v.LiNK Video-inserter

VL2-MBN45

for Mercedes Benz vehicles
generation NTG4.5 with
Comand Online or Audio20
with 4pin HSD LVDS connector on the monitor

Video-inserter with 2 video + RGB + rear-view camera input and CAN control

Product features

- Video-inserter for factory-infotainment monitors
- 2 CVBS video-inputs for after-market devices (e.g. DVD-Player, DVB-T tuner, …)
- Built-in audio-switch for (no audio-insertion)
- Rear-view camera CVBS video-input
- Automatic switching to rear-view camera input on engagement of reverse gear
- Activatable parking guide lines for rear-view camera (not all vehicles)
- RGB-input for after-market navigation
- Video-in-motion (ONLY for connected video-sources)
- Compatible with factory rear-view camera
- AV-inputs PAL/NTSC compatible

Contents

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. If available, 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. Labor 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 must 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

Vehicle   Vehicles generation NTG4.5

Head-unit/monitor   Comand Online NTG4.5, Audio20 NTG4.5
                                         with 4pin HSD LVDS connector on the monitor

Limitations

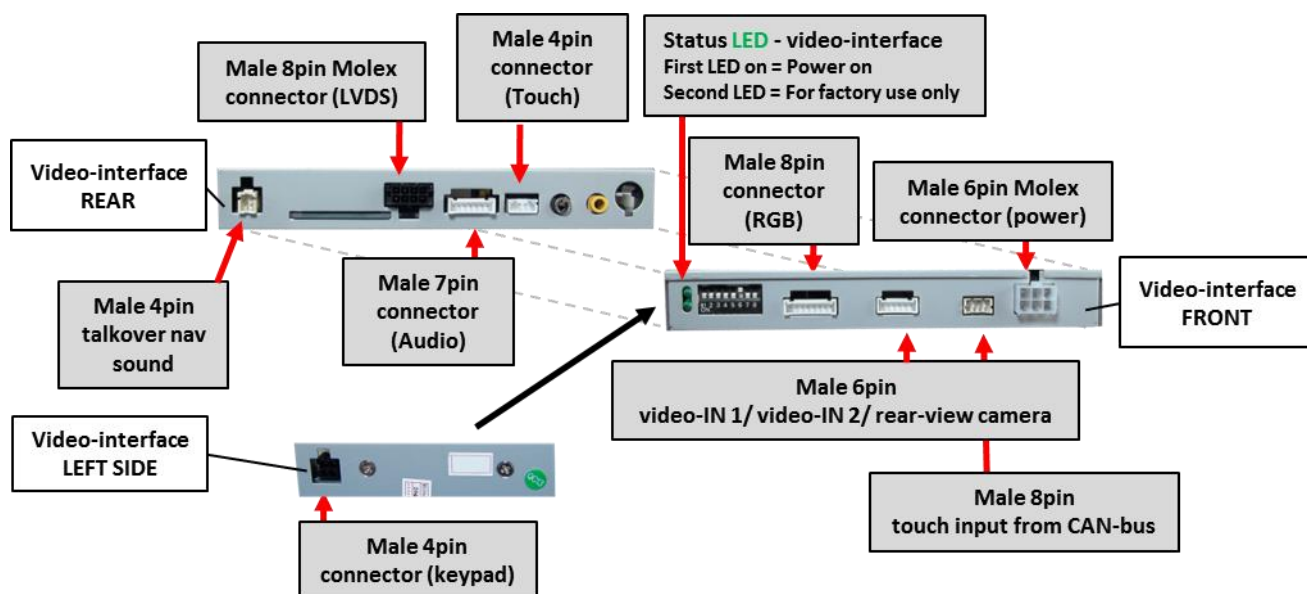*Video only*   The interface inserts ONLY video signals into the infotainment.
                                         For audio insertion a factory audio-AUX input or FM-modulator
                                         is required. For AUX option coding we offer OBD-N45-X-01.

Factory media interface   If available, its AUX cable with 3.5mm jack (available at MB), can
                                         be used for audio insertion. While used for audio insertion, the
                                         Apple adapter or USB adapter cannot be used simultaneously.

Factory rear-view camera   Automatic switch-back from inserted video to factory rear-view
                                         camera only while reverse gear is engaged. To delay the switch-
                                         back time, additional electronics is required.
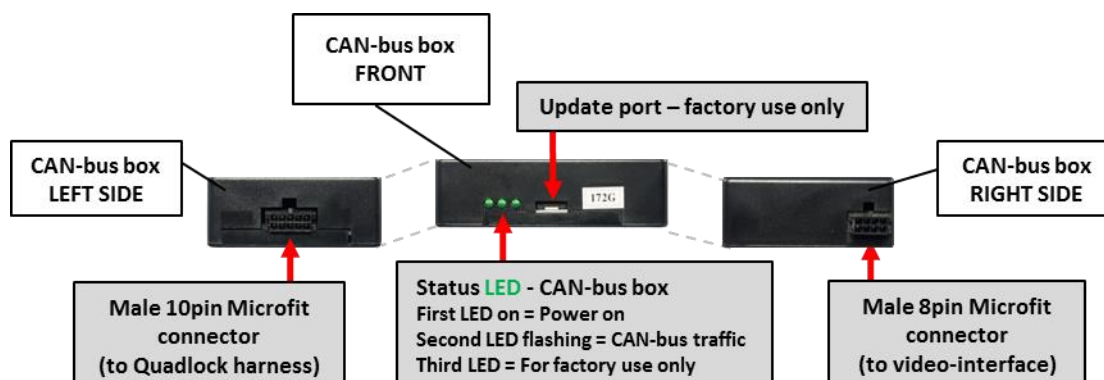
1.3.   Boxes and connectors

1.3.1. Video-interface

The video-interface converts the connected after-market sources video signals to an LVDS
signal which is the inserted into the factory monitor on certain trigger options.
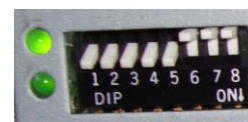
1.3.2. CAN-bus box

The CAN-bus box reads digital signals from the CAN-bus and converts them for the video-interface.

1.4. Dip-switch settings

Some settings must 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	RGB-input	enabled	disabled
2	CVBS AV1-input	enabled	disabled
3	CVBS AV2-input	enabled	disabled
4	RGB-input resolution	800x600	400x240 or 480x240
5	Rear-view cam type	after-market	factory or none
6	No function	-	set OFF
7	Monitor selection	Try all 4 possible combinations of dip 7 and 8 to find the best picture (quality and size)	
8			

See following chapters for detailed information.

1.4.1. Enabling the interface's video inputs (dip 1-3)

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 for the disabled will be skipped when switching through the video-interfaces inputs.

1.4.2. RGB-video input signal selection for after-market navigation (Dip 4)

If an after-market RGB navigation or other RGB video source is connected, the source's RGB output signal must match the interface's RGB video input setting.

Note: Setting 800x600 is only possible on Comand HU with 7" monitor.

1.4.3. Rear-view camera setting (dip 5)

If set to OFF, the interface switches to factory LVDS picture while the reverse gear is engaged to display factory rear-view camera or factory optical park system picture.
If set to ON, the interface witches to its rear-view camera input CAM while the reverse gear is engaged.

1.4.4. Monitor selection (dip 7-8)

Dip 7 and 8 are for monitor-specific video settings which cannot be predicted as even within the same head-unit version, the monitor specifications may vary. It is necessary to try all possible combinations (both OFF, both ON, 7 OFF and 8 ON, 7 ON and 8 OFF) - while a working video source is connected to the chosen input of the interface - to see which combination gives the best picture quality and size (some may give no picture). It is possible to first hot plug through the dip combinations, but if you do not experience any change of picture after trying all 4 options, retry and disconnected the 6pin power plug of the video-box between every change of the dip setting.

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 is sleep-mode. In case the sleep-mode does not show success, 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 interface is installed on the backside of the factory monitor and on the backside of the head-unit.

2.2. Connection schema

Quadlock harness

Quadlock female vehicle harness

Quadlock male on rear of head-unit

Audio In – Only for vehicles without factory media-interface

After-market navigation(optional)

Rear of factory monitor

4pin HSD LVDS cable

CAN-box FRONT

RGB cable

CAN-box REAR

Female 4pin HSD LVDS connector vehicle harness

6pin to 8pin cable

Video-interface REAR

Video-interface FRONT

Video cable

Video 1

Camera

Video 2

Rear-view camera (optional)

External keypad

Audio-insertion (optional)

AV-source 1 (optional)

AV-source 2 (optional)

Connecting video-interface and CAN-box

The CAN-bus box reads digital signals from the CAN-bus and converts them for the video-interface. ACC +12V max. 0.5A (red of 6pin) and reverse gear +12V max. 0.5A (green of 6pin) constant signal. Video-source switching (white of 6pin) as +12V impulse. Additionally there is a data exchange, e.g. for steering wheel position for driving path lines (grey of 6pin).

Pin-definition black 10pin power connector

Pin 1 – No function
Pin 2 – Battery +12V
Pin 3 – No function
Pin 4 – CAN High
Pin 5 – CAN Low
Pin 6 – No function
Pin 7 – Ground
Pin 8 – No function
Pin 9 – CAN Low Monitor
Pin 10 – CAN High Monitor

Quadlock harness

CAN-box FRONT

CAN-box REAR

6pin to 8pin cable

Video-interface FRONT

Pin-defintion white 6pin power connector

Pin 1 – ACC or Battery +12V
Pin 2 – ACC +12V
Pin 3 – CAN-bus control data
Pin 4 – Ground
Pin 5 – Rear-view camera trigger input, swtichtes to Cam at +12V signal
Pin 6 – AV-Switch-Signal

① Connect black female 10pin Microfit connector of the Quadlock harness to the male 10pin Microfit connector of the CAN-box.

Note: Check LEDs on CAN-box after reconnecting the battery, two must be on.

② Connect white female 6pin Molex connector of the 6pin to 8pin cable to the male 6pin Molex connector of the video-interface.
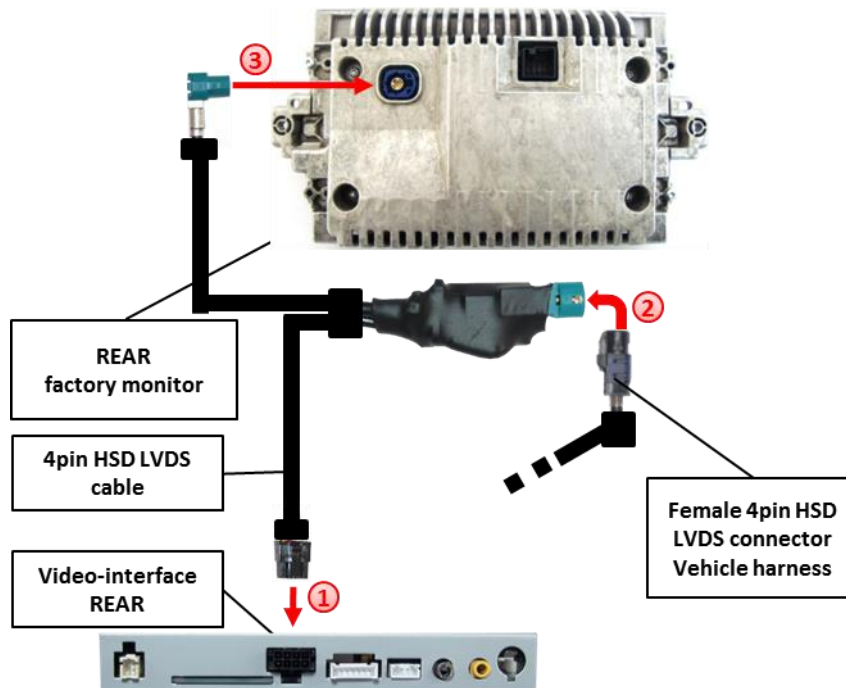
③ Connect black female 8pin Microfit connector of the 6pin to 8pin cable to male 8pin Microfit connector of the CAN-box.

Note: Check LEDs on video-interface after reconnecting the battery, one must be on.

Note: The CAN-box is not compatible with all vehicles. If the CAN-box does not deliver ACC to pin2 of the video-interface or blocks the vehicle CAN, it is possible to install without CAN-box. In this case see also note in chapter after-market rear-view camera if one is supposed to be connected.
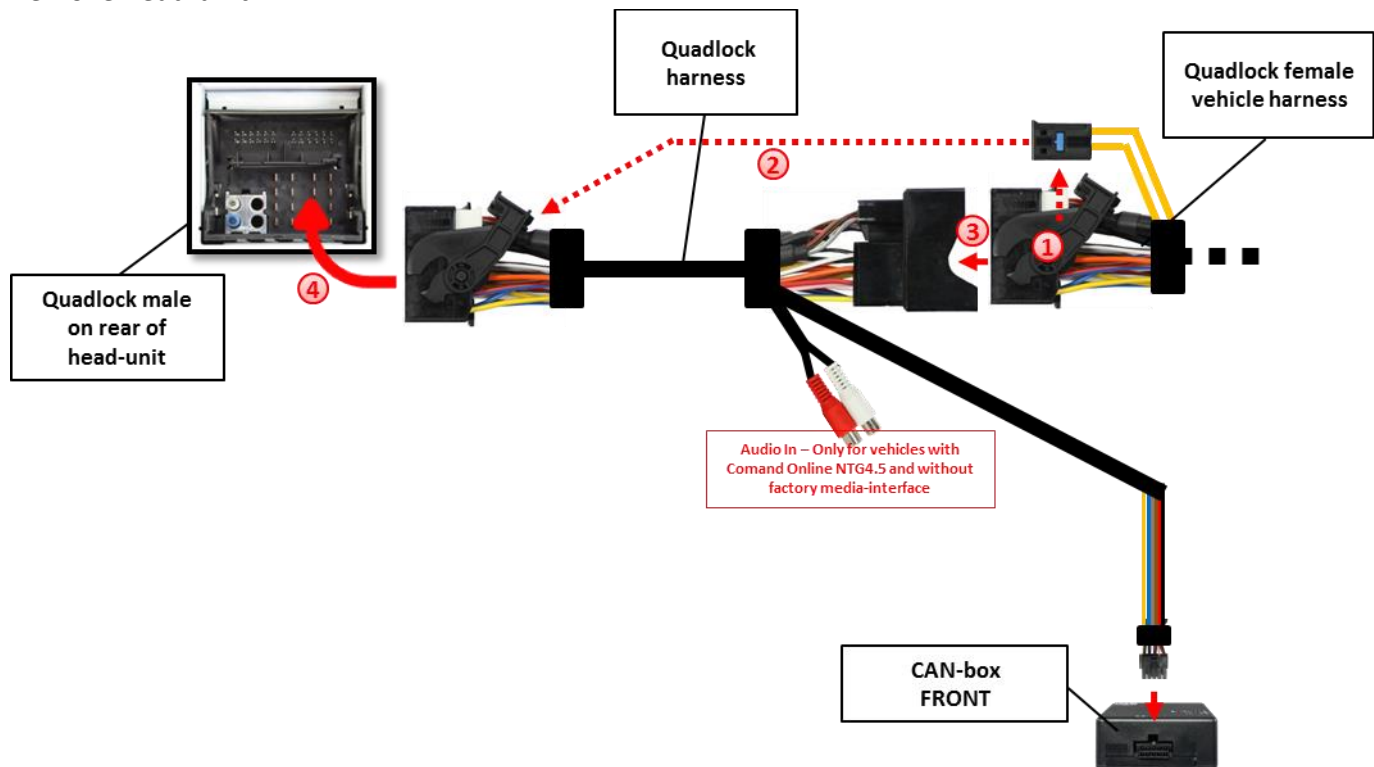
2.3. Connections to the factory monitor

Remove factory monitor.

① Connect female 8pin Microfit connector of the 4pin HSD LVDS cable to male 8pin Microfit connector of the video-interface.

② Remove female 4pin HSD LVDS connector from the rear of the factory monitor and connect it to the male 4pin HSD LVDS connector of the 4pin HSD LVDS cable.

③ Connect female 4pin connector of the 4pin HSD LVDS cable to the male 4pin HSD LVDS connector of the factory monitor.

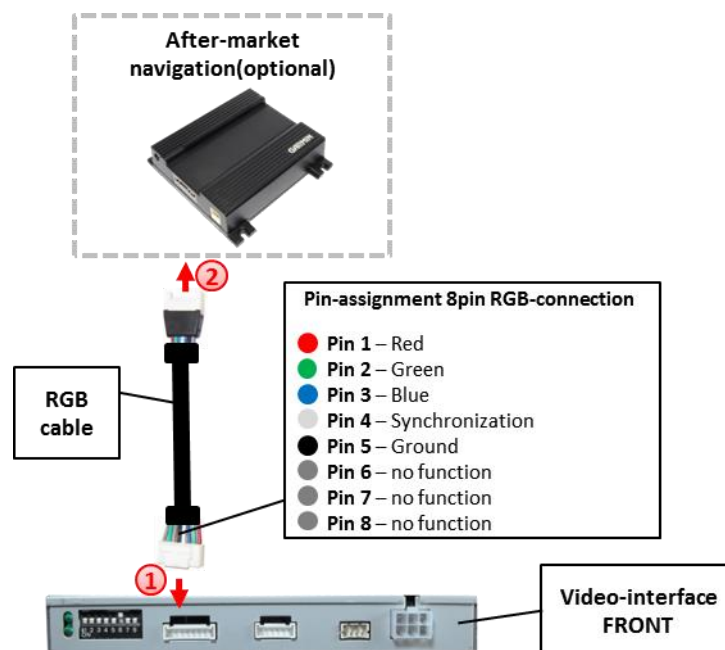### 2.4.   Connections to the head-unit

Remove head-unit.

① Remove the female Quadlock connector of the vehicle harness from the rear of the navigation computer.

② Remove optical leads –if existing- from the female Quadlock connector of the vehicle harness and insert them into the female Quadlock connector of Quadlock harness at the same position.

③ Connect female Quadlock connector of vehicle harness to the male Quadlock connector of Quadlock harness.

④ Connect female Quadlock connector of Quadlock harness to the male Quadlock connector of the head-unit.

2.5.   Connecting peripheral devices

It is possible to connect an after-market RGB navigation (or other RGB video source), 2 after-market AV-sources and an after-market rear-view camera to the video-interface.
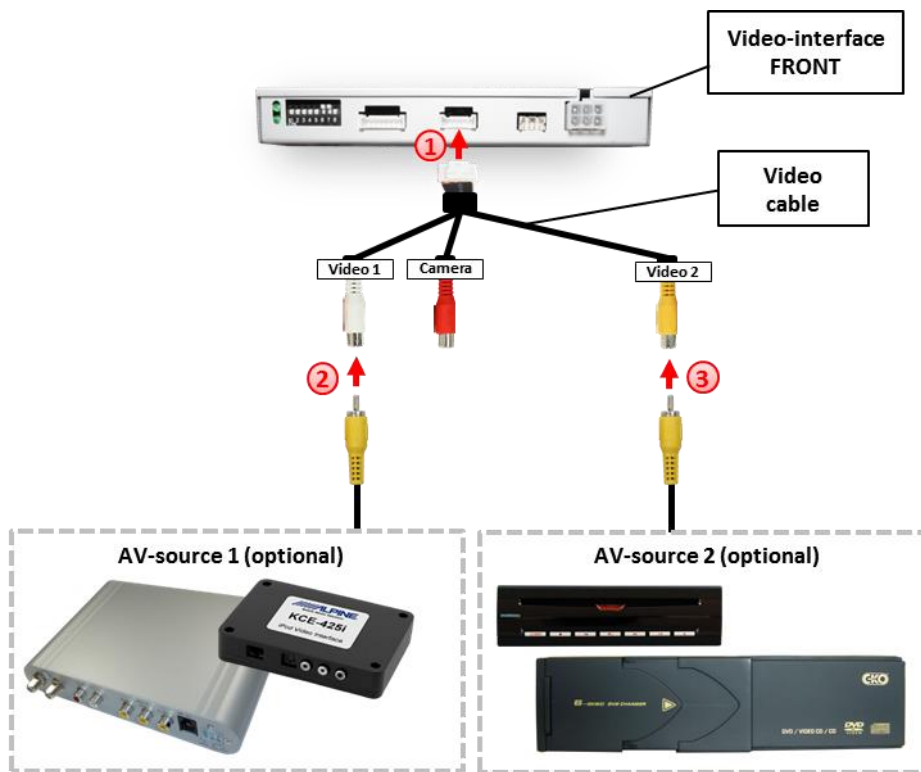
Before final installation of the peripheral devices, we recommend a test-run of the interface. Due to changes in the production of the vehicle manufacturer is always the possibility of incompatibility.

2.5.1. After-Market RGB navigation

After-market
navigation(optional)

Pin-assignment 8pin RGB-connection

- 🔴 **Pin 1** – Red
- 🟢 **Pin 2** – Green
- 🔵 **Pin 3** – Blue
- ⚪ **Pin 4** – Synchronization
- ⚫ **Pin 5** – Ground
- ⚫ **Pin 6** – no function
- ⚫ **Pin 7** – no function
- ⚫ **Pin 8** – no function

RGB cable

Video-interface
FRONT

① Connect female 8pin connector of the RGB cable to the male 8pin connector of the video-interface. The loose grey wires have no function and have to be isolated.

② Connect male 6pin connector of the RGB cable to the after-Market navigation.

2.5.2. Video-sources to AV1 and AV2

① Connect female 6pin connector of the video cable to male 6pin connector of the video-interface.

② Connect video RCA of the AV-source 1 to the female RCA connector Video 1 of the video cable.

③ Connect video RCA of the AV-source 2 to the female RCA connector Video 2 of the video cable.

2.5.3. Audio-switch and audio insertion

This interface can only insert video signals into the factory infotainment and switch audio signals. If an AV-source is connected to AV1 or AV2, audio insertion must be done by factory audio AUX input or FM-modulator to which the interface's sound-switch output is connected. When the interface is switched from AV1 to AV2, the audio signal is switched parallel to the corresponding video signal by the interface's built-in audio-switch.
The inserted video-signal can be activated simoultaneously to each audio-mode of the factory infotainment.

Depending whether the vehicle is equipped with a factory media interface, the factory AUX connections for audio insertion needs to be done in different ways which are described in the sub chapters.
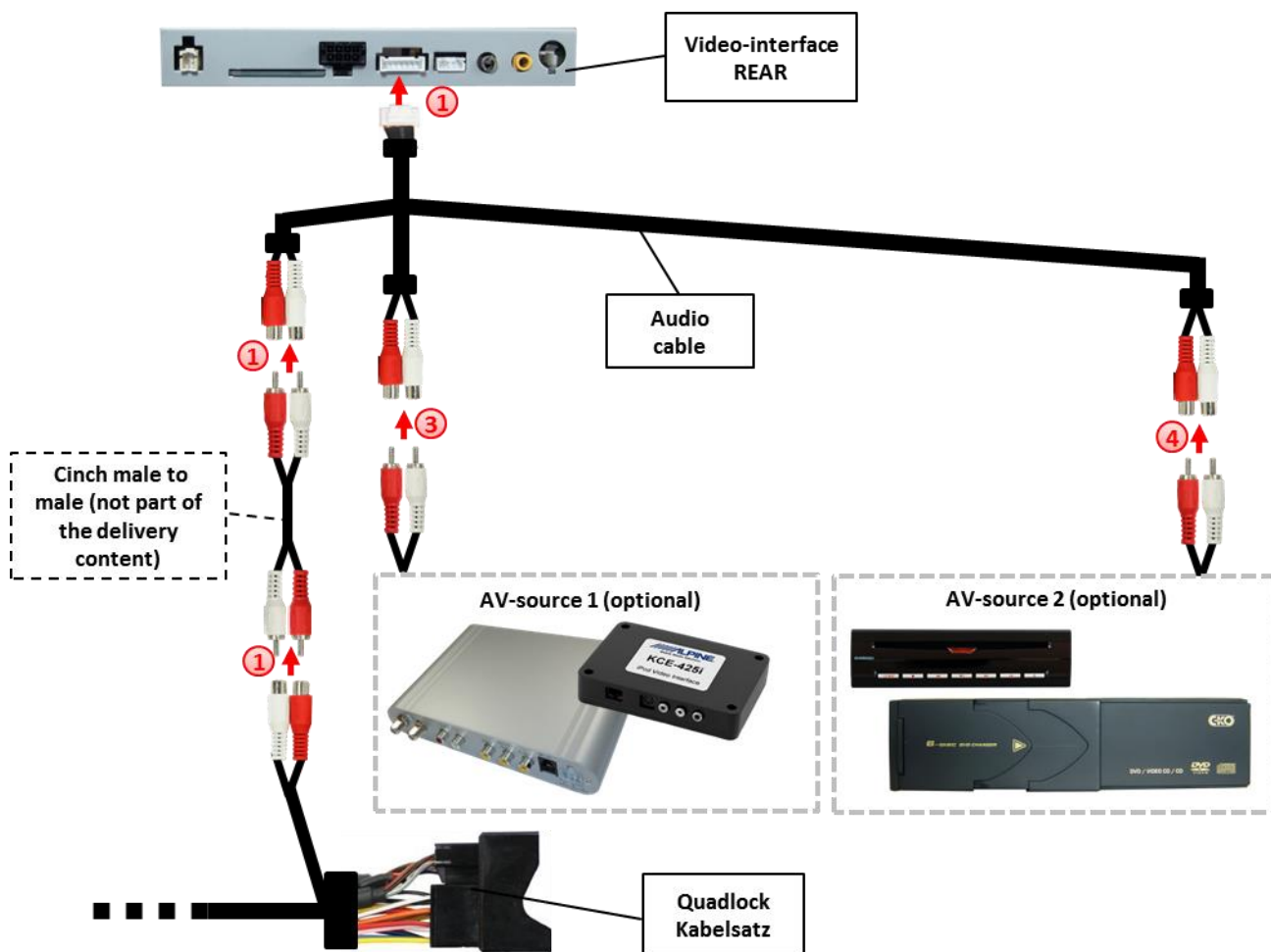
Audio pins	Definition
½	Audio input signal R/L of source AV2
¾	Audio input signal R/L of source AV1
5/6	Audio output signal R/L of factory audio AUX or FM-modulator
7	Ground

Note: If only one AV-source shall be connected, it is possible to connect the video output of the AV-source to the video input AV1 of the video-interface and the audio output of the AV-source directly to the point of audio-insertion (e.g. audio AUX input).

2.5.3.1. Audio insertion by factory audio AUX - NO factory media-interface in vehicle

On vehicles without factory media interface, the physical audio AUX input on the Quadlock connector can be used for audio insertion. The interface's harness has female RCA connector for this case.
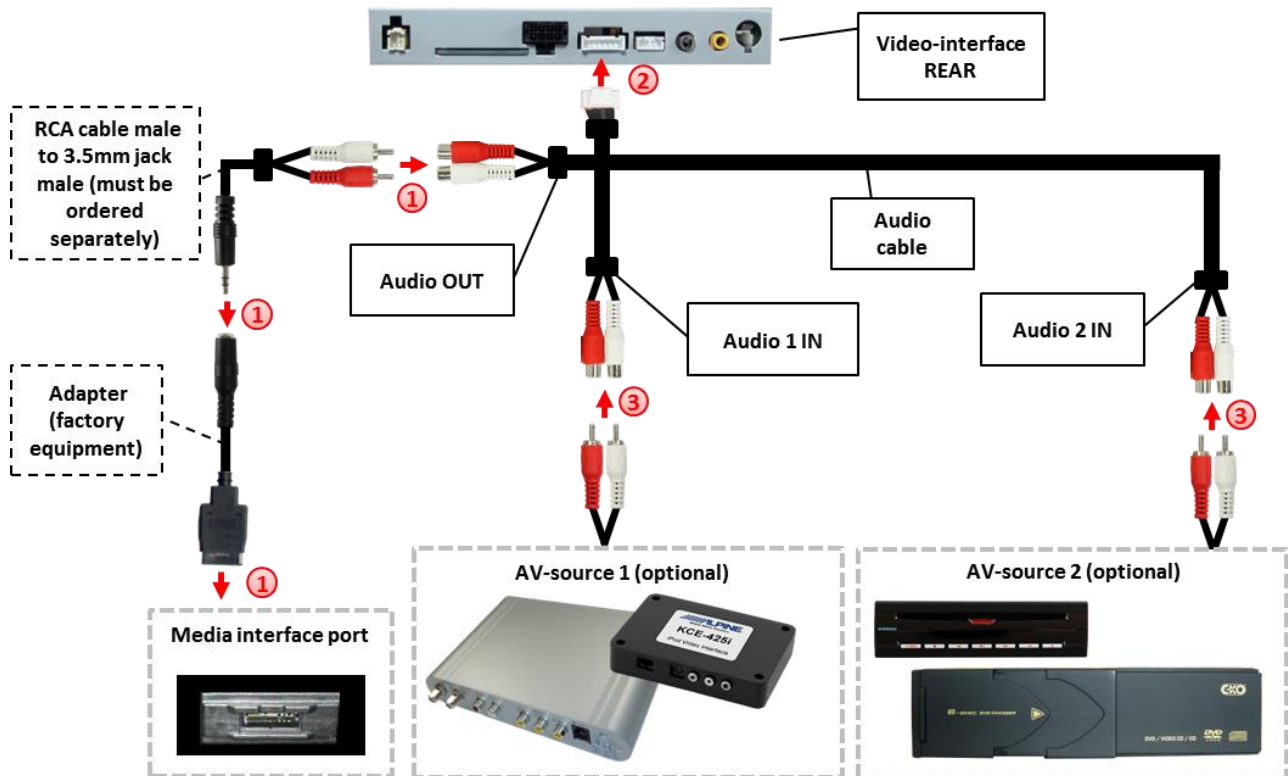
Note: If there is no option "AUX" in the audio menu of the Comand, it is necessary to code the Comand to AUX by diagnosis computer or with our product OBD-N45-X-01.

① Connect female 7pin connector of the audio cable to male 7pin connector of the video-interface.

② Connect the audio-RCA of the possibly existing factory AUX-input or the FM-modulator to the female RCA port AV-Out of the audio cable.

③ Connect the audio-RCA of the AV-source 1 to the female RCA port AV1 of the audio cable.

④ Connect the audio-RCA of the AV-source 2 to the female RCA port AV2 of the audio cable.

2.5.3.2. Audio insertion by factory audio AUX – vehicles with factory media-interface

On vehicles with factory media interface, the physical audio AUX input on the Quadlock connector is deactivated and **cannot** be used for audio insertion. Vehicles with factory media-interface have a 32pin Mitsumi (2 rows with 16pins each) connector in the glove box or middle console. An adapter to a 3.5mm jack bush for audio AUX is available as factory equipment and can be used for audio insertion. The user has to temporary disconnect the factory audio AUX adapter if he wants to use the factory iPod or USD adapter.

① Using the factory adapter, connect the the vehicle's media interface port by 3.5mm jack to a 3.5mm male jack to male RCA cable and connect the male RCA to the female RCA port Audio-OUT of the audio cable.

② Connect female 7pin connector of the audio cable to male 7pin connector of the video-interface.

③ Connect the audio-RCA of the AV-sources to the corresponding Audio IN female RCA ports of the audio cable.
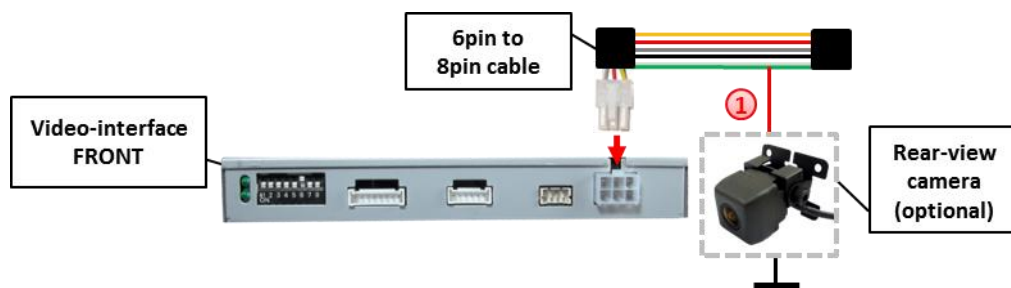
2.5.4. After-market rear-view camera

Some vehicles have a different reverse gear code on the CAN-bus which the included CAN-box is not compatible with. Therefore there is two different ways of installation. If the CAN-box can detect the reverse gear in the vehicle, the green wire of the 6pin to 8pin cable should carry +12V while the reverse gear is engaged.

Note: Do not forget to set dip5 of video-interface to ON before testing.
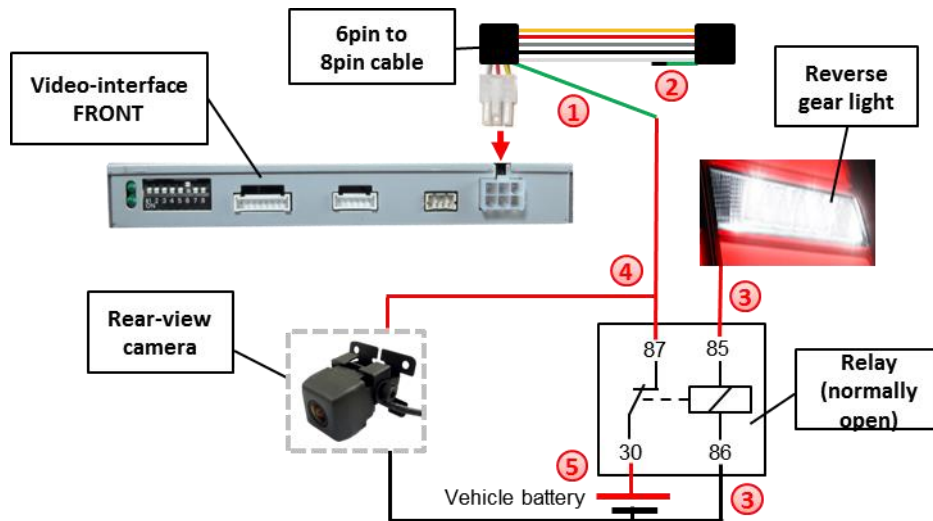
2.5.4.1. Case 1: CAN-box detects reverse gear

If the CAN-bus interface delivers +12V on the green wire of the 6pin to 8pin cable when reverse gear is engaged, the video-interface will automatically be switched to the rear-view camera input CAM while reverse gear is engaged.

① Additionally, the +12V (max. 500mA) power supply for the rear-view camera can be taken from the green wire of the 6pin to 8pin cable.
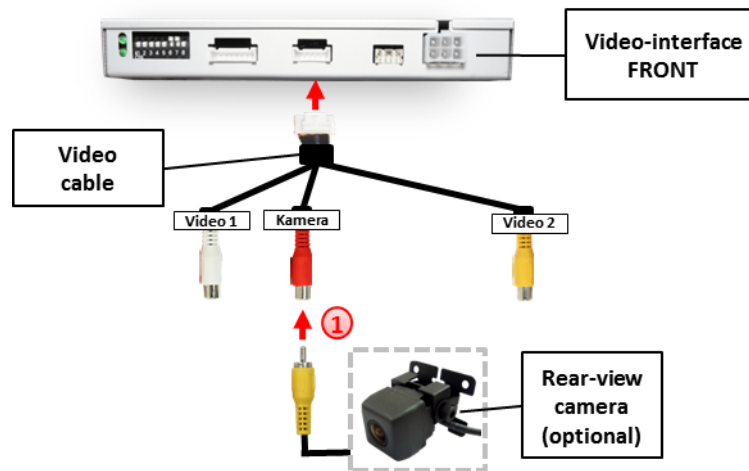
2.5.4.2.   Case 2: CAN-box does not detect reverse gear

If the CAN-bus interface does not deliver +12V on the green wire of the 6pin to 8pin 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 signal contains electronic interference, a normally open relay (e.g AC-RW-1230 with wiring AC-RS5) or filter (e.g. AC-PNF-RVC) is required. Below schema shows the use of a relay (normally open).

① Cut the green cable of the 6pin to 8pin cable close to the black 8pin connector.

② Isolate the short end of the green wire (CAN-box side).

③ Connect reverse gear light signal/power to coil (85) and ground to coil (86) of relais.

④ Connect rear-view camera power and green wire (video-interface side) of 6pin to 8pin cable to output (87) of relay.

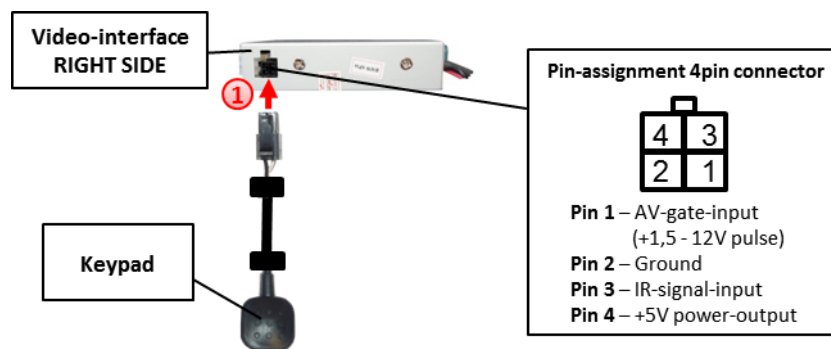⑤ Connect permanent battery power to input (30) of relay.

2.5.4.3. Video signal connection

① Connect the video-RCA of the after-market rear-view camera to the female RCA port of the video-interface which is labeled as CAM.

Note: Picture settings for CAM input must be done in AV2.

2.6. Connecting video-interface and keypad

Pin-assignment 4pin connector

| 4 | 3 |
| 2 | 1 |

Pin 1 – AV-gate-input
(+1,5 - 12V pulse)
Pin 2 – Ground
Pin 3 – IR-signal-input
Pin 4 – +5V power-output

① Connect the female 4pin Microfit connector of the keypad to the male 4pin Microfit connector of the video-interface.
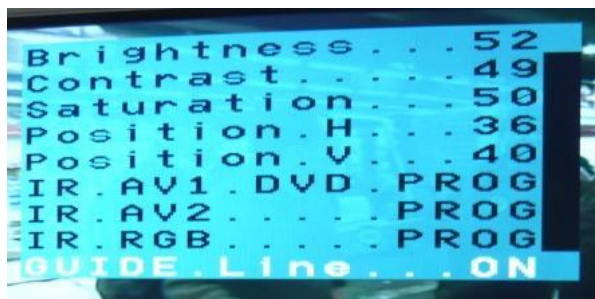
2.7. Picture settings and guide lines

The picture settings are adjusted by the 3 buttons on the video-interface. Press the MENU button to open the OSD settings menu or to switch to the next menu item. Press UP and DOWN change the selected value. The buttons are embedded in the housing to avoid accidental changes during or after installation. Picture settings must be done separately for RGB, AV1 and AV2 while the corresponding input is selected and visible on the monitor. AV2 and CAM share the same settings which must be adjusted in AV2.

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:

Brightness
Contrast
Saturation
Position H (horizontal)
Position V (vertical)
Guide lines (ON/OFF)

Note: If the CAN-box does not support the very vehicle, the guide-lines cannot be used. If supported and activated, the guide-line also show the steering wheel position dependant driving path.

3. Interface operation

3.1. By Comand-buttons

Some of the Comand-buttons can be used to execute interface functions.

Long press C button (3 sec.) beside knob in centre console to switch the video source. Each repetition will switch to the next enabled input. If all inputs are enabled the order is:

Factory video → RGB-in → video AV1 → video AV2 → factory video → …

Inputs which are not enabled by dip switch settings are skipped. With connected audio cable, when switching from video AV1 to video AV2, sound will be switched simultaneously.

3.2. By keypad

Alternatively or additionally to the factory infotainment buttons the interface's external keypad can be used to switch the enabled inputs.

4. Specifications

BATT/ACC range	7V ~ 25V
Stand-by power drain	<5mA
Power	0.3A @12V
Power consumption	2.4W
Video input	0.7V~1V
Video input formats	PAL/NTSC
RGB-video amplitude	0.7V with 75 Ohm impedance
Temperature range	-40°C to +85°C
Weight	352g
Dimensions (box only) B x H x T	154 x 22 x 92 mm

CE ▬▬▬12V DC

5. Frequently asked questions

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.
Inserted picture b/w.	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 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.

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.
Not possible to switch video sources by external keypad.	Pressed too short.	For video source switching a longer press of about 2.5 seconds is required.
	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" 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.

6. 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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