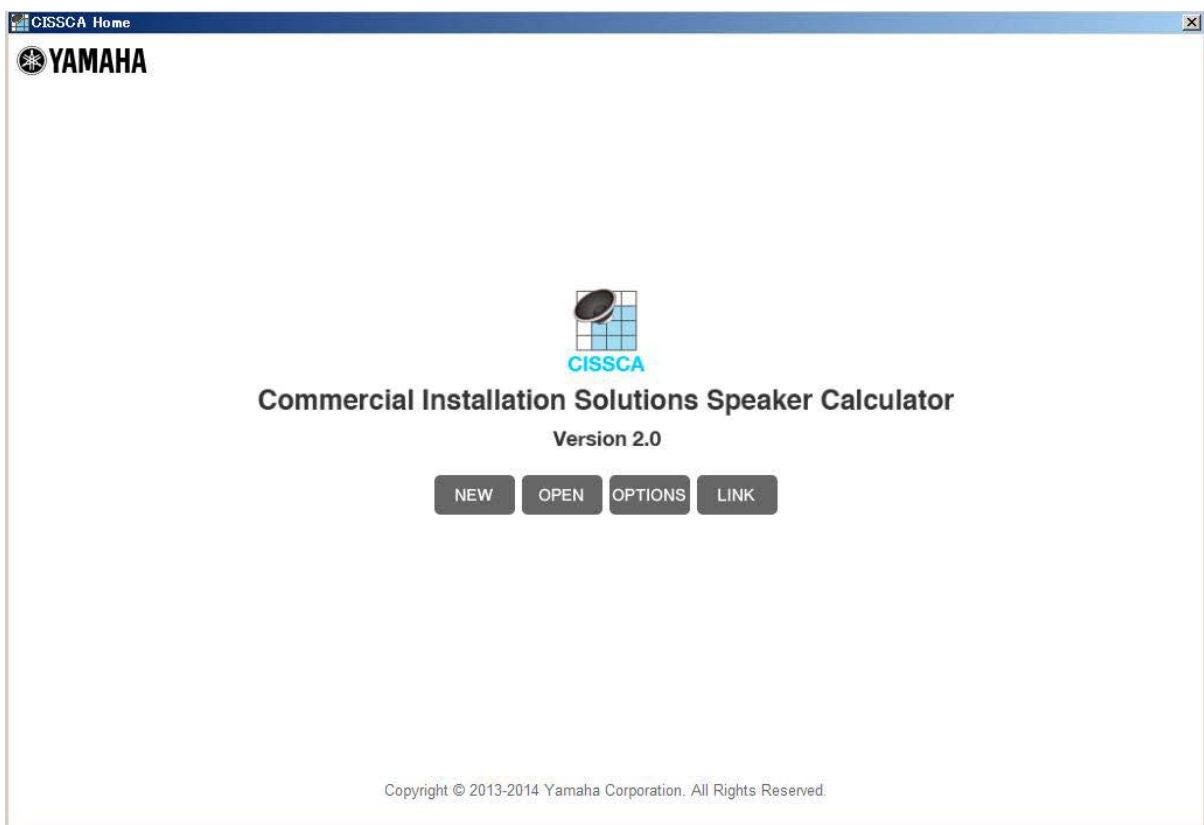


CISSCA User's Manual

V2.0 : September 2014



About CISSCA

Commercial Installation Solutions Speaker Calculator (CISSCA) is a software application that estimates the number of required speakers based on room and target conditions that you specify. It can also create reports containing the conditions and calculation results, which can be used to suggest speaker systems to customers.

Certain conditions have been simplified to facilitate and speed up the estimation process. If you want to specify conditions in more detail, please use Y-S3.

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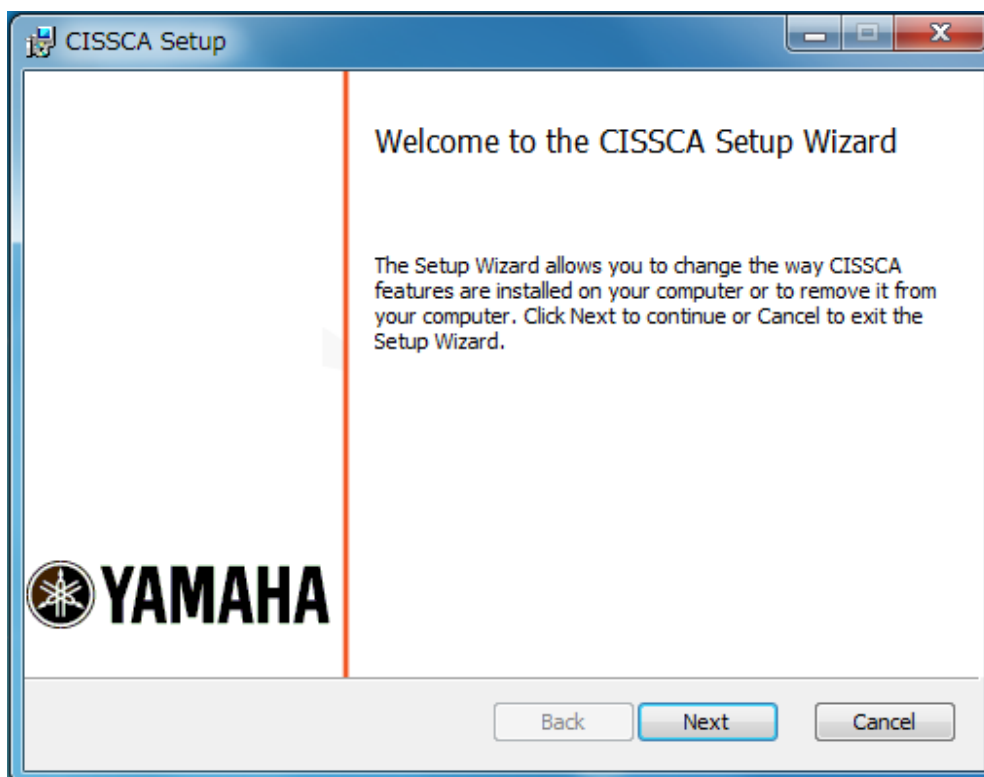
Any revision to the terms and conditions of this agreement is valid only if it is accompanied by a signature of an authorized Yamaha representative. The terms and conditions of this agreement shall be governed by and construed in accordance with the laws of Japan. All disputes that may arise concerning this agreement shall be settled under the jurisdiction of the Tokyo District Court.

PC System Requirements

OS	Windows 7 / 8 / 8.1
CPU	1 GB RAM (32 bit) or 2 GB RAM (64 bit)
Memory	1 GB RAM (32 bit) or 2 GB RAM (64 bit)
Hard disk	250MB or more free space
Display	1024×768 pixels, 256 colors or more, DirectX 9.0C

Install the Software

1. Double-click the CISSCA folder.
2. Double-click the installer file named CISSCA.
3. The CISSCA setup dialog box appears.



4. Follow the instructions on the screen to install the program.
5. During the installation, a folder named CISSCA is created on the PC (under Program Files\YAMAHA\CISSCA_Ver2 by default).
6. Shortcuts are added to the Start menu and desktop.

Uninstall the Software

1. Click Start > Settings > Control Panel > Add or Remove Programs.
2. The Add or Remove Programs dialog box appears.
3. Choose CISSCA, and click Remove.
4. A dialog box will appear. Follow the instructions on the screen to uninstall the program.

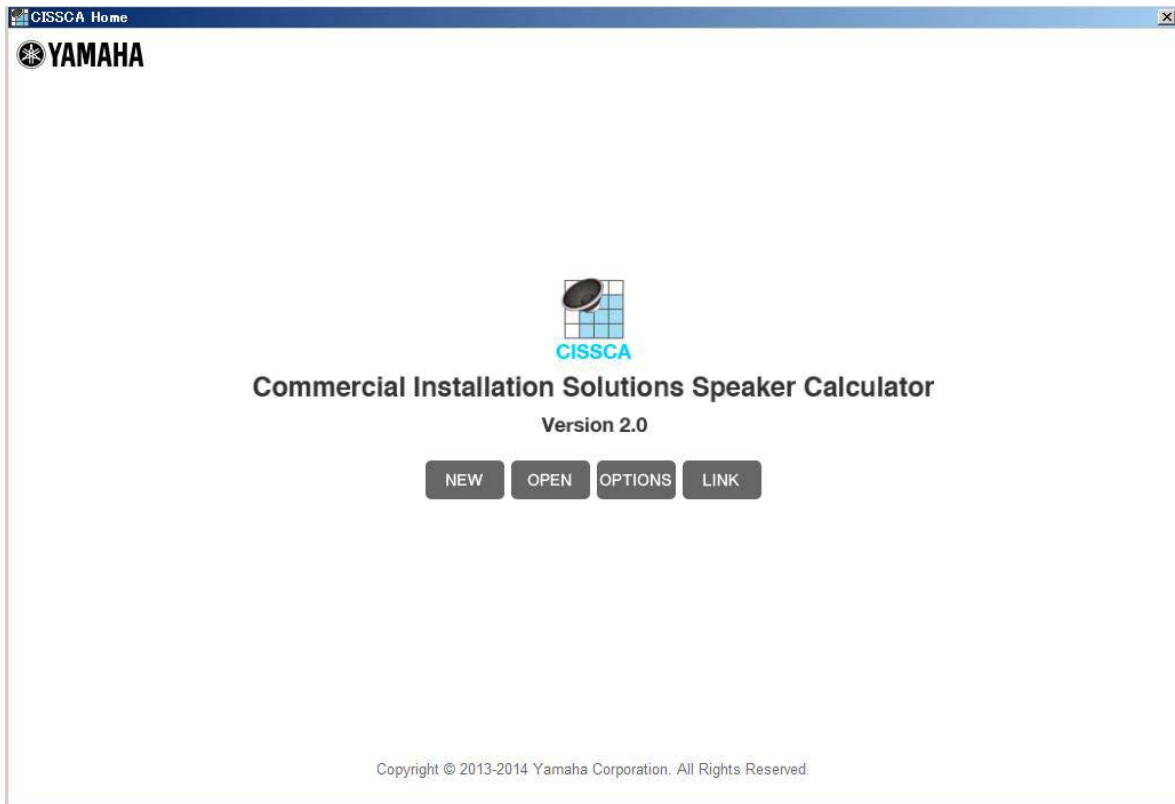
Index of Contents

About CISSCA	1
Terms of Use of the Software.....	2
Software License Agreement	2
PC System Requirements	5
Install the Software	5
Uninstall the Software.....	5
1 Starting CISSCA	7
1.1 Startup	7
1.2 Creating a Project	8
1.3 Common Features	8
2 Step1 . Setting Project and Room Conditions	9
3 Step2 . Selecting the Speaker	10
4 Step3 . Viewing the Coverage Area and Setting the Speaker Density	12
4.1 Ceiling speakers	14
4.2 Surface mount speakers	14
4.3 Subwoofers	14
5 Step4 . Viewing SPL Calculation Results.....	17
6 Step5 . Generating Reports	20

1 Starting CISSCA

1.1 Startup

To start the program, double-click the CISSCA icon on the desktop, or from the Start menu, click Programs > YAMAHA > CISSCA_Ver2. When the program starts, the initial screen (HOME screen) appears.



HOME screen

CISSCA is designed in a wizard format. From the HOME screen, you can simply enter conditions to specify the number of speakers and other design parameters. A design for a room can be managed as a project file.

- **Operations on the HOME Screen**

On this initial screen, you can perform the following operations.

- **Create a New Project: NEW**

Creates a new project.

- **Open an Existing Project: OPEN**

Opens a project that has been created in the past. You can also use this operation to create a new project based on a past project.

- **Configure settings: OPTION**

You can set various CISSCA options.

Language	English	Japanese
Unit	Meters	Feet / Inches
SPL on/off	on	off
Author Name	Yamaha	
Version	2.0.0910.0210	
close		

- **Language:** Select the language to use in the CISSCA screens. You can select English or Japanese.
 - **Unit:** Set the unit of measure. You can select meters or inches.
 - **SPL on/off:** Select whether to show or hide the SPL color map on page 4.
 - **Author Name:** Set the name of the author that is indicated in reports.
 - **Version:** The CISSCA version number.
- **View CISSCA Website: LINK**
 - Displays a Website containing CISSCA information. This requires an Internet connection.

1.2 Creating a Project

To create or edit a project, follow the procedure below. You can enter conditions and perform simulations.

- **Page 1:** Enter the project name and the conditions of the room and environment.
- **Page 2:** Select the speaker
- **Page 3:** Set the speaker layout density and layout type, etc.
- **Page 4:** Adjust the speaker output, display results, and generate reports.

Press NEXT to move to the next step (screen). Press BACK to return to the previous step (screen). You can go back to previous steps to change the values that have been entered.

1.3 Common Features

After a project is created, you can save it at any time (SAVE).

Other common features are as follows:

- **SAVE:** Saves the current project.
- **SAVE AS:** Saves the current project with another name.
- **Export CSV:** Saves the project content to a CSV (comma-separated text) file.
- **HOME:** Returns to the HOME screen.

- **QUIT:** Closes this application.
- **HELP:** Opens the directory which has manual of CISSCA. Please open a PDF file with an application such as Acrobat Reader (PDF reader).

2 Step 1. Setting Project and Room Conditions

Click NEW on the HOME screen to create a new project.

If you click OPEN and select an existing project, the screen that was showing when the project was saved appears.

CISSCA Version 2.0

YAMAHA MENU HELP

Project Name YAMAHA Corporation

1 ROOM INFO

Room Width 19' 8" Room Depth 32' 10"

Ceiling Height 11' 6" Listening Ear Height 3' 11"

MEMO
Yamaha Corporation
Hamamatsu office

1. ROOM INFO (W)19' 8" (D)32' 10" (H)11' 6" (Listen)3' 11"
2. SPEAKER SELECT
3. COVERAGE AREA
4. SOUND PRESSURE

Room Width 19' 8" Room Depth 32' 10"

Ceiling Height 11' 6" Listening Ear Height 3' 11"

BACK NEXT

Screen 1: Room information settings

On this screen, enter the environmental information of the target room. Project name: Enter a name for managing this design information.

(e.g.) Yamaha Corporation, meeting room, acoustic design

- **ROOM INFO**
 - **Room Width:** Enter the width of the room.
 - **Room Depth:** Enter the depth of the room.
 - **Ceiling Height:** Enter the height of the room.
 - **Listening Ear Height:** Enter the measurement height. In most cases, this will be the height of the listener's ears.
- **MEMO**

Enter a memo. The memo is also printed in reports. Enter information about the room or any other relevant information.

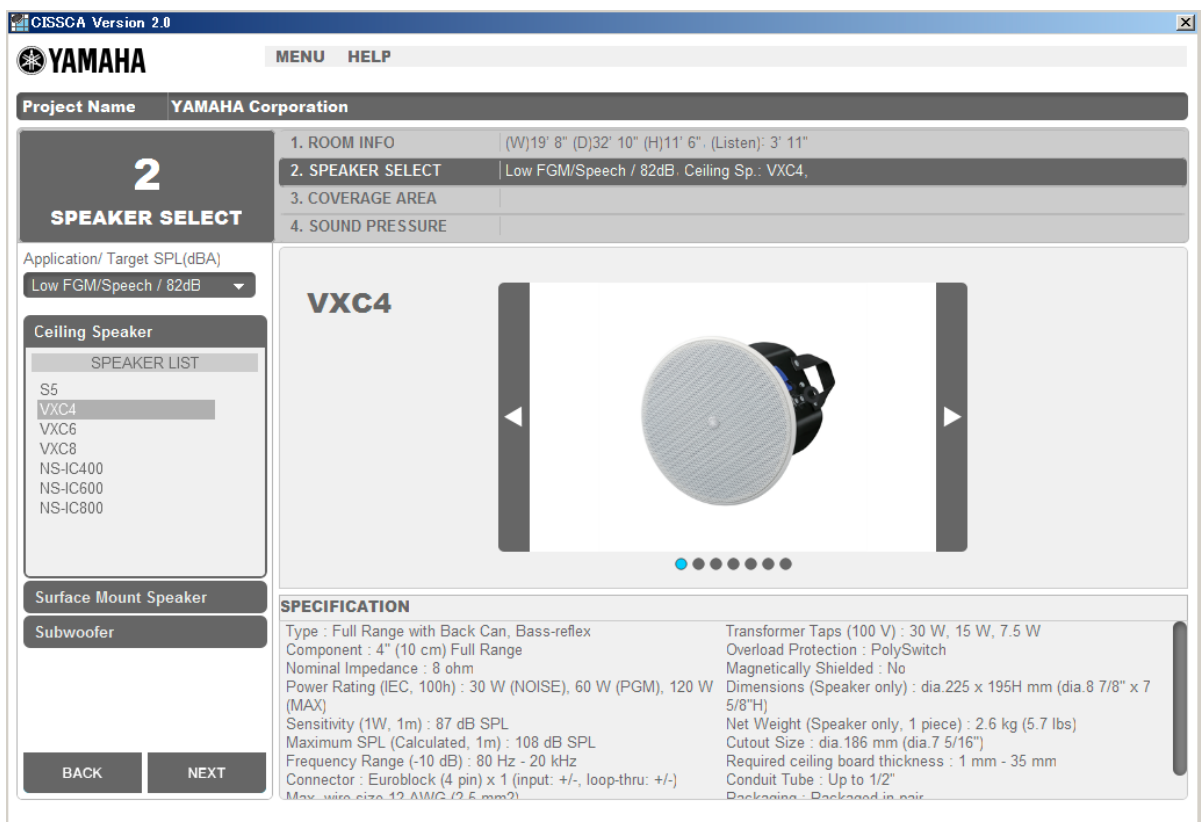
When you enter these values, they are reflected in the diagram on the right side of the screen so you can get a general idea of the room dimensions.

Note: In the earlier example, values are being entered in meters. You can also switch to inches. To do so, use the OPTION menu on the HOME screen.

After you enter the values, press NEXT to move to the next step.

3 Step 2. Selecting the Speaker

On this screen, set the required sound pressure level target (target SPL) and the speaker to use.



Screen 2: Selecting the speaker

- **Application/Target SPL**

By considering your application, set the maximum SPL that is necessary at the sound receiving point. Specific application examples are provided, so select a setting that is closest to your application (e.g. High BGM/79dB). In actuality, there will be some margin on the maximum SPL depending on the number of speakers that are laid out (layout density).

- **Application examples**

Name	Maximum SPL	Application example
	70dB	BGM (quiet)
Low BGM	73dB	
Mid BGM	76dB	BGM (medium)
High BGM	79dB	
Low FGM/Speech	82dB	BGM (loud), announcement
FGM/Speech	85dB	Aggressive BGM
High FGM	88dB	
Low Ent. Music	91dB	Music for an event (low)
Low Ent. Music	94dB	
Mid Ent. Music	97dB	Music for an event (medium)
Mid Ent. Music	100dB	
High Ent. Music	103dB	Music for an event (high)
High Ent. Music	106dB	

- **SPEAKER LIST**

Speakers that are appropriate for the application target are listed. When you select a speaker from this list, a photo and the specifications of the speaker are displayed on the right side of the window.

*Features added in V2.0

You can make estimations by using surface mount speakers and subwoofers in addition to ceiling speakers. Click the Surface Mount Speaker and Subwoofer tabs, and from the displayed lists, click the speakers that you want to include in the estimation. To deselect a selected speaker, click it again.

Select an appropriate speaker, and click NEXT to move to the next step.

4 Step 3. Viewing the Coverage Area and Setting the Speaker Density

On this screen, you will set the following items.

- Speaker density (quantity) and layout type
- Quantity, installation spacing, height, and angles (tilt and pan) of surface mount speakers
- Quantity and installation locations of subwoofers

CISSCA Version 2.0

YAMAHA MENU HELP

Project Name: YAMAHA Corporation

3 COVERAGE AREA

1. ROOM INFO (W)19' 8" (D)32' 10" (H)11' 6" (Listen): 3' 11"

2. SPEAKER SELECT Low FGM/Speech / 82dB Ceiling Sp.: VXC4

3. COVERAGE AREA Ceiling Sp.: Edge-to-Edge, Square

4. SOUND PRESSURE

CEILING SPEAKER

Density: Edge-to-Edge

Layout type: Square

Surface Mount Speaker

Subwoofer

BACK NEXT

Room Depth: 32' 10"

Room Width: 19' 8"

Ceiling Height: 11' 6"

Ceiling Speaker Spacing: 16' 6"

Surface Mount Speaker

X	-
Y	-
Pan	-
Tilt	-

Subwoofer

Height	-
--------	---

Listening Ear Height: 3' 11"

Screen 3: Coverage area view

4.1 Ceiling speakers

Ceiling speakers are automatically arranged in the room on the basis of the room information, the type of speaker, and the application that were specified in the previous steps. Speakers are displayed as dots in the diagram, and the coverage areas are displayed as circles (the area that starts from immediately below the speaker and extends outward horizontally until the SPL decreases by 6 dB).

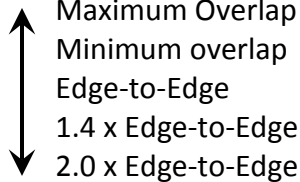
The coverage areas are results that are calculated from the selected speaker information; they will be slightly different from the nominal values indicated in catalogs and other related documents.

The spacing between the arranged speakers is displayed on the right side of the window.

- **Density (speaker layout density)**

Adjust the amount of overlap of the coverage areas, which indicates the boundaries where the SPL is 6 dB lower than at the sound receiving point immediately below the speaker (axis). By default, this is set to Edge-to-Edge. There are five adjustment levels that you can choose from.

High density



Low density

When you select a certain density, the software starts calculating and redraws the recalculated coverage areas. This calculation may take some time.

- **Layout type**

By default, speakers are arranged in a square pattern. You can also choose a hexagonal pattern.

- **Speaker Spacing**

Shows the spacing between speakers.

Note: Speaker spacing is displayed even in the case where there is only one speaker. Consider this to be an indicator of what the spacing would be if there were a second speaker. If the calculated number of speakers exceeds 128, an error message will appear. If this happens, select a lower density.

- **Layout pattern of speakers**

Maximum Overlap

In a maximum overlap layout the -6 dB SPL point of one speaker is aligned with the axis of the adjacent speaker. This approach requires a larger number of speakers, but results in optimum overall performance in applications that depend on high sound pressure levels.



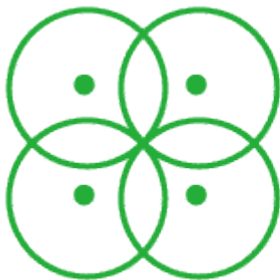
Square



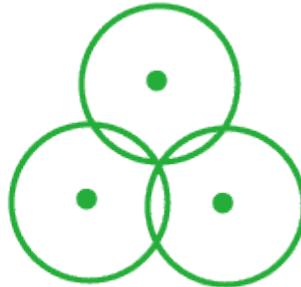
Hexagonal

Minimum overlap

Edge-to-edge speaker layouts can result in gaps in the coverage. A minimum overlap approach is recommended to effectively eliminate coverage gaps.



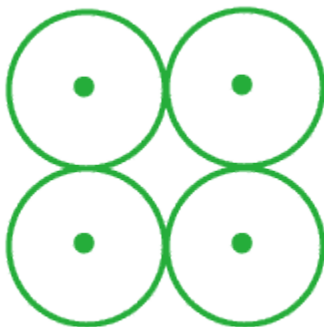
Square



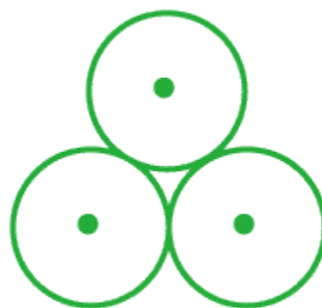
Hexagonal

Edge-to-Edge

Yamaha mostly recommends a Edge-to-edge layout, which is a commonly used configuration that aligns the -6 dB points of adjacent speakers. All Yamaha ceiling speakers supported by the CISSCA have a great advantage in this layout.



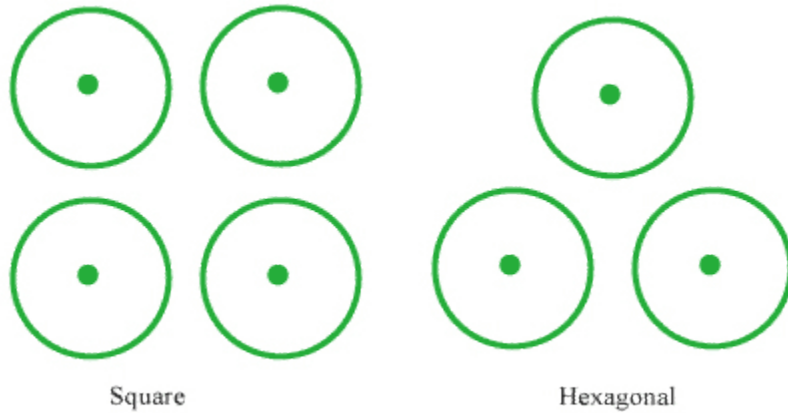
Square



Hexagonal

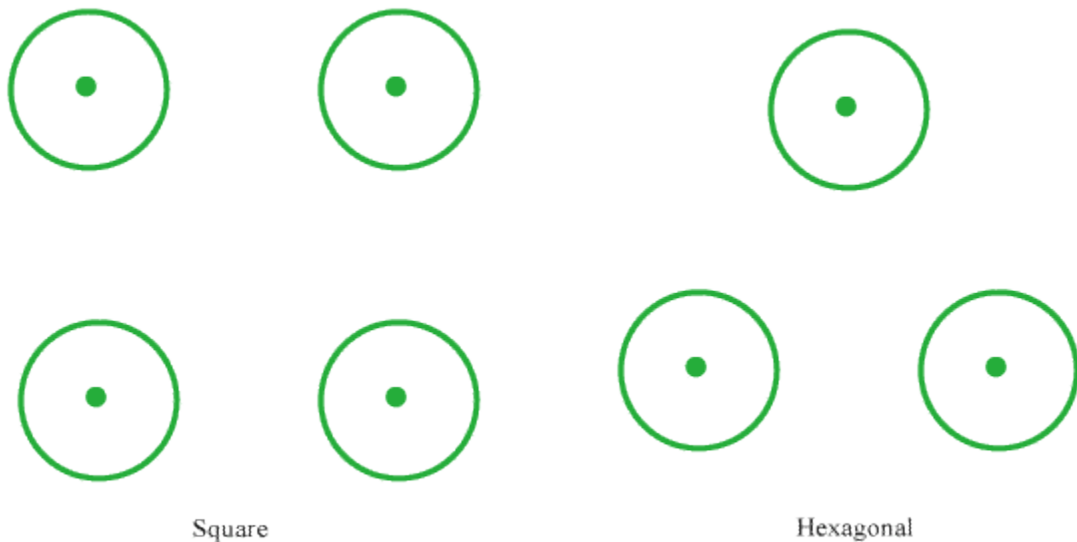
1.4 x Edge-to-Edge

In this configuration speakers are spaced 1.4 times further apart than in the standard Edge-to-Edge layout. This makes it possible to reduce the number of speakers used, resulting in a more economical system which Yamaha can recommend.



2.0 x Edge-to-Edge

The speakers are spaced 2 times further apart than in the standard Edge-to-Edge layout. This is the most economical approach, but Yamaha doesn't recommend it because it can result in uneven sound pressure level throughout the listening area.



4.2 Surface mount speakers

CISSCA Version 2.0

YAMAHA MENU HELP

Project Name: YAMAHA Corporation

3
COVERAGE AREA

1. ROOM INFO (W)19' 8" (D)32' 10" (H)11' 6" (Listen): 3' 11"
2. SPEAKER SELECT Low FGM/Speech / 82dB Ceiling Sp.: VXC4 Surface Mount Sp.: VXS5,
3. **COVERAGE AREA** Ceiling Sp.: Edge-to-Edge, Square, Surface Mount Sp.: Two,
4. SOUND PRESSURE

CEILING SPEAKER

Surface Mount Speaker

Sp pattern
Two

Spacing
x 16' 5" y
Angle
Pan 10.0 Tilt 5.0
Height 9' 10"

Subwoofer

Room Depth 32' 10"

Room Width 19' 8"

Ceiling Speaker Spacing 16' 6"

Surface Mount Speaker
X 16' 5"
Y 16' 5"
Pan 10.0
Tilt 5.0

Subwoofer
Height -

Ceiling Height 11' 6"

Listening Ear Height 3' 11"

BACK NEXT

Click the Surface Mount Speaker tab to specify settings for arranging surface mount speakers. The following settings are available.

- **Sp Pattern**
Specify the speaker arrangement pattern.
 - None:** None.
 - Two:** Arranges two speakers in front.
 - Four:** Arranges two speakers in front and two speakers in back.
 - Many:** Arranges speakers around the room at the specified spacing.
- **Spacing**
 - x:** Set the speaker spacing (distance) for the room width direction.
 - y:** Set the speaker spacing (distance) for the room depth direction. This is invalid when the arrangement pattern is set to "Two".
- **Angle**
 - Pan:** Set the speaker pan (horizontal angle).
 - Tilt:** Set the speaker tilt (vertical angle).
 - Height:** Set the speaker installation height.

4.3 Subwoofers

CISSCA Version 2.0

YAMAHA MENU HELP

Project Name: YAMAHA Corporation

3
COVERAGE AREA

1. ROOM INFO (W)19' 8" (D)32' 10" (H)11' 6" (Listen): 3' 11"
2. SPEAKER SELECT Low FGM/Speech / 82dB Ceiling Sp.: VXC4 Surface Mount Sp.: VXS5 Subwoofer: VXS10ST
3. COVERAGE AREA Ceiling Sp.: Edge-to-Edge, Square Surface Mount Sp.: Two Subwoofer.: 1(Ceiling)
4. SOUND PRESSURE

CEILING SPEAKER
Surface Mount Speaker
Subwoofer

Position

Height
Ceiling

Room Depth: 32' 10"

Room Width: 19' 8"

Ceiling Speaker Spacing: 16' 6"

Surface Mount Speaker

X	16' 5"
Y	-
Pan	10.0
Tilt	5.0

Subwoofer

Height	Ceiling
--------	---------

Ceiling Height: 11' 6"

Listening Ear Height: 3' 11"

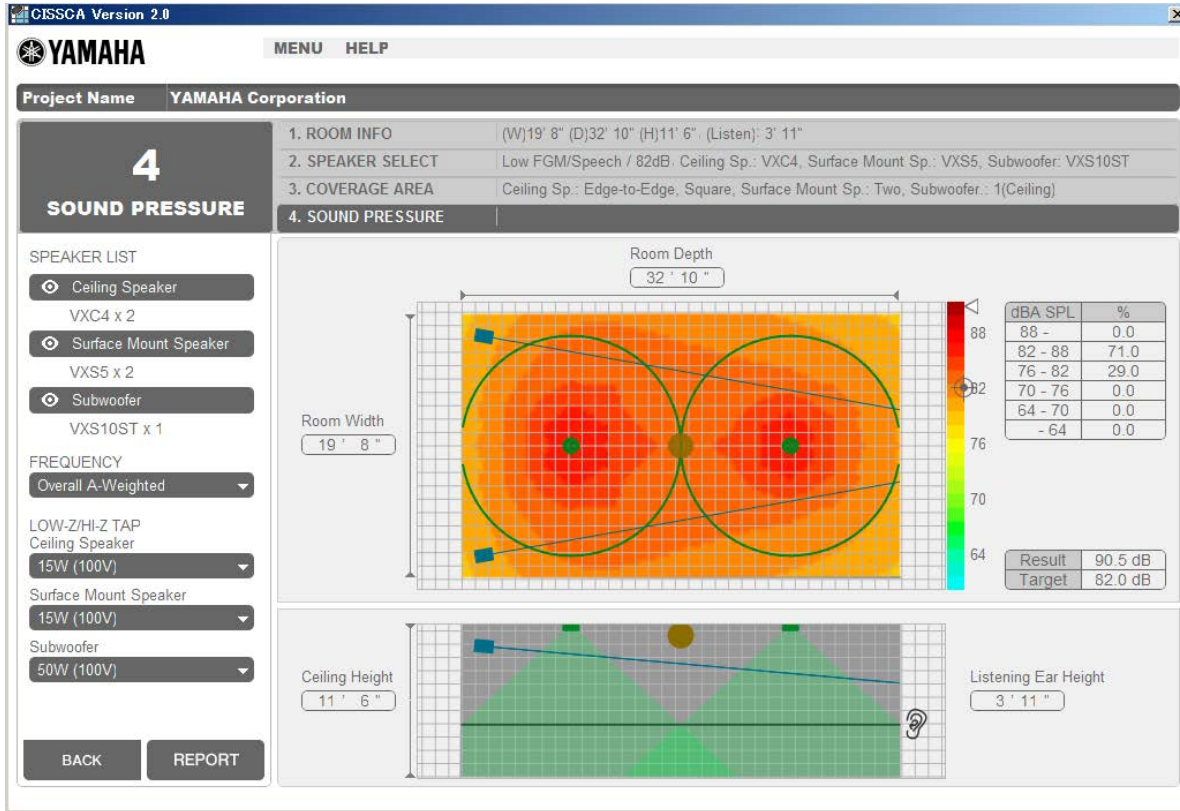
BACK NEXT

Click the Subwoofer tab to specify settings for arranging subwoofers. The following settings are available.

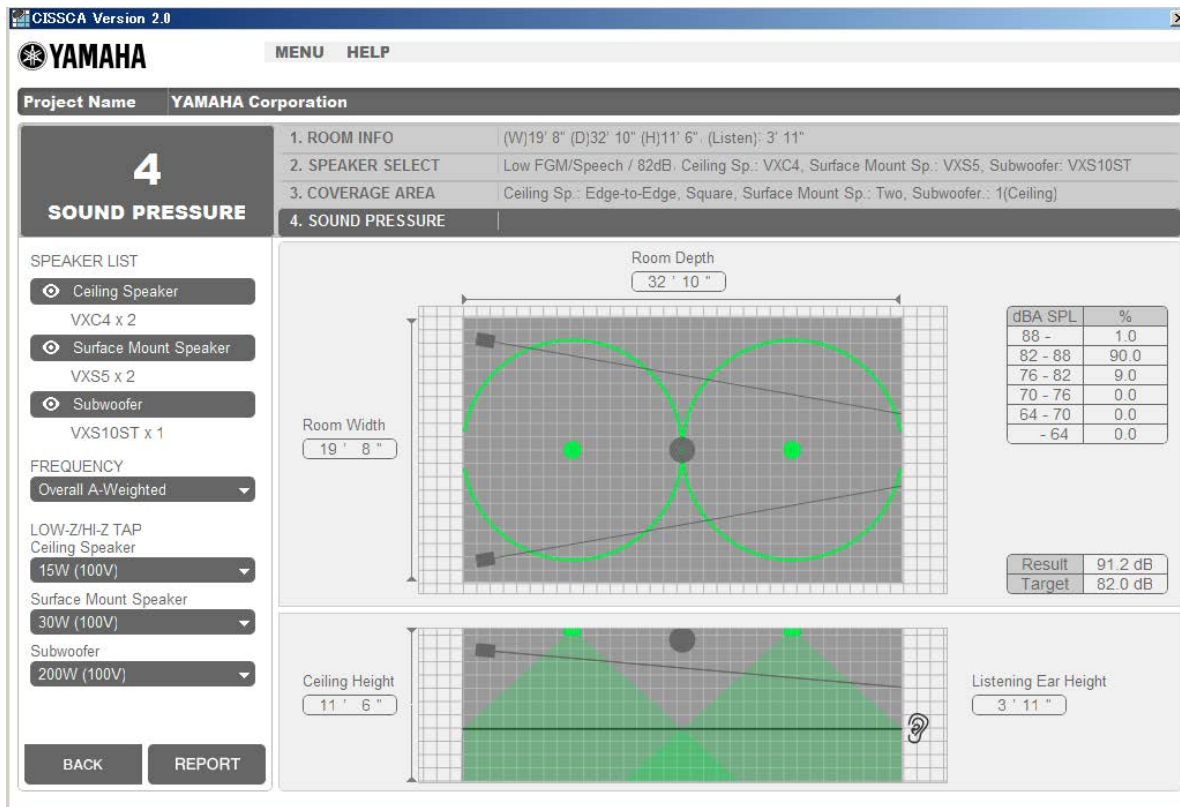
- **Position**
Select the installation locations from the nine available choices (sides, corners, and near the center of the room). You can install up to two subwoofers.
- **Height**
Set the installation height. Select "Ceiling" or "Floor".

5 Step 4. Viewing SPL Calculation Results

On this screen, you can view an SPL distribution map created on the basis of the specified conditions. You can update the map by changing speaker output settings, the measurement frequency, and other parameters.



Screen 4-1: SPL distribution map view




Screen 4-2: When the SPL distribution map is hidden

The SPLs are expressed using the different colors on the color bar shown on the right of the map. You can see that the SPL is the highest near the speaker and decreases as you move away from it. The wattage selected in the current selected speaker output list (Lo-Z/Hi-Z Tap) will be used to simulate the output sound pressure.

The color bar indicates how the colors are mapped to the SPLs. The target mark shown on the right side of the bar indicates the target SPL specified on Page 2. The arrow indicates the maximum SPL at the listening height with current speaker output setting. These are also shown numerically next to “Result (calculated result)” and “Target (target SPL)” on the right edge of the window.

The measurement frequency is usually based on the “Overall+A weighted” setting, but you can also change this. If you select a different frequency, the Result and Target numeric displays will not be shown. If SPL on/off (SPL map display option) is set to “ON”, the SPL colors and values that are used in the map are indicated on the right side of the window. The specified target SPL is also indicated.

The table on the right side of the window (dBA SPL or dB SPL) indicates the SPL distribution ratios in the room at 6 dB intervals. Speaker List: A list of speakers used in the calculation.

You can temporarily exclude speakers from the SPL calculation by clicking the eye icon () shown on the left of each speaker type. This is also reflected in reports.

- **Frequency**
Select the frequency band to use in the SPL calculation. The default setting is Overall A-Weighted. Other available settings are Overall Flat, Low (125-500 Hz), Mid (500-2 kHz), and High (2-8 kHz). If you change a parameter, the software recalculates and redraws the map.
- **Lo-Z/Hi-Z Tap**
Select the output value for a low-impedance connection of each speaker (PGM power rating) and the tap for a high-impedance connection. The software recalculates the SPL distribution on the basis of the selected values.
- **Report**
On the basis of the completed design information, the software generates a PDF report that can be printed on an A4 paper. You can open the PDF file in Adobe Reader (recommended) or a similar application, print it, and provide it as design information.

Note: Overlapping speaker coverage areas creates an acoustic space that allows for great flexibility. But at the same time, remember that the required number of speakers will increase. To adjust the number of speakers, go back to Page 3 and adjust the speaker density and the like.

6 **Step5. Generating Reports**

Click REPORT in the screen of Step 4 to generate a PDF report as shown below.

When you click REPORT, a dialog box will appear asking you to enter the path and file name of the PDF file. Enter the information, and save the file. The SPL maps for different measurement frequencies are displayed on page 2 and subsequent pages.



Project name: YAMAHA Corporation

Author name: YAMAHA

APPLICATION TARGET

Ceiling Speaker



: Low FGM/Speech / 82dB

: VXC4 x 2 (15W (100V))

Density: Edge-to-Edge

BASIC PATTERN: Square

Speaker Spacing: 16' 6"

Surface Mount Speaker



: VXS5 x 2 (30W (100V))

Sp Pattern: Two

Spacing: X : 16' 5"

Angle: Pan : 10.00 Tilt : 5.00

Height: 9' 10"

Subwoofer



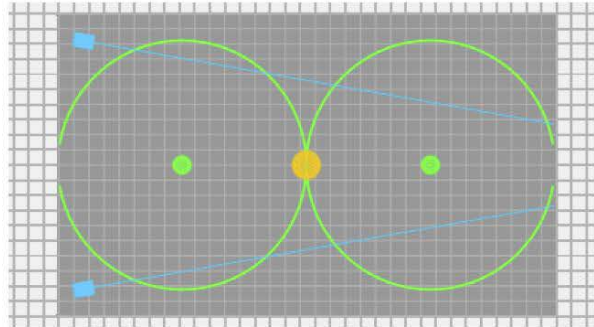
: VXS10ST x 1 (200W (100V))

Height: Ceiling

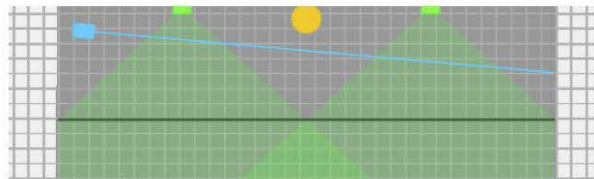
SPEAKER LAYOUT

Room Depth : 32' 10"

Room Width
19' 8"



Ceiling Height
11' 6"

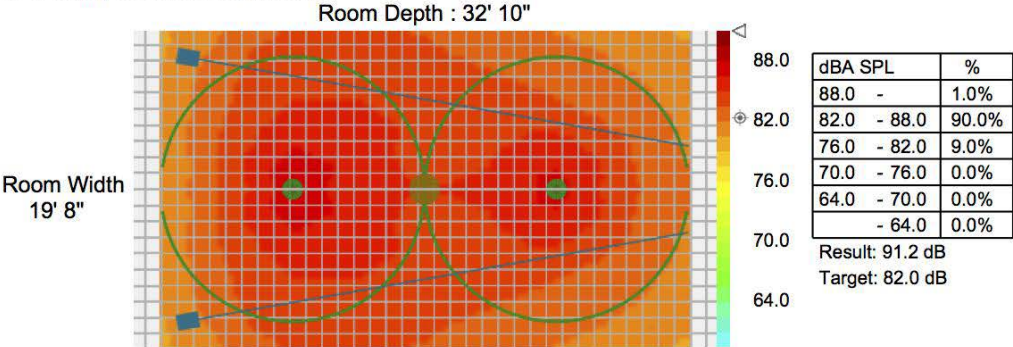


Listening Height
3' 11"

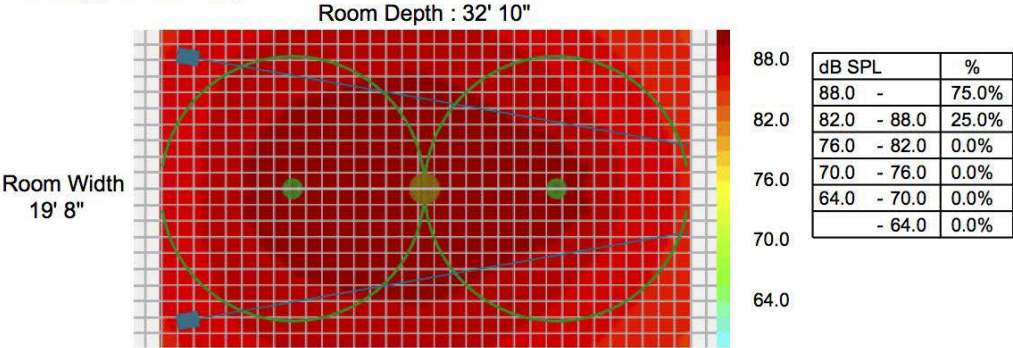
Memo

Yamaha Corporation Hamamatsu office

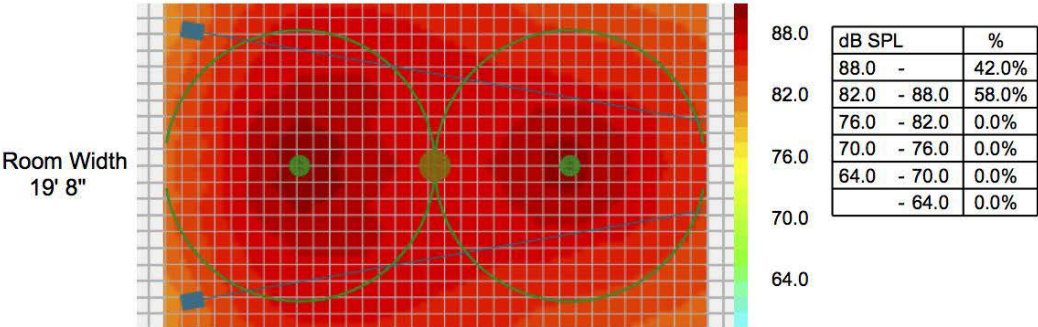
SPL Map [Overall A-Weighted]



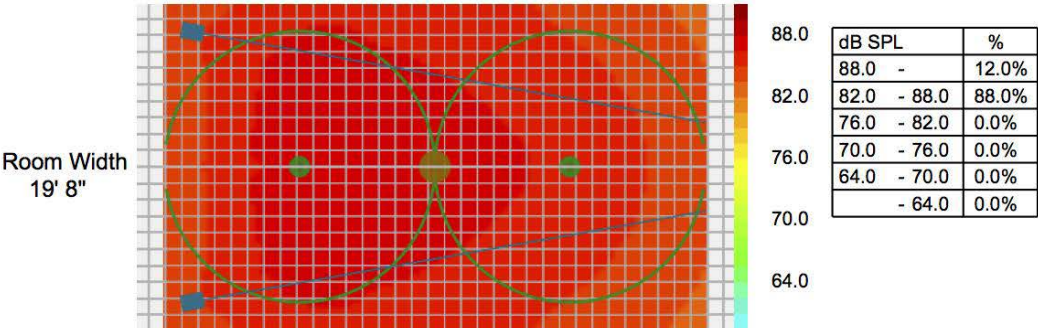
SPL Map [Overall Flat]



SPL Map [HIGH, 2kHz - 8kHz]
Room Depth : 32' 10"



SPL Map [MID, 500Hz - 2kHz]
Room Depth : 32' 10"



SPL Map [LOW, 125Hz - 500Hz]
Room Depth : 32' 10"

