BOGEN®

PRODUCT CATALOG

System Solutions, Design & Buying Guide

IP-Paging & Audio Distribution I Analog Systems
Speakers I Amplifiers I Mixers I Intercoms I Microphones
Music & Input Sources I System Design Guide

CATALOG 113

BOGEN

CATALOG 113

Welcome to the NEW Bogen

Product Catalog, System Solutions, Design & Buying Guide

For close to a century, **Bogen Communications LLC** has been a leading provider of commercial amplifiers, speakers, and intercom systems for music, paging, and educational applications.

Featuring our preferred and recently released offerings, this Catalog contains the products you need to solve business problems and operate at peak efficiency.

You will notice a **NEW ITEM**! label on select part numbers throughout this catalog. This tag signifies our newest and most innovative products that were designed to meet your intricate and complex challenges.

Bogen's emphasis on innovation provides clients with new products to meet advancing technical and regulatory requirements for phenomenal sound transmission in any space, regardless of shape, size, or ambient noise level.

For more information go to **www.bogen.com**, where you can find detailed product specifications, images, and more!

Better sound, smarter systems, safer spaces, exceptional service.

Explore Bogen Tiny Town

See Bogen's solutions at work and the markets we serve.

We've launched a new, animated way for customers to interact with the Bogen product line! **Bogen Tiny Town** was created with the goal to create an interactive virtual environment designed to showcase our range of products and how they're installed and utilized in various market verticals.

Here's what you'll find on each market vertical's page:

Interactive imagery:
Visitors can interact with vignettes that provide an immersive experience and allow the user to visualize how the products may be placed and function in a real-world setting, enhancing their understanding of Bogen product benefits throughout the space.

Example Floorplans (CAD Files & Sample BOMs):
These are visual representations of different layouts within the specific market vertical. They showcase how Bogen's products can be incorporated into various configurations to optimize space utilization and functionality. Both analog and IP versions are available for download.

Market Specific Guide:
This guide provides tailored information and insights into the unique needs and challenges of the particular market vertical.

Product Integration:
The Tiny Town platform demonstrates how Bogen's products seamlessly integrate into different spaces within the chosen market vertical.

bogen.com/tiny-town

BOGEN®

CATALOG 113

TABLE OF CONTENTS

BOGEN

CATALOG 113

TABLE OF CONTENTS

Customer Service/Orders • Factory Service/Parts • Free Application Design Service
Technical Support Assistance • Sales Offices/Distributors

CALL BOGEN TOLL FREE: 1-800-999-2809

ON THE WEB: www.bogen.com

Corporate Headquarters – **Tel: 201-934-8500**

NYQUIST IP-BASED PAGING/AUDIO DISTRIBUTION

BOGEN C4000 SERIES POWERED BY NYQUIST

IP-Based Paging and Audio Distribution Solution for safer, better facility management

The **NYQUIST C4000 Series** is a software-based solution for commercial paging and music distribution applications that demand a high degree of scalability and flexibility. The heart of the C4000 solution is a powerful, state-of-the-art system controller with an easy to use Web-based Graphical User Interface (GUI) that is accessible from any PC, tablet, or mobile device. Built-in, commercially licensed, Internet radio-based streaming audio services are perfect for background music applications.

Feature-rich, purpose-built appliances provide audio mixing, amplification, and distribution, as well as the ability to easily integrate with third-party devices and systems, such as PBXs, security, access control, and fire alarm.

The C4000 solution can be scaled to support a virtually unlimited number of audio sources, end-points, and zones. The C4000 software can be easily upgraded over time to add new features and capabilities to address ever-changing customer needs, environments, and technology.

- System Controller with optional Automatic Failover capability
- Support for a wide-array of networked appliances and endpoints
- Embedded pro-audio DSP capabilities in all amplifiers and mixers
- Internet-based streaming radio & music services
- Facility map-based interactive calling and zone paging
- Text-to-Speech based announcements
- Powerful automated Routines & Routines API to support crisis plans and third-party integrations
- Sound Masking feature delivers superior performance, high reliability, ease of use, and flexible coverage across any indoor space.

Clock/Messaging Display capability improves facility communications

Maps Showing Multi-facility Paging Capabilities

STANDALONE IP PAGING DEVICES

Bogen's **Version 2.0 firmware** unlocks *Nyquist* standalone appliance functionality for SIP endpoint and IP paging applications.

SIP STANDALONE CAPABLE

bogen.com/commercial-c4000

The C4000 Series is built upon Bogen's award winning Nyquist software-based IP communications platform, which provides users with unparalleled flexibility and scalability. The C4000 Series is perfectly designed to work within the following environments:

HEALTHCARE • INDUSTRIAL/MANUFACTURING FACILITIES • PUBLIC & PRIVATE INSTITUTIONS OFFICES • RETAIL OUTLETS • RESTAURANT & BARS • WAREHOUSES • TRANSPORTATION HUBS

NYQUIST System Controller

Model NQ-SYSCTRL

NQ-SYSCTRL

Bogen's Nyquist System Controller offers contractors a cost-effective means to deploy the Nyquist C4000 solution using a state-of-the-art processing platform pre-installed with the operating system and C4000 application software (excludes required S/W licensing). The Nyquist System Controller facilitates quick installs and offers high-performance operation for even the largest Nyquist C4000 system configurations.

PRODUCT FEATURES:

- Configuration and management via a web-based graphical user interface
- Remotely administrable from any PC/Mac, tablet, or mobile device
- Wizard-based Setup Assistant for quick and easy installation
- High-performance design capable of supporting even the largest C4000 applications
- Dual RJ45 10/100/1000 Mbps NICs for separate C4000 network and Internet access
- Front panel power status LED
- Small 1/2 rack, 1RU footprint for easy rack or wall mount
- Fan-less, convection air-cooled design for quiet, maintenance-free operation

ACCESSORIES
(SOLD SEPARATELY)

NQ-RMK01
1U Rack Mount Kit, Type 2

NQ-RMK03
1U-2U Rack Mount Kit, Type 3

NQ-RMK04
Appliance Joining Bracket

Networked 2-Channel & 4-Channel Audio Powered Amplifiers

SIP STANDALONE CAPABLE

Models NQ-A4060-G2/A4120-G2/A4300-G2, NQ-A2060-G2/A2120-G2/A2300-G2

NQ-A2120-G2, NQ-A2060-G2

NQ-A2300-G2

NQ-A4300-G2, NQ-A4120-G2, NQ-A4060-G2

Bogen's Nyquist-based networked audio power amplifiers offer cost-effective performance for permanent installations and commercial sound, and are designed to meet the rigorous requirements of today's sophisticated sound systems. Designed with the commercial sound contractor in mind, they offer state-of-the-art, built-in DSP software for extensive and comprehensive signal processing, which turns the amplifier into a complete audio solution. These amplifiers are available in 2-channel and 4-channel models ranging from 120 watts to 1200 watts total power, each with the same features to provide power and performance, no matter how large or small the application.

In addition to their extensive flexibility, the Nyquist networked audio power amplifiers use the latest in Class D amplifier technology and provide unparalleled sonic quality, exceptional reliability, and reduced heat output for increased operating efficiency.

PRODUCT FEATURES:

- Standalone operation enabled with firmware release 2.0.x or later
- Dedicated Balanced Line Input(s) (both Phoenix plug & RCA)
- Line Input(s) can be routed-out over the network
- Network-based audio input (paging, audio distribution)
- GUI based DSP control
  - 16-band Graphic Equalizer
  - Signal Present and Clip Monitor
  - Adjustable High-Low Pass, & Bandpass Filters
  - Noise Gate/Compressor/Limiter
  - 7-band Parametric Equalizer
- 4-ohm/25V, 8-ohm/70V output configurations
- Switch selectable 2-channel or 1-channel bridged operation on 2-channel models
- Switch selectable 4-channel, 2-channel bridged, 2-channel/1-channel bridged operation on 4-channel models
- Safety: CAN/CSA C22.2 No. 62368-1:2014; UL62368-1:2014; EN 62368-1:2014
- EMC: FCC Part 15b Class B; ICES-003, Issue 6: 2016; EN 55032:2012; EN 55035:2017

ACCESSORIES (SOLD SEPARATELY)	NQ-RMK01 1U Rack Mount Kit, Type 1	NQ-RMK03 1U-2U Rack Mount Kit, Type 3	NQ-RMK04 Appliance Joining Bracket	MT300M Matching Transformer Module

4-Channel Matrix Mixer Pre-Amplifier

Model NQ-P0100

Bogen's Nyquist networked 4-Channel Matrix Mixer Pre-Amplifier (MMPA) offers cost-effective performance for permanent installations and commercial sound. Developed with the commercial sound contractor in mind, the MMPA provides unparalleled flexibility and versatility without the need for add-on modules. It includes an embedded pro-audio DSP for extensive and comprehensive signal processing – allowing users to skillfully manage and mix multiple audio input channels. The resulting audio signal mix can be directed to the line out, or streamed over the Nyquist network where it can be used for one or more zones.

NQ-P0100

PRODUCT FEATURES:

- **4- MIC/Line Inputs**
  - CH1-CH4 configurable balanced/unbalanced inputs via 3 XLR and 4 screw-terminal connections
  - CH4 can be configured to support Push-to-Talk Mic applications
  - Mic inputs can be configured to supply Phantom Power when needed
  - CH1 can alternately be configured as an AES3 digital input
- **Web-based DSP control**
  - 16-band Graphic Equalizer
  - Signal Present and Clip Monitor
  - Adjustable High Pass, Low Pass, and Bandpass Filters
  - Noise Gate/Compressor/Limiter
  - 7-band Parametric Equalizer
- Standalone operation enabled with firmware release 2.0.x or later
- Mixed signal can be routed to Line Out or over the Nyquist network
- Nyquist network-based audio input (paging, audio distribution)
- Line-Level Monitor Output to drive input to "legacy" (i.e., non-Nyquist) amplifiers
- Safety: CAN/CSA C22.2 No. 62368-1:2014; UL62368-1:2014; EN 62368-1:2014
- EMC: FCC Part 15b Class A; ICES-003, Issue 6: 2016; EN 55032:2012; EN 55035:2017

ACCESSORIES
(SOLD SEPARATELY)

NQ-RMK01
1U Rack Mount Kit, Type 1

NQ-RMK03
1U-2U Rack Mount Kit, Type 3

NQ-RMK04
Appliance Joining Bracket

Public Address Mixer/Amplifiers

Models NQ-PA600, NQ-PA240, NQ-PA120

Bogen's Nyquist networked Public Address Mixer/Amplifier (PAMA) series offers cost-effective performance for permanent installations and commercial sound and is designed to meet the rigorous requirements of today's sophisticated sound systems. Developed with the commercial sound contractor in mind, the PAMA series provides unparalleled flexibility and versatility without the need for add-on modules. It includes an embedded pro-audio DSP for extensive and comprehensive signal processing – allowing users to skillfully manage and mix multiple audio input channels. The resulting audio signal mix can be directed to the PAMA's speaker out or line out, or streamed over the Nyquist network where it can be used for audio distribution to one or more zones.

These PAMAs are available in 120-, 240-, and 600-watt models, each with the same features to provide power and performance no matter the application. They use the latest in Class D amplifier technology and provide unparalleled sonic quality, exceptional reliability, and reduced heat output for increased operating efficiency.

NQ-PA240, NQ-PA120

NQ-PA600

PRODUCT FEATURES:

- **4 MIC/Line Inputs**
  - CH1-CH4 configurable balanced/unbalanced inputs via 2 XLR and 4 screw-terminal connections
  - CH4 can be configured to support Push-to-Talk Mic applications
  - Mic inputs can be configured to supply Phantom Power when needed
- **Web-based DSP control**
  - 16-band Graphic Equalizer
  - Signal Present and Clip Monitor
  - Adjustable High Pass, Low Pass, and Bandpass Filters
  - Noise Gate
  - Compressor/Limiter
  - 7-band Parametric Equalizer
- Standalone operation enabled with firmware release 2.0.x or later
- 8 ohm/70V output; 600 ohm balanced line output
- Nyquist network-based audio input (paging, audio distribution)
- Mixed signal can be routed to Line or Speaker Out or over the Nyquist network
- Safety: CAN/CSA C22.2 No. 62368-1:2014; UL62368-1:2014; EN 62368-1:2014
- EMC: FCC Part 15b Class A; ICES-003, Issue 6: 2016; EN 55032:2012; EN 55035:2017

ACCESSORIES
(SOLD SEPARATELY)

NQ-RMK01
1U Rack Mount Kit, Type 1

NQ-RMK03
1U-2U Rack Mount Kit, Type 3

NQ-RMK04
Appliance Joining Bracket

MT300M
Matching Transformer Module

Plenum-Rated VoIP Intercom Modules

Models NQ-GA10PV, NQ-GA10P

NQ-GA10PV

NQ-GA10P

Bogen's plenum-rated Nyquist VoIP intercom modules offer a convenient and cost-effective means of transforming any low-impedance analog speaker into a full-featured Power-over-Ethernet (PoE) IP speaker. They utilize the latest technology to deliver superior audio quality, making them perfect for IP paging and audio distribution, while the built-in talkback capability allows them to be used in VoIP intercom applications. Designed with the commercial sound contractor in mind, these intercom modules' plenum-rating provides unparalleled flexibility and versatility to help simplify site design.

In addition to their wide-ranging flexibility, these intercom modules use the latest in Class D amplifier technology and provide unmatched sonic quality, exceptional reliability, and reduced power consumption to permit standalone PoE operation over the local network.

These 10-watt, single channel, intercom modules are available with an HDMI video output (NQ-GA10PV) or without (NQ-GA10P), depending upon the application needs. They also offer a CAN bus interface to work with the NQ-E7020 Digital Call Switch (DCS) and a Form-C relay for controlling third-party devices (e.g., A/V override).

PRODUCT FEATURES:

- PoE 802.3af compliant
- Single 10-watt, 8-ohm speaker output
- Network-based audio output (paging, intercom, audio distribution)
- Talkback support
- Push-to-Talk (PTT) Microphone support (Bogen DDU250 or equivalent)
- Standalone operation enabled with firmware release 2.0.x or later
- DSP-based noise rejection and voice bandwidth optimization
- Analog Call Switch support (Bogen CA15C)
- DCS support (Bogen NQ-E7020)
- A/V Override Relay Output
- HDMI Video Output (NQ-GA10PV only) for augmenting audio with graphics and text message display
- In-wall, in-ceiling, shelf, or device mountable UL 2043 plenum-rated package
- Integrated slotted mounting flanges
- Optional 48VDC External Power Supply (PS4815W; sold separately)

ACCESSORIES

(SOLD SEPARATELY)

PS4815W
Wall Plug Power Adapter

Plenum-Rated 20W Integrated Amplifier

Models NQ-GA20P2

NQ-GA20P2

Bogen's plenum-rated Nyquist NQ-GA20P2 20-watt integrated amplifier offers cost-effective performance for permanent installations and commercial sound. Designed with the commercial sound contractor in mind, the amplifier's plenum-rating provides unparalleled flexibility and versatility to help simplify site design. It easily works as a page zone extender to facilitate voice access to a single zone of one-way paging over the Nyquist network. It also works great in background music applications – leveraging the powerful audio management and distribution capabilities of Bogen's Nyquist platform.

In addition to its extensive flexibility, the NQ-GA20P2 uses the latest in Class D amplifier technology and provides unparalleled sonic quality, exceptional reliability, and reduced power consumption to permit standalone Power-over-Ethernet Plus (PoE+) operation over the local network.

PRODUCT FEATURES:

- Single 20-watt, 8-ohm speaker output
- Single Balanced Line Output
- RJ-45 for Nyquist network connection
- PoE+ 802.3at compliant
- Nyquist network-based audio output (paging, intercom, audio distribution)
- Web-based configuration
- Front panel Power and Status LEDs
- In-wall, in-ceiling, shelf, or device mountable UL 2043 plenum-rated package
- Integrated slotted mounting flanges
- Optional 48VDC External Power Supply (PS4830W; sold separately)
- Standalone operation enabled with firmware release 2.0.x or later

ACCESSORIES

(SOLD SEPARATELY)

PS4830W
Wall Plug Power Adapter

Plenum-Rated VoIP Intercom Modules

Models NQ-GA40P3

SIP STANDALONE CAPABLE

NEW ITEM!

NQ-GA40P3

Bogen's plenum-rated Nyquist NQ-GA40P3 40-watt integrated amplifier offers cost-effective performance for permanent installations and commercial sound. Designed with the commercial sound contractor in mind, the amplifier's plenum-rating provides unparalleled flexibility and versatility to help simplify site design. It easily works as a page zone extender to facilitate voice access to a single zone of one-way paging over the Nyquist network. It also works great in background music applications – leveraging the powerful audio management and distribution capabilities of Bogen's Nyquist platform.

In addition to its extensive flexibility, the NQ-GA40P3 uses the latest in Class D amplifier technology and provides unparalleled sonic quality, exceptional reliability, and reduced power consumption to permit standalone Power-over-Ethernet Plus (PoE+) operation over the local network.

ACCESSORIES

(SOLD SEPARATELY)

PI5660W
Power over Ethernet Ultra Injector

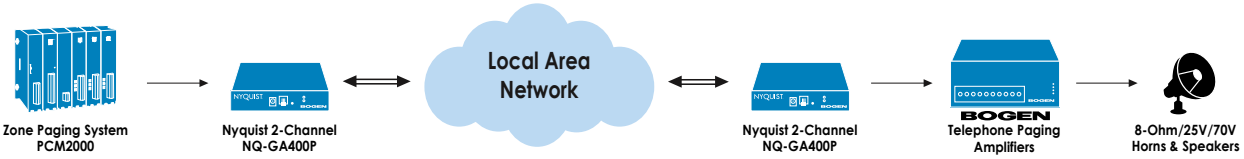
NQ-GAXMR1
Nyquist Distributed Audio Transformer

PRODUCT FEATURES:

- Single 40-watt, 8-ohm speaker output
- Single Balanced Line Output
- RJ-45 for Nyquist network connection
- PoE+ 802.3at compliant
- Nyquist network-based audio output (paging, intercom, audio distribution)
- Web-based configuration
- Front panel Power and Status LEDs
- In-wall, in-ceiling, shelf, or device mountable UL 2043 plenum-rated package
- Integrated slotted mounting flanges
- Optional 48VDC External Power Supply (PS4830W; sold separately)
- Standalone operation enabled with firmware release 2.0.x or later

GA400P

SOLUTION ARCHITECTURE



2-Channel AoIP Gateway

Model **NQ-GA400P**

SIP STANDALONE CAPABLE

NEW ITEM!

NQ-GA400P

The Nyquist 2-channel Audio over IP (AoIP) Gateway provides customers with a bridge between analog and digital signal channels. The GA400P digitally encodes analog signals and transmits them over the network, where they are then decoded by a second AoIP device to provide line-level audio to analog systems, such as amplifiers, and analog paging or sound systems. Similarly, the GA400P can take analog audio signals, encode them in digital format and distribute them over the Nyquist network. The NQ-GA400P incorporates two balanced line-level inputs and two balanced line-level outputs, along with two Form-C SPDT-type 2-amp dry contact relays that activate when a signal is present on a corresponding line-level output. Designed to operate over a 10/100 Ethernet network, the NQ-GA400P AoIP Gateway is IEEE 802.3af–compliant and can be powered using Power over Ethernet (PoE) switch or PoE injector when a PoE switch isn't available.

ACCESSORIES
(SOLD SEPARATELY)

NQ-RMK01, NQ-RMK02
Mounting Accessories

PRODUCT FEATURES:

- PoE powered: Customers can connect these appliances to standard PoE switches
- Create a digital bridge between two analog systems A cost-effective solution to interconnect analog audio systems quickly and easily in different locales or buildings for wide-area communications
- Standalone capability. Connect to 3rd party SIP and/or multicast capable systems and use as a Line-out audio endpoint for digital-to-analog communications. Encoder capable of generating unicast or multicast audio streams in a variety of codec formats.
- A gateway between analog and digital systems enables users to encode/decode audio for transmission across a network

Distributed Audio Transformer

Model **NQ-GAXMR1**

NEW ITEM!

NQ-GAXMR1

The NQ-GAXMR1 Distributed Audio Transformer provides impedance and voltage matching and is primarily designed for use with Bogen's low-impedance (4-ohm/8-ohm), PoE-based, integrated amplifier modules (NQ-GA10P, NQ-GA10PV, NQ-GA20P2, OR NQ-GA40P3) when the user needs to connect to one or more 25V or 70V transformer tapped speakers. While the NQ-GAXMR1 can also be used with other low power, low-impedance, Class D amplifiers, it's very important to note that any such amplifier must be capable of setting a high-pass (low-cut) filter at a minimum of 50Hz to prevent distortion that can occur due to transformer saturation.

NOTE: The NQ-GAXMR1 cannot be used for intercom applications with devices like the NQ-GA10P or NQ-GA10PV. It will function fine for GA10P/V amplifier applications.

PRODUCT FEATURES:

- 40-watt maximum load capacity
- 1 two-pin pluggable Phoenix style input connector
- 1 three-pin pluggable Phoenix style output connector
- 25V and 70V audio outputs (only one output can be used at a time)
- Integrated mounting flanges (4 thread forming M4 x 6mm screws included)
- Listed to UL Standard EN62368-1:2014 for U.S. & Canada
- Size: 2.559" x 4.810" x 2.5"
- Weight: 2.2 lbs
- Five (5) year limited warranty

Input/Output Controller

Model NQ-E7010

NQ-E7010

The NQ-E7010 Input/Output Controller appliance provides eight dry contact closure inputs to monitor events/triggers from third-party systems/devices such as fire alarms, lockdown buttons, and sensors. It provides eight open-collector type relay driver outputs to initiate actions such as clock correction (e.g., generating sync pulses) on third-party systems and devices, or access controls. The outputs can also be configured via the C4000 system software to respond to contact closure inputs from the same I/O Controller or others associated with the C4000 system.

PRODUCT FEATURES:

- 10/100 Ethernet
- PoE Class-3 (IEEE 802.3af compliant)
  - Optional 48 VDC 15W power supply
- 8 dry contact closure inputs (with 1 ground per 4 inputs)
- 8 relay driver outputs (500mA max per ground sink)
- USB 2.0 host port, Type A connector (future use)
- May be wall or shelf mounted: 5.6" W x 5.4" D x 1.7" H (2" H with rubber feet installed)
- Weight 1.95 lb. / 0.885kg

ACCESSORIES (SOLD SEPARATELY)

NQ-RMK01 1U Rack Mount Kit, Type 1	
NQ-RMK02 1U Rack Mount Kit, Type 2	**PS4815W** Wall Plug Power Adapter

Digital Call Switch

Model NQ-E7020-G2

NQ-E7020-G2

With the NQ-E7020-G2 Digital Call Switch (DCS), users can initiate a normal, urgent, or emergency call from any location in conjunction with an associated Nyquist VoIP intercom speaker (including traditional analog speakers converted to VoIP using the NQ-GA10P VoIP Intercom Module). This single-gang box type wall-mounted switch uses a full spectrum LED ring to confirm user actions, to indicate status (for example, changing color ring from solid color to blinking), or to acknowledge a button press when a user initiates a call or when a call has been terminated. The switch utilizes a capacitive touch sensor with no moving parts to jam or fail.

PRODUCT FEATURES:

- CAN Bus 2.0 Interface
- Capacitive touch sensor
- Full-spectrum LED ring indicates status and provides user feedback
- Single gang box, low voltage installation
- Includes matching white decora style plate
- Weight 0.2 lb. / 0.091kg
- Software-defined button behavior
  - Supports standard Normal/Emergency, Urgent/Emergency, and Emergency call-in modes
  - Each of the standard call-in modes also supports Privacy Mode
  - Can support room check-in when a facility is in Lockdown (in Nyquist C4000 release 3.0 and later)

Nyquist IP Entry Door Phone

Model NQ-EDP01

SIP STANDALONE CAPABLE

NQ-EDP01

The NQ-EDP01 is a convenient remote, weather-resistant, hands-free, half-duplex intercom station with call button. The NQ-EDP01 is a fantastic solution for applications such as security checkpoints at outside doors and entryways, or indoor check-in for secure spaces.

The NQ-EDP01 features easy wiring using standard Cat5 Ethernet cable and power via standard PoE switches. It can also be installed and used in Standalone Mode with third-party SIP 2.0 compliant VoIP systems.

Nyquist Zone Paging Microphone Station

Model NQ-ZPMS

NQ-ZPMS

The Nyquist NQ-ZPMS phone features a crystal clear 10.1" color touch screen that supports an impressive visual experience navigating the Nyquist C4000 IP-Based Paging System. Featuring a gooseneck microphone that supports HD hands-free paging and calling, the NQ-ZPMS can be utilized as the primary management IP phone, allowing daily system operation with the capability to make calls to extensions in the field, a two-way intercom, monitoring stations, zone paging, All-Call paging and Emergency All-Call paging. This device really shines when you have a large facility with many different zones you need to page because the display can show multiple softkeys, making zone paging a breeze.

KEY FEATURES & BENEFITS:

- **112 one-touch DSS keys on 10.1" capacity color touch screen**
- **HD audio on speaker and handset**
- **Built-in Bluetooth 5.0 and 2.4G/5G Wi-Fi**
- **Dual Gigabit ports, integrated PoE**
- **Stand with 2 adjustable angles of 40 and 50 degrees**

VoIP Admin Phone - Touchscreen Display

Model NQ-T1100

NQ-T1100

The Bogen NQ-T1100 VoIP admin phone (by Yealink) offers a large 7" color touch screen that makes navigating Nyquist C4000 & E7000 System features and menus swift, easy and convenient. The NQ-T1100 employs Yealink's Optima HD Voice technology and a wide-band codec for unparalleled audio clarity.

KEY FEATURES & BENEFITS:

- **HD Audio** - HD Voice refers to the combination of the phone's software and hardware design and the implementation of wideband technology to maximize acoustic performance.
- **Enhanced Call Management** - Supports numerous productivity-enhancing features, such as busy lamp field, call park, call pickup, call forward, call transfer, and 3-way conference.
- **Efficient Installation and Provisioning** - Integrated IEEE 802.3af Power-over-Ethernet (PoE) capability allows easy deployment with centralized powering and backup.
- **Secure Transport and Interoperability** - The NQ-T1100 uses SIP over Transport Layer Security (TLS/SSL), which is the latest network security technology.

VoIP Staff Phone –LCD Display

Model NQ-T2000

NQ-T2000

The Bogen NQ-T2000 VoIP staff phone (by Yealink) offers a 132x64 pixel, 2.3 inch, backlit graphical LCD display that is crisp, clear, and easy-to-use. The NQ-T2000 is a cost-effective, entry-level phone that offers rich visual information and HD Voice. It has dual 10/100 Mbps network ports with integrated PoE support for today's modern networks.

KEY FEATURES & BENEFITS:

- **HD Audio** - HD Voice refers to the combination of the phone's software and hardware design and the implementation of wideband technology to maximize acoustic performance.
- **Enhanced Call Management** - Supports numerous productivity-enhancing features, such as busy lamp field, call park, call pickup, call forward, call transfer, and 3-way conference.
- **Efficient Installation and Provisioning** - Integrated IEEE 802.3af Power-over-Ethernet (PoE) capability allows easy deployment with centralized powering and backup.
- **Secure Transport and Interoperability** - The NQ-T2000 uses SIP over Transport Layer Security (TLS/SSL), which is the latest network security technology.

VoIP Wall Baffle Combo Speaker w/ Integrated LED Text Display & LED Flasher

Model NQ-S1810WBC

NEW ITEM!

The Bogen Nyquist NQ-S1810WBC VoIP wall baffle combo speaker unit provides the same superior features as the NQ-S1810WT-G3 with the addition of a red LED messaging display and programmable flasher. There is no need for external amplifiers, traditional intercom wiring, or transformer taps to manually set or adjust. Connect the speakers via Cat5 to a PoE capable network switch (or add a PoE injector for a non-PoE switch), add the station into the system and it is ready to operate. The message display can show a clock with date and time (seconds are optional), or user-programmable messaging for standard or emergency announcements. The flasher is completely programmable for color, duty cycle, and duration to differentiate alert types, and can be triggered independent of the message display.

As one would expect from Bogen, the HD audio quality is superb, with excellent incoming and outgoing intelligibility. Many two-way speakers use the speaker itself as the microphone, resulting in poor talkback audio quality. The Nyquist Series VoIP Wall Baffle speakers use a separate high-performance MEMS microphone to achieve superior talkback audio.

NQ-S1810WBC

PRODUCT FEATURES:

- **LED Message Display** to visually inform students and personnel of the date and time, or scroll emergency or standard messages
- **Programmable messages** for predefined or manually-input messages, with longer ones scrolled across the display for a defined period of time
- **Programmable LED flasher** for gaining audience attention; use different colors for different types of alerts (e.g. fire, lockdown, weather, etc.) and triggers
- **Routines/Routines API functionality** for displaying messages, alerts, and flasher via predefined Routines triggered through system events or API calls

VoIP Wall Baffle Speaker

Model NQ-S1810WT-G3

SIP STANDALONE CAPABLE

NEW ITEM!

The Bogen Nyquist NQ-S1810WT-G3 VoIP wall baffle speaker provides superior HD audio quality and seamless integration into the Nyquist ecosystem. There is no need for external amplifiers, traditional intercom wiring, or transformer taps to manually set or adjust. Connect the speakers via Cat5 to a PoE Switch (or add optional PoE Injector for non-PoE switch), and it is ready to operate. Volume is controlled via the Nyquist system's Web UI. These Gen-3 VoIP speakers also offer a Form-C relay output for controlling/overriding third-party devices like AV sources.

As one would expect from Bogen, the HD audio quality is superb, with excellent incoming and outgoing intelligibility. Many two-way speakers use the speaker itself as the microphone, resulting in poor talkback audio quality. The Nyquist Series VoIP Wall Baffle speakers use a separate high-performance MEMS microphone to achieve superior talkback audio.

NQ-S1810WT-G3

PRODUCT FEATURES:

- 10/100 Ethernet connection
- Can be used as a standalone IP endpoint
- PoE Class-3 – no local power required, IEEE 802.3af compliant
- DHCP deployment for easy installation
- Pre-assembled for easy installation
- 10W integrated amplifier
- Reset button for restoring factory settings
- Form-C SPDT type 2A @ 30V DC dry contact relay output
- DSP-based noise rejection and voice bandwidth optimization
- MEMS digital microphone for superior talkback audio
- CAN Bus 2.0 Interface connects to Nyquist Digital Call Switches (NQ-E7020)
- 13.8"H x 11.9"W x 4.75"D

VoIP Speakers

Models NQ-S1810CT-T1

SIP STANDALONE CAPABLE

NEW ITEM!

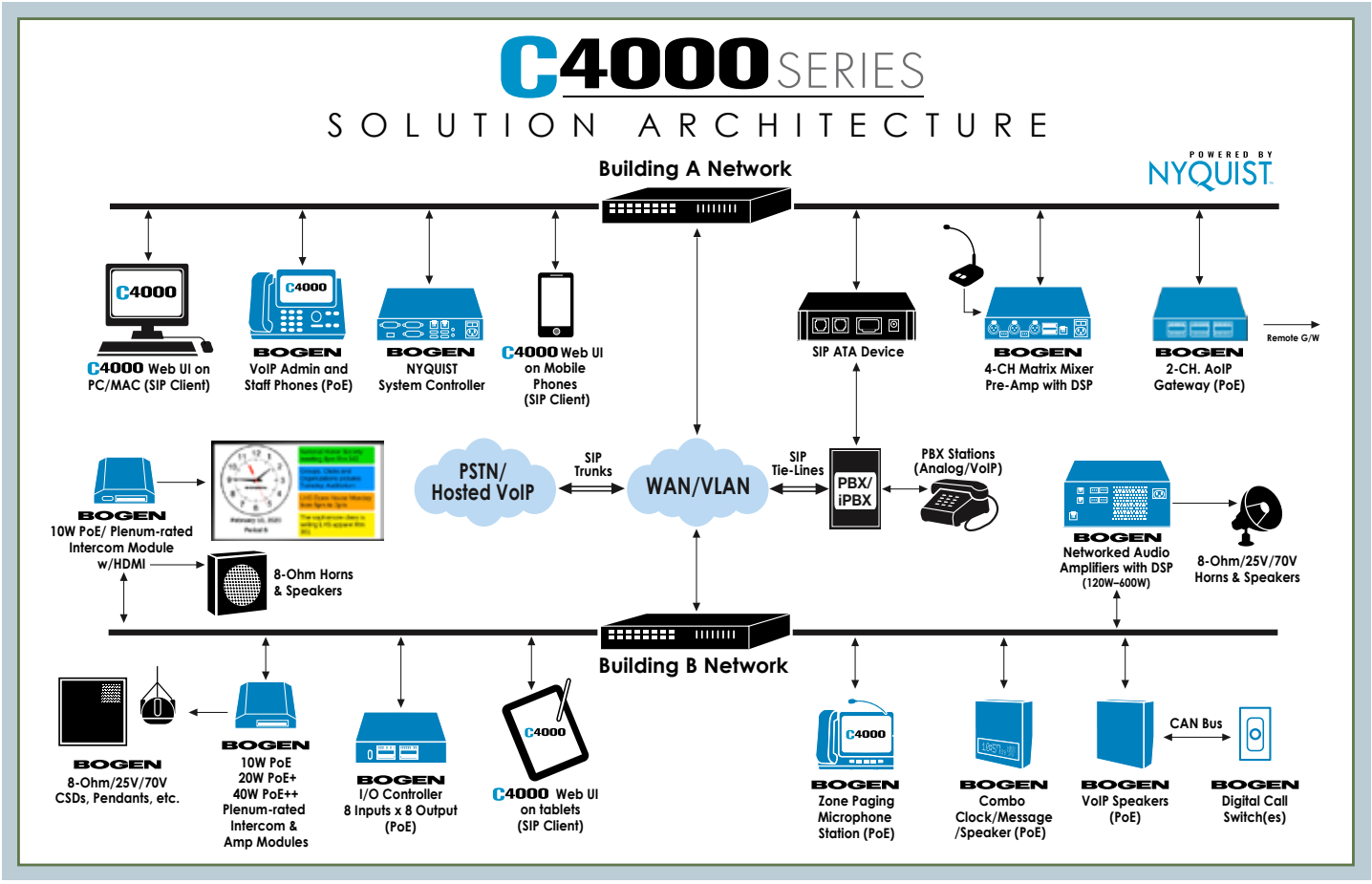
NQ-S1810CT-T1

The Bogen Nyquist NQ-S1810CT-T1 VoIP Ceiling Speaker offers increased flexibility where installers can use the VoIP speaker as a source for up to four (4) secondary passive 25V/70V speakers in a local speaker network, while retaining two-way intercom via the MEMS microphone on the VoIP speaker. The NQ-S1810CT-T1 can also serve as a PoE-based SIP endpoint in 3rd-party systems when operating in Standalone mode.

With the Nyquist NQ-S1810CT-T1 VoIP Ceiling Speaker, there is no need for external amplifiers, traditional intercom wiring, or transformer taps to manually set or adjust. Connect the speaker via Cat5-or-better cabling to a Power-Over-Ethernet (PoE) Switch or PoE Injector, and it is ready to use!

PRODUCT FEATURES:

- 10/100 Ethernet connection
- PoE Class-3 – no local power required, IEEE 802.3af compliant
- DHCP deployment for easy installation
- Pre-assembled for easy installation
- 10W integrated amplifier
- Reset button for restoring factory settings
- Form-C SPDT type 2A @ 30V DC dry contact relay output for muting local A/V audio.
- DSP-based noise rejection and voice band width optimization
- MEMS digital microphone for superior talkback audio



SOUND MASKING SPEAKERS

Nyquist Variable Firing Sound Masking Speaker

Model NQ-SMS1810-VF

The Bogen NQ-SMS1810-VF sound masking loudspeaker assembly consists of an 8" O.D., dual cone loudspeaker with a 10 oz. magnet, and 25V/70V, five position 4W max. rotary tap selector. 2 multi-position hangers included for upward, downward, and side firing installations. Installation is made easy via the included 78" (2m) suspension chain system which allows quick mounting and height adjustment. An integral wire strain relief is located on the top of the enclosure to facilitate secure speaker cable termination.

NQ-SMS1810-VF

PRODUCT FEATURES:

- Pre-assembled unit includes 8" loudspeaker, 25V/70V 4-tap transformer, an all metal enclosure, and mounting hardware
- Design accommodates upward, downward, and side firing installations
- Easy installation via the included 78" (2m) suspension chain system which allows quick mounting and height adjustment
- UL 2043 rated for plenum use above suspended ceiling systems in air handling spaces
- White powder coat finish

Nyquist Suspended Ceiling Grid Sound Masking Speaker

Model NQ-SMS1810-SCG

The Bogen NQ-SMS1810-SCG comprises a ceiling grid mount and a sound masking speaker assembly, which consists of an 8" dual-cone loudspeaker with a 10-ounce magnet and a 25V/70V, 4W max., five position rotary tap selector. A seismic safety cable is supplied to secure the speaker to a solid object in the plenum space.

NQ-SMS1810-SCG

PRODUCT FEATURES:

- An upfiring speaker that fits in a standard 1'x2' ceiling tile grid and can be placed on top of an existing ceiling tile
- The 5-position rotary tap selector provides easy selection of speaker power from 0.25W to 4W in 25V/70V systems
- UL 2043 rated for plenum use above suspended ceiling systems in air handling spaces

NYQUIST C4000 SOFTWARE

C4000-Series Software License Descriptions

All **Nyquist C4000** software licenses are perpetual and do not expire (i.e., no annual license renewal fees). Optional Software Update Subscriptions are available to allow customers to keep their C4000 system up-to-date with the latest features and functionality.

SYSTEM SOFTWARE BUNDLES

NQ-C4000-B1 C4000 System Software License – **Bundle 1**

- Supports up to 3 Paging Zones.
- Includes licensing for 10 Concurrent Calls*.
- Includes a 3-year subscription to software updates, which encompasses bug fixes, feature enhancements, and all standard new features.

NQ-C4000-B2 C4000 System Software License – **Bundle 2**

- Supports up to 9 Paging Zones.
- Includes licensing for 10 Concurrent Calls*.
- Includes a 3-year subscription to software updates, which encompasses bug fixes, feature enhancements, and all standard new features.

NQ-C4000-B3 C4000 System Software License – **Bundle 3**

- Supports up to 24 Paging Zones.
- Includes licensing for 10 Concurrent Calls*.
- Includes a 3-year subscription to software updates, which encompasses bug fixes, feature enhancements, and all standard new features.

NQ-C4000-B4 C4000 System Software License – **Bundle 4**

- Supports a virtually unlimited number of Paging Zones.
- Includes licensing for 10 Concurrent Calls*.
- Includes a 3-year subscription to software updates, which encompasses bug fixes, feature enhancements, and all standard new features

*Concurrent Calls are synonymous with simultaneous "talk paths" through the system. Additional Concurrent Call Licenses (CCLs) are available in expansion packs of 10 (See NQ-C4000CCLX section in "System Options and Add-Ons").

The following features/actions each consume one or more Concurrent Call Licenses when in-use:

All Call (1) • Emergency All Call (1) • Multi-Site All Call (1) • Multi-Site Emergency All Call (1) • Multi-Facility Paging (1 • Multi-Facility Annnouncements (1) Zone Page (1) • Station-to-Station Call (1) • Recording an announcement (1) • Scheduled Events (e.g., Bells, Tones, Announcements) (1 per active event) Retrieving a voice mail message (1) • Intercom Call (1) • Call Monitoring/Recording (1 in addition to the 1 for the call itself) • DISA Station Monitoring (2) Audio Distribution (1 momentarily during each start/stop of an audio distribution stream)

NQ-C4SWUP3YRB1 3-Year Extended System Software Updates – **Bundle 1**

- Extends the current Software Update Subscription (SUS) expiration date of a Bundle-1 system by 3-years (e.g., if the system's current SUS expiration is 3/31/2022, installing this license key will extend it to 3/31/2025).
- SUS encompasses bug fixes, feature enhancements, and all standard new features introduced in subsequent releases of the product.
- Any hardware that may be associated with a new feature is excluded and would need to be purchased separately.

NQ-C4SWUP3YRB2 3-Year Extended System Software Updates – **Bundle 2**

- Extends the current SUS expiration date of a Bundle-2 system (including systems upgraded to a Bundle-2 configuration using the NQ-C4000-B12UP upgrade option) by 3-years (e.g., if the system's current SUS expiration is 3/31/2022, installing this license key will extend it to 3/31/2025).
- SUS encompasses bug fixes, feature enhancements, and all standard new features introduced in subsequent releases of the product.
- Any hardware that may be associated with a new feature is excluded and would need to be purchased separately.

NQ-C4SWUP3YRB3 3-Year Extended System Software Updates – **Bundle 3**

- Extends the current SUS expiration date of a Bundle-3 system (including systems upgraded to a Bundle-3 configuration using the NQ-C4000-B23UP upgrade option) by 3-years (e.g., if the system's current SUS expiration is 3/31/2022, installing this license key will extend it to 3/31/2025).
- SUS encompasses bug fixes, feature enhancements, and all standard new features introduced in subsequent releases of the product.
- Any hardware that may be associated with a new feature is excluded and would need to be purchased separately.

NQ-C4SWUP3YRB4 3-Year Extended System Software Updates – **Bundle 4**

- Extends the current SUS expiration date of a Bundle-4 system (including systems upgraded to a Bundle-4 configuration using the NQ-C4000-B34UP upgrade option) by 3-years (e.g., if the system's current SUS expiration is 3/31/2022, installing this license key will extend it to 3/31/2025).
- SUS encompasses bug fixes, feature enhancements, and all standard new features introduced in subsequent releases of the product.
- Any hardware that may be associated with a new feature is excluded and would need to be purchased separately.

SYSTEM SOFTWARE UPDATE SUBSCRIPTION RENEWALS

https://www.bogen.com/software-update-subscriptions

SYSTEM OPTIONS & ADD-ONS

NQ-C4000PZX C4000 Series System Software - Paging Zone License Expansion Pk.

- Increases the current zone count of any Bundle-1, Bundle-2, or Bundle-3 system by 3-zones, allowing any of these systems to be grown/expanded in 3-zone increments (e.g., if a Bundle-2 system's current zone count is 9, installing this upgrade will increase it by 3 to 12-zones).

NQ-C4000CCLX C4000 Series System Software - Concurrent Call License Expansion Pk.

- All C4000 system bundles include licensing for 10 concurrent calls. This license expansion pack increases the Concurrent Call License (CCL) limit of any system by 10 calls, allowing the concurrent call handling capacity of any size system to be expanded in 10-call increments (e.g., if a system's current CCL limit is 10 calls, installing this expansion license will increase it by 10 to 20 concurrent calls.

NQ-C4000ICL C4000 Series System Software - Intercom Call License

- Intercom calling is disabled by default on every C4000 system. Installing this license enables intercom calling (i.e., talk back operation) between any two applicable Nyquist devices (VoIP phones, VoIP speakers, VoIP Intercom Modules, Web UI das board, etc.). Each NQ-C4000ICL license key installed/added to a system incrementally increases the concurrent Intercom Call limit by 1. For example, installing 3 NQ-C4000ICL licenses will permit up to 3 concurrent intercom calls on a system. Note: The Intercom Call limit can never exceed the system's maximum CCL limit (ref. the NQ-C4000CCLX license description above).

NQ-C4000QPL C4000 Series System Software - Queued Paging/Page Stacking License

- Queued Paging/Page Stacking is disabled by default on every C4000 system. In addition to allowing multiple users to simultaneously page to the same zone or zones (e.g., in airport terminals, etc.), Queued Paging is an effective way to eliminate feedback in areas where a paging device (e.g., phone, microphone, etc.) may be in close proximity to speakers receiving the page. Installing this license enables Queued Paging/Page Stacking on the system and allows the user to create 1 page stacking queue. Each NQ-C4000QPL license key installed/added to a system incrementally increases the page stacking queue limit by 1. For example, installing 3 NQ-C4000QPL licenses will permit up to 3 separate page stacking queues to be created on a system.

NQ-C4000TTS C4000 Series System Software - Text-to-Speech License

- This is a one-time, system-wide license required to enable TTS-based announcements & messaging within a C4000 system.

NQ-C4000MBP C4000 Series System Software - Map Based Paging License

- This is a one-time, system-wide license required to enable interactive map-based paging within a C4000 system.

NQ-C4000PBXI C4000 Series System Software - PBX Integration Services

- This is not a S/W license, but rather the part number to use when placing an order to schedule Bogen Technical Support phone and remote desktop assistance if needed when attempting to connect the C4000 with a customer's PBX/iPBX/Hosted VoIP service using SIP, FXO, or FXS integration.

NQ-C4000AFL C4000 Series System Software - Automatic Failover License

- This license is required to enable the Automatic Failover (AF) capability of the Nyquist server in a C4000 system. The AF feature requires customers to purchase a secondary standby System Controller (or server) on which to install this S/W license. An AF S/W license is not required to be purchased for the Nyquist system's primary server.

NQ-C4000API C4000 Series System Software - Routines API License

- This license is required to enable the API for 3rd-party access to Routines on an C4000 system. Only one (1) license is required regardless of how many 3rd-parties access/use the API.

NQ-C4000SML C4000 Series System Software - Sound Masking License

- This is a one-time, system-wide license required to enable sound masking within a C4000 system.

SOFTWARE BUNDLES UPGRADES

NQ-C4000-B12UP C4000 Series System Software License Bundle Upgrade – B1-B2

- Upgrades a Bundle-1 system to a Bundle-2 configuration by increasing the current zone count of the Bundle-1 system by 6-zones (e.g., if a Bundle-1 system's current zone count is 3, installing this upgrade will increase it to 9 zones).
- Extends the current SUS expiration date by 1 year (e.g., if the system's current expiration is 3/31/2025, installing this upgrade will extend it to 3/31/2026).

NQ-C4000-B23UP C4000 Series System Software License Bundle Upgrade – B2-B3

- Upgrades a Bundle-2 system to a Bundle-3 configuration by increasing the current zone count of the Bundle-2 system by 15-zones (e.g., if a Bundle-2 system's current zone count is 9, installing this upgrade will increase it to 24 zones).
- Extends the current SUS expiration date by 1 year (e.g., if the system's current expiration is 3/31/2025, installing this upgrade will extend it to 3/31/20263).

NQ-C4000-B34UP C4000 Series System Software License Bundle Upgrade – B3-B4

- Upgrades a Bundle-3 system to a Bundle-4 configuration by increasing the current zone count of the Bundle-3 system to virtually unlimited zones (e.g., if a Bundle-3 system's current zone count is 24, installing this upgrade will enable it to support a virtually unlimited number of zones).
- Extends the current SUS expiration date by 1 year (e.g., if the system's current expiration is 3/31/2025, installing this upgrade will extend it to 3/31/2026).

PUBLIC ADDRESS AMPLIFIERS

Platinum Series Amplifier

Models **PS600**

Bogen's Platinum Series Public Address Amplifiers offer powerful features rarely found in other commercial amplifiers – such as a 5-band, full parametric EQ, without the need for add-on modules, delivering outstanding value for a wide variety of installed sound applications such as retail, restaurants, hospitality, corporate meeting rooms, educational facilities, houses of worship and many more. The Platinum Series model lineup includes the PS600 (600W), PS240 (240W), PS120 (120W), and PS60 (60W), all manufactured with proven Bogen reliability, backed by an industry-leading five (5) year warranty.

PRODUCT FEATURES:

- 600 watt model
- 4 Dedicated microphone inputs (XLR connectors MIC 1-4) with selectable phantom power
- 1 Selectable MIC 5/TEL input
- 1 Selectable MIC 6/AUX 1 input
- 1 Dedicated AUX 2 input
- 8-ohm, 25V/70V speaker output
- Standard 19" rack mountable – 2RU package for all models
- 5-band full parametric equalizer with independent Gain, Frequency, and Q controls
- Lo-cut filter for all MIC channels
- True loudness contour function on AUX 1 and AUX 2
- Audio Enhancement feature for improved voice intelligibility with adjustable level
- Selectable AUX input muting during TEL paging: - 60, -21, -10, and 0dB
- VOX sensitivity adjustment for TEL paging
- Input muting with individual selection available on all inputs
- Adjustable automatic level control on TEL input
- AUX fade back after TEL page
- Remote master volume control capability (using optional GSRVC)
- Preamp out/Power amp in connections, serves as an Insert for external audio processing
- Level indicator meter, and peak limiting when amplifier is driven toward clipping
- 100VAC-240VAC, 50/60 Hz universal power supply
- Detachable IEC power cord
- Detachable, tamper-resistant front cover
- Listed to UL Standard EN62368-1:2014 for U.S. & Canada

ACCESSORIES (SOLD SEPARATELY)	PSRPK Rack Panel Mounting Kit	GSRVC Remote Volume Control

Gen-2 Platinum Series Amplifiers

NEW ITEM!

Models **PS120-G2/PS240-G2**

PS120-G2/PS240-G2

The next generation of Bogen's Platinum Series (PS) Amplifiers delivers the highest audio volume for all speaker types at specified power levels, eliminating the need for an external impedance matching transformer. The Gen-2 Platinum Series amplifiers include an internal impedance matching transformer and a rear-panel selector switch with separate connector blocks for both 8-ohm/25V and 70V speakers. These new models also retain the powerful features of the first-generation PS models, including the 5-band full parametric equalizer (EQ).

PRODUCT FEATURES:

- New 8-ohm/25V-70V switch and separate output connector blocks on rear panel allows the user to easily select the proper amp output for the type of speakers being installed; no longer will you need an external impedance matching transformer for 70V speakers.
- Increase design flexibility and enable a wide variety of installation configurations with a single amplifier, allowing either 8-ohm/25V, 70V operation.
- 120 and 240-watt models
- 4 Dedicated microphone inputs (XLR connectors MIC 1-4) with selectable phantom power
- 1 Selectable MIC 5/TEL input
- 1 Selectable MIC 6/AUX 1 input
- 1 Dedicated AUX 2 input
- 8-ohm/25V, 70V speaker outputs
- 5-band full parametric equalizer with independent Gain, Frequency, and Q controls
- True loudness contour function on AUX 1 and AUX 2
- Audio Enhancement feature for improved voice intelligibility with adjustable level
- Lo-cut filter for all MIC channels
- Remote master volume control capability (using optional GSRVC)

PS120-G2

PS240-G2

PUBLIC ADDRESS AMPLIFIERS

Classic Series Mixer-Amplifiers
Models C100, C60, C35, C20, C10

The Classic Series mixer-amplifiers provide mixing of microphones, telephone, and auxiliary sources. Bogen's Classic Series amplifiers offer high performance, flexibility, and reliability for most applications requiring a variety of inputs.

C100, C60, C35

C20, C10

PRODUCT FEATURES:

- 100-, 60-, and 35-watt models as well as 20- and 10-watt models
- 4 inputs (C35/60/100 models): 1 MIC (Lo-Z), 1 AUX (Hi-Z), 1 TEL, plus 1 selectable MIC or AUX
- 3 inputs (all C10/C20 models): 1 MIC (Lo-Z), 1 TEL, plus 1 selectable MIC or AUX
- AUX muting w/ external contact closure or automatic w/ TEL
- TEL input voice-activated (VOX) mute over AUX input
- Variable threshold for voice-activated AUX mute
- Separate volume controls for each input plus overall bass and treble (C35/60/100 models) or tone (all C10/20 models)
- Outputs for 4-ohm, 8-ohm (not C100 model), 16-ohm, 25V, and 70V speaker systems
- Screw terminal connection for microphones
- Input Sensitivity: 600 µV, MIC; 85 mV, AUX; 75 mV, TEL
- Thermal protection and electronic shutdown
- Record output jack (C35/60/100 only)
- Listed to UL Standard 62368-1 (C100/C60/C35), listed to UL Standard 60065 (C20/C10) for US and Canada

Model	Number of Inputs	MIC precedence over AUX input(s)	Bass/Treble control	4-, 16-ohm, 25V, 70V speaker outputs	8-ohm speaker outputs	VOX muting of AUX input (TEL input only)	Variable VOX threshold	Tape/Booster Output
C100	4 – 1 MIC, 1 AUX, 1 TEL, 1 MIC/AUX	●	●	●		●	●	●
C35/C60	4 – 1 MIC, 1 AUX, 1 TEL, 1 MIC/AUX	●	●	●	●	●	●	●
C10/C20	3 – 1 MIC, 1 TEL, 1 MIC/AUX	●	*	●	●	●	●	

* *Treble Cut only*

ACCESSORIES (SOLD SEPARATELY)

RPK35B	RPK50	WMT1A
Rack Panel Kit (C20/10 Models)	Rack Panel Kit (C100/C60/C35 Models)	Line-Matching Transformer

MODULAR AMPLIFIERS

Power Vector Modular Mixer-Amplifiers

Models V250, V150, V100, V60, V35

Bogen's Power Vector modular input mixer-amplifier series offers a wide range of power levels from which to choose, with five models ranging from 35W to 250W. The amplifiers are designed to work with both high- (70V/25V) and low-impedance (4/8-ohm) speaker systems. Each model includes eight module bays for input modules and allows up to four levels of priority between modules. Two module bays are also capable of accepting signal-processing output modules. Each input channel has an associated signal/clip LED for signal status. An 11-segment LED output meter monitors output signal level, which can be controlled by the Remote Volume Control Panel (RVCP, sold separately). Modules are required, but sold separately.

PRODUCT FEATURES:

- 5 models ranging from 35W to 250W, each with a large power reserve
- Capable of handling 70V, 25V, 8-ohm, and 4-ohm speaker loads
- 8 input module bays
- 2 module bays capable of handling signal-processing output modules
- 4 levels of priority between modules
- 11-segment LED output level meter with Average/Peak switch
- Two-color LED for each channel indicates signal active/signal clipping
- Bass and treble controls (bypassable)
- Master mute control mutes all audio from the mixer section of the amplifier
- 125 Hz Low Cut feature
- Signal-processing insert jacks
- Pre-EQ unbalanced buffer output signal "post" all unit controls, but "pre" any external signal-processing equipment connected
- Grounded, unswitched AC convenience receptacle with a 500W maximum capacity provided for external equipment
- Rack mountable (RPK87 sold separately)
- Listed to UL Standard 60065 for U.S. and Canada

Wide selection of Advanced Input & Signal Processing Output Modules are available (sold separately)

ACCESSORIES
(SOLD SEPARATELY)

RPK87
Rack Mounting Kit

Wall-Mount Power Vector Modular Mixer-Amplifiers

Models WV250, WV150, WV100

The Wall-Mount Power Vector Series combines up to 8 modular inputs and signal-processing outputs to meet various application requirements. The amplifier's convenient and efficient wall-mount design provides a protected and accessible audio system in a permanent and inconspicuous mounting.

PRODUCT FEATURES:

- 100-, 150-, and 250-watt models; each with large power reserve
- 8 module bays total, supporting up to 2 signal processing output and up to 8 input modules
- Four priority levels between modules
- 4-ohm, 8-ohm, 25V, and 70V outputs
- Secure, permanent wall mounting (in-wall with BBF or surface-mount with BBS)
- 11-segment LED output level meter registers Peak or Average output
- Adjustable output level limiter with active indicator
- Front-mounted tape output provides unbalanced signal level output
- Independent volume controls for each input
- External mute control
- Bass and treble controls with center detent
- 125 Hz Low Cut switch
- Tone control bypass switch
- Thermal, short-circuit, and overload protection
- Thermally-controlled 3-speed fan
- Listed to UL Standard 60065 for U.S. and Canada

(Wall-Mount Power Vector shown with WMAD Component)

Wide selection of Advanced Input and Signal Processing Output Modules are available (sold separately)

REQUIRED COMPONENTS
(SOLD SEPARATELY)

BBF	BBS	WMAD
FLUSH-MOUNT BACK BOX	SURFACE-MOUNT BACK BOX	FRONT COVER/ DOOR

MODULAR AMPLIFIERS

M-Class Amplifiers

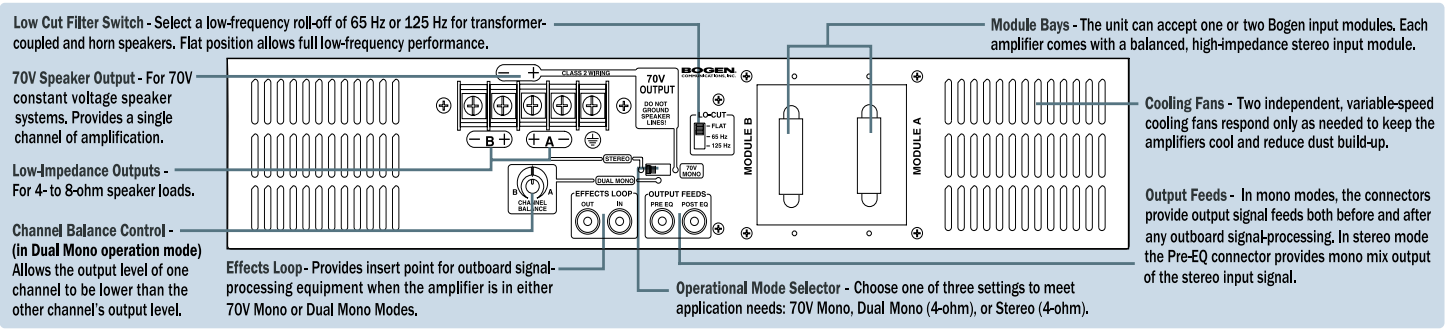
Models **M600, M450, M300**

Bogen's M-Class amplifiers provide professional sound installers with exactly what they need from an amplifier: 3 modes of operation — stereo (4-ohm), 70V mono, dual mono (4-ohm); 2 bays for a variety of input modules; up to 600W/ch stereo (4-ohm) or 1200W of 70V mono power; massive power toroid and heat sinks; heavy 14-gauge chassis; patented Back-Slope™ AC voltage stabilization; clip limiters; and DC voltage, over-current, and thermal protection circuits.

ACCESSORIES (SOLD SEPARATELY) — **RPK35B** Rear Rack Supports

PRODUCT FEATURES:

- 3 mono power levels: 1200W, 900W, or 600W for 70V speaker systems
- 3 stereo power levels: 600W, 450W, or 300W per channel @ 4 ohms
- 3 modes of operation to choose from: Stereo (4-ohm), Dual Mono (4-ohm), or 70V Mono
- 2 module input bays for flexible modular input capability
- Low noise, low distortion, and high slew rate
- Professional, high-impedance, balanced stereo input module included (BAL2S)
- 3 selectable low-frequency roll-off choices
- 2:1 mixer function when in mono modes
- Insert connections for outboard equipment
- Post- and pre-EQ Output Feeds
- DC, overload, short circuit, and thermal protection circuits
- Power-saving Sleep Mode
- Clip limiting circuits for speaker protection
- Status, Signal, and Clip/Limit indicators
- Back-Slope AC voltage stabilization for varying AC line voltages
- Recessed volume control knobs
- 2 independent, continuously variable cooling fans
- Listed to UL Standard 60065 for U.S. & Canada



ADVANCED SIGNAL PROCESSING OUTPUT MODULES

Plug-In Signal-Processing Output Modules

Bogen's plug-in signal-processing output modules automatically insert themselves into the mix bus signal path leading to the power amplifier stage when installed. (Shipping weight: 1 lb. each.)

Model **RIO1S - Relay Input/Output**

- Transformer-isolated, balanced line-level input
- 600-ohm/10k jumper-selectable input impedance
- 8-ohm, 750mW output
- Input and output level controls
- Relay responds to selectable priority level
- External control of priority muting
- N.O. or N.C. relay contacts
- Input can be muted from higher priority modules, with signal fade back
- Output can gate with relay priority level
- Screw terminal strips
- RJ11 connection with line output and dedicated N.O. relay contact

ADVANCED INPUT MODULES

Input Modules

Advanced plug-in Input Modules provide a wide range of functions to support a variety of applications. (Shipping weight: 1 lb. each)

Models LMM1S, LMR1S - Line/MIC Inputs

LMM1S

LMR1S
(with Remote Volume Control)

- Input level controlled by remote panel or direct voltage (LMR1S)
- Wall Plate Control included (with LMR1S only)
- Limiter with LED activity indicator (LMR1S)
- Line/MIC gain switch
- Gain/Trim control
- Bass & Treble controls
- Noise gate w/threshold control
- Fade back from mute
- 24V phantom power
- Priority & bus assignments
- Screw terminal input
- Mutes lower priority modules

Models MIC2S, MIC2X - Microphone Inputs

MIC2S

MIC2X

- Gain/Trim control
- High Cut/Low Cut controls
- Enhance control
- Noise gate w/Threshold control
- Limiter w/Threshold control
- 24V Phantom power
- Priority & Bus assignable
- Screw terminals (MIC2S)
- XLR connector (MIC2X)

Model TEL1S - Telephone Input

- Loop start or ground start trunk interfacing
- Dry loop interface to paging ports
- Audio-activated paging in dry loop
- Gain/Trim control; Noise gate & Limiter
- Mutes lower priority modules
- Mutable by higher priority modules
- Bus assignable & Transformer-isolated
- Screw terminal connections

ACCESSORY
PRS48
48V DC
Power Supply

Model BAL2S - Balanced Input

- Stereo, high-impedance, electronically balanced inputs
- Professional-quality, low noise performance
- Selectable gain of 0 or 18 dB
- Compatible w/telephone system page ports
- Mutable by higher priority modules
- Variable ducking level when muted
- Fade back from mute
- Screw terminal connections

Model MAX1R - Mono AUX Input

- Gain/Trim control
- Bass & Treble controls
- Gate feature mutes lower priority modules
- Mutable by higher priority modules
- Variable ducking level when muted
- Fade back from mute
- Bus assignable
- RCA connectors

Model SAX1R - Stereo AUX Input

- Gain/Trim control
- Bass & Treble controls
- Gate feature mutes lower priority modules
- Mutable by higher priority modules
- Variable ducking level when muted
- Fade back from mute
- Stereo-to-mono summing option
- Bus assignable
- RCA connectors

Model TBL1S - Transformer Balanced Input

- Gain/Trim control
- Bass & Treble controls
- Transformer-isolated, dual-impedance, line-level input
- Variable ducking level when muted
- Mute send & receive
- Fade back from mute
- Mute send threshold & duration adjustments
- Priority & Bus assignable
- Pluggable screw terminal connections

Model TNG1S - Tone Generator Input

- Level control
- Select 4 of 8 tones to trigger
- Burst/steady, slow whoop, siren, mechanical bell, Klaxon, night ringer, double chime, & doorbell tones
- Momentary & continuous playback modes
- Microprocessor-controlled
- Priority assignable
- Mute send & receive
- Screw terminal trigger connections

LISTEN TO TONES ON OUR WEBSITE

ACCESSORY
(SOLD SEPARATELY)

MA3 Module Adapter
Adapts Modules for use with D-Series, WMA, and DPA Amps

DUAL-CHANNEL POWER AMPLIFIERS

Black Max™ Power Amplifiers
Models X600, X450, X300

Bogen's Black Max amplifiers are designed to provide maximum performance in constant voltage speaker systems. Dual 70V transformerless outputs deliver exceptionally clean audio to speaker systems requiring two channels of audio up to 600W per channel.

High-efficiency Class H amplifier design and the auto-sleep feature aid in reducing power consumption on continuously-powered systems. Rear-mounted volume controls, independent low cut filters on each input, and pluggable input terminal strips were specifically designed for the fixed install market. Built-in power sequencing for multiple Black Max amplifiers combats current in-rush problems of large audio systems. Massive power toroid and heat sinks; heavy 14-gauge chassis; patented Back-Slope™ AC voltage stabilization; clip limiters; and DC voltage, over-current, and thermal protection circuits make the Black Max both an efficient and reliable workhorse amplifier.

PRODUCT FEATURES:

- Dual 70V amplifier channels
- 300W/450W/600W per channel for 70V speaker systems
- Low noise, low distortion, and high slew rate
- High-efficiency Class H amplifier design
- Transformerless direct drive outputs
- Electronically balanced high-impedance inputs
- Pluggable terminal strips for input connections
- Independent low cut filters for each channel
- Built-in power sequencing with other Black Max amps
- Pluggable terminal strip for sequencing wiring
- Rear panel power sequencing status indicator
- DC, overload, short circuit, and thermal protection circuits
- Clip limiting circuits for speaker protection
- Power-saving sleep mode for intermittent use
- Status, Signal, and Limit indicators
- Back-Slope AC voltage stabilization for dependable performance over varying AC line voltages (±10%)
- Heavy-gauge steel chassis with cast aluminum front
- Rear-mounted volume controls
- Mounts in 2 rack spaces (3-1/2") directly stackable without need for extra space above or below
- 2 independent, continuously variable cooling fans for dependable and quiet operation
- Listed to UL Standard 60065 for U.S. and Canada

ACCESSORY
(SOLD SEPARATELY)

RPK86
Rear Rack Support Brackets

COMPACT AMPLIFIERS

CC-Series Compact Mixer-Amplifiers
Models CC4021, CC4041

The CC-Series consists of two compact mixer-amplifiers, CC4021 and CC4041, each providing 40 watts of output power. The features available and number of inputs vary per model. Each unit measures 2 rack spaces in height but only 8-1/4" wide, allowing 2 units to be placed side-by-side without requiring additional rack spaces.

CC4021

CC4041

PRODUCT FEATURES:

- 40 watts of output power
- Individual volume control for each Input
- Compatible with 70V, 25V, 4-ohm, and 8-ohm systems
- Individual phantom power for MIC inputs
- Audio-activated & Defeatable muting
- Bass and treble controls
- Peak and signal indicators
- External 24V DC supply input
- Listed to UL Standard 60065 for U.S. and Canada

ACCESSORY
(SOLD SEPARATELY)

RPK93
Rack Mount Kit

Model	Total Number of Inputs	Number of MIC/Line Inputs (balanced)	Number of AUX Inputs (unbalanced)	Audio-activated Muting Priority Levels	Dimensions	Product Weight
CC4021	2	1	1	1	8-1/4" W x 3-1/2" H x 10-3/8" D	11 lb.
CC4041	4	3	1	1		11 lb.

MONO-CHANNEL POWER AMPLIFIERS

Mono Power Amplifier
Models HTA250A, HTA125A

The HTA Series high-performance power amplifiers can safely drive loads continuously at full (RMS) power. Overload protection includes an electronic shutdown circuit and a thermal breaker.

PRODUCT FEATURES:

- 250- and 125-watt models available
- Convection-cooled
- Power MOSFET output circuitry
- Thermal protection and automatic electronic overload protection
- Hi-Z unbalanced and Lo-Z balanced or unbalanced input w/ accessory transformer (TL600)
- Internal Low Cut filter switch
- 90 dB signal-to-noise
- 4- and 8-ohm, 25V, 25VCT and 70V outputs
- Input sensitivity: Hi-Z, 500 mV; Lo-Z, 150 mV (HTA250A); 150 mV (HTA125A)
- Power Consumption: 520W (HTA250A); 260W (HTA125A)
- Line bridging (driving multiple amplifiers) is possible w/ an accessory transformer (TL100)
- 19" rack-mount design (3 rack spaces)
- Listed to UL Standard 62368-1 for US and Canada

ACCESSORIES (SOLD SEPARATELY)

WMT1A Line-Matching Transformer

TL100 1:1 Bridging Transformer

Mono Power Amplifier
Model BPA60

The BPA60 supplies 60 watts of power amplification for professional and commercial sound systems requiring continuous high-quality sound.

PRODUCT FEATURES:

- 60 watts
- 1 input: Hi-Z unbalanced
- Lo-Z balanced input with accessory transformer
- Input level control and low cut filter switch
- 8-ohm/25V, 16-ohm, 25VCT, and 70V outputs
- Sensitivity: 300mV, Hi-Z; 75mV, Lo-Z
- Resettable circuit breaker & thermal protection
- Operates with 25V and 70V systems
- 120V AC, 60 Hz, 180W @ full rated output
- Rack-mountable (kit sold separately)
- Listed to UL Standard 60065 for U.S. and Canada

ACCESSORIES (SOLD SEPARATELY)

RPK53 Rack Panel Kit

TL100 1:1 Bridging Transformer

WMT1A Line-Matching Transformer

ALSO AVAILABLE FROM BOGEN...

BOGEN® TIME SYSTEMS

Master, Wired, Wireless, and IP Clock Systems

Bogen offers the most advanced, high quality, high-tech time solutions. Whether you are designing a new school, hospital, or office, or retrofitting an existing facility, you will benefit from Bogen's advanced time systems.

We offer timepieces including simple Quartz Clocks, IP Clock Systems, GPS Systems (synched to UTC within 1-microsecond anywhere on the globe), and everything in between. Our highly tooled, microprocessor-based products allow us to take a unique approach to the market by providing advanced solutions at competitive prices.

Visit our website at:
www.bogen.com/products/type/time-systems

MIXERS

Power Vector Mixer
Model **VMIX**

This 8-channel Power Vector mixer/pre-amplifier offers a wide variety of operational features and functions for superior audio performance. Eight module bays accept plug-in modules, allowing up to four levels of priority between modules. For large applications, several Power Vector Mixers can be bridged together.

PRODUCT FEATURES:

- Wide selection of plug-in modules (sold separately)
- 8 module bays
- 2 module bays capable of handling signal-processing plug-in output modules
- 4 levels of priority between modules
- 8 inputs, with independent volume controls for each
- LED signal/clip indicator for each channel
- Bass and treble controls
- 11-segment LED output level meter monitors the output level of the mixer with Avg./Peak switch
- Balanced transformer-isolated output
- Balanced output signal level switch (-50, -10, and +4 dBμ)
- Unbalanced signal output jack
- Join multiple Power Vector mixers together using bridging jack and mute terminals
- 125 Hz Low Cut feature
- Tone control bypass switch
- Module security cover prevents tampering with module controls
- Resettable circuit breaker
- Listed to UL Standard 60065 for U.S. and Canada

Wide selection of Advanced Input and Signal Processing Output Modules are available (sold separately)

ACCESSORIES
(SOLD SEPARATELY)

RPK87
Rack Mounting Kit

Output Level Meter	Frequency Response	Output Impedance	Signal-To-Noise Ratio	Dimensions	Product Weight
11 Segments	±1 dB (20 Hz-20 kHz) balanced-out	100 ohms, unbalanced; 50 ohms @ +4 dBμ, 600 ohms @ -10 dBμ, 5 ohms @ -50 dBμ, balanced	-99 dB, fundamental	17-1/4" W x 3-7/8" H x 14-3/4" D	15 lb.

MIC/LINE Mixer
Model **CAM8PRO**

The Bogen CAM8PRO is an 8-input, dual-bus MIC/Line mixer that combines superb performance with a generous array of simple-to-use features in a single rack space design. It features 8 independently-assignable inputs switchable between MIC and Line. Each input has a trim control, a switchable low cut filter, and a Main/Auxiliary bus output selector. Phantom Power can be universally applied to all MIC-selected inputs for condenser microphones. The CAM8PRO also features a built-in Compressor/Limiter with adjustable Threshold and Ratio Controls, a Bar Graph Output Meter that indicates input signal levels, and a headphone jack. External power supply included.

PRODUCT FEATURES:

- 8 independently-assignable inputs
- Dual-bus design with Main/AUX output selector for each input
- Pluggable terminal strip connections
- Balanced inputs and outputs
- Direct bus connection for cascading multiple mixers
- MIC/Line switch for each input and Main output
- Low Cut Filter for each input
- Switchable Phantom Power for condenser MIC inputs
- Output Level Control knob for Main and AUX outputs
- Gain/Trim Control for each input
- Compressor/Limiter (Main output; bypassable)
- Adjustable Threshold and Ratio Controls
- LED Bar Graph Output Meter (Peak or Average)
- Headphone Output

Inputs	Phantom Power/ Voltage	Bridging Input	Compressor/ Limiter	Output Level Meter	Frequency Response	MIC Equiv. Input Noise	MIC/AUX Input Impedance	Signal-To-Noise Ratio	Output Impedance	Crosstalk (adjacent channels)	Dimensions	Product Weight
8	30V DC	●	●	● (8 segments)	±1 dB, 20 Hz-20 kHz	-129 dBV	3.5k/15k ohms	90 dB	220-ohm unbalanced, 440-ohm balanced	> -90 dB	19" W x 1-3/4" H x 7-1/2" D	7 lb.

UNIVERSAL AUDIO PROCESSOR

Universal Audio Processor
Model **CORE**

The Bogen CORE is a highly versatile digital mixer/processor designed for small to medium installations. Flexible hardware configurations, in blocks of 4: for 4 in/12 out, 8 in/8 out, etc. The CORE's PC-based software allows for design, downloading, reversal of in-box designs, and live monitoring, calibration, and routing. Three system hardware configurations are available: CORE8X8 (8 inputs, 8 outputs), CORE4X12 (4 inputs, 12 outputs), and CORE12X4 (12 inputs, 4 outputs).

PRODUCT FEATURES:

- Configurable using PC/laptop software
- Programmable, scalable front panel knobs for analog control functions
- Full DSP drag-and-drop component library
- Third-party control via RS-232 serial and Ethernet
- Stack up to 12 units to increase number of inputs and outputs
- Listed to CE and UL standards

HARDWARE COMPONENTS:

- Main Frame: 4 slots for input/output cards, 16 TTL/Analog Inputs, 8 TTL Outputs, RS485, RS232 Port, Ethernet Port
- Output Card: 4 channels with individual overload indicator, mute, meter, signal present, level control, and adjustable overload threshold
- Input Card: 4 balanced audio input channels with individual bypass, mute, -66 dB to 0 dB sensitivity select, phantom power, mute, RTO (route to output), VU meter, signal present, level control, and adjustable overload threshold

SOFTWARE COMPONENTS:

- Auto Gate, Noise Sensing, Compressor, Comp-limiter, Expander, and Ducker
- Equalizers: Mono and Stereo GEQ (1 Octave, 2/3 Octave, 1/3 Octave), Mono and Stereo PEQ (2, 4, 6, 8, 10, 16 bands)
- Dynamic Feedback Control
- Programmable Level Controls
- Provides up to 53 minutes of digital audio WAV file storage, triggered via calendar-based schedule or dry contact; 2 separate messages can be simultaneously output to independent zones
- Mixers: Auto, Matrix, Standard, and Room Combiner
- Noise Generators: White, Pink, Tone
- Page Control Module: for zone paging applications
- Create custom control interface screens

Dimensions	Product Weight
17-1/8" W x 1-3/4" H x 11-5/8" D	8 lb.

ACCESSORIES (SOLD SEPARATELY)

DSM2000 Desktop Paging Microphone	**JB** Junction Box	**NSM** Noise Sensing Microphone	**PPM8** 8-Button Paging Microphone	**PPM8SP** 8-Button Paging Microphone w/Stack Paging	**PPM8SPJB** 8-Button Paging Microphone w/Junction Box
PPM8SPJBSP 8-Button Paging Microphone w/Page Stacking Chip	**PPMIT5** IP Touchscreen Paging Station	**PPMKEYPAD** Additional Keypad	**RAC5** Remote Analog Controller (5 sources)	**RAC8** Remote Analog Controller (8 sources)	**URC** Programmable Remote Controller	**URC200** IP-Based Remote Controller

JB
W x 3-3/8" H x 1" D / 0.1 lb.

NSM
N/A / 2 lb.

PPMKEYPAD
4-1/4" W x 8" H x 2" D / 1.4 lb

URC200
5 -1/2" W x 4-1/2" H x 1-1/2" D / 0.8 lb.

PPMIT5
9-7/8" W x 13-3/4" H x 5-5/8" D / 2.4 lb

RAC5
2" W x 4-1/2" H x 2-3/4" D / 0.1 lb.

RAC8
2" W x 4-1/2" H x 2-3/4" D / 0.1 lb.

URC
3-1/2" W x 3-1/2" H x 2" D / 0.1 lb.

PPM8 (shown with 2-PPMKEYPAD units)
4-1/4" W x 8" H x 2" D / 1.4 lb

See Page 88 For Details

TELEPHONE PAGING AMPLIFIERS

TPU Series Mixer-Amplifiers

Models TPU250, TPU100B, TPU60B, TPU35B, TPU15A

TPU250

TPU100B, TPU60B, TPU35B

TPU15A

Bogen's TPU Series of mixer-amplifiers are the ideal choice for the telephone paging industry. There are 5 models to choose from, ranging in power from 15 watts to 250 watts, and each model provides signal-activated, automatic muting of background music during a telephone page, and gradual return of music following a page.

PRODUCT FEATURES:

- 250-, 100-, 60-, 35- and 15-watt models specially designed for telephone paging systems
- 3 inputs on TPU250-G2 and TPU-B models: 1 TEL, 1 MIC (Lo-Z), 1 AUX (Hi-Z)
- 2 inputs on TPU15A: 1 TEL, 1 AUX (Hi-Z)
- 600-ohm balanced TEL input for direct connection to page ports and adapters
- TEL input has Automatic Level Control (ALC) for constant page announcement level
- Separate MIC input for a low-impedance push-to-talk microphone (excluding TPU15A model)
- Audio enhancement circuitry (excluding TPU15A model)
- Music input – mutable by external contact closure (excluding TPU15A model) or activity on TEL input
- Separate volume controls for mic, paging, background music, and night ringer
- Built-in night ringer can be activated from 90V ring signal (excluding TPU15A model) or external contact closure
- 25V and 70V constant-voltage outputs, balanced and unbalanced; also 8-ohm on TPU15A
- Wall-mount design provides minimum protrusion from backboard
- TPU-B models may be rack-mounted using RPK82 rack mounting kit (sold separately)
- TPU15A, TPU250, and TPU600-G2 designed to rack mount directly, no kit necessary
- Easily accessible, recessed front-panel controls (except TPU15A and TPU600-G2) for setting volume, muting, music, etc.
- RCA jacks provided to allow amplifier bridging to double the number of amplifier inputs and outputs (excluding TPU15A model); TPU600-G2 uses pluggable Phoenix style connector for bridging
- Thermal and electronic overload protection (excluding TPU15A model), resettable circuit breaker (Except TPU250 and TPU600-G2), Slo-Blo fuse on TPU250
- Listed to UL Standard 60065 for U.S. and Canada

Specialized Telephone Input

The TPU-Series' 600-ohm transformer balanced input is perfectly suited to connect to paging ports and paging adapters such as Bogen's UTI1. Here are a few specially designed features:

· The background music will mute whenever paging activity is present on the telephone input, even if control contacts are not available. (Separate mute control contacts are also available.)

· To avoid problems with noise on the lines falsely muting the background music, a built-in VOX threshold control (not on TPU15A) lets you decide what's a real signal and what's noise.

· Because not everyone speaks at the same level, the Automatic Level Control feature keeps loud voices from booming out of the paging system's speakers.

Audio Enhancement

Crisp, clean, intelligible sound is the goal of every paging system. The audio enhancement circuit adds back the high frequency harmonics that are lost through the handsets and speakers. With one simple control, you can adjust the amount of high frequency content the audio enhancement circuit adds back until optimum intelligibility is reached.

Variable Music Mute

Add some polish to announcements by using the TPU's built-in variable mute feature. Variable mute allows you to control the level of the music heard in the background during a page. It is fully adjustable from no muting of music to full suppression of music. The TPU also gracefully fades the muted music back in after the page is finished for a smooth, professional sound (not available on TPU15A).

Bridging

Bridging two TPU amplifiers permits them to be used in tandem with one another to increase the total output power of the system, thereby permitting additional speakers to be added. For example, when two 250-watt amplifiers are bridged, the total output capacity of the system is 500 watts. Also, both amplifiers will receive the same input signal, amplify it, and deliver to the speaker loads connected to each amplifier (not available on TPU15A).

Model	Output Power (Watts)	Inputs			Adjustable Mute Threshold	Automatic Level Control	Bass/Treble Controls	Peak Level LED	Adjustable Mute Level	Fade Back From Mute	Audio Enhancement	Night Ringer		Outputs				
		Telephone	Music	Microphone								90V Activation	Contact Closure	70V	25V	25VCT	8 Ohms	16 Ohms
TPU250	250	●	●	●	●	●	●	●	●	●	●	●	●	●	●			
TPU100B	100	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●
TPU60B	60	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●
TPU35B	35	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●
TPU15A	15	●	●			●	*	●					●	●	●		●	
TPU 600-G2		●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	

* *Treble Cut only*

ACCESSORIES (SOLD SEPARATELY)

RPK82 Rack Panel Kit (TPU-B Models)

WMT1A Line-Matching Transformer

TELEPHONE PAGING AMPLIFIERS

TPU Series Mixer-Amplifier
Model **TPU600-G2**

TPU600-G2

Bogen model TPU600-G2 is a telephone paging amplifier rated at 600 watts. This second generation (G2) TPU amplifier is a full-featured, wall- or rack-mounted amplifier that provides inputs for a dry-loop, 600-ohm telephone page signal, a background music source, and a low impedance microphone. Automatic background music mute is provided when making a telephone page. Background music mute level during a page is adjustable, and the music then gradually fades back in after the page is completed. A Normally Open (NO) contact closure music mute control input is provided for use with push-to-talk microphones. An adjustable Automatic Level Control system limits the output level of the telephone page channel so that differences in the volume of the paging party's voice will be less noticeable. Bass and treble controls are provided for adjusting the quality of the output signal. An Audio Enhancement feature is also provided to improve the clarity of the output signal by reintroducing the higher frequency harmonics that are normally lost through the telephone system. The TPU600-G2 amplifier includes a built-in night ringer that can be triggered by either a standard telephone (analog) ring signal or an external contact closure. The night ringer mutes the background music but does not affect paging.

PRODUCT FEATURES:

- Compact rack-/wall-mount design
- Inputs for 600-ohm balanced telephone line and background music
- 25V, 70V, or 8-ohm output
- Built-in night ringer triggered by external contact closure
- Integral automatic level control (ALC) circuit
- Signal-activated music muting circuit
- Individual controls for tone, page volume, back ground music volume, night ringer volume
- Lo-cut switch
- LED overload indicator
- Thermal and electronic overload protection
- Black finish
- Listed to UL Standard 60065 for U.S. & Canada
- The TPU600-G2, can be wall- or rack-mounted (bracket kits included)

ACCESSORIES
(SOLD SEPARATELY)

WMT1A
Line-Matching Transformer

PAGING CONTROL MODULES

Zone Paging System

Model **PCM2000**

The PCM2000 Zone Paging System provides robust zone paging for applications requiring 1 to 99 zones and up to 32 paging zone groups. Its multi-function modules ensure flexibility and future expansion with minimum time and expense.

PAGING:

- Allows for 1 to 99 paging zones in 3-zone increments
- Up to 32 programmable paging zone groups
- Emergency All-Zone Override Paging input
- All-Call function can be disabled
- 250-watt power handling capacity (separate amplifier required)
- Works with systems that are central- or self-amplified, or mixed
- Drives up to 40 self-amplified speakers per zone module in low-power mode

INSTALLATION:

- Operates with 70V and self-amplified (24V) paging systems
- Future expandability up to 99 paging zones using 10 PCM2000 slave assemblies
- Universal Telephone Interface allows simple connection to loop and ground start trunks, to PBX or KEY paging ports, and to analog 90V station lines
- Easy connections using standard RJ11 and Euro-style terminal blocks
- Relay driver outputs mirror the operation of each paging zone to control external equipment
- Two C-form relay contacts change state when system is activated to control external equipment
- A setup tone can be produced by the system to check system operation and volume levels
- Easy programming of system features through the telephone
- System programming can be reset to factory defaults
- Wall-mountable (brackets included)
- FCC Part 68 Registered
- Listed to UL Standard 60950 for U.S. and Canada

BACKGROUND MUSIC:

- No interruption of background music in zone not being paged (two amplifiers required)
- Inhibit background music in any zone
- Zone modules can accept separate background music sources

PCM2000 System – Shown with modules for a 9-Zone Paging System

Works with both central- and self-amplified systems

NIGHT RINGER:

- Night Ring activated from 90V ring signal or contact closure
- Night Ring tone can be selected as either simulated ringer sound or chime
- Night Ring tone can be directed to a specific group of zones
- RJ11 input connector

CODE CALLING:

- Night Ring activated from 90V ring signal or contact closure
- Night Ring tone can be selected as either simulated ringer sound or chime
- Night Ring tone can be directed to a specific group of zones
- RJ11 input connector

SIGNAL TONES:

- Contact closure input controlled tone annunciation
- Tone signaling can be directed into a specific group of zones
- Tone can be selected as tone burst, chime, or 4 quick beeps
- Tone can be selected to follow state of contact closure input or preset burst length

Number of Modules Required For Zone Paging Applications:

	Total Number of Zones in System										
	3	6	9	12	15	18	21	24	27	More Than 27 Zones	99 Zones
PCMTIM	← 1 Module Required For Each Total System →										
PCMCPU*	1			2			3			1 PCMCPU for every 9 Zones	11
PCMZPM	1	2	3	4	5	6	7	8	9	1 PCMZPM for every 3 Zones	33
PCMTBM	← 1 Module Required For Each Total System (optional module for talk back or time tone options) →										

**Note: One PCMPS2 Power Supply (not included) is required for each PCMCPU Module.*

PAGING CONTROL MODULES

TIME TONES*:

- Built-in real-time clock
- Controls up to 8 time-triggered tone-signaled events
- Each time-triggered event's tone can be directed to a specific group of zones
- Time-triggered tone burst length adjustable (2-8 seconds) or chime tone
- Simple programming of times/events through the telephone
- Master clock synchronization ability

TWO-WAY COMMUNICATIONS*:

- Provides hands-free, 2-way talk back communications in 70V paging system (amplifier required)
- Zones can be individually set to be talk back or one-way only
- "Privacy Beep" can be enabled in talk back zones to prevent eavesdropping

**** Requires PCMTBM Module***

PCM2000 ACCESSORIES
(SOLD SEPARATELY)

RPK88
Rack Mount Kit
Module housing for 10 modules max. with 12 wiring saddles, knockouts for wire access, and 8 mounting brackets.

RPK84
Rack Mount Kit
2 panel adapter, 6 modules max.

PCMPS2
Power Supply (12V DC)

System	Power Requirements	Audio Power Capability+	Operating Current	Dimensions	Product Weight
PCM2000	12V DC@1.5A Power Supply (not included – PCMPS2 recommended)	250W (9-zone system)	1.5A max. (9-zone system)	1-1/2" W x 7-1/2" H x 4-1/4" D, each module	1 lb., each module

+ Separate Amplifier Required

Also Available...

PCM2000 Configuration Guide

Our PCM2000 system configuration guide will assist you in designing zone paging applications. It illustrates many popular applications for the PCM2000. This valuable guide is available for download from our website here: https://www.bogen.com/sites/default/files/2021-01/pcm2000_configuration_guide.pdf

Pre-Assembled Zone Paging System

Model PCMSYS3

The PCMSYS3 is a pre-assembled and tested 3-zone PCM system with a PCMPS2 power supply. Use right out of the box for 1- to 3-zone applications or expand it with other PCM modules.

Ready-To-Go, right out of the box!

1 - PCMTIM
Telephone Interface Module

1 - PCMCPU
Central Processor Module

1 - PCMZPM
3-Zone Paging Module

1 - PCMPS2
System Power Supply

EXPANSION:

- Add PCMZPM modules for up to 9 zones
- Add PCMTBM module for talk back and realtime clock/tone applications
- Add satellite assemblies for up to 99 zones

To Order a PCM2000 System select from the following modules:

PCMTIM
Telephone Interface Module

A universal interface connects to any type of telephone port, rapidly and trouble-free. Provides input for night ringer and emergency page override. One required per system.

PCMCPU
Central Processor Unit Module

The PCMCPU controls system operation and holds all programmed parameters. One required for every 3 PCMZPM modules (9 paging zones).

PCMZPM
3-Zone Paging Module

The 3-Zone module provides 3 paging zone outputs. Increase the system capacity by adding additional modules, up to 3 zones at a time. The zone outputs can drive 70V or self-amplified speaker systems. Relay driver outputs mirror the state of each paging zone to control external equipment. If desired, system-wide back ground music can be disconnected and a separate music source can be connected to any PCMZPM module. Background music can also be inhibited in any zone. One for every 3 paging zones.

PCMTBM
Talk Back Module (optional)

Allows 2-way, hands-free talk back communications throughout the paging system. The built-in real-time clock allows up to 8 user-scheduled time tones to be emitted in a specific group of zones. The clock can be synchronized with an external master clock. Only one PCMTBM is required for the entire system when needed.

DIGITAL FEEDBACK TERMINATION

Model **DFT120**

The DFT120 eliminates the acoustical feedback loop created by the telephone handset and the paging speaker while providing high- capacity, high-quality recording and playback of audio pages.

PRODUCT FEATURES:

- High sampling rate for excellent playback quality
- Record a message while another is being played
- Stacks up to 16 messages for playback
- 240 seconds of total audio memory
- Automatic or externally controlled unit operation for recording, play, and stop
- Activates recording by loop start trunk, 4-wire dry loop, audio trigger, or DTMF
- Digital recording and playback of pages, 60-second maximum message length
- Adjustable delay between messages
- Message repeat, abort, stop, and pre-page tone option
- 8- or 600-ohm output impedances
- Zone control DTMF tones stripped from message and regenerated
- Volume control
- Adapter included

Power Requirements	Dimensions	Product Weight
12V Power Supply (included)	10" W x 6-3/4" H x 1-1/2" D	3 lb.

TONE GENERATOR

Model **TG4C**

The TG4C is designed to produce four different types of tones for use as alarm or announcement signals in paging systems. An audio signal can be routed through the TG4C to allow easy installation in paging systems. During generation of the tones, the routed audio will be suppressed.

PRODUCT FEATURES:

- 4 types of tones: slow whoop, steady, pulsed alarm, and chime
- Choice of continuous generation of tone or two-burst operation (except for steady tone)
- Tones triggered by external contact closure (momentary or long duration)
- External audio signal can pass through the TG4C and is suppressed during tone generation
- Adjustable tone level and pitch
- 600-ohm output
- Tone generation reset available

Power Requirements	Dimensions	Product Weight
Wide power supply range, 12V to 48V DC @ 30 mA (power supply not included)	6-3/4" W x 5-3/4" H x 2" D	2 lb.

ACCESSORIES (SOLD SEPARATELY)	PRS40C 12V DC Power Supply	WMT1A Line-Matching Transformer

MATCHING TRANSFORMERS

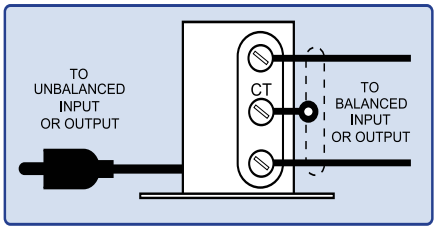
Models **WMT1A, WMT1AS**

Models WMT1A and WMT1AS are general purpose matching transformers that allow proper connections between high (10k-ohm) and low (600-ohm) inputs and outputs. Both models can be used to balance an unbalanced line or provide isolation between two pieces of equipment. Both models can be configured to produce a balanced, microphone level signal from a line-level signal such as that from a pre-amp or music source. In addition, Model WMT1AS can adapt speaker level signals (25V/70V systems) to a level suitable for the AUX input of an amplifier.

PRODUCT FEATURES:

- Hi-Z, 10k-ohm primary impedance
- Lo-Z, 600-ohm secondary impedance, balanced with center tap
- Matches high-to-low impedance or low-to-high impedance
- Adapts line-level signals to microphone inputs
- RCA connector for Hi-Z side
- Screw terminals for Lo-Z side

Dimensions	Product Weight
2" W x 2-3/8" H x 1-1/4" D	4 oz.



AMBIENT NOISE SENSOR

Model **ANS501**

The Ambient Noise Sensor System electronically adjusts the level of a page or background music in applications where ambient noise levels are continuously changing. The ANS501 ensures that page announcements or background music are intelligible even during periods of high ambient noise levels. The system includes a sensor microphone module (ANS500M) that monitors the ambient noise level and a 12V DC power supply.

ANS501

ANS500M
(Sensor MIC, one included)

PRODUCT FEATURES:

- Automatically adjusts paging level as ambient noise levels rise and fall
- Balanced and unbalanced input and output
- AUX inputs bypass gain control feature
- Unbalanced stereo AUX inputs (summed mono)
- Supports up to 4 sensor microphones (one ANS500M included) wired in parallel for large areas
- Sensor microphones can be located up to 2,000 feet from control unit
- Only 2 wires needed for connection of sensor microphones
- Microphone module includes an adjustable mounting bracket for precise positioning
- Connects easily between pre-amp and power amp or to amplifier insert jacks
- Sensitivity and max boost control
- Adjustable ramp speed

ACCESSORY (SOLD SEPARATELY) **ANS500M** Sensor Microphone

Power Requirements	Dimensions	Product Weight
12V DC Power Supply (included)	Control Unit: 5-1/4" W x 3" H x 1-1/4" D Sensor Microphone: 2" W x 2-1/8" H x 7/8" D	1 lb. 4 oz.

NIGHT RINGER

Model **NR100**

The NR100 converts any paging system into an after hours night bell alert system. The NR100 connects to the paging system's amplifier and emits a ringer tone through the paging system's speakers, thus eliminating the need for loud old-fashioned bells positioned throughout a facility. The NR100 is an efficient and easy way to alert security or personnel of incoming calls during non-business hours.

PRODUCT FEATURES:

- Responds to 90V ring signals or external contact closures
- Produces dual-frequency electronic ringer tone
- Easily connects to any paging system
- Automatically mutes background music while ringing
- Ringer volume control
- Compact size
- Low current draw
- No maintenance

ACCESSORY (SOLD SEPARATELY) **PRSLSI** 24V DC Power Supply

Power Requirements	Dimensions	Product Weight
External 24V DC @ 25 mA, power supply *(not included)*	5-1/4" W x 3-1/4" H x 1-1/4" D	1 lb.

VOICE-ACTIVATED RELAY

Model **VAR1**

The VAR1 is a relay device that monitors audio activity over a wide range of input voltages and operates two sets of C-Form relay contacts in response to detected activity. The VAR1 can be used to detect voltages as low as signals directly from a microphone or as high as signals from 70V speaker systems. A low-level output of the detected audio, transformer-isolated from the input, is also available for use with other equipment. The VAR1 can also be used as a balanced, low-impedance MIC pre-amp.

PRODUCT FEATURES:

- Two sets of C-Form (both N.O. and N.C.) relay contacts respond to audio activity
- 4 levels of input signals: microphone, 600-ohm line, and 25V and 70V speaker systems
- Built-in balanced, low noise, high gain microphone pre-amp
- A transformer-isolated, 600-ohm small signal level output of detected audio available
- Works with self-amplified or central-amplified paging systems
- Separate microphone pre-amp gain control
- Adjustable release delay – 0.25s to 25s
- Trigger threshold adjustment
- Relay active indicator light

ACCESSORY (SOLD SEPARATELY) **PRS40C** 12V DC Power Supply

Power Requirements	Dimensions	Product Weight
External 12V to 24V DC @ 100 mA *(not included)*	5-3/8" W x 3-7/8" H x 1-3/8" D	1 lb.

ATTENUATORS

Attenuator Speaker Series
Models AT35A, AT10A, ATP35, ATP10

Both Attenuator Series (AT and ATP) allow the output level of a group of loudspeakers to be set from a wall-mounted volume control without affecting overall amplifier volume settings. The ATP-Series also has a priority bypass function that overrides the volume control knob to provide full volume audio to the speakers.

PRODUCT FEATURES:

- Adjusts loudspeaker output levels on 25V & 70V systems
- 2 models control up to 35-watt or 10-watt speaker systems
- Priority override of volume/Emergency Bypass feature (ATP models)
- 10 attenuation steps and an off setting
- Mounts in standard electrical box; single (AT10A, ATP10) or double (AT35A, ATP35)
- Simple connections

Model	Power Rating	Gang Box	Emergency Bypass	Dimensions*	Product Weight
AT10A	10 watts	Single		2-3/4" W x 4-1/2" H x 2-3/4" D	13 oz.
AT35A	35 watts	Dual		4-5/8" W x 4-5/8" H x 3" D	14 oz.
ATP10	10 watts	Single	●	2-3/4" W x 4-1/2" H x 2-5/8" D	13 oz.
ATP35	35 watts	Dual	●	4-5/8" W x 4-5/8" H x 3" D	14 oz.

*Depth from front of plate

DOOR PHONE

Analog Door Phone
Model ADP1

Bogen's ADP1 Door Phone provides convenient remote, hands-free, two-way communication between two locations. Durable, weather-resistant, stainless steel construction protects against vandals and varying weather conditions.

Shown with bezel frame

Shown without bezel frame

PRODUCT FEATURES:

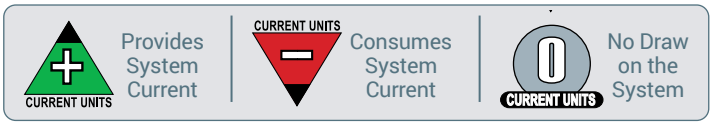
- Weather-resistant
- Vandal-resistant brushed stainless steel faceplate with mounting gasket and heavy-duty call button
- Suitable for indoor or outdoor station, door, or gate communication
- Push button initiates the call at remote location
- Connect directly to an analog PABX/KSU station programmed for ringdown operation
- Adjustable microphone and speaker volume
- Adjustable call timeout (15 seconds to 2 minutes)
- Call limit timer can be disabled
- Responds to CPC pulses
- Hands-free communications
- Auto-answer feature allows monitoring of remote location
- Powered by telephone line; no power supply needed
- Fits interior and exterior dual gang electrical boxes (user supplied)

Dimensions	Product Weight
5" W x 5" H x 1-7/8" D; 6-3/8" W x 6-3/8" H x 1-7/8" D *(with bezel frame)*	2 lb.

SELF-AMPLIFIED (24V) SYSTEMS

Bogen introduces the next generation in self-amplified (24V) paging equipment. Only Bogen offers high-efficiency horn speakers that use digital switching amplifiers and constant dispersion horn technology, single- and multi-zone telephone paging interfaces that provide a new level of features and flexibility with programmable AUX relay contacts and installer-programmable dialing codes, and an extensive line of 24V switching power supplies with secure mounting holsters and pluggable screw terminal connectors on models above 1 amp.

To locate **Bogen's Self-Amplified (24V) Paging Products**, simply look for the upward-pointing **GREEN** triangles and the downward-pointing **RED** triangles. The numbers inside the triangles indicate **Current Units**, which determine how much power that product provides to or consumes from the system.



Other products such as telephone interfaces, buffered level controls, and 24V power supplies that are well suited for use in self-amplified paging systems carry these same icons for easy identification. Suitable products that neither provide nor consume power are shown with the neutral **GRAY** icon with a zero inside it.

For more information on understanding **Current Units** for your system, see page 70.

Getting Started

1. **Select Your Self-Amplified Speaker Type**
   (Use this chart)
2. **Select a Telephone Interface**
   (pages 18 & 25
3. **Select Your Power Supplies**
   (pages 31-32)

SPEAKER MODELS →		ACD2X2, AMBS, ASM1, ASWB1, ASWG1, ASWG1DK *see charts on page 26*	SAH5, SAH5A *see chart on page 30*	SAH15, SAH30, AH15A *see charts on pages 28 & 30*
TYPICAL AMBIENT NOISE LEVEL	**TYPICAL ENVIRONMENTS**			
VERY HIGH NOISE **85-95 dB** Speech Almost Impossible To Hear	• Construction Site • Loud Machine Shop • Noisy Manufacturing • Printing Shop			
HIGH NOISE **75-85 dB** Speech Is Difficult To Hear	• Assembly Line • Crowded Transit Waiting Area • Machine/Print Shop • Shipping Warehouse • Supermarket (Peak) • Very Noisy Bar or Restaurant			
MEDIUM NOISE **65-75 dB** Must Raise Voice To Be Heard	• Bank/Public Area • Transit Waiting Area • Department Store • Noisy Office Setting • Supermarket (Normal) • Bar or Restaurant			
LOW NOISE **55-65 dB** Speech Is Easy To Hear	• Conversational Speech • Doctor's Office • Hospital • Hotel Lobby • Quiet Office • Quiet Bar or Restaurant			

SINGLE-/MULTI-ZONE TELEPHONE INTERFACE

Single-Zone Universal Telephone Interface

Model **UTI1**

+20 CURRENT UNITS

Bogen's UTI1 is a single-zone telephone interface that is compatible with all standard analog port types. A background music (BGM) input with variable muting coordinates music and page announcements. An additional audio output provides a "page only" function (no BGM) for application flexibility. A built-in 24V DC, 1A power supply is provided for powering amplified speakers. Paging volume controls are provided for each of the outputs. Contact-triggered tones and night ring signals, as well as programmable AUX relay contacts, are all programmed using DTMF tones through the dual-purpose override input.

PRODUCT FEATURES:

- Emergency override and general paging
- Interfaces to Loop Start, Ground Start, Analog Station, and Page Ports (with or without contact closure activation)
- Background music (BGM) input with level control and variable muting
- Separate Page and BGM and Page Only
- Level control for each output
- 24V DC, 1A power supply
- 150 Speaker T/R drive capacity per output
- Page level limiter with active indicator
- Override input (loop start or page port)
- Programmable timeout for station mode
- Tone burst (2 to 7 sec), chime, and slow whoop tone selections
- Microcontrolled-operated, DTMF-programmable
- Night ring tone or chime selection
- Programming through override jack
- Wall-mount design
- FCC Part 68 Registered
- Listed to UL Standard 60950 for U.S. and Canada

ACCESSORY
(SOLD SEPARATELY)

RPKUTI1
Security Cover & Rack Mount Kit
(sold as a set)

Power Requirements	Dimensions	Product Weight
120V AC, 0.5A	12-1/4" W X 5-1/4" H X 2-1/2" D (without rack mount kit)	5 lb.

Multi-Zone Universal Telephone Interface

Model **UTI312**

+20 CURRENT UNITS

Bogen's UTI312 is a multi-zone paging controller with universal telephone interface. It is expandable from 3 to 12 zones in 3-zone increments using ZX3 expansion modules. Each zone has its own buffered paging output (150 speaker drive capacity) with volume control, a C-form relay contact and "zone active" indicator. Each module includes a pluggable 24V DC power distribution terminal strip and pluggable terminal strips for each zone. A built-in 24V DC, 1A power supply is provided for powering amplified speakers. Two background music (BGM) inputs with volume controls provide each zone with a choice of BGM sources or no BGM. Two tone triggers are available as well as a 90V night ringer input. Separate volume controls for the night ring and tone triggers, along with an adjustable page level limiter, make it easy to set appropriate levels.

Powerful software features provide the UTI312 enormous flexibility for demanding applications. 2-, 3-, 4-, or 5-digit dialing plans allow the UTI312 to fit into any dialing structure. Twenty-four zone groups, zone groups for each tone input and night ring as well as a zone group for the override input, provide plenty of installer flexibility.

PRODUCT FEATURES:

- Expandable from 3 to 12 zones (in 3-zone increments using ZX3 modules)
- One-way paging only
- Interfaces to Loop Start, Ground Start, Analog Station, and Page Ports (with or without contact closure activation)
- 2 Background music (BGM) inputs
- BGM sources assignable per zone
- Level control for each zone output
- 150 Speaker T/R drive capacity per zone
- Programmable AUX Relay
- Override input (loop start or page port)
- Auto select paging zone group
- 2-, 3-, 4-, or 5-digit dialing plans
- Microcontroller operated, DTMF programmable
- Programmable trunk port timeout
- Responds to CPC disconnect signal
- Separate override, all-call, tone trigger, night ring, and code call zone groups
- Contact and 90V Night Ring inputs
- 24 User-assignable zone groups
- FCC Part 68 Registered
- Listed to UL Standard 60950 for U.S. and Canada

ACCESSORY
(SOLD SEPARATELY)

ZX3 Module
3-Zone Plug-In Expansion Module
(one included w/UTI312)

Power Requirements	Dimensions	Product Weight
120V AC, 0.75A	16-3/8" W x 3-1/2" H x 4-7/8" D *(without mounting flanges)* 19" W *(with mounting flanges)*	8 lb.

SELF-AMPLIFIED CEILING SPEAKERS

Drop-In Ceiling Speakers

Models ACD2X2, ACD2X2U

The ACD2X2 full-range speaker is quick and easy to install. Simply wire it and drop it into place. This saves installation time, effort, and cost.

Tile Support Rail Included

PRODUCT FEATURES:

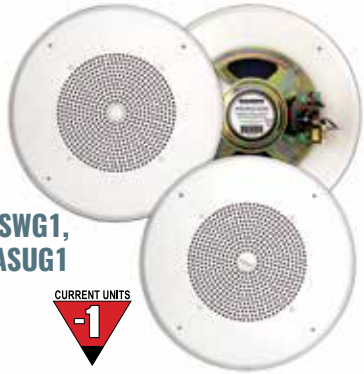
- 2' x 2' design fits into 2' x 2' and 2' x 4' suspended ceiling tile spaces (tile support rail included for 2' x 4' ceilings)
- Finely perforated grille covers entire front of speaker panel
- Fully enclosed, industrial-grade steel construction
- Front-mounted, recessed volume control
- Self-contained 1-watt amplifier
- 8" main cone speaker, with secondary cone
- Non-reflective finish, off-white (ACD2X2) or bright white (ACD2X2U)
- Listed to UL Standard 60065 for U.S. & Canada
- Complies with UL-2043

Dimensions:	23-7/8" W x 5" H x 23-7/8" D
Product Weight:	12 lb. each

Ceiling Speaker Assemblies

Models ASWG1, ASUG1, ASWG1DK, ASUGDK1

These traditional style, recessed ceiling speakers are available with a fixed or detachable volume control knob.



ASWG1, ASUG1

CURRENT UNITS -1

ASWG1DK, ASUG1DK (w/detachable volume knob)

PRODUCT FEATURES

- 8" cone speaker
- Front-mounted volume control with knob (Knob is detachable on "DK" versions)
- Steel grille with enamel finish, off-white ("W" versions) or bright white ("U" versions)
- Self-contained 1-watt amplifier
- 90° dispersion pattern

ACCESSORIES (SOLD SEPARATELY)

TB8	RE84	MR8
Tile Bridge	Ceiling Enclosure	Mounting Ring

Dimensions:	12-7/8" dia. x 3-1/4" D (without knob)
Product Weight:	2.5 lb. each

Determine Speaker Quantity

Using the chart:

1. **Locate the dimensions of the room (length and width).**
2. **Where these two measurements meet will be the number of speakers required. Use the number in GREEN for 8' ceilings, BLUE for 10' ceilings, and PURPLE for 12' ceilings.** *(You may need to increase the number of speakers in areas where large objects or shelving project into the coverage area, blocking sound.)*
3. **The number of Current Units needed is the same as the number of speakers (1W models, ACD2X2(U), ASWG1/DK, ASUG1/DK, ASM1, AMBSL/Q1).**

Current Units (min.) = Number of Ceiling Speakers

GREEN for 8 ft. Ceiling
BLUE for 10 ft. Ceiling
PURPLE for 12 ft. Ceiling

LOOK UP SHORTER DIMENSION OF AREA ON THIS SIDE	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
20	1 1 1	2 2 1	3 2 2	4 3 2	5 3 2	6 4 3	6 4 3	7 5 3	8 5 4	9 6 4	10 6 4	10 7 5	11 7 5	12 8 5	13 8 6	13 9 6	14 9 6	15 10 7	16 10 7
30	4 2 2	5 3 2	6 4 3	7 5 3	8 5 4	10 6 4	11 7 5	12 8 5	13 8 6	14 9 6	15 10 7	17 11 7	18 11 8	19 12 8	20 13 9	21 14 9	22 14 10	24 15 11	
40	6 4 3	8 5 4	9 6 4	11 7 5	13 8 6	14 9 6	16 10 7	17 11 8	19 12 8	20 13 9	22 14 10	24 15 11	25 16 11	27 17 12	28 18 13	30 19 13	31 20 14		
50	10 6 4	12 8 5	14 9 6	16 10 7	18 11 8	20 13 9	22 14 10	24 15 11	26 16 11	28 18 12	29 19 13	32 20 14	33 21 15	35 23 16	37 24 17	39 25 17			
60	14 9 6	17 11 7	19 12 8	21 14 9	24 15 11	26 17 12	28 18 13	31 20 14	33 21 15	35 23 16	38 24 17	40 26 18	42 27 19	45 29 20	47 30 21				
70	19 12 9	22 14 10	25 16 11	27 18 12	30 19 13	33 21 15	36 23 16	39 25 17	41 26 18	44 28 20	47 30 21	50 32 22	52 33 23	55 35 24					
80	25 16 11	28 18 13	31 20 14	35 22 15	38 24 17	41 26 18	44 28 20	47 30 21	50 32 22	54 34 24	56 36 25	60 38 27	63 40 28						
90	32 20 14	35 23 16	39 25 17	42 27 19	46 29 20	49 32 22	53 34 24	56 36 25	60 38 27	64 41 28	67 43 30	70 45 31							
100	39 25 17	43 28 19	47 30 21	51 33 23	55 35 24	59 38 26	62 40 28	67 43 30	71 45 31	74 47 33	78 50 35								
110	47 30 21	52 33 23	56 36 25	60 39 27	65 42 29	69 44 31	74 47 33	78 50 35	82 52 36	86 55 38									
120	56 36 25	61 39 27	66 42 29	70 45 31	75 48 33	80 51 36	85 54 38	90 57 40	94 60 42										
130	66 42 30	72 46 32	76 49 34	82 52 36	87 56 38	92 59 41	97 62 43	103 66 45											
140	77 49 34	82 53 37	88 56 39	93 60 41	99 63 44	105 67 46	110 70 49												
150	88 56 39	94 60 42	100 64 45	106 68 47	112 72 50	118 76 52													
160	100 64 45	107 68 47	114 72 50	120 76 53	125 80 56														
170	114 72 50	120 76 53	127 81 56	133 85 59															
180	128 81 56	134 88 60	142 90 63																
190	142 90 63	150 96 66																	
200	156 100 70																		

LOOK UP LONGER DIMENSION OF AREA ON THIS SIDE

SELF-AMPLIFIED CEILING/SURFACE-MOUNT SPEAKERS

Easy Install® Ceiling Speakers

Model ASM1

Bogen's Self-Amplified Easy Install Speakers can be installed in a ceiling tile in less than a minute in any drop ceiling with standard ceiling tiles. Installation is a simple, three-step process that requires no tools. Simply pierce the ceiling tile with the specially-designed studs, use wing nuts to secure the speaker to the ceiling, and fasten wire nuts to make the 24V DC power and audio connections.

ASM1

PRODUCT FEATURES:

- Installs in less than a minute
- No-tool installation eliminates need to cut ceiling tiles
- Built-in 1-watt amplifier
- Direct and reflected sound paths create wide dispersion angle
- Lightweight and durable, off-white plastic shell with paintable finish
- Contemporary, low-profile design
- O-ring seal prevents whistling and ensures smoother sound without peaks
- Front-mounted volume control
- Complies with NFPA National Code 160b for installation in plenums and other air handling spaces
- Complies with UL-2043

ACCESSORY (SOLD SEPARATELY) **SMTB** Tile Bridge

Frequency Response	Maximum dBspl	Depth	Dimensions	Product Weight
125 Hz - 15 kHz	90	3" from tile surface	9-1/2" diameter	2 lb.

Metal Box Speakers

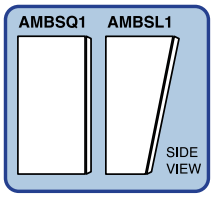
Models AMBSQ1, AMBSL1

Bogen's Self-Amplified Metal Box Speakers are available in two models, AMBSQ1 and AMBSL1, and are suitable for both ceiling and wall mounting.

PRODUCT FEATURES:

- Rugged all-steel, surface-mounted, off-white painted enclosure
- Speaker front is available flat (AMBSQ1) or angled downward by 12.5 degrees for wall mounting (AMBSL1)
- Full-range 8" cone loudspeaker for excellent intelligibility
- Built-in volume control with detachable knob
- Self-contained 1-watt amplifier
- Wiremold® knockouts
- Mounting hardware included

Wiremold® is a registered trademark of Wiremold/Legrand.



Models	Front Panel Design	Frequency Response	Maximum dBspl	Dimensions	Product Weight
AMBSL1	Slant/Angle	110 Hz -15 kHz	92	11-5/8" W x 11-3/8" H x 5-3/8" D (Top Dimension) 11-5/8" W x 11-3/8" H x 3-1/8" D (Bottom Dimension)	9 lb.
AMBSQ1	Square/Flat	110 Hz -15 kHz	92	11-5/8" W x 11-5/8" H x 4-1/4" D	9 lb.

Wall Baffle Speakers

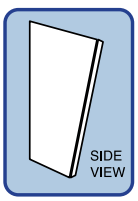
Model ASWB1

The ASWB1 Wall Baffle Speaker is an 8", cone-type loudspeaker, complete with a built-in amplifier and volume control, designed for telephone paging applications. It is engineered to provide excellent sound quality and trouble-free operation.

ASWB1

PRODUCT FEATURES:

- Self-contained 1-watt amplifier
- Simulated walnut finish, black grille cloth front
- Sloping front panel (13.5 degrees) provides enhanced downward dispersion
- Easy wall-mount installation (mounting hardware included)
- Built-in volume control
- 8" main cone speaker
- 90° dispersion pattern

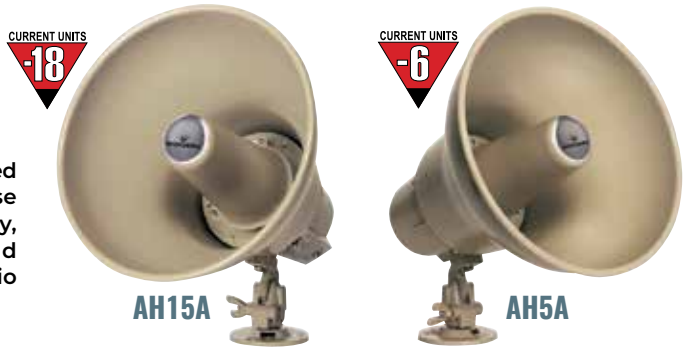


Dimensions:	9-1/2" W x 9-1/2" H x 5-1/4" D
Product Weight:	4 lb.

SELF-AMPLIFIED METAL HORN SPEAKERS

Traditional Metal Horn Speakers

Models AH15A (15W) , AH5A (5W)



The AH5A and AH15A Metal Horn Speakers are rugged, self-contained amplified paging horn assemblies that can be used for high noise paging areas indoors as well as for outdoor use. Their sturdy, weatherproof, all-metal construction allows them to withstand any environment while continuing to provide excellent audio intelligibility for paging and background music.

PRODUCT FEATURES:

- 5- and 15-watt models with built-in amplifiers
- Screwdriver-adjustable volume controls
- Universal tilt-and-swivel mount
- Banding slots secure horns to beams and pillars
- 4-conductor, color-coded cable for quick connections to audio and power sources
- Plastic cover protects volume control and provides cable strain relief
- Self-aligning, field-replaceable diaphragm
- Weatherproof, all-aluminum housing
- Speaker and brackets have textured mocha enamel finish
- 110° dispersion pattern

Dimensions	Product Weight
9" dia. x 9-1/4" "D	4 lb. each

ACCESSORIES (SOLD SEPARATELY)

BC1	TCSPT1	HSES10
Beam Clamp	Terminal Cover For Conduit	Horn Speaker Electrical Box Strap (Pack of 10)

Determine Speaker Quantity

Choose the chart below that corresponds to the speaker you will use (AH15A or AH5A):

1. Choose the level of ambient noise in the area to be covered.
2. Locate the area's square footage.
3. Where these two measurements meet are two numbers. The number in **GREEN** is the number of speakers required. The number in **RED** is the number of **Current Units** needed for that many speakers. (You may need to increase the number of speakers in areas where large objects or shelving project into the coverage area, blocking sound.)

Current Units (min.) = Number in RED

Model AH15A

HORN QTY. & MIN. CURRENT UNITS (CU) BASED ON AMBIENT NOISE		SIZE OF AREA TO BE COVERED (THOUSANDS OF SQUARE FEET)																				
		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
75–85 dB High Noise – speech is difficult	HORNS	1	2	3	4	5	5	6	7	8	9	10	10	11	12	13	14	15	15	16	17
	CU	18	36	54	72	90	90	108	126	144	162	180	180	198	216	234	252	270	270	288	306
85–95 dB Very High Noise – speech almost impossible	HORNS	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
	CU	36	72	108	144	180	216	252	288	324	360	396	432	468	504	540	576	612	648	684	720

Model AH5A

HORN QTY. & MIN. CURRENT UNITS (CU) BASED ON AMBIENT NOISE		SIZE OF AREA TO BE COVERED (THOUSANDS OF SQUARE FEET)																				
		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
55–65 dB Low Noise – speech is easy	HORNS	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10
	CU	6	6	12	12	18	18	24	24	30	30	36	36	42	42	48	48	54	54	60	60
65–75 dB Medium Noise – must raise voice to be heard	HORNS	1	2	3	4	5	5	6	7	8	9	10	10	11	12	13	14	15	15	16	17
	CU	6	12	18	24	30	30	36	42	48	54	60	60	66	72	78	84	90	90	96	102

Let Us Design Your System... *For FREE!!!*

BOGEN FREE DESIGN SERVICE

See Page 88 For Details

SELF-AMPLIFIED HORN SPEAKERS

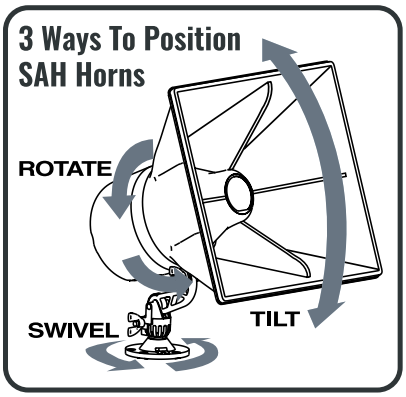
High-Efficiency, Digital Switching Horn Loudspeakers

Models SAH30 (30W) CURRENT UNITS -17, SAH15 (15W) CURRENT UNITS -9, SAH5 (5W) CURRENT UNITS -4

Using digital switching amplifier technology, these Self-Amplified Horn Loudspeakers provide unprecedented low DC current draw and heat dissipation, allowing them to use fewer power supplies, run on longer cable runs, and work at higher ambient temperatures than conventional analog self-amplified horn speakers. The shape of the horn's flare provides a controlled dispersion of sound for better intelligibility. The horn can be rotated on its axis, offering wide dispersion patterns vertically or horizontally, depending on its position. In addition, these weatherproof, plastic horns are extremely durable and rugged. They can be used in any environment, indoors or outdoors, without affecting sound quality.

PRODUCT FEATURES:

- 5-, 15-, and 30-watt models with built-in amplifiers
- All models operate from 24V DC power source
- Digital switching amplifier technology greatly reduces current consumption when compared to conventional analog self-amplified horn loudspeakers
- Low heat dissipation of the digital switching amplifier allows units to operate with continuous background music and in higher ambient temperatures than conventional analog amplifiers
- Excellent extended frequency response from 1.6'' diameter voice coil and 90 mm, 12-ounce magnet structure (SAH5/15), or 100mm, 16-ounce magnet structure (SAH30)
- Rotatable horn allows for the use of a wider (120°) vertical or horizontal dispersion pattern
- Predictable dispersion pattern over the full frequency range ensures excellent intelligibility and ease of layout
- Removable access cover protects terminals and volume control
- Weatherproof, UV-protected mocha finish plastic housing
- Simple, secure, cast aluminum swivel mount
- Screw terminal strip for easy wire connections
- Electrical box mounting strap included

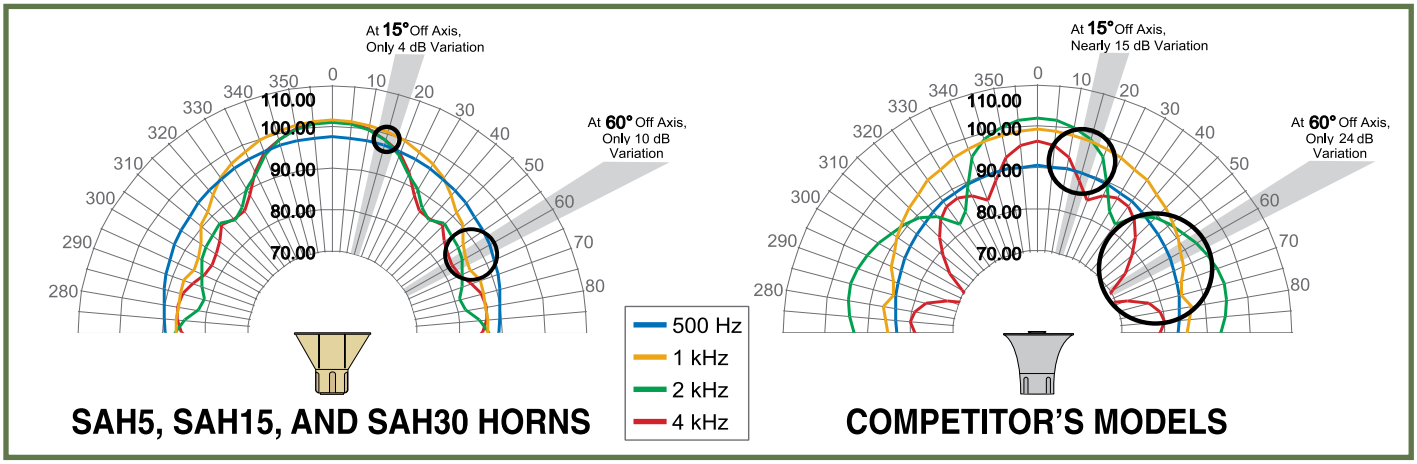


ACCESSORY (SOLD SEPARATELY) — **BC1** Beam Clamp

Models	Maximum Power Level	Frequency Response	Maximum dBspl	Dimensions	Product Weight
SAH5	5 watts	275 Hz -14 kHz	119	10-5/8" W x 12" H x 11-1/2" D	6 lb.
SAH15	15 watts		124		
SAH30	30 watts		127		

Controlled Dispersion

Many horns in the market disperse sound frequencies in a wild and uncontrolled manner. This reduces intelligibility and causes inconsistent sound quality over the horn's coverage angle. Bogen's SAH horns benefit from Bogen's long history as a commercial and pro audio company. Bogen's SAH horns disperse the various frequencies that make up the sound of a page in a very carefully controlled manner. This means that the listener hears clean, crisp intelligible pages over the full coverage area of the horn.



**4 kHz is a particularly important frequency for voice intelligibility*

SELF-AMPLIFIED HORN SPEAKERS

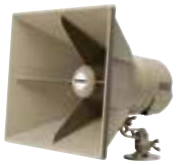
Determine Speaker Quantity

Choose the chart below that corresponds to the speaker you will use (SAH30, SAH15, or SAH5):

1. Choose the level of ambient noise in the area to be covered.
2. Locate the area's square footage.
3. Where these two measurements meet are two numbers. The number in **GREEN** is the number of speakers required. The number in **RED** is the number of **Current Units** needed for that many speakers. (You may need to increase the number of speakers in areas where large objects or shelving project into the coverage area, blocking sound.)

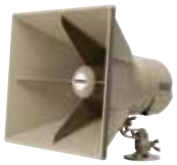
Current Units (min.) = Number in RED

Model SAH30



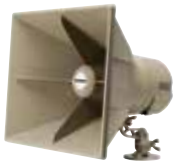
HORN QTY. & MIN. CURRENT UNITS (CU) BASED ON AMBIENT NOISE		SIZE OF AREA TO BE COVERED (THOUSANDS OF SQUARE FEET)																			
		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
85–95 dB Very High Noise – speech almost impossible	HORNS	1	2	3	4	6	7	8	9	10	11	12	13	14	16	17	18	19	20	21	22
	CU	17	34	51	68	102	119	136	153	170	187	204	221	238	272	289	306	323	340	357	374

Model SAH15



HORN QTY. & MIN. CURRENT UNITS (CU) BASED ON AMBIENT NOISE		SIZE OF AREA TO BE COVERED (THOUSANDS OF SQUARE FEET)																			
		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
75–85 dB High Noise – speech is difficult	HORNS	1	2	3	4	5	5	6	7	8	9	10	10	11	12	13	14	15	15	16	17
	CU	9	18	27	36	45	45	54	63	72	81	90	90	99	108	117	126	135	135	144	153
85–95 dB Very High Noise – speech almost impossible	HORNS	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
	CU	18	36	54	72	90	108	126	144	162	180	198	216	234	252	270	288	306	324	342	360

Model SAH5



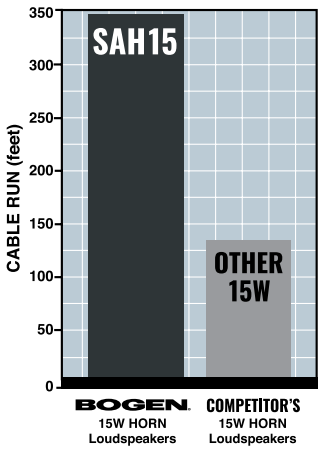
HORN QTY. & MIN. CURRENT UNITS (CU) BASED ON AMBIENT NOISE		SIZE OF AREA TO BE COVERED (THOUSANDS OF SQUARE FEET)																			
		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
55–65 dB Low Noise – speech is easy	HORNS	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10
	CU	4	4	8	8	12	12	16	16	20	20	24	24	28	28	32	32	36	36	40	40
65–75 dB Medium Noise – must raise voice to be heard	HORNS	1	2	3	4	5	5	6	7	8	9	10	10	11	12	13	14	15	15	16	17
	CU	4	8	12	16	20	20	24	28	32	36	40	40	44	48	52	56	60	60	64	68

Lower Currents = Lower Voltage Drops

Bogen's SAH self-amplified horn speakers consume significantly less current than equivalently sized conventional analog self-amplified horns. Lower current draw means less voltage drop and longer cable runs than those allowed by conventional analog self-amplified horns. This allows more flexibility as to where you mount your power supplies and how many individual power supplies need to be installed.

Voltage Drop Comparison

(1-Horn at end of cable – 24 ga.)

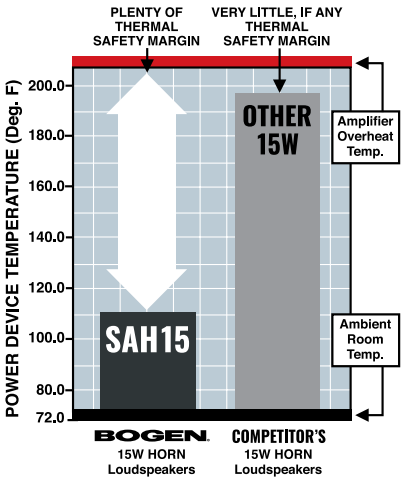


Thermally Rugged

By virtue of its high efficiency digital switching technology, the SAH self-amplified horn speaker's amplifier produces very little wasted heat. Lower amplifier operating temperatures mean these horns can work harder in higher temperature environments than conventional analog self-amplified horns. Lower operating temperatures also mean less stress on critical internal components and better reliability. Continuous background music is easy for these cool-running horns.

Temperature Comparison

(@ 1/3 Max. Power)



LEVEL CONTROLS

Buffer/Expander/Volume Level Control

Model **BUFEX**

Used with 24V systems, the BUFEX is a multi-purpose device that can work as a volume control for a network of speakers and as a buffer that can drive up to 150 speakers. It also functions as a system expander when connecting to 100V, 70V, and 25V speaker systems.

To address the needs of emergency announcements, the BUFEX has a Bypass feature that allows emergency announcements to be heard at high levels regardless of the volume setting on the BUFEX. The BUFEX contains a Bypass Trim feature that allows some adjustment to the Bypass level.

PRODUCT FEATURES:

- Local volume control for a group of speakers
- Provides buffering for up to 150 self-amplified speakers
- Allows self-amplified speakers to work with 100V/70V/25V systems, expanding existing systems
- Continuously variable attenuator
- Rugged and attractive stainless steel wall plate with engraved lettering
- Easy and secure terminal strip connections
- Jumper selectable 100V, 70V, or 25V speaker selections as well as T/R
- Bypass trim allows a max. 12 dB attenuation over bypass announcements
- Bypass feature overrides local volume setting for high importance messages
- Mounts in single gang wall box

Dimensions	Product Weight
2-7/8" W x 4-5/8" H x 2-1/2" D	3 oz.

Signal Level Control

Model **SLC**

The SLC provides a simple and cost effective way to remotely control the volume level of a network of up to 150 speakers. Simply wire in series with the audio feed to the desired group of amplified speakers. The SLC is designed for 24V systems.

PRODUCT FEATURES:

- Continuously variable attenuator
- Rugged and attractive stainless steel wall plate with engraved lettering
- Mounts in single gang wall box
- Easy and secure terminal strip connections
- Passive (requires no DC power)

Dimensions	Product Weight
2-7/8" W x 4-5/8" H x 2" D	2 oz.

24V POWER SUPPLIES

Switch-Mode and Linear

Models SPS2466, SPS2425, SPS2410, SPS2406, PRS2403R

SPS2466

SPS2425

SPS2406

PRS2403R

SPS2410

PRODUCT FEATURES:

- Specially designed for use with 24V Bogen equipment
- Wide range of current outputs
- UL and C-UL listed

Model	Ratings	Mounting	Connections	Dimensions	Product Weight
SPS2466	24V DC @ 6.6A	Holster	Pluggable Terminal Strip	2-7/8" W x 6-3/4" H x 1-5/8" D	2 lb.
SPS2425	24V DC @ 2.50A	Holster	Pluggable Terminal Strip	3" W x 5-3/4" H x 1-3/4" D	2 lb.
SPS2410	24V DC @ 1.00A	Holster	Pluggable Terminal Strip	2-1/2" W x 4-1/4" H x 1-1/4" D	2 lb.
SPS2406	24V DC @ 0.60A	Receptacle	Wires, Barrel-Type	2" W x 3-3/8" H x 1-1/4" D	2 lb.
PRS2403R	24V DC @ 0.30A	Plug-In	Wires, Barrel-Type	2-1/4" W x 3-1/4" H x 2" D	1 lb.

GENERAL POWER SUPPLIES

48V Regulated

Models PS4830W, PS4815W

PRODUCT FEATURES:

- Specially designed for use with 48V Bogen equipment
- UL and C-UL listed

PS4830W

PS4815W

Model	Output	120V AC Input Style	Output Connections	Dimensions	Product Weight
PS4830W	48V DC, 625 mA	Plug-in	Barrel Connector	4" x 1-5/8" x 1-1/4"	0.5 lb.
PS4815W	48V DC, 310 mA	Plug-in	Barrel Connector	2-7/8" x 2" x 1-1/8"	0.5 lb.

Low Voltage

Models PRS40C, PRS48, PCMPS2

These Power Supplies are designed to supply low voltage DC requirements. Corded or outlet mounted.

PRODUCT FEATURES:

- Specially designed for use with Bogen equipment
- Wide range of voltages and current outputs
- UL and C-UL listed

PRS48

PRS40C

PCMPS2

Model	Output	120V AC Input Style	Output Connections	Dimensions	Product Weight
PRS40C	12V DC @ 0.3A	Plug-in	Barrel Connector	2" W x 2-3/8" H x 1-5/8" D	1 lb.
PRS48	48V DC @ 0.1A	Plug-in	Screw Terminals	2-1/2" W x 3" H x 2" D	1 lb.
PCMPS2	12V DC @ 1.5A	Plug-in	Barrel Connector	2-1/4" W x 4" H x 1-3/8" D	1 lb.

MUSIC & PAGING SOURCE

6-Zone Music & Paging System
Model **DRZ120**

The DRZ120 is a unique, self-contained 6-zone music and paging system for small- to medium-sized applications. It combines a digital FM tuner/MP3 player with 7 MIC & LINE inputs. It has a 120-watt amplifier capable of driving 4-16 ohm or 70-volt speaker systems. The DRZ120 permits connection of up to six individual paging and music zones. The unit also features Bass and Treble controls and a 5-segment LED output signal level indicator. The built-in FM tuner uses a PLL synthesizer to provide accurate frequency selection. MP3 audio can be played from files (.mp3 & .wav) accessed via the USB or SD card slots on the front panel. The MIC1 Input can be set for VOX-activated override/muting of the other audio inputs. Also, there is a push-button activated Chime feature that produces a short, melodic series of four ascending bell-like alert tones which are played across all outputs.

PRODUCT FEATURES:

- Self-contained, 6-zone music and paging system with FM Tuner, MP3 Player, MIC, and LINE inputs
- 120-watt audio output (into 8-ohm)
- For use with 4-16 ohm or 70-volt systems
- Enable from 1-6 zones for music or paging
- 7 total audio inputs - MIC1-4, Line1-3
- MIC1 input uses a front 1/4" TRS connector for a balanced Lo-Z microphone
- MIC1 VOX-activated muting of all other audio inputs governed via a MUTE Control
- Built-in digital FM Tuner with PLL synthesizer provides accurate frequency selection
- Auto station search and manual tuning
- RCA inputs for LINE1-3
- 5-segment LED output level meter
- Back-lit tuner display, LCD
- FM 75Ω coaxial antenna connector
- Over 800 FM station presets
- Bass and Treble controls
- Chime button with priority output
- Infrared Remote Controller for FM tuner and MP3 player control:
  - *Volume control*
  - *TUNER/MP3 select button*
  - *Preset and scan channel selection*
  - *USB/SD media select*
  - *MP3 play/pause/forward/ backward/ repeat options*
  - *EQ mode selection (none, Classic, Jazz, Rock, Bass & Pop)*
- AUX post-mix LINE output
- Power-on LED indicator
- Rack-mountable with integral brackets
- Operates from nominal 120V AC, 60 Hz
- Listed to UL Standard 60065 for U.S. and Canada
- FCC Part 15 compliant

Power Requirements:	120V AC nominal @ 60Hz
Dimensions:	19-1/8" W x 3-1/2" H x 13-3/4" D
Product Weight:	25.2 lb.

INTERCOMS

Desktop Intercoms
Models **PI35A, SI35A**

PI35A

SI35A

The SI35A and PI35A High-Powered Desktop Control Centers are dual-channel intercom and program distribution systems for applications with numerous locations, requiring maximum intelligibility of voice announcements and other sources.

PRODUCT FEATURES:

- Communicate with multiple or remote locations (PI35A - 25 room max.; SI35A - up to 75 rooms
- Distribute program material from microphones, CD player/tuner, or other background sources
- 5 inputs: 2- MIC (1 built-in console mic), 1- AUX (Hi-Z) unbalanced, 1- TEL, 1-25V amplifier
- Built-in 20W intercom amp and 35W program amplifier permit instant communication with any location without interrupting the distribution of program to other locations

Power Requirements:	120V AC
Dimensions:	PI35A - 20-1/2" W x 8-1/2" H x 11" D SI35A - 20-1/2" W x 12" H x 11" D
Product Weight:	PI35A - 24 lb.; SI35A - 29 lb.

ACCESSORIES (SOLD SEPARATELY)

CA10A Call Switch, 2-Position	**CA11A** Call Privacy Switch, 2-Position	**CA17** Call-In Switch, Push Button	**DDU250** Desktop Paging Microphone	
CONNECTOR KITS **2518** – 18-Gauge **2520** – 20-Gauge **2522** – 22-Gauge	**SBA225** 25-Station Selector Panel for SI35A	**SCR25A** Call-In Module for SI35A	**TL156** Connection Kit Insertion Tool	**WMT1A** Line Matching Transformer

WIRELESS MICROPHONES

UHF PLL Single-Channel Diversity Wireless Microphone Systems

Models UHF8011BP, UHF8011HH

The UHF8011BP and UHF8011HH Wireless Microphone Systems offer users the freedom to move around while speaking. System choices consist of an 1,440-channel PLL single-channel UHF receiver coupled with either a body pack transmitter (UHF8011BP) with lavaliere microphone, or a wireless handheld microphone (UHF8011HH)

PRODUCT FEATURES:

UDR8011 Single-Channel UHF PLL Receiver

- Offers 1,440 user-selectable frequencies in UHF 470-960 MHz band; 120 dB dynamic range; operation up to 500 feet line-of-sight
- Antenna diversity for maximum range and dropout protection, LCD screen, 1/4" unbalanced and XLR balanced outputs, noiseless transmitter ON/OFF switching, and digital level control for output
- Half-rack receiver design with detachable, rear dual antennas, powered by wall power adapter (included)
- Base unit: 8" W x 1-5/8" H x 6-1/2" D; 1 lb.
- Detachable Antenna: 12" long (fully extended); 4 oz.

UHT8011 Wireless Handheld Microphone

- Sleek housing with internal antenna for optimum aesthetics and durable long life
- Unidirectional dynamic cartridge for optimum sound, maximum feedback rejection, and minimal handling noise
- Audio mute switch allows convenient audio muting while leaving the transmitter "ON"
- LED and LCD display
- Convenient, economical operation with AA alkaline or NiMH batteries (2x)
- 10-1/2" long x 2" dia.; 10 oz.

UHF8011BP

SYSTEM INCLUDES

UBP8011 Body Pack Transmitter
UDR8011 UHF PLL Receiver Base
BCLM1 Lavaliere Microphone

UHF8011HH

SYSTEM INCLUDES

UHT8011 Wireless Handheld Mic
UDR8011 UHF PLL Receiver Base

UBP8011 Body Pack Transmitter

- Audio mute switch allows convenient audio muting while leaving the transmitter "ON"
- LED and LCD display
- 4-Pin, Mini-XLR connection
- Convenient, economical operation with AA alkaline or NiMH batteries (2x)
- 2-1/4" W x 4" H x 1" D; 2.8 oz. (without batteries)
- **Lavaliere mic included ONLY as a part of the UHF8011BP packaged system -- it is NOT included with the UBP8011 accessory**

ACCESSORIES (SOLD SEPARATELY)

RPK900	UHFADS	UHFASA	UHFDCD	UHFHSMB	UHFUDA
Single/Dual Unit Rack Mount Kit	Antenna Distribution System	Antenna Signal Amplifier	Dual Charging Dock	Headset Mic (Black)	Unidirectional Antenna

UHFHSMB
5" W x 5-1/4" H x 6" D / 12 oz.

RPK900
19" W x 1-3/4" H x 4" D / 2 lb.

UHFASA
3" W x 3/4" H x 3" D / 2 lb.

UHFDCD
6-1/2" W x 3" H x 4" D / 4 lb.

UHFADS
19" W x 1-3/4" H x 10" D / 5 lb.

UHFUDA
14-1/4" W x 13-3/4" H x 1.5" D / 4 lb.

UHT8011 Handheld Microphone, UBP8011 Body Pack Transmitter, and UDR8011 UHF PLL Receiver Base all can be purchased separately as individual items/accessories. Lavaliere mic not included when purchased as an accessory

WIRED MICROPHONES

Handhelds

Model HDU250

Professional Handheld Stage Microphone

The HDU250 is a dynamic microphone that is ideal for acoustically demanding environments. It features a heavy zinc die cast case with a rigid, low noise cable-mount system and a lockable silent reed switch. ***7" D x 2" dia.; 13 oz.***

PRODUCT FEATURES:

- Cardioid pickup pattern
- High-output design with excellent gain before feedback
- High sound pressure capability without distortion
- 250-ohm low impedance
- Frequency response range of 50 Hz to 18 kHz
- Sensitivity of -72 dB +/- 3 dB
- Rubberized black finish; includes mic clip

Model HDU150

Handheld Stage Microphone

The HDU150 is an attractive, dynamic, all-purpose microphone ideally suited for a wide variety of vocal and sound reinforcement applications. ***6-1/2" D x 1-1/2" dia.; 13 oz.***

PRODUCT FEATURES:

- Cardioid pickup pattern
- Wide dynamic range with minimum feedback
- Lockable, silent on/off reed switch
- 500-ohm impedance
- Frequency response range of 70 Hz to 15 kHz
- Sensitivity of -70 dB +/- 3 dB
- Rubberized black finish; includes mic clip

Model HDO100

Handheld Public Address Microphone

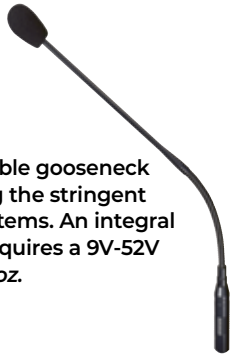
The HDO100 is an attractive, dynamic microphone perfectly suited for public address applications and instrument sound reproduction. ***6-1/2" D x 1-1/2" dia.; 13 oz.***

PRODUCT FEATURES:

- Omni-directional pickup pattern
- Low sensitivity to handling noise and stage vibrations
- Lockable, silent on/off reed switch
- 500-ohm impedance
- Frequency response range of 70 Hz to 15 kHz
- Sensitivity of -72 dB +/- 3 dB
- Rubberized black finish; includes mic clip

Goosenecks

Model GCU250



Condenser Gooseneck Microphone

The GCU250 is a high-performance, adjustable gooseneck condenser microphone capable of meeting the stringent demands of today's conference and PA systems. An integral XLR male connector mounting base and requires a 9V-52V DC phantom power source. ***18-1/2" Long; 4 oz.***

PRODUCT FEATURES:

- Cardioid pickup pattern
- Clean, accurate vocal reproduction with low ambient noise
- 250-ohm impedance
- Frequency response range of 50 Hz to 18 kHz
- Sensitivity of -65 dB +/- 3 dB
- Durable all-metal case with non-glare black finish
- 5-1/2" adjustable lower stalk, with 9-1/2" rigid upper section

Model GDU150

Dynamic Gooseneck Microphone

The GDU150 is a dynamic, gooseneck microphone that features a durable all-metal case with a non-glare black finish. It has a 10" long, fully flexible neck section with an integral XLR mounting base. ***16-3/4" Long; 11 oz.***

PRODUCT FEATURES:

- Cardioid pickup pattern
- High sound pressure capability and low sensitivity
- 500-ohm impedance
- Frequency response range of 100 Hz to 12 kHz
- Sensitivity of -75 dB +/- 3 dB
- Silent push-on/push-off talk switch on base
- Integral multi-layer breath/wind filter, ruggedly built

Model MGN19A

Industrial Gooseneck Microphone

The MGN19A is a dynamic, push-button activated microphone designed for all industrial and commercial public address and paging applications. ***23-1/2" Long; 1.25 lb.; 19" flexible neck w/mounting flange***

PRODUCT FEATURES:

- Omni-directional pickup pattern
- 400-ohm impedance
- Frequency response 50 Hz to 12 kHz, w/ 2 kHz boost
- Sensitivity of -76 dB +/- 3 dB
- Push-to-talk switch on mic housing
- Black-plated gooseneck with black plastic housing
- 4-conductor, 2-shielded cable included

WIRED MICROPHONES

Boundary

Model **SCU250**

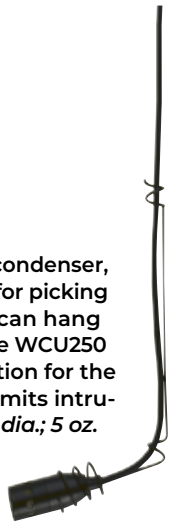
Professional Boundary Microphone

The SCU250 is an unobtrusive, surface-mount, boundary, condenser microphone ideal for meeting rooms, conferences, and stage productions where minimum visibility is ideal. It requires an external 9V to 52V DC phantom power supply. ***2-3/4" W x 3/4" H x 3-1/4" D; 11 oz.***

PRODUCT FEATURES:

- Cardioid pickup pattern
- Well suited for sound source and immediate surroundings
- Phantom power operated
- 250-ohm impedance
- Frequency response range of 20 Hz to 18 kHz
- Sensitivity of -58 dB +/- 3 dB
- Low-impedance balanced output
- Mounting keyways for hanging or for mounting surface
- Heavy-duty metal case; matte black finish
- 26-ft. long quad cable, attached

Overhead



Model **WCU250**

Professional Overhead Hanging Microphone

The overhead WCU250 is a back electret condenser, professional microphone perfectly suited for picking up audio from large groups. Because it can hang from the ceiling and is compact in size, the WCU250 is very useful in minimizing visual distraction for the performers and the audience alike and limits intrusion into the working space. ***1-1/4" D x 1/2" dia.; 5 oz.***

PRODUCT FEATURES:

- Cardioid pickup pattern
- Clear, crisp sound with outstanding ambient noise isolation
- Phantom power operated
- 250-ohm impedance
- Frequency response range of 50 Hz to 18 kHz
- Sensitivity of -65 dB +/- 3 dB
- Integrated metal hanger; matte black finish; 20-ft. cable
- Stainless steel, adjustable black hanger

Desktop

Model **DDU250**

Dynamic Desktop Microphone

The DDU250 is a high-quality, dynamic, gooseneck desktop microphone ideal for any PA system. The gooseneck permits the user to adjust the microphone's angle and height to suit the user's needs. ***4-1/4" W x 18-1/4" H x 6-1/4" D; 3.5 lb.***

PRODUCT FEATURES:

- Cardioid pickup pattern
- Push-to-lock and push-to-talk switches
- Effective feedback control
- 16" long, fully flexible gooseneck stalk
- 10-ft. cable with external contact closure outputs for talk switches
- 500-ohm impedance
- Frequency response 100 Hz to 12 kHz
- Sensitivity of -76 dB +/- 3 dB

ACCESSORIES
(SOLD SEPARATELY)

MC27
Microphone Clip
(for HD Handhelds)

SB6
Floor Boom Stand

XLR25
Microphone Cable

MAC
Microphone Cable

MSM
Shock-Isolated Microphone Base

MAC
25 feet long / 1 lb.

MSM
4-3/4" W x 1-3/4" H x 4" D / 6 oz.

XLR25
25 feet long / 12 oz.

SB6
34"–62" H adjustable, 30" boom arm / 6 lb.

MC27
1-3/4" W x 4-3/4" H x 2" D / 6 oz.

APOGEE™ Professional Loudspeakers

Models AMT-15, AMT-12

The Apogee AMT-15 and AMT-12 loudspeakers are designed to deliver high-output music and sound reinforcement in a sleek, cost-effective package

PRODUCT FEATURES:

- Molded polypropylene construction
- Heavy gauge steel grilles with powder-coated finish
- Large, high-sensitivity woofers
- Ferrofluid-cooled and damped, high-output titanium alloy compression drivers
- Up to 300W power handling capability for AMT-15; 200W for AMT-12
- Rich, dynamic bass response
- Top-side sockets to receive speaker feet for stacking
- Lightweight with integral carrying handle molded into speaker housing
- Two combo input connectors: 1/4" Phone and Speakon™
- Smooth, precise passive crossover

AMT-15

AMT-12

Model	Drivers	Frequency Response	Sensitivity	Dispersion	Impedance	Power Handling	Dimensions	Product Weight
AMT-15	15" Woofer; 45mm Compression Driver	50 Hz - 20 kHz	98 dB (1W @ 1m)	Horizontal: 65 degrees	8-ohm	300 watts	19" W x 27" H x 15" D	47 lb.
AMT-12	12" Woofer; 45mm Compression Driver	60 Hz - 20 kHz	96 dB (1W @ 1m)	Vertical: 65 degrees	8-ohm	200 watts	16-1/4" W x 23" H x 13" D	37 lb.

ACCESSORIES

(SOLD SEPARATELY)

See page 104 for rigging assemblies

Model AFI-2s2

The Apogee AFI-2s2, with its carefully arranged woofers, extends vertical pattern control down to 500 Hz, making it ideal for smaller spaces with poor acoustics. It is well suited for use as the main speaker in mid-sized houses of worship, auditoriums, and meeting rooms, yet with its 120dB max SPL, powerful enough for bars and small clubs.

PRODUCT FEATURES:

- Low frequency, dual 8" permanent magnet cone-type, moisture-resistant driver provides long-term stability of cone resonance/mass parameters
- Horn-loaded, thermally-cooled compression driver
- Highly durable, powder-coated on perforated steel, Textured high-strength black finish
- Enclosure Type: 10° trapezoidal, optimally-vented bass

AFI-2s2

Model	Frequency Response (1M on axis)	Sensitivity (1W @ 1M)	Dispersion	Max. Power Handling	Max. SPL (@ 1M)	Dimensions	Product Weight
AFI-2s2	66 Hz to 15.5 kHz +/- 3dB	96dB	Horizontal: 75 degrees Vertical: 60 degrees (rotatable)	225W Cont./ 900W Peak	120dB Cont./ 126dB Peak	Front: 9.7" Rear: 5.8" Depth 12.7"	36 lb.

APOGEE™ Fixed Installation Loudspeaker

Model AFI-4

The Apogee AFI-4 is a fully arrayable loudspeaker versatile enough for clubs, discos, churches, theaters, and theme parks. Much of this versatility comes from the available options that include a 60° x 45° or 90° x 45° horn as well as bi-amplification capabilities. These horns, as well as the logo plate, are rotatable to allow alternative hanging positions.

AFI-4

PRODUCT FEATURES:

- One 12" neodymium magnet cone-type driver is treated with a waterproofing compound, providing resistance to moisture, and enabling long-term stability of cone resonance and cone mass parameters; also treated with Ferrofluid® for greater power handling capability, lower distortion, and control of short-term impedance rise
- One 1.75" voice coil, 1" exit horn-loaded compression driver treated with Ferrofluid
- Fourteen rigging points, four each on top and bottom, two each on both sides and rear, all backed with 16-gauge steel
- 30° trapezoidal, optimally-vented bass enclosure type
- SX weather treatment for use in limited exposure enclosures
- Two handles – one top, one bottom – designed as an integral part of the enclosure (no moving parts)
- Cabinet Construction: Multi-ply hardwood with stainless steel fasteners
- Highly durable, perforated steel grille

Model	Frequency Response (1M on axis)	Sensitivity (1W @ 1M)	Dispersion	Max. Power Handling	Max. SPL (@ 1M)	Dimensions	Product Weight
AFI-4	58 Hz to 20 kHz +/- 3dB	99dB SPL/ 100 Hz to 4 kHz	Horizontal: 60 degrees Vertical: 45 degrees (rotatable)	300W Cont./ 1200W Peak	124dB Cont./ 130dB Peak	Front: 15.3" Rear: 9.9" Depth 12.1"	53 lb.

APOGEE™ Fixed Installation Loudspeaker

Model AFI-8

The Apogee AFI-8 is a fully arrayable loudspeaker capable of filling large churches, theaters, sports venues, and theme parks with clean, articulate full bandwidth sound. Available with a 60° x 40° or 90° x 40° high frequency horn pattern insuring that the AFI-8 works flawlessly in any room configuration. A bi-amplified version is also available.

AFI-8

PRODUCT FEATURES:

- One 12" neodymium magnet cone-type driver is treated with a waterproofing compound, providing resistance to moisture, and enabling long-term stability of cone resonance and cone mass parameters
- One 3" voice coil, 2" exit horn-loaded compression driver treated with Ferrofluid
- Fourteen rigging points, four each on top and bottom, two each on both sides and rear, all backed with 16-gauge steel
- 30° trapezoidal, optimally-vented bass enclosure type
- SX weather treatment for use in limited exposure enclosures
- Two handles – one top, one bottom – designed as an integral part of the enclosure (no moving parts)
- Cabinet Construction: Multi-ply hardwood with stainless steel fasteners
- Highly durable, perforated steel grille

Model	Frequency Response (1M on axis)	Sensitivity (1W @ 1M)	Dispersion	Max. Power Handling	Max. SPL (@ 1M)	Dimensions	Product Weight
AFI-8	46 Hz to 20 kHz +/- 3dB	99dB SPL/ 100 Hz to 4 kHz	Horizontal: 60 degrees Vertical: 40 degrees (rotatable)	400W Cont./ 1600W Peak	125dB Cont./ 130dB Peak	Front: 20.25" Rear: 13.3" Depth 15.1"	77 lb.

APOGEE™ Fixed Installation Loudspeaker

Model AFI-9

The Apogee AFI-9 is a fully arrayable loudspeaker capable of filling large churches, theaters, sports venues, and theme parks with clean, articulate full bandwidth sound. Available with a 60° x 40° mid/high-frequency horn, the point source MF/HF section blends seamlessly with the dual hornloaded low-frequency section, insuring that the AFI-9 works flawlessly in any room configuration.

AFI-9

PRODUCT FEATURES:

- Two 12" neodymium magnet cone-type, low-frequency drivers
- Two 6-1/2" permanent magnet cone-type, mid-frequency drivers
- One 4" voice coil, 2" exit hornloaded high-frequency compression driver
- Drivers are constructed of inherently waterproof compounds, highly resistant to moisture
- Six rigging points, three each on top and bottom, backed with 16- gauge steel plates
- 30° trapezoidal, optimally-vented bass enclosure type
- SX weather treatment for use in limited exposure enclosures
- Two handles – one top, one bottom – designed as an integral part of the enclosure (no moving parts)
- Cabinet Construction: Multi-ply hardwood with stainless steel fasteners
- Highly durable, perforated steel grille

Model	Frequency Response (1M on axis)	Sensitivity (1W @ 1M)	Dispersion	Max. Power Handling	Max. SPL (@ 1M)	Dimensions	Product Weight
ALA-9	55 Hz to 20 kHz +/- 3dB	104dB SPL/ 100 Hz to 4 kHz	Horizontal: 60 degrees Vertical: 40 degrees (rotatable)	600W Cont./ 2400W Peak	132dB Cont./ 138dB Peak	Front: 28.25" Rear: 15.39" Depth 24.95"	144 lb.

APOGEE™ Fixed Installation Subwoofer

Model AFI-118

The Apogee AFI-118 features a high power, long excursion, 18" cone driver capable of deep, rich, and extremely powerful bass. It works perfectly in combination with the AFI-8 or other AFI full-range speakers. The AFI-118 is superb for multi-media presentations, clubs, churches, discos, concert halls, and theaters.

AFI-118

PRODUCT FEATURES:

- One 18" permanent magnet cone-type driver is treated with a waterproofing compound, providing resistance to moisture, and enabling long-term stability of cone resonance and cone mass parameters
- Fourteen rigging points, four each on top and bottom, two each on both sides and rear, all backed with 16-gauge steel;
- Rectangular, optimally-vented bass enclosure type
- SX weather treatment for use in limited exposure enclosures
- Cabinet Construction: Multi-ply hardwood with stainless steel fasteners
- Highly durable, perforated steel grille

Model	Frequency Response (1M on axis)	Sensitivity (1W @ 1M)	Dispersion	Max. Power Handling	Max. SPL (@ 1M)	Dimensions	Product Weight
AFI-118	35 Hz to 70 kHz +/- 3dB	98dB SPL	Omni-directional	600W Cont./ 2400W Peak	126dB Cont./ 132dB Peak	21" W x 27" H x 27" D	97 lb.

NEAR® On/In-Ground Outdoor Speakers

Models IG8s2M, IG6s2M

NEAR® IG8s2M and IG6s2M all-environment speakers employ advanced technologies and superior materials to deliver truly high-fidelity sound to everyone on a patio or deck, at every volume level, without fatigue.

These NEAR speakers radiate sound evenly in a 360-degree pattern for more uniform coverage and better sound quality for every listener. Both the IG8s2M and IG6s2M utilize a Generation 2 MDT metal alloy woofer with dual voice coil UDIO technology along with patented Magnetic Liquid Suspension (MLS) technology. A Titanium alloy tweeter supplies smooth, detailed "air" and life to the music. The result is exceptional sound quality that rivals audiophile-grade indoor speaker systems.

Truly weatherproof, not just "weather-resistant," they can be installed totally exposed to the elements. The Mulch Brown-colored enclosure is a color-through polymer that sheds moisture, dirt and chemicals.

PRODUCT FEATURES:

- Purpose-built for all-weather durability
- Stylish design provides functional rigidity and extra security when buried
- Generation 2 anodized metal alloy speaker cones (MDT) maintain specified performance over a broad range of temperatures (-20 to +160 degrees F; -29 - +71 C)
- UDIO (upside down/inside outside) driver employs inverted diaphragm driven by dual-layer voice coils for extremely accurate linearity
- Heavy-gauge epoxy-coated stainless steel grille withstands the rigors of outdoor living
- MLS spiderless motor uses specially developed Ferrofluid to center the voice coil and eliminates the distortion generated by spiders
- Sealed magnet gap locks out moisture and debris
- 1" coincident mounted tweeter with a 8" (IG8s2m) and 6.5" (IG6s2M) woofer positioned for optimum dispersion
- Advanced polymer cone surrounds resist UV rays, chlorine, fertilizer and salt spray
- 70V multi-tap transformer standard for 70V operation (can be by-passed for 8-ohm systems)
- Color: Mulch Brown enclosure with matching grille

ACCESSORY
(SOLD SEPARATELY)
IE1
Direct Burial
Junction Box

Model	Frequency Response	Sensitivity	Dispersion	Power Req. (@8-ohms)	Power Req. (@70V)	Max. SPL @ 1M (1/2 space)	Dimensions	Product Weight
IG6s2M	45 Hz - 17.5 kHz (+/- 2.5dB)	87dB	360 degrees	up to 150W	64W, 32W, 16W, 8W, 4W	108dB	16" dia. base x 17.75" H	16.5 lb.
IG8s2M	38 Hz - 17.5 kHz (+/- 2.5dB)	89dB	360 degrees	up to 150W	128W, 64W, 32W, 16W, 8W	110dB	19.25" dia. base x 17.75" H	19.5 lb.

NEAR® On/In-Ground Outdoor Satellite Speaker

Model IG4M

The NEAR IG4M is a broad area coverage, high-performance "satellite" speakers thoughtfully designed with double Perfect Fit connectors, 70V/16- ohm operation, and included ground stake make them easy to install. With its advanced NEAR audio technologies, such as ultra low mass Metal Diaphragm Technology (MDT™) cones and Magnetic Liquid Suspension (MLS™) "spiderless" voice coil guidance and low-resonance enclosures, the IG4M provides an exceptional level of performance unmatched by competitive products in its class.

PRODUCT FEATURES:

- On-ground or in-ground stake mounting option (ground stakes supplied)
- Built-in multi-tap 70V transformer with rotary switch selections for 64W, 32W, and 16W, including 16-ohm bypass
- Anodized metal alloy speaker cones (MDT) maintain specified performance over a broad range of temperatures for consistent high quality in every season
- Durable powder-coated aluminum grille
- Rectangular grille perforations prevent clogging
- Water and dust-proof (IP67) input connectors eliminate long term connection problems
- Color: Mulch Brown enclosure

ACCESSORY
(SOLD SEPARATELY)
IE1
Direct Burial
Junction Box

Frequency Response	Sensitivity	Dispersion	Power Requirements	Max. SPL @ 1M (1/2 space)	Dimensions	Product Weight
70 Hz - 19 kHz (+/- 3dB)	86dB	Min. 120 degrees	70V w/selectable 64-, 32-, & 16-watts power; 16-ohm bypass up to 75W	108dB	7.75" dia. base x 19.5" H*	8 lb.

**With Mount Stake added*

NEAR® On/In-Ground Outdoor Subwoofers

Models IGS212M, IGS12M

The NEAR IGS212M and IGS12M all-environment, full-range subwoofers deliver unparalleled low-frequency performance via groundbreaking engineering and design. The IGS212M offers dual 12-inch metal diaphragm woofers and the IGS12M a single woofer, along with legendary MDT and MLS technologies. These powerful subwoofers are mated with an innovative enclosure design roto-molded using NEAR exclusive LLDP (Linear Low-Density Polyethylene) to create the toughest and most beautifully versatile outdoor subwoofer available, at any price. Their ultra- rugged design is tough as nails and weatherproof, yet attractive enough to install "free standing" and their conical design provides functional rigidity and extra security when buried.

PRODUCT FEATURES:

- Purpose-built to be extremely durable in all weather conditions, mounted in-ground.
- Dual (IGS212M) and single (IGS12M) 12" metal diaphragm woofers
- Anodized MDT is extremely stable in all environments.
- UDIO driver employs inverted cone diaphragm driven by voice coils wound both inside and outside the aluminum former for extremely accurate linearity
- Signal connection is via pre-terminated burial grade cable exiting the bottom of the enclosure.
- MLS "spiderless" motor design uses specially developed Ferrofluid to center the woofer voice coil and eliminates the distortion generated by traditional fabric spiders.
- Sealed magnet gap eliminates corrosion near voice coil.
- Color-through enclosure is acoustically inert and stands tough under abuse in extreme conditions.
- Advanced polymer diaphragm surround
- Color: Mulch Brown (IGS212M)

ACCESSORY
(SOLD SEPARATELY)
IE1
Direct Burial
Junction Box

Model	Frequency Response	Sensitivity	Dispersion	Power Req.	Power Req.	Diaphragms	Dimensions	Product Weight
IGS212M	28 Hz - 90 Hz (+/- 3dB)	94dB	360 degrees	up to 500W (@ 4-ohms)	64W, 32W, 16W, 8W, 4W	Two (2) 12" Metal Alloy	23.5" dia. base x 24" H	55 lb.
IGS12M	35 Hz - 100 Hz (+/- 3dB)	91dB		up to 300W	128W, 64W, 32W, 16W, 8W	One (1) 12" Metal Alloy		45 lb.

NEAR® On/In-Ground Outdoor Subwoofer

Model IGS100M

The NEAR IGS100M subwoofer delivers exceptional low-frequency performance via ground-breaking engineering. The subwoofer's Proprietary Metal Diaphragm Technology (MDT™) cones and Magnetic Liquid Suspension (MLS™) technologies have been continuously advanced, and coupled with Upside Down/Inside Out (UDIO) woofer technology and new bass vent tuning, its NEAR woofer performance has reached a new pinnacle in the 10-inch woofer class. This powerful woofer technology is mated with an innovative enclosure design roto-molded using Linear Low-Density Polyethylene (LLDP) enclosure material to create a toughest and high performing 10-inch outdoor subwoofer.

PRODUCT FEATURES:

- On-ground or in-ground mounting option
- Weather-proof materials and construction
- Linear Low-Density Polyethylene (LLDP) color-through enclosure
- Signal connection via pre-terminated burial-grade cable
- Anodized metal alloy speaker cone is extremely stable in all environments
- UDIO dome driver driven by dual voice coils
- MLS ferro-magnetic fluid suspension for lower distortion and higher output
- Sealed magnet gap eliminates corrosion
- Color: Mulch Brown enclosure

ACCESSORY
(SOLD SEPARATELY)
IE1
Direct Burial
Junction Box

Frequency Response	Sensitivity	Dispersion	Power Requirements	Max. SPL @ 1M (1/2 space)	Dimensions	Product Weight
35 Hz - 100 Hz (+/- 3dB)	91dB	360 degrees	Up to 300 Watts (@ 8-ohms)	115dB	19.5" dia. base x 17.5" H*	36 lb.

NEAR® Outdoor Loudpeakers

Models LB8/T, LB6/T, LB5/T

NEAR's LB-Series (LB8, LB6, and LB5) loudspeaker models deliver high-fidelity performance in even the most extreme environments. Superior materials such as rust proof hardware and UV resistant enclosures make them ultra-durable. Advanced NEAR audio technologies such as Magnetic Liquid Suspension (MLS) drivers and Metal Diaphragm Technology (MDT) cones imbue the LB speakers with the smooth, highly detailed, and lifelike sonic performance of fine indoor speakers.

The LB-Series loudspeakers employ an exclusive "lever bracket" mount combined with a perfect-fit, totally waterproof input connector. This innovative mounting system helps to simplify the speaker's installation.

PRODUCT FEATURES:

- Purpose-built for all-weather durability
- Anodized metal-alloy speaker cones (MDT) are extremely stable
- Coincident driver configuration for symmetrical dispersion in any orientation
- Waterproof (IP68) input connector (included) eliminates long-term connection problems
- MLS Ferrofluid voice coil centering system
- Dual-layer voice coil with inside and outside windings for ultra-low distortion
- 70V transformer versions (T) available
- Heavy-gauge, powder-coated stainless steel mounting bracket with unique (patent-pending) cast aluminum lever-mount clamp
- Mineral-filled polypropylene cabinet for durability and rigidity
- Colors: Black (B) and White (W) enclosures (paintable)

2 COLOR CHOICES*

BLACK WHITE

*Actual color may vary from catalog colors.

Model	Frequency Response	Sensitivity	Dispersion	Power Req. (@8-ohms)	Power Req. (@70V)	Max. SPL @ 1M (1/2 space)	Dimensions	Product Weight
LB8/T	45 Hz - 19 kHz (+/- 2.5dB)	90dB	Min.120 degrees (Horiz. & Vert.)	up to 175W; 700W peak	64W, 32W, 16W, 8W, 4W, or 8-ohm (T)	113dB	10.25" W x 17.875" H x 11.75" D	16 lb./ 18 lb. (T)
LB6/T	48 Hz - 19 kHz (+/- 2.5dB)	88dB	Min.120 degrees (Horiz. & Vert.)	up to 150W; 600W peak	64W, 32W, 16W, 8W, 4W, or 8-ohm (T)	110dB	8.5" W x 15.75" H x 8.9" D	11 lb./ 12 lb. (T)
LB5/T	55 Hz - 19 kHz (+/- 2.5dB)	87dB	Min.120 degrees (Horiz. & Vert.)	up to 75W; 300W peak	32W, 15W, 8W, 4W, 2W, or 8-ohm (T)	106dB	7.125" W x 13.875" H x 7.75" D	7 lb./ 8 lb. (T)

NEAR® Outdoor Loudpeaker

Model LB4TM

The NEAR LB4TM loudspeaker is elegantly designed, rugged to the extreme, and a snap to install. In fact, it offers two mounting methods: our Signature (Ball & Socket) wall-mount bracket, and the very handy stake mounting accessory for installation in gardens and around other outdoor entertainment areas. The LB4TM utilizes metal-alloy speaker cones and dense-packed mica-filled polypropylene enclosures. The LB4TM is also extremely versatile and allows for multiple mounting configurations.

Shown with GS4 Ground Stake (sold separately)

ACCESSORIES (SOLD SEPARATELY)

GS4 Ground Stake

IE1 Direct Burial Junction Box

PRODUCT FEATURES:

- Purpose-built to be durable in all weather conditions
- Anodized metal-alloy speaker cones (MDT) are extremely stable
- Waterproof (IP67) input connector (included) eliminates long-term connection problems
- MLS Ferrofluid voice coil centering system
- Fluid-sealed gap eliminates corrosion in magnet
- Dual-layer voice coil with inside/outside windings for ultra-low distortion
- Mineral-filled polypropylene cabinet for durability and rigidity
- Mounting options: ball-and-socket bracket for easy-mount (included) or Ground Stake (sold separately)
- Color: Mulch Brown enclosure

Frequency Response	Sensitivity	Dispersion	Power Requirements	Max. SPL @ 1M (1/2 space)	Dimensions	Product Weight
75 Hz - 19 kHz (+/- 3dB)	86dB	Min. 120 degrees	Up to 75W (average) 300W peak	105dB	5.5" W x 10.25" H x 6.3" D	4.5 lb.

NEARSCAPES™ Outdoor Satellite/Subwoofer System

System Model IG44.1DSP

The NEAR NEARSCAPES IG44.1DSP system is a great way to deliver unobtrusive, super high -performance sound into outdoor living spaces. This bollard style "satellite/subwoofer" system boasts high clarity at any volume, deep articulate bass, and ultra-low distortion for areas up to 3000 sq. ft.

The 120-degree wide dispersion of the four (4) IG4M satellites means fewer speakers are needed to cover an area with high-clarity sound than using competing systems with 60-degree dispersion; every listener in the coverage area will hear full-performance sound without overly loud "hot" and low-fidelity "dead" zones. These can be either on-ground mounted or installed partially buried for lower visibility and greater security.

The IGS100M in-ground subwoofer features dual voice coil windings, allowing them to be wired with either one (mono) or two-channel (stereo) signals, and can be employed free-standing or in-ground for minimum visibility and maximum bass performance.

For the ultimate in outdoor audio performance, the system includes the awesome NQ-A2120-G2 2-channel amplifier. It belts out 240 watts of total power efficiently and reliably– more than enough to power the IG44.1 speaker system to robust volume levels.

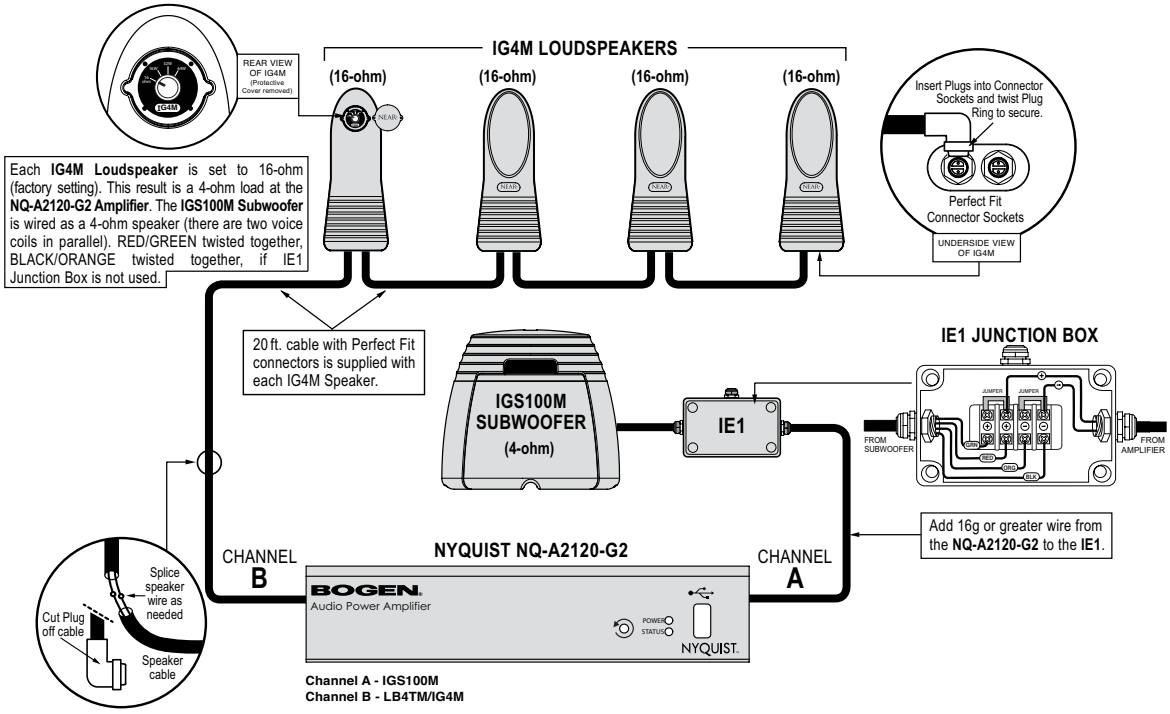
SYSTEM EQUIPMENT LIST:

- One (1) NQ-A2120-G2 2-channel power amplifier with digital signal processing
- Four (4) IG4M bollard-style satellite speakers
- One (1) IGS100M subwoofer
- One (1) IE1 direct burial junction box
- Four (4) 20-ft burial-grade speaker wires pre-terminated with Perfect Fit IP-67-rated screw-in connectors for fast, secure wiring

NEARSCAPES IG44.1DSP

Mid/woofer Dia.	4.5"
Tweeter Dia.	1"
Satellite Cone Material	Heat Tolerant Metal Alloy
Dispersion	Wide - 120°
Satellite Input	Low Impedance 16 Ohms with built-in 70V Multi-wattage Power Taps
Subwoofer Cone Dia.	10"
Subwoofer Cone Material	Heat Tolerant Metal Alloy
Subwoofer Input	Low Impedance 16 Ohms with built-in 70V Dual-wattage Power Taps

NEARSCAPES IG44.1DSP - QUICK START WIRING CONNECT GUIDE



NEARSCAPES™ Outdoor Satellite/Subwoofer System

System Model NEARSCAPES 4.1DSP

The NEAR NEARSCAPES 4.1DSP system provides exceptional high-performance sound into any outdoor area. This flexible "satellite/subwoofer" system including 120-watts per channel power amp boasts high clarity at any volume, deep articulate bass, and ultra-low distortion for areas up to 2400 sq. ft.

The wide dispersion of four (4) LB4TM satellite speakers means fewer speakers are needed to cover an area with high-clarity sound. The LB4TM's wide dispersion design and high-tech components ensure that everyone on the deck or patio hears well-balanced, lifelike sound at every volume level without fatigue.

The IGS100M in-ground subwoofer's 10-inch driver is loaded into a bandpass enclosure – delivering quality bass to outdoor installs. This results in superior sound quality that rivals audiophile-grade indoor loudspeaker systems.

Also included is the A2120-G2 2-channel power amplifier, which provides 120-watts per channel efficiently and reliably – more than enough to power the IG44.1 speaker system.

SYSTEM EQUIPMENT LIST:

- Four (4) LB4TM satellite speakers, dark brown mulch color, with surface mount brackets
- Four (4) GS4 ground stakes, dark brown mulch color
- One (1) IGS100M, dark brown mulch color
- One (1) NQ-A2120-G2 power amplifier

NEARSCAPES 4.1DSP

Mid/woofer Dia.	4.5"
Tweeter Dia.	1"
Satellite Cone Material	Heat Tolerant Metal Alloy
Dispersion	Wide - 120°
Satellite Input	Low Impedance 16 Ohms with built-in 70V Multi-wattage Power Taps
Subwoofer Cone Dia.	10"
Subwoofer Cone Material	Heat Tolerant Metal Alloy
Subwoofer Input	Low Impedance 16 Ohms with built-in 70V Dual-wattage Power Taps

NEARSCAPES™ Outdoor Satellite/Subwoofer System

System Model NEARSCAPES 4.1

NEAR's NEARSCAPES 4.1 system combines the rugged durability of commercial components with the sound performance of indoor audiophile-grade speakers. A system of four (4) LB4TM satellites and a single IGS10M subwoofer evenly covers a 60' x 40' (2400 sq. ft.) area with smooth, high-definition, lifelike music. These durable speakers can be mounted either on-ground with the supplied ground stakes or partially buried in-ground for lower visibility and greater security.

The IGS100M in-ground subwoofer features dual voice coil windings, allowing them to be wired with either one (mono) or two-channel (stereo) signals, and can be employed free-standing or in-ground for minimum visibility and maximum bass performance.

SYSTEM EQUIPMENT LIST:

- Four (4) LB4TM satellite-style speakers
- Four (4) color-matched ground stakes
- One (1) IGS100M subwoofer
- Each LB4TM includes a 20-INCH input cable with the Perfect Fit connector

NEARSCAPES 4.1

Mid/woofer Dia.	4.5"
Tweeter Dia.	1"
Satellite Cone Material	Heat Tolerant Metal Alloy
Dispersion	Wide - 120°
Satellite Input	Low Impedance 16 Ohms with built-in 70V Multi-wattage Power Taps
Subwoofer Cone Dia.	10"
Subwoofer Cone Material	Heat Tolerant Metal Alloy
Subwoofer Input	Low Impedance 16 Ohms with built-in 70V Dual-wattage Power Taps

ALL-WEATHER SPEAKERS

A-SERIES Loudspeakers

Models A8TB/W, A6TB/W, A2TB/W

A-Series Loudspeakers set the standard for smooth, accurate sound, attractive appearance, constant and reliable high performance, and rugged construction. Metal Diaphragm Technology (MDT) ensures speaker cone stability in all environmental conditions. Magnetic Liquid Suspension (MLS) is a Ferrofluid seal around the magnet gap and voice coil that provides protection from moisture and corrosion, as well as perfect voice coil alignment.

A8TB/W

A6TB/W A2TB/W

PRODUCT FEATURES:

- Reduced distortion at all output levels
- Unsurpassed sound quality
- Completely weatherproof, fully-sealed cabinet for indoor and outdoor applications
- Withstands harsh weather conditions including sun, wind, rain, freezing temperatures, ice, and snow
- Corrosion-resistant mounting hardware
- Dual-layer aluminum voice coils, combined with Ferrofluid, provide efficient heat-sinking under long-term, high power situations

2 COLOR CHOICES*

BLACK WHITE

*Actual color may vary from these catalog colors.

ACCESSORIES (SOLD SEPARATELY)

ASTB4 Terminal Block Protective Cover

TMA812 Tilt Mount Adapter *(for A8T model only)*

A-SERIES High-Output, Long Throw Loudspeaker

Model A12

The A12 High-Output, Long-Throw Loudspeaker provides deep, rich bass and smooth highs. A high-powered speaker that projects well in "far-field" applications as well as in more intimate settings. A built-in transformer means one speaker will work with 70V or 16-ohm systems. Dual metal-alloy mid/bass drivers and a Mylar high-frequency compression driver combine to minimize distortion and provide precise sound reproduction at any volume level.

A12

PRODUCT FEATURES:

- Dual 6-1/2'' LF driver with horn-loaded HF driver
- Dual metal-alloy MDT™ mid/bass speaker cones are extremely stable in all environments
- MLS™ Ferrofluid voice coil suspension replaces distortion-causing mechanical spider
- Rigid MDT diaphragm design delivers clear sound & low distortion
- Dual-layer voice coil with separate inner and outer windings for improved thermal path
- Horn-loaded compression driver features Mylar diaphragm for long-term, consistent performance
- Vented cabinet with specially-designed vent covers that resist water entry
- Improved compound rubber surrounds resist UV rays, chemicals, and salt spray
- Gold-plated, rustproof input connectors
- Optional multi-angle tilting bracket for pole/wall mounting

BLACK ONLY

Actual color may vary from this catalog color.

ACCESSORY (SOLD SEPARATELY)

TMA812 Tilt Mount Adapter

Model*	Frequency Response	Sensitivity (1W@1m)	Dispersion	Impedance	Power Handling	Design Type	Dimensions	Product Weight
A2T*	55 Hz-20 kHz	88 dBspl	Horiz. 80˚; Vert. 80˚	70V	16 watts (16W, 8W, 4W tap settings)	Coaxial	9" W x 8" dia. x 8-1/4" D (with bracket)	10 lb.
A6T*	50 Hz-20 kHz	89 dBspl	Horiz. 110˚; Vert. 45˚up/35˚down	70V	32 watts (32W, 16W, 8W tap settings)	2-way	13-7/8" W x 7-1/8" H x 7-3/4" D (with bracket)	12 lb.
A8T*	45 Hz-20 kHz	91 dBspl	Horiz. 100˚; Vert. 35˚up/45˚down	70V	64 watts (64W, 32W, 16W tap settings)	2-way	17-7/8" W x 10-1/4" H x 10" D (with bracket)	20 lb.
A12	55 Hz-17.5 kHz	94.5 dBspl	Horiz. 90˚; Vert. 45˚	16-ohm/70V	225W at 16-ohm, 128W at 70V (128W, 64W, 32W, 16W, 8W tap settings)	2-way, 3-Driver	10-1/4" W x 17-7/8" H x 11-3/4" D	22 lb.

** Model Colors specified by adding suffix to Model number: B for black, W for white (A6TB or A6TW)*

ORBIT SERIES SPEAKERS

ORBIT OPS1 Pendant Ceiling Speakers

Models OPS1B, OPS1W

Orbit Pendant Speakers provide an ideal sound solution for open space environments that require clear, quality sound evenly distributed throughout the area. These speakers offer a pleasing industrial design and mount from above.

PRODUCT FEATURES:

- Specially designed to provide full-range bass in open space environments
- Easy-to-use cable suspension system includes three suspension cables with attached forged eyebolts
- Large cabinet volume and computer-matched venting system for superior bass output
- Snap-lock input connector for easy wiring to drop cables
- Low-resonance cabinet structure
- Threaded brass insert point for optional safety cable eyebolt
- Color-matched suspension cables and hardware
- Powder-coated, perforated sturdy steel grille
- Available in both dark gray and white textured, paintable finish

ACCESSORIES (SOLD SEPARATELY)

CK10	CK10B	CK10W
Cable Kit; Silver	Cable Kit; Black	Cable Kit; White

2 COLOR CHOICES*

DARK GRAY | WHITE

*Actual color may vary from these catalog colors.

PRODUCT FEATURES FOR BOTH OPS1 & OCS1 MODELS:

- 140-degree wide-dispersion coaxial driver for broad, even coverage
- Stable, high-definition metal-alloy woofer cone
- 6-1/2" MDT metal-alloy cone delivers detailed sound; 3/4" polycarbonate tweeter
- MLS voice coil centering system
- Sensitivity: 89.5 dBspl
- Extremely good off-axis response
- For 16-ohm, 70V, and 100V systems
- Frequency response: 45 Hz to 19 kHz
- Fire-rated (UL 94V0) ABS baffle
- High-efficiency drivers deliver superior performance
- Connector provides loop-through to the next speaker
- Listed to UL Standard 60065 for U.S. and Canada

Impedance	Power Handling	Dimensions	Product Weight
16 ohms	100W	OCS1 12-3/8" dia. x 12" D OPS1 14" dia. x 9-1/4" D	10 lb.
70V	32, 16, 8, 4, 2, & 1 W taps		
100V	32, 16, 8, 4, & 2 W taps		

ORBIT OCS1 Ceiling Speakers

Models OCS1B, OCS1W

Orbit Ceiling Speakers are the ideal choice for installations where the quality of music and vocal reinforcement are both crucial.

PRODUCT FEATURES:

- Computer-matched venting system and large back can provide exceptionally full bass output
- Easy wiring with snap-on connector
- Front-mounted tap selector under grille
- Attachment point for seismic (safety) cable
- Input terminal cover knockouts provide protection for connections
- Heavy-gauge steel back can
- Integral swing-out clamps secure installation in the ceiling
- Attractive heavy-gauge steel grille assembly with fine perforations
- Available in black and white textured, paintable finish
- Complies with UL-2043

ACCESSORIES (SOLD SEPARATELY)

TBCR		
Tile Bridge Ceiling Support Ring		
CK10	**CK10B**	**CK10W**
Cable Kit; Silver	Cable Kit; Black	Cable Kit; White

2 COLOR CHOICES*

BLACK | WHITE

*Actual color may vary from these catalog colors.

CEILING SPEAKERS

Mini-Pendant Ceiling Speakers

Models MPS1B/W, MPS2B/W

The Bogen MPS1 and MPS2 Mini-Pendant Speakers are an excellent choice for high ceiling and open space environments.

PRODUCT FEATURES:

- Wide dispersion 4-1/2" driver for broad, even coverage; superb off-axis response
- High-power handling capability for foreground sound/high-ambient noise environments
- Central attachment point for suspension and second point provided for safety cable
- Selectable power taps via rear-mounted control; 32, 16, 8, 4, 2, 1 watts @ 70V
- Low-resonance cabinet structure improves mid-range clarity
- Computer-matched venting system for extended bass output
- High-efficiency drivers deliver superior performance
- For 70V and 16-ohm low-impedance systems
- Quick and easy wiring with snap-on connector
- Simple single point suspension method
- Powder-coated perforated steel grille, available in black or white finish

Model	Impedance	Sensitivity (1W @ 1m)	Frequency Response (-10 dB)	Dimensions	Product Weight
MPS1	Low (16 ohms)/ High (70V)	86 dB (Avg. 100 Hz-10 kHz)	50 Hz-14 kHz	10" dia. x 7-7/8" H	4.5 lb.
MPS2	Low (16 ohms)/ High (70V)	87 dB (Avg. 100 Hz-15 kHz)	50 Hz-22 kHz		

2 COLOR CHOICES*

BLACK OFF-WHITE

*Actual color may vary from these catalog colors.

ACCESSORIES (SOLD SEPARATELY)

- CK10B Cable Kit; Black
- CK10W Cable Kit; White

FG-Series Foreground Speakers

Models FG20B, FG20W

NEW ITEM!

The Bogen FG20 Foreground speaker is designed to be a value-oriented solution for a wide variety of music environments. Its wide bandwidth provides very clean sound performance while the quality construction ensures the reliability installers can count on.

The FG20B is black in color; the FG20W is off-white. The drivers consist of a 3-1/2" woofer and 3/4" Mylar® tweeter. Both models of FG20 handle 20 watts @ 8-ohms or have power taps via a rotary switch for 2, 4, 8, 15 or 20 watts @ 70 volts.

FG20B FG20W

PRODUCT FEATURES:

- Smooth, wide frequency response for full range of sound
- Compact, rugged plastic enclosures
- Mathematically aligned vent for optimum bass efficiency and musical balance
- Individually sweep-tone tested to ensure reliability
- U-bracket for mounting included

2 COLOR CHOICES*

BLACK OFF-WHITE

*Actual color may vary from these catalog colors.

CEILING SPEAKERS

Hi-Fidelity Ceiling Speakers
Models HFCS1 & HFCS1LP

Bogen's coaxial and 2-way, High-Fidelity Ceiling Speakers deliver unsurpassed performance and value.

PRODUCT FEATURES:

- Installs into a variety of ceiling environments including suspended ceilings and hard-surfaced ceilings
- Large steel back can for extended bass response (HFCS1)
- Low-profile housing allows greater range of installation depths (HFCS1LP)
- Computer-matched venting system for excellent bass output
- Wide dispersion coaxial driver provides broad, even coverage
- Easy-to-install mounting system for a variety of ceiling types
- High power handling for foreground sound
- Selectable power taps via front-mounted rotary control under grille
- Excellent off-axis response, smooth contouring
- Easy wiring with 4- terminal snap-on input connector (providing loop-through)
- 3/4" durable polycarbonate tweeter cone
- 6-1/2" highly stable polypropylene cone
- Sensitivity: 89 dBspl @ 1W/1m
- Available in black or white
- Attachment point for seismic cable
- Listed to UL Standard 60065 for U.S. & Canada
- Fire-rated (94VO) ABS baffle

ACCESSORIES
(SOLD SEPARATELY)

TBCR
Tile Bridge Ceiling Support Ring

CK10
Cable Kit- Silver

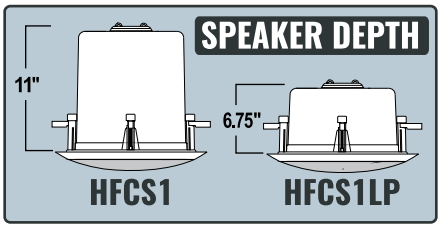
2 COLOR CHOICES*

BLACK

WHITE

*Actual colors may vary from these catalog colors.

Model	Impedance	Power Handling	Frequency Response	Dimensions	Product Weight
HFCS1/ HFCS1LP	16 ohms	75W	*HFCS1:* 65 Hz-19 kHz	*HFCS1:* 12-5/16" dia. x 12" D	*HFCS1:* 9 lb.
	70V	32, 16, 8, 4, 2, & 1 W taps	*HFCS1LP:* 78 Hz-19 kHz	*HFCS1LP:* 12-5/16" dia. x 7-3/4" D	*HFCS1LP:* 8 lb.
	100V	32, 16, 8, 4, & 2 W taps			



Hi-Fidelity, Small Footprint Ceiling Speaker
Model HFSF1

The Bogen HFSF1 Small-Footprint Ceiling Speaker delivers superior sound in a very compact enclosure. The speaker is unobtrusive at only 7-1/4" in diameter, and mounts easily in all types of ceilings including existing hard-surface types and suspended ceilings.

The low-distortion, coaxial-design speaker, coupled with a computer-matched venting system, delivers superb fidelity for music as well as high intelligibility for voice reinforcement.

PRODUCT FEATURES:

- Superior sound in a very compact enclosure
- Wide-dispersion coaxial driver for broad, even coverage; superb off-axis response
- Small footprint, visually appealing
- Only 6-1/4" diameter ceiling opening required
- Installs in wide range of ceiling types
- For 70V and low-impedance systems
- Selectable power taps via control mounted under grille; 16, 8, 4, 2, 1 watts at 70V
- 16-ohm selector position for low-impedance systems
- Quick wiring with removable plug-in connector providing loop-through terminals
- Attachment point for seismic safety cable
- Input terminal cover with conduit knockout
- Fire-rated (94VO) ABS baffle
- Compound rubber surround for lasting performance year after year
- Integral mounting clamps tighten quickly and firmly
- Tile bridge (TBSF) accessory recommended for suspended ceiling installations
- Off-white, paintable finish
- Listed to UL Standard 60065

ACCESSORIES
(SOLD SEPARATELY)

TBSF
Tile Bridge Ceiling Support Ring

CK10
Cable Kit; Silver

Impedance	Power Handling	Sensitivity	Frequency Response	Dimensions	Product Weight
16-ohm Nominal	50W (16-ohm)	86 dBspl @ 1W/1m	78 Hz -20 kHz	7-1/4" dia. x 7-1/2" D	4.5 lb.
70V Settings	16, 8, 4, 2, 1W taps (70V)				

CEILING SPEAKERS ASSEMBLIES

Models **SEC4T, S86 Series, S810 Series**

SEC4T

S86T725PG8W(U)
& Variations

S810T725PG8W(U)
& Variations

Bogen's SEC4T Compact Ceiling Speaker Assembly consists of a 4" cone speaker pre-assembled onto a 7-1/4" steel ceiling grille, painted with bright-white enamel finish.

Both the S86 & S810 Ceiling Speaker Assemblies consist of an 8" cone speaker pre- assembled on to a 13" steel ceiling grille painted with off-white (PG8W) or bright white (PG8U) enamel. Options for these assemblies are recessed volume control (VR), volume control with knob (VK), and rear-mounted screw terminal strip for power taps (BR).

PRODUCT FEATURES:

- 4-watt capacity /4-watt transformer
- 8" cone speaker (S86 & S810) and 4" cone speaker (SEC4T) provides excellent audio quality
- 6 different power taps available (4, 2, 1, 1/2, 1/4, 1/8 W)
- Pre-assembled for faster installation
- S86/S810 available in off-white (W) or is bright white (U) enamel over steel grille; SEC4T is available in bright white only
- Works with both 70V and 25V amplifier outputs
- Some S86/S810 models available with recessed volume control knob (see chart below)
- Screw terminals (BR models only)

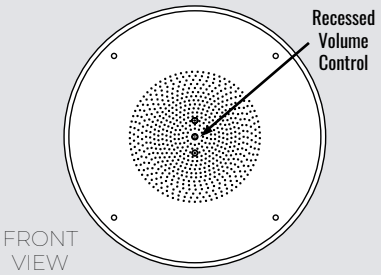
Model	Dimensions:
S86/S810	13" dia. x 3-1/4" D
SEC4T	7-1/8" dia. x 3" D

Model	Magnet Weight	Frequency Response	Sensitivity (4ft./1W)	No Volume Control	Recessed Volume Control (VR)	Volume Control w/Knob (VK)	Screw Terminals (BR)	Shipping Weight (6/carton)
S86T725PG8W	6 oz.	50 Hz-12 kHz	95 dBspl	●				27 lb. / carton
S86T725PG8WVR					●			
S86T725PG8WVK						●		
S86T725PG8WBR				●			●	28 lb. / carton
S86T725PG8WBRVR					●		●	
S86T725PG8WBRVK						●	●	
S810T725PG8W	10 oz.	70 Hz-15 kHz	96 dBspl	●				30 lb. / carton
S810T725PG8WVR					●			
S810T725PG8WVK						●		
For Bright White versions of the above models, replace the "W" in each model number with a "U".								
SEC4T	4 oz.	75 Hz-20 kHz	86 dBspl (1W @ 1m)	●				19 lb. / 10 per carton

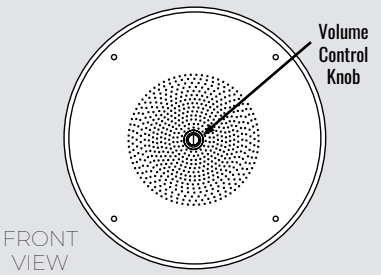
Ceiling Speaker Assembly Variations

Bogen ceiling speaker assemblies consist of an 8" cone speaker (S86 or S810) mounted in an enamel, steel-finished ceiling grille (PG8W or PG8U) with a transformer (T725). The assemblies are available in several options, as outlined here:

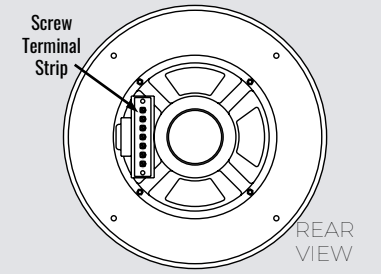
Recessed Volume Control
S86/S810T725PG8WVR



Volume Control Knob
S86/S810T725PG8WVK



Screw Terminal Strip
S86T725PG8WBR



2 COLOR CHOICES

S86 & S810 Speaker Grilles available in Bright White ("U" versions) and Off-White ("W" versions)

ACCESSORIES
(SOLD SEPARATELY)

RE84 Ceiling Speaker Enclosure	**MR8** Mounting Ring
TB8 Ceiling Tile Bridge	**TBSF** Tile Bridge *(for SEC4T only)*

Drop-In Ceiling Speakers

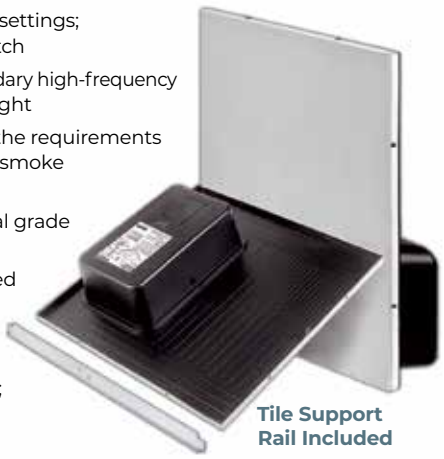
Bogen's Drop-In Ceiling Speakers are full-range loudspeakers that allow fast and simple installation, which saves time, effort, and cost. Depending on whether your ceiling grid is 2' x 2' or 2' x 4', the speaker can be dropped directly into place, or you can simply make a single cut to the ceiling tile, place the tile support rail, and then insert the speaker into position.

Models CSD2X2, CSD2X2VR(U)

70V and 25V Operation

- 2 ft. X 2 ft. with back can enclosure
- 4-watt, 70V/25V transformer
- 4, 2, 1, 1/2, & 1/4-watt tap settings; selectable by rotary switch
- 8" main cone with secondary high-frequency cone; 10 oz. magnet weight
- Plenum-rated—meets the requirements of UL standard 2043 for smoke and heat release
- Fully enclosed, industrial grade steel construction
- Front-mounted, recessed volume control versions available (VR)
- Listed to UL Standard 60065 for U.S. & Canada; and UL Standard 1480 for U.S.

Fully Enclosed Driver



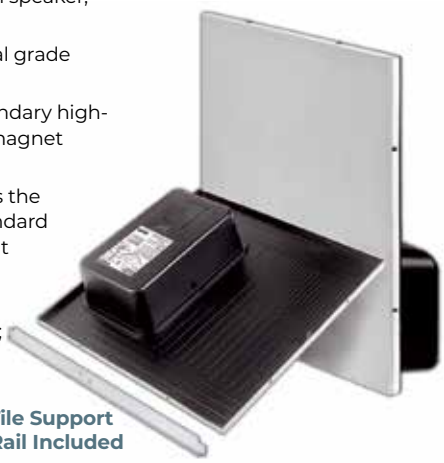
Tile Support Rail Included

Models CSD2X2L(U)

Low-impedance (8-ohm) Operation

- 2 ft. X 2 ft. with back can enclosure
- Low-impedance: 8-ohm speaker, 15W maximum power
- Fully enclosed, industrial grade steel construction
- 8" main cone with secondary high-frequency cone; 10 oz. magnet weight
- Plenum-rated — meets the requirements of UL standard 2043 for smoke and heat release
- Listed to UL Standard 60065 for U.S. & Canada; and UL Standard 1480 for U.S.

Fully Enclosed Driver



Tile Support Rail Included

Models CSD1X2, CSD1X2VR(U)

70V and 25V Operation

- 1 ft. X 2 ft. with back can enclosure
- 4-watt, 70V/25V transformer
- 4, 2, 1, 1/2, & 1/4-watt tap settings; selectable by rotary switch
- Fully enclosed, industrial grade steel construction
- 8" main cone with secondary high-frequency cone; 10 oz. magnet weight
- Plenum-rated — meets the requirements of UL standard 2043 for smoke/heat release
- Front-mounted, recessed volume control versions available (VR)
- Listed to UL Standard 60065 for US and Canada

Fully Enclosed Driver

Tile Support Rail Included

Model	Speaker Size		Grille Color		Impedance			
	1 ft. x 2 ft.	2 ft. x 2 ft.	Off-white	Bright White (U)	70V/25V (4W max.)	8-ohm (L) (15W max.)	Speaker Back Can	Recessed Volume Control (VR)
CSD1X2	●		●		●		●	
CSD1X2U-V2								
CSD1X2VR	●		●		●		●	●
CSD1X2VRU	●			●	●		●	●
CSD2X2		●	●		●		●	
CSD2X2U-V2								
CSD2X2VR		●	●		●		●	●
CSD2X2VRU		●		●	●		●	●
CSD2X2L		●	●			●	●	
CSD2X2LU		●		●		●	●	

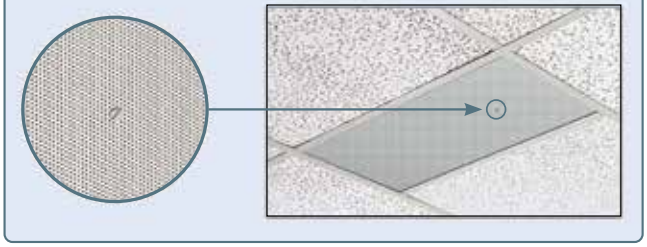
ALL DROP-IN SPEAKERS FEATURE:

- Finely perforated grille over entire front of speaker
- Tile Support Rail crossbar (included) for use with 2' x 4' and 2' x 2' suspended tile ceilings
- Bright white ("U" versions) or off-white grille finish
- Seismic attachment points

Available in Off-White and Bright White (U)
(for Bright White versions add a "U" to end of model number)

Model	Dimensions	Product Weight
CSD1X2/VR	12-1/4" W x 5" H x 24" D	10 lb.
CSD2X2/VR/L	24" W x 4-7/8" H x 24" D	12 lb.

VR Versions (with front-mounted recessed volume control



DROP-IN CEILING SPEAKERS

Model **CSD1X2U-V2**

NEW ITEM!

The Bogen CSD1X2U-V2 is a full-range ceiling speaker offering increased options for IP network designers and system integrators of Bogen's Nyquist and other systems. With the easy addition of one of several available Nyquist plenum-rated amplifier modules, the CSD1X2U-V2 can be converted into an intercom appliance, or by adding a NQ-GAXMR1 transformer, become a source amplifier/speaker for a secondary chain of 25V/70V speakers.

CSD1X2U-V2

PRODUCT FEATURES:

- Simple to install: Unpack, attach the speaker wiring (8-ohm or 25V/70V input), and select the desired power tap setting (if 25V/70V operation).
- Easy to convert into a Nyquist passive IP speaker or IP intercom speaker. Increase designer and end user options for choice of intercom style and location with the addition of a Nyquist GA10P(V) and optional call switch.
- Convert the speaker into a 25V/70V audio amplifier source and speaker combo unit. Now audio designers have a combination unit that functions as both an IP speaker and 25V/70V amplifier, from which multiple secondary 25V/70V speakers can be daisy-chained to increase audio coverage. (Requires optional Nyquist GA-series amplifier and an NQ-GAXMR1 distributed audio transformer.)
- Listed to UL Standard 62368-1 for US and Canada.

ACCESSORIES
(SOLD SEPARATELY)

NQ-GA10P/ NQ-GA10PV
VoIP Intercom Modules

NQ-GA40P3
Integrated Amplifier Module

NQ-GA20P2
Amplifier Module

NQ-GAXMR1
Distributed Audio Transformer

Model **CSD2X2U-V2**

NEW ITEM!

The Bogen CSD2X2U-V2 is a full-range ceiling speaker offering increased options for IP network designers and system integrators of Bogen Nyquist and other systems. The CSD2X2U-V2 can be converted into an intercom appliance with the addition of a Nyquist GA10P/V amplifier module, or a source amplifier/speaker by adding one of several plenum-rated amplifier modules and a NQ-GAXMR1 transformer to drive a secondary chain of 25V/70V speakers.

CSD2X2U-V2

PRODUCT FEATURES:

- Simple to install: Unpack, attach the speaker wiring (8-ohm or 25V/70V input), and select the desired power tap setting (if 25V/70V operation).
- Easy to convert into a Nyquist passive IP speaker or IP intercom speaker. Increase designer and end user options for choice of intercom style and location with the addition of a Nyquist GA10P(V) and optional call switch.
- Convert the speaker into a 25V/70V audio amplifier source and speaker combo unit. Now audio designers have a combination unit that functions as both an IP speaker and 25V/70V amplifier, from which multiple secondary 25V/70V speakers can be daisy-chained to increase audio coverage. (Requires optional Nyquist GA-series amplifier and an NQ-GAXMR1 distributed audio transformer.)
- Listed to UL Standard 62368-1 for US and Canada.

ACCESSORIES
(SOLD SEPARATELY)

NQ-GA10P/ NQ-GA10PV
VoIP Intercom Modules

NQ-GA40P3
Integrated Amplifier Module

NQ-GA20P2
Amplifier Module

NQ-GAXMR1
Distributed Audio Transformer

WALL-MOUNT SPEAKERS

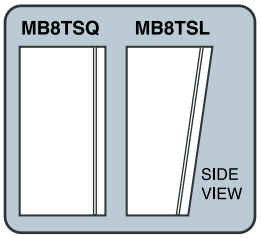
Metal Box Speakers

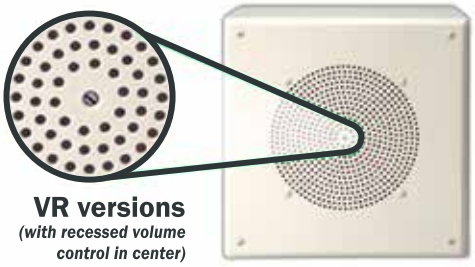
Models MB8TSL/MB8TSLVR, MB8TSQ/MB8TSQVR

Bogen's Metal Box Speakers feature all-steel construction, surface-mounted enclosure with an 8" cone loudspeaker and 4-watt 70V/25V transformer. The MB8TSL is designed primarily for wall mounting, and its face is angled downward 12.5 degrees. The MB8TSQ is suitable for ceiling or wall mounting. "VR" versions include a recessed volume control.

PRODUCT FEATURES:

- Rugged all-steel, surface-mounted, off-white painted enclosure
- Full-range 8" cone speaker for excellent intelligibility
- Compatible with 70V/25V systems
- 4-watt maximum power
- 6 power taps available (4, 2, 1, 1/2, 1/4, 1/8 watts)
- Mounting hardware included
- Wiremold® knockouts
- "VR" versions include a recessed volume control





VR versions
(with recessed volume control in center)

Models	Front Panel Design	Frequency Response	Sensitivity (dBspl @ 1W)	Dimensions	Product Weight
MB8TSL/VR	Slant/Angle	110 Hz-15 kHz	96	11-5/8" W x 11-3/8" H x 5-3/8" D (Top Dimension) 11-5/8" W x 11-3/8" H x 2-3/4" D (Bottom Dimension)	9 lb.
MB8TSQ/VR	Square/Flat	110 Hz-15 kHz	96	11-5/8" W x 11-5/8" H x 4-1/4" D	9 lb.

Wiremold® is a registered trademark of Wiremold/Legrand.

Wall Baffle Speakers

Models WBS8T725, WBS8T725V, WBS8T725BR, WBS8T725BRV, WBS810T725

WB8T725

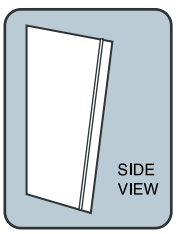
Bogen Wall Baffle Speakers consist of 8" cone speakers (S86 or S810) pre-assembled into a simulated walnut-finished wooden enclosure with a black grille cloth on front. These wall baffles are handsomely styled and ruggedly built with 3/8" particle board reinforced at the corners.

Designed for wall mounting, the face is angled downward 13.5 degrees. Recessed volume control and terminal strip are available options on the WBS8T725 model.

Dimensions
9-1/2" W x 9-1/2" H x 5-1/4" D (3-1/4" D @ bottom)

PRODUCT FEATURES:

- 4-watt capacity
- 6 power taps available (4, 2, 1, 1/2, 1/4, 1/8 watts)
- Simulated walnut finish
- Works with both 70V and 25V amplifier outputs
- Pre-assembled for faster installation
- 8" cone speaker for excellent audio quality
- 6 oz. or 10 oz. magnet weights
- Recessed volume control available (V models only)
- Screw terminals available (BR models only)
- Easy wall-mount installation
- Mounting hardware included



Model	Magnet Weight	Frequency Response	Sensitivity (4ft./1W)	No Volume Control	Recessed Volume Control (V)	Screw Terminals (BR)	Shipping Weight (4/carton)
WBS8T725	6 oz.	50 Hz-12 kHz	95 dBspl	●			18 lb. / carton
WBS8T725V					●		
WBS8T725BR				●		●	
WBS8T725BRV					●	●	19 lb. / carton
WBS810T725	10 oz.	70 Hz-15 kHz	96 dBspl	●			20 lb. / carton

HORN LOUDSPEAKERS

Models SP58A, SP158A, SP308A, SPT5A, SPT15A, SPT30A, BDT30A, IH8A, KFLDS30T

SP58A, SPT5A

SP158A, SP308A SPT15A, SPT30A

BDT30A*

Bogen's Horn Loudspeakers offer high efficiency and excellent intelligibility. Rotary switch-selected power taps make any installation quick and easy. The SPT & BDT models are compatible with 70V and 25V paging systems; SP models are 8-ohm versions. The KFLDS30T Horn is a 70V/25V wide dispersion, high-intelligibility, reentrant type loudspeaker. The IH8A is an all-purpose paging horn.

KFLDS30T

PRODUCT FEATURES:

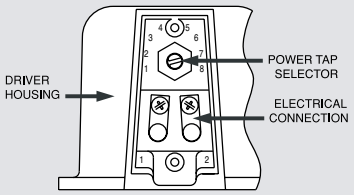
- Maximum speaker power capacities of 7.5, 15, and 30 watts
- Rotary switch-selected power taps on transformer models
- Constant voltage (70V/25V) and 8-ohm versions
- Tilt and swivel base for easy positioning
- Sturdy, all-metal construction with mocha enamel finish (KFLDS30T horn flare is constructed of polycarbonate)
- Weatherproof design
- Twin reentrant horns for bi-directional projection (BDT30A only)
- KFLDS30T provides wide-angle projection with a rotatable horn flare

IH8A

** Model BDT30A; Some assembly required*

Special Protection

The SPT15A, SPT30A, BDT30A & KFLDS30T use a cast aluminum end bell specially designed to make them weather-proof. A rotary selector switch is used to set the specific power tap for the speaker. This switch's entry into the end bell is sealed by a special mounting nut with an integral O-ring. A removable plastic panel protects both the rotary switch and the electrical connections. This panel provides a narrow opening for the speaker wires to exit, reducing the chance of water infiltration.



Tilt & Swivel Base

Bogen's 15- and 30-watt horns include a unique and easy-to-use tilt and swivel mounting base that provides nearly 180 degrees of tilt and a full 360-degrees of swivel. A single wing nut locks in the angle of the speaker. Loosening the wing nut frees the speaker in each rotational axis, making it fast and easy to precisely aim the speakers where the sound is needed. The base provides three holes for screw mounting and a slot to allow strapping the speakers to beams. The actual mounting base can easily be removed so that the base can be installed separately. The speakers can then be attached to the bases at a later time.

Model	Max Power Capacity (Watts)	Frequency Response	Sensitivity (dBspl, 1W @ 4ft.)	Max Sound Level (dBspl, full power @ 4ft.)	Power Taps (Watts) 70V	Power Taps (Watts) 25V	Low-Impedance 8-ohm	Dispersion Angle (degrees)	Connection	Dimensions	Product Weight
SPT5A	7.5	250 Hz-14 kHz	96	105	7.5, 5, 2.5, 1.25, 0.65	1, 0.62, 0.31	No	120°	Wire Lead	6" dia. x 4" D	1.5 lb.
SP58A					N/A	N/A	Yes				
SPT15A	15	275 Hz-14 kHz	109	121	15, 7.5, 3.8, 1.8, 0.9	15, 7.5, 1.8, 0.94, 0.46	No	110°	Screw Terminal	9" dia. x 9-1/4" D	4 lb.
SP158A					N/A	N/A	Yes				3 lb.
SPT30A	30	225 Hz-14 kHz	110	125	30, 15, 7.5, 3.7, 1.8	15, 7.5, 3.7, 1.8	No	100°	Screw Terminal	11" dia. x 10-1/2" D	6 lb.
SP308A					N/A	N/A	Yes				5 lb.
BDT30A	30	225 Hz-14 kHz	106**	121**	30, 15, 7.5, 3.7, 1.8	15, 7.5, 3.7, 1.8	No	100°**	Screw Terminal	9-5/8" dia. x 12-1/8" D**	7 lb.
IH8A	15	350 Hz-14 kHz	108	120	N/A	N/A	Yes	130°	Wire Lead	6-1/4" dia. x 6" D	2.5 lb.
KFLDS30T	30	300 Hz-12 kHz	104	119	30, 15, 7.5, 3.7, 1.8	15, 7.5, 3.7, 1.8, 0.9, 0.5, 0.25	No	70° (Vert.) x 95° (Horiz.)	Screw Terminal	14-3/8" W x 8-1/4" H x 12-7/8" D	6 lb.

** Each Horn

ACCESSORIES
(SOLD SEPARATELY)

BC1
Beam Clamp

HSES10
Horn Speaker Electrical Box Strap
(pack of 10; not for SP58A & SPT5A)

TCSPT1
Terminal Cover for Conduit
(BDT30A, KFLDS30T, SP158A, SP308A, SPT15A, & SPT30A)

Flange-Mounted Horn Speaker

Model FMH15T

The Bogen FMH15T is a flange-mounted, high-intelligibility, reentrant-type loudspeaker. Its sturdy, weatherproof, vandal-resistant, all-metal construction is ideal for indoor and outdoor use. It has a built-in tap selector switch for selecting the speaker power in 70V or 25V constant-voltage systems.

PRODUCT FEATURES:

- Excellent efficiency and voice intelligibility
- Weather-sealed tap selector switch
- 15 watts max. @ 70V or 25V
- Select flush (BBFM6) or surface (BBSM6) mount enclosure for installation (each sold separately)
- Vandal-resistant accessory components for hostile-environment applications
- Heavy-duty cast aluminum grille (SGHD8) and adapter ring (FMHAR8) installation accessories
- All-metal with black enamel finish

Power Taps (Watts)		Frequency Response	Sensitivity (dBspl @ 1W)	Dispersion Angle	Dimensions	Product Weight
70V	25V					
15, 7.5, 3.6, 1.8, 0.9	15, 7.0, 1.8, 0.9, 0.5, 0.25, 0.125	600 Hz -14 kHz	104	100°	6-7/8" dia. x 5-1/2" D	3 lb.

ACCESSORIES

(SOLD SEPARATELY)

BBSM6
Surface-Mount Enclosure
(11" W x 11" H x 6" D)

BBFM6
Flush-Mount Enclosure
(9-7/8" W x 9-7/8" H x 6" D)

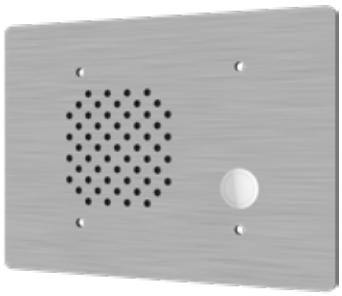
SGHD8
Heavy-Duty Grille
(11" W x 11" H x 1/2" D)

FMHAR8
Adapter Ring

Vandal-Resistant Speaker

Model VRS3

NEW ITEM!



The Bogen VRS3 is a vandal-resistant speaker designed for hands-free two-way communications. The VRS3 consists of a 3-inch, weather-resistant, cone-type speaker and a 25V transformer (tapped at 0.25, 0.5, and 1 watt). The transformer can also be bypassed for 8-ohm operation. The speaker and transformer are mounted on a #12-gauge stainless steel faceplate. The speaker is protected from harm by the faceplate, and three (3) interwoven steel screens.

The VRS3 includes a heavy-duty metal push button switch that protrudes slightly from the faceplate and can be used to initiate a call to a control center. The switch can be wired for use with systems that require a momentary contact closure for call annunciation (e.g., Nyquist or Multicom 2000).

The VRS3 has a 5-1/2" H x 7-1/2" W faceplate and should be mounted to a three-gang box (5-13/16" L x 4" W x 2-1/8" H), such as the Thomas & Betts Model 3G4D 1/2 or equivalent. Alternatively, the VRS3 can be surface mounted using an enclosure from Quam (model SE3GVP).

PRODUCT FEATURES:

- Heavy-duty vandal-resistant and weather-resistant construction
- Speaker rating: 1W, 25V with 3 taps (0.25W, 0.5W, 1W) operation
- Momentary contact (normally open) pushbutton callswitch
- One-way security hardware included (tamper-resistant, #6-32 x 1", 'pin-in-torx' screws)

EASY INSTALL® SPEAKERS

Surface-Mount Ceiling Speakers

Models SM1EZ, SM4T

Easy Install Speakers drastically cut system installation time because each speaker can be completely installed–mounted in the ceiling, secured, and connected–in less than a minute!

This versatile speaker carries voice messages with clarity anywhere dependable communication is required. It can be installed in any suspended ceiling with ceiling tiles– quick, easy, and trouble-free. Compatible with both 70V and 25V systems.

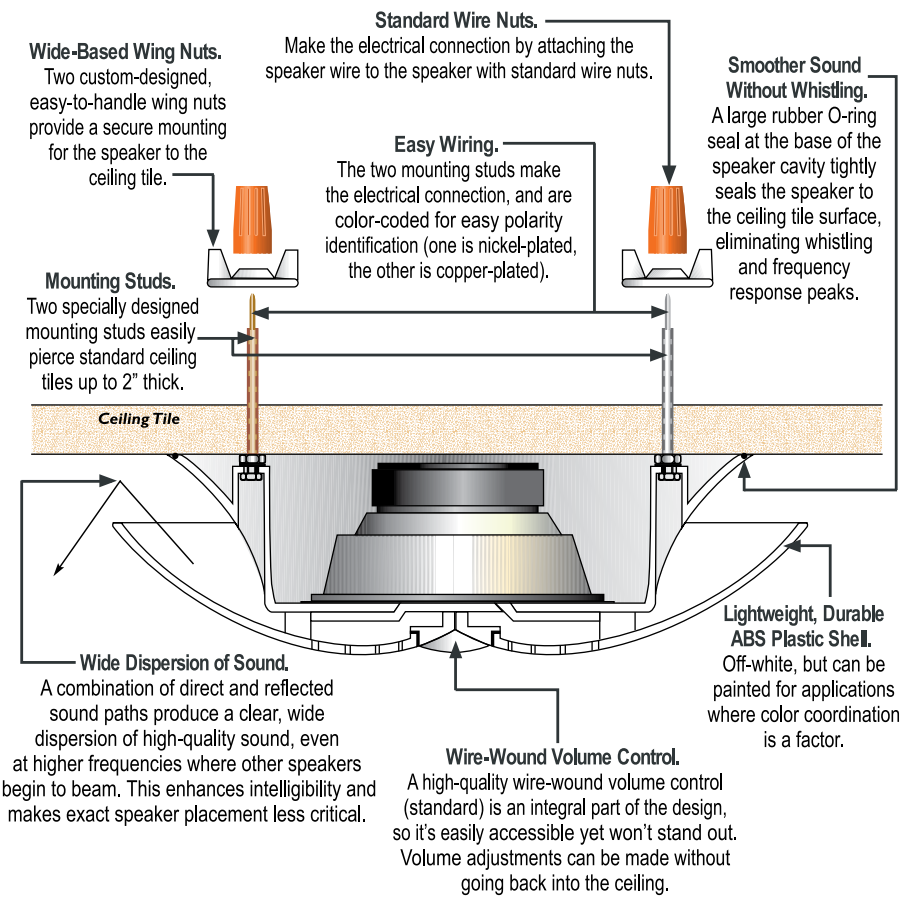
PRODUCT FEATURES:

- **Installs in Seconds.** Each speaker assembly is specially designed for immediate installation as soon as you take it out of the box. Complete installation takes less than a minute.
- **No-Tool Installation.** No tools needed; everything you need is right in the box.
- **Contemporary, Low-Profile Design.** Looks good in any environment.
- **No Clean Up.** Installation means piercing ceiling tiles, NOT cutting them. So, there's virtually no mess and no ceiling tile pieces to clean up.

Model Variations:

- **SM1EZ** is a one-watt, single tap speaker.
- **SM4T** is a four-watt, multi-tap speaker with settings of 4, 2, 1, 1/2, & 1/4 watts. Settings are rotary switch selectable (no transformer wires to deal with).

Complies with NFPA National code 160b that allows speakers to be installed in plenums and other air handling spaces. Complies with UL-2043.



INSTALLS IN SECONDS!

The speaker's two specially designed mounting studs easily pierce through the ceiling tile.

Two (2) wide-based wing nuts secure the speaker assembly to the ceiling tile.

Two (2) standard wire nuts connect the speaker wires to the mounting studs, making the electrical connection. That's all it takes!

Dimensions:	9-1/2" diameter
Depth:	3" (from tile surface)
Frequency Response:	125 Hz – 15 kHz
Sensitivity:	90 dBspl (1 watt @ 1 meter)
Product Weight:	2 lb. each
Shipping Weight:	15 lb./carton (5/carton)

ACCESSORY (SOLD SEPARATELY) — **SMTB** Tile Bridge

EASY DESIGN™ SPEAKERS

Ceiling Speaker
Model CS1EZ

Bogen's CS1EZ is a pre-assembled ceiling speaker comprised of an 8" cone speaker and steel ceiling grille painted with enamel. The CS1EZ includes a volume control knob and rear-mounted screw terminal board for easier electrical connection.

PRODUCT FEATURES:

- 1-watt, single-tap design
- Screw terminal connections for fast installation
- Designed for 70V amplifier output
- 8" cone speaker for excellent audio quality
- Heavy-duty, wire-wound volume control with knob
- 50 Hz-12 kHz frequency response
- 95 dBspl @ 4 ft. /1W input sensitivity
- Off-white finish

Dimensions	Product Weight
13" dia. x 3-1/4" D	3 lb.

ACCESSORIES (SOLD SEPARATELY)

TB8	RE84	MR8
Tile Bridge	Ceiling Enclosure	Mounting Ring

Horn Loudspeakers
Models HS30EZ, HS15EZ, HS7EZ

Bogen's line of Easy Design Horn Loudspeakers are made of weatherproof all-metal construction, thereby making them ideal for both indoor and outdoor use in industrial plants, warehouses, schools, construction sites, and recreational areas. All models come with swivel and tilt mounting bases for greater flexibility in setting the angle of projection.

HS7EZ HS15EZ HS30EZ

PRODUCT FEATURES:

- 7.5-, 15-, and 30-watt models
- Single-tap design
- HS7EZ features 12" lead wire for electrical connections
- HS15EZ and HS30EZ feature screw terminal connections for fast installation
- Designed for 70V amplifier outputs
- Weatherproof design
- Stepped attenuator volume control
- Tilt and swivel mounting base for flexibility in coverage
- Textured mocha enamel

Model	Frequency Response	Sensitivity	Dispersion	Dimensions	Product Weight
HS7EZ	250 Hz - 14 kHz	105 dBspl (4 ft./7.5W) input (@1 kHz)	120°	6" dia. x 4" D	2 lb.
HS15EZ	275 Hz - 14 kHz	121 dBspl (4 ft./15W) input (@1 kHz)	110°	9" dia. x 9-1/4" D	4 lb.
HS30EZ	225 Hz - 14 kHz	125 dBspl (4 ft./30W) input (@1 kHz)	100°	11" dia. x 10-1/2" D	6 lb.

ACCESSORIES (SOLD SEPARATELY)

BC1
Beam Clamp

HSES10
Horn Speaker Electrical Box Strap

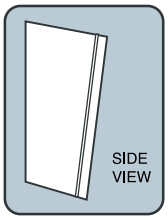
TCSPT1
Terminal Cover for Conduit

Wall Baffle Speaker
Model WB1EZ

The WB1EZ comes pre-assembled with an 8" cone speaker enclosed in a simulated walnut-finished wooden enclosure with a black grille cloth on front and a recessed volume control.

PRODUCT FEATURES:

- 1-watt, single-tap design
- Screw terminal connections for for fast installation
- Designed for 70V amplifier output
- 8" cone speaker for excellent audio quality
- Recessed volume control
- Designed for easy wall-mount installation; face has 13.5 degree downward angle
- 50 Hz-12 kHz frequency response
- 95 dBspl @ 4ft./1W input sensitivity



Dimensions	Product Weight
9-1/2" W x 9-1/2" H x 5-1/4" D (3-1/4" D @ bottom)	4 lb.

EASY DESIGN™ GUIDE

What Is Easy Design?

1 Select the Correct Type of Speaker for the Job
(see chart below)

→

2 Determine the Number of Speakers Required
(see charts on pages 70-72)

→

3 Select the Amplifier for the System
(see page 73)

Armed with just 3 pieces of information, you can quickly create a bill of materials for speaker paging jobs. Bogen's Easy Design line of products was created specifically to make the design process easier and less time consuming for the installer.

You supply some basic pieces of information – type of application, dimensions of the area to be covered, ambient noise level, and ceiling height*. Then, a few simple and direct charts will immediately provide you with the best type of speaker to use, the number of speakers needed, and the amplifier power required for the job.

Each speaker in the Easy Design line is designed with a single power tap and a volume control. Any paging system you create using the Easy Design products will be flexible, robust, and powerful. If noise levels increase in the future, just turn up the volume controls on the speakers – the amplifier will not overload!

You get all the benefits of a 70V central-amplified system – full power capability, high-quality sound and performance, 2-wire installation, long speaker runs, flexibility in amplifier location, no distributed power supplies – and now, super simple system design (we've eliminated the multiple power taps). Easy Design speakers have the high quality and reliability that you expect from Bogen.

** Not all dimensions are needed for all speaker types. Refer to Section 2 for specific dimensions for each speaker.*

1 Selecting Correct Speaker Type

- Determine the ambient noise level and type of environment in which the speakers will be installed.
- Then select the speaker(s) best suited for the area.

EXAMPLE:

- The ambient noise level in a machine shop in an industrial area is 90 dB. By referring to the chart, you will find that the HS30EZ horn loudspeaker is best suited for this environment.

For applications with mixed noise levels, such as a location with quiet waiting rooms, medium noise level office areas, and very noisy manufacturing, select an appropriate speaker type for each different area.

Once you have selected the speaker type(s), the next step is to determine how many speakers you will need to cover the area sufficiently.

SPEAKER MODELS →		CS1EZ, SM1EZ, WB1EZ *see charts on pages 70 & 73*	HS7EZ *see chart on page 71*	HS15EZ, HS30EZ *see charts on page 71*
TYPICAL AMBIENT NOISE LEVEL	**TYPICAL ENVIRONMENTS**			
VERY HIGH NOISE **85-95 dB** Speech Almost Impossible To Hear	• Construction Site • Loud Machine Shop • Noisy Manufacturing • Printing Shop			
HIGH NOISE **75-85 dB** Speech Is Difficult To Hear	• Assembly Line • Crowded Transit Waiting Area • Machine/Print Shop • Shipping Warehouse • Supermarket (Peak) • Very Noisy Bar or Restaurant			
MEDIUM NOISE **65-75 dB** Must Raise Voice To Be Heard	• Bank/Public Area • Transit Waiting Area • Department Store • Noisy Office Setting • Supermarket (Normal) • Bar or Restaurant			
LOW NOISE **55-65 dB** Speech Is Easy To Hear	• Conversational Speech • Doctor's Office • Hospital • Hotel Lobby • Quiet Office • Quiet Bar or Restaurant			

NOW, TURN TO PAGES 70 - 72 TO DETERMINE THE NUMBER OF SPEAKERS NEEDED.

2 Determining the Number of Ceiling Speakers Required

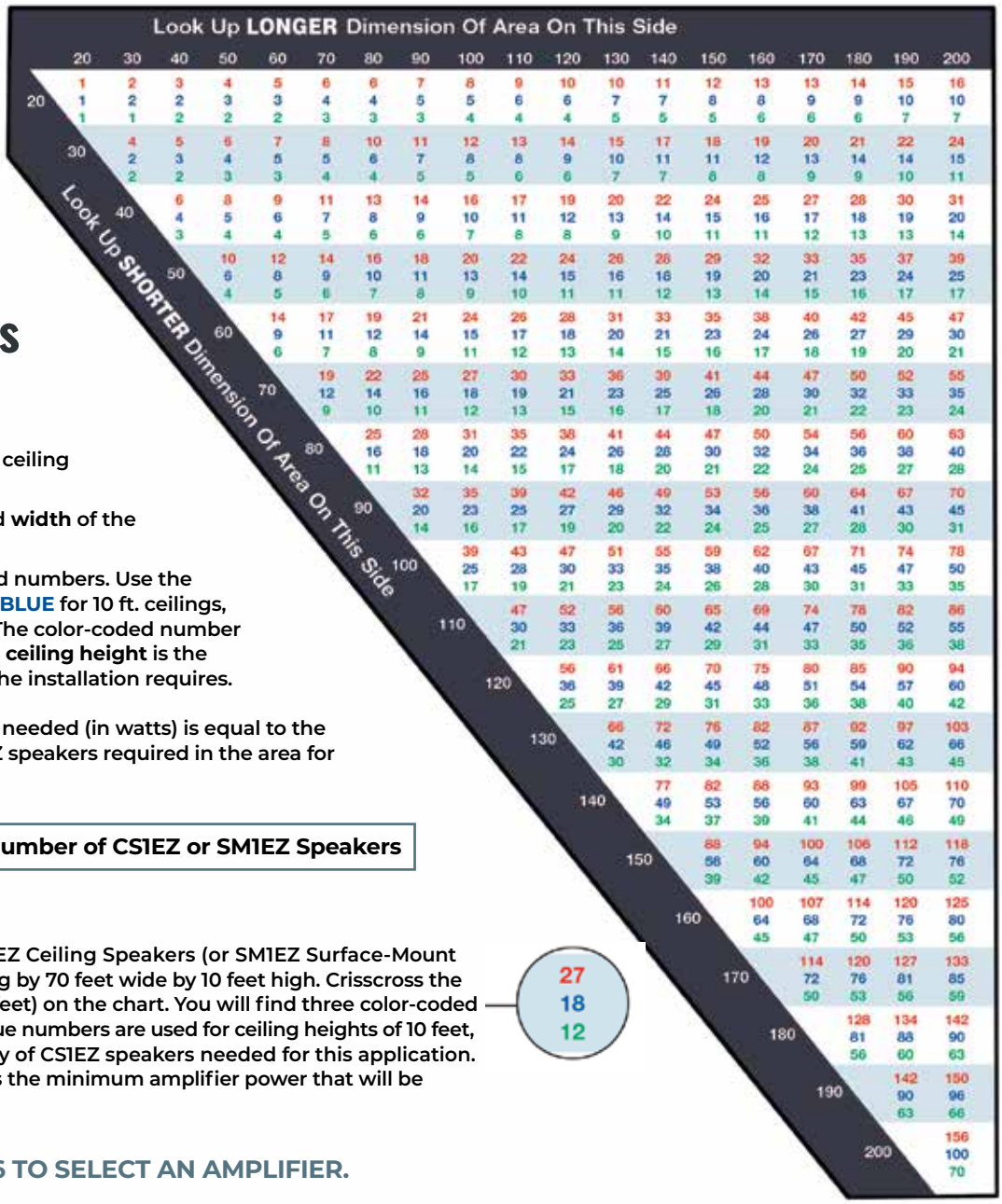
Ceiling Speaker
Model **CS1EZ**

Surface-Mount Ceiling Speaker
Model **SM1EZ**


CS1EZ


SM1EZ

Use the below chart to determine the number of **CS1EZ Ceiling Speakers** and/or **SM1EZ Surface-Mount Ceiling Speakers** a particular installation will require, based on the dimensions of the area and the ceiling height.



Ceiling Speakers (CS1EZ, SM1EZ)

- Obtain the length, width, and ceiling height of the area.
- Look up where the **length** and **width** of the area meet on the chart.
- You will find three color-coded numbers. Use the **RED** number for 8 ft. ceilings, **BLUE** for 10 ft. ceilings, and **GREEN** for 12 ft. ceilings. The color-coded number that corresponds to the area's **ceiling height** is the general number of speakers the installation requires.

The **minimum amplifier power** needed (in watts) is equal to the total number of CS1EZ or SM1EZ speakers required in the area for uniform coverage.

Amplifier Power (min.) = Number of CS1EZ or SM1EZ Speakers

EXAMPLE:

A typical office area, using CS1EZ Ceiling Speakers (or SM1EZ Surface-Mount Ceiling Speakers), is 100 feet long by 70 feet wide by 10 feet high. Crisscross the length (100 feet) and width (70 feet) on the chart. You will find three color-coded numbers: 27, 18, and 12. Since blue numbers are used for ceiling heights of 10 feet, 18 is the recommended quantity of CS1EZ speakers needed for this application. This number (18) also represents the minimum amplifier power that will be needed (in watts) for this area.

27
18
12

NOW, TURN TO PAGE 106 TO SELECT AN AMPLIFIER.

2 Determining the Number of Horn Speakers Required

- Obtain the **square footage** of the area to be covered and its ambient noise level.
- Where the area's square footage intersects the area's **ambient noise level**, you will find two numbers.

The number in **GREEN** is the typical **number of horn loudspeakers** the installation requires. Additional speakers may be needed in areas that have obstructions, like shelving, that block sound dispersion.

The number in **RED** is the **minimum amplifier power** needed (in watts) for the installation.

Amplifier Power (min.) = Number in RED

EXAMPLE:

A factory has 35,000 square feet of open area and an average ambient noise level of 80 dB. Thus, it will require HS15EZ Horn Loudspeakers. Using the chart for the HS15EZ speaker, crisscross the square footage and the ambient noise level. The number of horn loudspeakers needed for an installation is shown in **GREEN** and the minimum amplifier power for this number of speakers is shown in **RED**. As you can see, 6 speakers are needed for this application and the minimum amplifier power needed is 90 watts.

Model HS30EZ

Use this chart to determine the number of **HS30EZ** Horn Loudspeakers a particular installation will require, based on the size of the area and the ambient noise level of the environment.

HORN QTY. & MIN. POWER (WATTS) BASED ON AMBIENT NOISE		SIZE OF AREA TO BE COVERED (THOUSANDS OF SQUARE FEET)																			
		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
85–95 dB Very High Noise – speech almost impossible	HORNS	1	2	3	4	6	7	8	9	10	11	12	13	14	16	17	18	19	20	21	22
	POWER	30	60	90	120	180	210	240	270	300	330	360	390	420	480	510	540	570	600	630	660

GREEN represents the number of speakers.

RED represents the minimum amplifier power required.

NOTE: For applications over 100dB, contact Bogen FREE DESIGN SERVICE for assistance.

Model HS15EZ

Use this chart to determine the number of **HS15EZ** Horn Loudspeakers a particular installation will require, based on the size of the area and the ambient noise level of the environment.

HORN QTY. & MIN. POWER (WATTS) BASED ON AMBIENT NOISE		SIZE OF AREA TO BE COVERED (THOUSANDS OF SQUARE FEET)																			
		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
75–85 dB High Noise – speech is difficult	HORNS	1	2	3	4	5	5	6	7	8	9	10	10	11	12	13	14	15	15	16	17
	POWER	15	30	45	60	75	75	90	105	120	135	150	150	165	180	195	210	225	225	240	255
85–95 dB Very High Noise – speech almost impossible	HORNS	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
	POWER	30	60	90	120	150	180	210	240	270	300	330	360	390	420	450	480	510	540	570	600

GREEN represents the number of speakers.

RED represents the minimum amplifier power required.

Model HS7EZ

Use this chart to determine the number of **HS7EZ** Horn Loudspeakers a particular installation will require, based on the size of the area and the ambient noise level of the environment.

HORN QTY. & MIN. POWER (WATTS) BASED ON AMBIENT NOISE		SIZE OF AREA TO BE COVERED (THOUSANDS OF SQUARE FEET)																			
		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
55–65 dB Low Noise – speech is easy	HORNS	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10
	POWER	8	8	15	15	23	23	30	30	38	38	45	45	53	53	60	60	68	68	75	75
65–75 dB Medium Noise – must raise voice to be heard	HORNS	1	2	3	4	5	5	6	7	8	9	10	10	11	12	13	14	15	15	16	17
	POWER	8	15	23	30	38	38	45	53	60	68	75	75	83	90	98	105	113	113	120	128

GREEN represents the number of speakers.

RED represents the minimum amplifier power required.

NOW, TURN TO PAGE 106 TO SELECT AN AMPLIFIER.

2 Determining the Number of Wall Baffle Speakers Required

Wall Baffle Speaker

Model WB1EZ

Use the below chart to determine the number of WB1EZ speakers a particular installation will require, based on the dimensions of the area.

Wall Baffle Speaker (WB1EZ)

- Obtain the **length** and **width** of the area.
- Where the length and width of the area crisscross on the chart, you will find the typical **number of speakers** that the installation requires.

The minimum amplifier power needed (in watts) is equal to the total number of WB1EZ speakers required in the area for uniform coverage.

Amplifier Power (min.) = Number of WB1EZ Speakers

Example:

An area's dimensions are 150 ft. long by 110 ft. wide. Crisscross these two dimensions on the chart and you will find that 28 WB1EZ Wall Baffle Speakers are needed for this application. This number (28) is also the minimum amplifier power needed (in watts) for this area.

Look Up **LONGER** Dimension Of Area On This Side

Look Up **SHORTER** Dimension Of Area On This Side

	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
20	1	1	1	2	2	2	3	3	3	4	4	4	5	5	5	6	6	6	6
30	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	
40	3	3	4	5	5	6	7	7	8	9	9	10	11	11	12	13	13		
50	4	5	6	7	8	8	9	10	11	12	12	13	14	15	16	17			
60	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20				
70	8	9	11	12	13	14	15	16	18	19	20	21	22	23					
80	11	12	13	15	16	17	19	20	21	23	24	25	27						
90	14	15	16	18	20	21	23	24	26	27	28	30							
100	17	18	20	22	23	25	27	28	30	32	33								
110	20	22	24	26	28	29	31	33	35	37									
120	24	26	28	30	32	34	36	38	40										
130	28	30	33	35	37	39	42	44											
140	33	35	37	40	42	45	47												
150	33	40	43	45	48	50													
160	43	45	48	51	52														
170	48	52	54	56															
180	54	58	60																
190	60	64																	
200	66																		

Mixed Speaker Type Applications

For applications with more than one type of speaker:

- Determine the number of speakers and the minimum amplifier power needed for each type of speaker separately.
- Add together the minimum amplifier power needed for each type of speaker to obtain the minimum amplifier power needed for the entire application.

Example:

An application requires 10 SM1EZ Surface-Mount Ceiling Speakers (minimum amplifier power needed is 10 watts), 5 HS15EZ Horn Loudspeakers (minimum amplifier power needed is 75 watts), and 10 WB1EZ Wall Baffle Speakers (minimum amplifier power needed is 10 watts). Add together the minimum amplifier power needed for each type of speaker: 10 watts + 75 watts + 10 watts. The sum is 95 watts. This is the minimum amplifier power needed (in watts) for the entire application.

NOW, TURN TO PAGE 106 TO SELECT AN AMPLIFIER.

EASY DESIGN™ GUIDE

3 Selecting an Amplifier

Once you determine the number of speakers and the minimum amplifier power for the installation, you are ready to select the system amplifier. A 70V paging amplifier is very easy to select.

- Locate amplifiers on the chart on page 106 that have a **wattage equal to or higher** than the minimum amplifier power of your application. *(Amplifiers with power capacities greater than this number will not damage the speakers. The extra power available is simply not used.)*
- Determine the **amplifier features** needed for the application *(see the Site Survey Check List and the Amplifier Features Chart*
- Using the chart on page 106, **find an amplifier** that offers these features. As long as the wattage of the selected amplifier is equal to or higher than the minimum amplifier power, the amplifier will work well for the application.

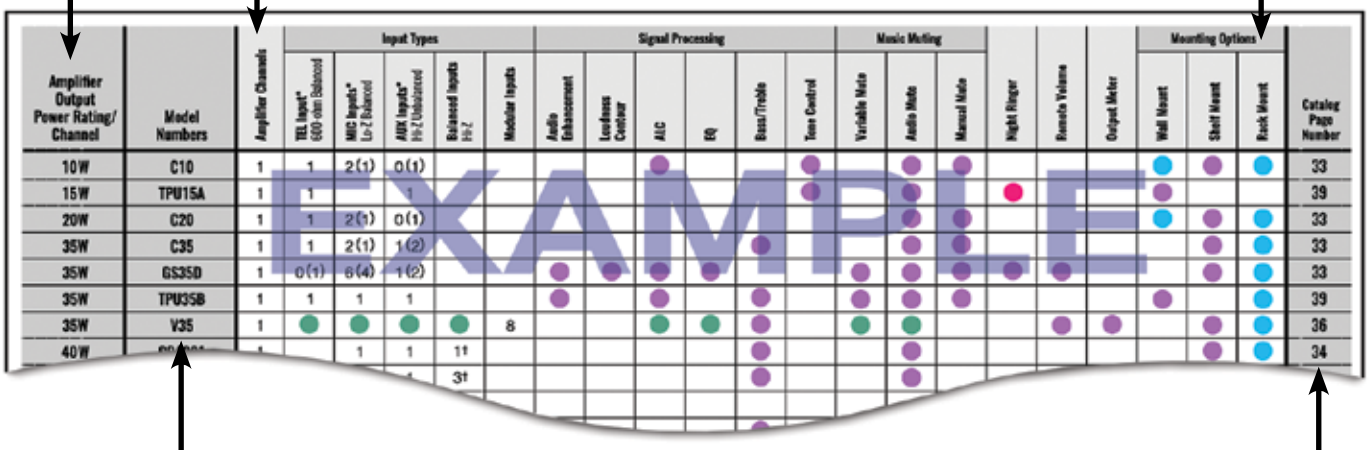
If you think the application's system may need to expand in the future (this is often the case with new constructions and relocating companies), you may want to select an amplifier with a greater power capacity now.

EXAMPLE:
An application requiring 18 CS1EZ Ceiling Speakers requires a minimum amplifier power of 18 watts, so an amplifier with a power rating of 18 watts minimum is needed. Now, look at the chart on page 106 to determine which amplifiers provide the necessary wattage to drive the speakers as well as provide the amplifier features that are most appropriate for the installation. Since the minimum wattage needed is 18, the amplifier with the lowest power usable for this installation is 20 watts (model C20). However, if the C20 does not have the features required for the application, such as bass and treble controls, you can select any amplifier of greater wattage that offers the specific features. For instance, you might select the TPU35B or C35. Both of these amplifiers have a higher wattage than the application's minimum amplifier power needed and provide the desired features because they have bass and treble controls. Either of these amplifiers will work well for this application. Plus, there is room to expand the system on a 35W or higher amplifier without the need to purchase an additional amplifier in the future.

The Amplifier Features Chart outlines the features and power ratings of Bogen amplifiers that can be used for a variety of application needs. For complete chart, see page 106.

A POWER
Locate a power rating that is higher than the application requires (allowing for future system expansion).

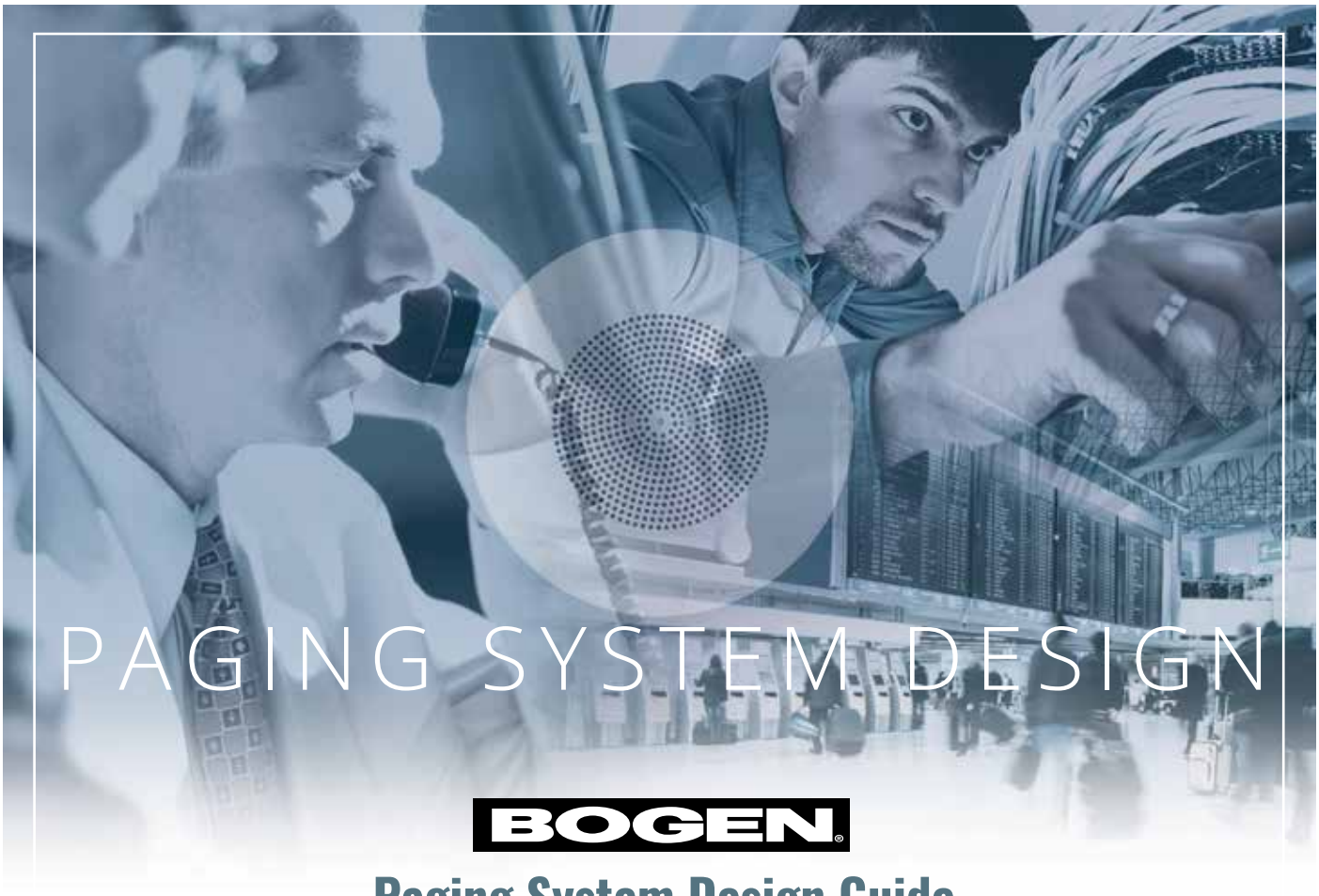
B FEATURES
Find the amplifier features that the application requires.



C MODEL NUMBERS
Select the amplifier model(s) best suited for your application.

D REFERENCE PAGE
Turn to the page number indicated for more information about the product you need.

REFER TO CHART ON PAGE 106



BOGEN

Paging System Design Guide

Design Your Own Systems • Learn Design Principles
Master the Basics of Paging System Technology
Understand the Benefits of both 70V and 24V Systems

Bogen created our **System Design Guide** to help you to understand how a paging system works and how to set one up. It is filled with helpful information and reference material that is sure to help answer your questions about centralized 70V amplifier and 24V self-amplified systems and products, how and when to use them, and how to correctly set them up.

Actually, all that you need to design a proper paging system is a few simple measurements. Then, follow the step-by-step process to select the type and quantity of system components needed. At any point, you can contact **Bogen's Technical Support Department** toll-free for assistance or take advantage of Bogen's Free Application Design Service.

Paging System Technology (Introduction)

70V Systems (Central Amplified)

What Is a 70V System? • Why Use 70V Outputs? • What Makes a 70V Speaker?
Amplifier Output Types • Amplifier Input Types • Designing 70V Systems • Amplifier Selection

24V Systems (Self-Amplified)

What Is a Self-Amplified System? • Why Use Self-Amplified Technology?
What Makes a Self-Amplified Speaker? • Designing Self-Amplified Systems

Speaker Layout • Site Survey • Site Survey Checklist • Speaker Wiring
Wire Types • Wire-Related Losses • Telephone Interfaces • Sound Pressure Levels Chart

PAGING SYSTEM DESIGN GUIDE

Paging System Technology

The aim of a paging system is to deliver important audio announcements, at the proper level and with sufficient clarity, to people working in a facility and to make those announcements easily understood. The two most common ways to accomplish this are to use either 70V centralized amplifiers with passive speakers or self-amplified speakers operating from a 24V DC power supply.

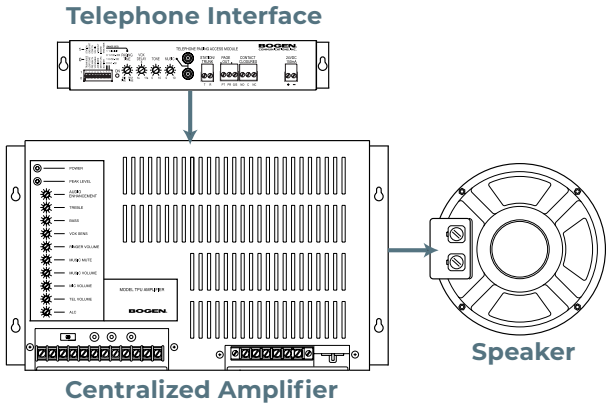
Pages 75-78 explain 70V systems and pages 79-80 explain self-amplified systems. Speaker layout, wiring methods, and phasing are the same for either technology and are covered on pages 82-88.

Central-Amplified Systems – pages 75-78
Self-Amplified Systems – pages 79-80

What Is A 70V System?

A 70V Paging System Consists Of:

- A **CENTRALIZED AMPLIFIER** that offers a variety of features to enhance voice and music reproduction as well as easy system expansion.
- **SPEAKERS** that connect with a simple 2-wire installation because the audio power is supplied from the centralized amplifier.
- An **INTERFACE DEVICE** that connects the paging system to the telephone system. (Depending on the telephone system and amplifier, an interface device may not be needed.)



Why Use 70V Outputs?

Low Currents Allow For Long Runs

Why do distributed sound systems use centralized amplifiers with 70V output signals? Because 70V systems can handle extremely long lengths of wire to connect the speakers to the amplifier, and they can power a large number of speakers in each system.

When sending power signals over long distances, it is important to minimize the amount of current flowing in the wire. High currents allow too much power, or electrical energy, to be wasted in wires in the form of heat.

The power (**P**) lost in the wire is related to the square of the current (**I**), so reducing the current in the wires a little reduces the power lost in them considerably. In fact, reducing the current flowing in a wire by a factor of 2 will reduce the power loss by a factor of 4.

$$P = I^2 \times R$$

P	I²	R
Power Lost In Wires (Watts)	Current Flowing In Wire (Amps)	Resistance Of Wire (Ohms)

However, the power the load demands and the output level of the amplifier determine the amount of current that must flow in the speaker wires.

$$I = P / V$$

I	P	V
Current Flowing In Wire (Amps)	Power Needed In Wires (Watts)	Amplifier Output Voltage (Volts)

So to lower the amount of power lost in the wires, increase the voltage that the amplifier uses to drive the load. By doing this, the current in the wires can be reduced while still supplying the same power to the load (for the same power **P**, any increase in **V** will lower **I**).

Of course, you cannot just change the voltage driving a load from one level to another without also making the load compatible with the new voltage level. To ensure compatibility, 70V systems use transformers on the speakers that change the high 70V amplifier output levels to lower levels that are compatible with typical 8-ohm speakers.

Easy To Control Speaker Power Draw

The output of a central paging amplifier is designed to limit the maximum output voltage that can be supplied to the speakers. This maximum output voltage remains the same regardless of the amplifier's power capacity. Because the output voltage is limited, speaker manufacturers can design products that consume a specific amount of power from the amplifier. This is beneficial in two ways.

First, the speakers will not consume more power than they are designed for so, they cannot blow out from using an amplifier that's too powerful. Second, since each speaker's power consumption is known, the correct amplifier power for the paging system is the total power consumed by all the speakers.

What Makes A 70V Speaker?

Step-Down Transformer

70V paging speakers have a step-down transformer, which is used to convert the high-voltage/low-current amplifier signal of the central paging amplifier to the low-voltage/high-current signal that speakers use.

Taps

The primary side of the step-down transformer (the side that connects to the amplifier) has a number of connections (called taps or power taps) that can be used to select the peak power the speaker will consume from the amplifier.

Why Taps?

The selection of the power tap has an effect on both the amplifier power needed for the system and the volume of the speaker. The more power a speaker consumes, the louder the sound from the speaker. By tapping speakers for lower power in quiet areas and for higher power in noisier areas, you can control and balance the sound level of the paging system.

It is important that speakers be tapped correctly for the area that they will be used in. Setting all the speakers for the same power regardless of the amount of the noise in different areas will cause balance problems. If the amplifier is adjusted to produce adequate paging levels in the noisy areas, the paging levels in the quiet areas will be too loud or vice versa. Selecting the proper tap setting is not difficult, but it does require knowing the level of ambient noise in different areas. (See Sound Pressure Levels Chart on page 88.) It is always better to use the next highest wattage tap if there is any doubt about the speaker being sufficiently loud for the area.

Of course, the best way to determine how effectively a system covers an area is to test it. Never install a paging system and leave the site without testing it. Sound adjustments or additional speakers may be needed. Some paging equipment, such as Bogen's PCM2000, UTI1, and UTI312 paging interfaces include a test tone that is sent to all speakers in the system so installers can check the system installation. For other systems, the installer can have pages made while he walks the area to listen for appropriate sound levels and uniform coverage of the system to find out if and where adjustments need to be made and to make sure that all speakers are properly connected.

Easy Design™ Without Taps

To make designing paging systems as easy as possible, Bogen offers a line of Easy Design™ speakers. These speakers do not require tapping and allow for on-the-fly adjustment of speaker paging levels. All that is needed to design a complete system are the dimensions of the different paging areas and the type of environment. With this basic information, you can use the Easy Design speaker line to quickly design a robust, professional, and powerful paging system.

Amplifier Output Types

70V Output

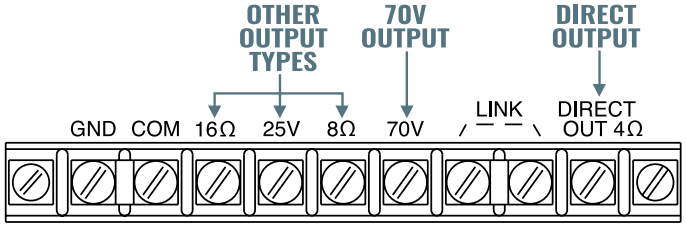
A 70V output is available on Bogen amplifiers and is the primary type of output for paging systems. A step-up output transformer in the amplifier provides the high 70V output signal. All speakers with step-down transformers (rated for 70V systems) are connected to this output.

Other Output Types (25V, 16/8/4-ohm)

There are a number of other standard speaker impedances that Bogen amplifiers can be connected to. These outputs provide the correct speaker signal level for different configurations of low-impedance speakers. The lower voltage (25V) output is provided on many Bogen amplifiers for use in paging installations that require a speaker voltage of less than 70V to meet building code requirements.

Direct Output

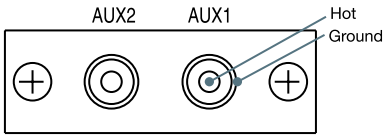
Direct outputs are used with low-impedance speakers. These outputs have an exceptional low frequency (bass) response, providing the fuller sound that low-impedance speakers can reproduce. Certain Bogen amplifiers, designed for general purpose sound reinforcement applications, include this feature, which allows the step-up output transformer to be bypassed for direct connection to the power amplifier's output.



Amplifier Input Types

Auxiliary Input (AUX)

The Auxiliary input is the most common type of input used in paging. This input is designed to connect to most music sources, such as a CD player or tuner. Usually the connector for such an input is a Phono jack (also called an RCA jack). It connects to other equipment using standard audio cables.



Phono (RCA) Input Jacks

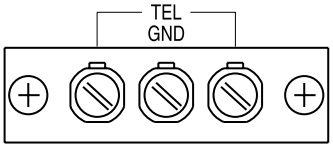
The AUX input has an outer connection that is directly connected to the equipment's ground and a center connection that is the "hot" input. AUX inputs, sometimes referred to as Hi-Z or high-impedance inputs, have a high input impedance so that they won't put too much of a load on the source equipment's output. This type of input is "unbalanced". You must use shielded cable with this type of input in order to avoid getting noise induced into the system.

Normally, connections between source equipment and the amplifier's AUX input should not be too long, about 6 feet. The problem with long connections is that the cable acts like an antenna, picking up any electrical noise in the area. The longer the cable, the more noise that is picked up.

Telephone Input (TEL)

The TEL input is so named because it was designed to be compatible with page port outputs of telephone systems. The TEL input is a 600-ohm transformer-coupled input that:

- Matches the impedance of the telephone port to provide proper interfacing
- Electrically isolates the amplifier from the PBX or Key System
- Provides a balanced input with a great deal of noise immunity



Telephone Input Screw Terminal

Bogen's TEL inputs do not have to be shielded, but it is always a good idea to provide more noise immunity. Normally a ground terminal is available on the input for the shield connection. Higher noise immunity allows the amplifier to be located much farther away from the source equipment than what an unbalanced input will allow.

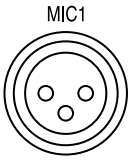
The input transformer is not designed to pass loop current from a telephone line. Any time you want to connect to a telephone station or trunk port, you will need to use a telephone interface module like the TAMB2, which converts the telephone signal into a "dry" audio signal compatible with the amplifier's TEL input.

Microphone Input (MIC)

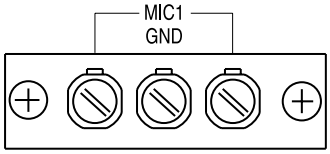
The traditional paging amplifier input is the Microphone input. MIC inputs were the primary announcement source until connection to the telephone system became possible. MIC inputs are still used in public address applications today.

When connected properly, a microphone can be hundreds of feet away from the amplifier and still provide clear, quiet audio.

MIC inputs are the most sensitive of all the amplifier inputs and tend to pick up the stray electrical noise in an area. To combat the noise pickup problem, MIC inputs are balanced. Just like TEL inputs, the balancing of the input provides a high level of noise immunity. MIC inputs are also made to have a fairly low input impedance, which makes it difficult for electrical noise to get induced. The low impedance effectively keeps down noise, which makes its signal level smaller.



Balanced Microphone XLR™ Connector



Balanced Microphone Screw Terminal

Microphone cable is always shielded. The input requires three connections – two for the balanced signal and one for the shield ground. You can reverse the balanced signal leads and the system will still work properly. However, if you improperly wire the ground connections, the amplifier can become unstable and start to oscillate. When this occurs, the amplifier may heat up enough to cause its protection circuits to shut it down or it may produce very distorted sound.

PAGING SYSTEM DESIGN GUIDE

Designing 70V Systems

1 Determining Quantities

To figure out how many speakers you need for your application, you only need the dimensions of the area in which the paging system will be installed.

- For Bogen's Easy Design™ line speakers, refer to the charts on pages 69-72.
- For speakers with multiple tap settings, refer to this section for information.

CEILING SPEAKERS

To determine the number of ceiling speakers your installation requires, divide the area's total square footage by the speaker coverage as indicated in this chart.

Ceiling Height (ft.)	Coverage (sq. ft.)
8	250
10	400
12	580
14	780

TOTAL AREA (Sq. Ft.) ÷ SPEAKER COVERAGE = NUMBER OF SPEAKERS

WALL BAFFLE SPEAKERS

To determine the number of wall baffle speakers your installation requires, divide the area's total square footage by 600 square feet.

Coverage is 600 sq. ft. per speaker

TOTAL AREA (Sq. Ft.) ÷ 600 Sq. Ft. = NUMBER OF SPEAKERS

HORN LOUDSPEAKERS

To determine the number of horn loudspeakers your installation requires, divide the area's total square footage by the speaker coverage as indicated in the chart below.

See chart below

TOTAL AREA (Sq. Ft.) ÷ SPEAKER COVERAGE = NUMBER OF SPEAKERS

2 Determining Tap Settings

To determine tap settings, use the appropriate chart.

Recommended Ceiling Speaker Tap Settings

Ambient Noise Range	Ceiling Height (ft.)			
	8	10	12	14
Low Noise (55 dB - 65 dB)	1/2W* 1/4W**	1/2W* 1/4W**	1W	1W
Medium Noise (65 dB - 75 dB)	1W* 1/2W**	1W* 1/2W**	2W	4W
High Noise (75 dB - 85 dB)	4W			
Very High Noise (85 dB - 95 dB)				

*SM4T Tap Settings **S86/S810 Tap Settings

Recommended Wall Baffle Tap Settings

Ambient Noise Range	Tap Setting
Low Noise (55 dB - 65 dB)	1W
Medium Noise (65 dB - 75 dB)	4W
High Noise (75 dB - 85 dB)	
Very High Noise (85 dB - 95 dB)	

Recommended Horn Tap Settings

	Ambient Noise Range	Speaker Power Taps (Watts)	Coverage (sq. ft.)
SPT5A	Low Noise (55 dB - 65 dB)	1.25W	6,500
	Medium Noise (65 dB - 75 dB)	7.5W	6,500
SPT15A	Medium Noise (65 dB - 75 dB)	0.9W	7,000
	High Noise (75 dB - 85 dB)	3.8W	6,500
	Very High Noise (85 dB - 95 dB)	15W	2,500
SPT30A	High Noise (75 dB - 85 dB)	3.8W	7,000
	Very High Noise (85 dB - 95 dB)	30W	5,500

3 Determining Amplifier Power

To determine the total power your installation will require, simply multiply the number of speakers by the tap wattage.

TOTAL SPEAKERS X TAP WATTAGE = MINIMUM AMPLIFIER POWER

Amplifier Selection

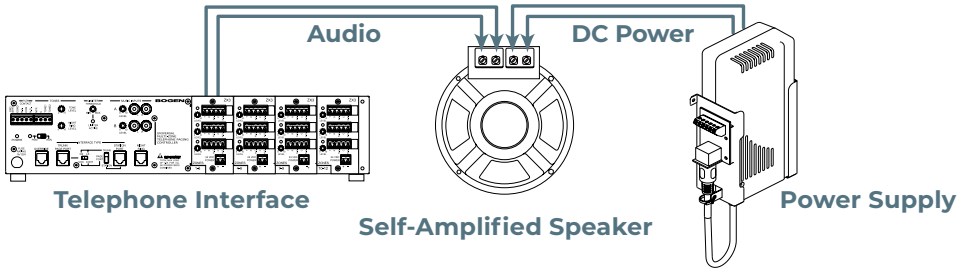
Once you know the minimum amplifier power your system requires, refer to the Amplifier Charts on pages 106-107.

PAGING SYSTEM DESIGN GUIDE

What Is A Self-Amplified System?

Self-Amplified Paging Systems Consist of:

- **SELF-AMPLIFIED SPEAKERS** each contain an individual built-in miniature amplifier that drives the speaker directly. Each speaker requires 4 wires. Two wires supply the raw 24V DC voltage to power the speaker's internal amplifier, and another two wires supply the low-level audio paging signal to the amplifier's input. All amplified speakers contain volume controls to adjust output level.
- A **POWER SUPPLY** or multiple power supplies provide the raw 24V DC voltage that will power the amplifier built into each self-amplified speaker. Several power supplies can be located inconvenient areas in the facility.
- An **INTERFACE DEVICE** that connects the paging system to background music sources and the telephone system and supplies a telephone level audio paging signal to all the speakers in the system. (Depending on the telephone system and number of speakers in the system, an interface device may not be needed.)



Why Self-Amplified Technology?

Low Signal Levels Prevent Crosstalk

In certain installations, it may be desirable to use conductors in an existing telecommunication cable to deliver paging to different floors or areas in a facility. 70V amplifier signals would not be appropriate to run in the same cable with analog telephone signals since their high level could cause crosstalk in the other telephone circuits in the cable. Because the audio signal levels supplied to the inputs of the amplified speakers are similar in level to analog telephone levels, there will be no crosstalk of the paging system in the telephone lines.

The raw 24V DC power needed by the self-amplified speaker can also be carried in the telecom cable since it contains no interfering signals, but care must be exercised to make sure the length of cable will not cause too much voltage to be lost in the cable. (*See Page 86 for more information.*)

Convenient System Expansion

A self-amplified system can be expanded by adding extra speakers and power supplies as required. They are extremely scalable due to the fact that each speaker is an amplifier unto itself. It is also easy to connect additional power supplies where needed to power the speakers. In some instances, there may not be sufficient audio signal level available for the speaker's input. In these instances, a small buffer can be installed in line to boost the signal level.

Self-amplified speakers can also be used to expand 70V paging systems in cases where the added speakers would overload an existing central 70V amplifier. The same buffer that is used to boost signal level can be used to reduce the large 70V speaker signal to a level that is compatible with the input of self-amplified speakers. A suitable power supply can be located near the expansion speakers to power their internal amplifiers. This approach can be used instead of replacing the central 70V amplifier with a larger one to handle the extra speakers.

Cost-Effective For Small Installation

Self-amplified speakers can be very cost-effective in small systems since they provide scalability in small increments. The centralized amplifiers in 70V systems are typically available in set output power level steps that start at 6 or 10 watts and increment by 10 watts or more from one model to next higher powered model. In small applications that require only a few watts of paging, the extra power capability of the 70V amplifiers may not be an advantage due to the higher cost associated with the amplifier's extra power, especially if it will not be used in the future.

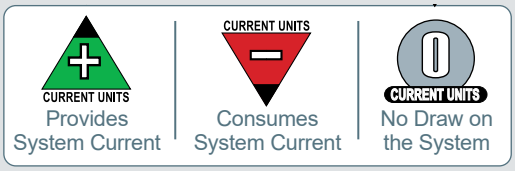
Self-amplified systems can be designed with much smaller output level power steps so that only the necessary audio power is installed in the facility. This can result in a lower cost of equipment especially where the desired power level is considerably less than the smallest applicable 70V amplifier output level.

Understanding Current Units

Self-Amplified paging systems are made up of equipment that consume or provide operating current. To operate properly, the system needs to provide at least as much 24V current as it consumes.

Each product has a Current Units number. This number is either positive, negative, or zero to indicate how much current it provides to or consumes from the system.

Note: One Current Unit = 50 mA, 24V DC



PAGING SYSTEM DESIGN GUIDE

What Makes A Self-Amplified Speaker?

Built-In Amplifier

As the name suggests, all self-amplified speakers contain their own built-in, miniature amplifier. These amplifiers range in size from 1 watt, which are used on cone speakers, up to 30 watts, which are used on the SAH30 horn speakers.

Bogen's latest line of self-amplified horns use a revolutionary digital switching amplifier. Unlike conventional analog amplifiers, an amplifier that uses this advanced technology produces very little heat when it operates. It produces so little heat that all it needs to dissipate the waste heat are the copper interconnecting traces on the printed circuit board instead of the typical large aluminum heat sinks. Because it produces so little heat, it also draws considerably less power from the power supply. Why? Because it is not wasting half of the power supply energy it consumes as heat.

More typical in the industry are speakers that employ analog amplifiers, which produce considerable waste heat while operating. They typically release half the 24V power they consume in the form of heat, and heat is a major contributor to the failure of an amplifier.

The amplifiers in Bogen's AH series of self-amplified horns are analog but rid themselves of waste heat through their large cast aluminum end bell that works as an excellent heat sink, quickly and effectively removing excess heat. Competitive products using plastic end bells don't have this cooling advantage.

4 Wires

All self-amplified speakers require four wires to make the necessary connections. Two of the connections are used to provide 24V DC power to the built-in amplifier. The other connection pair to a self-amplified speaker for the audio signal input.

The general audio signal level is the same as what you would find on any analog telephone line. The input is transformer balanced, also similar to the inputs found on telephone systems. The balanced nature of the input greatly reduces interference and noise caused by equipment running in the facility. The use of a transformer provides electrical isolation between the input leads and the actual amplifier, which protects it from ground loops and RF interference, and provides an all-around rugged input.

Designing Self-Amplified Systems

1 Determining Quantities

Figuring out how many speakers you need for your application is simple.

- For Bogen's Ceiling and Wall Baffle Speakers, you will need room dimensions.
- For Bogen's Horn Speakers, you will need room dimensions and ambient noise levels.

CEILING SPEAKERS

SELF-AMPLIFIED

To determine the number of ceiling speakers your installation requires, divide the area's total square footage by the speaker coverage as indicated in this chart.

Ceiling Height (ft.)	Coverage (sq. ft.)
8	250
10	400
12	580
14	780

TOTAL AREA (Sq. Ft.) ÷ SPEAKER COVERAGE = NUMBER OF SPEAKERS

WALL BAFFLE SPEAKERS

SELF-AMPLIFIED

To determine the number of wall baffle speakers your installation requires, divide the area's total square footage by 600 square feet.

Coverage is 600 sq. ft. per speaker

TOTAL AREA (Sq. Ft.) ÷ 600 Sq. Ft. = NUMBER OF SPEAKERS

HORN LOUDSPEAKERS

SELF-AMPLIFIED

To determine the number of horn loudspeakers your installation requires, divide the area's total square footage by the speaker coverage as indicated in the chart below.

	Ambient Noise Range	Coverage (sq. ft.)	Volume Setting
SAH5, AH5A	Low Noise (55 dB - 65 dB)	8,050	LOW
	Medium Noise (65 dB - 75 dB)	6,955	HIGH
SAH15, AH15A	Medium Noise (65 dB - 75 dB)	6,955	LOW
	High Noise (75 dB - 85 dB)	6,500	MEDIUM
	Very High Noise (85 dB - 95 dB)	2,600	HIGH
SAH30	Very High Noise (85 dB - 95 dB)	5,500	HIGH

TOTAL AREA (Sq. Ft.) ÷ SPEAKER COVERAGE = NUMBER OF SPEAKERS

2 Determining Power Supply Capacity

To determine total 24V DC Power Supply size requirement, follow the steps below.

1. Add all the − numbers of the self-amplified speakers for the system and volume controls together.
2. Select a power supply (or power supplies) with a + number(s) equal to or greater than the total − amount for the system.

PAGING SYSTEM DESIGN GUIDE

Speaker Layout

The layout of the speakers should be planned before installation begins. The spacing of the speakers can be adjusted so that the speakers are evenly spaced in a row. Some adjustments may need to be made due to sound obstructions that may be in the area such as high shelving, cubicle walls, etc.

Ceiling Speakers

Layout starts in one corner of the area. The first speaker should be positioned from each wall a distance approximately equal to the ceiling height of the room (**dimension A**).

The next speaker in **Row 1** should be spaced a distance approximately equal to twice the height of the ceiling (**dimension B**). Each additional speaker in the row should use this same spacing.

Row 2 starts at twice the ceiling height distance (**B**) from row 1 and twice the ceiling height (**B**) from the wall. The other speakers in this row are also spaced at twice the ceiling height.

Row 3 is again spaced at twice the ceiling height (B) from the previous row. The first speaker starting this row is positioned at one ceiling height distance (**A**) from the wall (**similar to row 1**).

Continue this pattern of alternating rows until the room is covered.

The spacing of the speakers can be adjusted so that the speakers are evenly spaced in a row and are more aesthetically pleasing.

Horn Loudspeakers

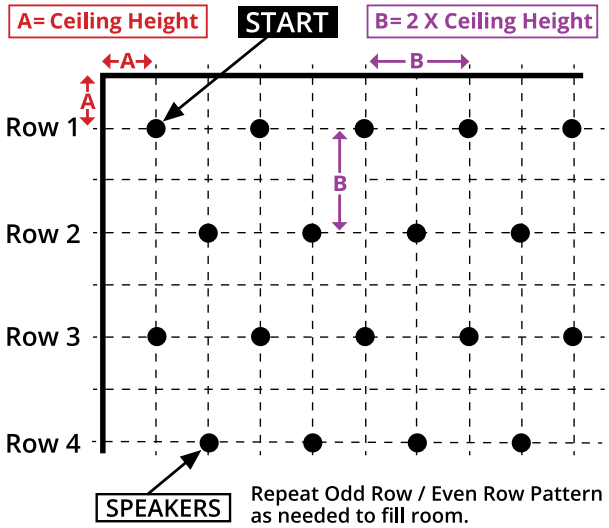
Desired mounting height, barring obstructions, is 15 to 20 feet with the speakers angled downward toward the listening area and facing in the same direction. Follow the diagram for the layout of the horn speakers while using the charts below to define the lettered dimensions for each specific speaker.

Begin in one corner of the area. The first speaker in Row 1 is positioned a distance equivalent to (**1/2C**). The next speaker in Row 1 should be a distance equivalent to (**C**) from the first speaker. Each additional speaker in the row should use this same spacing. Row 2 starts at the indicated distance (**D**) from Row 1. Using the diagram as a guide, fill in the remaining rows in this same alternating pattern until the entire area is appropriately covered.

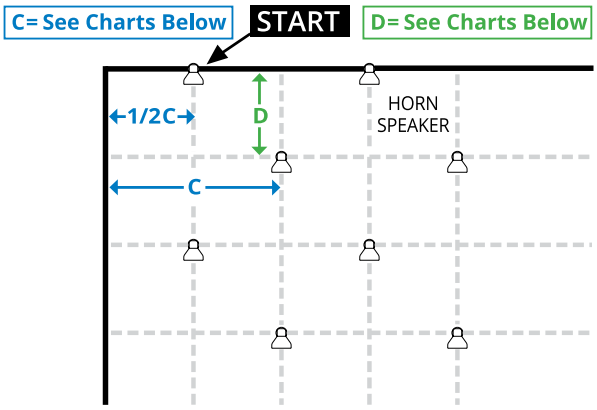
For areas that include high shelving or corridors, speakers should be installed so that they project down the aisles between the shelves or down through the corridors.

The spacing of the speakers can be adjusted so that the speakers are evenly spaced in a row.

Ceiling Speaker Layout



Horn Speaker Layout



NOTE: Each environment is unique. This layout plan is general in nature and may not be applicable for every installation.

	Ambient Noise Range	C	D	Volume Setting
HS7EZ	Low Noise (55 dB - 65 dB)	120 ft.	80 ft.	1/2 Rotation
	Medium Noise (65 dB - 75 dB)	100 ft.	60 ft.	Full Clockwise
HS15EZ	High Noise (75 dB - 85 dB)	100 ft.	60 ft.	1/2 Rotation
	Very High Noise (85 dB - 95 dB)	65 ft.	40 ft.	Full Clockwise
HS30EZ	Very High Noise (85 dB - 95 dB)	90 ft.	55 ft.	Full Clockwise

	Ambient Noise Range	C	D	Volume Setting
SAH5, AH5A	Low Noise (55 dB - 65 dB)	115 ft.	70 ft.	LOW
	Medium Noise (65 dB - 75 dB)	107 ft.	65 ft.	HIGH
SAH15, AH15A	Medium Noise (65 dB - 75 dB)	107 ft.	65 ft.	LOW
	High Noise (75 dB - 85 dB)	100 ft.	65 ft.	MEDIUM
	Very High Noise (85 dB - 95 dB)	65 ft.	40 ft.	HIGH
SAH30	Very High Noise (85 dB - 95 dB)	97 ft.	57 ft.	HIGH

	Ambient Noise Range	Speaker Power Taps (Watts)	C	D
SPT5A	Low Noise (55 dB - 65 dB)	1.25W	100 ft.	65 ft.
	Medium Noise (65 dB - 75 dB)	7.5W	100 ft.	65 ft.
SPT15A	Medium Noise (65 dB - 75 dB)	0.9W	105 ft.	67 ft.
	High Noise (75 dB - 85 dB)	3.8W	100 ft.	65 ft.
	Very High Noise (85 dB - 95 dB)	15W	63 ft.	40 ft.
SPT30A	High Noise (75 dB - 85 dB)	3.8W	103 ft.	68 ft.
	Very High Noise (85 dB - 95 dB)	30W	97 ft.	57 ft.

Speaker Layout

Wall Baffle Speakers

The layout of the speakers should be planned prior to installation. Because wall baffle speakers are designed to project forward, it is best to aim them in the same direction as this provides for both greater coverage and clarity. You can use the building's roof pillars or other available supports for mounting the wall baffles. In some cases, it may be necessary to mount the wall baffles on opposing walls. In these cases, the speakers will project sound in opposing directions.

Chart for 70V & 25V passive speakers

Ambient Noise Range	Tap Setting
Low Noise (55 dB - 65 dB)	1W
Medium Noise (65 dB - 75 dB)	4W
High Noise (75 dB - 85 dB)	
Very High Noise (85 dB - 95 dB)	

Chart for 24V self-amplified speakers

Ambient Noise Range	Facing Speaker Distance	Volume
Low Noise (55 dB - 65 dB)	< 40 ft.	Med
	40 to 60 ft.	High

• HALLWAY/ROOMS

Wall baffle speakers work well with rooms and hallways that are 20' to 60' wide. Layout starts at one end of the hallway or room. The first speaker should be installed 10' from the end of the hallway or room. The next speaker, on that wall should be installed 20' from the first speaker, as should any additional speakers required to cover the length of the hallway or room.

The first speaker on the opposing wall should be installed 20' from the end of the hallway or room, thereby staggering the speakers. Each additional speaker should also be installed 20' apart from the previous one. (See Figure 1.)

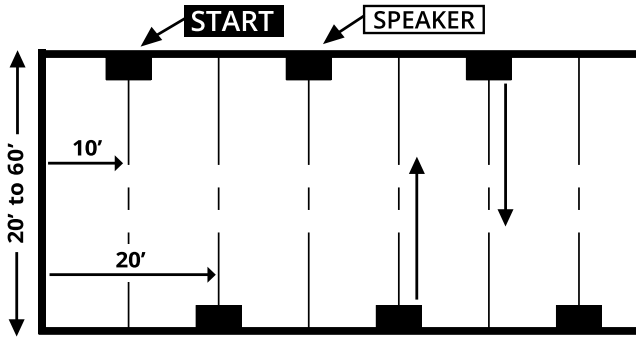


FIGURE 1

• OPEN AREA

The number of speakers needed to cover an open area and the layout of those speakers are contingent upon the availability of suitable mounting points in the area to be covered.

Layout starts in one corner of the room. The first speaker should be installed 10' from the corner of the room with each additional speaker in the first row installed in increments of 20' from the first. Based on Figure 2, install the next row of speakers 30' from the first row and 20' from the wall with increments of 20' between each speaker. The third row would follow the example of the first, and each additional row would continue this pattern of alternating rows until the whole area is covered. (See Figure 2.)

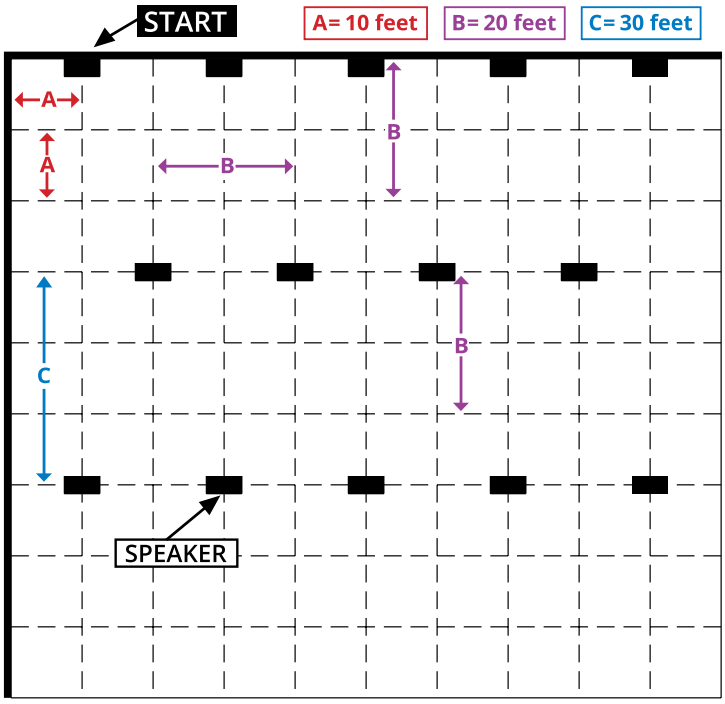


FIGURE 2

PAGING SYSTEM DESIGN GUIDE

Site Survey

Designing a system and determining an installation's requirements are quite simple. After you set up your first system, the steps will appear logical and soon the process will become routine. However, before you begin designing or quoting a job you will need some basic information regarding the site and the end-user's needs.

Use the Site Survey Check List below to ensure that you collect all the information you will need to complete the design of the paging system. When you have completed the check list, create a bill of material for the equipment you need for the installation's sound system. Refer to the Easy Design™ Guide (pages 69-73), page 75 for 70V systems, or page 79 for 24V systems.

Tools Needed (for Site Survey Check List below)

You will need to bring the following tools with you when you visit the installation site:

- Measuring wheel/tape measure
- Sound pressure meter
- Calculator
- Bogen Product catalog
- Photocopies of the **Site Survey Check List**

Obtain a copy of the floor plan, or create sketches of any areas that may require special design considerations (high shelving, speaker mounting locations, exposed beams, amplifier location, etc.).

A successful paging system depends on more than just understanding the physical requirements of the installation site; it also depends on knowing which special paging features the user will benefit from and use on a daily basis. These include zone paging, tone controls, night ringer, feedback elimination, ambient noise sensors, multiple inputs, etc.

Site Survey Check List

This **Site Survey Check List** will help to determine the paging system equipment needed for installations. Photocopy this page and bring it with you when you visit installation sites. You may require several copies of this chart for each installation.

Section I – SYSTEM NEEDS required for the installation.
Section II – SPECIFIC AREA NEEDS within the installation.

NOTE: Installations that contain areas with different style environments or sound levels may require Section II to be filled out separately for each area.

I. SYSTEM NEEDS

a. What Type of Telephone Port Will Be Available for Connection to the Paging System? *(see page 87)*

❑ Loop Start ❑ Ground Start ❑ Other: _____
❑ Page Port ❑ Analog Station Port

b. How Many MIC Inputs Are Needed? _____ *(see page 77)*

c. How Many AUX Inputs Are Needed? _____ *(see page 77)*

d. Is Zone Paging Required? ❑ Yes ❑ No *(see pages 30-31, 36)*

If yes, how many zones: _____

e. Is Talk Back Required? ❑ Yes ❑ No *(see page 32)*

If yes, in individual zones? ❑ Yes ❑ No *(see pages 30-31)*

If yes, system-wide (no zones)? ❑ Yes ❑ No *(see page 32)*

f. Is Group Paging Required? ❑ Yes ❑ No *(see pages 30-31)*

g. Are Time Tones Needed to Signal Shift Changes?

❑ Yes ❑ No *(see pages 30-31)*

h. How Can Headend Equipment Be Mounted?

❑ Rack ❑ Wall ❑ Shelf

i. System Features Needed:

❑ Auto Level Control (ALC)
❑ Bass & Treble Controls
❑ Automatic Mute
❑ MOH Output
❑ Audio Enhancement
❑ Subwoofer
❑ Variable Loudness Contour Control
❑ Graphic Equalizer
❑ Variable Mute
❑ Manual Mute
❑ Night Ringer
❑ Sound Masking

j. Any Technology Preference?

❑ 70V Central Amplifier ❑ Self-Amplified 24V Equipment
❑ None

II. SPECIFIC AREA NEEDS

a. Area Name/Description: _____

b. Area Dimensions:

Length _____ ft. Width _____ ft.
Square Footage _____ sq. ft. Ceiling Height _____ ft.

c. Ambient Noise Level: _____ dB *(to estimate, see chart on page 88)*

d. Will There Be Large Changes in Ambient Noise Levels in the Area? ❑ Yes ❑ No *(see pages 22-23, 33)*

If yes, note range: _____ dB to _____ dB

e. Is Hearing Protection Worn On-Site? ❑ Yes ❑ No

f. Environment:

❑ Office/Professional/Retail Store
❑ Institutional/Remote Public Area
❑ Aisles created by high storage racks
❑ Cafeteria/Break Room
❑ Loading Docks/Outdoor Areas
❑ Factory/Industrial
❑ Warehouse
❑ Hallways
❑ Auditorium
❑ Other: _____

g. Where Will the Speakers Be Placed?

❑ Indoors ❑ Outdoors

h. How Can the Speakers Be Mounted?

❑ Suspended/Drop Ceiling*
❑ Beams, Columns, Other Structures
❑ Wall**
❑ Ground

** Make note of any changes in surfaces or positions for the speaker mounting.*
*** Make note of any changes in wall angles, surfaces, or height.*

i. Are Volume Controls Mounted on Each Speaker Needed?

❑ Yes ❑ No

j. Are Wall-Mounted Attenuators Needed for Area's Volume Control? ❑ Yes ❑ No *(see pages 34 & 42)*

k. Is Feedback Elimination Equipment Needed?

❑ Yes ❑ No *(see page 32)*

l. Is Background Music Needed? ❑ Yes ❑ No

If yes, BGM source: *(see page 44)*

❑ Tuner • Antenna available for tuners? ❑ Yes ❑ No
❑ CD Player/Receiver ❑ Other: _____

To use Bogen's FREE DESIGN SERVICE, DO NOT use this checklist.
Use the online form at: *https://www.bogen.com/free-design-service*

Speaker Wiring

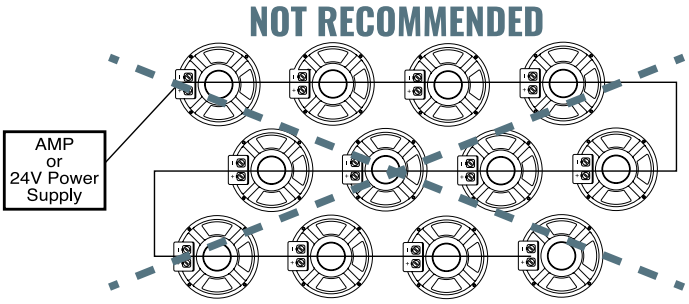
Speaker Wiring Patterns

Because distributed paging systems involve a great number of speakers and long distances, the manner in which the speakers are wired is important. Deciding on how to wire the speakers depends on whether separate zones of speakers are needed, how many lines back to the amplifier are reasonable, and how easy it will be to troubleshoot the system in the future.

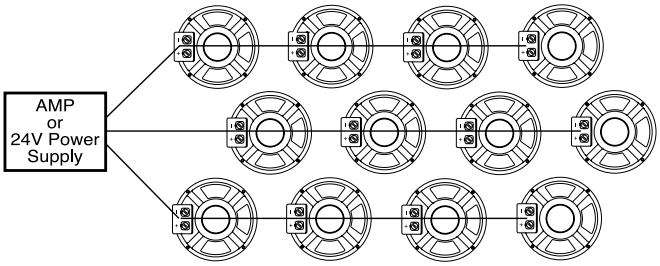
How you wire a speaker system may require some tradeoffs. The simplest way is to parallel all the speakers on one very long run of wire. This approach leads to some problems. First, the amount of power lost in a long run of wire may not allow the required amount of 70V speaker signal, or 24V DC voltage for self-amplified paging systems, to get to the farthest speakers. Second, if there should be a short on the wire run, it would take down the entire run. In order to locate it, you would need to disconnect each speaker until the failed one is found.

Multiple Wire Runs

A more practical approach is to wire each row of speakers in an area together and run a lead wire from this row back to the amplifier. The objective is not to have so many speakers daisy-chained together that it makes troubleshooting impossible. Wire runs can be separated to determine in which run the problem exists.



Single Wire Run (NOT Recommended)



Multiple Wire Runs (Preferred)

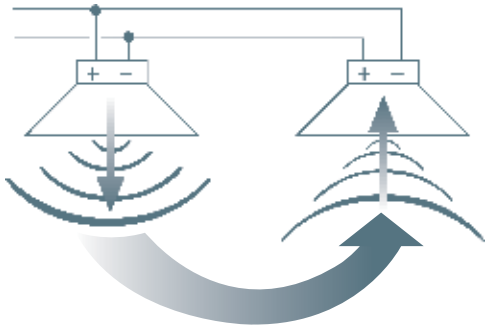
Speaker Wiring Patterns

As the voltage on a speaker changes from plus to minus, the speaker cone moves from pushing out to pulling in. If you reverse the polarity, the speaker responds in the opposite manner.

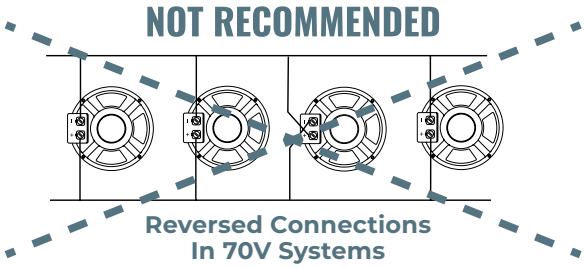
The reversed polarity in one speaker causes the sound between the speakers to be cancelled, mostly affecting the bass. These two speakers are then out of phase.

In a paging system, all the speakers should be in phase so that they all push out at the same time. Out-of-phase speakers operate perfectly well and will not cause any harm to a paging system, but will tend to diminish the bass response in the area around the out of phase speaker.

The important thing is to wire all the same polarity (+ or -) connections together. This will ensure that the speakers in the system all work in unison. All paging speaker connections have a polarity indicator. It may be a color code, plus (+) and minus (-) symbols, or a red dot.



Reversed polarity in one speaker causes the sound between the speakers to be cancelled, mostly affecting the bass

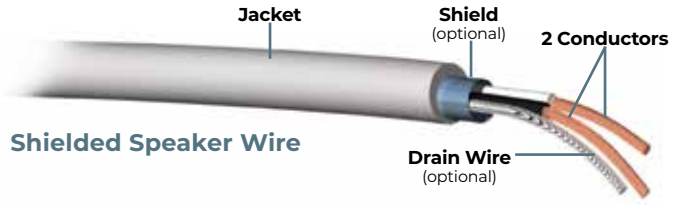


Reversed Connections In 70V Systems

Wire Types

Speaker Wire

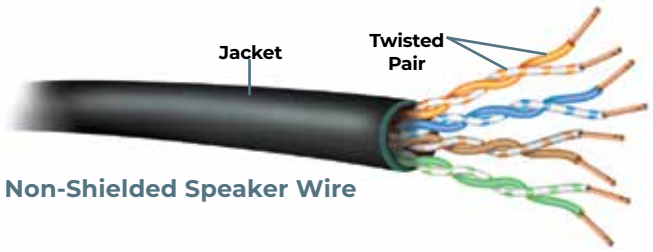
The speaker wire best suited for paging systems is 2 conductors in a jacket. The gauge of the conductors varies depending on the installation. In many instances, a shielded version of the speaker wire is used. The shield can be useful to help protect the conductors from receiving electrical interference from other electrical equipment in the area. The shield is particularly useful when speakers are to be used as microphones in talk-back applications.



Shielded Speaker Wire

UTP

Unshielded Twisted Pair (UTP) wire has many uses but is most common in data and telecom installations. It uses solid conductors, typically 24 gauge. It has insulation to withstand voltages similar to speaker wire and can be used in 70V and self-amplified applications, as long as the thin gauge and the associated higher resistance is accounted for. Also because there is no shield, the use of UTP in talk back applications (where the speaker acts as a microphone) may lead to higher electrical noise on the talk back signal. There are normally several twisted pairs in a single cable and these can be paralleled to approximate lower gauge wires.



Non-Shielded Speaker Wire

Shielded Cable

Shielded cable refers to any conductor (or conductors) wrapped in an electrically conductive shield. The two types of cable most prevalent for audio installations are:

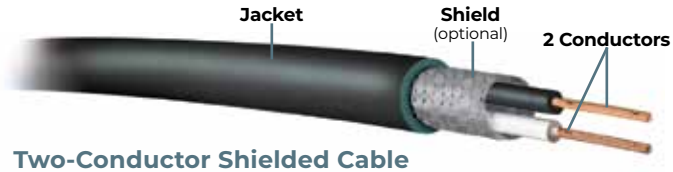
- **SINGLE-CONDUCTOR SHIELDED CABLE**

Single-conductor shielded cable is used to connect external equipment to the unbalanced AUX inputs of amplifiers. The center conductor carries the signal source and the shield carries the ground between the amplifier and external equipment. In addition to completing the ground return between the electrical equipment, the cable provides a large amount of noise and interference protection for the center conductor. The most common connector for this type of cable is the Phono connector (a.k.a. the RCA connector). The connector's center pin connects to the internal conductor and the skirt around the connector's perimeter connects to the shield of the cable.

Single Conductor Shielded Cable

- **TWO-CONDUCTOR SHIELDED CABLE**

Two-conductor shielded cable is typically used with balanced microphones. Two internal conductors are required for the low-impedance balanced microphones used in paging systems. The shield is wrapped around these conductors and provides the same protection against electrical interference and noise as single-conductor cable. Balanced microphone inputs provide a ground connection point for the shield. Without the ground connection, the shield would be ineffective. Some microphones with push-to-talk switches require two more conductors to carry the switch closure back to the amplifier. In this cable, the conductors for the switch closure are not wrapped in the shield but rather carried in the cable jacket outside of the shield. The most popular types of connectors for microphone cable are screw terminals and XLR connectors.



Two-Conductor Shielded Cable
(Balanced MIC Cable)

Wire-Related Losses

Wire is an important but often ignored component of a paging system. Because all wire has resistance, some of the voltage at the source is lost or dropped in the wire before it reaches the target destination. The amount of voltage lost in the wires is affected by the resistance or gauge of the wire and the current flowing in the wire. This is classic Ohm's law in action. If the drops in the cables are not anticipated, the final volume level at the passive speaker may not meet the requirement or, for a self-amplified speaker, there may not be enough DC voltage available to the speaker to allow the built-in amplifier to operate cleanly or at all.

There are different charts for centralized and self-amplified speakers to determine the maximum cable lengths that should be allowed. In the case of central amplifier systems, try to keep the system power lost in the wires to 10% or less. However, less power at the speaker is the only negative effect larger losses have on the system. Clarity, intelligibility, and frequency response are unaffected by larger losses in the wiring of centrally amplified systems.

Self-amplified systems are particularly sensitive to losses in the wire, especially the amount of supply voltage that is lost in the wires on the way to the self-amplified speaker. When the drop in the wiring becomes too large, the speakers may begin to distort or stop functioning altogether. For this reason, it is important to adhere to the maximums shown in the tables below.

Wire Loss in Central Amplified Systems (70V & 25V)

Once you have an idea of how many speakers are to be wired together in a run, estimate how long the wire run will be from the first to the last speaker in each run. Include the lead-in wire length from the amplifier to the first speaker in each run in your overall run length. For each run, sum up the speaker power and cable lengths.

With that information, refer to the Wire Loss Chart to ensure that the wire gauge is sufficient to support the power and cable length for the run. It may be necessary to increase the wire gauge, split the speaker loads, or shorten the wire run lengths if they exceed the chart maximums.

70V WIRE LOSS CHART

Wire Gauge	70V - Load Power Per Wire Run (Watts)						
	5	10	15	30	50	100	200
16	10,000	7,000	4,600	2,300	1,400	700	350
18	9,000	4,500	2,800	1,400	830	415	205
20	5,500	2,700	1,800	900	540	270	135
22	3,400	1,700	1,100	550	330	115	60
24	2,100	1,000	700	350	210	105	50
	Maximum Wire Run Cable Length (ft.) (10% of Power Lost in Wire)						

Shield/Stranded Cable Recommended

25V WIRE LOSS CHART

Wire Gauge	25V - Load Power Per Wire Run (Watts)						
	5	10	15	30	50	100	200
16	1,280	640	425	215	125	60	30
18	800	400	265	130	80	40	20
20	505	250	165	80	50	25	12
22	315	155	105	50	30	15	7
24	200	100	65	30	20	10	5
	Maximum Wire Run Cable Length (ft.) (10% of Power Lost in Wire)						

Shield/Stranded Cable Recommended

Wire Loss and Voltage Drop In Self-Amplified Systems

The most important wiring consideration with self-amplified speakers is to ensure that there will be enough voltage available at each device to allow its internal amplifier to operate correctly. If too much voltage is dropped in the wires leading to a speaker, this may not be the case.

Once you have an idea of how many speakers are to be wired together in a run, estimate how long the wire run will be from the first to the last speaker in each run. Include the lead-in wire length from the power supply to the first speaker in each run. Also, sum up the CU ratings of all the speakers on the run.

With that information, refer to the Voltage Drop Chart to ensure that there are not too many speakers loading the wire use in the run or that the wire gauge is sufficient to support the power and cable length desired. To stay within the chart length limits, it may be necessary to either create a shorter run containing less speakers or double up on conductors in the cable to effectively lower the gauge of the supply wire. The Reducing Gauge Chart can be used to determine what effective gauge is achieved by doubling or tripling up on pairs in the cable.

Reducing Gauge		
Wire Gauge (AWG)	GAUGE OF 2 PARALLEL PAIR	GAUGE OF 3 PARALLEL PAIR
26	24	22
24	22	20
22	20	18
20	18	16
18	16	14
16	14	12

VOLTAGE DROP CHART

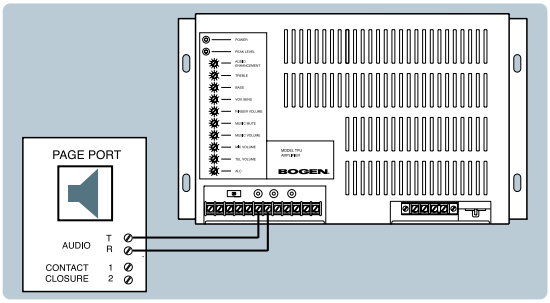
Total CU (Current Units) on cable run	Wire Gauge (AWG) 26	24	22	20	18	16
10	220	351	557	887	1413	2237
20	110	175	279	443	706	1118
30	73	117	186	296	471	746
40	55	88	139	222	353	559
50	44	70	111	177	283	447
60	37	58	93	148	235	373
70	31	50	80	127	202	320
80	28	44	70	111	177	280
90	24	39	62	99	157	249
100	22	35	56	89	141	224
110	20	32	51	81	128	203

Maximum Wire Run Cable Length (ft.)

Telephone Interfaces

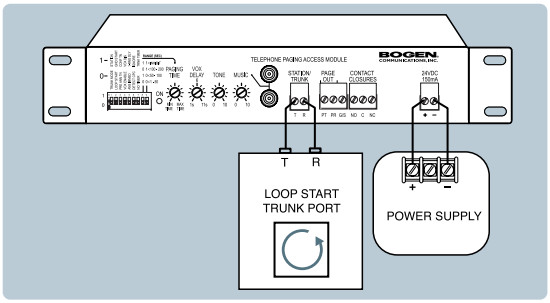
The most common way to make announcements over a paging system is through the telephone system. It is a convenient and readily available live input source. However, audio and telephone technologies are different. This sometimes makes it necessary to use an adapter to link the two systems together. There are many types of telephone ports possible in telephone switches. The four types presented here – **Page Port**, **Loop Start** trunk, **Ground Start** trunk, and **Analog** ring-up station – are the only ones Bogen recommends as interfaces to telephone systems. Other port types, and specifically digital station ports, are not suitable for connection to amplifiers and interface devices.

Page Ports



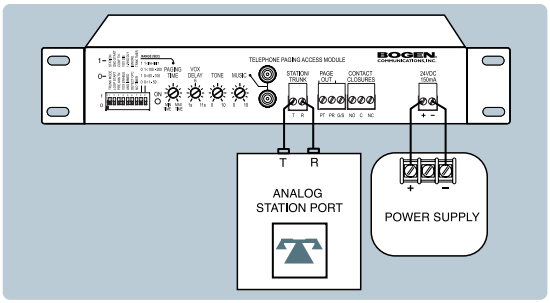
- Dedicated audio output available standard on most telephone systems
- Can be connected directly to the input of most amplifiers
- A 600-ohm dry audio signal and a normally open control contact closure
- Control contacts, if available, activate during a page and typically control the muting of background music
- Some page ports provide only an audio pair, which requires audio equipment have voice-activated (VOX) functions such as background music muting
- Paging ports are not always bi-directional like telephone lines (bi-directionality is necessary when including talk-back capability in a paging system)
- Not all paging ports will produce DTMF tones, which are necessary when using zone paging equipment

Loop and Ground Start



- The Loop Start, or CO port, is the most popular type of paging interface to use when a page port is not available or suitable
- A Ground Start trunk uses loop current but employs a request and acknowledgment handshake for making the initial connection
- An interface device is necessary when connecting a trunk to an amplifier
- When paging, an interface adapter detects the off-hook condition of the trunk and connects the amplifier to the trunk port through signal conditioning electronics
- When the trunk is released, the adapter detects the on-hook condition and immediately disconnects the amplifier from the trunk
- A pop at the end of a page is typically present due to the large change in telephone line voltage between on- and off-hook conditions

Analog Station



- An analog station allows interfacing when neither a paging port nor a trunk port is available
- Analog ring-up interfacing requires a more sophisticated interface than other methods
- The interface must detect a high-voltage ring signal and answer the call to start the page
- To determine when to disconnect a page, typically two system timers are used: one limits the maximum length of a page to ensure disconnection, the other senses audio activity and disconnects after a preset length of silence
- Many telephone switches now provide a calling party control (CPC) signal, which indicates to the interface that the caller has disconnected; Bogen interfaces disconnect immediately upon detecting a CPC signal

Sound Pressure Levels Chart

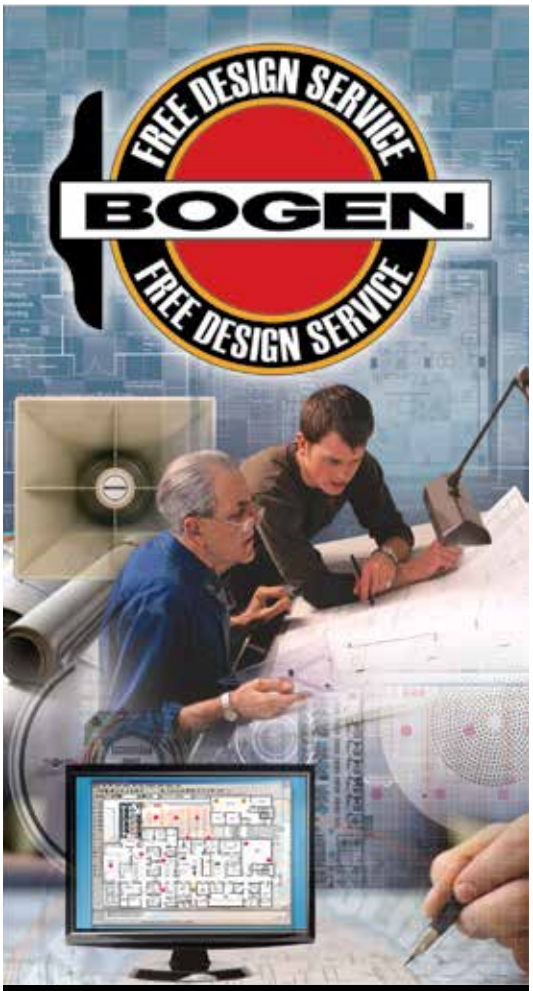
Typical Ambient Noise Level			Typical Environments		
Very High Noise	85-95 dB	Speech Almost Impossible To Hear	Construction Site Loud Machine Shop	Noisy Manufacturing Printing Shop	95 dB
High Noise	75-85 dB	Speech is Difficult To Hear	Assembly Line Crowded Transit Station Machine Shop	Shipping/Warehouse Supermarket (Peak Time) Very Noisy Restaurant/Bar	85 dB 75 dB
Medium Noise	65-75 dB	Must Raise Voice to be Heard	Bank/Public Area Department Store Noisy Office	Restaurant/Bar Supermarket Transit Station	65 dB
Low Noise	55-65 dB	Speech is Easy To Hear	Conversational Speech Doctor's Office Hospital	Hotel Lobby Quiet Office Very Quiet Restaurant/Bar	55 dB

Free Application Design Service

Bogen's Free Application Design Service was created to assist with the design of paging systems for any and every project encountered. It's fast, comprehensive, and **FREE**. So let us design it for you!

The Application Design Service provides:

- PAGING SPEAKER PLACEMENT DESIGN
- SOUND MASKING SPEAKER PLACEMENT DESIGN
- COMPLETE BILL OF MATERIALS - This includes product description, model number, and quantity. We can even fax it to the distributor of your choice for pricing if you wish.
- CONNECTIVITY DRAWINGS
- SCOPE OF WORK
- DETAILED ASSUMPTIONS
- COMPLETE BILL OF MATERIALS (blueprints must be supplied; AutoCAD® format files are preferred/accepted)



www.bogen.com/free-design-service

How the Application Design Service works:

1. You provide the information concerning your project (see the Design Request Form on our site: www.bogen.com/requestform.pdf). For any large or complex applications, your local Bogen Regional Sales Manager can visit the site for exact specifications.

2. Bogen will then provide you with a working technical bid response document and then all you have to do is deliver it. Then, a copy of the bid will also be sent to your local Bogen Field Sales Manager for immediate follow-up and to see if you have any questions or need additional assistance.

Put Bogen's Resources and Expertise to Work for You!

No application is too big, small, simple, or complex for Bogen Paging Product Designers.

FOR MORE INFO OR TO SEND IN A PROJECT TO US

Call 1-800-999-2809

BOGEN

SOUND MASKING DESIGN GUIDE

Leveraging Bogen's 90+ years of audio engineering excellence, Sound Masking delivers superior performance, high reliability, ease of use, and flexible coverage across any indoor space.

Sound masking can be useful in many environments such as:

- Commercial facilities, including both open and closed offices.
- Medical facilities, particularly to satisfy regulations that mandate protection of patient health information.
- Educational institutions, in administrative offices, consultation rooms, libraries, student centers, and areas where focused study is required.
- Secure facilities, such as legal offices, court rooms, accounting firms, and military facilities.

NYQUIST™

Sound Masking System Design Guide

Sound Masking Design Goals

The primary goals of sound masking are to reduce distractions caused by unwanted sound and to provide conversational or speech privacy. Distractions are reduced by increasing the background noise while reducing the range of fluctuations in sound levels within a targeted area. Speech privacy is provided by increasing the background noise *surrounding* the target area, effectively distorting and muffling sounds and voices emanating from within.

Sound masking creates an evenly distributed and diffused sound field in which listeners are unable to detect the source. This "random" noise obfuscates most sounds within the environment—such as a conversation or typing—thereby reducing disturbances and providing a level of privacy, even within an open space.

Sound Masking Applications

Coverage and Planning

Sound masking can be useful in many environments such as:

- Commercial facilities, including both open and closed offices.
- Medical facilities, particularly to satisfy regulations that mandate protection of patient health information.
- Educational institutions, in administrative offices, consultation rooms, libraries, student centers, and areas where focused study is required.
- Secure facilities, such as legal offices, court rooms, accounting firms, and military facilities.

Areas where sound masking should not be utilized are:

- Training and audio/visual presentation rooms, where intelligibility is important.
- Bathrooms (for security purposes, unless requested by customer).
- Areas used by the hearing or sight impaired.

Sound masking is usually not applied in conference rooms and closed offices where clear and reliable communication is important. For these environments, privacy can be enhanced by applying sound masking to the *adjacent* hallway or open office/space, thereby providing improved privacy from people outside the "protected" area (*see Figure 1*).

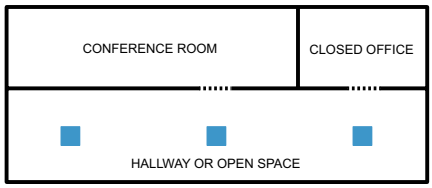


Figure 1: Typical sound masking application.

An exception when sound masking may be needed *within* a closed office is where the walls between it and the adjoining offices only extend up to the drop ceiling, not the structural ceiling, leaving the ceiling plenum (i.e., the space between the drop ceiling and the structural ceiling) open and acting as an air duct. This would allow sound to travel between each office through return air grilles, compromising privacy. Sound masking applied in a closed office would also prevent distractions from noise traveling outside open spaces into the closed office via the plenum space in the ceiling (*see Figure 2*).

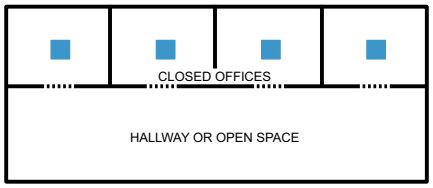


Figure 2: Closed offices application.

NYQUIST™

Acoustics

A critical factor in the success of a sound masking system is first addressing the physical acoustics of the target area. The goal is to decrease the level of unwanted sound to which people are exposed, thereby decreasing the level of unwanted sound to mask (*see Figure 3 and Figure 4*).

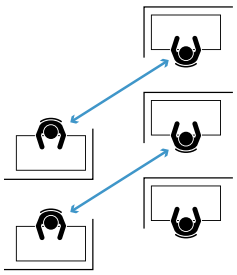


Figure 3: Poor design (line-of-sight between office workers)

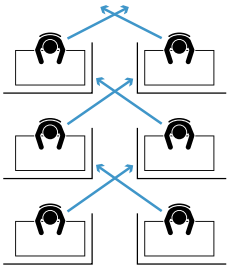


Figure 4: Good design (no line-of-sight between office workers)

Where possible, minimize *direct line-of-sight transmission* between workspaces/cubicles (*see Figures 5 and 6*) by adding or replacing partition walls, using the appropriate height and material.

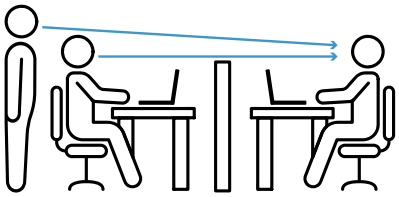


Figure 5: Low partitions offer no speech privacy.

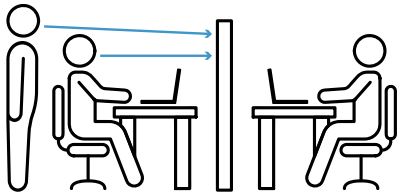


Figure 6: Minimum 66" partitions can block speech.

To minimize *voice and sound reflection* and reduce environmental sound in the target area (*see Figure 7 and Figure 8*):

- Change flooring material from hard surfaces such as hardwood or tiles to carpets.
- Replace standard flat-panel ceiling lights with parabolic recessed light fixtures.
- Use absorbent material in ceiling tiles and on cubical walls.

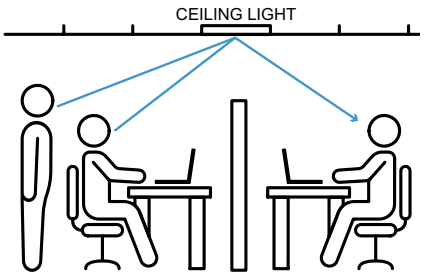


Figure 7: Sound bounces off light fixtures with hard, reflective surface.

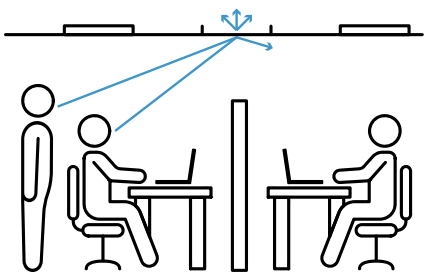


Figure 8: Sound is reduced by absorbent ceiling tiles.

Speaker Options

NQ-SMS1810-SCG: Nyquist Suspended Ceiling Grid Sound Masking Speaker

The NQ-SMS1810-SCG includes a ceiling grid mount and a sound masking speaker assembly, which consists of an 8" dual-cone loudspeaker with a 10-ounce magnet and a 25V/70V, 4W max., rotary tap selector. A seismic safety cable is supplied to secure the speaker to a solid object in the plenum space.

Installation: Place upward-facing on top of a 24"-wide ceiling tile on a conventional suspended ceiling grid.

NQ-SMS1810-VF: Nyquist Variable Firing Sound Masking Speaker

The assembly for the NQ-SMS1810-VF comes with an 8" dual-cone loudspeaker with a 10-ounce magnet and a 25V/70V, 4W max., rotary tap selector. It includes two multi-position hangers for multiple mounting configurations and also comes with a chain kit.

Installation: Connect the two multi-position hangers to the structural ceiling to hang above the suspended ceiling deck. It can face upwards, downwards, or sideways.

CSD2X2 and CSD1X2: Drop-In Ceiling Speaker

The CSD2X2 or CSD1X2 replaces a conventional ceiling tile and faces downward.

Installation: Mount the CSD2X2 or CSD1X2 parallel to the floor plane in a 24"-wide suspended ceiling tile grid facing downward.

Refer to Table 1 for additional devices that work in conjunction with the above speakers.

Nyquist 2-Channel Audio Power Amplifiers	Nyquist 4-Channel Audio Power Amplifiers	Volume control wall unit (for closed offices and conference rooms)
• NQ-A2060-G2	• NQ-A4060-G2	• AT10A 10W Attenuator
• NQ-A2120-G2	• NQ-A4120-G2	• AT35A 35W Attenuator
• NQ-A2300-G2	• NQ-A4300-G2	
Note: 15–20% headroom is recommended for the masking amplifiers. Note: Any Bogen high-impedance downward-facing ceiling speaker can be used for sound masking applications.		

Table 1: Other available devices

Buildings with Suspended Ceilings

The ceiling plenum is the most common location to install sound-masking speakers. The specific type of speaker to use depends on the plenum's depth and available space.

A typical office has a height of 9′ from the floor to the visible face of drop-ceiling tiles. The plenum extends upwards from the top of the drop ceiling to the structural ceiling (hard deck) above. In this kind of construction, either install NQ-SMS1810-SCG on top of the ceiling tile grid to avoid a cluttered plenum (*see Figure 9)* or, using the chain kit, hang NQ-SMS1810-VF upward-facing from the structural ceiling, with the bottom of each speaker about 6″ to 8″ above the suspended ceiling grid (*see Figure 10*).

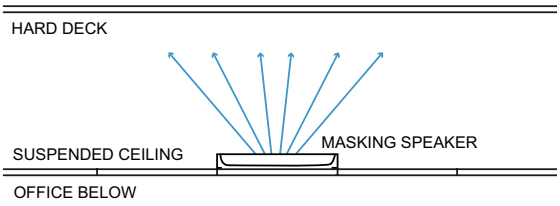


Figure 9: NQ-SMS1810-SCG placement with a typical plenum height.

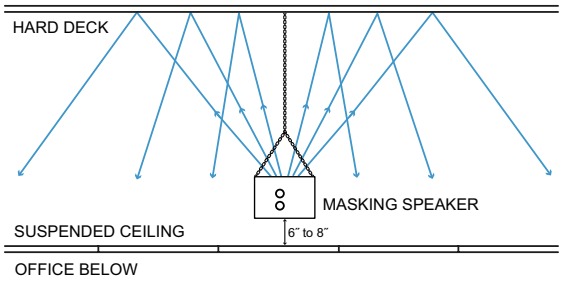


Figure 10: NQ-S1810SM-VF placement with a higher plenum height.

For optimal masking with either layout, speakers should be placed in a grid pattern (*see Figure 13*). Since sound mixes well in the open plenum space, this will give an even coverage of sound masking. The taller the plenum space, the further apart the speakers should be and the higher the wattage should be set for the transformer taps. The shorter the plenum space, the closer the speakers should be to one another.

If the plenum depth exceeds 6′, hang upward-facing NQ-SMS1810-VF speakers 2′ to 4′ from the structural ceiling (hard deck).

When there is acoustic absorption material or thermal insulation on the structural ceiling, hang downward-facing NQ-SMS1810-VF speakers 2′ to 4′ from the structural ceiling (*see Figure 11*). Adjacent speakers must be incoherent[1] (i.e., different) and therefore a two-channel system is required (*see Two-Channel Wiring*).

CSD2X2 speakers can be used when the plenum is shallow (less than 1′ in height) and/or contains obstructions which would prevent an even coverage of sound masking and cause difficulty in installation (*see Figure 12*). Adjacent speakers must be incoherent and therefore a two-channel system is required (see *Two-Channel Wiring*).

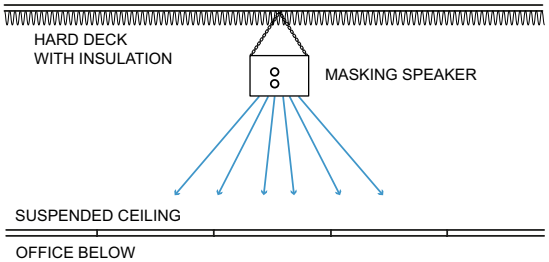


Figure 11: NQ-S1810SM-VF installed in plenum space with insulation.

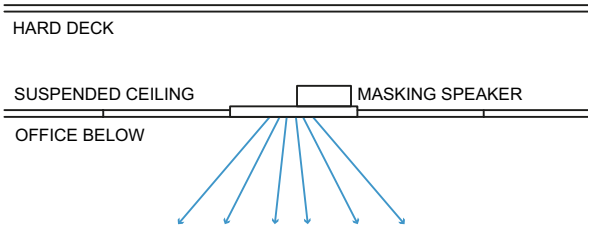


Figure 12: CSD2X2 speaker installed within a suspended ceiling.

1 Coherent signals have the exact same frequency and a definite phase relationship, whereas incoherent signals do not. Sound masking signals from the same generator are coherent to each other; signals from different generators are incoherent.

Buildings with Open Ceilings

With an open-plenum ceiling, hang the NQ-SMS1810-VF facing upward 2′ to 4′ away from the structural ceiling.

When there is acoustic absorption material or thermal insulation on the structural ceiling, hang downward-facing NQ-SMS1810-VF speakers 2′ to 4′ from the structural ceiling. Adjacent speakers must be incoherent and, therefore, a two-channel system is required (*see* *Two-Channel Wiring*).

In the rare case of an interior with a sloped ceiling, hang NQ-SMS1810-VF facing sideways into the sloped ceiling.

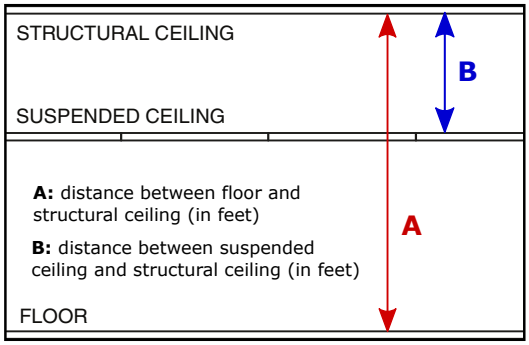
If an obstacle prevents the installation of a speaker, the speaker can be moved to an appropriate space but the speakers on either side should be spaced out accordingly to maintain optimum sound masking. For example, if a speaker needs to be moved three feet away from its intended installation point, then the next speaker moves two feet away from its original position, and the next speaker one foot away from its original position.

Important: Masking speakers should not be installed within three feet of a rectangular metal air duct.

Determining Speaker Placement

Recommended speaker placement is determined by the speaker position, orientation, and the *calculated acoustic path* (P), which is the distance the sound travels from the speaker to the floor.

The formula used to calculate the acoustic path (P) is determined by the presence of a drop ceiling, the speaker orientation, the speaker type, and the plenum height, as shown in the following table. The variables A and B correspond to the distances between the floor and structural ceiling (A) and between the suspended ceiling and structural ceiling (B).



Drop ceiling	Speaker type	Speaker orientation	Plenum depth	Calculated Acoustic Path (P)
No	NQ-SMS1810-VF	Upward	—	P = A + 4
No	NQ-SMS1810-VF	Downward	—	P = A − 2
Yes	NQ-SMS1810-VF	Upward Bottom of speaker 6″ above ceiling grid	2′ to 6′	P = A + B − 1
Yes	NQ-SMS1810-VF	Upward Speaker 4′ below structural ceiling	> 6′	P = A + 4
Yes	NQ-SMS1810-VF	Downward	—	P = A − 2
Yes	NQ-SMS1810-SCG	Upward	—	P = A + B
Yes	CSD	Downward	—	P = A − B

Table 2: Acoustic path calculation formulas

Once the acoustic path (P) has been calculated, use the following table to determine the correct spacing distance (*d*) to leave between speakers.

Calculated acoustic path (P)	Speaker spacing for VF and SCG (±1′)	Speaker spacing for CSD (±2′)
8′–10′	9′	8′
10′–12′	10′	10′
12′–14′	11′	12′
14′–16′	12′	
16′–18′	13′	
18′–20′	14′	
20′–22′	15′	
22′–24′	16′	
24′–26′	17′	
> 26′	see comments below	

Table 3: Speaker spacing based on calculated acoustic path and speaker type

If P exceeds 26′, consider changing the speaker orientation and/or type and using the relevant formulas to obtain a smaller value for P. If P is still greater than 26′ after trying all other options, use CSD speakers or install VF speakers facing downward at 18′ to 20′ from the floor at a spacing distance (*d*) of 14′.

For example, if upward-facing SCG speakers result in P = A + B = 27′, we may get a smaller P value using upward-facing VF speakers (P = A + 4, assuming B > 4), downward-facing VF speakers (P = A − 2), or even CSD speakers (P = A − B, assuming a drop ceiling).

Once the speaker spacing distance *d*′ has been determined, the speaker layout is relatively simple. Layout starts in one corner of the room. The first speaker should be installed *c*′ from the corner of the room—where *c* is between 2′ and one half the spacing distance (*d*)—with each additional speaker in the first row installed *d*′ from the previous one. Move down *d*′ and install the next row of speakers, with speakers again installed in increments of *d*′ from the first. Each additional row will continue the same pattern until the whole area is covered (see Figure 13).

Enclosed offices and most small enclosed spaces follow the same placement rule except when using CSD speakers. Even in spaces of less than 200 sq. ft., use a minimum of two CSDs, located diagonally from each other, to prevent hot spots.

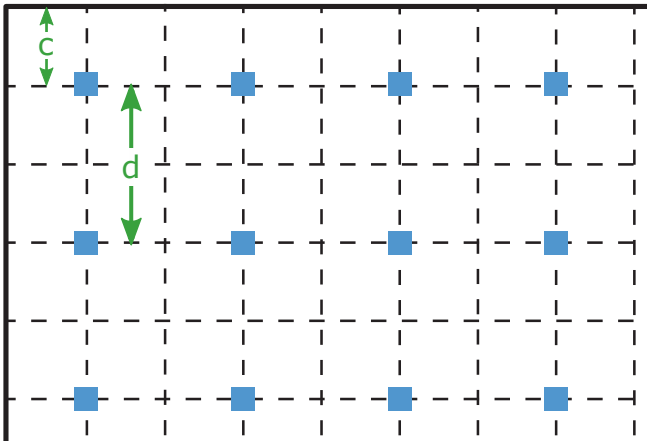


Figure 13: The distance between each speaker ■ and its adjacent speakers is d′ (±1′ or ±2′, depending on speaker type). The distance between outer speakers and the wall is c′, a value between 2′ and ½d′.

Determining Speaker Power Tap

CSD speakers should be tapped at 1W when the drop ceiling is less than 14′ tall and 2W when it is 14′ or taller. VF and SCG speakers should be tapped at 2W for speakers spaced less than 14′ apart and 4W for speakers spaced more than 14′ apart.

Multiple-Wire Runs

When more than 10 speakers are required, multiple runs can be wired in parallel, with no more than 10 speakers per run (*see Figure 14*). This reduces the overall resistance, allowing the amplifier more head room, increasing the number of speakers the amplifier can handle, and providing coverage for both small and large areas.

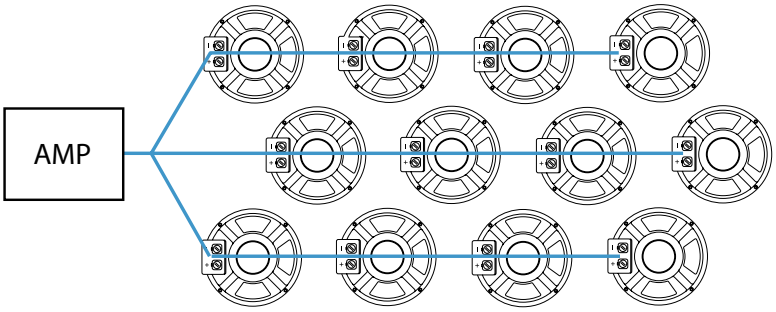


Figure 14: Installation with multiple wire runs is recommended for more than ten speakers.

Two-Channel Wiring

A two-channel, acoustically incoherent wiring design (*see Figure 15*) is required for direct radiating speakers (e.g., CSD or NQ-SMS1810-VF when installed facing downward). Adjacent speakers receive signals from different sound masking sources, thereby avoiding *comb filtering* (i.e., acoustic interference). It is critical to make sure that the sound masking from each channel has the same spectrum preset and level.

Ideally, the two channels should come from two different amplifiers, ensuring the signals will be different. When it is not practical to have multiple amplifiers, add phase shift to one of the channels to achieve the same result (see *Viewing Station Configuration Settings* in the *Nyquist System Administrator Guide* and refer to the **Add Phase Shift** station setting).

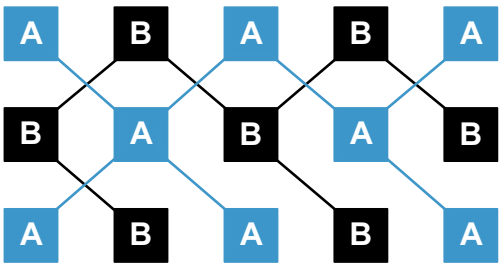


Figure 15: A two-channel wiring design.

Wire-Related Losses

Wire is an important but often ignored component of a sound masking system. Because all wire has resistance, some of the voltage at the source is lost or dropped in the wire before it reaches the target destination. The voltage lost in the wires is affected by the resistance and gauge of the wire and the electrical current flowing through the wire. This is classic Ohm's law in action. If the voltage lost in the cables is not anticipated, the final volume level at the passive speaker may not meet the requirement.

The sound masking system can be run as 25V or 70V. A 70V system can use significantly longer cables, but requires twice the number of amplifiers due to bridging. There are separate charts for 25V and 70V transformer distribution systems that specify the maximum cable lengths that should be allowed. Attempt to keep the system power lost in the wires below 10%; however, less power at the speaker is the only negative effect that larger losses

have on the system. Clarity, intelligibility, and frequency response are unaffected by larger losses in the wiring of transformer distribution systems.

Once the number of speakers to be wired together in a run has been decided, estimate how long the wire run will be from the first to the last speaker in each run. Include the lead-in wire length from the amplifier to the first speaker in each run in the overall run length. For each run, sum up the speaker power and cable lengths. Using that information, refer to the Wire Loss Chart to ensure that the wire gauge is sufficient to support the power and cable length for the run. It may be necessary to increase the wire gauge, split the speaker loads, or shorten the wire run lengths if they exceed the chart maximums.

	70V – Load Power Per Wire Run (Watts)						
Wire Gauge	**5**	**10**	**15**	**30**	**50**	**100**	**200**
16	10,000	7,000	4,600	2,300	1,400	700	350
18	9,000	4,500	2,800	1,400	830	415	205
20	5,500	2,700	1,800	900	540	270	135
22	3,400	1,700	1,100	550	330	115	60
24	2,100	1,000	700	350	350	105	50
	Maximum Wire Run Cable Length (ft.) (10% of power lost in wire) Shielded Pair, Stranded Cable						

Figure 16: 70V Wire Loss Chart

	25V – Load Power Per Wire Run (Watts)						
Wire Gauge	**5**	**10**	**15**	**30**	**50**	**100**	**200**
16	1,280	640	425	215	125	60	30
18	800	400	265	130	80	40	20
20	505	250	165	80	50	25	12
22	315	155	105	50	30	15	7
24	200	100	65	30	20	10	5
	Maximum Wire Run Cable Length (ft.) (10% of power lost in wire) Shielded Pair, Stranded Cable						

Figure 17: 25V Wire Loss Chart

Sound Masking Zoning Choices

There are a number of factors that must be considered in mapping out the sound masking zones for each physical location. Their acoustic attributes and administrative functions, as well as the available speaker types, are all factors that must be considered.

Areas with different structural and acoustical features should be assigned to distinct sound masking zones. For example, closed vs. open offices, areas with alternating suspended ceilings, and open offices with extreme panel height differences. Areas with different administrative functions should also be assigned to different sound masking zones, such as cafeterias, open offices, reception areas, closed offices, and conference rooms. It is usually best to also separate areas using different types of speakers, such as upward-facing vs. downward-facing speakers, into distinct masking zones.

Sound Masking Levels

Introducing a New Sound Masking System

It is advisable to introduce a sound masking system slowly. Turn the system on at 10 dB below the final target level and bring it up to its final level over a period of 20 to 30 days, allowing time for office staff to adjust to the extra ambient sound (see *Sound Masking Zones* in the *Nyquist System Administrator Guide*, particularly the **Slow Ramp Days** setting).

Finding the Right Balance

In general, louder sound masking levels provide more speech privacy. However, in the real world of an open office space, there is a limit to how much speech privacy one can have. If the masking sound is set higher than a reasonable level, issues may arise. Office workers will talk louder and any speech privacy gained will be lost. A comfortable sound pressure level (SPL) range for sound masking in a relatively quiet office area is 46 dB_A to 52 dB_A. Using 47 dB_A as a starting point, raise or lower the masking level based on the existing background noise level.

It is critical to avoid sudden sound level changes throughout the facility. Keep sound levels balanced between different zones, as well as masked and unmasked areas. If there is an unmasked open area nearby, the adjacent corridor or space should have speakers that gradually reduce the masking level. A cost-efficient way is to adjust the speaker power tap setting to create a spatial gradient of masking levels as one enters the open area.

Adjust overall zone output levels using the masking zone's Output Gain to obtain uniform levels throughout masked areas. If there are multiple stations within a zone (a station, in this context, represents an amplifier output channel), adjust the output level of each station via the Output Power field of the Edit Station view, which allows adjustments of ±6 dB (see *Editing Station Configuration Settings* in the Nyquist System Administrator Guide). Do not rely on the amplifier's DSP output levels to make adjustments to the channel.

Measuring Sound Levels

Masking sound levels should be measured using a sound pressure level meter with A-weighting in each open area and in each closed room where a sound masking speaker is installed. Measure SPL at a height off the floor of 4.0' to 4.7' (i.e., approximately ear height when seated). Measurements should be made across several locations in larger areas. Adjust the masking sound levels to within ±3 dB of the target level.

Emergency Muting

If applying sound masking to an area with an existing paging system, the sound masking should not interfere with the paging system. To compensate for the masking noise, the normal paging system level should be increased by +3 dB.

The masking noise will immediately be muted by the Nyquist system whenever an Alarm tone, Disable-Audio command, or an Emergency or Emergency-All-Call announcement occurs. Once the announcement or alarm has completed, the masking sound will be automatically ramped back up to its previous level over a period of five (5) minutes (known as *fast ramping*). This also occurs whenever the masking zone signal has been disabled and re-enabled, as well as after a system reboot, power outage, or system maintenance.

Note: Sound masking is not muted for an Emergency announcement or Alarm that is being played to a specific zone.

Sound Masking Spectrum

In addition to the sound masking level, the sound masking spectrum is also very important. Because sound masking is intended primarily for speech privacy, it is only the frequency range of speech that is critical, so the masking sound is adjusted using high- and low-pass filters to minimize sounds outside that range.

High-frequency sound is considered “hissy” and uncomfortable, but high frequency sound is also more effective at providing speech privacy. This results in a tradeoff between performance and acceptability. Using a sound spectrum that rolls off approximately 5 dB per octave provides a good balance between effectiveness and comfort. A well-designed HVAC (i.e., air conditioning) system generates a significant level of low-frequency sound. To avoid adding an unwanted rumbling sound, the masking sound covers the higher, speech-like frequencies but reduces frequencies below 160 Hz.

The ideal sound masking level and spectrum are strongly affected by the acoustic conditions of the room, such as the panel height, ceiling tile material, furniture, flooring, etc. Bogen provides a number of spectrum preset options corresponding to these various conditions, applications, and preferences.

The following is a list of available spectrum preset options:

Closed-plan space	Recommended for private office or small conference room with some reflective surfaces, absorptive ceiling, and furnishings.
Ideal open-plan space	Suitable for open offices with 5-foot or higher cubical panels, absorptive ceilings and furnishings, and proper layout.
Good open-plan space	Suitable for open office with 4- to 5-foot high cubical panels, some reflective surfaces, and moderate furniture absorption.
Non-ideal open plan space	Recommended for open office with no cubical panels or with cubical panels under 4-foot high, reflective surfaces, and moderate furniture absorption.
NCB contour	Noise Criterion Balanced (NCB) Contour may be used to evaluate the acceptability of masking sound in various non-industrial environments.
NRC Canada Contour	A cost-effective open-plan environment masking spectrum published by the National Research Council, Canada.
NC40 Contour	Noise Criterion (NC) 40 Contour may be used to evaluate the acceptability of masking sound in an open office environment.

NYQUIST

Sound Masking System Design Example

Here is a scenario where a sound masking system installation is requested for an office complex.

Assume the following conditions:

- The building has two large open offices, several closed offices, and a few conference rooms.
- The building has suspended ceilings.
- Some areas have sound absorption materials in the ceiling plenum.
- The suspended ceiling height is lower than 12 feet.
- The plenum depth is between one and three feet.

The final sound masking design is shown (*see Figure 18*) to make it easier to visualize as each area is analyzed and an optimal design determined.

Office Areas

There are four distinct areas in which sound masking is to be incorporated:

Zone 1: Open Office Area X

Open Office Area X is approximately 8600 sq. ft., therefore requiring 50 upward-facing NQ-SMS1810-VF speakers installed in the plenum area 13' apart across the length of the room and 14' apart across the width of the room.

The NQ-A4120-G2 amplifier can provide 120W per channel when operating at 25V. Allowing 20% headroom, each channel should not exceed 96W. At 2W per 25V speaker, this allows for a maximum of 48 speakers per channel. Since a single channel cannot support all 50 speakers, two channels (A and B) are used, assigning 25 speakers to each channel.

Channels A and B of an NQ-A4120-G2 amplifier are assigned to Sound Masking Zone 1.

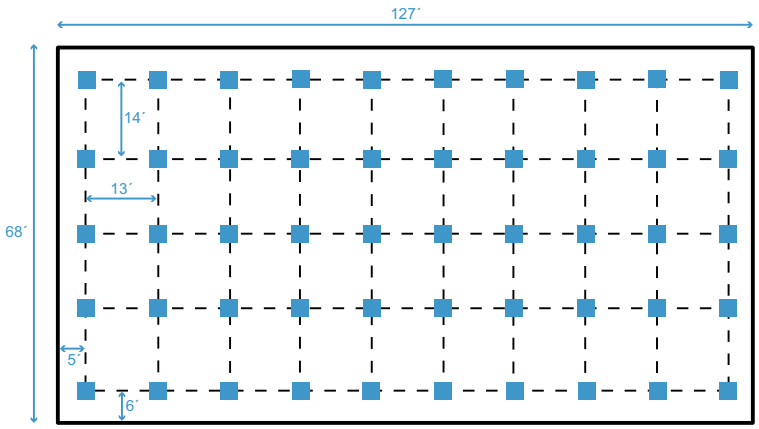


Figure 18: 8600 sq. ft. open office area with 50 NQ-SMS1810-VF speakers in place.

Zone 2: Closed Offices

There are several private closed offices ranging in size from 90 to 200 sq. ft. One upward-facing NQ-SMS1810-VF speaker tapped to 2W is used in addition to an optional wall-mount volume control for each office.

Channel C of the NQ-A4120-G2 amplifier is assigned to Sound Masking Zone 2.

Zone 3: Open Office Area Y

Due to acoustic material above the drop ceiling tile (e.g., a layer of fiberglass sheet), CSD2X2s are the only option for Open Office Area Y. At approximately 1200 sq. ft., 16 speakers are installed within the drop ceiling (*see Figure 19*). Two-channel wiring is also mandated. Speakers are installed 8' apart from each other and tapped to 1W. Alternate speakers will receive signals from two channels from two separate amplifiers, as shown in Figure 20.

Channel D of NQ-A4120-G2 and Channel A of a separate NQ-A2120-G2 are assigned to Sound Masking Zone 3.

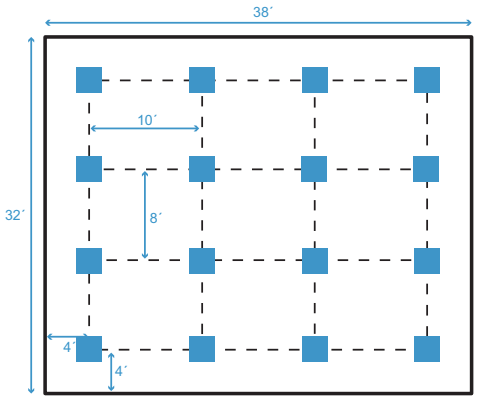


Figure 19: 1200 sq. ft. open space area with 16 CSD2X2 speakers.

Zone 4: Hallway Outside Conference Room

To provide speech privacy during meetings, three NQ-SMS1810-SCG speakers tapped to 2W are installed 12' apart in the plenum of the hallway ceiling. The speakers are placed 4' away from the conference room wall. A wall-mounted AT10A attenuator is also installed inside the conference room to adjust the masking sound level. Sound masking will be turned on during meetings and off at other times.

Channel B of the NQ-A2120-G2 is assigned to Sound Masking Zone 4.

The final layout is shown in Figure 20.

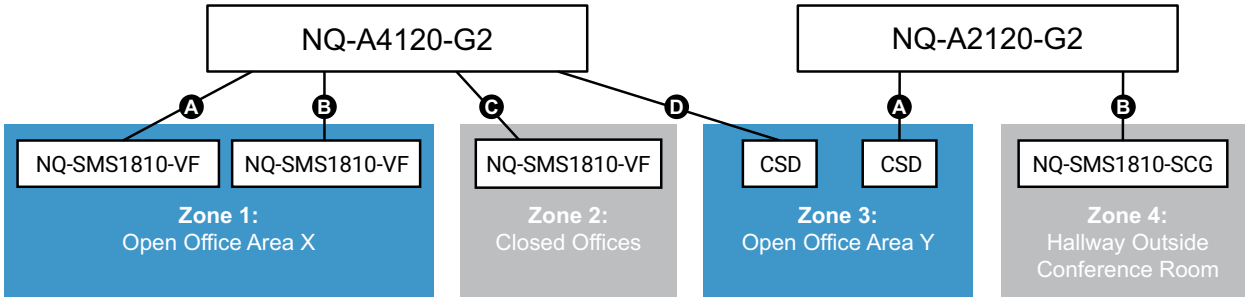


Figure 20: Sound masking design for a 4-zone office space.

Configuring the Nyquist System for Sound Masking

Once the speakers in the design example are installed and connected to the appropriate amplifier channels, there are several tasks that must be performed on the Nyquist System to configure the system.

1. Configure six sound masking stations for two amplifiers:
   - Four stations for the NQ-A4120-G2
   - Two stations for the NQ-A2120-G2
2. Define and configure four masking zones, assigning sound masking stations to each zone:
   - Open Office Area X
   - Closed Offices
   - Open Office Area Y
   - Hallway Outside Conference Room
3. Initiate sound masking and adjust levels

Add and Configure Amplifiers on the Nyquist System Controller

After the NQ-A4120-G2 and NQ-A2120-G2 amplifiers are connected to the network, they must be added to the Nyquist system and stations must be created for them of type Sound Masking via the Station Management view of each amplifier. It may be helpful to review the *Adding Amplifier and Gateway Devices* and *Adding and Editing a Sound Masking Zone* sections in the Nyquist System Administrator Guide for detailed instructions.

Note: For this example, ensure that all Amplifier Mode switches on the amplifiers are set to 25V/4Ω (not bridged), allowing the use of every channel on each amplifier.

Add the amplifiers to the Nyquist system and configure each channel, as specified in Table 4.

Device Type	NQ-A4120-G2				NQ-A2120-G2	
Channel	**A**	**B**	**C**	**D**	**A**	**B**
Name	A4120-A	A4120-B	A4120-C	A4120-D	A2120-A	A2120-B
Load Impedance	High (all speakers will be wired at 25V)					
Output Power	0 dB (may eventually be adjusted)					
Add Phase Shift	No	No	No	No	No	No

Table 4: Amplifier Station Management channel configurations Station Management channel configurations

Although channels A and B of the NQ-A4120-G2 are connected to the same zone and are from the same amplifier, two-channel wiring is not needed and **Add Phase Shift** is set to **No** because the NQ-SMS1810-VF speakers on both channels are upward-facing, which do not need to be phase shifted (as the sound waves are significantly randomized by reflecting off the structural ceiling). All other channels can also be **No** because they do not include more than one channel from the same amplifier, so there are no phasing issues.

Configure Sound Masking Zones

Now that the amplifiers have been configured for sound masking, the sound masking zones can be created.

It may be helpful to review the *Sound Masking Zones* section of the Nyquist System Administrator Guide, which provides details on how to add and edit sound masking zones, as well as an overview of sound masking zones in general.

For this example, the properties of the four sound masking zones will be configured as specified in Table 5.

	Zone 1	Zone 2	Zone 3	Zone 4
Enabled	No	No	No	No
Number	1	2	3	4
Name	Open Office Area X	Closed Offices	Open Office Area Y	Hallway Outside Conference Room
Stations	A4120-A A4120-B	A4120-C	A4120-D A2120-A	A2120-B
Speaker Orientation	Up	Up	Down	Up
Spectrum Preset	Good open-plan space	Closed-plan space	Good open-plan space	Non-ideal open-plan space
Output Gain	-35 dB	-35 dB	-35 dB	-35 dB
Slow Ramp Days	30	30	30	30

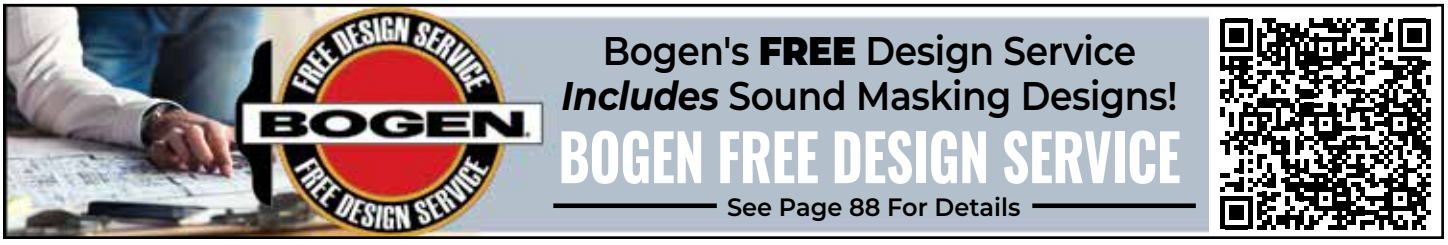
Table 5: Sound masking zone configurations

Initiate Sound Masking and Adjust Levels

Once all sound masking zones are configured, return to the Sound Masking Zones page and enable each zone to determine if the sound masking volume satisfies the sound masking needs. It may be necessary to adjust the sound masking levels to ensure an even sound distribution, wherein the direction of the sound source is undetectable and the volume appears consistent. The levels can be adjusted by modifying the Output Gain for each masking zone.

Once the levels are satisfactory, select **Start Ramping**. Sound Masking is now in effect and will reach the specified level in 30 days.

Assuming that there is an existing paging system in one or more of the sound masking areas, at some point during those 30 days (e.g., approximately 15 days), the paging and audio distribution cut levels (and optionally the system-wide All-Call cut level) should be increased by +3 dB to compensate for the increased noise level. This can be performed manually via the Nyquist web interface (Zones configuration) or by creating a routine that includes Change-Volume actions for each audio type (i.e., Audio Distribution, Zone Paging, and optionally All-Call) and for any zone that overlaps a sound masking zone, specifying a cut level +3 dB above the zone's current level, and scheduling the routine to occur at the desired time (e.g., approximately 15 days into the ramping process).



ACCESSORIES

MOUNTING / RIGGING / RACK KITS

MODEL	DESCRIPTION	ASSOCIATED MODELS	DIMENSIONS / PROD. WT.	PAGE NO.
108-2120	Yoke Assembly	AMT-12	24-1/2" W x 12" H x 3" D / 7 lb.	48
108-2150	Yoke Assembly	AMT-15	27-1/4" W x 13" H x 3" D / 8 lb.	48
109-2140	Rigging Beam Assembly	AMT Series	22" W x 3" H x 2" D / 15 lb.	48
109-2151	Rigging Kit	AMT Series	10" W x 1-1/2" H x 1/4" D / 2 lb.	48
BBF	Back Box for Flush Mounting	WV-Series	14-1/2" W x 24-3/4" H x 3-7/8" D / 2 lb.	21
BBFM6	Flush Mount Enclosure	FMH15T	9-7/8" W x 9-7/8" H x 6" D / 8 lb.	66
BBS	Back Box for Surface Mounting	WV-Series	16-1/4" W x 26-3/4" H x 3-7/8" D / 16 lb.	21
BBSM6	Surface Mount Enclosure	FMH15T	11" W x 11" H x 6" D / 11 lb.	66
BC1	Beam Clamp	Horn Loudspeakers	2-1/8" W x 2" H x 3/4" D / 6 oz.	39, 40, 65, 68
CK10	Cable Kit (Silver)	HFCS1/HFSF1/MPS1/MPS2/OCS1/OPS1	10 feet long / 4 oz.	58, 59, 60
CK10B	Cable Kit (Black)	OPS1B/MPS1B/MPS2B	10 feet long / 4 oz.	58, 59
CK10W	Cable Kit (Off-White)	OPS1W/MPS1W/MPS2W	10 feet long / 4 oz.	58, 59
FMHAR8	Adapter Ring	FMH15T	7" dia. / 5 lb.	66
HSES10	Horn Speaker Electrical Box Strap	Horn Speakers**	1/2" W x 5-1/2" long / 3 oz.	39, 65, 68
MR8	Mounting Ring	S86, S810, CS1EZ, ASWG1/DK	12" dia. x 3/4" D / 15 lb.*	37, 61, 68
PSRPK	Rack Kit	Platinum Series Amps	1-1/4" W x 3-1/2" H x 10-1/4" D / 2 lb.	19
RE84	Round Enclosure	S86, S810, CS1EZ, ASWG1/DK	12-1/4" dia. x 4-1/2" D / 24 lb.*	37, 61, 68
RPK35B	Rack Panel Kit	C10/C20	19" W x 3-1/2" H x 6-1/2" D / 3 lb.	20
RPK50	Rack Mount Kit	C35/C60/C100	2-1/2" W x 3-1/2" H x 2-1/8" D / 10 oz.	20
RPK53	Rack Mount Kit	BPA60	2" W x 3-1/2" H x 1" D / 7 oz.	25
RPK82	Rack Mount Kit	TPU35B/60B/100B	3" W x 8-3/4" H / 14 oz.	28
RPK84	Rack Mount Kit	PCM2000	7" W x 8" H / 2 lb.	30
RPK35B	Rear Rack Support Brackets	M-Class/Black Max Amplifiers	3-3/4" W x 3-1/2" H / 7 oz.	22, 24
RPK87	Rack Mount Kit	V-Series, VMIX	1" W x 3-1/2" H x 3-3/4" D / 1 lb.	21, 26
RPK88	Rack Mount Kit	PCM2000	19" W x 10-1/2" H x 2" D / 3 lb.	30
RPK93	Rack Mount Kit	CC-Series	1-1/4" W x 3-1/2" H x 8-1/4" D / 2 lb.	24
RPKUTI1	Rack Mount Kit/Security Cover	UTI1	19" W x 5-1/4" H x 2-3/8" D / 2 lb.	36
SGHD8	Heavy-Duty Grille	FMH15T	11" W x 11" H x 1/2" D / 8 lb.	66
SMTB	Tile Bridge for Easy Install Speakers	ASM1, SM1EZ/SM4T	4-3/8" W x 1-1/4" H x 23-3/4" D / 5 lb.*	38, 67
TB8	Tile Bridge	S86, S810, CS1EZ, ASWG1/DK	23-3/4" W x 3/4" H x 14-1/2" D / 17 lb.*	37, 61, 68
TBCR	Tile Bridge Support Ring	HFCS1/OCS1	17" W x 1-1/8" H x 24" D / 2 lb.	58, 60
TBSF	Tile Bridge	HFSF1, SEC4T	10" W x 1/2" H x 24" D / 14 oz.	60, 61
TCSPT1	Terminal Cover for Conduit	Horn Speakers***	1-3/4" W x 3" H x 1-1/4" D / 2 oz.	39, 65, 68
TMA812	Tilt Mount Adapter	A12 & A8	7" W x 4-3/4" H x 4-1/2" D / 2 lb.	57
WMAD	Door for WV-Series Amps	WV-Series	16-1/4" W x 26-3/4" H x 1" D / 9 lb.	21

Weight based on per carton. Check with Bogen for quantity per carton.
***Horn Speakers: AH5A, AH15A, BDT30A, HS15EZ, HS30EZ, IH8A, KFLDS30T, SP158A, SP308A, SPT15A, & SPT30A.*
****Horn Speakers: AH5A, AH15A, BDT30A, HS15EZ, HS30EZ, KFLDS30T, SP158A, SP308A, SPT15A, & SPT30A.*

ACCESSORIES

AMPLIFIERS

MODEL	DESCRIPTION	ASSOCIATED MODELS	DIMENSIONS / PROD. WT.	PAGE NO.
GSRVC	Remote Volume Control	Platinum Series Amps	2-3/4" W x 4-1/2" H x 1-3/8" D / 2 oz.	19
MT300M	Matching Transformer Module	Platinum Series Amps	5-1/2" W x 6-1/2" H x 3-1/2" D	19
TL100	1:1 Ratio Plug-In Transformer	BPA60/HTA125A/HTA250A	1" dia. x 1-1/4" D / 1 oz.	25


GSRVC


MT300M


TL100

PAGING / INTERCOM

MODEL	DESCRIPTION	ASSOCIATED MODELS	DIMENSIONS / PROD. WT.	PAGE NO.
2518	18-Gauge Connector	PI35A/SI35A	5/8" W x 1/4" H x 3/4" D / 2 oz., 30	44
2520	20-Gauge Connector	PI35A/SI35A	5/8" W x 1/4" H x 3/4" D / 2 oz., 30	44
2522	22-Gauge Connector	PI35A/SI35A	5/8" W x 1/4" H x 3/4" D / 2 oz., 30	44
CA10A	Call-In Switch	PI35A/SI35A	2-3/4" W x 4-1/2" H x 2" D / 2 oz.	44
CA11A	Call Privacy Switch	PI35A/SI35A	2-3/4" W x 4-1/2" H x 1-3/4" D / 2 oz.	44
CA17	Call-In Switch	PI35A/SI35A	2-3/4" W x 4-1/2" H x 1" D / 1 oz.	44
CA21B	Call-In Switch	PI35A/SI35A	2-3/4" W x 4-1/2" H x 1" D / 1 oz.	--
PCMPS2	12V DC/1.5A Power Supply	PCM2000	2-1/4" W x 4" H x 1-3/8" D / 1 lb.	30
SBA225	25-Key Station Panel Selector	SI35A	19" W x 1-3/4" H x 1-1/4" D / 2 lb.	44
SCR25A	Call-In Module	SBA225/SI35A	17" W x 1-1/4" H x 4" D / 2 lb.	44
TL156	Insertion Tool	PI35A/SI35A	2" W x 3-1/4" H x 1" D / 1 oz.	44


CA10A


CA11A


CA17


CA21B


SBA225


SCR25A


PCMPS2


2518, 2520, 2522, TL156

NYQUIST

MODEL	DESCRIPTION	ASSOCIATED MODELS	DIMENSIONS / PROD. WT.	PAGE NO.
NQ-RMK01	Rack Mount Kit, 1pc.	Nyquist Models	3-7/8" W x 1-3/4" H x 1-3/8" D / 0.5 lb.	7, 8, 11, 12
NQ-RMK02	Rack Mount Kit, 2pcs.	Nyquist Models	6-5/8" W x 1-3/4" H x 1-3/8" D / 0.5 lb.	11
NQ-RMK03	Rack Mount Kit, 2pc.	Nyquist Models	5-1/2" W x 1-3/4" H x 1-3/8" D / 0.5 lb.	7, 8
NQ-RMK04	Rack Mount Kit, 1pc., Brackets- 2pcs., screws	Nyquist Models	1-3/8" W x 1-3/4" H x 8" D / 0.5 lb. 5/8" W x 1-1/2" H x 1-3/8" D / 0.5 lb.	7, 8
PI5660W	Power over Ethernet Ultra Injector	NQ-GA40P3	6.43"W × 2.56"H × 1.42D" 0.5lb.	10


NQ-RMK01


NQ-RMK02


NQ-RMK03


PI5660W


NQ-RMK04

NEAR®

MODEL	DESCRIPTION	ASSOCIATED MODELS	DIMENSIONS / PROD. WT.	PAGE NO.
GS4	Ground Stake (with screws)	LB4TM	14" long / 1 lb..	54
IE1	Direct Burial Junction Box	In-Ground Speakers/Subs	5-1/8" L x 3-1/4" W x 2-3/4" D / 1 lb..	52, 53, 54, 55


GS4


IE1

MISC.

MODEL	DESCRIPTION	ASSOCIATED MODELS	DIMENSIONS / PROD. WT.	PAGE NO.
ASTB4	Electrical Cover	A2T, A6T, A8T	2-7/8" W x 1-7/8" H x 2-3/16" D / 2 oz.	57
SRCA6	Stereo 6 ft. RCA Cable	Music & Input Sources	6 feet long / 5 oz.	--
T725	Transformer, Speaker Matching 4-watt (Taps: 4, 2, 1, 1/2, 1/4, 1/8)	8-ohm Speakers	2-1/2" W x 1-1/4" H x 1-3/8" D / 6 oz.	--
T72510	Transformer, Speaker Matching 10-watt (Taps: 10, 5, 2-1/2, 1-1/4, 5/8)	8-ohm Speakers	3" W x 1-1/2" H x 1-1/2" D / 10 oz.	--


ASTB4


SRCA6


T725


T72510

AMPLIFIER CHART

Bogen Amplifier Features Chart

Amplifier Output Power Rating/ Channel	Model Numbers	Amplifier Channels	Input Types					Signal Processing						Music Muting			Night Ringer	Remote Volume	Output Meter	Mounting Options		
			TEL Input* 600-ohm Balanced	MIC Inputs* Lo-Z Balanced	AUX Inputs* Hi-Z Unbalanced	Balanced Inputs Hi-Z	Modular Inputs	Audio Enhancement	Loudness Contour	ALC	EQ	Bass/Treble	Tone Control	Variable Mute	Audio Mute	Manual Mute				Wall Mount	Shelf Mount	Rack Mount
10W	C10	1	1	2(1)	0(1)					●			●		●	●				◆	●	◆
15W	TPU15A	1	1		1								●		●		■			●		
20W	C20	1	1	2(1)	0(1)										●	●				◆	●	◆
35W	C35	1	1	2(1)	1(2)							●			●	●					●	◆
35W	TPU35B	1	1	1	1			●		●		●		●	●	●				●		◆
35W	V35	1	●	●	●	●	8			●	●	●		●	●			●	●		●	◆
40W	CC4021	1		1	1	1†						●			●						●	◆
40W	CC4041	1		3	1	3†						●			●						●	◆
60W	BPA60	1			○																●	◆
60W	C60	1	1	2(1)	1(2)							●			●	●					●	◆
60W	TPU60B	1	1	1	1			●		●		●		●	●	●	●			●		◆
60W	V60	1	●	●	●	●	8			●	●	●		●	●			●	●		●	◆
100W	C100	1	0(1)	2(1)	1(2)							●			●	●					●	◆
100W	TPU100B	1		1	1			●		●		●		●	●	●	●			●		◆
100W	V100	1	●	●	●	●	8			●	●	●		●	●			●	●		●	◆
100W	WV100	1	●	●	●	●	8			●	●	●		●	●			●	●	◆		
120W	PS120-G2	1	0(1)	4(6)	1(2)			●	●	●	●			●				●	●		●	◆
125W	HTA125A	1	○		○																●	◆
150W	V150	1	●	●	●	●	8			●	●	●		●	●			●	●		●	◆
150W	WV150	1	●	●	●	●	8			●	●	●		●	●			●	●	◆		
240W	PS240-G2	1	0(1)	4(6)	1(2)			●	●	●	●			●				●	●		●	◆
250W	HTA250A	1	○		○																●	◆
250W	TPU250	1	1	1	1			●		●		●		●	●	●	●			●		◆
250W	V250	1	●	●	●	●	8			●	●	●		●	●			●	●		●	◆
250W	WV250	1	●	●	●	●	8			●	●	●		●	●			●	●	◆		
300/600W	M300	2/1	●	●	●	2†	2			●				●	●						●	◆
300W	X300	1	●			2															●	◆
450/900W	M450	2/1	●	●	●	2†	2			●				●	●						●	◆
450W	X450	1	●			2															●	◆
600W	PS600	1	0(1)	4(6)	1(2)			●	●	●	●			●				●	●		●	◆
600/1200W	M600	2/1	●	●	●	2†	2			●				●	●						●	◆
600/1200W	TPU600-G2	2/1	●	●	●		2			●				●	●						●	◆
600W	X600	1	●			2															●	◆

● Feature included
● Features determined by type of Module installed
● Balanced Input available with accessory plug-in transformer (TL100/600)
● Accessory Kit required for mounting
● Contact Closure activation only

* Some inputs are switch selectable. The number in parantheses shows the maximum number of inputs when switched
† BAL2S Balanced Input module included standard; uses one modular input bay
# Switch-selectable Input

Specifications subject to change without notice.

AMPLIFIER CHART

Bogen Amplifier Specifications Chart

Model Numbers	Output Power Rating/Channel	Channels	Frequency Response*	Distortion**	Speaker Outputs	AC Line Draw***	Dimensions	Product Weight
BPA60	60W	1	20 Hz to 20 kHz	2% Max.	8-ohm/25V, 16-ohm, 25VCT, 70V	180W	15-1/4" W x 3-1/2" H x 8-3/4" D	16 lb.
C10	10W	1	70 Hz to 16 kHz	1% Max.	70V, 25V, 16-ohm, 8-ohm, 4-ohm	38W	11-3/8" W x 2-7/8" H x 7-3/8" D	5 lb.
C20	20W					50W		6 lb.
C35	35W	1	70 Hz to 16 kHz - Transformer 20 Hz to 20 kHz - Direct	1% Max.	70V, 25V, 16-ohm,4-ohm - Direct; 8-ohm on C35 & C60	85W	14-1/2" W x 3-3/4" H x 11" D	15 lb.
C60	60W					148W		17 lb.
C100	100W					220W		19 lb.
CC4021/41	40W	1	80 Hz to 20 kHz	1% Max.	70V, 25V, 8-ohm,4-ohm	2.0A	8-1/4" W x 3-1/2" H x 10-3/8" D	11 lb.
HTA125A	125W	1	20 Hz to 20 kHz	0.5% Max.	70V, 25V, 25VCT, 8-ohm, 4-ohm	260W	19" W x 5-1/4" H x 11" D	36 lb.
HTA250A	250W					520W		50 lb.
M300	300/600W	2 or 1	20 Hz to 20 kHz	0.5% Max.	4-ohm to 8-ohm (2 channel mode); 70V (1 channel mode)	12A	17" W x 3-1/2" H x 18-1/2" D (not including brackets)	41 lb.
M450	450/900W					15A		44 lb.
M600	600/1200W					20A		46 lb.
PS120-G2	120W	1	20 Hz to 20 kHz	0.3% Max.	70V, 25V, 8-ohm	1.55A	16-1/2" W x 3-1/2" H x 13-1/2" D	14 lb.
PS240-G2	240W					2.37A		
PS600	600W					5.3A		
TPU15A	15W	1	70 Hz to 12 kHz	2% Max.	70V, 25V, 8-ohm	0.5A	11" W x 2-3/4" H x 2-3/8" D	4 lb.
TPU35B	35W		70 Hz to 15 kHz	1% Max.	70V, 25V, 25VCT, 16-ohm	0.75A	14-1/4" W x 8-3/8" H x 3-5/8" D	12 lb.
TPU60B	60W					1.5A		15 lb.
TPU100B	100W					2A		18 lb.
TPU250	250W				70V, 25V	5A	19" W x 10-1/2" H x 3-7/8" D	28 lb.
TPU600-G2	600W				8-ohm, 70V, 25V	6.0A	8" W x 3.43" H x 13.48" D	6.2 lb.
V35	35W	1	45 Hz to 20 kHz - Transformer 20 Hz to 20 kHz - Direct	0.5% Transformer; 0.1% Direct (max.)	70V, 25V, 8-ohm, 4-ohm direct	0.6A	17-1/4" W x 3-7/8" H x 14-3/4" D	22 lb.
V60	60W					1.3A		26 lb.
V100	100W					2.0A		28 lb.
V150	150W					3.5A		31 lb.
V250	250W					5.5A		32 lb.
WV100	100W	1	45 Hz to 20 kHz - Transformer 20 Hz to 20 kHz - Direct	0.5% Transformer; 0.1% Direct (max.)	70V, 25V, 8-ohm, 4-ohm direct	2.0A	14-1/8" W x 21" H	27 lb.
WV150	150W					3.5A		29 lb.
WV250	250W					5.5A		28 lb.
X300	300/600W	2	20 Hz to 20 kHz	0.5% Max.	70V direct	12A	17" W x 3-1/2" H x 18-1/4" D (not including brackets)	41 lb.
X450	450/900W					15A		44 lb.
X600	600/1200W					20A		46 lb.

*@ -2dB FRP Transformer Output: @ FRP for Direct Outputs **Bandwidth limited to Frequency Response ***FRP @ 120VAC Line Voltage

Specifications subject to change without notice.

Nyquist Specifications Chart

NYQUIST™ **SPECS CHART**

Model Numbers	Power Output	Frequency Response @ 1W	Max. AC Current	Indicators	S/N Ratio (20k BW)	Dimensions	Product Weight
NQ-SYSCTRL	– – – – – – – – – – – – – – – –	– – – – – – – – – –	1.5A	Power LED (front); Network LEDs (rear)	– – – –	8" W x 1.7" H x 10.25" D	5 lb.
NQ-A4060-G2	4 CH: 60W @ 25V/4Ω; 2 CH: 120W @ 70V/25V/8Ω	20 Hz to 20 kHz +/- 0.25 dB	4A	Status & Power LEDs (front); Network LEDs (rear)	97 dB	13" W x 3.4" H x 13.4" D	6.3 lb.
NQ-A4120-G2	4 CH: 120W @ 25V/4Ω; 2 CH: 240W @ 70V/25V/8Ω		6A				6.3 lb.
NQ-A4300V-G2	4 CH: 300W @ 25V/4Ω; 2 CH: 600W @ 70V/25V/8Ω		12A				8.6 lb.
NQ-A2060-G2	2 CH: 60W @ 25V/4Ω; 1 CH: 120W @ 70V/25V/8Ω	20 Hz to 20 kHz +/- 0.25 dB	2A	Status & Power LEDs (front); Network LEDs (rear)	97 dB	8" W x 1.7" H x 13.4" D	4.4 lb.
NQ-A2120-G2	2 CH: 120W @ 25V/4Ω; 1 CH: 240W @ 70V/25V/8Ω		3A				4.4 lb.
NQ-A2300-G2	4 CH: 300W @ 25V/4Ω; 2 CH: 600W @ 70V/25V/8Ω		6A			13" W x 3.4" H x 13.4" D	6.4 lb.
NQ-PA120	120W @ 70V/8Ω	20 Hz to 20 kHz +/- 0.25 dB	2A	Status & Power LEDs (front); Network LEDs (rear)	97 dB	8" W x 1.7" H x 13.4" D	5.2 lb.
NQ-PA240	240W @ 70V/8Ω		3A				5.2 lb.
NQ-PA600	600W @ 70V/8Ω		7A			13" W x 3.4" H x 13.4" D	8.3 lb.
NQ-P0100	– – – – – – – – – – – – – – – – – –	– – – – – – – – – –	0.6A	Status/Power LEDs (front); Network LEDs (rear)	97 dB	8" W x 1.7" H x 8.6" D	2.6 lb.
NQ-GA10P/PV	10W @ 8Ω	20 Hz to 20 kHz +/- 0.25 dB	– – – –	Status/Power/Network LEDs (front)	80 dB	3.75" W x 0.875" H x 6.2" D	0.7 lb.
NQ-GA20P2	20W @ 8Ω	20 Hz to 20 kHz +/- 0.25 dB	– – – –	Status/Power/Network LEDs (front)	80 dB	3.75" W x 0.875" H x 6.2" D	0.7 lb.
NQ-E7010	External DC: 48-56V DC (5.5mm x 2.1mm Jack)	– – – – – – – – – –	– – – –	Status/Power/Network LEDs (front)	– – – –	5.6" W x 1.7" H x 5.4" D	1.95 lb.
NQ-E7020-G2	– – – – – – – – – – – – – – – –	– – – – – – – – – –	– – – –	3-Individual Full Spectrum LEDs (front)	– – – –	1.5" W x 4.4" H x 1.15" D	0.2 lb.
NQ-EDP01	– – – – – – – – – – – – – – – –	– – – – – – – – – –	– – – –	– – – – – – – – – – – – – – – –	– – – –	5" W x 5" H x 1.875" D	2.0 lb.
NQ-GA40P3	40W @ 8Ω	20 Hz - 20 kHz +/-0.25 dB	– – – –	Status/Power/Network LEDs (front)	80 dB	9" W x 3.69" H x 1.3" D	1.6 lb.
NQ-GA400P	20 H2 - 20 kHz<.1% THD+N	20 Hz - 20 kHz +/-0.25 dB	– – – –	Status/Power/Network LEDs (front)	80 dB	5.32" W x 5.5" H x 1.3" D	1.6 lb.

MODEL INDEX

C4000 Appliance	S/W Release			
	4.0	5.0	6.0	7.0
NQ-T1000	✓	✓	✓	✓
NQ-T1100	✓	✓	✓	✓
NQ-T2000	✓	✓	✓	✓
NQ-E7010	✓	✓	✓	✓
NQ-E7020	✓	✓	✓	✓
NQ-E7020-G2	✓	✓	✓	✓
NQ-EDP01			✓	✓
NQ-PO100	✓	✓	✓	✓
NQ-SYSCTRL	✓	✓	✓	✓
NQ-GA10P	✓	✓	✓	✓
NQ-GA10PV	✓	✓	✓	✓
NQ-GA20P2	✓	✓	✓	✓
NQ-GA40P3		✓	✓	✓
NQ-GA400P		✓	✓	✓
NQ-S1810CT	✓	✓	✓	✓
NQ-S1810CT-G2	✓	✓	✓	✓
NQ-S1810CT-T1		✓	✓	✓
NQ-S1810WT	✓	✓	✓	✓
NQ-S1810WT-G2	✓	✓	✓	✓
NQ-S1810WT-G3		✓	✓	✓
NQ-S1810WBC			✓	✓
NQ-A2060	✓	✓	✓	✓
NQ-A2060-G2	✓	✓	✓	✓
NQ-A2120	✓	✓	✓	✓
NQ-A2120-G2	✓	✓	✓	✓
NQ-A2300	✓	✓	✓	✓
NQ-A2300-G2	✓	✓	✓	✓
NQ-A4060	✓	✓	✓	✓
NQ-A4060-G2	✓	✓	✓	✓
NQ-A4120	✓	✓	✓	✓
NQ-A4120-G2	✓	✓	✓	✓
NQ-A4300	✓	✓	✓	✓
NQ-A4300-G2	✓	✓	✓	✓
NQ-PA120	✓	✓	✓	✓
NQ-PA240	✓	✓	✓	✓
NQ-PA600	✓	✓	✓	✓
NQ-ZPMS		✓	✓	✓
NQ-GAXMR1	✓	✓	✓	✓
Cisco SPA112 ATA	✓	✓	✓	✓
Yeastar TA2400	✓	✓	✓	✓
Grandstream HT813 ATA	✓	✓	✓	✓
Grandstream GXW4224				✓
Cisco ATA 191-3PW-K9	✓	✓	✓	✓

© Bogen Communications LLC

BOGEN

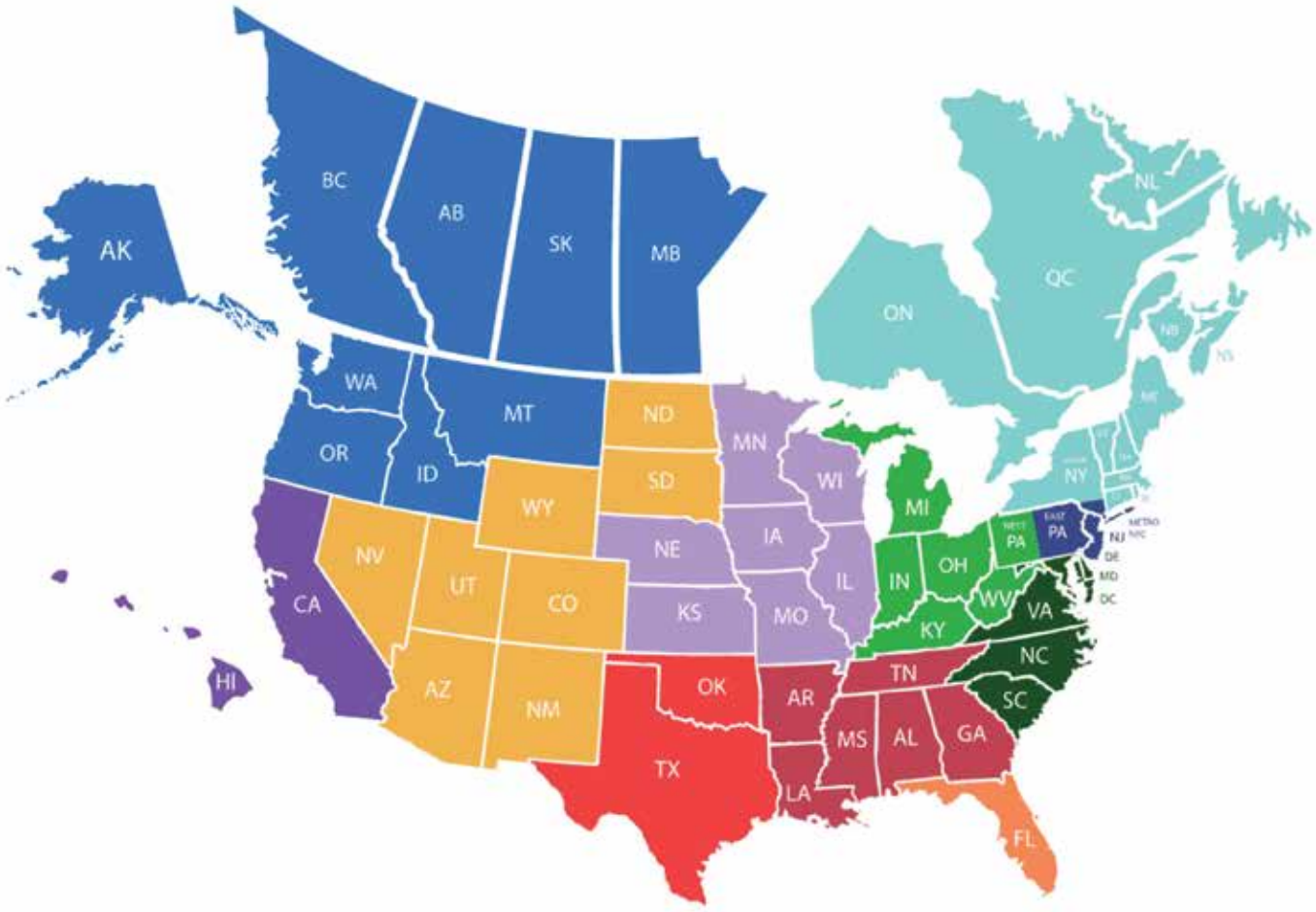
Bogen Offers FREE Training!

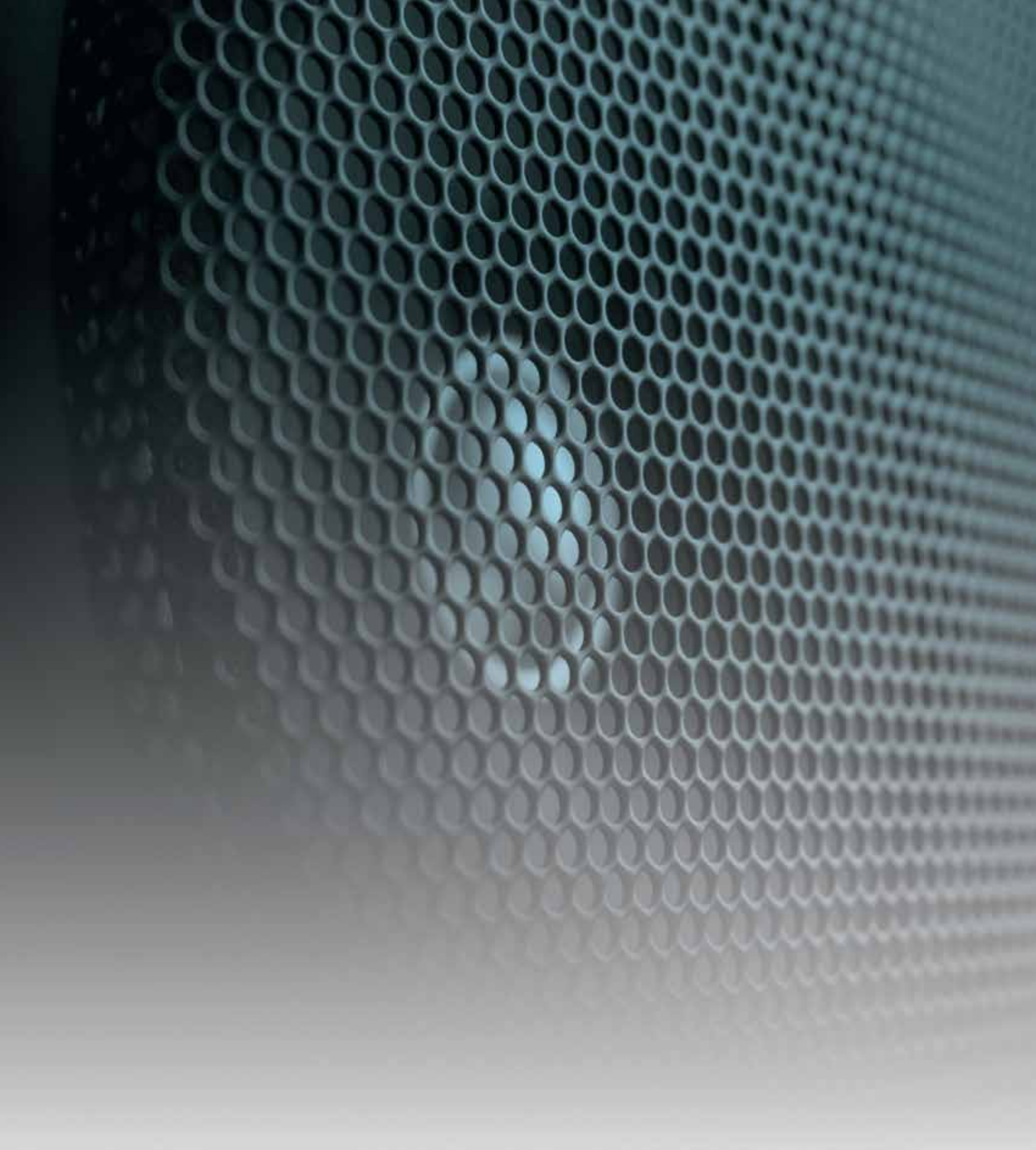
Bogen Elearning Gives You Free 24/7 Access
To Product Training, Monthly Webinars, And More.

eLearning!

BOGEN®

Find Your Bogen Regional Sales Manager





BOGEN®

FLORIDA / NEW JERSEY / TENNESSEE
Tel: 201-934-8500
www.bogen.com

54-9215-01M 2512
©2025 Bogen Communications LLC
All rights reserved.
Specifications are subject
to change without notice.