









# PROFESSIONAL

SUBWOOFERS MIDBASS WOOFERS COMPRESSION DRIVERS HORNS SUPER TWEETERS



#### **SUBWOOFER** LINE

#### **FEATURES**

Recommended for use as a subwoofer in a bass reflex or horn loaded cabinets.
Capabilities: High power handling, Large linear excursion.
Bandpass extension into the very low frequency zone.
High power output with low distortion.
Magnetic assembly was designed with Finite Element Analysis (FEA) for precise utilization and distribution of the magnetic field.
Double poly-cotton spider for precise centering and increased linear displacement of the cone & coil.
4" diameter spun laced fiberglass former withstands high temperatures and is mechanically strong.
Cone is reinforced with non pressed synthetic fibers that greatly improve mechanical stability during large excursions.
Fabric surround treated with rubberized materials for greater durability, better damping, and reduced standing waves.

less power compression.
Die-cast Aluminum frame is durable and made to perform.
High strength structural adhesives combined with materials that have good thermal resistance increase durability and reliability.



MODEL	15SWS1100	15SWS1000	15SWS800	18SWS1100	18SWS1000	18SWS800
Diameter	15"	15"	15"	18"	18"	18"
Impedance (Ω)	8	8	8	8	8	8
RMS (W)	1,100	1,000	800	1,100	1,000	800
Musical Program (W)	2,200	2,000	1,600	2,200	2,000	1,600
SPL 1W @ 1m (dB)	95	95	93	97	96	95
Frequency Resp. @ -10dB (Hz)	35 to 3,500	38 to 2,000	35 to 1,500	30 to 3,000	37 to 2,000	30 to 1,500
Resonance (Hz)	37	36	37	34	37	32
Voice Coil diameter in. (mm)	4 (100)	4 (100)	4 (100)	4 (100)	(4) 100	(4) 100
Voice Coil	Edge wound Al	4 Layer Al	4 Layer Cu	Edge wound Al	4 Layer Al	4 Layer Cu
Magnet Weight oz. (g)	120 (3,400)					
Basket	Die cast aluminum with epoxy finish					

COOLING SYSTEM DETAIL

185W51000

**SUSPENSION** DETAIL

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6W4P

Kapton® - Trademark Du Pont

8W4P



10MB3D

# **MIDBASS**

#### MB

- For midbass boxes that require high power handling, efficiency, high fidelity, and low distortion.
   Extremely versatile these speakers can be used in two-way, three-way and line array systems
- Extremely versatile these speakers can be used in two-way, three-way and line array systems.
  Magnet structure was designed with Finite Element Software (FEA) so that the magnetic field was optimized and evenly distributed. The 12" model has a copper shorted turn on the pole piece to lower distortion and extended the upper frequency response.
  Specially treated paper cone is reinforced with special fibers making it lighter, stronger and better sounding in the midbass.
  Edge treated surrounds are either accordion or m-roll style to increase linearity during large excursions. Added advantages include the reduction of standing waves and improved acoustic coupling.
  Efficient venting cools the voice coil which reduces power compression, increases reliability and raises maximum SPL.
  Low profile die cast aluminum frame is easer to install in smaller, shallower and horn loaded enclosures.
  High temperature structural adhesives form a material bond with high sheer strength greatly improving the durability and reliability of the product.

#### W4P

- Recommended for use in systems that require flat frequency response with extended range from the midbass to the upper midrange.
  An excellent choice when small unobtrusive speakers are called for in houses of worship, hotels, schools, clubs, restaurants and retail localizations.

- Iocalizations. Durable copper voice coil on Kapton<sup>®</sup> is large enough to handle a lot of power but light enough for extended frequency response. Special resins are used to treat the long fiber paper cone increasing strength and improving sound quality. Cloth (8") and foam (6") half roll surrounds are treated to improve stability during high excursions, increase acoustic coupling and help dampen standing waves.
- dampen standing waves. •Stamped steel epoxy coated frame is resistant to oxidation and won't bend even under harsh conditions.



MODEL	8MB4P	10MB3P	12MB3P	6W4P	8W4P
Diameter	8"	10"	12"	6"	8"
Impedance (Ω)	8	8	8	8	8
RMS (W)	250	300	500	100	150
Musical Program (W)	500	600	1,000	200	300
SPL 1W @ 1m (dB)	97	100	101	91	96
Frequency Resp. @ -10dB (Hz)	80 to 5,000	150 to 12,000	90 to 4,000	80 to 9,000	100 to 6,500
Resonance (Hz)	105	80	61	76	107
Voice Coil Diameter in.(mm)	1.8 (47)	3 (75)	2.4 (61)	1.3 (32)	1.8 (47)
Voice Coil		Kapton®/Aluminum			Copper
Magnet weight oz.(g)	45 (1,280)	91 (2,570)	93 (2,640)	20 (560)	44 (1,240)
Frame Material	Die cast	Die cast aluminum with epoxy finish			el epoxy finish



#### WOOFFR LINE



15WS600

### WS 600

- Recommended for smaller low frequency cabinets where high power handling, seamless linearity and low distortion sound is required.
  Ideal for touring and fixed installations. Recommended for use in sidefill and stage monitor speakers.
  Magnet assembly design optimized by finite element software (FEA) to improve the control of the flux in the gap.
  Double spiders control the alignment of the cone during high excursions.
  4<sup>a</sup> diameter Copper voice coil on a high temperature Kapton® former for increased power handling and structural durability.

- Kapton® former for increased power handling and structurar durability. Composite cellulose cone that is reinforced with long synthetic fibers improves mechanical stiffness, damping, and reduces standing waves. Efficient vented cooling system reduces power compression and improves efficiency. High temperature structural adhesives permanently bonds components increasing durability and reliability.









MODEL	12WS600	15WS600	18WS600	
Diameter	12"	15"	18"	
Impedance (Ω)	8	8	8	
RMS (W)	600	600	600	
Musical Program (W)	1,200	1,200	1,200	
SPL 1W @ 1m (dB)	95	97	98	
Frequency Resp. @ -10dB (Hz)	45 to 3,000	40 to 3,500	35 to 3,000	
Resonance (Hz)	46	35	33	
Voice Coil Diameter in. (mm)	4 (100)	4 (100)	4 (100)	
Magnet Weight oz.(g)	94 (2,700)	94 (2,700)	94 (2,700)	
Frame Material	Die cast aluminum with epoxy finish			

# Harman Pro Group | 2012 Section: 06

**UBL** 



### PW

Recommended for use in small and medium-size venues where high performance reproduction of the critical midrange frequencies are desired.
The right choice for two way loudspeakers that are used for sound reinforcement in auditoriums, ballrooms, nightclubs, and live music staces.

reinforcement in auditoriums, balirooms, nightclubs, and live music stages. •Precision wound copper voice coil is bonded to a Kapton® former and coated so that it holds it's structural shape under high power conditions. •Paper cone reinforced with long fibers is specially treated to ensure faithful reproduction and tone in the voice band. •Accordion edge fabric surround is specially treated to reduce fatigue and lower distortion. •Aluminum dust cap dissipates heat from the voice coil improving power handling and reducing power compression. No aluminum dust cap on (8PW3, 10PW3, 15PW6, and 15PW4). •Mechanically strong and weather resistant epoxy coated stamped steel frame.









	MODEL	8PW3	10PW3	12PW3	15PW3	15PW6
	Diameter	8"	10"	12"	15"	15"
	Impedance (Ω)	8	8	8	8	8
	RMS (W)	125	150	150	250	400
ŧ	Musical Program (W)	250	300	300	500	800
P P	SPL 1W @ 1m (dB)	92	98	98	98	97
ar F	Frequency Resp. @ -10dB (Hz)	70 to 8,000	60 to 6,000	60 to 6,000	40 to 4,000	60 to 4,000
dem	Resonance (Hz)	69	73	73	37	37
-Tra	Voice coil Diameter in.(mm)	1.3 (32)	1.8 (46)	1.8 (46)	2.4 (60)	3 (75)
Bn	Magnet Weight oz. (g)	20 (560)	44 (1,240)	44 (1,240)	57 (1,600)	86 (2,440)
Kapt	Frame Material	Stamped steel with epoxy finish				

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#### **COMPRESSION DRIVER** LINE

#### PHENOLIC

- Recommended for midrange applications in multi-way PA's, stage monitors, side fills and high SPL car audio systems.
  High sensitivity, low distortion and smooth response.
  Precisely formed phenolic diaphragm produces high fidelity sound through out the midrange.
  Diaphragm voice coil is bonded to Kapton<sup>™</sup> with high temperature adhesives to increase durability and raise power handling.
  "Phase Plug" is an acoustic transformer with optimized geometry to reduce phase cancellations.
  Magnetic Fluid in the gap (models D305 and D405) helps center the coil, improves heat dissipation, and reduces distortion.
  Quick change drop in diaphragm for easy repair.





(1)Xover 1.200Hz 12dB/oct (2)Xover 2.000Hz 12dB/oct









#### **COMPRESSION DRIVER** LINE

#### TITANIUM

- Recommended for use in high performance compact, two-way, multi-way and line array systems.
  For use in sound reinforcement, side fill and stage monitor loudspeakers.
  World class drivers with excellent performance.
  High sensitivity and linear frequency response.
  Pure TITANIUM Diaphragm is accurately shaped to produce high frequencies with clarity.
  Innovative IPF<sup>®</sup> Impregnated Polymer Fiber (models D3300Ti, D3305Ti) diaphragm surround reduces ringing and makes the high frequencies more linear

- diaphragm surround reduces ringing and makes the high frequencies more linear.
  •DPD<sup>®</sup> Driver Protection Device protection circuit (models D3300Ti, D3305Ti), protects the compression driver by reducing the input power during clipping and overload conditions.
  Precisely designed "Phase Plug" is an acoustic transformer that helps prevent phase cancellations.
  •Copper shorting ring on the pole piece reduces the modulation of the magnetic field, lowers distortion and increases high frequency output.
  •Magnetic Fluid in the gap (models D408Ti, D3300Ti, and D3305Ti) lowers distortion, helps to center the voice coil and wicks away heat.
  •Repair of the driver is easy because the quick change diaphragm indexes to center and has a unique gold-plated contact system (models D3300Ti and D3305Ti).



(1) Xover 2,000Hz 12dB/oct (2) Xover 800Hz 12dB/oct (3) Xover 1,200Hz 12dB/oct

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#### NEODYMIUM / TITANIUM



D2500Ti-Nd

#### **NEODYMIUM / TITANIUM**

•High performance drivers recommended for use in stage wedges, side fills, high output

High performance drivers recommended for use in stage wedges, side fills, high output compact systems, multi-way PA's and line arrays.
World class NEO driver, excellent performance.
High sensitivity, extended top end output and linear frequency response.
Neodymium magnet and the low carbon steel return structure optimally designed using finite element software (FEA). The rare-earth "NEO" magnet generates high force levels (BL) so the size and weight of the driver can be greatly reduced.
Copper shorted turn on the pole piece reduces the modulation of the magnetic field and lowers the inductance of the voice coil improving the high frequency output.
Pure titanium diaphragm is accurately formed with a sophisticated surface pattern that greatly improves the high frequency sound qualities.
Innovative IPF<sup>®</sup> - Impregnated Polymer Fiber surround (models D3501Ti-Nd, D3504Ti-Nd, and D3505Ti-Nd) makes diaphragm movement more pistonic improving the linearity of the frequency response.
DPD<sup>TM</sup> - Driver Protection Device protection circuit (models D3501Ti-Nd, D3504Ti-Nd, and D3505Ti-Nd) acts as a limiter to protect the driver against overload.
Optimized geometry of the "Phase Plug" acoustically loads the diaphragm, reduces resonances and improves phase response.
The Magnetic Fluid in the gap (models D3501Ti-Nd, D3504Ti-Nd, and D3505Ti-Nd) improves heat sink fins to increase thermal dissipation.
Aluminum rear cover has heat sink fins to increase thermal dissipation.
Aluminum rear cover has heat sink fins to increase thermal dissipation.



MODEL	D2500Ti-Nd	D3501Ti-Nd DPD	D3505Ti-Nd DPD	
Throat diameter	1"	2"		
Impedance (Ω)	8 and 16	8 an	d 16	
RMS (W)	80(1)	75(1)		
Musical Program (W)	160	150		
SPL 1W @ 1m (dB)	111	111	108	
Frequency Resp. @ -10dB (Hz)	1,000 to 22,000	500 a 25,000	500 a 20,000	ţ
Min. X-over Freq. 12dB/oct. (Hz)	1,500	800		PC
Voice Coil Diameter in. (mm)	1.7 (44)	3 (75)		T C
Voice Coil	Kapton <sup>®</sup> /CCAW	Kapton <sup>®</sup> /CCAW-edgewound		dem
Magnet weight oz. (g)	4 (115)	22 (610)		Tra
Housing material	Aluminum	Aluminum		Buo
Horn connection	Screw on	Bol	ton	Capto

(1) Xover 2,000Hz 12dB/oct (2) Xover 800Hz 12dB/oct

#### TWEETER/ HORN DRIVER



#### **DRIVER TWEETER**

- speakers. Compact device with reliable performance and high efficiency. 1" (25mm) convex dome phenolic diaphragm. CCAW copper clad aluminum Voice coil. 60° H x 60° V coverage angle with included HM11-25 screw on horn. Repair is simple and easy.

MODEL	DT150
Throat diameter	1"
Impedance (Ω)	8
RMS (W)	75 <sup>1</sup>
Musical Program (W)	150
SPL 1W @ 1m (dB)	108
Frequency Resp. @ -10dB (Hz)	1,500 to 15,000
Min. X-over Freq. 12dB/oct. (Hz)	4,000
Voice coil Diameter in. (mm)	1" (25)
Magnet weight oz. (g)	10 (290)
Housing material	Plastic
Horn connection	Screw on

1)Xover 4,000Hz 12dB/oct

Section:

#### LONG THROW





#### HORN LINE

#### **FEATURES**

Ideal for sound reproduction in small, medium and large-size environments.
Several models available with different sound dispersion designed to fit almost any application.
Optimized to increase directivity which raises max SPL, and to improve loading of the driver which magnifies efficiency.
Designed to couple with Selenium drivers to produce high clarity sounds.





Throat	1"	2"	2"
Material	Plastic	Aluminum	Fiberglass
Sound Dispersion HxV	45° x 45°	45° x 45°	40° x 20°
Low Frequency Limit. (Hz)	600	600	400
Driver Connection	Screw on	Bolt on	Bolt on
Width in. (mm)	6.1 (156)	6.1 (176)	17.5 (445)
Height in. (mm)	6.1 (156)	6.1 (165)	11 (280)
Length in (mm)	10.1 (258)	5.1 (134)	13.8 (352)



4.1 (103)

3 (75)



Length in (mm)

Sound dispersion

9.2 (234)

8.3 (210)

5.9 (151)

MODEL	HC23-25
Throat	1"
Material	Plastic
Sound Dispersion H x V	100° x 40°
Low Frequency Limit. (Hz)	600
Driver Connection	Screw on
Width in. (mm)	10 (254)
Height in. (mm)	5 (128)
Length in. (mm)	5.7 (145)

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Section:

JBL



# SUPER TWEETER

# FEATURES

- Ideal super tweeter when the reproduction of high frequencies must define the instruments.
- •Recommended for PA systems, stage monitors and most sound reinforcement systems in general.
- Extremely high sensitivity and lower distortion
- The geometry of the magnetic circuit was optimized with Finite Element Analysis (FEA) in order to efficiently utilize and distribute the magnetic field in the gap.
- The Phenolic diaphragms ability to hold it's shape is key to the production of high fidelity, high frequency sound.
- •Durability of the super tweeter is increased by using a high temperature voice coil that's bonded to a Kapton® former.
- Components are bonded with high temperature structural adhesives to increase durability and improve reliability.
- Easy diaphragm replacement for faster repairs.





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#### SOUND DISPERSION



0	6	EØ	•	
ST200	ST304	ST350	ST400 BLK	
8	8	8	8	

MODEL	ST200	ST304	ST350	ST400 BLK	
Impedance (Ω)	8	8	8	8	
RMS (W)	70(1)	40(2)	100(2)	150(2)	
Musical Program (W)	140	80	100(2)	150(2)	
SPL 1W @ 1m (dB)	105	106	111	111	
Frequency Resp. @ -10dB (Hz)	2,000 to 20,000	3,500 to 18,000	2,500 to 20,000	3,000 to 20,000	
Voice Coil Diameter	1.8	(46)		1.7 (42)	
Sound Dispersion HxV	40° x 40° 120° x 40°		120° x 40°	40° x 40°	
Magnet weight	8 (220)	11 (320)	17 (470)	15 (430)	
Diaphragm	Phenolic				
Housing material	Plastic				

(1) Xover 5,000Hz 12dB/oct (2) Xover 8,000Hz 12dB/oct

Section:

# JBL AUDIO ENGINEERING FOR SOUND REINFORCEMENT

by John Eargle and Chris Foreman

This book comprehensively covers all aspects of speech and music sound reinforcement. It is divided into four sections: Section 1 provides the tutorial fundamentals that all audio engineers will need, discussing subjects such as fundamentals of acoustics, psychoacoustics, basic electrical theory and digital processing. Section 2 deals with the fundamental classes of hardware that the modern engineer will use, such as loudspeaker systems and components, microphones, mixers, amplifiers and signal processors. Special atten tion is given to digital techniques for system control and to audio signal analysis. Section 3 deals with the basics of system design, from concept to final realization. It covers topics such as basic system type and speech intelligibility, site survey, user needs analysis and project ent. Section 4 discusses individual design areas, such as sports manage facilities, large-scale tour sound systems, high-level music playback, systems for the theater, religious facilities, and other meeting spaces. The book

is written in an accessible style, but does not lack for ample amounts of technical information. JBL and HPro brand products are prominently featured as examples to illustrate the principles and applications. Available at bookstores and on line.

#### JBL LIMITED WARRANTY

The JBL Warranty on professional loudspeaker products (except for enclosures) remains in effect for five years from the date of the first consumer purchase. JBL amplifiers are warranted for three years from the date of the original purchase. Enclosures and all other JBL products are warranted for two years from the date of the original purchase.

Your JBL Warranty protects the original owner and all subsequent owners as long as: A.) Your JBL product has been purchased in the Continental United States, Hawaii or Alaska. (This Warranty does not apply to JBL products purchased elsewhere except for purchases by military outlets. Other purchasers should contact the local JBL distributor for warranty information.) and B.) The original dated bill of sale is presented whenever warranty service is required.

Except as specified below, your JBL Warranty covers all defects in material and workmanship. The following are not covered: Damage caused by accident, misuse, abuse, product modification or neglect; damage occurring during shipment; damage resulting from failure to follow instructions contained in your Instruction Manual; damage resulting from the performance of repairs by someone not authorized by JBL; claims based upon any misrepresentations by the seller; any JBL product on which the serial number has been defaced, modified or removed. JBL will pay all labor and material expenses for all repairs covered by this warranty.

JBL continually engages in research related to product improvement. New materials, production methods and design refinements are introduced into existing products without notice as a routine expression of that philosophy. For this reason, any current JBL product may differ in some respect from its published description but will always equal or exceed the original design specifications unless otherwise stated.

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