USER'S MANUAL

Digital Servo

DS-10

Velodyne®

Enjoy.

We here at Velodyne want to thank you for selecting our product. Get ready to experience the highest quality and amazing low-distortion bass that Velodyne is world famous for. Relax as you enhance your home entertainment experience with our easy setup instructions.

*Welcome . . . **enjoy** your new Velodyne!*

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SAFETY NOTICES

CAUTION: To reduce the risk of electric shock, do not remove cover (or back). No user-serviceable parts inside. Refer servicing to qualified service personnel.

THE LIGHTNING FLASH WITH ARROWHEAD SYMBOL is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

THE EXCLAMATION POINT SYMBOL is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the subwoofer.

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1. READ INSTRUCTIONS — All safety and operating instructions should be read before the product is operated.

2. RETAIN INSTRUCTIONS — The safety and operating instructions should be retained for future reference.

3. HEED WARNINGS — All warnings on the product and in the operating instructions should be adhered to.

4. FOLLOW INSTRUCTIONS — All operating and use instructions should be followed.

5. WATER AND MOISTURE — The product should not be used near water — for example, near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, near a swimming pool or the like.

6. CARTS AND STANDS — The product should be used only with a cart or stand recommended by the manufacturer.

7. WALL OR CEILING MOUNTING — The product should be mounted to a wall or ceiling only as recommended by the manufacturer.

8. VENTILATION — The product should be situated so that its location or position does not interfere with its proper ventilation. For example, the product should not be situated on a bed, sofa, rug, or similar surface that may block the ventilation openings; or placed in a built-in installation such as a bookcase or cabinet that may impede the flow of air through the ventilation openings.

9. HEAT — The product should be situated away from heat sources such as radiators, heat registers, stoves, or other products that produce heat.

10. POWER SOURCES — The product should be connected to a power supply only of the type described in the operating instructions or as marked on the product.

11. GROUNDING OR POLARIZATION — This product may be equipped with a polarized alternating-current line plug (a plug having one blade wider than the other). This plug will fit into the power outlet only one way. This is a safety feature. If you are unable to insert the plug fully into the outlet, try reversing the plug.If the plug should still fail to fit, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the polarized plug.

12. POWER-CORD PROTECTION — Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point at which they exit from the product.

13. CLEANING — The product should be cleaned only as recommended by the manufacturer.

14. NONUSE PERIODS — The power cord of the product should be unplugged from the outlet when left unused for a long period of time.

15. OBJECT AND LIQUID ENTRY — Care should be taken so that objects do not fall and liquids are not spilled onto the enclosure.

16. DAMAGE REQUIRING SERVICE — The product should be serviced by qualified service personnel when:

    a. The power-supply cord or plug has been damaged.
    b. Objects have fallen or liquid has been spilled into the product.
    c. The product has been exposed to rain.
    d. The product does not appear to operate normally or exhibits a marked change in performance.
    e. The product has been dropped or damaged.

17. SERVICING — The user should not attempt to service the product beyond what is described in the operating instructions. All other servicing should be referred to qualified service personnel.

18. LIGHTNING — For added protection for the product during a lightning storm or when it is left unattended and unused for long periods of time, unplug it from the wall outlet.

19. OVERLOADING — Do not overload wall outlets, extension cords or integral convenience receptacles as this can result in a risk of fire or electric shock.

20. ATTACHMENTS — Only use attachments and accessories specified by the manufacturer.

21. VOLTAGE — Insure that the subwoofer is only connected to the rated source voltage. Do not connect the 120-volt version to 230-volts or vice-versa. This will result in damage to the product and possible injury to the user.

CAUTION: To prevent electrical shock, match wide blade of plug to wide slot, fully inserted.

WARNING: Your DS-10 subwoofer generates a very strong magnetic field. People with pacemakers should avoid holding the subwoofer close to their chest as many pacemakers are very sensitive. Check with your pacemaker manufacturer or physician for guidance with your device.

You've just unpacked your Digital Servo-10 (DS-10); an advanced and great sounding subwoofer. Velodyne designed the DS-10 to integrate with a wide variety of audio systems. The DS-10 integrates with systems consisting of classic turntables and analog amplifiers to those with surround sound processors and digital media players. Whether you want awesome bass while watching movies or you're an audiophile, the DS-10 has features and optimization options to suit you.

This introduction is your road map to which parts of this manual apply to your audio system and needs.

READ WHAT YOU NEED TO

This manual has multiple parts, so only read those parts that you need to. This allows you to quickly set up and start enjoying awesome bass without having to read through lots of pages that don't apply to your type of audio system(s) or your bass optimization needs.
The rest of this introduction summarizes this manual's sections, their goals, what's in them and in what cases reading it is recommended.

PART ONE – OPERATE

Goal

- To help you understand the DS-10 features and how to use its inputs, outputs and controls.

Recommended If

- You want to know what DS-10 features are available to you.
- You want to know how the audio genre presets impact the subwoofer's output.
- You are unfamiliar with the uses of the input and output connectors on the back of the DS-10.
- You are integrating your DS-10 into an advanced audio system that uses a universal remote to control all the components in your system.

What's in this Part

- Description of the functions of the controls, inputs, outputs and display on the DS-10.
- Description of the remote control button functions.
- Description of the audio presets.
- How to remove and re-install the front grille to access the front controls.
- Description of the power modes, including standby, active and night.
- Description of the serial (RS-232) commands available for controlling the DS-10.

PART TWO - CONNECT

Goal

- To help you connect one subwoofer or multiple subwoofers into your existing audio system(s).

Recommended If

- Your audio system requires connections not covered in the Quick Start Guide.
- You are controlling your audio system using a 12V trigger signal or serial (RS-232) commands.

What's in this Part

- How to connect using an LFE signal.
- How to connect multiple subwoofers using one subwoofer as a master to control the other slave subwoofers.
- How to connect separate Right and Left audio channels to your subwoofer(s)
- How to connect the EQ output on the subwoofer to your audio system inputs for performing Auto-EQ or Manual-EQ optimization. This isn't required for Self-EQ optimization.
- How to connect if controlling your audio system using a 12V trigger signal or serial (RS-232) commands.

PART THREE – OPTIMIZE

Goal

- To help you choose the DS-10 optimization option that is right for you.

Recommended If

- You are unfamiliar with the DS-10 optimization options for getting the best bass response for your listening room and preferences.
- You are unfamiliar with the optimization parameters for a subwoofer.

What's in this Part

- Comparison of the Place & Play, Self-EQ, Auto-EQ and Manual-EQ optimization options available for the DS-10 subwoofer.
- Description of what subwoofer parameters you can automatically and manually customize using each optimization option.
- What to do if your surround sound system also does equalization.

PART FOUR - TV SCREEN INTERFACE

Goal

- To help you understand how to use the TV screen interface and remote control to optimize your subwoofer's output.

Recommended If

- You're unfamiliar with the TV screen interface and remote control commands.

What's in this Part

- Make video connections between TV and subwoofer.
- System response and settings screens.
- Remote control button commands.
- Introductory screen runtime inactive modes.

PART FIVE - MAINTAIN

Goal

- To help you understand the DS-10 safety, care, warranty and service information.

Recommended If

- You want to know what how to protect your investment in your DS-10.
- You want to register your subwoofer's warranty.

What's in this Part

- Listing of the safety guidelines to follow when using your DS-10.
- Listing of the recommended maintenance and care of your DS-10.
- Listing of service and warranty information for your DS-10.

MANUAL CONVENTIONS

For simplicity, "receiver" is used throughout this document to refer to your audio receiver or surround sound processor. Many audio systems use receivers, but more complicated and updated systems use surround sound processors or controllers.

INTRODUCTION

This part of this manual describes how to operate your DS-10 subwoofer and its remote control, including:

Controls and Connectors

- The subwoofer's front and back panel controls and connectors.
- The remote control functions.
- Audio preset settings.
- How to remove and replace the front grille to access the front panel controls.

Features

- Night, light and power modes.
- Protection circuitry.
- The serial commands available for controlling the subwoofer. Serial commands are for advanced integration of the subwoofer into a home theater system. Usually, this is done by professional installers.

CONTROLS & CONNECTIONS

The subwoofer is set up, configured and adjusted by the controls, inputs and connections located on the back and front panels of the subwoofer and the remote. Figures 1, 2 and 3 show the location of each of these important operational interfaces. Brief descriptions of each interface are below.

Cabinet Front

In order to access the controls and connections on the front of the cabinet, you need to remove the grille. You don't need to remove the grille right now. For instructions on how to remove and re-install the grille, see the Remove Subwoofer Grille and Install Subwoofer Grille sections.

Figure 1: Subwoofer Cabinet Front with Grille Removed

A. LED Display: Shows volume level, crossover frequency and Auto-EQ status messages. LED display is visible through the front grille.

B. VOLUME: Adjust subwoofer output volume. The volume level shows on the LED.

C. CROSSOVER: Adjust low pass crossover frequency. The crossover frequency shows on the LED.

D. Remote Control Sensor: Receives remote control commands. This sensor is on bottom front of sub.

The volume and crossover frequency return to their saved values after a power cycle unless these settings were saved using the software's TV screen. The volume and crossover knobs don't change settings during Self-EQ, Auto-EQ or Manual-EQ.

REMOVE SUBWOOFER GRILLE

To remove the grille:

1. Place your thumbs on the top outside corners of the grille.
2. Use your thumbs to gently apply downward pressure to the top outer grille edges and pull the top grille edge towards you.
3. After the top of the grille is free of the top cabinet face, carefully rock the bottom grille cups of the grille off of the steel grille pegs.

INSTALL SUBWOOFER GRILLE

To reinstall the grille:

1. Carefully insert the bottom grille cups of the grille onto the lower steel grille pins.
2. Place your thumbs on the top outside corners of the grille.
3. Use your thumbs to gently push the top grille onto the cabinet face.
4. Push the grille to the cabinet over each grille pin.

Cabinet Back Panel

Figure 2: Subwoofer Cabinet Back Panel

XLR AUDIO INPUTS

A. LFE INPUT: Balanced XLR inputs. Connect LFE or left and right balanced XLR inputs from your receiver or processor. Either of these inputs can be used for an LFE signal.

RCA AUDIO INPUTS

B. LFE INPUT: Use one of these two RCA inputs for the LFE output from your receiver. Or use the pair for the left and right channel signals from your receiver.

SPEAKER LEVEL INPUTS

C. SPEAKER LEVEL: Input for either banana plug/jack or exposed wire/terminal connections.

RS-232 INPUT

D. RS-232 IN: Communicate with a computer, a touch panel remote control or an upstream daisy-chained DS-10 subwoofer.Also, the 12V trigger feature requires a 12V trigger signal (+12V or -12V) across pins 7 and 9 of this connector.

RCA AUDIO OUTPUTS

E. THRU: Connect subwoofer output to downstream subwoofer in a "daisy-chain." Output is unfiltered L&R.

F. OUTPUT: Crossed-over high frequency output signal to send to a preamp. The preamp amplifies this signal to use as the audio input to satellite speakers.

G. EQ OUTPUT LEFT/RIGHT: EQ sweep tone for Auto-EQ and Manual-EQ.

VIDEO OUTPUTS

H. VIDEO OUT: Display the video generated by the subwoofer on your TV using composite video.

I. S-VIDEO: Display the video generated by the subwoofer on your TV using S-video.

Either connect the VIDEO OUT or the S-VIDEO output; not both.

RS-232 OUTPUTS

J. RS323 OUT: Communicate with a downstream "daisy-chained" DS-10 subwoofer. Also, the 12V trigger feature requires a 12V trigger signal (+12V or -12V) across pins 7 and 9 of this connector.

CONTROLS

K. EXTERNAL REMOTE: Allows for hook-up of the optional Velodyne remote control receiver. With the optional receiver plugged in it will allow the remote control to control the subwoofer even if the subwoofer sensor is pointed away from you. Place the infrared receiver within direct line of sight from your usual listening position.

L. MIC: Connect the smaller end of the mic cable to use the microphone. The EQ functions will terminate unless the microphone is connected.

M. Power Receptacle: Connect detachable AC power plug.

N. POWER: Switch power to the subwoofer ON and OFF.

O. Serial Tag: Shows serial number, model number and manufacturing date for the subwoofer.

Remote Control

The Velodyne DS-10 remote control allows you to:

- Select listening presets and night mode.
- Adjust the subwoofer volume.
- Self-EQ.
- Set up, adjust and reset your subwoofer when connected to a TV.

Take care not to lose or misplace your remote control as some of the adjustments to the subwoofer can only be done using the remote.

Figure 3: Remote Control

Listening Controls

A. MUTE: Mutes and unmutes the subwoofer. You can use this to toggle between how your audio system sounds with and without the subwoofer playing.

B. PRESETS: Accesses the five presets and one EQ defeat listening modes. The presets are set at the factory, but you can adjust them.

B1. THEATER: EQ boost at 37 Hz.

B2. ROCK: EQ boost at 52 Hz.

B3. JAZZ: No EQ boost — reference listening.

B4. CUSTOM: Set to your listening preference.

B5. GAMES: EQ boost at 60 Hz.

B6. DEFEAT: Use to toggle between another preset being on and off to listen to the sound difference.

C. VOLUME + and **–** : Raises or lowers the volume of your subwoofer.

D. NIGHT: Limits the peak volume of the subwoofer to a percentage of the selected preset volume or SETUP volume.

Other Controls

E. ⏻: Toggles the subwoofer between *active and standby modes* if power switch on back of subwoofer is ON.

F. LIGHT: Changes the LED display operation between momentary on (default) and constantly on. The volume level is readable even with the front subwoofer grille in place.

Optimization Controls

G. EQ: Performs Self-EQ. If Setup parameters have been saved from either an Auto-EQ or Self-EQ, pressing this button won't run Self-EQ again unless you hold the button down for about 5 seconds. This is to prevent Self-EQ from running and over-writing any manual settings you have saved if this button is accidentally pushed.

H. Numeric keypad: Enters Setup mode, enters Self-EQ mode and starts other functions.

Optimization Controls for EQ Set Up Using a TV Screen

I. MENU: Enters SETUP mode from the introductory screen.

J. SELECT: Toggles field values.

K. SET + and **–** : Increases or decreases the Q value for a parametric EQ or sets values on the Settings screen.

L. EXIT: Exits Setup mode.

M. RESET: Resets volume to the last saved setting on the Systems Settings screen and defeats the crossovers on the Settings screen. Also exits from any EQ process to the Introductory screen.

N. TEST: Toggles between the Settings Screen and the System Response screen.

FEATURES

Audio Presets

The subwoofer comes with six audio presets, five of which are pre-programmed at the factory. The preset or preset's numbers and their corresponding labels on the remote are shown in the table below.

- Presets 1, 2, 3 and 5 are shipped from the factory with predetermined settings.
- Preset 4's contour level is set at 0 from the factory and is customizable by the user.
- Preset 6 defeats all the EQs to demonstrate the effect the equalization of the subwoofer has on the sound quality.

Because movies, rock, pop and games may already have their bass emphasized in the recordings, using these presets may cause too much low frequency boost for your listening preference. As such, the presets are offered purely to be used to personal taste and are not required for the various source types.

DEFAULT PRESET SETTING					
Number (System Settings Screen)	**Label on Remote**	**Contour EQ Frequency Boost at**	**Contour EQ Boost Level***	**Default Volume Level**	**Suggested Preset Use & Description**
1	Theater	37 Hz	3.0	34	Movies. Volume is slightly louder than for the Jazz preset.
2	Rock	52 Hz	2.0	33	Rock and Pop music. Volume is slightly higher than for the Jazz preset.
3	Jazz	35 Hz	0.0	30	Jazz and Classical music. This is the most neutral with no boost at any frequency or overall volume increase.
4	Custom	35 Hz	0.0	30	For you to make a custom boost frequency and level.
5	Games	60 Hz	2.5	33	Video Console and Online Game Playing. Gunfire and explosions sound better. Volume is slightly higher than for the Jazz preset.
6	Defeat	35 Hz	0.0	30	Defeats all EQs. Use to toggle between what your system sounds like with and without EQ.

*The boost level is proportional to dB. That is, a boost of 5.0 is greater than a boost of 3.0. For no boost use 0.0. The boost frequency and level are controlled by the contour frequency and contour level settings.

Night Mode

Night mode lowers the subwoofer volume by specifying a compression to a percentage of the overall volume level. The factory set, default percentage for this setting is 30%. You might want to use night mode during times when you want to enjoy your sound system but you don't want to disturb your neighbors or other people in your house who are sleeping or need quiet time.

You can toggle night mode on and off using the **NIGHT** button on the remote control. When toggling night mode:

- You hear a volume change.
- And either "**n**" then the volume level or "**n OFF**" appears on the front LED display.

If using the video output display, night mode shows as active below the Preset note on the Introductory screen. Night mode can be modified in the "Next" page of either the video output menu or the Windows Setup Program.

Active, Inactive & 12V Trigger Power Modes

The subwoofer has three power ON modes. These modes help the user control power conservation when the subwoofer isn't playing, but allow the subwoofer's power switch to remain ON at all times.

Active Mode:

- In the active mode, the subwoofer's standby mode is on. When the subwoofer gets an audio signal input, the internal amplifier turns on to play the audio. It takes a few seconds for the DSP processor to boot-up and then you hear the audio.

- If the subwoofer is in active mode and doesn't receive an audio signal, the subwoofer automatically goes into standby mode to save power. This takes between 10 to 15 minutes.

- In standby mode, the subwoofer's power switch is ON and its internal amplifier isn't on.

If the subwoofer will be left in standby for a period of greater than 5 days, Velodyne recommends turning off the power switch.

Inactive Mode:

- In the inactive mode, the standby mode is defeated.

- In the inactive mode and when the subwoofer power switch is ON, its internal amplifier is on even if the subwoofer isn't receiving an audio signal.

If the subwoofer will be left inactive for a period of greater than 5 days, Velodyne recommends setting the power switch to OFF.

12V Trigger Power Mode:

- In the 12V trigger mode, the subwoofer turns on with a 12V source (from a controlling receiver) at its RS-232 input.

- In 12V trigger mode and when the subwoofer's power switch is ON, its internal amplifier isn't on until it receives 12V in either polarity at the RS-232 input.

- In 12V trigger mode, if the 12V trigger is not applied, the subwoofer will not respond to the remote control. To reset the mode, apply the trigger and then use the remote to effect the change.

If the subwoofer will be left inactive in 12V trigger mode for a period of greater than 5 days, Velodyne recommends setting the power switch to OFF.

Light Mode

When the light mode is OFF, the LED display behind the front grille is always off, except when momentarily lit to show a change in the volume or crossover settings of the Auto-EQ process. When light mode is ON, the LED display always shows the volume, except it does reflect changes in crossover settings of the Auto-EQ process and then reverts to volume. Having the LED on at all times can be distracting in a darkened listening room, so the default setting is OFF.

Protection Circuitry

The subwoofer is equipped with protection circuitry to provide maximum performance with greatest reliability. The subwoofer is protected against:

- Overdriving the speaker
- Overdriving the amplifier
- Overheating the amplifier
- Excessive drop in power line voltage

The overdrive protection circuitry operates constantly without being audible under most situations.

If the subwoofer should shut down, reduce the volume setting and shut the subwoofer off until it cools down. The time the subwoofer takes to cool down depends on the ambient room temperature, but typically at least 10 minutes are required for the subwoofer to cool down and recover from the thermal shutdown.

Also, try plugging the unit into a different wall socket. Overloaded sockets or damaged home wiring circuits can cause power voltage drops while the subwoofer is drawing high power levels. This condition can result in the subwoofer shutting down intermittently.

230V Users & TV Interface

For 230-volt DS-10 subwoofers, the default video mode is NTSC video format. If your TV is NTSC compatible, you will have no trouble with this mode. However, certain TVs (especially older ones) may require PAL or SECAM video. To switch from NTSC to PAL/SECAM mode, press the DOWN ARROW four times followed by RESET. The subwoofer will restart in PAL/SECAM video mode. To revert back to NTSC, restore defaults by pressing 8-9-0 while on the video output Introductory screen.

RS-232 Serial Commands for Controlling Subwoofer

This section describes the RS-232 protocol specification and commands that can be used to control the subwoofer. This protocol indicates how DS-10 subwoofers receive run-time commands from devices such as Crestron® products.

The communication protocol uses the standard communication settings for the COM port as shown below.

COM Port Settings	
Baud Rate	9600
Data Bits	7 or 8
Parity	None
Stop	Bits 1

The DS-10 serial ports use a standard configuration that allows direct connection to a PC via a FEMALE to MALE DB-9 RS-232 serial extension cable. Only three pins are required as shown below.

IN Pin		OUT Pin	
2	Transmit	2	Receive
3	Receive	3	Transmit
5	Ground	5	Ground

If you are having trouble communicating with your DS-10 subwoofer, check your serial cable first.
It may be a null modem or "crossover" cable, which won't work for communicating with the subwoofer.

Serial commands should be formatted as shown below.

RS-232 SERIAL COMMAND FORMATS		
Byte Number	**Byte Description**	**Notes**
0	'#'	Header character
1 to 3 or 1 to 4	Command and Parameter Data	3 to 4 ASCII characters. See the RS-232 Serial Command table below. These characters must be in CAPS as the commands are case sensitive.
4 or 5	'$'	Termination character. This character is required or command is ignored.

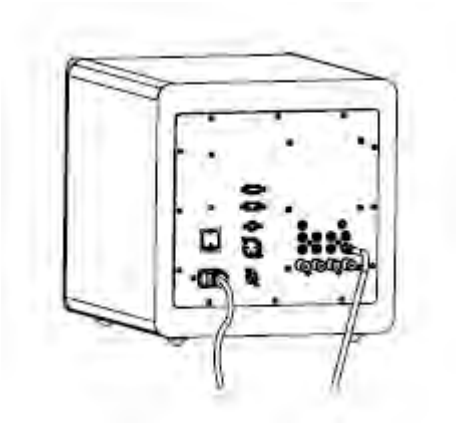
The serial commands are shown below.

RS-232 SERIAL COMMANDS				
Activity	**Command Format**	**Acceptable n Values**	**Examples**	**Comments**
Volume	#VOnn$ #VO+$ #VO-$ #VO?$	00-99	#VO25$, #VO+$ #VO-$ #VO?$	Sets volume to a value Increments volume up Increments volume down Requests current volume setting
Preset	#PSn$ #PS?$	1 , 2, 3, 4, 5, 6	#PS4$ #PS?$	Activates the indicated preset Requests the current preset
Light Mode	#LTn$ #LT?$	0, 1	#LT0$ #LT1$ #LT?$	Activates light mode Deactivates light mode Requests light mode state
Night Mode	#NMn$ #NM?$	0, 1	#NM1$ #NM0$ #NM?$	Activates night mode Deactivates night mode Requests night mode state
Mute	#MUn$ #MU?$	0, 1	#MU0$ #MU1$ #MU?$	Un-mutes subwoofer Mutes subwoofer Requests mute state
Power	#LTn$ #LT?$	0, 1	#LT1$ #LT0$ #LT?$	Turns power on Turns power off Requests power state '$'

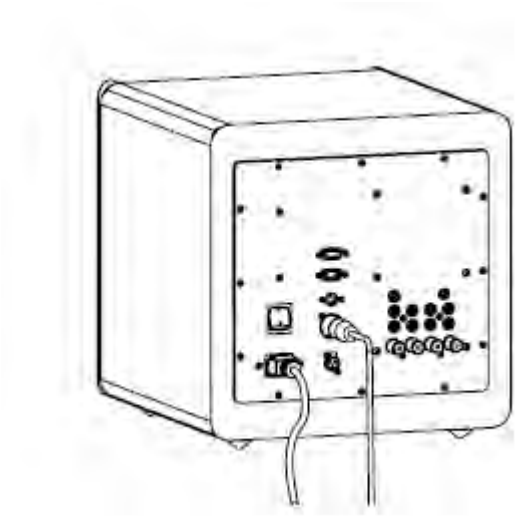
IMPORTANT: DO NOT Connect the DS-10 using Dual Inputs. DO NOT connect using the dual inputs of line-level RCA and speaker-level either for dual connections to a single system or for dual systems. Connecting both inputs will damage the DS-10.

How to Connect Using an LFE Signal

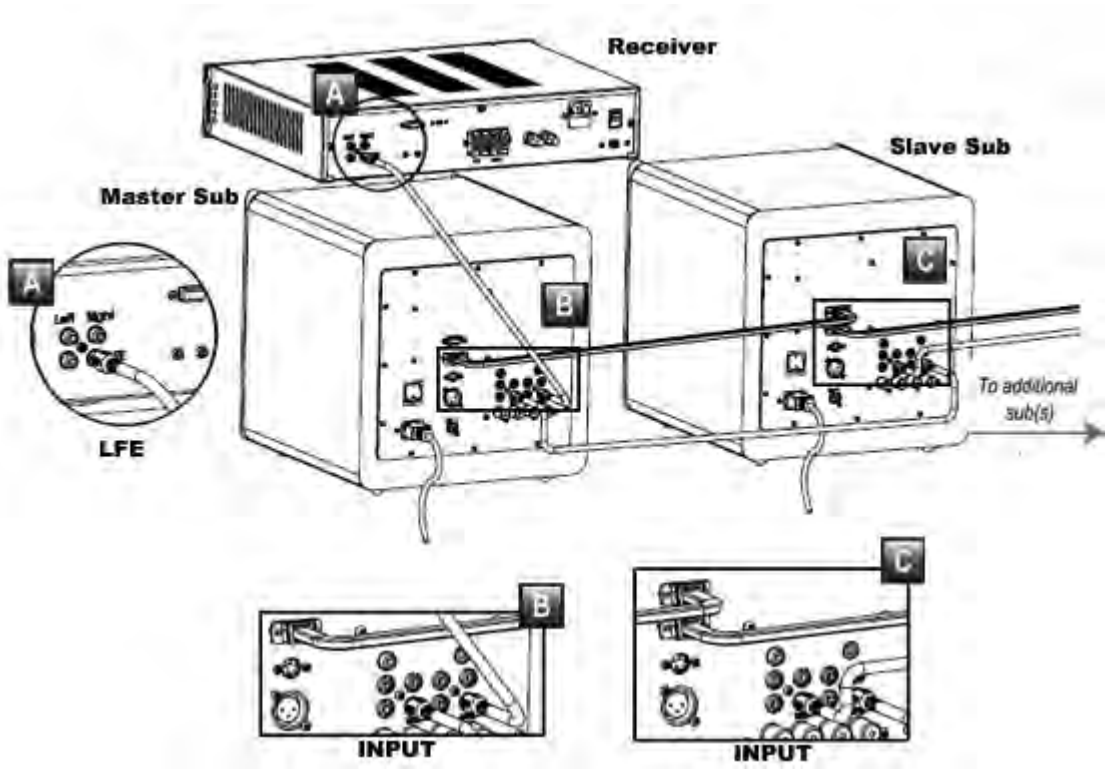
RCA LFE Connection:



XLR LFE Connection:

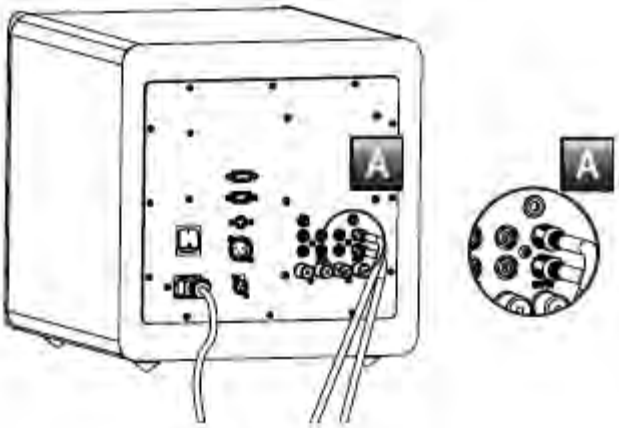


How to Connect Multiple Subwoofers Using One Subwoofer as Master to Control the Other Slave Subwoofer

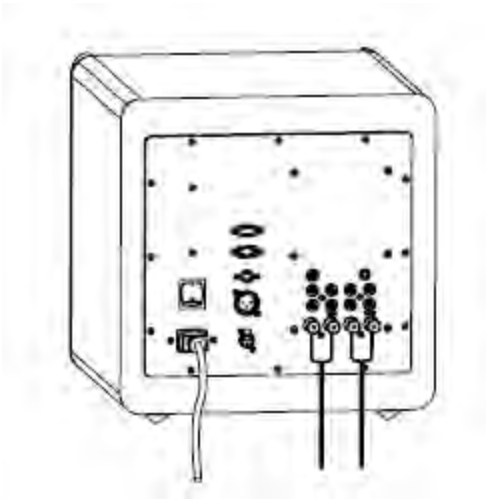


How to Connect Separate Left and Right Audio Channels to Your Subwoofer

Left & Right RCA Connection:



Left & Right Speaker Level Connection:



NOTE: Be sure to connect + to + and - to -. Do not leave any wire strands loose at the connection.

How to Connect if Controlling your Audio System Using a 12V Trigger Signal on the RS-232 Connections

The 12V Trigger Connection requires a 12V trigger signal (polarity irrelevant) across pins 7 and 9 of the RS-323 INPUT connector.

OPTIMIZATION INTRODUCTION

This part of this manual first explains the optimization methods and nomenclature. To help you choose a method, this section then describes the capabilities of each method as well as the time each optimization requires to complete. Next, to help you choose how to perform your selected optimization method, this part describes the optimization TV screen interface.

To help you understand the parameters you can optimize, this section then discusses each how each parameter affects the subwoofer's bass output. Finally, this part recommends the basic methodology for performing Manual-EQ optimization.

OPTIMIZATION METHODS

The DS-10 subwoofer offers the Place & Play, Self-EQ, Auto-EQ and Manual-EQ optimization methods. EQ is a shorthand way to refer to all the subwoofer's parameters that can be changed to equalize how the subwoofer sounds throughout its frequency range. You choose what is right for you although Velodyne recommends Auto-EQ as it automatically gives you great sounding bass in about 5 minutes (not including setup time) and doesn't require you to install and use the Velodyne-authored TV-screen interface to manually modify the bass frequency response.

Place & Play

Place & Play setup doesn't require the use of the supplied microphone. You can get great sounding bass from the factory-default EQ settings with the ability to use the default preset EQ settings for different audio genres.

Self-EQ

Self-EQ is the simplest and fastest way to optimize the bass response from your subwoofer for your room. Self-EQ adjusts the levels of eight parametric EQs only. Self-EQ uses a sweep tone generated from the subwoofer itself that is picked up using the calibrated microphone. Self-EQ smoothes the frequency response of the subwoofer from 15 to 120 Hz and leaves the settings for volume, crossover, slope and phase unchanged.

Auto-EQ (Recommended)

Auto-EQ is recommended by Velodyne. Auto-EQ is a highly advanced way to automatically optimize the bass response from your subwoofer and audio system. During the Auto-EQ process, the Auto-EQ digital signal processing algorithm uses a calibrated microphone and the sweep tone played through your system to optimize the low frequency output response. Auto-EQ or adjust the levels of the eight parametric EQ's only. Auto-EQ leaves the settings for volume, crossover slope and phase unchanged.

Auto-EQ is recommended because, unlike Self-EQ, it optimizes the subwoofer to the audio system and satellite speakers, but is not as complex and time-consuming as Manual-EQ.

Manual-EQ

Manual-EQ is the most customized way to optimize the bass response from your subwoofer. The Auto-EQ optimizes in a manner that sounds great for many people. However, we at Velodyne understand that everyone has unique listening preferences and that there are thousands and thousands of receiver, processor, speaker and room combinations. Hence, the DS-10 subwoofers and the Auto-EQ system are designed to support custom EQ settings through the Manual-EQ process. We recommend you start your Manual-EQ optimization with the settings from the Auto-EQ optimization as a starting point for you to further tune the DS-10 subwoofer to your preference. You can optimize the subwoofer for the preset levels, crossover filter parameters, and phase as well as the full parametric filter parameters.

Manual-EQ also uses the sweep tone played through your system, but also requires you to use the Velodyne-authored TV-screen interface to manually modify the bass frequency response.

CHOOSE OPTIMIZATION METHOD & OPTIONS

With DS-10 you choose the level of subwoofer performance optimization that is right for you. The optimization level determines what options the Auto-EQ system optimizes foru se the table below to choose an optimization level. Below the table are short explanations of what you can optimize for; audio genres, your listening room, your audio system and your listening preferences.

SUBWOOFER PERFORMANCE OPTIMIZATION METHOD[1]				
	Place & Play	**Self-EQ**	**Auto-EQ**	**Manual-EQ**
Cable Connection, Receiver Setup, Program Installation & Clean Up Time	8 minutes	10 minutes	15 minutes	25 minutes
Optimization Time	0 minutes	2 minutes	5 minutes	30 minutes
Optimization Options	Audio genre presets	Room, Audio genre presets	Room, audio system, & Audio genre presets	Room, audio system, & listening preferences Audio genre presets
Parameters Optimized	User Preset Selection	User Preset Selection Parametric filter levels	Subwoofer volume User Preset Selection Parametric filter levels	Subsonic filter frequency and slope Polarity Subwoofer volume User Preset Selection Contour filter frequency and level of each preset Parametric filter levels Crossover filter frequency and slope Phase Parametric filter band-widths and frequencies Servo gain (music to theater)
Optimization Level		Average	Medium	Highly Customized
Requires Microphone & Mic Connections	No	Yes	Yes	Yes
Requires TV Setup Program	No	No	No	Yes
Requires Knowledge of Frequency Response Curves and Filter Parameters	No	No	No	Yes
Time if Use the "Crawl Test" Technique to Optimize Subwoofer Placement	>20 minutes[2]	>20 minutes[2]	>20 minutes[2]	>20 minutes[2]

1 Setup and optimization times are approximate and for one subwoofer.

2 Actual time depends on the number of locations at which you listen to or look at the frequency response of the subwoofer.

OPTIMIZATION OPTIONS

Optimize for Audio Genres

You might prefer to have a different bass sound and feel that depends on the type of audio you're listening to. For example, if you're gaming versus if you're watching a movie. Having presets that are accessible on the remote control allows you to easily optimize for these different audio genres without any additional setup by you. And you don't have to use the presets for the type of audio on the remote control buttons. For example, if you like how your Jazz music sounds using the Pop preset better than the Jazz preset, use the Pop preset. If you're feeling a bit more adventurous, you can even modify these presets to your exact tastes using the TV interface.

Optimize for Your Room

As a subwoofer plays in a room, the reflections of the sound waves off the walls create standing waves. Standing waves cause places in the room where certain frequencies are louder and others are diminished. Some room cancellations of the sound waves can be like black holes that no amount of amplifier power can fill. Thus, as a general rule it is better to "cut down" a peak of the frequency response rather than to "boost up" a valley. Self-EQ and Auto-EQ perform this adjustment automatically for you.

In general, you should try to achieve a frequency response that is +/– 3 dB at all lower frequencies. This is because most people perceive a response curve of this accuracy level as very smooth. However, people with excellent hearing or who have been trained to listen for sonic purity can hear frequency response deviations to as small as +/- 1 dB or less. The DS-10 Self-EQ and Auto-EQ both will automatically smooth your DS-10 subwoofer output to within a +/- 3 dB window.

Optimize for Your Audio System

How good your bass sounds also depends on how smoothly it blends with the output of the satellite speakers. If a smooth transition doesn't exist at the crossover frequency, you hear either too much mid-bass or the bass frequencies as separate from the mid and high frequencies. To smoothly blend the subwoofer with the main speakers, you first need to know the low frequency response of the main speakers. Auto-EQ determines the low frequency response of the main speakers automatically and blends with it.

The response always rolls off at the lowest end, but no dip or peak should exist at the crossover frequency with the satellites. While the goal is a perfectly flat response, this may not be possible in the higher frequencies of the subwoofer's response due to peaks or valleys introduced by the satellites.

Optimize for Your Listening Preferences

Everyone has a personal preference as to how they want their audio system to sound. With the Self-EQ and Auto-EQ features, the bass response for your subwoofers in your listening room should be within +/– 3 dB. These EQ methods aren't as aggressive as they could be as optimizing filters for flatter response takes exponentially longer due to perturbing external noises to the process. Also, using more EQ can sometimes have a negative effect in the time domain, so less EQ is preferable.

However, you can make the correcting filters more aggressive or adjust it in other ways to match your listening preferences. Auto-EQ serves as an excellent starting point for those of you who want to manually adjust parameters to modify the frequency response profile and the parametric filter frequencies, bandwidths and levels. It's your subwoofer, not ours any more. You have the freedom to make it sound the way you want it to.

Optimize for Subwoofer Placement

When you unpack the subwoofer, you place it in the room according to the information in the general section and optionally the "Crawl Test" section in the Subwoofer Placement Recommendations Guide. The "Crawl Test" can help you to improve the bass reproduction quality by simulating moving the subwoofer around the room using acoustic reciprocity to find the placement that gives you the sound you like best. With the "Crawl Test" you have to move around the room. Moving yourself around is easier than moving a heavy subwoofer around.

If you want to use the "Crawl Test", do so before performing any of the optimization methods.

Room placement is one step to equalize the subwoofer(s) to the room. Subwoofers operate at extremely low frequencies, which are primarily omni-directional. Hence; you can't usually tell where the bass is coming from. Finding the best location for your subwoofer in your room is a trial and-error process.

With the "Crawl Test" Technique:

- You find the best tradeoff between appearance of the subwoofer in the room and the subwoofer sound quality.
- You optimize the subwoofer placement when the room is in the configuration that it is in when you typically listen, such as doors opened or closed, curtains open or closed, etc. Additionally, you can learn what effect the configuration has on bass quality, by changing it and listening or measuring.
- You can rely just on what you hear to pick a location or you can use the microphone and sweep tone with the subwoofer set to Manual EQ to look at the frequency response graphs to see which location is best.

Your satellite speakers also contribute to how your audio system sounds. If moving your satellites is an option, you might likewise place them through experimentation and measurement.

OPTIMIZATION PARAMETERS (EQ)

The following table describes the subwoofer EQ parameters that are either automatically configured with Auto-EQ and/or Self-EQ. All of these parameters can be manually customized by you using the Manual-EQ method.

EQ Parameter	Set with Auto-EQ	Set with Self-EQ	Description
Low Pass Crossover Frequency and Slope	No	No	The upper limit of your subwoofer's frequency response. The crossover frequency can be set to increments of 1 Hz, between 40 Hz and 199 Hz or it can be disabled (-- or OFF). The crossover slope can be set to 6, 12, 18, 24, 30 or 36 dB/octave. Typically, these parameters are the same for all the presets however you can choose to vary the values in thedifferent presets. For Self-EQ the crossover frequency is set to 160 Hz with a slope of 24 dB. For Auto-EQ the crossover frequency is set to 80 Hz with a slope of 24dB. The subwoofer crossover frequency can also be changed by the subwoofer's front panel control. Please note that this type of change is temporary until you change it and save it to the DS-10 using the TV interface.
Subsonic Filter Frequency and Slope	No	No	Sets your subwoofer's lowest frequency limit in increments of 1 Hz between 15 Hz and 35 Hz. The subsonic filter slope can be set to 6, 12, 18 or 24 dB/octave. Usually, the subsonic filter doesn't need to be changed from its default of 15 Hz with a steep roll off of 24 dB. The default settings provide the maximum protection at the widest bandwidth. Increasing the crossover frequency protects the subwoofer more; lowering the slope protects it less. If your subwoofer isn't adequately protected at very low frequencies, you can blow up the subwoofer's amplifier or cause other damage that requires subwoofer replacement, which are very expensive repairs. It is easier to overdrive the subwoofer at these low frequencies because you can't hear these frequencies. Warped vinyl records can have unexpected output at very low frequencies and damage the subwoofer. Some CD's are made without filtering this part of the signal out. Adjust the subsonic filter if your media requires it or if peaks and valleys exist at the very lowest frequencies that you can't correct using room placement of the subwoofer and/or parametric filter adjustment. Use of a lower slope at the lowest crossover frequency should be done only intermittently to extend the life of your DS-10 subwoofer. The proper setting for these parameters is dependent on playback level and size of the room. Experiment carefully and choose the correct setting for your usage.

EQ Parameter	Set with Auto-EQ	Set with Self-EQ	Description
			Typically, during Manual-EQ these parameters are the same for all the presets. However if your media is so demanding and varied for different listening modes, you might want to set these filters individually for each preset.
Phase	No	No	Adjust the phase delay of your subwoofer's output signal from 0° to 180° in 15° increments to allow a better blend to the satellites at crossover and account for distance or delay differences. During Manual-EQ, we recommend you adjust the polarity before adjusting the phase.
Polarity (+/-)	No	No	Your subwoofer's polarity can be either positive (+) or negative (-). Toggling between these settings reverses the audio signal's phase 180 degrees. This can be helpful with extreme placements, certain crossover slopes or blending to main speakers driven by amplifiers with inverted polarity.
Volume (1-99)	No	No	During Manual-EQ, you can set the volume level from 1 to 99 for each preset (1-5) separately from the Setup preset (the 0 or global preset) volume. The Setup preset volume can be changed permanently or temporarily using the TV screen interface or temporarily using the volume control on the remote or the volume knob on the front of the subwoofer. If the change made by the volume control on the front or on the remote is desired to be permanent, you must enter the TV screen interface's setup menu and select to save and exit. Otherwise, the new volume setting will be lost upon turning off power to the subwoofer. The factory default presets include volume difference from the Setup preset volume per the character of the preset. This difference helps identify the preset audibly, but can be changed. Each preset increments its volume in accordance with any changes of the subwoofer volume, keeping these differences intact. For example, if the subwoofer is set to the Jazz preset (preset 3) and shows a volume of 30 because the Setup preset volume is 30 and the Theater preset (preset 1) volume is 40, selecting preset 1 raises the volume to 40. If the VOL+ key on the remote is then used to increase the volume to 45, and then the Jazz preset (preset 3 – same level as the Setup preset) is selected, the subwoofer will display a volume of 35. These volume differences can be seen in the preset volume line in the TV screen interface.

EQ Parameter	Set with Auto-EQ	Set with Self-EQ	Description
Contour Frequency	No	No	Frequency that can be set in increments of 1 Hz between 15 Hz and 200 Hz to boost or cut the signal (contour) of your subwoofer's frequency response at that frequency. The contour filter acts as an "extra" user-set EQ that can be used to manipulate the subwoofer frequency response when a particular preset is invoked. The subwoofer's Setup preset parameters don't include those for the contour filter as each contour filter is a subset of each of the other presets.
Contour Level	No	No	A preset's contour filter's amount of boost or cut added at the contour frequency. + 6 dB is the maximum boost. -13 dB is the maximum cut. The contour level is like changing the volume at only one bass frequency.
Theater / Music Indicator	No	No	Sets the accelerometer servo gain of the DS-10 system between 1 and 8. The 1 setting is for the least amount of servo gain or allowing some distortion; this setting might be more appreciated for media with less accuracy required, such as movies or games. The 8 setting is for the most amount of servo gain or least amount of distortion; this setting would be used more for critical listening of music. We prefer using 8 for the theater preset, but feel free to customize it if you like. The somewhat higher distortion of the 1 setting during playback makes explosions and other theatrical and gaming content have an overall louder and more impressive bass response. The lowest distortion setting of 8 lowers the overall perceived level because of the elimination of distortion products, producing a very tight and "fast" sounding bass – well suited for listening to music. Numbers in between yield a result either more towards the one end or the other. You can determine the best setting by listening. The subwoofer's setup preset parameters don't include this setting as it is like the contour: different for each preset. The factory setting for the presets are: • N/A for the setup preset • 8 (least distortion) for Theater (Preset 1) • 6 (low distortion) for Rock (Preset 2) • 8 (least distortion) for Jazz (Preset 3) • 8 (least distortion) for Custom (Preset 4) • 3 (moderate distortion) for Games (Preset 5) • 8 (least distortion) for Defeat (Preset 6)
Default Preset	No	No	This is the preset used when your subwoofer is powered on from the off state. The factory setting is preset 3. This preset can be set to any one of the presets using the TV screen interface. When the standby mode is used from the remote (red button), the preset stays the same as the last setting and does not revert to the default setting.

OPTIMIZATION PARAMETERS (PARAMETRIC)

The following table describes the three parameters of the eight EQ filters that can be adjusted during the optimization process of the DS-10 subwoofer. The parametric filters can help you to achieve better room equalization. Although the Auto-EQ and Self-EQ optimization processes automatically adjust the level of the preset parametric filters, only the Manual-EQ allows adjustment of the frequency and bandwidth, as well as level of these filters.

The parametric filters should be adjusted after the system parameters have be set.

During the Manual-EQ process, remember that all of the preset parameters are available for adjustment. At this time, you can customize each preset to get the appropriate character for use with differing satellites or media depending on your needs and system complexity

EQ Setting	Set with Self-EQ	Set with Auto-EQ	Set with Manual-EQ	Description
Frequency (F)	No	No	Yes	The center frequency for the parametric filter. The parametric filters should be placed at peaks and valleys in the frequency response during Manual-EQ optimization. You should put a filter at the highest peak first and adjust the filter levels before proceeding to put filters at the next highest peak. You should put filters at the peaks before putting filters at valleys. Remember that you are using up amplifier headroom when you raise a dip, so it is better to lower a peak. When manually setting the filter frequencies, avoid putting more than one filter at one frequency. The filters can be close, but if you find that you need to stack the filters at one frequency, you have probably placed the subwoofer or microphone in a poor location in the room near or at a null. To correct for this RESET the subwoofer using the remote, move the location of the subwoofer or mic and start over with the Auto-EQ optimization and then proceed back into Manual-EQ. The default parametric filters are at the 1/3 octave ISO frequencies: 20 Hz, 25 Hz, 32 Hz, 40 Hz, 50 Hz, 63 Hz, 80 Hz and 100 Hz.
Level (L)	Yes	Yes	Yes	The filters can be adjusted in level between +6 dB and -13 dB. The default level is 0 for all filters.
Bandwidth (Q)	No	No	Yes	The bandwidth determines how narrow the parametric filter is. The narrower the filter, the higher the Q value and the faster the roll off on each side of its center frequency. The default Q setting for the bandwidth is 4.3 The Q can be set between 0.1 and 20. The Q or bandwidth of the filter is usually adjusted last after correctly setting the frequency and level. It is adjusted so that as little around the dip or peak being corrected is affected.

What to do if Your Surround Sound System Also Does Equalization

Most surround sound systems also perform an automatic optimization of your system. You probably have already done this for your existing system. When you add in the DS-10 subwoofer, we recommend you:

1. Place your subwoofer in its permanent location.
2. Run the DS-10 AUTO-EQ . This gives the surround sound system a nicely bandpassed bass output for blending well to the satellites to use during its automatic equalization process. If you run the sound system automatic equalization routine before you get the blend correct, the sound system equalization algorithm may turn the subwoofer way down or up due to a peak or dip where the subwoofer blends to the speakers.
3. Run the surround sound automatic equalization after the DS-10 AUTO-EQ even if you have previously run this before the subwoofer was added to the system. The surround system automatic equalization now has a smoothly blended bass region for measurement and should now make the correct choices during its run.

However, due to different automatic equalization systems having different algorithms, you might want to experiment with the opposite approach; running the surround sound equalization process first and then the DS-10 EQ. You can compare which order of the equalization processes gives sound that is most pleasing to you. Also be sure to examine your final settings to be sure that you didn't end up with your sound system's LFE channel set very low or very high and that the level at the DS-10 subwoofer is the opposite to compensate. Ideally the channel level will be somewhere near 0 dB and the DS-10 subwoofer level at or below 50 or 60.

TV SCREEN INTERFACE

One of the advanced features of your Digital Servo subwoofer is the available options for optimizing the bass output, including Self-EQ, Auto-EQ and Manual-EQ. You can use all the optimization methods, except Manual-EQ, without the TV screen interface. However, if you want to use Manual-EQ optimization you need to use the TV screen interface. Also, if you want to view your subwoofer's frequency response and/or parameter settings, you need to use a TV screen interface.

For your convenience, Velodyne provides the following interface for performing optimizations:

TV Screen Display and Remote Control Commands: This combination is often referred to by the shorter name of **TV Screen interface** because settings and command choices are shown on your TV screen. The TV screen interface and remote control can be used together to:

- Control and display preset EQ and parametric filter settings
- Initiate Self-EQ, Auto-EQ and Manual-EQ optimizations
- Display the subwoofer's frequency response curve
- Display the parametric filter curves
- Save settings to the subwoofer's memory

TV Screen User Interface for Optimization

In order to use the TV Screen interface to perform any setup or optimization of your Digital Servo subwoofer, you need to connect the video input on your TV to the video output of the subwoofer.

This part of this document covers:

- How to make the video connection between your TV and subwoofer.
- How to modify and save subwoofer parameters using the remote control.
- How to run Self-EQ and Auto-EQ optimization using the remote control.
- How to perform Manual-EQ optimization using the remote control.

Instruction Conventions

- Words in all uppercase bold letters in the setup instructions (e.g., **SELECT**, **MENU**, etc.) identify the specific remote button to be pressed or selected, or the field (e.g., **NEXT**, **SEL**, etc.) on the screen you should select or should be paying attention to.
- Words in title case and bold are the names of the interface screens, such as **Introductory** screen.

Make Video Connection between TV and Subwoofer

To make the video connection from the subwoofer to the TV:

1. Connect either:
   The subwoofer's Video Output (yellow RCA connector) to the TV's composite video input (yellow connector). OR
   The subwoofer's S-VIDEO output to the TV's S-Video input.
2. Use the TV's remote to set the video input where you connected the video output as the active TV image. The **Introductory** screen appears on your TV screen as shown in Figure 1.

See the *Controls & Connections* section of the *Digital Servo User's Manual* for locations of these connectors on the subwoofer's back panel.

If your video monitor or TV does not have composite or S-Video inputs, see your TV retailer for the appropriate video adapter.

Following is an overview of the screens you use to optimize the subwoofer audio output.

Introductory Screen

When you first connect the video output of the subwoofer to your TV and turn on the power to both the TV and subwoofer, the **Introductory** screen appears as shown Figure 1. If you use the remote to change settings, such as the selected preset or volume, the changes are automatically reflected on this screen. This screen indicates that the subwoofer is in its Active mode. However, this screen can also be used to indicate the subwoofer is in Runtime Inactive modes; screenshots are shown later in this section.

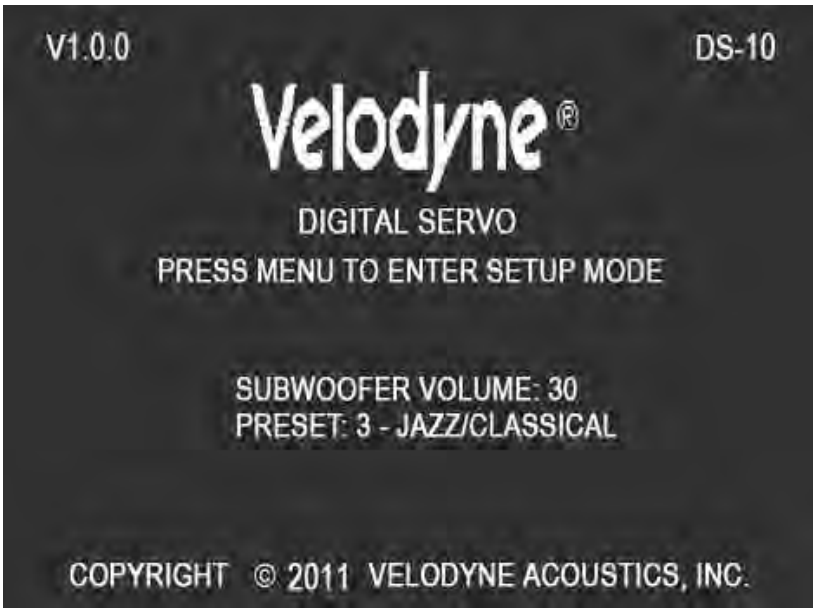


Figure 1: Introductory Screen

On the remote, if you press MUTE to mute the subwoofer or NIGHT to go to night mode, these settings are also displayed on the **Introductory** screen as shown in Figure 2.

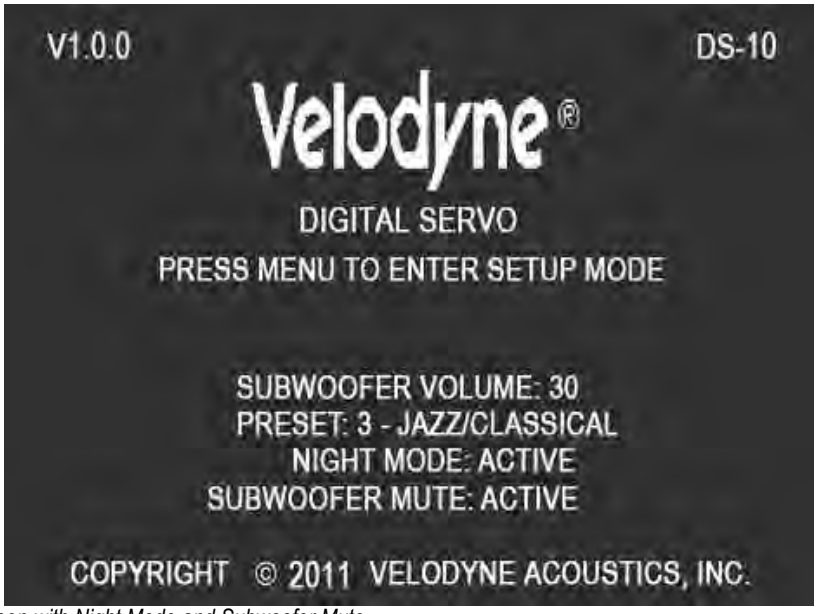


Figure 2: Introductory Screen with Night Mode and Subwoofer Mute

The **Introductory** screen also shows the current power status – if **12V Trigger** has been activated, if it has gone into Standby, or if it is running in **–Slave Mode–**; screenshots are shown later in this section.

SYSTEM RESPONSE SCREEN

From the **Introductory** screen you can get to the **System Response** screen that is used to display the frequency response graph for the subwoofer's output by pushing 1-2-3-4-5 on the remote. See Figure 3. See the Remote Control Button Sequence Commands table later in this section for this and other button sequences.

The **System Response** screen has the following information and features on it:

- A system response graph that shows the subwoofer's low frequency output from 15 to 200 Hz.
- A moving screen pixel marks on the frequency response curve the current frequency of the sweep tone that is playing.
- 8 parametric filters each of which can be used at its current frequency or adjusted to a frequency and Q you desire between 15 and 200 Hz when in Manual-EQ mode.

The filter level range is -13db to +6dB although the screen is only marked from -12dB to +6dB.

Status Message

The MIC? status message appears in the upper left hand corner of the TV screen if the subwoofer is receiving no signal from the microphone. Figure 3 shows the MIC? status message. If the MIC? message appears, the microphone is not connected, or either the microphone or the cable is damaged.

Screen Navigation

You can go to the **System Settings** screen using the **NEXT** option in the upper right hand corner of the screen.

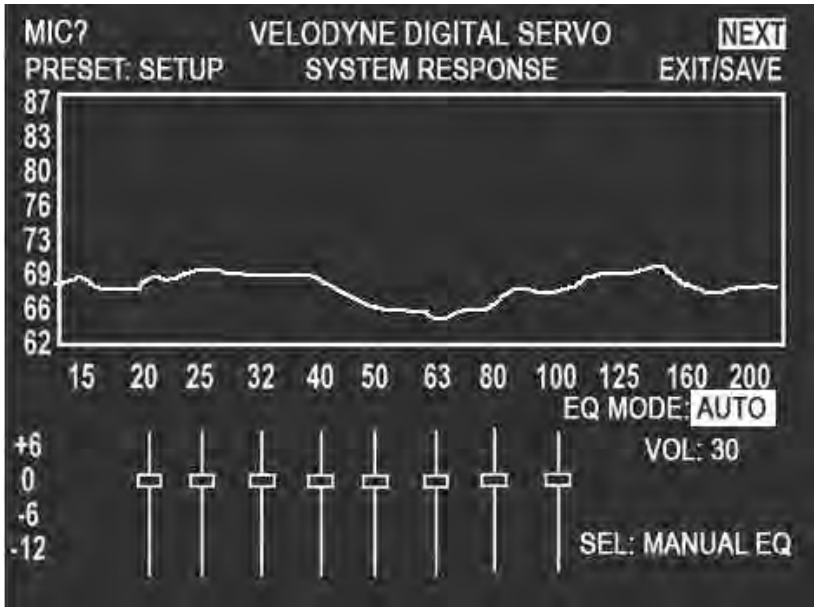


Figure 3: System Response Screen

SYSTEM SETTINGS SCREEN

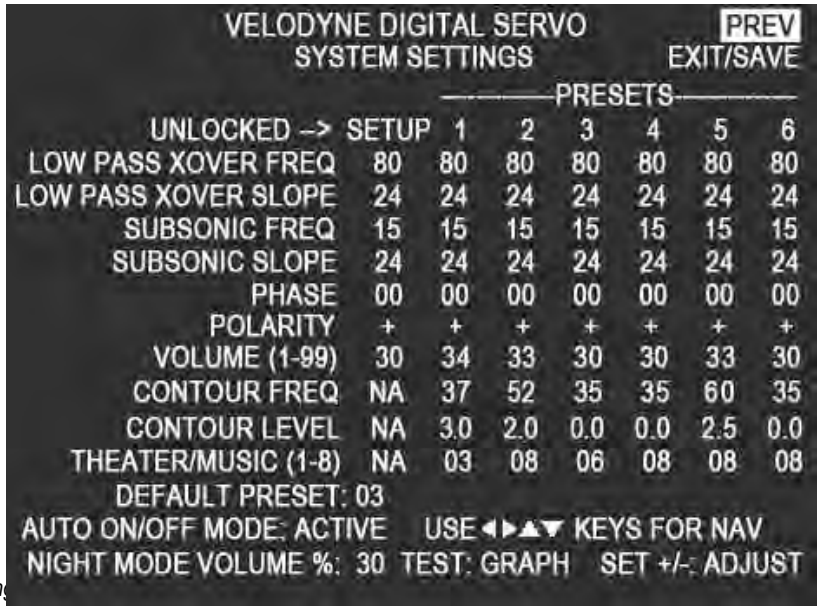
From the **System Response** screen you can get to the **System Settings** screen by selecting **NEXT**.

The **System Setting** screen has the following information and features on it:

- Display and modify the crossover filter, subsonic filter, phase, polarity, theater/music, volume, and other settings for each preset.
- The **Setup** preset is in the first column and is used to globally set the crossovers, slopes, phase, polarity, and volume for all presets.

Screen Navigation

You can go back to the **System Response** screen using the **PREV** option in the upper left hand corner of the screen.



VELODYNE DIGITAL SERVO PREV
SYSTEM SETTINGS EXIT/SAVE

		PRESETS					
UNLOCKED –>	SETUP	1	2	3	4	5	6
LOW PASS XOVER FREQ	80	80	80	80	80	80	80
LOW PASS XOVER SLOPE	24	24	24	24	24	24	24
SUBSONIC FREQ	15	15	15	15	15	15	15
SUBSONIC SLOPE	24	24	24	24	24	24	24
PHASE	00	00	00	00	00	00	00
POLARITY	+	+	+	+	+	+	+
VOLUME (1-99)	30	34	33	30	30	33	30
CONTOUR FREQ	NA	37	52	35	35	60	35
CONTOUR LEVEL	NA	3.0	2.0	0.0	0.0	2.5	0.0
THEATER/MUSIC (1-8)	NA	03	08	06	08	08	08

DEFAULT PRESET: 03
AUTO ON/OFF MODE: ACTIVE USE ◄►▲▼ KEYS FOR NAV
NIGHT MODE VOLUME %: 30 TEST: GRAPH SET +/-: ADJUST

Figure 4: System Settin

Screen Controls

You use the remote control to adjust the settings of the subwoofer. You perform all the setup functions using the buttons on the Velodyne-supplied remote control and see the results on your TV screen. These controls are described later.

Tips for Using the TV Screen Controls

When using the on TV screen controls:

- Remember to point the remote control at the subwoofer, not the TV.
- Use the ▲, ▼, and directional arrow buttons that surround the **SELECT** button to navigate the fields of the setup screens.
- Settings are typically changed using the **SELECT** button, followed by the ▲ and ▼ buttons.
- Alternatively, the **SET +/-** buttons can be used to change settings.
- A screen field highlighted in reverse video indicates your current location on the screen.
- Holding down one of the ▲, ▼, and buttons causes the remote function to repeat and you can then rapidly move through fields to arrive at the desired field.
- You can perform most of the setup process by using the ▲, ▼, and directional arrow buttons and the **SELECT** button.

REMOTE CONTROL BUTTON COMMANDS

Following are commands and their remote control button sequences. Unless otherwise noted, these sequences work only on the

Introductory screen.

Go to **System Response** screen	1 – 2 – 3 – 4 – 5	On the **Introductory** screen
Self-EQ	3 – 2 – 1 or EQ	Initiate Self-EQ optimization. Be sure to connect the microphone before engaging. After 28 sweeps, the unit saves and resets.
Cancel Self-EQ and Auto-EQ	RESET	Stop and cancel a Self-EQ or Auto-EQ optimization process.
Restore defaults	8 – 9 – 0	Restore defaults and reset the subwoofer.
Restore last saved volume	RESET	If volume is changed, restores last saved volume.
Display serial number	▲ - ▲ - ▲ - ▲ - SELECT	Shows the serial number of the unit at the top of the screen.
Switch PAL/SECAM video	▼ - ▼ - ▼ - ▼ - RESET	The unit restarts in PAL/SECAM video mode. Use 8 -9- 0 (Restore defaults) to return to NTSC mode.

Go to the System Response Screen

To get to the **System Response** screen:

1. With the **Introductory** screen showing on the TV, press **1-2-3-4-5** on the remote. As you press these buttons, the numbers display on the **Introductory** screen as shown in Figure 5.

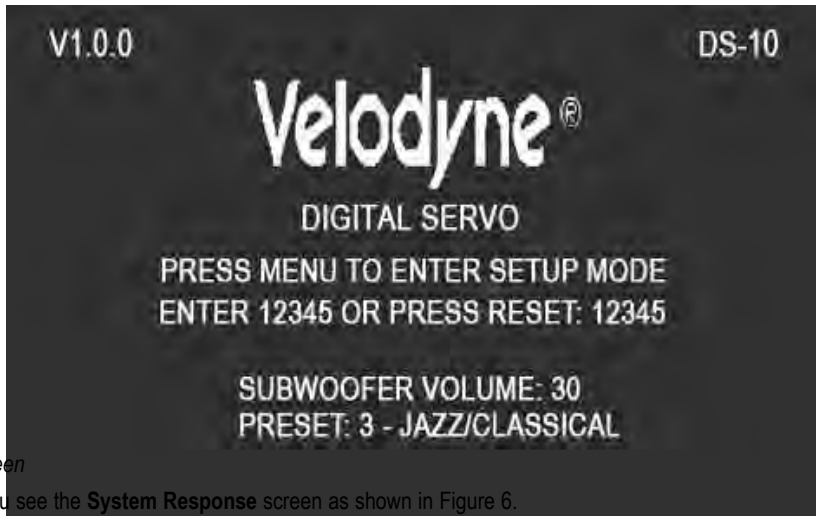


Figure 5: Introductory Screen

2. After pressing **5**, you see the **System Response** screen as shown in Figure 6.

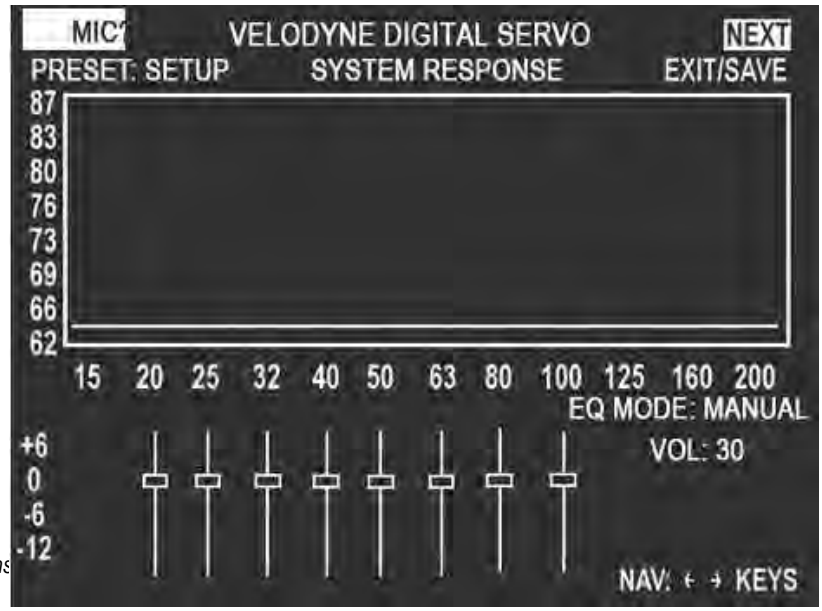


Figure 6: System Respons

Go to the System Settings Screen

To get to the **System Settings** screen:

1. On the **System Response** screen, navigate the cursor to the **NEXT** field.
2. Press **SELECT** on remote.
3. The **System Settings** screen appears as shown in Figure 7.

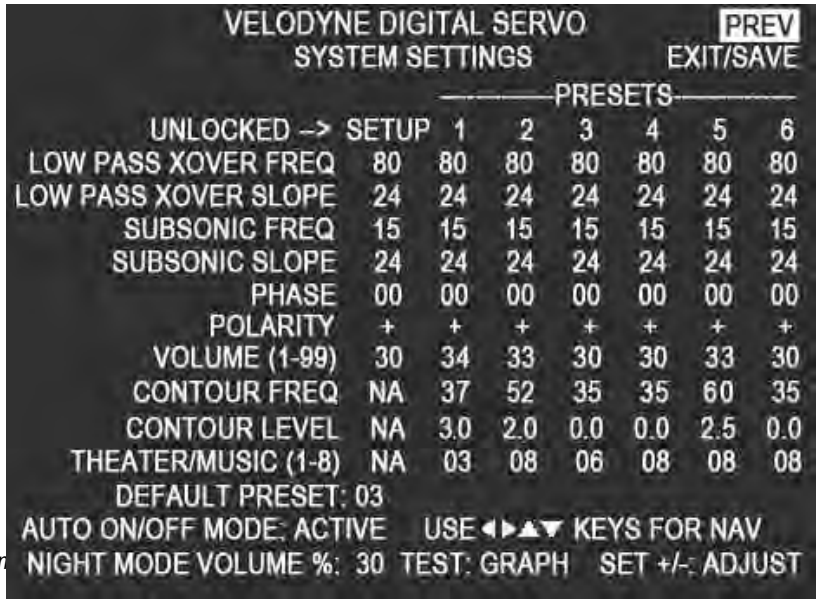


Figure 7: System Settin

Lock the Setup Preset

Before modifying any of the individual preset settings, lock the Setup preset. You can also lock the Setup preset to make sure it doesn't get

changed after setting up your subwoofer. To lock the Setup preset:

1. On the **System Settings** screen position the cursor over UNLOCKED.
2. Press **SELECT** on the remote.
3. **LOCKED** appears on the screen as shown in Figure 8.

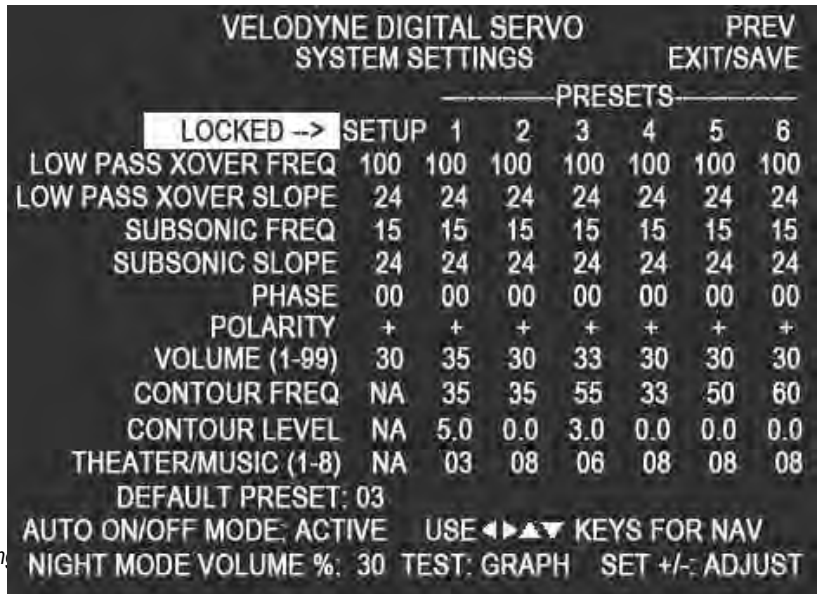


Figure 8: System Settin

Restore Defaults

To restore the factory defaults for all the EQ settings:

On the **Introductory** screen, press **8-9-0** on the remote. The numbers won't appear on the screen as you press them. If you are successful, the screen flickers and then restores the **Introductory** screen; the **DEFAULTS RESTORED** message appears at the top of the screen as shown Figure 9.

Figure 9: Introductory Sc

Save Settings

If you exit any EQ optimization without saving the settings, when the subwoofer power cycles, your settings return to what they were

previously. To save optimization settings:

1. Press the **EXIT** button on the remote, or position the cursor over the **SAVE/EXIT** field on either the **System Settings** screen or the **System Response** screen.
2. The **SAVE SETTINGS?** prompt appears with **YES** selected as shown in Figure 10.
3. Press **SELECT** to save settings.

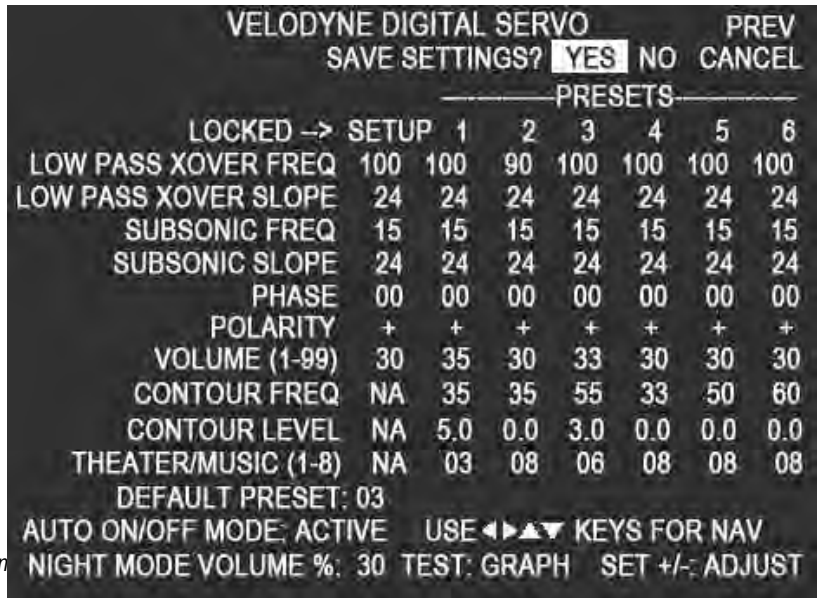


Figure 10: System Settin

- Selecting **YES** and then pressing **SELECT** on the remote button, saves your settings and reboots the subwoofer, returning you to the **Introductory** screen.
- Selecting **NO** and then pressing **SELECT** on the remote button, returns you to the **Introductory** screen without saving; the previous settings saved in memory are used.
- Selecting **CANCEL** and then pressing **SELECT** on the remote button, keeps you on the current screen.

4. While the subwoofer is saving its settings, you will see the video flicker and you may hear a slight pop from the subwoofer. The subwoofer then displays the default preset and the volume. This is normal behavior.

Select a Preset

To select which preset you want to Manual-EQ, be sure to have the microphone connected to the subwoofer and the sweep tone output is playing through the subwoofer and that you've connected the sweep tone output from the subwoofer into your audio system. See the *How To Connect The EQ Output From The Subwoofer To Your Audio System* section.

1. Position the cursor in a preset column (you cannot select the heading) on the **System Settings** screen.
2. Press **TEST**.

OR

1. Highlight the **PRESET** field on the **System Response** screen.
2. Use the **SET +/-** buttons on the remote to select a preset.

OR

1. Press a preset button on the remote on either the **System Settings** or the **System Response** screen.

Make & Save Preset Changes

The simplest customization of parameters you can do is to make and save changes to the presets.

You can modify the preset parameters on the **System Settings** screen.

See the *Optimization Parameters (EQ) and Optimization Parameters (Parametric)* section of this manual for a detailed explanation of the preset parameter settings that you can modify.

1) Go to the **System Settings** screen.
2) Use the remote keys to make changes to the presets as shown in Figure 11.
3) Press **TEST** to review the curve with these settings active.

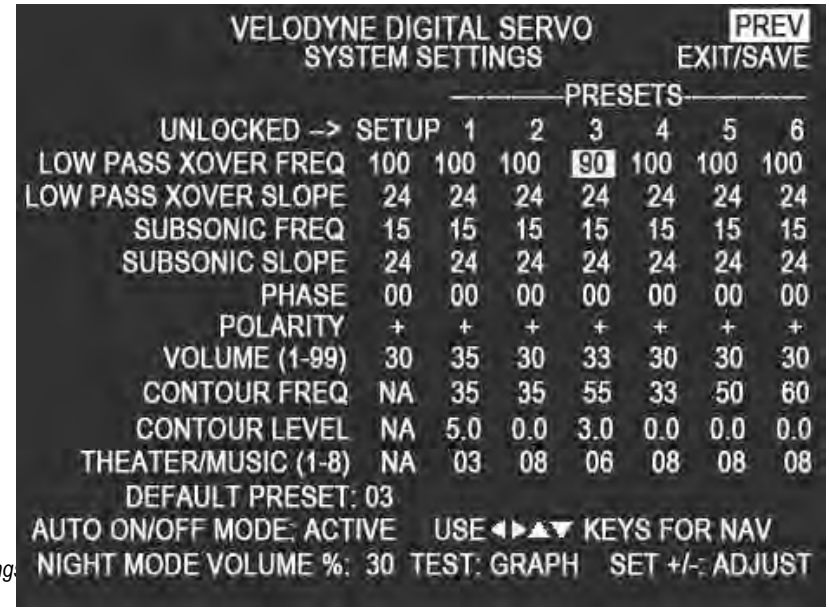


Figure 11: System Setting

Change Default Preset

The Default preset is invoked when the subwoofer powers on. The factory setting is preset 3 for the Default preset. To change the default preset:

1. Use the ▲, ▼, ► and ◄ remote keys to select the current value for the **DEFAULT PRESET** as shown in Figure 12.

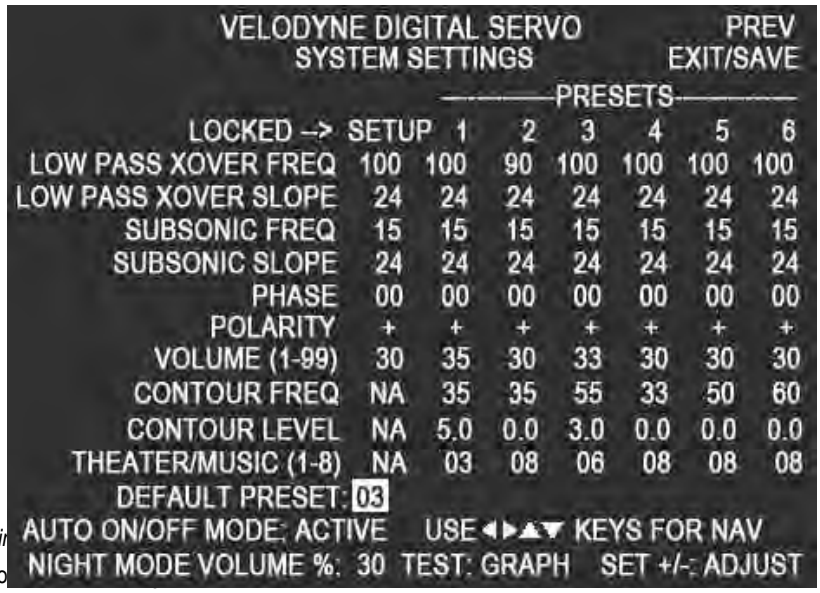


Figure 12: System Setti

2. Push **SELECT** to
3. Use the ▲ or ▼ remote keys to select the preset that you want as the default. Press **SELECT**.

4. Use the ▲, ▼, and remote keys to navigate to the **SAVE/EXIT** field and save per the Save Settings instruction above.

Set Parametric Equalizer Filter Parameters

You can use the parametric equalizer parameters to achieve better room equalization. To use the parametric EQ feature:

1. Go to the **System Response** screen.
2. Position the cursor over the EQ slider box.
3. Press **SELECT**. The values for that particular EQ appear on the right hand side of the screen as shown in Figure 13.

If all you want to change is the level of each EQ, then you do not need to push **SELECT**. Simply push the ▲ or ▼ remote keys when you are on the slider that you wish to change. The other EQ filter parameters will not show on the right.

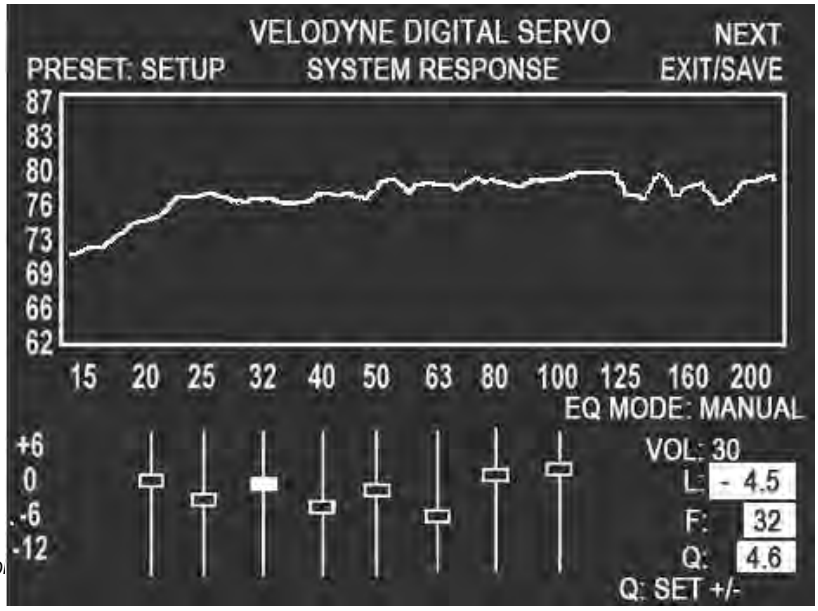


Figure 13: System Respo

4. To manipulate a parametric EQ, use:
   - and to move the frequency up and down. (F)
   - **SET + and SET –** to change the Q value. (Q)
   - ▲ and ▼ to adjust the level of the EQ. (L)

A selected EQ that has been moved with its level changed and Q adjusted is shown in Figure 14:

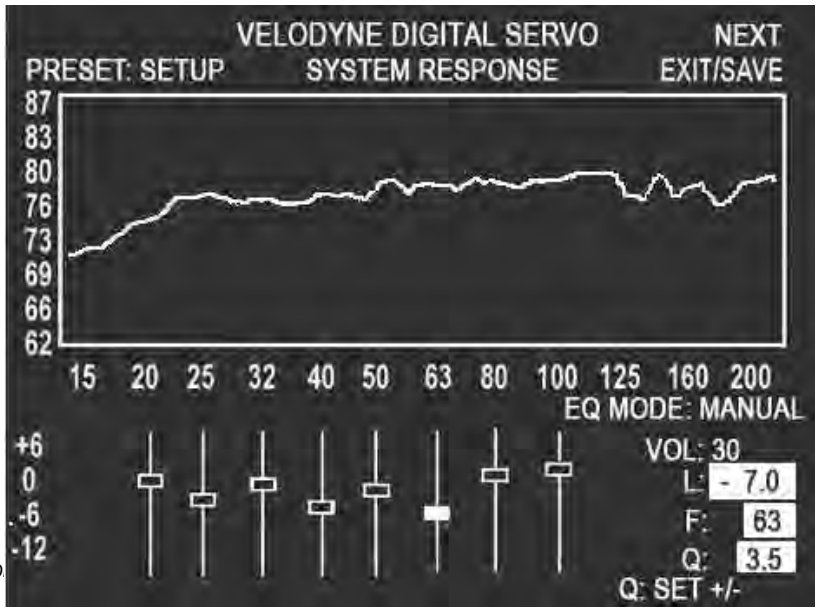


Figure 14: System Respo

5. To unselect the EQ, press **SELECT** again.
6. Use and to position the cursor on another EQ, if desired, and repeat Step 3, until the room is equalized.

Don't p more than one EQ at one frequency. EQs can be close, but not stacked. If you find you need to stack the EQs at one frequency in order to get enough output, you are probably working with a room mode. In this case, it is best to move the location of the subwoofer or listening position instead.

Running Self-EQ Optimization – Your First EQ

The easiest EQ optimization to perform is the Self-EQ. With Self-EQ the subwoofer generates its own sweep tone. To perform Self-EQ optimization:

1) Remove the microphone, mic cable and stand from the accessory kit. Carefully snap the microphone into the stand and attach the larger end of the cable to it. See the *Digital Servo User's Manual* for more information.
2) Place the microphone at the main listening position.
3) Attach the small end of the mic cable to the jack on the left side of the subwoofer front control panel.
4) Connect your subwoofer to your TV video input as described above in the *Make Video Connection between TV and Subwoofer* section.
5) Make sure the subwoofer is on and your audio system is not playing any signal.
6) Press **3 – 2 – 1** on the remote to start Self-EQ; the **System Response** screen will display as well. The subwoofer's front display status message shows **SE**.

Once the Self-EQ process starts, you can press **RESET** on the remote to stop Self-EQ. If you exit back to the **Introductory** screen, you can't see the Self-EQ frequency response curve again.

7) On the **System Response** screen, **SELF** option shows in the **EQ MODE** area.

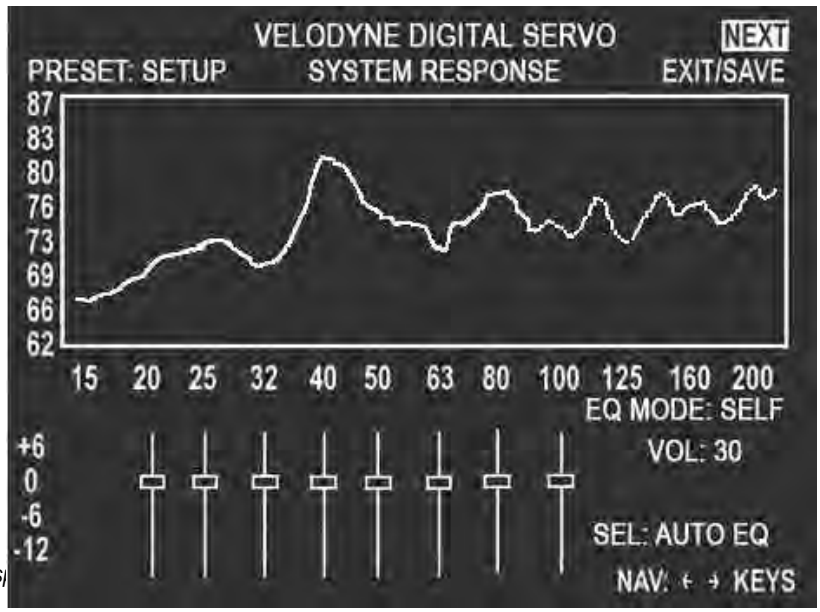


Figure 15: System Res

8) You can watch the subwoofer smooth its frequency response by adjusting the parametric EQ filters on the **System Response** screen. Self-EQ doesn't change the Setup preset parameters (volume, crossover, etc.) and uses the crossover set to 160 Hz.
9) When Self-EQ finishes, the sweep tones stop, the front status message shows **End** for 10 seconds, the subwoofer reboots by turning itself off and back on. The subwoofer display shows the preset number and then volume level. During this process the new filter settings are saved into the subwoofer's memory.

Running Auto-EQ Optimization – Stepping Up in Power

The next level up in the Digital Servo EQ optimization methods is Auto-EQ optimization. To perform Auto-EQ optimization:

1) Set up the microphone as in the Self-EQ instructions above.
2) Connect your subwoofer to your TV video input as described above in the *Make Video Connection between TV and Subwoofer* section.
3) Make sure the subwoofer and your audio system are both on.
4) Place the Digital Servo Sweep Tone CD into your disc player and press play.
5) Once the sweep tone starts to play, adjust the receiver or processor output level to about the level of a normal-loudness conversation at the mic.
6) Press and hold **EQ** on the remote until Auto-EQ starts; you will see on the **System Response** screen the **AUTO** option in the **EQ MODE** area. See Figure 16.

The Auto-EQ proceeds until one of the following occurs:

- Auto-EQ finishes successfully, saving the settings.
- You decide to quit, and press **RESET** on the remote. You exit back to the **Introductory** screen, you don't see the Auto-EQ frequency response curve any more.
- You move the cursor off the **AUTO** field (in which case the field automatically reverts to Manual-EQ).
- The frequency response level is too high (peaks over 87 dB) or too low (average level below 70 dB).
- The Sweep Tone CD stops playing.

7) The Digital Servo subwoofer not only adjusts the Setup preset EQ filter levels as you watch, but it also adjusts the subwoofer level, crossover, slope, and phase during the Auto-EQ optimization process.
8) You can also watch the status messages during the process in the upper left hand corner of the TV screen.
9) When Auto-EQ optimization finishes, the front display status message shows **End** for 10 seconds, the subwoofer reboots by turning itself off and back on. The display shows the preset number and then volume level. During this process the new filter settings are

saved into the subwoofer's memory.

10) While the subwoofer is rebooting, shut off the Sweep Tone CD and remove it from the player.

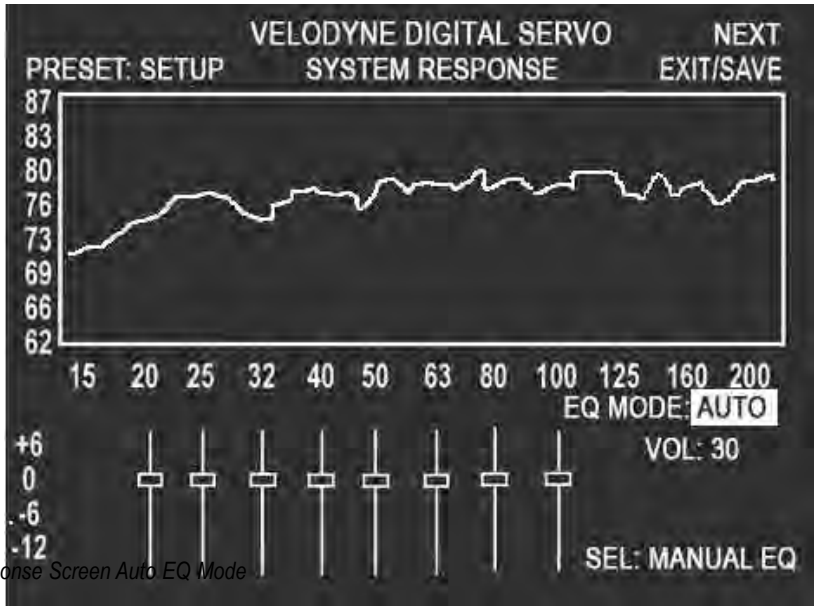


Figure 16: System Response Screen Auto EQ Mode

Running Manual EQ Optimization– Adjust it to Your Liking

In some particularly problematic rooms, it may be necessary to employ even further adjustment than the Auto-EQ. Manual EQ gives enough flexibility to get the subwoofer response very flat:

1) Set up the microphone, subwoofer and Sweep Tone CD as in the Auto-EQ optimization instructions.
2) Connect your subwoofer to your TV video input as described above in the *Make Video Connection between TV and Subwoofer* section.
3) Set the system playback volume level as in the Auto-EQ optimization instructions.
4) Push 1 – 2 – 3 – 4 – 5 on the remote. If you are already on the **System Response** screen, select the **MANUAL** option in the **EQ MODE** area.
5) Click **Mute**. You can now see the low frequency character of the satellites so that you can make a judgment about their roll-off frequency and slope to properly blend to them with the Digital Servo subwoofer.
8) Click **Mute** again to restore the subwoofer to playing.

In Manual-EQ, if you press **RESET** on the remote, you are prompted if you want to save and exit, exit without saving, or to cancel the exit action.

9) Adjust the preset parameters.
10) Adjust the parametric filter EQ parameters.
11) Save your changes as described in the Save Settings section.

Perform Listening Test

As a final thought on matching your Digital Servo subwoofer to your room, don't forget the objective listening test. That is, make sure the unit

sounds good to you! Often, you may want to add a bit more bass than what would normally be considered flat even after you remove the major peaks and valleys to achieve a flat frequency response. This is quite normal because human hearing rolls off rapidly below 100Hz, causing the bass not to sound as loud. In order for the bass to sound flat to you, especially at lower levels, you may need to increase the subwoofer volume in relation to the satellite speakers. An increase of about 2 dB to 8 dB is normal.

To raise the subwoofer volume in relation to the satellites:

- Raise the level for the subwoofer in the speaker level setup of your surround receiver or processor.

OR

- Raise the volume of your Digital Servo subwoofer after you have finished your room equalization and other settings.

INTRODUCTORY SCREEN RUNTIME INACTIVE MODES

This section describes the appearance of the Introductory screen with various runtime messages that are shown when the subwoofer is inactive. In all cases, reactivating the subwoofer will take only a couple of seconds as the subwoofer starts up.

Standby Mode

Figure 17 shows the message displayed when the Standby feature is engaged. The subwoofer enters Standby mode if this mode is set to **ACTIVE** in the **System Settings** screen, saved, and has not had any input signal for 10 to 15 minutes.

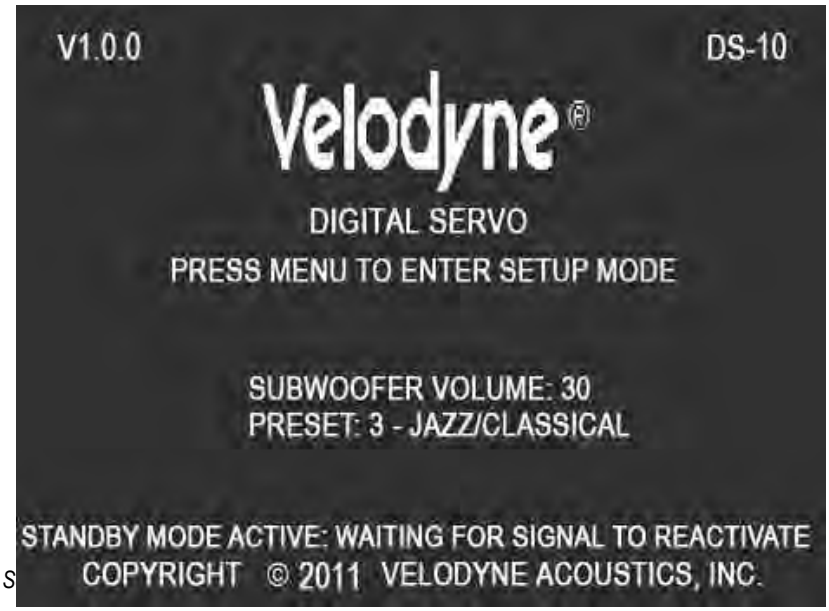


Figure 17: Introductory S

Power Off Mode

Figure 18 shows the message displayed when the on the remote is pressed, powering down the subwoofer. When in this mode,

press to reactivate the unit.

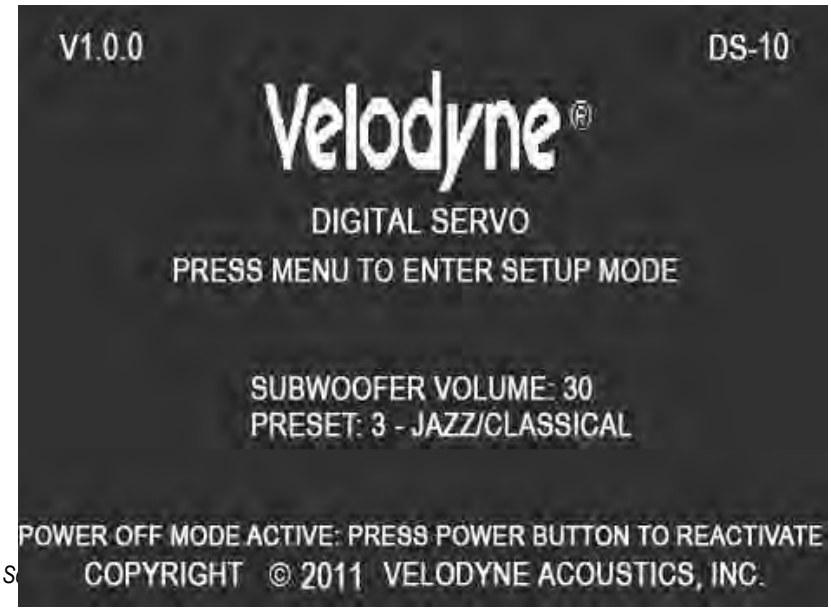


Figure 18: Introductory S

Waiting for 12 Volt Trigger Mode

Figure 19 shows the message displayed when the unit is waiting for a 12 Volt trigger to activate after the **AUTO ON/OFF MODE** is set to **12V TRIGGER** operation on the **System Settings** screen and saved.

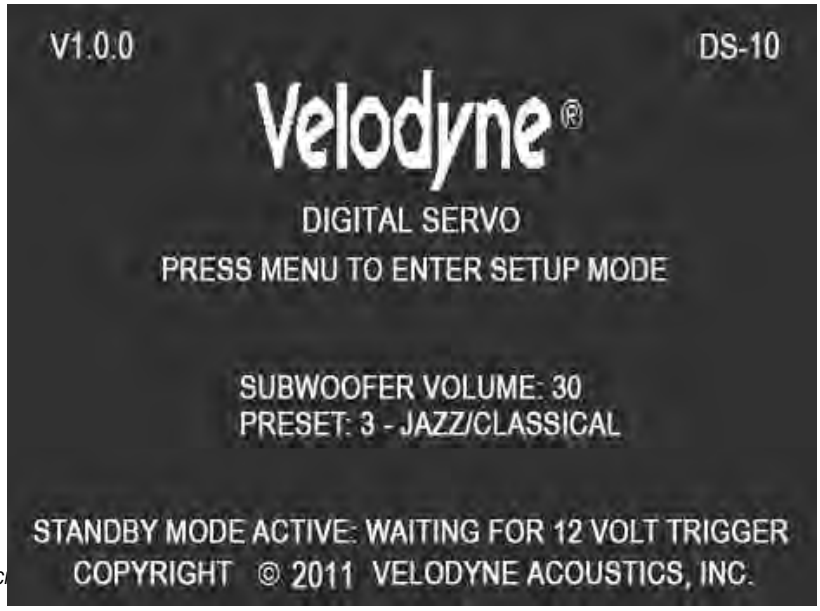


Figure 19: Introductory Sc

Defeat Subwoofer's Low Pass Crossover Filter

In rare cases you may want to permanently defeat the subwoofer's low pass crossover. For example, the subwoofer's input from the receiver

is limited by the receiver's internal crossover to the bass frequencies or you simply would rather not use the subwoofer's crossover filter. To defeat the low pass crossover:

1. Navigate to the **System Settings** screen.
2. Move the cursor down to **LOW PASS XOVER FREQ** and push **SELECT**.
3. Press **RESET**.
4. The screen shown in Figure 20 appears.
5. Exit and save per the *Save Settings* instruction above.

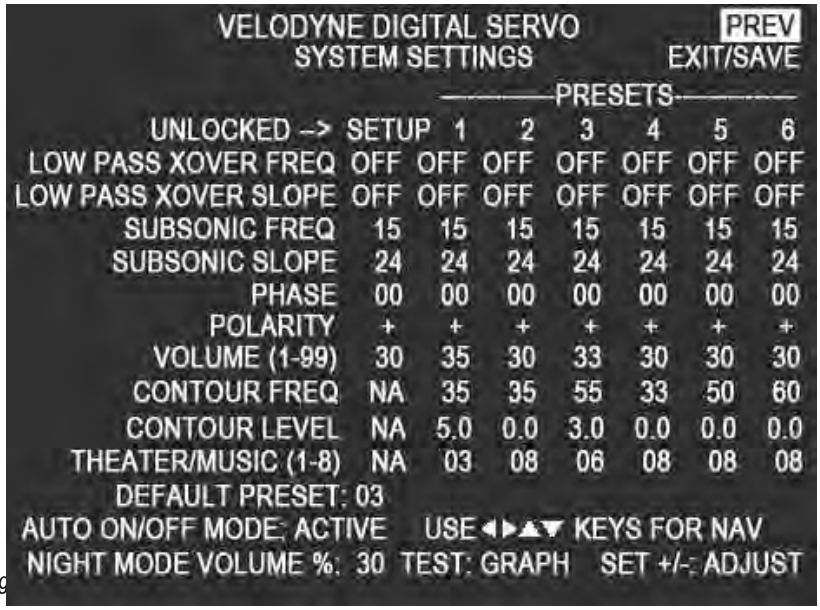


Figure 20: System Setting

Protect Subwoofer from Damage

DO NOT PUT HEAVY OBJECTS or other objects ON TOP of the subwoofer cabinet that could scratch or dent the cabinet.

DO NOT ALLOW OBJECTS TO FALL INTO, OR LIQUIDS TO SPILL ON, THE SUBWOOFER CABINET.

DO NOT EXPOSE SUBWOOFER TO DRIPPING OR SPLASHING FROM LIQUIDS.

DO NOT PLACE LIQUID-FILLED OBJECTS ON OR NEAR THE SUBWOOFER. Examples of liquid-filled objects include flower vases, beverages and liquid-fueled lamps.

DO NOT OPERATE THE SUBWOOFER NEAR ANY BODIES OF WATER: BATHTUBS, SWIMMING POOLS, LAKES, ETC.

DO NOT OPERATE THE VELODYNE DS-10 SUBWOOFER OUTSIDE OF BUILDING STRUCTURES.

DO NOT PUSH FOREIGN OBJECTS OF ANY KIND into the subwoofer or connector openings, other than the proper cables.

DO NOT PLACE BURNING CANDLES, INCENSE, OR SMOKING PRODUCTS ON TOP OF OR NEAR THE SUBWOOFER.

DO NOT PLACE A LAPTOP COMPUTER ON TOP OF THE SUBWOOFER. Damage could occur to either the laptop hardware or the subwoofer finish.

Clean

USE A CLEAN, SOFT DAMP CLOTH to remove dust or fingerprints from the subwoofer cabinet. Unplug the subwoofer power cord from the power outlet before cleaning to prevent static electricity from damaging the subwoofer during cleaning.

DO NOT CLEAN THE SUBWOOFER CABINET with detergents, soaps, abrasives, aerosol sprays, chemical solvents, alcohol, or other cleaning solutions.

Troubleshoot

SUBWOOFER ISN'T PLAYING

1. Verify unit is plugged in and power outlet used is active.
2. Verify the power switch is on.
3. Verify the subwoofer is connected to a source and all 12V triggers are on.
4. Verify the subwoofer can produce sound. A good way to test this is to press 3-2-1 on the remote control while pointing it at the IR sensor on the subwoofer. The woofer should play the sweep tone used for room Self-EQ.

IF THE BASS DOESN'T SOUND LOUD ENOUGH TO YOU:

1. Increase the subwoofer's VOLUME level.
2. Increase the receiver's LFE or SUB OUT volume level, if it is adjustable.
3. Put the subwoofer closer to a corner of your room.

IF THE SUBWOOFER OUTPUT IS DISTORTED, INTERMITTENT OR STOPS:

The subwoofer may have shut down due to the protection circuitry.

1. Reduce the volume setting; or
2. Shut the subwoofer off until normal operating conditions return.

TV SHOWS DISTORTED COLORS.
Some TVs are particularly sensitive to stray magnetic fields. If your TV shows distorted colors after installing your subwoofer, simply increase the distance between your TV and your subwoofer until normal color returns.

POOR VIDEO QUALITY on SETUP SCREENS on TV
Many new receivers and AV processors support HDMI connectivity and can up-convert legacy source material to true high definition 1080i/p output. If you're having difficulty currently seeing the video from your DS-10 subwoofer, go into the receiver's setup menu and select a lower output resolution. You may also find that it's helpful to use a composite to S-video adaptor to help in this process and go into your receiver using the S-video input. Doing so eliminates one step in the video processing chain.

OTHER ISSUES see SERVICE BULLETINS and FAQs
The **Support > Service Bulletins** and **Support > FAQs** pages of www.velodyne.com also contain information about setting up your subwoofer.

Service

DO NOT ATTEMPT TO SERVICE THE SUBWOOFER YOURSELF beyond what is described in this owner's manual.

ONLY USE QUALIFIED SERVICE TECHNICIANS TO REPAIR DAMAGED PARTS. Service the subwoofer using qualified service technicians when:

- A power cord or plug is damaged
- The power socket on the subwoofer is damaged
- Objects have fallen into the subwoofer or liquid has spilled into the subwoofer
- The subwoofer was rained on or has become partially or fully submerged in water
- The subwoofer does not operate normally or exhibits a marked change in performance
- The cabinet has been dropped or is damaged
- The subwoofer driver's cone and/or suspension is physically damaged

Packaging

Save the carton and packing materials for future use. Using other packaging for this unit may result in severe damage when shipping or moving. You can use this packaging should you ever move or need to return the subwoofer to Velodyne for service. To save storage space, you can flatten the box and put the other packing material in a plastic bag.

FOR YOUR RECORDS. . .

Date Purchased _____

Dealer _____

Serial # _____

Please register your product online. If you don't have internet access call Velodyne customer service at 408-465-2800 (U.S. or Canada only). Outside of the U.S. and Canada, call the distributor that supplied your product. We'll walk you through the simple registration process.

LIMITED WARRANTY - U.S. AND CANADA ONLY

VELODYNE ACOUSTICS, Inc. ("VELODYNE") warrants all electronics for a period of three years, drivers for a period of five years, and full range speakers for a period of five years. All VELODYNE products have a warranty from the date of purchase against defects in materials and workmanship subject to the following conditions:

1. VELODYNE is not responsible for defects which result from the use of an amplifier or controller other than the one originally supplied with the unit (subwoofer) or defects which result from modifications or repairs made by any component of the system by anyone other than a VELODYNE factory authorized service representative.
2. This warranty is void if any repairs or service covered by the terms of this warranty are made to any component of the system by anyone other than a VELODYNE factory authorized service representative.
3. VELODYNE is not responsible for damage caused by accidents, abuse, misuse, natural or personal disaster or unauthorized modification. The VELODYNE products are not intended for professional or commercial use and VELODYNE is not responsible for damage resulting from such use.
4. The VELODYNE product warranty is limited to units that are purchased from authorized VELODYNE dealers and finalized within authorized dealer locations.
5. This warranty is nontransferable under any condition.
6. Use of this product outside the U.S. and Canada voids this warranty.

TO OBTAIN SERVICE

Information regarding service may be obtained from the dealer from whom you purchased the unit, or by contacting VELODYNE customer service. Warranty service must be performed by a VELODYNE factory authorized service representative within the warranty period set forth above. If VELODYNE determines the unit is defective, VELODYNE will, at VELODYNE's option, repair or replace the product at no charge if the product is forwarded prepaid to a factory authorized service representative. Products forwarded to the factory authorized service representative should be shipped securely and properly packaged, insured and freight prepaid.

WARRANTY OUTSIDE THE UNITED STATES AND CANADA

The Warranty of this product if it is sold to a consumer outside of the United States or Canada shall comply with applicable law and shall be the sole responsibility of the distributor that supplied this product. To obtain any applicable warranty service, please contact the dealer from which you purchased this product, or the distributor that supplied this product.

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