Video-inserter
INTCAMMER15

Compatible with

Mercedes Benz vehicles with
Garmin Audio30 or Audio40 infotainment



examples

Video-inserter for front- and rear-view camera
and two additional video sources

Product features

- Video-inserter for factory-infotainment systems
- 1 CVBS Input for rear-view camera
- 1 CVBS Input for front camera
- 2 CVBS video-inputs for after-market devices (e.g. USB-Player, DVB-T2 tuner)
- Automatic switching to rear-view camera input on engagement of the reverse gear
- Automatic front camera switching after reverse gear for 10 seconds
- Video-in-motion (ONLY for connected video-sources)
- Video-inputs NTSC and PAL compatible

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Legal Information

By law, watching moving pictures while driving is prohibited, the driver must not be distracted. We do not accept any liability for material damage or personal injury resulting, directly or indirectly, from installation or operation of this product. This product should only be used while standing or to display fixed menus or rear-view-camera video when the vehicle is moving, for example the MP3 menu for DVD upgrades.

Changes/updates of the vehicle's software can cause malfunctions of the interface. We offer free software-updates for our interfaces for one year after purchase. To receive a free update, the interface must be sent in at own cost. Labour cost for and other expenses involved with the software-updates will not be refunded.

1. Prior to installation

Read the manual prior to installation.
Technical knowledge is necessary for installation. The place of installation has to be free of moisture and away from heat sources.

1.1. Delivery contents



Take down the serial number of the interface and store this manual for support purposes:

_____

1.2. Checking the compatibility of vehicle and accessories

Requirements

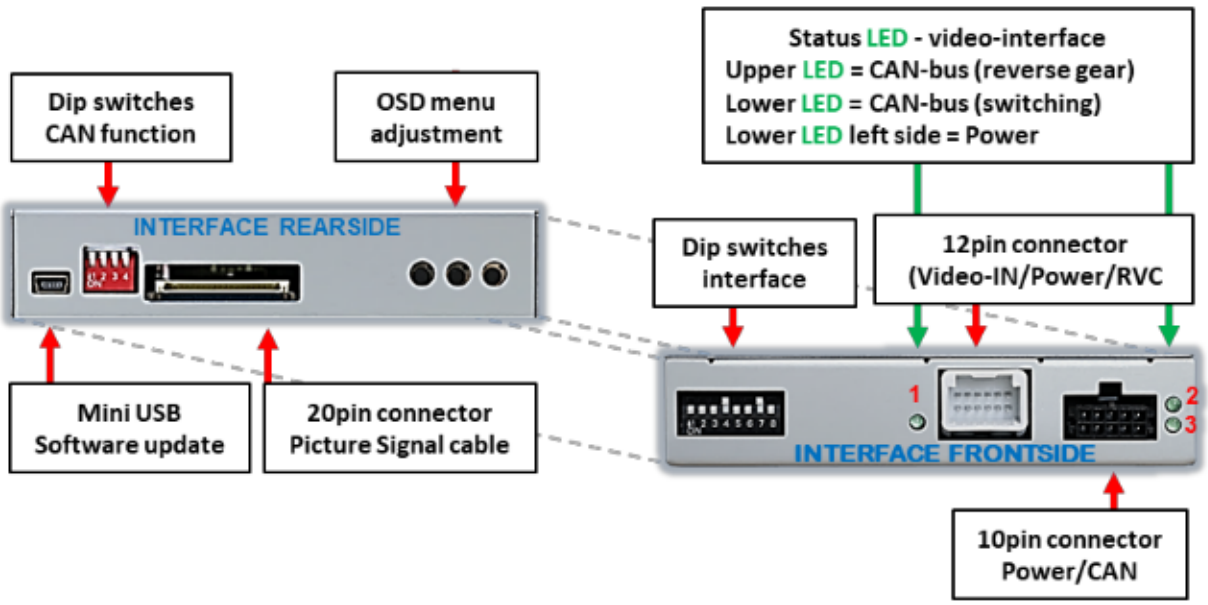
Brand	Compatible vehicles	Compatible systems
Mercedes-Benz	Vito (W447) since about 2019	Garmin Audio30/Audio40 *Only for head-units made by Garmin - not compatbile with Audio40 made by Pioneer*

Limitations

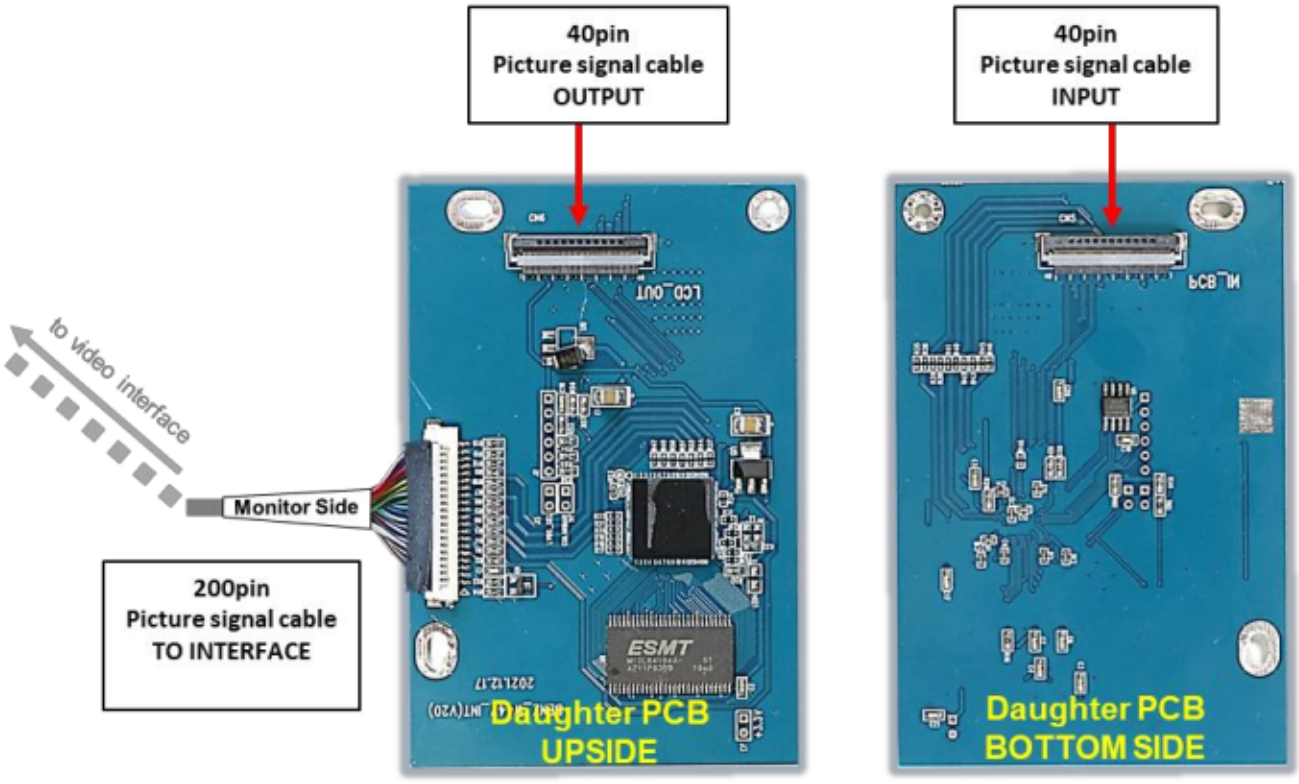
Video only	The interface inserts ONLY video signals into the infotainment. For inserting Audio signals either the possibly existing factory audio-AUX-input or a FM-modulator can be used. In case that 2 AV sources shall be connected, a desired audio switching will require additional electronic.
Factory rear-view camera	Automatically switching-back from inserted video to factory rear-view camera is only possible while the reverse gear is engaged. To delay the switch-back an additional electronic part is required.
After market front camera	The front camera will automatically be switched for 10 seconds after disengaging the reverse gear. A manually front camera switching is possible by external keypad.

1.3. connectors - video-interface

The video-interface (daughter PCB) converts the video signals of connected after-market sources in a factory monitor compatible picture signal which is inserted in the factory monitor, by using separate trigger options.

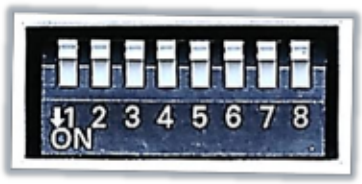


1.4. connectors – daughter PCB



1.5. Dip-switch settings

1.5.1. 8 dip - black



Some settings have to be selected by the dip-switches on the video interface.
Dip position down is ON and position up is OFF.

Dip	Function	ON (down)	OFF (up)
1	**Front camera**	enabled*	disabled
	Power supply output (red wire)	+12V (max. 3A) when reverse gear is engaged incl. 10 seconds delay and +12V by manual switching to front camera by keypad	+12V (max. 3A) ACC
2	**CVBS AV1-input**	enabled	disabled
3	**CVBS AV2-input**	enabled	disabled
4	**No function**		Set to OFF
5	**Rear-view cam type**	after-market	factory or none
6	**No function**		Set to OFF
7	**No function**		Set to OFF
8	**No function**		Set to OFF

*The front camera will automatically be switched for 10 seconds after disengaging the reverse gear (see following information).

After each Dip-switch-change a power-reset of the Video Interface has to be performed!

1.5.1.1. Activating the front camera input (dip 1)

If set to ON, the interface switches for 10 seconds from the rear-view camera to the front camera input after having disengaged the reverse gear. In addition, a manual switch-over to the front camera input is possible via keypad (short press) from any image mode.
Description of the front camera power supply: see chapter “Power supply output”.

1.5.1.2. Enabling the interface’s video inputs (dip 2-3)

Only the enabled video inputs can be accessed when switching through the interface’s video sources. It is recommended to enable only the required inputs, disabled inputs will be skipped when switching through the video-interfaces inputs.

1.5.1.3. Rear-view camera setting (dip 5)

If set to OFF, the interface switches to factory picture while the reverse gear is engaged to display factory rear-view camera.
If set to ON, the interface switches to its rear-view camera input **„V4 Reverse“** while the reverse gear is engaged.

Note: Dip 4, 6, 7 and 8 are out of function and have to be set to **OFF**.

After each Dip-switch-change a power-reset of the Video Interface has to be performed!

1.5.2. 4 dip - red

By using the Dip-switches, the factory Head-unit or vehicle can be chosen which the interface will be connected to.

Dip position down is **ON** and position up is **OFF**.



Set all dip switches to off

Vehicle/Navigation	Dip 1	Dip 2	Dip 3	Dip 4
All vehicles	OFF	OFF	OFF	OFF

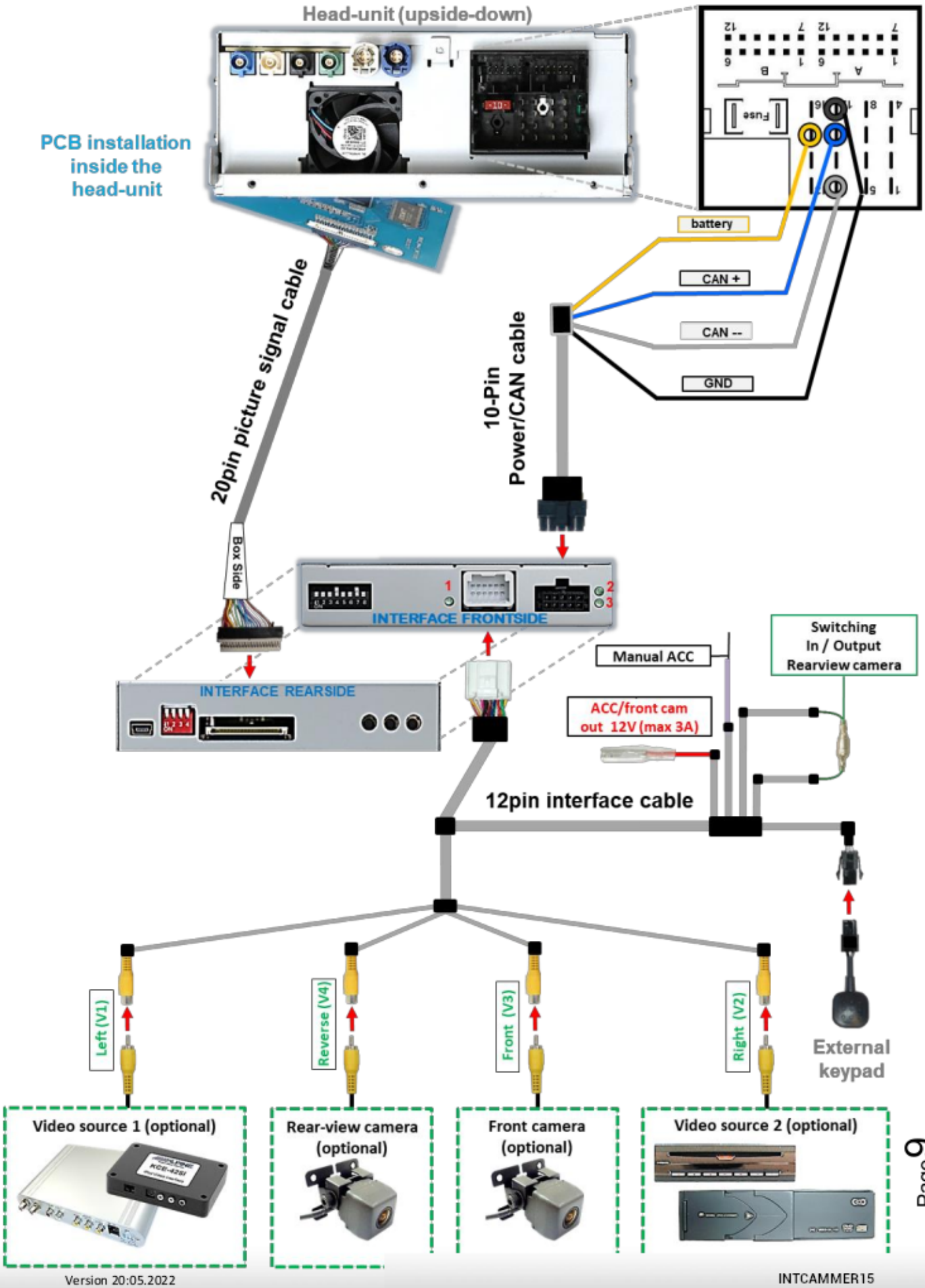
2. Installation

Switch off ignition and disconnect the vehicle's battery! The interface needs a permanent 12V source. If according to factory rules disconnecting the battery is to be avoided, it is usually sufficient to put the vehicle to "Sleep-Mode". In case it does not succeed, disconnect the battery with a resistor lead.
If power source is not taken directly from the battery, the connection has to be checked for being start-up proven and permanent.

2.1. Place of installation

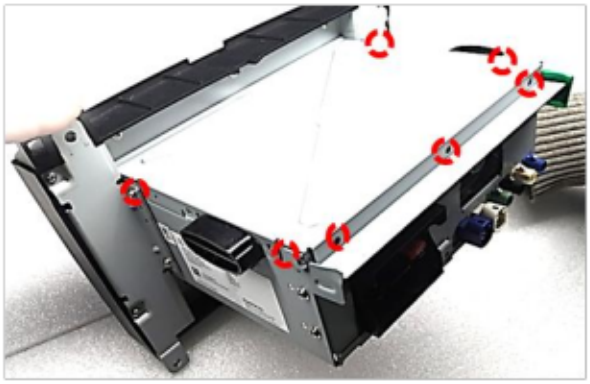
The video interface is designated to be connected behind the vehicle`s head unit.
The daughter PCB is prepared to be connected inside the factory head unit).

2.2. Connection scheme

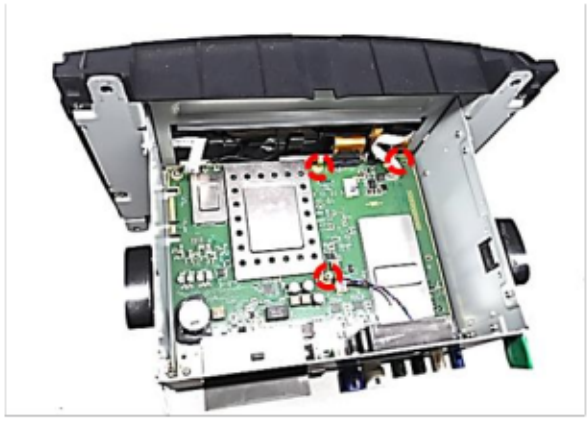


2.3. Installation – daughter PCB

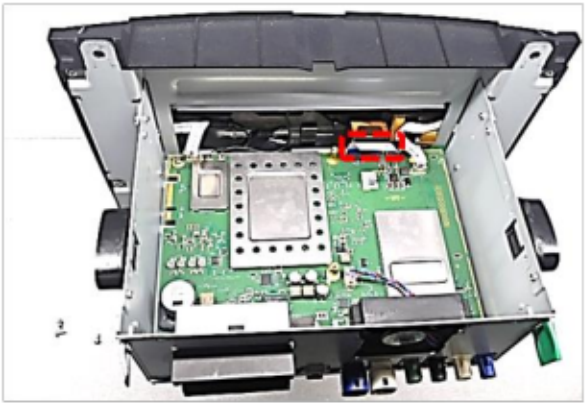
Remove the factory monitor and open the head-unit`s housing. The daughter PCB is built to be installed into the optical lead between the monitor panel and mainboard of the vehicles monitor.



1 Unscrew the 7 screws at the top of the head unit and remove the housing cover.



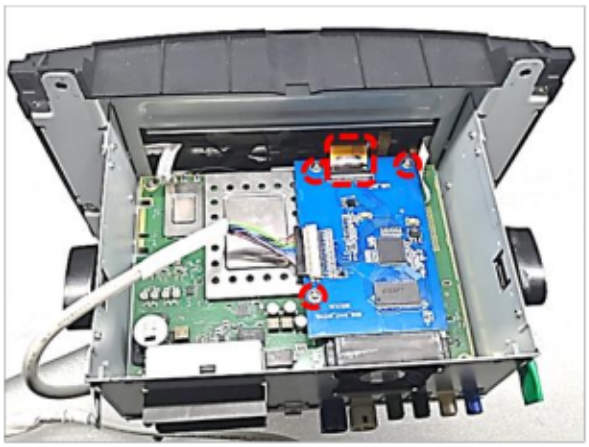
2 Unscrew the 3 screws at the indicated points and replace them with the enclosed spacers.



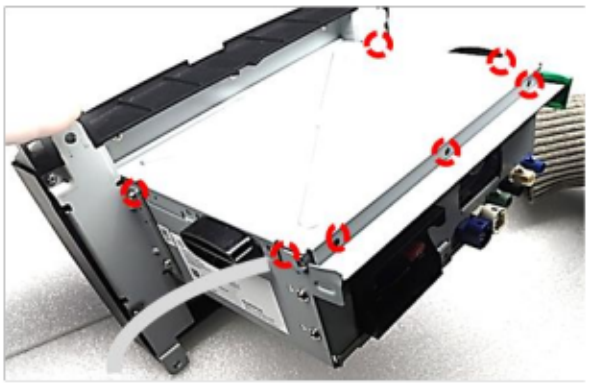
3 Unclick and disconnect the original copper-coloured 40pin ribbon cable from the ribbon cable base and connect the enclosed 40pin ribbon cable instead.



4 Connect the opposite side of the enclosed 40pin ribbon cable to the ribbon cable base "PCB-IN" of the daughter PCB's bottom side.



5 Attach the daughter PCB to the spacers. Connect the previously become free 40-pin copper-coloured ribbon cable to the ribbon cable base "LCD-OUT".



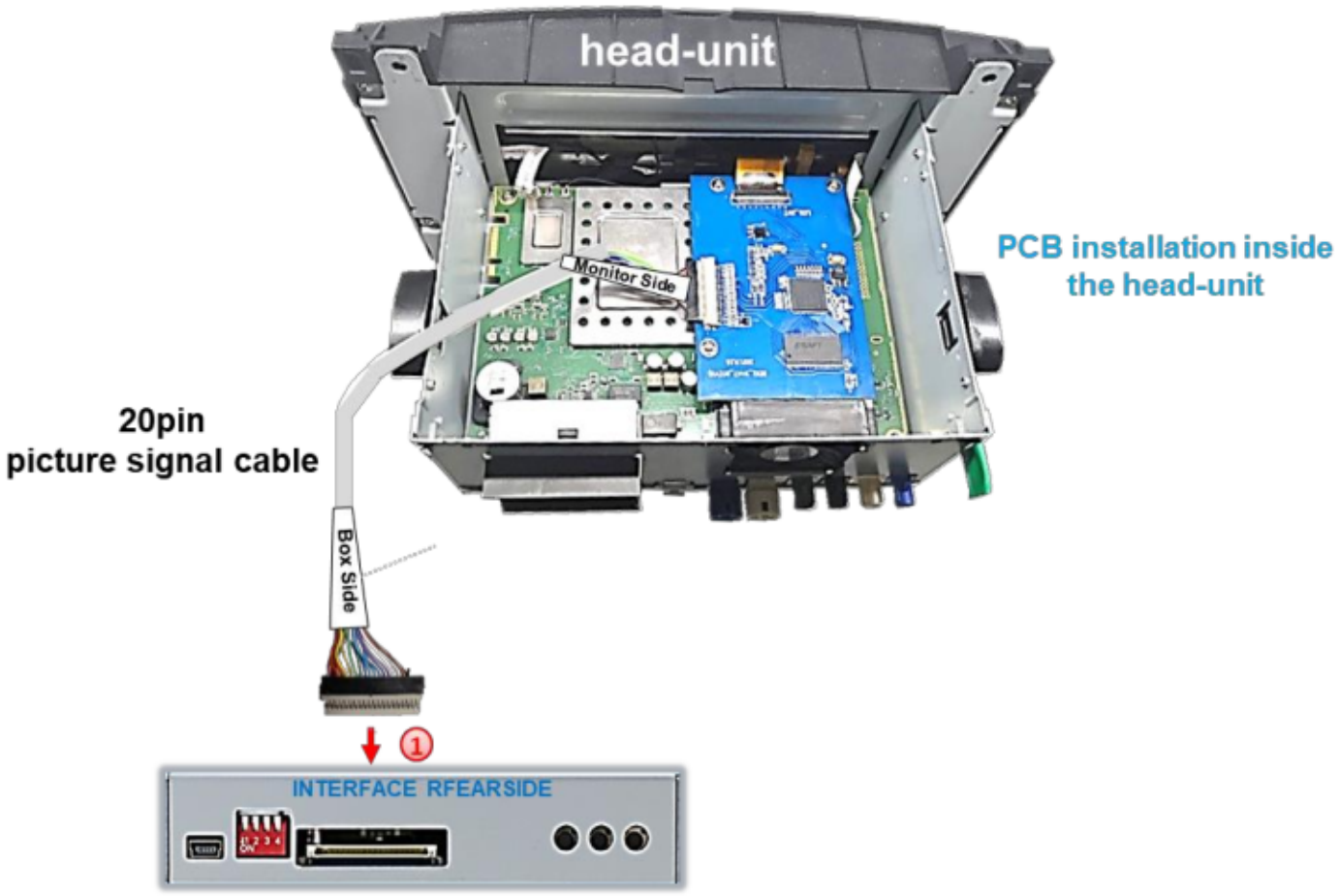
6 Lead the 20pin picture signal cable out of the housing at the indicated point, without jamming it and fix the housing cover by the 7 screws.

2.3.1. Warning notes, concernin the installation of ribbon cables

1) The contacting ends of ribbon cables always have to be installed in a straight and precise 180° position to the connector. Each deviation from a perfect contact position will curse faulty contact and even danger of short circuit

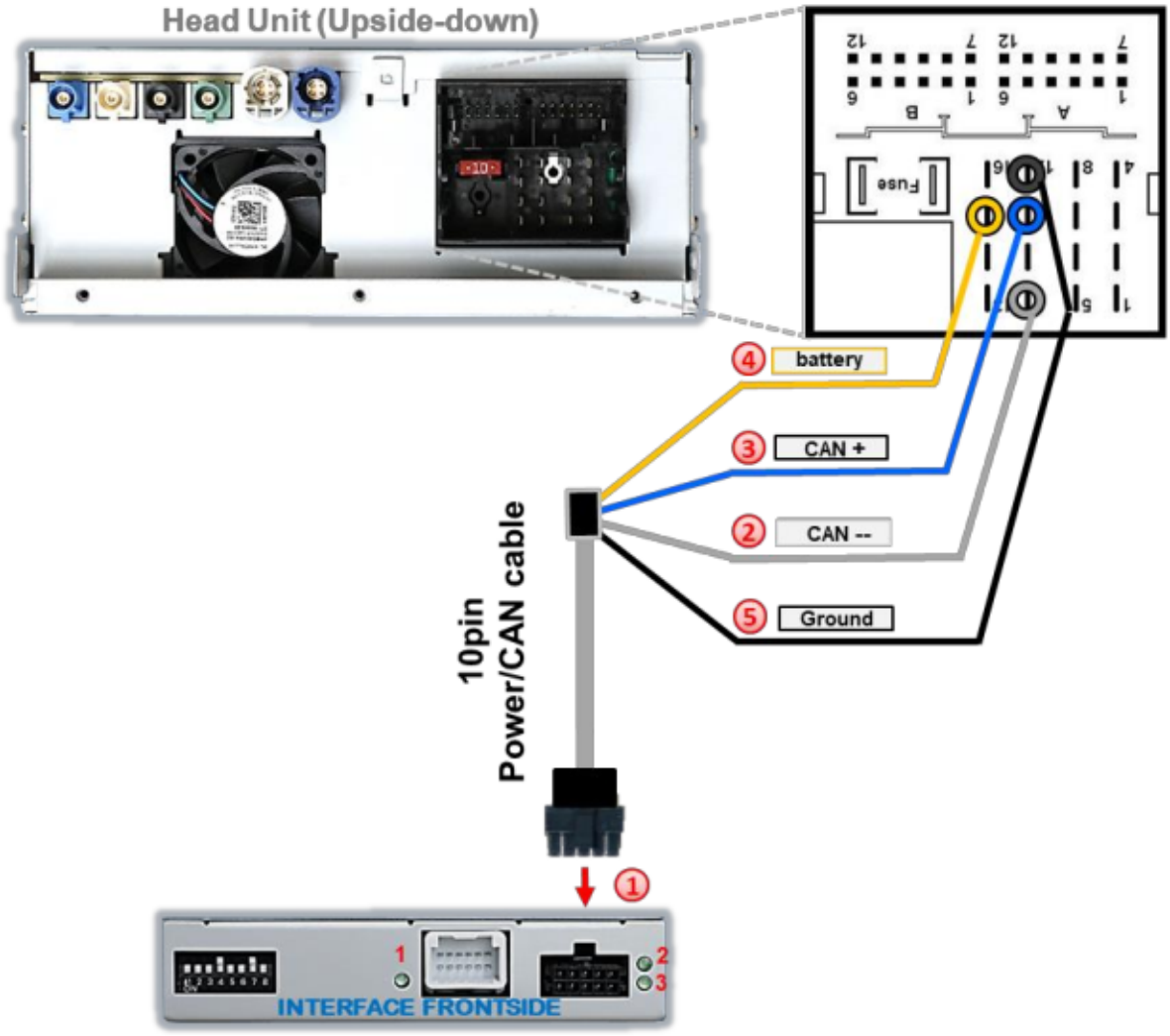
2) The ribbon cable's contacting side always has to correspond to the contacting side of the connector, concerning the mounting position.

2.4. Connection – 20pin picture signal cable



1 Connect the female 20pin connector of the daughter PCB's pre-connected 20pin picture signal cable to the video interface's male 20pin connector.

2.5. Connection – 10pin Power / CAN cable



1. Connect the enclosed 10pin Power / CAN cable's female10pin connector to the male 10pin connector of the video interface.

2. Connect the single grey wire „CAN LOW" of the 4 cables to the vehicle's CAN low wire and isolate the connection

3. Connect the single blue wire **„CAN HIGH"** of the 4 cables to the vehicle's CAN high wire and isolate the connection

4. Connect the single red wire to stabile **+12V terminal 30**.

5. Connect the single black cable to the vehicle's negative **Ground**.

Check 1

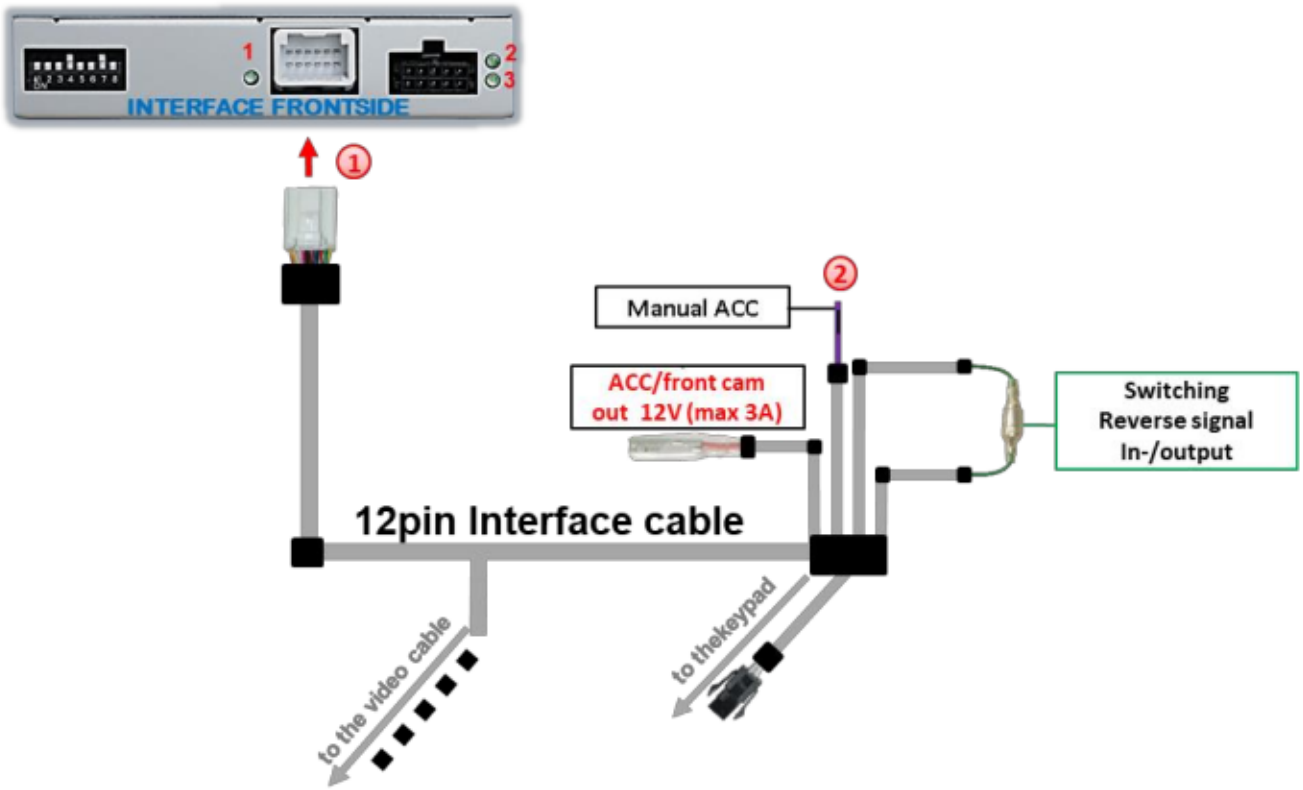
Exceptionally, the CAN communication may not succeed in all vehicles! If, after connecting the 10pin power cables, no interface LED lightens up while the ignition is turned on, the analog power supply needs to be done! (see following chapter)

Check 2

Exceptionally, the power supply to the video interfaces may not be interupted after switching to the vehicle's sleep mode. If the interface LEDs continue to shine even in the vehicle's sleep mode, please contact the support!

2.6. Analog power supply

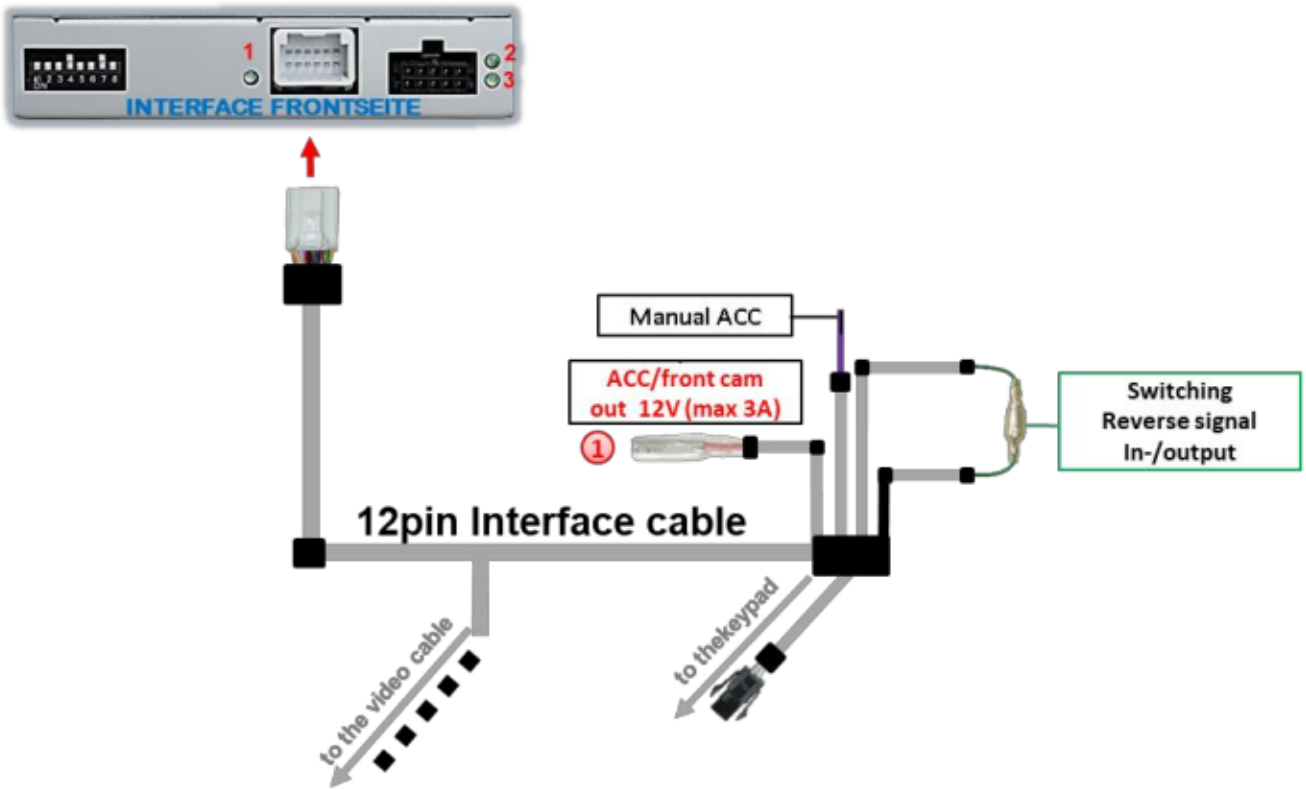
If the communication between the CAN box and the vehicle's CAN bus does not succeed (not all vehicles are compatible), the analogue connection is required.



1. Connect the female 12pin connector of the 12pin interface cable to the male 12pin connector of the video interface.

2. Connect the 12pin interface cable's purple coloured wire **Manual ACC** to +12V **Ignition power** or to +12V **S-contact terminal 86s +12V** (e.g. glove compartment illumination).

2.7. Power supply output



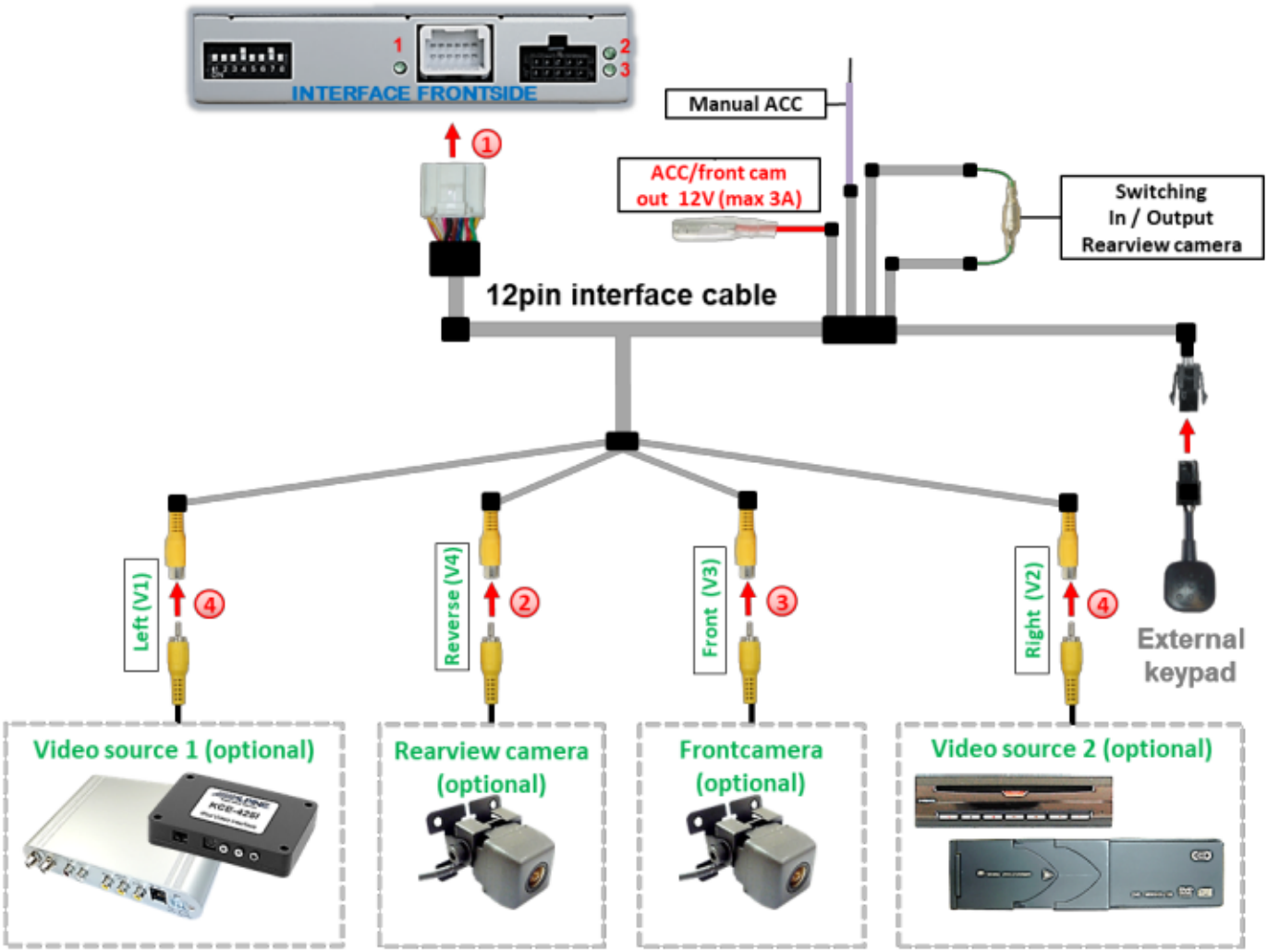
1 The red power supply output **ACC/front cam out 12V (max 3A)** can be used to power an external source and has a different assignment, depending on the position of dip switch 1 (of 8 dips):

Dip	Function
Dip 1 **ON**	+12V (max. 3A) when reverse gear is engaged plus 10 seconds delay after reverse gear is disengaged and +12V when manually switched to front camera by keypad (short press)
Dip 1 **OFF**	+12V permanent (max. 3A) ACC

2.8. Connection – Video sources

It is possible to connect an after-market rear-view camera, an after-market front camera and two more video sources to the video-interface.

Before the final installation, we recommend a test-run to detect a incompatibility of vehicle and interface. Due to changes in the production of the vehicle manufacturer there's always a possibility of incompatibility.

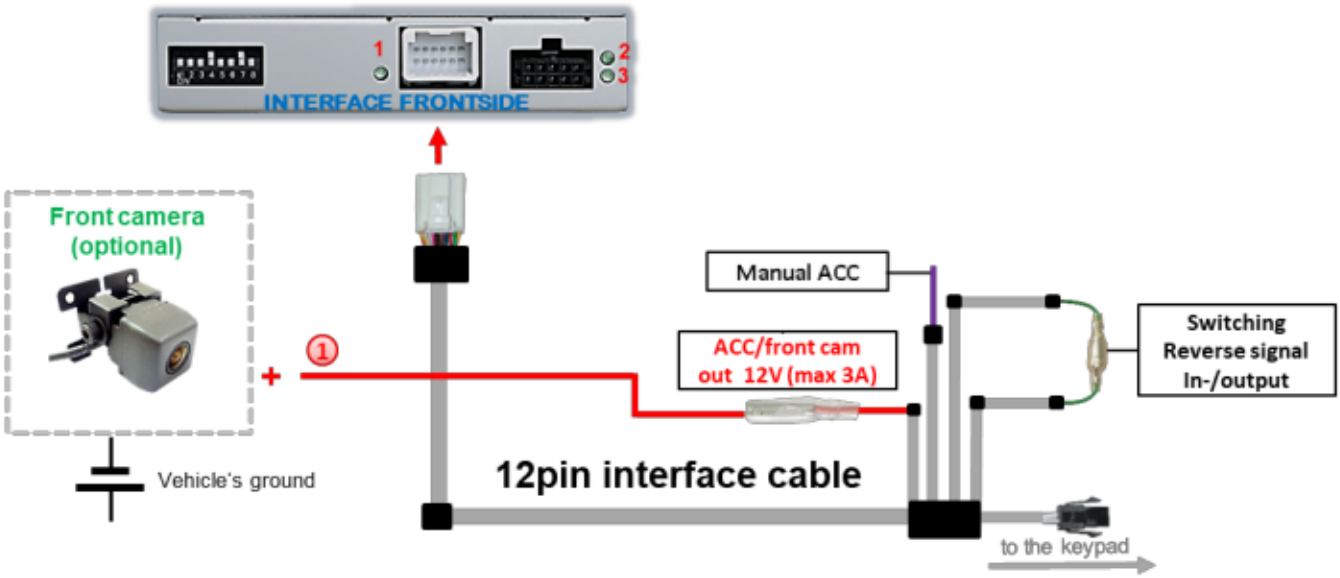


1. Connect the 12pin interface cable's female 12pin connector to the male 12pin connector of the video-interface.
2. Connect the video RCA of the Rear-view camera to the 12pin interface cable's female RCA connector **„Reverse V4**.
3. Connect the front camera's video RCA connector to the 12pin interface cable's female RCA connector **„Front V3"**.
4. Connect the video RCA of the AV source 1 and 2 to the 12pin interface cable's female RCA connector **"Left (V1)"** and **"Right (V2)"**.

2.8.1. Audio insertion

This interface is only able to insert video signals into the factory infotainment. If an AV-source is connected, the audio insertion has to be done by the factory audio AUX input or an FM-modulator. The inserted video-signal can be activated simultaneously to each audio-mode of the factory infotainment. If 2 AV sources shall be connected to the infotainment, additional electronic is necessary to switch the audio signals.

2.8.2. After-market front camera



① The red power supply output **ACC/front cam out 12V (max 3A)** can be used to power a front camera. If Dip 1 is set to ON (black 8 dips), the power supply output gives +12V (max 3A) when reverse gear is engaged plus 10 seconds delay after reverse gear is disengaged.

Note: In addition, a manual switch-over to the front camera input is possible via keypad (short press) from any image mode. The power supply output gives +12V then, as well (if Dip 1 is set to ON and the front camera input is selected).

Attention: A long press of the external keypad push button will switch the interface to the next source.

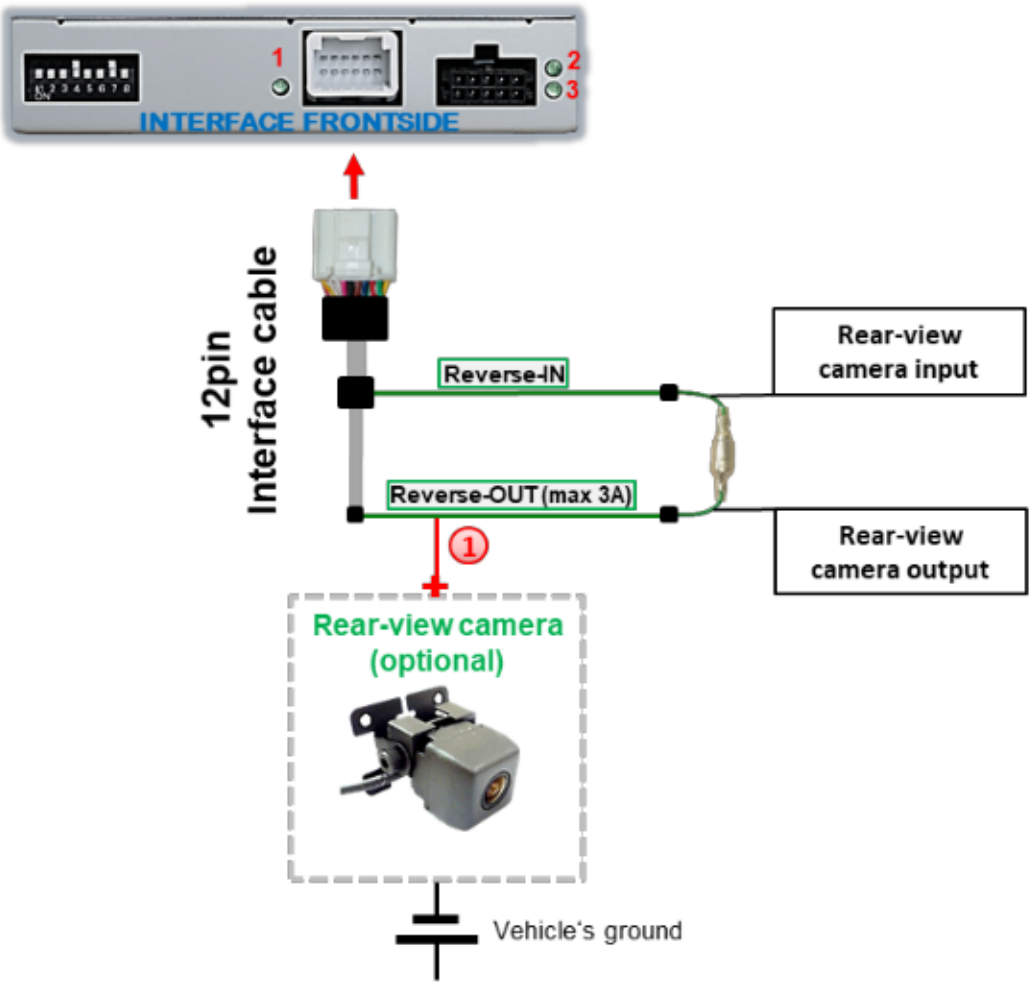
2.8.3. After-market rear-view camera

Some vehicles have a different reverse gear code on the CAN-bus which doesn't communicate with the interface's CAN. In this case there are two different ways of installation. If the interface's CAN is able to detect an enabled vehicle's reverse gear, the green wire of the 12pin cable should carry +12V while the reverse gear is engaged.

Note: Do not forget to set dip5 of video-interface to ON before testing.

2.8.3.1. Case 1: Interface receives the reverse gear signal

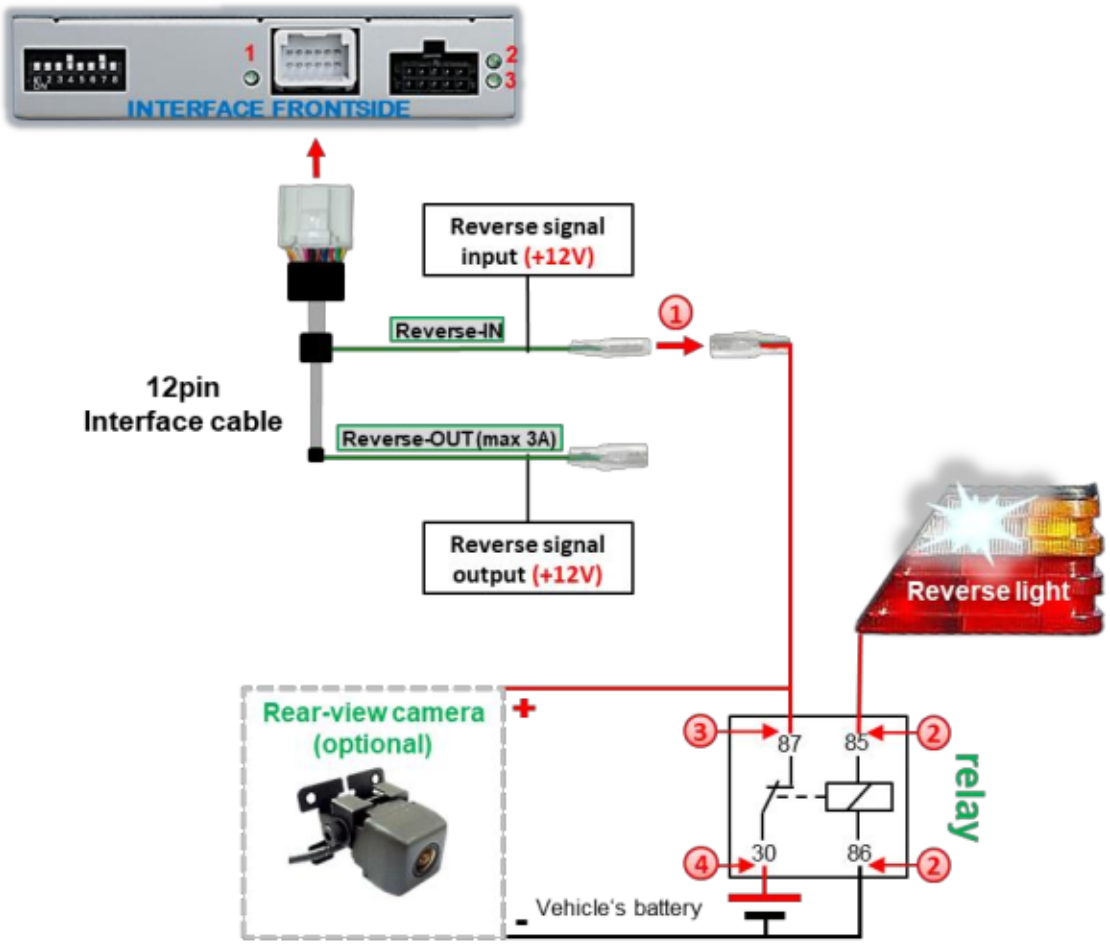
If the interface receives +12V on the green wire of the 12pin interface cable while reverse gear is engaged, the video interface will automatically switch to the rear-view camera input "CAMERA-IN" while the reverse gear is engaged.



1 The 12 V power supply for the rear-view camera (max 3A) has to be taken from the 12pin interface cabl's green wire "Reverse-OUT" to avoid an unnecessary, permanent power supply to the camera electronic.
Both green cables "Reverse IN" and "Reverse OUT" have to remain connected.

2.8.3.2. Case 2: Interface does not receive the reverse gear signal

If the video interface does not receive +12V on the green wire of the 12pin interface cable when reverse gear is engaged (not all vehicles are compatible), an external switching signal from the reverse gear light is required. As the reverse gear light's power supply isn't voltage-stable all the time, an ordinary open relay (e.g AC-RW-1230 with wiring AC-RS5) or filter (e.g. AC-PNF-RVC) is required. The diagram below shows the connection type of the relay.



1. Disconnect the green cable's pre-connected male- and female connectors of the 12pin cable and connect the green input cable **"Reverse-IN"** to the output connector (87) of the relay.

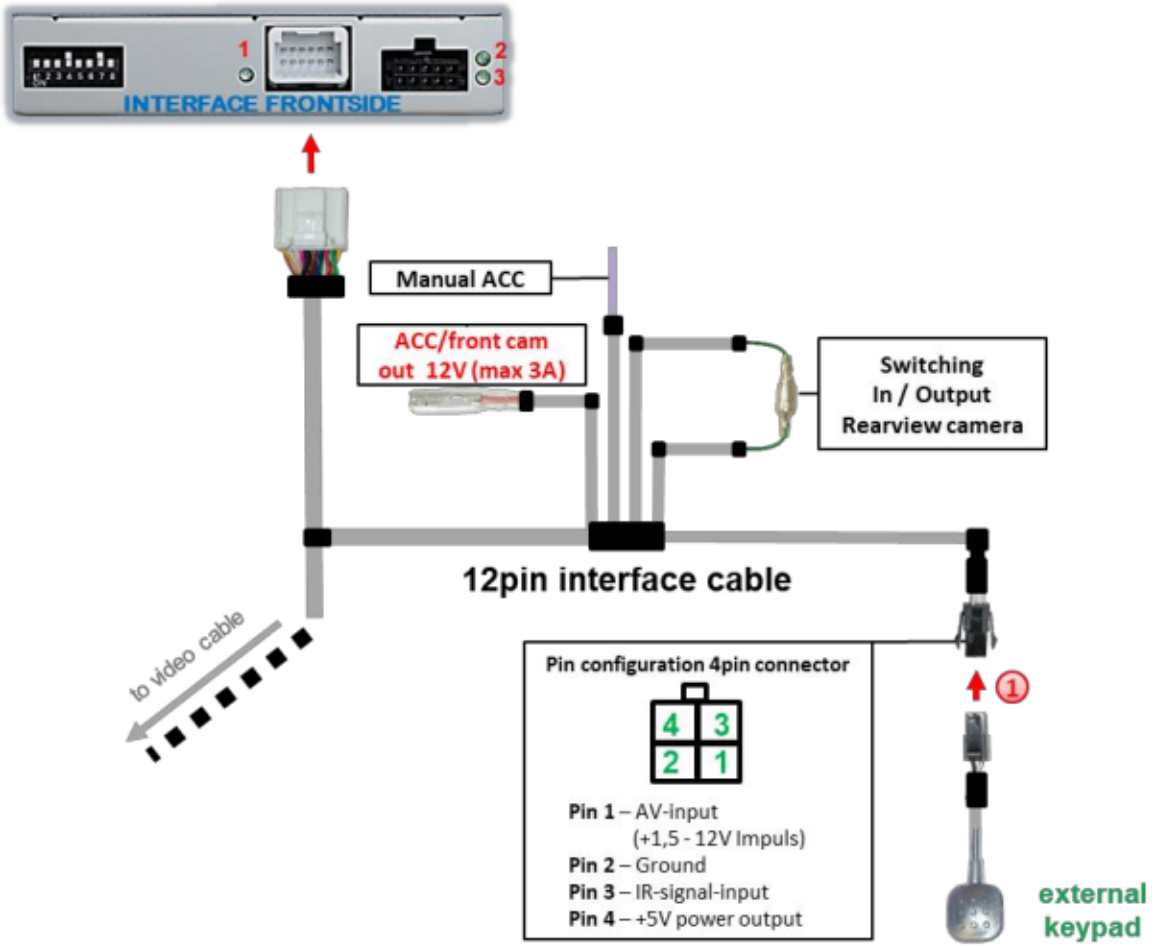
   Note: Not least to avoid short circuits, the best solution should be, to crimp a male 4mm connector to the relay's output cable and connect it to the green cable's female 4mm connector. The output-cable **"Reverse-OUT"** remains disconnected as it's out of function.

2. Connect the Reverse light's power-cable to coil (85) and the vehicle's ground to coil (86) of the relay.

3. Connect the output connector (87) of the relay to the rear-view camera's power-cable, like you did it to the green **"Reverse-IN"** cable before.

4. Connect permanent power / 12V to the relay's input connector (30).

2.9. Connection – external keypad



1 Connect the keypad's female 4pin connector to the 12pin interface cable's male 4pin connector.

Note: Even if the switching through several video sources by the keypad mightn't be required, the keypad's invisible connection and availability is strongly recommended.

3. Interface operation by external keypad

The interface's external keypad can be used to switch the enabled inputs.

- Long press of keypad (2-3 seconds)

By long pressing the external keypad (2-3 seconds), the video interfaces witches the input from the factory video to the inserted video sources.

Each press (approx. 2 sec) will switch to the next enabled input. If all inputs are enabled the order is:

Factory video → video IN1 → video IN2 → factory video →...

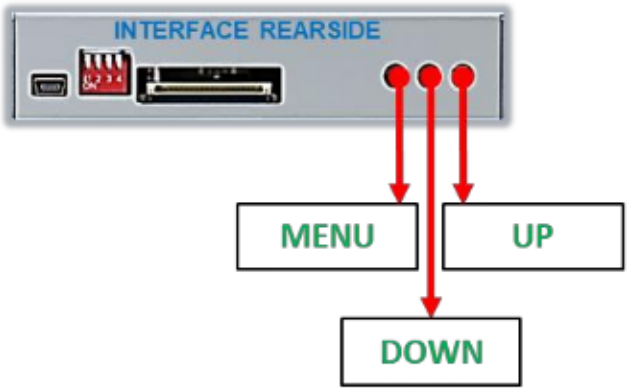
Disabled inputs will be skipped.

Note: The interface switches **after releasing** the switch (after long pressure).

- Short press of keypad (only if DIP 1 is set to ON)

By short pressing the external keypad, the video interfaces switches from the factory video to the front camera input and back to factory video.

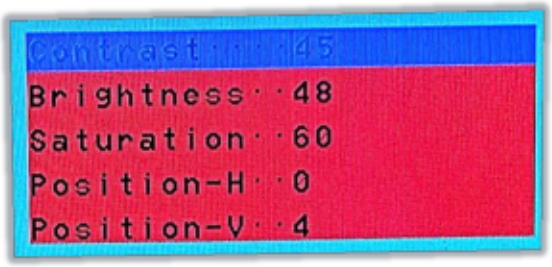
4. Picture settings



The picture settings are adjustable by the 3 push-buttons of the daughjter PCB's menu keypad. Press the 1. button to open the OSD settings menu or to switch to the next menu item. By pressing the other both push buttons the selected value will be changed. To avoid accidental changes during or after the installation, we recommend to disconnect the keypad from the pushbutton cable after the adjustments are done. Adjustments have to be done, while the selected input is visible on the monitor.

Note: The OSD menu is only shown when a working video source is connected to the selected video-input of the interface.

The following settings are available:



Contrast
Brightness
Saturation
Position H (horizontal picture position)
Position V (vertical picture position)

Note: To adjust the reverse picture settings, engage the reverse gear.

5. Specifications

BATT/ACC range	7V - 25V
Stand-by power drain	10mA
Power	140mA @12V
Video input	0.7V - 1V
Video input formats	NTSC/PAL
Temperature range	-40°C to +85°C
Dimensions Video-box	117 x 26 x 90mm (W x H x D)
Dimensions daughter PCB	100 x 6 x 68mm (W x H x D)

6. FAQ – Trouble shooting Interface functions

For any troubles which may occur, check the following table for a solution before requesting support from your vendor.

Symptom	Reason	Possible solution
No picture/black picture (factory picture).	Not all connectors have been reconnected to factory head-unit or monitor after installation.	Connect missing connectors.
	No power on CAN-bus box (all LED CAN-bus box are off).	Check power supply of CAN-bus box. Check CAN-bus connection of CAN-bus box.
	CAN-bus box connected to CAN-bus in wrong place.	Refer to the manual where to connected to the CAN-bus. If not mentioned, try another place to connect to the CAN-bus.
	No power on video-interface (all LED video-interface are off).	Check whether CAN-bus box delivers +12V ACC on red wire output of 8pin to 6pin cable. If not cut wire and supply ACC +12V directly to video-interface.
No picture/black picture/white picture (inserted picture) but factory picture is OK.	No picture from video source.	Check on other monitor whether video source is OK.
	No video-source connected to the selected interface input.	Check settings dips 1 to 3 of video interface which inputs are activated and switch to corresponding input(s).
	LVDS cables plugged in wrong place.	Double-check whether order of LVDS cables is exactly connected according to manual. Plugging into head-unit does not work when the manual says to plug into monitor and vice versa.
Inserted picture totally wrong size or position.	Wrong monitor settings of video-interface.	Try different combinations of dips 7 and 8 of video-interface. Unplug 6pin power after each change.
Inserted picture double or 4 times on monitor.		
Inserted picture distorted, flickering or running vertically.	Video sources output set to AUTO or MULTI which causes a conflict with the interfaces auto detection.	Set video source output fixed to PAL or NTSC. It is best to set all video sources to the same standard.
	If error occurs only after source switching: Connected sources are not set to the same TV standard.	Set all video sources to the same standard.
	Some interfaces can only handle NTSC input.	Check manual whether there is a limitation to NTSC mentioned. If yes, set source fixed to NTSC output.
Inserted picture b/w.		
Inserted picture qual. bad.	Picture settings have not been adjusted.	Use the 3 buttons and the interface's OSD to adjust the picture settings for the corresponding video input.
Inserted picture size slightly wrong.		
Inserted picture position wrong.		
Camera input picture flickers.	Camera is being tested under fluorescent light which shines directly into the camera.	Test camera under natural light outside the garage.
Camera input picture is bluish.	Protection sticker not removed from camera lens.	Remove protection sticker from lens.

Symptom	Reason	Possible solution
Camera input picture black.	Camera power taken directly from reverse gear lamp.	Use relay or electronics to "clean" reverse gear lamp power. Alternatively, if CAN-bus box is compatible with the vehicle, camera power can be taken from green wire of 6pin to 8pin cable.
Camera input picture has distortion.		
Camera input picture settings cannot be adjusted.	Camera input picture settings can only be adjusted in AV2 mode.	Set dip 3 of video-interface to ON (if not input AV2 is not already activated) and connect the camera to AV2. Switch to AV2 and adjust settings. Reconnect camera to camera input and deactivate AV2 if not used for other source.
Graphics of a car in camera input picture.	Function PDC is ON in the interface OSD.	In compatible vehicles, the graphics will display the factory PDC distance. If not working or not wanted, set interface OSD menu item UI-CNTRL to ALLOFF.
Chinese signs in camera input picture	Function RET or ALL is ON (function for Asian market) in the interface OSD.	Set interface OSD menu item UI-CNTRL to ALLOFF or PDCON.
Not possible to switch video sources by OEM button.	CAN-bus interface does not support this function for vehicle.	Use external keypad or cut white wire of 6pin to 8pin cable and apply +12V impulses for AV-switching.
	Pressed too short.	For video source switching a longer press of about 2.5 seconds is required.
Not possible to switch video sources by external keypad.	SW-version of interface does not support external keypad.	Use OEM-button or cut white wire of 6pin to 8pin cable and apply +12V impulses for AV-switching.
Interface does not switch to camera input when reverse gear is engaged.	CAN-bus interface does not support this function for the vehicles.	Cut the green wire of the 6pin to 8pin cable and apply +12V constant from reverse gear-lamp signal. Use relay to "clean" R-gear lamp power.
Interface switches video-sources by itself.	CAN-bus interface compatibility to vehicle is limited.	Cut the grey wire of 6pin to 8pin and isolate both ends. If problem still occurs, additionally cut the white wire of 6pin to 8pin cable and isolate both ends.

7. Technical Support

Please note that direct technical support is only available for products purchased directly from NavLinkz GmbH. For products bought from other sources, contact your vendor for technical support.

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