MUSWAY D8 V3 8 Channel Class D Amplifier with 10-Channel DSP User Guide

MUSWAY
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D8 V3 8 Channel Class D Amplifier with 10-Channel DSP User Guide

VERSION 1.0
D8 V3 8-CHANNEL CLASS D AMPLIFIER WITH 10-CHANNEL DSP

Contents

TECHNICAL SPECIFICATIONS

POWER SUPPLY

Voltage:	7.5 – 15 VDC
Idle current:	1.5 A
Switched off:	<0.1 mA
Consumption @ 13.8 VDC 2 Ω Max. Musical Power :	40 A
Remote IN:	9 – 15 VDC (1 mA)
Remote OUT:	11 – 15 VDC (200 mA)
Fuse:	40 A

AMPLIFIER STAGE

Distortion – THD (1 kHz @ 4 Ω, 90% Power):	0.05%
Bandwidth (-3 dB, 2 V RMS, 4Ω):	15 Hz – 22 kHz
S/N ratio @ A weighted, 1 V, Max. Power:	95 dB A
Damping factor @ 1 kHz, 2 V RMS, 4 Ω:	> 70
Input sensitivity:	0 V RMS or 18V RMS (High-level); 4 V RMS (Line-level)
Input impedance:	13 Ω (High-level); 47 kΩ (Line-level)
LOAD IMPEDANCE (MIN): 8CH:	2 Ω
4CH – Bridge (1-2) (3-4) (5-6) (7-8) :	4 Ω
OUTPUT POWER (RMS) @ 13.8 VDC, 1% THD: 8CH @ 4 Ω: 8CH @ 2 Ω:	 50 W x 8 75 W x 8
4CH – (Bridge 1/2; 3/4; 5/6; 7/8) @ 4 Ω:	150 W x 4

SIGNAL CONNECTIONS
RCA Pre-Out:…… 4 V RMS Max.

Declaration of Conformity
Audio Design GmbH hereby declares that the MUSWAY D8V3 device complies with Directive 2014/53/EU. The full declaration of conformity can be viewed at "**www.musway.de/ce**"
DIGITAL SIGNAL PROCESSOR (32 bit Clock speed: 330 MHz)

Crossover:	Full / Hi Pass / Lo Pass / Band Pass
Crossover type and slope:	Bessel / Butterworth / Linkwitz @ 6/12/18/24/30/36/42/48 dB/0ct
Crossover Frequency:	1 Hz step @ 20 Hz – 20 kHz
Phase inversion:	0° / 180°
Output Equalizer:	31-Band Parametrical Equalizer: ±15 dB
Time Alignment Distance:	0 – 601.392 cm 0-236.796 inch
Time Alignment Delay:	0 – 17.688 ms
Time Alignment Step:	0,08 ms; 2,8 cm
Time Alignment Fine Set:	0,02 ms; 0,7 cm
Presets (Local Stored):	6 Presets

GENERAL REQUIREMENTS

PC connections	Micro USB (1.1 / 2.0 / 3.0)
Software/PC requirements:	Microsoft Windows (32/64 bit): XP, Vista, Windows 7, Wind ows 8, Windows 10
Graphic card min. resolution:	1024 x 768
Ambient operating temperature range:	0 – 55 °C

SIZE / WEIGHT

Size without brackets (mm):	127 x 37 x 205
Net Weight (kg):	1,5

SCOPE OF DELIVERY

- 1 x D8V3 DSP Amplifier
- 1 x 1,5 m USB Cable
- 1 x 20-pole Cable Adapter (Speaker Outputs)
- 1 x 20-pole Cable Adapter (High-Level Inputs, REM In- and Outputs)
- 1 x 8-pole Cable Adapter (Pre-Amplifier In- and Outputs)
- 1 x Owner's Manual (English/German)
- 1 x 40 A replacement fuse
- 1 x 3 mm hex key

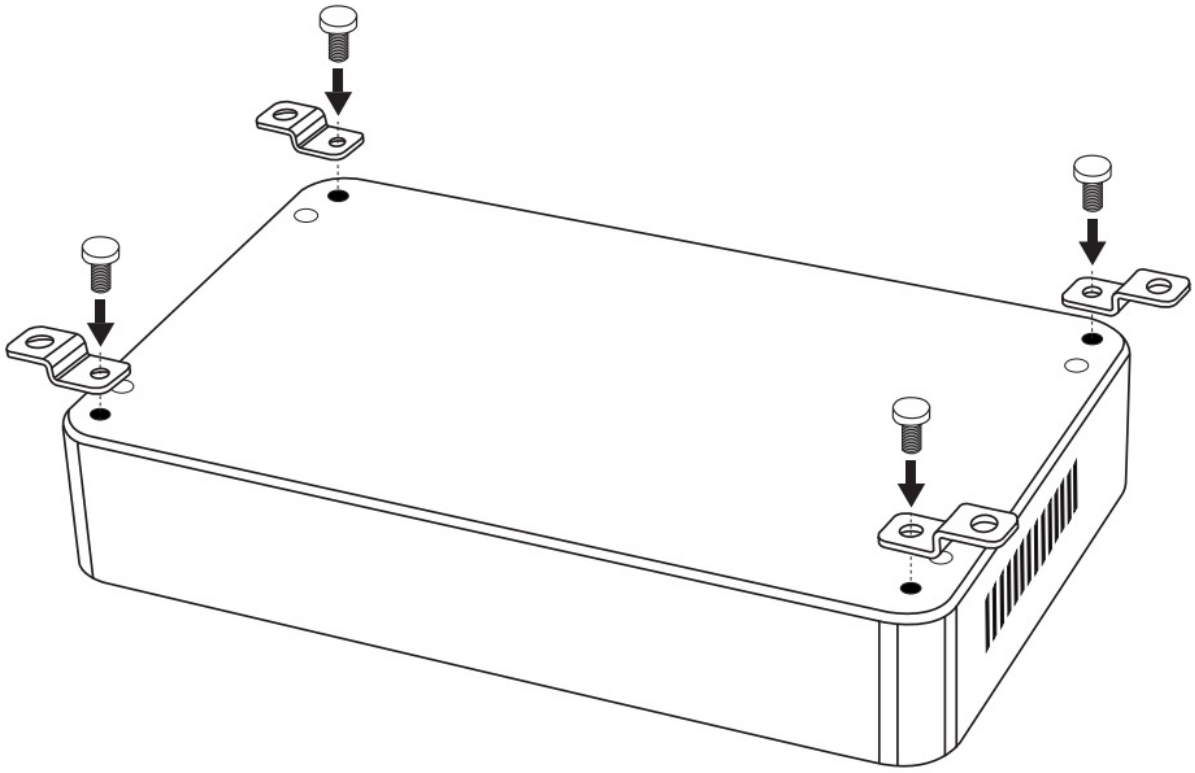
SAFETY INSTRUCTIONS

THE PURCHASED DEVICE IS ONLY SUITABLE FOR AN OPERATION WITH A 12V ON-BOARD ELECTRICAL SYSTEM OF A VEHICLE. Otherwise, fire hazards, risk of injury, and electric shock consist.
PLEASE DO NOT MAKE ANY OPERATION OF THE SOUND SYSTEM, WHICH DISTRACT YOU FROM A SAFE DRIVING. Do not make any procedures, which demand longer attention. Perform these operations not until you have stopped the vehicle in a safe place. Otherwise, the risk of accident consists.
ADJUST THE SOUND VOLUME TO AN APPROPRIATE LEVEL, SO THAT YOU ARE STILL ABLE TO HEAR EXTERIOR NOISES WHILE DRIVING. High-performance sound systems in vehicles may generate the acoustic pressure of a live concert. Permanent listening to extremely loud music may cause the loss of your hearing abilities. The hewing of extremely loud music while driving may derogate your cognition of warning signals in traffic. In the interests of common safety, we suggest driving with a lower sound volume. Otherwise, the risk of accident consists.
DO NOT COVER COOLING VENTS AND HEAT SINKS. Otherwise, this may cause heat accumulation in the device and fire hazards consists.
DO NOT OPEN THE DEVICE. Otherwise, fire hazards, risk of injury, and electric shock consist. Also, this may cause a loss of the warranty.
REPLACE FUSES ONLY WITH FUSES WITH THE SAME RATING. Otherwise, fire hazards and risk of electric shock consist.
DO NOT USE THE DEVICE ANY LONGER, IF A MALFUNCTION OCCURS, WHICH REMAINS NOT REMEDIED. Refer in this case to the chapter TROUBLESHOOTING. Otherwise the risk of injury and damage of the device consists. Commit the device to an authorized retailer.
INTERCONNECTION AND INSTALLATION SHOULD BE ACCOMPLISHED BY SKILLED STAFF ONLY. The interconnection and installation of this device demand technical aptitude and experience. For your own safe-ness, commit the interconnection and installation to your car audio retailer, where you have purchased the device.

DISCONNECT THE GROUND CONNECTION FROM THE VEHICLE'S BATTERY BEFORE INSTALLATION. Before you start with the installation of the sound system, disconnect by any means the ground supply wire from the battery, to avoid any risk of electric shock and short circuits.
CHOOSE AN APPROPRIATE LOCATION FOR THE INSTALLATION OF THE DEVICE. Look for an appropriate location for the device, which ensures a sufficient air circulation. The best places are spare wheel cavities and open spaces in the trunk area. Less suitable are storage spaces behind the side coverings or under the car seats.
DO NOT INSTALL THE DEVICE AT LOCATIONS, WHERE IT WILL BE EXPOSED TO HIGH HUMIDITY AND DUST. Install the device at a location, where it will be protected from high humidity and dust. If humidity and dust attain inside the device, malfunctions may be caused.
MOUNT THE DEVICE AND OTHER COMPONENTS OF THE SOUND SYSTEM SUFFICIENTLY. Otherwise, the device and components may get loose and act as dangerous objects, which could cause serious harm and damage in the passenger room.
ENSURE CORRECT CONNECTION OF ALL TERMINALS. Faulty connections may cause fire hazards and lead to damage of the device.
MOUNT THE DEVICE AND OTHER COMPONENTS OF THE SOUND SYSTEM SUFFICIENTLY. Otherwise, the device and components may get loose and act as dangerous objects, which could cause serious harm and damage in the passenger room.
ENSURE NOT TO DAMAGE COMPONENTS, WIRES, AND CABLES OF THE VEHICLE WHEN YOU DRILL THE MOUNTING HOLES. If you drill the mounting holes for the installation into the vehicle's chassis, ensure by any means, not to damage, block, or tangent the fuel pipe, the gas tank, other wires or electrical cables.
DO NOT INSTALL AUDIO CABLES AND POWER SUPPLY WIRES TOGETHER. Ensure while installation not to lead the audio cables between the head unit and the processor together with the power supply wires on the same side of the vehicle. The best is an areal separated installation in the left and right cable channels of the vehicle. Therewith overlap of interferences on the audio signal will be avoided. This stands also for the equipped bass-remote wire, which should be installed not together with the power supply wires, but rather with the audio signal cables.
ENSURE THAT CABLES MAY NOT BE CAUGHT UP IN CLOSE-BY OBJECTS. Install all the wires and cables as described on the following pages, therewith these may not hinder the driver. Cables and wires which are installed close by the steering wheel, gear lever or brake pedal, may be caught up and cause highly dangerous situations.
DO NOT SPLICE ELECTRICAL WIRES. The electrical wires should not be bared, to provide power supply to other devices. Otherwise, the load capacity of the wire may get overloaded. Use therefore an appropriate distribution block. Otherwise, fire hazards and risk of electric shock consist.
DO NOT USE BOLTS AND SCREW NUTS OF THE BRAKE SYSTEM AS GROUND POINTS. Never use for the installation or the ground point bolts and screw nuts of the brake system. steering system or other security-relevant components. Otherwise, fire hazard consists or driving safety will be derogated.
ENSURE NOT TO BEND OR SQUEEZE CABLES AND WIRES WITH SHARP OBJECTS. Do not install cables and wires, not dose-by movable objects like the seat rail, or may be bent or harmed by sharp and barbed edges. If you lead a wire or cable through the hole in a metal sheet, protect the insulation with a rubber grommet.
KEEP AWAY SMALL PARTS AND JACKS FROM CHILDREN. If objects like these will be swallowed, the risk of serious injuries consists. Consult promptly a medical doctor. if a child swallowed a small object.

MECHANICAL INSTALLATION

- Avoid any damages to the components of the vehicle like airbags, cables, board computers, seat belts, gas tanks, or the like.
- Ensure that the chosen location provides sufficient air circulation for the amplifier. Do not mount the device into small or sealed spaces without air circulation near by heat dispersing parts or electrical parts of the vehicle.
- Do not mount the amplifier on top of a subwoofer box or any other vibrating parts, whereby parts could loosen inside.
- The wires and cables of the power supply and the audio signal must be as short as possible to avoid any losses and interferences



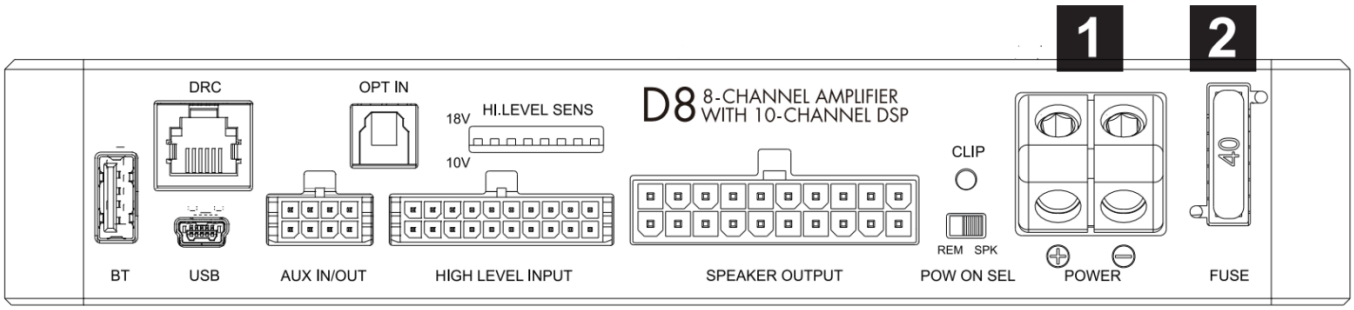
WARNING

Before you start with the installation, disconnect necessarily the GROUND connection wire from the battery to avoid any risk of electric shocks and short circuits.

ELECTRICAL INTERCONNECTION

BEFORE CONNECTING

For the professional installation of a sound system, car audio retail stores offer appropriate wiring kits. Ensure a sufficient profile section (at least 0 5 mm), a suitable fuse rating, and the conductivity of the cables when you purchase your wiring kit. Clean and remove rust-streaked and oxidized areas on the contact points of the battery and the ground connection. Make sure that all screws are fixed tight after the installation because loose connections cause malfunctions, insufficient power supply or interferences.



POWER Connect the POWER + terminal (+12V) with the +12V pole of the vehicle's battery. Use a suitable cable with a sufficient cross-section (at least 0 5 mm) and install an additional in-line fuse. For safety reasons the distance between the fuse block and the battery should be shorter than 30 cm. Do not set in the fuse into the fuse block until the installation is accomplished.

Connect the POWER — terminal (ground) with a suitable contact ground point on the vehicle's chassis. The ground wire must be as short as possible and must be connected to a blank metallic point at the vehicle's chassis. Ensure that this ground point has a stable and safe electrical connection to the negative –"pole of the battery. Check this ground wire from the battery to the ground point if possible and enforce it, if required. Use a ground wire with a sufficient cross-section (at least 0 5 mm) and the same size as the positive + power supply wire. This helps reduce most of the interference than can occur in audio reproduction.

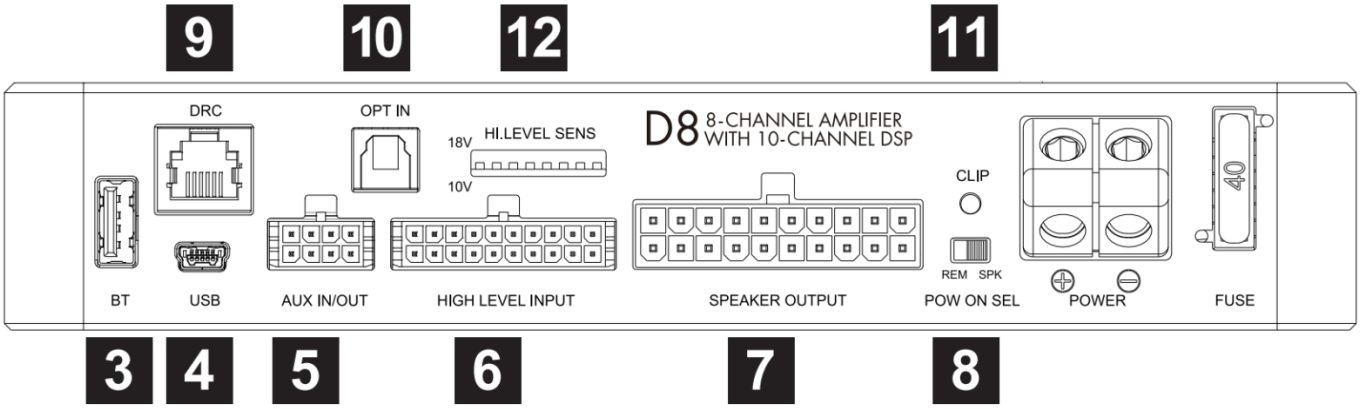
FUSE The inserted fuse (40 A blade) protects the amplifier from shorts and capacity overload. If you need to

replace the fuse, make sure to use the same type of fuse with the same rating.

WARNING

Make sure the connection polarity Is as Indicated on the terminals. A misconnection may result in damage to the amplifier. After applying power, waft about 8 seconds before turning the amplifier on.

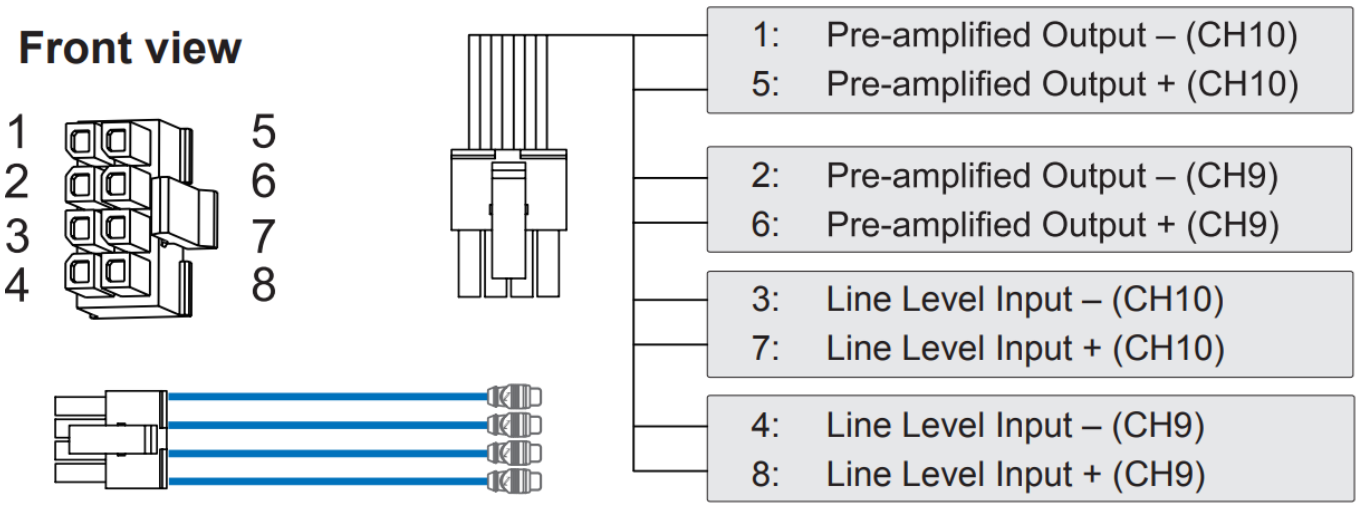
DESCRIPTION OF OPERATION



3 BT This USB input is suited for an external Bluetooth" dongle with wireless audio streaming function with/or adjusting the DSP by an APP through a smartphone/mobile device. Check the website "**www.musway.de**"for more information or ask your car audio retailer

4 USB This USB input is suited for the connection with a PC/laptop computer to manage the functions of the MUSWAY DSP software to set up the DSP functions of the amplifier. The connection is USB 1.1/2.0/3.0 compatible. For downloading the software please visit "**www.musway.de/dsp**".

5 AUX IN/OUT

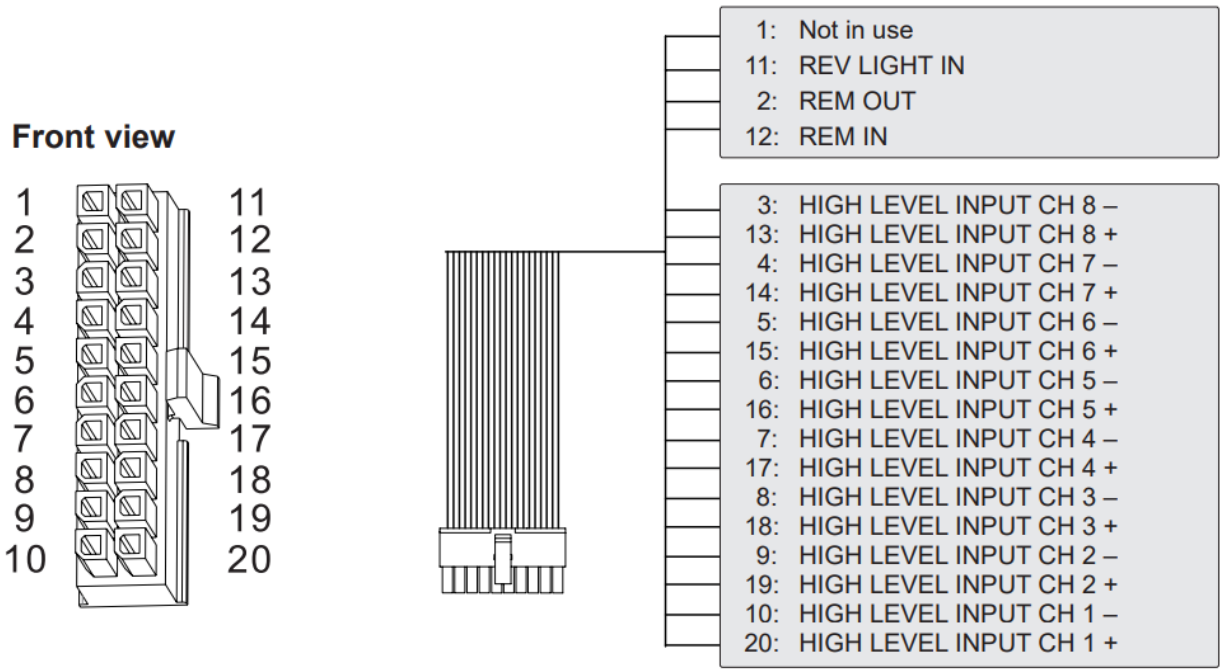


AUX IN: Auxiliary low-level stereo signal input to connect an external stereo pre-amplifier source.

AUX OUT: 2CH pre-amplified output (CH9 & CH10), optimized to drive an amplifier for additional external speakers. such as subwoofer or center speakers etc.

6. HIGH-LEVEL INPUT

20 pole multipolar connector to manage the input high-level signals, REM IN connections, etc.



REV LIGHT IN: If you connect the reverse gear light cable here, the audio streaming in Bluetooth" Mode will be interrupted and the regular audio from the head unit is audible to perceive signal tones from the park distance control.

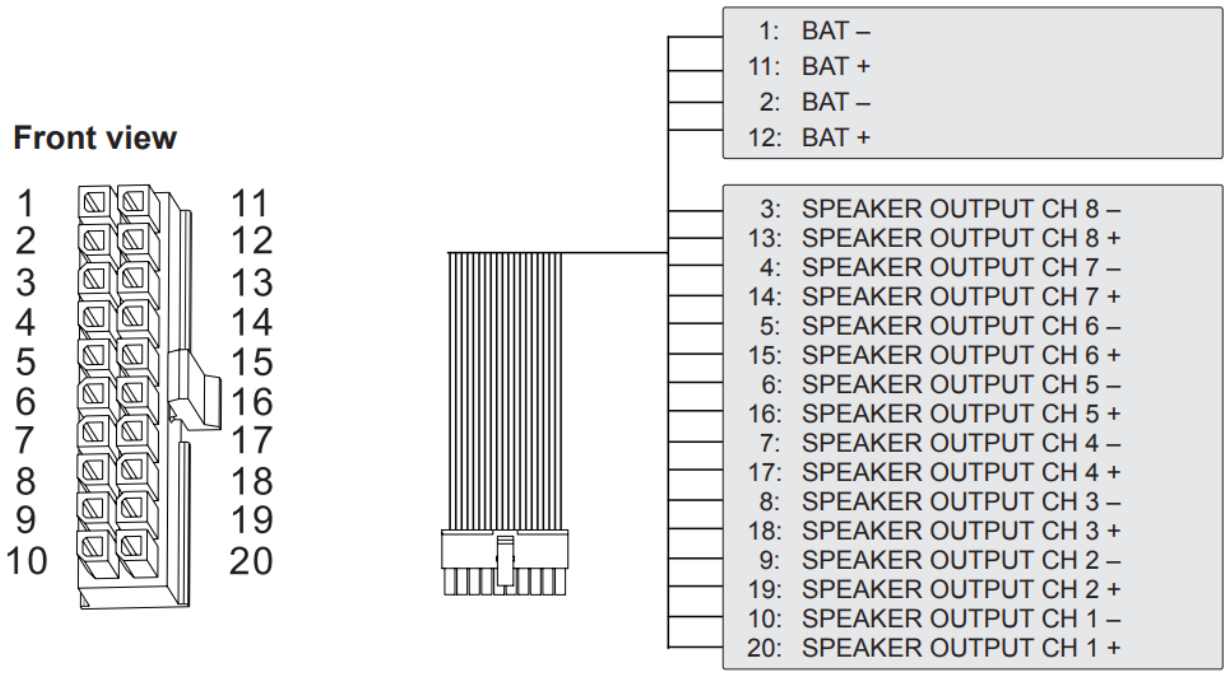
REM OUT: The REM OUT is suited to turn on other devices/amplifiers of the sound system, such as additional amplifiers. It takes about 10 seconds to supply the signal to the REM OUT output. The 200 mA output current capability can also drive an automotive relay.

REM IN: The REM IN is suited to turn on the amplifier if a turn-on signal from the head unit/car stereo is available. The voltage must be between 7.5 and 15 VDC.

HIGH-LEVEL INPUTS CHI -8: Connect here the amplified speaker outputs coming from the head unit. CHI features the Auto Turn-On function through the connection with the speaker outputs of the head unit.

7. SPEAKER OUTPUTS

20 pole multipolar connector to manage the amplified speaker output signals and power supply.



BATTERY TERMINALS +/-:

BAT+: Connection terminal for positive (+) power supply from the car-specific cable harness

BAT-: Connection terminal for negative (-) power supply from the car-specific cable harness

These power terminals are paralleled with the POWER terminals internally. The power cables must be properly insulated to prevent electrical short. If the POWER terminals are connected to the battery, it is not mandatory to

connect the power supply here.
SPEAKER OUTPUTS CH1-8: Connect here speakers (2 – 4 Ohms) according to your sound system. A maximum of 8 speakers can be con-figured based on the system you wish to create in your vehicle.
If you want to bridge the speaker outputs (BTL mode)and drive the connected speakers/subwoofers with a 4 Ohm load, bridge the channels as follows:
Channel pair 1: SPEAKER OUT1+ (+) 8 SPEAKER OUT2- (-) with 4 Ohms
Channel pair 2: SPEAKER OUT3+ (+) 8 SPEAKER OUT4- (-) with 4 Ohms
Channel pair 3: SPEAKER OUT5+ (+) 8 SPEAKER OUT6- (-) with 4 Ohms
Channel pair 4: SPEAKER OUT7+ (+) 8 SPEAKER OUT8- (-) with 4 Ohms

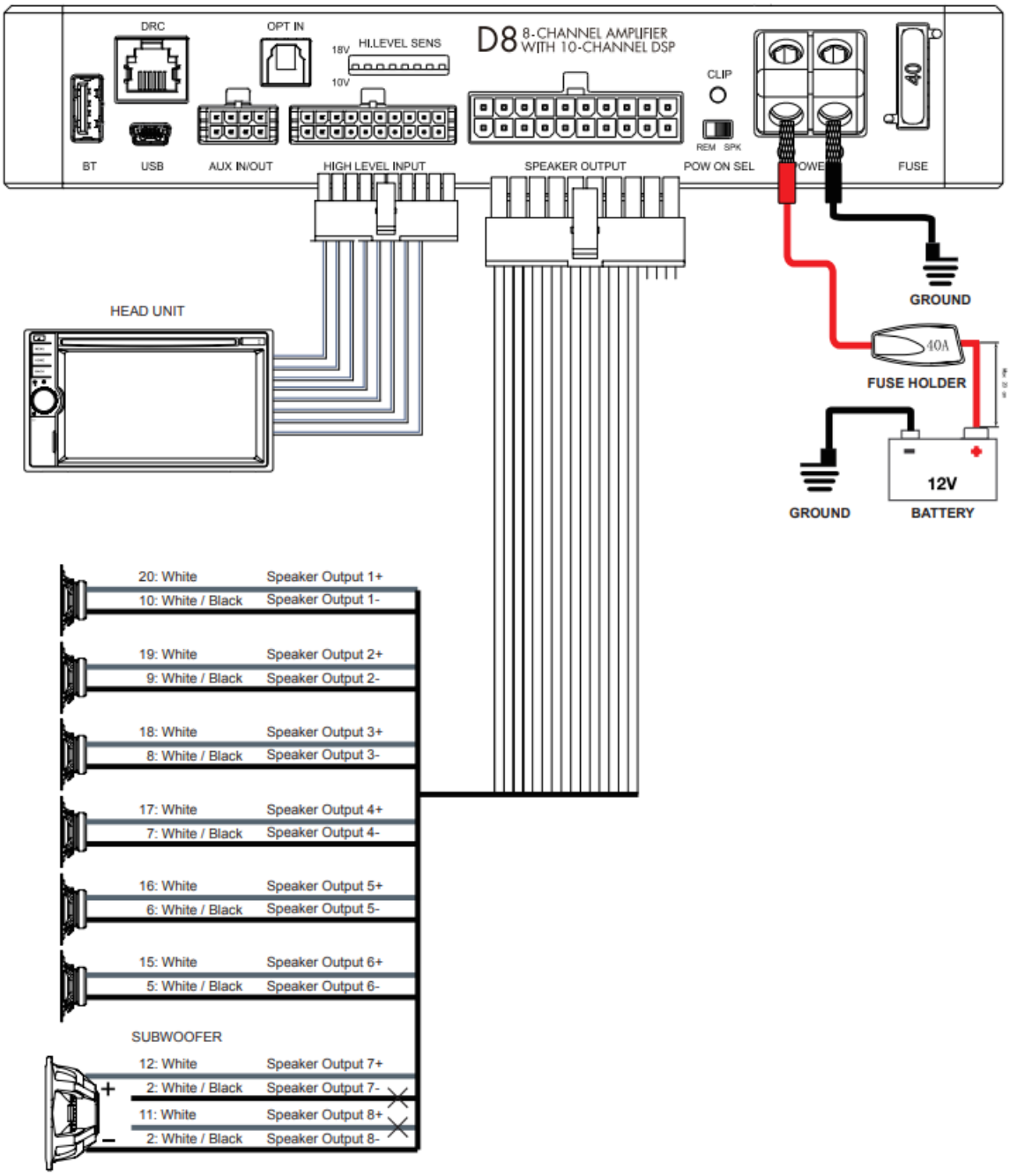
WARNING
Do not parallel the outputs, otherwise, it may lead the amplifier to be damage.
8. POW ON SEL (POWER ON SELECTION)
The amplifier can be turned on/off by using the following methods:
SPK: Slide the switch into position SPK, if you want to turn on/off the amplifier through the CH 1 input channel of the high-level speaker inputs and its Auto Turn-On function. Refer to page 9 and section 6 for more details.
REM: Slide the switch into position REM, if you want to turn on/off the amplifier through the REM and a turn-on signal from the head unit/car stereo. Refer to page 9 and section 6 for more details.
9. DRC This input is suited for an external MUSWAY digital remote controller. Check the website "**www.musway.de**" for more information or ask your car audio retailer.
10. OPT IN The amplifier accepts through its Optical input PCM stereo signals up to 96 kHz / 24 bit sampling frequency rate. Multi-channel signals coming from audio/video sources (such as the audio tracks of a film in DVD) can not be reproduced. Connect a fiber optic cable with a TOSLINK connector.
11. CLIP This LED lights up red if one of the 8 high-level inputs (CH1-8) is overdriven. The LED has no function when an input signal is applied to the Optical input and the Bluetooth input. If this LED lights up reduce the input sensitivity by using the regarding controller Input Sensitivity until the LED goes out.
12. HI. LEVEL SENS You can select the input sensitivity (10V or 18V) for the high level. This function is suited to match the output voltage of the connected signal source with the amplifier.

SYSTEM CONFIGURATION

In order to configure the inputs, amplified speaker outputs and pre-amplified power outputs, EQ, and time delays for the amplifier, it must be interfaced with the PC. When you get to this point you must already be aware of what type of system you intend to set up. In order to avoid complications in preparation, make sure the following points before you start:

- The type of signals that will be assigned to the inputs (e.g.: front left or center or subwoofer, etc.).
- The speakers in the system (e.g.: 3-way front or sub stereo or 2-way rear, etc.).
- If there are passive crossovers that manage groups of speakers (e.g.: 3-way systems with active midrange).
- If you intend to use an external mono amplifier to drive a subwoofer. If you intend to use the amplified outputs of the amplifier bridged (BLT mode) thus increasing the power on the output.

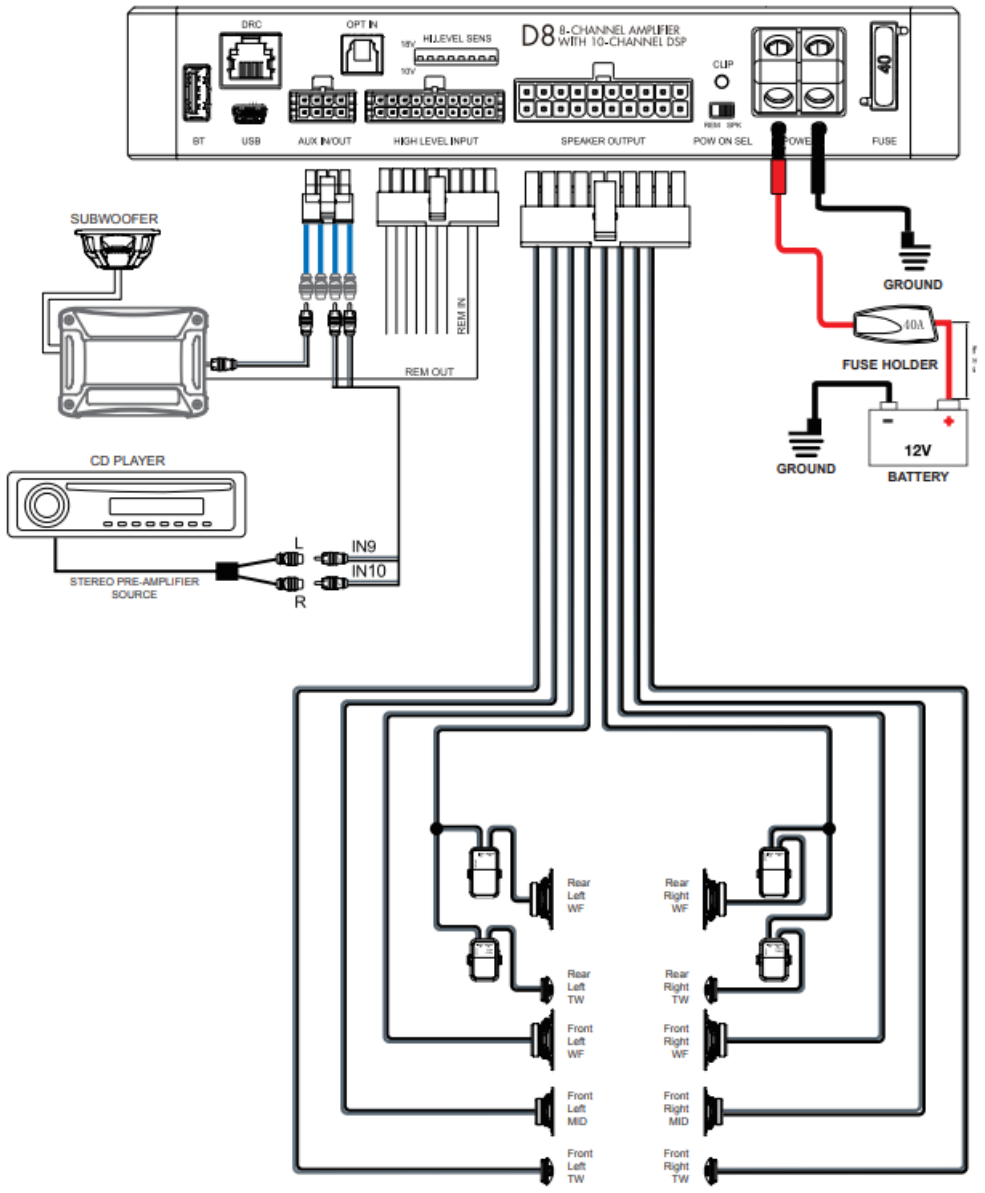
WARNING
Before turning on the system, set the head-unit output level to a lower level (approximately 20% of Its maximum excursion) to avoid damaging the speakers during calibration.
TYPICAL APPLICATION A



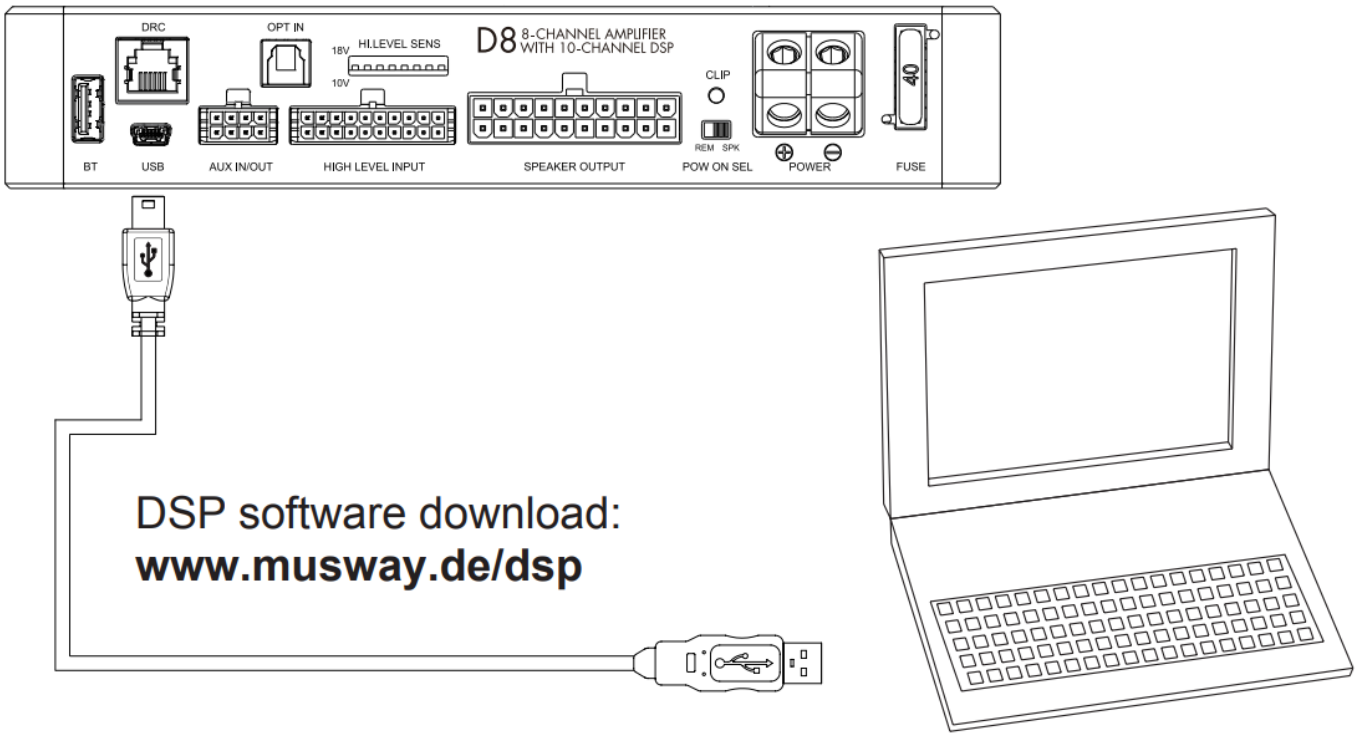
CH1-CH8 AMPLIFIED OUTPUT CHANNELS CONFIGURATION

STEREO MODE	BRIDGE MODE
CH1 50 W @ 4 Ohms / 75 W @ 2 Ohms CH2 50 W @ 4 Ohms / 75 W @ 2 Ohms	CH1+ (+) / CH2- (-) 150 W @ 4 Ohms
CH3 50 W @ 4 Ohms / 75 W @ 2 Ohms CH4 50 W @ 4 Ohms / 75 W @ 2 Ohms	CH3+ (+) / CH4- (-) 150 W @ 4 Ohms
CH5 50 W @ 4 Ohms / 75 W @ 2 Ohms CH6 50 W @ 4 Ohms / 75 W @ 2 Ohms	CH5+ (+) / CH6- (-) 150 W @ 4 Ohms
CH7 50 W @ 4 Ohms / 75 W @ 2 Ohms CH8 50 W @ 4 Ohms / 75 W @ 2 Ohms	CH7+ (+) / CH8- (-) 150 W @ 4 Ohms

TYPICAL APPLICATION B



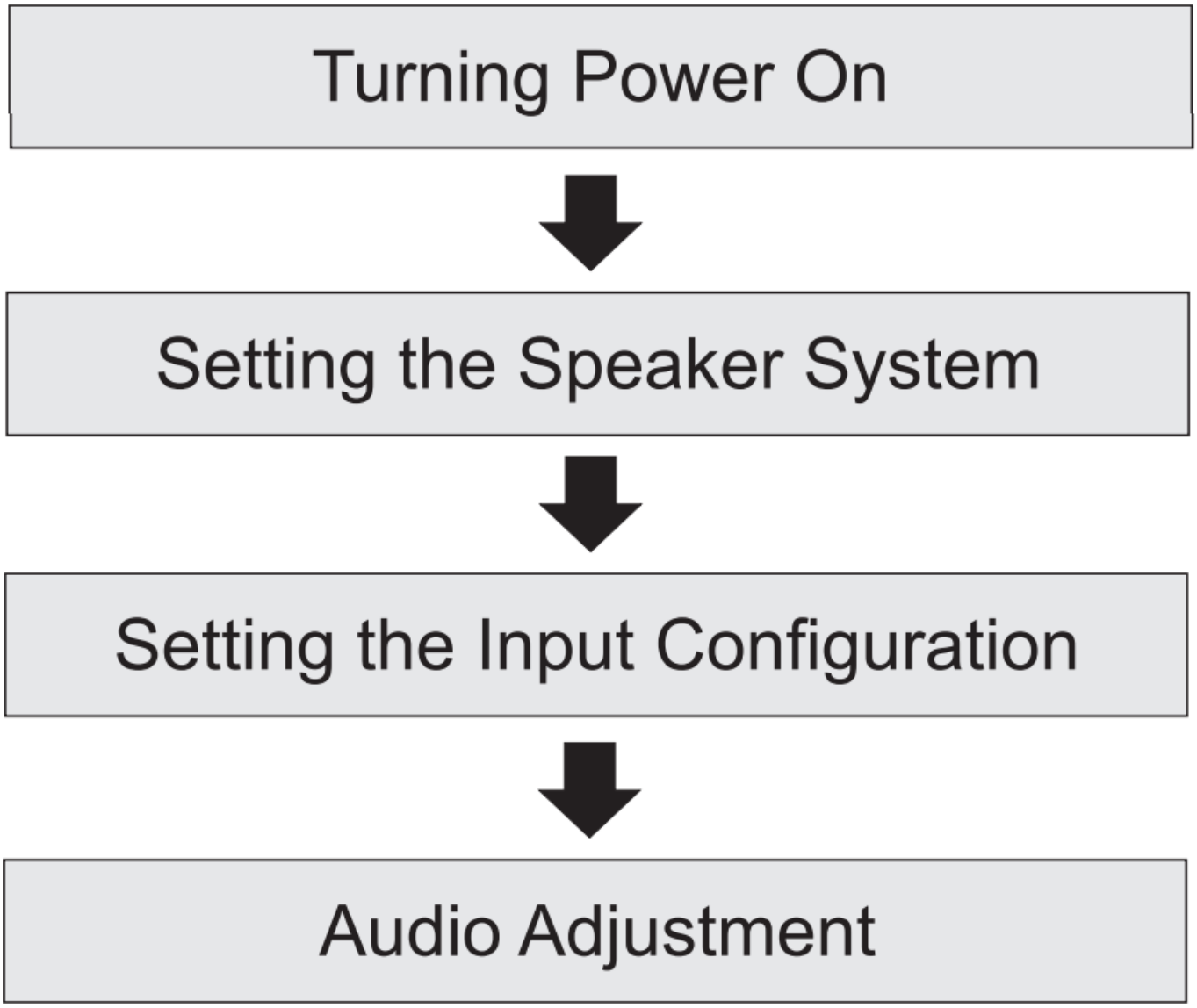
INITIAL SYSTEM START-UP



Recommended specifications:
CPU:…… 1.6 GHz or higher
Memory:…….. 1 GB or higher
HDD: ……512 MB or more available space
Display……: 1024×576 or higher
OS:…….. Microsoft Windows XP, Vista, 7, 8 or higher

- Download and save the MUSWAY DSP software before connecting the amplifier to your personal computer.
- Install the amplifier in your vehicle before you connect a computer to it .
- Turn the ignition key to the ACC or ON position.
- Connect a PC/Laptop with the USB terminal of the amplifier by using the enclosed USB cable. After you have opened the DSP software, you can set/adjust all the audio settings on the computer. The amplifier is on when the logo on the top lights up in orange. After 10 seconds it becomes operative.

BEFORE YOU FIRST USE THE UNIT
When you first use the unit, set the following:



WARNING Before turning on the sound system, check again carefully the configuration of the cand ross-overs, the speaker's setup. The wrong type of crossover or inappropriate parameter may cause permanent damage to the speakers, especially tweeters without passive crossovers.
DSP SOFTWARE

1. **INPUT SOURCE**

   Choosing the different main input sources.

2. **HIGH-LEVEL MIX**

   The High-Level Mix feature is an ingenious feature that lets you mix all the inputs to the current main signal, the adjustable. This is particularly useful if the audio stream is currently playing as the traffic announcement is being made on the radio. If the radio is set so that every message is auto the high-level mixer detects this and mixes the radio signal without interruption. equation of high level is freely adj main source and magically played louder,

3. **SETTING**

   This section contains high-level volume control, language choice, and firmware updating.

4. **SIGNAL ROUTING**

   With the extensive assignment section of the inputs and outputs, every conceivable signal routing is possible, which ks to the bridgeable speaker outputs. unfolds unexpected possibilities than

5. **DELAY CALCULATOR**

   Each connected loudspeaker can be set perfectly by entering the distance in centimeters to the center of the acutely for the respective loudspeaker is automatically determined.

6. **EXTENSIVE FILTER SECTION**

   Besides the separately adjustable slope for high and low pass fistic stage. After input, the correct time liters, and different filter characteristics can be selected. Each channel can also be set separately and the output signal to AUX can be freely configured.

7. **PARAMETRICAL 31- BAND EQUALIZER**

   The equalizer section leaves nothing to be desired: graphical real-time display, adjustable Q factor, and separate s function.

8. **CHANNEL MIXER**

   This section contains the core of the software. Each channel can be processed here individually or by linking any chapter things, the volume or the phase position can be controlled here. Channel ’ s channel ’ s name. full control of all channels including bypasnnel pair synchronously. Among name is editable by double clicking

each

TROUBLESHOOTING

Malfunction: no function

Reason:	Remedy:
1. The power supply connection of the device is not correct	Recheck
2. The cables have no mechanical or electrical contact	Recheck
3. The remote turn-on connection from the head unit to the amplifier is not correct	Recheck
4. POW ON SEL switch position incorrect	Recheck
5. Defective Fuses. In case of replacing the fuses, ensure the correct fuse rating	Replace Fuses

Malfunction: one or more channels or controllers are without function / faulty stereo stage

Reason:	Remedy:
1. The connections of the speakers or the RCA audio cables are not corre ct	Recheck
2. The speaker cables or the RCA audio cables are defective	Replace cables
3. The loudspeakers are defective	Replace speakers
4. HP controller in LP/BP operation is adjusted to high	Turn down controller
5. No signal from the head unit	Check head unit settings
6. A wrong input source is selected, which is not connected (e.g. AUX IN)	Check selection
7. For example on one or more channels „Mute“ is activated in the DSP s oftware.	Check settings
8. The volume level on the remote controller is adjusted too low	Turn up the volume level on the re mote

Malfunction: one or more channels or controllers are without function / faulty stereo stage

Reason:	Remedy:
1. The balance or fader controller of the head unit is not in the center position	Turn to center-position
2. The connections of the speakers are not correct	Recheck
3. The loudspeakers are defective	Replace speakers
4. HP controller in LP/BP operation is adjusted to high	Turn down controller
5. For example on one or more channels are incorrectly adjusted in the DSP sof tware.	Check settings

Malfunction: distortions on the loudspeakers

Reason:	Remedy:
1. The loudspeakers are overloaded	Turn down the level Turn down the level on the head unit Switch off loudness on the head unit Reset bass EQ on the head unit

Malfunction: no bass or stereo sound

Reason:	Remedy:
1. Interchange of loudspeaker cable polarity	Reconnect
2. The RCA audio cables are loose or defective	Reconnect or replace the cables
3. For example on one or more channels are incorrect ly adjusted in the DSP software.	Check settings

Malfunction: amplifier runs into protection mode

Reason:	Remedy:
1. Short circuit on the loudspeakers or cables	Reconnect
2. Overheated by too low speaker impedance	Choose a higher impedance Use a new speaker setup
3. Insufficient air circulation by a inappropriate mounti ng position of the amplifier	Change the mounting position Ensure air circulation
4. Overloaded by an insufficient power supply (too sm all profile section on the power cables)	Use a bigger profile section

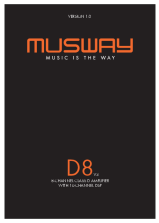
Malfunction: hiss or white noise on the loudspeakers

Reason:	Remedy:
1. The level controllers in the DSP software are turn ed up too loud	Turn down the level
2. The treble controller on the head unit is turned up	Turn down the level on the head unit
3. The speaker cables or the RCA audio cables are d efective	Replacing the cables
4. The hissing is caused by the head unit	Check the head unit

MIDWAY is a brand of Audio Design GmbH
Am Breilingsweg 3
D-76709 Kronau
Tel. +49 7253 – 9465-0
Fax +49 7253 – 946510

www.musway.de

Documents / Resources

	MUSWAY D8 V3 8 Channel Class D Amplifier with 10-Channel DSP [pdf] User Guide D8 V3 8 Channel Class D Amplifier with 10-Channel DSP, D8 V3, 8 Channel Class D Amplifier with 10-Channel DSP, Class D Amplifier with 10-Channel DSP, Amplifier with 10-Channel DSP, Amplifier DSP, DSP Amplifier, Amplifier

References

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- Musway - Music is the Way
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- musway.de/dsp