DS18 DSP8.8BT Digital Sound Processor Owner's Manual

Contents

DS18 DSP8.8BT Digital Sound Processor

FEATURES

GENERAL

- System integration sound processor for use when adding amplifiers to a factory or aftermarket head units.
- Wireless control with DSP8.8BT APP for Android and iOS devices.
- Auto turn on with DC offset.
- Compact size and wire harness connector design.
- Hi-Volt RCA output and adjustable Gain input.
- Hi-Level input up to 20Wrms power capacity.

AUDIO

- 32-bit Digital Signal Processing.
- Equalization with 31 bands Graphic equalizer selectable on each channel.
- Crossover totally adjustable on each channel from 6 to 48 dB/oct.
- Audio delay available on each channel up to 8ms.
- Input summing totally adjustable.
- Signal phase control on each channel (0/180 degrees).
- Hi-Volt RCA Pre-Output (8 Volts)
- Input Voltage Adjustable from 200mV to 9V (Gain)

CONNECTIVITY

- 8 RCA outputs.
- 8 RCA and/or Hi-level speaker inputs.
- Amplifier remote output.
- System control through a wireless (BT) connection to your Android or iOS mobile device.

ELEMENTS DESCRIPTION

1. **Input Harness Connector: +12V:** Used to connect the positive terminal 12V car battery. To ensure an adequate power supply for the processor, a dedicated cable should be used to connect directly to the positive pole of the battery, and the fuse should be connected in series within 20 centimeters from the positive pole of

the battery.

GND: Used to connect the device grounding cable. The power supply grounding cable needs to be firmly connected to the frame of the vehicle or other places with good conductivity. Please use the cable with the same specifications as the power supply cable and
connect to the frame of the vehicle near the installation
position of the processor.

Before connecting the power supply, you must confirm that the power supply meets the designated power requirements and connect in strict accordance with the equipment instructions. Otherwise, the equipment may be damaged and may cause accidents such as fire, electric shock, etc.

REMOTE TURN-ON SIGNAL IN/OUT

REM IN: Connect it to the ACC control output Signal. The processor will switch on/off automatically with the vehicle ACC signal on/off.

REM OUT: It provides separate REMOTE signal output to the other amplifiers to control other amplifiers' switch turn on/off. Note: the starting signal of the external power amplifier must be taken from the REM OUT terminal of this equipment.

HI/LOW LEVEL SIGNAL INPUT TERMINALS

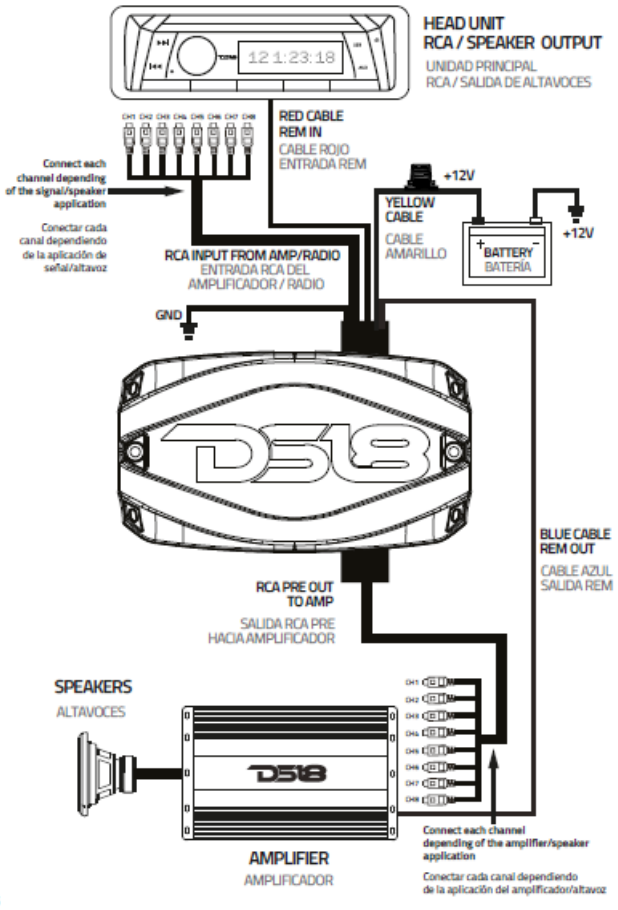
RCA audio input that supports a maximum of 8 channels, connects this from the factory head unit speaker level signal or an aftermarket head unit
low-level signal.

2. **Turn-on Mode selector**

   AUTO TURN ON/OFF CONTROL OPTIONS

   For auto turn on/off mode, it offers two options: DC OFFSET/REM.

WIRING CONNECTION



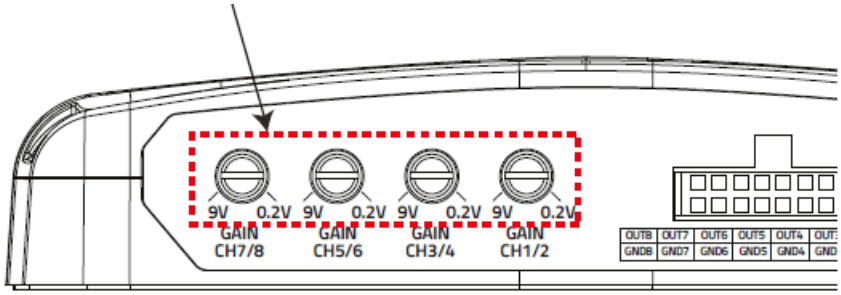
BASIC DSP SETTING

EQ SCREEN:

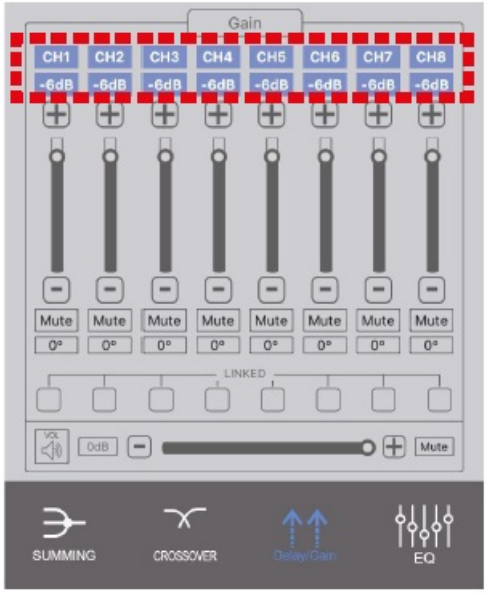
From this page you can get to all settings. We recommend that you look at all the pages and get familiar with all

the possible settings. EQ should NOT be your first settings!!
We recommend going to Delay/Gain page and presetting gains for all channels used. Then go to the CROSSOVER page and preset all your crossovers. BEFORE turning the system “FULLY” on. Amplifiers should be powered off now.

INPUT GAIN:
It is a fact that very few people, including professional installers, know how to set gains correctly. Failure to do so yields higher distortion, a higher noise floor which decreases dynamic headroom, less than optimum operating conditions for electronic equipment, and a higher failure rate for both the electronic equipment and transducers alike. While most people set this control by ear to how loud they want their music, this is not the intent of this control. The range is from 0.2 volts to 9 volts. The control is meant for matching the output of the unit’s signal voltage. For example, if you have a
source unit with low output voltage, you would probably have the control set fairly high, towards the O.2V range. A lot of head units have 4 volts of output signal voltage which means that your control would be set midway through the range. If you happen to have a speaker line that yields 6 volts or more, you will set the gain at the minimum position, towards the 9V range. In all these examples, when properly level matched, the DSP will put out the full volume with a clean signal. Setting the control above the improper point may result in poor sound quality and overall undesirable results.

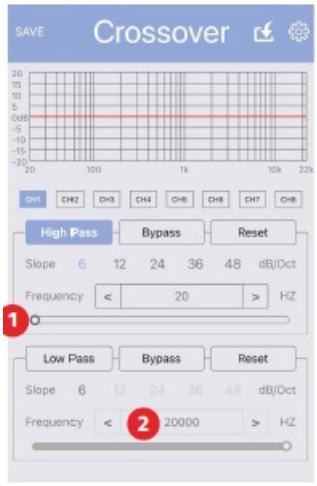


INDIVIDUAL GAIN SETTING:
This the important. MAKE SURE that ALL your amplifiers are NOT connected (They are powered off). Now PRESET the individual gain controls channel by channel. Setup ALL channels – tweeters, midrange/ mid-bass, woofers to -6dB. Set MASTER level to -6dB also. With the DSP8.8BT GAINS set up this way… plus you’re presetting the amplifiers input gain controls. You’ll still have over 12dB of gain to work with BEFORE increasing GAIN on each of the amplifiers. Once this is done save that setting. THIS IS just for the initial setup. When you get near the end of the setup you can readjust the gain settings here, on the DSP, AND the amplifiers.

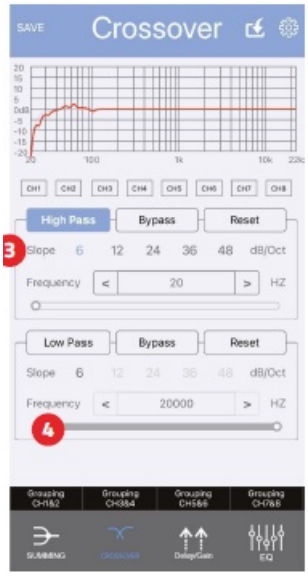


BASIC SETUP – CROSSOVER SETTINGS

FULLY ACTIVE SYSTEM



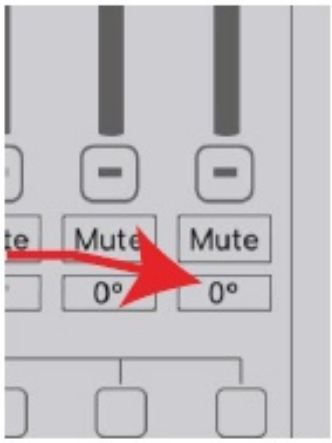
Knowing the basic starting x-over frequencies for each speaker as described on the previous page. Start setting the X-Over up. For this example we will assume a FULLY active system with a 2-way front system NO rear fill speakers and subwoofers. 5/6 Channel.
With this 6 channel “ACTIVE” system start with the tweeter’s crossover at 3,500Hz. Choose a crossover slope. 6dB, 12dB or 24dB. For this example we’ll use 12dB. Touch the GREY dot on the slider (1).
Slide the dot to the left or right to change X-Over frequency.
To get to a more specific crossover frequency, you can tap the center rectangle with (2) the frequency shown and type in the exact frequency.
Since this is an example, we will use typical STARTING frequencies which may NOT be the final settings.



- TWEETERS – HIGH PASS – 3,500Hz
- MIDRANGE – BANDPASS – 350Hz- 3,500Hz
- SUBWOOFER – LOW PASS – 60Hz

GAIN – POLARITY SETTING

This is also the best time to make sure ALL speakers phase. There are FREE Polarity apps online that help you do this. AGAIN, super important phase. You can easily adjust the phase from screen, just tap the bottom BLUE rectangle with the O inside this will switch speaker 180 “Out of Phase” which may back INTO phase. You should hear the reference, use a phase meter to make sure. a Phase Meter makes it much easier get the set-up correctly the FIRST TIME. ving Gain and Phase set-up properly kes the TOTAL DSP setup experience much easier. recommend using a Phase Meter, or Phase Meter off your smartphone to help you with this part of set-up.



DELAY/GAIN – GAIN SETTING / PINK NOISE that we know that the speakers are in phase, let's Pink Noise through the system and set gains a little closer. This speeds up the setup as using Pink Noise is more constant sound. Make sure you have set up ALL and SAVED everything. And "Burned" it to DSP. IF so…. then play pink noise (USB, CD, BT) in the driver's seat. Play at a MODERATE to a level. It should sound like a BIG ball of noise. With speakers being more prominent or distinct than other. An easy way to make sure is to MUTE erything but the tweeters in this 5 channel all active stem With ONLY the tweeters playing they should sound like they are equal in output. Neither one is louder than the other. If NOT, go into the GAIN settings turn the brighter (or louder) tweeter DOWN in say 1- 3dB. this until I they are equal in level to you. Shut off the tweeters and now turn on the mid-bass drivers. Same match level to YOUR ears.

SAVE/SYNC/SAVE/SYNC DELAY/GAIN – POLARITY SETTING

This is also the best time to make sure ALL speakers are in phase. There are FREE Polarity apps online that can help you do this. AGAIN, super important phase. You can easily adjust the phase from this screen, just tap the bottom BLUE rectangle with the O inside this will switch
the speaker 180 "Out of Phase" which may put it back INTO phase. You should hear the difference, use a phase meter to make sure. Using a Phase Meter makes it much easier to get the set-up correctly the FIRST TIME. Having Gain and Phase set-up properly makes the TOTAL DSP setup experience much easier. We recommend using a Phase Meter, or Phase Meter "App" off your smartphone to help you with this part of the set-up.

DELAY/GAIN – GAIN SETTING / PINK NOISE

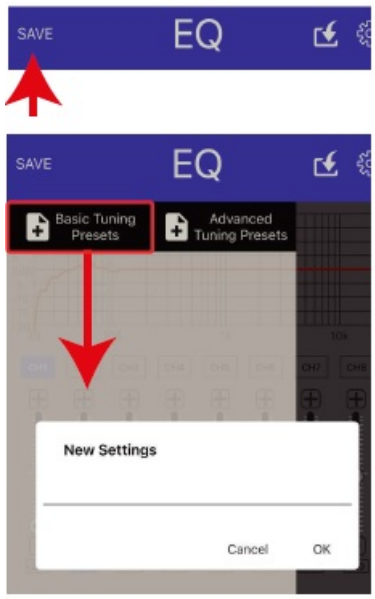
Now we know that the speakers are in phase, let's run Pink Noise through the system and set gains a little closer. This speeds up the setup as using Pink Noise is a more constant sound. Make sure you have set up ALL crossovers and SAVED everything. And "Burned" it to the DSP. IF so…. then play pink noise (USB, CD, BT) while in the driver's seat. Play at a MODERATE to a LOW level. It should sound like a BIG ball of noise. With NO speakers being more prominent or distinct than any other. An easy way to make sure is to MUTE everything but the tweeters in this 5 channel all active system With ONLY the tweeters playing they should sound like they are equal in output. Neither one is louder than the other. If NOT, go into the GAIN settings and turn the brighter (or louder) tweeter DOWN in level, say 1- 3dB. Do this until I they are equal in level to you. Shut off the tweeters and now turn on the mid-bass drivers. Same "drill", match level to YOUR ears.

SAVE/SYNC/SAVE/SYNC

SETTINGS PAGE – OFF ANY SCREEN
On the Settings page you can see what source(s) you are using and pick between them. You can also see all the Bluetooth devices that you may have paired up to DSP8.8BT app. And choose between Those also. Down at the bottom are 2 settings:

- Refresh Device list This will be useful when you set up this up with your installer/tuner and you. You can choose yourself or your installer can pick himself.
- Reset DSP Tuning This is useful if you don't like your DSP Settings and want to do a clean setup all over again.

BASIC / ADVANCED SETTINGS



SAVE SETTINGS / NAME:
This is SUPER important. ALWAYS save settings!! Once you select SAVE on ANY page it will bring you to the "New Settings" text box as shown to the left. You have a choice of Basic Tuning Presets and Advanced Tuning Presets. The difference is that the BASIC setting… ANYONE can access it. ADVANCED ONLY you (or whomever you give your password to) can access. It is best to first save in BASIC and then once refined in your tuning SAVE in ADVANCED.
Once you've entered YOUR settings name, for example, BOB6 it will save it to the APP. As shown to the left. You can save 10 settings. You may want one set to show that it is ALL 6dB per octave crossovers… So BOB6 is easy to remember and then do the same setting but uses per octave crossover slopes. Call that one BOB12, that way you can hear the difference in slopes, Or different EQ settings. To sync to DSP8.8BT, go back to the SAVE button

on the top of each page blue bar. Click on SAVE and look at your saved settings Pick the one you want to be The setting The EQ / GAIN / PHASE / DELAY setting. Let's say it is the 66666 saved file that is shown highlighted to the left. Since it is highlighted it is THE selection.
To sync data from DSP8.8BT to DSP8.8BT APP, click on the top bar with the white outlined box and arrow pointing down. It takes one minute to sync data from DSP8.8BT.

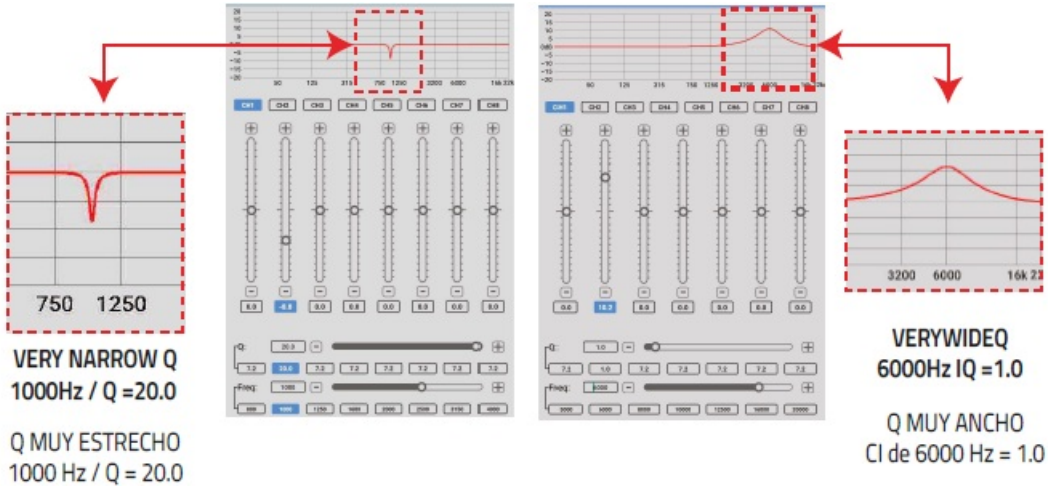
EQUALIZER SETTINGS

EQUALIZER SCREEN:
This is where ALL the "magic" happens. There are 31 bands of Parametric Equalizer adjustments. This means that YOU can select whatever frequency you need to fix, or bands of frequencies and easily solve the peaks or dips in your system setup. QUICKLY! You can LOCK the EQ on this page also. This makes it so you don't accidentally change an EQ setting while adjusting something else.

FREQUENCY:
Each of the 31 Bands can be changed to ANY frequency you need it to be. Click inside the BLUE boxes at the bottom of each frequency and type the frequency, Q, or boost desired. Since there are 31 bands of adjustment = SCROLL Left to Right

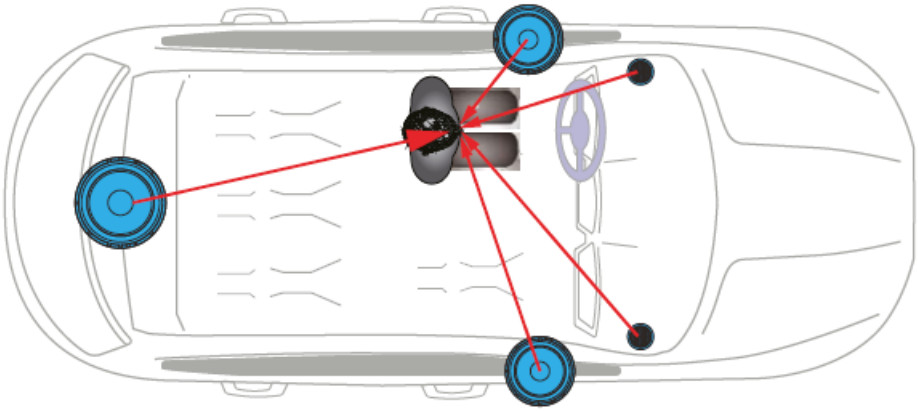
Q ADJUST:
Q (or width) of the frequency is adjusted. Q's of 1 is very wide, Q of 18 is very narrow as shown below on the APP itself. To change Q simply slide the light blue "Q" bar. Or TAP +/-.
SPECIAL NOTE: An RTA is an ABSOLUTE necessity to adjust ANY audio system that has an equalizer, especially 1/3 octave.

AN EXAMPLE OF FREQUENCY AND Q
The example to the left shows you what happens at a frequency when Q is adjusted differently at different frequencies. Look at the 1000Hz EQ setting which has a Q of 20 at the same time 6000Hz has a Q of 1. You can use fewer EQ adjustments to effect far greater frequencies making EQ adjustment much quicker. (You MUST have an RTA to properly adjust ANY Equalizer!!)



TIME ALIGNMENT

Once we have levels, phase and gains pretty much set. It's time to do Time Alignment. Think of all this preset up as prepping a car to be painted. If you've ever painted a car, it's ALL about the prep work. Paint (in our case Time Alignment) is the finishing touches. And up till now it was ALL just getting ready for this part!
It is important that we do this methodically. Some experts say to Time Align BEFORE EQ the system. Some say do it after. It is up to YOU. Both ways work. And we have found that as much EQ you do in this process BEFORE and AFTER it really doesn't matter.
Let's assume that you've done some EQ, GAIN and checked to make sure all speakers are "In Phase". PLUS… you've got the system sounding good. Clean, smooth, tight with really good mid-bass punch. Then it is the PERFECT time to do time alignment.
Below is a conceptual picture of what we (you?) are trying to do. Get speakers that are at different physical dimensions away from your ears to be time coherent. Meaning move them electronically so they SEEM to be at the same time /distance dimension.
Thereby creating the illusion of stereo imaging and sound stage Where the sound does not appear to be coming for the left or right, but in front of you. And out on the hood of the vehicle Plus the woofer sounding like it is under the dash on front of you .. even though the woofer is actually in the trunk of the vehicle.



FINAL SETTINGS
At this point, you are pretty much done, we recommend that you live with the initial setup (EQ / Time Delay / Gains) for a week and THEN make adjustments.
Also do not spend too much time "tweaking" the system. Once you have gains set CORRECTLY and have checked "Phase" acoustically (with a Phase Meter – which is built into the Audio Tools APP) Spend LESS than 45 minutes EQ your system. Then take a break as your ears and brain will be charcoal!! Rest your ears overnight and listen again in the morning. 45 Minutes is plenty of time to get a system initially "dialed in". You need to "live" with it for a bit BEFORE randomly changing settings.
ONCE MORE TIME! SAVE/SYNC
Now click on the top bar with the white outlined box and arrow pointing down let's make sure that this LAST "tune" is SAVED and SYNCED to the DSP8.8BT. Double check that all the EQ settings/Time Alignment/Gains, etc. Are as you set them and nothing has changed. When you tap it, upload the DSP data setting from the device back to APP. It takes around one minute to upload data to prevent data package dropout.
This is used for data from device to APP. When you select the saved file, the data is from APP to device. They

have reversed the data sync direction.
For example, your DSP tuning is done for a while, but you want another installer to re-tune it, he might need to know what the current DSP data setup is. So that he can start from there.
Or, if you like some other vehicles DSP tuning (using DSP8.8BT APP) and you want to get their data, you can connect to his vehicle with the DSP8.8BT APP with its amplifier, and upload it into your DSP8.8BT APP, and then load it into one of your 5 memories.

SPECIFICATIONS

POWER SUPPLY

- Working Voltage …….. 9 – 16 VDC
- Remote Input Voltage ……9 – 16V
- Remote Output Voltage……...12.8V (0.5A)
- Fuse Size ……. 2 Amp

AUDIO

- THD + N ……< 1%
- Frequency Response …… 20Hz-20KHz (+/- 0.5dB)
- Signal to Noise Ratio @ A Weighte ……...>100dB
- Input Sensitivity ……..0.2 – 9V
- Input Impedance
- Maximum Pre-Out Level (RMS) ……..8V
- Pre-Out Impedance

AUDIO ADJUSTMENT

- Crossover Frequency ……Variable HPF/LPF 20Hz to 20KHz
- Crossover Slope ……Selectable
  …… 6/12/18/24/36/48 dB/Oct
- Equalization ……31 Bands Parametric
- Q Factor ……Selectable
- EQ Presets ……Yes / Si: POP/Dance/Rock/Classic/Vocal/Bass
- User Presets ……Yes: Basic / Advanced

SIGNAL PROCESSING

- DSP Speed ……147 MIPS
- DSP Precision …….. 32-Bit
- DSP Accumulators …… 72-Bit

DIGITAL TO ANALOG CONVERSION (DAC)

- Precision …….. 24-Bit
- Dynamic Range ……108dB
- THD + N ……..-98dB

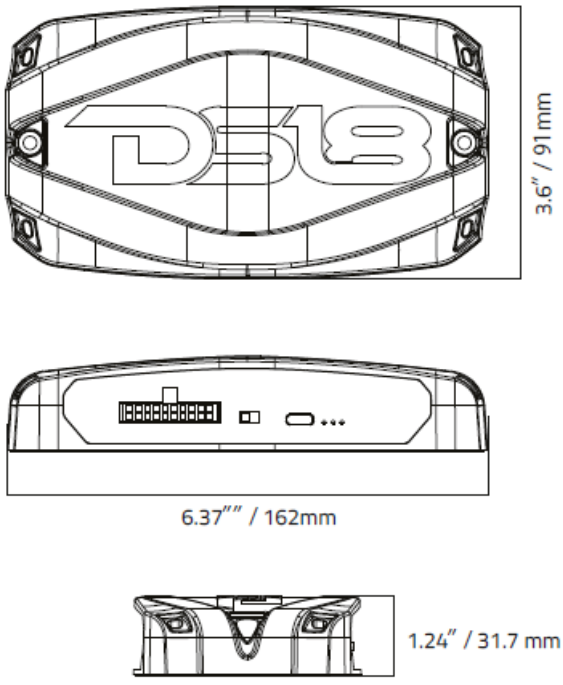
ANALOG TO DIGITAL CONVERSION (ADC)

- Precision…… 24-Bit
- Dynamic Range ……..105dB
- THD + N ……-98dB
- INPUT | OUTPUT / ENTRADA | SALIDA
- High / Low Level Input ……..Up to 8 channel / Hasta 8 canales
- Low Level Output ……..Up to 8 Channel / Hasta 8 canales
- Type / Tipo…… RCA (Female) / RCA (hembra)

DIMENSION

- Length x Depth x Height / Largo x Profundo x Alto …… 6.37” x 3.6” x 1.24”
  ……..162 mm x 91.5 mm x 31.7 mm

DIMENSIONS



WARRANTY

Please visit our website [DS18.com](DS18.com) for more information on our warranty policy.

Documents / Resources

	**DS18 DSP8.8BT Digital Sound Processor** [pdf] Owner's Manual DSP8.8BT, Digital Sound Processor, Sound Processor, DSP8.8BT, Processor
	**DS18 DSP8.8BT Digital Sound Processor** [pdf] Owner's Manual DSP88BT, 2AYOQ-DSP88BT, 2AYOQDSP88BT, DSP8.8BT, Digital Sound Processor, DSP8.8BT Digital Sound Processor, Sound Processor

References

- **Official DS18 Pro Audio Store - Speakers, Subwoofers, Amps & More!**