

PRODUCT FEATURES:

- Adds front, rear, left and right camera inputs to the factory MBUX display.
- Supports CVBS and AHD cameras up to 1080p.
- Automatically detects the connected camera video format.
- Automatically displays the rear camera when the vehicle is shifted into reverse.
- Automatically displays the left or right side camera when the corresponding turn signal is activated.
- Front camera can automatically display after shifting out of reverse.
- Allows manual camera selection using the factory steering wheel controls.
- Retains compatibility with factory video features, including the OEM rear-view camera.
- Includes two configurable +12V outputs for powering/triggering cameras or accessories.
- Built-in On-Screen Display (OSD) for camera and interface configuration.
- Interface can also be configured using a PC/Mac web browser via USB.
- USB-C update port allows software/firmware updates.

RADIO COMPATIBILITY:

- 10.25" MBUX System with Navigation.

PARTS INCLUDED:



RFM-MB3 Module



RFM-MB3 Harness



GMSL Video Cable



Video Harness

OPTIONAL ADD-ON CAMERAS:

Optional add on cameras are available to complete the multi-view capability of the RFM-MB1. Cameras available and ***sold separately*** include: (More cameras can be found at www.cruxinterfacing.com)



CSV-01 Universal Fender
Mount Side View Camera



CFF-01 Bullet Type Front Camera



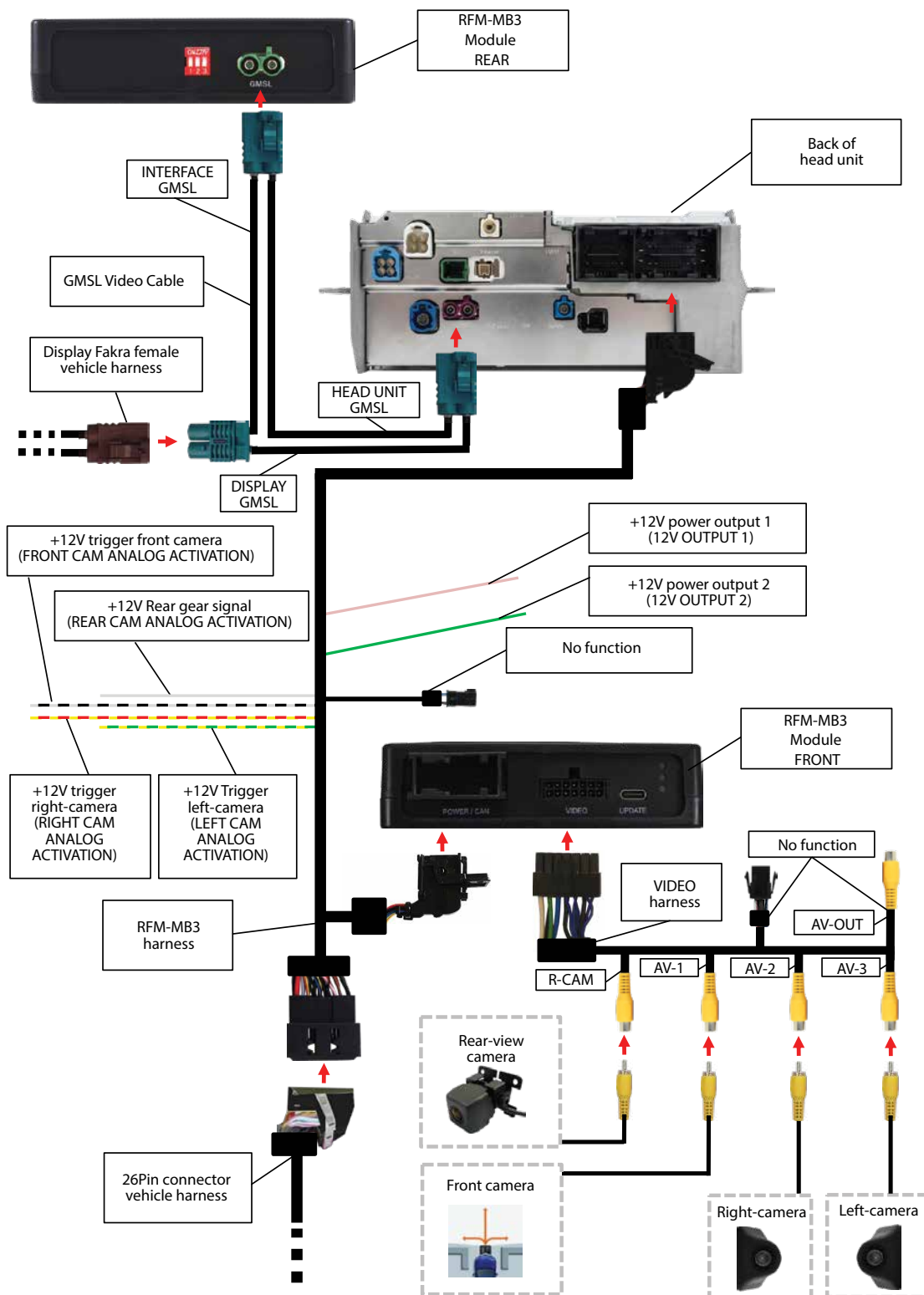
CFF-02 Square Body Front Camera



CFF-03 Grille Mount Front Camera



INSTALLATION DIAGRAM:



DIP SWITCH SETTINGS:

<u>SCREEN SIZE</u>	<u>DIP 1</u>	<u>DIP 2</u>	<u>DIP 3</u>
10.25" NTG7	OFF	OFF	OFF

NOTE: Unplug the module power harness before setting the DIP switches.

LED INFORMATION:



INSTALLATION:

The RFM-MB3 is installed at the headunit and monitor. Refer to the installation diagram on page 2 for a visual reference on the connections.

OSD OPERATION:

The RFM-MB3 adds front, rear, left and right camera inputs that can be configured using the built-in OSD (On Screen Display) menu or on a PC browser (see page ---).
The next steps will help you setup the cameras to seamlessly integrate to the factory MBUX System.
Use the steering Wheel Control buttons to enter and exit the OSD Menu.

The OSD menu can be controlled via the following buttons:



SELECTING THE INTERFACE AS THE CURRENT VIDEO SOURCE:



Press long "STAR" button to choose the interface as current video source.
Short press "STAR" button switch the video sources (cameras/AV sources).
Each short press will switch to the next enabled input. If all inputs are enabled the order would be as follows:

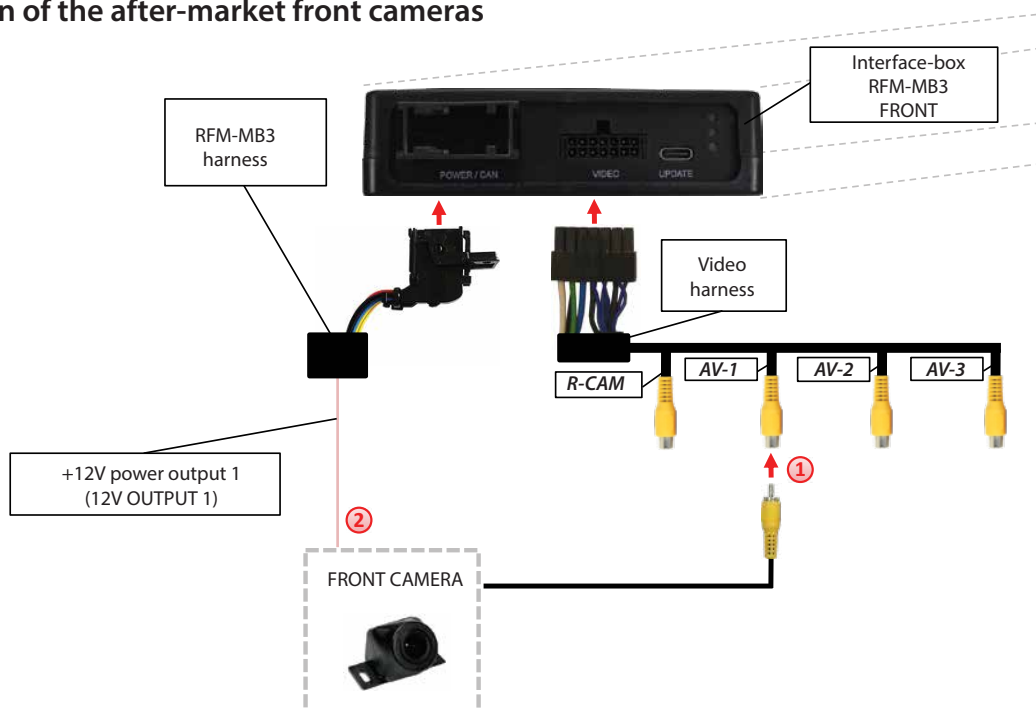
Rear CAM → Front CAM → Right Cam/AV1 → Left Cam/AV2 → ...

Inputs which are not enabled are skipped.

The exiting of the interface camera/video level is achieved by long press of "STAR" button or short press of "BACK" button.

SETTING UP THE CAMERAS:

Connection of the after-market front cameras



CONNECTION OF THE AFTER-MARKET FRONT CAMERAS: (Continued)

- 1 Connect the video RCA of the after-market front camera to the female RCA connector "AV-1" of the V4C-VIDEO harness.
- 2 The pink wire (12V OUTPUT 1) of RFM-MB3 harness can be used for +12V electric power supply (max. 1A) of the after-market front camera. Configure in the OSD-menu "Option 1", menu item "Power Out 1" the setting "CAM" (see also chapter "Configurable switching outputs").

```

U8-NTG7 SETTINGS
PARK LOGIC          SPEED & TIME
POWER OUT 1         CAM
POWER OUT 2         CAM
CAR TYPE            SPRINTER
CAMERA RESET
FACTORY REST
BACK
  
```

SETTINGS FOR CONNECTING AN AFTER-MARKET FRONT CAMERA:

You have to configure some settings in the OSD menus INPUT, Option 1 and Option 2 if you want to connect an after-market front camera (Operation of the OSD: see page 3).

```

U8-NTG7 SETTINGS
RVC                  ON
FVC                  ON
RIGHT UC/AU1         ON
LEFT UC/AU2          ON

RVC VIDEO TYPE       AUTO
FVC VIDEO TYPE       AUTO
RIGHT UC/AU1 VIDEO TYPE AUTO
LEFT UC/AU2 VIDEO TYPE AUTO
BACK
  
```

```

U8-NTG7 SETTINGS
PARK LOGIC          SPEED & TIME
POWER OUT 1         CAM
POWER OUT 2         CAM
CAR TYPE            SPRINTER
CAMERA RESET
FACTORY REST
BACK
  
```

```

U8-NTG7 SETTINGS
R/F CAM TILL        10
F/S CAM FROM        0
F/S CAM TILL        60
RVC TRIGGER         CAN
FVC TRIGGER         CAN
RIGHT UC/AU1 TRIGGER CAN
LEFT UC/AU2 TRIGGER CAN
BLINKER MODE        OFF
BACK
  
```

OSD-menu	Menu item	Setting	Explanation
INPUT	FVC	OFF	Front camera deactivated
		ON	Switches to front camera if parking process is enabled and reverse gear is released
OPTION 1	PARK LOGIC	RGEAR ONLY	Enabled while parking process (not suitable for front camera operation)
		SPEED & TIME	Enabled while parking process and up to e.g. 10km (speed adjustable) or up to 20 second
OPTION 2	R/F CAM TILL	XX	Speed setting for deactivating of the camera image

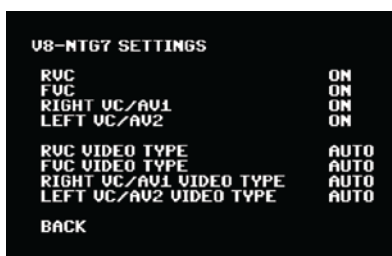
Note: You can deactivate the camera image by short pressing the "Back" button on steering wheel (right steering wheel side).



SETTINGS FOR CONNECTING AN AFTER-MARKET WIDE VIEW FRONT CAMERA:

For the use of a wide view front camera, the interface offers not only manual activation, but also activation via the blinker function. Note: via CAN bus blinker signal detection (menu: Option 2 / FVC TRIGGER - "CAN"), the activation does not take place in "blinker comfort mode" (brief touch of the blinker lever).

You have to configure some settings in the OSD menus INPUT, OPTION 1 and OPTION 2 if you want to connect an after-market front camera (Operation of the OSD: see page 3).



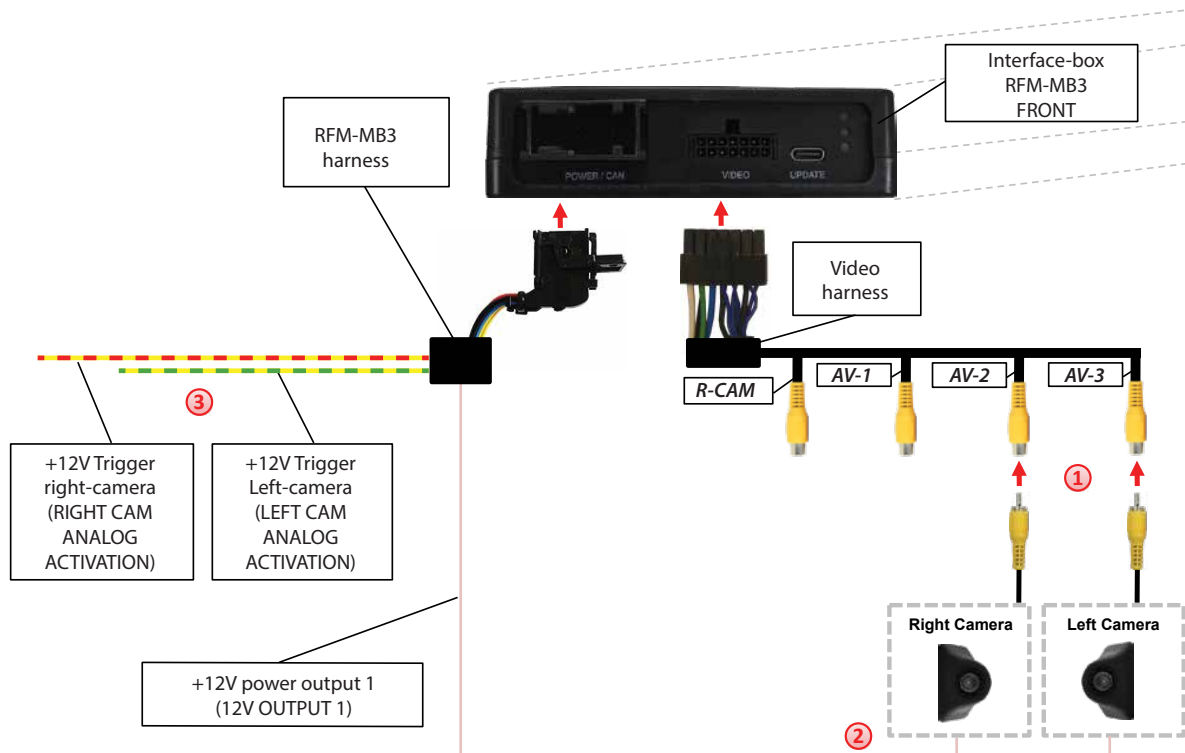
OSD-menu	Menu item	Setting	Explanation
INPUT	FVC	OFF	Front camera deactivated
		ON	Switches to front camera if parking process is enabled and reverse gear is released
OPTION 1	PARK LOGIC	RGEAR ONLY	Enabled while parking process (not suitable for front camera operation)
		SPEED & TIME	Enabled while parking process and up to e.g. 10km (speed adjustable) or up to 20 second
OPTION 2	R/F CAM TILL	XX	Speed setting for deactivating of the camera image
OPTION 2	F/S CAM FROM	XX	Speed range setting for front- and side cameras (minimum)
OPTION 2	F/S CAM TILL	XX	Speed range setting for front- and side cameras (maximum)
OPTION 2	BLINKER MODE	FRONT CAM	Activation of the front camera image when the blinker is activated
		CAN	Blinker signal detection over CAN Bus
OPTION 2	FVC TRIGGER	ANALOG	Blinker signal detection over analogue +12V signals

Note: The camera activation via the blinker mode is only available for front camera or for the side view cameras. A parallel use of this function for all cameras is not possible.



AFTER-MARKET SIDE VIEW CAMERAS:

Connection of the after-market side view cameras



① Connect the video RCA of the right side view camera to the female RCA connector "AV-2" and the video RCA of the left side view camera to the female RCA connector "AV-3" of the VIDEO harness.

② The pink wire (12V OUTPUT 1) of harness RFM-MB3 can be used for +12V electric power supply (max. 1A) of the after-market side cameras. Configure in the OSD-menu "OPTION 1", menu item "POWER OUT 1" the setting "CAM" (see page 11).

U8-NTG7 SETTINGS

PARK LOGIC
POWER OUT 1
POWER OUT 2
CAR TYPE
CAMERA RESET
FACTORY REST
BACK

SPEED & TIME
CAM
CAM
SPRINTER

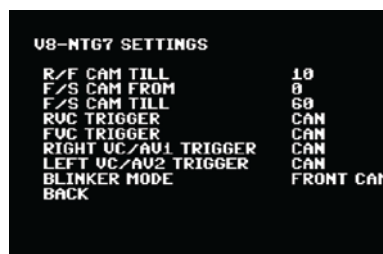
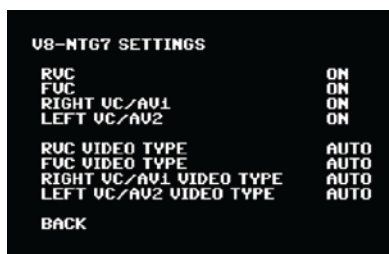
③ Exception: Connect the yellow/red wire to the right analogue blinker signal and the yellow/green wire to the left analogue blinker signal of harness RFM-MB3 (triggered +12V blinker power) and make the menu setting - OPTION 2 / RIGHT VC , LEFT VC TRIGGER -ANALOGUE", if the system doesn't switch to the aftermarket side view camera automatically after the described OSD-setup (OPTION 2 / RIGHT VC , LEFT VC TRIGGER - "CAN", see next chapter).



SETTINGS FOR CONNECTING OF AFTER-MARKET SIDE VIEW CAMERAS:

For the use of side view cameras, the interface offers not only manual activation, but also activation via the blinker function. Note: via CAN bus blinker signal detection (menu: OPTION 2 / RIGHT VC, LEFT VC TRIGGER - "CAN"), the activation does not take place in "blinker comfort mode" (brief touch of the blinker lever).

You have to configure some settings in the OSD menus INPUT, OPTION 1 and OPTION 2 if you want to connect an after-market front camera
(Operation of the OSD: see page 3).



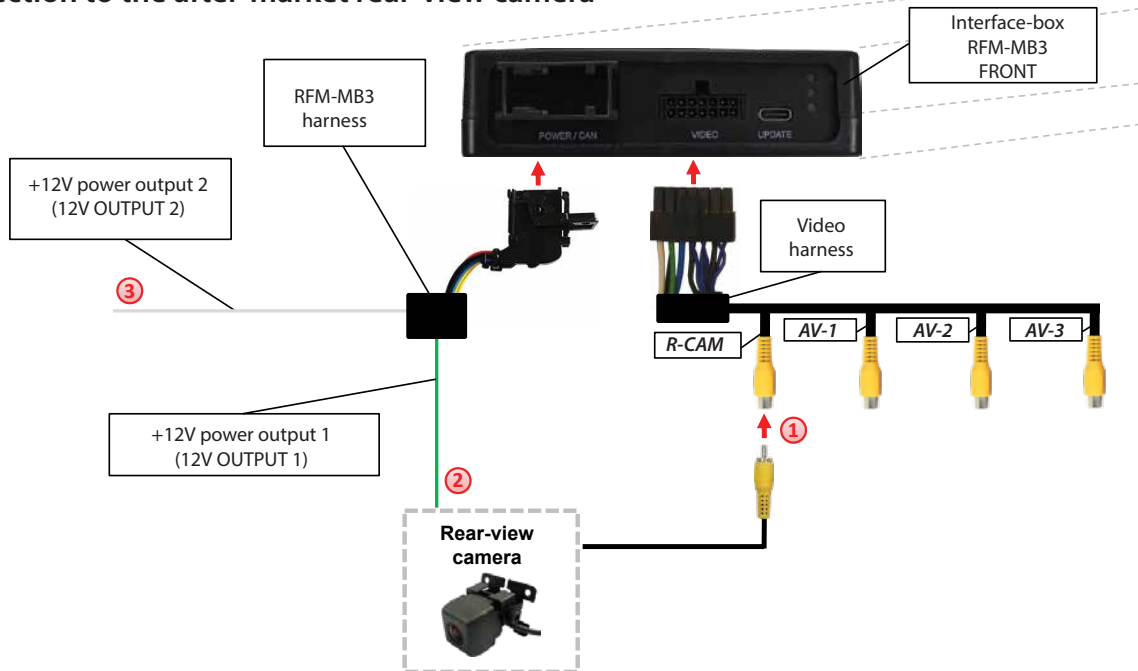
OSD-menu	Menu item	Setting	Explanation
INPUT	RIGHT VC	ON	Right camera input activated
	LEFT VC	ON	Left camera input activated
OPTION 1	PARK LOGIC	RGEAR ONLY	Enabled while parking process (not suitable for front camera operation)
		SPEED & TIME	Enabled while parking process and up to e.g. 10km (speed adjustable) or up to 20 second
OPTION 2	R/F CAM TILL	XX	Speed setting for deactivating of the camera image
OPTION 2	F/S CAM FROM	XX	Speed range setting for front- and side cameras (minimum)
OPTION 2	F/S CAM TILL	XX	Speed range setting for front- and side cameras (maximum)
OPTION 2	BLINKER MODE	SIDE CAM	Activation of the side view cameras image when the blinker is activated
OPTION 2	RIGHT TRIGGER	CAN	Blinker signal detection over CAN Bus
		ANALOGUE	Blinker signal detection over analogue +12V signals
OPTION 2	LEFT TRIGGER	CAN	Blinker signal detection over CAN Bus
		ANALOG	Blinker signal detection over analogue +12V signals

Note: The camera activation via the blinker mode is only available for front camera or for the side view cameras. A parallel use of this function for all cameras is not possible.



AFTER-MARKET REAR-VIEW CAMERA:

Connection to the after-market rear-view camera



1 Connect the video RCA of the after-market rear-view camera to the female RCA connector "R-CAM" of the VIDEO harness.

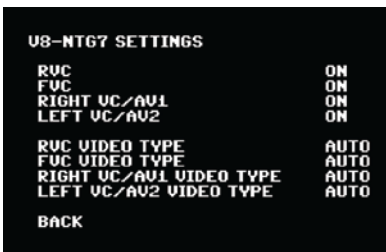
2 The green wire (12V OUTPUT 2) of harness RFM-MB3 can be used for +12V electric power supply (max. 1A) of the after-market rear-view camera. Configure in the OSD-menu "OPTION 1", menu item "POWER OUT 2" the setting "CAM" (see page 11).

3 Exception: Connect the white wire of RFM-MB3 harness to analogue rear gear signal (+12V) and make the menu setting - OPTION 2 / RVC TRIGGER - "CAN", if the system doesn't switch to the aftermarket rear-view camera automatically after the described OSD-setup (OPTION 2 / RVC TRIGGER - "ANALOG", see next chapter).



SETTINGS FOR CONNECTING AN AFTER-MARKET REAR-VIEW CAMERA:

You have to configure some settings in the OSD menus INPUT, OPTION 1 and OPTION 2 if you want to connect an after-market rear-view camera (Operation of the OSD: see chapter "OSD-Operation").



OSD-menu	Menu item	Setting	Explanation
INPUT	RVC	OFF	Rear-view camera deactivated
		ON	Switches to rear-view camera if reverse gear is engaged or PDC is activate
OPTION 1	PARK LOGIC	RGEAR ONLY	Enabled while parking process (not suitable for front camera operation)
		SPEED & TIME	Enabled while parking process and up to e.g. 10km (speed adjustable) or up to 20 second
OPTION 2	R/F CAM TILL	XX	Speed setting for deactivating of the camera image
OPTION 2	RVC TRIGGER	CAN	Rear gear signal detection over CAN Bus
		ANALOG	Rear gear signal detection over analogue +12V signals

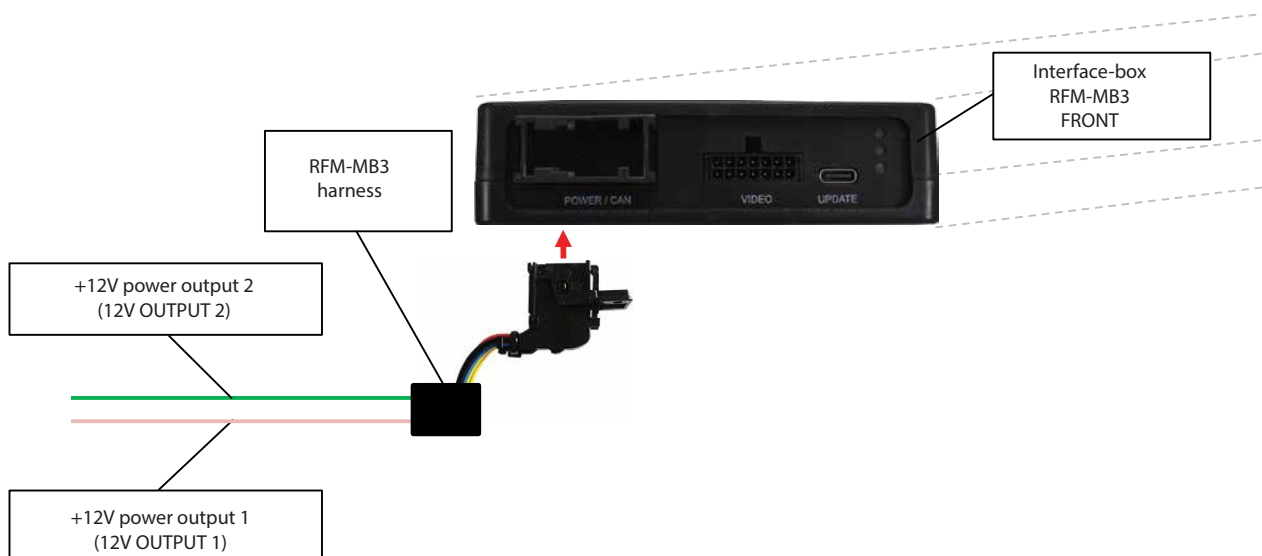
Note: You can deactivate the camera image by short pressing the "Back" button on steering wheel (right steering wheel side).

SETTINGS FOR OEM REAR_VIEW CAMERA:

OSD-menu	Menu item	Setting	Explanation
INPUT			If a factory rear-view camera is existing!
	RVC	OEM	The interface turns off, if reverse gear is enabled and it displays factory rear-view camera
OPTION 1	PARK LOGIC	SPEED & TIME	Enabled while parking process and up to e.g. 10km (speed adjustable) or up to 20 second
OPTION 2	R/F CAM TILL	XX	Speed setting for deactivating of the camera image



CONFIGURABLE TRIGGER OUTPUTS:



You can configure the both +12V trigger outputs separately. The pink wire is (12V OUTPUT 1) is POWER OUT 1 and the green wire is (12V OUTPUT 2) is POWER OUT 2. Note: You can configure the both trigger outputs in the OSD-menu OPTION 1 separately (Operation of the OSD: see page 3).



OSD-menu	Menu item	Setting	Explanation
OPTION 1	POWER OUT 1 (pink)	CAM	+12V when the interface is on (red LED on)
		ACC	+12V when ignition is on
	POWER OUT 2 (green)	CAM	+12V when camera input is activated (manually or automatically)
		RGEAR	+12V when reverse gear is engaged
		AVS	+12V when camera / video input was manually activated
		OFF	Trigger output deactivated

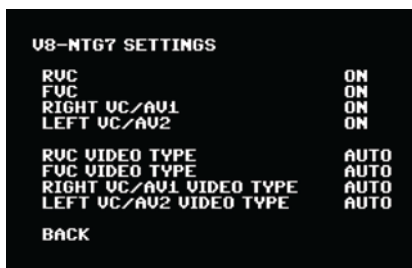
Tip: We recommend for all camera modes the POWER OUT setting "CAM" and for AV source the power out setting "AVS" or "ACC".



CAMERA VIDEO FORMAT SETTINGS:

3.3. Camera video format settings

The interface features automatic camera video format detection (CVBS, AHD). Alternatively, the camera video format setting can be configured manually for each video input in the OSD menu INPUT (operation of the OSD: see page 3).



OSD-menu	Menu item	Setting
INPUT	RVC VIDEO TYPE / FVC VIDEO TYPE / RIGHT VC/AV 1VIDEO TYPE / LEFT VC/AV2 VIDEO TYPE	AUTO
		CVBS PAL
		CVBS NTSC
		720p/25 PAL
		720p/30 NTSC
		1080p/25 PAL
		1080p/30 NTSC

Note: Automatic camera video format detection is performed only once (if successful). To reactivate automatic detection, select the "CAMERA RESET" menu item once in the OSD

Alternatively, automatic camera video format detection can be reactivated using DIP switch "3". To do this, first disconnect the interface from power, set DIP 3 to ON, reconnect the interface to power, and after 10 seconds set DIP 3 back to OFF.

3.4. Picture settings

The camera picture settings can be set in the OSD menu. For this setting you must at first activate the camera level and push then the "HOME" steering wheel button for 3sec. (right steering wheel side) to activate the settings menu. With the "PICK UP" (up), "HANG UP" (down) and "STAR" (OK) steering wheel buttons you can select and change the "BRIGHTNESS", "CONTRAST" and "COLOUR" menu points. Over the menu point "Exit" you can leave this settings menu.

BRIGHTNESS	25
CONTRAST	25
COLOUR	25

Note: The picture settings will be retained for every camera input separately.



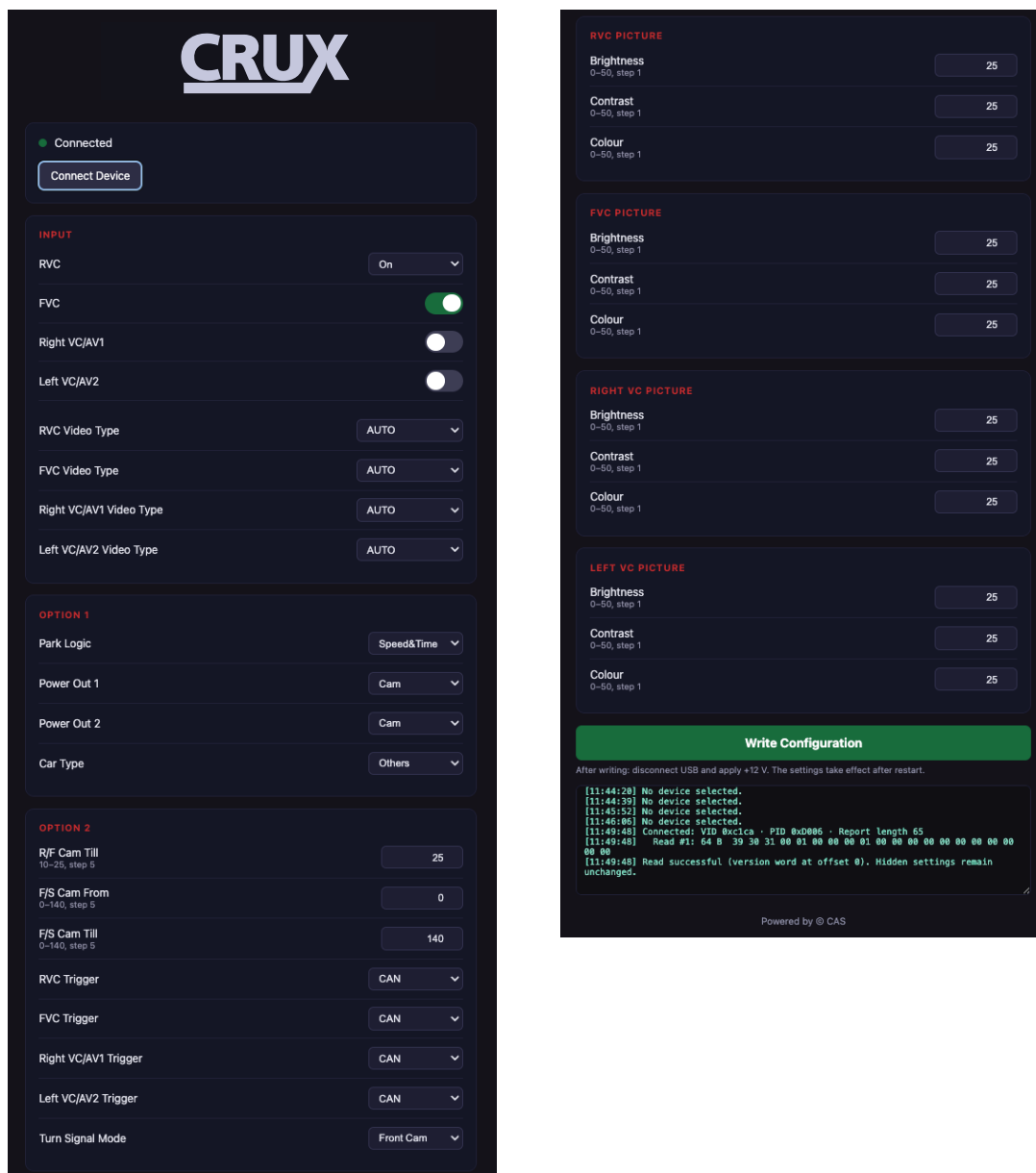
INTERFACE SETTING with PC BROWSER :

All OSD menu settings described above can alternatively be made on a PC.

To do this, connect the interface to the PC/Mac using a USB cable and open this URL using a Chromium-based browser such as Google Chrome, Microsoft Edge, or Opera:

setup.casgermany.com

On the setup page, click "Connect Device", select "CAS Bootloader" in the popup window, and click "Connect". Once all desired settings have been made, click "Write Configuration" at the bottom of the page. Finally, the interface can be disconnected from USB and installed in the vehicle.



CRUX

Connected
Connect Device

INPUT

RVC On

FVC On

Right VC/AV1

Left VC/AV2

RVC Video Type AUTO

FVC Video Type AUTO

Right VC/AV1 Video Type AUTO

Left VC/AV2 Video Type AUTO

OPTION 1

Park Logic Speed&Time

Power Out 1 Cam

Power Out 2 Cam

Car Type Others

OPTION 2

R/F Cam Till 10-25, step 5 25

F/S Cam From 0-140, step 5 0

F/S Cam Till 0-140, step 5 140

RVC Trigger CAN

FVC Trigger CAN

Right VC/AV1 Trigger CAN

Left VC/AV2 Trigger CAN

Turn Signal Mode Front Cam

RVC PICTURE

Brightness 0-50, step 1 25

Contrast 0-50, step 1 25

Colour 0-50, step 1 25

FVC PICTURE

Brightness 0-50, step 1 25

Contrast 0-50, step 1 25

Colour 0-50, step 1 25

RIGHT VC PICTURE

Brightness 0-50, step 1 25

Contrast 0-50, step 1 25

Colour 0-50, step 1 25

LEFT VC PICTURE

Brightness 0-50, step 1 25

Contrast 0-50, step 1 25

Colour 0-50, step 1 25

Write Configuration

After writing: disconnect USB and apply +12 V. The settings take effect after restart.

```
[11:44:28] No device selected.
[11:44:39] No device selected.
[11:45:52] No device selected.
[11:46:06] No device selected.
[11:49:48] Connected: VID 0xc1ca · PID 0x0005 · Report length 65
[11:49:49] Read #1: 64 0 39 30 31 00 01 00 00 00 00 00 00 00 00 00
[11:49:48] Read successful (version word at offset 8). Hidden settings remain unchanged.
```

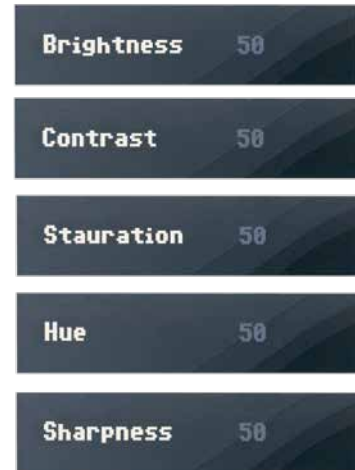
Powered by © CAS



CAMERA SETTINGS:

You can calibrate individual camera image in the OSD menu.

Activate one of the cameras. Press the “HOME” button (right side steering wheel controls) for 3 seconds to activate this menu. Use “Volume” rotary knob to change the Brightness, Contrast, Saturation, Hue, and Sharpness of the camera image. Press the rotary knob to enter the selection. Repeat the steps above for the other cameras connected. Select “Exit” to leave the menu.



FORCE VIEWING THE FRONT CAMERA:

Use the steering wheel controls to force view any of the cameras that are enabled.

Press the ★ button for 3 seconds to enter forced camera view mode. Each short press thereafter toggles to the next camera that is enabled. If all cameras are enabled, the order will be as follows:

Rear CAM → Front CAM → Right CAM → Left Cam → ...

Cameras that are not enabled are skipped.

Press the ★ button again for 3 seconds to exit this mode.



VEHICLE APPLICATIONS:

Mercedes-Benz

2024 - PRESENT Sprinter (W907/910) w/ MBUX 2G NTG7 with 26 pin socket, 10.25" screen

2024 - PRESENT V-Class (W447) w/ MBUX 2G NTG7 with 26 pin socket, 10.25" screen

