



# Product User's Guide

Compact Powered Line Array Systems



VT4887ADP

VT4887ADP-DA

VT4887ADP-AN

VT4887ADP-CN

VT4881ADP

VT4881ADP-DA

VT4881ADP-AN

VT4881ADP-CN





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# SECTION 1 : SAFETY INSTRUCTIONS



## Important

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
15. **WARNING:** To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.
16. Do not expose this equipment to dripping or splashing and ensure that no objects filled with liquids, such as vases, are placed on the equipment.
17. To completely disconnect this apparatus from the AC Mains, disconnect the power supply cord plug from the AC receptacle.
18. The mains plug of the power supply cord shall remain readily operable.





THIS APPARATUS CONTAINS POTENTIALLY LETHAL VOLTAGES. TO PREVENT ELECTRIC SHOCK OR HAZARD, DO NOT REMOVE DRIVEPACK CHASSIS, INPUT MODULE OR AC INPUT COVERS. NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

### **WATCH FOR THESE SYMBOLS**



The lightning bolt triangle is used to alert the user to the risk of electric shock.



The exclamation point triangle is used to alert the user to important operating or maintenance instructions.

### **FCC COMPLIANCE NOTICE**

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

**CAUTION:** Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

### **CSA COMPLIANCE NOTICE**

CSA Certification Applies to Amplifier Module Only

# JBL DRIVEPACK® DECLARATION OF CONFORMITY

## Safety and EMC Compliance Specifications

**EN 55103-1:1997** Electromagnetic Compatibility - Product Family Standard for Audio, Video, Audio-Visual and Entertainment Lighting Control Apparatus for Professional Use, Part 1: Emissions

**EN 55103-1:1997** Magnetic Field Emissions-Annex A @ 10 cm and 1 M

**EN 55022:2003** Limits and Methods of Measurement of Radio Disturbance Characteristics of ITE: Radiated, Class B Limits; Conducted, Class A

**EN 55103-2:1997** Electromagnetic Compatibility - Product Family Standard for Audio, Video, Audio-Visual and Entertainment Lighting Control Apparatus for Professional Use, Part 2: Immunity

**EN 61000-4-2:1995 + A1:1999 & A2:2001** Electrostatic Discharge Immunity (Environment E2-criteria B, 4 kV Contact, 8 kV Air discharge)

**EN 61000-4-3:2003** Radiated, Radio-frequency, Electromagnetic Immunity (Environment E2, criteria A)

**EN61000-4-4:2005** Electrical Fast Transient/Burst Immunity (criteria B)

**EN 61000-4-5:2001** Surge Immunity (criteria B)

**EN 61000-4-6:1996** Immunity to Conducted Disturbances Induced by Radio-Frequency Fields (criteria A)

**EN 61000-4-11:2004** Voltage Dips, Short Interruptions and Voltage Variation

**UL 60065:2003, 7th edition:** Audio/Video and Musical Instrument Apparatus for Household, Commercial and Similar General Use

**IEC 60065, 2001:** Audio, Video and Similar Electronic Apparatus - Safety Requirements

**CAN/CSA E60065-03:** Audio, Video and Similar Electronic Apparatus – Safety Requirements

## SECTION 2 : BEFORE YOU BEGIN

The VERTEC® DP Series systems covered by this manual are not intended for fixed installation in outdoor or high moisture environments. Moisture can damage the speaker cone and surround and cause corrosion of electrical contacts and metal parts. Avoid exposing the speakers to direct moisture. Keep loudspeakers out of extended or intense direct sunlight. The driver suspension will prematurely dry out and finished surfaces may be degraded by long-term exposure to intense ultra-violet (UV) light.

VERTEC® DP Series Compact Powered Line Array loudspeakers can be suspended with available array frames (P/N VT4887-AF, VT4887-SF) or they can be ground-stacked. These systems can generate considerable energy. When placed on a slippery surface such as polished wood or linoleum, a single speaker may move due to its acoustical energy output. Precautions should be taken to assure that the speaker does not fall off a stage or scaffold platform on which it is placed. While it is unlikely that a ground-stacked array will move when properly attached to its array frame, precautions should be taken to assure that the array assembly cannot fall from any surface on which it is placed. Hearing damage, prolonged exposure to excessive SPL VERTEC® DP Series loudspeakers are easily capable of generating sound pressure levels (SPL) sufficient to cause permanent hearing damage to performers, production crew and audience members. Caution should be taken to avoid prolonged exposure to SPL in excess of 90 dB.

### Package Contents

- Product User's Guide (this document)
- JBL DrivePack® compatible loudspeaker
- CD containing System Architect™ software
- AC Power North America/Europe Cord-Set
- Protective Jacket Set
- Warranty Card

## SECTION 3 : INTRODUCTION TO VERTEC® DP SERIES COMPACT POWERED LINE ARRAY SYSTEMS



Shown: VT4881ADP over VT4887ADP

### VERTEC® DP Series Compact Powered Systems

The VERTEC DP Series compact models are part of a family of powered integrated audio loudspeaker systems featuring the JBL DrivePack® amplifier modules, designed in cooperation with Crown International. The JBL DrivePack features cutting-edge technology such as patented high efficiency Class-I power amplifier circuitry. Loudspeaker components include patented JBL Differential Drive® woofers.

This guide covers the following models:

**VT4881ADP**.....1x18" subwoofer system  
**VT4881ADP-DA**.....DPDA network input module, AES digital audio  
**VT4881ADP-AN**.....with optional DPAN network input module, analog audio  
**VT4881ADP-CN**.....with optional DPCN network input module, Cobranet™ digital audio

**VT4887ADP**.....2x8" bi-amplified three-way full range system  
**VT4887ADP-DA**.....DPDA network input module, AES digital audio  
**VT4887ADP-AN**.....with optional DPAN network input module, analog audio  
**VT4887ADP-CN**.....with optional DPCN network input module, Cobranet™ digital audio



## VERTEC DP SERIES, COMPACT POWERED SYSTEMS SPECIFICATIONS

<b>Product Acoustics</b>		
	VT4887ADP	VT4881ADP
Frequency Response ( $\pm 3$ dB):	67 Hz – 20 kHz	34 Hz - 125 Hz
Frequency Range (-10 dB):	55 Hz – 22 kHz	25 Hz - 160 Hz
Horizontal Coverage Angle (-6 dB):	100 deg. nominal (500 Hz – 16 kHz)	N/A
Vertical Coverage Angle (-6 dB):	Varies with array size and configuration	N/A
Maximum Peak Output:	136 dB SPL, 1m	131 dB SPL, 1m
<b>Transducer Sections</b>		
<u>Low Frequency</u>	Two 2168H-1, 203 mm (8 in) dia., 76 mm (3 in) Dual Coil, Differential Drive®, Direct Cooled	One 2269G, 457 mm (18 in) dia., 100 mm (4 in) Dual Coil, Differential Drive®, Direct Cooled, 2000W Cont./8000W Peak
Bandpass Nominal Impedance:	4 Ohms (LF woofers wired in parallel)	4 Ohms
<u>Mid &amp; High Frequency:</u>	MID: Four 2104H 101 mm (4 in) with 25.4 mm (1 in) dia. voice coil HF: Two JBL 2408H 25 mm (1 in) exit compression drive, 38 mm (1.5 in) voice coil	N/A
Bandpass Nominal Impedance:	8 ohms (drivers wired in series-parallel)	N/A
<b>System Electronics</b>		
DP Internal Amplification Output (at load):	DP2; 2200W Peak, 1100W Continuous	DP1; 3600W Peak, 1800W Continuous
DP Output Topology:	DP2; 2-Channel, Class-I	DP1; 1-Channel, Class-I
Signal Processing:	dbx Type IV Conversion System, Precision bandpass filters, limiting, pre-equalization filters and automatic self-test functions	
System Management:	DSP based limiters for mechanical and thermal protection	
Signal Input:	F-XLR Active 20K Ohms Balanced, 10K Ohms Unbalanced	
Signal Loop-Through:	M-XLR (passive pass-through)	
Controls:	Precision 0.5 dB increment Detented 16 dB input attenuator	
AC Power Operating Range:	Auto Select 90-132/VAC 50/60 Hz	
AC Line Voltage:	50/60 Hz, Auto-Detect; 120V/240V ( $\pm 10\%$ )	
AC Input Connector: AC Power Loop-thru:	Neutrik PowerCon (Blue) Neutrik PowerCon (Gray)	
AC Current Requirement:	4A per system at 120V, 3A per system at 240V	5A per system at 120V, 3.2A per system at 240V
<b>Enclosure</b>		
Box Construction:	Wedge frustum 5 degree side angle enclosure. PlyMax™ engineered composite structure, DuraFlex finish, 2 handles	Rectangular enclosure. PlyMax™ engineered wood composite structure. DuraFlex™ finish, 6 handles
Suspension System:	S.A.F.E. hardware, integral hinge bars nest in rigging tubes on box ends. Quick release pins with restraining lanyards	S.A.F.E. hardware, as per VT4887ADP. Suspend with VT4887-AF Array Frame. Set of 4 hinge bars included with VT4881ADP system.
Grille:	Black perforated steel, foam backed	
Dimensions (W x H x D):	787 mm X 279 mm X 563 mm (31 in X 11 in X 22.1 in)	787 mm X 569 mm X 800 mm (31 in X 22.4 in X 31.5 in)
Net Weight:	39.7 kg (87.5 lb)	62.2 kg (137 lb)

## SECTION 4 : VERTEC® DP SERIES TRANSDUCERS



### **2408H High Frequency Compression Driver**

JBL's 2408H features a lightweight neodymium magnet structure, annular polymer diaphragm and a 1" exit. Coupled to a proprietary waveguide engineered to be part of the system's thermal-transfer mechanism, it is designed to deliver crystal-clear sound with superb dynamic range. The 2408H is an 8 Ohm device. Two are included in each VT4887ADP system.



### **2168H-1 Low Frequency Loudspeaker**

The 2168H-1 is an 8" transducer engineered with JBL's patented Differential Drive® technology. These low frequency drivers dramatically reduce driver weight while greatly enhancing all critical performance parameters: frequency response, power output, and distortion. Differential Drive technology features a unique design with heat sinks integrated into the cast aluminum frame for a highly improved performance to weight ratio. The dual voice coil design places the neodymium magnets inside the voice coil assembly, completing the magnetic circuit without the heavy surrounding steel structure of conventional drivers. 8 Ohm device.

*For more information, see JBL Tech Note Vol. 1 Number 33, "Differential Drive Transducers"*

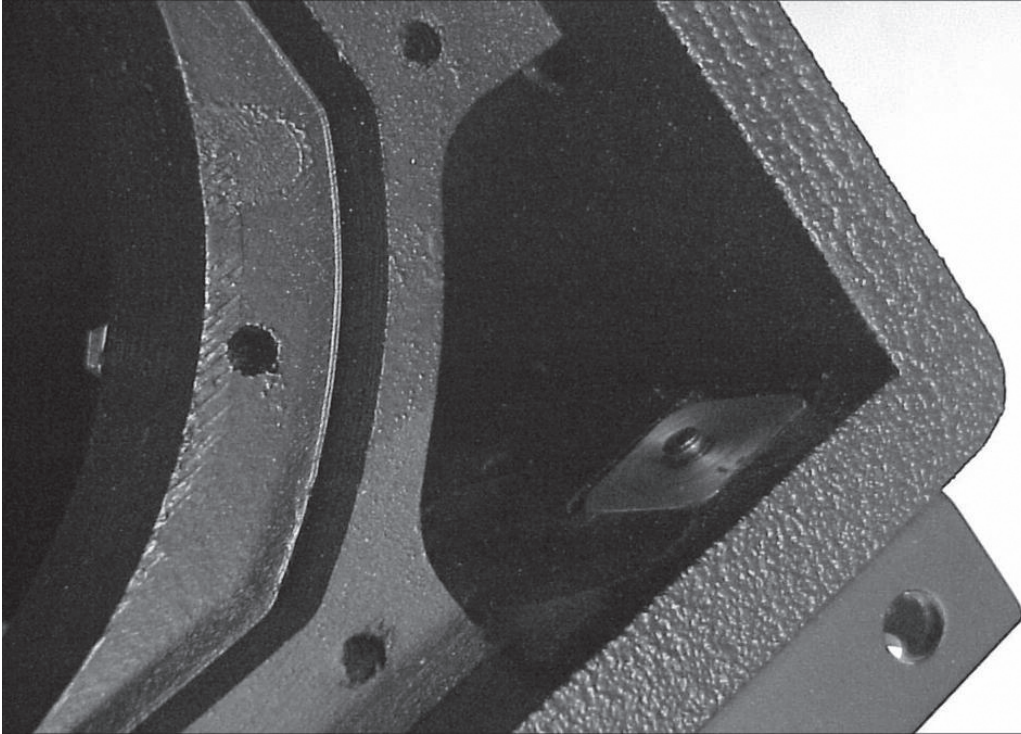


### **2269G Ultra Long Excursion, Differential Drive® Low Frequency Drivers**

Ultra Long Excursion 460mm (18") transducer features 2000 watts continuous (AES), 8000 watts peak power handling capacity. It's the latest example of JBL's patented Differential Drive® dual voice-coil loudspeaker technology, fitted with dual neodymium magnets, JBL's exclusive Vented Gap Cooling™, and an ultra-robust composite cone with a peak-to-peak maximum excursion of 89 mm (3.5").

## SECTION 5 : ENCLOSURE CARE AND MAINTENANCE

VERTEC DP Series enclosures are constructed of JBL PlyMax™, an exclusive hybrid engineered-wood technology designed to reduce enclosure weight while offering exceptional panel rigidity with the appropriate acoustical properties. The exterior of each enclosure is covered with JBL's exclusive DuraFlex™ finish.



### **PAINTING JBL VERTEC DP SERIES SYSTEM PRODUCTS**

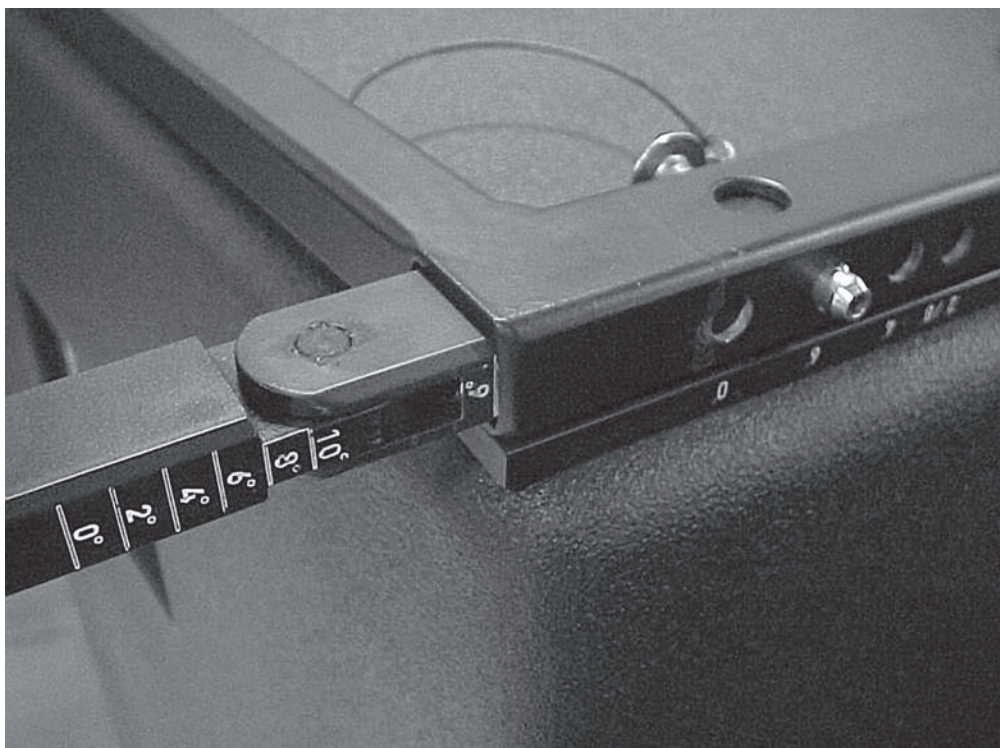
Each JBL Professional VERTEC DP Series system model is readily paintable. The DuraFlex finish provides a lightly textured surface that any household or industrial paint readily adheres to. The result is a speaker enclosure that is able to blend unobtrusively into the decor of any stage set or environment.

#### **Instructions for painting wood enclosures (do not paint the JBL DrivePack®):**

1. Prepare the enclosure surface by cleaning and wiping off dust and film with a damp cloth. It may be necessary to use a mild household cleaner to remove grease. Avoid using a cloth that will deteriorate over the textured surface.
2. Apply as many coats of paint as is required. Application can be by rolling, brushing or spraying. Care must be taken when painting the grille. Avoid any paint or type of application that will clog the open cells in the foam of the front grille. Depending on the type of paint, it may not be wise to spray the grille.
3. For painting systems that are installed in environmentally-hostile locations, it is recommended that an automotive paint should be used for maximum protection.

*Note: for systems that will be transported on a regular basis, oil-based paints or Krylon-type spray paints will give better long-term results than water-based Latex type paints.*

## SECTION 6 : SUSPENSION



### Safety Precautions

*Before attempting to suspend your speakers, read and understand the following safety information.*

### IMPORTANT SAFETY WARNING!

The information in this section has been assembled from recognized engineering data and is intended for informational purposes only. None of the information in this section should be used without first obtaining competent advice with respect to applicability to a given circumstance. None of the information presented herein is intended as a representation or warranty on the part of JBL. Anyone making use of this information assumes all liability arising from such use.

All information presented herein is based upon materials and practices common to North America and may not directly apply to other countries because of differing material dimensions, specifications, and/or local regulations. Users in other countries should consult with appropriate engineering and regulatory authorities for specific guidelines.

Correct use of all hardware is required for secure system suspension. Careful calculations should always be performed to ensure that all components are used within their rated workload before the array is suspended. Never exceed maximum recommended load ratings.

Before suspending any speaker system always inspect all components (enclosure, suspension tubes, pins, etc.) for cracks, deformations, corrosion, missing, loose or damaged parts that could reduce strength and safety of the array. Do not suspend the speaker until the proper corrective action has been taken. Use only load-rated hardware when suspending VERTEC® DP Series loudspeakers.

## Are You New to Rigging?

If your work with suspended loudspeakers also involves rigging, you should do the following:

- Read and study JBL Technical Note Volume 1, Number 14: Basic Principles for Suspending Loudspeaker Systems (available at [http://www.jblpro.com/pub/technote/tn\\_v1n14.pdf](http://www.jblpro.com/pub/technote/tn_v1n14.pdf)).
- Know the Rules for Safe Rigging.
- Attend a safe rigging seminar, such as that presented by professionals like Rigging Seminars™ or by Chain Motor Hoist manufacturers like Columbus McKinnon Corp. (manufacturers of the C/M Lodestar).
- Meet and establish a relationship with a licensed mechanical or structural engineer. Get in the habit of asking them questions instead of guessing about their answers. Learn from what they tell you.
- Meet and discuss this aspect of your business with your Insurance Agent.
- Research and understand the codes, practices, and requirements in the venues where you intend to operate your sound system.

### General Hardware Information

Any hardware used in an overhead suspension application must be load rated for the intended use. Generally, this type of hardware is available from rigging supply houses; industrial supply catalogs and specialized rigging distributors. Local hardware stores do not usually stock these products.

### Attachment to Structures

A licensed Professional Engineer must approve placement and method of attachment to structures prior to installation of any overhead object. The following performance standards should be provided to the Professional Engineer for design purposes: Uniform Building Code as applicable, Municipal Building Code as applicable, Seismic Code as applicable. Installation of hardware and method of attachment must be carried out in the manner specified by the Professional Engineer. Improper installation may result in damage, injury or death.

### Suspension Hardware Inspection & Maintenance

Suspension systems are comprised of mechanical devices and, as such, they require regular inspection and routine maintenance to insure proper function ability. JBL VERTEC® DP Series loudspeakers must be inspected for fatigue at least annually. The inspection shall include a visual survey of all corners and load bearing surfaces for signs of cracking, water damage, de-lamination, or any other condition that may decrease the strength of the loudspeaker enclosure. Accessory rigging hardware provided with or for JBL VERTEC DP Series loudspeakers must be inspected for fatigue at least annually. The inspection shall include a visual material survey for signs of corrosion, bending or any other condition that may decrease strength of the fastener. For other fittings used, refer to the manufacturer's inspection and maintenance guidelines for process.

*JBL is not responsible for the application of its products for any purpose or the misuse of this information for any purpose. Furthermore, JBL is not responsible for the abuse of its products caused by avoiding compliance with inspection and maintenance procedures or any other abuse. Prior to suspending the system, an expert, trained and experienced in flying loudspeaker systems should inspect all rigging parts and components.*

## Industry Resources

Allen Products  
(562) 424-1100  
1635 E. Burnett Street  
Signal Hill, CA 90806  
[www.allenproducts.com](http://www.allenproducts.com)

ATM Fly-Ware  
(562) 424-1100  
1635 E. Burnett Street  
Signal Hill, CA 90806  
[www.atmflyware.com](http://www.atmflyware.com)

M.A.N. Flying Systems  
20 Sidar Road Brook Road  
Industrial Estate  
Rayleigh, Essex SS6 7XF U.K.  
[www.manfly.co.uk](http://www.manfly.co.uk)

McMaster Carr  
Various locations through the U.S.A.  
For a location near you, visit them online:  
[www.mcmastercarr.com](http://www.mcmastercarr.com)

JBL Professional - Tech Note V1 No. 14  
“Basic Principles for Suspending Loudspeakers”

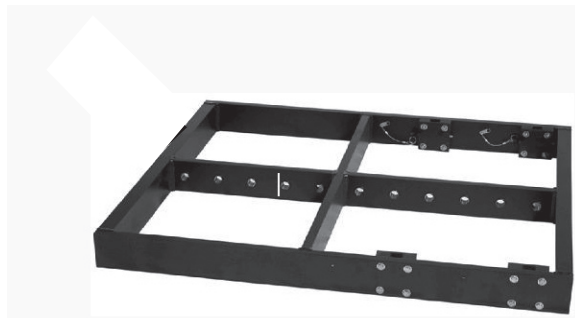
[www.jblpro.com/technote/tn\\_v1n14.pdf](http://www.jblpro.com/technote/tn_v1n14.pdf)

### Safe Rigging

The JBL VERTEC® DP Series arrayable loudspeakers are equipped with integral suspension hardware and should only be suspended using the supplied equipment. The system is designed to facilitate the suspension of the loudspeakers by a qualified person familiar with rigging hardware and industry practices. Improper installation may result in damage, injury or death.

### Working Load Limit

The working load limit (WLL) for any group (“array”) of JBL VERTEC DP Series system products is noted on the appropriate VERTEC Array Frame.



VT4887-AF Array Frame

## SECTION 7 : JBL DRIVEPACK® TECHNOLOGY



### Introduction to the JBL DrivePack Integrated Audio System

JBL DrivePack equipped loudspeakers are a family of fully integrated audio systems, coupling industry-leading loudspeaker technology to a combination of comprehensive digital signal processing and advanced amplifier technology, perfectly matched to the enclosures to deliver superb audio quality and powerful performance.

The DrivePack is attached to the back of each DP-compatible loudspeaker enclosure, creating a seamless electro-mechanical system that offers both convenience and portability along with the unmatched reliability, accuracy and superb sound of JBL loudspeakers. The DrivePack includes onboard DSP functionality to communicate readiness and operational status, including a self-test cycle and lighted indicators for fault detection upon power-up.

#### DrivePack Signal-Processing & Amplification Unit



The DrivePack electronics unit is intended to be used when mounted to a speaker enclosure of 5/8" minimum thickness of wood or composite material and with load impedances of 4 Ohms, 8 Ohms for low and mid frequency channels, and 8 or 16 Ohms for the high frequency channel.

#### OPERATING INSTRUCTIONS

All that is required to get your DP compatible loudspeaker system up and running is to connect an AC power source to the AC Power module via the Neutrik PowerCon™ inlet connector, and a full range line level audio signal to the Input module via the AUDIO IN XLR connector.

Upon initial power-up of the DrivePack, the Blue Power LED will illuminate and the Green DP Ready indicator (located to the left of the input module input level control) will flash during the boot-up and AC line auto-select soft-start process. The JBL DrivePack is equipped with Auto-Sensing Universal AC Voltage Selection and can operate anywhere in the world that has an available 100-120VAC or 200-240VAC power source. On the power-up sequence the JBL DrivePack® input module senses line voltage and sets the high voltage line select relay within about 2 seconds. The system is ready for operation when the Green Ready LED on both the AC Input module and DPIP module is steadily illuminated.

## AC POWER REQUIREMENTS

Standard JBL DrivePack systems are equipped with a DP multi-channel Crown Class-I power amplifier and loudspeaker specific DSP electronics and require appropriate AC power.



**CAUTION:** In compliance with safety agency criteria and proper system operation, it is critical that the system installer observe all electrical safety practices at all times and provide proper earth grounding for all AC Power connections.

## AC POWER CORD KIT

Convenience 120VAC North America NEMA 5-15 Edison type AC plug to PowerCon® connector and 240V Europe CEE 7/7 Schuko type AC plug to PowerCon connector cord sets are provided with this JBL DrivePack product for light-duty shop testing or system configuration type use.

One spare gray Neutrik (P/N NAC3FCB) PowerCon connector is included in the AC Power Cord Set for your convenience to create a pass-through AC power cable. To create a pass-through cable the system installer may choose to simply cut off the AC plug from one of the provided AC cord sets and replace it with the provided Gray PowerCon AC Outlet connector. Follow the wiring convention indicated in Table 1.

NOTE: Tighten set screws to 2.5Nm (1.8lb-ft) torque to prevent opening by hand.

## USER-FABRICATED AC POWER DISTRIBUTION

System owners may choose to fabricate or purchase a custom AC Power cable infrastructure optimized for their specific JBL DrivePack system configuration. See Table 1 for custom application wiring and connector information.

**NOTE:** Parts not provided.



**CAUTION:** Do not exceed 80% current rating of any AC connector at any time! See Table 2 for current draw information.

**Table 1. User-Fabricated AC Cable and Connector Information**

AC Inlet Cable Connector	Neutrik PowerCon® NAC3FCA quick lock 3-pole A-type cable connector for power inlet. Rated current per contact: 20 A (rms), Rated Voltage: 250VAC.
AC Outlet Cable Connector	Neutrik PowerCon® NAC3FCB quick lock 3-pole B-type cable connector for power outlet. Rated current per contact: 20 A (rms), Rated Voltage: 250VAC.
Wiring	Cable: screw-type terminals or soldering nom. wire size/contact: 2.5 mm <sup>2</sup> / 14 AWG
Wiring convention	Ground – Ground, Neutral – Neutral, AC Hot – AC Hot
With the two non-interchangeable types of connectors (A-type, B-type) it is impossible to produce a short circuit. Mating connectors (combination) are identified by mechanical keyways and by color.	

**Table 2. Power Connector Coding**

A-type (POWER INLET);	Cable connector: Blue
B-type (POWER OUTLET)	Cable connector: Gray, with Blue bushing



### DP2 AC Power Ratings

Description	120VAC	240VAC	
Idle (Sleep Mode)	< 20W		
Quiescent Power Draw	< 75W		
1/8th Power, Pink Noise (UL/CSA)	400W, 4A rms	400W, 3A rms	
1/3rd Power, Pink Noise	8 A	4.6 A	
Maximum Power Draw	3950W		
Inrush Current	Inrush current limiting via PTC soft-start		
AC Power Module Connectors: 12A Max, 100-120VAC/220-240VAC, 50-60 Hz. Class 1 Wiring			16 AWG (1.5 mm <sup>2</sup> )
Inlet Connector Rating	4A	3A	
Outlet Connector Rating	8A	9A	

### DP1 AC Power Ratings

Description	120VAC	240VAC	
Idle (Sleep Mode)	< 10W		
Quiescent Power Draw	< 60W		
1/8th Power, Pink Noise (UL/CSA)	600W, 5A rms	600W, 3.2A rms	
1/3rd Power, Pink Noise	9 A	6 A	
Maximum Power Draw	4500W		
Inrush Current	Inrush current limiting via PTC soft-start		
AC Power Module Connectors: 12A Max, 100-120VAC/220-240VAC, 50-60 Hz. Class 1 Wiring			16 AWG (1.5 mm <sup>2</sup> )
Inlet Connector Rating	5A	3.2A	
Outlet Connector Rating	7A	8.8A	

**Line Voltage Selection:** The DrivePack® features an international Auto-Sensing power supply and will automatically select the correct operating voltage range window. Automatic voltage selection is between 100-120VAC and 200-240VAC operation, 50/60Hz.

**Line Voltage Tolerance:** The amp will operate normally (with expected de-rating in power output during low line conditions) over a range of 100-120VAC +/-10% or 200-240VAC +/-10% AC input voltage. The amp will shut down for voltages below nominal line and self protect for over-voltage beyond 15% nominal line.



**CAUTION:** Continuous voltages 10% beyond high line at either 120VAC or 240VAC operation ranges can disrupt performance of the JBL DRIVEPACK! To avoid activation of amplifier low line/high line protection which will interrupt audio performance, the system operator should maintain AC supply voltages within the rated voltage windows.

## AC Power Module

### POWER Indicator:

Blue LED – located near power inlet lights when AC power is applied.

### Amp READY Indicator:

Green LED near power inlet, ON during normal operation, long pulse during sleep mode.

### Sleep Mode:

If audio input signals are not detected for 2 hours, the amplifier will go into sleep/standby mode; the amplifier output section is turned off while the supply powering the DP Input Module and DSP logic remains active. This mode reduces current draw and heat loss. While in sleep mode the READY indicator pulses slowly. Recovery from sleep mode is instantaneous when an audio signal is detected.



### Thermal Management:

JBL DrivePack® systems are cooled by Passive Convection. No fans are used in any part of the thermal management system. To maintain efficient cooling it is a good practice to assure open space around the DrivePack units.

### Operating Temperature:

The system will remain touchable during quiescent operation and will not provide a burn hazard during any operating condition.

## Input Module Controls, Indicators and Connectors

JBL DrivePack® systems are equipped with a modular input bay and input modules are available in three versions in the VERTEC DP Series: the DPIIP, DPDA, DPAN and the DPCN.

### Audio Signal Distribution

Connecting source audio signals to the input modules on JBL DrivePack systems is similar to daisy-chaining multiple external amplifier channels together.

Assuming an output device source impedance of 100 Ohms and a 10:1 load to source ratio, up to 20 JBL DrivePack units typical can be linked together on one output source without using a distribution amp.

**NOTE:** Please refer to VERTEC DP Series spec sheets for additional features and specifications of the DPIIP, DPAN and DPCN input modules.



## DPIP – Basic Input Module

See Figure 1a

The Basic DPIP input module features analog audio inputs and sophisticated onboard digital signal processing technology. Precision Bandpass limiting, pre-equalization filters and automatic self-test functions ensure optimized performance. JBL engineers have calibrated DSP speaker management and limiter parameters to insure smooth phase response and transfer function curves right out of the box.

### CONTROLS

#### 1) Subwoofer Filter Enable Select Switch

- a) Momentary, Enables or disables the selected function. On subwoofer applications the low-pass frequency is set to 80 Hz and for full range systems the high-pass is raised to 80 Hz. (Knee shape and slopes are model dependent).

#### 7) Input Sensitivity/Attenuation Control:

- a) 16 dB Precision Detented rotary control, 0.5 dB steps. Sensitivity +4 dBu nominal (+23 dBu clip) with the control fully counter clockwise, and -10 dBv nominal (+4 dBu clip) with the control fully clockwise.

### INDICATORS

#### 2) Subwoofer Filter Enable

- a) Orange LED, illuminates when the function is enabled.

#### 3) FAULT

- a) Red LED, illuminates during any fault condition.

#### 4) THERMAL PROTECTION

- a) Orange LED, illuminates during thermal limiting:
  - ai) PULSING indicates first stage of thermal limiting, amplifier output level is reduced to prevent overheating.
  - aii) FLASHING indicates transducer thermal limits have been exceeded. Further reduction in output level is applied.
  - aiii) SOLID illumination indicates thermal protection is in the third stage of protection and amplifier shut down may occur if immediate action is not taken to correct the external reason for excessive heating of the amplifier.

#### 5) Ready

- a) Green LED, illuminates when the system is ready for operation.

#### 6) SIGNAL/CLIP

- a) (Signal) Green LED, detects input signal above the threshold set at -70 dBu. b) Yellow indicates that the audio drive signal has exceeded limits preset in DSP on any channel and compression/limiting is active.
- c) (Clip) Red LED, Clip detection monitors input, DSP, and each amplifier output channel. The LED changes from Green to Red when clipping THD at any point is detected.

### CONNECTORS

#### 8) Audio In

- a) F-XLR Active 20K Ohm Balanced, 10K Ohm Unbalanced.
- b) Pin 2 Hot (Positive voltage produces outward cone motion of L.F. Transducers).

#### 9) Audio Out

- a) M-XLR Passive Audio Pass-through.
- b) Pin 2 Hot (Positive voltage produces outward cone motion of L.F. Transducers).

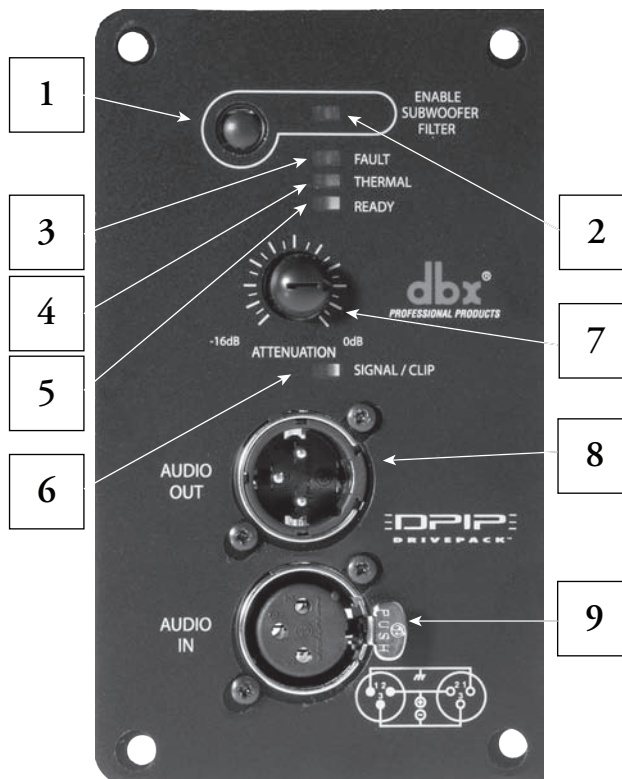


Figure 1a

## DPDA – HiQnet Networked Input Module with AES Digital Audio and BSS Omnidrive HD Signal Processing

**HiQnet™** See Figure 1b

The DPDA Input Module can be used as a retro-fittable sub-assembly with any JBL DrivePack-equipped speaker system. Upgrading to the DPDA module provides powered loudspeaker system users with AES/EBU digital audio capabilities, the sonic benefits of advanced signal processing features, and a variety of input and connectivity options.

Its onboard 100 Mb Ethernet networking switch with daisy-chain capability allows for Remote Control and Monitoring via HiQnet System Architect™ software. Additionally, a rotary mechanical encoder switch allows for array identification and box positioning, up to 99 different speaker positions within each of 99 different speaker arrays or groups.

Twenty, type-selectable input filters (10 System and 10 Guest filters) are available for system equalization along with user-adjustable input delay of up to 2 seconds and sub filter access (user-adjustable low pass filter for subwoofer systems; high pass filter for full-range systems). Signal generator functions (sine wave, swept tone, pink or white noise) are available to facilitate system testing and up to fifty presets can be stored internally.

In addition, Master Control Panels and Master Monitor Panels within System Architect software allow for convenient grouping of control and monitoring functions for multiple JBL DrivePack enclosures with DPDA input modules. This functionality provides a powerful remote control/monitoring interface that is especially useful when working with larger multi-box line array or subwoofer systems.

The HiQnet System Architect™ software user interface provides remote access to the controls, displays and digital speaker preset files available in the JBL DrivePack® Software Control Panel

### INDICATORS

#### 1) CROSSPATCH

If active, AES audio and HiQnet/network is daisy-chained via Ethercon/RJ45 out connector.

#### 2) AES LOCK

If active, indicates AES sync has been detected and input card has locked to it.

#### 3) FAULT

Red LED illuminates during any fault condition.

#### 4) CLIP

Red LED indicates clipping at any point is detected.

#### 5) SIGNAL

Green LED indicates a detected input signal above the threshold set at -70dBu.

#### 6) OVER TEMP

Orange LED illuminates during thermal limiting:

#### 7) READY

Green LED illuminates when the system is ready for operation.

#### 8) DATA

Yellow LED indicates network activity

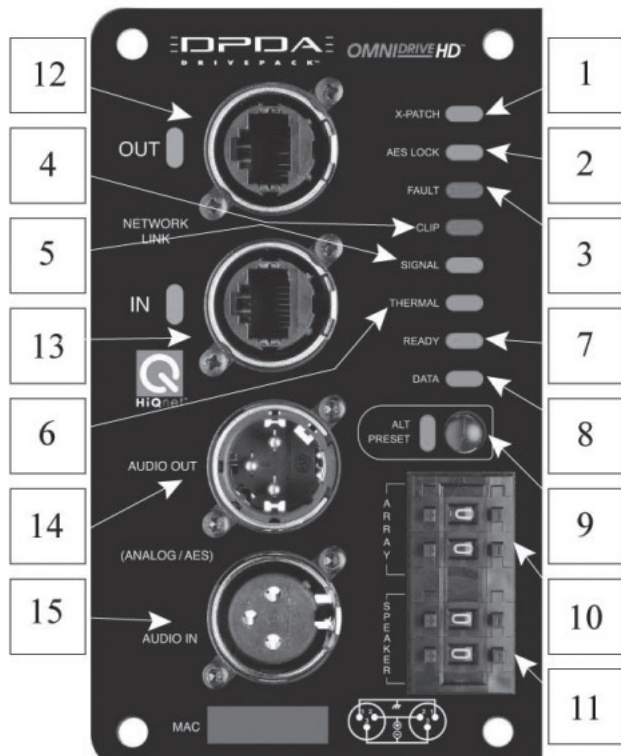


Figure 1b

### CONTROLS

#### 9) ENABLE ALT PRESET

a) Press and hold for 3 seconds.

b) When LED is active, the alternate preset with 80Hz high pass has been recalled or loaded.

On subwoofers, the preset with 80Hz low pass is recalled.

## **10) ARRAY ID MECHANICAL ENCODER**

- a) If “00”, the software will automatically determine the array IDs as they are wired.
- b) User can manually set all speakers to be in the same array or cluster via the rotary dial.

## **11) LOUDSPEAKER POSITION ID MECHANICAL ENCODER**

- a) If “00”, the software will automatically determine the position of the speakers within the array via their network interconnections (speakers must be daisy-chained for software to determine their location).
- b) User can manually determine the position of the speakers within the array via the rotary dial.

Note: Array ID/Loudspeaker ID Examples

Example A: “00 00” would be complete auto ID mode.

Example B: “01 01” would be Array ID #1, speaker on position #1 (top) etc.

## **CONNECTORS**

### **12) NETWORK 100MB ACTIVITY OUTBOUND**

The Orange Activity LED indicates activity on the outbound Ethercon connection.

### **13) NETWORK 100MB ACTIVITY INBOUND**

The Orange Activity LED indicates activity on the inbound Ethercon connection.

### **14) AUDIO OUT**

- a) Analog mode: passive pass through
- b) AES mode: 110 ohms, buffered

### **15) AUDIO IN**

- a) Analog mode: Balanced , 20Kohms input impedance
- b) AES mode: Differentially balanced, 110 ohms input impedance

# DPAN – Optional HiQnet Network Input Module with Analog Audio

**HiQnet™** See Figure 1c

The DPAN input module features analog audio inputs and sophisticated onboard digital signal processing technology. Precision band pass limiting, pre-equalization filters and automatic self-test functions ensure optimized performance. In addition, the DPAN input module adds 100 Mb Ethernet networking functionality and HiQnet compatibility. It enables remote control and monitoring via HiQnet System Architect™ software. Network Control and Monitoring is enabled by the JBL DP-DCP (DrivePack Device Control Panel) supplied within HiQnet System Architect. Network capabilities include monitoring of status, input and output levels, clipping, temperature, load faults and gain reduction. Additional control features available in software include load supervision, dynamic processing, ten internal user defined presets, delays, onboard noise and sine-wave generators, network device event logging, and user alert messaging.

## CONTROLS

### 1) ENABLE ALT PRESET button

a) Momentary, Enables or Disables the selected function. Factory ALT Preset:  
On subwoofer applications, the subwoofer low-pass filter frequency is set to 80 Hz and for full range systems the high-pass is raised to 80 Hz. (Knee shape and slopes are model dependent).

**Internal Controls** - Input Sensitivity 2-Position Switch: Located on the back side of the front panel, full output is achieved by selecting either +4 dBu in one position or +20 dBu in the other position. Switch positions are marked with silkscreen on the PWB.

NOTE: Product is shipped factory set to the +20 dBu switch position to provide optimal input gain structure and headroom for most professional audio equipment. Changing the sensitivity switch to the +4 dBu setting is not recommended unless connection to -10 dBV equipment is required.

## INDICATORS

### 2) ENABLE ALT PRESET

a) Orange LED illuminates when the function is enabled.

### 3) FAULT

a) Red LED illuminates during any fault condition.

### 4) THERMAL Protection

a) Orange LED illuminates during thermal limiting:

ai) FLASHING indicates first stage of thermal limiting, amplifier output level is reduced to prevent overheating.

aii) SOLID illumination indicates thermal protection is in the second stage of protection and amplifier shut down may occur if immediate action is not taken to correct the external reason for excessive heating of the amplifier.

### 5) READY

a) Green LED, illuminates when the system is ready for operation

### 6) SIGNAL/CLIP

a) (Signal) Green LED, detects input signal above the threshold set at -70 dBu

b) (Clip) Red LED, Clip detection monitors input, DSP, and each amplifier output channel. The LED changes from Green to Red when clipping THD at any point is detected.

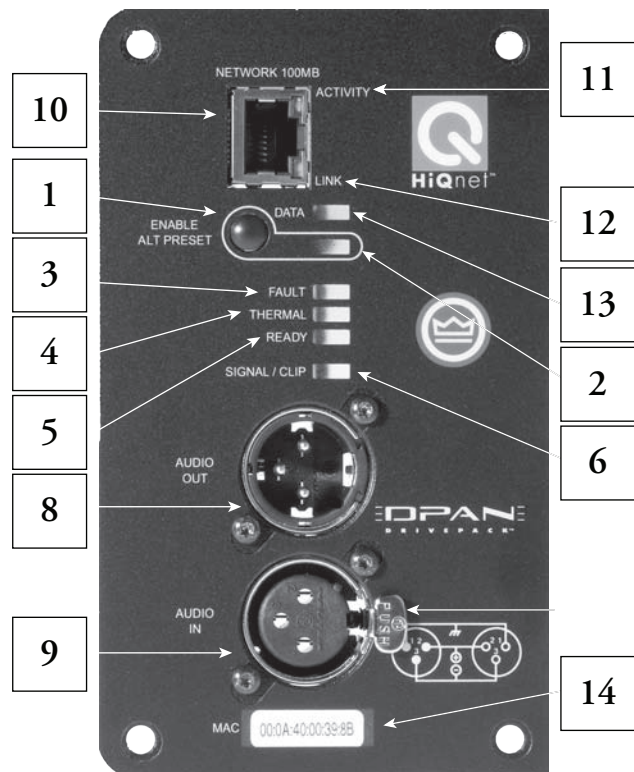


Figure 1c

### **11) NETWORK 100MB ACTIVITY**

- a) The Activity LED indicates data activity on the network line.

### **12) NETWORK 100MB LINK**

- a) The LINK LED indicates that the data is at 100 Megabits.

### **13) DATA**

- a) Yellow LED Flashes for received data packet addressed to this DPAN device.

## **CONNECTORS**

XLR connectors allow connectivity to an analog audio source. This input can be used as a back-up to CobraNet® or as a primary audio source in the absence of CobraNet®.

### **8) AUDIO IN**

- a) F-XLR Active 20K Ohm Balanced, 10K Ohm Unbalanced.
- b) Pin 2 Hot (Positive voltage produces outward cone motion of L.F. Transducers).

### **9) AUDIO OUT**

- a) M-XLR Passive Audio Pass-through.
- b) Pin 2 Hot (Positive voltage produces outward cone motion of L.F. Transducers).

### **10) HiQnet 100MB NETWORK Connector**

- a) The network connector is a standard RJ-45 connector that allows the DPAN to connect to an Ethernet network. Connection is made using a standard Category 5 cable to a network switch port.

## **MAC ADDRESS WINDOW**

**14) The MAC address** is a unique 12 digit hexadecimal hardware address assigned to every network device by the manufacturer and is not changeable by the user. This unique physical address enables each device on the network to identify and communicate directly with other devices connected to the network.

## DPCN – Optional HiQnet Network Input Module with CobraNet™ Digital Audio

**HiQnet™** See Figure 1d

In addition to all features included on the DPAN, the DPCN input module adds CobraNet and offers the ability to direct up to 64 audio channels on one network, with digital audio and remote control and monitoring via Ethernet combined on a single cable.

DPCN modules include the option to use an analog input as a backup audio source providing complete reliability and flexibility to cover any situation.

The *HiQnet System Architect™* software user interface provides remote access to digital speaker preset files in the JBL DrivePack®. As with the DPAN, user-addressable features include ten user defined presets, up to 2 seconds of delay per channel, onboard noise and sine-wave generators, network device event logging, and user alert messaging.

### CONTROLS

#### 1) ENABLE ALT PRESET button

Momentary, Enables or disables the selected function. Factory ALT Preset: On subwoofer applications the subwoofer low-pass filter frequency is set to 80 Hz and for full range systems the high-pass is raised to 80 Hz. (Knee shape and slopes are model dependent).

**2) INTERNAL CONTROLS-** Internal +4 dBu or +20 dBu sensitivity select switch. See NOTE on DPAN for details.

### INDICATORS

#### 2) ENABLE ALT PRESET

a) Orange LED, illuminates when the function is enabled.

#### 3) FAULT

a) Red LED illuminates during any fault condition.

#### 4) THERMAL Protection

a) Orange LED illuminates during thermal limiting: See DPAN for details.

#### 5) READY

a) Green LED illuminates when the system is ready for operation.

#### 6) SIGNAL/CLIP

a) (Signal) Green LED indicates a detected input signal above the threshold set at -70 dBu.  
b) (Clip) Red LED indicates clipping at any point is detected.

#### 11a & 11b) CobraNet™ NETWORK 100MB ACTIVITY

a) The Activity LED on the RJ-45 connectors display network information concerning the Ethernet and CobraNet™ connections.  
ai) Flashing Green indicates network activity.  
aii) Flashing Orange on Activity and Link LEDs simultaneously indicates a network FAULT.

#### 12a & 12b) NETWORK 100MB LINK

a) The LINK LED on the RJ-45 connectors displays network information concerning the Ethernet and CobraNet™ connections.  
ai) Solid Orange indicates the device is linked to a CobraNet™ Network.  
aii) Flashing Orange on the LINK indicator-only indicates this device is the CobraNet™ Conductor.  
aiii) Flashing Orange on Activity and Link LEDs simultaneously indicates a network FAULT.

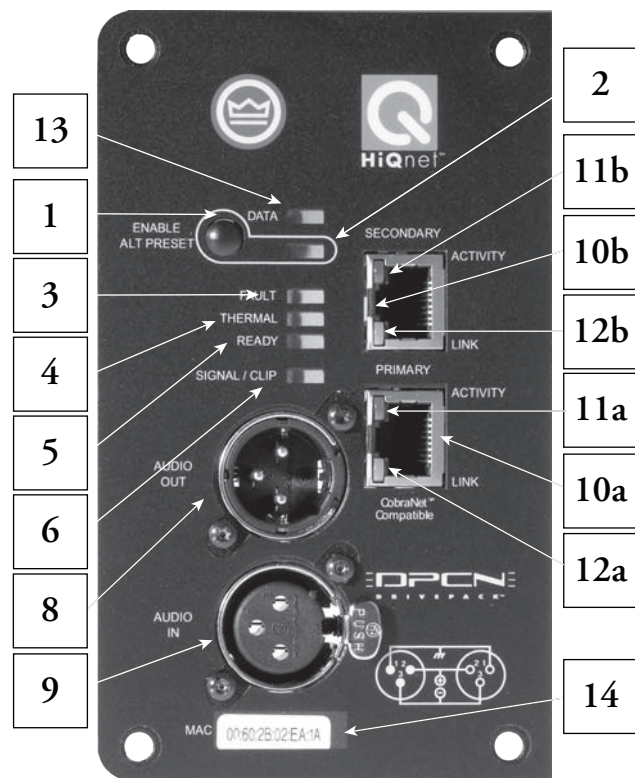


Figure 1d



### 13) DATA

- a) Yellow LED Flashes for received data packet addressed to this DPAN device.

## CONNECTORS

XLR connectors allow connectivity to an analog audio source. This input can be used as a back-up to CobraNet™ or as a primary audio source in the absence of CobraNet™.

### 8) AUDIO IN

- a) F-XLR Active 20K Ohm Balanced, 10K Ohm Unbalanced, PIN 2 HOT.

### 9) AUDIO OUT

- a) M-XLR Passive Audio Pass-through.

### 10a & 10b) CobraNet™ PRIMARY and SECONDARY NETWORK CONNECTORS

- a) The dual RJ-45 CobraNet™ connectors allow a Primary & Secondary connection to the 100Mb Ethernet network and provide device control and monitoring as well as CobraNet™ digital audio on the same CAT5 cable. Should the Primary connection (10a) lose Link activity with the network, the DPCN will automatically switch to the Secondary connection (10b) to ensure uninterrupted audio and control/monitoring. Use the Primary connector as your main CobraNet™ and Ethernet port.

NOTE: These dual RJ-45 connectors CANNOT be used to daisy-chain Ethernet cables. An external Ethernet Switch is required to “distribute” Ethernet connections. See Section 7 for details.

## MAC ADDRESS WINDOW

- 14) **The MAC address** is a unique 12 digit hexadecimal hardware address assigned to every network device by the manufacturer and is not changeable by the user. This unique physical address enables each device on the network to identify and communicate directly with other devices connected to the network.

## Protective Jackets for Input and AC Power Modules

Each VERTEC Series system is supplied with a pair of protective jackets that are designed to fit snugly onto the input and AC power modules of the DP2 or DP1 electronics assembly. These jackets are made of reinforced, weatherized nylon fabric with Velcro attachment strips and drawstrings to secure the opening once installed. They can be used by the system operator or installer to provide a degree of protection from dirt, dust, and moisture and to protect cables and connectors.

### Protective Jacket Installation

Complies with IEC 60529 - IPX-3, not evaluated for outdoor use.

1. Remove two protective jackets from the protective jacket kit. To install, open the jacket by “unzipping” the Velcro strip and locate two smaller Velcro tabs on the inside of the jacket. See *Figure 1*



Figure 1

2. Open the center Velcro tab and insert through the opening in the module riser. See *Figure 2*



Figure 2

3. Next, wrap the left side of the cover around the bottom edge of the riser. Insure that the bottom of the jacket is tucked into the riser ring crevice between the top of the chassis and the bottom of the riser ring rim. See *Figure 3*.

4. Pull the second Velcro tab through the second opening in the riser ring. See *Figure 3*



Figure 3

5. Wrap the opposite end of the open jacket around the riser ring as shown in *Figure 4*. Be certain that the bottom of the protective jacket is tucked-in all the way around the riser ring as shown.



*Figure 4*

6. “Zip” up the Velcro strip and pull the draw cord closed as required as shown in *Figure 5*. The protective jacket should now be securely fastened all the way around the riser ring at the bottom and top end of the jacket and should be closed securely forming a protective closure around the connector panel.

7. Repeat the process for the other connector panel.



*Figure 5*

# SECTION 8 : SYSTEM ARCHITECT SOFTWARE

The VERTEC DP Series has optional advanced network control capabilities with the DPAN, DPCN or DPDA input modules. VERTEC DP Series loudspeaker systems utilize Harman Professional's HiQnet™ protocol to enable a complete configuration, control, and monitoring solution. HiQnet protocol provides remote access to loudspeaker preset files in the JBL DrivePack® input modules making system setup easy yet powerful, via the DrivePack Software Device Control Panel with its intuitive, user-friendly graphical interface. HiQnet System Architect™ provides complete software control of not only your JBL DrivePack-equipped loudspeakers, but also other HiQnet-compatible audio components within the total system.

It is recommended to visit [www.harman.com](http://www.harman.com) for the most up to date version of HiQnet System Architect.

## QUICK-START CONFIGURATION GUIDE

For JBL DrivePack-equipped loudspeaker Systems using System Architect software

### INTRODUCTION:

This guide applies to all JBL loudspeaker models powered by DrivePack DP1, DP2 or DP3 amplifier assemblies which incorporate DPAN, DPCN or DPDA input modules.

Each loudspeaker must be connected to a 100BaseT Ethernet switch using a standard CAT-5 cable. Loudspeakers with DPDA input modules could alternatively use one CAT-5-to-switch connection per cluster. The control computer which will run System Architect must also be connected by a 100BaseT connection to a switch on the same physical network.

If managed Ethernet switches are a part of the network, additional knowledge of TCP/IP protocols and Ethernet-switch manufacturer-specific configurations may be required. This is beyond the scope of this document. It is assumed that unmanaged switches are used in the networking examples discussed below.

Special requirements exist for CobraNet™ - compliant products using the DPCN input module. This is addressed in Appendix A.

A Glossary of networking terminology used is provided at the end of this document.

### AS-SHIPPED ETHERNET CONFIGURATION:

Each loudspeaker product is shipped from the JBL factory with the following configuration:

- DHCP is enabled. (See glossary for details)
- Auto IP address negotiation is enabled (See glossary for details)
- Auto HiQnet device setting is enabled. (See glossary for details)
- The default IP address for all products shipped is 169.254.127.1 with subnet mask 255.255.0.0

### QUICK-START: CONFIGURING YOUR PC WITH SYSTEM ARCHITECT™ SOFTWARE:

- 1) Install System Architect software on the Microsoft Windows 2000 or XP-equipped computer that will control/monitor the HiQnet™ - compliant products.
- 2) Note that System Architect will only display graphics correctly when the Windows PC display is set to standard, small font size. If Windows is set to "large" fonts, then the displays within System Architect may become unreadable. To correct this problem change Windows to the standard font size. (See Appendix B for details)
- 3) Note that System Architect will only display graphics correctly when the Windows PC. Regional and Language settings are set to standard US English language. If Windows is set to any language other than US English, objects in custom control panels will not display or function properly. To correct this problem change Windows to the standard font size. (See Appendix C for details)
- 4) If you are using a CobraNet™ - compatible product see Appendix A for special instructions now before proceeding further.

## **QUICK-START -- CONNECTING PC TO A JBL HiQNet DEVICE FOR THE FIRST TIME:**

If this your first experience connecting a control computer running System Architect to a HiQnet-compliant JBL product, then this initial test configuration will be useful. It will greatly help to resolve simple networking issues before you connect to multiple devices or connect to a larger network:

Step 1) Connect one networked loudspeaker to an unmanaged 100BaseT network switch with a standard CAT5 cable. Don't apply AC power to the loudspeaker just yet.

Step 2) Connect the control computer to the Ethernet switch with a standard CAT5 cable.

### **Setting up a Simple Isolated Ethernet Network Using DHCP**

In this configuration DHCP will automatically assign an IP address to the device on the network and your computer.

Step 1) Open Network Connections on your computer and confirm that DHCP is Enabled. To do this click Start, point to Settings, click Control Panel, and then double-click Network Connections. When your Network Connections Window opens, double click on the Local Area Network icon. A Local Area Connections Status window will open. Click on the Properties button and the Local Area Connection Properties window open. Next scroll through the items window, select the Internet Protocol (TCP/IP) item and click on the Properties button. The Internet Protocol (TCP/IP) Properties window will open. Select the "Obtain an IP address automatically" option. Click OK through all your open network windows to close them.

Step 2) Apply power to your JBL DrivePack and wait for it to boot up. With DHCP enabled, the DrivePack and your computer should both automatically negotiate an IP Address.

Step 3) Launch System Architect. The DrivePack system should appear in the Venue View within a few minutes.

Step 4) If nothing comes up, you should first check that your System Architect™ application has the 'Network Active on start-up' and 'Auto Populate venue view with detected devices' boxes checked; these are found in the Application Button (Q Button) under options.

Step 5) If Auto Populate is checked and the network is active (look at the network status icon located at the bottom left corner of the Venue View window) and the devices are still not showing in the Venue View, select the Readdress Devices wizard in the Tools menu and change the IP address of the devices so they can be on the same network as your computer.

Set up with a Static IP address

Step 1) Go back through Step 1 above, except select "Use the following IP Address:" option.

Step 2) Change the TCP/IP address of the control computer to 169.254.1.y and change the subnet mask set to 255.255.0.0.

Note: The placeholder "y" in the last segment of the IP address represents a number anywhere in the range of 1 to 254. The only requirement in your number selection is that no two devices on the same network can share the same IP address. Depending upon PC operating system configuration a reboot may be needed now.

Step 3) Avoid connecting the switch to any other Ethernet equipment other than the PC and the loudspeaker just yet. You're creating a network with only two devices -- the PC and the loudspeaker. This is useful for a first test as it avoids any additional networking configuration issues.

Step 4) Now launch System Architect in Windows. Once you see the Venue View of System Architect appear, then proceed as follows.

Step 5) Verify that the HiQnet™ network is active by observing the Online/Offline status icon located at the top left of the Venue window. The icon should indicate a green color and “Go Offline”. If it shows inactive status, double click on the icon and the network will activate.

Step 6) Power up the loudspeaker connected to the network. Recheck the network status and verify that the HiQnet network is Active. The loudspeaker will automatically determine an IP address and a HiQnet Address. This can require up to 2 minutes in some cases. Once completed an Icon in the venue view will appear representing the JBL Loudspeaker system connected to the network.

Step 7) Now double-click on the JBL loudspeaker to see the product specific control panel within System Architect. From here you can control and change parameters and configuration of the JBL loudspeaker as required.

### **ALTERNATE QUICK-START -- USING SYSTEM ARCHITECT'S READDRESSING WIZARD:**

Step 1) Once you have connected and powered up one DrivePack device to the network, verify that the HiQnet network is active by observing the Online/Offline status icon located at the top left of the Venue window. The icon should indicate a green color and “Go Offline”. If it shows inactive status, double click on the icon and the network will activate.

Step 2) On the ribbon toolbar of System Architect™, click on Tools and then select Readdress Devices. The wizard will open up. Click on Next to go to the next screen.

Step 3) The wizard will detect the device on the network and a device icon appears in the wizard window. Select it and then click on the Configure button at the bottom of the screen.

Step 4) The ‘Configure Node’ window will open. Uncheck the ‘Use DHCP’ button and verify that the ‘Readdress Automatically’ box at the top of the screen is unchecked.

Step 5) Exit the wizard by clicking on Finish.

Step 6) The JBL loudspeaker system will have appeared in the System Architect Venue view by this time. Now double-click on the JBL loudspeaker to see the product-specific device control panel within System Architect. From here you can control and change parameters and configuration of the JBL loudspeaker as required.

### **WORKING WITH A NETWORK OF MULTIPLE JBL DEVICES:**

#### Network Setup with DHCP

With the computer set to DHCP Enabled, connect devices to the network and apply power to devices one or two at a time. The devices should AUTO-IP and populate Venue View as they are discovered by the network. If they do not or seem to take too long to come up on the network, go back and use Static IP.

#### Static IP

Step 1) After completing the quick start procedure with one DrivePack device go back and verify that the host PC's Static IP address is set to an address in the auto IP range, such as:

IP Address: 169.254.1.Y (Y is a number between 1 and 254)  
Subnet Mask: 255.255.0.0

Step 2) With System Architect running in Windows, power up the remaining loudspeakers connected to the network one or two at a time. System Architect will automatically determine an IP address and a HiQnet Address for each loudspeaker on the network assuming the devices populating the network are new units (DHCP ENABLED). This can require up to 2 minutes in some cases. Once completed an Icon in the venue view will appear representing the JBL Loudspeaker system connected to the network.

Step 3) If System Architect fails to recognize network devices within about two minutes, make sure all of your connections are good and verify IP addressing. Launch the Readdress Devices wizard and repeat steps 3 - 4 in the above procedure.

### **DISABLE DHCP/AUTO HIQNET ADDRESS IN SYSTEM ARCHITECT™:**

Step 1) Click on any previous icons showing in venue view, and press the Delete key.

Step 2) Select TOOLS->Readdress Devices, click NEXT

Step 3) The master computer should discover the HiQnet™ products powered up on the network. If not, please make sure all of your connections are good and verify IP addressing.

Step 4) Once the wizard has launched and found devices on the network, select a single component (It will highlight) - click on the CONFIGURE button located on the bottom of the window.

Step 5) System Architect will have detected the device, automatically assigned a HiQnet address and disabled the “Readdress Automatically” function. You can manually assign a HiQnet address if desired.

Step 6) Un-check the box labeled “Use DHCP”

Step 7) The IP Address entry box will un-dim.

Step 8) In the Set Address window, set up a Static IP address—The IP address consists of a set of 4 three-digit numbers separated by a dot and must be unique. Network wizard will have already assigned an IP address in the 169.254.X.Y range. You can start by leaving the IP address assigned by network wizard or perhaps just change the X (third) number segment value to the same number in all devices. Start with an address for example 169.254.1.Y. Enter the same number sets in the Subnet mask field for all of the components as well as the master computer. Set the HiQnet address on each device sequentially. You can change the IP address to a completely unique range at a later time, for example 126.126.0.Y or 192.168.1.Y etc. You may want to create a network system log and write down all of your device IP addresses in your log for future reference.

Step 9) Click OK. The Configure Node window will close.

Step 10) Repeat the procedure for all remaining devices on the network.





# GLOSSARY OF TERMS

**Auto HiQnet Address:** When devices boot up, System Architect software, when configured to do so, will automatically negotiate and assign a unique HiQnet™ address to each device. The devices will then keep this address until there is a conflict at start up or the user manually assigns the device a new address.

**AES/EBU:** The digital audio standard frequently called AES/EBU, officially known as AES3, is used for carrying digital audio signals between various devices. It was developed by the Audio Engineering Society (AES) and the European Broadcasting Union (EBU) and first published in 1985, later revised in 1992 and 2003. Both AES and EBU versions of the standard exist. Several different physical connectors are also defined as part of the overall group of standards.

**Auto-IP Address:** Devices and computers, if set to use a DHCP server, and a DHCP server is not present on the network, will automatically negotiate a default IP address in the form of 169.254.xxx.xxx. This can cause problems if you have some devices or PC's set with static IP addresses. It is possible that addresses manually assigned to Static IP devices may intentionally fall outside of the default Auto-IP address range and may now be on a separate subnet and will no longer be able to communicate with devices in the Auto-IP address range. However, if there isn't a DHCP server on the network, then having all devices/PC's using an Auto-IP address will not cause any problems. In summary: all devices and PC's on a network will need to exist on the same subnet, whatever that may be.

**DHCP:** (Dynamic Host Configuration Protocol) An established Ethernet protocol for assigning IP addresses automatically to physical hardware devices. A DHCP server must be present on the network to provide an IP address to each device when power is applied. With dynamic (DHCP) addressing, a device might have a different IP address every time it connects to the network. If a DHCP Server is not installed on the network, a computer will place a default network ID (See Auto-IP Address) into the TCP/IP address and Subnet Mask.

**HiQnet:** The networking protocol established by Harman Professional to provide communication between products for the purposes of: control, monitoring, and providing interaction between products. The protocol is independent of the physical connection type. Typical physical connections include: Ethernet, USB, RS232, RS422, Infrared, and others. For info go to <http://www.harmanpro.com/hiqnet/>

**HiQnet Address:** The HiQnet™ address is a unique number that allows System Architect software, the PC in use, and the connected devices, to keep track of each other on the network. The HiQnet address is completely independent of Ethernet IP addresses.

**IP Address:** (Internet Protocol address) Identifier for a computer or device on a TCP/IP network. Each device in a network has its own identifying IP address. Example: 169.254.17.42. Networks using the TCP/IP protocol route messages based on the destination's IP address. An IP address is made of four numbers separated by periods. Each number can be zero to 255. The last number can never be a zero or 255. For example, 126.126.17.1 could be an IP address. 126.126.17.0 would not be a valid IP address.

**Subnet Mask (short for Subnetwork Mask):** Large networks may require subdivision into smaller groups or subnets to keep the network more manageable. A subnet is a portion of a network that shares a common address component. On TCP/IP networks, subnets are defined as all devices whose IP addresses have the same prefix.

For example, all devices with IP addresses that start with 126.126.126. would be part of the same subnet. IP networks are divided using a subnet mask. A mask is a filter that selectively includes or excludes certain values. Values that do not conform to the mask are not visible to each other. A mask is used to determine what subnet an IP address belongs to. An IP address has two components, the network address and the host address. Like IP addresses, a subnet mask contains four bytes (32 bits) and is often written using the same "dotted-decimal" notation. A very common default subnet mask for example is 255.255.0.0 A subnet mask neither works like an IP address, nor does it exist independently from them. Instead, subnet masks accompany an IP address and the two values work together. Applying the subnet mask to an IP address splits the address into two parts, an "extended network address" and a host address. The subnet mask is the network address plus the bits reserved for identifying the subnetwork. Dividing a network into subnets is useful for both security and performance reasons.

**System Architect:** A software application for use on Windows PC's that provides control of HiQnet compliant products. System Architect integrates HiQnet-compliant products within a unified control application program. This program allows grouping, cutting and pasting of settings, custom control panels, and more. It integrates products from Harman Professional brands using the HiQnet protocol.

## APPENDIX A: CONFIGURING COBRANET

### General

CobraNet is a licensed technology developed by Peak Audio, Inc. consisting of proprietary communications protocol, firmware and hardware. It allows reliable, deterministic (i.e. real-time) transmission of high quality (i.e. un-compressed) digital audio over standard 100Base-T Fast-Ethernet network. CobraNet will also operate on faster versions of Ethernet (e.g. Giga-bit and 10Giga-bit).

A CobraNet system is comprised of CobraNet devices and the Ethernet network that connects them. PCs or other system controllers may also be connected to the network for setup but are not required for operation.

### Ethernet

Ethernet is a hardware and signaling specification developed by Xerox in 1970 for data networking. The IEEE (Institute of Electrical and Electronics Engineers) standardized the technology in the IEEE 802.3 standard and its variants.

With over 50 million nodes installed, Ethernet is easily the most dominant data networking technology in use today. It is carried over inexpensive CAT-5 UTP cables or fiber. Typical Ethernet cabling limitations are: 100 meters over CAT-5 copper cable, 2 kilometers over multimode fiber.

### The CobraNet™ Device

Each CobraNet device embeds specialized hardware and firmware. The hardware includes a standard 100MB Fast-Ethernet interface along with custom high-speed DSP chips and clock circuitry. The DSP and its embedded software are used to encode and decode the Ethernet network messages using the proprietary protocol. The clock circuitry is used to accurately decode the system master clock timing needed for high-quality real-time audio delivery.

### Audio Specs

All CobraNet devices operate at a fixed sample rate of 48kHz. The audio data may be transmitted at 16, 20 or 24 bit data as desired. For reliable operation, each CobraNet device must implement transmit and receive buffering. This buffering is fixed at 256 samples and results in a minimum audio network latency of 5.333ms. (256 samples at 1/48kHz per sample)

### Bundles and Audio Channels

Routing of digital audio between CobraNet devices is accomplished through Bundles. A Bundle is the name given to the proprietary encoded message (a.k.a. "packet") transmitted between CobraNet devices that include multiple channels of digital audio. Each CobraNet device can transmit and receive up to four Bundles. Each Bundle includes up to 8 Audio Channels. Therefore, each device is capable of transmitting and receiving up to 32 Audio Channels to and from the network.

Bundles can be transmitted using Ethernet multicast or Ethernet unicast methods. Multicast Bundles are sent to all CobraNet devices on the network, while unicast Bundles are sent to one and only one CobraNet device. Since each device can send and receive four Bundles, great flexibility is allowed in the routing of audio over the network. Up to 8 multicast Bundles (64 Audio Channels) can be transmitted on a simple repeater based Ethernet network. Up to 4 multicast Bundles (32 Audio Channels) along with up to 421 unicast Bundles (>3000 Audio Channels) can be transmitted simultaneously on a full-duplex switch-based CobraNet network.

Assignment of Bundles is accomplished through the selection of a Bundle number. Bundles between 1-255 are always multicast, while Bundles between 256 - 65,279 are unicast. Bundle assignments must not be duplicated. Only one CobraNet transmitter is allowed per bundle.

## **The Conductor**

On a CobraNet network, the Conductor coordinates transmission of audio packets throughout the entire network. When two or more CobraNet devices are interconnected properly, one of them will be selected the Conductor based on their respective Conductor.

### **Priority**

A higher Conductor Priority over-rides a lower priority. If an operating Conductor is removed from the network for any reason (e.g. power turned off), the remaining devices again arbitrate and select a new Conductor. All CobraNet devices have the capacity to serve as the Conductor.

The Conductor periodically broadcasts a well-defined message to all CobraNet™ devices. This allows each CobraNet device to recover the master clock timing information needed for high quality audio delivery.

The Conductor also recognizes each CobraNet device on the network and assumes the responsibility to assign transmitter positions and priorities for each Bundle of each CobraNet device. Like a conductor of an orchestra, the Conductor signals the beginning of a synchronous transmission cycle, and then each device sends its Bundle(s) in lock step.

### **Primary and Secondary Network Ports (Dualink)**

Some CobraNet devices implement two network connections. This provides for added reliability in the event of problems with network hardware or cabling. If the primary connection is lost, the secondary connection can be enabled using an entirely separate network hardware path in less than a few seconds.

### **Repeater Networks**

CobraNet can operate on simple repeater-based networks and more complex switch-based networks. Repeater networks use low-cost Ethernet hubs. On a repeater-based network, all packets are broadcast to all connected nodes. CobraNet multi-cast and unicast Bundles can be assigned but because of the simpler repeater-type hubs, even unicast transmissions are broadcast to all nodes. Therefore, a maximum of 8 full-loaded Bundles (64 audio channels) are allowed on the entire network. More Bundles may be allowed if they are loaded with less than the full eight audio channels. There is no limit to the number of active receivers on a repeater network. Generally, a repeater based CobraNet network must be dedicated to CobraNet traffic only to guarantee reliable transmission of audio packets.

See Tested Ethernet Products on the Peak Audio website for a list of recommended Ethernet repeaters.  
[http://www.peakaudio.com/CobraNet/tested\\_Ethernet.html](http://www.peakaudio.com/CobraNet/tested_Ethernet.html)

### **Switched Networks**

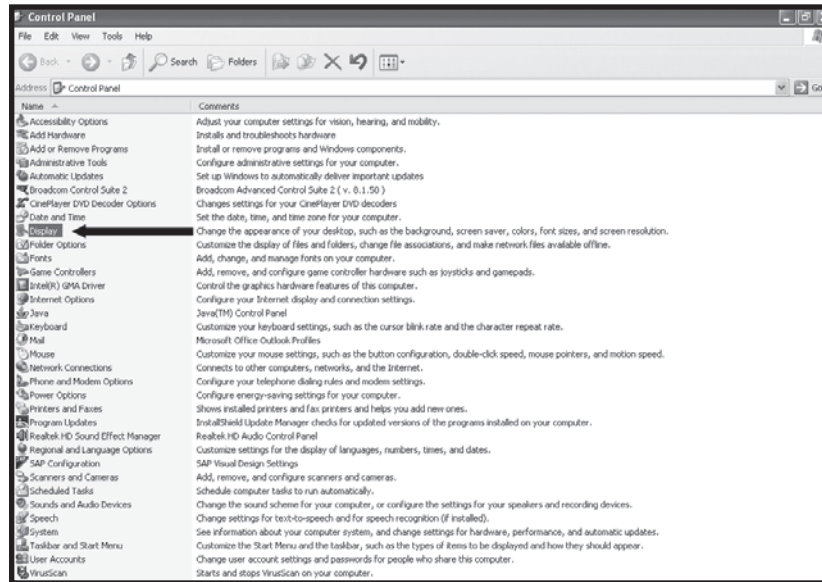
Larger CobraNet networks can be built using Ethernet switches. Ethernet switching technology is more sophisticated than hubs. Switches do not simply broadcast each and every packet to all nodes. Instead, they examine the destination address of each packet received on each port, and then “switch” that data to the identified recipient. CobraNet unicast Bundles exploit this feature to allow more overall network traffic. In effect each port has 100MB of bandwidth and the overall network can be as large as 100MB times the number of ports on the network. Multicast Bundles are allowed on a switched network, but they must be used with care. Peak recommends that not more than four multicast Bundles be used in a switched CobraNet network.

Another enhancement available with most new Ethernet switches is “full-duplex” links. A full-duplex link allows simultaneous send and receive over the same Ethernet connection. This enables a CobraNet device to simultaneously send and receive up to 64 channels per node for a total of 128 channels.

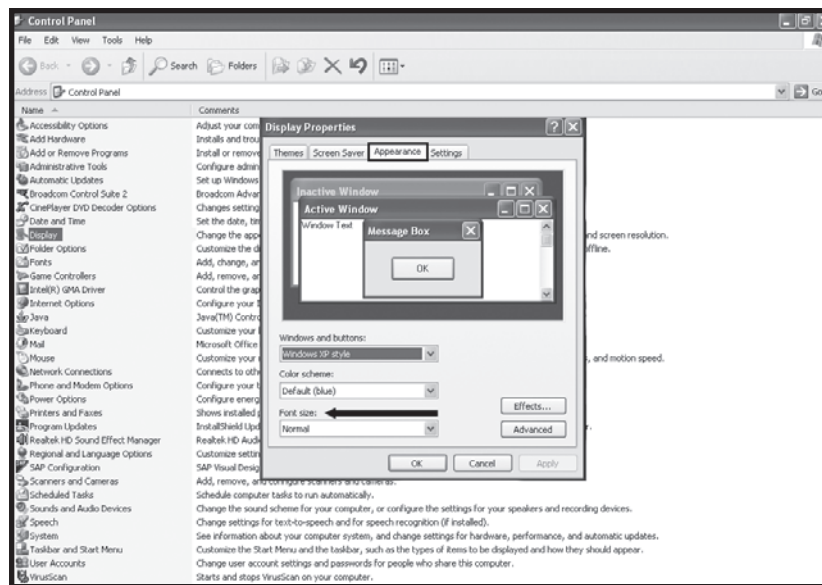
The combination of switching and full-duplex technologies in switched CobraNet networks allows up to 128 channels per 100Mbit Ethernet link and greater than 3000 individual audio channels. There is no limit to the number of active receivers on a switched CobraNet network. Switched networks also eliminate the potential for Ethernet collisions. This allows general PC network traffic and CobraNet traffic to coexist on the same network. See Tested Ethernet Products on the Peak Audio website for a list of recommended Ethernet switches. [http://www.peakaudio.com/CobraNet/tested\\_Ethernet.html](http://www.peakaudio.com/CobraNet/tested_Ethernet.html)

## APPENDIX B: Setting Windows to the Standard Font Size

1. Open the Windows control panel.
2. Double click on the Display panel, the Display Properties panel will open.



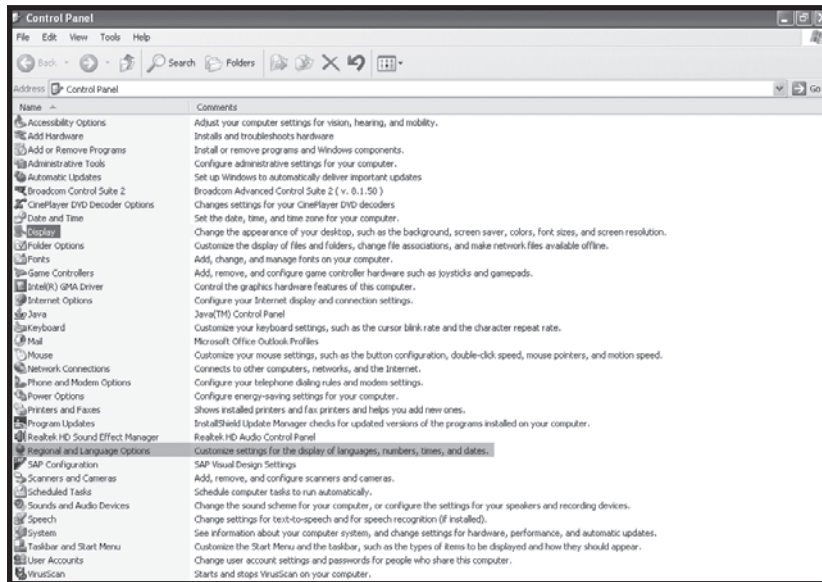
3. Next click on the Appearance tab.



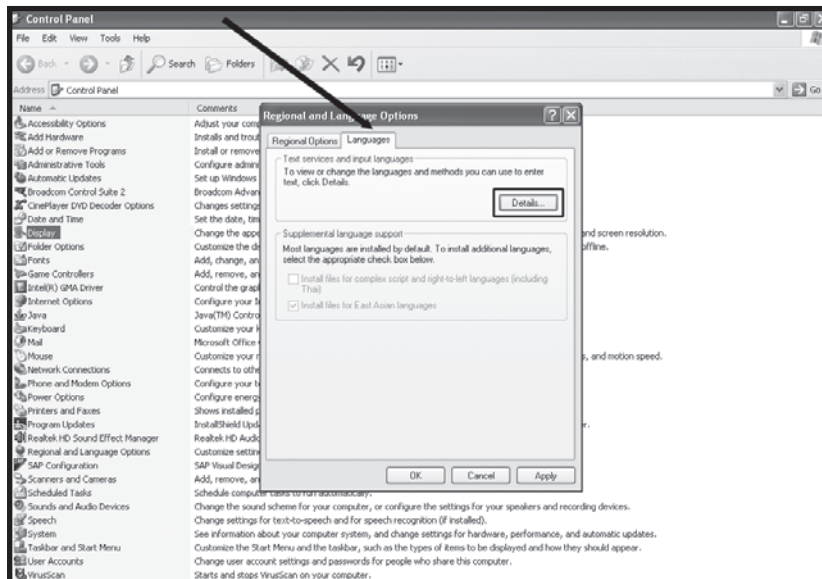
4. Go to the 'Font size' drop-down menu and select "Normal".
5. Click on the Apply button, then "OK" to close the Display Properties panel.
6. End.

## APPENDIX C: Setting MS Windows Regional and Language Options to U.S. (United States) English

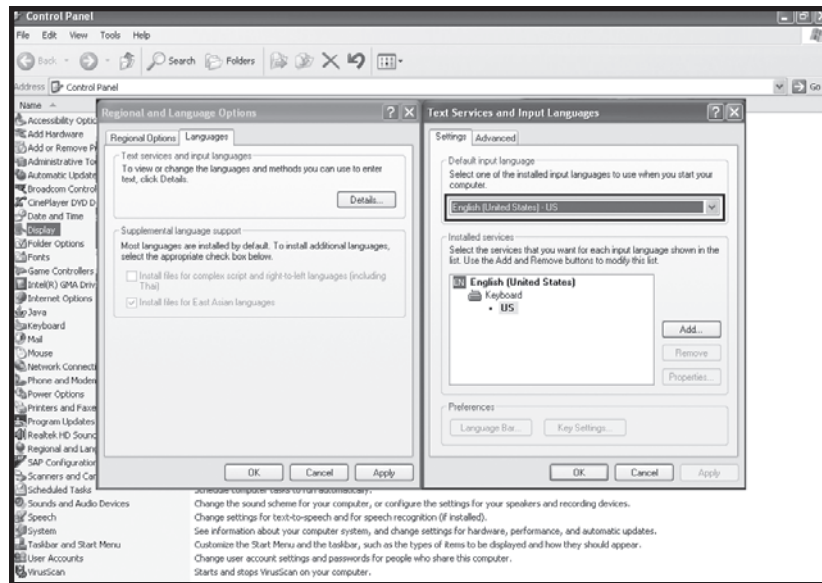
1. Open the Windows control panel.



2. Double-click on Regional and Language Options icon; Regional Options panel will open.
3. Click on the Languages tab.



4. Next, click on the 'Details' button.



5. The Text Services and Input Languages Options panel will open.
6. Go to the Default input language drop-down menu and select English (United States), U.S... Click on the OK button to close the Text Services and Input Languages panel.
7. End.

## SECTION 9 : JBL LIMITED WARRANTY

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

### **Who Is Protected by This Warranty?**

Your JBL Warranty protects the original owner and all subsequent owners so 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.

### **What does the JBL Warranty cover?**

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.

### **Who Pays for What?**

JBL will pay all labor and material expenses for all repairs covered by this warranty. Please be sure to save the original shipping cartons because a charge will be made if replacement cartons are requested. Payment of shipping charges is discussed in the next section of this warranty.

### **How to Obtain Warranty Performance**

If your JBL product ever needs service, write or telephone us at JBL Incorporated (Attn: Customer Service Department), 8500 Balboa Boulevard, PO. Box 2200, Northridge, California 91329 (818/893-8850). We may direct you to an authorized JBL Service Agency or ask you to send your unit to the factory for repair. Either way, you'll need to present the original bill of sale to establish the date of purchase. Please do not ship your JBL product to the factory without prior authorization. If transportation of your JBL product presents any unusual difficulties, please advise us and we may make special arrangements with you. Otherwise, you are responsible for transporting your product for repair or arranging for its transportation and for payment of any initial shipping charges. However, we will pay the return shipping charges if repairs are covered by the warranty.

### **Limitation of Implied Warranties**

ALL IMPLIED WARRANTIES, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO THE LENGTH OF THIS WARRANTY.

### **EXCLUSION OF CERTAIN DAMAGES**

JBL'S LIABILITY IS LIMITED TO THE REPAIR OR REPLACEMENT, AT OUR OPTION, OF ANY DEFECTIVE PRODUCT AND SHALL NOT INCLUDE INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND. SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS AND/OR DO NOT ALLOW THE EXCLUSION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS AND EXCLUSIONS MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS, WHICH VARY, FROM STATE TO STATE.

## SECTION 10 : JBL CONTACT INFORMATION

<p><b>Mailing Address:</b> JBL Professional 8500 Balboa Blvd. Northridge, CA 91329 USA</p> <p><b>Shipping Address:</b> JBL Professional 8500 Balboa Blvd., Dock #15 Northridge, CA 91329 USA (Do not return product to this address without first obtaining prior authorization from JBL)</p> <p><b>Customer Service:</b> Monday through Friday 8:00am - 5:00pm Pacific Coast Time In the U.S.A. (800) 8JBLPRO (800.852.5776) www.jblproservice.com</p> <p><b>On the World Wide Web:</b> www.jblpro.com</p>	<p><b>Outside the USA:</b> Contact the JBL Professional Distributor in your area. A complete list of JBL Professional international distributors is provided at our U.S.A. website - <a href="http://www.jblpro.com">www.jblpro.com</a></p> <p><b>Product Registration:</b> Register your product online at: <a href="http://www.jblpro.com/registration">www.jblpro.com/registration</a></p>
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