MUSWAY TUNE12 12 Channel DSP Processor with PC/APP Control User Manual

Contents

MUSWAY

MUSWAY TUNE12 12 Channel DSP Processor with PC/APP Control

TECHNICAL SPECIFICATIONS

POWER SUPPLY

- **Operating Voltage:** 7 – 16 VDC (down to 6 V)
- **Power Consumption:** 0.8 A
- **Switched off:** < 0.1 mA
- **Remote IN:** 3 – 16 VDC (1 mA)
- **Remote OUT:** 11 – 15 VDC (300 mA)
- **Fuse:** 3 A resettable

AUDIO STAGE

- Distortion – THD+N (Digital Input): < 0.0005 %
- Distortion – THD+N (Analog Input): < 0.004 %
- Bandwidth (–1 dB): 15 Hz – 22 kHz
- S/N Ratio @ A weighted (Digital Input): 116 dB
- S/N Ratio @ A weighted (Analog Input): 108 dB
- **Input Sensitivity:** 8 V – 24 V RMS (High Level); 1 V – 8 V RMS (Low Level, AUX)
- **Input Impedance:** 13 Ω (High Level); 22 kΩ (Low Level, AUX)

SIGNAL CONVERTERS

- **A/D:** Burr-Brown 24 Bit / 96 kHz
- **D/A:** Burr-Brown 24 Bit / 192 kHz
- **Crosstalk:** > 90 dB
- **Output Voltage:** 6.5 V RMS

SIGNAL CONNECTIONS

- 8 x High-Level Input with EPS via 16-pole Cable Adapter
- 6 x RCA Low-Level Input
- 2 x RCA AUX Input
- 12 x RCA Pre-Output with 6.5 V RMS Max.
- 1 x Optical Input (PCM, 96 kHz / 24 bit)
- 1 x Coaxial Input (S/PDIF, 96 kHz / 24 bit)

DIGITAL SIGNAL PROCESSOR (64 bit Clock speed: 295 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
- **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 – 692 cm
- **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, Windows 8, Windows 10
- Graphic Card min. Resolution: 1024 x 768
- **Ambient Operating Temperature Range:** 0 – 55 °C

SIZE / WEIGHT

- **Size Without Brackets (mm):** 220 x 37,5 x 135
- **Net Weight (kg):** 0,975

SCOPE OF DELIVERY

- 1 x TUNE12 Processor
- 4 x Mounting Brackets
- 1 x 1,5 m USB Cable
- 1 x 5-pole Power Cable Adapter
- 1 x 16-pole Cable Adapter (High-Level Input)
- 1 x Owner’s Manual (English/German)

SAFETY INSTRUCTIONS

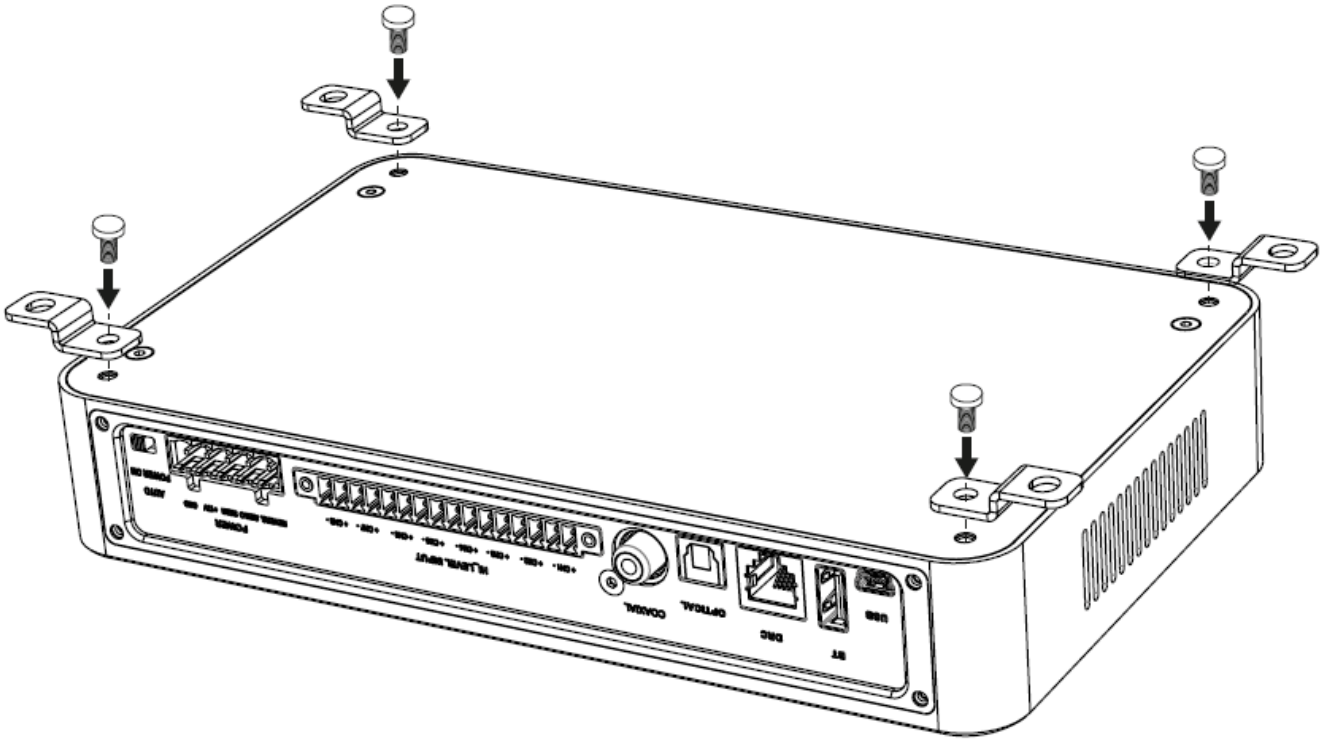
- THE PURCHASED DEVICE IS ONLY SUITABLE FOR AN OPERATION WITH A 12V ONBOARD ELECTRICAL SYSTEM OF A VEHICLE. Otherwise fire hazard, risk of injury, and electric shock consist.
- PLEASE DO NOT MAKE ANY OPERATION OF THE SOUND SYSTEM, WHICH DISTRACTS YOU FROM A SAFE DRIVING. Do not make any procedures, which 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. Hearing 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 hazard consists.
- DO NOT OPEN THE DEVICE. Otherwise fire hazard, risk of injury, and electric shock consist. Also, this may cause a loss of the warranty.
- REPLACE FUSES ONLY WITH FUSE 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 to 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 safeness, 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 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 to 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 separate 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 therefor 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 close-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 damage to the components of the vehicle like airbags, cables, board computers, seat belts, gas tank or the like.
- Ensure that the chosen location provides sufficient air circulation for the device. 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 device 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.

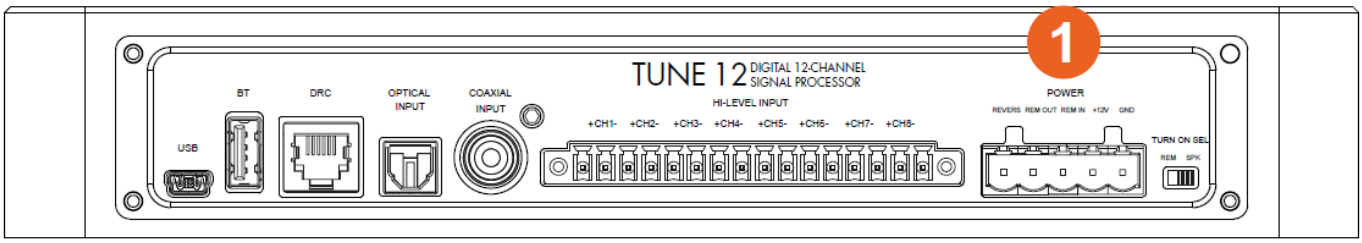


WARNING
Before you start with the installation, disconnect necessarily the GROUND connection wire from the battery to avoid any risk of electric shocks and short circuits.

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 Ø 2,5 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

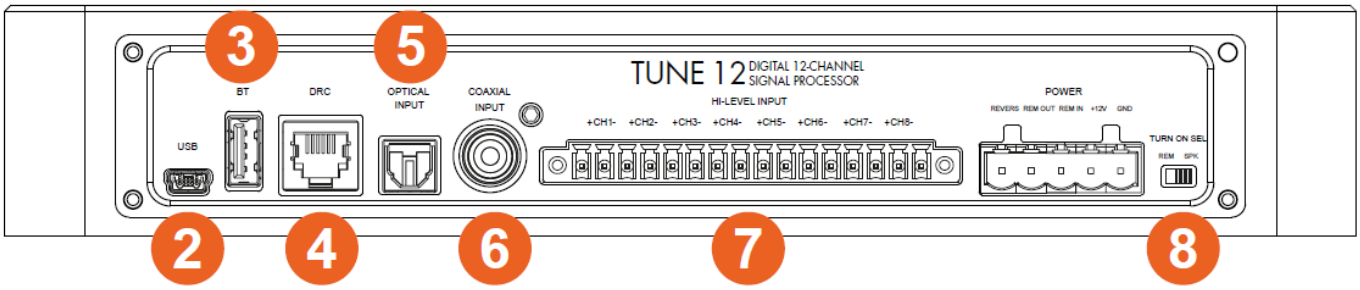
Connect +12V with the +12V pole of the vehicle's battery. Use a suitable cable with a sufficient cross-section (at least Ø 2,5 mm) and install an additional in-line fuse. For safety reasons the distance be-tween the fuse block and the battery should be shorter than 30 cm. Do not set in the fuse into the fuse block until the installation is accomplished.

Connect the GND 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 Ø 2,5 mm) and the same size as the positive + power supply wire. This helps reduce most of the interference than can occur in audio reproduction.

REM IN is suited to turn on the device if a turn-on signal from the head unit/car stereo is available. The voltage must be between 3 and 16 VDC. For that, the switch TURN ON SEL must be in position REM. REM OUT can be used to connect another device such as an amplifier in order to supply it with a turn-on signal (REM OUT function). If necessary, you can connect the vehicle's reverse gear signal to REVERS. As soon as a +12 V signal is present at the connection, the device switches the high-level inputs to active. This is useful if you listen to music via the low-level inputs and would like to hear the acoustic warning tones of the parking assistant via the high-level inputs over the sound system when the reverse gear is engaged.

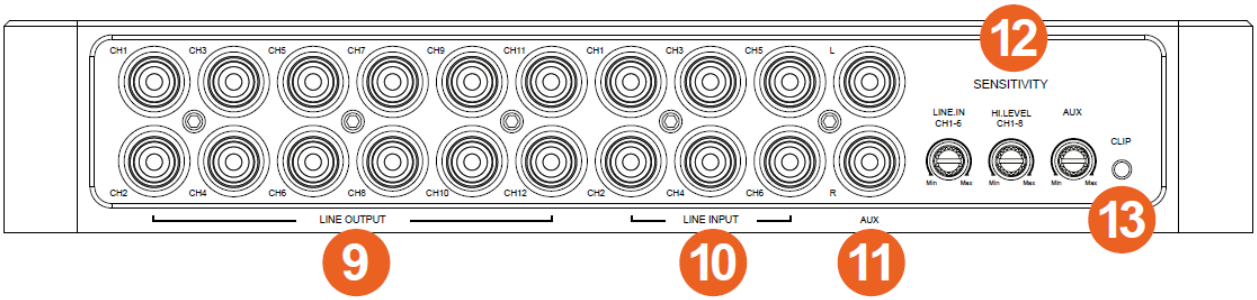
WARNING
Make sure the connection polarity is as indicated on the terminals. A misconnection may result in damage to the device. After applying power, wait about 8 seconds before turning the device on.

DESCRIPTION OF OPERATION



1. **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 device. The connection is USB 1.1/2.0/3.0 compatible. For downloading the software please visit "**www.musway.de/dsp**".
2. **BT**
   This USB input is suited for an external Bluetooth® dongle with a 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.
3. **DRC**
   This input is suited for an external MUSWAY digital remote controller. Check the website "www.mus-way.de" for more information or ask your car audio retailer.
4. **OPTICAL INPUT**
   The Optical Input accepts 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.
5. **COAXIAL INPUT**
   The Coaxial Input in S/PDIF format for connecting sources with a digital audio output. The sampling rate of this input has to be in the range of 32 and 96 kHz. Note: This signal processor can only handle stereo input signals.
6. **HI LEVEL INPUT**
   Connect here the amplified speaker output by using the enclosed 16-pole multipolar connector. CH1-2 features the Auto Turn-On function through the connection with the speaker outputs of the head unit
7. **TURN ON SEL**
   The device 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 device through the CH1 input channel of the high-level speaker inputs and its Auto Turn-On function.

- **REM:** Slide the switch into position REM, if you want to turn on/off the device through the REM IN and a turn-on signal from the head unit/car stereo in low-level operation.
- **NOTE:** Power on by REM is recommended. In case if thereâ€™s no REM/ACC signal on the vehicle, turn on/off the device with the source speaker outputs as an alternative solution.



8. **LINE OUTPUT**

   These RCA outputs deliver DSP-modified low-level preamplifier output signals for additional amplifiers. Connect each channel according to your sound system setup.

9. **LINE INPUT (LOW LEVEL)**

   Connect here the preamplifier low-level outputs coming from the head unit. The low-level input on TUNE12 can be used as an independent source, which means TUNE12 allows you to connect low-level input and high-level input at the same time to use multiple sources.

10. **AUX IN**

    These stereo RCA inputs are suited for an auxiliary low-level input signal from an external stereo preamplifier source such as a game console or a media player.

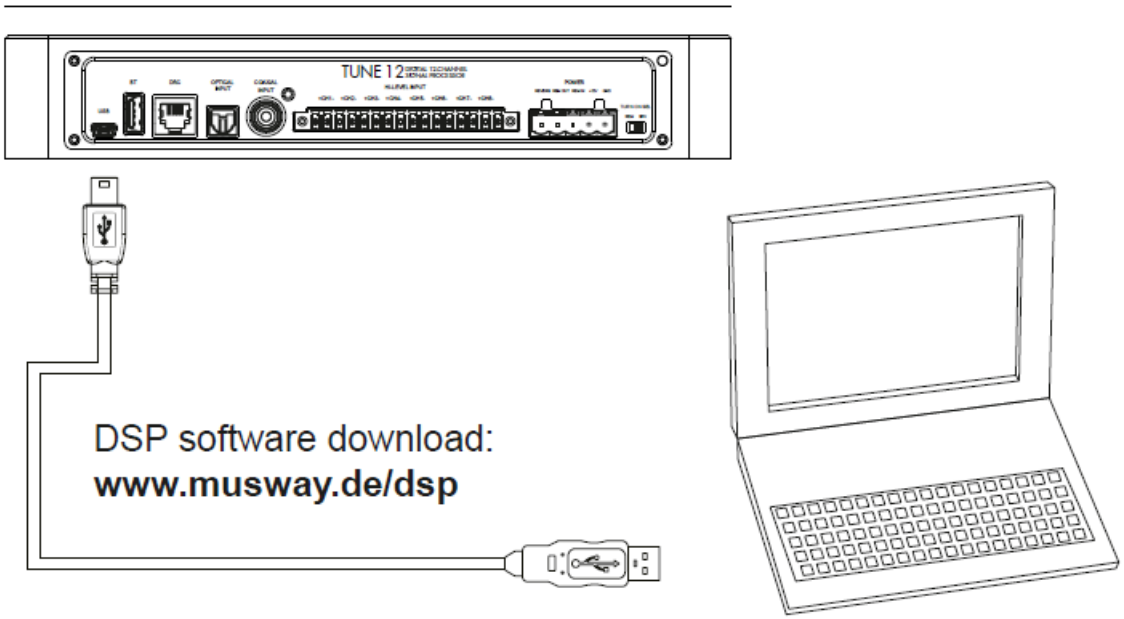
11. **INPUT SENSITIVITY**

    With these controllers, you can adjust the input sensitivity for each input section. This function is suited to match the output voltage of the connected signal source with the device.

12. **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, Coaxial, and Bluetooth™ input. If this LED lights up, reduce the input sensitivity by using the controller Input Sensitivity until the LED goes out.

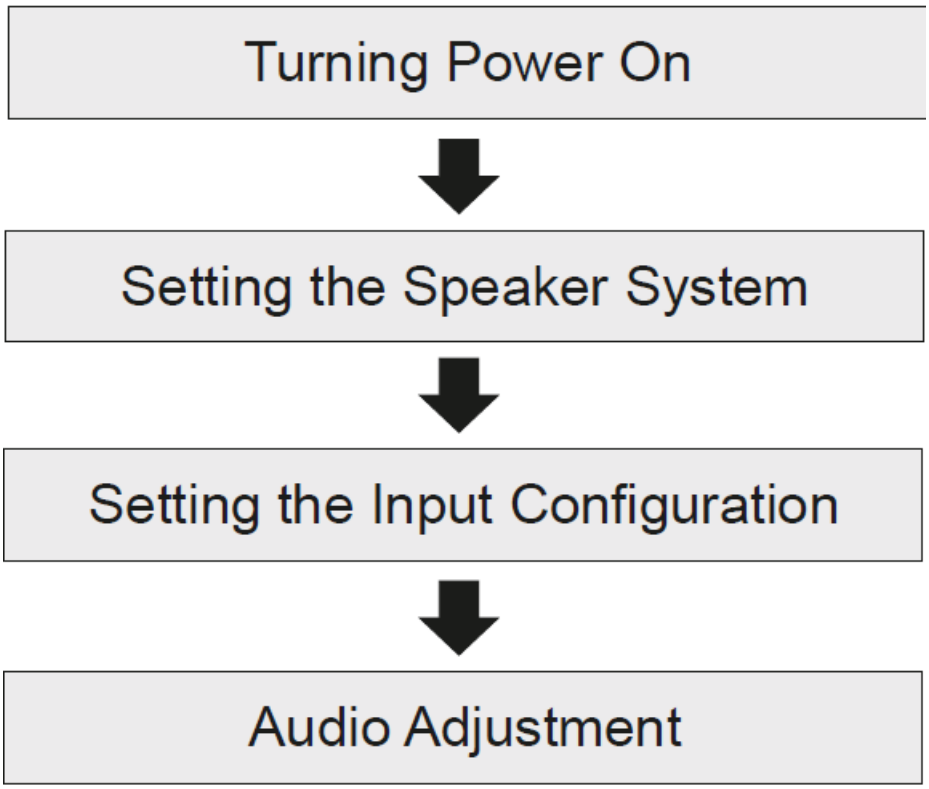
INITIAL SYSTEM START-UP



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, 10 or higher
- Download and save the MUSWAY DSP software before connecting the device to your personal computer.
- Install the device 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 device 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 device 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 cross-overs, and the speaker's setup. The wrong type of crossover or inappropriate parameter may cause permanent damage to the speakers, especially tweeters without passive crossovers.

ACCESSORIES

DRC1
With the DRC1 remote control, it is possible to control the overall volume and the subwoofer level on the amplifier. You can also select the input signal, the subwoofer level channel pair and the DSP preset. A short press on the rotary knob also mutes the entire sound system. Thanks to the OLED display, the DRC1 is clearly arranged and only needs to be connected to the amplifier with the enclosed connection cable (5.00 m).

BTS
The BTS dongle features an audio streaming function that lets you wirelessly transfer music from your mobile device to the DSP amplifier. Simply connect the dongle to the DSP amplifier via USB and select the Bluetooth® input via software or the optional DRC1 remote control.

BTA
The BTA dongle features an audio streaming function that lets you wirelessly transfer music from your mobile device to the DSP amplifier. Simply connect the dongle to the DSP amplifier via USB and select the Bluetooth® input via software or the optional DRC1 remote control. Besides the audio streaming function, the BTA dongle offers the possibility of configuring and controlling the DSP amplifier via smartphone/tablet. The app can be downloaded for iOS in the App Store and for Android® under Google Play for free.

Declaration of Conformity

Audio Design GmbH hereby declares that the MUSWAY TUNE12 device complies with Directive 2014/53/EU. The full declaration of conformity can be viewed at **www.musway.de/CE**.

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Documents / Resources

	**MUSWAY TUNE12 12 Channel DSP Processor with PC/APP Control** [pdf] User Manual TUNE12 12 Channel DSP Processor with PC APP Control, TUNE12 12 Channel DSP Processor with PC, TUNE12 12 Channel DSP Processor with APP Control, APP Control, PC C ontrol, TUNE12 DSP Processor, DSP Processor, TUNE12 12 DSP Processor, Processor

References

- **Domain Details Page**
- **way.de**
- **Musway - Music is the Way**
- **musway.de/CE**
- **musway.de/dsp**