 0…100
byte[8]	0 - 0x06	Paramode 0…6
byte[9]		ChechSum

0x66 : Front Camera Activation

Action	Front Camera Activation	
byte[0]	0xF2	MCU_KEY_MUSIC
byte[1]	0x00	
byte[2]	0x66	MCU_KEY_F_CAM
byte[3]	0x02	
byte[4]		iKey
byte[5]	0x01	
byte[6]		checkSum

0x67 : Set Music Source

Action	Set Music Source	
byte[0]	0xF2	MCU_KEY_MUSIC
byte[1]	0x00	
byte[2]	0x67	
byte[3]	0x01	
byte[4]	0x01 – 0x0d	Device Mode
	0x01	*SRC_MUSIC*
	0x02	*SRC_MOVIE*
	0x03	*SRC_BT*
	0x04	*SRC_BTMUSIC*
	0x05	*SRC_DVR*
	0x06	*SRC_AUX*
	0x07	*SRC_MOBILE_APP*
	0x08	*SRC_DVD*
	0x09	*SRC_CMMB*
	0x0a	*SRC_RADIO*
	0x0d	*SRC_ATSL_AIRCONSOLE*
byte[5]		checkSum

0x68 : Unknown

Action	Unknown	
byte[0]	0xF2	MCU_KEY_MUSIC
byte[1]	0x00	
byte[2]	0x68	MCU_KEY1_3
byte[3]	0x02	
byte[4]		Request Information
byte[5]	0x01 – 0x0d	Device Mode
	0x01	*SRC_MUSIC*
	0x02	*SRC_MOVIE*
	0x03	*SRC_BT*
	0x04	*SRC_BTMUSIC*
	0x05	*SRC_DVR*
	0x06	*SRC_AUX*
	0x07	*SRC_MOBILE_APP*
	0x08	*SRC_DVD*
	0x09	*SRC_CMMB*
	0x0a	*SRC_RADIO*
	0x0d	*SRC_ATSL_AIRCONSOLE*
byte[6]		checkSum

0x69 : Unknown

Action	Unknown	
byte[0]	0xF2	MCU_KEY_MUSIC
byte[1]	0x00	
byte[2]	0x69	MCU_KEY1_4
byte[3]	0x02	
byte[4]		Param0
byte[5]		Param1
byte[6]		checkSum

0x6A : MCU State Parameter Set (Param0, Param1)

Action	MCU State Parameter Set	
byte[0]	0xF2	MCU_KEY_MUSIC
byte[1]	0x00	
byte[2]	0x6A	
byte[3]	0x02	
byte[4]		Param0
byte[5]		Param1
byte[6]		checkSum

0x6A : Param set 1

Param0	0x01	1
Param1	0x00 | 0x01	KESAIWEI_SYS_BACKCAR_MIRROR Default: 0

0x6A : Param set 8

Param0	0x08	8
Param1	0x00 | 0x01	KESAIWEI_SYS_LANGUAGE Default: 1

0x6A : Param set 9

Param0	0x09	9
Param1	0x00 | 0x01	KESAIWEI_SYS_SD_HOST Default: 0

0x6A : Param set 11

Param0	0x1b	11
Param1	0x00 | 0x01	KESAIWEI_SYS_CAMERA_SELECTION Default: 1

0x6A : Param set 12

Param0	0x1c	12
Param1	0x00 | 0x01	KESAIWEI_SYS_DVD_SELECTION Default: 0

0x6A : Param set 14

Param0	0x1e	14
Param1	0x00 | 0x01	KESAIWEI_SYS_VIDEO_DRIVING_BAN Default: 0

0x6A : Param set 18

Param0	0x12	18
Param1	0x00 | 0x01	KESAIWEI_RECORD_BT_OFF Default: 0

0x6A : Param set 19

Param0	0x13	19
Param1	0x00 | 0x01	KSW_ORIGINAL_CAR_VIDEO_DISPLAY Default: 1

0x6A : Param set 20

Param0	0x14	20
Param1	0x00 | 0x01	KESAIWEI_SYS_FRONT_CAMERA Default: 0

0x6A : Param set 22

Param0	0x16	22
Param1	0x00 | 0x01	KESAIWEI_SYS_REVERSING_TRACK Default: 1

0x6A : Param set 23

Param0	0x17	23
Param1	0x00 | 0x01	KESAIWEI_SYS_RADAR Default: 1

0x6B : Click on Screen in Coordinates iX, iY

Action	Click on Screen in Coordinates iX, iY	
byte[0]	0xF2	MCU_KEY_MUSIC
byte[1]	0x00	
byte[2]	0x6B	MCU_KEY2_10
byte[3]	0x06	
byte[4]	0x01 – 0x0d	Device Mode
	0x01 *0x02* *0x03* *0x04* *0x05* *0x06* *0x07* *0x08* *0x09* *0x0a* *0x0d*	*SRC_MUSIC* *SRC_MOVIE* *SRC_BT* *SRC_BTMUSIC* *SRC_DVR* *SRC_AUX* *SRC_MOBILE_APP* *SRC_DVD* *SRC_CMMB* *SRC_RADIO* *SRC_ATSL_AIRCONSOLE*
byte[5]	0x00 – 0x05	(iX / 256)
byte[6]	0x00 – 0xFF	(iX % 256)
byte[7]	0x00 – 0x01	(iY / 256)
byte[8]	0x00 – 0xFF	(iY % 256)
byte[9]	0x00 | 0x01	iClickStatus
byte[10]		checkSum

Example :
Click at (iX, iY) = (1111 x 252)
1111 = 4 x 256 + 87 => byte[5] = 0x04, byte[6] = 0x57
252 = 0 x 256 + 252 => byte[7] = 0x00, byte[8] = 0xFC

0x6C : Set Brightness level (from settings): Action unknown

Action	Set Brightness level	
byte[0]	0xF2	MCU_KEY_MUSIC
byte[1]	0x00	
byte[2]	0x6C	MCU_KEY1_5
byte[3]	0x01	
byte[4]	0x00 – 0x64	Brightness Setting: 0 – 100
byte[5]		checkSum

0x6F : Message Beat Timer

Action	Clock: Beat Timer	
byte[0]	0xF2	MCU_KEY_MUSIC
byte[1]	0x00	
byte[2]	0x6F	
byte[3]	0x01	
byte[4]		Beat Timer
byte[5]		checkSum

0x70 : Set Android ARM Settings

Action	Set Android ARM Settings	
byte[0]	0xF2	MCU_KEY_MUSIC
byte[1]	0x00	
byte[2]	0x70	
byte[3]	0x02	
byte[4]	Param0	
byte[5]	Param1	
byte[6]		checkSum

0x70 : Param set 1

Param0	0x01	1
Param1	0x00 | 0x01	RECORD_CAR_TYPE Default : 0

0x70 : Param set 2

Param0	0x02	2
Param1	0x00 | 0x01	RECORD_AMPLIFIER Default : 0

0x70 : Param set 3

Param0	0x03	3
Param1	0x00 | 0x01	RECORD_AUX_SWITCHING Default : 0

0x70 : Param set 4

Param0	0x04	4
Param1	0x00 | 0x01	RECORD_DVR Default : 0

0x70 : Param set 5

Param0	0x05	5
Param1	0x00 - 0x03	SYS_BT_TYPE_KEY Default : 0

0x70 : Param set 6

Param0	0x06	6
Param1	0x00 | 0x01	CCC_IDRIVE_TYPE Default : 0

0x70 : Param set 7

Param0	0x07	7
Param1	0x00 | 0x01	KSW_AGREEMENT_SELECT_INDEX Default : 0

0x70 : Param set 8

Param0	0x08	8
Param1	0x00 | 0x01	REVEERSING_MUTE_SELECT_INDEX Default : 0

0x70 : Param set 9

Param0	0x09	9
Param1	0x00 | 0x01	HANDSET_AUTOMATIC_SET_INDEX Default : 0

0x70 : Param set 10

Param0	0x0a	10
Param1	0x00 | 0x01	IDEOGRAM Country (1: zh, CN, TW Countries) Default : 0

0x70 : Param set 15

Param0	0xf	15
Param1	0x00 | 0x01	COLLECT_CAN_DATA_SWITCH_INDEX Default : 0

0x70 : Param set 16

Param0	0x10	16
Param1	0x00 | 0x01	AUX_ACTIVATION_FUNCTION_INDEX Default : 0

0x70 : Param set 17

Param0	0x11	17
Param1	0x00 | 0x01	VOICE_KEY_FUNCTION_INDEX Default : 0

0x70 : Param set 18

Param0	0x12	18
Param1	0x00 | 0x01	360_CAMERA_TYPE_INDEX Default : 0

0x70 : Param set 19

Param0	0x13	19
Param1	0x00 | 0x01	BACKLIGHT_CONTROL_INDEX Default : 0

0x70 : Param set 20

Param0	0x14	20
Param1	0x00 | 0x01	AHD_CAMERA_TYPE Default : 0

0x70 : Param set 21

Param0	0x15	21
Param1	0x00 | 0x01	MAP_KEY_FUNCTION_INDEX Default : 0

0x70 : Param set 23

Param0	0x17	23
Param1	0x00 | 0x01	AUX_ITEM_POSITION Default : 0

0x71 : Unknown

Action	Unknown	
byte[0]	0xF2	MCU_KEY_MUSIC
byte[1]	0x00	
byte[2]	0x71	
byte[3]	0x01	
byte[4]		Param0
byte[5]		checkSum

0x73 : Set Music Equalizer

Action	Set Music Equalizer	
byte[0]	0xF2	MCU_KEY_MUSIC
byte[1]	0x00	
byte[2]	0x73	
byte[3]	0x04	
byte[4]	0x00 – 0x17	Low: 0 - 23
byte[5]	0x00 – 0x17	Mid: 0 - 23
byte[6]	0x00 – 0x17	High: 0 - 23
byte[7]	0x00 – 0x04	Equalizer Mode: 0 - 4
byte[8]		checkSum

0x74 : Cmd Wheel State

Action	Command Wheel State	
byte[0]	0xF2	MCU_KEY_MUSIC
byte[1]	0x00	
byte[2]	0x74	CMD_WHEEL_STATE
byte[3]	0x01	
byte[4]	0x05 | 0x06 | 0x08 | 0x09	Param: 5, 6, 8 or 9
byte[5]		checkSum

0x75 : Set Radio FM

Action	Set Radio FM	
byte[0]	0xF2	MCU_KEY_MUSIC
byte[1]	0x00	
byte[2]	0x75	
byte[3]	0x03	
byte[4]	0x01 | 0x02	FM: ON: 1 | OFF:2
byte[5]		((CurFreq >> 8) & 255)
byte[6]		(i_TvCurFreq & 255)
byte[7]		checkSum

0x76 : BMT VAL : Unknown

Action	BMT Val	
byte[0]	0xF2	MCU_KEY_MUSIC
byte[1]	0x00	
byte[2]	0x76	CMD_BMT_VAL
byte[3]	0x03	
byte[4]		Param0
byte[5]		Param1
byte[6]		Param2
byte[7]		checkSum

0x77 : Display Type

Action	BMT Val	
byte[0]	0xF2	MCU_KEY_MUSIC
byte[1]	0x00	
byte[2]	0x77	
byte[3]	0x03	
byte[4]		Param0
byte[5]		Param1
byte[6]		Param2
byte[7]		Type
byte[8]		checkSum

0x77 : Param set example: Set RGB & Brightness values

Param0	0x00 - 0xff	AMBIENT_LIGHT_R_VALUE Default: 0xff
Param1	0x00 - 0xff	AMBIENT_LIGHT_G_VALUE Default: 0xff
Param2	0x00 - 0xff	AMBIENT_LIGHT_B_VALUE Default: 0xff
Type	0x00 - 0xff	CUR_SELECT_POSITION Default: 0xff

0x78 : Cmd Mute

Action	Command Mute	
byte[0]	0xF2	MCU_KEY_MUSIC
byte[1]	0x00	
byte[2]	0x78	CMD_MUTE
byte[3]	0x02	
byte[4]		Param0
byte[5]		Param1
byte[6]		checkSum

0x79 : CMD Main Volume

Action	Command Main Volume	
byte[0]	0xF2	MCU_KEY_MUSIC
byte[1]	0x00	
byte[2]	0x79	CMD_MAIN_VOL
byte[3]	0x04	
byte[4]	Param0	
byte[5]	Param1	
byte[6]	Param2	
byte[7]	Param3	
byte[8]		checkSum

0x79 : Param set example

Param0	0x00 | 0x01	KSW_COCKBOARD_ASCENDING_STATUS Default: 0
Param1	0x00 | 0x01	KSW_AIRMATIC_STATUS Default: 0
Param2	0x00 | 0x01	KSW_AUXILIARY_RADAR_STATUS Default: 0
Param3	0x00 | 0x64	KSW_INSTRUMENT_BACKLIGHT_VALUE Default: 12

Example of Commands

Action	Change OEM Music source State example: SRC_RADIO
Shell	echo -e "\xf2\x00\x67\x01\x0a\x8d" > /dev/ttyS3

Action	Start Black Screen
Shell	echo -e "\xf2\x00\x6a\x02\x0d\x00\x86" > /dev/ttyS3

Commands: Carplay Carlinkit Autokit

Action	Carplay Home
Shell	am broadcast -a cn.manstep.phonemirrorBox.AUTO_BOX_CONTROL_CMD_EVT --ei cn.manstep.phonemirrorBox.AUTO_BOX_CONTROL_CMD_DATA 9

Action	Carplay Music Play
Shell	am broadcast -a cn.manstep.phonemirrorBox.AUTO_BOX_CONTROL_CMD_EVT --ei cn.manstep.phonemirrorBox.AUTO_BOX_CONTROL_CMD_DATA 10

Action	Carplay Music Pause
Shell	am broadcast -a cn.manstep.phonemirrorBox.AUTO_BOX_CONTROL_CMD_EVT --ei cn.manstep.phonemirrorBox.AUTO_BOX_CONTROL_CMD_DATA 11

Action	Carplay Play or Pause
Shell	am broadcast -a cn.manstep.phonemirrorBox.AUTO_BOX_CONTROL_CMD_EVT --ei cn.manstep.phonemirrorBox.AUTO_BOX_CONTROL_CMD_DATA 12

Action	Next Song
Shell	am broadcast -a cn.manstep.phonemirrorBox.AUTO_BOX_CONTROL_CMD_EVT --ei cn.manstep.phonemirrorBox.AUTO_BOX_CONTROL_CMD_DATA 13

Action	Prev Song
Shell	am broadcast -a cn.manstep.phonemirrorBox.AUTO_BOX_CONTROL_CMD_EVT --ei cn.manstep.phonemirrorBox.AUTO_BOX_CONTROL_CMD_DATA 14

Action	Carplay Phone Answer
Shell	am broadcast -a cn.manstep.phonemirrorBox.AUTO_BOX_CONTROL_CMD_EVT --ei cn.manstep.phonemirrorBox.AUTO_BOX_CONTROL_CMD_DATA 15

Action	Carplay Phone Hang up
Shell	am broadcast -a cn.manstep.phonemirrorBox.AUTO_BOX_CONTROL_CMD_EVT --ei cn.manstep.phonemirrorBox.AUTO_BOX_CONTROL_CMD_DATA 16

Action	Launch Maps
Shell	am broadcast -a cn.manstep.phonemirrorBox.AUTO_BOX_CONTROL_CMD_EVT --ei cn.manstep.phonemirrorBox.AUTO_BOX_CONTROL_CMD_DATA 30

Action	Launch Phone
Shell	am broadcast -a cn.manstep.phonemirrorBox.AUTO_BOX_CONTROL_CMD_EVT --ei cn.manstep.phonemirrorBox.AUTO_BOX_CONTROL_CMD_DATA 31

Action	Launch Music
Shell	am broadcast -a cn.manstep.phonemirrorBox.AUTO_BOX_CONTROL_CMD_EVT --ei cn.manstep.phonemirrorBox.AUTO_BOX_CONTROL_CMD_DATA 32

MISC

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

Version

Date	2020-06-17
Author	VincentZ4
Dictionary Version	2.00
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
Commands	2.11: Description of every function used to send broadcast to the MCU.
Commands	1.10: Added function 0x67 description
Commands	1.07: Updated Doors logs, Parking brake status, Belt Status.
Events	1.06: Added: iDrive rotary, iDrive btn Menu, Tel, Back, Nav, Options. Steering Wheel buttons: Tel
Commands	1.05: Added Carplay commands (cn.manstep.phonemirrorBox API)
Commands	1.04: Added Black Screen command
Events	1.03: Added Screen switch Events: “Android to OEM” & “OEM to Android”
Events	1.02: Added Belt on/off Event
Events	1.01: Added Car door Events (Front & Trunk)
Events	1.00: iDrive detection Events (Pressed) + Steering Wheel Next / Prev.