BIDDING REQUIREMENTS for PURCHASING

NOTICE AND INFORMATION FOR BIDDERS

Attachment A: Bid Breakdown & Schedule

Bidder: _____

DASNY Contact: Kevin Towle, Purchasing Coordinator, (518) 257-3209

Services/Product Required By: As soon as possible based on product lead times.

Description: Furnish, Deliver, and Install Theatrical Lighting, Audio, and Controls

Bid Open Location: DASNY, Corporate Headquarters, 515 Broadway, Albany, NY 12207 Bid Open Date and Time: Thursday, November 7th, 2024 at 2:30 PM

Manufacturer	Make/Model	Description	Qty	UOM	Unit Price	Extended Price
City Theatrical	5900	City Theatrical SHOW-BABY-M	6	EA	$	$
ETC	7415A1000	ColorSource CYC 120v w/ XLR	20	EA	$	$
Martin Lighting	MAR-90800000	ELP PAR	20	EA	$	$
ETC	7225A1000-US	ETC CS20 20-Fader ColorSource Lighting Console (40-Channel/Device)	1	EA	$	$
High End Systems	2594A1000-B	HES SOLAPIX 7 black in molded insert	20	EA	$	$
High End Systems	LS-UB-MI 2550A1200-B	High End Systems Lonestar	10	EA	$	$
Lightronics	IDP104	Lightronics IDP104	4	EA	$	$
Martin Lighting	90232100	MAC Aura XB	20	EA	$	$
Source Four	7462A1051	Source Four LED Series 3 Lustr Light Engine w/ Shutter	33	EA	$	$
Asus	VT229H	Monitors	2	EA	$	$
ETC	7462A2004-K	14deg XDLT Lens Tube	4	EA	$	$
ETC	7462A2005-K	19deg XDLT Lens Tube	16	EA	$	$
ETC	7462A2006-K	26deg XDLT Lens Tube	16	EA	$	$
ETC	7462A2007-K	36deg XDLT Lens Tube	12	EA	$	$
ETC	7462A2008-K	50deg XDLT Lens Tube	12	EA	$	$
ETC	DPSJ-25	Powercon to Powercon 25'	40	EA	$	$
		5 Pin DMX	60	EA	$	$
ETC	CEM3	CEM3 power controller	2	EA	$	$
ETC	ECPB Net	ECPB; NET Plug-in station (1 gang)	6	EA	$	$
ETC	Eos MFW 20	Eos Fader Wing, 20 Fader	1	EA	$	$
ETC	ECPB PB1	ETC 1-gang, 2.5" deep back box, surface mount	6	EA	$	$
ETC	4311A1012	Ion Xe Console, 12,288 Outputs	2	EA	$	$
ETC	I1916	Ion Xe + Single Wing Flight Case	1	EA	$	$
ETC	SR3AF-48 w/Door	Sensor3 48-Module Rack, black, locking door with filter	2	EA	$	$
ETC	SR3AF-24 w/Door	Sensor3 24-Module Rack, black, locking door with filter	1	EA	$	$
ETC	SSSh24-48	Sensor Sound Suppression Hood, black (SR3-24 and SR3-	2	EA	$	$

		48)				
ETC	D20	Dual 20A Dimmer Module 350µS	61	EA	$	$
ETC	R20AF	Dual 20A Relay Module with Advanced Features	4	EA	$	$
ETC	CC20	Dual 20A Constant Current Module	2	EA		
ETC	AFM	Airflow module	5	EA	$	$
ETC	SNB-8	8-port Simple Network Box with PoE	1	EA	$	$
ETC	E1004-4	4 button Inspire station, black	3	EA	$	$
ETC	ECPB PB-U	U-Bolt Kit for ECPB Plug-in station (1 and 2 gang)	4	EA	$	$
		50' NET CABLE PROPLEX WITH ETHERCON	1	EA	$	$
		SLIDE POT SMALL	1	EA	$	$
Apple	iPad	12.9-inch iPad Pro Wi-Fi 256GB - Space Gray and Smart Keyboard Folio for iPad Pro 12.9-inch (6th generation) - US English	2	EA	$	$
AKG/Crown	PCC-160	Crown PCC-160 Boundary Microphone	2	EA	$	$
AKG/Crown	XTI 1002	Crown XTI 1002 Amplifier	2	EA	$	$
DBX	PA2	DriveRack PA2	2	EA	$	$
DBX	RTA-M	Reference Microphone	2	EA	$	$
DPA	4099	DPA Microphones Core 4099 Microphone, Loud SPL, Stereo System Kit for Piano (Pair)	2	EA	$	$
DPA	4266	DPA 4266 CORE Omnidirectional Flex Headset Microphone for Shure Wireless - Medium Length, Beige	2	EA	$	$
DPA	4188	DPA 4188 CORE Slim Directional Flex Headset Microphone for Shure Wireless - Long Length, Brown	2	EA	$	$
Electro-Voice	ZLX-12	Electro-Voice ZLX-12 12" Two-Way Passive Loudspeaker (Black)	2	EA	$	$
Electro-Voice	ZLX-12BT	Electro-Voice ZLX-12BT 12" 2-Way 1000W Bluetooth-Enabled Powered Loudspeaker (Black)	1	EA	$	$
Electro-Voice	ZLX-15BT	Electro-Voice ZLX-15BT 15" 2-Way 1000W Bluetooth-Enabled Powered Loudspeaker (Black)	1	EA	$	$
Hollyland	Solidcom C1	Hollyland Solidcom C1 Pro-8S Full-Duplex ENC Wireless Intercom System with 8 Headsets (1.9 GHz)	1	EA	$	$
Hollyland	Solidcom C1	Hollyland Solidcom C1 HUB	2	EA	$	$

		Base for DECT Intercom System (1.9 GHz)				
Midas	M32 LIVE	Midas M32 Console	8	EA	$	$
Midas	DL16	Midas DL16 16-Input / 8-Output Stage Box with 16 Midas Mic Preamps	8	EA	$	$
Shure	ULXD1	Shure ULXD1 ULXD1-G50	2	EA	$	$
Shure	ULXD2	Shure ULXD2/SM58 G50	4	EA	$	$
Shure	ULXD4Q	Shure ULXD4Q Quad-Channel Digital Wireless Receiver (H50: 534 to 598 MHz)	10	EA	$	$
Shure	SM58-LC	Shure SM58-LC Cardioid Dynamic Microphone	10	EA	$	$
	XLR25	XLR 25	5	EA	$	$
	XLR50	XLR 50	1	EA	$	$
	XLR199	XLR 100	1	EA	$	$
		Remove noisy 112.5KVA transformer with new 75KVA copper wound transformer (8db lower than regular units) - (Including Turn On Fee/Inspection	1	LS	$	$
		Install four data distribution boxes on catwalk, one per "4 way" corner, two universes per box using 3/4" EMT	1	LS	$	$
		Change connectors in floor pockets from porcelain ungrounded to choice of 2 x 20 amp stage pin or 2 x 20 amp duplex	1	LS	$	$
		Freight and Installation	1	LS	$	$

Alternate(s)						
		Source Four LED Series 3 Lustr Light Engine w/ Shutter	13	EA	$	$

If bidding or proposing commodities other than those specified, the bidder must, in every instance, give all information required in Section 2.0 (B) of the Notice and Information for Bidders. Products will only be considered if proof of comparability is provided to DASNY in writing. A determination that a commodity or product is an “or equal” will be determined by DASNY in its sole and absolute discretion and any such determination will be final.

TOTAL BID_____

NOTICE AND INFORMATION FOR BIDDERS

(The below questions 1) and 2) need only be answered if the above total bid is for one million dollars or more)

1. Does your firm anticipate the use of subcontractors and outside suppliers specific to this procurement
   Yes ☐ No ☐
2. Does your firm anticipate the creation of employment opportunities arising from this procurement?
   Yes ☐ No ☐

(The below information must be completed for all bids.)

Identify all subcontractors, if any: _____

STATE, PROVINCE FOR FOREIGN COUNTRY THAT YOUR FIRM'S PRINCIPAL PLACE OF BUSINESS IS LOCATED:

_____

ADDRESS OF FACTORY OR PLANT WHERE ITEMS ARE MANUFACTURED AND/OR ASSEMBLED. *(Attach additional sheet(s) if more than one manufacturer)*

_____
_____
_____
_____

_____
BIDDER (FIRM NAME)

_____
SIGNATURE

_____
NAME (TYPE/PRINTED)

_____
TITLE

_____
Date

_____
Email address

Attachment B: Detailed Specifications

Lehman College Lighting and Audio Equipment - 382800

Master FFE List

Line No.	Item Description	Mfr	Model/SKU	Qty
	Lighting and Controls			
1	City Theatrical SHOW-BABY-M	City Theatrical	5900	6
2	ColorSource CYC 120v w/ XLR	ETC	7415A1000	20
3	ELP PAR	Martin Lighting	MAR-90800000	20
4	ETC CS20 20-Fader ColorSource Lighting Console (40-Channel/Device)	ETC	7225A1000-US	1
5	HES SOLAPIX 7 black in molded insert	High End Systems	2594A1000-B	20
6	High End Systems Lonestar	High End Systems	LS-UB-MI 2550A1200-	10
7	Lightronics IDP104	Lightronics	IDP104	4
8	MAC Aura XB	Martin Lighting	90232100	20
9	Source Four LED Series 3 Lustr Light Engine w/ Shutter	Source Four	7462A1051	33
10	21.5" Asus VT229H Monitor	Asus	VT229H	2
11	14deg XDLT Lens Tube	ETC	7462A2004-K	4
12	19deg XDLT Lens Tube	ETC	7462A2005-K	16
13	26deg XDLT Lens Tube	ETC	7462A2006-K	16
14	36deg XDLT Lens Tube	ETC	7462A2007-K	12
15	50deg XDLT Lens Tube	ETC	7462A2008-K	12
16	Powercon to Powercon 25'	ETC	DPSJ-25	40
17	5 Pin DMX			60
18	CEM3 power controller	ETC	CEM3	2
19	ECPB: NET Plug-in station (1 gang)	ETC	ECPB Net	6
20	Eos Fader Wing, 20 Fader	ETC	Eos MFW 20	1
21	ETC 1-gang, 2.5" deep back box, surface mount	ETC	ECPB PB1	6
22	Ion Xe Console, 12,288 Outputs	ETC	4311A1012	2
23	Ion Xe + Single Wing Flight Case	ETC	I1916	1
24	Sensor3 48-Module Rack, black, locking door with filter	ETC	SR3AF-48 w/Door	2
25	Sensor3 24-Module Rack, black, locking door with filter	ETC	SR3AF-24 w/Door	1
26	Sensor Sound Suppression Hood, black (SR3-24 and SR3-48)	ETC	SSSh24-48	2
27	Dual 20A Dimmer Module 350µS	ETC	D20	61
28	Dual 20A Relay Module with Advanced Features	ETC	R20AF	4
29	Dual 20A Constant Current Module	ETC	CC20	2
30	Airflow module	ETC	AFM	5
31	8-port Simple Network Box with PoE	ETC	SNB-8	1
32	4 button Inspire station, black	ETC	E1004-4	3
33	U-Bolt Kit for ECPB Plug-in station (1 and 2 gang)	ETC	ECPB PB-U	4
34	50' NET CABLE PROPLEX WITH ETHERCON			1
35	SLIDE POT SMALL			1
	Audio			
36	12.9-inch iPad Pro Wi-Fi 256GB - Space Gray and Smart Keyboard Folio for iPad Pro 12.9-inch (6th generation) - US English	Apple	iPad	2
37	Crown PCC-160 Boundary Microphone	AKG/Crown	PCC-160	2
38	Crown XTI 1002 Amplifier	AKG/Crown	XTI 1002	2
39	DriveRack PA2	DBX	PA2	2
40	Reference Microphone	DBX	RTA-M	2
41	DPA Microphones Core 4099 Microphone, Loud SPL, Stereo System Kit for Piano (Pair)	DPA	4099	2
42	DPA 4266 CORE Omnidirectional Flex Headset Microphone for Shure Wireless - Medium Length, Beige	DPA	4266	2
43	DPA 4188 CORE Slim Directional Flex Headset Microphone for Shure Wireless - Long Length, Brown	DPA	4188	2
44	Electro-Voice ZLX-12 12" Two-Way Passive Loudspeaker (Black)	Electro-Voice	ZLX-12	2
45	Electro-Voice ZLX-12BT 12" 2-Way 1000W Bluetooth-Enabled Powered Loudspeaker (Black)	Electro-Voice	ZLX-12BT	4
46	Electro-Voice ZLX-15BT 15" 2-Way 1000W Bluetooth-Enabled Powered Loudspeaker (Black)	Electro-Voice	ZLX-15BT	2
47	Hollyland Solidcom C1 Pro-8S Full-Duplex ENC Wireless Intercom System with 8 Headsets (1.9 GHz)	Hollyland	Solidcom C1	1
48	Hollyland Solidcom C1 HUB Base for DECT Intercom System (1.9 GHz)	Hollyland	Solidcom C1	1
49	Midas M32 Console	Midas	M32 LIVE	1
50	Midas DL16 16-Input / 8-Output Stage Box with 16 Midas Mic Preamps	Midas	DL16	2
51	Shure ULXD1 ULXD1-G50	Shure	ULXD1	8
52	Shure ULXD2/SM58 G50	Shure	ULXD2	8
53	Shure ULXD4Q Quad-Channel Digital Wireless Receiver (H50: 534 to 598 MHz)	Shure	ULXD4Q	2
54	Shure SM58-LC Cardioid Dynamic Microphone	Shure	SM58-LC	4
55	XLR 25		XLR25	10
56	XLR 50		XLR50	10
57	XLR 100		XLR199	5
	Other Project Costs			
65	Remove noisy 112.5KVA transformer with new 75KVA copper wound transformer (8db lower than regular units) - (Including Turn On Fee/Inspection			1
66	Install four data distribution boxes on catwalk, one per "4 way" corner, two universes per box using 3/4" EMT			1
67	Change connectors in floor pockets from porcelain ungrounded to choice of 2 x 20 amp stage pin or 2 x 20 amp duplex			6
68	Freight and Installation			1
	Alternate(s)			
A1	Source Four LED Series 3 Lustr Light Engine w/ Shutter	Source Four	7462A1051	13

CITY THEATRICAL
NEW YORK • LONDON
An Environmental Lights Company

Multiverse® SHoW Baby®

With tens of thousands of units sold since their introduction in 2011, SHoW Baby plug and play transceivers set the standard for ease of use and reliability at an affordable price point. The addition of Multiverse radio technology enhances the performance even more.

Multiverse® SHoW Baby® is a wireless DMX transceiver that delivers breakthrough plug and play wireless DMX and RDM transmission **right out of the box**. In its default mode, it works exactly like SHoW Baby 6 with six user selectable SHoW IDs.

By connecting an RDM controller, like DMXcat® Multi Function Test Tool, all of the revolutionary new 2.4GHz Multiverse SHoW IDs are accessible. Users can add to their existing SHoW Baby systems, build new single universe Multiverse systems, or use **Multiverse SHoW Baby** as a receiver on multiple universe systems with a Multiverse Transmitter*.

What's in the box

SPECIFICATIONS:

P/N	Frequency	Universes
5900	2.4GHz	1

Physical		
Length	92mm	(3.625 in)
Width	76mm	(3.0 in)
Height	46mm	(1.8 in)
Antenna	2dBi	
User Interface	One button/indicator lights	
Construction	Injection molded plastic, black	
Power Connector	5.5mm x 2.1mm, center positive, 9mm mating depth**	
Data Connector	Neutrik® 5P XLR Connectors for DMX IN and DMX OUT	

Electrical	
Power	7.5-30VDC, 1W
Broadcast Power	2.5mW, 8mW, 25mW, 80mW
Broadcast Modes	Adaptive, Full, Low, Mid, High, Max
DMX Burst Modes	Auto Dynamic
Ethernet Protocols	N/A
SHoW IDs	Multiverse: 147; Neo: 70
RF Sensitivity	-95dBm
RDM Features	RDM Proxy, RDM Responder

Product Information	
Use Environment	Indoor
IP Rating	IP50
Compliance	FCC, IC, CE, ARIB, RoHS
Warranty	One year

*Note: Multiverse SHoW Baby (P/N 5900) is compatible with Multiverse Transmitter (P/Ns 5910 and 5911) when used with a Multiverse SHoW ID on the 2.4GHz band.

**Note: The 5627 12VDC Power Supply with Plug Kit for Multiverse SHoW Baby is not compatible with Multiverse Node.

475 Barell Avenue, Carlstadt, NJ 07072 | Voice: 800-230-9497, 201-549-1160 | Fax: 201-549-1161 | sales@citytheatrical.com

ETC

ColorSource CYC

ColorSource Series

Type(s)	
Project	
Date	
Notes	

GENERAL INFORMATION

The ColorSource CYC is a dedicated cyclorama fixture designed with the sole purpose of creating beautiful, smooth washes of light on a cyclorama or wall. And it delivers! This is the first ETC fixture to use this innovative five-color mix of red, green, blue, lime, and indigo for expanded range and color control.

PRODUCT FEATURES

- All LED (RGBI-L)
- Rich, bright light
- Fanless operation
- Stand-alone presets and sequences
- Simple setup and user interface

ORDERING INFORMATION

ColorSource CYC

MODEL	DESCRIPTION	ETL PART NUMBER	CE PART NUMBER	
CSCYC	ColorSource CYC fixture, black	7415A1000	7415A1200	

Color Options: Fixture ships standard in black. For additional colors please use the below color code suffix:

Add -1 for white, -5 for silver or -8 for custom color.

Notes: C-clamp sold separately

COLORSOURCE CYC SHIPS WITH:

- Hanging yoke
- Power cable

PRODUCT SPECIFICATIONS

Source

LED details	42 Lumileds LUXEON® C LEDs
Max lumens	4,117
Lumens per watt	31
L70 rating (hours to 70% output)	50,000 hours (estimate pending LM84 test data)

Color

Colors used	Red, green, blue, indigo and lime
Color temperature range	Variable
Calibrated array	Yes
Red shift	No

Optical

Beam angle range	N/A (asymmetrical)
Gate size	N/A
Aperture size	N/A
Pattern projection	No
Pattern size	N/A
Camera flicker control/Hz range	1,200 Hz (default) and 25,000 Hz (via RDM)
Notes	The ColorSource CYC has a built in accessory for spill control

Control

Input method	DMX-512 via 5-pin XLR connector
Protocols	DMX
Modes (Footprint)	5 channel- IRGBS (5) Direct- IRGBILS (7) 1 channel- I (1) RGB- RGB (3)
RDM configuration	Yes
UI type	7-segment address display
Local control	Yes
Onboard presets	Yes (12)
Onboard sequences	Yes (5)
Onboard effects	No
Fixture-to-fixture control	Yes
Notes	Local level control via UI

Electrical

Voltage range	100–230 VAC, 50/60 Hz
Input method	powerCON in and thru
Inrush	39 A (first half-cycle) at 120 V 74 A (first half-cycle) at 230 V
Fixtures per circuit*	9 using power thru connector (or 10 per 20 A switched circuit, R20 module or similar)
Wattage Typical/ Standby	133 W / 1.4 W at 120 V 116 W / 1.2 W at 230 V
Current draw	1.11 A at 120 V 0.59 A at 230 V

*Note: All measurements are for 120 V, 60 Hz. Results may vary in different regions.

Thermal

Ambient operating temp	0°–40° C (32°–104° F)
Fan (controllable)	No (N/A)
Droop compensation	Yes
dB range	18.5 dBA average at 1 m
BTUs/hour	453

Physical

Materials	Die-cast aluminum and plastic
Color options	Black, white, silver or custom color
Mounting options	Yoke and floor
IP rating	IP20
Weight	10.3 lb (4.67 kg)
Included accessories	Hanging yoke, power cable
Notes	See accessories list for power cable options

Warranty

Fixture	5 years
LED array	10 years

Regulatory and Compliance

Approved regulatory standards	cETLus to UL 1573 CSA C22.2 No. 166 CE Compliant EAC Compliant

***Note about LED luminaire lifetime:**
ETC utilizes a nationally recognized third-party lab for luminaire testing according to IES LM-84. See etcconnect.com/About/News/ETC-Fixture-Ratings-and-Warranties-Extended.aspx.

All LED sources experience some lessening of light output and some color shift over time. LED output will vary with thermal conditions. In individual situations, LEDs will be used for different durations and levels. This can eventually lead to minor alterations in color performance, necessitating slight adjustments to presets, cues or programs.

PRODUCT FEATURES

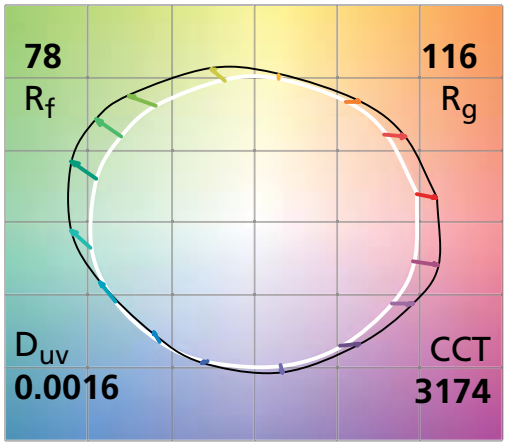
UNIQUE 5-COLOR ARRAY
ColorSource CYC uses a unique blend of red, green, blue, indigo and lime LEDs.

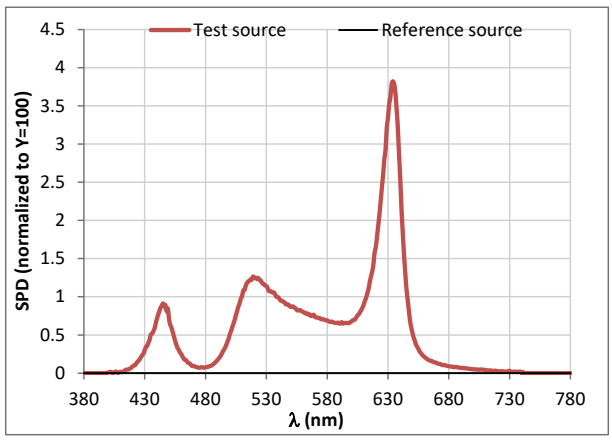
COMPACT DESIGN
The ColorSource CYC was designed to fit onto even the tightest of stages.

FAN-FREE
No fan means a quieter stage.

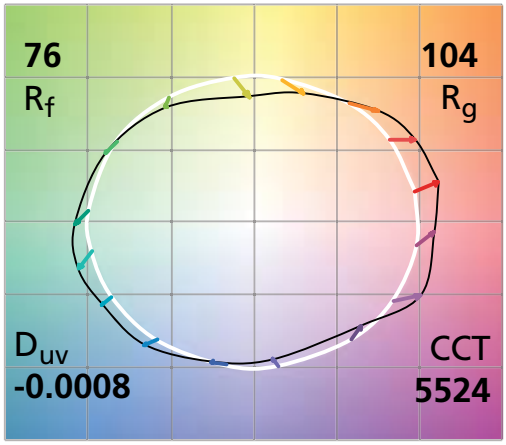
COLOR METRIC INFORMATION

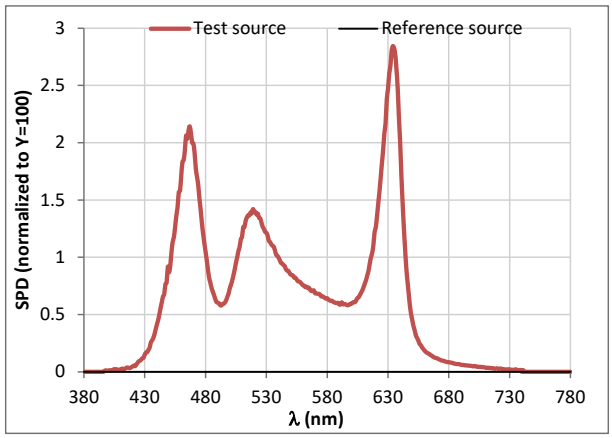
TM-30-15 3200 K - COLORSOURCE CYC





TM-30-15 5600 K - COLORSOURCE CYC





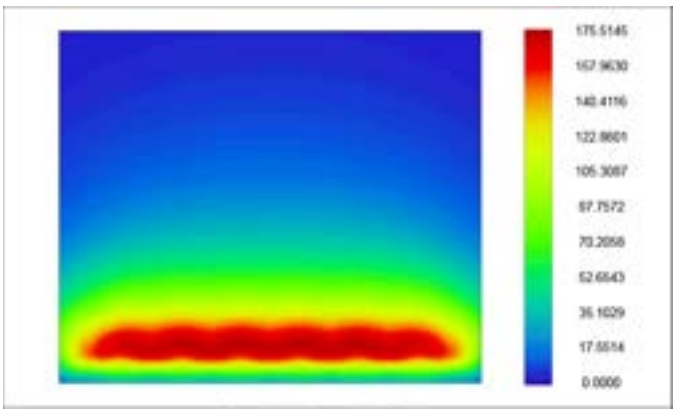
COLOR METRIC INFORMATION

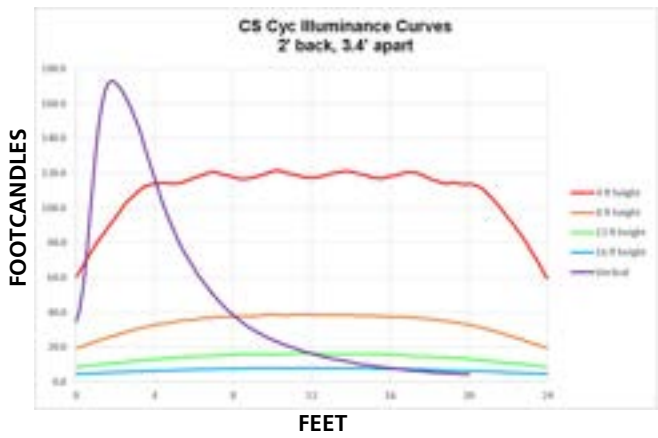
Additional Color Metrics

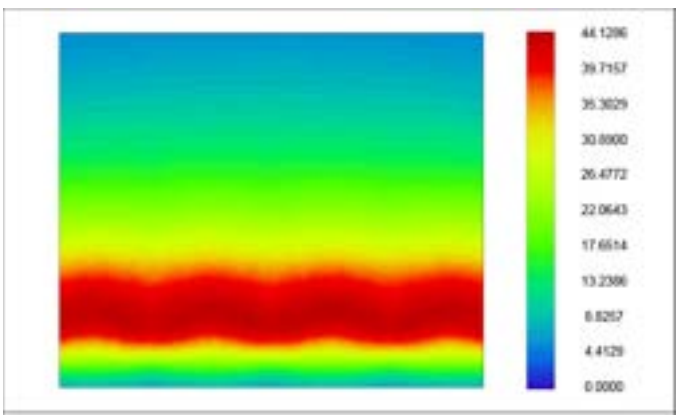
	CS CYC 3200 K	CS CYC 5600 K
CRI R_a (R_9)	72 (2)	72 (-42)
TLCI	52	68

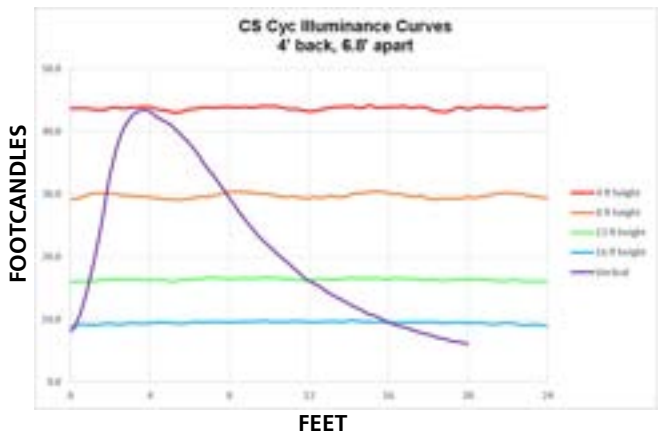
PHOTOMETRICS

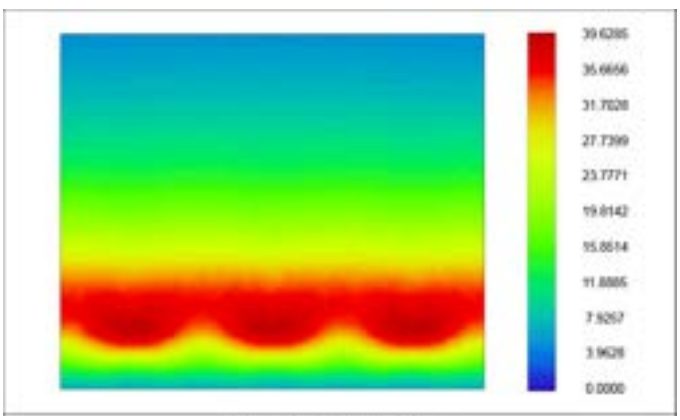
Numerical values represent footcandles.

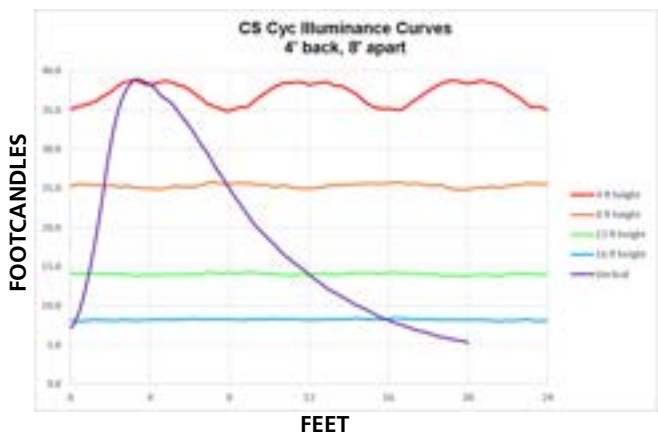












ADDITIONAL ORDERING INFORMATION

Accessories

MODEL	DESCRIPTION	PART NUMBER	
400SC	Safety cable	7060A1022	
400CC	C-Clamp	7060A2009 (not CE)	
DPA-A	1.5 m / 5 ft powerCON to parallel blade U-ground (Edison) connector	7410B7037-A (not CE)	
DPA-B	1.5 m / 5 ft powerCON to 20 A two-pin and ground (stage-pin) connector	7410B7037-B (not CE)	
DPA-C	1.5 m / 5 ft powerCON to grounded 20 A twistlock connector	7410B7037-C (not CE)	
DPA-X	1.5 m / 5 ft powerCON to bare-end power input lead	7410B7037-X (not CE)	
DPJ-5	1.5 m / 5 ft powerCON to powerCON fixture to fixture jumper	7410B7020	
DPJ-10	10 ft powerCON to powerCON fixture to fixture jumper	7410B7010	

PHYSICAL

ColorSource CYC Dimensions

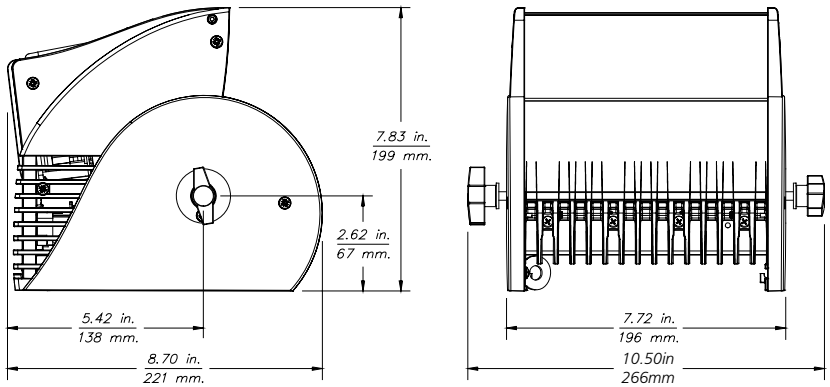
MODEL	HEIGHT		WIDTH		DEPTH	
	in	mm	in	mm	in	mm
ColorSource CYC (Floor)	7.83	199	10.5	266	8.70	221
ColorSource CYC (Hang)	11.97	304	10.5	266	8.70	221

ColorSource CYC Weights

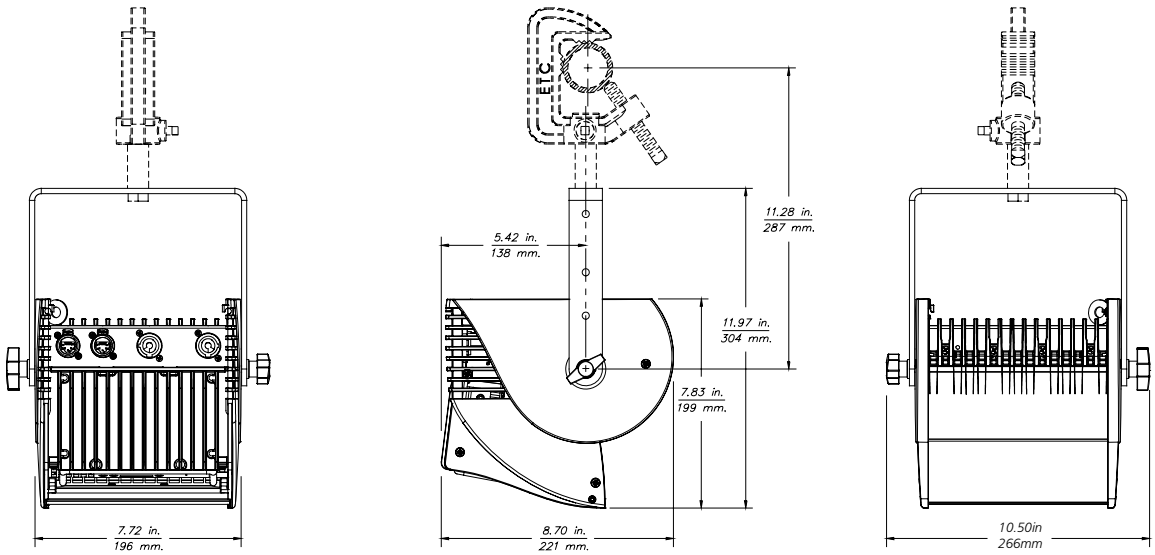
MODEL	WEIGHT*		SHIPPING WEIGHT	
	lb	kg	lb	kg
ColorSource CYC	10.3	4.67	12.9	5.85

*Without mounting hardware

FLOOR



HANG



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ELP PAR

STATIC RGBW LED PAR FIXTURE WITH ZOOM

SPEC SHEET

The Martin ELP PAR static LED fixture sets a new standard in the static wash category, with unprecedented lumen output, high-intensity narrow zoom, full-gamut color calibration and smart rigging and control features.

The ELP PAR makes installation faster and easier, thanks to a quick-focus system and bright angle of projection indicators. Other performance enhancements include a wide zoom range that allows both stage illumination and tight mid-air beam effects, an advanced color-calibration system that delivers accurate color reproduction and precise color temperature control, an extended color mode and a CTC channel that can modify RGB channels.

Whether lighting a theatre production, festival, exhibition or corporate event, fill the stage with color and create stunning beam effects with this versatile LED fixture that sets a new performance benchmark in its class.

KEY MESSAGES

BRIGHTNESS THAT GOES THE DISTANCE

The ELP PAR delivers a class-leading 3,500 lumens of output–double the brightness of the previous generation–thanks to its newly designed 7 x 40W RGBW light engine. It's perfect for covering larger stages that require long throw distances.

SMART SETUP FEATURES

Streamline setup with smart rigging and control features, including omega-bracket-connectivity and bright angle of projection indicator marks for quick and repeatable installation. With the push of a button, the fixture temporarily switches to full-power/open-white/adjustable-zoom settings to instantly confirm projection and focus.

HIGH-INTENSITY ZOOM

ELP PAR's next-generation zoom system excels at creating both broad washes and high-intensity mid-air effects, bringing new flexibility to the lighting designer's toolbox.

FULL-GAMUT COLOR CALIBRATION

The ELP PAR features a full-gamut color-calibration system, which allows consistent color reproduction from fixture to fixture and supports a dedicated color temperature control channel for adjusting the color space from the desired color temperature.

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ELP PAR

STATIC RGBW LED PAR FIXTURE WITH ZOOM

SPEC SHEET

ORDERING INFORMATION

MODELS

- ELP PAR in cardboard box MAR-90800000
- ELP PAR - White in cardbord box MAR-90800005

INCLUDED ITEMS

- Adjustable mounting bracket

RELATED ITEMS

- Martin Companion software suite
  (incl. firmware uploader) .....Free download from www.martin.com
- Martin Companion Cable USB/DMX
  hardware interface ..... P/N 91616091

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ELP PAR

STATIC RGBW LED PAR FIXTURE WITH ZOOM

SPEC SHEET

ACCESSORIES

POWER INPUT CABLES

- Power Input Cable, H07RN-F, 2.5 mm², 14 AWG, bare ends to TRUE1 NAC3FX-W (female), 1.5 m (4.9 ft.) ..... P/N 91611797
- Power Input Cable, H07RN-F, 2.5 mm², 14 AWG, bare ends to TRUE1 NAC3FX-W (female), 5 m (16.4 ft.) ..... P/N 91611786
- Power Input Cable, SJOOW, 12 AWG, bare ends to TRUE1 NAC3FX-W (female), 1.5 m (4.9 ft.) ..... P/N 91610173
- Power Input Cable, SJOOW, 12 AWG, bare ends to TRUE1 NAC3FX-W (female), 5 m (16.4 ft.) ..... P/N 91610174

POWER LINKING CABLES

- Power Relay Cable, H07RN-F, 2.5 mm², TRUE1 to TRUE1, 0.45 m (1.5 ft.) ..... P/N 91611784
- Power Relay Cable, H07RN-F, 2.5 mm², TRUE1 to TRUE1, 1.2 m (3.9 ft.) ..... P/N 91611785
- Power Relay Cable, H07RN-F, 2.5 mm², TRUE1 to TRUE1, 2.5 m (8.2 ft.) ..... P/N 91611796
- Power Relay Cable, SJOOW, 12 AWG, TRUE1 to TRUE1, 0.45 m (1.5 ft.) ..... P/N 91610170
- Power Relay Cable, H07RN-F, 2.5 mm², TRUE1 to TRUE1, 1.2 m (3.9 ft.) ..... P/N 91610171
- Power Relay Cable, H07RN-F, 2.5 mm², TRUE1 to TRUE1, 2.5 m (8.2 ft.) ..... P/N 91610172

POWER CONNECTORS

- Cable Connector, Neutrik powerCON TRUE1 NAC3FX-W TOP (female) ..... P/N 91611789HU
- Cable Connector, Neutrik powerCON TRUE1 NAC3FX-W TOP (male) ..... P/N 91611788HU

INSTALLATION HARDWARE

- Martin Omega bracket for rigging clamp attachment ..... P/N 91602001
- Half-coupler clamp ..... P/N 91602005
- G-clamp (suspension vertically downwards only) ..... P/N 91602003
- Quick-trigger clamp (suspension vertically downwards only) ..... P/N 91602007
- Safety cable, safe working load 50 kg ..... P/N 91604003

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ELP PAR

STATIC RGBW LED PAR FIXTURE WITH ZOOM

SPEC SHEET

TECHNICAL SPECIFICATIONS

DYNAMIC EFFECTS

Color mixing	RGBW
Color presets	48 color presets, virtual color wheel effects
Color temperature control	Variable 2,800 - 10,000 K
Electronic dimming	0 - 100%, four dimming curve options
Strobe and pulse effects	Variable speed and action, random strobe
Electronic 'shutter' effect	Instant open and blackout
Zoom	Motorized

CONTROL AND PROGRAMMING

Control options	DMX, RDM
DMX channels	14
16-bit fine control	Dimming, RGB, zoom
LED color management modes	Raw, extended and calibrated
DMX address setting	Control panel with OLED display
DMX compliance	USITT DMX512-A
RDM compliance	ANSI/ESTA E1.20

OPTICS

Light source	7 x 40 W RGBW Osram LEDs
Minimum LED lifetime	50,000 hours (to >70% luminous output)*
Beam angle (half-peak)	4.2° - 38.7°
Field angle (one-tenth peak)	5.1° - 58.6°
Cutoff angle (3%)	5.7° - 69.6°
Binning	Tight color and flux binning
Calibration	Full Gamut Color Calibration

**Figure obtained under manufacturer's test conditions*

PHOTOMETRIC DATA

Wide beam	3,525 lumens
Narrow beam	1,445 lumens
Fixture Center Intensity Narrow Beam	390,083 cd
Fixture Center Intensity Wide beam	9,957 cd
CRI (Color Rendering Index)	>70
CQS (Color Quality Scale)	83
TM-30 Rf (IES TM-30-15 Fidelity Index)	77
TM-30 Rg (IES TM-30-15 Gamut Index)	117
TLCI (Television Lighting Consistency Index)	61
CCT	6,000 K
LED refresh rate standard mode	3,600 Hz
LED refresh rate theatre mode	19,200 Hz

CONSTRUCTION

Filter mount	191 x 191 mm (7.5 x 7.5 in.)
Color	Black
Housing	Aluminum and composite
Protection rating	IP 20

INSTALLATION

Mounting points	Adjustable bracket, surface or truss mount (fits Martin Omega Bracket)
Location	Not for household use, indoor use in dry location only
Orientation	Any
Minimum distance to combustible materials	0.5 m (1.7 ft.)
Minimum distance to illuminated surfaces	1 m (3.3 ft.)
Minimum clearance around fans and vents	0.5 m (1.7 ft.)

CONNECTIONS

AC power input	Neutrik PowerCON TRUE1 TOP
AC power throughput	Neutrik PowerCON TRUE1 TOP
DMX data in/out	Neutrik 5-pin locking XLR

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ELP PAR

STATIC RGBW LED PAR FIXTURE WITH ZOOM

SPEC SHEET

TECHNICAL SPECIFICATIONS

ELECTRICAL

AC power	100-240 V nominal, 50/60 Hz
Power supply unit	Auto-ranging electronic switch mode
Typical half-cycle RMS inrush current at 240 V	8.7 A
Power Factor	0.99 @ 100 V / 120 V , 0.94 @ 220 V / 230 V / 240 V
Typical current draw	3.0 A @ 100 V / 120 V ,1.7 A @ 220 V / 230 V / 240 V *

POWER CONSUMPTION

Typical	300 W *
Hibernation	3 W *

**Measurements made at nominal voltage. Allow for a deviation of +/- 10%*

Typical: full output white, no effects moving, regulated fan speed.

Hibernation: no output, motors de-energized, fans stopped, wake-up procedure to re-use fixture.

THERMAL

Maximum surface temperature	65° C (149° F)
Cooling	Forced air (temperature regulated, low noise)
Maximum ambient temperature (Ta max.)	40° C (104° F)
Minimum ambient temperature (Ta min)	-10°C (14° F)
Total heat dissipation*	1170 BTU/hr.

**Calculated, +/- 10%, at full intensity, full white*

APPROVALS

Global CB Certification/IECEE	IEC 60598-2-17 (IEC 60598-1)
EU safety	EN 60598-2-17 (EN 60598-1), EN 62471, EN 62493
EU EMC	EN 55015; EN 55032; EN 55035; EN 61000-3-2, EN 61000-3-3, EN 61547
US safety	UL 1573
US EMC	FCC Part 15 Class B
Canadian safety	CSA C22.2 No. 166
Canadian EMC	ICES-003 Class B, ICES-005 Class B
Australia/NZ	RCM
United Kingdom	UKCA

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ELP PAR

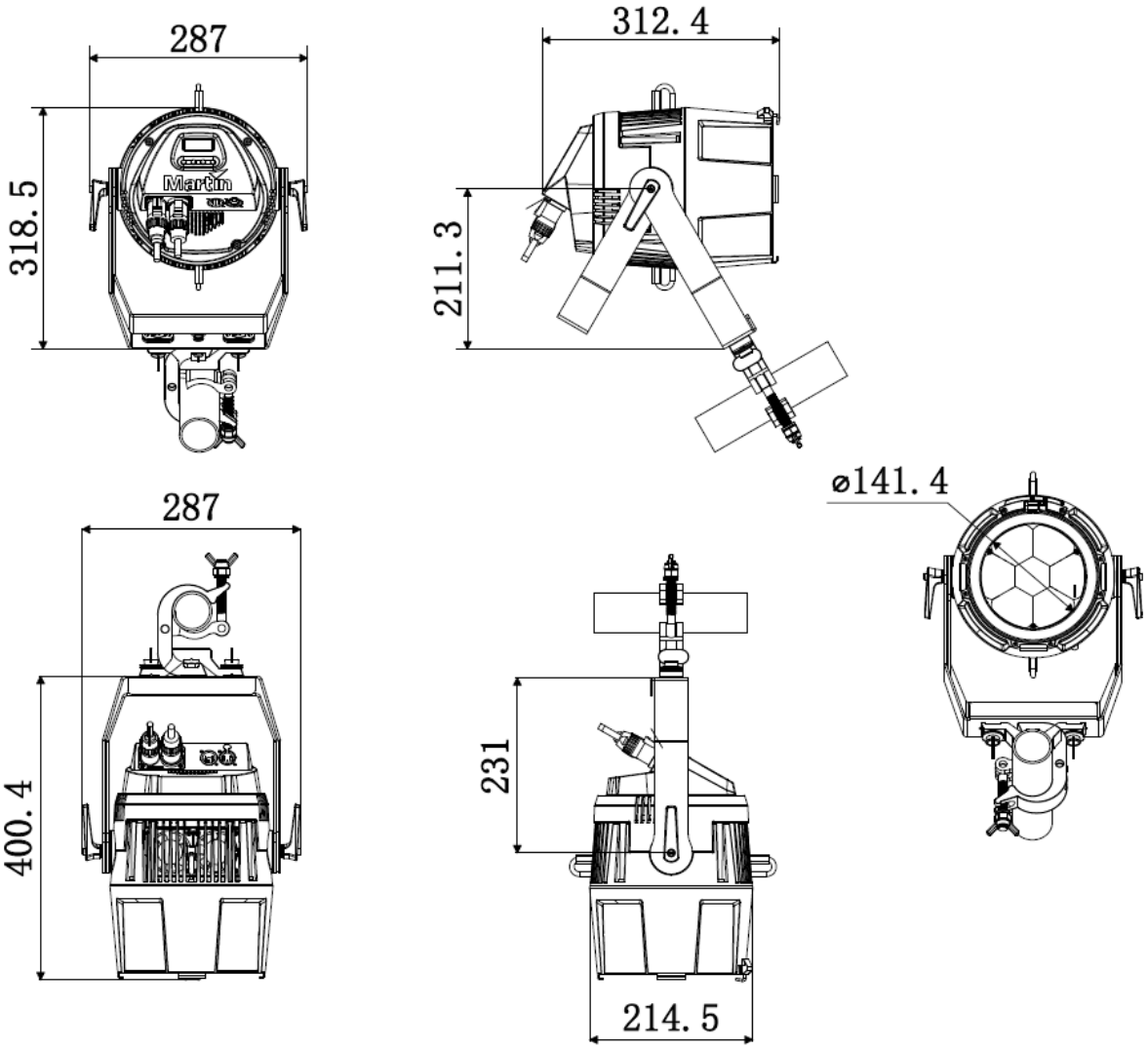
STATIC RGBW LED PAR FIXTURE WITH ZOOM

SPEC SHEET

DIMENSIONS

PHYSICAL

Dimensions
Including Bracket (L x W x H).....312x287x401 mm (12.3x11.3x15.8 In.)
Weight ..... 7.8 Kg (17.2 Lbs.)



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ETC

Ion Xe

Eos Family Control

Type(s)	
Project	
Date	
Notes	

GENERAL INFORMATION

Ion Xe is the compact workhorse of the Eos Family. With the same backlit keyboard layout and full-featured software as larger consoles in the family – Ion Xe gives you the complete Eos experience in a budget-friendly and portable package.

Eos Family software includes:

- Approachable yet powerful syntax for programmers of every level
- Industry-leading color control tools
- Magic Sheets for custom programming and displays
- Augment3d 3D programming and visualization environment
- Virtual Media Server function for pixel-mapping
- Timecode and automation integration
- Multi-user and multi-programmer working environment

For drawings, photos, and more, visit the Ion Xe product webpage. To explore the latest software features, accessories, and other Eos Family products, visit etcconnect.com/Eos.

ORDERING INFORMATION

ION XE

MODEL	DESCRIPTION	PART NUMBER
Ion Xe - 2K	Ion Xe console, 2,048 outputs (base)	4311A1011 *
Ion Xe - 12K	Ion Xe console, 12,288 outputs (maximum)	4311A1012 *
Ion Xe 10K Up	After-sale 10K output upgrade	4311A0060
Ion Xe 10K Initial Up	Ion Xe 10K initial output upgrade †	4311A0062
Ion Xe RPU - 2K	Ion Xe Remote Processor Unit, 2,048 outputs (base)	4311A1031 *
Ion Xe RPU - 12K	Ion Xe Remote Processor Unit, 12,288 outputs (maximum)	4311A1032 *
Ion Xe RPU 10K Up	Ion Xe RPU after-sale 10K output upgrade	4311A0061
Ion Xe RPU 10K Initial Up	Ion Xe RPU initial 10K output upgrade †	4311A0063

* Add -US for Edison, -EU for Schuko/UK13A, -AZ for Australian Type I

Consoles shipped after 2023-03 require Eos software v3.2.1 or higher

† Initial upgrade sold in some markets as an alternative to 4311A1012 / 4311A1032

All models are available without wireless radios (WiFi and Bluetooth). Please contact ETC for ordering information.

SHIPS WITH:

- One three-button scroll mouse and mousepad
- Alpha-numeric keyboard
- Locking regionalized IEC power cord
- Two active display port to DVI adapters
- One 18-inch LED gooseneck Littlite
- Augment3d AR target kit
- Dust cover

ORDERING INFORMATION

ION XE ACCESSORIES

MODEL	DESCRIPTION	PART NUMBER
Eos MFW 10	Eos Motorized Fader Wing 10	4240A1021 *
Eos MFW 20	Eos Motorized Fader Wing 20	4240A1022 *
Eos FW 20	Eos Standard Fader Wing 20	4240A1023 *
Eos FW 40	Eos Standard Fader Wing 40	4240A1024 *
Net3 RVI3	Remote Video Interface	4250A1130 *
ETC Puck Base	ETC Puck, 1,024 outputs (base)	4380A1133
ETCnomad Base	Client Software Key Kit	4380A1011
Ion Xe FC	Ion Xe Flight Case	I1916

* Add -US for Edison, -EU for Schuko/UK13A, -AZ for Australian Type I

SPECIFICATIONS

HARDWARE AND INTERFACES

- Supports two external display port monitors (1920x1080 minimum, 3840x2160 maximum), with optional single-touch or multi-touch screen control and DDC/CI support
- Main Playback with two 100 mm standard faders
- Four encoders for non-intensity parameter control
- Dedicated high-resolution intensity level wheel
- Backlit Eos keypad
- Included USB keyboard
- Solid-state hard drive
- IEC power input (100–240 VAC at 50/60 Hz), fused mains power switch, locking regionalized power cable included
- Two individually configurable Gigabit Ethernet ports, RJ45 connectors
- One 802.11ac WiFi Ethernet adapter (to be enabled with future software)
- Bluetooth 5.1 for connecting input accessories (to be enabled with future software)
- sACN and Art-Net network output protocols
- Four DMX-512 / RDM 5-pin XLR ports
- Contact closure triggers via D-Sub connector
- USB 3.1 ports, for flash drives, pointing devices, keyboards (5 USB-A ports, 2 USB-C ports)
- One Littlite XLR port
- One Kensington lock port
- Multiple MIDI and/or SMPTE timecode inputs, MIDI In and Out, Analog/Serial Inputs, OSC transmit/receive, UDP transmit/receive through network interface or Response Gateways

ELECTRICAL AND THERMAL

- Power consumption approximately 2 A at 120 V or 230/240 V
- Ambient room temperature 0°C to 35°C (32°F to 95°F)
- Ambient humidity up to 90% non-condensing

REGULATORY AND COMPLIANCE

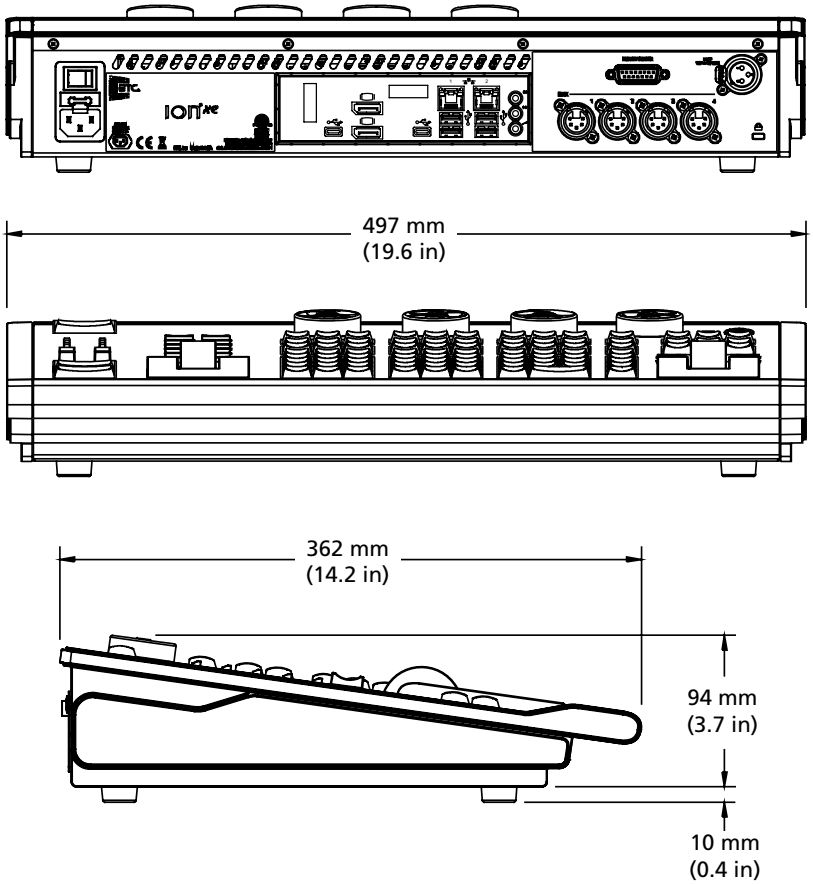
- CE Compliant
- cETLus listed
- UKCA marked
- FCC compliant
- RoHS compliant
- WEEE

PHYSICAL

Ion Xe Dimensions and Weights*

MODEL	HEIGHT		WIDTH		DEPTH		WEIGHT	
	mm	in	mm	in	mm	in	kg	lb
Ion Xe	107	4.2	497	19.6	362	14.2	5.8	12.7
Ion Xe in shipping container	197	7.8	679	26.8	470	18.5	8.5	18.7
Ion Xe in flight case	320	12.5	803	31.6	521	20.5	18.6	41.0

* Dimensions and weights typical



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ETC

ColorSource Consoles

ColorSource System

GENERAL INFORMATION

Available in two sizes with optional audiovisual and ethernet capabilities, ColorSource consoles provide hands-on control designed for the latest technology. These affordable, portable desks specialize in streamlined, plug-and-play setup; the console recognizes intelligent lights in the rig via RDM and auto-populates them in patch, and the on-board touchscreen allows fixtures to be dragged into place on a customizable stage map for quick selection and programming. The faders and touchscreen can be used to control moving lights, mix LED colors, play stored looks and effects and - with the AV consoles -play sound and visual media.

APPLICATIONS

- One-off events
- Corporate theaters
- Touring productions
- School auditoriums/theaters
- Community theaters
- Houses of worship
- Small TV studios
- Tradeshows

ORDERING INFORMATION

ColorSource consoles

MODEL	PART NUMBER	DESCRIPTION
CS20	7225A1000-US	20 Fader ColorSource console (80 Channels or Devices)
CS40	7225A1001-US	40 Fader ColorSource console (80 Channels or Devices)
CS20AV	7225A1100-US	20 Fader ColorSource AV console with network, audio, and video features (80 Channels/Devices)
CS40AV	7225A1101-US	40 ColorSource AV console with network, audio, and video features (80 Channels or Devices)

ColorSource Accessories

MODEL	PART NUMBER	DESCRIPTION
CS20DC	7225A4020	Dust cover CS20 and CS20AV
CS40DC	7225A4021	Dust cover CS40 and CS40AV
CS20RK	7225K1002	19" Rack mount kit for CS20 and CS20AV consoles
	I1865	Pelican Case with foam for CS20 and CS20AV consoles
	I1866	Pelican Case with foam for CS40 and CS40AV consoles
	7225A2020-US	Replacement Power supply (Edison connector)

SHIPS WITH:

- Power supply

SPECIFICATIONS

MECHANICAL

- One home and five configurable softkey buttons
- Four configurable function faders
- 7" color multi-touch touchscreen

PLAYBACK CONTROLS

- One cue list with 999 cues
- 10 pages of 20 or 40 playbacks
  - Static memories or sequences
- Playback Toy for filtered and timed execution of playbacks
- Mulitple bump modes (Flash, Solo, Solo Change, Move/Go)
- Full-history rubberbanding for playbacks
- On-board help system
- Extensive library for controlling moving lights

MEDIA

- Audio input type:
  - 3.5 mm (1/8") TRS, Stereo, unbalanced
  - Line in -10 dBV (316 mV RMS)
  - Input Impedance: 29k ohms
- Audio output type:
  - 3.5 mm (1/8") TRS, Stereo, unbalanced
  - Line out -10 dBV (316 mV RMS) at 10k ohms "Line Level"
  - Load Impedance : 10k – 200k ohms
- Supported media file formats:
  - Audio: mp3, aac and wav files (44.1 kHz sample rate, 4 GB maximum file size)
  - Image: jpg, png, tiff, and bmp files (1280 x 720 maximum resolution)

    Please note: visual output is limited to still images and effects from the VideoToy feature of the ColorSource AV console. Movie files are not supported

REGULATORY AND COMPLIANCE

- cETLus Listed
- CE Compliant

SPECIFICATIONS

PROGRAMMING TOOLS

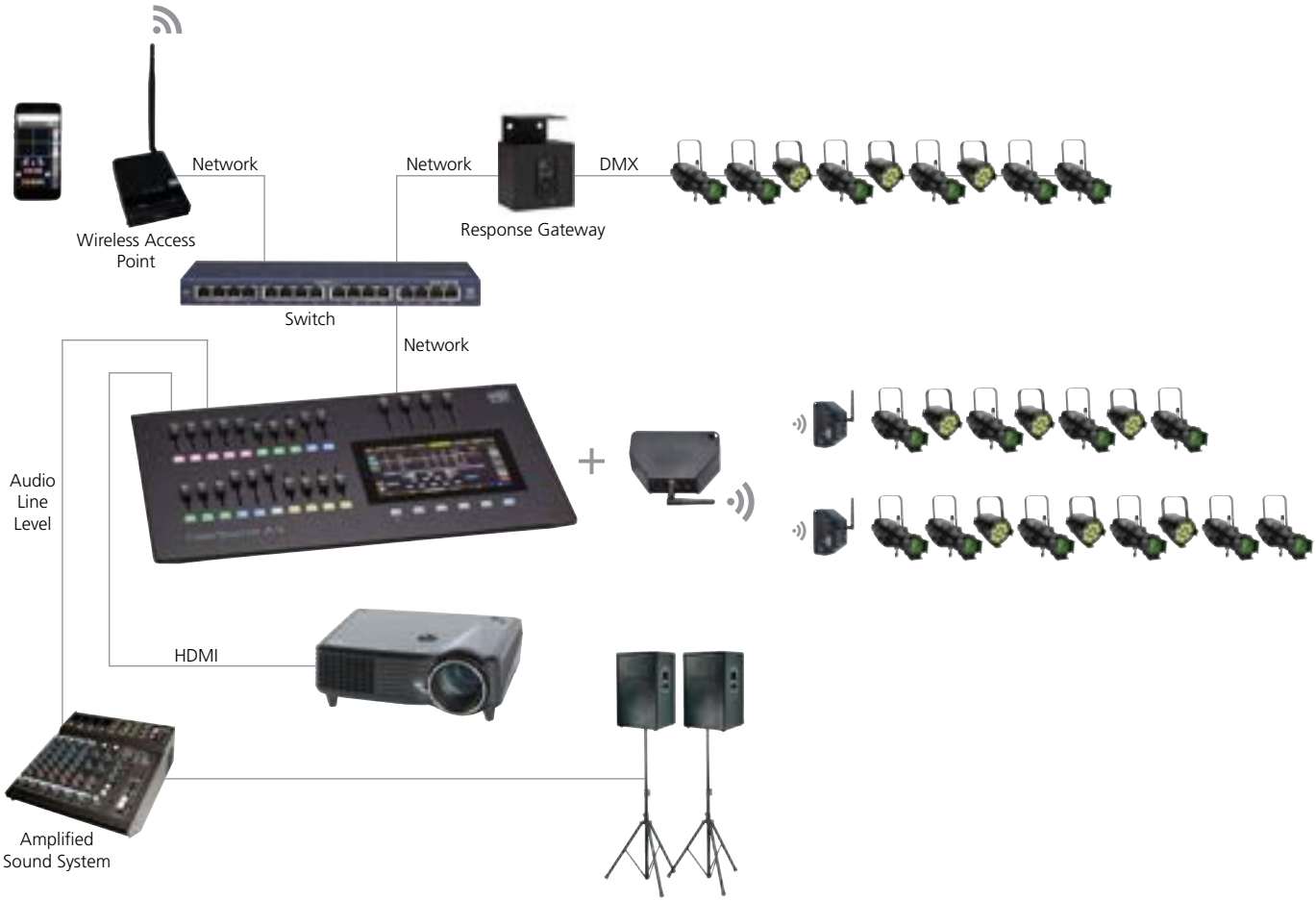
- Color and white pickers
- Reference based Position, Color and Beam palettes
- Innovative touch-based parameter controls
- Auto fixture selection on fader moves
- Virtual Level/Rate wheel
- Cutomizable Channel display using Stage Map
- Effects (intensity, color, shape, and parameter)
- Fixture Tags for Quick Selects
- 27 Quick Select groupings
- Two independent channels
- Virtual keypad for level entry

UNIQUE FEATURES

- **COLORSOURCE 20**
  - 80 channels / multi-parameter devices
  - 20 Channel / Playback faders with color indication
  - One DMX/RDM port
  - One USB port
  - 2 GB onboard storage for show files
- **COLORSOURCE 40**
  - 80 channels / multi-parameter devices
  - 40 Channel / Playback faders with color indication
  - One DMX/RDM port
  - One USB port
  - 2 GB onboard storage for show files
- **COLORSOURCE 20 AV**
  - 80 channels / multi-parameter devices
  - 20 Channel / Playback faders with color indication
  - Two DMX/RDM ports
  - Two USB ports
  - RJ45 for network (sACN, ArtNet, OSC)
  - Sound-to-light playback
  - HDMI® port for monitor or media playback
  - "Amigo" browser-based remote
  - 25 GB onboard storage for show files and media
- **COLORSOURCE 40 AV**
  - 80 channels / multi-parameter devices
  - 40 Channel / Playback faders with color indication
  - Two DMX/RDM ports
  - Two USB ports
  - RJ45 for network (sACN, ArtNet, OSC)
  - Sound-to-light playback
  - HDMI port for monitor or media playback
  - "Amigo" browser-based remote
  - 25 GB onboard storage for show files and media

COLORSOURCE CONSOLE SAMPLE SYSTEM

COLORSOURCE AV SAMPLE SYSTEM



PHYSICAL

ColorSource Console dimensions*

MODEL	HEIGHT		WIDTH		DEPTH	
	in	mm	in	mm	in	mm
CS20 / CS20AV	2.36	60	18.3	465	11	279
CS40 / CS40AV	2.36	60	26.3	668	11	279

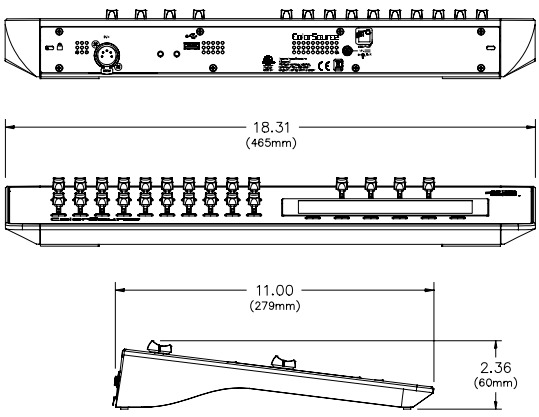
*Weights and dimensions typical.

ColorSource Console weights*

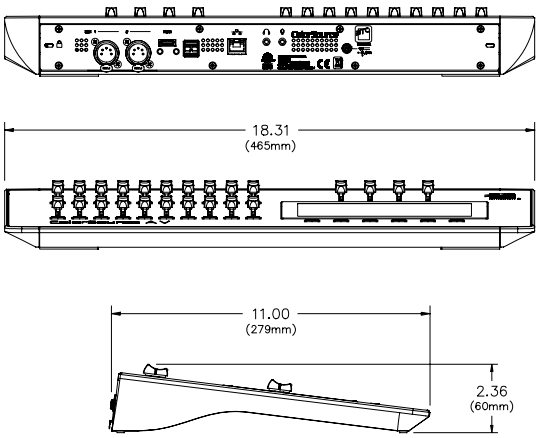
MODEL	WEIGHT		SHIPPING WEIGHT	
	lb	kg	lb	kg
CS20 / CS20AV	6.9	3.13	10.85	4.92
CS40 / CS40AV	9.55	4.33	13.55	6.15

*Weights and dimensions typical.

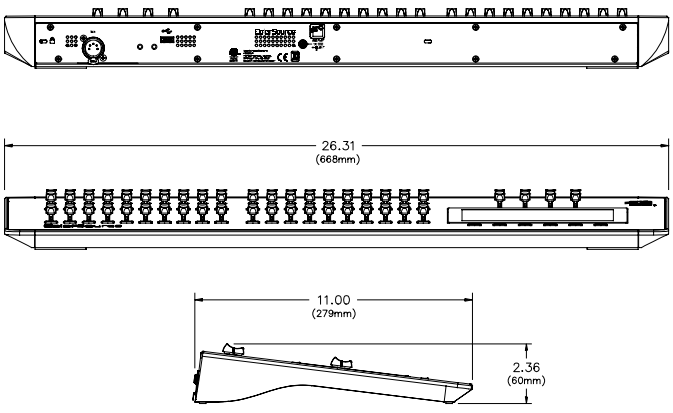
COLORSOURCE 20



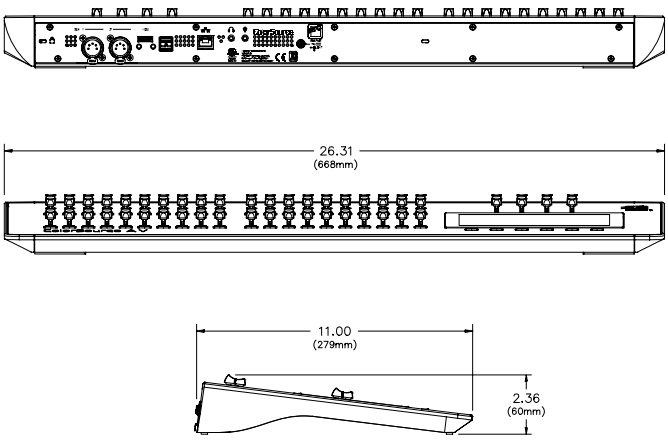
COLORSOURCE 20 AV



COLORSOURCE 40



COLORSOURCE 40 AV



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ETC

SolaPix

High End Systems

Type(s)

Project

Date

Notes

OVERVIEW

Fixture Overview

The SolaPix family of wash fixtures from High End Systems takes the traditional concept of a pixel wash and pushes it to its maximum potential. Whether you are using the fixture to spread color all over a ballroom, tradeshow floor, or concert stage, the bright and punchy output will envelop your production with beautiful saturated color. Additionally, when you need to add interest, the narrow zoom and fully macro- and pixel-controlled face gives you a wide variety of looks and effects to help set the mood and steal the show.

Applications

- Live concerts
- Tradeshows
- Festivals
- Industrial shows
- Award shows
- Studios
- Theatre
- Corporate events

Product Features

- Additive LED, RGBW, color mixing system for extremely powerful saturated colors and tunable white control
- Versatile 4.5°–60° zoom
- Extremely efficient optical system provides market-leading lumen output
- FleX Effects Generator for easily customizable macros
- Pixel mapping on all models
- Modular control with Art-Net, or sACN in addition to simultaneous DMX control
- Patent-Pending HaloGraphic Pixel Definition

ORDERING INFORMATION

SolaPix

Model	Description
2594A1000-B	SolaPix 7, black, packaged in molded insert
2594K1001	Roadcase for SolaPix 7 (fits up to six (6) SolaPix 7)
2595A1100-B	SolaPix 19, black, packaged in molded insert
2595K1001	Roadcase for SolaPix 19 (fits up to three (3) SolaPix 19)
2596A1200-B	SolaPix 37, black, packaged in molded insert
2596K1001	Roadcase for SolaPix 37 (fits up to two (2) SolaPix 37)

Note: Fixture includes two (2) Omega brackets, one (1) fixture power cord, bare ends to powerCON® TRUE1® TOP input, and a safety cable.

Please see tables on page 9 for bracket type details.

Accessories

Model	Description
2560B7009*	Fixture power cord upgrade, NEMA 5-15P "Edison" to powerCON TRUE1, 15 A
2560B7004	Fixture power cord upgrade, NEMA 5-20P to powerCON TRUE1, 20 A
2560B7005	Fixture power cord upgrade, Stage Pin to powerCON TRUE1, 20 A
2560B7006	Fixture power cord upgrade, L6-20P to powerCON TRUE1, 20 A
2560B7007	Fixture power cord upgrade, L5-20P to powerCON TRUE1, 20 A
67040007	Mega-Claw™
55040014	Cheeseborough 2" Alloy 1/2 Coupler Truss Clamp
67040010	Mini-Claw™

*: Not rated for use with SolaPix 37

PRODUCT SPECIFICATIONS

Source

Fixture Type	SolaPix 7	SolaPix 19	SolaPix 37
LED Quantity	7	19	37
Max. Field Lumens	5,500	14,500	29,000
Integrating Sphere Lumens	5,600	15,200	30,500
LPW	20	20	20
LED Type	40 W Osram Ostar LED		
LED Life	50,000 Hours / 5 year warranty		

Color

Color Mixing	Red, Green, Blue, and White
Color Temperature Range	Variable from 2800–8000 K

Optical

Beam Angle	4.5°–60°
Flicker Control/Hz Range	2.4 kHz, 16 kHz

Control

Input Method	DMX (5-pin) or Ethernet
Protocols	DMX via RS-485 Art-Net, or sACN via Ethernet
RDM Functions	Yes
UI Type	Full color graphical UI with 6 button navigational control
Local Control	Yes
Effects Engine	Built in effects engine with multi parameter color and speed control
Pixel Mapping	Individual addressing via DMX, Art-Net, or sACN
Dimming Performance	16-Bit, DMX controlled

Electrical

Fixture Type	SolaPix 7	SolaPix 19	SolaPix 37
Max Wattage	400 W	900 W	1700 W
Max Current	4.0 A @ 100 V 1.7 A @ 240 V	7.6 A @ 100 V 3.8 A @ 240 V	14.3 A @ 120 V 7.2 A @ 240 V
Inrush (First Half Cycle)	120 V: 57 A 230 V: 78 A	120 V: 28 A 230 V: 96 A	120 V: 69 A 230 V: 91 A
Fixtures Per Circuit	5 fixtures (R20 module or similar)	2 fixture (R20 module or similar)	1 fixture (R20 module or similar)
Voltage Range	100–240 V 50–60 Hz		120–240V 50–60Hz
Input Method	powerCON TRUE1		
Additional Details	See pages 6-8 for additional power information		

Thermal

Ambient Operating Temp	0°–40° C (32°–104° F)
Fan Mode	Standard, Studio, User fan control channel

Physical

Fixture Type	SolaPix 7	SolaPix 19	SolaPix 37
Pan and Tilt Range	540° Pan 255° Tilt	540° Pan 255° Tilt	540° Pan 258° Tilt
Max Pan/Tilt Speed	Pan - 360° in 1.2 s Tilt -180° in 0.66 s	Pan - 360° in 1.6 s Tilt - 180° in 0.91 s	Pan - 360° in 2.5 s Tilt - 180° in 1.72 s
Weight	9.1 kg (20 lb)	15.8 kg (35 lb)	23.6 kg (52 lb)
Materials	Steel and aluminum frame with molded plastic covers		
Color Options	Black, white by request		
Mounting Options	Any orientation		
IP Rating	IP-20		
Included Accessories	powerCON TRUE1 TOP to bare end fixture tail Two (2) Omega brackets Safety cable		

Warranty

Fixture Warranty	Five (5) years for light engine Two (2) year for complete fixture
Warranty Details	etcconnect.com/support/warranty.aspx

Regulatory & Compliance

Regulatory Standards	Listed to UL 1573 Certified to CSA STD. C22.2 No: 166 EAC
CE Compliance Declared to the Following Standards	Safety: EN 60598-1, EN 60598-2-17, EN 62031, EN 62471 EMC: EN 55015, EN 61547, EN 61000-3-2, EN 61000-3-3
Complies to the ROHS Directive	Yes

Safety

Safety	Minimum distance to illuminated surface = 2.0 m Minimum distance from fixture head to combustible materials = 0.1 m

Note: All LED sources experience some lessening of light output and some color shift over time. LED output will vary with thermal conditions. Thermal conditions can be affected by ambient temperatures and orientation.

PHOTOMETRIC DATA

SolaPix 7 - All on, Standard Mode

	Degree	Candela	Field Lumens	Power Usage	Lumens Per Watt
Narrow Beam	4.5°	400,700	2,954	280 W	9
Narrow Wash	14°	116,300	3,953	280 W	12
Medium Wash	26°	50,200	4,555	280 W	14
Wide Wash	60°	13,200	5,496	280 W	17

Narrow Beam - 4.5°

Throw Distance	10 ft 3.0 m	20 ft 6.1 m	30 ft 9.1 m	50 ft 15.2 m	200 ft 61 m
Field Diameter	0.8 ft 0.24 m	1.6 ft 048 m	2.4 ft 0.72 m	3.9 ft 1.20 m	15.7 ft 4.80 m
Illuminance (fc)	4,007	1,002	446	161	11
Illuminance (lux)	43,105	10,776	4,789	1,724	108

Narrow Wash - 14°

Throw Distance	10 ft 3.0 m	20 ft 6.1 m	30 ft 9.1 m	50 ft 15.2 m	200 ft 61 m
Field Diameter	2.5 ft 0.8 m	4.9 ft 1.5 m	7.4 ft 2.3 m	12.3 ft 3.8 m	49.1 ft 15 m
Illuminance (fc)	1,163	291	130	47	3
Illuminance (lux)	12,512	3,128	1,390	500	31

Medium Wash - 26°

Throw Distance	10 ft 3.0 m	20 ft 6.1 m	30 ft 9.1 m	50 ft 15.2 m	200 ft 61 m
Field Diameter	4.6 ft 1.4 m	9.2 ft 2.8 m	13.9 ft 4.2 m	23.1 ft 7.0 m	92.3 ft 28.2 m
Illuminance (fc)	502	126	56	21	2
Illuminance (lux)	5,394	1,348	599	216	13

Wide Wash - 60°

Throw Distance	10 ft 3.0 m	20 ft 6.1 m	30 ft 9.1 m	50 ft 15.2 m	200 ft 61 m
Field Diameter	11.5 ft 3.52 m	23.1 ft 7.04 m	34.6 ft 10.56 m	57.7 ft 17.60 m	230.9 ft 70.40 m
Illuminance (fc)	132	33	15	6	1
Illuminance (lux)	1,419	355	158	57	4

SolaPix 19 - All on, Standard Mode

	Degree	Candela	Field Lumens	Power Usage	Lumens Per Watt
Narrow Beam	4.5°	1,087,400	8,017	570 W	11
Narrow Wash	14°	315,700	10,730	570 W	15
Medium Wash	26°	136,100	12,362	570 W	17
Wide Wash	60°	35,800	14,917	570 W	20

Narrow Beam - 4.5°

Throw Distance	10 ft 3.0 m	20 ft 6.1 m	30 ft 9.1 m	50 ft 15.2 m	200 ft 61 m
Field Diameter	0.8 ft 0.24 m	1.6 ft 048 m	2.4 ft 0.72 m	3.9 ft 1.20 m	15.7 ft 4.80 m
Illuminance (fc)	10,874	2,719	1,209	435	28
Illuminance (lux)	117,000	29,250	13,000	4,680	293

Narrow Wash - 14°

Throw Distance	10 ft 3.0 m	20 ft 6.1 m	30 ft 9.1 m	50 ft 15.2 m	200 ft 61 m
Field Diameter	2.5 ft 0.8 m	4.9 ft 1.5 m	7.4 ft 2.3 m	12.3 ft 3.8 m	49.1 ft 15 m
Illuminance (fc)	3,157	790	351	127	8
Illuminance (lux)	33,960	8,490	3,773	1,358	85

Medium Wash - 26°

Throw Distance	10 ft 3.0 m	20 ft 6.1 m	30 ft 9.1 m	50 ft 15.2 m	200 ft 61 m
Field Diameter	4.6 ft 1.4 m	9.2 ft 2.8 m	13.9 ft 4.2 m	23.1 ft 7.0 m	92.3 ft 28.2 m
Illuminance (fc)	1,361	341	152	55	4
Illuminance (lux)	14,640	3,660	1,627	586	10

Wide Wash - 60°

Throw Distance	10 ft 3.0 m	20 ft 6.1 m	30 ft 9.1 m	50 ft 15.2 m	200 ft 61 m
Field Diameter	11.5 ft 3.52 m	23.1 ft 7.04 m	34.6 ft 10.56 m	57.7 ft 17.60 m	230.9 ft 70.40 m
Illuminance (fc)	358	90	40	15	1
Illuminance (lux)	3,852	963	428	154	4

To determine center beam illumination in footcandles at any throw distance, divide candela by the throw distance squared.

Metric conversions: For meters, multiply feet by 0.3048.
For lux, multiply footcandles by 10.76.

PHOTOMETRIC DATA

SolaPix 37 - All on, Standard Mode

	Degree	Candela	Field Lumens	Power Usage	Lumens Per Watt
Narrow Beam	4.5°	2,117,500	15,612	1480 W	11
Narrow Wash	14°	614,700	20,896	1480 W	15
Medium Wash	26°	265,000	24,074	1480 W	17
Wide Wash	60°	69,800	29,049	1480 W	20

Narrow Beam - 4.5°

Throw Distance	10 ft 3.0 m	20 ft 6.1 m	30 ft 9.1 m	50 ft 15.2 m	200 ft 61 m
Field Diameter	0.8 ft 0.24 m	1.6 ft 048 m	2.4 ft 0.72 m	3.9 ft 1.20 m	15.7 ft 4.80 m
Illuminance (fc)	21,175	5,294	2,353	847	53
Illuminance (lux)	227,842	56,961	25,316	9,114	570

Narrow Wash - 14°

Throw Distance	10 ft 3.0 m	20 ft 6.1 m	30 ft 9.1 m	50 ft 15.2 m	200 ft 61 m
Field Diameter	2.5 ft 0.8 m	4.9 ft 1.5 m	7.4 ft 2.3 m	12.3 ft 3.8 m	49.1 ft 15 m
Illuminance (fc)	6,147	1,537	683	246	16
Illuminance (lux)	66,133	16,533	7,348	2,645	165

Medium Wash - 26°

Throw Distance	10 ft 3.0 m	20 ft 6.1 m	30 ft 9.1 m	50 ft 15.2 m	200 ft 61 m
Field Diameter	4.6 ft 1.4 m	9.2 ft 2.8 m	13.9 ft 4.2 m	23.1 ft 7.0 m	92.3 ft 28.2 m
Illuminance (fc)	2,650	663	295	106	7
Illuminance (lux)	28,509	7,127	3,168	1,140	71

Wide Wash - 60°

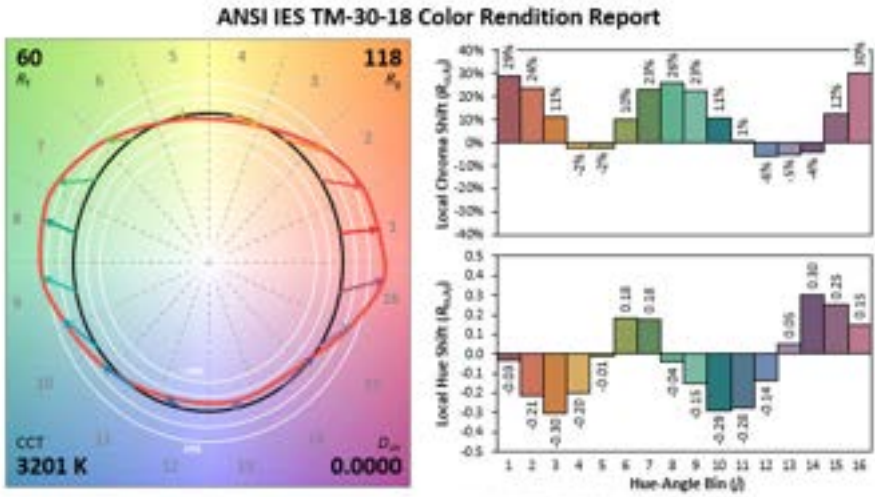
Throw Distance	10 ft 3.0 m	20 ft 6.1 m	30 ft 9.1 m	50 ft 15.2 m	200 ft 61 m
Field Diameter	11.5 ft 3.52 m	23.1 ft 7.04 m	34.6 ft 10.56 m	57.7 ft 17.60 m	230.9 ft 70.40 m
Illuminance (fc)	698	175	78	28	2
Illuminance (lux)	7,501	1,875	833	300	19

To determine center beam illumination in footcandles at any throw distance, divide candela by the throw distance squared.

Metric conversions: For meters, multiply feet by 0.3048.
For lux, multiply footcandles by 10.76.

COLOR METRIC DATA

SolaPix tuned to 3200 K

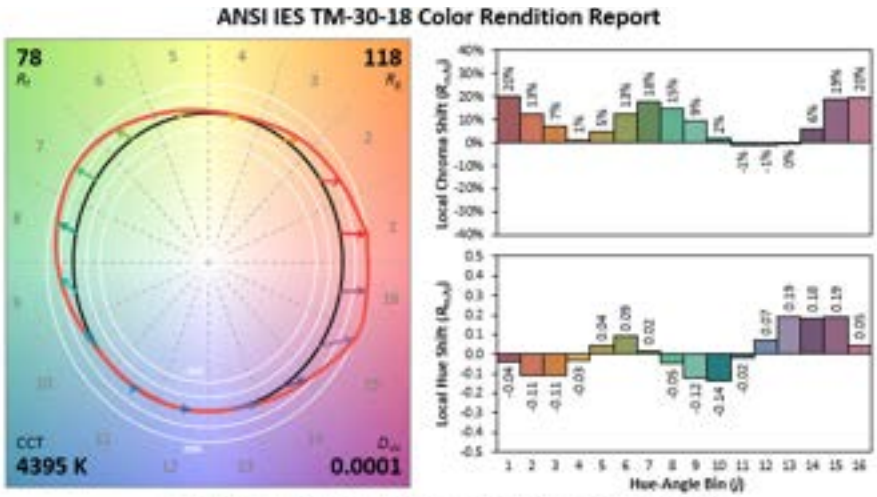


Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.

Additional Color Metrics

CRI Ra (R9)	76
TLCI	66

SolaPix tuned to 4400 K

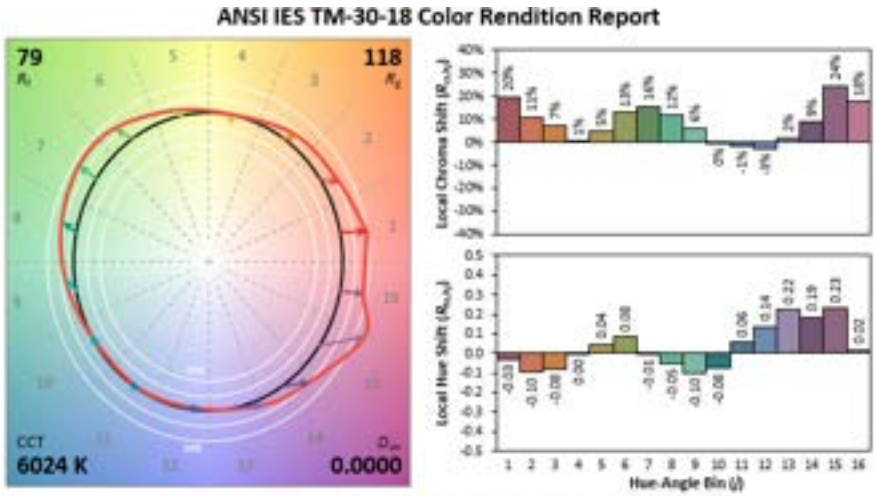


Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.

Additional Color Metrics

CRI Ra (R9)	58
TLCI	39

SolaPix tuned to 6000 K



Colors are for visual orientation purposes only. Created with the ANSI/IES TM-30-18 Calculator Version 2.00.

Additional Color Metrics

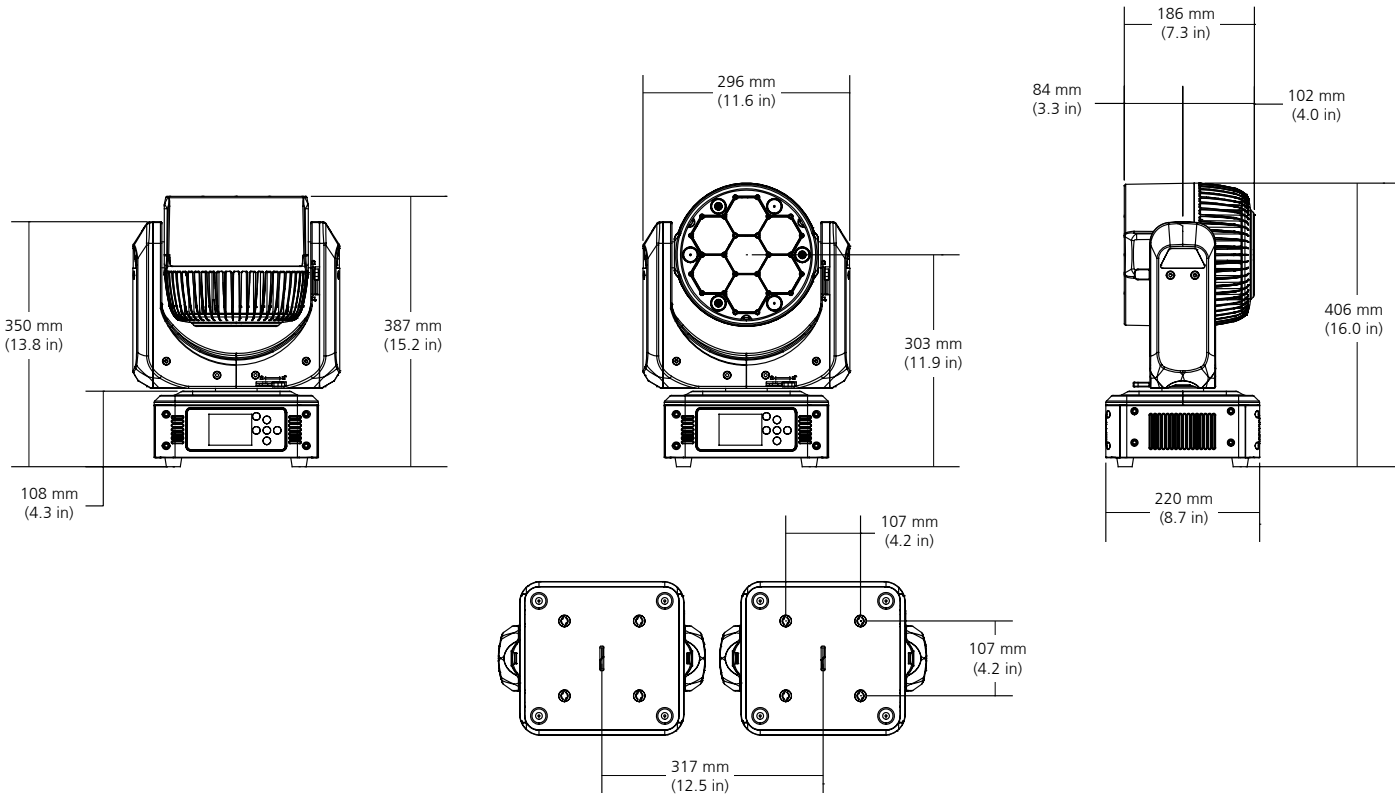
CRI Ra (R9)	78
TLCI	74

PHYSICAL INFORMATION

SolaPix 7 Dimension Table

Model	Height	Width	Depth	Weight
SolaPix 7	16.0 in	11.6 in	8.7 in	20.2 lb
	406 mm	296 mm	220 mm	9.1 kg
SolaPix 7 in molded insert with box (shipping dimensions)	22 in	15 in	11 in	33 lb
	559 mm	381 mm	280 mm	15 kg
Six (6) SolaPix 7 in molded insert with road case (shipping dimensions)	37 in	47 in	23.4 in	307 lb
	939 mm	1195 mm	595 mm	139.3 kg

SolaPix 7 Drawing



Power Table

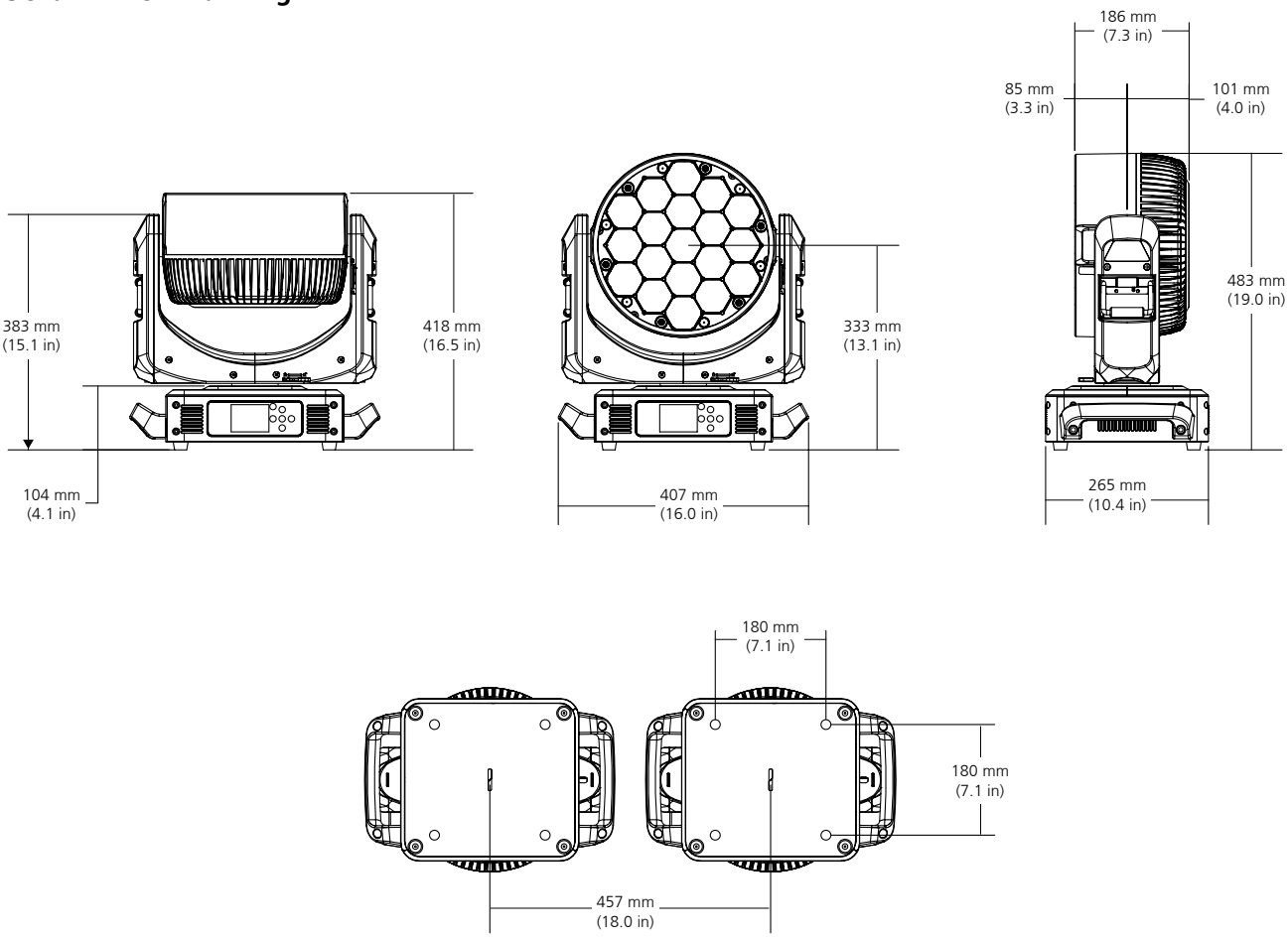
VAC	Amps	Hz	Watts	VA	PF
100	4.1	50	408	411	0.99
120	3.4	60	400	405	0.99
200	2.0	50	388	399	0.97
208	2.0	60	388	410	0.96
220	1.8	50	385	400	0.96
230	1.7	50	385	401	0.96
240	1.7	60	382	406	0.94

PHYSICAL INFORMATION

SolaPix 19 Dimension Table

Model	Height	Width	Depth	Weight
SolaPix 19	19 in	16 in	10.4 in	35 lb
	483 mm	407 mm	265 mm	15.8 kg
SolaPix 19 in molded insert with box (shipping dimensions)	25 in	22 in	16 in	59 lb
	635 mm	559 mm	407	26.8 kg
Three (3) SolaPix 19 in molded insert with road case (shipping dimensions)	37 in	47 in	23.4 in	296 lb
	939 mm	1195 mm	595 mm	134.3 kg

SolaPix 19 Drawing



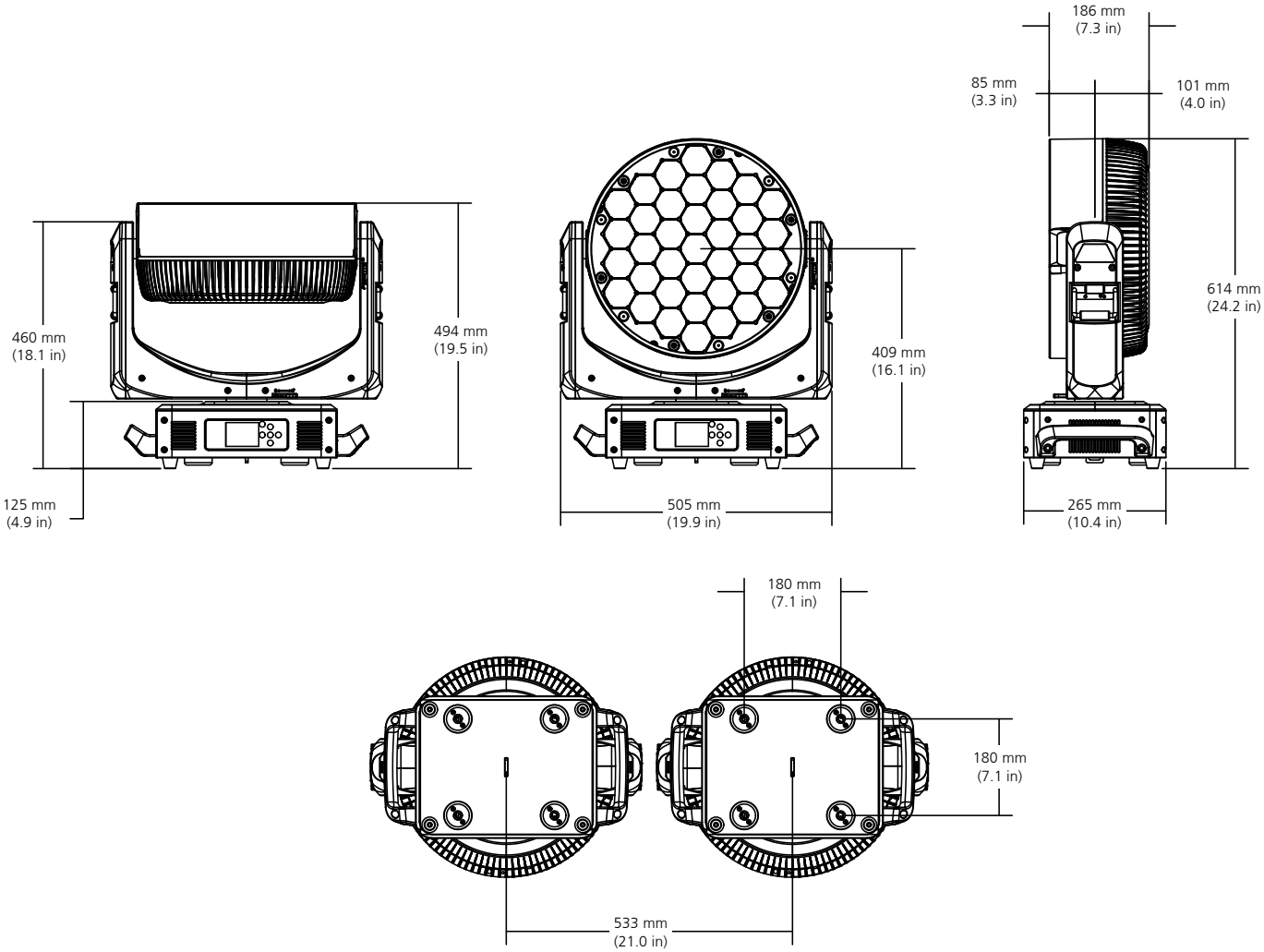
Power Table

VAC	Amps	Hz	Watts	VA	PF
100	10.0	50	990	1000	0.99
120	8.1	60	930	965	0.99
200	4.7	50	910	934	0.97
208	4.5	60	928	930	0.97
220	4.3	50	907	938	0.96
240	3.9	60	896	928	0.96

PHYSICAL INFORMATION

SolaPix 37 Dimension Table

Model	Height	Width	Depth	Weight
SolaPix 37	24.2 in	19.9 in	10.4 in	52.9 lb
	614 mm	505 mm	265 mm	24 kg
SolaPix 37 in molded insert with box (shipping dimensions)	27.6 in	24.5 in	21.3 in	88.2 lb
	700 mm	570 mm	540 mm	40 kg
Two (2) SolaPix 37 in molded insert with road case (shipping dimensions)	38 in	48 in	24 in	295.4 lb
	966 mm	1220 mm	610 mm	134 kg



Power Table

VAC	Amps	Hz	Watts	VA	PF
120	15.2	60	1815	1822	0.99
200	8.6	50	1710	1723	0.99
208	8.3	60	1716	1730	0.99
220	7.8	50	1704	1721	0.98
240	7.2	60	1704	1726	0.98

ADDITIONAL ORDERING INFORMATION

SolaPix 7 Accessories

Model #	Description
H7180023	Omega bracket, 107 mm Single-hole
2599A2000	Omega bracket, 107 mm Three-hole (included)
2594A1020	SolaPix 7 Hex Snoot
2594A1021	SolaPix 7 Hex Snoot with Diffusion
H7000012	Galvanized Safety Cable with Spring Snap

SolaPix 19 Accessories

Model #	Description
H7150008	Omega bracket, 180 mm Single-hole (included)
2599A2001	Omega bracket, 180 mm Three-hole
2595A1020	SolaPix 19 Hex Snoot
2595A1021	SolaPix 19 Hex Snoot with Diffusion
H7000012	Galvanized Safety Cable with Spring Snap

SolaPix 37 Accessories

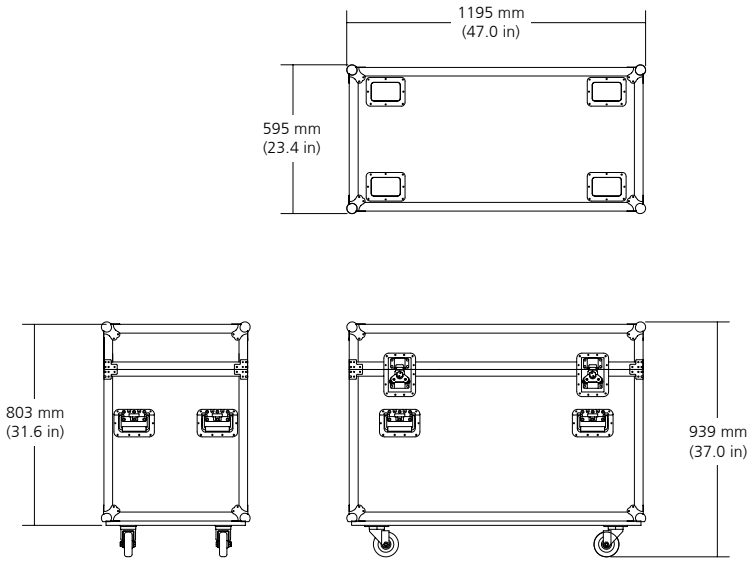
Model #	Description
H7150008	Omega bracket, 180 mm Single-hole (included)
2599A2001	Omega bracket, 180 mm Three-hole
2596A1020	SolaPix 37 Hex Snoot
2596A1021	SolaPix 37 Hex Snoot with Diffusion
H7000012	Galvanized Safety Cable with Spring Snap

ADDITIONAL ORDERING INFORMATION

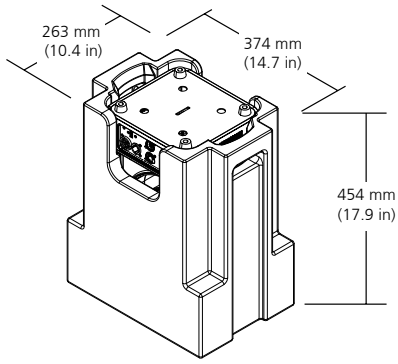
Road Case Accessories

Model #	Description
i02	Spacer for empty road case, Half
i03	Spacer for empty road case, Third
i04	Spacer for empty road case, Quarter
i06	Spacer for empty road case, Sixth

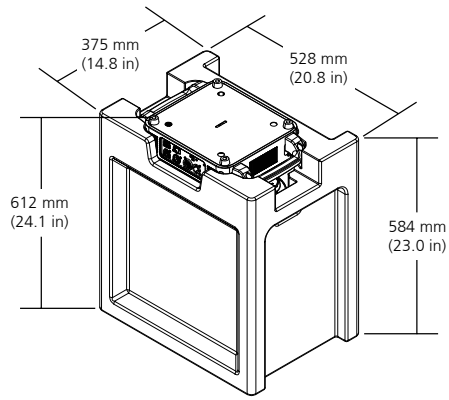
Optional Road Case



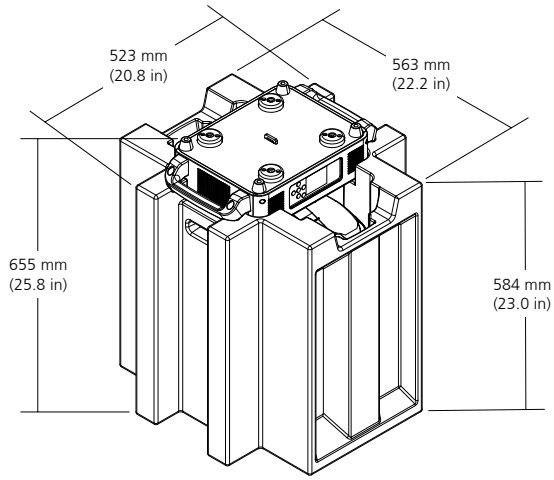
SolaPix 7 Molded Insert



SolaPix 19 Molded Insert



SolaPix 37 Molded Insert



Corporate Headquarters ▪ Middleton, WI USA
Global Offices ▪ London, UK ▪ Rome, IT ▪ Holzkirchen, DE ▪ Paris, FR ▪ Hong Kong
Dubai, UAE ▪ Singapore ▪ New York, NY ▪ Orlando, FL ▪ Los Angeles, CA ▪ Austin, TX

etcconnect.com

ETC

Lonestar

High End Systems

Type(s)

Project

Date

Notes

GENERAL INFORMATION

The High End Systems Lonestar brings the renowned brightness, quality, and performance of our bright white LED framing fixtures in a more compact package. With more than 15,400 lumens and a rich feature set, Lonestar is a perfect addition to lighting systems in theatres, television studios, cruiseships, and other small to medium-sized venues. The luminaire's rich colors, powerful zoom, full curtain framing, diffusion, and prism effects make Lonestar a versatile and affordable tool for designers who want maximum performance from a compact-sized automated fixture.

Applications

- Houses of worship
- Nightclubs and retail installations
- Small to medium-sized performance venues
- Cruiseships and themed entertainment
- Production rental companies
- Tradeshow and ballroom AV
- Studio and film

Product Features

- Bright white LED engine
- 290 W Ultra-Bright engine
- Fixture output 15,400 lumens
- High quality 13-lens optic system
- Extremely powerful 3.8°–55° zoom
- CMY color mixing system
- Electronic linear CCT mixing control
- Ten position plus open color wheel
- Full-curtain framing system for total control of beam shaping
- 15-blade iris for extremely tight beam effects
- Two diffusion Light and Medium system with additional, optional heavy diffusion
- Nine position plus open Rotating Gobo Wheel
- Dual prisms for compound beam and projection effects
- Linearly insertable rotating animation wheel

ORDERING INFORMATION

Model	Description
LS-UB-MI 2550A1200-B	Lonestar, Black, Ultra-Bright in Molded Insert, Boxed
RC-LS 2550K1001	Road Case, Holds Up to Three (3) Lonestar Fixtures in Molded Insert

Color Options: Fixtures ship standard in black. White available by request.
Included Accessories: Fixture includes two (2) 107 mm Three-hole Omega brackets, one (1) fixture power cord with bare ends to powerCON® TRUE1® TOP input, and a safety cable.

Accessories

Part Number	Description
LS-TH 2550A1020	Top Hat, Snoot for Lonestar
LSA-HFROST 2550A2083	Heavy Frost Accessory for Lonestar
2500B7029-A	Fixture Power Cord Upgrade, 5-15 Edison to powerCON TRUE1 TOP, 15 A
2560B7005	Fixture Power Cord Upgrade, Stage Pin to powerCON TRUE1 TOP, 20 A
2560B7006	Fixture Power Cord Upgrade, L6-20 to powerCON TRUE1 TOP, 20 A
2560B7007	Fixture Power Cord Upgrade, L5-20 to powerCON TRUE1 TOP, 20 A
55040014	Cheeseborough 2" Alloy 1/2 Coupler Truss Clamp
67040010	Mini-Claw™

PRODUCT SPECIFICATIONS

Source

Engine	Ultra-Bright
LED Details	290 W
Field Lumens	See photometrics on page 4
Integrating Sphere Lumens	15,400 lumens
LPW	53
LED Life	50,000 hours
Native CCT	7000 K

Color

Color Mixing	Cyan, magenta, yellow, CTO-linear
Color Temperature	Variable down to 2200 K
Color Wheel	Ten (10) dichroic colors plus open

Optical

Beam Angle Range	3.8°–55°
Gate Size	15.8 mm
Aperture Size	120 mm
Pattern Projection	Rotating and indexable wheel with nine (9) patterns plus open
Animation	Bi-directional animation wheel
Prism	Five facet star and four facet linear rotating prism with simultaneous insertion
Diffusion	Light and medium diffusion Optional heavy diffusion in prism slot
Iris	15-blade iris
Framing	Four-plane, full-curtain framing system with 120° module rotation
Flicker Control/Hz Range	2.4 kHz and 16 kHz

Control

Input Method	DMX (5-pin) or Ethernet
Protocols	DMX via RS-485 Art-Net or sACN via Ethernet
Ethernet Pass-Thru	Passive Ethernet in and thru with and without power
Data Conversion	Patented data conversion system for: DMX to Ethernet Ethernet to DMX
Modes (Footprint)	Standard or Trifusion (48 channels)
RDM Functions	Yes
UI Type	Full color graphical UI with 6-button navigational control
Local Control	Yes
Dimming Performance	16-bit, DMX controlled

Notes: All LED sources experience some lessening of light output and some color shift over time. LED output will vary with thermal conditions. Thermal conditions can be affected by ambient temperatures and orientation

Electrical

Voltage Range	100–240 V 50–60 Hz
Input Method	powerCON TRUE1 TOP
Wattage (Max)	615 W
Current (Max)	6.2 A @ 100 V
Inrush (First Half Cycle)	120 V: 56.8 A 230 V: 78.0 A
Fixtures per Circuit	2 fixtures (15 A power thru connector) 3 fixtures (R20 module or similar) Note: TRUE1 TOP connector rated for 20 A (120 V / 60 Hz) and 16 A (240 V / 50 Hz)

Thermal

Ambient Operating Temp	-10°–40°C (14°–104°F)
Fan Mode	Standard, Studio, and Linear Continuous control channel
Stationary Noise	35 dBA at full intensity (16.3 dBA background noise)

Physical

Pan and Tilt Range	540° pan, 251° tilt
Max Pan/Tilt Speed	360° in 2.306 s/180° in 1.26 s
Materials	Steel and aluminum frame with molded plastic covers
Color Options	Black, white by request
Mounting Options	Any orientation
IP Rating	IP20
Weight	23 kg (50 lb)
Included Accessories	powerCON TRUE1 TOP to bare end fixture tail Two (2) 107 mm Three-hole Omega clamp brackets Safety cable

Warranty

Fixture Warranty	Five (5) years for light engine Two (2) years for complete fixture
Warranty Details	etcconnect.com/Support/Warranty.aspx

Regulatory & Compliance

Regulatory Standards	Listed to UL 1573 Certified to CSA STD. C22.2 No: 166 FCC Class A EAC
CE compliance declared to these standards	Safety: EN 60598-1, EN 60598-2-17, EN 62031, EN 62471 EMC: EN 55015, EN 61547, EN 61000-3-2, EN 61000-3-3
Complies to the ROHS directive	Yes

Safety

Safety	Minimum distance to illuminated surface = 3.0 m (10 ft) Minimum distance from fixture head to combustible materials = 0.1 m (4.0 in)

FEATURE DETAILS

Rotating Gobo Details

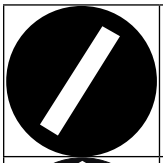
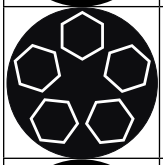
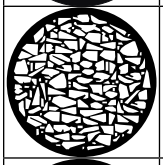
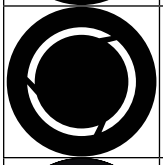
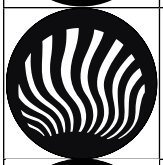
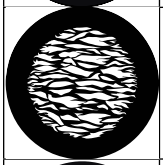
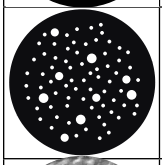
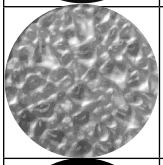
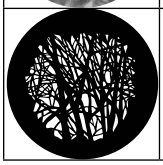
Outside Diameter	17.5 mm (0.69 in)
Image Diameter	13 mm (0.51 in)
Materials	0.5 mm aluminum 1.1 mm glass Borofloat®

Color Wheel Details

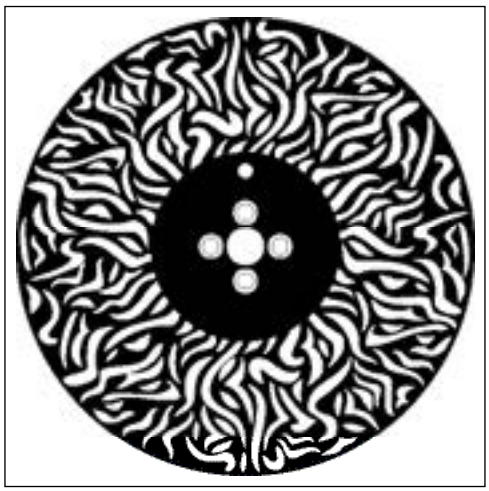
Shape	Fixed wedge
Materials	1.1 mm glass Borofloat

Animation Wheel Details

Movement	Bi-directional continuous rotation
Materials	0.6 mm aluminum

	1 - Bar
	2 - Starvolver
	3 - Fracked
	4 - Broken Tunnel
	5 - Seashell
	6 - Glacial
	7 - Shower
	8 - Ice
	9 - Branch Out

	1 - Red
	2 - Blue
	3 - Green
	4 - Yellow
	5 - Purple
	6 - TM-30
	7 - Lavender
	8 - Half CTO
	9 - Full CTO
	10 - Dark Blue



PHOTOMETRIC DATA

Lonestar - Ultra-Bright

	Degree	Candela	Field Lumens	Power Usage	Lumens Per Watt
Narrow	3.8°	1,771,100	5,209	290 W	18
Medium	26°	143,900	12,073	290 W	42
Wide	55°	30,000	10,700	290 W	37

Narrow - 3.8°

Throw Distance	10 ft 3.0 m	20 ft 6.1 m	30 ft 9.1 m	50 ft 15.2 m	200 ft 61 m
Field Diameter	0.7 ft 0.21 m	1.3 ft 0.41 m	2.0 ft 0.61 m	3.3 ft 1.02 m	13.3 ft 4.05 m
Illuminance (fc)	17,711	4,428	1,968	709	45
Illuminance (lux)	190,564	47,641	21,174	7,623	476

Medium - 26°

Throw Distance	10 ft 3.0 m	20 ft 6.1 m	30 ft 9.1 m	50 ft 15.2 m	200 ft 61 m
Field Diameter	4.6 ft 1.41 m	9.2 ft 2.82 m	13.9 ft 4.23 m	23.1 ft 7.04 m	92.3 ft 28.15 m
Illuminance (fc)	1,439	360	160	58	4
Illuminance (lux)	15,479	3,870	1,720	619	39

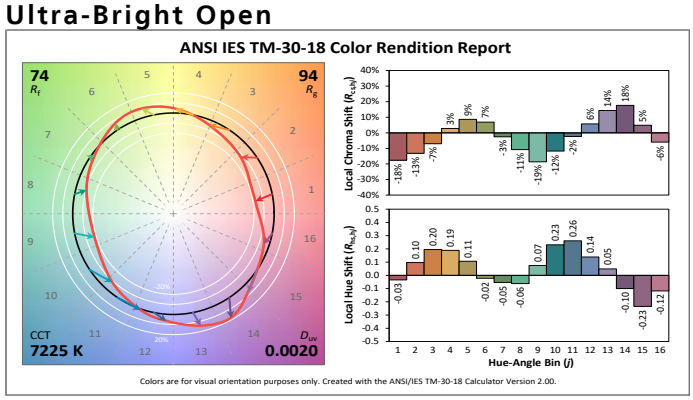
Wide - 55°

Throw Distance	10 ft 3.0 m	20 ft 6.1 m	30 ft 9.1 m	50 ft 15.2 m	200 ft 61 m
Field Diameter	10.4 ft 3.18 m	20.8 ft 6.35 m	31.2 ft 9.53 m	52.1 ft 15.87 m	208.2 ft 63.47 m
Illuminance (fc)	300	75	34	12	1
Illuminance (lux)	3,226	807	358	129	8

To determine center beam illumination in footcandles at any throw distance, divide candela by the throw distance squared.

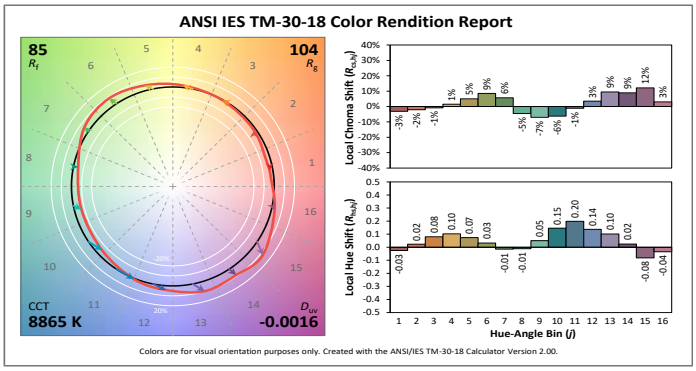
Metric conversions: For meters, multiply feet by 0.3048.
For lux, multiply footcandles by 10.76.

Ultra-Bright Open



Additional Color Metrics	
CRI R_a (R_g)	73 (-24)
TLCI	50

Ultra-Bright with TM-30 Filter



Additional Color Metrics	
CRI R_a (R_g)	87 (96)
TLCI	83

PHYSICAL

Product Dimensions

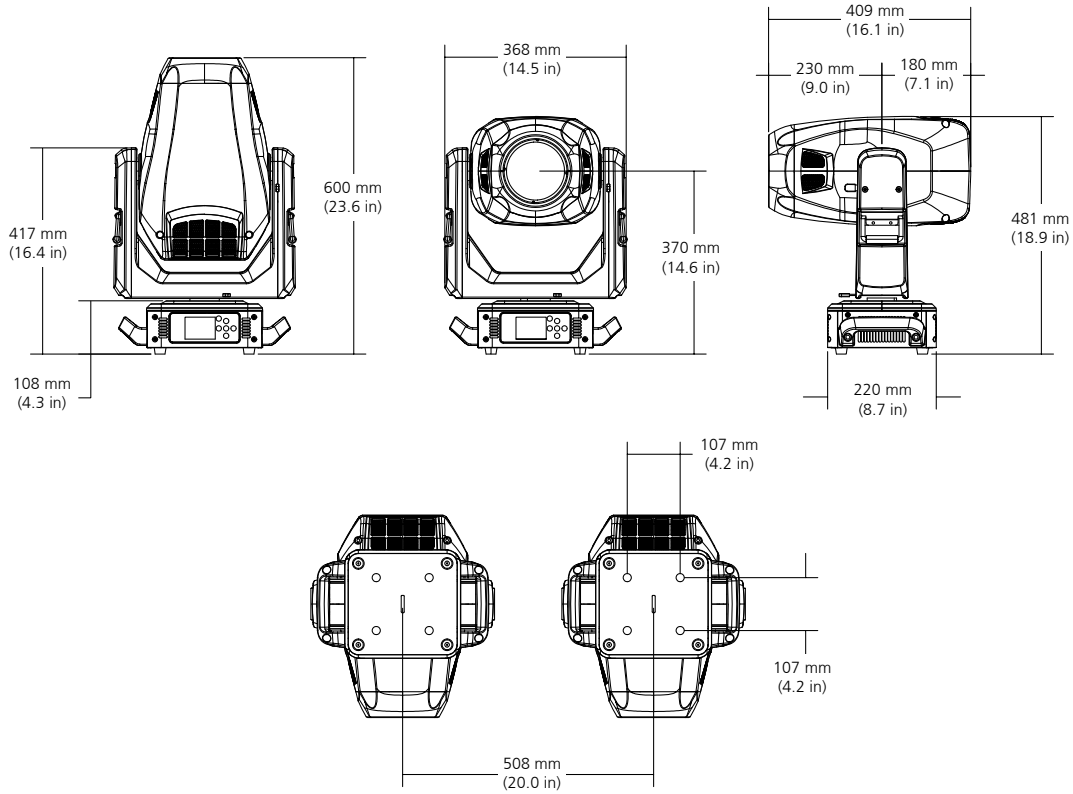
Model	Height		Width		Depth	
	in	mm	in	mm	in	mm
Lonestar**	23.6	600	14.5	368	8.7	221
Lonestar in Box with Molded Insert	26.6	676	21.1	536	14.9	378

Product Weight

Model	Weight	
	lb	kg
Lonestar**	50.0	23
Lonestar in Box with Molded Insert	77.0	35

**Does not include mounting hardware

Lonestar



Power Table

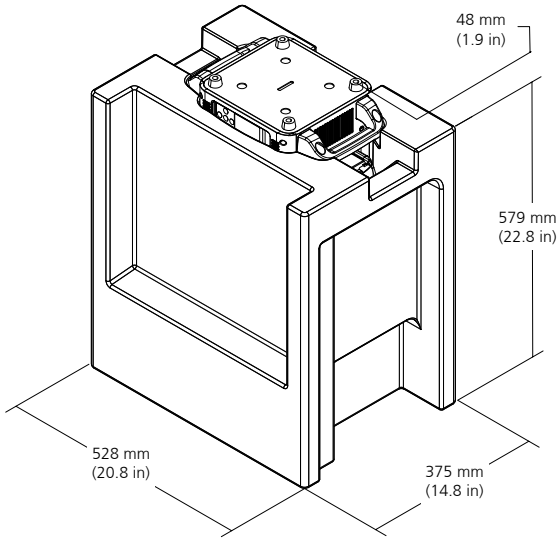
VAC	Amps	Hz	Watts	VA	PF
100	6.2	50	615	619	0.99
120	5.1	60	611	614	0.99
200	2.9	50	570	602	0.97
208	2.9	60	583	602	0.97
220	2.7	50	579	599	0.97
230	2.6	50	580	596	0.96
240	2.5	60	575	607	0.95

ADDITIONAL ORDERING INFORMATION

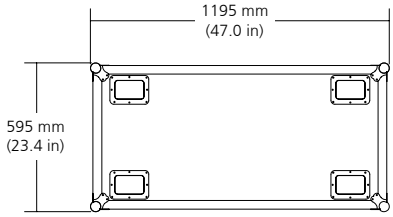
Additional Accessories

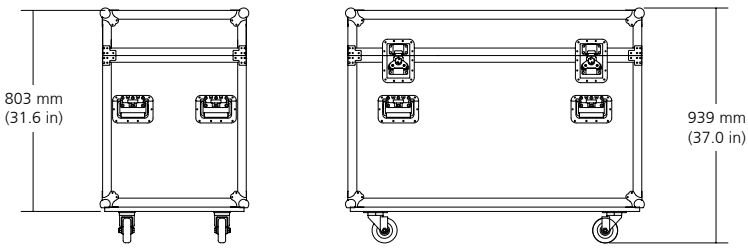
Model Number	Description
2599A2000	Omega bracket, 107 mm Three-hole (included)
H7180023	Omega bracket, 107 mm Single-hole
H7000012	Galvanized safety cable with spring snap

Molded Case Insert Dimensions



Optional Road Case





Corporate Headquarters ▪ Middleton, WI USA
Global Offices ▪ London, UK ▪ Rome, IT ▪ Holzkirchen, DE ▪ Paris, FR ▪ Hong Kong
Dubai, UAE ▪ Singapore ▪ New York, NY ▪ Orlando, FL ▪ Los Angeles, CA ▪ Austin, TX

etcconnect.com

DMX Opto-isolation and Distribution

- Receives/transmits (1) Universe of DMX
- (4) Optically Isolated DMX512 Outputs
- (5) PIN DMX "XLR TYPE"
- LED Power and DMX Signal Indicators
- 12v DC External Power Supply (provided)

IDP104
DMX512 Opto-Isolated Splitter

The IDP104 is an optically isolated DMX splitter with one DMX input and four independent DMX output circuits.

SPECIFICATIONS

Power Input:	12v DC	Size:	5" x 2.5" x 5.5" (portable) 12" x 10" x 4" (wall mount)
Output Signal:	(4) DMX512 Control Chains via (5) Pin XLRs	Weight:	2 Pounds (portable) 10 Pounds (wall mount)
Input Signal:	DMX512		

Architect & Engineer's Specifications

The splitter shall receive/transmit (1) universe of DMX512 by (5) pin, XLR type connector. The splitter shall display a valid DMX512 signal and power is present via LED indicator. Power shall be supplied to the device via an external, 12v-16v 800ma or greater power supply. The splitter shall be housed in a self contained, free standing, portable housing no greater than 6"x6"3". The device shall split the DMX512 input to (4) DMX512 outputs. Each output shall be optically isolated, on each of (3) signal wires, D+, D- and ground.

The optically isolated splitter shall be a Lightronics IDP104.

To view and/or download the Owner's Manual click here: **www.lightronics.com/manuals/idp104m.pdf**

509 Central Dr STE 101, Virginia Beach, VA 23454 Tel: 757-486-3588 / 800-472-8541
Fax: 757-486-3391 Visit us online at **www.lightronics.com** (160108)

MAC Aura XB

The MAC Aura XB takes an award-winning, innovative, compact LED wash light to the next level, incorporating many new features first introduced with the MAC Quantum Wash™. Not only does the MAC Aura XB offer additional brightness, it also features a new superior color mixing system and an optimized lens design for tighter beams and more even washes. Martin's unique and patented Eye-candy Aura Effect™ is also part of the package.

Super bright single lens wash with fully premixed color

Compact design and low weight

High efficiency, low power consumption, long service life

GALLERY

FEATURES

- Super-bright single-lens wash with fully premixed color
- Broad color palette, RGBW color mixing
- Eye-candy Aura Effect™
- Uniform shades
- Built-in FX engine
- 10 to 60° uniform zoom
- 6000 Lumens output
- Rapid movement
- Compact, low weight design (6.5 kg)
- High efficiency, low power consumption, long lifetime

TECHNICAL SPECIFICATIONS

Physical
Length (across yoke): 302 mm (11.9 in.)
Width (across yoke): 302 mm (11.9 in.)
Height (head straight up): 360 mm (14.2 in.)
Weight (without accessories): 6.5 kg (14.4 lbs.)

Dynamic Effects
Beam color mixing: RGBW
Aura (secondary lens array illumination) color mixing: RGB
Beam color temperature control: CTO, variable 10 000 - 2500 K
Beam and aura electronic 'color wheel' effect: 33 LEE-referenced colors plus white, variable-speed color-wheel rotation effect and random color
Beam and aura independent shutter effects: Electronic, with regular and random pulse, burst and strobe effects
Pre-programmed effects: Range of independent and synchronized Beam and Aura FX, two combinable
Electronic dimming: Independent beam and aura, four dimming curve options
Zoom: 10° - 60° (one-tenth peak angle)
Pan: 540°
Tilt: 232°
Pan and tilt speed: Adjustable via onboard control panel and DMX

Control and Programming
Control options: Independent or synchronized Beam and Aura control
Control system: DMX, RDM
Control resolution: 8-bit, with 16-bit control of pan & tilt
DMX channels: 14/25
Setting and addressing: Control panel with backlit graphic display
DMX compliance: USITT DMX512-A

RDM compliance: ANSI/ESTA E1.20
Transceiver: RS-485
Firmware update: Via DMX with Martin™ USB Duo DMX Interface Box

Optics and Photometric Data
Light source: 19x 15W RGBW LED Array System
LED refresh rate: Beam 1200 Hz, Aura 4395 Hz
Minimum LED lifetime: 50 000 hours (to >70% luminous output)*
Total luminous output (wide, one-tenth peak): 6000 lumens
Total luminous output (narrow, one-tenth peak): 4300 lumens
Video compatibility: Designed for use with HD/high-speed video cameras
**Figure obtained under manufacturer´s test conditions*

Construction
Color: Black
Housing: High-impact thermoplastic, flame-retardant to UL 94 5VA
Protection rating: IP20

Installation
Mounting points: M12 hole for rigging clamp, attachment points for surface-mounting bracket
Orientation: Any
Minimum distance to combustible materials: 200 mm (8 in.) from fixture
Minimum distance to illuminated surfaces: 1 m (3 ft. 4 in.) from fixture
Location: Indoor use only, must be fastened to surface or structure

Connections
AC power: Neutrik PowerCON TRUE1 NAC3PX dual socket
AC power input socket: Accepts Neutrik PowerCON TRUE1 NAC3FX-W cable connector
AC power thru socket: Accepts Neutrik PowerCON TRUE1 NAC3MX-W cable connector
DMX data in/out: 5-pin locking XLR

Electrical
Maximum power consumption: 400 W
Power supply unit: Auto-ranging electronic switch mode
AC power: 100-240 V nominal, 50/60 Hz
Typical half-cycle RMS inrush current: 10.7 A
Power consumption, all effects static, zero light output: <25 W

Typical Power and Current
100 V, 60 Hz: 359 W, 3.8 A, PF 0.99
120 V, 60 Hz: 355 W, 3.2 A, PF 0.99
208 V, 60 Hz: 350 W, 1.8 A, PF 0.97
230 V, 50 Hz: 349 W, 1.7 A, PF 0.95
240 V, 50 Hz: 349 W, 1.6 A, PF 0.95
Measurements made at nominal voltage with all LEDs at full intensity. Allow for a deviation of +/- 10%.

Thermal
Cooling: Forced air (temperature-regulated, low noise, user-definable levels)
Maximum ambient temperature (Ta max.): 40° C (104° F)
Minimum ambient temperature (Ta min.): 5° C (41° F)
Total heat dissipation (calculated, +/- 10%): 1230 BTU/hr.

Approvals
EU safety: EN 60598-2-17 (EN 60598-1), EN 62471
EU EMC: EN 55103-1, EN 55103-2, EN 55015, EN 61547
US safety: UL 1573
US EMC: FCC Part 15 Class A
Canadian safety: CSA E598-2-17 (CSA E60598-1)
Canadian EMC: ICES-003 Class A
Australia/NZ: C-TICK N4241

Included Items
M12 bolt suitable for use with Martin rigging clamps
Note that power cables and connectors are not included and must be ordered separately

Accessories

Power cables
Power input cable, H07RN-F, 2.5 mm2, 14 AWG, bare ends to Neutrik TRUE1 NAC3FX-W (female), 1.5 m (4.9 ft.): P/N 91611797
Power input cable, H07RN-F, 2.5 mm2, 14 AWG, bare ends to Neutrik TRUE1 NAC3FX-W (female), 5 m (16.4 ft.): P/N 91611786
Power Throughput Cable, H07RN-F, 2.5 mm2, 14 AWG, Neutrik TRUE1 to TRUE1, 0.45 m (1.5 ft.): P/N 91611784
Power Throughput Cable, H07RN-F, 2.5 mm2, 14 AWG, Neutrik TRUE1 to TRUE1, 1.2 m (3.9 ft.): P/N 91611785
Power Throughput Cable, H07RN-F, 2.5 mm2, 14 AWG, Neutrik TRUE1 to TRUE1, 2.5 m (8.2 ft.): P/N 91611796

Power connectors
Cable connector, Neutrik PowerCON TRUE1 NAC3FX-W (female): P/N 91611789
Cable Connector, Neutrik PowerCON TRUE1 NAC3MX-W (male): P/N 91611788

Installation hardware
Quick surface mounting bracket for MAC Aura XB, set of 5: P/N 91606018
G-clamp: P/N 91602003
Half-coupler (tube) clamp: P/N 91602005
Quick trigger clamp: P/N 91602007

Flightcase
6-unit flightcase for MAC Aura™: P/N 91515020

Optical Accessories
MAC Aura / Aura XB Soft Lens Kit: P/N 91611730

Related Items
Martin USB Duo™ DMX Interface Box: P/N 90703010
Martin DMX 5.3 Splitter™: P/N 90758140

Martin RDM 5.5 Splitter™: P/N 90758150

Ordering Information
MAC Aura XB™ in cardboard box: P/N 90232100
MAC Aura XB™ in 6-unit flightcase: P/N 90232110

ETC

Source Four LED Series 3

Source Four LED Series

Type(s)

Project

Date

Notes

GENERAL INFORMATION

Over a decade of research comes together in the Source Four LED Series 3 fixture. ETC brings the eight-color Lustr X8 array and the tunable white light Daylight HDR array to the professional stage with this fixture. The deep red LEDs in both arrays reveal richer skin tones, bring a deeper dimension to your scenery, and add warmth to sunsets and firelight. Additional features include wireless DMX/RDM through City Theatrical's Multiverse® technology, contactless programming and control using NFC and ETC's Set Light app, and an intuitive user interface featuring a color picker and action-responsive backlit encoders.

ORDERING INFORMATION

Source Four LED Series 3 Light Engine with XDLT Shutter Barrel

(For use with XDLT fixed-field lens tubes only)

MODEL	DESCRIPTION	ETL PART NUMBER	CE PART NUMBER
S4LEDS3LS-0	Source Four LED Series 3 Lustr X8 with XDLT shutter barrel, black	7462A1051	7462A1251
S4LEDS3DS-0	Source Four LED Series 3 Daylight HDR with XDLT shutter barrel, black	7462A1071	7462A1271

Source Four LED Series 3 Light Engine Body

(For use with standard barrels, zoom lens tubes and retrofit of existing fixtures)

MODEL	DESCRIPTION	ETL PART NUMBER	CE PART NUMBER
S4LEDS3L-0	Source Four LED Series 3 Lustr X8, body only, black	7462A1050	7462A1250
S4LEDS3D-0	Source Four LED Series 3 Daylight HDR, body only, black	7462A1070	7462A1270

Color options: -1 = white, -5 = silver, -8 = custom colors
Fixture ships with a gobo holder and a 1.5 m powerCON TRUE1 TOP® power-input cable with a connector of choice.
See page 9 for connector options.

Please note: Lens tubes and c-clamp to be ordered separately. When using Source Four LED Series 3 with standard and EDLT lens tubes, order light engine and Source Four LED shutter barrel (7060A2012-K). See pages 8–9 for information.

PRODUCT SPECIFICATIONS

Source

LED details	90 Lumileds LUXEON® C and CZ
Max lumens	**Lustr X8:** 10,889 **Daylight HDR:** 14,214
Lumens per watt	**Lustr X8:** 35 **Daylight HDR:** 42
L70 rating (hours to 70% output)	>54,000

Color

Colors used	**Lustr X8:** Deep Red, Red, Amber, Lime, Green, Cyan, Blue, Indigo **Daylight HDR:** Deep Red, Red, Mint, Cyan, Blue, Indigo
Color temperature range	1900–10450 K
Calibrated array	Yes
Red shift	Yes (selectable)

Optical

Beam angle range	Swappable lens tubes between 5°–90°
Gate size	80 mm
Aperture size	6.25–17.5 in (depending on lens tube)
Pattern projection	Yes
Pattern size	A or B
Camera flicker control/Hz range	Yes: 5 kHz, 25 kHz
Notes	Can be used with LED CYC and Fresnel adapters

Control

Input method	5-Pin XLR, Multiverse wireless and NFC
Protocols	DMX-512, RDM, City Theatrical Multiverse, NFC
Modes (footprint)	5 modes (1–12 channels)
RDM configuration	Yes
UI type	Full color display
Local control	Yes
Onboard presets	Yes (12)
Onboard sequences	Yes
Onboard effects	No
FixtureLink	Yes
Notes	15-bit virtual dimming engine

All LED sources experience some lessening of light output and some color shift over time. LED output will vary with thermal conditions. In individual situations, LEDs will be used for different durations and levels. This can eventually lead to minor alterations in color performance, necessitating slight adjustments to presets, cues or programs.

Electrical

Voltage range	100–240 VAC 50/60 Hz
Input method	AC via Neutrik powerCON TRUE1 TOP
Inrush	40 A at 120 V (First half-cycle) 80 A at 230 V (First half-cycle)
Fixtures per circuit*	5 (link up to 4 via Power Thru connector) Note: TRUE1 connector rated for 20 A (120 V/60 Hz) and 16 A (240 V/50 Hz)
Wattage typical Direct at Full (Idle)	**Lustr X8:** 307 (6.3) W at120 V 305 (4.7) W at 230 V **Daylight HDR:** 340 (6.3) W at 120 V 330 (4.7) W at 230 V
Current draw	**Lustr X8:** 2.6 A at 120 V 1.35 A at 230 V **Daylight HDR:** 2.85 A at 120 V 1.5 A at 230 V

*All measurements are for 120 V, 60 Hz. Results may vary in different regions.

Thermal

Ambient operating temp	0°C to 40°C (32°F to 104°F)
Fan (controllable)	Yes (yes)
Droop compensation	Yes
dB range	34 dBA average at 1 m
BTUs/hour	**Lustr X8:** 1,047 **Daylight HDR:** 1,159

Physical

Materials	Die-cast, all metal housing
Color options	Black, white, silver, or custom color
Mounting options	Yoke, cyc floor stand (sold separately)
IP rating	IP20
Weight	With barrel: 8.9 kg (19.6 lb) Without barrel: 6.8 kg (14.9 lb)
Included accessories	Hanging yoke, 1.5 m power cable, A-size gobo holder
Notes	- Positive locking double-clutch fixture body - Slot for glass or stainless steel patterns and soft focus diffuser - Wide accessory slot with sliding cover for motorized pattern device or iris

Warranty

Fixture	5 years
LED array	10 years

Regulatory and Compliance

Approved regulatory standards	cETLus Listed Conforms to UL1573 Certified to C22.2 C22.#166 CE Compliant

PRODUCT FEATURES

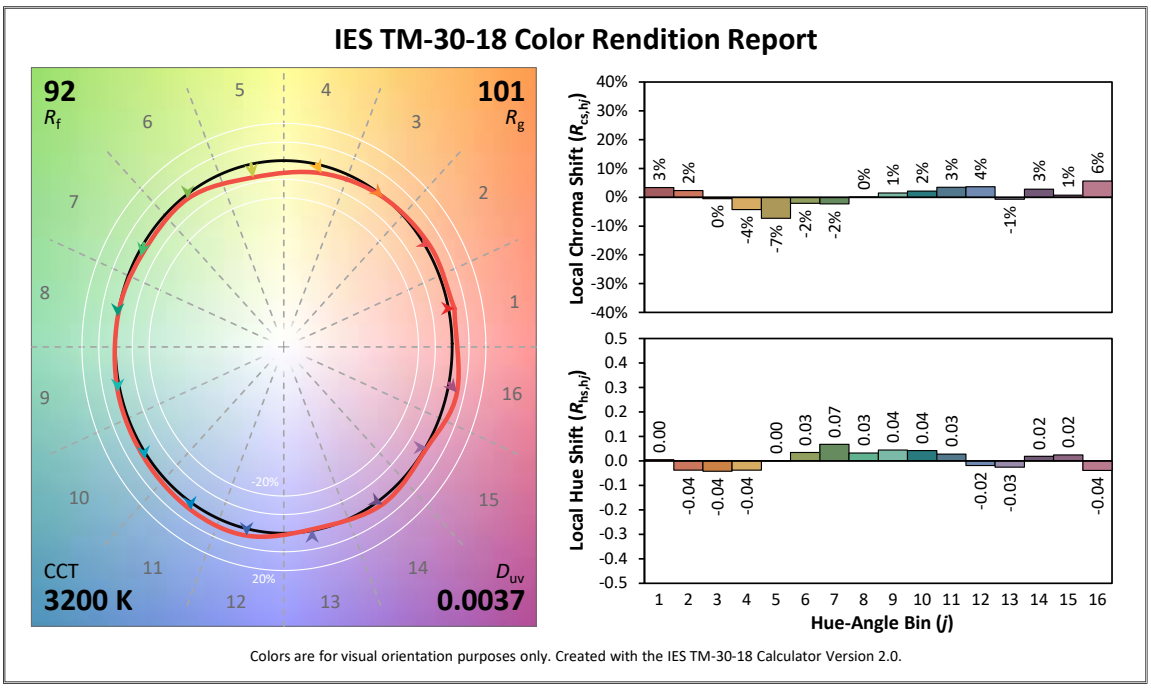
DEEP RED
Over a decade of research brings the addition of the deep red LED to Series 3. This LED expands the gamut for richer colors, healthier skin tones, and a higher quality white light.

WIRELESS CONTROL
Activate wireless DMX functionality with City Theatrical's Multiverse transmitter and configure your fixtures via NFC using the Set Light app.

XDLT LENS TUBES
Increase fixture brightness and improve pattern projection clarity and contrast when used with XDLT lens tubes.

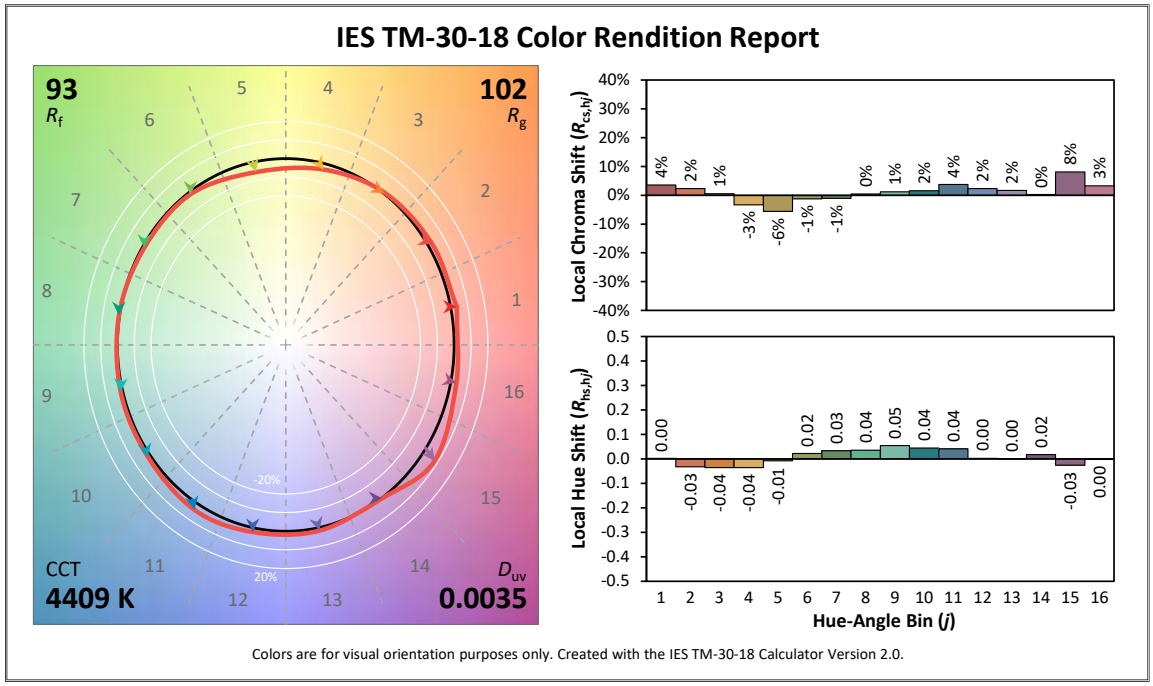
COLOR METRIC INFORMATION

SOURCE FOUR LED SERIES 3 LUSTR X8 3200 K TM-30-18



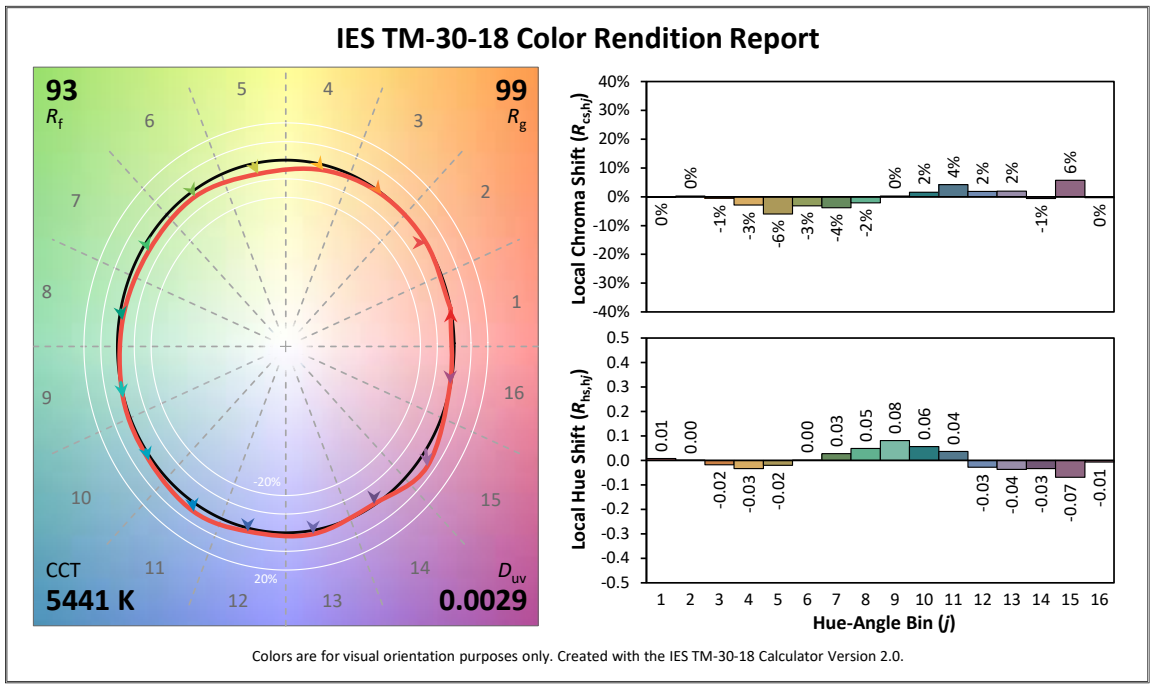
COLOR METRIC INFORMATION

SOURCE FOUR LED SERIES 3 LUSTR X8 4500 K TM-30-18



Colors are for visual orientation purposes only. Created with the IES TM-30-18 Calculator Version 2.0.

SOURCE FOUR LED SERIES 3 LUSTR X8 5600 K TM-30-18



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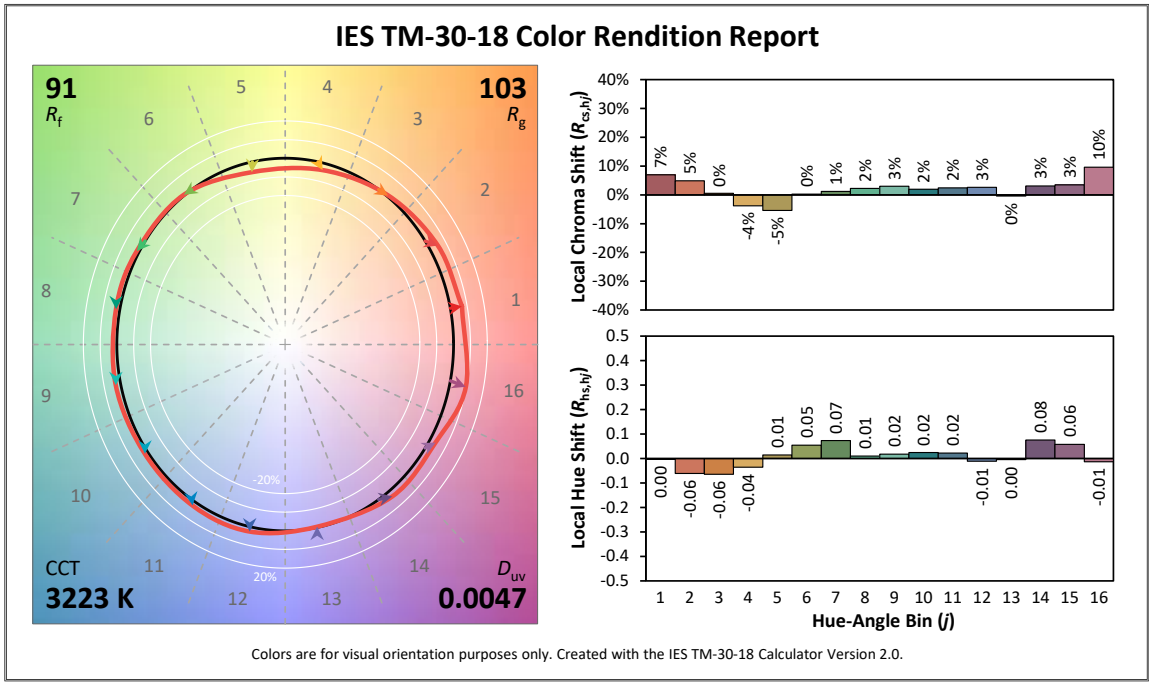
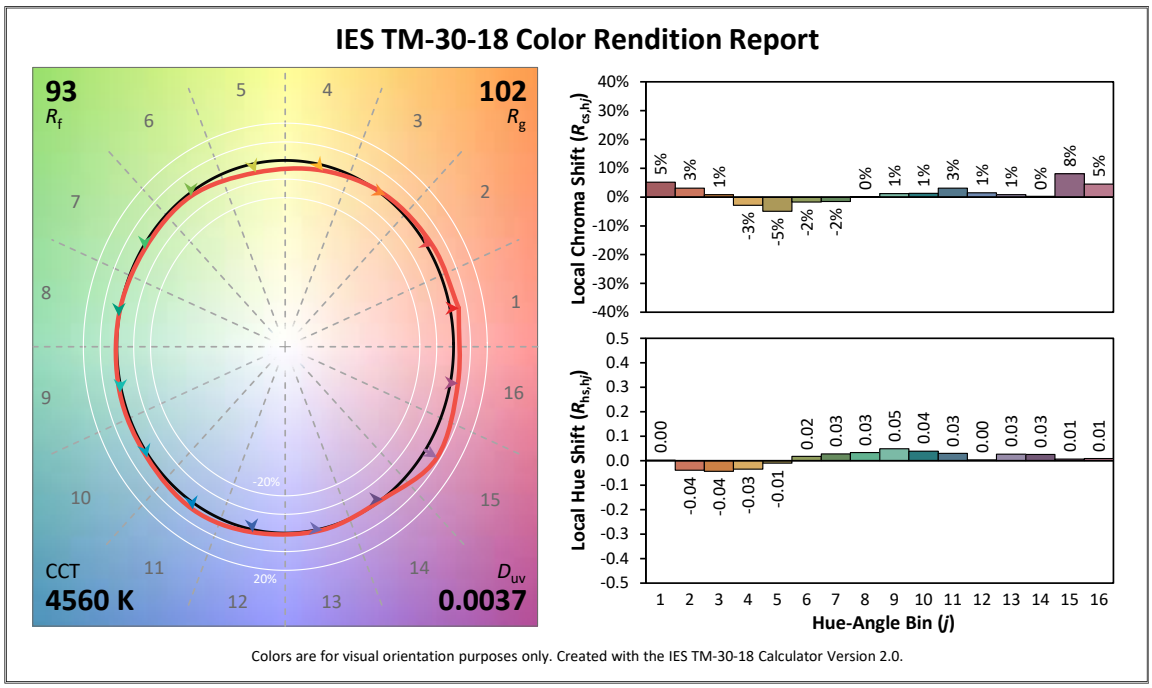
COLOR METRIC INFORMATION

SOURCE FOUR LED SERIES 3 DAYLIGHT HDR 3200 K TM-30-18

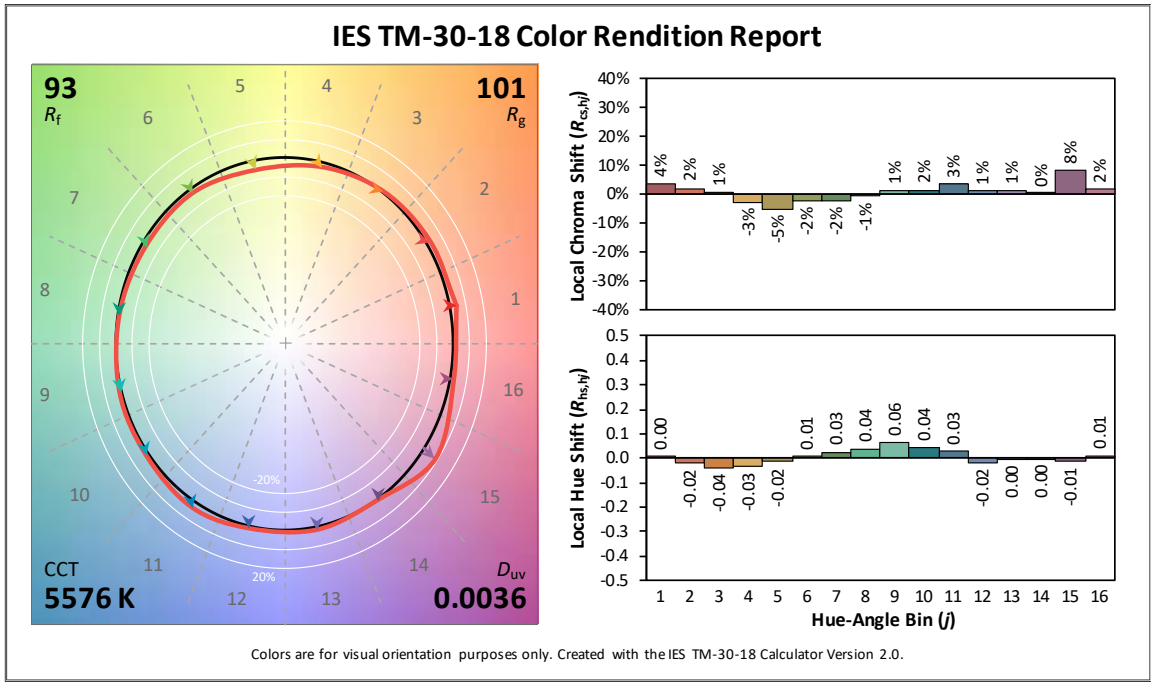


SOURCE FOUR LED SERIES 3 DAYLIGHT HDR 4500 K TM-30-18



COLOR METRIC INFORMATION

SOURCE FOUR LED SERIES 3 DAYLIGHT HDR 5600 K TM-30-18



TYPE	LUSTR X8 3200 K	LUSTR X8 4500 K	LUSTR X8 5600 K
CRI Ra	93	94	98
TLCI	96	97	97
SSI	78	70	73

TYPE	DAYLIGHT HDR 3200 K	DAYLIGHT HDR 4500 K	DAYLIGHT HDR 5600 K
CRI Ra	86	93	95
TLCI	91	96	98
SSI	71	71	72

PHOTOMETRY INFORMATION

	Series 3 Lustr X8		Series 3 Daylight HDR		115 V/575 W LL HPL		120 V/750 W SL HPL		230 V/750 W LL HPL	
Lens Tube	Lumens	Candela	Lumens	Candela	Lumens	Candela	Lumens	Candela	Lumens	Candela
XDLT 5°	6,031	630,344	7,074	686,006						
XDLT 10°	7,823	375,028	9,600	412,304						
XDLT 14°*	7,544	185,125	9,191	200,085						
XDLT 19°*	8,921	144,856	10,708	156,524						
XDLT 26°*	10,120	82,357	12,346	89,668						
XDLT 36°*	10,426	47,215	12,733	51,954						
XDLT 50°	8,499	26,017	10,404	28,348						
XDLT 70°	9,945	14,197	12,271	18,037						
XDLT 15°–30° Narrow	7,187	111,905	9,392	144,923						
XDLT 15°–30° Mid	11,103	115,144	14,503	150,738						
XDLT 15°–30° Wide	10,140	73,494	13,151	95,282						
EDLT 19°	5,349	75,742	6,606	88,849	7,287	145,803	13,012	260,363	7,677	104,145
EDLT 26°	9,399	81,612	11,278	88,180	8,631	102,089	15,412	182,301	9,093	72,920
EDLT 36°	9,302	52,150	11,331	60,325	7,992	55,190	14,271	98,553	8,420	39,421
EDLT/LED 50°	8,045	24,769	9,675	29,105	8,085	23,224	14,437	41,471	8,518	16,588
5°	3,523	398,072	4,190	431,270	5,247	753,340	9,370	1,345,250	5,528	538,100
10°	5,370	236,941	6,396	264,915	6,678	438,654	11,925	783,310	7,036	313,324
14°	5,359	114,625	6,586	125,582	7,196	226,677	12,850	404,780	7,582	161,912
19°	4,482	70,341	5,364	76,233	6,261	136,371	11,180	243,520	6,596	97,408
26°	5,849	54,998	7,055	60,587	7,666	98,703	13,690	176,255	8,077	70,502
36°	9,732	46,186	11,687	50,496	7,974	50,896	14,240	90,885	8,402	36,354
50°	7,893	24,669	9,914	28,663	7,829	25,564	13,980	45,650	8,248	18,260
70°	9,926	16,156	11,928	17,679	9,033	12,471	16,130	22,270	9,517	8,908
90°	10,259	11,137	12,359	12,366	7,395	6,345	13,205	11,330	7,791	4,532
15°–30° Zoom Nar	5,907	120,817	7,017	130,805	6,418	221,514	11,460	395,560	6,761	158,224
15°–30° Zoom Mid	6,640	88,295	7,855	96,585	6,418	101,744	11,460	181,685	6,761	72,674
15°–30° Zoom Wide	5,732	41,321	6,784	44,035	6,698	59,186	11,960	105,690	7,056	42,276
25°–50° Zoom Nar	10,889	72,877	13,054	80,448	8,420	84,417	15,035	150,745	8,871	60,298
25°–50° Zoom Mid	9,977	40,162	11,903	48,985	8,568	53,368	15,300	95,300	9,027	38,120
25°–50° Zoom Wide	9,555	32,935	11,297	34,862	8,277	35,549	14,780	63,480	8,720	25,392

* Lenses with color correction technology

PREFERRED LENSING OPTIONS

(Lenses sold separately)

XDLT Lenses

Note: XDLT lens tubes require the XDLT shutter barrel (7462A2012-K)

MODEL	DESCRIPTION	ACCESSORY SIZE	WEIGHT	PART NUMBER
XDLT5	5° XDLT lens tube with lens installed, black	17.5 in	4.45 kg (9.8 lb)	7462A2002-K
XDLT10	10° XDLT lens tube with lens installed, black	14 in	2.77 kg (6.1 lb)	7462A2003-K
XDLT14	14° XDLT lens tube with lens installed, black	10 in	7.39 kg (16.3 lb)	7462A2004-K
XDLT19	19° XDLT lens tube with lens installed, black	10 in	6.4 kg (14.1 lb)	7462A2005-K
XDLT26	26° XDLT lens tube with lens installed, black	7.5 in	3.95 kg (8.7 lb)	7462A2006-K
XDLT36	36° XDLT lens tube with lens installed, black	7.5 in	3.95 kg (8.7 lb)	7462A2007-K
XDLT50	50° XDLT lens tube with lens installed, black	7.5 in	2.59 kg (5.7 lb)	7462A2008-K
XDLT70	70° XDLT lens tube with lens installed, black	7.5 in	2.59 kg (5.7 lb)	7462A2009-K

For white, add '-1' to the model number. Add '1' before the 'K' to the part number.
For silver, add '-5' to the model number. Add '5' before the 'K' to the part number.
For custom colors, add '-8' to the model number. Add '8' before the 'K' to the part number.

EDLT and Standard Lenses

Note: EDLT and Standard lens tubes require a Source Four LED shutter barrel (7060A2012-K)

MODEL	DESCRIPTION	ACCESSORY SIZE	WEIGHT	PART NUMBER
LED50LT	LED-specific 50° EDLT with lenses installed	7.5 in	2.0 kg (4.4 lb)	7460A2008
436EDLT	36° EDLT w/lens installed	6.25 in	2.0 kg (4.4 lb)	7060A2048
426EDLT	26° EDLT w/lens installed	6.25 in	2.0 kg (4.4 lb)	7060A2047
419EDLT	19° EDLT w/lens installed	6.25 in	1.91 kg (4.2 lb)	7060A2046
490LT	90° w/lens installed	7.5 in	1.72 kg (3.8 lb)	7060A2052-K
470LT	70° w/lens installed	7.5 in	1.72 kg (3.8 lb)	7060A2051-K
414LT	14° w/lens installed	7.5 in	1.91 kg (4.2 lb)	7060A2050-K
410LT	10° w/lens installed	12 in	1.95 kg (4.3 lb)	7060A2001-K
405LT	5° w/lens installed	14 in	3.27 kg (7.2 lb)	7060A2000-K

For white, add '-1' to the model number. Add '1' before the 'K' to the part number.
For silver, add '-5' to the model number. Add '5' before the 'K' to the part number.
For custom colors, add '-8' to the model number. Add '8' before the 'K' to the part number.

Zoom Lens Assemblies

Use with light-engine body models.

MODEL	DESCRIPTION	ACCESSORY SIZE	WEIGHT	PART NUMBER
41530LT	Source Four 15°–30° Zoom lens assembly	7.5 in	7.44 kg (16.4 lb)	7060A2030-K
42550LT	Source Four 25°–50° Zoom lens assembly	7.5 in	7.44 kg (16.4 lb)	7060A2032-K
XDLT1530	XDLT 15°–30° Zoom (LED Only)	7.5 in	8.16 kg (18 lb)	7462A2018-K

LED Adapters

MODEL	DESCRIPTION	ACCESSORY SIZE	WEIGHT	PART NUMBER
S4LEDCYC	LED Cyc adapter	NA	2.1 kg (4.5 lb)	7460A2011
S4LEDFRES	LED Fresnel adapter	7.5 in	4.2 kg (9.2 lb)	7460A2016

ADDITIONAL ORDERING INFORMATION

Fixture Accessories

MODEL	DESCRIPTION	PART NUMBER
400CC	C-Clamp	7060A2009
400SC	Safety cable	7060A1022
400PH-A	Pattern holder (A size)	7060A1013
400PH-B	Pattern holder (B size)	7060A1014
400PH-G	Glass pattern holder	7060A1019
400RS	Drop-in iris	7060A1012
S4LED-SB	Standard/EDLT Source Four LED shutter barrel	7060A2012-K
S4LEDBY	Source Four LED balance yoke assembly	7462A2021-K

Other Accessories

TYPE	445 MM / 17.5 IN		355 MM / 14 IN		255 MM / 10 IN		190 MM / 7.5 IN		159 MM / 6.25 IN	
	Model	Part No.	Model	Part No.	Model	Part No.	Model	Part No.	Model	Part No.
Top Hat	TH17.5	PSF1194	405TH	PSF1025	TH10	PSF1198	400PTH6	PSF1023	400TH	PSF1021
Half Hat	HH17.5	PSF1195			HH10	PSF1199	400PHH	PSF1027	400HH	PSF1026
Color Frame	CF17.5	PSF1196	405CF	7060A3070	CF10	PSF1201	407CF	7061A3007	400CF	7060A3043
Donut	DN17.5	PSF1197	405DN	7060A1029	DN10	PSF1200	407DN	7060A1016	400DN	7060A1015

Power Input Cables

Use information below to order 5 ft power input leads with factory-fitted connectors. CE fixtures ship with 2 m powerCON TRUE1 TOP to bare end (2500B7035).

MODEL	DESCRIPTION	PART NUMBER (NOT CE)
T1PA-A	5 ft TRUE1 TOP to parallel blade U-ground (Edison) connector (ETL only)	2500B7029-A
T1PA-B	5 ft TRUE1 TOP to 20 A two-pin and ground (stage-pin) connector (ETL only)	2500B7029-B
T1PA-C	5 ft TRUE1 TOP to grounded 20 A twistlock connector (ETL only)	2500B7029-C
T1PA-X	5 ft TRUE1 TOP to bare-end power input lead (ETL only)	2500B7029-X

Note: One cable of your choice is included with each fixture.

Power Thru Jumpers

Power thru jumpers connect to output (thru) connectors to provide power to successive luminaires inline.

MODEL	DESCRIPTION	PART NUMBER
T1PJ-5	5 ft TRUE1 TOP to TRUE1 TOP fixture to fixture jumper (ETL only)	2500B7030
T1PJ-10	10 ft TRUE1 TOP to TRUE1 TOP fixture to fixture jumper (ETL only)	2500B7031

Diffusers

MODEL	DESCRIPTION	PART NUMBER
S4LED-SFD	Source Four LED - Soft focus diffuser	7460A4019
S4LED-SWD6	Source Four LED - Smooth wash diffuser for 6.25 in gel frame slots	7460K1001
S4LED-SWD7	Source Four LED - Smooth wash diffuser for 7.5 in gel frame slots	7460K1002
S4LED-SWD10	Source Four LED - Smooth wash diffuser for 10 in gel frame slots	7462K1018
S4LED-SWD12	Source Four LED - Smooth wash diffuser for 12 in gel frame slots	7460K1003
S4LED-SWD14	Source Four LED - Smooth wash diffuser for 14 in gel frame slots	7460K1004

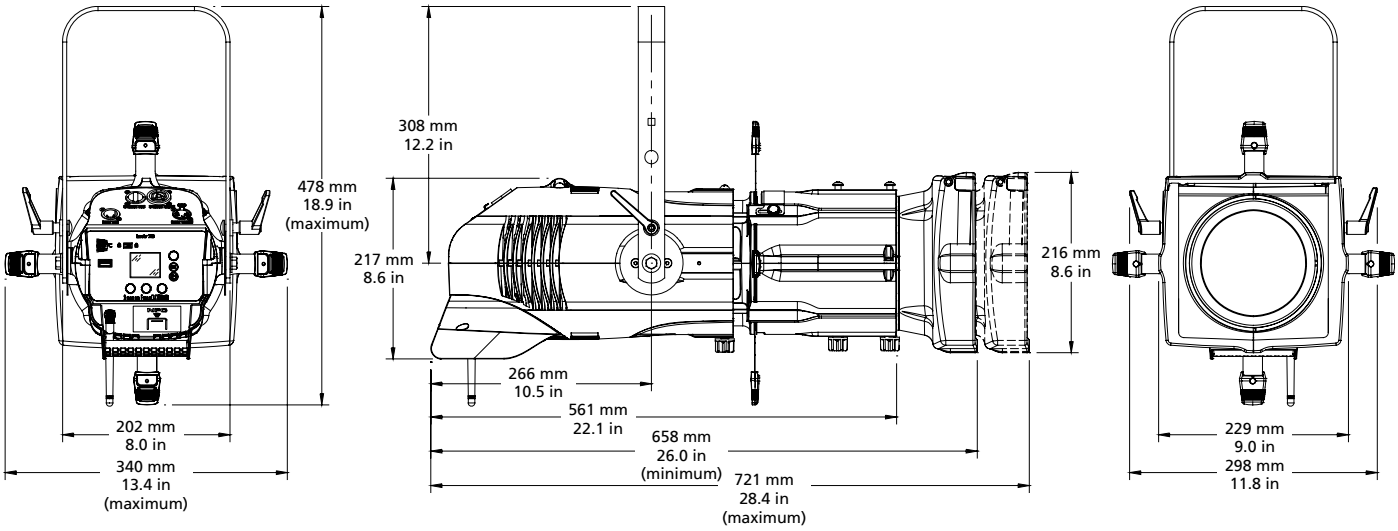
The Soft Focus Diffuser fits into a standard A-Size pattern holder and delivers beautiful homogenized light when not in sharp focus. Also, use with patterns for dappled and soft-edge projections.

The Smooth Wash Diffuser is used when extra-smooth blending of multiple Source Four LED fixtures is required. The smooth wash diffuser is placed into the gel-frame slot of the lens tube.

PHYSICAL

	WEIGHT		SHIPPING WEIGHT	
	kg	lb	kg	lb
With Barrel	8.9	19.6	10.7	23.4
Without Barrel	6.8	14.9	8.3	18.3

*Does not include mounting hardware or lens tube



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VT229H

- Overview
- Tech Specs
- Review
- Support

Buy Where to buy

ASUS VT229H Touch Monitor - 22 inch (21.5 inch viewable) FHD (1920x1080), 10-point Touch, IPS, 178° Wide Viewing Angle, Frameless, Flicker free, Low Blue Light, HDMI, 7H Hardness

- 21.5” Full HD IPS technology with stunningly wide 178° viewing angles
- 10-point multi-touch capacity featuring 7H hardness screen delivers smooth and durable touch experience.
- Windows 11/ 10 compliance
- Its frameless design makes it perfect for almost-seamless multi-display setups
- ASUS Eye Care monitors feature TÜV Rheinland-certified Flicker-free and Low Blue Light technologies to ensure a comfortable viewing experience

Compare


ASUS
10-point Touch

ASUS VT229H Multi-touch MONITOR

Beauty at Your Fingertips

10-Point Multi-touch – An Incredibly Intuitive Touch Experience

The ASUS VT229H touchscreen monitor combines 10-point multi-touch capability with superb image quality, flexible connectivity, durability and great ergonomics.
The precise and accurate multi-touch display featuring 7H hardness — allowing up to 10 simultaneous touches — is optimized for use with Windows 10, allowing you to work smarter and more efficiently, as well as perfect for public usage with protection and durability.

VT229H has passed the tests and been confirmed that it has best compatibility and reliability with Windows10 operating system. Ensuring home and business users of Microsoft's new operating system can benefit from ASUS Touch Monitor.

Simply tap, drag, pinch, zoom or spin with your fingers for an amazingly natural and effortless touch experience. All Windows 10 touch gestures can be used on the ASUS VT229H.

Stunningly Vivid Display

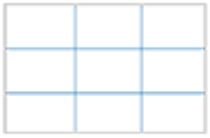
The ASUS VT229H has a 21.5-inch widescreen (16:9) display that delivers outstanding image quality thanks to Full HD 1920x1080 resolution and 178° IPS wide-viewing-angle panel. With a fast 5ms response time, you'll get pin-sharp images for any kind of content. And you can also choose your preferred aspect ratio for scaling non-widescreen images — either 16:9 or 4:3 — via the ASUS Aspect ratio control.

The Touchscreen Monitor That Gives You Much More

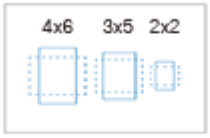
To give you a truly vivid viewing experience, VT229H includes some of our special proprietary technologies, such as QuickFit Virtual Scale* Scale and Splendid Video Intelligence Technologies.

* Patent-pending

ASUS QuickFit Virtual Scale's onscreen alignment grid overlay helps you align and preview actual-size photos and documents on screen prior to printing, making sure they print perfectly every time.



Alignment Grid



Photo

Supporting Formats:

Grid: Alignment
Photos: 4"x6", 3"x5", 2"x2"

ASUS Splendid Video Intelligence Technology employs a color engine with eight preset modes. These allow you to adjust your display easily for the best color accuracy and image fidelity, depending on what kind of content is being displayed. You can access the presets via a designated hotkey.

Reading

Creating comfortable experience as if reading actual books by adjusting the monitor's color temperature and brightness levels, simulating paperback books.

Darkroom

Best choice for soft ambient light environment for visual pleasure.

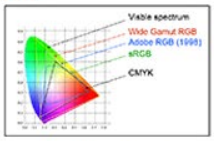
Scenery

Increases the brightness range, introducing more contrast gradations and selectively tweaking color saturation for more lush landscapes.

Theater

Enhances the contrast and color saturation of the image — delivering livelier and more vivid visuals for greater immersion.

sRGB

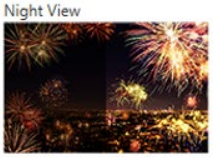


Provides the best performance for viewing graphics.

Game

Brings out dark, hard-to-see areas while leaving well-lit portions untouched — allowing you to see opponents lurking in obscure corners.

Night View



Intelligently raises Y-luminance to highlight poorly-lit details, capturing each scene's beauty in a crisp and vibrant fashion.

Standard

Delivers clear document viewing and web browsing experiences with optimized color and contrast.

Perfect Comfort and Flexibility for Home and Office

Designed With You in Mind

VT229H has multiple video connectors, including HDMI and VGA inputs, making it suitable for use anywhere, either in the home or at the office.
VT229H features an elegant circular base with an ergonomically-designed tilting stand that lets you choose the ideal viewing position. The monitor is also VESA mount-compatible, making it easy to mount on a wall or monitor arm. Advanced power-saving features ensure low energy costs and maximum reliability, and it meets stringent environmental standards including RoHS, ENERGY STAR.

Protect your eyes with ASUS Eye Care Technology

Visit ASUS Eye Care microsite
: https://www.asus.com/Microsite/display/eye_care_technology/
VT229H has undergone stringent performance tests and is awarded Flicker-free and Low Blue Light certifications by TÜV Rheinland laboratories, a global provider of technical, safety, and certification services, to show display quality with clear image and prevent users suffering from eye strain and fatigue.

Flicker-free Technology

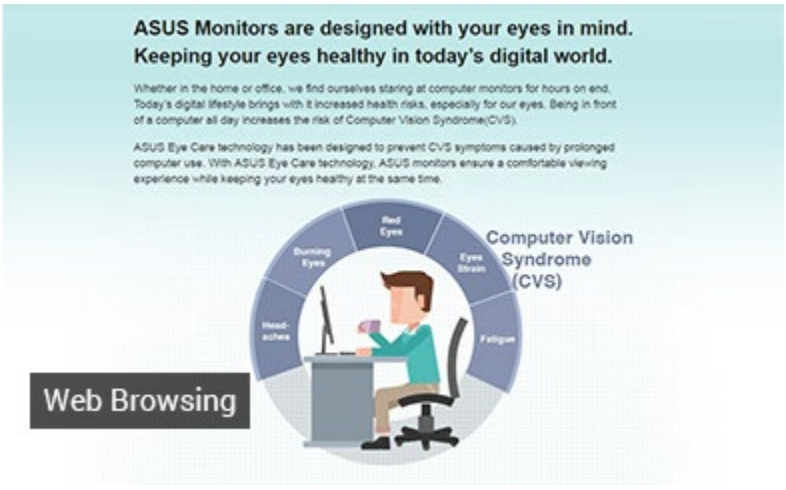
ASUS Flicker-Free technology reduces flicker for a comfortable viewing experience. This technology helps minimize instances of eyestrain and other damaging ailments, especially when you spend long, countless hours in front of a display processing documents, surfing web pages or watching videos.

With ASUS Flicker-free technology

Without ASUS Flicker-free technology

Ultra-low Blue Light Monitor

The TÜV Rheinland-certified ASUS Blue Light Filter protects you from harmful blue light, and you can easily access its four different filter settings via a hotkey.

- 

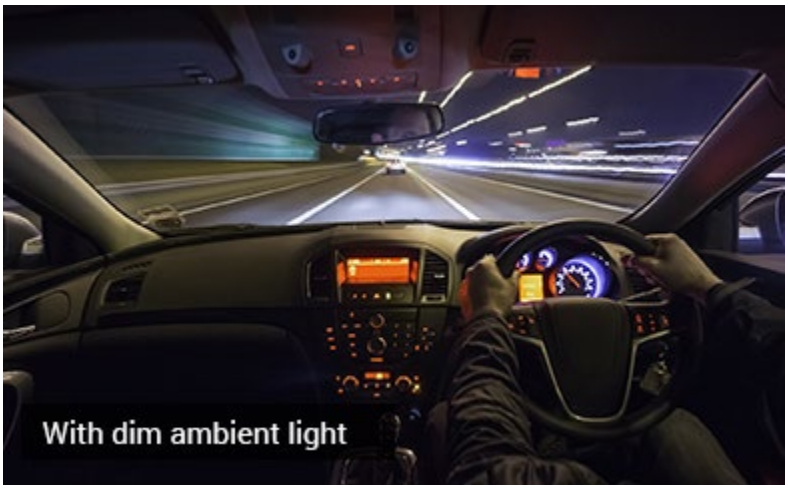
Level 1 is ideal for normal web browsing, and gives you excellent color reproduction for lifelike visuals, minimal color shift.

- 

Level 2 is ideal when you're viewing photos and videos, giving you a perfect balance of high image quality.

- 

Level 3 gives you the look of real paper, making it ideal for long hours of reading or word processing.

- 

  Level 4 is ideal for environments with dim ambient light.

ETC

CEM3 Power Controller

ETC Power Control Series

Type(s)

Project

Date

Notes

GENERAL INFORMATION

The Sensor3 Control Electronics Module (CEM3) is ETC's new platform for power control. CEM3 manages priority-based Ethernet, DMX and Preset control for ultra-smooth 16-bit dimming, fast activation of relays, and instant-on support for emergency-lighting systems. Energy usage, system status, and quick changes to circuit setup can be accessed at its intuitive facepanel or remotely at the lighting console.

APPLICATIONS

- Professional and educational theaters
- Production studios
- Performance halls
- Retail and dining
- Houses of worship
- High-density architectural dimming
- Touring and Portable dimming

FEATURES

- **Net3 Uplink** - Connect to the Net3 lighting network using the ethernet jack on the front of the control module
- **USB QuickLoad** - Back up system settings and upgrade software
- **Point of Control Interface** - Easy-to-read systems display shows the user-pertinent system information
- **Live Control Override -** For presets, set level, and dimmer check
- **Local Menu** - Access to setup features and control directly at the control processor
- **Backup Looks** - 64 presets with programmable fade times and priority allows for take control, pile on, or live control failover sources to ensure that your show will never go black!
- **Connect to Console** - System and rack feedback to live control desks is standard
- **Quick Setup Wizard** - Builds a simple system in a single step
- **Advanced Features (AF)** - Adds dimmer-specific reporting
- **ETC Dimmer Doubling™** - Increase your individually controllable fixtures without adding extra circuits (supported only at 60hz)
- **RideThru** - Optional accessory that supports the processor electronics for a few seconds during a power outage
- **Battery Pack** - Optional accessory that supports the processor electronics for several minutes during a power outage

ORDERING INFORMATION

Control Module

MODEL	DESCRIPTION
CEM3	CEM3 Power Controller

Compatible Systems

MODEL	DESCRIPTION
SENSOR3 INSTALLATION RACKS	
SR3-48/SR3AF-48	Sensor3 48-module installation racks
SR3-24/SR3AF-24	Sensor3 24-module installation racks
SR3-12/SR3AF-12	Sensor3 12-module installation racks
SR3-6/SR3AF-6	Sensor3 6-module installation racks
HSR3/HSR3AF-	Sensor3 230 V installation racks
SR3AFN	Sensor3 GFCI installation racks
ESR3AFN	Sensor3 CE installation racks
SENSOR3 TOURING RACKS	
SP3	Sensor3 small-frame touring rack
SP3	Sensor3 large-frame touring rack
SENSOR3 PORTABLE PACKS	
SP3-2420	Sensor3 12-module portable pack
SP3-1220	Sensor3 6-module portable pack

CEM3 Accessories

MODEL	DESCRIPTION
RK	Retrofit kit for Sensor standard and AF racks

ETC

CEM3 Power Controller*

ETC Power Control Series

SPECIFICATIONS

GENERAL
- Universal Control Electronics Module
- Direct Ethernet connectivity for dimmer levels, feedback and system control
- UL, cUL LISTED and CE Marked
- UL 924 LISTED for Emergency Lighting Control

PHYSICAL
- Formed-steel body
- Die-cast facepanel finished with textured epoxy paint
- Slide-in module installs and removes without tools
- Spring-loaded module release
- Airflow sensor to ensure adequate airflow

ELECTRICAL
- Accepts:
  - Single phase
  - Three phase WYE
- Universal Voltage range 91–139V and 181–259 VAC*
- Line-feed frequencies from 47–53 Hz and 57–63 Hz
- Automatic frequency-variation compensation
- Two configurable DMX512 inputs (2500 V opto-isolated)

*Note: Suggested maximum main transformer tap 135 V or 255 V to allow for line fluxuation.

CONTROL FEATURES
- Eight-line by 20-character graphical LCD for system configuration, live control, and status display
- Full number pad for quick access to dimmers
- Shortcut buttons for Setup, About, and live control
- Five status LED indicators: Power, Network activity, DMX-A DMX-B, and Panic
- 64 user-programmable presets
- Single Panic circuit with flexible programming
- Replacement CEM3 automatically loads rack configuration
- Configuration backups saved on USB or network
- Dimmer outputs regulate to maintain constant power ±1V
- Individual output scale voltage settings for load-wiring compensation
- Selectable Firing Modes: Normal, Forward Phase, Reverse Phase, Dimmer Doubled, Sinewave, and Fluorescent
- Control Modes: Dimmed, Switched, Latch/lock, Always On, and Off
- Selectable Dimmer Output Curves: Linear, Modified Linear, Square, Modified Square, Sensor 2.0, and five custom curves
- 16-bit fade resolution (> 30,000-Step Resolution per 1/2 cycle)
- Selectable Data Loss Behavior

FEEDBACK
- All Sensor racks with CEM3 modules include basic system diagnostic reporting
- Standard rack feedback includes: DMX input status, rack power status, and rack temperature
- Advanced Features (AF) provides dimmer-specific status and load feedback (requires AF dimmer rack and AF dimmer modules)

LOCAL PROGRAMMING

LOCAL LIVE CONTROL
- Set Levels, Preset Activation, and Dimmer Check

STATUS (ABOUT)
- All modules: module type, mode, control source, module location, and overtemp
- AF modules: module removed, breaker trip, recorded and actual load
- Rack: temperature, rack type, Run Hours
- Network: IP address, SubNet mask, Gateway and active link
- Rack Data Ports: status for DMX A and B, and sACN
- About Rack Power: frequency, voltage per phase, and voltage headroom
- About Software: version number

SETUP
- Setup dimmer: Firing Mode, Curve, Scale Voltage and Name
- Patch
- Set rack priority per DMX port
- Data Loss Behavior: Hold last Look, Wait and Fade, Play Preset
- Name the rack (using ACN)
- Custom dimmer numbering
- Get Config and save Config to USB

PHYSICAL

CEM3 Dimensions

MODEL	HEIGHT		WIDTH		DEPTH	
	in	mm	in	mm	in	mm
CEM3	2.06	52	11.80	300	7.00	178

CEM3 Weight

MODEL	WEIGHT		SHIPPING WEIGHT	
	lb	kg	lb	kg
All CEM3	3.5	1.6	6.2	2.8

Maximum BTU Production per Module

MODEL	BTUS	WATTS	EFFICIENCY
All CEM3	<10	<4	N/A

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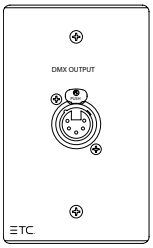
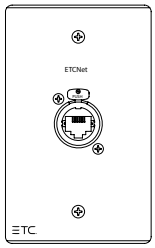
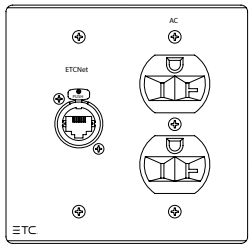
ETC

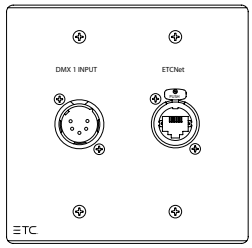
Plug-In Stations

Control Series









Type(s)

Project

Date

Notes

GENERAL INFORMATION

Electronic Control Plug-in Boxes (ECPBs) provide connection points for control equipment to operate lighting and other equipment from multiple locations throughout a venue. Available standard connector types support industry-standard DMX512 and Ethernet, portable houselight control, remote control devices, and 120 V outlets.

APPLICATIONS

- An integral part of any complete lighting system installation:
  - Theatres and auditoriums
  - Television studios
  - Houses of worship
  - Museums
  - Casinos
  - Hospitality

FEATURES

- Surface or flush mount
- Most models fit in standard RACO back boxes
- Data connector options include:
  - DMX512 Input
  - DMX512 Output
  - Remote Focus Unit (RFU)
  - Ethernet Network
  - Portable Unison Heritage station
  - Serial or computer interface
- Duplex Edison AC power outlet
- Custom configurations available (RFU, Serial)
- DMX inputs and outputs support termination of Belden 9729 (or equivalent) or Category5 cable

REGULATORY AND COMPLIANCE

- ETL Listed

ORDERING INFORMATION

Single Gang Plug-in Stations

Model	Description	Legend
ECPB DMXIN	DMX In Station	DMX INPUT
ECPB NET	Ethernet Station	NETWORK
ECPB DMXOUT	DMX Out Station	DMX OUTPUT
ECPB DMX1-OUT	DMX Out Station	DMX1 OUTPUT
ECPB DMX2-OUT	DMX Out Station	DMX2 OUTPUT
ECPB DMX3-OUT	DMX Out Station	DMX3 OUTPUT

ORDERING INFORMATION

Two Gang Plug-in Stations

Model	Description	Legend
ECPB DMX OUT/NET	DMX Out and Ethernet	DMX OUTPUT/ NETWORK
ECPB DMX OUT/AC	DMX Out and AC Plug	DMX OUTPUT/AC
ECPB DMXIN/NET	DMX In and Ethernet	DMX 1 INPUT/ NETWORK
ECPB DMX IN/OUT	DMX In and Out	DMX 1 INPUT/ DMX OUTPUT
ECPB DMXIN/2-IN	Dual DMX Input	DMX 1 INPUT/ DMX 2 INPUT
ECPB NET/NET	Dual Ethernet	NETWORK/NETWORK
ECPB NET/AC	Ethernet and AC Plug	NETWORK/AC
ECBP UNISON/NET	Unison Portable and Ethernet	UNISON/ NETWORK

Three Gang Plug-in Stations

Model	Description	Legend
ECPB NET/NET/AC	NET, NET, AC Plug-in station	NETWORK/NETWORK/ AC

Note: Custom configurations are available with up to seven connectors, contact ETC for pricing and lead time information.

Accessories

Model	Description
ECPB PB1/ECPB PB2	1- and 2-gang Surface Mount Back Boxes (2.5 in deep)
1SBD-4/2SBD-4/3SBD-4/ SBD-4/5SBD-4/6ESBD-4	1- through 6-gang Surface Mount Back Boxes (3.5 in deep)
ECPB PB-U	U-Bolt kit for 1- and 2-gang stations (back box not included)
ECPB PB-U3	U-Bolt kit for 3-gang stations (back box not included)
UBOLTKIT	U-Bolt pipe-mount assembly
UBOLTKITOFFSET	Offset U-Bolt pipe-mount assembly

SPECIFICATIONS

PHYSICAL

- Faceplates made from 0.80 in aluminum
- Finished in fine texture, scratch-resistant black powder coat
- White legends standard
  - Engraving or custom legends available
- Mounts in standard RACO flush-mount back box (supplied by others)
  - Surface-mount back boxes available from ETC
- Optional U-Bolt Pipe-mount kit for use with surface-mount back boxes

ELECTRICAL

- Low voltage class 2 wiring for data connections
- Voltage barriers provided when Class 1 and Class 2 wiring terminations are included in the same faceplate
- Terminal blocks supplied for contractor terminations

CONNECTOR OPTIONS

- Following standard connectors available for Plug-in Stations:
  - 5-Pin XLR plug connectors for DMX input
  - 5-Pin XLR socket connectors for DMX output
  - RJ45 connectors for Network connections - Twisted Pair
  - 6-Pin DIN socket connectors for Unison portable stations

PHYSICAL

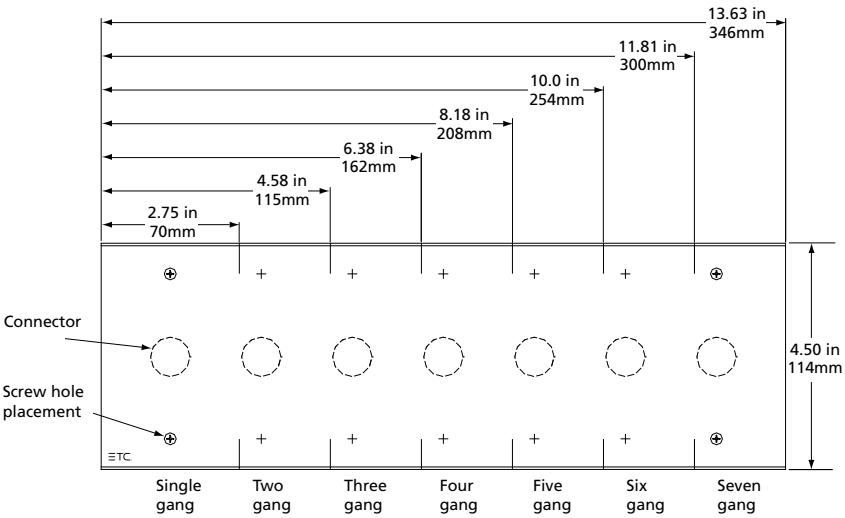
Station Wall Plate Dimensions

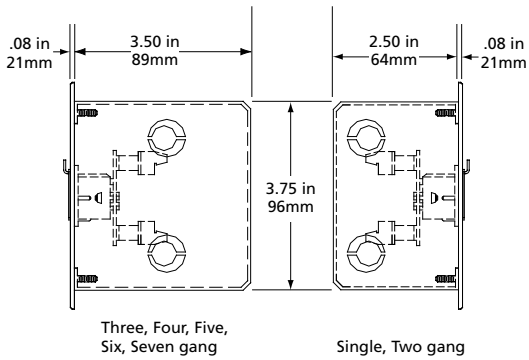
Model	Width		Height		Depth	
	in	mm	in	mm	in	mm
Single gang	2.75	70	4.50	114	2.50	64
Two gang	4.56	115	4.50	114	2.50	64
Three gang	6.38	162	4.50	114	3.50	89
Four gang	8.18	208	4.50	114	3.50	89
Five gang	10.00	254	4.50	114	3.50	89
Six gang	11.81	300	4.50	114	3.50	89
Seven gang	13.63	346	4.50	114	3.50	89

Flush-mount Back Boxes (supplied by others)

Model	Required back box
Single gang	RACO 690 or equivalent
Two gang	RACO 691 or equivalent
Three gang	RACO 697 or equivalent
Four gang	RACO 698 or equivalent
Five gang	RACO 699 or equivalent
Six gang	RACO 965 or equivalent
Seven gang	Provided by ETC

Note: Gangable back boxes are not supported. Surface-mount boxes are provided by ETC upon request.





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etcconnect.com

ETC®

Eos Motorized Fader Wings

100V 115/120V 230/240V

Eos® Series

GENERAL INFORMATION

The Eos motorized fader wings may be used to provide extended playbacks for Eos Ti, Gio, Gio @5, Ion Xe, Eos and Ion Xe RPUs, RVIs, ETCnomad (PC or Mac native) and ETCnomad Puck.

Up to three wings may be attached to any of these devices. There are two wings – a x10 and x20. The x10 has 10 60mm motorized faders, two 4.3" full-color high-resolution displays and three controls buttons. The x20 adds 10 additional faders, two more displays and three controls buttons. The wing provides power sensing and automatically turns on when both an active USB data connections and mains power are provided via the external 12V power supply.

Connected devices must be running Microsoft Windows 7 or higher or Mac OSX El Capitan (10.11) or later. These wings are NOT compatible with Windows XP.

FEATURES

- Playback layout consistent with Eos Ti and Gio
- Either 10 or 20 pageable playbacks (100 pages are supported)
- Paging/bank conventions are determined in a setup menu
- Button/fader and configuration mapping displayed via full-color high-resolution displays.
- Two powered USB ports
- VESA 100x100mm mountable
- Kensington Lock compatible locking point

INTERFACES

- AC Input (100 – 240VAC at 50/60Hz) with external power supply
- Two USB ports

ORDERING INFORMATION

Eos Motorized Fader Wings

MODEL	DESCRIPTION
Eos MFW 20	Eos Motorized Fader Wing 20
Eos MFW 10	Eos Motorized Fader Wing 10

Eos Motorized Fader Wing Accessories

MODEL	DESCRIPTION
Eos 2W FC	Eos Combined Wing Flight Case
Eos PGW	Eos Programming Wing
ETCnomad (512 or 6144)	ETCnomad (512 or 6,144 Output Kit)
ETCnomad Puck (512 or 2048)	ETCnomad Puck (512 or 6,144 Output)

Ships with

- Power supply
- IEC power cord
- Dust cover
- USB cable

The wing is compatible with

- Eos Ti
- Gio
- Gio @5
- Ion Xe/Ion Xe 20
- Eos/Ion/Ion Xe Remote Processor Units
- RVI3
- ETCnomad for PC/Mac (requires ETCnomad Lighting Controller Kit and output device)
- ETCnomad Puck

Note: These wings are not supported on Element or any Windows XP devices. The Eos Motorized Fader Wing cannot be connected to a host computer using a KVM switch.

Eos Motorized Fader Wings

Eos Series

PHYSICAL

Eos Motorized Fader Wing Dimensions*

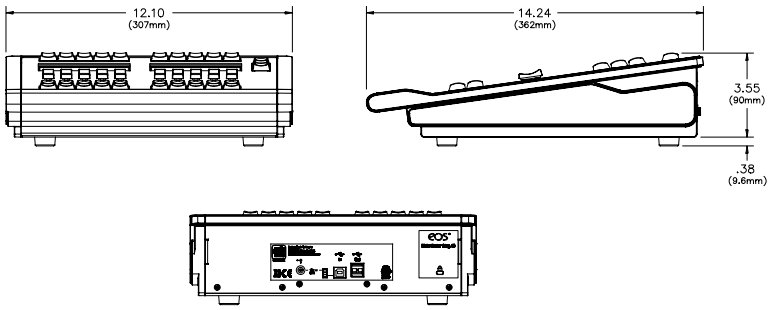
MODEL	HEIGHT		WIDTH		DEPTH	
	inches	mm	inches	mm	inches	mm
Eos MFW 20	4.27	109	22.30	566	14.24	362
Eos MFW 10	4.27	109	12.10	307	14.24	362
Eos PGW with Flight Case	12.45	316	31.59	802	20.47	520

Eos Motorized Fader Wing Weights*

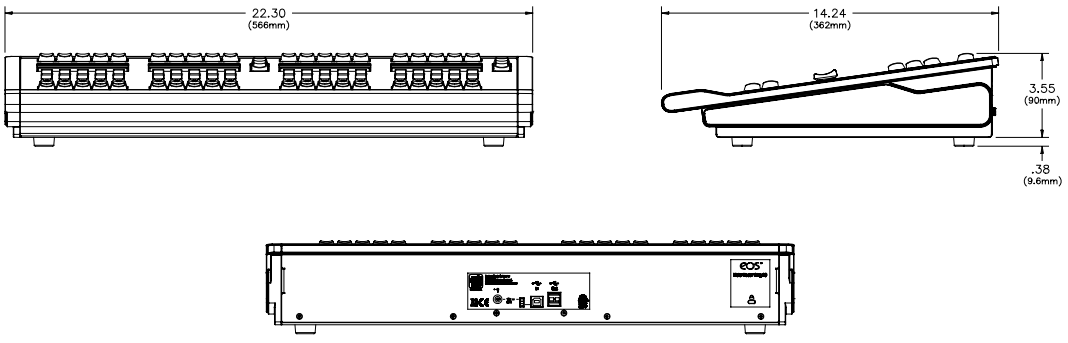
MODEL	WEIGHT		SHIPPING WEIGHT	
	lbs	kgs	lbs	kgs
Eos MFW 20	10.7	4.9	17.1	7.8
Eos MFW 10	6.2	2.8	12.5	5.7

*Weights and dimensions typical

EOS MOTORIZED FADER WING 10



EOS MOTORIZED FADER WING 20



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ETC® Sensor3™ 120V UL Advanced Features Racks

100V 120V

Sensor3 SR Series

GENERAL INFORMATION

Sensor3 dimming systems provide high-density, professional features and exceptional reliability for lighting applications requiring the best the entertainment industry can offer.

APPLICATIONS

- Professional and academic theaters
- Production studios
- Concert and performance halls
- Themed retail and dining venues
- Theme parks
- Multipurpose convention centers
- Houses of worship

FEATURES

- System monitoring with optional circuit reporting
- High dimmer density
- Up to two 2.4kW dimmers per module
- Six, 12-, 24-, and 48- module racks available
- Rugged industrial construction
- Installation flexibility
- Adaptable modular design
- 100,000A Short Circuit Current Rating (SCCR)
- Advanced configuration editing built into rack
- Up to 16 presets per space
- Up to 16 assignable zones per space
- Built-in Unison Echo Station support for
  - Six connected sensors or stations (16 with external PS)
  - Six connected racks or power controllers (16 with ext PS)
- Direct Ethernet control-signal input (Net3™, sACN)
- Two DMX512-A inputs
- Supports ETC Dimmer Doubling™

ACCESSORIES

- Dimmer Doubler
- Sound Suppression Hood
- Floor pedestal for 24-module rack
- Document holder

ORDERING INFORMATION

Installation Racks

MODEL	DESCRIPTION
SR3AF-48	Sensor3 48-Module Advanced Features Rack
SR3AF-48-TERM	Sensor3 48-Module Advanced Features Rack with Termination Bay
SR3AF-24	Sensor3 24-Module Advanced Features Rack
SR3AF-12	Sensor3 12-Module Advanced Features Rack
SR3AF-6	Sensor3 Six-Module Advanced Features Rack
SR3AF-24 1P	Sensor3 24-Module Single Phase AF Rack
SR3-12 1P	Sensor3 12-Module Single Phase AF Rack
SR3-6 1P	Sensor3 6-Module Single Phase AF Rack

Note: SR48AF available with Optional Termination Bay

Rack Options

MODEL	DESCRIPTION
AT48	Amp-Trap fuse option for 48-module rack
AT24	Amp-Trap fuse option for 24-module rack
AT12	Amp-Trap fuse option for 12-module rack
BK48	Bus kit for two 48-module racks
BK24	Bus kit for two 24-module racks
BK12	Bus kit for two 12-module racks
AUX30-48	30” Auxiliary Rack(s) for 48-module rack
AUX19-48	19” Auxiliary Rack(s) for 48-module rack
AUX19-24	19” Auxiliary Rack(s) for 24-module rack
AUX19-12	19” Auxiliary Rack(s) for 12-module rack

Notes: Vibration reduction mounts available for all Sensor3 racks. Contact ETC

Power feeds above 800A up to 2,000A require the addition of a 30” auxiliary rack.

Optional main circuit breakers are available for use in auxiliary racks - 100A, 200A, 225A, 250A, 300A, 400A, 600A, 800A, 1000A, and 1200A.

Rack Accessories

MODEL	DESCRIPTION
SSSh24-48	Sensor Sound Suppression Hood – large
SSSh6-12	Sensor Sound Suppression Hood – small
DH	Document Holder

Control Accessories

E10xx/E11xx	Inspire Stations
EPS5/EPS10	Preset recall stations
ELS	Light Sensor
EOCC	Echo Occupancy Sensor
E-SPM-WM	Wall-Mount Station Power Module (16+16)
E-SPM-RM	Rack-Mount Station Power Module (16+16)
	Echo Zone and Room Controllers

SPECIFICATIONS

GENERAL

- Racks available in four sizes:
  - SR3AF-6: Six modules, 12 dimmers maximum
  - SR3AF-12: 12 modules, 24 dimmers maximum
  - SR3AF-24: 24 modules, 48 dimmers maximum
  - SR3AF-48: 48 modules, 96 dimmers maximum
- Dual-density (two dimmers per module), single-density and half-density dimmer modules available
- Operating temperature: 0 to 40°C / 32 to 104°F
  - Dimmer room HVAC systems must at all times maintain the specified ambient temperature at the dimmer rack. Dimming systems operating within 10°F of the upper or lower temperature limits must strictly follow installation and operation guidelines to operate reliably.
- Relative humidity: 10-90% non-condensing
- All racks UL and cUL Listed

MECHANICAL

- Rugged 16-gauge steel construction
- Fine-textured, scratch-resistant epoxy paint
- SR3-6 and SR3-12 uses wall-mount installation
- SR3-24 can be wall- or pedestal-mounted
- SR3-48 is floor-mounted
- Top and bottom conduit access through removable panels (SR3-48) or knockouts (SR3-6, SR3-12, and SR3-24)
- No tools required for module removal or installation
- Keyed module slots prevent insertion of inappropriate module types
- Front access to all wiring and terminations
- Full-height locking door
- Electrostatic air filter easily removed from door for periodic cleaning
- High-efficiency cooling system with airflow sensor
- High-visibility LED status beacon
- Optional termination bay available for SR48AF enclosure

ELECTRICAL

- SR3AF-6, SR3AF-12 and SR3AF-24 accept:
  - Three-phase 120/208 VAC
  - Single-phase 120/240 VAC
- SR3AF-48 accepts:
  - Three-phase 120/208 VAC
- Line feed frequencies from 47-63Hz
- Line feed voltage range is 91-139 VAC*
- Load terminals accept up to #4 AWG (25mm^2) wire (see chart)
- Short Circuit Current Rating: 100,000A RMS symmetrical at 240VAC
- Auxiliary equipment racks and custom switch-gear/ distribution available (call ETC for details)

*Note: The suggested maximum main transformer tap is 135V to allow for line fluctuation

CONTROL ELECTRONICS

- CEM3 Power Control
- Full number pad for fast access to dimmer override and setup
- Supports Dimmer Doubling™
- System, rack, dimmer-specific load and diagnostic reporting

OPTIONS

- Amp-Trap® fuses to allow feeding individual racks from oversized mains
- All-copper bus kits available
- Vibration reduction kits available for all racks

ADDITIONAL INFORMATION

Compatible Dimmer Modules

SENSOR ADVANCED FEATURES (AF) MODULES	
MODEL	**DESCRIPTION**
D15AF/D20AF	Dual 15A/20A Dimmer Module – 500µS – AF
D50AF	Single 50A Dimmer Module – 500µS – AF
D100AF	Half 100A Dimmer Module – 500µS – AF
D20HR	Single 20A Dimmer Module – 1000µS – AF
D20DHR	Dual 20A Dimmer Module – 800µS – AF
D50HR	Half 50A Dimmer Module – 800µS – AF
SENSOR SPECIAL-PURPOSE MODULES	
ELV10	Dual 10A dimmer for electronic low-voltage transformers
TR20SAF/TR20AF	Dual ThruPower Relay with dimmer
D15FB/D20FB	Single 15A/20A two-wire fluorescent dimmer with emergency battery backup
D15F/D20F	Single 15A/20A Fluorescent Dimmer Module
R15AF/R20AF	Dual 15A/20A Relay Module – AF
CC15/CC20	Dual 15A/20A Constant Circuit Breaker Module
AFM	Air Flow Module

Control Modules

MODEL	DESCRIPTION
CEM3	Power Controller

Load Wiring Lug Capacity

CONNECTION	WIRE SIZE
10A, 15A, 20A, and 50A lugs	4 AWG Max. (25mm^2)
100A lugs	2/0 Max.

Primary Feed Lug Capacity

CONNECTION	WIRE SIZE	FEED RATING
SR3-48	Dual 600 kcmil – 2 AWG	800A*
SR3-24	Dual 350 kcmil – 4 AWG	400A
SR3-12	Dual 250 kcmil – 6 AWG	200A
SR3-6	Single 2/0 – 14 AWG	100A

*With the addition of an AX48-30 rack and amp traps, feeder sizes can increase up to 2,000A max. See Sensor Aux Bay datasheet for more details.

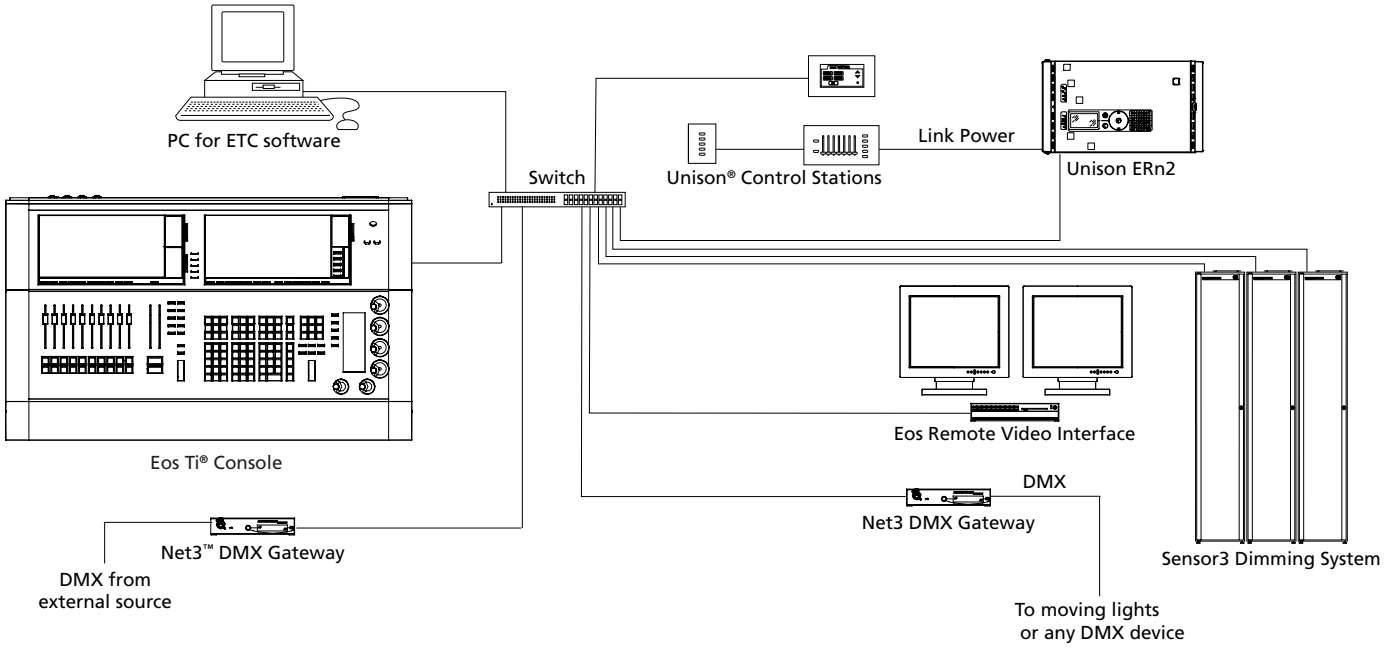
Sound Pressure Level (dBA)

MODEL	dBA @ 1000Hz (1kHz)**	
	WITHOUT SSSh***	WITH SSSh
SR3-48	37.0	30.9
SR3-24	40.2	34.0
SR3-12	41.8	33.8
SR3-6	26.0	21.4

**dBA values for each Sensor rack measured at one meter. Visit www.etcconnect.com for full spectrum dBA ratings.

***Sensor Sound Suppression hood (SSSh)

SAMPLE SYSTEM RISER



Sensor3 SR Series

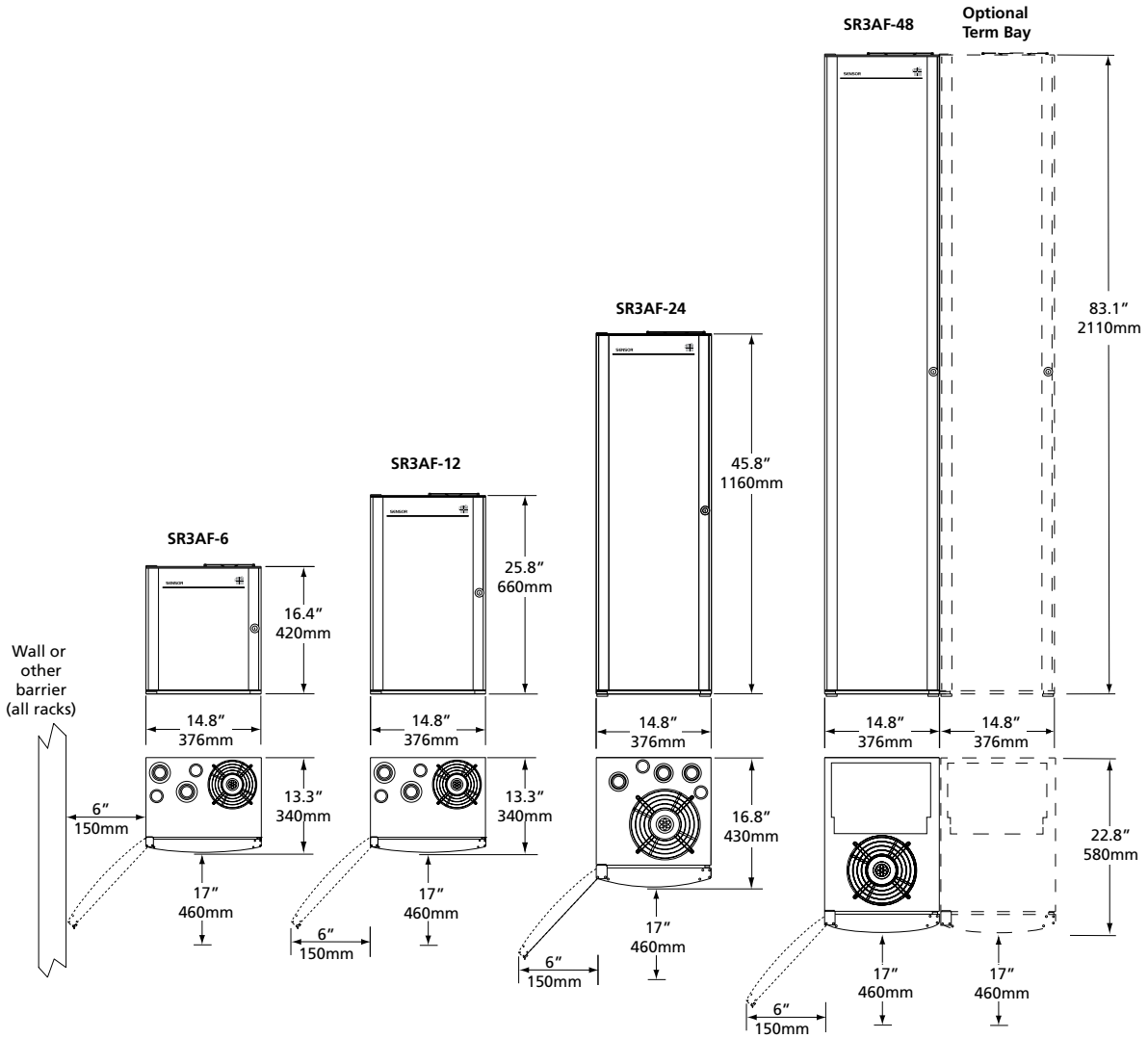
PHYSICAL

Empty Rack Weights*

Rack Dimensions

MODEL	WEIGHT		SHIPPING WEIGHT		HEIGHT		WIDTH		DEPTH	
	lbs	kgs	lbs	kgs	inches	mm	inches	mm	inches	mm
SR3-48 w/Door	219	100	233	106	83.1	2110	14.8	376	22.8	580
SR3-48 w/ Term Bay	315	143	325	148	83.1	2110	29.6	752	22.8	580
SR3-24 w/Door	124	57	135	62	45.8	1160	14.8	376	16.8	430
SR3-12 w/ Door	56	26	64	30	25.8	660	14.8	376	13.3	340
SR3-6 w/ Door	36	16	45	21	16.4	420	14.8	376	13.3	340

* Refer to module datasheets to calculate rack weight for other module types.



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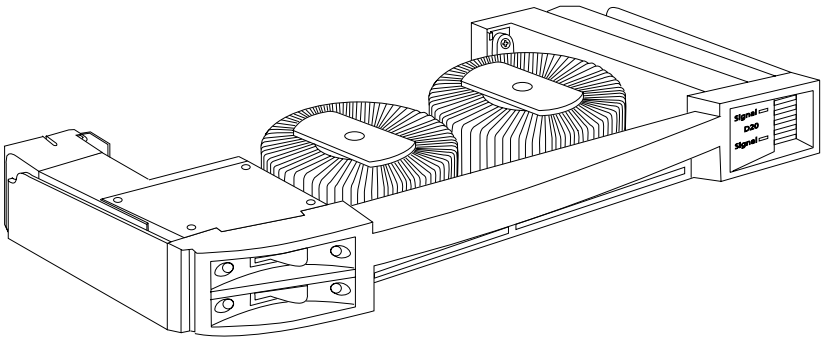
ETC®

Standard Dimmer Module

Standard Series

100V 120V



GENERAL INFORMATION

The Standard Dimmer Module is designed for use in both Sensor®+ and Unison® Dimming Series modular rack enclosures. Standard Dimmer Modules provide cost-effective digital forward phase angle dimming for standard loads such as incandescent, low voltage, quartz, neon, cold-cathode and 2 and 4-wire fluorescent ballasts. The patented, high-density, dual modules feature modular installation and removal, fully magnetic circuit breakers and standard or enhanced risetime toroidal filters.

APPLICATIONS

- Incandescent lighting
- Low voltage lighting
- Quartz lighting
- Neon lighting
- Cold Cathode lighting
- 2-wire Fluorescent ballast
- 4-wire Fluorescent ballast

FEATURES

- Two 1.8 or 2.4kW dimmers per module
- Standard or Enhanced risetime toroidal filters
- High-density modular assembly
- Die-cast aluminum chassis
- Fully magnetic circuit breakers

GENERAL

- 100,000A Short Circuit Current Rating (SCCR)
- UL and cUL LISTED

ORDERING INFORMATION

100-120V Standard Dimmer Modules

MODEL	DESCRIPTION
D15	Dual 15A Dimmer Module, 350µS
D15E	Dual 15A Dimmer Module, 500µS
D20	Dual 20A Dimmer Module, 350µS
D20E	Dual 20A Dimmer Module, 500µS
AFM	Air Flow Module

Compatible Systems

MODEL	DESCRIPTION
INSTALLATION RACKS*	
SR3	Sensor3 Installation racks
SR+	Sensor+ Installation racks
SR	Sensor Installation racks
TOURING RACKS	
SP3	Sensor+ 24 module Touring Rack (48-20A dimmers)
SP+	Sensor+ 48 module Touring Rack (96-20A dimmers)
PORTABLE PACKS	
SP3	Sensor3 Portable Packs
SP+	Sensor+ Portable Packs

*Rack enclosures also available for 230CE and 240 Volt applications

Standard Dimmer Module

Standard Series

SPECIFICATIONS

GENERAL
- UL and cUL Listed for continuous duty at 100% of rated load
  - D15/D15E – 1.8kW
  - D20/D20E – 2.4kW

PHYSICAL
- Modular plug-in assemblies
- Cast aluminum chassis, finished with textured epoxy paint
- Keyed to prevent insertion in inappropriately rated rack positions

CIRCUIT BREAKERS
- Fully magnetic to eliminate nuisance tripping
- 20x inrush current rating
- 125%, 10-120 seconds, must-trip rating
- Rated for 100% switching duty applications

RATINGS
- 100,000A Short Circuit Current Rating Rating (SCCR)
- Modules withstand hot-patching of cold loads up to full rating
- UL and cUL LISTED

POWER DEVICE
- Sealed, patented assembly
- Field replaceable with screwdriver
- Two back-to-back SCRs per circuit
- One control LED per circuit
- Integral bonded heatsink
- Integral temperature sensor

FILTERING
- High quality toroidal filters
  - 350µS risetime - Standard 100-120V modules*
  - 500µS risetime - Enhanced 100-120V modules*

  *Risetime measured at full load, at worst case firing angle (90 degrees), from 10-90% of output wave form

DIMMER RANGE
- Incandescent, low voltage dimming range 100-0%
- Dimming range of 2 and 4-wire fluorescent ballast is dependent on lamp ballast combination. Contact ETC for range verification
- Sizing of Neon transformer used in dimming applications should be 1.5x greater than size used in non-dimming application

PHYSICAL

Module Dimensions

MODEL	HEIGHT		WIDTH		DEPTH	
	inches	mm	inches	mm	inches	mm
D15	1.5	38.	11.8	300	4.9	127
D15E	1.5	38	11.8	300	4.9	127
D20	1.5	38	11.8	300	4.9	127
D20E	1.5	38	11.8	300	4.9	127

Module Weights

MODEL	WEIGHT		SHIPPING WEIGHT	
	lbs	kgs	lbs	kgs
D15/D20	5.0	2.3	6.9	3.1
D15E/D20E	5.5	2.5	6.9	3.1

Maximum BTU Production per module

MODEL	BTUS	WATTS	EFFICIENCY
D15	380	112	96.9%
D15E	474	140	96.1%
D20	522	154	96.8%
D20E	810	238	95.0%

These values should be provided to a qualified HVAC design engineer, along with dimmer quantities, types and dimmer room dimensions, to calculate dimmer room air handling requirements.

Dimmer room HVAC systems must at all times maintain the specified ambient temperature **at the dimmer rack**. Dimming systems operating within 10°F of the upper or lower temperature limits must strictly follow installation and operation guidelines to operate reliably.

SCR Rating

MODULE	D15/D20
Single cycle peak surge current	625A
Half cycle peak surge current	1620A
Transient over voltage	600V

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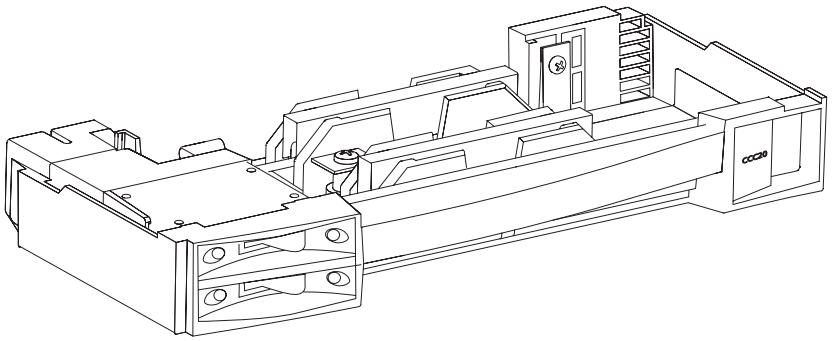
Web • www.etcconnect.com 7050L1028 Rev. F USA 08/12

ETC®

Constant Modules

Special Purpose Series

100V 120V



GENERAL INFORMATION

The Constant Module is a dual, plug-in assembly for use in both Sensor®+ and Unison® Dimming Series modular dimmer rack enclosures. The Constant module distributes power with overcurrent protection from the dimmer rack enclosure to non-dimmed loads, typically motors, backup and emergency systems or auxiliary power distribution panels.

APPLICATIONS

- Devices requiring constant current power
- Motors
- Backup and Emergency systems
- Auxiliary power distribution panels

FEATURES

- Two circuits per module
- Does not respond to control signals
- High-density modular assembly
- Die-cast aluminum chassis
- Fully magnetic circuit breakers

GENERAL

- 100,000A Short Circuit Current Rating (SCCR)
- UL and cUL LISTED

ORDERING INFORMATION

100-120 Volt Constant Current Modules

MODEL	DESCRIPTION
CC15	Dual 15A Constant Module
CC20	Dual 20A Constant Module

Compatible Systems

MODEL	DESCRIPTION
INSTALLATION RACKS	
SR3	Sensor3 Installation racks
SR+	Sensor+ Installation racks
SR	Sensor Installation racks
TOURING RACKS	
SP3	Sensor+ 24 module Touring Rack (48-20A dimmers)
SP+	Sensor+ 48 module Touring Rack (96-20A dimmers)
PORTABLE PACKS	
SP3	Sensor3 Portable Packs
SP+	Sensor+ Portable Packs

SPECIFICATIONS

GENERAL

- UL and cUL Listed for continuous duty at 100% of rated load
  - CC15 – 1.8kW
  - CC20 – 2.4kW
- Does not respond to control signals

PHYSICAL

- Modular plug-in assemblies
- Cast aluminum chassis, finished with textured epoxy paint
- Keyed to prevent insertion in inappropriately rated rack positions

CIRCUIT BREAKERS

- Fully magnetic to eliminate nuisance tripping
- 20x inrush current rating
- 125%, 10-120 seconds, must-trip rating
- Rated for 100% switching duty applications

RATINGS

- 100,000A Short Circuit Current Rating (SCCR)
- Replaceable fuse for short circuit protection and fault current coordination
- UL and cUL LISTED

EFFICIENCY

- Efficiency is >99%

PHYSICAL

Module Dimensions

MODEL	HEIGHT		WIDTH		DEPTH	
	inches	mm	inches	mm	inches	mm
CC15	1.5	38	11.8	300	4.9	127
CC20	1.5	38	11.8	300	4.9	127

Module Weights

MODEL	WEIGHT		SHIPPING WEIGHT	
	lbs	kgs	lbs	kgs
CC15	2.1	1.1	4.0	1.8
CC20	2.2	1.1	4.0	1.8

Maximum BTU Production per module

MODEL	BTUS	WATTS	EFFICIENCY
CC15/CC20	<10	<4	>99.0%

These values should be provided to a qualified HVAC design engineer, along with dimmer quantities, types and dimmer room dimensions, to calculate dimmer room air handling requirements.

Dimmer room HVAC systems must at all times maintain the specified ambient temperature **at the dimmer rack**. Dimming systems operating within 10°F of the upper or lower temperature limits must strictly follow installation and operation guidelines to operate reliably.

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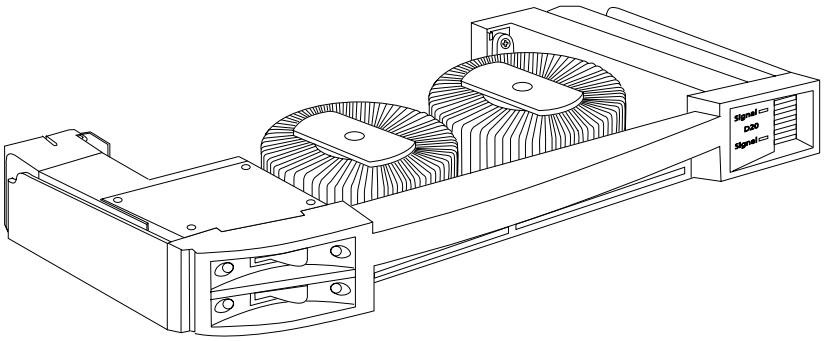
Web • www.etcconnect.com

ETC®

Standard Dimmer Module

Standard Series

100V 120V



GENERAL INFORMATION

The Standard Dimmer Module is designed for use in both Sensor®+ and Unison® Dimming Series modular rack enclosures. Standard Dimmer Modules provide cost-effective digital forward phase angle dimming for standard loads such as incandescent, low voltage, quartz, neon, cold-cathode and 2 and 4-wire fluorescent ballasts. The patented, high-density, dual modules feature modular installation and removal, fully magnetic circuit breakers and standard or enhanced risetime toroidal filters.

APPLICATIONS

- Incandescent lighting
- Low voltage lighting
- Quartz lighting
- Neon lighting
- Cold Cathode lighting
- 2-wire Fluorescent ballast
- 4-wire Fluorescent ballast

FEATURES

- Two 1.8 or 2.4kW dimmers per module
- Standard or Enhanced risetime toroidal filters
- High-density modular assembly
- Die-cast aluminum chassis
- Fully magnetic circuit breakers

GENERAL

- 100,000A Short Circuit Current Rating (SCCR)
- UL and cUL LISTED

ORDERING INFORMATION

100-120V Standard Dimmer Modules

MODEL	DESCRIPTION
D15	Dual 15A Dimmer Module, 350µS
D15E	Dual 15A Dimmer Module, 500µS
D20	Dual 20A Dimmer Module, 350µS
D20E	Dual 20A Dimmer Module, 500µS
AFM	Air Flow Module

Compatible Systems

MODEL	DESCRIPTION
INSTALLATION RACKS*	
SR3	Sensor3 Installation racks
SR+	Sensor+ Installation racks
SR	Sensor Installation racks
TOURING RACKS	
SP3	Sensor+ 24 module Touring Rack (48-20A dimmers)
SP+	Sensor+ 48 module Touring Rack (96-20A dimmers)
PORTABLE PACKS	
SP3	Sensor3 Portable Packs
SP+	Sensor+ Portable Packs

*Rack enclosures also available for 230CE and 240 Volt applications

Standard Dimmer Module

Standard Series

SPECIFICATIONS

GENERAL
- UL and cUL Listed for continuous duty at 100% of rated load
  - D15/D15E – 1.8kW
  - D20/D20E – 2.4kW

PHYSICAL
- Modular plug-in assemblies
- Cast aluminum chassis, finished with textured epoxy paint
- Keyed to prevent insertion in inappropriately rated rack positions

CIRCUIT BREAKERS
- Fully magnetic to eliminate nuisance tripping
- 20x inrush current rating
- 125%, 10-120 seconds, must-trip rating
- Rated for 100% switching duty applications

RATINGS
- 100,000A Short Circuit Current Rating Rating (SCCR)
- Modules withstand hot-patching of cold loads up to full rating
- UL and cUL LISTED

POWER DEVICE
- Sealed, patented assembly
- Field replaceable with screwdriver
- Two back-to-back SCRs per circuit
- One control LED per circuit
- Integral bonded heatsink
- Integral temperature sensor

FILTERING
- High quality toroidal filters
  - 350µS risetime - Standard 100-120V modules*
  - 500µS risetime - Enhanced 100-120V modules*

  *Risetime measured at full load, at worst case firing angle (90 degrees), from 10-90% of output wave form

DIMMER RANGE
- Incandescent, low voltage dimming range 100-0%
- Dimming range of 2 and 4-wire fluorescent ballast is dependent on lamp ballast combination. Contact ETC for range verification
- Sizing of Neon transformer used in dimming applications should be 1.5x greater than size used in non-dimming application

PHYSICAL

Module Dimensions

MODEL	HEIGHT		WIDTH		DEPTH	
	inches	mm	inches	mm	inches	mm
D15	1.5	38.	11.8	300	4.9	127
D15E	1.5	38	11.8	300	4.9	127
D20	1.5	38	11.8	300	4.9	127
D20E	1.5	38	11.8	300	4.9	127

Module Weights

MODEL	WEIGHT		SHIPPING WEIGHT	
	lbs	kgs	lbs	kgs
D15/D20	5.0	2.3	6.9	3.1
D15E/D20E	5.5	2.5	6.9	3.1

Maximum BTU Production per module

MODEL	BTUS	WATTS	EFFICIENCY
D15	380	112	96.9%
D15E	474	140	96.1%
D20	522	154	96.8%
D20E	810	238	95.0%

These values should be provided to a qualified HVAC design engineer, along with dimmer quantities, types and dimmer room dimensions, to calculate dimmer room air handling requirements.

Dimmer room HVAC systems must at all times maintain the specified ambient temperature **at the dimmer rack**. Dimming systems operating within 10°F of the upper or lower temperature limits must strictly follow installation and operation guidelines to operate reliably.

SCR Rating

MODULE	D15/D20
Single cycle peak surge current	625A
Half cycle peak surge current	1620A
Transient over voltage	600V

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Theater on stage miking
Houses of worship
Conference and lectern

- Supercardioid polar pattern rejects the pit orchestra and offers an impressive gain before feedback
- Phase coherent cardioid® design prevents coloration from surface sound reflections
- Finely crafted, rugged housing withstand the rigors of the stage
- Low profile to be inconspicuously placed on the stage-floor
- Industry standard stage-floor microphone

PCC-160

The Crown PCC®-160 (Phase Coherent Cardioid®) is a surface-mounted supercardioid microphone intended for professional applications on stage floors, lecterns, conference tables, and news desks—wherever improved gain-before-feedback and articulation are important.

Similar to the Pressure Zone Microphone® (PZM®), the PCC® is designed to be used on a relatively large boundary surface. Unlike the PZM®, the Phase Coherent Cardioid® uses a sub miniature supercardioid mic capsule. Its directional polar pattern improves gain-before-feedback, reduces unwanted room noise and rejects sounds from the rear. Surface-mounting creates a “half-supercardioid” polar pattern and increases directivity 3 dB. Since the microphone capsule is placed on a boundary, direct and reflected sounds arrive at the diaphragm in-phase. This coherent addition of direct and reflected waves increases sensitivity 6 dB and prevents phase cancellations. The mic capsule is small enough to ensure phase coherency up to the highest frequencies in the audible spectrum, resulting in a wide, smooth frequency response free of phase interference. Clarity and reach are also enhanced.

Self-contained electronics eliminate the need for an in-line preamp box. The PCC® -160 can be phantom powered directly from the console or other remote power source providing 12 to 48 V. If battery power is required, a battery supply unit can be inserted anywhere in the mic line right up to the console or mixer. A “bass tilt” switch allows the user to tailor the low-end response for particular applications. Thanks to its low profile and black finish, the microphone becomes almost invisible in use. A side-mounted connector complements the form factor of the PCC® -160, allowing the unit to be placed effectively at the stage edge, at the top of a lectern or in other tight spots. If desired, the cable can be hard-wired for bottom entry.

The heavy-gauge, all steel body protects the unit from accidental abuse. Permanent mounting is enabled by screw holes in the base. Engineering attention-to-detail has assured years of trouble-free use from this reliable microphone.

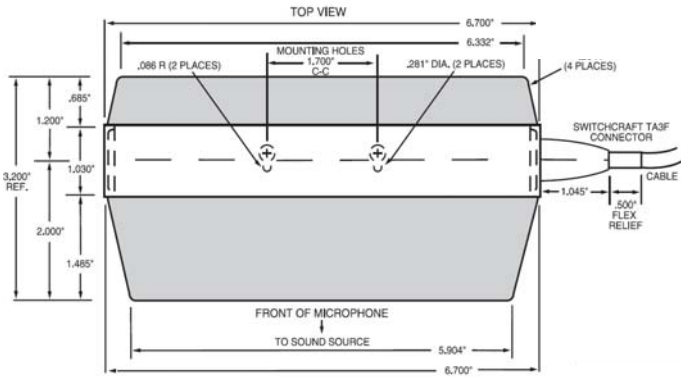
Capable of withstanding up to 120 dB SPL with-out distorting, the PCC® -160 will never overload in practical use. Its electret condenser capsule provides a wide, smooth frequency response from 50 Hz to 18 kHz. RFI suppression is included. Self-noise is low, and sensitivity is very high to override mixer noise in distant-miking applications. Output impedance is 150 ohms, balanced.

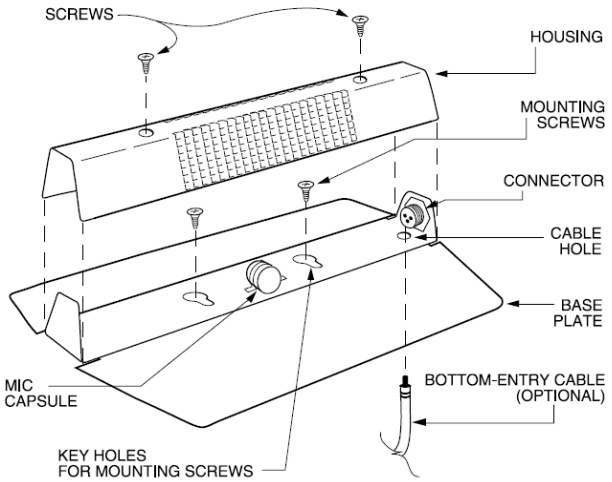
Operating Instructions

Unbalanced operation: If you are using a phantom power supply that does NOT include an isolation transformer, and you desire an unbalanced output, use pin 2 as hot and pin 1 as ground. This procedure prevents distortion in the PCC® circuit. Do not unbalance the output of the supply by connecting pin 3 to pin 1. If you are using a phantom supply containing an iso-lation transformer (such as the Crown PH-1A AC/Battery Supply), then you can unbalance the output by connecting pin 3 to pin 1 in the cable feeding the mixer. This results in 6 dB more sensitivity. The PCC® includes two keyhole slots in its base to accept mounting screws. Note: The porous foam liner in the housing must go toward the front of the microphone; the dense foam liner goes toward the rear. Otherwise the frequency response and polar pattern will be degraded.

Placement suggestions for the PCC® -160 are in the Crown® Boundary Microphone Applications Guide and Speech Sound Reinforcement Application Guide, available online at http://www.crownaudio. com/mic_web/mic-library.htm.

BASS TILT SWITCH: On the bottom of the micro-phone is a bass-tilt switch which allows the user to tailor the low-end response for particular applications. In general, use the FLAT position. Use the CUT position to reduce room rumble and air-handler noise. Use the BOOST position to compensate for low-frequency losses when the PCC® is placed on small boundaries such as lectern shelf-tops.





Architects' & Engineers' Specifications

The microphone shall be the PCC® -160 or equivalent.
The microphone shall be a half-supercardioid electret condenser type, utilizing a subminiature transducer of rugged construction. A smooth frequency response from 50 Hz to 18,000 Hz shall be obtained, with a uniform off-axis response, over 20 dB down at the rear nulls. The microphone will exhibit excellent off-axis response and gain-before-feedback.
The microphone shall employ the principle of phase coherency achieved by mounting a small-diameter element very near a boundary, thus eliminating comb filtering in the audible spectrum. A 15-foot (4.6-m), two-conductor shielded cable with TA3F and A3M connectors shall be supplied with the microphone. The microphone shall have a sensitivity of 22 mV/Pa. The microphone shall accept a 120 dB SPL input while providing no greater than 3 percent THD (open-circuit termination). Equivalent noise shall be 22 dBA typical.
The Crown Model PCC® -160 is specified.

Specifications:

Polar pattern:	supercardioid
Frequency range:	50 to 18,000 Hz
Impedance:	150 ohms
Sensitivity:	22mV/Pa (-30dBV)
Equivalent noise level:	22 dB-A
Maximum SPL:	120 dB
Cable:	4,6 m (15ft.)
Finish:	black
Net weight:	170 g (6 oz.)
Item number:	PCC-170 6000H50110

Fig. 1 Frequency Response

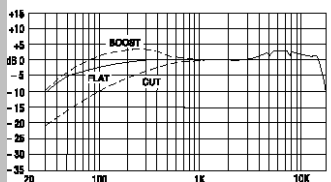
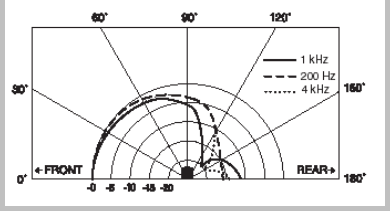


Fig. 2 Vertical Plane Polar Response



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ETC Unison Echo Inspire Control Stations

Echo Control Series

Type(s)

Project

Date

Notes

GENERAL INFORMATION

The control you need – right at your fingertips. These EchoConnect-powered stations are designed to initiate preset, zone, and space controls for your entire system. They communicate efficiently with dimmers, relays and power control panels to provide necessary control for any installation. You can choose your level of control with a variety of button and fader stations created with your solutions in mind.

APPLICATIONS

- Education
- Hospitality
- Healthcare facilities
- Office buildings
- Conference rooms
- Meeting rooms
- Retail

FEATURES

- EchoConnect: two-wire topology-free system gives you the freedom to easily place stations wherever they are needed
- Fastener-Free Faceplate System: no visible means of attachment
- Decorator style face plates available in one-, two-, three- and four-gang options
- Color condition: rear-illuminated buttons that indicate system status using blue for active and amber or off for inactive
- Simple user-legend system supports use of a variety of standard nomenclature, or user-supplied inserts
- Multi Space Preset functionality

REGULATORY AND COMPLIANCE

- cULus Listed
- CE Certified

ORDERING INFORMATION

Product

MODEL	DESCRIPTION
E1001-_	Inspire 1-Button Control Station
E1002-_	Inspire 2-Button Control Station
E1004-_	Inspire 4-Button Control Station
E1006-_	Inspire 6-Button Control Station
E1008-_	Inspire 8-Button Control Station
E1104-_	Inspire 4-Button with Fader Control Station

Enter station color code in __ space provided:

1 = Cream (RAL 9001), 3 = Gray (RAL 7001), 4 = Black (RAL 9004), 5 = Signal White (RAL 9003)

Stations flush-mount (F) in industry-standard gang boxes. (By others)

Additional Faceplates

MODEL	DESCRIPTION
1IFP-_	Inspire 1-gang faceplate
2IFP-_	Inspire 2-gang faceplate
3IFP-_	Inspire 3-gang faceplate
4IFP-_	Inspire 4-gang faceplate

Enter station color code in __ space provided:

1 = Cream (RAL 9001), 3 = Gray (RAL 7001), 4 = Black (RAL 9004), 5 = Signal White (RAL 9003)

Stations ship with 1-gang faceplate. Additional faceplates can be ordered separately.

Echo Power Requirements

EchoConnect:	One unit of control power
Auxiliary Power:	Not required

SPECIFICATIONS

FUNCTIONAL

- Button and fader functions include: preset activation/ deactivation, record, raise, lower, zone on/off control and room combine
- Blue button illumination for active status
- Amber or no button illumination for inactive status
- Fader halo-illumination displays actual output level
- Zone or preset control from any station with real-time user toggle

MECHANICAL

- Standard configurations with 1, 2, 4, 6 and 8 buttons or 4 buttons and rotary fader
- Gangable for custom applications
- Enclosed electronics assembly and faceplate included
- Cantilevered switch arrays with removable button caps
- No visible means of attachment
- Flush-mount in industry standard backbox, RACO 690 or equivalent
- Surface-mount backboxes available from ETC upon request
- Constructed of injection-molded, ABS plastic in three RAL standard colors Cream (RAL 9001), Black (RAL 9004), and White (RAL 9003)
- User configurable legends on each button, or use standard legends that come with each station. Field configurable without the use of tools
- Integral LED response indicator for each button with indication of active(blue) and inactive(amber or off) state

ELECTRICAL

- Connect via the EchoConnect control network via low-voltage Class 2 wiring
- Topology-free wiring over Belden 8471 or equivalent and one #14 ESD drain wire
- Supports optional use of Belden 1583A or equivalent Ethernet control wire when used with Cat5 termination accessories
- Wiring may be bus, loop, homerun or any combination of these
- Supports up to 500 m (1,640 ft) of control wiring
  - Up to 1000 ft using CAT5
- All station terminations utilize removable connectors

THERMAL

- Ambient room temperature: 0°–50° C (32°–122° F)
- Ambient humidity: 5–95% non-condensing

FUNCTIONALITY

BASIC MODE FUNCTIONALITY

- Preset Mode:
  - Button 1-8 Push: Toggle Preset 1-8 (Default) or Off
  - Button 1-8 Hold: Space Raise
  - Button 1-8 Double Tap: Quick Toggle Preset 1-8 (Default)
- Zone Mode
  - One Button: Zone 1 Toggle
  - Two Button: Zone 1 Raise, Zone 1 Lower
  - Four Button: Select Zone 1 / 2, Selection Raise/Lower
  - Six Button: Select Zone 1 / 2 / 3 / 4, Selection Raise/Lower
  - Eight Button: Select Zone 1 / 2 / 3 / 4 / 5 / 6, Selection Raise/Lower
  - Four Button-Fader: Select Zone 1 / 2 / 3 / 4, Selection Raise/Lower

CUSTOM MODE FUNCTIONALITY

(Requires Programing With EchoAccess Mobile App and additional connection hardware)

- Button Push
  - Preset Toggle*, Preset Activate*
  - Zone Toggle, Zone Lower, Zone Raise, Zone Set to Level, Zone Set to Color, Zone Set to Color Temp
  - Space Off*, Space Toggle, Space Lower, Space Raise, Space Set to Level
  - Space Combine Toggle, Space Combine, Space Uncombine
  - Space Set to Color, Space Set to Color Temp
  - Sequence Toggle
  - Timeclock Hold Toggle, Timeclock Hold Enable Timeclock Hold Disable
- Button Hold
  - Zone Lower
  - Zone Raise
  - Space Lower
  - Space Raise
- Button Double Tap
  - Preset Toggle*, Preset Activate*
  - Zone Toggle, Zone Set to Level, Zone Set to Color, Zone Set to Color Temp
  - Space Off, Space Toggle, Space Set to Level, Space Set to Color, Space Set to Color Temp
  - Timeclock Hold Toggle, Timeclock Hold Enable, Timeclock Hold Disable
- Fader Push
  - Preset Toggle*, Preset Activate*
  - Zone Toggle, Zone Set to Level, Zone Set to Color, Zone Set to Color Temp
  - Space Off,* Space Toggle, Space Set to Level Space to Color
  - Selection to Level, Selection Toggle
  - HSI Color Mode, Color Temp Mode, Studio Mode
- Fader Double Tap
  - Preset Toggle*, Preset Activate*
  - Zone Toggle, Zone Set to Level, Zone Set to Color Zone Set to Color Temp
  - Space Off*, Space Toggle, Space Set to Level, Space to Color
  - Selection to Level, Selection Toggle
- Fader Rotate
  - Zone Raise / Lower,
  - Space Raise / Lower
  - Selection Raise / Lower
  - Color Zone Hue Raise / Lower,
  - Color Zone Sat. Raise / Lower
  - Zone Color Temp Raise / Lower
  - Zone Tint Raise / Lower
  - Selection Hue Raise / Lower
  - Selection Sat. Raise / Lower
  - Selection Tint Raise / Lower
  - Selection Color Temp Raise / Lower

*Multi Space capable - allowing for presets to be recalled in multiple spaces from a single control

ECHO FAMILY OF PRODUCTS

EchoConnect Power Supplies

MODEL	DESCRIPTION
E-SPS	6 U Room Station Power Supply, Knockout Mount
E-SPS-DIN	16 U DIN rail Station Power Supply with 24 V Aux
E-SPM-A	16 U DRd Station Power Module with 24 V Aux
E-APS	24 V Aux Power Supply, Knockout Mount

EchoTouch

MODEL	DESCRIPTION
ETS	EchoTouch Controller Mk2

Echo Stations

MODEL	DESCRIPTION
E1001	Inspire One Button Station
E1002	Inspire Two Button Station
E1004	Inspire Four Button Station
E1006	Inspire Six Button Station
E1008	Inspire Eight Button Station
E1104	Inspire Four Button with Fader Station
EPS05	Echo Preset Station - 5 Button
EPS10	Echo Preset Station - 10 Button
EPSKS	Echo Keyswitch Station
E-ATC	Echo TimeClock

Echo Responsive Controls

MODEL	DESCRIPTION
ELS	Light Sensor
EOCC	Ceiling-Mount PIR Occupancy Sensor
EVAC	Ceiling-Mount PIR Vacancy Sensor
E-DOC-C	Ceiling-Mount Dual Tech Occupancy Sensor
E-DVAC-C	Ceiling-Mount Dual Tech Vacancy Sensor
E-DOC-W	Wall-Mount Dual Tech Occupancy Sensor
E-DVAC-W	Wall-Mount Dual Tech Vacancy Sensor
E-DOC-SM1	Switch-Mount Dual Tech Sensor - One Button
E-DOC-SM2	Switch-Mount Dual Tech Sensor - Two Button

Echo Interfaces

MODEL	DESCRIPTION
EACC	EchoAccess Interface
EEB	Echo Expansion Bridge
EDMXC	Echo DMX Scene Controller
EEI	Echo-Echoflex Interface
ECII	Echo Contact Input Interface
ECOI	Echo Contact Output Interface
EDRI	Echo Demand Response Interface
EBI	Echo BACnet Interface
EII	Echo Integration Interface

Zone Controllers

MODEL	DESCRIPTION
ERC-G2	One Zone Relay Controller
EDRC-G2	Two Zone Relay Controller
ELD-G2	One Zone 0–10 V Controller
EDLD-G2	Two Zone 0–10 V Controller
ESSC-G2	One Zone SmartSpace Controller
EDSSC-G2	Two Zone SmartSpace Controller
ELVD-G2	600-Watt Phase Adaptive Dimmer (120 V)
ELVD-277-G2	600-Watt Phase Adaptive Dimmer (277 V)
ELVD-G2-MLV	600-Watt Forward Phase Dimmer (120 V)
ELVD-277-G2-MLV	600-Watt Forward Phase Dimmer (277 V)

Room Controllers

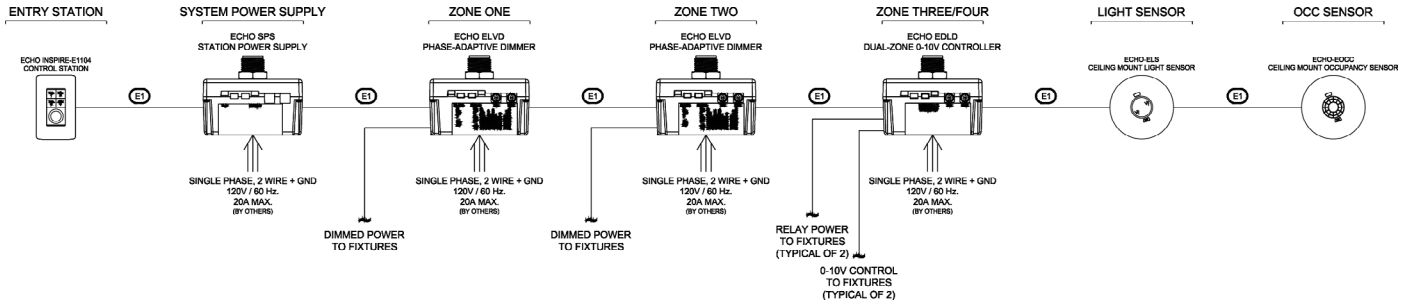
MODEL	DESCRIPTION
ERMC4-G2	Four Zone Room Controller
ERMCT4-G2	Four Zone Room Controller with TimeClock
ERMC8-G2	Eight Zone Room Controller
ERMCT8-G2	Eight Zone Room Controller with TimeClock

Panel Products

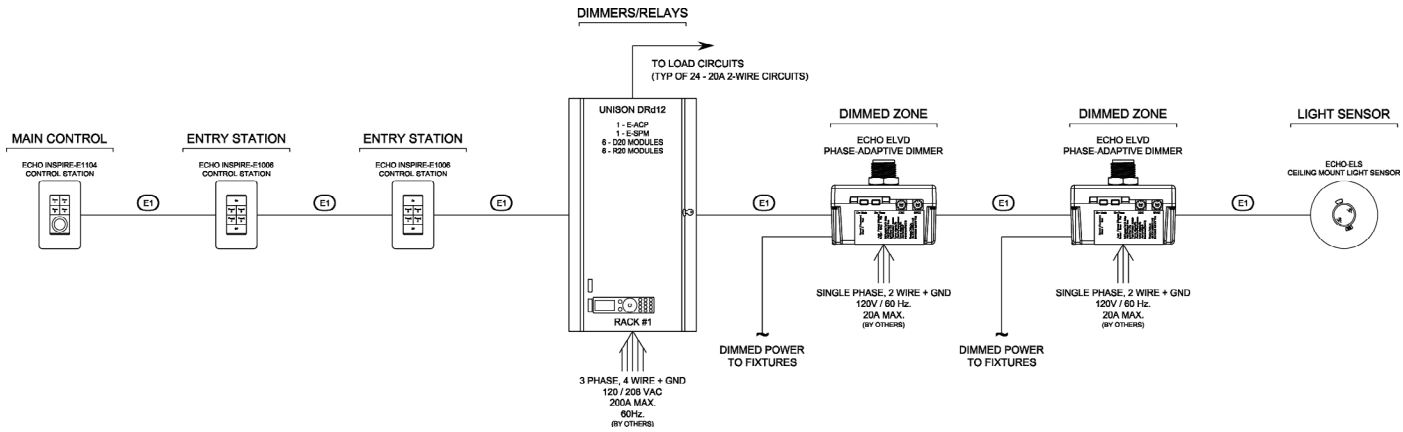
MODEL	DESCRIPTION
ERP	Echo Relay Panel Mains Feed
ERPA	Echo Relay Panel Mains Feed 277 V
ERP-FT	Echo Relay Panel Feedthrough
IQ	Sensor IQ Intelligent Breaker System
SR3	Sensor3 Power Control System
DRd	Unison DRd with Echo Control

SAMPLE ECHO SYSTEMS

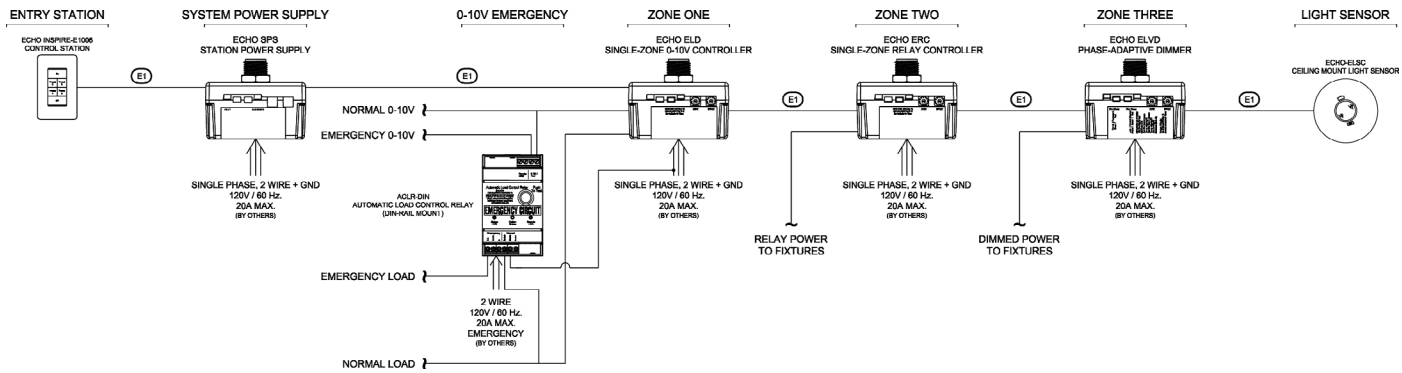
SMALL SYSTEM



MEDIUM SYSTEM

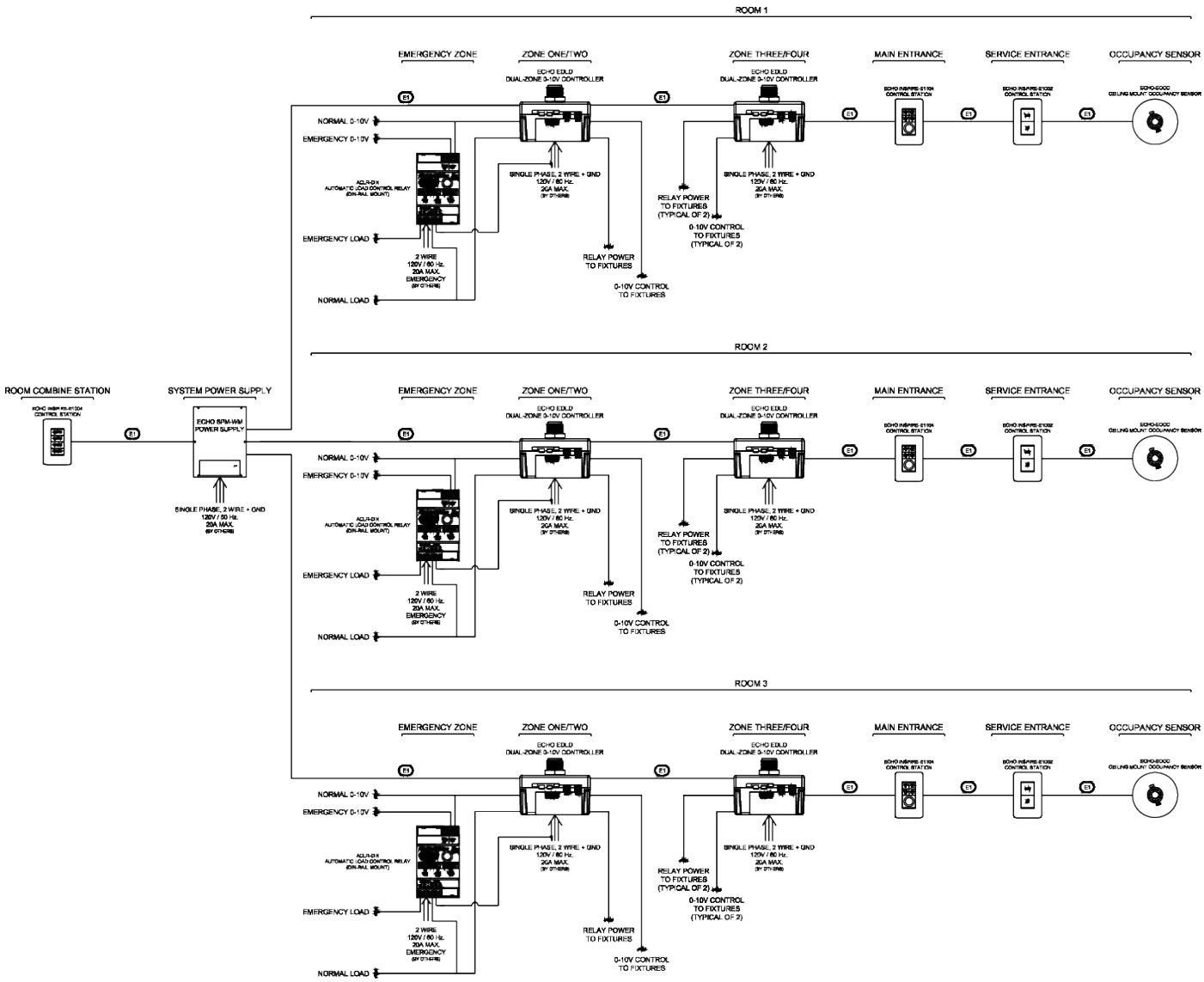


CONFERENCE ROOM



SAMPLE ECHO SYSTEMS

MEDIUM BALLROOM



Unison Echo Inspire Control Stations*

Echo Control Series

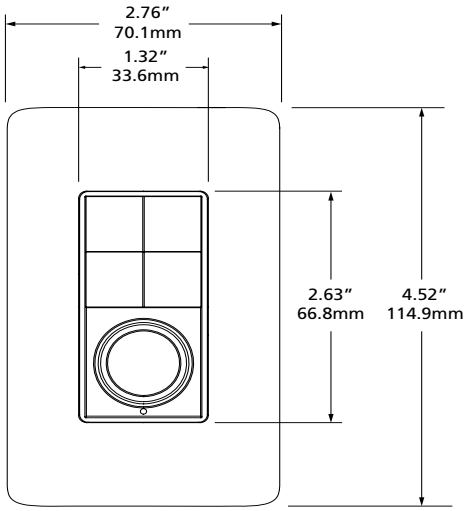
PHYSICAL

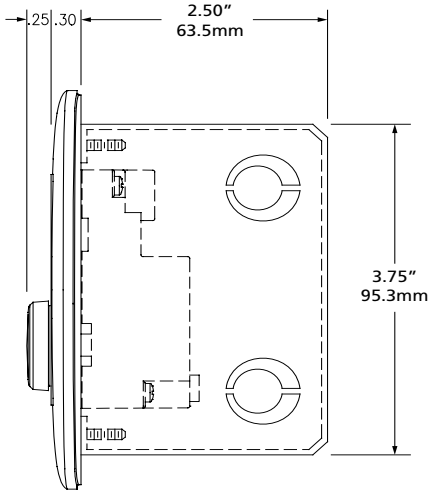
Product Dimensions

MODEL	HEIGHT		WIDTH		DEPTH	
	in	mm	in	mm	in	mm
E100X	4.52	115	2.76	71	0.30	8
E1104	4.52	115	2.76	71	0.55	14

Product Weights

MODEL	WEIGHT		SHIPPING WEIGHT	
	oz	g	oz	g
E100X	3.68	105	7.49	213
E1104	3.75	107	7.54	214





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etcconnect.com

XTi 2 Series

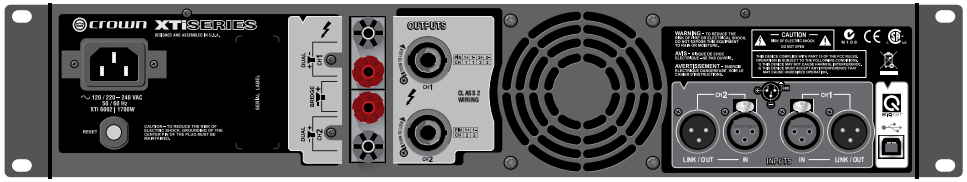
Features

There's no debate – when you choose Crown's XTi 2 Series, you're choosing one of the most powerful and innovative amplifiers on the market today. That's because the XTi 2 Series amps continue to set the standard for unmatched performance and value, delivering the goods night after night without breaking a sweat.

- Peakx Plus™ Limiters provide the ultimate in system performance and protection by allowing full control over threshold, attack, and release
- Enhanced Subharmonic Synth section provides user control over frequency, gain and filter type for system-specific tuning
- 3 user-defined fan mode controls—normal, early and fullspeed—for matching fan performance to a specific application
- New system monitoring provides software visibility of AC line voltage and power supply temperature
- Remotely manage and configure using HiQnet Band Manager™ or Audio Architect™ control software

XTi 2 Series

XTi 1002, 2002, 4002



XTi 6002

Power Matrix

Model	Channels	2Ω Dual	4Ω Dual	8Ω Dual	4Ω Bridged	8Ω Bridged
1002	2	700W	500W	275W	1400W	1000W
2002	2	1000W	800W	475W	2000W	1600W
4002	2	1600W	1200W	650W	3200W	2400W
6002	2	3000W	2100W	1200W	6000W	4200W

*1kHz, 20mS burst, both channels driven

Amplifier Performance Specifications	XTi 1002	XTi 2002	XTi 4002	XTi 6002
Sensitivity (for full rated power at 4Ω)	1.4V			
Rated Power Output (per Channel at 4Ω)	500W Stereo	800W Stereo	1200W Stereo	2100W Stereo
Signal to Noise Ratio (below rated 1kHz power at 8Ω)	100 dB (A Weighted)	100 dB (A Weighted)	100 dB (A Weighted)	103 dB (A Weighted)
Total Harmonic Distortion	<0.5%			
Damping Factor 20 Hz to 1kHz	>500			
Frequency Response (at 1W, 20 Hz to 20 kHz)	+0 dB, -1 dB			
Crosstalk (below rated power) 20 Hz to 1kHz	>70 dB			
Input Impedance	20kΩ balanced, 10kΩ unbalanced			

Physical Specifications				
Width	19 in. (48.3cm)			
Height	3.5 in. (8.9cm)			
Depth	12.25 in. (31.1cm)	12.25 in. (31.1cm)	12.25 in. (31.1cm)	16.2 in. (41.1cm)
Net Weight	18.5 lbs (8.4kg)	18.5 lbs (8.4kg)	18.5 lbs (8.4kg)	24 lbs (10.9kg)
Shipping Weight	21.5 lbs (9.75kg)	21.5 lbs (9.75kg)	21.5 lbs (9.75kg)	30 lbs (13.6kg)

DriveRack® PA2

Owner's Manual

Warranty

1. Please register your product online at dbxpro.com. Proof-of-purchase is considered to be the responsibility of the consumer. A copy of the original purchase receipt must be provided for any warranty service.

2. dbx warrants this product, when purchased new from an authorized U.S. dbx dealer and used solely within the U.S., to be free from defects in materials and workmanship under normal use and service. This warranty is valid to the original purchaser only and is non-transferable.

3. dbx liability under this warranty is limited to repairing or, at our discretion, replacing defective materials that show evidence of defect, provided the product is returned to dbx WITH RETURN AUTHORIZATION from the factory, where all parts and labor will be covered up to a period of two years. A Return Authorization Number must first be obtained from dbx. The company shall not be liable for any consequential damage as a result of the product's use in any circuit or assembly.

4. dbx reserves the right to make changes in design or make additions to or improvements upon this product without incurring any obligation to install the same additions or improvements on products previously manufactured.

5. The foregoing is in lieu of all other warranties, expressed or implied, and dbx neither assumes nor authorizes any person to assume on its behalf any obligation or liability in connection with the sale of this product. In no event shall dbx or its dealers be liable for special or consequential damages or from any delay in the performance of this warranty due to causes beyond their control.

Technical Support & Service

If you require technical support, contact dbx Technical Support. Be prepared to accurately describe the problem. Know the serial number of your device – this is printed on a sticker attached to the chassis.

Before you return a product to the factory for service, we recommend you refer to this manual. Make sure you have correctly followed installation steps and operating procedures. For further technical assistance or service, please contact our Technical Support Department at (801) 566-8800 or visit dbxpro.com. If you need to return a product to the factory for service, you MUST first contact our Technical Support Department to obtain a Return Authorization Number.

NO RETURNED PRODUCTS WILL BE ACCEPTED AT THE FACTORY WITHOUT A RETURN AUTHORIZATION NUMBER.

Please refer to the Warranty information, which extends to the first end-user. After expiration of the warranty, a reasonable charge will be made for parts, labor, and packing if you choose to use the factory service facility. In all cases, you are responsible for transportation charges to the factory. If the product is still under warranty, dbx will pay the return shipping.

Use the original packing material if it is available. Mark the package with the name of the shipper and with these words in red: DELICATE INSTRUMENT, FRAGILE! Insure the package properly. Ship prepaid, not collect. Do not ship parcel post.

Table of Contents

Overview

Introduction

The DriveRack® PA2 represents the next generation of PA loudspeaker management processing from dbx®. With dynamics, EQ, feedback suppression, crossover, subharmonic synthesis, and delay processing, the DriveRack PA2 provides all the processing you need between your mixer and amplifiers to optimize and protect your loudspeakers.

Building upon the same great features that made the DriveRack PX, PA, and PA+ so popular, the DriveRack PA2 adds the latest advancements in dbx's proprietary AutoEQ™ and AFS™ (Advanced Feedback Suppression) algorithms, a new input delay module for delaying the sound system to the backline, Ethernet control via an iOS®, Android™, Mac®, or Windows® device, and much, much more!

The updated Wizards in the PA2 are more intuitive and powerful than ever and offer step-by-step assistance with setup configuration, loudspeaker optimization, and system feedback elimination. The updated AutoEQ™ uses frequency sweeps rather than pink noise and allows you to take up to four measurements for analysis, providing an extremely accurate, timely, and non-intrusive automatic EQ experience. And the enhanced AFS algorithm is now even faster and more accurate at eliminating feedback, without adversely affecting your system's tone.

The most exciting new feature of the DriveRack PA2 is the network and Wi-Fi control capabilities using the free DriveRack PA2 control application available for iOS, Android, Mac, and Windows compatible devices. Now you can configure and adjust the settings of your loudspeaker management processor from anywhere in the venue!

You say your speaker or amplifier tunings aren't available in the DriveRack PA2's default tuning list? No problem. Use the DriveRack PA2 control app to connect to the online database, where you can instantly download and apply the latest available tunings from JBL®, Crown®, dbx, and more – no firmware update necessary!

With supported crossover configurations for full range, 2-way, and 3-way systems, enhanced algorithms and functionality, and a stylish new design, the DriveRack PA2 was engineered to continue the DriveRack legacy of great-sounding and affordable loudspeaker management processing.

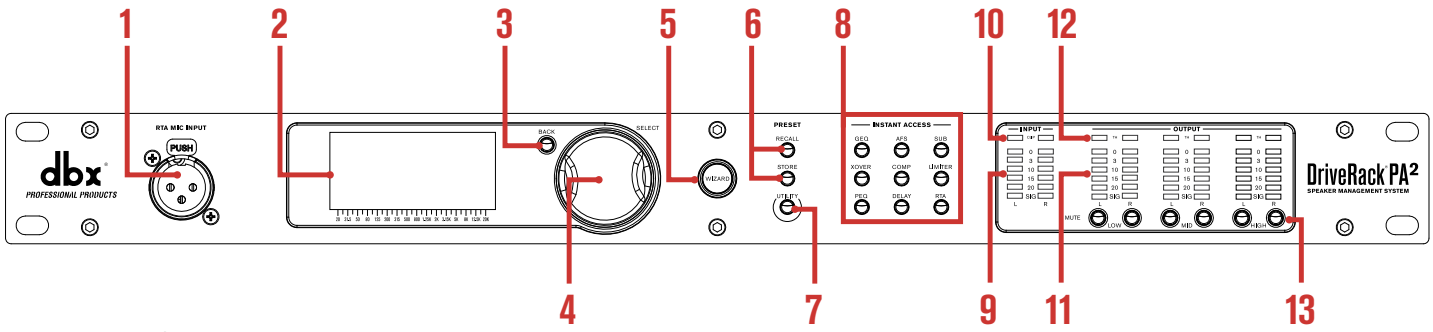
Thanks for choosing dbx.

Features

- 24-Bit A/D & D/A Converters
- 48 kHz/32-Bit Floating Point Processing
- dbx Type IV™ Conversion
- Setup Wizard For Easy System Configuration
- Level Assist For System Level Balancing
- AutoEQ™ For Fast & Accurate Room Equalization Using 8-Band Parametric EQ
- AFS™ For Ringing Out The System & On-The-Fly Feedback Suppression
- 31-Band Graphic EQ For Tailoring The System's Frequency Response To Taste
- Subharmonic Synthesizer
- dbx® Compression
- Pre-Crossover Delay For Aligning The Sound System To The Stage Backline
- Crossover With Support For Full Range, 2-Way, & 3-Way Configurations
- Stereo 8-Band Output Parametric EQs For Speaker Tunings
- Stereo PeakPlus™ Output Limiters
- Stereo Output Driver Alignment Delays For 2-Way & 3-Way Systems
- Real-Time Analyzer
- White/Pink Noise Generator
- 2 XLR Inputs
- 6 XLR Outputs
- Front-Panel XLR RTA Mic Input With 15V Phantom Power
- Support For Mono Or Stereo Inputs
- Support For Mono Or Stereo Subwoofers
- Bright, 6-Segment Input & Output Meters
- Front-Panel Output Mute Buttons
- Security Lockout
- Easy-To-Read LCD Display
- Storage Memory Locations For Up To 75 User Presets
- Various Speaker & Amplifier Tunings Included
- Network Control Via The Free DriveRack PA2 Control Application For iOS®, Android™, Mac®, & Windows® Compatible Devices

User Interface & Connectors

Front Panel



1. **RTA MIC INPUT**
   Connect the dbx RTA-M measurement microphone (sold separately) to this balanced XLR input jack for easy calibration of your sound system using the built-in Wizards or for use with the RTA. This jack supplies +15V phantom power.

2. **LCD Display**
   This LED-backlit LCD display provides the visual feedback required for operating the PA2 processor from the front panel.

3. **BACK Button**
   Pressing this button will navigate back one level in the current menu tree. Pressing this button multiple times will navigate back to the home screen.

4. **DATA Wheel (SELECT)**
   This data wheel is used for scrolling and loading presets, scrolling menus, selecting on-screen options and parameters, and editing selected on-screen options and parameters. Some functions are performed by turning the data wheel and others are performed by pressing the data wheel.

5. **WIZARD Button**
   Pressing this button enters the Wizard menu, where you can select a specific Wizard to run or run all Wizards in succession. For more information on the different Wizards, see ***'Using The Wizards' on page 14***.

6. **PRESET Buttons**
   The STORE and RECALL buttons are used to store and recall presets. For more information on storing, copying, and recalling presets, see ***'Managing Presets' on page 25***.

7. **UTILITY Button**
   Pressing this button enters the Utility menu, where you can get information about the PA2's firmware and network settings and configure global system settings which dictate how the PA2 operates. See ***'Utility' on page 46*** for information on the options and parameters available in the Utility menu.

8. **INSTANT ACCESS Buttons**
   Pressing each of these buttons opens the menu for the corresponding processing module, where you can edit the parameters pertaining to each processing module. Pressing the RTA button enters the Real-Time Analyzer, where you can monitor the system's signal using the optional dbx RTA-M microphone for fine-tuning and troubleshooting the system.

9. INPUT Meters

These 6-segment LED meters display the input signal level strength and available headroom, and range from SIG (signal present) to 0 (dBFS). These meters monitor the signal level right after the A/D converter and will light when the signal level is greater than or equal to the values shown in the table to the right.

Input LEDs	dBFS	(switch set to +4 dBu)	(switch set to -10 dBV)
0	-0.1	19.9 dBu	7.7 dBV
3	-3	17 dBu	4.8 dBV
10	-10	10 dBu	-2.2 dBV
15	-15	5 dBu	-7.2 dBV
20	-20	0 dBu	-12.2 dBV
SIG	-48	-28 dBu	-40.2 dBV

10. CLIP LEDs

When these LEDs light, it indicates that the PA2's inputs are being overdriven and input clipping is occurring. These LEDs feature a peak hold function, so they will remain lit for a short period of time after the signal level drops back below the clip point. The dbx Type IV™ conversion system built into the PA2 will clamp down on excessively loud input signals and prevent the A/D converters from clipping. If you're lighting these LEDs, you will need to reduce the output level of your mixer. If you have the +4dBu/-10dBV switch on the back panel of the PA2 set to the -10dBV position, but you're sending a +4dBu signal to the PA2's inputs, this may cause these LEDs to light prematurely. If this occurs, set this switch to the +4dBu position (it is recommended that you mute the PA2's outputs before doing so).

11. OUTPUT Meters

These 6-segment LED meters display the output signal level strength and available headroom, and range from SIG (signal present) to 0 (dBFS). These meters monitor the signal level after the limiter modules and output MUTE buttons and will light when the signal level is greater than or equal to the values shown in the table to the right.

Output LEDs	dBFS	dBu
0	-0.1	19.9
3	-3	17
10	-10	10
15	-15	5
20	-20	0
SIG	-48	-28

12. TH (THRESHOLD) Indicators

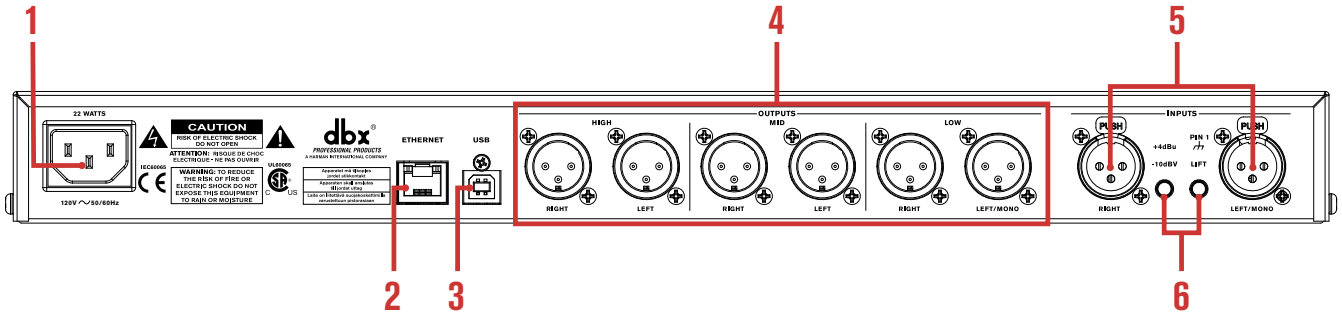
These multi-colored threshold LEDs indicate output limiter activity within the specified output channels. The three colored states are:

- **Green**
  The signal level is under threshold and no limiting is occurring.
- **Yellow**
  The signal level has approached the threshold and some minor limiting is occurring. This state is only active when the limiter's OverEasy™ setting is turned on.
- **Red**
  The signal level has exceeded the limiter's threshold and limiting is occurring.

13. MUTE Buttons

Pressing each of these buttons will mute the corresponding output channel. When activated, the signal will be muted prior to the output meter. The state of these outputs are global and are not stored to presets. However, the state of these buttons will be retained after a power cycle. The MUTES POWERUP function, available in the Utility menu, lets you configure the PA2 to always power on with all outputs muted. See ***'Utility' on page 46*** for more information on this feature. You can also press and hold any of these MUTE buttons upon power up to force the PA2 to initialize with all outputs muted. See ***'Initialize With Mutes On' on page 47*** for more information on this feature.

Rear Panel



1. **IEC AC Power Inlet**
   Connect the included IEC power cord to this power inlet. The DriveRack PA2 ships from the factory configured for one of two specified power voltage ranges, they are:

   - 100-120V, 50Hz/60Hz
   - 220-240V, 50Hz/60Hz

   NOTE: Ensure the screening under this outlet matches the voltage specification in your country before applying power to the PA2.

2. **Ethernet Port**
   This RJ45 connector is used for updating the firmware and controlling the PA2 from a networked device using the free DriveRack PA2 control app. See ***'Network Connections' on page 9***, ***'Networking' on page 57***, and ***'Firmware Updates' on page 59*** for more information on using this port.

   NOTE: A DHCP enabled switch or Wi-Fi router is required to assign an IP address to the PA2 for network control.

3. **USB Port**
   This USB connector is used for updating the PA2's firmware. See ***'Firmware Updates' on page 59*** for more information.

4. **Outputs 1–6**
   These six electronically balanced XLR outputs correspond to the low, mid, and high output processing chains. Note that crossover frequencies can be extended to overlap each other in the crossover processing module, allowing for more flexible crossover configuration, such as configuring multiple outputs for full range operation.

5. **Inputs 1–2**
   Connect your mixer outputs to these electronically balanced XLR input connectors. These inputs can be configured for stereo or mono applications in the Wizard. The input sensitivity of these jacks are affected by the +4dBu/-10dBV switch.

6. Input Switches

These switches are recessed to prevent accidental switching. You may need to use the tip of your fingernail or an object with a pointy tip, such as a pen, to activate these switches.

- **+4dBu/-10dBv Switch**
  This switch sets the PA2's input sensitivity. Select the +4dBu option (switch out) when connecting a mixer or device which has a nominal output operating level of around +4dBu. Select the -10dBV option (switch in) when connecting a mixer or device which operates at a lower "consumer" level, such as some DJ mixers or a consumer device with unbalanced output connectors (such as RCA connectors). If you're not sure what the nominal output operating level of your mixer is, check the product's manual or contact the manufacturer. It's advised that you reduce your mixer's output level and power off your amplifiers or mute the PA2's outputs before changing the position of this switch.
- **Ground Lift Switch**
  The ground lift switch lifts the pin 1 chassis ground on both input XLR connectors. In most applications, this switch should be left in the out (disabled) position. If hum becomes an issue and is caused from a ground loop between your mixer and PA2, try engaging this switch. It's advised that you power off your amplifiers or mute the PA2's outputs before changing the position of this switch.

Installing The DriveRack PA2

Installation Recommendations

FOR RACK MOUNT USE ONLY. Install the PA2 in your 19" rack with the provided rack screws. When installed in a rack, make sure there is proper ventilation. The sides and back of the device should be free of any obstruction that would prevent airflow. The PA2 should not be mounted above or below anything that generates excessive heat. Ambient temperatures should not exceed 95° F (35° C) when equipment is in use. Although the unit is shielded against radio frequency and electromagnetic interference, extremely high fields of RF and EMI should be avoided where possible.

Making Connections

Audio Connections

1. Ensure the power is turned off on all interconnecting equipment and the PA2 before making audio connections.
2. See ***'Application Guide' on page 50*** for application notes and system diagrams which can be used for reference when connecting the PA2 to your system. See ***'Cable Diagrams' on page 61*** for information on cabling.
3. Connect the outputs of your mixing console to the inputs of the PA2.

> ***NOTE:*** The +4dBu/-10dBV switch on the back panel of the PA2 must be set to the correct position for your application in order to avoid performance issues. +4dBu is referred to as "pro level" and will be the correct setting for most applications, as most pro and semi-pro mixers will output a nominal level of around +4dBu. -10dBV is referred to as "consumer level" and will need to be used when connecting a source which has an output level approximately 12 dB lower than pro level equipment.

4. Connect the PA2's outputs to the designated amplifier or powered speaker inputs.
5. If you plan to calibrate the system using the built-in Wizards, connect the optional dbx RTA-M measurement microphone using a microphone cable of suitable length and place it in a microphone stand.

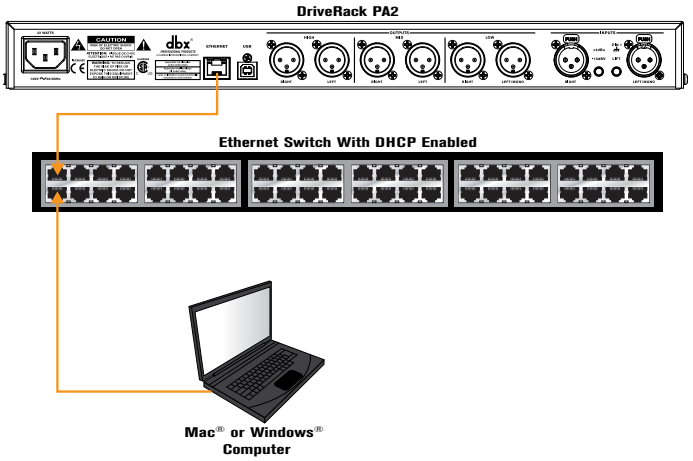
Network Connections

1. Download and install the free DriveRack PA2 control app on the iTunes Store®, Google Play™, or from www.dbxpro.com.
2. Connect a straight-through CAT5, CAT5e, or CAT6 Ethernet cable (sold separately) to the Ethernet port on the DriveRack PA2.
3. Connect the other end of the Ethernet cable to one of the LAN ports on a DHCP-enabled network router or switch.
4. For a wired connection, connect your computer's Ethernet port to one of the other LAN ports on the router or switch using a straight-through CAT5, CAT5e, or CAT6 cable.
5. Make sure the network switch or router is powered on and fully booted then power on the DriveRack PA2. See ***'Applying Power' on page 10*** for further information on properly powering on the PA2. If the PA2 is already powered on, power down your amplifiers or powered speakers then power cycle the PA2. The PA2 must be powered on after the switch/router in order to be assigned an IP address.
6. To verify the PA2 has been assigned an IP address, press the **UTILITY** button then select the SYSTEM INFO option or press the **DATA** wheel from the home screen to view the System Info home screen.
7. If using a Wi-Fi router, connect to the Wi-Fi network using your Wi-Fi equipped computer or device.

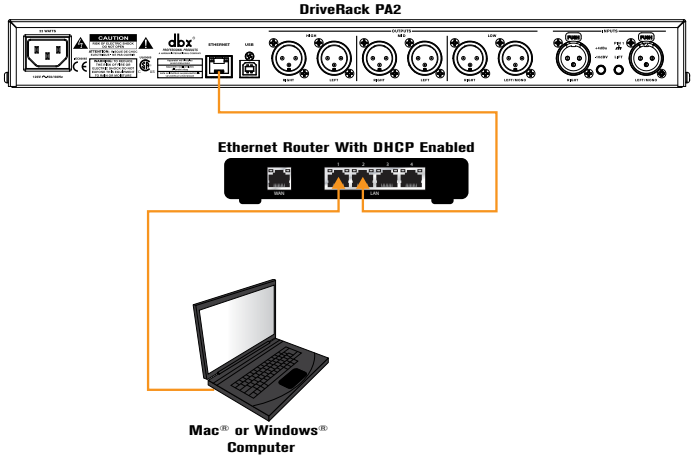
NOTE: A DHCP (Dynamic Host Configuration Protocol)-enabled switch or router must be used to assign an IP address to the DriveRack PA2. See ***'Networking' on page 57*** for more information on networking or if you're having difficulty connecting to the PA2 over the network.

NOTE: Crossover Ethernet cables can also be used for Ethernet connections as long as the switch or router is capable of auto-sensing the type of Ethernet cable connected and reconfiguring itself accordingly (referred to as auto-MDI/MDIX sensing). See ***'Cable Diagrams' on page 61*** for more information on the difference between straight-through and crossover Ethernet cable types.

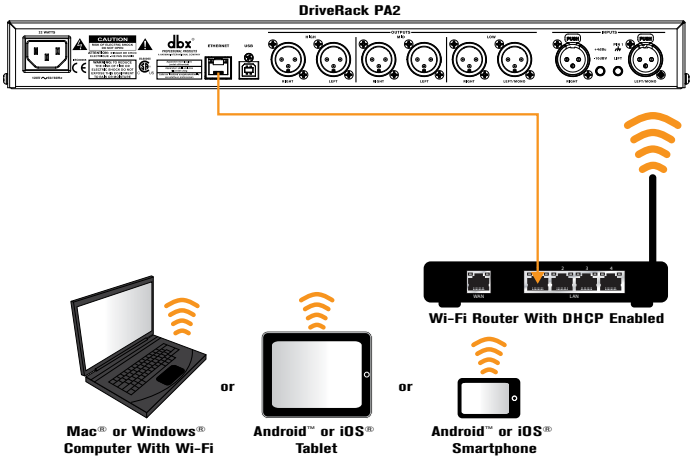
Wired Ethernet Switch



Wired Ethernet Router



Wi-Fi Router



Applying Power

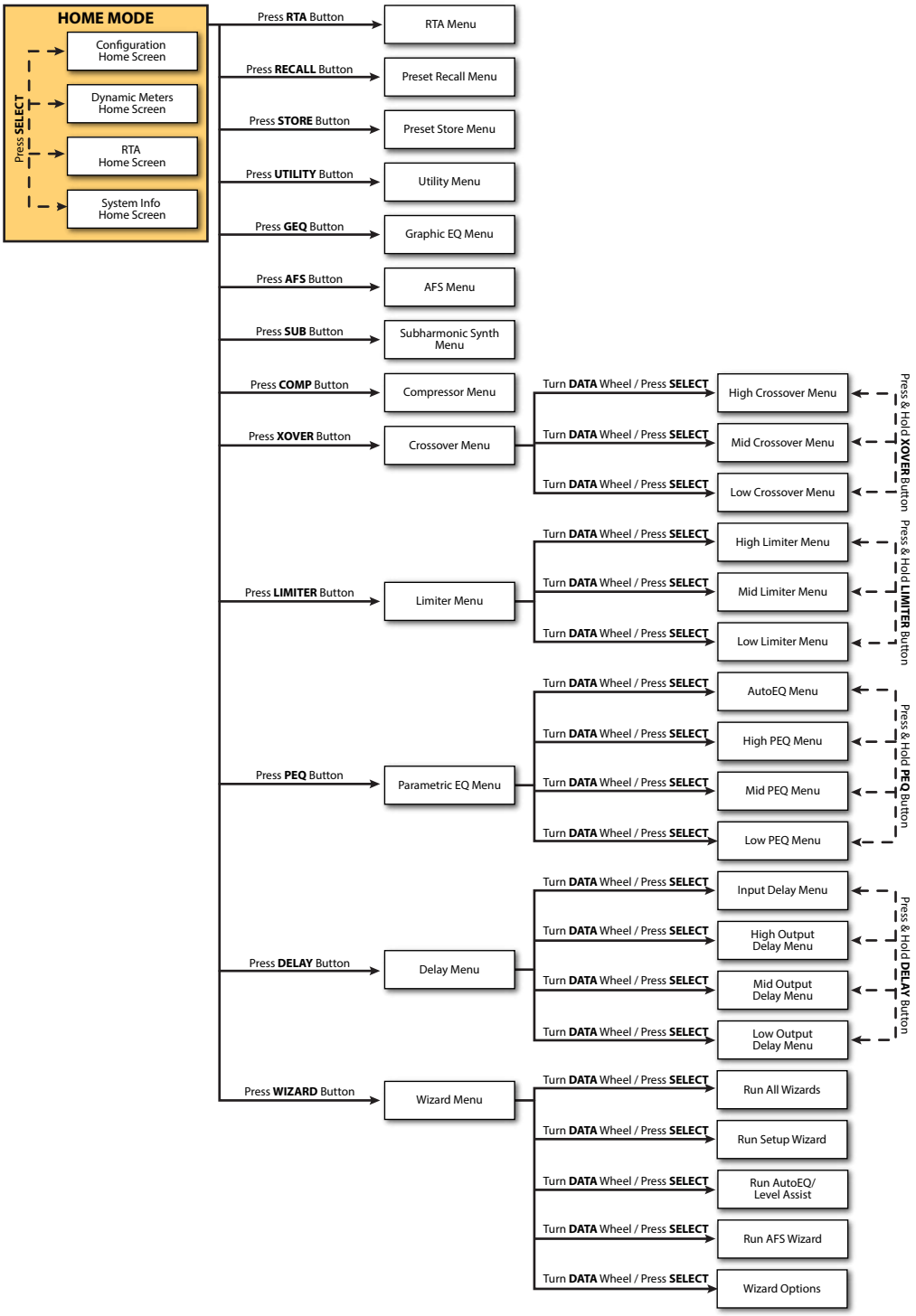
1. Ensure your power amplifiers or powered speakers are turned off.
2. Make sure the included IEC power cable provided with your PA2 has the proper connector for connection to your AC power outlet and that the power screening under the IEC power inlet on the back panel of the PA2 matches your country's voltage requirements.
3. Connect the power cable to the AC power inlet on the PA2's back panel.
4. Apply power to the PA2 by connecting the other end to an available AC power outlet. Since the PA2 does not have a power switch, an AC power strip or power conditioner can be used for switching power to the PA2 on or off.
5. Apply power to your mixer then your power amplifiers or powered speakers.

NOTE: When powering up a fully configured and connected PA system, it is advisable to ALWAYS turn on the mixer and PA2 first, then turn on your amplifiers or powered speakers. It's also a good idea to ensure you're not passing audio to the mixer's outputs (or ensure your mixer's master faders are all the way down) before applying power to the amplifiers. When powering down the system, you should ALWAYS power down the amplifiers first, wait about 10 seconds to allow them to discharge, then power down the mixer and PA2. In short, every time you use your system, the power amps should be the last components turned on and the first components turned off.

Getting Started

Menu Navigation Overview

The DriveRack PA2's user interface was carefully designed to provide logical navigation and avoid deeply nested menus. The menu navigation is laid out as shown in the below diagram.



Operating Modes Explained

This section describes the different operating modes available in the DriveRack PA2 and how to enter each mode.

Home Mode

This is the default operating mode. It is the mode the DriveRack PA2 enters when it initially boots and is the mode which displays the selected home screen. From any menu, you can get back to Home mode by repeatedly pressing the **BACK** button. How many times you must press the **BACK** button to return to Home mode is determined by how deeply you have navigated in the current menu.

Wizard Mode

This mode is entered by pressing the **WIZARD** button. This mode is used to create a new system configuration or edit an existing one. It is also used to AutoEQ a system (optional RTA-M microphone required) and ring out a system for feedback. When running the Wizards, pressing and holding the **WIZARD** button will abort the Wizard and return to the main Wizard menu.

Edit Mode

Edit mode is entered by pressing any of the **INSTANT ACCESS** buttons or the **UTILITY** button. This mode is used to edit processing module parameters, RTA parameters, and global system parameters.

Preset Recall Mode

This mode is entered by pressing the preset **RECALL** button and is used to load an existing factory or user preset.

Preset Store Mode

This mode is entered by pressing the preset **STORE** button and is used to store the current preset to a user preset memory location.

The Home Screens

The home screen is the first screen which appears in the LCD display after the DriveRack PA2 fully initializes (this is also referred to as "Home mode"). There are four home screens to choose from, providing the instant visual feedback you need, when you need it. All home screens will display the currently loaded preset number and name, so you always know which preset is currently loaded. To toggle between Home screens, simply press the **DATA WHEEL** from Home mode. Below is a description of each available home screen.

Configuration Home Screen

This is the default home screen. This screen shows the configuration and signal flow of the currently loaded preset. The far left of the screen indicates input configuration. The far right of the screen indicates output configuration. All the blocks in-between represent the processing modules.

Configuration Home Screen

Dynamic Meters Home Screen

This home screen shows dynamic processing activity in the input compressor and output limiter modules. The meters on the left of this screen show threshold activity. The ⊟ icon indicates the signal is below threshold and no dynamics processing is occurring. The ⊡ icon indicates that the signal level is within the "OverEasy" region and some minor compression or limiting is beginning to occur (this icon will only light if the dynamics processor is configured with "OverEasy" enabled). The ⊞ icon indicates that the signal is over threshold and full compression or limiting is occurring. The meters on the right show how much gain reduction is occurring in each processing module.

Dynamic Meters Home Screen

RTA Home Screen

This home screen provides quick access to the Real-Time Analyzer. When the optional RTA-M measurement microphone is connected to the RTA Mic Input, this RTA can be used for manually fine-tuning and troubleshooting the system.

RTA Home Screen

System Info Home Screen

This home screen shows the currently installed firmware version and the network IP address assigned to the PA2.

System Info Home Screen

NOTE: After a power cycle, the DriveRack PA2 will return to the home screen selected before the unit was powered down.

NOTE: The TIME OUT feature in the Utility menu will determine if the DriveRack PA2 will return to the home screen after a period of inactivity and how long it will wait before timing out. See ***'Utility' on page 46*** for further information on the TIME OUT feature.

Configuring The DriveRack PA2

This section of the manual describes how to configure the DriveRack PA2 for your application. The easiest way to configure the PA2 is to use the built-in Wizards. However, for the veteran sound engineers and DriveRack power users, the PA2 can also be configured and tweaked manually. For example, you can create the basic configuration using the Setup Wizard, or load an existing preset, then tweak the parameters as necessary from there. The RTA can then be used to analyze the system's frequency response for making manual adjustments or for troubleshooting system issues.

Using The Wizards

The PA2 Wizards are accessed by pressing the **WIZARD** button. These Wizards walk you through the configuration process with simple, step-by-step instructions, making it easy to configure the PA2 for your amplifiers, speakers, and the venue.

Using the optional dbx RTA-M measurement microphone, the Wizards can optimize your sound system by helping adjust your left/right speaker balance, low/mid/high level balance, and analyzing your room and applying accurate room EQ – in a fraction of the time it would take to manually analyze and calibrate the system.

The updated DriveRack PA2 Wizard section now also includes options for altering existing configurations (presets), making it possible to use the Wizards to update portions of a configuration without having to recreate the whole configuration from scratch. Below is a list and description of each of the available options in the PA2's Wizard menu.

RUN ALL WIZARDS *[CURRENT SETTINGS, NEW SETTINGS]*
Select this option to run through all the Wizards in succession. Select the NEW SETTINGS option to default all the Wizard settings and configure a new system from scratch. Select the CURRENT SETTINGS option to alter an existing configuration or to view the selections made when the preset was configured – note that you can only view these settings if the currently loaded preset was created using the Setup Wizard.

RUN SETUP WIZARD
This Wizard allows you to enter your speaker and amplifier models and automatically sets the crossover, output parametric EQ, driver alignment delay (for bi-amped main speakers), polarity, and limiter settings. The Setup Wizard in the PA2 now stores all selections made with the preset. So if you load a preset that was created using the Setup Wizard, all the selections made during creation can be viewed at any time by entering the Setup Wizard. The available options in this menu are as follows:

- **RUN ALL SETUP**
  Select this option to run through the entire Setup Wizard (which consists of all Setup Wizard items listed below).
- **RUN INPUT SETUP** *[MONO, STEREO]*
  Select this option to switch the input configuration between mono or stereo.
- **RUN GEQ SETUP** *[DUAL MONO, STEREO LINKED]*
  Select this option to switch the GEQ configuration between dual mono or stereo linked.
- **RUN SPEAKER/AMP SETUP**
  Select this option to update speaker and/or amp selections (tunings).

RUN AutoEQ/LEVEL ASSIST

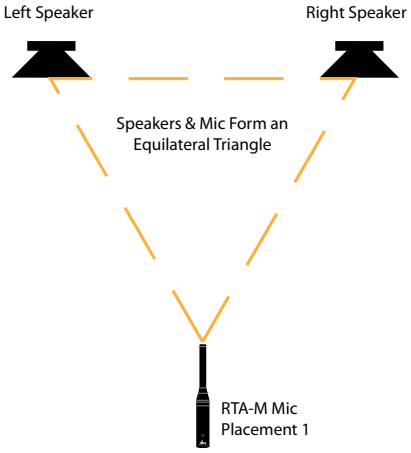
When used with the optional dbx RTA-M measurement microphone, this Wizard helps you balance the left/right speaker levels, the low/mid/high speaker levels (for 2-way and 3-way systems), and automatically equalizes the speakers to the current room environment. After selecting this option, you can select whether you would like to run both the Level Assist and AutoEQ functions, Level Assist only, or AutoEQ only.

The diagrams to the right show the recommended Level Assist and AutoEQ RTA-M mic positions. When running AutoEQ, you will be prompted to select how many mic positions you would like AutoEQ to analyze – the selections are 2, 3, or 4.

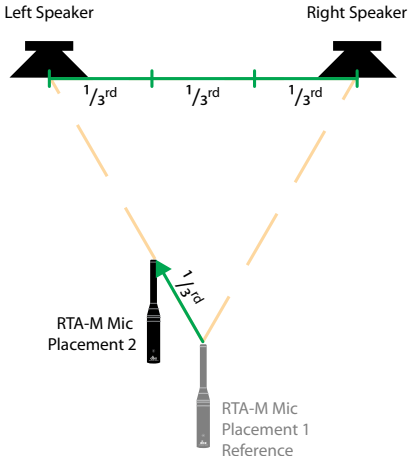
The Level Assist and AutoEQ mic position 1 measurements should be taken with the microphone placed equidistant from the speakers, so that the three components form an equilateral triangle, as shown in the Level Assist/AutoEQ Mic Position 1 diagram.

Each time you move the RTA-M mic position it should move approximately 1/3rd the distance the speakers are apart from the initial "RTA-M Mic Placement 1 Reference", as shown in the AutoEQ Mic Position 2–3 diagrams.

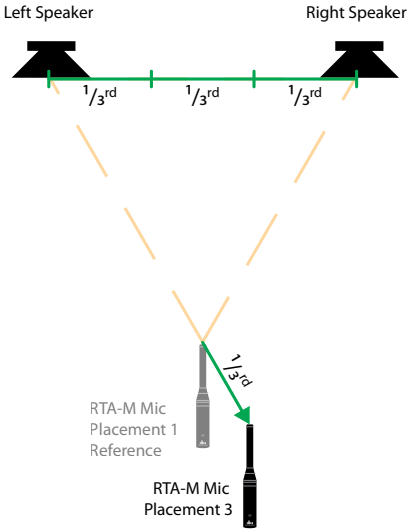
Level Assist/AutoEQ Mic Position 1



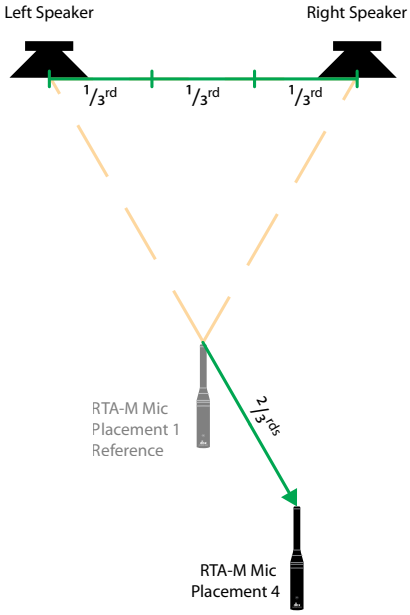
AutoEQ Mic Position 2



AutoEQ Mic Position 3 (Optional)



AutoEQ Mic Position 4 (Optional)



Mic position 4 is the exception as it should be placed 2/3rds the distance from the RTA-M Mic Placement 1 Reference. For example, if your speakers were 20 feet apart, you would move the microphone approximately 7' (20 * (1/3) = 6.6) from the RTA-M Mic Placement 1 Reference for mic positions 2–3 and approximately 14' from the RTA-M Mic Placement 1 Reference for mic position 4. However, as a general rule of thumb and for the sake of simplicity, a distance of 5' should work well for most venues. If the recommended placement of the mic in positions 2–4 are not possible, just place the mic in a position that differs from the other measurement positions.

RUN AFS WIZARD

This Wizard walks you through the process of ringing out the system to provide higher system gain before feedback. This is accomplished by pushing your system into feedback so AFS can detect the initial frequencies which cause feedback and notch them using Fixed filters. When the AFS Wizard is complete, it will automatically enable the Live filters, for automated protection during system use.

WIZARD OPTIONS
The available options in this menu are:

- **AutoEQ TARGET** *[RECOMMENDED PA CURVE, FLAT, REFLECTIVE ROOM]*
  When a sound system's frequency response is flattened, it can sound a bit thin on the bottom end. The AutoEQ TARGET option makes up for this by adding a bass boost. Select the RECOMMENDED PA CURVE option (this is the default setting) to allow AutoEQ to automatically enhance the low end. Select the FLAT option if you want the system to be tuned flat when running the AutoEQ Wizard. Select the REFLECTIVE ROOM option when operating a sound system in a room with excessive acoustic reflections; this option will still apply bass boost, as well as a slight attenuation on the higher frequencies to compensate for the excessive reflections.
- **LEVEL ASSIST AUTO TRIM** *[ON, OFF]*
  When this option is turned on, Level Assist will automatically make fine level adjustments under the hood for any system level mismatches which are 3 dB or less. When this option is turned off, no automatic level adjustments will be made by Level Assist and all system level mismatches will need to be adjusted using the amplifier attenuators until they are within a 1 dB tolerance.

> ***NOTE:*** Level adjustments made by the LEVEL ASSIST AUTO TRIM function cannot be seen or edited. To clear them you must turn the LEVEL ASSIST AUTO TRIM function off then re-run Level Assist in the Wizard menu.

- **MIC RESPONSE** *[dbx RTA-M, FLAT]*
  When the dbx RTA-M option is selected, AutoEQ will automatically compensate for the frequency response of the dbx RTA-M microphone, providing more accurate AutoEQ results. Select the FLAT option if using a measurement microphone other than the dbx RTA-M.
- **SETUP AUTO NAMING** *[ON, OFF]*
  When this option is on, the PA2 will automatically name presets based on the speaker selections made when running the Setup Wizard – the automatically generated preset name can still be edited when storing the preset if desired. When turned off, preset names will remain as they were stored unless you manually edit them and store the changes.

To use the Wizards to configure a new system:

1. Press the **WIZARD** button.
2. Select the RUN ALL WIZARDS option using the **DATA** wheel.
3. Select the NEW SETTINGS option by turning the **DATA** wheel. Press the **DATA** wheel to confirm your selection.
4. Follow the on-screen instructions. Turn the **DATA** wheel to edit on-screen selections and press the **DATA** wheel to confirm on-screen selections.

> ***NOTE:*** Pressing and holding the **WIZARD** button at any time during the Wizard procedure will exit the current Wizard and return to the main Wizard menu.

About Speaker & Amplifier Tunings

The PA2 has a Setup Wizard to help you configure your sound system. When you run the Setup Wizard, it will ask you to select the make and model of your speakers and amplifiers from a list of available options, referred to as “tunings”. There are speaker tunings and amplifier tunings. When you select your speakers from the tuning list, the PA2 will automatically configure the crossover, output PEQs, polarity, and in some cases, driver alignment delays. When you select your amplifiers from the tuning list, the PA2 will automatically set your output gains (located in the crossover) and limiter threshold settings.

The PA2 includes a variety of speaker and amplifier tunings from JBL®, Crown®, and more. If your particular tunings are not available in the PA2’s preset tuning list, you can use the DriveRack PA2 control app to access the online database where you can find additional tunings. If you can’t find tunings for your particular speakers or amplifiers, you will need to select the NOT LISTED option in the PA2’s Setup Wizard. The PA2 will automatically set usable default settings which may sound and work just fine, however, you may wish to manually calibrate the PA2 in order to realize the full potential of your sound system and ensure your loudspeakers are protected. Providing full details on how to manually calibrate a sound system is beyond the scope of this manual, but you can find books and free information on the Internet which cover these topics. This section of the manual will cover some of the basics to help get you started.

Loudspeaker manufacturers perform extensive testing on their products and will often provide much of the data necessary to optimize their loudspeaker systems. Check your speaker manufacturer’s website or contact them directly to see if they can provide a speaker tuning data sheet that you can use for manually entering speaker tuning parameters into the PA2. These tuning data sheets will typically include recommended crossover, polarity, driver alignment delay, and sometimes, parametric EQ settings.

Manual System Optimization Tips

TIP: You may want to disable the TIME OUT feature located in the Utility menu before performing any of the following system optimization procedures. This will ensure the PA2 does not revert back to the home screen throughout the process. See ***'Utility' on page 46*** for more information on disabling this feature.

1. Set Crossover Frequency & Filter Settings

The active crossover in the PA2 is used to allow each speaker or driver in a multi-way loudspeaker systems to operate within its frequency range limits. If you can't find any tuning information for a particular speaker/driver, get the specification sheet for it from the manufacturer. It can give you a good idea where to set crossover frequency settings by providing the speaker or driver's frequency response, which is the range of frequencies each speaker or driver is capable of reproducing.

If you're bi-amping main speaker cabinets, the speaker manufacturer should be able to provide you with the recommended crossover frequency settings, and oftentimes, filter types and slope rates. If you're using subs and can't find recommended crossover frequency settings, you can dial it in by ear. Typically, subs and mains will be crossed over at around 80–100 Hz, so somewhere in this range is a good place to start. You can then fine-tune the settings from there by ear using full-bandwidth reference material that you are familiar with. When auditioning these crossover settings, it helps to first balance the amp levels for all drivers or cabinets to achieve a frequency response that suits your taste. When auditioning the sound system, don't turn it up too loud until you've calibrated the gain structure – more about this later.

If you're configuring a simple full-range system then you don't necessarily need to enter any crossover parameters. However, it is a good idea to take note of the speaker's frequency response spec and set a high-pass filter at the lower frequency limit specified (45 Hz, for example). This will prevent excessive driver excursion caused by subsonic frequencies and allow for more headroom in your amp. You'll then want to choose a filter type and slope rate that will effectively roll-off the low end without dramatically compromising the low-end response of the sound system (try auditioning BW 24–BW 48 filter types).

Once the crossover frequencies have been set, it's time to set the filter types and slope rates. Determining which settings to use here can be a bit difficult. These settings are dependent on the natural frequency response and roll-off characteristics of each speaker cabinet or driver. The goal is to achieve a flat frequency response throughout the loudspeaker system with seamless transitions throughout the crossover overlap regions. For example, a midrange driver in a 3-way system may inherently exhibit a fairly gradual roll-off up into the high end, whereas the tweeter may require a steep roll-off to protect it from over-excursion. In this case, the midrange driver can be set with a more gradual roll-off to fill in the "gap" created from the steep roll-off of the tweeter. You can use a combination of the RTA and your ears to dial in these settings. Just make sure you don't exceed the frequency range limitations of the drivers. The difference between the LR and BW filter type options is in the way they sum together. You want to select the filter types that provide the flattest frequency response throughout the crossover overlap regions. Note that it's okay to mix and match these filter types if that's what it takes to achieve a flatter system response. Also note that you may not be able to achieve a flat response at this stage of the process due to driver alignment and/or polarity issues. Therefore, just get it as close as you can for now. For more information on LR and BW filters, see "LP TYPE" and "HP TYPE" under the section, ***'Crossover (XOVER)' on page 41***.

2. Set Driver Alignment Delays & Polarity

Once the crossover frequencies, filter types, and slope rates have been set, you're ready to optimize the system's phase response. All drivers in the system need to work in unison in order for the sound system to sound its best. This is accomplished by setting driver alignment delays to make up for any physical driver offsets and matching the polarity for all drivers.

The PA2's output POLARITY parameter (located in the crossover) is used to match polarity between drivers. Some multi-way main speakers will require certain drivers to be polarity inverted when operating in bi-amped mode (bypassing the internal passive crossover network). When selecting any bi-ampable main speaker from the PA2's speaker tuning list in the Setup Wizard, such polarity inversion will be performed for you automatically. If your multi-way main speaker model isn't listed in the PA2 and you can't find tuning information for them, check the loudspeaker's spec sheet or documentation, or contact the speaker manufacturer as they will usually be able to provide this information.

If you're unable to find polarity information for your speakers, or just want to verify your drivers are in phase, you can do some investigative work using a tone generator or some sine wave tone samples (which can be downloaded for free online). To do so, take note of the crossover frequency setting used between the drivers being tested and play a sine wave tone of that frequency through the system.

TIP: Make sure any active AFS modules are turned off before passing sine tones through the PA2. Failing to do so may cause Live AFS filters to be set.

For example, if you're testing the woofer and high frequency driver in a bi-amped main speaker cabinet and the active crossover frequency between the two is set at 2.5 kHz, play a 2.5 kHz sine wave tone through the system. Both drivers will reproduce the tone simultaneously as long as the crossover frequency is indeed within the range of frequencies both drivers are capable of reproducing. Stand in the "sweet spot" of the venue (the audience position equidistant from the speakers) and invert the polarity in the PA2's crossover for the low output and find out which setting provides the loudest signal level (note that results are most noticeable if sound pressure levels between the drivers have been matched). The setting which provides the loudest signal level is the one which is more "in phase" and is the setting you should use. If applicable, perform this same test, working your way down through the lower-frequency drivers.

Once polarity is matched for all drivers in the system, you're ready to optimize the driver alignment delays. The "polarity" test mentioned in the previous paragraph can also be used for determining if driver alignment delay is necessary. Play the selected sine tone through the system (once again, the sine tone frequency should match the set crossover frequency of the drivers being tested) and invert the polarity on the lower driver so that the two drivers are out of phase. If necessary, adjust the drivers' levels until the most phase cancellation is achieved. Try adjusting the driver alignment delay for each driver to see if either produces more phase cancellation. Set the delay for the most phase cancellation on whichever driver requires it. When done, set the polarity back for proper phase alignment. Repeat this procedure for the remaining speakers/drivers if applicable. For more information on setting driver alignment delays, see ***'Delay' on page 39***.

Changes to all these settings can be difficult to judge when heard in the context of the whole system, but by zeroing in on the specific crossover frequency regions, matching levels, and inverting polarity on one of the drivers, you are free to experiment with different settings to determine the best settings for your loudspeaker system. Adjust each of these parameters until the most phase cancellation is achieved then switch the polarity back so the drivers are once again in phase. Optimizing these parameters using this test will allow your system to work in harmony and improve its magnitude and phase response.

3. Set Gain Structure & Limiters

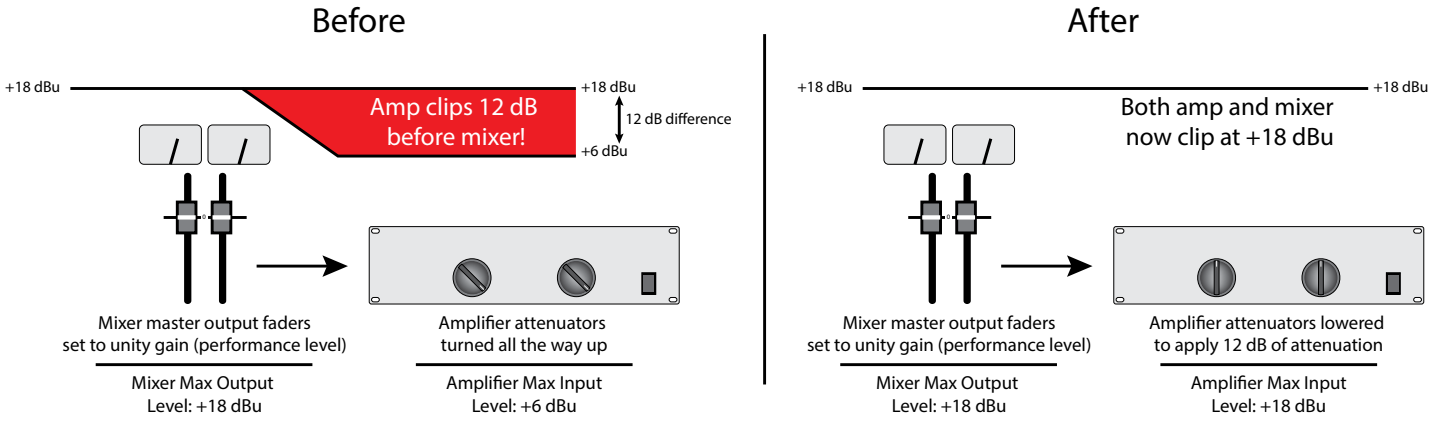
Now that the crossover settings are optimized and the loudspeaker drivers are in phase, it's time to calibrate the gain structure of the system. This will provide ample headroom for all system components in the signal chain and optimize your system's signal-to-noise performance.

Your amplifiers play a vital role in system setup, because they are the last devices in the signal chain before your loudspeakers and offer the greatest amount of gain (that is their job after all). If your amplifiers are setup incorrectly you will not be using

your system to its fullest potential and could potentially cause damage to your loudspeakers. When you select your amplifiers in the Setup Wizard, the PA2 will automatically set the limiter thresholds and gain structure between the PA2 and amplifiers. If your amplifiers are not available in the Setup Wizard, you should choose the NOT LISTED option. The following section explains how you would go about manually optimizing the system's gain structure and set the built-in limiters to protect your amplifiers from clipping.

Gain structure refers to aligning the gain of each device so that the input circuits of all devices clip at the same time – this allows you to know exactly how much headroom you have in the entire system by simply looking at the mixer's main output meter and optimizes the noise floor of the entire sound system. Quite often PA systems are setup with the amplifier input attenuator controls turned all the way up, in the incorrect assumption that this is the only way to get the maximum level out of the sound system. Setting up your amplifiers in such a manner can help prevent someone from raising your amp attenuators and damaging the system (this is sometimes required for permanent install applications and requires the output gain be reduced in the device feeding the amplifier), however, your noise floor will likely suffer in doing so.

Amplifiers are fixed gain devices, turning down the amplifier input attenuators does not change the potential output of the amplifier – it only requires more input voltage to get full output power. Many amplifiers will clip with an input level greater than +6 dBu when the input attenuators are turned all the way up. Most mixing consoles can deliver well over +18 dBu of output level before clipping. This means that with your amps turned all the way up, you are sacrificing 12 dB of headroom, resulting in poorer noise performance and the potential risk of clipping the amplifier. By adjusting the amplifier controls properly, you can maximize your system's performance and protect your loudspeakers. The following diagram illustrates the previous example and shows how it can be easily remedied by simply lowering the input attenuators on the amplifier to apply 12 dB of attenuation, effectively lowering the signal level entering the amplifier by 12 dB and fitting the signal within the operational headroom constraints of the amp.



One way to set up your gain structure is to play pink noise through the entire system and adjust each gain stage in the signal chain in succession using the clip indicators on each device. If there is no clip indicator on your mixer then use the output meters; most reputable console manufacturers use red LEDs at the top of the meters to show the onset of clipping.

To calibrate the system's gain structure and PA2 limiters:

WARNING! Although it is highly unlikely that you are using tube amplifiers, since they are not practical for live sound reinforcement use, please note that some tube amplifiers can be damaged if operated without a load (the speaker) connected. Therefore, do not perform the following procedure if using tube amplifiers unless you have verified they can be operated without a load connected. This is not an issue with modern solid state amplifier designs.

1. You will need to send a pink noise signal through the entire system to perform this calibration procedure. Some mixers have a built-in pink noise generator, which will work. You can also check your smartphone's app store, as there are many audio apps now available which have a built-in pink noise generator, or search online for a pink noise sample and burn it to a CD or load it into your portable music player or smartphone.
2. Once you have your pink noise signal, power down the sound system, disconnect all the loudspeakers from the amplifiers, and turn all your amplifier attenuators all the way down.
3. Set the +4dBu/-10dBV switch on the back panel of the PA2 to match the nominal operating level of your mixer. See ***'Rear Panel' on page 6*** for more information on this switch.
4. Now, turn the mixer, DriveRack PA2, and amplifiers back on. Go into the PA2's output limiters and ensure they are all turned OFF, OVEREASY is set to OFF, and their THRESHOLD's are set all the way up to 0.0 dB. Also, turn off all non-essential PA2 processing if it is enabled (i.e., Compressor, GEQ, Subharmonic Synth, and AFS).
5. Set your mixer's main output faders to unity gain (0). Play or enable the pink noise. If the pink noise signal is being fed to a mixer channel, set the mixer channel's fader to unity gain (0). Adjust the gain/trim control of the channel (or pink noise level if using the mixer's built-in noise generator) until the mixer's main meters read 0 VU.
6. Raise the mixer's main output faders until the INPUT CLIP LEDs on the PA2 just begin lighting.
7. Now, go to each amp channel and slowly raise its attenuator until the amp channel's clip LED just begins to light.

   TIP: Once all amp attenuators have been set, you may want to take note of their position using gaffers tape or some other non-permanent means. This way you can retain the reference amp attenuator settings above which the amplifiers will clip.

8. Go into one of the PA2's limiter modules. Turn the limiter on and slowly lower the THRESHOLD parameter until the corresponding amp channel's clip LEDs stop lighting. Don't lower the limiter THRESHOLD parameter too far, just far enough to hold the signal level just below the clip point of the connected amplifier. Do this for each active pair of PA2 outputs (i.e., High, Mid, and Low).
9. Turn down the pink noise and main output faders on the mixer then power down the system.
10. Reconnect your speakers to your amps.
11. Power up the system, ensuring to power up your amps last.

The system is now optimized to provide the loudest levels possible, with adequate headroom between devices, and with the least amount of noise. Now, sit back, play your favorite music through the system, and slowly raise your mixer's main output faders. When the mixer's main faders are set to unity gain (0), the system will now provide the highest sound pressure level it is capable of without clipping. If the system is not loud enough when the mixer is set just below the output clip point, this is an indication that the system is inadequate for the application. If this happens, you can try adding PA2 compression with make-up gain as it may provide a slightly higher system output level. If the system level is still inadequate for the venue, you may want to consider amplifiers with greater output power, but still within the power rating of your loudspeakers, or additional speakers and amplifiers. Most loudspeaker manufacturers recommend an amplifier which provides 1.5 to 2 times the rated RMS power

of the speaker. If the sound system is too loud when the mixer's main faders are set to unity, this indicates that you have more power than is required for the venue and you can simply turn down your mixer's main output faders until the desired performance level is achieved.

4. Balance The System's Frequency Response

It's now time to balance the system's overall frequency response by fine-tuning the amplifier attenuators. This step is not absolutely necessary, but is recommended as it can help smooth out the system's frequency response before applying any system EQ, which translates to smaller gain adjustments in the EQ and better sound quality. You can perform this procedure while listening to your reference music and do it by ear or use the dbx RTA-M reference mic and RTA. The music you choose to use for reference should contain full-bandwidth audio and should be something you have spent much time listening to and are extremely familiar with.

Since the gain structure is already set and the limiters calibrated, you will not want to raise your amplifier attenuators, as we've already determined when we set the gain structure, setting them any higher will cause the amplifiers to clip. Instead you will want to lower the amp attenuators for whichever frequency range (i.e., low, mid, or high) is too loud. For example, if the system has too much midrange, turn down your mid amp attenuators. If the system has too much high end, turn down the high amp attenuators. The goal is to achieve a somewhat balanced system.

TIP: If you made any additional adjustments to amp attenuator settings in this step, you may want to make additional marks around the attenuators to indicate these updated positions for future system use.

5. EQ The System In The Venue

Now that the system is optimized for use, it's time to EQ the sound system in the venue. The PA2's built-in AutoEQ Wizard does a great job of equalizing your sound system in a timely manner so we recommend using it. You can alter the parametric EQ settings generated by AutoEQ or tailor the equalization of the system using the built-in GEQ (Graphic EQ) – this will leave your automatically generated AutoEQ settings intact. The following instructions can be used to fine-tune the system after running AutoEQ or to manually EQ the sound system in the event you don't have the dbx RTA-M measurement microphone. Note that using the DriveRack PA2 control app on a mobile device allows you to walk around the venue while making EQ adjustments.

To EQ the system by ear using the GEQ:

1. Choose a music reference source that you are familiar with and that contains full-bandwidth audio material. Play the reference music through the sound system. Turn the music up as close as possible to performance level (the level at which the system will be used during performance).
2. Walk around the venue and listen to the sound system. Does it sound thin, bright, muddy, or muffled? Try to get an overall assessment of how the different audience areas sound and what kind of improvements can be made.
3. Go into the PA2's Graphic EQ (GEQ).
4. Try each of the available QUICK CURVE options. Do any of them sound close to what you're after? If so, keep the selection. You can proceed and fine-tune the system further by manually adjusting the GEQ's frequency bands if you feel it can be further improved. If none of the QUICK CURVE options sound right, set the QUICK CURVE parameter back to MANUAL.
5. Make any further adjustments to the frequency bands in the GEQ to suit your taste.

6. Ring Out The System With AFS

Ringing out the sound system for feedback before use allows you to squeeze a little more gain out of the system before the onset of feedback and can help ensure you're not right at the edge of feedback during the performance. The AFS Wizard does a great job of taking the guesswork out of ringing out the sound system for feedback. However, if you prefer to ring out the system manually, you can. The benefits of doing so is the ability to select different filter width settings for the Fixed and Live filters, and precisely determine how many Fixed filters can be used to maximize the system's gain before feedback – freeing up all remaining filters for Live mode use during the performance.

To manually ring out the system using AFS:

1. Perform a sound check and set up a rough mix for all microphones which will be active during the performance. When done, take note of the mixer's main output fader positions – your target gain when ringing out the system will be around 5 dB above this setting.
2. If noise gates are being used on any of the active mics – including vocal effect processors with built-in noise gates – bypass them before ringing out the system. You can re-enable them once the ring-out procedure is complete.
3. Have the musicians stop playing and turn the main mixer faders all the way down.
4. Go into the AFS module by pressing the **AFS** button.
5. Turn AFS on.
6. Go to the MODE parameter and set it to FIXED.
7. Go to the TYPE parameter and select the desired width for the Fixed filters – select the MUSIC option for the most precise and inaudible feedback suppression. See ***'Advanced Feedback Suppression (AFS)' on page 31*** for further information on the available AFS TYPE options.
8. Go to the FIXED FILTERS parameter and set it to 12.
9. Ensure no sound is present at any of the microphones then slowly raise the main mixer faders until you reach your target gain (described in step 1) or run out of Fixed filters, whichever happens first, then lower the main mixer faders back to performance level (the level at which you had the mixer's main faders during sound check in step 1).
10. Lower the FIXED FILTERS setting to change all unset Fixed filters to Live filters. Make sure you don't lower it too far as you don't want to remove set Fixed filters.
11. Set the AFS MODE to LIVE.
12. Go to the TYPE parameter and select the desired width for the Live filters – select the MUSIC/SPEECH option for the best all around real-time feedback protection. See ***'Advanced Feedback Suppression (AFS)' on page 31*** for further information on the available AFS TYPE options.
13. The system is now ready for use and any available Live filters will be available for on-the-fly feedback suppression during the performance.

NOTE: When ringing out the system in Fixed mode, any sound detected by AFS will trigger filters to be set. Therefore, make sure the microphones are active, but there is no signal present at the mics when AFS is active in Fixed mode.

7. Add Finishing Touches

The system is now ready for use. Additional processing can now be applied to add the finishing touches. For example, subharmonic synthesis can be applied to enhance the system's bass response and compression can be applied to add a touch of mixbus-style compression. For tips on setting these processing module settings, see ***'Subharmonic Synthesis (SUB)' on page 35*** and ***'Compressor (COMP)' on page 37***.

Operating The DriveRack PA2

This section of the manual describes how to operate the DriveRack PA2 after you have initially configured and optimized the system using the Wizards. This includes editing parameters and managing presets.

Editing Parameters

To edit a processing module's parameters:

1. Press the module's button (e.g., **GEQ**, **AFS**, **SUB**, etc.).
2. Some menus will offer a list, depending upon the currently loaded configuration, where you can select which module you want to edit. For example, if you have configured a 3-way system and press the **PEQ** button, you will be presented with a list containing the AutoEQ PEQ, HIGH PEQ, MID PEQ, and LOW PEQ. If you see such a list, turn the **DATA** wheel to highlight the desired option then press the **DATA** wheel to make the selection.
3. Turn the **DATA** wheel to select the parameter you wish to edit.
4. Press the **DATA** wheel to edit the selected parameter.
5. Turn the **DATA** wheel to edit the setting. Press the **DATA** wheel then repeat steps 3–5 to make any further edits in the current menu or use the alternative method of editing multiple parameters within a menu described in the below tip box.
6. When done editing, press the **BACK** button to exit the menu. Note that you may have to press the **BACK** button repeatedly to exit the menu, depending upon how deeply you're nested in the menu.

TIP: When in a module's edit menu, subsequent presses of the selected module's button will navigate down the selected column in the menu, allowing for quicker parameter editing by directly jumping from one parameter to the next. For example, when editing the GEQ module, pressing the **GEQ** button with the right hand and turning the **DATA** wheel with the left hand allows you to edit the frequency bands in the GEQ with much more efficiency.

Managing Presets

The DriveRack PA2 has two types of presets: user and factory. The user presets occupy preset memory locations1–75. The factory presets occupy preset memory locations 76–100. The difference between these preset types is that factory presets are meant to be used as templates and cannot be overwritten and user presets can be overwritten and are designed to store your custom presets. You can load either a factory or user preset to start with, edit the preset or run the various Wizards to alter the settings for your application, then store the changes to any one of the 75 user preset memory locations. All settings created when running the Wizards and all settings located in the processing modules (e.g., graphic EQ, limiter, delay, crossover, etc.) will be stored to the preset. The exceptions are the Utility and RTA settings, which are global and are not stored to individual presets.

Recalling Presets

Recalling presets requires that you enter Preset Recall mode, select a preset, and then load it. This helps prevent accidental switching of presets from the front panel DATA wheel.

To recall a preset:

1. Press the **RECALL** button. You are now in Preset Recall mode.
2. Turn the **DATA** wheel until you have selected the preset you wish to load.
3. Press the **RECALL** button or **DATA** wheel to load the selected preset.

Editing Presets

Presets are edited one of two ways: by running the various Wizards in the Wizard menu, or by pressing a processing module's button (e.g., **AFS**, **SUB**, **COMP**, **LIMITER**, **DELAY**, etc.) and changing the module's settings. See ***'Using The Wizards' on page 14*** for information on using the various Wizards. See ***'Editing Parameters' on page 24*** for information on editing processing module parameters.

NOTE: The STORE button will light whenever a processing module's parameters have been changed from their stored value, indicating the changes need be stored to memory to be retained. Any unstored preset setting changes will be retained after a power cycle, but will be lost as soon as another preset is recalled.

Storing Presets

When you are satisfied with the changes made to a factory or user preset, you can store the changes to a user preset memory location. The STORE button is used to store modifications made to a preset.

To store a preset:

1. Press the **STORE** button. You are now in Preset Store mode.
2. The current name of the preset will be shown in the LCD display and you now have the option to keep the name or rename the preset. If you do not wish to rename the preset, proceed to step 3. If you do wish to rename the preset, follow the on-screen instructions.
3. Press the **STORE** button a second time.
4. Turn the **DATA** wheel to select the user preset memory location you wish to store the preset to. If you wish to store the preset to its current memory location, leave as is.
5. Press the **STORE** button a third time to store the preset.

TIP: Pressing the **STORE** button 3 times in succession will perform a Quick Store function, allowing you to quickly store updates made to a preset. Performing this operation will store the updated settings to the current memory location with the current preset name.

Copying Presets

Presets can be copied from one memory location to another. This can come in handy for creating a backup of a preset within the PA2 box, creating variations of similar presets (for example, you may have already configured a stereo sub preset for larger shows and wish to copy it and create a mono sub preset for smaller shows), or for creating an initial preset template and then copying that preset template for use at each venue you play. For example, let's say you're playing "Club X" this weekend and you've already pre-configured the PA2 for your system (i.e., you have run all the Wizards and stored your template preset). When you show up to Club X, you can copy your template preset to a new memory location and name it "Club X". Now, run through only the Wizards which must be run at the venue (i.e., AutoEQ, and AFS) then save the changes. Presto! Next time you use your system at Club X, all you have to do is connect the system and recall the Club X preset – although you may wish to consider re-ringing out the system with the AFS Wizard to ensure the system will provide the best protection possible for the current venue conditions.

To copy a preset:

1. Recall the preset you wish to copy.
2. Press the **STORE** button. You are now in Preset Store mode.
3. The current name of the preset will be shown in the LCD display and you now have the option to keep the name or rename the preset. If you do not wish to rename the preset, proceed to step 4. If you do wish to rename the preset, follow the on-screen instructions.
4. Press the **STORE** button a second time.
5. Turn the **DATA** wheel to select the user preset memory location you wish to copy the preset to.
6. Press the **STORE** button a third time to copy the preset to the new preset memory location. Note that the preset that was residing in the selected memory location will be permanently overwritten.

The PA2 Processing Modules & Parameters

This section of the manual provides descriptions of all the processing modules available in the DriveRack PA2 and their associated parameters.

Graphic EQ (GEQ)

The 31-band GEQ module lets you manually tune the sound system's frequency response and is meant to be used alone or alongside the AutoEQ PEQ (which is set when you run the AutoEQ Wizard). In previous DriveRack models, the GEQ was set when you ran the AutoEQ Wizard. AutoEQ in the PA2 now uses its own dedicated 8-band parametric EQ (referred to as the "AutoEQ PEQ") for system equalization, freeing up the GEQ for custom-tuning tasks. Use AutoEQ to tune the system at the venue, then use the GEQ to shape the system's tone to taste by ear.

Typically, a flattened sound system will sound light on the bottom end. The PA2's AutoEQ TARGET parameter compensates for this by automatically applying bass boost – see ***'WIZARD OPTIONS' on page 16*** for further information on the AutoEQ TARGET parameter. However, if the AutoEQ TARGET parameter is set to FLAT, you could use the GEQ instead to tailor the low end to your liking. This allows you to add some of the bottom end back in, while still maintaining the "flat" reference point (just bypass the GEQ and the system is back to your flat reference point). Let's say you have a DJ rig and also prefer a little more "sizzle" on the top end. Just raise the high-frequency bands in the GEQ to add some extra top end to the system.

The GEQ Quick Curves allow you to quickly alter the frequency response of the system. Try auditioning each option to see which one works best for your application. You can then manually edit any GEQ bands from there if further adjustments are required.

The GEQ can be configured for dual mono or stereo linked operation. See ***'Using The Wizards' on page 14*** for more information on this option.

GEQ Parameters

The Graphic EQ menu can be accessed by pressing the **GEQ** button. Turn the **DATA** wheel to scroll through the list of parameters. Press the **DATA** wheel to edit a selection.

GRAPHIC EQ *[ON, OFF]*
This parameter turns the GEQ module on or off.

QUICK CURVE *[MANUAL, FLAT, MY BAND, SPEECH, PERFORMANCE, DJ]*
This parameter allows you to select from preset EQ curves. Note that you can select one of these Quick Curves and then further edit the individual GEQ bands manually from there if required. The following Quick Curve options are available:

- **MANUAL (Restore)**
  This option is used for getting back to your original GEQ settings in the event that you change the Quick Curve option. For example, if you've already configured the GEQ and you then select the FLAT Quick Curve option, the GEQ will be flattened (all bands set to 0 dB). By then selecting the MANUAL Quick Curve option, the GEQ settings you had prior to selecting the FLAT option will be restored.
- **FLAT**
  Select this option to reset all GEQ bands to 0 dB (flat).

- **MYBAND**
  This option is optimized for live music performance using a portable PA system in small to medium sized venues (coffee shops, clubs, etc.). It offers some low-end boost along with low-mid cut, which enhances the low end while preventing the system from sounding too muddy. The high end is also slightly attenuated.
- **SPEECH**
  This option is optimized to enhance speech intelligibility.
- **PERFORMANCE**
  This option is optimized for live music performance using larger PA systems in larger sized venues (large clubs). This EQ curve is very similar to the MYBAND option except that it does not attenuate the low mids and offers additional attenuation on the highest frequencies.
- **DJ**
  Selecting this option will boost the low and high frequencies and attenuate the mid frequencies and is optimized for playback of pre-recorded material. This setting represents the popular “smiley face” EQ curve commonly used by DJs.

FREQUENCY BANDS *[-12 dB – +12 dB]*
There are 31 frequency band gains available for editing (ranging from 20 Hz–20 kHz). The gain of each band can be adjusted in .1 dB increments.

Parametric EQ (AutoEQ, HIGH, MID, LOW PEQ)

There are two types of PEQs available in the PA2: the AutoEQ PEQ and the output PEQs (labeled LOW, MID, and HIGH). The AutoEQ PEQ is an 8-band parametric EQ which resides in the input processing side of the PA2 (pre crossover) and is automatically adjusted by the built-in AutoEQ Wizard. In most cases you will likely just look at the settings in the AutoEQ PEQ to see how the system was equalized after running the AutoEQ Wizard. However, you can go into the AutoEQ PEQ and manually adjust the settings if desired.

The 8-band HIGH, MID, and LOW PEQs reside in the output processing side of the PA2 (post crossover) and were designed to be used exclusively for speaker tunings. In a perfect world, your loudspeaker drivers would exhibit ultra-flat frequency response (what you put in, you get out). Unfortunately, loudspeaker drivers don't have extremely flat frequency response by design and require some help to achieve a more flat frequency response. The output PEQs allow you to compensate for this fact and improve the frequency response of the loudspeaker system, before taking the room into account.

If your main and sub speaker models are available in the Setup Wizard, the output PEQs will automatically be set when you select them. By applying speaker tuning EQ, loudspeaker frequency response can be improved. Keep in mind that selecting some speaker models in the Setup Wizard won't set any parametric EQ settings, so don't be alarmed if you selected your speakers in the Setup Wizard and no PEQ settings were set. These output PEQs can also be adjusted, so you can manually enter speaker tuning parameters if your speakers aren't listed and speaker tuning data sheets are available for your speaker models.

PEQ Parameters

The PEQ menus can be accessed by pressing the **PEQ** button. You will see a list of the available PEQs to select from. Which options are available in the list will depend upon the current configuration. In all cases you will at least see the AutoEQ PEQ and HIGH OUTPUT PEQ. If you've configured a 2-way system, you will also see a LOW OUTPUT PEQ. If you've configured a 3-way system, you will see an additional MID OUTPUT PEQ. Turn then press the **DATA** wheel to select the desired PEQ module. Turn the **DATA** wheel to scroll through the list of parameters. Press the **DATA** wheel to edit a selection. When in the PEQ menu, pressing and holding the **PEQ** button for approximately 2 seconds will advance to the next active PEQ module from the list, wrapping around through the available modules.

- **AutoEQ/PARAMETRIC EQ** *[ON, OFF]*
  Turns the selected PEQ module on or off.
- **FLATTEN** *[RESTORE, FLAT, MANUAL, AUTOEQ (AutoEQ Only)]*
  This parameter has two options in the output PEQs: RESTORE and FLAT. Select the FLAT option to zero out the selected PEQ (set all bands to 0 dB). Select the RESTORE option to retrieve the settings you had before you selected the FLAT option.

  The AutoEQ PEQ provides three options: FLAT, MANUAL, and AUTOEQ. Select the FLAT option to zero out the AutoEQ PEQ (set all bands to 0 dB). The MANUAL option shows any manual adjustments you have made to the AutoEQ PEQ – if you haven't made any, the PEQ will be flat when the MANUAL option is selected. If you have manually edited AutoEQ settings, selecting the AUTOEQ option will restore the PEQ settings that were set by the AutoEQ Wizard.
- **BAND(1–8) TYPE** *[BELL, LOW SHELF, HIGH SHELF]*
  This parameter selects the PEQ filter type. Use the BELL type to edit a range of frequencies, the LOW SHELF type to edit all frequencies below a specified frequency, or the HIGH SHELF type to edit all frequencies above a specified frequency. Each band (1–8) allows you to select between these three band types, so any band can be a bell or shelving type filter.

- **BAND(1–8) FREQUENCY** *[20 Hz – 20 kHz]*
  This parameter adjusts the center/cutoff frequency of the selected EQ band.
- **BAND(1–8) GAIN** *[-12 dB – +12 dB]*
  This parameter adjusts the gain of the selected EQ band.
- **BAND(1–8) Q** *[0.1 – 15.909]*
  This parameter is only available with BELL type filters and adjusts the width of the selected PEQ filter. Lower Q settings provide wider filters, affecting a wider range of frequencies when adjusted. Higher Q settings provide narrower filters, which affect fewer frequencies when adjusted.
- **BAND(1–8) SLOPE** *[3 dB/Octave – 14.295 dB/Octave]*
  This parameter is only available with LOW SHELF or HIGH SHELF type filters and adjusts the slope rate of the filter beyond the cutoff frequency. Lower settings yield a more gradual slope. Higher settings produce a steeper slope.

Advanced Feedback Suppression (AFS)

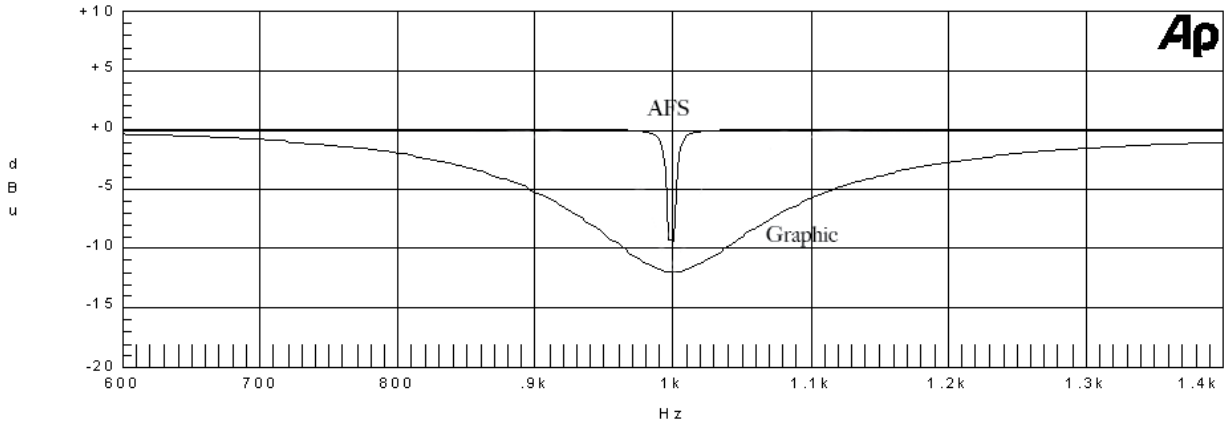
Feedback is caused when an in-phase audio loop is created between an input transducer (such as a guitar pickup or microphone) and an output transducer (a loudspeaker). The DriveRack PA2 includes the exclusive AFS™ (Advanced Feedback Suppression) algorithm to help combat this dreadful phenomenon.

The AFS algorithm in the PA2 is a little different than the AFS algorithm used in any previous dbx products. That's because the dbx engineers revisited the already-stellar AFS algorithm to see if they could improve it. And guess what? They did! The updated AFS algorithm in the PA2 can now detect and eliminate feedback faster than ever before and with even higher precision. The updated AFS algorithm offers the following enhancements:

- It is faster at eliminating the offending feedback frequency.
- It can better determine what is actually feedback, making it far less likely to set false triggers on feedback-like audio sources, such as a flute.
- It can better determine how much attenuation is required to notch out the feedback, resulting in notch filters which aren't as deep and even less audible.
- It prevents the filters from being too narrow to tackle feedback at lower frequencies.
- It has better frequency resolution, which provides pinpoint accuracy and uses the narrowest filters possible.
- When lifting Live filters, the filters are lifted more gradually to better determine if it is safe to lift the filter, preventing blaring feedback from suddenly returning.

AFS uses precision frequency detection and state-of-the-art processing to determine the exact range of feedback frequencies to remove (instead of indiscriminately removing large sections of audio). In the past, graphic equalizers were used to eliminate feedback from a system. This was an acceptable method for eliminating feedback, but when this method is put up against precision notch filters, such as those found in AFS, it becomes very evident that using graphic equalizers for this task severely affects the tone of the system. With AFS, the precision filters remove only a fraction of the frequency spectrum, eliminating the feedback with far less audible artifacts. The below diagram shows a comparison of filter widths between the AFS filters and conventional 1/3 octave graphic EQ filters.

Filter Precision Comparison Chart



TIP: AFS works best when the signal entering the PA2's inputs is sufficient. This requires proper gain staging between the mixer and PA2. If the signal level is too low, AFS may be slow to respond to feedback. See ***'Manual System Optimization Tips' on page 18*** for further information on gain structure and ringing out the system with AFS.

NOTE: Signals sent to the PA2's LEFT and RIGHT inputs are summed to mono before entering AFS for analysis. If the signal feeding one of the PA2's inputs is polarity inverted, AFS will not be able to detect feedback – as the feedback will cancel out before being analyzed. If you experience problems with AFS not detecting feedback, check the polarity of the signals/cables feeding the PA2's inputs to ensure they have the same polarity.

AFS Parameters

The AFS menu can be accessed by pressing the **AFS** button. Turn the **DATA** wheel to scroll through the list of parameters. Press the **DATA** wheel to edit a selection.

- **AFS** *[ON, OFF]*
  Turns the AFS module on or off. If AFS is off, the filters are bypassed and the algorithm is halted (the filters are not updated). If AFS is on, the filters are active and they are updated according to the currently selected mode (Fixed or Live).

  WARNING! If AFS is turned on and filters are set (in use), be careful when turning AFS off, as all filters will be immediately removed from the signal path and sudden feedback could occur. It is recommended that you lower your mixer output faders before turning AFS off.

- **CLEAR MODE** *[NONE, LIVE ONLY, ALL]*
  This parameter selects which filters will be cleared when you perform the clear function. If the NONE option is selected, filters cannot be cleared. If the LIVE ONLY option is selected, only the Live filters will be cleared when you perform the clear function and the Fixed filters will be left alone. When the ALL option is selected, both Live and Fixed filters will be cleared when performing the clear function.
- **CLEAR <PRESS SELECT>**
  Selecting this option then pressing the **DATA** wheel triggers the clear function, which removes set AFS filters. The clear function allows you to either clear only the Live filters or all AFS filters so you can ring out the system for a new venue. The CLEAR MODE parameter selects which filters will be cleared when performing the clear function.
- **MODE** *[FIXED, LIVE]*
  This parameter determines whether the AFS algorithm will set Live or Fixed filters. Select the FIXED mode option to initially ring out the system for optimal gain before feedback using the Fixed filters (the microphones should be active during this procedure, but there should be no signal present at the microphones). Fixed filters are "static" and will remain set until you manually clear them.

  Once you have rung out the system with the Fixed filters, set the mode to LIVE to further protect the system from feedback during the performance using the Live filters. In Live mode, AFS uses logic to determine what is feedback and what is not. The enhanced AFS algorithm in the PA2 can better distinguish between progam material and feedback, dramatically lowering the probability of false Live filters being set on feedback-like music content, such as a flute.

  Live filters are "dynamic" and will update as feedback conditions change. When all of the Live filters have been set, they will

begin to round robin – meaning that if all Live filters have been set and new feedback occurs, the first Live filter set will be released then re-set at the new feedback frequency location. The Live filters can be set to release after a period of time by enabling the LIVE LIFT option and adjusting the LIFT AFTER parameter. Note that when you run the AFS Wizard, AFS will automatically switch between Fixed and Live mode operation behind the scenes.

- **TYPE** *[SPEECH, MUSIC/SPEECH, MUSIC]*
  This parameter sets the width of the AFS filters. The available options are:

  SPEECH (Constant bandwidth of 11 Hz below 76 Hz, constant Q of 7 at or above 76 Hz)
  This option is optimized for speech sound reinforcement, where wider notch filters are less noticeable. Select this option when using the sound reinforcement system for speech only. With this option selected, notch filters will be wider, but will provide the fastest, most solid protection against feedback.

  MUSIC/SPEECH (Constant bandwidth of 9 Hz below 260 Hz, constant Q of 29 at or above 260 Hz)
  This option is optimized for live music or speech sound reinforcement and provides the best all-around protection. It will provide the best combination of fast feedback suppression and precision, using filters slightly narrower and less audible than the SPEECH setting. If you're not sure which setting to use, select this option.

  MUSIC (Constant bandwidth of 8 Hz below 927 Hz, constant Q of 116 at or above 927 Hz)
  This option is optimized for live music sound reinforcement and offers the highest level of sonic quality. When this option is selected, the AFS algorithm will zero in on the offending feedback frequency, while leaving the surrounding frequencies unscathed.

NOTE: To guarantee that feedback is suppressed using the minimum number of filters possible, AFS may automatically widen filters. For example, if you had selected the MUSIC setting and an adjacent frequency is feeding back, AFS will detect both frequencies, and if they are in close enough proximity, will set a single, wider filter rather than two narrow filters. Using a single, wider filter rather than two narrow filters will not alter the sonic quality and will ensure that the maximum number of filters will always be available for use. Automatically adjusted filter widths will never be any wider than the SPEECH setting.

TIP: You can change the TYPE parameter at any time when manually ringing out the system with AFS. This allows you to use narrow notch filters in combination with wider notch filters. For example, you could set the TYPE parameter to MUSIC then ring out the system in Fixed mode, switch over to Live mode, then set the TYPE parameter to MUSIC/SPEECH for the Live filters. This would allow you to use the extremely narrow MUSIC notch filters for the Fixed filters (providing the best sound quality possible), then use the slightly faster, wider MUSIC/SPEECH notch filters for the Live filters (providing slightly faster feedback suppression during the performance).

- **FIXED FILTERS** *[0 – 12]*
  This parameter sets how many of the AFS filters will be allocated as Fixed filters. After selecting how many filters will be allocated as Fixed filters, all remaining filters will be allocated as Live filters. There are a total of 12 AFS filters available, so the simple formula is: Total Filters Available - Selected Number of Fixed Filters = Number of Live Filters. For example, if you select a FIXED FILTER setting of 8, you will have 4 Live filters available for use (12 - 8 = 4).

TIP: Since it's not really possible to predict exactly how many Fixed filters you may need, a good setting to start with is the default setting of 6. If after ringing out the system, you feel you need to squeeze a little more gain out of the system before feedback, you can increase the FIXED FILTERS setting and run the AFS Wizard again or manually ring out only the newly added Fixed filters in the AFS menu.

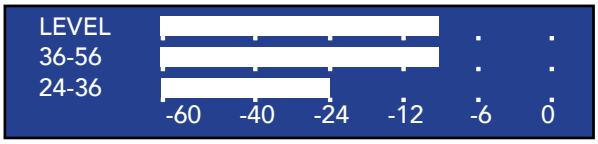
NOTE: If the FIXED FILTERS setting is changed after filters have been set, the filters will be cleared one by one as you increase or decrease the setting. For example, if you decrease the FIXED FILTERS setting by one, the last Fixed filter set will be cleared because the Fixed filter will be changed to a Live filter. Likewise, if the FIXED FILTERS setting is increased by one (and thus the number of Live filters goes down), then the first Live filter set will be cleared. The Fixed/Live filter allocation is indicated at the bottom of the LCD display in the AFS menu. "F" indicates Fixed filters and "L" indicates Live filters. A highlighted F or L indicates a filter that is set, or in use.

- **LIVE LIFT** *[ON, OFF]*
  This parameter turns the LIVE LIFT feature on or off. When turned on, this parameter essentially enables a timer. Turn LIVE LIFT on when you want AFS to lift (release) Live filters after a predetermined time set by the LIFT AFTER parameter. Higher fidelity can be restored to the system by lifting Live filters when they are no longer needed (for example, if a singer steps to the front of the stage and triggers feedback, setting a Live filter, and then backs off).
- **LIFT AFTER** *[5S – 60M]*
  When the LIVE LIFT parameter is turned on, this parameter determines how long it will take before AFS will attempt to remove a set Live filter. The selectable options range from 5S (5 seconds) to 60M (60 minutes). The updated AFS algorithm in the PA2 will slowly release Live filters by 3 dB increments to determine if it is safe to remove them. If it gets to 0 dB and no feedback reoccurs, the filters are completely lifted. If feedback attempts to reappear while releasing, the filters are once again set and the timer resets. This helps prevent a sudden reoccurrence of blaring feedback in the event a Live filter is still required and needs to remain set.
- **SELECTED FILTER** *[1 – 12]*
  This parameter selects between the available filters shown at the bottom of the LCD display when in the AFS menu and provides information on each filter. "L" represents a Live filter and "F" represents a Fixed filter. As you select each filter, the set frequency, Q, and amount of attenuation will be shown for the filter in the bottom of the LCD display.

Subharmonic Synthesis (SUB)

dbx's subharmonic synthesis (or sub-synth) processing has been specifically optimized to enhance the low frequencies in audio material and was designed for use in a variety of professional audio applications, including nightclub and dance DJ mixing, theatre and film sound, sound design, music recording, live music performance, and broadcasting. Using traditional EQ to enhance this extremely low frequency region can increase noise potential and stage rumble (low-frequency feedback) in live PA systems. Another problem is that the audio source may not have sufficient low end in this region to boost or the mic used to capture the sound may not capture these extremely low frequencies. Subharmonic synthesis creates synthesized low frequencies based on some of the higher frequencies in the audio program and gives you noise free low-end enhancement. The subharmonic module's two separate bands of subharmonic synthesis provide additional control for creating a deep, smooth low-end response.

The level meters available in the Subharmonic Synth menu show overall effect level, 35–56 Hz effect level, and 24–36 Hz effect level. Use these meters while adjusting the subharmonic synthesizer's parameters to see how much of the effect you are adding to the mix.



Subharmonic Synthesis Level Meters

Subharmonic Synthesis Parameters

The Subharmonic Synth menu can be accessed by pressing the **SUB** button. Turn the **DATA** wheel to scroll through the list of parameters. Press the **DATA** wheel to edit a selection.

- **SUBHARMONIC** *[ON, OFF]*
  This parameter turns the subharmonic synth module on or off.
- **SUBHARMONICS** *[0% – 100%]*
  This parameter sets the overall level of the sub-synth effect.
- **36–56 HZ LEVEL** *[0% – 100%]*
  This parameter adjusts how much of the sub-synth effect is added between the 36 Hz to 56 Hz region. If the sound becomes too "woofy" or "growly", try turning this parameter down. You may find that a certain setting produces fine results in one room, but produces too much "boominess" in another. If this occurs, adjust the parameter as needed.
- **24–36 HZ LEVEL** *[0% – 100%]*
  This parameter adjusts how much of the sub-synth effect is added between the 24 Hz to 36 Hz region. If your woofers are bottoming out (making a ticking or popping sound), turn this parameter down. Enhance this frequency region less than the 36-56 Hz region (as shown in the above level meter screenshot) for more natural bass roll-off. Experimentation will pay off with smooth, full, deeply extended bass.

IMPORTANT! The subharmonic synthesis process produces low-frequency audio signals that some speakers may not be designed to reproduce. Attempting to achieve enhanced bottom end with these systems may not be possible and may result in over-stressing or even damaging your loudspeakers. It is generally not a good idea to use this feature without a subwoofer. In any case, please refer to your speakers' frequency response specification, and avoid forcing them to reproduce low frequencies that they are not designed to reproduce.

NOTE: If you experience low-frequency artifacts on a voice when using subharmonic synthesis, try engaging a high-pass filter, using EQ, or a combination thereof on the vocal's mixer channel to reduce the artifacts. If a high-pass filter and EQ are not enough, try lowering the overall amount of Subharmonic Synthesis applied to the signal by adjusting the SUBHARMONICS parameter.

NOTE: The left and right input signals are summed to mono before the subharmonic synthesizer processes the audio. The subharmonic synthesis effect signal is then output as a mono effect and mixed in with the unprocessed audio signal. Any panned signals which contain enough low-frequency content to trigger the subharmonic synthesis effect will output a mono summed effect signal, which will be played out of both the left and right PA loudspeakers.

Compressor (COMP)

A compressor is used to compress the dynamic range of the audio signal, bringing up the lower-level portions of the signal and restricting the higher-level portions of the signal. In live sound applications, it is common to compress the audio at different stages in the signal chain. For example, you may apply compression to individual instruments using the mixer's insert points and/or a group of instruments using the mixer's bus or group inserts. You can also apply compression to the entire mix in order to add some additional "body" to the sound and help "glue" the mix together. It's this latter application that the compressor module in the PA2 was designed to address.

Typically, you want to control the dynamic range where it's needed. For example, using a compressor on an entire mix, without compressing individual instruments, may not improve a mix where some instruments are much more dynamic than others. The dynamic instruments still won't sit right in the mix. You'll have to increase their volume so their lower-level signals aren't lost in the mix and then their louder-level signals will just hit the compressor harder than everything else and suck everything down with it.

The compressor module in the PA2 is a broadband compressor which provides overall mix compression and is located on the input processing side of the PA2. The compressor module can help add the final touch of dynamics processing to the mix, but should be used sparingly as this type of compression generally works best with lower ratio settings. A 1:5 to 2:1 ratio with 2–3 dB of compression should do the trick. It's subtle, but it can help smooth things out and add a little extra "girth" to the sound if set properly. Be careful not to apply too much compression, as doing so can have the adverse affect of making the sound "smaller" or creating "pumping" or "breathing" artifacts.

NOTE: If using subharmonic synthesis, which is placed before the compressor, the strong low-frequency energy from the sub-synth process can cause excessive compressor pumping/breathing. If you exhibit this type of behavior, try lowering the subharmonic synthesis level and/or the compression ratio to eliminate the artifacts.

Compressor Parameters

The Compressor menu can be accessed by pressing the **COMP** button. Turn the **DATA** wheel to scroll through the list of parameters. Press the **DATA** wheel to edit a selection.

- **COMPRESSOR** *[ON, OFF]*
  Turns the compressor module on or off.
- **THRESHOLD** *[-60 dB to 0 dB]*
  This parameter sets the level at which the compressor will begin compressing the signal. The compressor's Threshold Indicator (shown to the right) indicates when signal is below threshold, above threshold, or in the OverEasy region. For example, if the threshold parameter is set to -10 dB, any signal which exceeds -10 dB will be compressed, while any signal lower than -10 dB will be left alone (uncompressed). Typically, you will want to set the threshold parameter so that the lower levels of the signal drop below threshold and the higher levels exceed threshold. This can easily be achieved by looking at the compressor's Threshold Indicator and adjusting the THRESHOLD parameter until the meter alternates back and forth between the ⊟ and ⊞ icons (or ⊟, ⊡, and ⊞ icons if OVEREASY is turned on).

THRESHOLD INDICATOR

Signal Below Threshold

Signal Above Threshold

Signal Approaching Threshold (OverEasy™ Turned On)

- **RATIO** *[1:1 to Inf:1]*
  This parameter determines how much compression is applied to the signal once it exceeds threshold. For example, applying

a 2:1 ratio would allow the output signal level to increase by only 1 dB for every 2 dB of level increase over threshold. In other words, 1 dB of compression will be applied for every 2 dB increase in level above threshold. For light compression, choose a lower ratio. For heavy compression increase the ratio. A ratio setting of about 10:1 or higher essentially turns the compressor into a limiter. Typically, a setting of 1.5 to 2:1 will yield best results for most applications where the compressor is used.

- **GAIN** *[-20 dBu to +20 dBu]*
  This parameter is used to compensate for the gain lost due to compression. Typically, you can look at the gain reduction meter and then apply a matching amount of gain. Or you can turn the compressor on or off to A/B the compressed signal with the uncompressed signal and adjust the gain until the two levels match when A/B'ed. By using compression on a signal and then boosting the signal with the gain parameter, you can slightly increase the average level and create a signal that sounds a little louder than it actually is. However, care should be taken to prevent over-compression, which can cause level pumping and increase the likelihood of feedback.

- **OVEREASY** *[OFF, 1–10]*
  One criterion that determines how a compressor will function is called the "knee". The knee region exists at or around the compressor's threshold setting and determines how gradual or abrupt the compression will be. A compressor with hard-knee characteristics won't compress the signal until it exceeds threshold and will provide a more abrupt and aggressively compressed sound, as well as retain more of the attack and level of the original sound. Conversely, a compressor with soft-knee characteristics will begin compressing the signal lightly before it has actually exceeded threshold and will apply more compression as the signal level approaches threshold, applying full compression once the signal does exceed threshold. This can generate smoother, more musical compression for applications that require a smooth ("round") sound, rather than an aggressively compressed ("attacky") sound.

  The OVEREASY parameter in the PA2's compressor module varies the knee characteristics of the compressor. When set to OFF, the compressor will function as a hard-knee compressor, making it sound more aggressive as described above. Setting this parameter to a setting between 1–10 will cause the compressor to act as a soft-knee compressor, yielding more gradual, smooth, and natural compression. The OVEREASY parameter's 1–10 range is referred to as VariKnee™. Lower values provide a slightly softer knee than a hard-knee compressor. As you increase the OVEREASY setting, the knee softens, rounding out the sound. This lets you choose the exact knee that is needed for the dynamic effect you are looking for.

  Generally, a hard-knee compressor will sound louder, more aggressive, and more audible when compressing. The softer the knee, the lower in level the source will sound, but the smoother and less noticeable the compression will be. Use proper judgement, depending upon the application and/or genre of music being reproduced through the sound system, and experiment to find the best setting that works for your application.

Delay

There are two different delay module types available in the PA2: the input (also known as pre or backline) delay module and the output (also known as driver alignment) delay module.

The output delay modules (labelled HIGH, MID, and LOW) are used to time align loudspeaker drivers which require it. Typically, driver alignment delay is only required when configuring a bi-amplified (2-way) or tri-amplified (3-way) system. Time alignment delay is required because of the physical offset which exists between the different drivers within the loudspeaker system, and when you bypass the internal passive crossover circuit in a speaker enclosure you must make up for these differences in distance. Because of this physical offset, the sound emanating from each driver will reach the listeners' ears at different times, creating phase anomalies in the frequency regions where multiple drivers reproduce the same frequencies (the frequency range in close proximity to the set crossover frequencies).

Driver alignment delays are included with speaker tunings, so when you select a specific model of bi-amplified main speaker in the Setup Wizard, driver alignment delays will automatically be entered for you based on the model you selected. However, depending upon where you place your subwoofers or the type of subwoofers used, you may need to enter a delay offset to take them into account as well. If you place your mains directly on top of your subs or use stand mounts that mount your mains above your subs, you shouldn't have to worry about a delay offset between your mains and subs. If you're not sure, take a look at one of your speaker stacks from the side perspective and ask yourself, "is the woofer's voice coil in my main speaker physically aligned with the subwoofer's voice coil?" You should be able to get a good idea if you may have to apply some delay offset for your subs or simply reposition your mains on top of the subs, if possible. Note that small differences in distance (e.g., a few inches) between low and sub drivers is negligible and should not be of any concern, due to the large size of these low-frequency waveforms.

If your subs are placed off to the side of the stage or somewhere other than between the mains or under the mains (anywhere not aligned with the mains when viewed from the side perspective), you will likely need to manually apply some driver alignment delay. If you do need to apply driver alignment delay to compensate for sub placement, you can calculate the difference in distance between the sub and "sweet spot" (the audience position which forms an equilateral triangle with the main speakers) and the mains and sweet spot, then enter this value into the corresponding driver alignment delay (i.e., the cabinet which is further forward will need to be "pushed back" or delayed). If the subs are located further back from the mains, you will have to apply the delay to the mains. If the subs are located further forward than the mains, the driver alignment delay will have to be applied to the subs.

The input delay module is used for a different purpose. Once your driver alignment delays have been dialed in, the input delay module can be used to apply a slight delay to the entire sound system (that's why it's placed pre-crossover). By applying this backline delay, the acoustic sound emanating directly from the instruments on stage (drums, guitar amps, horns, etc.) can be positively reinforced by the sound system. To set the backline delay, measure or approximate the distance between the instrument furthest back on stage (usually the drums) and the main speakers then enter this distance into the input delay module (the PA2 allows you to enter the delay time setting in feet, meters, or milliseconds – no calculation required). Don't forget to take your driver alignment delays into account. For example, if you've placed your subs to the side of the stage and delayed your mains to align them, the mains delay would need to be subtracted from the calculated backline delay. You can also try simply dialing this in by ear, by standing in front of the stage and wirelessly adjusting the input delay LENGTH, using the Mobile Control app, until the system sounds its best.

Delay Parameters

The Delay menus can be accessed by pressing the **DELAY** button. You will see a list of the available delays to select from. In all cases you will at least see the INPUT DELAY and HIGH OUTPUT DELAY. If you've configured a 2-way system, you will

also see a LOW OUTPUT DELAY. If you've configured a 3-way system, you will see an additional MID OUTPUT DELAY. Turn and press the **DATA** wheel to select the desired delay module. Turn the **DATA** wheel to scroll through the list of parameters. Press the **DATA** wheel to edit a selection. When in a Delay menu, pressing and holding the **DELAY** button for approximately 2 seconds will advance to the next delay module, wrapping around through the available modules.

- **DELAY** *[ON, OFF]*
  Turns the selected delay module on or off.
- **LENGTH (LOW, MID, and HIGH OUTPUT DELAYS)** *[0ms/0ft/0m – 10ms/11.27ft/3.43m]*
  Sets the delay time or length. Each pair of outputs has up to 10ms of delay time available for driver alignment delay. Delay length will be displayed in all units at the same time (i.e., milliseconds, feet, and meters), making it easy to dial in the setting for the units you prefer. Delay lengths can be adjusted by the following increments: ~.02 ms/~.02 ft/~.01 meter.
- **LENGTH (INPUT DELAY)** *[0ms/0ft/0m – 100ms/112.7ft/34.3m]*
  Sets the delay time or length. The input delay has up to 100ms of delay time available for backline delay. Delay length will be displayed in all units at the same time (i.e., milliseconds, feet, and meters), making it easy to dial in the setting for the units you prefer. Delay lengths can be adjusted by the following increments: ~.02 ms/~.02 ft/~.01 meter.

Crossover (XOVER)

A crossover is used to divide the broadband signal into separate frequency bands. This allows each loudspeaker or driver in a sound system to be operated within its optimal frequency range. Using an active crossover, like that in the PA2, has the additional benefits of increasing the efficiency of your power amplifiers, lowering intermodulation distortion, and in some cases, improving the drivers' transient response.

The crossover module in the PA2 can be configured for full range, 2-way, or 3-way operation. All outputs provide a band-pass filter (a combination of high pass and low-pass filters) with selectable Butterworth or Linkwitz-Riley filter types and filter slopes ranging from 6 dB/octave to 48 dB/octave.

When you select your main and sub speakers in the Setup Wizard, the PA2 will automatically configure the crossover for your system. If tunings aren't listed for your main or sub speakers, check the ever-growing online database using the DriveRack PA2 control app to see if they've been added. If tunings cannot be found for your speakers, selecting the NOT LISTED option for any such components will set safe and usable crossover settings. These settings may work perfectly fine for you, but if you would like to dig your heels in, know that you may be able to improve system performance by fine-tuning the crossover parameters. See ***'Manual System Optimization Tips' on page 18*** for more information on optimizing the crossover.

All outputs (LOW, MID, and HIGH) do allow you to overlap and roll out the crossover frequencies. This allows you to configure multiple outputs for full range operation if required. There are some included factory presets in the PA2 already configured for this type of operation. See ***'Preset List' on page 55*** to see a list of the available pre-configured factory presets.

Crossover Parameters

Each pair of outputs (i.e., LOW, MID, and HIGH) will contain their own set of crossover parameters. The Crossover menu can be accessed by pressing the **XOVER** button. You will see a list of the available band-pass filters to select from. Which options are available in the list will depend upon the current configuration. In all cases you will at least see the HIGH BAND. If you've configured a 2-way system, you will also see a LOW BAND for the LOW outputs. If you've configured a 3-way system, you will see an additional MID BAND for the MID outputs. Turn and press the **DATA** wheel to select the desired band. Turn the **DATA** wheel to scroll through the list of parameters. Press the **DATA** wheel to edit a selection. When in the Crossover menu, pressing and holding the **XOVER** button for approximately 2 seconds will advance to the next active crossover band from the list, wrapping around through the available bands.

- **HP FREQUENCY** *[OUT, 16 Hz – 20 kHz]*
  Adjusts the cutoff frequency of the high-pass filter.
- **HP TYPE** *[BW 6, BW 12, BW 18, BW 24, BW 30, BW 36, BW 42, BW 48, LR 12, LR 24, LR 36, LR 48]*
  Selects the high-pass filter type and slope rate. BW stands for Butterworth. When two Butterworth filters are summed, a 3 dB increase in level will be created at the crossover frequency. LR stands for Linkwitz-Riley. When two Linkwitz-Riley filters are summed, there is no increase in level around the crossover frequency, which makes these type of filters very popular. The numbers next to each option represent the filter slope rate in decibels per octave.
- **GAIN** *[-60 dB to +20 dB]*
  Adjusts the output level for the selected band.
- **LP FREQUENCY** *[16 Hz – 20 kHz, OUT]*
  Adjusts the cutoff frequency of the low-pass filter.
- **LP TYPE** *[BW 6, BW 12, BW 18, BW 24, BW 30, BW 36, BW 42, BW 48, LR 12, LR 24, LR 36, LR 48]*
  Selects the low-pass filter type and slope rate. BW stands for Butterworth. When two Butterworth filters are summed, a 3

dB increase in level will be created at the crossover frequency. LR stands for Linkwitz-Riley. When two Linkwitz-Riley filters are summed, there is no increase in level around the crossover frequency, which makes these type of filters very popular. The numbers next to each option represent the filter slope rate in decibels per octave.

- **POLARITY** *[NORMAL, INVERTED]*
  Inverts the polarity of the selected PA2 outputs. Polarity inversion is used to match driver polarity in systems which require it. See ***'Manual System Optimization Tips' on page 18*** for more information on polarity inversion.

Limiter

Limiters are used to set a ceiling on the signal level, preventing the signal from exceeding a predetermined threshold. For this reason, they are used to prevent the overdriving of equipment. Limiters are compressors with high ratios (typically, a ratio of around 10:1 or higher). The ratio controls in the PA2 limiter modules are fixed at infinity:1. In live PA sound systems, limiters can be used just before the amplifiers to squeeze the last bit of level out of the sound system and protect the loudspeakers by preventing the amplifiers from clipping.

The limiter modules in the PA2 are post-crossover, meaning they can function as band-limited limiters. This allows you to limit the LOW, MID, and HIGH outputs independently. For example, you could apply limiting on the signal feeding the subwoofer amplifier without affecting any of the higher frequencies being sent to the main speakers. This has the additional benefit of making any such limiting less noticeable.

The limiter thresholds will automatically be set for you when you run the Setup Wizard and select your amplifiers or powered speakers from the tuning list. If tunings aren't listed for your amplifiers, check the ever-growing online database using the DriveRack PA2 control app to see if they've been added. If tunings cannot be found for your amps, select the NOT LISTED option. Note that the limiters will not be set when selecting the NOT LISTED option for your amps. Therefore, the limiters will need to be calibrated manually if you wish to use them to protect the system. See ***'Manual System Optimization Tips' on page 18*** for more information on manually calibrating the limiters.

The PA2's limiters are dbx PeakPlus™ type limiters. They use RMS detection, which provides very musical and natural limiting. They also utilize some functionality from the dbx PeakStopPlus™ type limiters, in that they offer a soft clipping function which helps by rounding out the transients (peaks). This provides additional protection and prevents the system from becoming dull and lacking punch when limiting occurs. These PeakPlus™ limiters have an overshoot of 3 dB, meaning it is possible for transients to exceed the threshold by up to 3 dB.

Limiter Parameters

The Limiter menus can be accessed by pressing the **LIMITER** button. You will see a list of the available limiters to select from. In all cases you will at least see the HIGH OUTPUT LIMITER. If you've configured a 2-way system, you will also see a LOW OUTPUT LIMITER. If you've configured a 3-way system, you will see an additional MID OUTPUT LIMITER. Turn and press the **DATA** wheel to select the desired limiter module. Turn the **DATA** wheel to scroll through the list of parameters. Press the **DATA** wheel to edit a selection. When in a limiter menu, pressing and holding the **LIMITER** button for approximately 2 seconds will advance to the next limiter module, wrapping around through the available modules.

- **LIMITER** *[ON, OFF]*
  Turns the selected limiter module on or off.

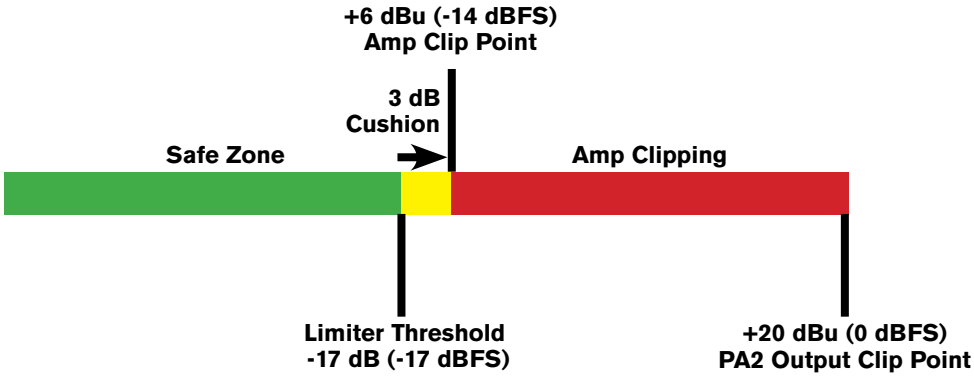
- **THRESHOLD** *[-60 dB to 0 dB]*
  This parameter sets the level at which the limiter will begin limiting the signal. The limiter's Threshold Indicators (shown to the right) indicate when signal is below threshold, above threshold, or in the OverEasy region. For example, if the threshold parameter is set to -17 dB, any signal which exceeds -17 dBFS will be limited, while any signal lower than -17 dBFS will be left alone. You will want to set the threshold to a setting just below the clip point of the amp. For example, if your amp clips at +6 dBu, based on where you have set your amplifier attenuators, you would want to set the limiter's THRESHOLD to about -14 dB. Note that it is possible for short peaks to exceed the threshold by up to 3 dB. To be absolutely safe, you can lower the threshold by an additional 3 dB to provide a "3 dB cushion". This would mean, in the previous example, that the threshold would be set to -17 dB as shown in the following illustration.

THRESHOLD INDICATOR

Signal Below Threshold

Signal Above Threshold

Signal Approaching Threshold (OverEasy™ Turned On)



Limiter Threshold Setting Example

- **OVEREASY** *[OFF, 1–10]*
  One criterion that determines how a limiter will function is called the "knee". The knee region exists at or around the limiter's threshold setting and determines how gradual or abrupt the limiting will be. A limiter with hard-knee characteristics won't limit the signal until it exceeds threshold and will provide a more abrupt and aggressively limited sound, as well as retain more of the attack and level of the original sound. Conversely, a limiter with soft-knee characteristics will begin limiting the signal lightly before it has actually exceeded threshold and will apply more limiting as the signal level approaches thershold, applying full limiting once the signal does exceed threshold. This can generate smoother, more musical limiting.

  The OVEREASY parameter in the PA2's limiter module varies the knee characteristics of the limiter. When set to OFF, the limiter will function as a hard-knee limiter, making it sound more aggressive as described above. Setting this parameter to a setting between 1–10 will cause the limiter to act as a soft-knee limiter, yielding more gradual, smooth, and natural limiting. The OVEREASY parameter's 1–10 range is referred to as VariKnee™. Lower values provide a slightly softer knee than a hard-knee limiter. As you increase the OVEREASY setting, the knee softens, rounding out the sound. This lets you choose the exact knee that is needed for the dynamic effect you are looking for.

  Generally, a hard-knee limiter will sound louder, more aggressive, and more audible when limiting – although when the PA2 is configured for 2-way or 3-way operation, the output limiters become "band-limited", making these artifacts far less audible. The softer the knee, the lower in level the source will sound, but the smoother and less noticeable the limiting will be. Use proper judgement, depending upon the application and/or genre of music being reproduced through the sound system, and experiment to find the best setting that works for your application.

RTA

The 31-band RTA (Real-Time Analyzer) module allows you to monitor frequency levels. This information can help with identifying system issues – such as improperly set crossover settings, blown drivers, or driver/speaker dependent level issues. It can also be used when manually tuning the sound system.

RTA Parameters

The RTA menu can be accessed by pressing the **RTA** button. Turn the **DATA** wheel to scroll through the list of parameters. Press the **DATA** wheel to edit a selection.

- **RATE** *[SLOW, FAST]*
  Adjusts how quickly the RTA will sample the audio and update its display. When set to FAST, instantaneous peaks can be seen, but the RTA will react very quickly, making it difficult to use for some tasks. When set to SLOW, the RTA will update at a slower rate, making it easier to read the amplitude levels of all frequencies.
- **GRAPH OFFSET** *[0 dB – 40 dB]*
  Adjusts the signal level entering the RTA. Adjust this parameter so that the full frequency spectrum of the monitored signal can be displayed within the RTA graph.
- **GRAPH TYPE** *[OPT1 – OPT6]*
  Selects between six different RTA graph view types. Select the type which looks best to you.
- **GRAPH HOLD** *[0.5 sec – 5.0 sec]*
  Sets the length of time the RTA will display (hold) peaks in the display, providing an easy-to-read visual indication of peak levels, even after they've already passed.
- **SIGNAL GENERATOR** *[OFF, PINK, WHITE]*
  Turns the built-in signal generator on or off. The signal generator can be used when calibrating the sound system using 3rd party analysis tools, such as analysis software or another hardware analyzer. It can also be used to measure the frequency response of the system using the built-in RTA. There are two different noise options to select from: PINK and WHITE. Some analyzers are calibrated to read "flat" across the frequency spectrum when white noise is used, others are calibrated to read flat when pink noise is used, and some allow you to select between the two. Select the appropriate option depending upon your analyzer. Note that the PA2's built-in RTA is calibrated to read flat when using pink noise.
- **SIGNAL AMPLITUDE** *[-60 dB – 0 dB]*
  Adjusts the level of the built-in signal generator.

TIP: When using the RTA from the front panel of the PA2, you may want to disable the TIME OUT feature in the Utility menu to prevent the LCD display from timing out and returning to the home screen. For more information on the TIME OUT feature, see ***'Utility' on page 46***.

TIP: You can choose to make the RTA your home screen. For more information on changing the home screen, see ***'The Home Screens' on page 13***.

Utility

The Utility menu allows you to edit global system parameters and provides system information.

Utility Parameters

The Utility menu is accessed by pressing the **UTILITY** button. Turn the **DATA** wheel to scroll through the list of parameters. Press the **DATA** wheel to edit a selection.

- **SYSTEM INFO**
  Selecting this option displays important PA2 system information, such as the currently installed firmware version, network IP address, and Mac address. You can also view this system information via the System Info home screen. See ***'The Home Screens' on page 13*** for more information on this feature.
- **LCD CONTRAST** *[0% – 100%]*
  Adjust this parameter to vary the contrast of the LCD display. Use it to make the LCD display more visible under different lighting conditions.
- **TIME OUT** *[10s, 30s, 1min, 2min, 3min, 4min, 5min, 10min, DISABLED]*
  This parameter sets the time that it takes for the PA2 to return to the home screen after a period of inactivity, or whether the PA2 will return to the home screen at all (DISABLED).
- **MUTES POWERUP** *[CURRENT, MUTE ALL]*
  This option determines whether the PA2 will boot with the output mute settings last used when the device was powered down (CURRENT) or if it will always boot with all outputs muted (MUTE ALL).
- **SECURITY**
  Select this option to edit your administrative password. The default password is 'administrator'. Changing the password to anything other than the default password will enable the Security feature. When enabled, the PA2 will require a password before it can be controlled over a network using the DriveRack PA2 control app. Follow the on-screen instructions to edit the password. Changing the password back to 'administrator' will disable the Security feature.
- **DEVICE NAME**
  Allows you to edit the name of the device. This name is displayed when connecting to the device from the PA2 control app.
- **SALES BANNER** *[ON, OFF]*
  Turns the Sales Banner on or off. The Sales Banner is used for display purposes only.

Power-Up Functions

Power-up functions allow you to reset DriveRack PA2 presets and settings, lock out the front-panel controls, and configure the PA2 to always power up with the output mutes enabled. These power-up functions are accessed by pressing and holding certain buttons upon power-up. The following section describes the power-up functions available in the PA2 and how to use them.

Initialize With Mutes On

This power-up function forces the PA2 to boot up with all outputs initially muted. This will prevent audio from passing through the PA2's outputs until you're ready to manually unmute the output channels.

To initialize the PA2 with mutes on:

1. Press and hold any output **MUTE** button then power on the PA2. Keep the button pressed until the LCD display reads, "*MUTE BUTTON HELD All outputs will be muted after initialization.*" then release the **MUTE** button.
2. The PA2 will now initialize with all outputs muted regardless of the mutes' previous state when the PA2 was last powered down.

NOTE: The INITIALIZE WITH MUTES ON option is a one-time operation. After performing this power-up function, the PA2 will revert back to normal operation – meaning the PA2 will power up with all mutes set to the state they were at when the processor was last powered down. The exception is if you have enabled the MUTES POWERUP option in the Utility menu, in which case the PA2 will always power up with all output mutes enabled. See ***'Utility' on page 46*** for further information on this feature.

System Lockout

This power-up function locks out the PA2's front-panel controls to prevent unauthorized tampering. The following options are available:

- **System Unlocked**
  This is the default setting and allows access to all PA2 functions from the front-panel controls.
- **System Locked**
  When this option is selected, all front-panel controls will be locked and a "LOCKED" message will appear in the LCD display whenever any button is pressed or the DATA wheel is turned.
- **System Locked with AFS Filter Clear**
  When this option is selected, all front-panel controls will be locked with the exception of the AFS filter clear function. To clear the AFS filters when this option is selected, press the **AFS** button to enter the AFS menu then press and hold the **AFS** button until the AFS filter clear prompt appears in the LCD display.
- **System Locked with AFS Filter Clear and Mutes**
  This option is similar to the "System Locked with AFS Filter Clear" option listed above. When this option is selected, all front-panel controls will be locked with the exception of the AFS filter clear function and output mutes. To clear the AFS filters when this option is selected, press the **AFS** button to enter the AFS menu then press and hold the **AFS** button until the AFS filter clear prompt appears in the LCD display.

To change the System Lockout option:

1. Press and hold the **RTA** button then power on the PA2. Keep the button pressed until the System Lockout menu appears in the LCD display then release the button.
2. Turn the **DATA** wheel to highlight the desired option.
3. Press the **DATA** wheel to select the highlighted option.
4. When prompted, press the **RTA** button to confirm the selection. The PA2 will boot up and operate according to the System Lockout option selected. Pressing any button other than the **RTA** button will abort the procedure and maintain the setting selected prior to entering the System Lockout menu.

Factory Reset

The Factory Reset function resets all user presets and Utility settings in the PA2 back to their factory default state.

WARNING! Performing the Factory Reset procedure will permanently reset all user presets and set all PA2 settings back to their factory default state. This operation is irreversible.

To perform a Factory Reset:

1. Power down the DriveRack PA2.
2. Press and hold the **STORE** button then apply power to the DriveRack PA2. Keep the button pressed until the "*FACTORY RESET Release STORE button*" message appears in the LCD display then release the **STORE** button.
3. Press the **WIZARD** button to perform the Factory Reset procedure. Press the **STORE** button to cancel the operation.

Soft Reset

The Soft Reset function resets all Utility settings in the DriveRack PA2 back to their factory default state without resetting user presets.

To perform a Soft Reset:

1. Power down the DriveRack PA2.
2. Press and hold the **UTILITY** button then apply power to the DriveRack PA2. Keep the button pressed until the "*SOFT RESET Release UTILITY button*" message appears in the LCD display then release the **UTILITY** button.
3. Press the **WIZARD** button to perform the Soft Reset procedure. Press the **UTILITY** button to cancel the operation.

Application Guide

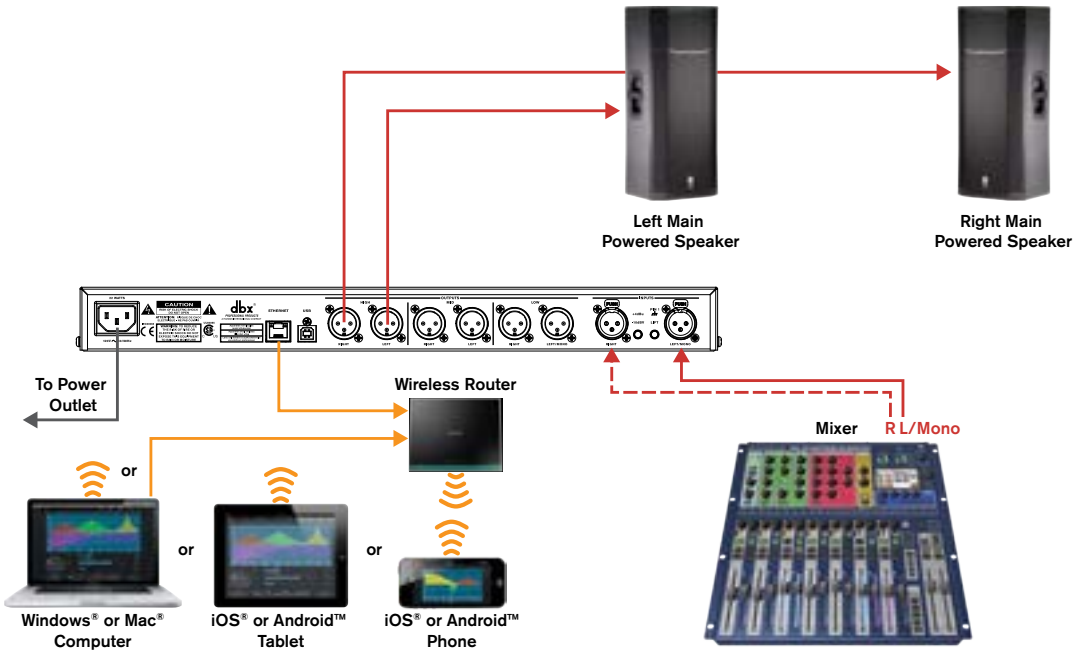
This section of the manual shows the various ways in which the DriveRack PA2 can be configured and provides system diagrams and application notes for each application type. Use these diagrams and notes for reference when initially connecting and configuring the DriveRack PA2 for your application.

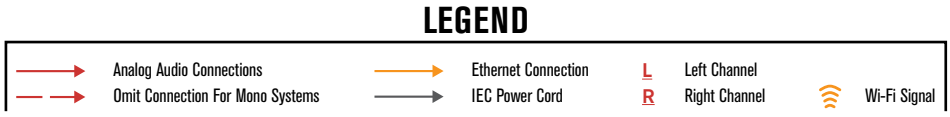
Full Range Application 1 (Standard)

This application is suited for full range systems which do not require an active crossover. In this type of configuration, the PA2 will send full range signal (20 Hz - 20 kHz) through the HIGH outputs. When the PA2 is configured for this type of application using the Setup Wizard, only the HIGH outputs will be enabled; the MID and LOW outputs will be disabled and will not pass audio.

Application Notes:

- Make sure your mixer and amplifiers (or powered speakers) are turned off before making connections.
- Make connections as described in ***'Making Connections' on page 8*** then apply power to the system according to the instructions described in ***'Applying Power' on page 10***.
- Run the Setup Wizard and select the MONO input option if connecting your mixer to the PA2 via a single connection, or select the STEREO input option if connecting the mixer to the PA2 via a left/right stereo connection.
- In the Setup Wizard, select your main speakers from the list. If prompted, select the PASSIVE option for your main speaker configuration. If your speakers are not listed in the PA2, use the DriveRack PA2 control app to check the online database to see if your speaker tunings have been added. If you can't find speaker tunings for your speakers, select the NOT LISTED option from the tuning list.





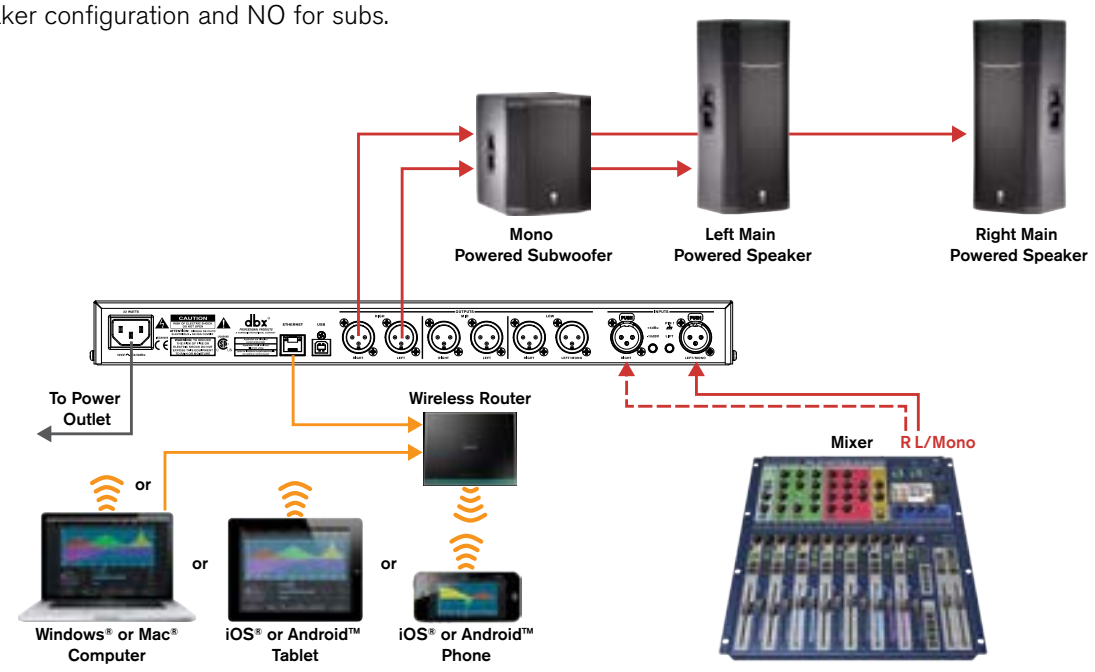
Full Range Application 2 (Sub-Satellite System)

The full range application may also be used for some 2-way powered sub-satellite speaker systems, where you have a pair of powered mains and one or two powered subwoofers which are part of the same product series and are meant to be integrated together. These type of integrated powered speaker systems are designed by the manufacturer to be easy to setup and use. If you have such a system and PA2 tunings are available for your powered main and sub speakers, it is recommended that you configure the PA2 for a 2-way system. See ***'2-Way Application' on page 53*** for further information on this type of application. If the PA2 does not contain tunings for your speakers and you are unable to download them from the online database using the DriveRack PA2 control app, it is recommended that you configure the system as shown in the following system diagram.

In this type of configuration, the PA2 will send full range signal (20 Hz - 20 kHz) through the HIGH outputs. The powered subwoofer(s) would then perform the job of the crossover (separating the mid/high frequencies from the low frequencies). You can still utilize most of the features in the PA2, with the exception of the crossover, and in some cases the limiters – as some of these speaker systems may have built-in limiters which cannot be defeated. When the PA2 is configured for this type of application using the Setup Wizard, only the HIGH outputs will be enabled; the MID and LOW outputs will be disabled and will not pass audio.

Application Notes:

- Make sure your mixer and powered speakers are turned off before making connections.
- Make connections as described in ***'Making Connections' on page 8*** then apply power to the system according to the instructions described in ***'Applying Power' on page 10***.
- Run the Setup Wizard and select the MONO input option if connecting your mixer to the PA2 via a single connection, or select the STEREO input option if connecting the mixer to the PA2 via a left/right stereo connection.
- In the Setup Wizard, select the NOT LISTED option from the tuning list. If prompted, select the PASSIVE option for your main speaker configuration and NO for subs.



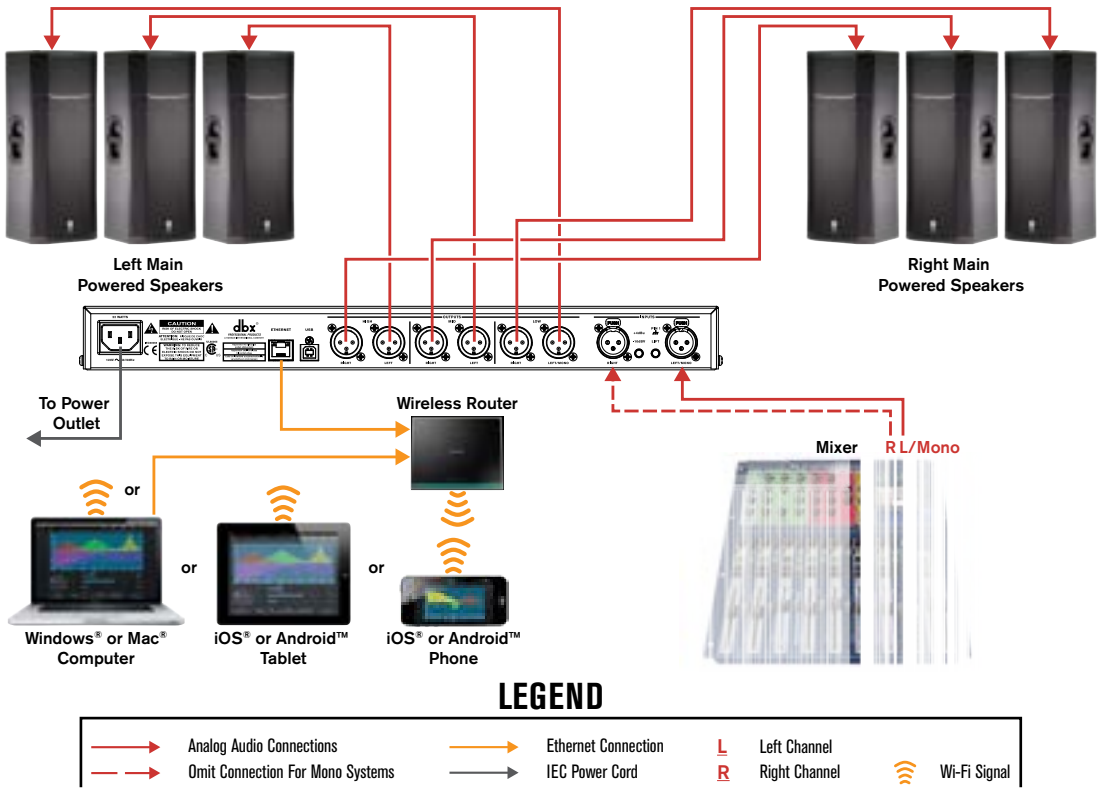
Full Range Application 3 (All Outputs Full Range)

Some full range systems may require more than two full range outputs from the PA2. The PA2 can accommodate these systems as well, but such systems are atypical and cannot be properly configured using the PA2's Setup Wizard alone. Typically, you can parallel your amps or powered speakers in such a system and just use a pair of outputs from the PA2 to feed the system – this is the recommended way to configure this type of system as the Setup Wizard can still be used and you could simply configure the system as shown in ***'Full Range Application 1 (Standard)' on page 50***. However, if your amplifiers or powered speakers do not offer parallel connections then of course this method won't work.

The easiest way to configure such a system is to load a preset which is pre-configured for this type of application, such as preset 13. When using the PA2 for this type of application, the LOW, MID, and HIGH outputs will all be active and will output a full-range signal (20 Hz - 20 kHz). Note that you can alter the crossover frequencies at any time. So, for example, if you have a system which requires 4 full range outputs and 2 subwoofer outputs, this same configuration could still be used by altering the crossover settings to send low frequencies to the subs (using the LOW outputs) and all higher frequencies to the mains (using the MID and HIGH outputs).

Application Notes:

- Make sure your mixer and amplifiers (or powered speakers) are turned off before making connections.
- Make connections as described in ***'Making Connections' on page 8*** then apply power to the system according to the instructions described in ***'Applying Power' on page 10***.
- Recall preset 13 (ST.6FR). Note that no limiters will be set in this application. If using powered speakers, you can simply use their built-in limiters. For information on manually calibrating the limiters, see ***'Manual System Optimization Tips' on page 18***.

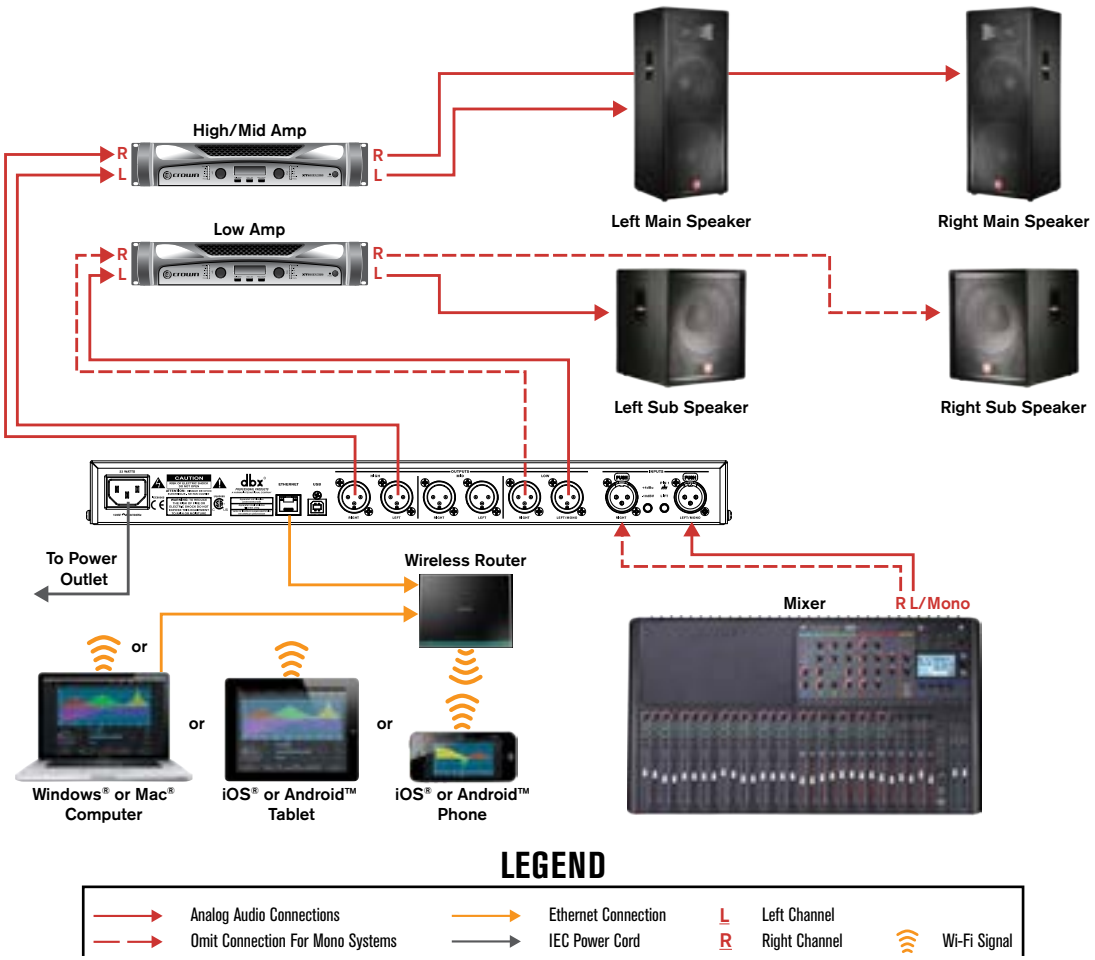


2-Way Application

This application is suited for systems using full range main speakers along with subs or for systems using bi-ampable main speakers with no subs. In this type of application, the PA2 will split the signal into two frequency bands and send all lower frequencies out the LOW outputs to the subs (or low frequency drivers if configuring a bi-amplified main speaker system) and all upper frequencies out the HIGH outputs to the full range mains (or high frequency drivers if configuring a bi-amplified main speaker system). When configuring the PA2 for this type of application, the LOW and HIGH outputs will be enabled and the MID outputs will be disabled.

Application Notes:

- Make sure your mixer and amplifiers (or powered speakers) are turned off before making connections.
- Make connections as described in ***'Making Connections' on page 8*** then apply power to the system according to the instructions described in ***'Applying Power' on page 10***.
- Run the Setup Wizard and select the MONO input option if connecting your mixer to the PA2 via a single connection, or select the STEREO input option if connecting the mixer to the PA2 via a left/right stereo connection.
- In the Setup Wizard, select your main and sub speakers from the list. If you're using passive (non bi-amped) mains along with subs, select the PASSIVE main speaker configuration option when prompted. If you're using a bi-ampable main speaker without subs, select the 2WAY main speaker configuration option when prompted. If your speakers are not listed in the PA2, use the DriveRack PA2 control app to check the online database to see if your speaker tunings have been added. If you can't find speaker tunings for your speakers, select the NOT LISTED option from the tuning list.

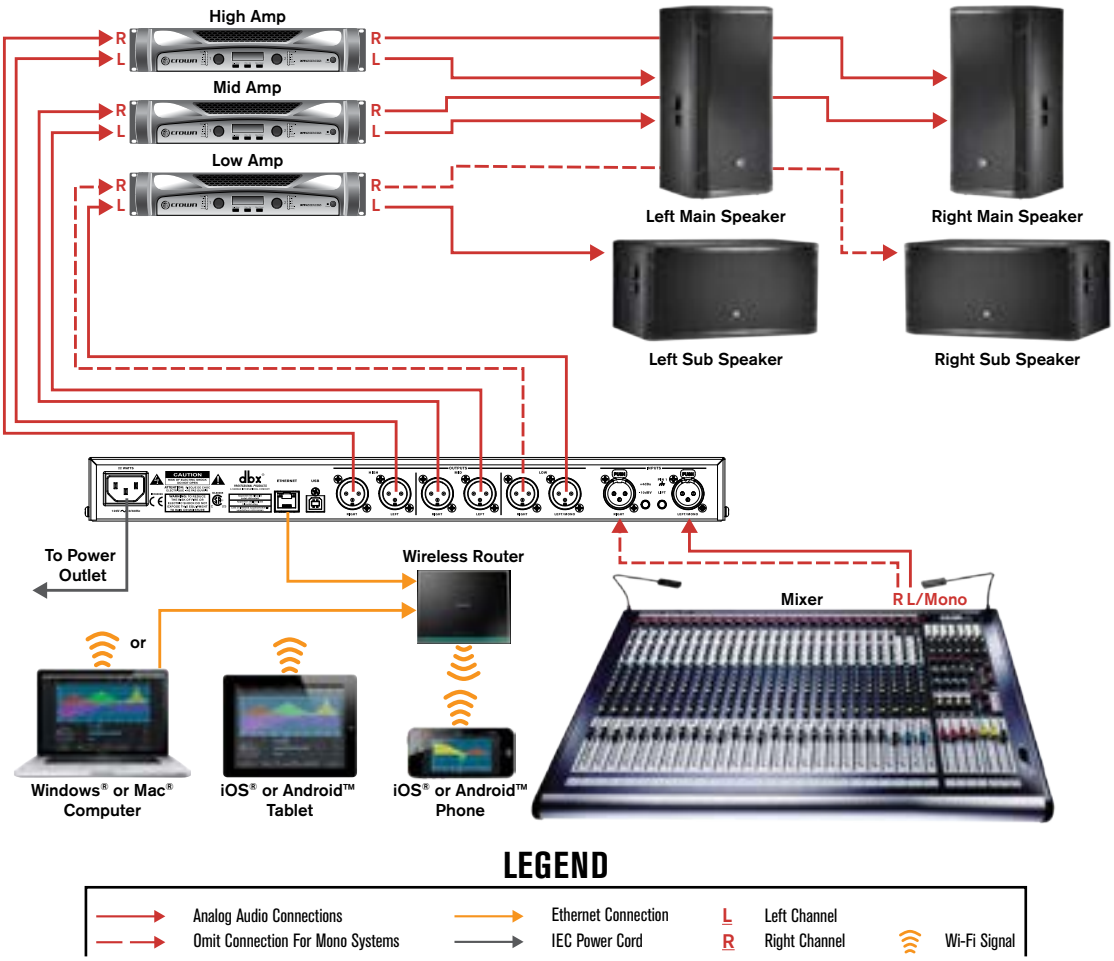


3-Way Application

This application is suited for systems using bi-ampable main speakers along with subs. In this type of application, the PA2 will split the signal into three frequency bands and send all the low frequencies out the LOW outputs to the subs, all the mid frequencies out the MID outputs to the woofers in the mains, and all the high frequencies out the HIGH outputs to the high frequency drivers in the mains.

Application Notes:

- Make sure your mixer and amplifiers (or powered speakers) are turned off before making connections.
- Make connections as described in ***'Making Connections' on page 8*** then apply power to the system according to the instructions described in ***'Applying Power' on page 10***.
- Run the Setup Wizard and select the MONO input option if connecting your mixer to the PA2 via a single connection, or select the STEREO input option if connecting the mixer to the PA2 via a left/right stereo connection.
- In the Setup Wizard, select your main and sub speakers from the list. When prompted, select the 2-WAY main speaker configuration option. If your speakers are not listed in the PA2, use the DriveRack PA2 control app to check the online database to see if your speaker tunings have been added. If you can't find speaker tunings for your speakers, select the NOT LISTED option from the tuning list.



Preset List

User Preset #	Factory Preset #	Name	Description
1, 26, 51	76	ST.Full Range	Stereo Full Range
2, 27, 52	77	M.FullRange	Mono Full Range
3, 28, 53	78	ST.2WaywST.Sub	Stereo 2-Way with Stereo Subs
4, 29, 54	79	ST.2WaywM.Sub	Stereo 2-Way with Mono Sub
5, 30, 55	80	M.2WaywST.Sub	Mono 2-Way with Stereo Subs
6, 31, 56	81	M.2WaywM.Sub	Mono 2-Way with Mono Sub
7, 32, 57	82	ST.3WaywST.Sub	Stereo 3-Way with Stereo Subs
8, 33, 58	83	ST.3WaywM.Sub	Stereo 3-Way with Mono Sub
9, 34, 59	84	M.3WaywST.Sub	Mono 3-Way with Stereo Subs
10, 35, 60	85	M.3WaywM.Sub	Mono 3-Way with Mono Sub
11, 36, 61	86	ST.Bi-ampMains	Stereo bi-amped mains (2-Way)
12, 37, 62	87	M.Bi-ampMains	Mono bi-amped mains (2-Way)
13, 38, 63	88	ST.6FR	Stereo All 6 Outputs Full Range
14, 39, 64	89	ST.4FRwST.Sub	Stereo 4 Outputs Full Range with Stereo Subs
15, 40, 65	90	ST.4FRwM.Sub	Stereo 4 Outputs Full Range with Mono Sub
16, 41, 66	91	JRX115w118S	JBL® Demo Preset
17, 42, 67	92	JRX125w118S	JBL Demo Preset
18, 43, 68	93	EON305	JBL Demo Preset
19, 44, 69	94	EON315	JBL Demo Preset
20, 45, 70	95	EON510w518S	JBL Demo Preset
21, 46, 71	96	EON515XTw518S	JBL Demo Preset
22, 47, 72	97	K-10wK-Sub	QSC® Demo Preset
23, 48, 73	98	K-12wK-Sub	QSC Demo Preset
24, 49, 74	99	PR12wPRSub	Peavey® Demo Preset
25, 50, 75	100	PV115wPV118	Peavey Demo Preset

DriveRack PA2 Control Application

The DriveRack PA2 control application is available for Android™, iOS®, Mac®, and Windows® compatible devices. This application is available for free and can be downloaded on the iTunes Store®, Google Play™, or from www.dbxpro.com.

The DriveRack PA2 control application can be used to perform most of the same functions available from the DriveRack PA2's front panel, this includes running all Wizards, viewing the RTA, editing system and processing parameters, and managing presets. The DriveRack PA2 control app also adds the ability to connect directly to the online tuning database (Internet connection required), where you can download additional tunings from Crown®, JBL®, dbx®, and more!

NOTE: You can control one PA2 device on the network at a time using the PA2 control app. Multiple control devices can be connected to the PA2 simultaneously, however, it is best to control the PA2 from only one device at a time for best performance. For example, you may have the app running on a laptop that sits next to the mixing console and remains active during the entire performance and used for the RTA and occasional tweaks, and then use a tablet periodically when walking around the venue and making adjustments. Performance will be determined by the speed of the wired and/or wireless network. Generally speaking, connecting up to 3 apps simultaneously should work fine on standard 10/100 Mbps wired and 802.11n Wi-Fi networks.

Device Requirements

Visit dbxpro.com for the latest information on device requirements for the DriveRack PA2 control application.

NOTE: A DHCP (Dynamic Host Configuration Protocol) enabled router or switch must be used in the PA2 control network to assign an IP address to the PA2. See ***'Making Connections' on page 8*** and ***'Networking' on page 57*** for more information on connecting and setting up a network for PA2 control.

Networking

Networking Overview

The PA2 can be network controlled with the use of a network switch or router which has a built-in DHCP server. DHCP (Dynamic Host Configuration Protocol) is a protocol for automatically assigning IP addresses to devices on a network. The DHCP server is required to assign an IP address to the DriveRack PA2.

NOTE: The DriveRack PA2 does not support control via a proxy or VPN connection.

NOTE: If you would like to assign a static IP address to the PA2, you will need to use a network switch or router which supports static DHCP addressing.

Network Security

Careful planning should be made before placing a PA2 on a network that provides any access to the public. Some examples of public access are direct access to the device using an unsecured or weakly secured wireless network, or a network jack in a public area that provides network access to the PA2. It is highly recommended that the PA2 be placed on a protected, isolated network that does not have any connection to the public to prevent unauthorized users from reconfiguring or controlling the device. Most routers and switches have built-in functions which help protect the network from unauthorized users, such as MAC address filtering, encryption, and disabling the SSID broadcast. Check the documentation for your switch or router for information on configuring these security features.

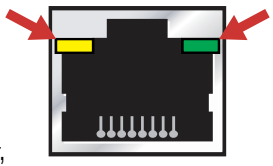
Network Troubleshooting

If you are having difficulty connecting to the PA2 using the DriveRack PA2 control app, try following the below steps to resolve the issue.

1. **Power On The Network Switch/Router First, Then The PA2**
   Make sure the router or switch is powered on first and let it fully boot. With the amplifiers turned off, power on the PA2. Follow the instructions in step 2 to verify that the PA2 has been assigned an IP address.

2. **Verify The PA2's IP Address**
   Press the **UTILITY** button on the front panel of the PA2. Turn the **DATA** wheel to select the SYSTEM INFO option then press the **DATA** wheel. Ensure the PA2 has been assigned an IP address. If you're connecting using a Mac® or Windows® computer and the PA2 does have an IP address, but you can't connect using the DriveRack PA2 control app, go to step 4. If the PA2's IP address reads "0.0.0.0", power cycle the PA2 (ensure your amplifiers are off) then check the IP address again. If the PA2 now has an IP address, see if you can connect using the DriveRack PA2 control app. If the PA2 still does not have an IP address or you still cannot connect with the DriveRack PA2 control app, go to step 3.

3. **Ethernet LED Indicators**
   Ensure the yellow and green LEDs are lighting on the PA2's Ethernet port (the green LED may flash which is fine). If using a wired connection from a computer, ensure that these LED indicators are also lighting on your computer's Ethernet port. If any of these LEDs are not lighting, try removing and reconnecting each Ethernet connection. If an Ethernet port's LEDs begin lighting after reconnecting any of these cables, try power cycling the PA2 and reconnecting with the DriveRack PA2 control app. If the Ethernet LEDs still are not lighting on the PA2 and/or computer, go to step 4.



4. **Check The Type Of Ethernet Cables Used**
   Ensure you are using the correct type of Ethernet cables with your switch/router and that they are fully inserted into the Ethernet connectors. See ***'Cable Diagrams' on page 61*** for detailed information on supported Ethernet cables.
   If you've verified you are using the correct type of Ethernet cables and all cables are known-working, but you still can't connect, go to step 5.

5. **Check Network Settings & Switch/Router Configuration**
   Check the IP address of your networked control device and the PA2 (use the instructions in step 2 to view the PA2's IP address) and ensure they both have similar IP addresses – in most cases, only the numbers after the last period should be different. If the IP addresses are similar and you're still unable to connect, go to step 6.

   If the IP addresses are not similar or one of the devices still doesn't have an IP address, consult the documentation which came with your network switch or router to see how to enter the utility used for configuring the switch/router. Ensure the DHCP server is enabled and check the logs to see if it detects the devices you are trying to network (devices are typically shown as MAC addresses). You can view the PA2's MAC address in the Utility menu (use the instructions in step 2 to view the PA2's MAC address).

6. **Software Firewall**
   If connecting using a Mac® or Windows® computer, check the firewall to see if it is active. An active firewall may restrict traffic between the DriveRack PA2 control app and PA2. In this case, you will need to allow the DriveRack PA2 control app to communicate with the PA2 over the network. Try disabling your firewall and then relaunching the DriveRack PA2 control app. If this fixes the problem, refer to your firewall manufacturer's documentation on how to reconfigure your firewall to allow the DriveRack PA2 control app, or ports 19272 (TCP and UDP) and port 21 (FTP), to pass through the firewall.

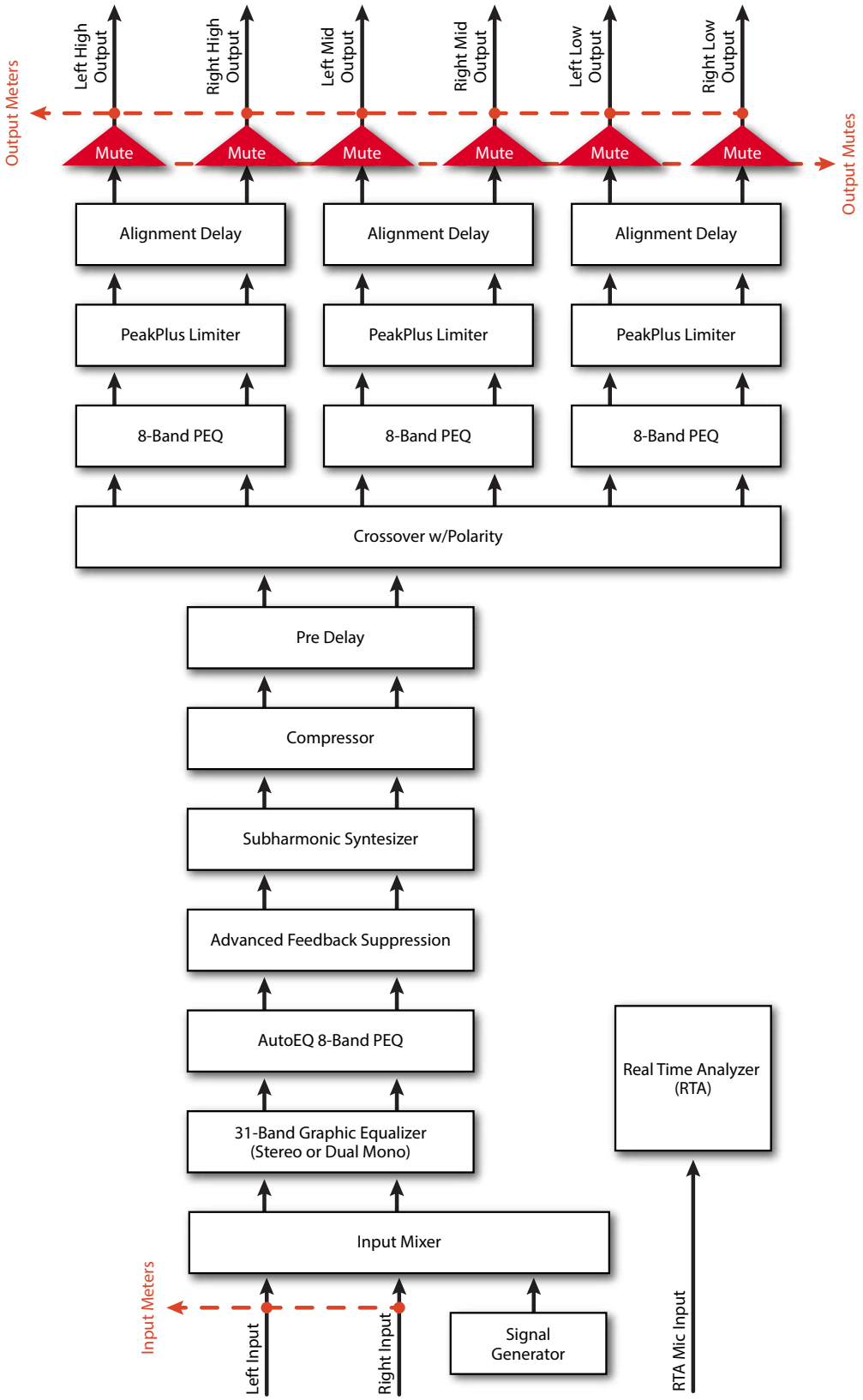
Technical Information

Firmware Updates

The USB or Ethernet connector on the back panel of the PA2 can be used to perform firmware updates. Connect the USB port to a Windows® PC for performing firmware updates using the PA2 Firmware Update Utility application. As firmware updates becomes available, the Firmware Update Utility application will be available on the PA2 product page at dbxpro.com.

If using the DriveRack PA2 control app, you can update the PA2 via the Ethernet port straight from the application, regardless of the device you're using for control (i.e., iOS®, Android™, Mac®, or Windows® device). Follow the included instructions provided with each application to perform the update procedure.

DSP Block Diagram



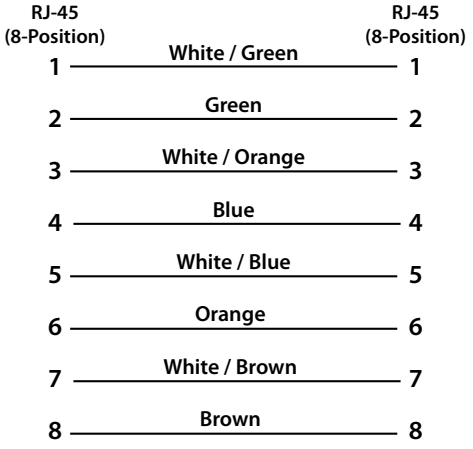
Cable Diagrams

Ethernet Cable Diagrams

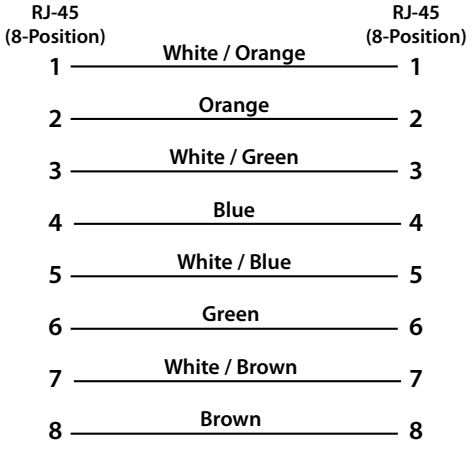
Straight-Through

Use straight-through CAT5, CAT5e, or CAT6 Ethernet cables to connect the PA2 to your network switch/router. The below diagrams show the pinout of such cables. These are the most common type of Ethernet cables available.

TIA/EIA 568A Straight-Through



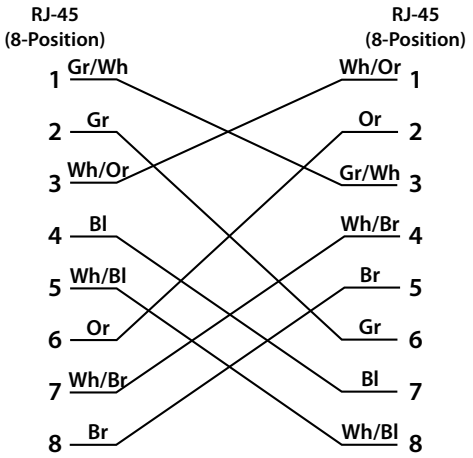
TIA/EIA 568B Straight-Through



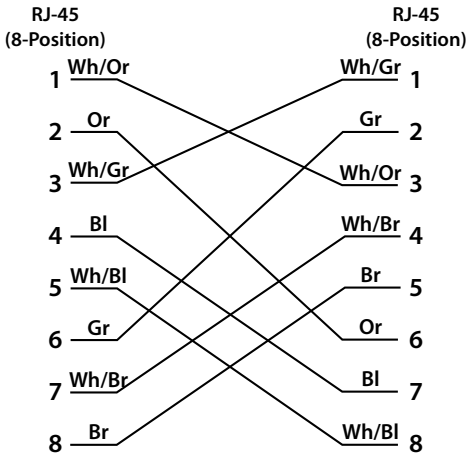
Crossover

Crossover cables can only be used with network switches/routers which support auto-MDI/MDIX sensing. This feature allows the switch/router to detect whether a straight-through or crossover cable is connected and re-configure itself accordingly. The below diagrams show the pinouts of crossover cables.

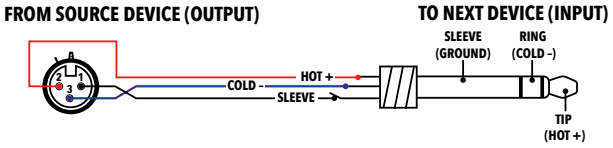
TIA/EIA 568A Crossover



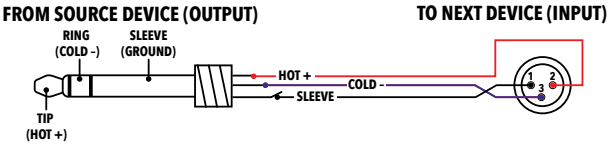
TIA/EIA 568B Crossover



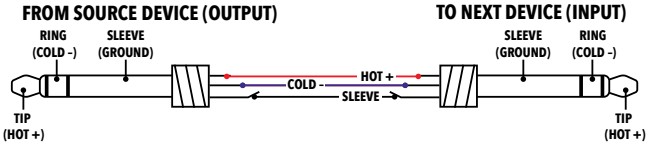
Audio Cable Diagrams



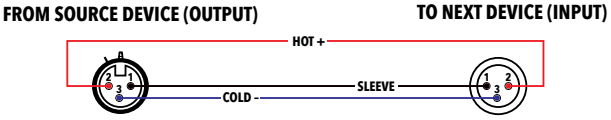
FEMALE XLR TO TRS PHONE



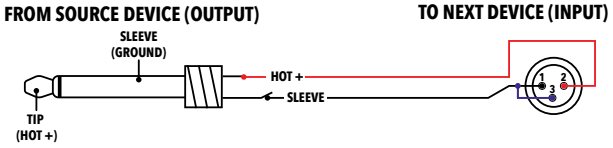
TRS PHONE TO MALE XLR



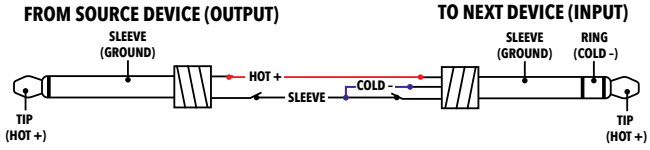
TRS PHONE TO TRS PHONE



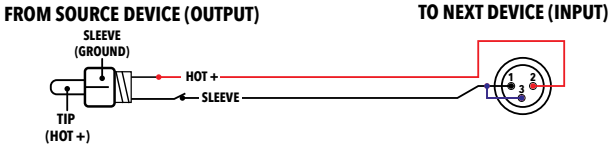
FEMALE XLR TO MALE XLR



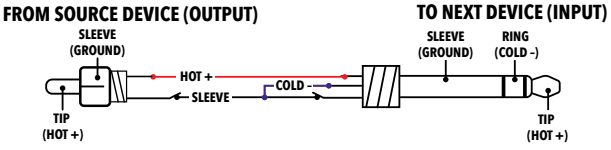
TS PHONE TO MALE XLR



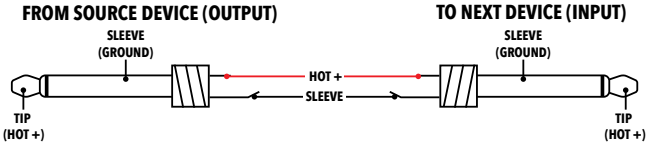
TS PHONE TO TRS PHONE



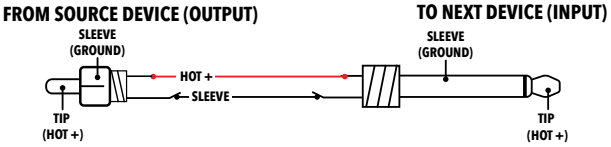
RCA PHONO TO MALE XLR



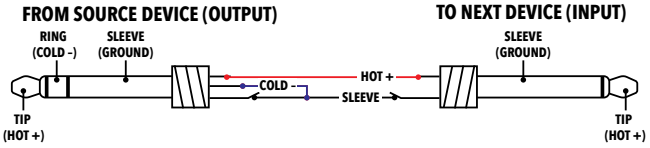
RCA PHONO TO TRS PHONE



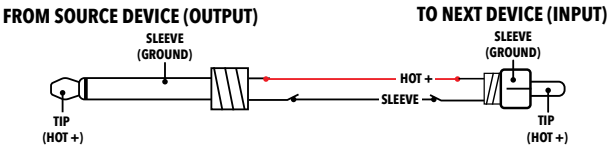
TS PHONE TO TS PHONE



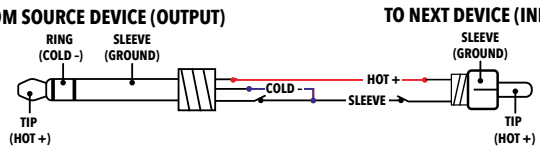
RCA PHONO TO TS PHONE



TRS PHONE TO TS PHONE

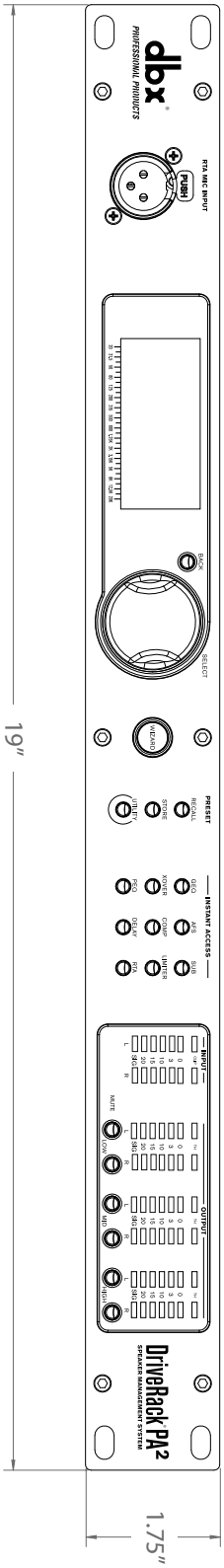


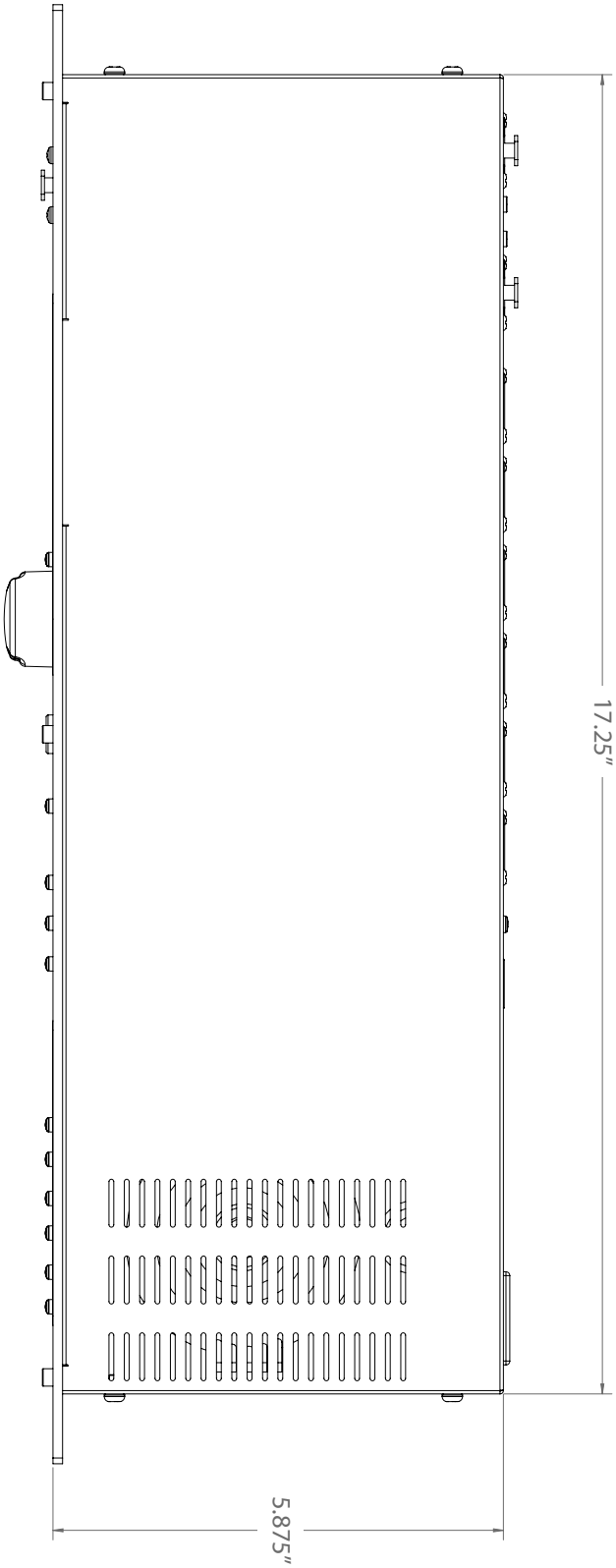
TS PHONE TO RCA PHONO



TRS PHONE TO RCA PHONO

Dimensions





Specifications

ANALOG INPUTS

Number of Inputs:	2 line inputs, 1 RTA mic input
Connectors:	2 female XLR line inputs, 1 female XLR RTA mic input
Type:	Electronically balanced/RF filtered
Impedance:	> 50 kΩ
Max Input Level (line inputs):	> +20 dBu
CMRR:	> 45 dB
RTA Mic Preamp Phantom Power:	+15 VDC

ANALOG OUTPUTS

Number of Outputs:	6 line outputs
Connectors:	Male XLR
Type:	Electronically balanced, RF filtered
Impedance:	120 Ω
Max Output Level:	+20 dBu
Alignment Delay:	Up to 10ms per output channel pair

A/D PERFORMANCE

A/D Converter:	24-bit with dbx Type IV™ Conversion System
A/D Dynamic Range:	112 dB A-weighted, 110 dB unweighted
Type IV Dynamic Range:	123 dB with transient material, A-weighted, 22kHz BW; 121 dB with transient material, unweighted, 22kHz BW; 115 dB typical with program material, A-weighted, 22kHz BW

D/A PERFORMANCE

D/A Converter:	24-bit
D/A Dynamic Range:	112 dB A-weighted, 110 dB unweighted

SYSTEM PERFORMANCE

Internal Processing Wordlength:	32-bit floating point
Sample Rate:	48 kHz
Dynamic Range:	110 dB A-weighted 107 dB unweighted
THD+Noise:	0.003% typical at +4 dBu, 1 kHz, 0 dB input gain
Frequency Response:	20 Hz – 20 kHz, +0 /- 0.5 dB
Interchannel Crosstalk:	< -110 dB, -120 dB typical (input-to-output: < -100 dB)
Latency:	Input to output: 1.847 ms

POWER SUPPLY

Operating Voltage:	100-120 VAC 50/60 Hz or 220-240 VAC 50/60 Hz
Power Consumption:	22 Watts

PHYSICAL

Unit Weight:	5.25 lbs. (2.4 kg)
Shipping Weight:	6.75 lbs. (3.1 kg)
Dimensions:	1.75" (H) x 5.75" (D) x 19" (W) 4.4cm (H) x 14.6cm (D) x 48.26cm (W)

Specifications are subject to change without notice.

Additional Resources

dbx Website

http://www.dbxpro.com

DriveRack PA2 Product Page

http://www.dbxpro.com/en-US/products/driverack-pa2

dbx Support

http://www.dbxpro.com/en-US/support

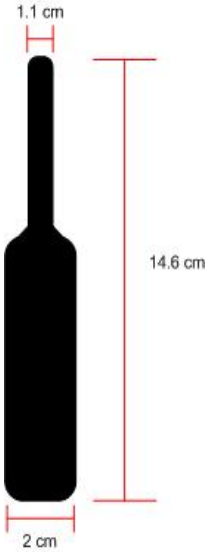
dbx User's Forum

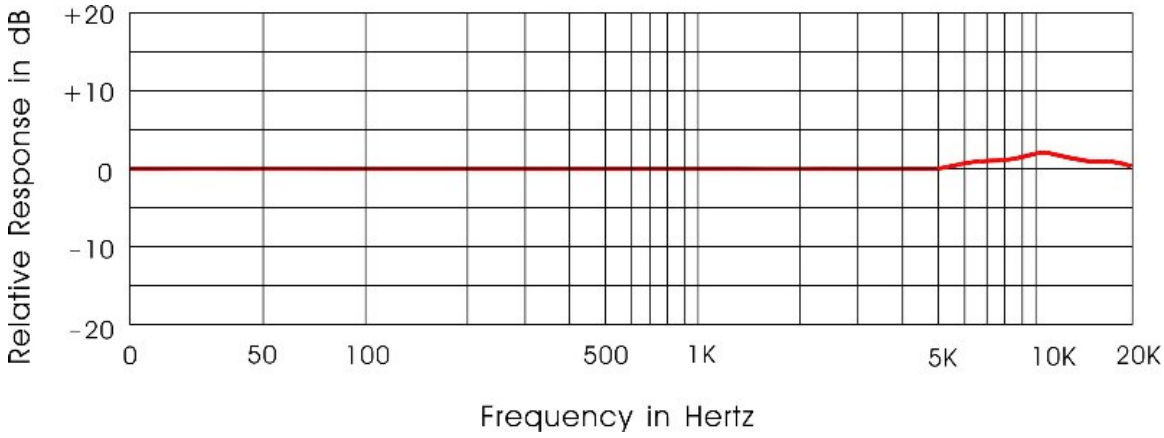
http://www.dbxpro.com/forum

Phone: (801) 566-8800
Website: dbxpro.com
Support: dbxpro.com/en-US/support

DriverRack® PA2 Owner's Manual
PN: 5044138-B

dbx RTA-M

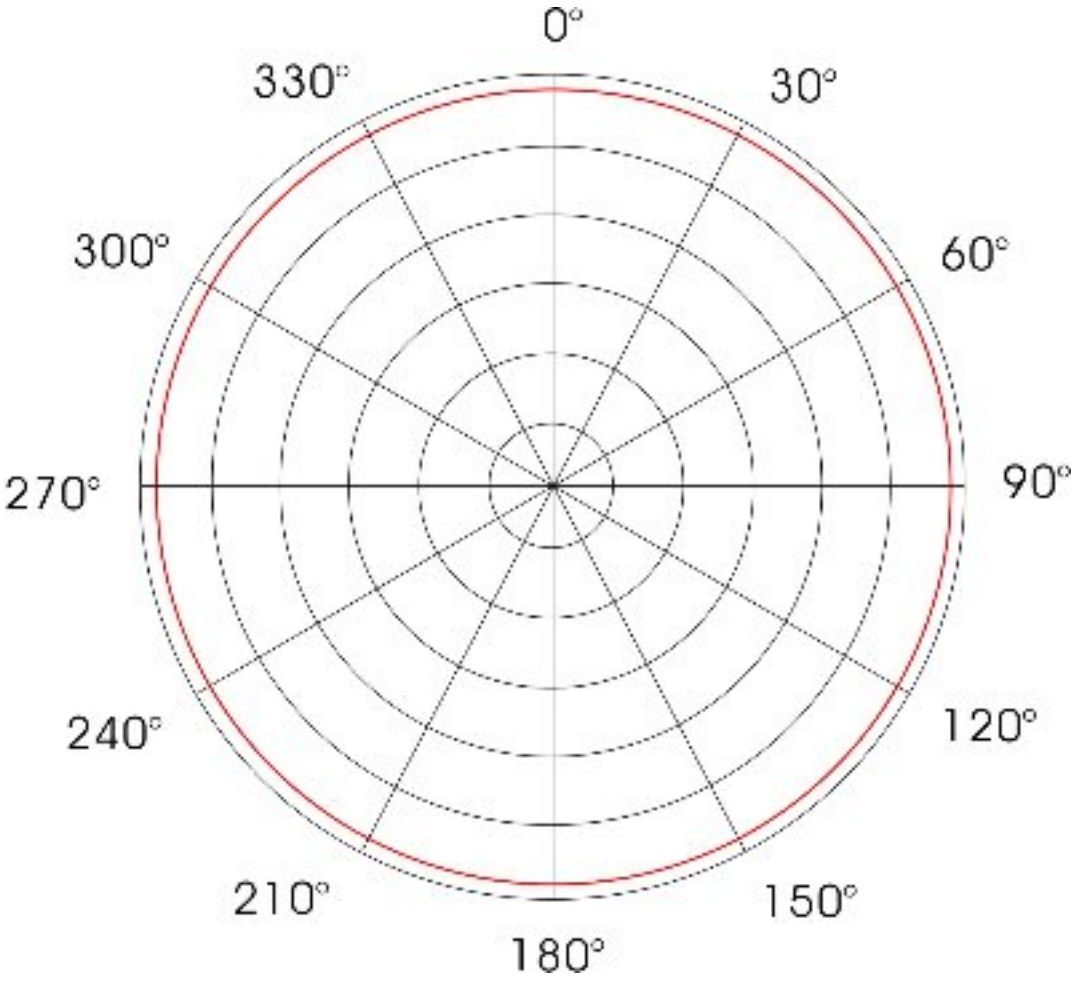




The RTA-M is an omni-directional, flat frequency measurement microphone specially designed for the Driverack series to pick up all frequencies from 20 Hz to 20 kHz , ensuring accurate "pinking"/real-time analysis of your audio. It runs on phantom power (supplied by the Driverack units) and comes with a clip and case.

Features:

Polar Pattern : omni-directional
Element : back electret-Condenser
Frequency Response : 20 Hz - 20 kHz
Impedance : 250 +/-30% (at 1,000Hz)
Sensitivity : -63 dB +-3 dB (0 dB=1V/ microbar 1,000 Hz indicated by open circuit)
Operating Voltage : phantom power 9V-52VDC


0°
30°
60°
90°
120°
150°
180°
210°
240°
270°
300°
330°

DPA MICROPHONES

4099 CORE
Instrument Microphones

core by DPA

The award-winning 4099 has been updated with CORE by DPA technology. The series is designed with a supercardioid polar pattern for high rejection and superior gain-before-feedback. The mics retain a uniform off-axis frequency response. The 4099 is very adaptable, due to the wide selection of ingenious mounting options offered. In fact, the same microphone can be used with 10 different clips, allowing it to be used on almost any instrument. The correct variant to use depends on the type of instrument the mic is being used on.

4099 for Loud SPL

4099-DC-1-101-A for Accordion
4099-DC-1-201-B for Bass
4099-DC-1-201-C for Cello
4099-DC-1-101-CM with Clamp Mount
4099-DC-1-199-G for Guitar
4099-DC-1-101-P for Piano
4099-DC-1-199-S for Saxophone
4099-DC-1-101-SM with Stand Mount
4099-DC-1-101-U Universal
4099-DC-1-199-V for Violin

4099 for Extreme SPL

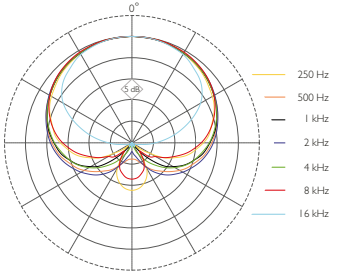
4099-DC-2-201-D for Drum
4099-DC-2-199-T for Brass

Visit **dpa**microphones.com/how2dvote to learn how to correctly position your 4099 on your instrument.

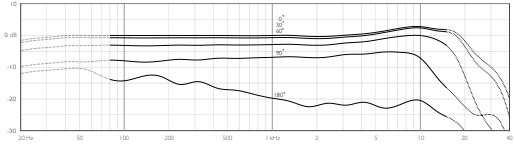
Specifications

Directional pattern
Supercardioid
Principle of operation
Pressure gradient
Cartridge type
Pre-polarized condenser
Frequency response
20 Hz - 20 kHz
Effective frequency range ± 2 dB, at 20 cm (7.9 in)
80 Hz - 15 kHz with 2 dB soft boost at 10 - 12 kHz
Second order low-cut filter at 80 Hz with DAD4099-BC
Sensitivity, nominal ±3 dB at 1 kHz
4099 for Loud SPL: 6 mV/Pa; -44 dB re. 1 V/Pa
4099 for Extreme SPL: 2 mV/Pa; -54 dB re. 1 V/Pa
Equivalent noise level, A-weighted
4099 for Loud SPL: Typ. 23 dB(A) re. 20 µPa (max. 26 dB(A))
4099 for Extreme SPL: Typ. 28 dB(A) re. 20 µPa (max. 31 dB(A))
Distortion, THD < 1%
4099 for Loud SPL: 128 dB SPL RMS, 131 dB SPL peak
4099 for Extreme SPL: 134 dB SPL RMS, 137 dB SPL peak
Dynamic range
4099 for Loud SPL: Typ. 108 dB
4099 for Extreme SPL: Typ. 109 dB
Max. SPL, THD 10%
4099 for Loud SPL: 142 dB
4099 for Extreme SPL: 152 dB
Output impedance
From MicroDot: 30 - 40 Ω
From DAD4099-BC/DAD6001-BC: 100 Ω
Cable drive capability
Up to 300 m (984 ft) with DAD4099-BC or DAD6001-BC XLR Adapter
Output balance principle
Signal balanced with DAD4099-BC or DAD6001-BC XLR Adapter
Common mode rejection ratio (CMRR)
> 60 dB from 50 Hz to 15 kHz with DAD4099-BC or DAD6001-BC XLR Adapter
Power supply (for full performance)
Min. 5 V – max. 50 V through DPA adapter for wireless systems
48 V phantom power ±4 V with DAD4099-BC or DAD6001-BC XLR Adapter
Current consumption
Typ. 1.5 mA (microphone)
3.5 mA with DAD4099-BC or DAD6001-BC XLR Adapter
Connector
MicroDot
Microphone length
45 mm (1.8 in)
Cable length / cable diameter
1.8 m (5.9 ft) / 1.6 mm (0.06 in) or 2.2 mm (0.09 in)
Gooseneck length
140 mm (5.5 in)
Capsule diameter
5.4 mm (0.21 in)

Polar pattern



Frequency response
Measured at 20 cm (7.9 in)



Cable and adapter overview

Mic	SPL range	Cable	XLR connection
4099-DC-1-101-A	For Loud SPL – up to 142 dB	1.6 mm (0.06 in)	DAD6001-BC
4099-DC-1-201-B	For Loud SPL – up to 142 dB	2.2 mm (0.09 in)	DAD6001-BC
4099-DC-1-201-C	For Loud SPL – up to 142 dB	2.2 mm (0.09 in)	DAD6001-BC
4099-DC-1-101-CM	For Loud SPL – up to 142 dB	1.6 mm (0.06 in)	DAD6001-BC
4099-DC-2-201-D	For Extreme SPL – up to 152 dB	2.2 mm (0.09 in)	DAD6001-BC
4099-DC-1-199-G	For Loud SPL – up to 142 dB	1.6 mm (0.06 in)	DAD4099-BC
4099-DC-1-101-P	For Loud SPL – up to 142 dB	1.6 mm (0.06 in)	DAD6001-BC
4099-DC-1-199-S	For Loud SPL – up to 142 dB	1.6 mm (0.06 in)	DAD4099-BC
4099-DC-1-101-SM	For Loud SPL – up to 142 dB	1.6 mm (0.06 in)	DAD6001-BC
4099-DC-2-199-T	For Extreme SPL – up to 152 dB	1.6 mm (0.06 in)	DAD4099-BC
4099-DC-1-101-U	For Loud SPL – up to 142 dB	1.6 mm (0.06 in)	DAD6001-BC
4099-DC-1-199-V	For Loud SPL – up to 142 dB	1.6 mm (0.06 in)	DAD4099-BC

DPA MICROPHONES

4099 for Loud SPL

4099 for Extreme SPL

core by DPA

Service & repair
If you are not satisfied with the characteristics exhibited by this product, please go to **dpa**microphones.com/service for instructions.

Warranty
4099 CORE Instrument Microphones are covered by a two-year limited warranty.

CE marking
This product conforms to all relevant directives approved by the European Commission.

CE

DPI-4099-C-QG-

dpamicrophones.com/4099

NEW

Introducing the new

d:fine™ 88 & 66 Headset Mics

The versatile d:fine™ Headsets are now available with the legendary 4088 directional and 4066 omnidirectional capsules. Both headsets are made for the stage and with the d:fine 88 featuring high isolation from background noise and the d:fine 66 allowing for high frequency response modifications we have a headset that suits all your needs.

Features

- Pristine audio quality
- Dual-ear mounting for active situations
- Minimal visual impact
- Adapts to all pro wireless systems

www.dpamicrophones.com/dfine

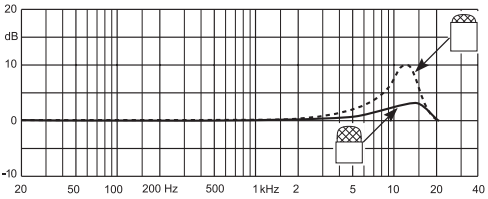
Specifications

d:fine™ Headset Microphones

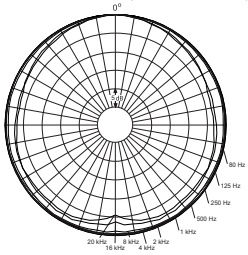
Directional characteristics:
Omnidirectional or Directional
Principle of operation:
Omni: Pressure – Cardioid: Pressure gradient
Cartridge type:
Pre-polarized condenser
Frequency range:
20 Hz - 20 kHz
Frequency range, ± 2 dB:
Omni: Soft boost grid: 20 Hz – 20 kHz, 3 dB soft boost at 8 – 20 kHz. Optional High boost grid: 20 Hz – 20 kHz, 10 dB boost at 12 kHz.
Cardioid: (Near field 2-3 cm (0.8-1.2 in))
100 Hz - 20 kHz with 3 dB soft boost at 8 - 20 kHz
Sensitivity, nominal, ± 3 dB at 1 kHz:
6 mV/Pa; -44 dB re. 1 V/Pa
Equivalent noise level, A-weighted:
Typ. 26 dB(A) re. 20 µPa (max. 28 dB(A))
Equivalent noise level, ITU-R BS.468-4:
Typ. 38 dB (max. 40 dB)
S/N ratio (A-weighted), re. 1 kHz at 1 Pa (94 dB SPL):
Typ. 68 dB(A)
Total Harmonic Distortion (THD):
<1 % up to 123 dB SPL peak; <1 % up to 120 dB SPL RMS sine
Dynamic range:
Typ. 97 dB
Max. SPL, peak before clipping:
144 dB
Output impedance:
From MicroDot: 30 - 40 Ω. From XLR adapter: 100 Ω.
Cable drive capability:
Up to 300 m (984 ft) XLR adapter
Output balance principle:
Signal balanced XLR adapter

Common Mode Rejection Ratio (CMRR):
> 60 dB from 50 Hz to 15 kHz with XLR adapter
Power supply (for full performance):
Min. 5 V to max. 50 V through DPA adapter for wireless systems. 48 V phantom power ± 4 V with XLR adapter.
Current consumption:
Typ. 1.5 mA (microphone). 3.5 mA with XLR adapter.
Connector:
MicroDot
Weight:
Single Ear: Microphone boom: 1 g (0.035 oz). Earhook: 1 g (0.035 oz). Cable: 8 g (0.28 oz). Total: 10 g (0.35 oz)
Dual Ear: Microphone boom: 1 g (0.035 oz). Earhook: 3 g (0.1 oz). Cable: 8 g (0.28 oz). Total: 12 g (0.42 oz)"
Microphone housing size:
Length: 10 mm (0.4 in), Diameter: 5 mm (0.2 in)
Capsule diameter: 5.4 mm (0.2 in)
Boom length (omni): 90 and 110 mm (3.5 and 4.3 in)
Boom length (directional): 100 and 120 mm (3.9 and 4.7 in)
Cable length: 1.25 m (4.1 ft)
Earhook and mic boom color:
Black, beige, brown
Cable color:
Black, beige, brown
Cable diameter:
1.6 mm (0.06 in)
Polarity:
+V at MicroDot pin for positive sound pressure (and pin 2 on XLR adapter)
Electro Magnetic Compatibility (EMC):
Fully compatible
Temperature range:
-40 °C to 45 °C (-40 °F to 113 °F)
Relative Humidity (RH):
Up to 90%

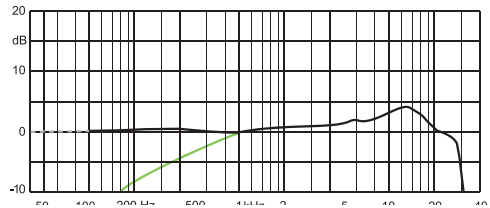
Frequency Response (omnidirectional)



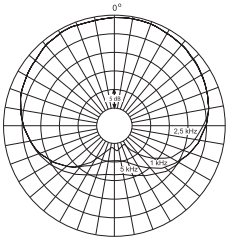
Polar Pattern (omnidirectional)



Frequency Response (directional)



Polar Pattern (directional)



NEW

Introducing the new

d:fine™ 88 & 66 Headset Mics

The versatile d:fine™ Headsets are now available with the legendary 4088 directional and 4066 omnidirectional capsules. Both headsets are made for the stage and with the d:fine 88 featuring high isolation from background noise and the d:fine 66 allowing for high frequency response modifications we have a headset that suits all your needs.

Features

- Pristine audio quality
- Dual-ear mounting for active situations
- Minimal visual impact
- Adapts to all pro wireless systems

www.dpamicrophones.com/dfine

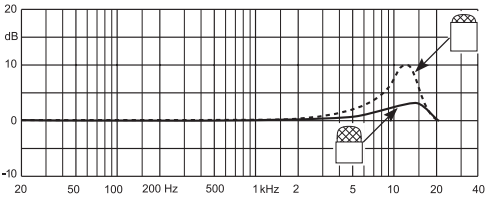
Specifications

d:fine™ Headset Microphones

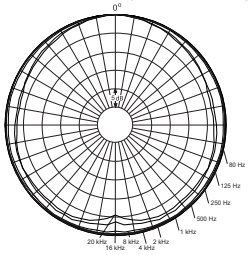
Directional characteristics:
Omnidirectional or Directional
Principle of operation:
Omni: Pressure – Cardioid: Pressure gradient
Cartridge type:
Pre-polarized condenser
Frequency range:
20 Hz - 20 kHz
Frequency range, ± 2 dB:
Omni: Soft boost grid: 20 Hz – 20 kHz, 3 dB soft boost at 8 – 20 kHz. Optional High boost grid: 20 Hz – 20 kHz, 10 dB boost at 12 kHz.
Cardioid: (Near field 2-3 cm (0.8-1.2 in))
100 Hz - 20 kHz with 3 dB soft boost at 8 - 20 kHz
Sensitivity, nominal, ± 3 dB at 1 kHz:
6 mV/Pa; -44 dB re. 1 V/Pa
Equivalent noise level, A-weighted:
Typ. 26 dB(A) re. 20 µPa (max. 28 dB(A))
Equivalent noise level, ITU-R BS.468-4:
Typ. 38 dB (max. 40 dB)
S/N ratio (A-weighted), re. 1 kHz at 1 Pa (94 dB SPL):
Typ. 68 dB(A)
Total Harmonic Distortion (THD):
<1 % up to 123 dB SPL peak; <1 % up to 120 dB SPL RMS sine
Dynamic range:
Typ. 97 dB
Max. SPL, peak before clipping:
144 dB
Output impedance:
From MicroDot: 30 - 40 Ω. From XLR adapter: 100 Ω.
Cable drive capability:
Up to 300 m (984 ft) XLR adapter
Output balance principle:
Signal balanced XLR adapter

Common Mode Rejection Ratio (CMRR):
> 60 dB from 50 Hz to 15 kHz with XLR adapter
Power supply (for full performance):
Min. 5 V to max. 50 V through DPA adapter for wireless systems. 48 V phantom power ± 4 V with XLR adapter.
Current consumption:
Typ. 1.5 mA (microphone). 3.5 mA with XLR adapter.
Connector:
MicroDot
Weight:
Single Ear: Microphone boom: 1 g (0.035 oz). Earhook: 1 g (0.035 oz). Cable: 8 g (0.28 oz). Total: 10 g (0.35 oz)
Dual Ear: Microphone boom: 1 g (0.035 oz). Earhook: 3 g (0.1 oz). Cable: 8 g (0.28 oz). Total: 12 g (0.42 oz)"
Microphone housing size:
Length: 10 mm (0.4 in), Diameter: 5 mm (0.2 in)
Capsule diameter: 5.4 mm (0.2 in)
Boom length (omni): 90 and 110 mm (3.5 and 4.3 in)
Boom length (directional): 100 and 120 mm (3.9 and 4.7 in)
Cable length: 1.25 m (4.1 ft)
Earhook and mic boom color:
Black, beige, brown
Cable color:
Black, beige, brown
Cable diameter:
1.6 mm (0.06 in)
Polarity:
+V at MicroDot pin for positive sound pressure (and pin 2 on XLR adapter)
Electro Magnetic Compatibility (EMC):
Fully compatible
Temperature range:
-40 °C to 45 °C (-40 °F to 113 °F)
Relative Humidity (RH):
Up to 90%

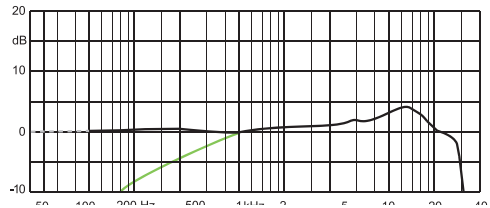
Frequency Response (omnidirectional)



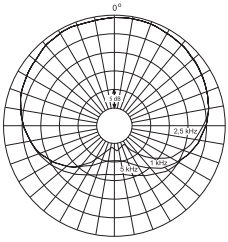
Polar Pattern (omnidirectional)



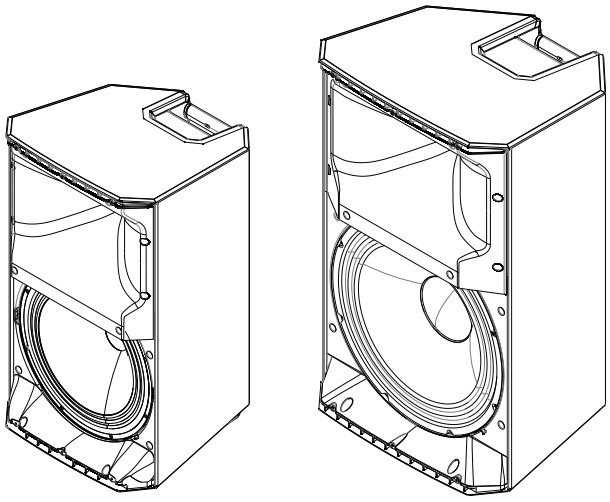
Frequency Response (directional)



Polar Pattern (directional)



ZLX-12 and ZLX-15 Two-Way Passive Loudspeaker



- 12 inch woofer for low-end punch in a compact enclosure and 1.5 inch high-frequency titanium compression driver.
- 15 inch woofer for extended low-frequency response and 1.5 inch high-frequency titanium compression driver.
- Durable composite construction with innovative hi/lo grip design for easy pole mounting.
- Exclusive split-baffle design for superior driver time alignment.

ZLX models cut through the competition with the most complete and innovative package of features in their class–all of which work together to make it quicker and easier than ever to take control of your sound, whatever the gig. When choosing a loudspeaker, it's always wise to ask "What's inside the box?" Then take a listen and hear the EV difference for yourself.
Featuring custom drivers housed in an innovative new cabinet design, the two compact and versatile ZLX models make EV's renowned sound quality and rugged reliability more accessible than ever before.
A compact and versatile loudspeaker featuring EV-engineered drivers in a rugged enclosure. Whether pole-mounted or used as a floor monitor, ZLX delivers stunning sonic impact and intelligibility–the legendary "EV Sound" the pros trust.

Technical specifications

Model	ZLX-12	ZLX-15
Frequency Response:	82 Hz – 18 kHz [1]	56 Hz – 18 kHz[1]
Frequency Range:	55 Hz – 20 kHz	44 Hz – 20 kHz
Axial Sensitivity:	95 dB	96 dB

Maximum SPL:	125 dB	126 dB
Recommended HP Frequency:	40 Hz	
Coverage (Hort. x Vert.):	90° x 60°	
Power Handling:	250 Watts Continuous, 1000 Watts Peak	
LF Transducer:	EVS-12K, 300 mm (12 in) Woofer	EVS-15L, 380 mm (15 in) Woofer
HF Transducer:	DH-1K	
Crossover Frequency:	2.1 kHz	1.7 kHz
Nominal Impedance:	8 Ω	
Minimum Impedance	7 Ω	
Connectors:	Dual NL4	
Enclosure:	Polypropylene	
Grille:	18 Gauge Steel with Black Powder Coat	
Dimensions (H x W x D):	610 mm x 356 mm x 356 mm (24 in x 14 in x 14 in)	685 mm x 423 mm x 383 mm (27 in x 17 in x 15 in)

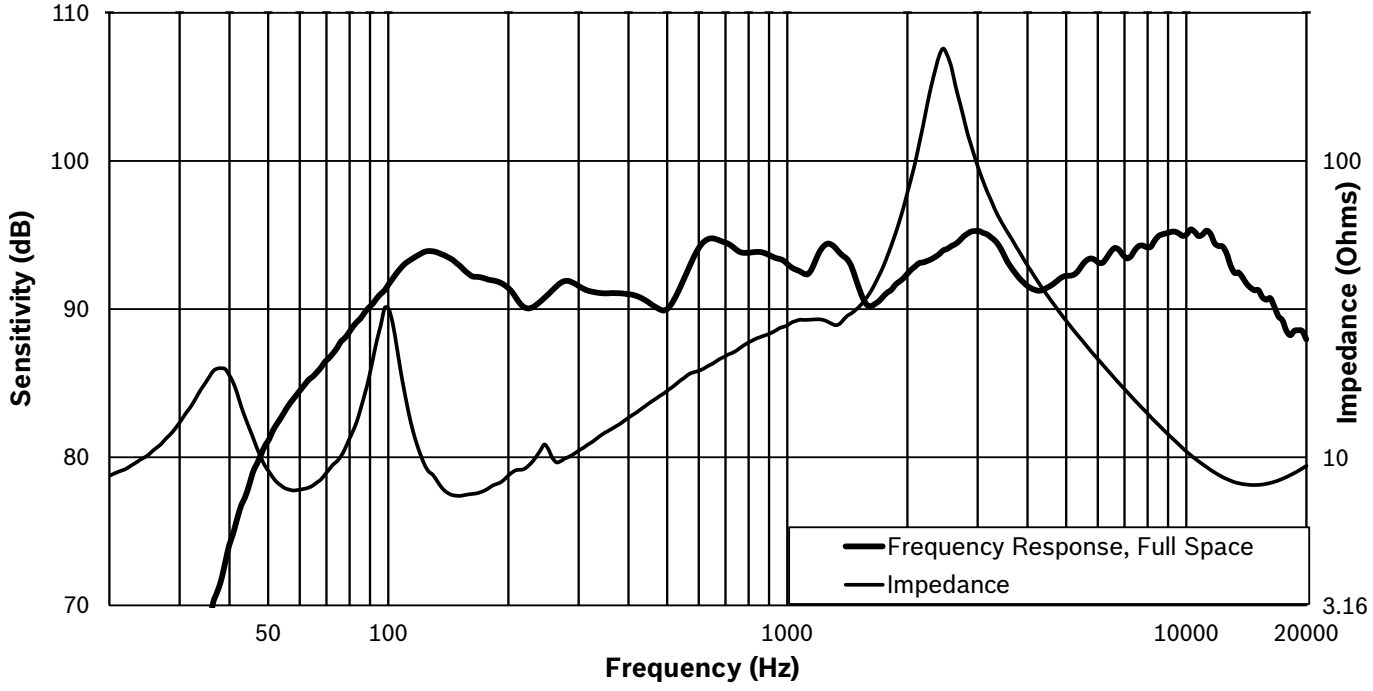
Net Weight:	14.9 kg (32.8 lb)	16.6 kg (36.5 lb)
Shipping Weight:	18.0 kg (39.6 lb)	22.0 kg (48.3 lb)

1. Full Space Measurement, will have low frequency extension when mounted on floor or wall.

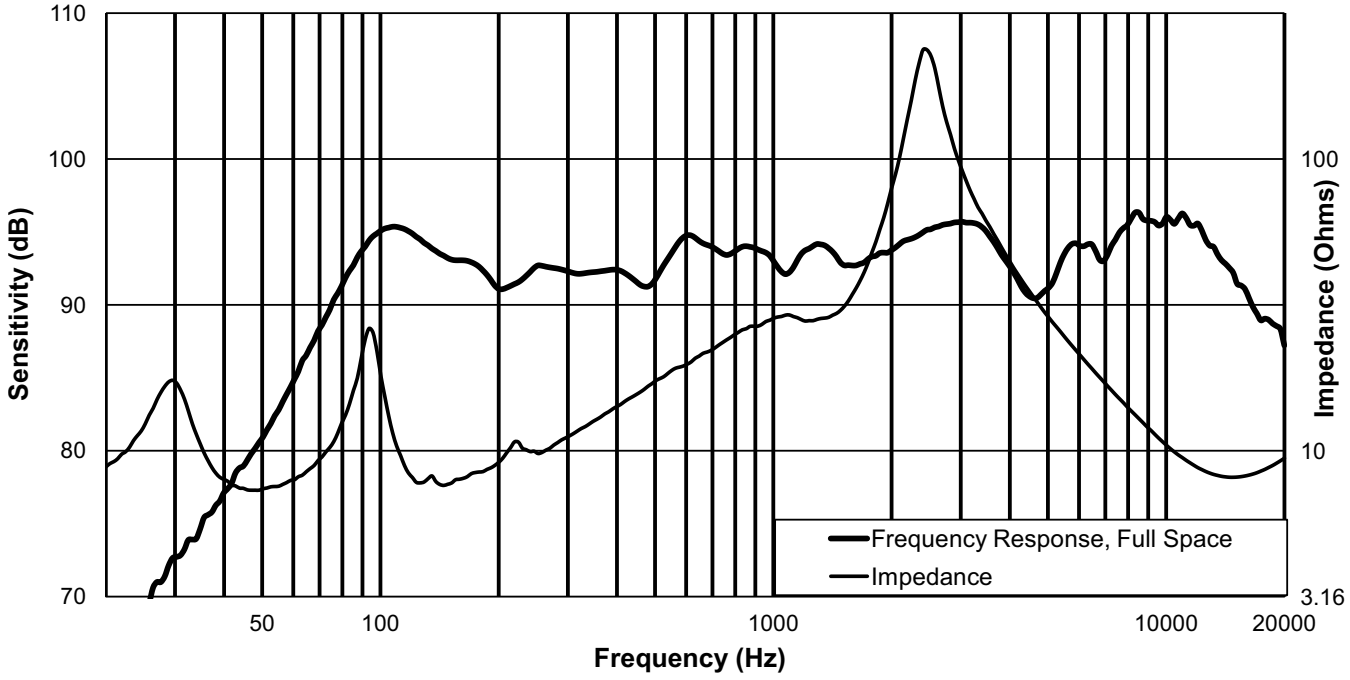
System overview

Frequency Response:

ZLX-12

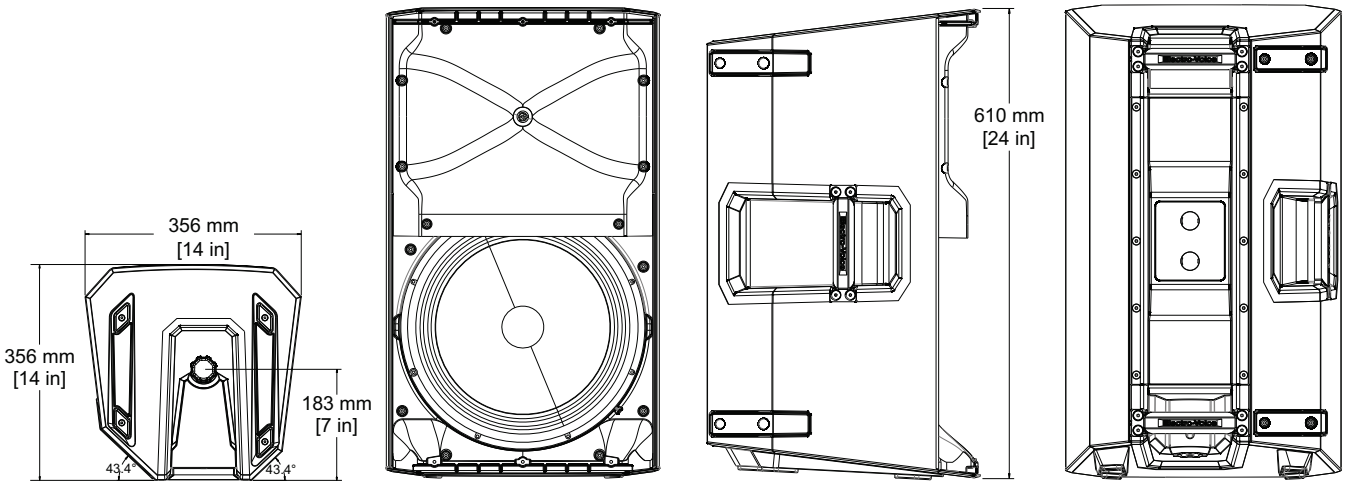


ZLX-15

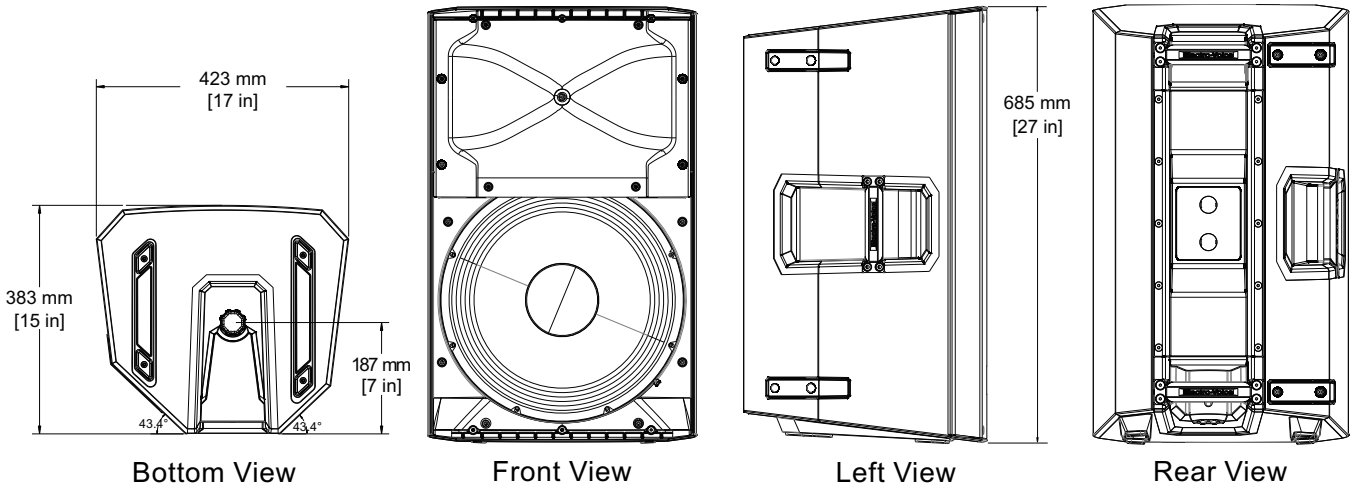


Dimension Drawings:

ZLX-12



ZLX-15



Notice

This loudspeaker should be suspended overhead only in accordance with the procedures and limitations specified in the User's Manual and possible manual update notices. This system should be suspended with certified rigging hardware by an authorized rigging professional and in compliance with local, state, and federal overhead suspension ordinances.

Ordering information

ZLX-12 12" Two-Way Passive Loudspeaker
Order number **ZLX-12**

ZLX-15 15" Two-Way Passive Loudspeaker
Order number **ZLX-15**

Accessories

ZLX-BRKT ZLX Wall Mount Bracket
Order number **ZLX-BRKT**

ZLX-12-CVR ZLX Padded Cover for ZLX-12/P-EV Logo
Order number **ZLX-12-CVR**

ZLX-15-CVR ZLX Padded Cover for ZLX-15/P-EV Logo
Order number **ZLX-15-CVR**

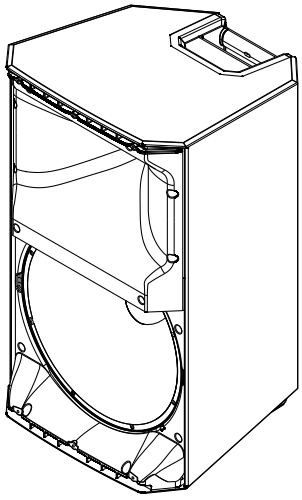
Represented by:

Americas:
Bosch Security Systems, Inc.
12000 Portland Avenue South
Burnsville MN 55337
USA

www.electrovoice.com

Document Number F01U280692 | Vs1 | 21. Dec 2012

ZLX-12BT 12" 2-way powered speaker BT



- High-quality Bluetooth® audio streaming for background music or musical accompaniment. *Bluetooth® connectivity is available in select countries.*
- Quick**Smart**DSP features best-in-class processing. Easy setup via four presets, sub/top system-match, two-band EQ, five user-programmable presets, visual monitoring of limiter status, input level control and meters, and master volume control to optimize gain structure, all via LCD.
- High-efficiency 1000 W Class-D power amplifier delivers us to 127 dB peak SPL utilizing transducers designed and engineered by EV.
- EV-patented Signal Synchronized Transducers (SST) waveguide design provides precise and consistent coverage, minimal distortion, and maximized acoustical loading.
- Three optimally located handles combined with a rugged composite structure provides the most portable professional sound speaker on the market.

NOW STREAMING: Cut through the competition with Bluetooth® enhanced ZLX portable loudspeakers

ZLX portable loudspeakers offer the best performance and reliability in their class - with components and engineering that work together to make it quicker and easier than ever to take control of your sound, whatever the gig. Now with Bluetooth® enabled wireless audio streaming, legendary ZLX performance becomes even more convenient with the ability to connect to any mobile device for streaming your music library.

Featuring custom drivers housed in an innovative cabinet design, the two new wireless, compact, and versatile ZLX models make EV's renowned sound quality and rugged reliability more accessible than ever before.

Bluetooth® is available in select countries.

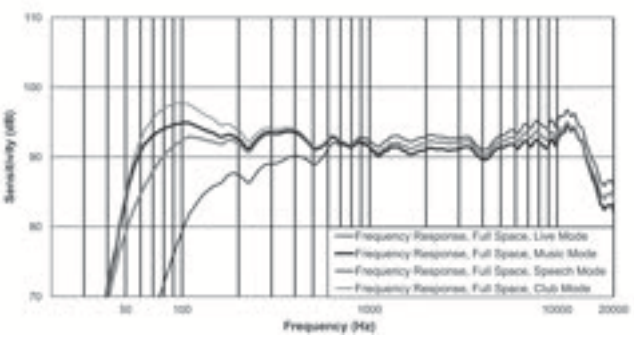
Technical specifications

Frequency Response (-3 dB)[1]:	65 Hz - 18 kHz
Frequency Range (-10 dB):	50 Hz - 20 kHz
Maximum SPL[2]:	126 dB
Coverage (H x V):	90° x 60°
Power Rating:	1000 W
LF Transducer:	EVS-12K, 300 mm (12 in) woofer
HF Transducer:	DH-1K
Connectors:	(2) XLR/TRS Combo Jack (1) 3.5 mm Input and (1) XLR link Output
Enclosure:	Polypropylene
Grille:	18 Gauge steel with black powder coat

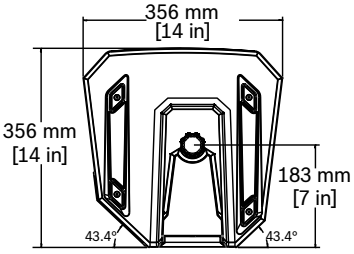
Color:	Black
Dimensions (H x W x D):	610 mm x 356 mm x 356 mm (24 in x 14 in x 14 in)
Net Weight:	15.6 kg (34.3 lb)
Shipping Weight:	19.0 kg (41.8 lb)
Power Consumption[3]:	100 - 240 V~, 50 - 60 Hz, 0.8 - 0.5 A

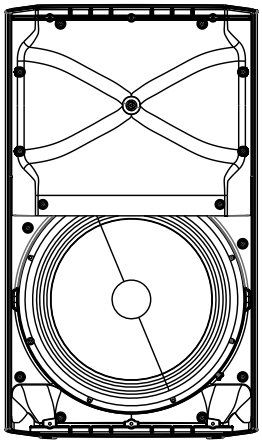
1. Full-Space measurement using the MUSIC DSP preset.
2. Maximum SPL is measured at 1 m using broadband pink noise at maximum output.
3. Current rating is specified at 1/8 full output power.

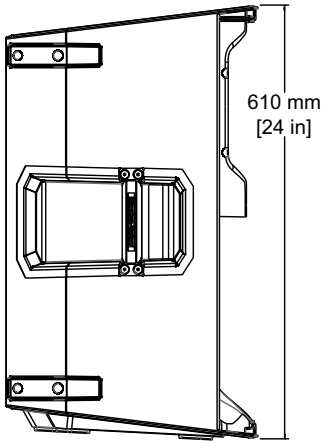
Frequency response:

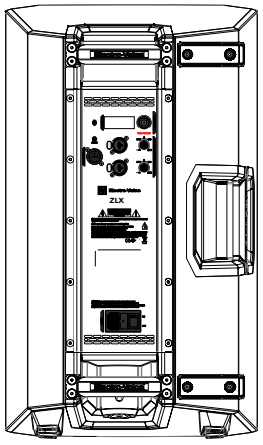


Dimensions:



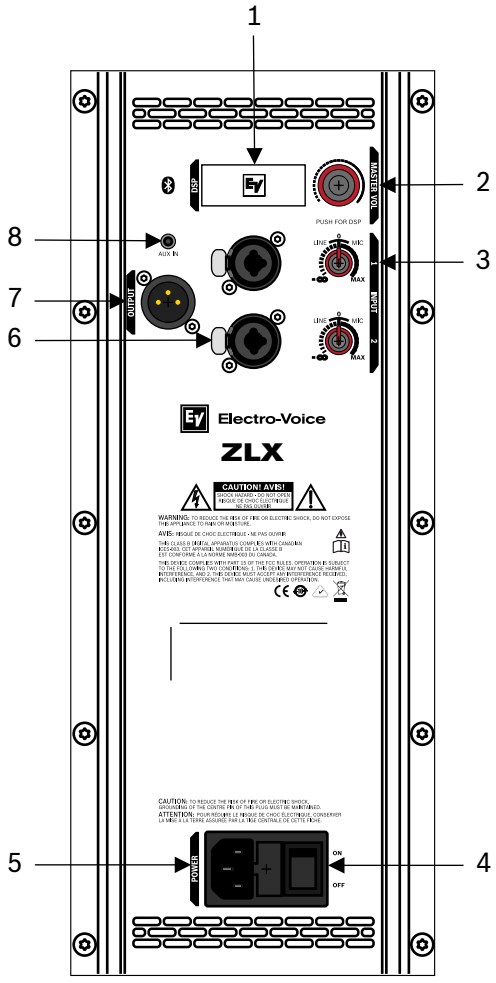






System overview

Full-Range loudspeaker control and monitoring interface



Full-Range loudspeaker amplifier panel

1. **LCD** - DSP control and monitoring interface.
2. **MASTER VOL** - Adjusts the sound level.
   DSP - Scroll through the menu and select the available choices. Push the MASTER VOL knob to enter the DSP menu.
3. **INPUT LEVEL** - Level control for adjusting the individual inputs' level. The 12 o'clock position is unity gain (no gain or attenuation), the range to the left of zero is for adjusting line level sources, and the range to the right of zero (0) is for adjusting microphone levels. LINE and MIC input level control is available for both INPUT 1 and INPUT 2.
4. **POWER** - AC switch or switching the power ON or OFF. The LCD screen lights up when the power is turned ON, after approximately 3 seconds.
5. **MAINS IN** - AC connection is established via an IEC-connector.
6. **INPUT** - Balanced input for the connection of signal sources like mixing consoles, instruments, or microphones. Connections can be established using ¼ inch TRS or XLR connectors.
7. **OUTPUT** - XLR output sends the mix of all input signals to another loudspeaker or subwoofer. INPUT LEVEL controls the signal level to OUTPUT. The MASTER VOL or DSP control settings do not affect OUTPUT. This is also the output for the BT signal which is configurable via the MIX OUT setting.
8. **AUX IN** - 3.5 mm audio jack input for connecting external audio media devices, such as MP3 players.

For more information, see the ZLX Powered Loudspeaker Series Installation manual (F.01U. 349.854).

Ordering information

ZLX-12BT-EU 12" 2-way powered speaker BT EUcord
Powered 12-inch 2-way loudspeaker with Bluetooth® and EU cord, black
Order number **ZLX-12BT-EU**

ZLX-12BT-US 12" 2-way powered speaker BT UScord
Powered 12-inch 2-way loudspeaker with Bluetooth® and US cord, black
Order number **ZLX-12BT-US**

Accessories

ZLX-BRKT ZLX Wall Mount Bracket
Wall mount bracket for ZLX-12/12P/12BT and ZLX-15/15P/15BT, black
Order number **ZLX-BRKT**

ZLX-12-CVR ZLX Padded Cover for ZLX-12/P - EV Logo
Padded cover for ZLX-12/12P/12BT, EV logo, black
Order number **ZLX-12-CVR**

Represented by:

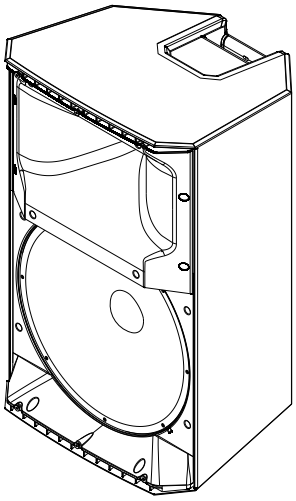
Germany:
Bosch Sicherheitssysteme GmbH
Robert-Bosch-Ring 5
85630 Grasbrunn
Germany

Bosch Security Systems, Inc.
12000 Portland Avenue South
Burnsville MN 55337
USA

www.electrovoice.com

Document Number | Vs1 | 11. Apr 2018

ZLX-15BT 15" 2-way powered speaker BT



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Technical specifications

Frequency Response (-3 dB)[1]:	55 Hz - 18 kHz
Frequency Range (-10 dB):	42 Hz - 20 kHz
Maximum SPL[2]:	127 dB
Coverage (H x V):	90° x 60°
Power Rating:	1000 W
LF Transducer:	EVS-15L, 380 mm (15 in) woofer
HF Transducer:	DH-1K
Connectors:	(2) XLR/TRS Combo Jack (1) 3.5 mm Input and (1) XLR link Output
Enclosure:	Polypropylene
Grille:	18 Gauge steel with black powder coat

Color:	Black
Dimensions (H x W x D):	685 mm x 426 mm x 383 mm (27 in x 17 in x 15 in)
Net Weight:	17.3 kg (38.0 lb)
Shipping Weight:	23.0 kg (50.78 lb)
Power Consumption[3]:	100 - 240 V~, 50 - 60 Hz, 0.8 - 0.5 A

1. Full-Space measurement using the MUSIC DSP preset.
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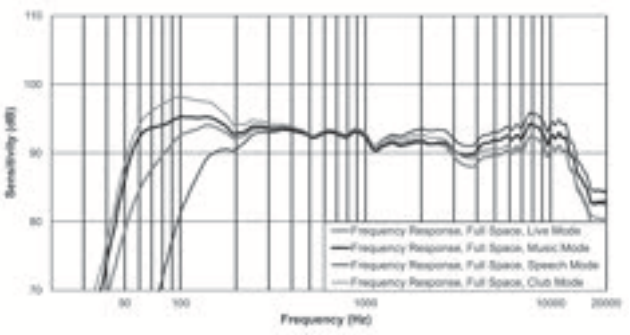
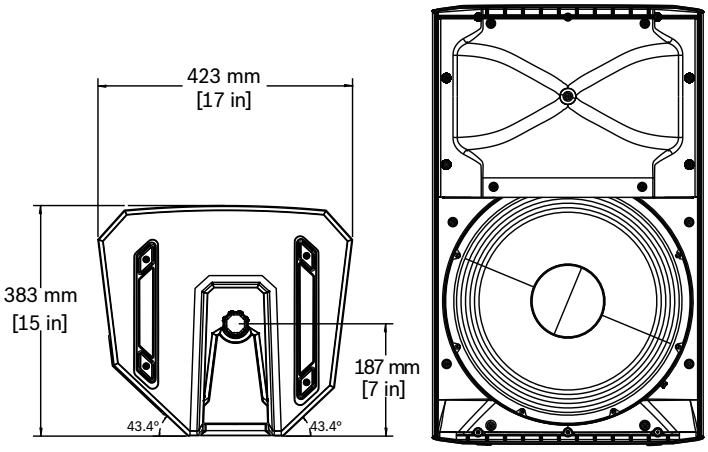
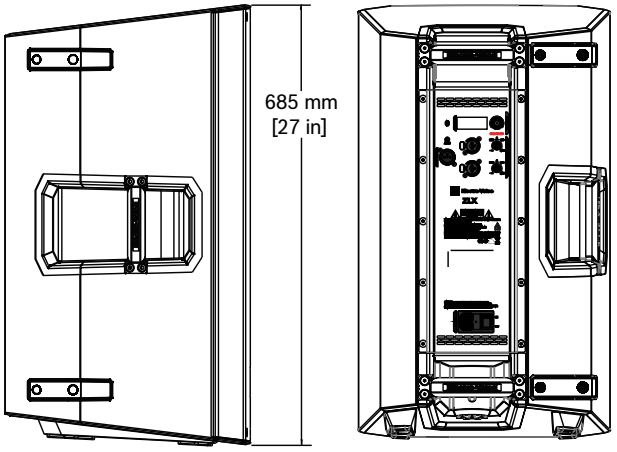
3. Current rating is specified at 1/8 full output power.

Frequency response:



Dimensions:





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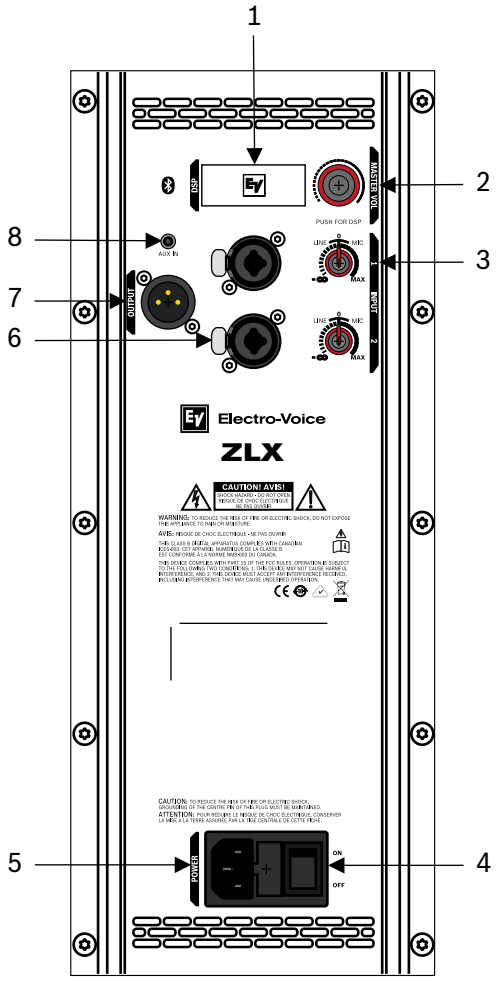

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Padded cover for ZLX-15/15P/15BT, EV logo, black
Order number **ZLX-15-CVR**

Represented by:

Germany:
Bosch Sicherheitssysteme GmbH
Robert-Bosch-Ring 5
85630 Grasbrunn
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Bosch Security Systems, Inc.
12000 Portland Avenue South
Burnsville MN 55337
USA

www.electrovoice.com

Document Number | Vs1 | 11. Apr 2018

Hollyland Solidcom C1 Pro – Hub8S

User Manual

V1.0.0

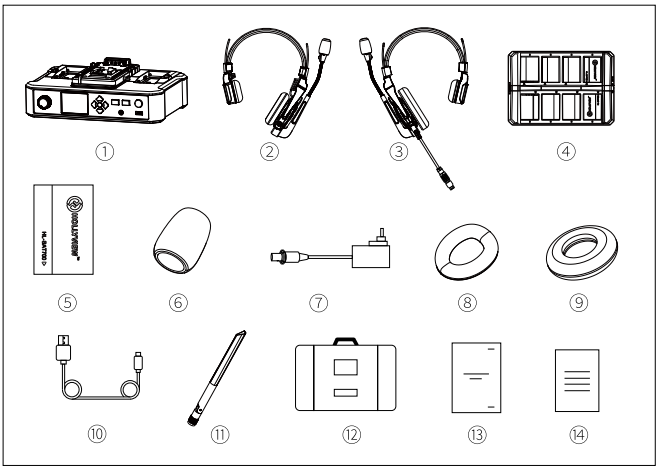
Introduction

Thank you for purchasing Hollyland Solidcom C1 Pro full-duplex wireless noise-cancelling intercom system.

The Solidcom C1 Pro – Hub8S is a full-duplex wireless noise-cancelling intercom system engineered to provide clear audio and all-day wearing comfort in a truly wireless design with no beltpack required. The system operates in the 1.9GHz band, providing a reliable LOS range of up to 1,100ft (350m).

This User Manual will help you through the installation and use of the equipment.

Packing List

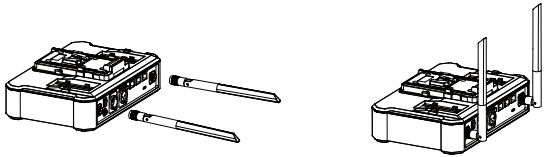


Solidcom C1 Pro - Hub8S Intercom Headset Package

①	Hub	x1
②	Remote Headset (With Blue Nameplate)	x8
③	0B10 Wired Headset (With Red Nameplate)	x1
④	8-Slot Charging Case	x1
⑤	Headset Battery	x16
⑥	Microphone Cushion	x9
⑦	12V/2A DC Adapter	x2
⑧	Over-ear Leather Cushion	x9
⑨	On-ear Foam Cushion	x9
⑩	USB-A to USB-C Cable	x1
⑪	High-Gain Antenna	x4
⑫	Storage Case	x1
⑬	User Manual	x4
⑭	Warranty Card	x1

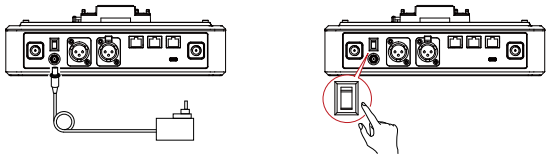
Note: The quantity of the items depends on the product configuration.

Installing the Hub Antennas



Powering on the Hub

- Connect the 12V/2A DC adapter to the hub.
- Switch on the Hub.



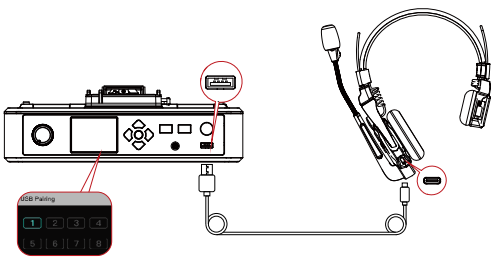
Note: The hub can also be powered on by NP-F batteries, V-mount batteries, or G-mount batteries.

Pairing

The hub and remote headsets that come from the same system will pair with each other automatically right out of the box. Manual pairing is only required when a new headset needs to be added or when a headset or the hub needs to be replaced.

Connecting a Headset to the Hub Using a USB-C Cable

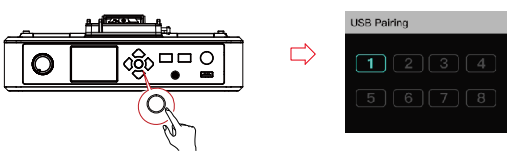
A USB-C cable is required for pairing. Connect the headset to the hub via the USB interface on the hub and the USB-C interface on the headset. Then, the number selection interface will automatically be displayed on the hub. Simply press the arrow buttons to select a number and press the round Menu/Confirmation button to complete number settings and pairing.



Setting Headset Numbers on the Hub

When repairing and numbering a headset, be sure to turn on all the headsets to avoid selecting duplicate numbers. Otherwise, the other headsets may not be connected.

In case of wrong numbering for the headset, simply connect it to the hub using a USB cable and perform pairing and numbering again.



Configuring the Hub on the Web Server

Turn on the hub, connect it to a computer using a network cable via the RJ45 interface on the hub and the network port on the computer, configure the same network segment for the computer and hub, open a browser on the computer, and then enter the following addresses (Check the corresponding addresses through the network menu on the hub):

Default IP address of a master hub: 192.168.218.10

Default IP address of a remote hub: 192.168.218.11

You can log in to the web server (default password: **12345678**) to upgrade the hub, perform headset grouping, and set headset states.

Parameters

	Hub	Wired Headset
Interface	RJ45 interface Power interface (DC interface) 4-wire audio interface (RJ45 socket) USB interface 2-wire audio interface PGM audio interface USB-C interface 0B10 headset interface RF antenna interface	USB-C interface
Antenna	External	Built-in
Power Supply	DC power, NP-F battery, V-mount battery, G-mount battery	700mAh lithium polymer battery
Operation Time	/	About 10 hours
Charging Time	/	About 2.5 hours
Volume Adjustment	Adjustment knob	Adjustable in 7 gears
Power Consumption	<4.5W	<0.3W
Dimensions	(LxWxH): 259.9mmx180.5mmx65.5mm (10.2"x7.1"x2.6")	(LxWxH): 186.9mmx75.6mmx188.6mm (7.4"x3"x7.4")
Net Weight	About 1300g (45.9oz) with the antennas excluded	About 170g (6oz) with the battery included
Transmission Range	1,100ft (350m) LOS	
Frequency Band	1.9 GHz (DECT)	
Wireless Technology	Adaptive Frequency Hopping	
Modulation Mode	GFSK	
Wireless Power	≤ 21dBm (125.9mW)	
Bandwidth	1.728MHz	
RX Sensitivity	<-90dBm	

Frequency Response	150Hz–7kHz
Signal-to-Noise Ratio	>55dB
Distortion	<1%
Input SPL	>115dBSPL
Temperature Range	0℃ to 45℃ (working condition) –10℃ to 60℃ (storage condition) Note: The highest working temperature is 40℃ when the adapter is used for the power supply.

Safety Precautions

Do not place the product near or inside heating devices (including but not limited to microwave ovens, induction cookers, electric ovens, electric heaters, pressure cookers, water heaters, and gas stoves) to prevent the battery from overheating and exploding.

Do not use non-original charging cases, cables, and batteries with the product. The use of non-original accessories may cause electric shock, fire, explosion, or other dangers.

Support

If you encounter any problems in using the product or need any help, please contact Hollyland Support Team via the following ways:

Hollyland User Group

HollylandTech

HollylandTech

HollylandTech

support@hollyland-tech.com

www.hollyland-tech.com

Note:

Due to product version upgrades or other reasons, this User Manual will be updated from time to time. Unless otherwise agreed, this document is provided as a guide for use only. All representations, information, and recommendations in this document do not constitute warranties of any kind, express, or implied.

FCC Requirement

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the device. This device complies with Part 15 of the FCC Rules.
Operations are subject to the following two conditions:
(1) This device may not cause harmful interference.
(2) This device must accept any interference received, including interference that may cause undesired operations.

FCC Radiation Exposure Statement:
The device has been tested and complies with FCC SAR limits.

Note:
This device has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This device generates, uses, and can radiate radio frequency energy, and if it is not installed and used in accordance with the instrustions, it may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this device does cause harmful interference to radio or television reception, which can be determined by turning the device off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
- Reorient or relocate the receiving antenna.
- Increase the distance between the device and the receiver.
- Connect the device to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Video Reviews +

What's in the Box +

Product Specs −

Item	Parameters
Transmission Range	1,100ft (350m) LOS
Frequency Information	1.9 GHz (DECT) (varies by country and region)
Modulation Mode	GFSK
RX Sensitivity	<-90dBm
Battery Capacity	700mAh（2.66Wh）
Operation Time	**Remote headset: >10 hours** (ENC ON) **Master headset: >5 hours** (ENC ON with **5** remote headsets) **Master headset: >4 hours** (ENC ON with **7** remote headsets)
Charging Time	About 2.5 hours
Frequency Response	ENC OFF: 150Hz–7kHz (fluctuation range: ±6dB) ENC ON: 150Hz–7kHz
Signal-to-Noise Ratio	71±2dB@94dBSPL,1kHz
Distortion	<1%@94dBSPL, 150Hz–7kHz
Microphone Type	Electret
Input SPL	>115dBSPL
Output SPL	94±3dBSPL (@94dBSPL, 1kHz)
ENC	20dB±2
Net Weight	About 170g (6oz) with the battery included for each wireless headset
Temperature Range	0℃ to 45℃ (working condition) −10℃ to 60℃ (storage condition)

Frequently Asked Questions +

Midas M32

Digital Console for Live and Studio with 40 Input Channels, 32 MIDAS Microphone Preamplifiers and 25 Mix Buses

Processing	
Input Processing Channels	32 Input, 8 Aux and 8 FX Return Channels
Output Processing Channels	16
16 aux buses, 6 matrices, main LRC	100
Internal Effects Engines (True Stereo / Mono)	16
Internal Show Automation (structured Cues / Snippets)	500 / 100
Internal Total Recall Scenes (incl. Preamplifiers and Faders)	100
Signal Processing	40-Bit Floating Point
A/D Conversion (8-channel, 96 kHz ready)	114 dB Dynamic Range (A-weighted*)
D/A Conversion (stereo, 96 kHz ready)	120 dB Dynamic Range (A-weighted*)
I/O Latency (Console Input to Output)	0.8 ms
Network Latency (Stage Box In > Console > Stage Box Out)	1.1 ms
Connectors	
MIDAS PRO Series Microphone Preamplifier (XLR)	3 2
Talkback Microphone Input (XLR)	1
RCA Inputs / Outputs	2
XLR Outputs	16
Monitoring Outputs (XLR / ¼" TRS Balanced)	2
Aux Inputs/Outputs (¼" TRS Balanced)	6
Phones Output (¼" TRS)	2 (Stereo)
Digital AES/EBU Output (XLR)	1
AES50 Ports (KLARK TEKNIK SuperMAC)	2
Expansion Card Interface	32 Channel Audio Input / Output
ULTRANET P-16 Connector (No Power Supplied)	1
MIDI Inputs / Outputs	1
USB Type A (Audio and Data Import / Export)	1
USB Type B, rear panel, for remote control	1
Ethernet, RJ45, rear panel, for remote control	1
Mic Input Characteristics	
Design	MIDAS PRO Series
THD+N (0 dB gain, 0 dBu output)	<0.01% (unweighted)
THD+N (+40 dB gain, 0 dBu to +20 dBu output)	<0.03% (unweighted)

Input Impedance (Unbalanced / Balanced)	10 kΩ / 10 kΩ
Non-Clip Maximum Input Level	+23 dBu
Phantom Power (Switchable per Input)	+48 V
Equivalent Input Noise @ +45 dB gain (150 ? source)	-125 dB (22 Hz-22 kHz, unweighted)
CMRR @ Unity Gain (Typical)	>70 dB
CMRR @ 40 dB Gain (Typical)	>90 dB
Input/Output Characteristics	
Frequency Response @ 48 kHz Sample Rate	0 dB to -1 dB (20 Hz-20 kHz)
Dynamic Range, Analogue In to Analogue Out	106 dB (22 Hz-22 kHz, unweighted)
A/D Dynamic Range, Preamplifier and Converter (Typical)	109 dB (22 Hz-22 kHz, unweighted)
D/A Dynamic Range, Converter and Output (Typical)	109 dB (22 Hz-22 kHz, unweighted)
Crosstalk Rejection @ 1 kHz, Adjacent Channels	100 dB
Output level, XLR Connectors (Nominal / Maximum)	+4 dBu / +21 dBu
Output Impedance, XLR Connectors (Unbalanced / Balanced)	50 Ω / 50 Ω
Input impedance, TRS Connectors (Unbalanced / Balanced)	20 kΩ / 40 kΩ
Non-Clip Maximum Input Level, TRS Connectors	+21 dBu
Output Level, TRS (Nominal / Maximum)	+4 dBu / +21 dBu
Output Impedance, TRS (Unbalanced / Balanced)	50 Ω / 50 Ω
Phones Output Impedance / Maximum output Level	40 Ω / +21 dBu (Stereo)
Residual Noise Level, Out 1-16 XLR Connectors, Unity Gain	-85 dBu 22 Hz-22 kHz unweighted
Residual Noise Level, Out 1-16 XLR Connectors, Muted	-88 dBu 22 Hz-22 kHz unweighted
Residual Noise Level, TRS and Monitor out XLR Connector	-83 dBu 22 Hz-22 kHz unweighted
Display	
Main Screen	7" TFT LCD, 800 x 480 Resolution, 262k Colours
Channel LCD Screen	128 x 64 LCD with RGB Colour Backlight
Main Meter	24 Segment (-57 dB to Clip)
Power	
Switch-Mode Power Supply	Auto-Ranging 100-240 VAC (50/60 Hz) ± 10%
Power Consumption	120 W
Physical	
Standard Operating Temperature Range	5°C – 40°C (41°F – 104°F)
Dimensions	891 x 612 x 256 mm (35.1 x 24.1 x 10.1")
Weight	25 kg (55 lbs)

MIDAS DL16

16 Input, 8 Output Stage Box with 16 MIDAS Microphone Preamplifiers, ULTRANET and ADAT Interfaces

User Manual

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EN Important Safety Instructions

Terminals marked with this symbol carry electrical current of sufficient magnitude to constitute risk of electric shock. Use only high-quality commercially-available speaker cables with plugs pre-installed. All other installation or modification should be performed only by qualified personnel.

This symbol, wherever it appears, alerts you to the presence of uninsulated dangerous voltage inside the enclosure – voltage that may be sufficient to constitute a risk of shock.

This symbol, wherever it appears, alerts you to important operating and maintenance instructions in the accompanying literature. Please read the manual.

Caution
To reduce the risk of electric shock, do not remove the top cover (or the rear section). No user serviceable parts inside. Refer servicing to qualified personnel.

Caution
To reduce the risk of fire or electric shock, do not expose this appliance to rain and moisture. The apparatus shall not be exposed to dripping or splashing liquids and no objects filled with liquids, such as vases, shall be placed on the apparatus.

Caution
These service instructions are for use by qualified service personnel only. To reduce the risk of electric shock do not perform any servicing other than that contained in the operation instructions. Repairs have to be performed by qualified service personnel.

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. Use only 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. The apparatus shall be connected to a MAINS socket outlet with a protective earthing connection.

16. Where the MAINS plug or an appliance coupler is used as the disconnect device, the disconnect device shall remain readily operable.

17. Correct disposal of this product: This symbol indicates that this product must not be disposed of with household waste, according to the WEEE Directive (2012/19/EU) and your national law. This product should be taken to a collection center licensed for the recycling of waste electrical and electronic equipment (EEE). The mishandling of this type of waste could have a possible negative impact on the environment and human health due to potentially hazardous substances that are generally associated with EEE. At the same time, your cooperation in the correct disposal of this product will contribute to the efficient use of natural resources. For more information about where you can take your waste equipment for recycling, please contact your local city office, or your household waste collection service.

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LIMITED WARRANTY

For the applicable warranty terms and conditions and additional information regarding MUSIC Group's Limited Warranty, please see complete details online at music-group.com/warranty.

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1. Introduction

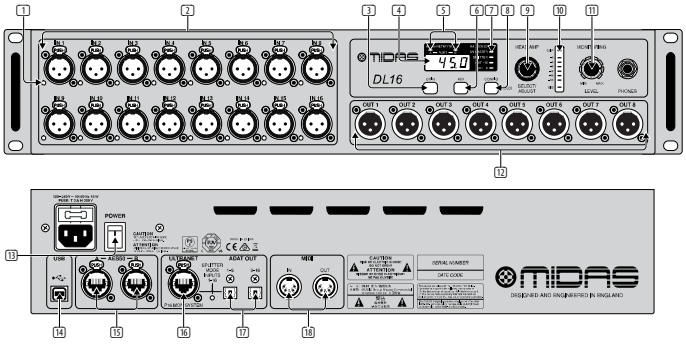
The DL16 Digital Snake is a 16-in, 8-out stagebox that features AES50 networking with KLARK TEKNIK SuperMac technology. Designed with multiple scenarios in mind, the DL16 works equally well as a standalone pair for use with analog mixing consoles, or as part of the trio of MIDAS digital mixing solutions along with the M32 digital mixer and the BEHRINGER P16 personal monitoring system.

The 16 MIDAS-designed XLR inputs are fully programmable and remote-controllable from the M32. 8 balanced XLR outputs provide ample sends to the stage for mains and monitoring. The front panel also allows the level and phantom power to be controlled for all inputs and outputs, accompanied by an 8-LED meter and 7-segment display. The currently selected channel can be monitored via ¼" headphone jack with level control.

Dual AES50 jacks allow transmission of all audio and MIDI data to the FOH M32 with a single Ethernet cable, and also allow up to 3 DL16s to be cascaded for maximum channel count. In this scenario, 48 bidirectional audio channels at 24-bit / 48 kHz can be transferred on just one CAT5 line between FOH and stage, including 48 analog inputs from stage, 24 analog outputs on stage as well as the 16 ULTRANET channels, MIDI data and head amp remote control.

An additional ULTRANET output provides the 16 channels for use with BEHRINGER's P16 personal monitoring system via Ethernet cable, allowing each musician to dial in their own custom mix from the stage. A pair of ADAT ports can carry additional sends to the stage beyond the 8 analog outputs, or split the 16 inputs. Lastly, a USB jack allows for future firmware updates.

2. Callouts



1. PHANTOM LEDs light when the 48V button is engaged for a particular channel.
2. MIDAS PRO mic/line inputs accept balanced XLR male plugs.
3. GAIN button, when pressed and held, displays the currently selected mic input's gain setting, which may then be adjusted using the SELECT/ADJUST knob.
4. DISPLAY shows the selected channel number, its gain setting, or the sample rate in Snake Master configuration.
5. NETWORK LINK LEDs light red to indicate the AES50 ports are connected but not synchronised, and light green to indicate they are connected and synchronised.
6. 48 V button sends phantom power to the currently selected mic input, indicated by a lit button when active.
7. STATUS LEDs show the operation mode of various features. See the Operation Mode Chart for details. The HA LOCKED LED indicates that preamp gain adjustment has been blocked by the controlling M32. To unlock, open the M32 Setup/Global page and un-check the General Preference 'Lock Stagebox'.
8. CONFIG button, when pressed and held, allows the device's operation mode to be adjusted by the SELECT/ADJUST knob. See Operation Mode Chart for details.
9. SELECT/ADJUST knob scrolls through the 16 channels, adjusts the gain of the currently selected input, and changes the operating mode. Push repeatedly to scroll **In**puts, **Out**puts, **P**16 channels, **A**DAT outputs, and **St**age (only in Snake Master mode).
10. LED METER displays the signal level of the currently selected channel.
11. MONITORING LEVEL knob adjusts the level of the PHONES output.
12. XLR outputs accept balanced XLR female plugs.
13. POWER switch turns the unit on and off.
14. USB input accepts a USB type–B plug for firmware updates via PC.
15. AES50 ports allow connection to a SuperMAC digital multichannel audio network via shielded Cat-5e Ethernet cable with terminated ends. This allows connection to digital mixers or cascading of multiple DL16 units.
16. ULTRANET port sends 16 channels to a BEHRINGER P-16 personal monitoring system.
17. ADAT OUT jacks send AES50 channels 17-32 to external equipment via optical cable, or split the local 16 inputs for direct ADAT recording.
18. MIDI IN/OUT jacks accept standard 5-pin MIDI cables for MIDI communication to and from an M32 console.

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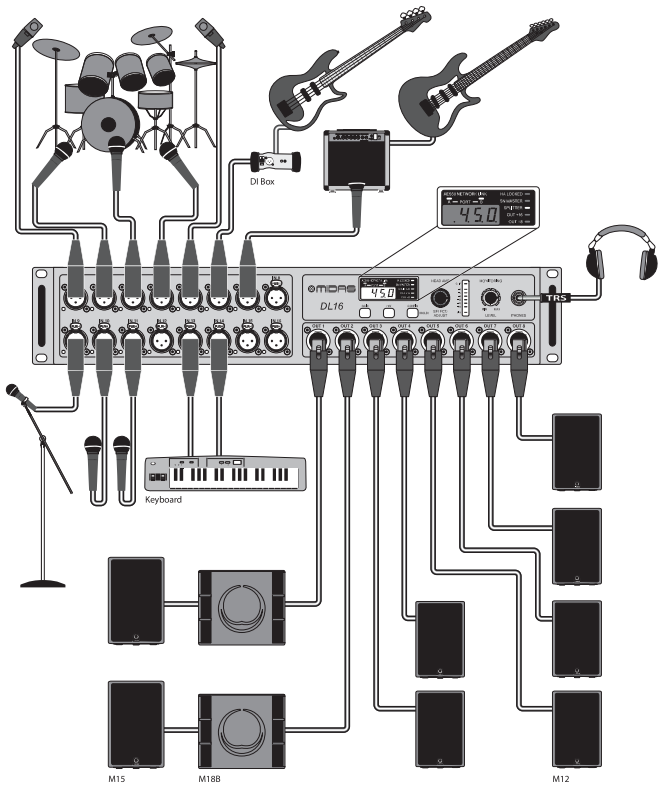
3. Hookup Diagrams

DL16 common connections



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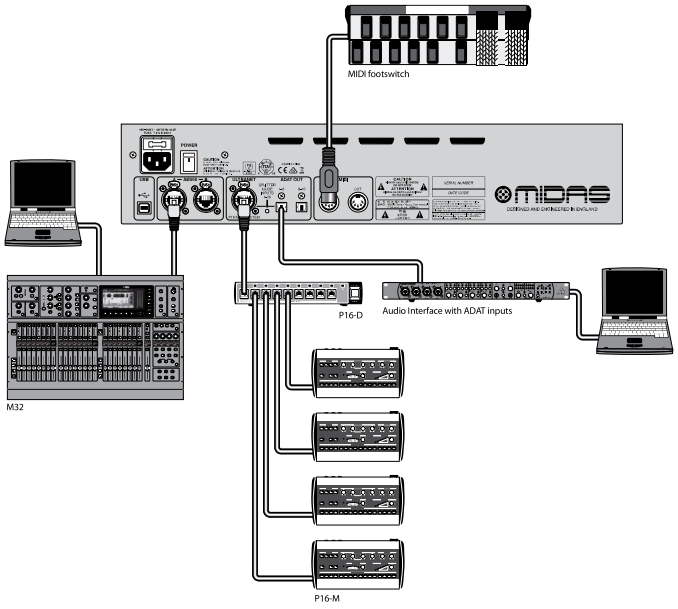
DL16 common connections, rear panel



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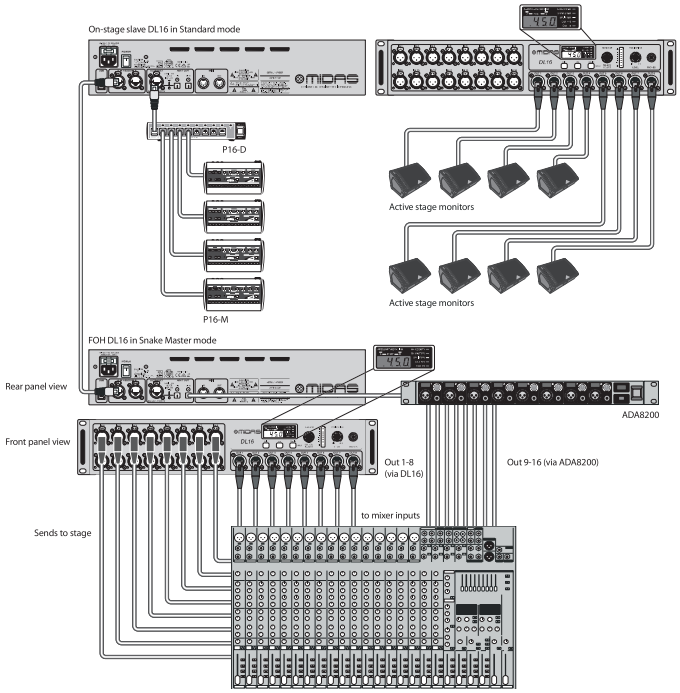
DL16 as standalone snake



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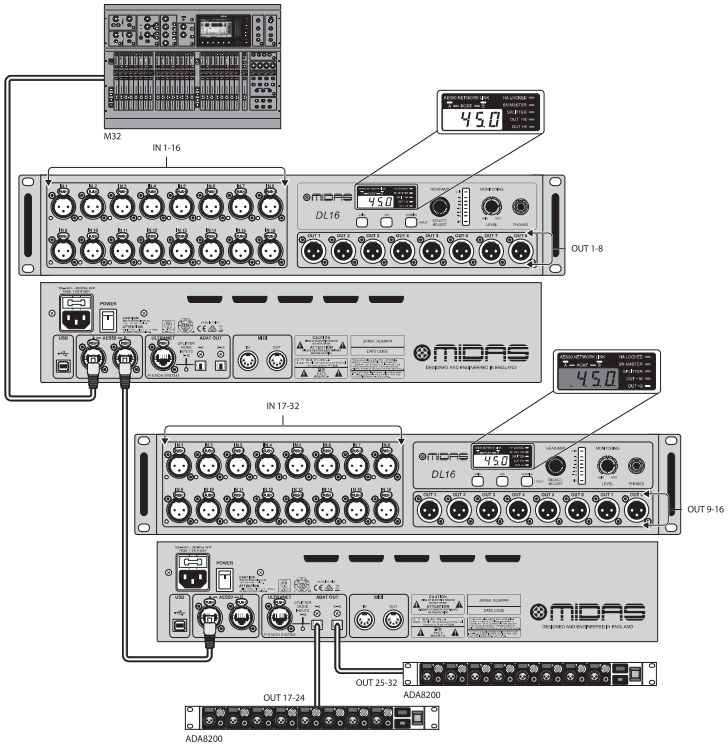
Linking two DL16 units



Note: The signals on both DL16 units (Out 1-8 and 9-16) and both ADA8200 units (Out 17-24 and 25-32) are fully defined on the M32's 'Routing/AES50 Output' page. The second DL16's outputs must be set to Out +8 on the unit itself.

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4. Configuring the DL16

By using the CONFIG button and SELECT/ADJUST knob, the DL16 can be configured to suit many different applications. The STATUS LEDs indicate the current settings. By holding the CONFIG knob while turning the SELECT/ADJUST knob, you can scroll through all 10 configuration options. See the Operation Mode Chart for the routing details of each configuration setting.

When using multiple DL16 units, activating SN(ake) MASTER mode on one unit allows that unit to control the preamp gain of the second unit. An DL16 set to SN MASTER will also dictate the overall clock synchronization (44.1 or 48 kHz). This is useful when using a pair of DL16s as a standalone digital snake (16 x 16) or a 32-channel mic preamp via ADAT. See the 'Standalone Operation' section for details.

SPLITTER mode routes the 16 local analog inputs directly to the ADAT outputs and ULTRANET output. This is useful when using the DL16 as a standalone snake where the ULTRANET monitor mix cannot be adjusted from an M32 console. Additionally, the DL16 can be used as a high-quality mic preamp that sends the 16 inputs to an interface or computer with an ADAT card for recording purposes. When SPLITTER mode is off, the ADAT outputs carry AES50 channels 17-32 and the ULTRANET output carries channels 33-48.

The OUT +8 and OUT +16 options shift the XLR outputs for use with multiple DL16s. For example, if a connection scenario involves 3 daisy-chained DL16s, the first unit will carry AES50 channels 1-8. The second unit should be set to OUT +8 so that its analog outputs carry channels 9-16, and the 3rd DL16 should be set to OUT +16 so that its analog outputs carry channels 17-24. This way you can provide up to 24 return signals to the stage. Alternatively, you may also use the same block of 8 output signals on a set of distributed DL16 stageboxes.

MIDAS DL16 Operation Mode Chart

Seq.	LED SN MASTER	sync clock	LED SPLITTER	LED OUT +16	LED OUT +8	XLR analog out 1-8	ADAT out 1-8	ADAT out 9-16	P-16 Ultranet out 1-16
1 (default)		AES50 (console)				= AES50-A, ch01-ch08	= AES50-A ch17-ch24	= AES50-A ch25-ch32	= AES50-A ch33-ch48
2		AES50 (console)			on	= AES50-A ch09-ch16	= AES50-A ch17-ch24	= AES50-A ch25-ch32	= AES50-A ch33-ch48
3		AES50 (console)		on		= AES50-A ch17-ch24	= AES50-A ch17-ch24	= AES50-A ch25-ch32	= AES50-A ch33-ch48
4		AES50 (console)	on			= AES50-A, ch01-ch08	= Local In 01 - 08	= Local In 09 - 16	= Local In 01 - 16
5		AES50 (console)	on		on	= AES50-A ch09-ch16	= Local In 01 - 08	= Local In 09 - 16	= Local In 01 - 16
6		AES50 (console)	on	on		= AES50-A ch17-ch24	= Local In 01 - 08	= Local In 09 - 16	= Local In 01 - 16
7	on	48 kHz (int)				= AES50-A, ch01-ch08	= AES50-A, ch01-ch08	= AES50-A ch09-ch16	= AES50-A ch01-ch16
8	on	44.1 kHz (int)				= AES50-A, ch01-ch08	= AES50-A, ch01-ch08	= AES50-A ch09-ch16	= AES50-A ch01-ch16
9	on	48 kHz (int)	on			= AES50-A, ch01-ch08	= Local In 01 - 08	= Local In 09 - 16	= Local In 01 - 16
10	on	44.1 kHz (int)	on			= AES50-A, ch01-ch08	= Local In 01 - 08	= Local In 09 - 16	= Local In 01 - 16

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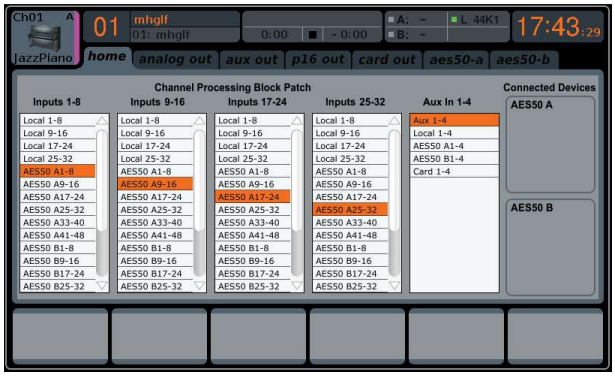
4.1 Standard Operation

The DL16 is in Standard (default) mode when all the configuration STATUS LEDs on the front display are off. This is useful for using the unit as a digital snake along with the MIDAS M32 console to conveniently transfer 16 channels from the stage to FOH, and send 40 total channels back to the stage. The sends to the stage are arranged as AES50 channels 1-8 which appear on the 8 analog XLR OUTPUTS, AES50 channels 17-24 and 25-32 which appear on the ADAT OUTPUTS, and AES50 channels 33-48 appearing at the ULTRANET OUTPUT. The specific routing of the AES50 channels can be configured on the M32.

4.2 Cascaded Operation

To make use of the DL16's full potential, up to 3 units can be cascaded to allow 48 channels of bidirectional audio. Any AES50 signals cascaded from one DL16's port A to another DL16's port B are automatically shifted up 16 channels, allowing the last DL16 in the chain to transmit all audio channels to and from the stage via its AES50-A port. The M32 Routing home page allows selection of the incoming AES50 signals that can be connected to the channel processing. The routing of the audio sent from console to stage box can be adjusted on the M32 Routing AES50 pages, respectively.



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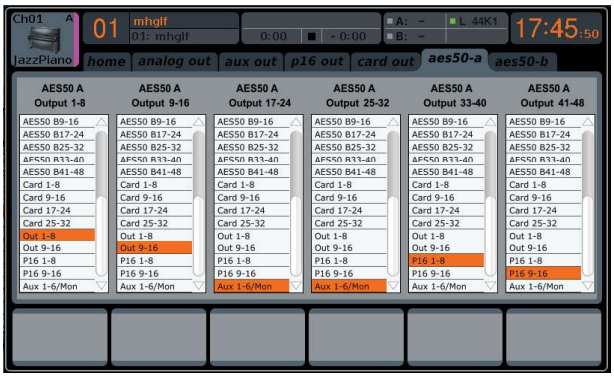
Signals sent from the M32 to the stage are seen the same on all DL16 units in the chain. AES50 channels 1-8 will appear on the XLR OUTPUTS of each unit. To achieve maximum output to the stage, the 2nd and 3rd units in the chain must have their physical OUTPUTS set to OUT +8 and OUT +16 respectively.



The following chart details the signal flow to and from the stage when using 3 DL16 units.

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5. Standalone Operation

The DL16 does not necessarily need to be used in conjunction with the M32 console. A pair of DL16 units can be linked to send 16 channels to and from the stage, providing a high-quality digital snake that can work with any analog mixer.

In this scenario, a master DL16 will be placed at FOH near the main mixing console, and the other on the stage (see 'DL16 as standalone snake' hookup diagram). The FOH unit must be set to SN MASTER mode so that it can control the preamps of the unit on stage. All sends from FOH to the stage can be connected to INTPUTS 1-8 on the 'master' DL16, which will appear at the on-stage unit's XLR OUTPUTS. Connect all the sound sources from the performers to INPUTS 1-16 of the on-stage DL16. Channels 1-8 will appear at the 'master' DL16's XLR OUTPUTS and channels 9-16 will appear at the ADAT OUTPUT. Connect the ADAT 9-16 OUTPUT to an ADA8200 or similar preamp to provide analog XLR outputs. The outputs from the 'master' DL16 and the ADA8200 can be connected to any sort of main console for mixing, analog or digital.

Note - when using a pair of DL16 units as a standalone digital snake, the master unit at FOH is able to control the mic gains of the unit(s) on stage. However, in order to do so, one must press the SELECT/ADJUST button on the master unit so that the display reads "St 1".

For recording applications, a single DL16 can also be used as a high-quality mic preamp. Connect the sound sources to the INPUTS 1-16, and send those channels via ADAT to an interface or ADAT card installed in your computer. For this scenario, the DL16 must be set to SPLITTER mode.

6. MIDI Communication

The DL16 head amp gain and phantom power settings can be controlled remotely via MIDI whenever it is used standalone, independent from the MIDAS M32.

Note: The DL16 will only accept MIDI controls when its preamps are not controlled via AES50 already. Connection to an M32 console or another DL16 in SN Master mode will always inhibit reception of preamp related MIDI commands.

The standard channel for transmit/receive of MIDI controls is 1. MIDI channel 2 is used when the SN slave unit is to be controlled via the SN Master unit.

	TRANSMIT / RECEIVE			
Select	**CC #**	**Value**	**Channel**	**Description**
SN MASTER "In 1-16" (FOH)	80…95 96…111	0…19 0, 127	1 1	Controls local head amps of master unit Gain In 1-16, -2.5…+45 dB, 2.5 dB steps 48V Phantom 1-16 on/off
SN MASTER "St 1-16" (Stage)	80…95 96…111	0…19 0, 127	2 2	Controls remote head amps of slave unit Gain In 1-16, -2.5…+45 dB, 2.5 dB steps 48V Phantom 1-16 on/off
SN SLAVE	—	—	—	No MIDI transmission or reception when controlled by SN Master or M32 console
Ext Sync w/o AES50 preamp control	80…95 96…111	0…19 0, 127	1 1	Gain In 1-16, -2.5…+45 dB 48V Phantom 1-16 on/off

Note: The string 0xEE, 0x7E, 0x7E can be sent for testing if a DL16 is communicating via MIDI. The response would be 0xEE, 0x7E, 0x7F when MIDI inputs and outputs of the DL16 are connected to the test interface.

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7. Specifications

Processing	
A/D converters (8-channel, 24-bit @ 44.1 / 48 kHz)	114 dB dynamic range (A-weighted)
D/A converters (stereo, 24-bit @ 44.1 / 48 kHz)	120 dB dynamic range (A-weighted)
Networked I/O latency (stagebox in > console processing* > stagebox out)	1.1 ms
Connectors	
XLR inputs, programmable mic preamps	16
XLR outputs	8
Phones outputs, ¼" TRS	1 (mono)
AES50 ports, SuperMAC	2
P-16 connector, ULTRANET (no power supplied)	1
MIDI inputs / outputs	1 / 1
ADAT Toslink outputs (2 x 8 Ch)	2
USB type B, rear panel, for system updates	1
Mic Input Characteristics (MIDAS PRO)	
THD + noise, @ unity gain, 0 dBu out	< 0.01% unweighted
THD + noise, @ +40 dB gain, 0 dBu out	< 0.03% unweighted
Input impedance XLR, unbal. / bal.	10 kΩ / 10 kΩ
Non clip maximum input level, XLR	+23 dBu
Phantom power, switchable per input	48 V
Equivalent input noise @ +40 dB gain, (150R source)	-125 dBu, 22 Hz – 22 kHz unweighted
CMRR, XLR, @ unity gain (typical)	> 70 dB
CMRR, XLR, @ 40 dB gain (typical)	> 90 dB
Input/Output Characteristics	
Frequency response @ 48 kHz sample rate	0 to -1 dB 20 Hz to 20 kHz
Dynamic range, analogue in to analogue out	107 dB (22 Hz - 22 kHz unweighted)
A/D dynamic range, preamp and converter (typical)	109 dB (22 Hz to 22 kHz unweighted)
D/A dynamic range, converter and output (typical)	110 dB (22 Hz - 22 kHz unweighted)
Cross talk rejection @ 1 kHz, adjacent channels	100 dB
Output level, XLR, nom./max.	+4 dBu / +21 dBu
Output impedance, XLR, unbal. / bal.	50 Ω / 50 Ω
Phones output impedance / level	40 Ω / +21 dBu (mono)
Residual noise level, out 1-8 XLR, unity gain	-86 dBu, 22 Hz - 22 kHz unweighted
Indicators	
Display	4-digit, 7-segment, LED
Front status LEDs	AES50-A, red/green AES50-B, red/green HA Locked, red SN Master, green Splitter, orange Out +16, orange Out +8, orange
Meter	Sig, -30 dB, -18 dB, -12 dB, -9 dB, -6 dB, -3 dB, Clip
Rear panel	Splitter mode, orange
Power	
Switch-mode autorange power supply	100-240 V (50/60 Hz)
Power consumption	45 W
Physical	
Dimensions	482 x 225 x 89 mm (19 x 8.9 x 3.5")
Weight	4.7 kg (10.4 lbs)

* incl. all channel and bus processing, excl. insert effects and line delays

FEDERAL COMMUNICATIONS COMMISSION COMPLIANCE INFORMATION

MIDAS
DL16

Responsible Party Name:	**MUSIC Group Research UK Limited**
Address:	**Klark Industrial Park, Walter Nash Road, Kidderminster. Worcestershire. DY11 7HJ. England.**
Phone Number:	**+44 1562 741515**

DL16

complies with the FCC rules as mentioned in the following paragraph:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Important information:

Changes or modifications to the equipment not expressly approved by MUSIC Group can void the user's authority to use the equipment.

ULX-D®

DIGITAL WIRELESS SYSTEMS

Shure ULX-D® Digital Wireless offers uncompromising 24-bit audio clarity and extremely efficient RF performance with single, dual, and quad channel receivers for any size professional sound reinforcement application. Generations ahead of any other available system in its class, ULX-D brings a new level of performance to professional sound reinforcement.

UNCOMPROMISING PROFESSIONAL DIGITAL WIRELESS

24-bit/48 kHz digital audio that delivers incredibly clear and accurate sound reproduction

20 Hz – 20 kHz frequency range with flat response

Greater than 120 dB dynamic range

Wide selection of trusted Shure Microphones

Available in UHF, VHF and ISM (900MHz) Frequency Bands (region dependent)

EXTREMELY EFFICIENT AND RELIABLE RF PERFORMANCE

Up to 64 MHz overall tuning range (region dependent)

Up to 17 active transmitters in one 6 MHz TV channel (22 on an 8 MHz TV channel)

High Density mode enables up to 47 active transmitters in one 6 MHz TV channel

Rock-solid signal stability with no audio artifacts over the entire 100 meter range

Optimized scanning automatically finds, prioritizes, and selects the cleanest frequencies available

SCALABLE, INTELLIGENT HARDWARE

Single (half-rack), Dual and Quad (full-rack) receiver form factors

AES 256-bit encryption equipped for secure wireless transmission

Dante Domain Manager compatible

Wireless Workbench® 6 compatible for advanced coordination, monitoring and control; features Site Survey tool for scanning frequencies in the 902-928 MHz ISM band

Compatible with the Shure SB900A Rechargeable Battery and SBC chargers

APPLICATIONS

- Installed Audio
- Critical Audio Performances
- High channel counts
- Secure presentations

PRODUCT HIGHLIGHTS

- 24-bit/48 kHz Digital Wireless Audio
- High Density Mode
- Single, Dual, and Quad Channel Receivers
- Advanced Rechargeability
- Dante Domain Manager Compatible
- Boundary and Gooseneck Base Transmitters are available in black and white color options

SHURE

ULX-D® DIGITAL WIRELESS SYSTEMS

SPECIFICATIONS (SUBJECT TO CHANGE)

RF Carrier Range	174–216 MHz, 470–865 MHz, 1492–1525 MHz, 1785–1805 MHz Note: Varies by region (See Frequency Range and Ouput Power table)
Working Range	100 m (328 ft) Note: Actual range depends on RF signal absorption, reflection and interference.
RF Tuning Step Size	25 kHz, varies by region
Image Rejection	>70 dB, typical
RF Sensitivity	-98dBm at 10^{-5} BER
Latency	<2.9 ms
Audio Frequency Response	ULXD1: 20 Hz – 20 kHz (±1 dB) ULXD2: 30 Hz – 20 kHz (±1 dB) Note: Dependent on microphone type
Audio Dynamic Range System Gain @ +10	XLR Analog Output: >120 dB, A-weighted Dante Digital Output (Dual and Quad receivers): 130 dB (typical), A-weighted
Total Harmonic Distortion –12 dBFS input, System Gain @ +10	<0.1%
System Audio Polarity	Positive pressure on microphone diaphragm produces positive voltage on pin 2 (with respect to pin 3 of XLR output) and the tip of the 6.35 mm (1/4-inch) output.
Operating Temperature Range	–18 °C (0 °F) to 50 °C (122 °F) Note: Battery characteristics may limit this range.
Storage Temperature Range	–29°C (–20°F) to 74°C (165°F) Note: Battery characteristics may limit this range.

FREQUENCY RANGE

Band	Range (MHz)	Transmitter Output (mW)
V50	174 to 216	1/10/20
V51	174 to 216	1/10/20
G50	470 to 534	1/10/20
G51	470 to 534	1/10/20
G52	479 to 534	1/10
H50	534 to 598	1/10/20
H51	534 to 598	1/10/20
H52	534 to 565	1/10
J50	572 to 636	1/10/20
K51	606 to 670	1/10
L50	632 to 696	1/10/20
L51	632 to 696	1/10/20
P51	710 to 782	1/10/20
R51	800 to 810	1/10/20
JB (Tx only)	806 to 810	1/10
AB (Rx and Tx)	770 to 810	"A" band (770.250-805.750): 1/10/20 "B" band (806.125-809.750): 1/10
Q51	794 to 806	1/10/20
X52	902 to 928	1/10/20
X50	925 to 932	1/10
X51	925 to 937.5	1/10
X52	902 to 928	0.25/10/20
X53	902 to 907.5; 915 to 928	0.25/10/20
X54	915 to 928	0.25/10/20
Z16	1240 to 1260	1/10/20

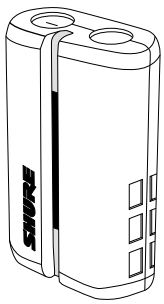
*Note: Not all frequencies available in all regions. Contact your authorized Shure dealer for availability.

NOTE:

This Radio equipment is intended for use in musical professional entertainment and similar applications. This Radio apparatus may be capable of operating on some frequencies not authorized in your region. Please contact your national authority to obtain information on authorized frequencies and RF power levels for wireless microphone products.

RECHARGEABLE POWER MANAGEMENT (sold separately)

SB900A RECHARGEABLE BATTERY



ULX-D transmitters are compatible with the SB900A lithium-ion rechargeable battery, which provides over 9 hours of continuous use and precise tracking of remaining life and charge cycle details.

SBC200 DUAL DOCKING RECHARGING STATION

This compact and portable unit charges batteries while in transmitters or out. Up to 4 SBC200's can be chained toget.her to run off one power supply.

SBC220 2-BAY NETWORKED CHARGING STATION

Enables docked charging and storage for any combination of two SB900A batteries or ULXD1, ULXD2 wireless transmitters. When connected to a network, the charging status of each transmitter can be viewed remotely. Up to four SBC220 units can be linked together to share power and network connectivity.

SBC800 EIGHT BATTERY RECHARGING STATION

This compact and portable unit charges up to 8 SB900A batteries to full capacity within 3 hours, with status LEDs to indicate power levels. SB900A batteries fit securely in the charger for easy, efficient storage and transport.

BATTERY RUNTIMES

(Note: Frequency Band Dependent)

BATTERY TYPE	1 MW	10 MW	20 MW
SB900A	> 9 hours	> 9 hours	> 7 hours
Alkaline	> 8 hours	> 8 hours	< 6 hours
NiMH	> 8 hours	> 8 hours	< 6 hours
Li-primary	10-16 hours	10-16 hours	7-9 hours

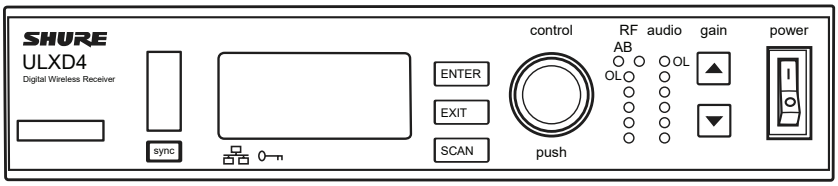
ULXD4 DIGITAL WIRELESS RECEIVER

OVERVIEW

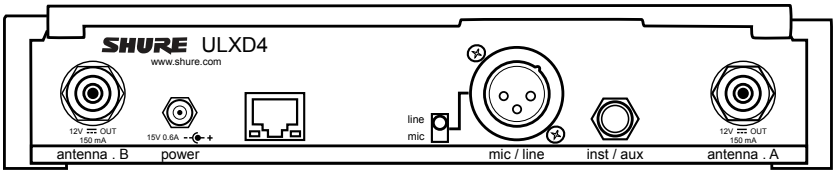
The Shure ULXD4 is a half-rack wireless receiver for use with ULX-D® Digital Wireless Systems. With an expansive set of professional features, including 24-bit/48kHz digital audio quality, efficient and intelligent RF performance, and AES 256-bit encryption, ULX-D offers uncompromising wireless tailored for professional sound reinforcement.

FEATURES

- Up to 64 MHz tuning range
- Predictive switching diversity
- Intelligent scanning automatically finds and deploys the cleanest frequencies to transmitters over IR sync
- Interference detection and alerts provided on both the receiver and WWB6
- Front panel gain adjustment buttons provide up to 60 dB additional gain
- AES 256-bit encryption-enabled for applications where secure transmission is needed
- Ethernet networking for streamlined setup across multiple receivers, WWB6 integration (coming soon), and AMX/Crestron control
- Support for frequency coordination with Axient Spectrum Manager (coming soon)
- Rugged metal chassis
- Intuitive front panel LCD menu and controls
- Easily readableUpgraded LCD with adjustable contrast and brightness
- Audio and RF LED meters with peak indicator
- Front panel lockout
- XLR and ¼" outputs
- Remoteable ½ wave antennas
- Furnished rack hardware



ULXD4
Front Panel



ULXD4
Back Panel

SPECIFICATIONS

(SUBJECT TO CHANGE)

Dimensions	197 mm × 171 mm × 42 mm (7.75 in. × 6.75 in. × 1.65 in.), H × W × D
Weight	913 g (2.0 lbs), without antennas
Housing	Galvanized Steel

RF OUTPUT

Spurious Rejection	>80 dB, typical
Connector Type	BNC
Impedance	50 Ω
Bias Voltage	12 - 13 V DC, 170 mA maximum, per antenna

AUDIO INPUT

Gain Adjustment Range	-18 to +42 dB in 1 dB steps (plus Mute setting)
Configuration	1/4" (6.35 mm): Impedance balanced (Tip=audio, Ring=no audio, Sleeve=ground) XLR: Balanced (1=ground, 2=audio +, 3=audio -)
Impedance	1/4" (6.35 mm): 100 Ω (50 Ω Unbalanced) XLR: 100 Ω
Full Scale Output	1/4" (6.35 mm): +12 dB XLR: LINE setting= +18 dBV, MIC setting= -12 dBV
Mic/Line Switch	30 dB pad
Phantom Power Protection	1/4" (6.35 mm): Yes XLR: Yes

NETWORKING

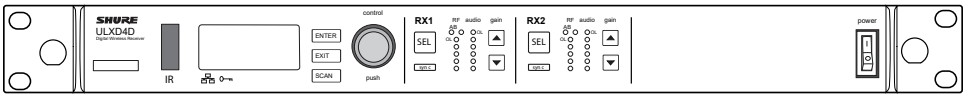
Power Over Ethernet (PoE)	No, protected
Network Interface	Single Port Ethernet 10/100 Mbps
Network Addressing Capability	DHCP or Manual IP address
Maximum Ethernet Cable Length	100 m (328 ft)

COMPONENT SPECIFICATIONS
ULXD4D DUAL CHANNEL DIGITAL WIRELESS RECEIVER

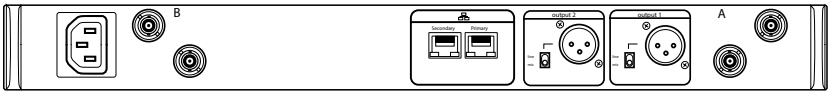
OVERVIEW

The Shure ULXD4D Dual Channel Digital Wireless Receiver offers two channels of uncompromising audio quality, RF signal stability, and advanced setup features in a space-efficient single rack unit. Digital wireless processing delivers premium 24-bit/48 kHz audio and RF spectrum efficiencies that dramatically increase the number of available compatible channels. With an expansive set of enhanced features including AES 256-bit encryption for security and Dante™ digital networking for audio over Ethernet, the ULXD4D brings a new level of performance to professional sound reinforcement.

- Two receivers in a rugged 1RU metal chassis with internal power supply
- Individual gain controls, LED meters, and XLR outputs for each channel
- Up to 64 MHz tuning range (region dependent)
- Digital predictive switching diversity
- High Density mode optimizes ULX-D systems to simultaneously operate significantly more channels in applications up to 30 meters
- RF cascade ports allow distribution of RF signal to another unit
- Optimized scanning automatically finds, prioritizes, and deploys the cleanest frequencies to transmitters over IR sync
- Bodypack Frequency Diversity ensures uninterrupted audio for mission-critical applications
- AES 256-bit encryption-enabled for secure transmission
- Audio summing routes both audio channels to each XLR receiver output
- Dante Domain Manager compatible
- Up to 60 dB independently adjustable gain for each channel
- Ethernet networking for streamlined frequency coordination and deployment across multiple receivers
- Wireless Workbench® 6 (WWB6) software integration for advanced coordination, monitoring, and control
- Interference detection and alerts provided on both the receiver and WWB6
- AMX®/Crestron® control
- AXT600 Axient® Spectrum Manager compatible
- Intuitive front panel LCD menu and controls with lockout feature
- Audio and RF LED meters with peak indicator
- XLR connectors with switchable mic/line output level
- Remoteable ½ wave antennas



ULXD4D
Front Panel



ULXD4D
Back Panel

SPECIFICATIONS

(SUBJECT TO CHANGE)

Dimensions	44 mm × 482 mm × 274 mm (1.73 in. × 18.97 in. × 10.79 in.), H × W × D
Weight	3.36 kg (7.4 lbs), without antennas
Housing	Steel; Extruded Aluminum
Power Requirements	100 to 240 V AC, 50-60 Hz, 0.26 A max.

RF OUTPUT

Spurious Rejection	>80 dB, typical
Connector Type	BNC
Impedance	50 Ω
Bias Voltage	12–13 V DC, 150 mA maximum, per antenna

AUDIO INPUT

Gain Adjustment Range	–18 to +42 dB in 1 dB steps (plus Mute setting)
Configuration	XLR: Balanced (1=ground, 2=audio +, 3=audio –)
Impedance	100 Ω
Full Scale Output	LINE setting= +18 dBV, MIC setting= –12 dBV
Mic/Line Switch	30 dB pad
Phantom Power Protection	Yes

NETWORKING

Network Interface	Dual Port Ethernet 10/100 Mbps, 1 Gbps
Network Addressing Capability	DHCP or Manual IP address
Maximum Ethernet Cable Length	100 m (328 ft)

CASCADE OUTPUT

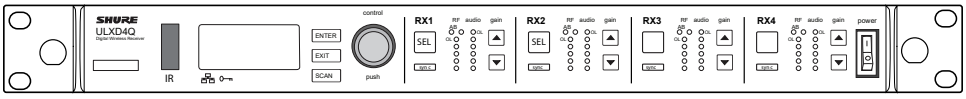
Connector Type	BNC: For connection of 1 additional receiver
Configuration	Unbalanced, passive
Impedance	50 Ω
Insertion Loss	0 dB

COMPONENT SPECIFICATIONS
ULXD4Q QUAD CHANNEL DIGITAL WIRELESS RECEIVER

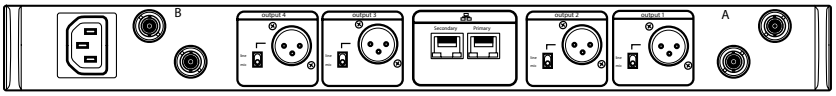
OVERVIEW

The Shure ULXD4Q Quad Channel Digital Wireless Receiver offers four channels of uncompromising audio quality, RF signal stability, and advanced setup features in a space-efficient single rack unit. Digital wireless processing delivers premium 24-bit/48 kHz audio and RF spectrum efficiencies that dramatically increase the number of available compatible channels. With an expansive set of enhanced features including AES 256-bit encryption for security and Dante™ digital networking for audio over Ethernet, the ULXD4D delivers the most wireless performance per square inch.

- Four receivers in a rugged 1RU metal chassis with internal power supply
- Individual gain controls, LED meters, and XLR outputs for each channel
- Up to 64 MHz tuning range (region dependent)
- Digital predictive switching diversity
- High Density mode optimizes ULX-D systems to simultaneously operate significantly more channels in applications up to 30 meters
- RF cascade ports allow distribution of RF signal to another unit
- Optimized scanning automatically finds, prioritizes, and deploys the cleanest frequencies to transmitters over IR sync
- Bodypack Frequency Diversity ensures uninterrupted audio for mission-critical applications
- AES 256-bit encryption-enabled for secure transmission
- Audio summing routes two or more audio channels to combinations of receiver outputs. Use each channel's gain adjustment to reach the desired mix.
- Dante Domain Manager compatible
- Two receivers in a rugged 1RU metal chassis with internal power supply
- Individual gain controls, LED meters, and XLR outputs for each channel
- Ethernet networking for streamlined frequency coordination and deployment across multiple receivers
- Interference detection and alerts provided on both the receiver and WWB6
- Up to 60 dB independently adjustable gain for each channel
- Wireless Workbench® 6 software integration for advanced coordination, monitoring, and control AMX/Crestron control
- Compatible with the AXT600 Axient™ Spectrum Manager
- Intuitive front panel LCD menu and controls with lockout feature
- Upgraded LCD with adjustable contrast and brightness
- Audio and RF LED meters with peak indicator
- Switchable mic/line output level
- Remoteable ½ wave antennas



ULXD4Q
Front Panel



ULXD4Q
Back Panel

SPECIFICATIONS

(SUBJECT TO CHANGE)

Dimensions	44 mm x 482 mm x 274 mm (1.73 in. x 18.97 in. x 10.79 in.), H x W x D
Weight	3.45 Kg (7.6 lbs), without antennas
Housing	Steel; Extruded Aluminum
Power Requirements	100 to 240 V AC, 50–60 Hz, 0.32 A max.

RF OUTPUT

Spurious Rejection	>80 dB, typical
Connector Type	BNC
Impedance	50 Ω
Bias Voltage	12 - 13 V DC, 150 mA maximum, per antenna

AUDIO INPUT

Gain Adjustment Range	–18 to +42 dB in 1 dB steps (plus Mute setting)
Configuration	XLR: Balanced (1=ground, 2=audio +, 3=audio –)
Impedance	100 Ω
Full Scale Output	LINE setting= +18 dBV, MIC setting= –12 dBV
Mic/Line Switch	30 dB pad
Phantom Power Protection	Yes

CASCADE OUTPUT

Connector Type	BNC: For connection of 1 additional receiver
Configuration	Unbalanced, passive
Impedance	50 Ω
Insertion Loss	0 dB

COMPONENT SPECIFICATIONS
ULXD2 WIRELESS HANDHELD TRANSMITTER

OVERVIEW

The Shure ULXD2 is a handheld wireless transmitter compatible with ULX-D® Digital Wireless Systems. Offering premium 20 Hz – 20 kHz audio quality, advanced rechargeability options, and a wide selection of interchangeable Shure microphone heads, the ULXD2 delivers uncompromising wireless performance for professional sound reinforcement applications. The ULXD2 is offered with SM58®, SM86, SM87A, Beta 58A®, Beta 87A, and Beta 87C.

- 20 Hz to 20 kHz range with flat frequency response (actual response is microphone dependent)
- AES 256-bit encryption-enabled for applications where secure transmission is needed
- >120 dB dynamic range
- 1, 10, and 20 mW selectable RF output power
- 5 segment battery fuel gauge
- Shure lithium-ion rechargeable battery pack provides up to 9 hours of battery life, precision metering, and zero memory effect
- Up to 8 hours continuous use with 2 x AA batteries
- Backlit LCD with easy to navigate menu and controls
- Available with TA4M and LEMO3 input connectors
- 100 meter (300 ft) operating range
- Rugged metal construction
- Frequency and power lockout

ULXD2
Wireless Handheld Transmitter

SPECIFICATIONS (SUBJECT TO CHANGE)

Gain Offset Range	0 to 21 dB (in 3 dB steps)
Battery Type	Shure SB900A Rechargeable Li-Ion or LR6 AA batteries 1.5 V
Battery Runtime @ 10 mW	Shure SB900A: up to 9 Alkaline: 8 hours See Battery Runtime Chart
Dimensions	256 mm × 51 mm (10.1 in. × 2.0 in.) L × Dia. V50, V51 Bands: 278 mm × 51 mm (10.9 in. × 2.0 in.) L × Dia.
Weight	340 g (12.0 oz.), without batteries V50, V51 Bands: 348 g (12.3 oz.), without batteries
Housing	Machined aluminum

AUDIO INPUT

Configuration	Unbalanced
Maximum Input Level 1 kHz at 1% THD	145 dB SPL (SM58), typical Note: Dependent on microphone type
Preamplifier Equivalent Input Noise (EIN) System Gain Setting ≥ +20	120 dBV, A-weighted, typical

RF OUTPUT

Antenna Type	Integrated Single Band Helical
Occupied Bandwidth	<200 kHz
Modulation Type	Shure Proprietary Digital
Power	1 mW, 10 mW, 20 mW See Frequency Range and Ouput Power table, varies by region

MICROPHONE OPTIONS
(See shure.com for more)

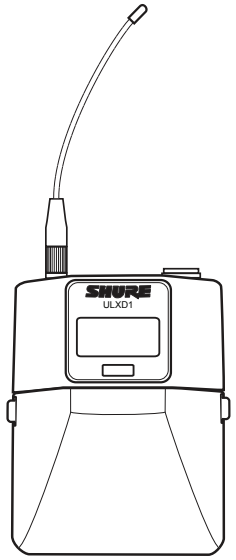
WL93	WL93 condenser capsule, omnidirectional lavalier mic
WL183	WL183 condenser capsule, omnidirectional lavalier mic
WL184	WL184 condenser capsule, supercardioid lavalier mic
WL185	WL185 condenser capsule, cardioid lavalier mic
WL50	WL50 condenser capsule, omnidirectional lavalier mic
WL51	WL51 condenser capsule, cardioid lavalier mic
SM31FH	SM31FH condenser capsule, moisture repellant cardioid headset mic
SM35	SM35 condenser capsule, cardioid headset mic
WCM16	WCM16 condenser capsule, hypercardioid headworn mic
WBH53	WBH53 condenser capsule, omnidirectional headworn mic
WBH54	WBH54 condenser capsule, supercardioid headworn mic
WB98H/C	WB98H/C condenser capsule, cardioid instrument clip mic

COMPONENT SPECIFICATIONS
ULXD1 WIRELESS BODYPACK TRANSMITER

OVERVIEW

The ULXD1 is a wireless bodypack transmitter compatible with ULX-D® Digital Systems. With a rugged yet lightweight aluminum case, the ULXD1 delivers uncompromising audio quality and RF performance, AES 256-bit encryption for secure transmission, and advanced rechargeability options for professional sound reinforcement applications.

- 20 Hz to 20 kHz range with flat frequency response (actual response is microphone dependent)
- AES 256-bit encryption-enabled for applications where secure transmission is needed
- >120 dB dynamic range
- 1, 10, and 20 mW selectable RF output power
- 5 segment battery fuel gauge
- Shure lithium-ion rechargeable battery pack provides up to 9 hours of battery life, precision metering, and zero memory effect
- Up to 8 hours continuous use with 2 x AA batteries
- Backlit LCD with easy to navigate menu and controls
- Available with TA4M and LEMO3 input connectors
- 100 meter (300 ft) operating range
- Rugged metal construction
- Frequency and power lockout



ULXD1
Wireless Bodypack Transmitter

SPECIFICATIONS (SUBJECT TO CHANGE)

Gain Offset Range	0 to 21 dB (in 3 dB steps)
Battery Type	Shure SB900A Rechargeable Li-Ion or AA batteries
Battery Runtime @ 10 mW	Shure SB900A: up to 9 Alkaline: 8 hours See Battery Runtime Chart
Dimensions	86 mm × 66 mm × 23 mm (3.4 in. × 2.6 in. × 0.9 in.) H × W × D
Weight	142 g (5.0 oz.), without batteries
Housing	Cast aluminum

AUDIO INPUT

Connector	4-Pin male mini connector (TA4M) LEMO3 connector
Configuration	Unbalanced
Impedance	1 MΩ
Maximum Input Level 1 kHz at 1% THD	Pad Off: 8.5 dBV (7.5 Vpp) Pad On: 20.5 dBV (30 Vpp)
Preamplifier Equivalent Input Noise (EIN) System Gain Setting › +20	120 dBV, A-weighted, typical

RF OUTPUT

Connector	SMA
Antenna Type	1/4 wave
Impedance	50 Ω
Occupied Bandwidth	<200 kHz
Modulation Type	Shure Proprietary Digital
Power	1 mW, 10 mW, 20 mW See Frequency Range and Ouput Power table, varies by region

MICROPHONE OPTIONS
(See shure.com for more)

WL93	WL93 condenser capsule, omnidirectional lavalier mic
WL183	WL183 condenser capsule, omnidirectional lavalier mic
WL184	WL184 condenser capsule, supercardioid lavalier mic
WL185	WL185 condenser capsule, cardioid lavalier mic
WL50	WL50 condenser capsule, omnidirectional lavalier mic
WL51	WL51 condenser capsule, cardioid lavalier mic
SM31FH	SM31FH condenser capsule, moisture repellant cardioid headset mic
SM35	SM35 condenser capsule, cardioid headset mic
WCM16	WCM16 condenser capsule, hypercardioid headworn mic
WBH53	WBH53 condenser capsule, omnidirectional headworn mic
WBH54	WBH54 condenser capsule, supercardioid headworn mic
WB98H/C	WB98H/C condenser capsule, cardioid instrument clip mic

COMPONENT SPECIFICATIONS
ULXD8 WIRELESS GOOSENECK BASE TRANSMITTER

OVERVIEW

The ULXD8 Gooseneck Base Transmitter offers a low-profile boundary form factor that is ideal for meetings and events where quick setup and teardown is important. With long transmission range (up to 300 feet/91 meters) and a wide selection of antenna distribution components, the ULXD8 is easily and efficiently scalable for use in very large meetings at conference and convention centers. A choice of rechargeable battery pack or standard AA batteries provide all-day runtime.

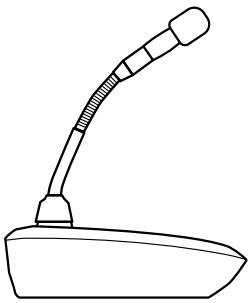
- Available in UHF TV band
- Available in black (ULXD8) or white (ULXD8W)
- AES 256-bit encryption for secure transmission
- Convenient gooseneck form factor for meetings and events where quick setup and teardown is important
- Designed for use with Shure Microflex MX405, MX410 and MX415 gooseneck microphones
- Very short latency (<3 msec)
- Long transmission range (up to 300 feet / 100 meters)
- Rechargeable SB900A battery pack provides up to 9 hours of battery life
- Standard AA alkaline batteries are additional power options
- SBC250 (2-bay), SBC450 (4-bay) and SBC850 (8-bay) Networked Charging Stations for docked charging of 2, 4 or 8 ULXD8 transmitters
- Configurable Mute button (Toggle, Push-to-Mute, Push-to-Talk, disabled) and Mute LED behavior
- Adjustable RF power, high-pass filter, and power lock settings

SPECIFICATIONS (SUBJECT TO CHANGE)

Gain Offset Range	0 to 21 dB (in 3 dB steps)
Battery Type	Shure SB900A Rechargeable Li-Ion or AA batteries
Battery Runtime @ 10 mW	Shure SB900A: Up to 9 hours Alkaline: Up to 8 hours 20 minutes Note: See Battery Runtime chart
Dimensions	137 mm × 78 mm × 41 mm (5.4 in. × 3.1 in. × 1.6 in.) H × W × D
Weight	293 g (10.3 oz.), with 2 AA batteries
Housing	Molded Plastic
AUDIO INPUT	
Connector	6-pin connector for Shure MX405/MX410/MX415
Configuration	Unbalanced
Impedance	>20 kΩ
RF OUTPUT	
Antenna Type	Integrated PIFA
Impedance	50 Ω
Occupied Bandwidth	<200 kHz
Modulation Type	Shure Proprietary Digital
Power	1 mW, 10 mW, 20 mW See Frequency Range and Ouput Power table, varies by region

AVAILABLE MODELS

ULXD8	Wireless Gooseneck Base Transmitter, Black
ULXD8W	Wireless Gooseneck Base Transmitter, White



ULXD8
Wireless Gooseneck Base Transmitter

MICROPHONE OPTIONS
(See shure.com for more)

MX405LP/C	5" Cardioid Gooseneck Microphone
MX405LP/S	5" Supercardioid Gooseneck Microphone
MX405RLP/N	5" Gooseneck with Red Top LED (no cartridge)
MX410LP/C	10" Cardioid Gooseneck Microphone
MX410LP/S	10" Supercardioid Gooseneck Microphone
MX410RLP/N	10" Gooseneck with Red Top LED (no cartridge)
MX410LPDF/C	10" Cardioid Dualflex Gooseneck Microphone
MX410LPDF/S	10" Supercardioid Dualflex Gooseneck Microphone
MX410RLPDF/N	10" Dualflex Gooseneck with Red Top LED (no cartridge)
MX410RLPDF/C	10" Cardioid Dualflex Gooseneck Microphone with Red Top LED
MX410RLPDF/S	10" Supercardioid Dualflex Gooseneck Microphone with Red Top LED
MX415LP/C	15" Cardioid Gooseneck Microphone
MX415LP/S	15" Supercardioid Gooseneck Microphone
MX415RLP/N	15" Gooseneck with Red Top LED (no cartridge)
MX415LPDF/C	15" Cardioid Dualflex Gooseneck Microphone
MX415LPDF/S	15" Supercardioid Dualflex Gooseneck Microphone
MX415RLPDF/N	15" Dualflex Gooseneck with Red Top LED (no cartridge)
MX415RLPDF/C	15" Cardioid Dualflex Gooseneck Microphone with Red Top LED
MX415RLPDF/S	15" Supercardioid Dualflex Gooseneck Microphone with Red Top LED
MX405WLP/N	No microphone cartridge, 5" (12.7cm) Gooseneck, bi-color status indicator, less preamp, white
MX405WRLP/N	No microphone cartridge, 5" (12.7cm) Gooseneck, light ring, less preamp, white
MX410WLP/N	No microphone cartridge, 10" (25.4cm) Gooseneck, bi-color status indicator, less preamp, white
MX410WRLP/N	No microphone cartridge, 10" (25.4cm) Gooseneck, light ring, less preamp, white
MX415WLP/N	No microphone cartridge, 15" (38.1cm) Gooseneck, bi-color status indicator, less preamp, white
MX415WRLP/N	No microphone cartridge, 15" (38.1cm) Gooseneck, light ring, less preamp, white
MX410WLPDF/N	No microphone cartridge, 10" (25.4cm) Dual Flex Gooseneck, bi-color status indicator, less preamp, white
MX410WRLPDF/N	No microphone cartridge, 10" (25.4cm) Dual Flex Gooseneck, light ring, less preamp, white
MX415WLPDF/N	No microphone cartridge, 15" (38.1cm) Dual Flex Gooseneck, bi-color status indicator, less preamp, white
MX415WRLPDF/N	No microphone cartridge, 15" (38.1cm) Dual Flex Gooseneck, light ring, less preamp, white

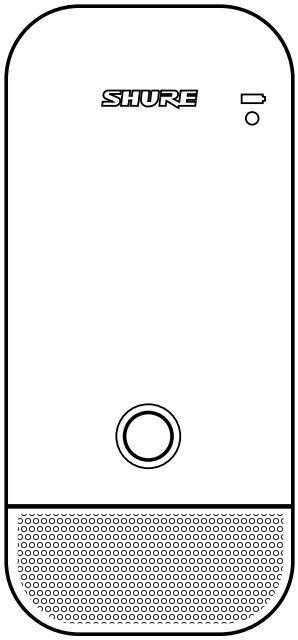
www.shure.com

COMPONENT SPECIFICATIONS
ULXD6 WIRELESS BOUNDARY TRANSMITTER

OVERVIEW

The ULXD6 Boundary Microphone Transmitter offers a low-profile boundary form factor that is ideal for meetings and events where quick setup and teardown is important. With long transmission range (up to 300 feet/91 meters) and a wide selection of antenna distribution components, the ULXD6 is easily and efficiently scalable for use in very large meetings at conference and convention centers. A choice of rechargeable battery pack or standard AA batteries provide all-day runtime.

- Available in UHF TV band
- Available in black (ULXD6) or white (ULXD6W)
- AES 256-bit encryption for secure transmission
- Low-profile boundary form factor for meetings and events where quick setup and teardown is important
- Very short latency (<3 msec)
- Long transmission range (up to 300 feet / 100 meters)
- SB900A rechargeable battery pack provides up to 9 hours of battery life
- Standard AA alkaline batteries are additional power options
- SBC250 (2-bay), SBC450 (4-bay) and SBC850 (8-bay) Networked Charging Stations for docked charging of 2, 4 or 8 ULXD6 transmitters
- Configurable Mute button (Toggle, Push-to-Mute, Push-to-Talk, disabled) and Mute LED behavior
- Adjustable RF power, high-pass filter, and power lock settings



ULXD6
Wireless Boundary Transmitter

SPECIFICATIONS (SUBJECT TO CHANGE)

Gain Offset Range	0 to 21 dB (in 3 dB steps)
Battery Type	Shure SB900A Rechargeable Li-Ion or AA batteries 1.5 V
Battery Runtime @ 10 mW	Shure SB900: Up to 9 hours 20 minutes AA batteries: Up to 8 hours 40 minutes See Battery Runtime Chart
Dimensions	114 mm × 62 mm × 34 mm (4.5 in. × 2.4 in. × 1.4 in.) H × W × D
Weight	241 g with AA batteries
Housing	Molded Plastic
AUDIO INPUT	
Configuration	Unbalanced
Impedance	>20 kΩ
RF OUTPUT	
Antenna Type	Integrated PIFA
Impedance	50 Ω
Occupied Bandwidth	<200 kHz
Modulation Type	Shure proprietary digital
Power	1 mW, 10 mW, 20 mW See Frequency Range and Ouput Power table, varies by region

AVAILABLE MODELS

ULXD6	Wireless Boundary Transmitter, Black
ULXD6W	Wireless Boundary Transmitter, White

COMPONENT SPECIFICATIONS

SBC250, SBC450 & SBC850 NETWORKED DOCKING STATIONS

OVERVIEW

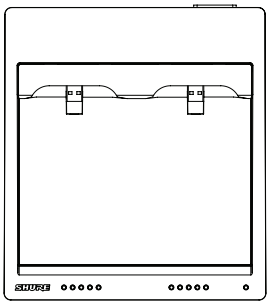
2-bay, 4-bay, and 8-bay Networked Docking Stations charges up to 2, 4, or 8 ULXD6 or ULXD8 transmitters that are equipped with the SB900A rechargeable battery. The transmitters simply slide into the charger; no need to remove the SB900A battery. When the stations are connected to a network, charging status of transmitters can be viewed remotely and settings or firmware can be updated while transmitters are docked, using Shure Wireless Workbench, SystemOn software or third-party room control systems.

SPECIFICATIONS (SUBJECT TO CHANGE)

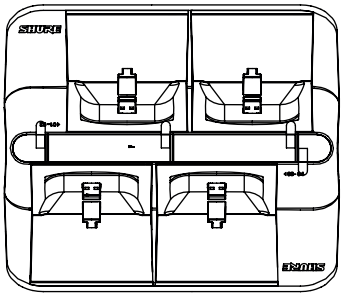
Charge Time	ULXD6 and ULXD8 15 minutes = 1 hour runtime; 1 hour = 50% charged; 3 hours = 100% charged.
Network Interface	10/100 Mbps Ethernet;
Power Requirement	SBC250 100 - 240V AC @ 0.35 A maximum, 50/60 Hz SBC450/SBC850 15 V DC @ 4.0 A maximum, supplied by external power supply (tip positive)
Housing	SBC250 Molded Plastic, Sheet Metal SBC450/SBC850 Molded Plastic, Cast Zinc Alloy
Dimensions	SBC250 215 mm × 191 mm × 62.5 mm (8.46 in. × 7.52 in. × 2.44 in.), H × W × D SBC450 82.1 mm × 224.4 mm × 192 mm (3.23 in. × 8.83 in. × 7.56 in.), H × W × D SBC850 82.1 mm × 392 mm × 192 mm (3.23 in. × 15.43 in. × 7.56 in.), H × W × D
Weight	SBC250 2.7 kg (5.95 lbs) SBC450 1.59 kg (3.51 lbs) SBC850 2.67 kg (5.89 lbs)
Operating Temperature Range	0 °C (32 °F) to 45 °C (113 °F)
Storage Temperature Range	–29 °C (–20 °F) to 74 °C (165 °F)

AVAILABLE MODELS

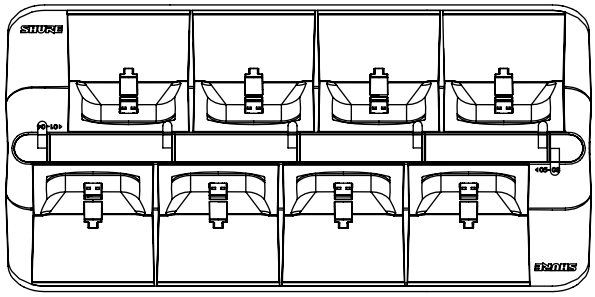
SBC250	Networked Docking Station, 2 Ports
SBC450	Networked Docking Station, 4 Ports
SBC850	Networked Docking Station, 8 Ports



SBC250
Networked Docking Station



SBC450
Networked Docking Statio



SBC850
Networked Docking Station

Product Specifications

SM58® Cardioid Dynamic Microphone

SM58

Overview

The legendary SM58® is an industry-standard, highly versatile cardioid dynamic vocal microphone that is consistently the first choice of vocal performers around the globe. Even in extreme conditions, the SM58 is tailored to target the main sound source while minimizing background noise, delivering warm and clear vocal reproduction.

Features

- Frequency response tailored for vocals, with brightened midrange and bass rolloff
- Uniform cardioid pickup pattern isolates the main sound source and minimizes background noise
- Pneumatic shock-mount system cuts down handling noise
- Effective, built-in spherical wind and pop filter
- Supplied with break-resistant stand adapter which rotates 180 degrees
- Legendary Shure quality, ruggedness and reliability
- Cardioid (unidirectional) dynamic
- Frequency response: 50 to 15,000 Hz

Available Models

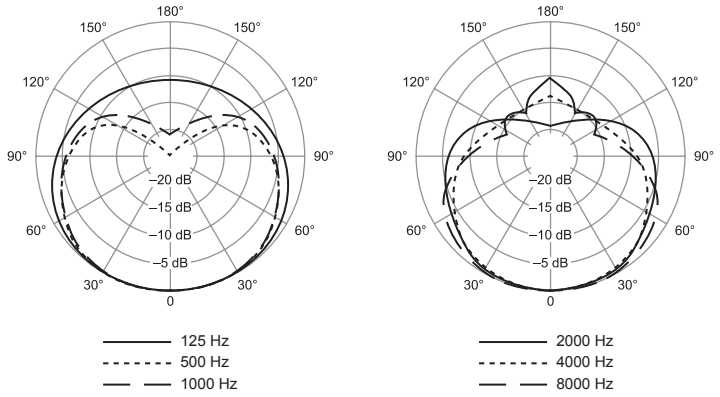
SM58-LC	Includes Stand Adapter and Zippered Pouch
SM58-CN	Includes 7.6 m (25 ft) XLR-Male to XLR-Female Cable, Swivel Adapter and a Zippered Pouch
SM58S	Includes Integrated On/Off Switch, Swivel Adapter and a Zippered Pouch

Specifications

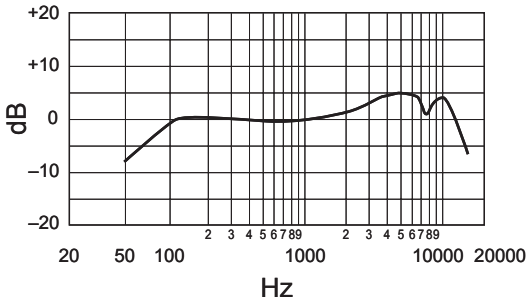
Type	Dynamic
Frequency Response	50 to 15,000 Hz
Polar Pattern	Cardioid
Sensitivity (at 1,000 Hz Open Circuit Voltage)	–54.5 dBV/Pa (1.85 mV) 1 Pa = 94 dB SPL
Impedance	Rated impedance is 150Ω (300Ω actual) for connection to microphone inputs rated low impedance
Polarity	Positive pressure on diaphragm produces positive voltage on pin 2 with respect to pin 3.
Case	Dark gray, enamel-painted, die cast metal; matte-finished, silver colored, spherical steel mesh grille
Connector	Three-pin professional audio connector (male XLR type)
Connector	Three-pin professional audio connector (male XLR type)
Net Weight	298 grams (10.5 oz)
Dimensions	162 mm (6-3/8 in.) L x 51 mm (2 in.) W

Optional Accessories and Replacement Parts

A58WS	Windscreen	**A55M**	Isolation Mount	**C25F**	7.6 m Cable (25 ft)
A25D	Microphone Clip	**A26M**	Dual Mount	**RK143G**	Screen and Grille
R59	Cartridge	**S37A, S39A**	Desk Stand		



Polar Pattern



Frequency Response

SHURE®
LEGENDARY
PERFORMANCE™

www.shure.com

Attachment C: Scope of Work and Site Logistics

Scope of Work

Awarded Bidder will furnish and deliver, including “white glove” delivery, unpacking, make ready for use, set in place and removal of debris for the specified equipment to the York College.

Bidder will be required to schedule and coordinate delivery with the point of contact provided on the Purchase Order prior to making deliveries.

Site Logistics

The delivery address York College Cafeteria, 94-20 Guy R Brewer Blvd, Jamaica, NY 11451

- Deliveries shall occur during normal business hours unless otherwise directed.
- There is a loading dock at the site.
- The delivery location is on the first floor located a short distance from the loading dock.
- There are no stairs or elevators.
- Project is on the first floor.