



BOSCH

PUBLIC ADDRESS GUIDE

PLENA SOLUTIONS

Plena - latin for complete



BOSCH means dependability

Bosch PA products are designed for simple, effective and long term operation.

In the Bosch PA mixer amplifiers, all have substantial feature sets. The European engineered amplifier circuits are bullet proof and the limiter circuits are as transparently effective as any to be found. From announcement chimes, multiple music inputs, and "smart" tone controls, the feature set is a step-up from common commercial products. Also units have an easy to use and attractive labeling system, with a unique colored pin system of setting appropriate levels. All models have pass through for additional amplification, music only outputs, telephone, emergency, and 70V input with VOX priority, enabling activation from virtually any emergency override system.

The PLE 1 mixer-amp series comes in 30, 60, and 120 watt versions.

The PLE 2 series offers two zone operations, two additional mic/line inputs, and separate tone controls for speech and music. The PLE 10M2 is a stand alone mixer with all the features of the PLE2, but without the amplifier.

One and two zone paging stations and a wall control work with every mixer-amp.

A power amp group and a mixer round out the core of this solid line. Other add-on solutions include a BGM Source, System Pre-amp, Weekly Timer, Message Manager and Feedback Suppressor.

PLENA ELECTRONIC LINE MODELS

PLE-1MA030-US 30W Single Zone Mixer Amplifier

PLE-1MA060-US 60W Single Zone Mixer Amplifier

PLE-1MA120-US 120W Single Zone Mixer Amplifier

PLE-2MA120-US 120W Two Zone Mixer Amplifier

PLE-2MA240-US 240W Two Zone Mixer Amplifier

PLE-10M2-US 6 Channel Mixer

PLE-1P-120-US 120W Single Channel Amplifier

PLE-1P-240-US 60W Single Single Channel Amplifier

PLE-2CS Dual Zone Call Station

PLE-1CS Single Zone Call Station

WP3S2Z Source Select Wall panel

PLN-DVDT Background Music Source

PLN-6TM Weekly Timer

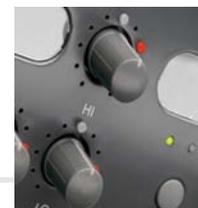
LBB1965 Message Manager

LBB1968 Feedback Suppressor

F
E
A
T
U
R
E
S



SMART EQ
Curves to optimize speech and music



SETTINGS
Unique pin set level indication



LABELS

**Application Advice,
System Design Assist,
Specific Quoting,
Supply & Implementation
Guidance by Starin**





MONO MIXER AMPS

PLE-1MA030-US 30W Single Zone Mixer Amplifier

PLE-1MA060-US 60W Single Zone Mixer Amplifier

PLE-1MA120-US 120W Single Zone Mixer Amplifier

- 🔊 4 microphone/line inputs, plus 3 music source inputs
- ❖ 70 V and telephone input with priority & VOX
- 🔊 Announcement only output, 3-wire volume override
- ❖ Voice-activated emergency override
- 🔊 Wide range of power options (30, 60 and 120 Watts)
- ❖ 2-tone chime
- 🔊 Outputs for line out and music only out
- ❖ Transparent & effective limiter circuit for protection & sonic integrity

Detachable labels- user can write the names for inputs, music sources and zones.

Bass / Treble Control -12/+12 dB



5 segment master output VU meter -18, -12, -6, -3, 0 dB

Headphone jack

Telephone / 70 V emergency input with VOX activation is provided for easy integration with another PA system or a telephone paging system.

RJ-45-Wall panel input for PLE-WP3S2Z

Separate music inputs with their own input selector and volume control.

Ducking control

Music output.

Output terminal

70V Call -only / 70V/ 4ohm / 25V



Input channels 1 and 2 can take priority over all other input channels:

Input 1 can be activated by contact closure on the PTT (push to talk). A 2-tone chime can be configured to precede an announcement.

Input 2 can be switched automatically if a signal is fed to the input, i.e., if someone speaks into the microphone (VOX activation).

Dip switches

Ducking level
Tel/70 V volume control
Limiter integrated in output stage
Speech filter

Input 3-4 Mic or line
Switch with phantom

Rack Mount kit included

Power consumption

PLE-1MA030-US 100 VA

PLE-1MA060-US 200 VA

PLE-1MA120-US 400 VA

Frequency response 50 Hz to 20 kHz
(+1/3 dB @ 10 dB ref. rated output)

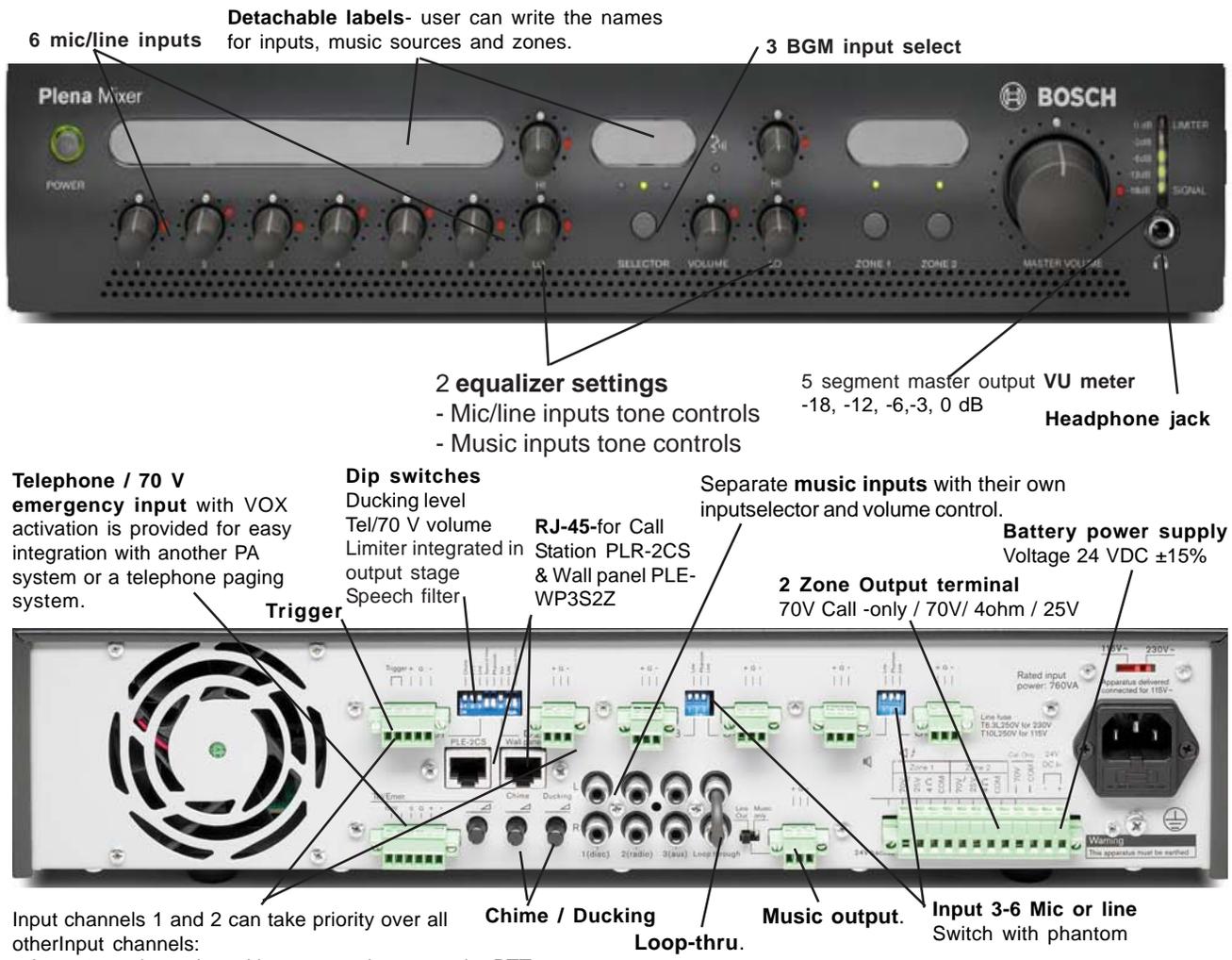
Distortion <1% @ rated output power, 1 kHz

DUAL ZONE MIXER-AMPS

PLE-2MA120-US 120W Two Zone Mixer Amplifier

PLE-2MA240-US 240W Two Zone Mixer Amplifier

- ⚡ **6 microphone/line inputs plus 3 music source inputs**
- ❖ **70 V, telephone and a call station input with priority & VOX**
- ⚡ **2 zones and announcement only output**
- ❖ **Voice activated emergency override**
- ⚡ **Transparent & effective limiter circuit for protection & sonic integrity**
- ❖ **2-tone chime built in (7 more chimes optional with call station)**
- ⚡ **Outputs for line out, music only out and insert point**
- ❖ **24 V backup power with built-in 24 V charger**
- ⚡ **Separate tone controls for microphones and music sources**



6 mic/line inputs

Detachable labels- user can write the names for inputs, music sources and zones.

3 BGM input select

2 equalizer settings
- Mic/line inputs tone controls
- Music inputs tone controls

5 segment master output VU meter
-18, -12, -6,-3, 0 dB

Headphone jack

Telephone / 70 V emergency input with VOX activation is provided for easy integration with another PA system or a telephone paging system.

Dip switches
Ducking level
Tel/70 V volume
Limiter integrated in output stage
Speech filter

RJ-45-for Call Station PLR-2CS & Wall panel PLE-WP3S2Z

Separate **music inputs** with their own inputselector and volume control.

Battery power supply
Voltage 24 VDC ±15%

2 Zone Output terminal
70V Call -only / 70V/ 4ohm / 25V

Input channels 1 and 2 can take priority over all otherInput channels:

Input 1 can be activated by contact closure on the PTT (push to talk). A 2-tone chime can be configured to precede an announcement.

Input 2 can be switched automatically if a signal is fed to the input, i.e., if someone speaks into the microphone (VOX activation).

Chime / Ducking

Loop-thru.

Music output.

Input 3-6 Mic or line
Switch with phantom

Rack Mount kit included

Power consumption

PLE-2MA120- US (mains) 400 VA

PLE-2MA240- US (mains) 800 VA

Frequency response 50 Hz to 20 kHz
(+1/3 dB @ 10 dB ref. rated output)

Distortion <1% @ rated output power, 1 kHz



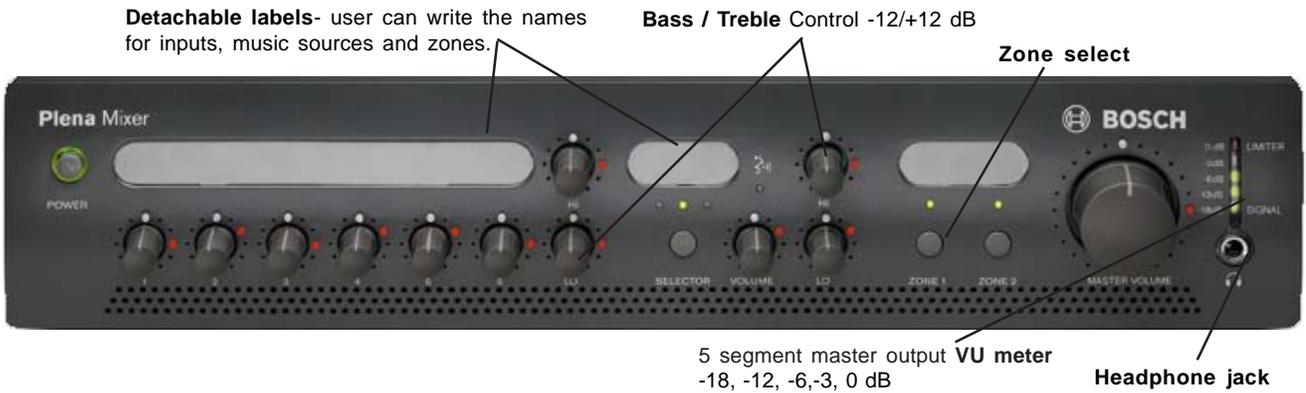
PUBLIC ADDRESS GUIDE

MIXER

PLE-10M2-US 6 Channel Mixer

Combined with the PLE-1P120-US or PLE-1P240-US amplifiers, you can build an easy-to-operate yet powerful and flexible public address system.

- ⚡ **6 microphone/line inputs, plus 3 music source inputs**
- ❖ **70 V, telephone and a call station input with priority & VOX**
- ⚡ **2 zones and 2-channel operation**
- ❖ **Voice-activated emergency override**
- ⚡ **2-tone chime built in, 7 more chimes optional with call station**
- ❖ **Outputs for line out, music only out, and insert point**
- ⚡ **24 V backup power with built-in 24 V charger**
- ❖ **Separate tone controls for microphones and music sources**



Telephone / 70 V emergency input with VOX activation is provided for easy integration with another PA system or a telephone paging system.

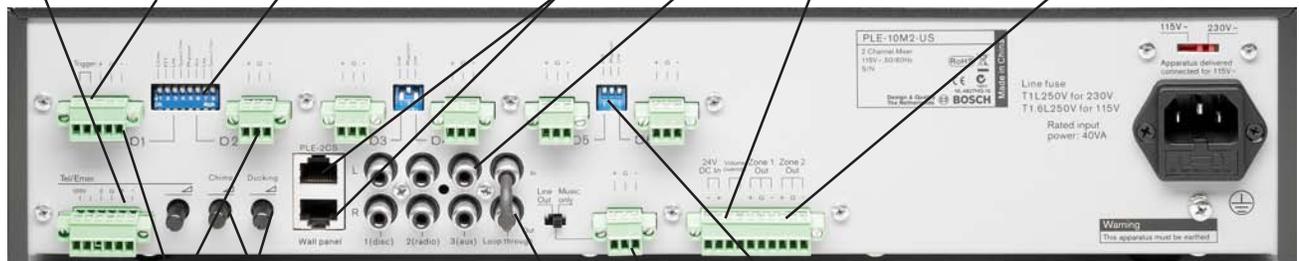
Dip switches
Ducking level
Tel/70 V volume
Limiter integrated in output stage
Speech filter

RJ-45-for Call Station PLR-2CS & Wall panel PLE-WP3S2Z

Separate music inputs with their own input selector and volume control.

2 Zone Output terminal
70V Call -only / 70V/ 4ohm / 25V

Battery power supply
Voltage 24 VDC ±15%



Input channels 1 and 2 can take priority over all other input channels:
 Input 1 can be activated by contact closure on the PTT (push to talk). A 2-tone chime can be configured to precede an announcement.
 Input 2 can be switched automatically if a signal is fed to the input, i.e., if someone speaks into the microphone (VOX activation).

Rack Mount kit included

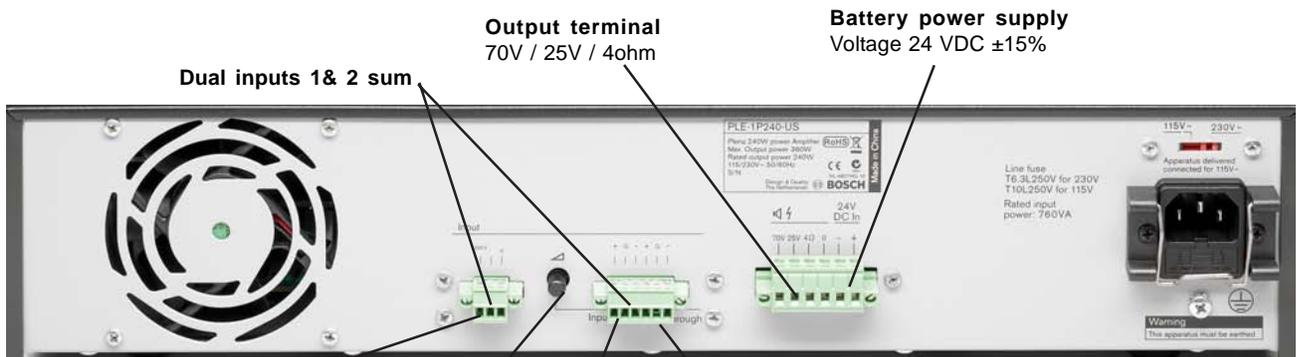
Frequency response 50 Hz to 20 kHz
 (+1/3 dB @ 10 dB ref. rated output)
Distortion <1% @ rated output power, 1 kHz
Signal to Noise ratio
 >63 dB (mic); >70 dB (line)
 S/N (flat at max volume)

AMPLIFIERS

PLE-1P-120-US 120W Single Channel Amplifier

PLE-1P-240-US 60W Single Single Channel Amplifier

- ⚡ 120 and 240 W power amplifier in a compact housing
- ❖ 1 V line level balanced input
- ⚡ 70 V, 25 V and 4 ohm outputs
- ❖ 70 V input for slave operation on 70 V speaker line
- ⚡ Temperature-controlled forced front to back ventilation (directly stackable)
- ❖ 24 VDC backup power with built-in charger
- ⚡ Llimiter protects the amp & loudspeaker against accidental overdriving.



Secondary input is 70 V line to connect the amplifier to a 25/70 V loudspeaker line to provide more power in remote locations.

Power consumption
 PLE-1P-120- US (mains) 227 W
 PLE-1P-240- US (mains) 351W

Frequency response 50 Hz to 20 kHz
 (+1/3 dB @ 10 dB ref. rated output)

Distortion <1% @ rated output power, 1 kHz

Fan acoustic noise level
 <40 dB SPL @ 1 m



PLE-WP3S2Z US Wall Panel

- Use with for Plena Easyline (PLE) mixer amplifiers
- Remote selection of three music source inputs
- Remote zone selection
- Perfect companion to Bosch volume controls
- Daisy-chain multiple wall panels
- Powered through the Plena system



PLE-1CS Call Station

- PPT or Toggle mode
- Fixed 6 foot cable
- Balanced signal
- Priority contact possible
- CAT 5 / RJ-45 connection

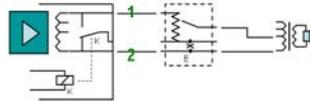


PLE-2CS Call Station

- Install up to 650 feet from mixer
- Daisy-chain up to six
- Automatic prioritizing stations
- Dip switches and rotary controls in base
- CAT 5 / RJ-45 connection



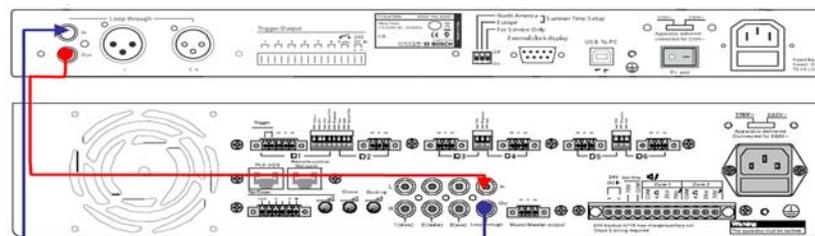
Volume control



PLN-6TM Weekly Timer

- Program 1, e.g. normal program
- Program 2, e.g. holiday program
- Switch 6 contact outputs manually

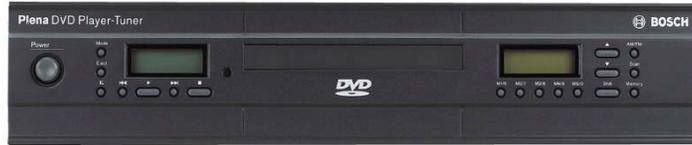
- Configure manually
- Configure with software via USB



Connection

PLN-DVDT Background Music Source

Multi-format DVD/CD player
plays MP3s
Digital FM tuner - 10 pre-sets
Mono/Stereo output



LBB1965 Message Manager

Storage capacity of 12
announcements (each
four messages)
Supervision against corrupted
or lost messages
Downloaded as .WAV files
Sampling: 24 kHz, 16 bits data
Headphone output for message
replay



LBB1968 Feedback Suppressor

Unique method and frequency shifting
in combination with acoustic echo
canceling.

The AEC works to reconstruct the
direct sound.

Achieve up to 12 dB additional
gain before feedback
No notch filters, so a clear and
natural sound.



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What is a low voltage system?

Basically, no matter how many devices you hang on to the load of the line, the voltage remains constant. This gives us the ability to hang a large number of speakers off of one amp and to run a fair distance. Yes, there are 25 and 100 volt systems out there (in some schools or over extremely long runs), but for our review we will reference the most common; 70 volt.

DETERMINE SPEAKER COVERAGE

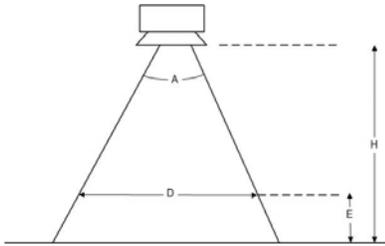
Each speaker has a dispersion pattern providing what circle of coverage can be provided before the level begins to drop off at the edges. If you know that, along with the ceiling height and the height if the listener, you can quickly figure out what the size of that "foot-print" coverage area is.

Now, we need to open the calculator on your PC and go to the View pull-down. Select scientific mode, because with dB in our math, there is a log as well as a tangent function. Don't run out on me because you squeaked by in Algebra like me. Here is the first equation.

$$D = 2 \times (H - E) \times \tan(A/2)$$

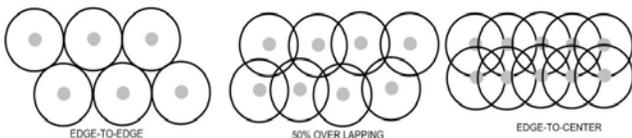
A is the coverage pattern at the -6dB down point as stated on the manufacturer spec sheet. H is ceiling height. E is ear height (4 foot seated).

Let's say we're using a speaker with a 110 degree pattern. We divide by two for 55. Hit the TAN button to get 1.428. Let's say the ceiling height is 12 feet and the listeners are seated at 4 feet. So, the 8 feet difference times 2, times 1.48, yields a 22.85' diameter of coverage area at ear height



Determine speaker coverage

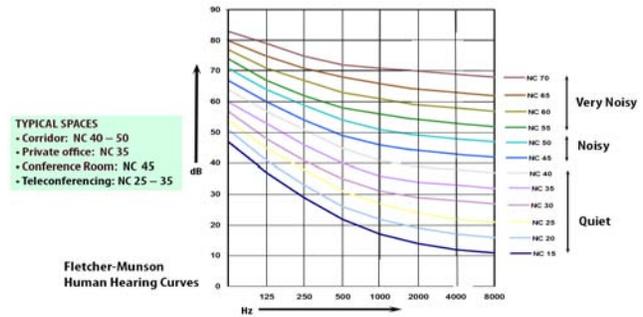
A distributed sound system of ceiling speakers or even down-firing horns (as in a factory or warehouse) serve the basic concept of blanketing sound across an area evenly for everyone in the area to hear clearly. The amount level changes across that area can be measured in plus or minus X dB deviation. Generally, you do not want more than a 3 dB deviation. That is achieved when the coverage pattern of each speaker is edge-to-edge with the adjacent pattern. A 2dB variation is achieved when a 50% overlap is arranged. When the patterns are edge-to-center, the greatest consistency in coverage is achieved with less than 1 dB of change across the area.



Determine the needed sound level

Generally speaking, you need about a 25 dB level above what is considered the ambient noise of the room. This may be considered the base Noise Criteria (NC) of the room empty or you may want to consider what the

ambient level is with people murmuring or even talking loudly, as in a crowded ballroom.



So if our NC is 45 and we add the 25 dB factor, we get over the ambient level for a 70 dB target level at the listener.

Determine the needed power

We've chosen our speaker. We know the coverage pattern and the speaker overlap configuration. We know the distance of the speaker to the listener. Now we can use two equations to figure power. This first one tells us the dB loss from the speaker to the listener position. $dB = 20 \log(D1/D2)$

The D1 is the distance from the speaker to the listener of 8 ft. Convert 8 feet into metric, because the D2 is sensitivity and that is measured in 1W per meter. So, 8 times .3048 is 2.4 meters. The log of 2.4 is .38. Multiplied that by 20 and you get a 7 dB loss.

The target level is 70 dB plus a Crest Factor (this allows for headroom from RMS -or average signal- to peaks; we will say 12 dB for this example). The difference from the 91 dB sensitivity and target level of 82 is 9 dB. The loss was 7dB, resulting in a need for 2 dB total gain make up.

A second equation figures power. $dB = 10 \log(P1/P2)$

The P1 is unknown power we need. P2 is the 1 watt sensitivity. P1 divided by one is P2. We know the dB needed as 2. So, divide that by 10 for $.2 = \log P2$. Find the antilog* of .2, which is 1.58 or 2 watts.

Now since you have laid out your speakers and know how many are in the room (or in zones, which we'll cover in the next edition), multiply the number of speakers times the watts per speaker. In our case, it is 18 speakers. Since the EVID C8.2 has that as a 1.88 W tap, if we have 18 speakers, our total speaker wattage is 36 (18*2). But wait! We're not done. We need to be sure the amplifier power has another 20% margin of safety.

Amp Power = Total Speak

So, our 36 watts needed :

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