Onboard Entertainment System
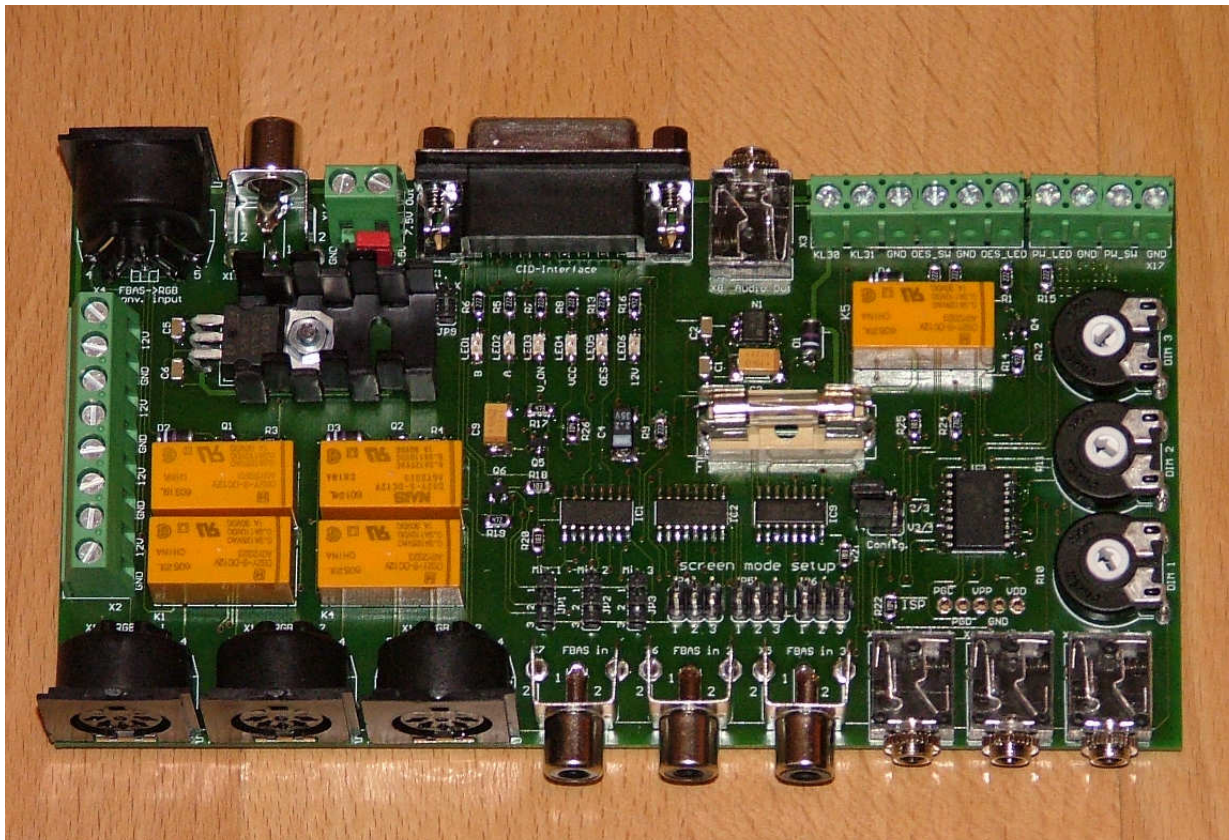
OES-Switch V1.2

user manual

Fig. 1: OES-Switch V1.2

1. descriprion OES-Switch V1.2:

The OES-Switch allows the connection of up to 3 video sources to the CID-Interface V3.x / V4.x.

It is possible to connect either 3 RGB-video sources (e.g. devices with a SCART-connector) or 3 FBAS-video sources (devices with yellow chinch connector, sometimes labelled with RCA or COMPOSITE video out).

It is not possible to connect RGB and FBAS video sources to the OES-Switch V1.2 at the same time!

If different video formats (e.g. VGA, RGB and FBAS) are to be connected to the OES-Switch V1.2, the video signals must be converted by appropriate VGA->RGB or FBAS->RGB converters to the RGB video format before being connected to the OES-Switch.

The colour info display (CID) in the car can still accept video signals in RGB-format only. This fact requires an FBAS->RGB-converter (e.g. LEK-CCR2SRGB) if the connected video sources provide FBAS-video signals. The OES-Switch V1.2 has suitable terminals for the connection of this type of converter including video out for the converter, video in from the converter and power supply connection (7.5V).

If video devices with RGB-video outputs are used, no conversion of video signals is necessary and the devices can be connected directly to the OES-Switch.

Additionally to the 3 video sources, the OES-Switch is capable of switching up to 3 stereo audio signals to one audio output which can be fed into a FM-modulator for instance. That means that both the video and audio signals of up to 3 sources can be selected by the OES-Switch V1.2.

The OES-Switch is equipped with screw terminals to supply 12V-power to 4 external devices (e.g. 3 video devices and one FM-modulator). The 12V-power supply can be switched on and off by the OES-Switch and can supply a total current of 4 A for all devices. The terminals are protected by a 4 A fuse to avoid damage in case of short circuit.

The OES-Switch is controlled by two high quality push-buttons with LED-illumination (optional, see figure 2 and 3). One button switches the OES-Switch on and off and the second button cycles through the connected video sources if pushed. When switching between the video sources, the "Soft-Switching"-function of the CID-Interface V4.x is supported (dim down – switch – dim up).

The LED-illumination of the push buttons indicates the operation mode and error codes by blinking signals.

For each of the 3 video sources, in total 9 screen formats and video mirrored / not mirrored are selectable independently by jumper settings. The brightness of the CID for each video source can be adjusted by 3 potentiometers additionally if the CID-Interface V4.x is used.

Fig. 2: push-buttons with LED-illumination

Fig. 3: high quality push-buttons

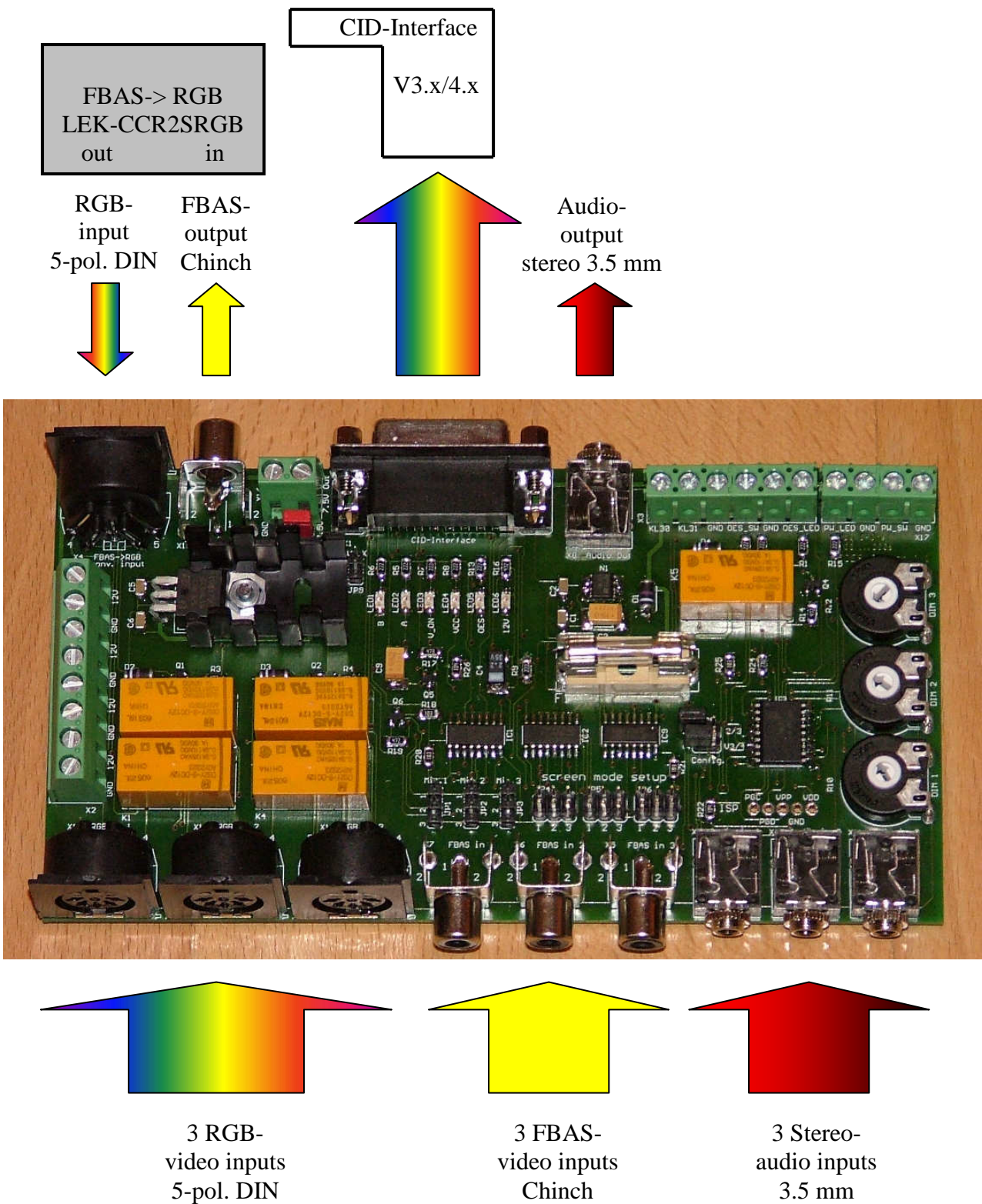## 2. **audio and video connections overview:**

Fig. 4: audio and video connections

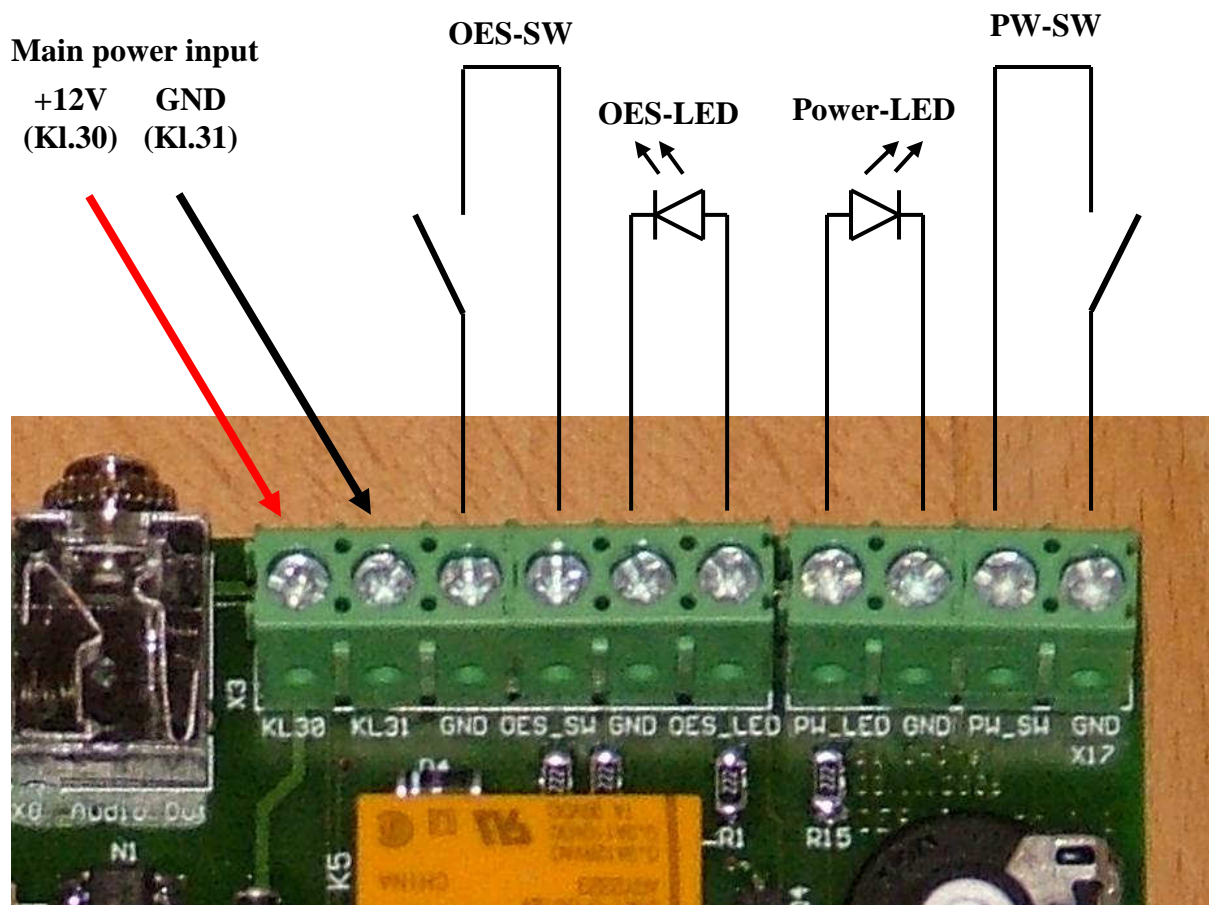### 3. screw terminals for main power in and push-buttons:

Fig. 5: screw terminals for main power, push-buttons and LEDs

The main power supply can be directly connected to the battery power of the car (e.g. 12V power jack), because if the OES-Switch V1.2 is switched off, the power supply of all connected external devices is interrupted by a relay. The OES-Switch itself goes into sleep-mode to reduce its power consumption to minimum (< 3 mA). Thus the OES-Switch can be operated also with the ignition switched off.

If the OES-Switch V1.2 shall not be controlled by the optional illuminated push-buttons shown in figure 2 and 3, any other normally open-push buttons may be used. For indication of the operating mode in this case, common LEDs may be connected to the screw terminals as shown in figure 5. Additional resistors for the LEDs are not required!

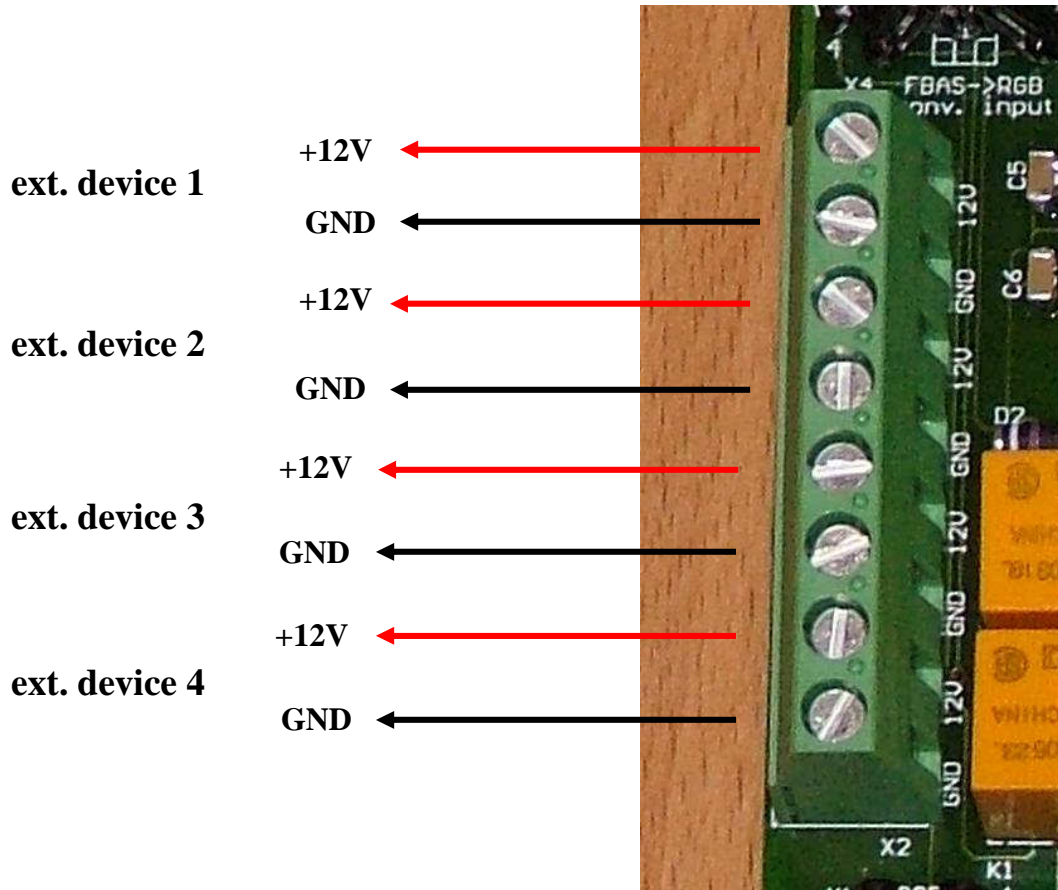## 4. screw terminals for power out connections (12V-Out):

Fig. 6: screw terminals 12V-Out

Up to 4 external devices (e.g. DVD-player, DVB-T receiver, camera and FM-modulator) can be connected to these screw terminals providing 12V-power.

All GND-pins and all +12V-pins are bridged, protected by a 4A-fuse and the 12V-power is switched by a relay if the OES-Switch is switched on. The maximum power consumption of all connected devices in parallel must not exceed 4 A at any time, otherwise the fuse will blow and must be replaced!

Please regard that the main power supply of the OES-Switch V1.2 must be connected to a source which is capable to provide a current of 4 A minimum, such as the car's 12V-power jack (fused with 10 A).

5. description of the inputs and outputs of the FBAS->RGB-converter:

FBAS->RGB-converter LEK-CCR2SRGB

| RGB-output (SCART) | FBAS-input (Chinch) | 7.5V-input power supply |

RGB-input (5-pol. DIN)   **FBAS-output (Chinch)**
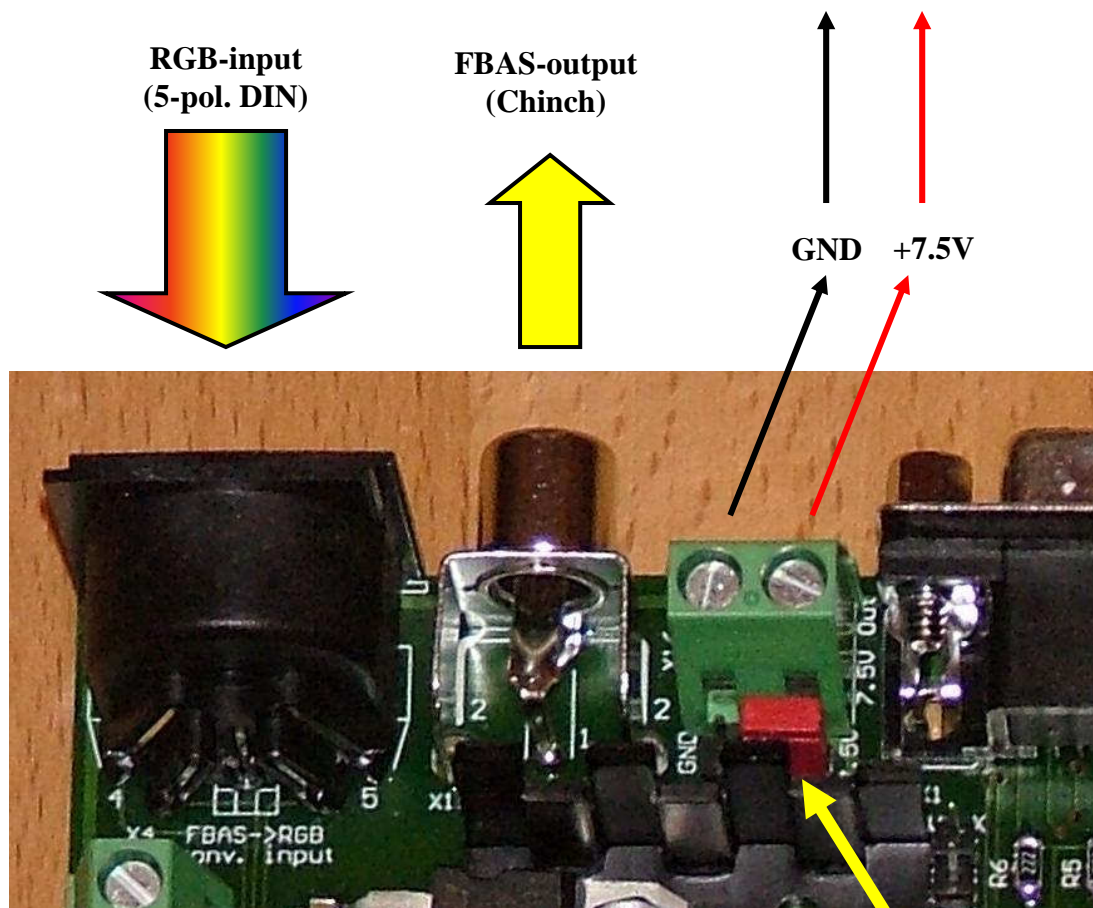
GND   +7.5V

Fig. 7: inputs and outputs for the FBAS-RGB-converter

jumper JP7 configures FBAS or RGB-operating mode

If FBAS-video sources are to be used, the signal must be converted to RGB-video format prior to being fed into the CID via the CID-Interface. All necessary inputs and outputs for the converter are available on the OES-Switch V1.2 as described in figure 7. The jumper JP7 determines if the OES-Switch works in RGB-video mode or FBAS-video mode.

For FBAS-video mode, the jumper must be set to link the pins 2 and 3.
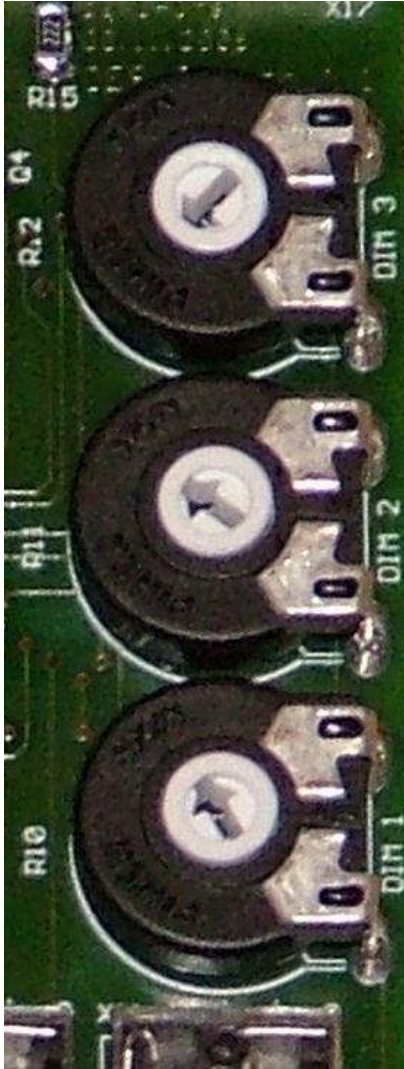
6. description of the external dimming:

Max.

brightness of external video source 3

Min.

Max.

brightness of external video source 2

Min.

Max.

brightness of external video source 1

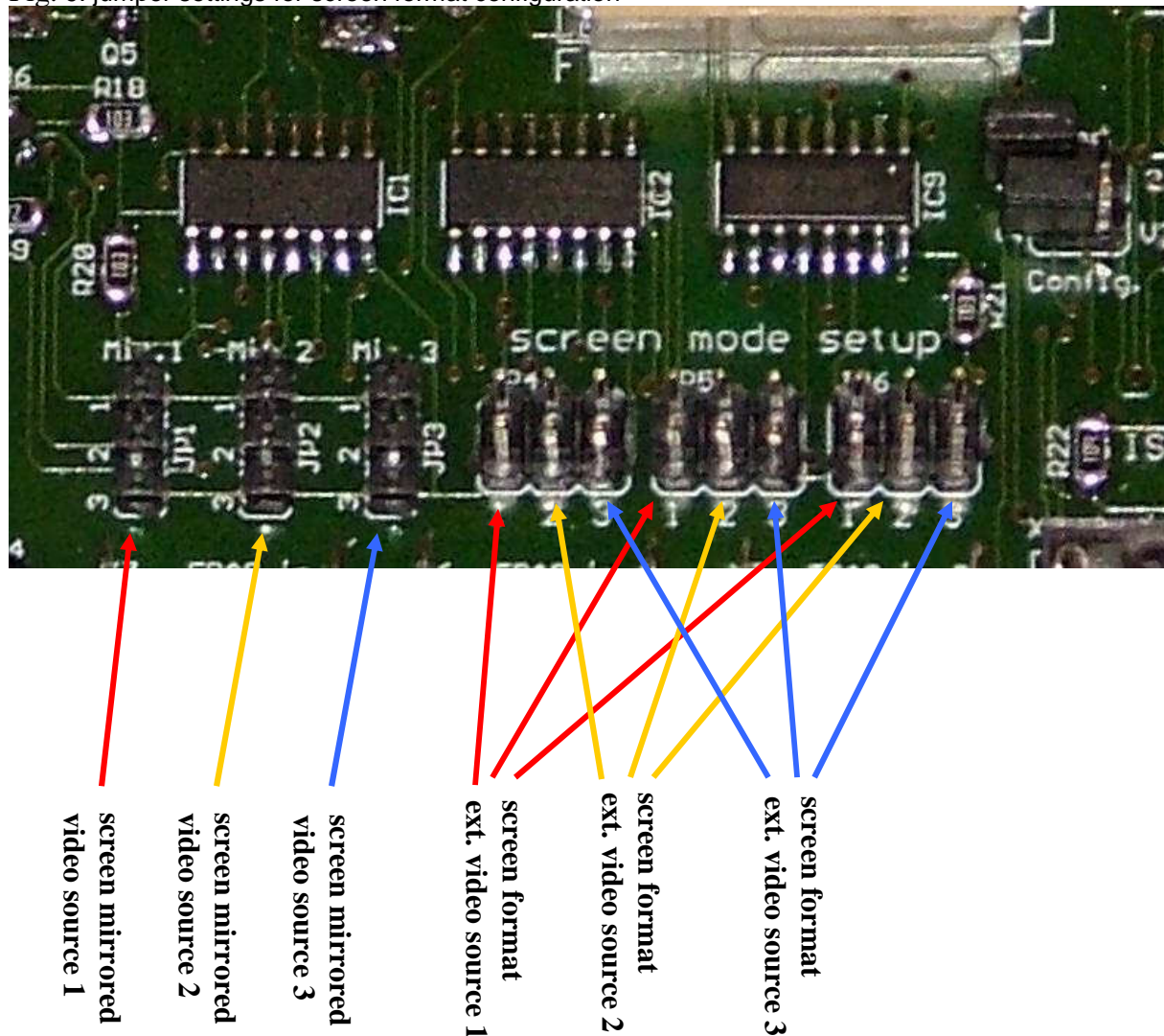**Min.**

Fig. 8: brightness potentiometer

These potentiometers allow the brightness adjustment of the CID for each external video source (both RGB and FBAS) between 0-100%. The user can adjust his preferred brightness level according to his personal requirements.
As already described in the installation manual of the CID-Interface V4.2, the maximum brightness level of the CID is always limited by the car, that means the brightness can only be reduced below the car's setting but never exceed them.

Thus the maximum brightness of the CID can only be reached when the headlights are switched off (car's brightness setting = 100%).

7. jumper settings for screen format configuration:

Fig. 9: jumper settings for screen format configuration

screen mirrored video source 1

screen mirrored video source 2

screen mirrored video source 3

screen format ext. video source 1

screen format ext. video source 2

screen format ext. video source 3

Via 3 jumpers per video source (JP4-6), 9 different screen formats are selectable independently for each video source. If the jumpers are left open, the screen format is set to 16 x 9 full screen, all other settings are described in the appendix.

The jumpers JP1-3 allows to mirror the screen for each video source, e.g. if a rear view camera for reversing is used.

If the CID-Interface V3.x is used, the pins 1 and 2 must be linked by a jumper to mirror the screen, for the CID-Interface V4.x pins 2 and 3 must be linked. No jumpers do not mirror the screen.

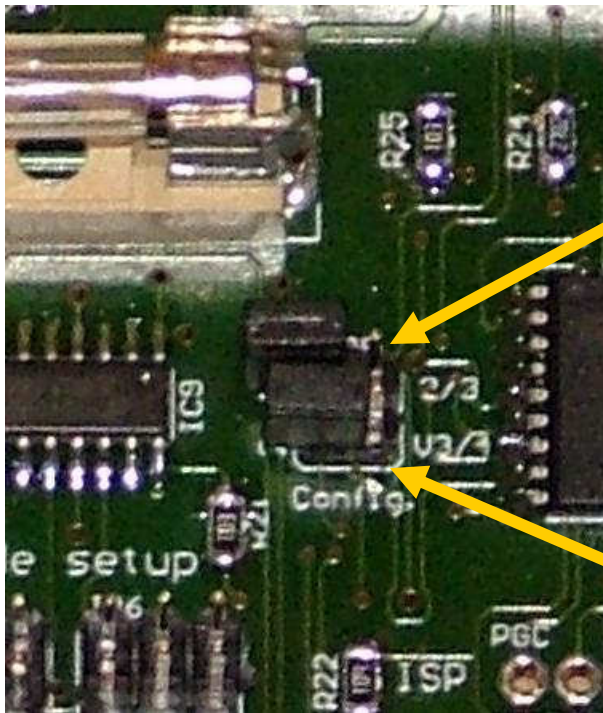## 8.   jumper settings for the operation modes of the OES-Switch V1.2:

Fig. 10: jumper JP8

When jumper „2/3" is set, the OES-Switch only uses the first two video and audio inputs (for the use of only 2 video sources)

If CID-Interface V3.x is connected to the OES-Switch, this configuration jumper "V3/4" must be set. For CID-Interface V4.x the jumper must be left open
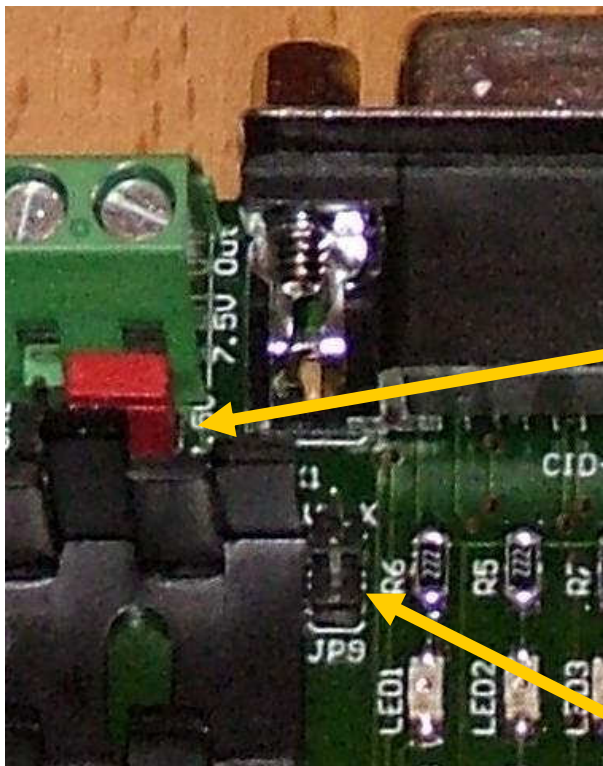

Fig. 11: jumper JP9

Jumper „FBAS-RGB" must be set to pins 1 and 2 in case of RGB-video sources are connected to the OES-Switch. For FBAS-video sources using the FBAS->RGB-converter, the pins 2 and 3 must connected (see chapter 5).

Jumper „V3.x" must be set in case of the CID-Interface V3.x is connected to the OES-Switch V1.2. For CID-Interface V4.x the jumper must be left open

9. putting the OES-Switch V1.2 into operation:

The OES-Switch V1.2 can be easily connected with the devices because all video and audio connections are made by connectors and the power supply and controls are connected via screw terminals. All connectors and screw terminals are clearly labelled for easy identification.

Optionally, the most common video adapter cables such as SCART to 5-pol. DIN (with and without audio connections) are available for easy connection of external video devices.

For creation of special customised adapter cables (RGB to 5-pol. DIN), the suitable 5-pol. DIN-male connector can be ordered separately (see appendix for pinout).

For audio connection, simple chinch cables (red / black to 3.5 mm stereo) may be used alternatively if the video source provides female chinch audio connectors. Standard FBAS-video chinch cables (yellow chinch) may be used to connect FBAS-video sources the OES-Switch V1.2.

For best video performance, short high-quality video cables with good shielding are recommended.

How to proceed with the installation:

Generally all connections with the OES-Switch should be made unpowered, otherwise some components may be damaged when accidentally causing a short during plugging connectors in.

➢ start with connecting the push-buttons with LEDs, refer to figure 5

➢ then connect the main power supply according figure 5 (e.g. to the 12V-power jack), do not swap polarity!

➢ check if the OES-Switch can be switched on and off by pushing the power button (PW-SW), otherwise check wiring

➢ unplug the main power supply again and connect all video devices, audio connections, power supply (12V-out), FBAS->RGB-converter (if required), FM-modulator and the CID-Interface to the OES-Switch. Pay attention to the polarity of the power supply!

➢ configure the OES-Switch V1.2 by jumpers (refer to chapter 8) for FBAS or RGB-operation and CID-Interface V3.x or V4.x

➢ for FBAS-video operation connect the FBAS->RGB-converter as shown in chapter 5 and 10, for RGB-operation connect as shown in chapter 11

➢ connect the FM-modulator to the audio output of the OES-Switch, connect audio outputs of video devices to the audio inputs of the OES-Switch

➢ connect the main power supply and check all functions of the OES-Switch

After a successful test, both push-buttons may be installed somewhere on the dash board or between the gear shift and the handbrake. The plastic cover there can be easily removed and holes for the buttons can be drilled.
The part can be also easily replaced later against a new one if necessary.

The OES-Switch itself can remain in the gloves box or can be placed on the left side behind the gloves box after being wrapped into e.g. a soft foil to protect the circuit from shorts and vibrations.

The OES-Switch V1.2 is operated by the two push-buttons only and switches the power supply for the external video devices on and off. The user need not to access the printed circuit board for normal operation, so it may disappear behind the gloves box.
Only the jumpers and brightness settings must be adjusted prior to stowing the OES-Switch away. Usually these settings are only made once.
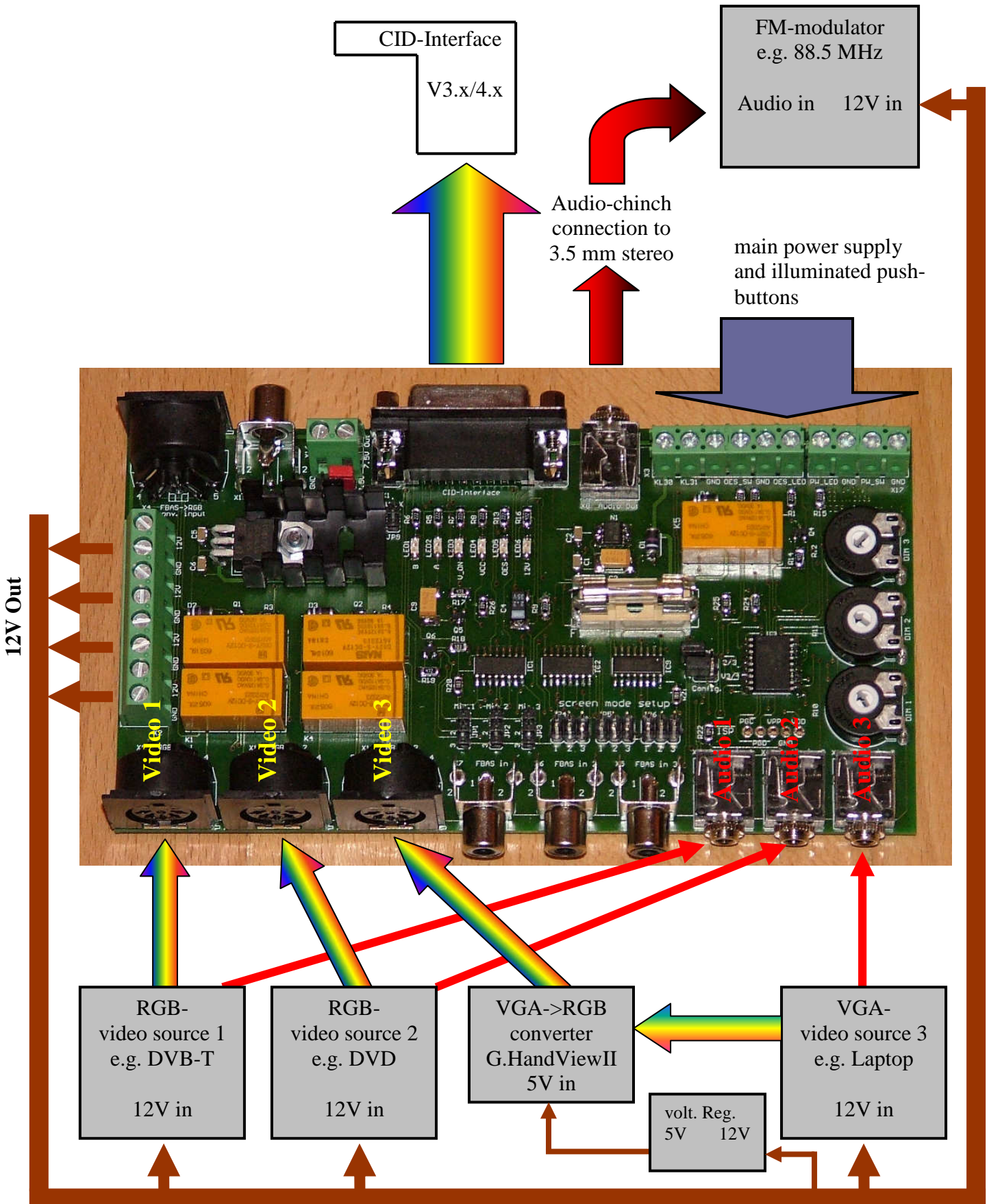
10. connecting FBAS-video devices to the OES-Switch V1.2:

Fig. 12: connecting FBAS-video sources:
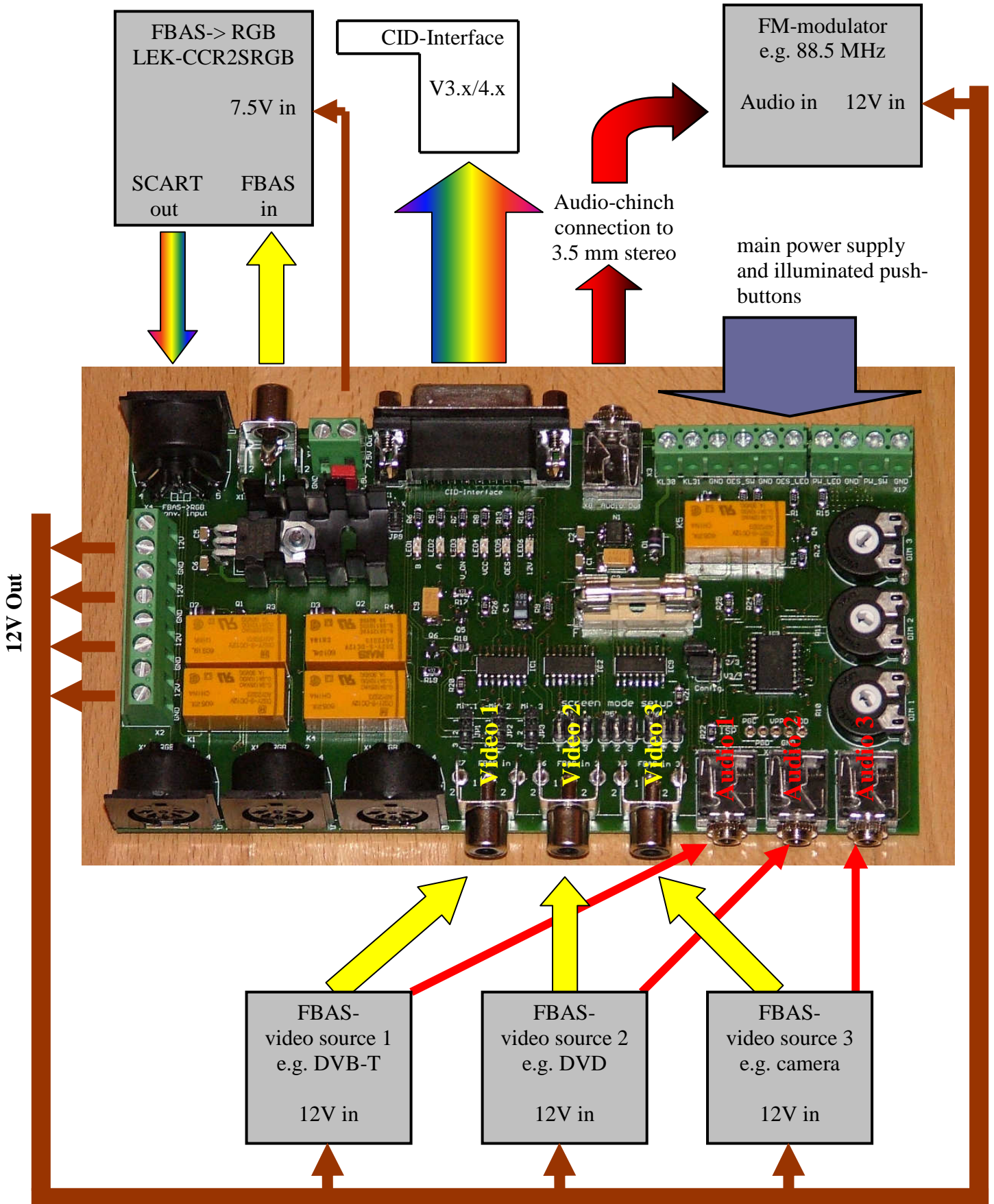
11. connecting RGB / VGA-video sources to the OES-Switch V1.2:

Fig. 13: connecting RGB / VGA-video sources

12. operating the OES-Switch V1.2:

The OES-Switch V1.2 is controlled by two push-buttons that have to be connected to the screw terminals as described in chapter 3 (figure 5).

> **push-button „Power-Switch" (PW-SW):**
> If this button is pressed al least 0.5 seconds, the OES-Switch V1.2 switches on and connects the main power supply to the "12V-Out" terminals via a relay (see chapter 4).
> All external video devices connected to these screw terminals are now powered up and ready for operation. The "on-state"-condition is indicated by the power-LED (see chapter 3) which is illuminated now.
>
> After pressing the power-switch button again for approx. 1.5 seconds, the power-LED flashes one time and switches off then. The OES-Switch V1.2 goes to the "off-state" and disconnects the "12V-Out" screw terminals from the main power supply. All external devices are unpowered now.
>
> The switch-off procedure initiated by pressing the power-switch at least 1.5 seconds can be executed at any time at any operation mode.
>
> Being in the „off-state"-condition, the OES-Switch V1.2 goes into a sleep-mode to reduce its own power consumption to minimum (typ. < 3 mA).
> This sleep current is only a very small load for the car's battery.
>
> If the car shall not be used for a long time (several weeks), it is recommended despite of the low sleep current to disconnect the OES-Switch V1.2 from the battery power, e.g. by pulling out the appropriate fuse for the connection point of the main power supply (e.g. the 12V power jack). In this case the OES-Switch V1.2 cannot discharge the battery at all.
> Alternatively a switch can be installed somewhere in the car to interrupt the main power supply of the OES-Switch V1.2 if the car is not used for a long time regularly.

Hint: Depending on the current configuration, operation mode and selected video device the "switch-off"-procedure may take several seconds in order to allow the CID-Interface V4.x to execute the "Soft-Switching"-function (dim down – switch – dim up). The power-LED however indicates the "switch-off"-procedure immediately.

➢ **push-button „OES-Switch" (OES-SW):**
If the OES-Switch V1.2 is switched on, pressing this button for a short time (longer than 0.3 seconds but shorter than 3 seconds) causes the OES-Switch to cycle through the video devices in the following sequence:

ext. video off -> video input 1 -> video input 2 -> video input 3 -> ext. video off -> video input 1 -> …. etc.

In the „ext. video off" status the CID shows the original radio screen, but the power supply of all connected video devices is already switched on and the video devices are ready for operation. As soon as the OES-switch is pressed the next time, the OES-Switch V1.2 selects the video input 1 using the "Soft-Switching"-function and the external video picture is immediately available.

After pressing the OES-switch again, the OES-Switch V1.2 selects the video input 2 using the "Soft-Switching"-function.

During the „Soft-Switching"-function, the new audio source of the next video input is selected exactly in the middle of the switching procedure. At that time the brightness of the CID is reduced to 0% (dark) and the corresponding audio signal of the newly selected video source is fed into the FM-modulator to always hear the sound of the active video source.

The current operation mode is indicated by the OES-LED (see chapter 3). In the "ext. video off"-state the OES-LED is switched off, after switching to video input 1 the OES-LED goes on. When switching to video input 2, the OES-LED blinks two times and stays on then. Switching to video input 3, the OES-LED blinks three times and stays on then.

„Instant-Off"-function: If the „ext. video off"-state shall be reached as fast as possible in order to see the original radio screen for e.g. the navigation, the button "OES-switch" must be pressed and held for approx. 3 seconds.

Doing so the OES-Switch V1.2 switches off the external video immediately <u>without</u> cycling through all remaining video inputs.
The OES-LED is switched off entering the "ext. video off"-state.

If the „Instant-Off"-function was used the last time, pressing the „OES-switch"-button again will make the OES-Switch V1.2 to immediately switch to the <u>last selected video input</u>. The OES-LED indicates the currently selected video input by blinking signals as described above.

Hint: If the jumper „2/3" is set (JP8), the OES-Switch V1.2 is limited to only 2 video and audio inputs. That means after the selected video input 2 the "ext. video off"-state follows instead of video input 3.

When jumper „V3/4" is set (JP8), the OES-Switch V1.2 is configured for operation with the CID-Interface V3.x. In this mode the "Soft-Switching"-function as well as the dimming settings adjusted by the potentiometers are disabled because the CID-Interface V3.x does not support these functions.

13. <u>voltage monitoring of the main power supply:</u>

During operation of the OES-Switch V1.2, the main power supply voltage (equal to battery voltage) is monitored constantly.

If the voltage drops below 11V, the power-LED starts to blink slowly (approx. one time per second). The engine should be started to charge the battery again or the OES (onboard entertainment system) should be switched off soon to prevent discharging the battery too much.

If the voltage should drop below 9V, the power-LED starts to blink quickly (approx. three times per second). A this point the battery is critically discharged already and the OES must be switched off immediately to protect the battery from a harming deep discharge!

The screw terminals „12V-Out" are protected against overcurrent by a 4A-fuse. If the fuse should be blown, the OES-Switch V1.2 indicates this error condition by blinking the power-LED in the following sequence: long – short – long – short – long – short... In this case the fuse must be replaced against a new one of the same type.

Hint: If the fuse should blow often despite of the operating current of all connected external devices should be lower than 4 A, the reason could be a high switch-on current of one or more devices. In this case a slow fuse is recommended instead of a fast one.

Video devices consuming more power than available from the OES-Switch V1.2 must not be connected to the "12V-Out" terminals! They must be connected directly to e.g. the 12V power jack of the car and switched off or disconnected manually.

appendix

❖ **meaning of the LEDs mounted on the PCB of the OES-Switch V1.2:**

signal ext.
video on

VCC internal
logic OK

adressing
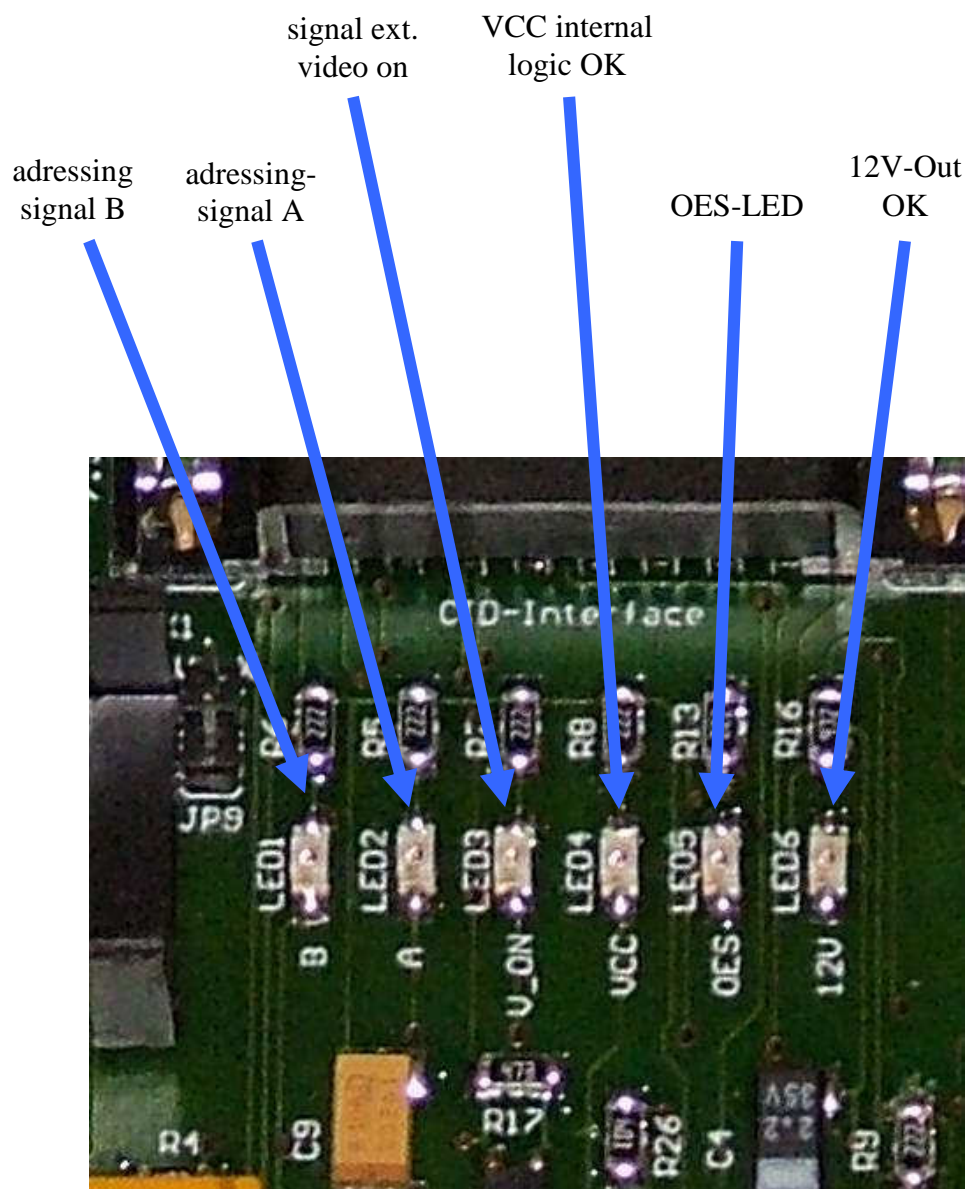signal B

adressing-
signal A

12V-Out
OK

OES-LED

Fig. 14: meaning of the LEDs mounted on the PCB

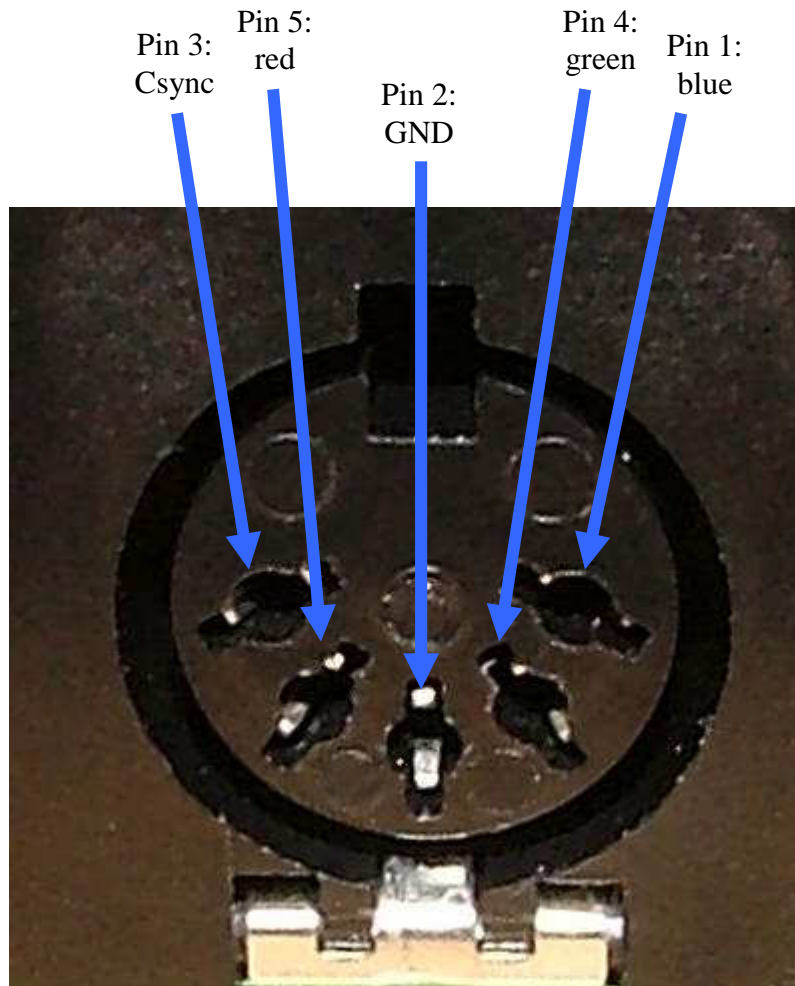### ❖ pinout of the RGB-inputs (5-pol. DIN-female connector):

Fig. 15: pinout of the 5-pol. DIN-female connector

❖ configurable screen formats of the CID:

screen format	JP4 (Mode 3)	JP5 (Mode 2)	JP6 (Mode 1)
16x9 full	open	open	open
4x3 middle	open	open	set
16x9 wide	open	set	open
16x9 zoom a	open	set	set
16x9 zoom b	set	open	open
4x3 left	set	open	set
4x3 right	set	set	open
16x9 zoom c	set	set	set

table 1: configurable screen formats of the CID via JP4-6

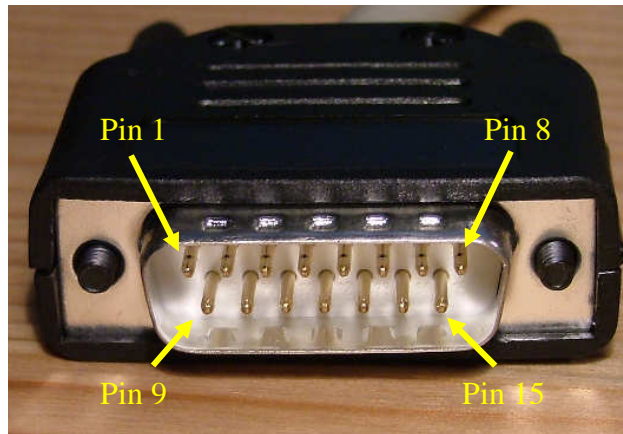❖ **pinout of the 15-pol. SubD-connector (CID-Interface V3.x / V4.x):**

Fig. 16: pinout of the SubD-connector of the CID-Interface

pin	signal	description	cable colour inside the connector
1	Inp 12V	reserved for future use at V4.x power supply at V3.x	white
2	Free		
3	Dim. Dim. Inh.	external dimming 0V-5V at V4.x CID-dimming inhibit at V3.x	red/blue
4	Free		
5	Blue	video signal blue (RGB)	blue
6	Green	video signal green (RGB)	green
7	Red	video signal red (RGB)	red
8	Csync	video signal Csync (RGB)	yellow
9	GND	GND CID-Interface	black
10	Vid.on	Signal for switching to external video	grey/purple
11	Mode1	CID screen format setup input 1	violet
12	Mode2	CID screen format setup input 2	purple
13	Mode3	CID screen format setup input 3	grey
14	Mirror	switching signal for mirror the screen	brown
15	Free		

table 2: pinout of the SubD 15-pol. connector of the CID-Interface V3.x / V4.x