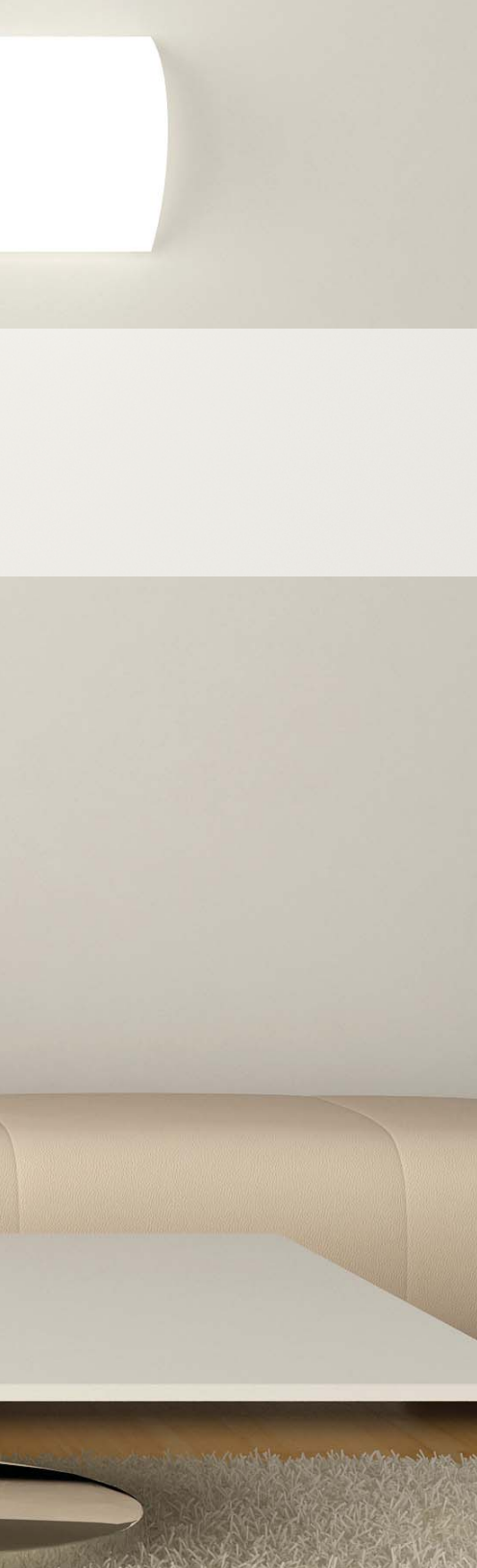


“... redefines what should be expected from a powered subwoofer ... *tremendously ambitious.*”

Jeff Fritz, SoundStage!

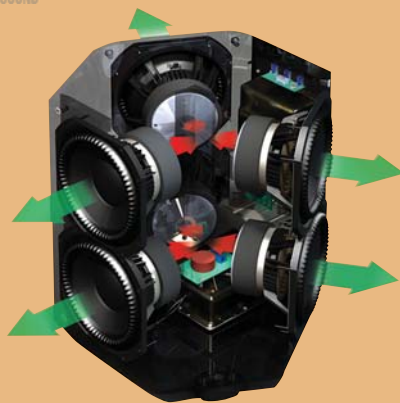


Paradigm Reference *Signature* SUB 1 and SUB 2

The most difficult task in designing SUB 1 and SUB 2 was not just to have these subs play lower AND louder than any other subwoofers in the world, but to do so in a size that wouldn't dominate the average living room. In a cabinet that could be mistaken for a very fine piece of furniture.

And then there are the mind-boggling specs. SUB 2 plumbs the depths to 7 Hz with bloodcurdling output: 112 dB at 10 Hz, 126 dB at 60 Hz (in room). Connected to a 240-volt line, SUB 2 delivers 4,500 watts of continuous RMS Sustained power and a Frankenstein 9,000 watts of Dynamic Peak power through its unique Power Factor Correction system. Talk about bringing your music and movies to life! SUB 1 is no slouch either, delivering 1,700 watts of continuous power and 3,400 watts at peak.

With not one, but six cutting-edge drivers in each sub, transient information is conveyed with pristine clarity and perfect precision. Dynamics come through with lightning-fast speed and a power so shattering that it must be heard to be believed. Bass reproduction is eerily accurate and detailed, in large part a result of the unique Vibration-Canceling (VC) Design Architecture ...



Vibration-Canceling Design Architecture: Physics trumps mechanics with a little help from Paradigm

Typically, subwoofer enclosures contain one large driver. As that driver moves back and forth, the cabinet can vibrate which leads to smeared response, bass that lacks clarity and definition. Well-executed cabinet design, like that on Paradigm Reference subwoofers, typically includes sophisticated and extensive physical bracing inside the enclosure.

So why, when Paradigm puts six drivers in a single cabinet without significant physical bracing, does a martini set on top, while the subs are playing, barely elicit a ripple? Designed, engineered and manufactured by Paradigm in North

America, SUB 1 and SUB 2 are movers, not shakers ... massive air movement, massive output, virtually vibration-free.

Six identical, perfectly balanced state-of-the-art drivers are radially aligned (two on each side) inside the cabinet. As opposing forces of equal magnitude, the powerful vibration-reaction forces (*see the arrows in diagram, left*) effectively cancel each other out. Barely a ripple disturbs the martini placed on top of the cabinet (*see right*), such is the degree to which unwanted, distortion-inducing vibrations are reduced.

How do they compare? **SUB 1:** The best subwoofer in its price range! | **SUB 2:** The best subwoofer in the world, period.

These Subs are Movers, not Shakers ... Massive Air Movement, Massive Output, Vibration Free

Our Vibration-Canceling (VC) Design Architecture (*see above*) is only part of the story. There's still no replacement for displacement: In a small, compact form factor, six 10" drivers in SUB 2 move more air than a pair of 15" woofers! SUB 1's six 8" drivers move as much air as two 12" woofers. The other part of the story lies in the cutting-edge design of the bass drivers:

Mineral-Filled Co-Polymer Polypropylene Cones: A 30% mineral content has introduced additional cone stiffness for a measurable increase in repeatability and consistency. Response is instantaneous—low, loud, fast and tight, unveiling layers and layers of low-frequency detail, with consistently perfect pace.

Overmolded NLC™ Non-Limiting Corrugated TPE Surrounds and Nomex® Cloth Spiders: These extreme low-density NLC™ surrounds on SUB 1 were FEA-optimized and overmolded onto the cones in house. Ten times more effective than standard thermoplastic elastomers in damping vibrations and resonances, the corrugated material works in tandem with our Vibration-Canceling Design Architecture to ensure not a hint of distortion exists, even at peak-to-peak excursion (almost 2" / 50 mm in SUB 2!) and full-on output.

RCR™ Resonance Control Ribs: NLC™ surround technology was not required in SUB 2 since the six 10" drivers already allow for larger surrounds. The cones' resonance control ribbing simply reinforces the new VC design architecture. As in SUB 1 cone excursion on each driver is extreme.

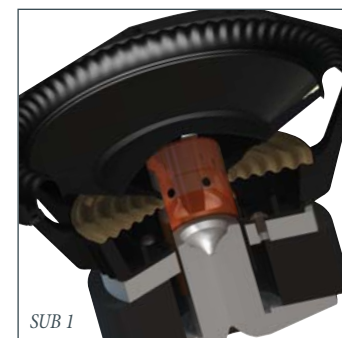
3" (76 mm) 10-Layer (SUB 2) and 1-1/2" (38 mm) 4-Layer (SUB 1) Long-Travel Aluminum Voice Coils: Wound on high-temperature composite polyamide formers in an oversize configuration, the coils provide exceptional stability and support for the extremely high cone excursion.

High-Pressure Die-Cast Aluminum Chassis with AVS™ Airflow Ventilation System Cooling: Large built-in ribs increase the heat dissipation surface providing forced-air cooling during large musical transients and chassis convection cooling at all other times. CNC-machined to ensure a precision fit.

Magnetic Pole Piece: FEA-optimized, tooled to support the extreme excursion.

Extruded Aluminum Center Heatsink (SUB 2): Provides internal convection and forced-air cooling to wick heat away from the high-velocity low-turbulence pole piece, increasing power handling and reducing distortion.

Computer-Optimized Ceramic (Hard Ferrite) Magnet Assemblies with Balanced Field Geometry: Using Finite Element Analysis, the magnet structures were optimized to yield the most powerful output in a Signature subwoofer to date. Transient and phase-response are exceptional with superb power handling and output linearity.



SUB 1



SUB 2

The most powerful subwoofer in the world...

or an elegant piece of high-end furniture ... at first glance, it's difficult to say.



Model shown: SUB 2

Paradigm Reference *Signature* SUB 1: Dual Ultra-Class-D™ Amplifiers

BIG POWER! Compact Package.

Two cutting-edge Ultra-Class-D™ amplifiers, designed, engineered and manufactured by Paradigm in North America, are housed inside the SUB 1's compact hexagonal cabinet. State-of-the-art amplifier parts include:

Switching Power Supplies: More than 90% efficiency! Optimized to completely and simultaneously control the operation of all six bass drivers. Prodigious total output: 3,400 watts Dynamic Peak Power; 1,700 watts (850 watts each amp) RMS Sustained Power.

More Power from a Compact Package: Our low-noise, ultra-high-power compact transformer (0.4 lb / 0.18 kg) is ideal for SUB 1's compact cabinet. Unlike the large and heavier transformers in a linear power supply, its ETD-core was developed specifically for applications that deliver very high power from a compact form factor. Highest quality MOSFET transistors, noise-suppression networks and an advanced control circuit result in tremendous current with ultra-quiet operation.

Full-Bridge Ultra-Class-D™ Design Output Stage: Operating from split power supply rails it ensures exceptionally low distortion. The high-quality output filter inductors with super-efficient toroidal cores, four high-quality MOSFET transistors on each amplifier (each can carry 65 amps of continuous current), and a noise-suppression network play a significant role. Not only does this design increase the speed of the switching, it also increases switching efficiency.

Precision Components and Dual-Sided Military Spec (FR-4 rated) Glass/Epoxy Circuit Boards: Superior "Reference" quality performance with an enviable degree of reliability over the long term.

Proprietary Amplifier Temperature Sensors: Maintain the safe operating temperature of the dual amplifiers, even under extreme operating conditions.

Advanced Short-Circuit Protection: If current through the MOSFETs exceeds an internally preset limit, a Silicon Controlled Rectifier (SCR) disables the output stage. Essentially a "latching" device, the SCR will not allow the output stage to be re-enabled until power is reset. Reaction time is typically within 10 μ s.

Novel Adaptive PWM (Pulse Width Modulation) Power Processor: Minimizes distortion and optimizes efficiency. Conventional Class-D designs have very low power supply rejection, however Paradigm's Ultra-Class-D™ design inherently rejects variations in the power supply.

Paradigm's Digital Signal Processing (DSP): Sophisticated mathematical algorithms "shape" response, ensuring accurate, consistent and musical bass without distortion, even when the sub is playing at the loudest level. (See graph on page 27)

Gorgeous 5/8" (16 mm) Ultra-Rigid Aluminum Amplifier Panel: Provides revolutionary heat-sinking and mechanical rigidity as well as improved isolation and lower noise.



Rear-Panel Interface



SUB 1/SUB 2 Input and Control Facilities

Input Facilities:

Low-Level Input – RCA:

Allows connection from the RCA (S/E) Left and Right or Sub/LFE Outputs of your Preamplifier/Processor or other suitable low-level source.

Low-Level Input – Balanced XLR:

Allows connection from the Balanced XLR Sub/LFE Output of your Preamplifier/Processor or other suitable low-level source. This input provides the lowest noise and distortion. It is particularly important for long cable runs where noise and distortion could degrade performance.

Control Facilities:

Auto On/Off:

Eliminates the need for a manually operated power switch. Turns the subwoofer on when there is an input signal. If no signal is present, after a period of time it turns off.

Trigger On/Off:

Allows the subwoofer's power on/off to be controlled by components that have a trigger output (preamp/processor, etc.).

Subwoofer Cut-Off with Bypass Option:

(Continuously variable 35 Hz – 150 Hz) Controls the subwoofer's upper frequency cut-off and can be set to match the low-frequency roll-off characteristics of your system's speakers.

Bypass Option:

Allows you to bypass the subwoofer's built-in cut-off control to let your preamp/processor's or receiver's internal bass management system provide the crossover function.

Subwoofer Level Control:

Balances the subwoofer level with that of the other speakers in your system.

Phase Alignment:

(Continuously variable 0° – 180°) Accurately synchronizes your subwoofer and front speakers through their bass frequency overlap region.

Paradigm Perfect Bass Kit included:

- USB Port/PBK Interface (see above):
- Connection of the Paradigm Perfect Bass Kit.
- Possible future upgrades to software in your sub.



Paradigm Reference *Signature* SUB 2: State-of-the-Art “Kilomax” Amplifier

3-Kilowatt Amplifier Platform: Designed, engineered and manufactured by Paradigm in North America, the SUB 2’s state-of-the-art Ultra-Class-D™ amplifier design premiered to rave reviews and great success in the Signature SUB 25. Motivated by their success, our engineers went back to work, tweaking, testing and modifying the amplifier’s circuit board and software. The result is the most powerful subwoofer amplifier we (or anyone else for that matter) have ever produced. We call it the “Kilomax” design because when connected to a 240-volt line, it delivers a monster 4,500 watts of RMS Continuous power and a Frankenstein 9,000 watts of Dynamic Peak power.

Comprehensive Heat Dissipation System: The robust 1/8” (3.2 mm) thick aluminum circuit board (*see inset, below left*) is overlaid with insulated metal substrates. Using aluminum rather than a fiberglass base, while more expensive, encourages exceptionally efficient cooling. Even more robust than ceramic, the aluminum substrates increase power density, minimize thermal impedance and conduct heat more efficiently while also offering greater mechanical durability. FR-4-rated circuit board designs typically require larger heatsinks. In SUB 2, a combination of aluminum and overlaid metal substrates allowed for a heatsink much reduced in size.

Power Factor Correction (PFC): PFC shapes the line current so that it is sinusoidal and continuous in time. This allows the maximum amount of power (95%) to be drawn and with far less noise on the line. To compare: A unit without PFC draws only 60 to 70%

of the available power since the line current is switched on and off by the input rectifier (a noise-inducing process in itself!) at twice the frequency. Current flows at the peak of the line voltage only, effectively choking the line.

No Power Transformer: The output stage is Direct-Connected™ to the power line to provide maximum power.

Advanced Output Stage: Increases switching speed and efficiency. Unlike conventional Class-D designs which use the slow built-in diodes of the output MOSFETS, our Ultra-Class-D™ design steers circulating currents to ultra-fast diodes (ten times faster!).

Opto-Coupled Inputs: Offer better isolation and lower noise.

Short-Circuit Protection: Reacts within 10 μs.

Paradigm’s Digital Signal Processing (DSP): Sophisticated mathematical algorithms “shape” response, ensuring accurate, consistent and musical bass without distortion, even when the sub is playing at the loudest level. (*See graph on page 27*)

Gorgeous 5/8” (16 mm) Ultra-Rigid Aluminum Amplifier Panel: Provides revolutionary heat-sinking and mechanical rigidity as well as improved isolation and lower noise.

Beauty ... and the Beast Within!

Beginning with a beautiful veneer, each cabinet is hand sanded, edges are made flush and exquisitely rounded and lacquer is applied. Cabinets are then left to cure for the better part of a week. Following this, multiple coats of lacquer are again applied. The cabinet is then hand-buffed with a high-end glaze and hand-polished to a high-gloss shine. A pain-staking process indeed, but well worth the time it takes. The most powerful subwoofer in the world and an elegant piece of fine furniture ... in this case, both descriptions are apt.



Printed Circuit Board: 1/8” (3.2 mm) thick





SUB 1

Design

Hexagonal cabinet with multiple high-excursion drivers radially aligned in a Vibration-Canceling Design Architecture, patented built-in Ultra-Class-D™ power amplifier, sealed enclosure, PBK interface, removable grille



SUB 2

Design

Hexagonal cabinet with multiple high-excursion drivers radially aligned in a Vibration-Canceling Design Architecture, patented built-in Ultra-Class-D™ power amplifier with Power Factor Correction, sealed enclosure, PBK interface

NOTE: Due to the incredibly high power and tremendous output the SUB 2's grilles are non-removable

Universal Input Power

SUB 2's Universal Input Power feature allows the subwoofer to operate connected to any line voltage between 108 volts and 265 volts. In order to achieve maximum output, connect to a 240-volt line. (See Dealer for additional information.)

SUB 1

Amplifier

High-Current Discrete-Output, 3,400 watts
Dynamic Peak / 1,700 watts RMS Sustained

Amplifier Features

Auto-on / off, Trigger-on / off, soft clipping, electrical shorting protection, thermal protection

Bass Drivers

Six 203-mm (8 in) mineral-filled co-polymer polypropylene cones, overmolded FEA-optimized NLC™ surrounds, 38-mm (1-1/2 in) four-layer long-excursion voice coils, high-temperature composite Nomex® formers, advanced spiders, 9.2-lb (4.16 kg) hard ferrite magnet / motor structure, AVS™ die-cast heatsink chassis

Low-Frequency Extension*

12 Hz (DIN)

Subwoofer Cut-Off Frequency

Variable 35 Hz – 150 Hz, Bypass Option

Sub / Sat Phase Alignment

Variable 0° – 180°

Line-Level Input

RCA (S/E) Left and Right or Sub-Out / LFE or Balanced XLR. From Sub-Out / LFE-Out of preamp / processor or other line-level source

Line-Level Input Sensitivity

100 mV mono

Line-Level Input Impedance

RCA: 10k ohms, XLR: 20k ohms

Accessory Included

Paradigm Perfect Bass Kit

Height, Width, Depth††

51.6 cm x 50.5 cm x 45.5 cm
20-1/4 in x 19-7/8 in x 17-7/8 in

Diameter of Hexagonal Cabinet

50.5 cm / 19-7/8 in

Weight (unpacked)

49.4 kg / 109 lb each

Finishes

Cherry, Piano Black

SUB 2

Amplifier**

High-Current Discrete-Output, 9,000 watts
Dynamic Peak / 4,500 watts RMS Sustained

Amplifier Features

Auto-on / off, Trigger-on / off, soft clipping, electrical shorting protection, thermal protection

Bass Drivers

Six 254-mm (10 in) RCR™ mineral-filled co-polymer polypropylene cones, FEA-optimized overmolded thermoplastic foam surrounds, 76-mm (3 in) ten-layer long-excursion voice coils, high-temperature composite Nomex® formers, dual advanced spiders, 25.2-lb (10.5 kg) hard ferrite magnet / motor structure, massive center heatsink and oversize pole piece, AVS™ die-cast heatsink chassis

Low-Frequency Extension*

7 Hz (DIN)

Subwoofer Cut-Off Frequency

Variable 35 Hz – 150 Hz, Bypass Option

Sub / Sat Phase Alignment

Variable 0° – 180°

Line-Level Input

RCA (S/E) Left and Right or Sub-Out / LFE or Balanced XLR. From Sub-Out / LFE-Out of preamp / processor or other line-level source

Line-Level Input Sensitivity

100 mV mono

Line-Level Input Impedance

RCA: 10k ohms, XLR: 20k ohms

AC Voltage (See note on Universal Input Power below left)

120v (at 3,000 watts) – 50/60 Hz
240v (at 4,500 watts) – 50/60 Hz

Accessory Included

Paradigm Perfect Bass Kit

Height, Width, Depth††

62.2 cm x 60.4 cm x 57.8 cm
24-1/2 in x 23-3/4 in x 22-3/8 in

Diameter of Hexagonal Cabinet

60.4 cm / 23-3/4 in

Weight (unpacked)

106 kg / 230 lb each

Finishes

Cherry, Piano Black