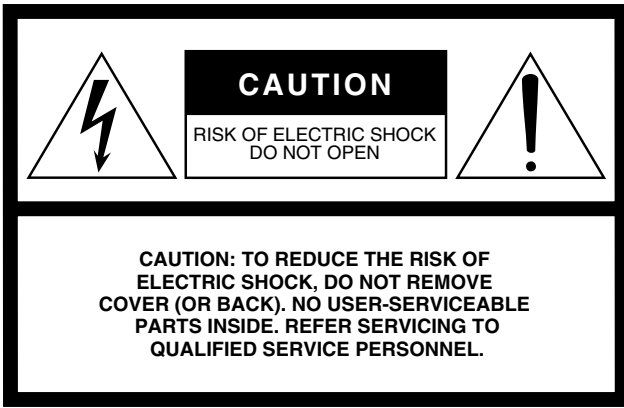


SPEAKER PROCESSOR **SP 2060**

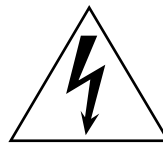
Owner's Manual





The above warning is located on the top of the unit.

Explanation of Graphical Symbols



The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated “dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

IMPORTANT SAFETY INSTRUCTIONS

- 1 Read these instructions.
- 2 Keep these instructions.
- 3 Heed all warnings.
- 4 Follow all instructions.
- 5 Do not use this apparatus near water.
- 6 Clean only with dry cloth.
- 7 Do not block any ventilation openings. Install in accordance with the manufacturer’s instructions.
- 8 Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- 9 Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- 10 Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
- 11 Only use attachments/accessories specified by the manufacturer.
- 12 Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
- 13 Unplug this apparatus during lightning storms or when unused for long periods of time.
- 14 Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.



WARNING

TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE.

(98-6500)

This product contains a battery that contains perchlorate material.
Perchlorate Material—special handling may apply,
See www.dtsc.ca.gov/hazardouswaste/perchlorate.

* This applies only to products distributed by YAMAHA CORPORATION OF AMERICA. (Perchlorate)

FCC INFORMATION (U.S.A.)

1. IMPORTANT NOTICE: DO NOT MODIFY THIS UNIT!

This product, when installed as indicated in the instructions contained in this manual, meets FCC requirements. Modifications not expressly approved by Yamaha may void your authority, granted by the FCC, to use the product.

2. IMPORTANT: When connecting this product to accessories and/or another product use only high quality shielded cables. Cable/s supplied with this product MUST be used. Follow all installation instructions. Failure to follow instructions could void your FCC authorization to use this product in the USA.

3. NOTE: This product has been tested and found to comply with the requirements listed in FCC Regulations, Part 15 for Class "B" digital devices. Compliance with these requirements provides a reasonable level of assurance that your use of this product in a residential environment will not result in harmful interference with other electronic devices. This equipment generates/uses radio frequencies and, if not installed and used according to the instructions found in the users manual, may cause interference harmful to the operation of other electronic devices. Compliance with FCC regulations does

not guarantee that interference will not occur in all installations. If this product is found to be the source of interference, which can be determined by turning the unit "OFF" and "ON", please try to eliminate the problem by using one of the following measures:

Relocate either this product or the device that is being affected by the interference.

Utilize power outlets that are on different branch (circuit breaker or fuse) circuits or install AC line filter/s.

In the case of radio or TV interference, relocate/reorient the antenna. If the antenna lead-in is 300 ohm ribbon lead, change the lead-in to co-axial type cable.

If these corrective measures do not produce satisfactory results, please contact the local retailer authorized to distribute this type of product. If you can not locate the appropriate retailer, please contact Yamaha Corporation of America, Electronic Service Division, 6600 Orangethorpe Ave, Buena Park, CA90620

The above statements apply ONLY to those products distributed by Yamaha Corporation of America or its subsidiaries.

* This applies only to products distributed by YAMAHA CORPORATION OF AMERICA.

(class B)

COMPLIANCE INFORMATION STATEMENT (DECLARATION OF CONFORMITY PROCEDURE)

Responsible Party : Yamaha Corporation of America
Address : 6600 Orangethorpe Ave., Buena Park, Calif.
90620
Telephone : 714-522-9011
Type of Equipment : SPEAKER PROCESSOR
Model Name : SP2060

This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:

- 1) this device may not cause harmful interference, and
- 2) this device must accept any interference received including interference that may cause undesired operation.

See user manual instructions if interference to radio reception is suspected.

* This applies only to products distributed by
YAMAHA CORPORATION OF AMERICA.

(FCC DoC)

ADVARSEL!

Lithiumbatteri—Eksplodingsfare ved fejlagtig håndtering. Udskiftning må kun ske med batteri af samme fabrikat og type. Levér det brugte batteri tilbage til leverandoren.

WARNING

Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren. Kassera använt batteri enligt fabrikantens instruktion.

VAROITUS

Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

(lithium caution)

NEDERLAND / THE NETHERLANDS

- Dit apparaat bevat een lithium batterij voor geheugen back-up.
- This apparatus contains a lithium battery for memory back-up.
- Raadpleeg uw leverancier over de verwijdering van de batterij op het moment dat u het apparaat aan het einde van de levensduur afdankt of de volgende Yamaha Service Afdeling:
Yamaha Music Nederland Service Afdeling
Kanaalweg 18-G, 3526 KL UTRECHT
Tel. 030-2828425
- For the removal of the battery at the moment of the disposal at the end of the service life please consult your retailer or Yamaha Service Center as follows:
Yamaha Music Nederland Service Center
Address : Kanaalweg 18-G, 3526 KL UTRECHT
Tel : 030-2828425
- Gooi de batterij niet weg, maar lever hem in als KCA.
- Do not throw away the battery. Instead, hand it in as small chemical waste.

(lithium disposal)

IMPORTANT NOTICE FOR THE UNITED KINGDOM


Connecting the Plug and Cord

WARNING: THIS APPARATUS MUST BE EARTHED

IMPORTANT. The wires in this mains lead are coloured in accordance with the following code:

GREEN-AND-YELLOW	: EARTH
BLUE	: NEUTRAL
BROWN	: LIVE

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug proceed as follows:

The wire which is coloured GREEN-and-YELLOW must be connected to the terminal in the plug which is marked by the letter E or by the safety earth symbol  or coloured GREEN or GREEN-and-YELLOW.

The wire which is coloured BLUE must be connected to the terminal which is marked with the letter N or coloured BLACK.

The wire which is coloured BROWN must be connected to the terminal which is marked with the letter L or coloured RED.

• This applies only to products distributed by Yamaha-Kemble Music (U.K.) Ltd.(3 wires)

PRECAUTIONS

PLEASE READ CAREFULLY BEFORE PROCEEDING

* Please keep this manual in a safe place for future reference.



WARNING

Always follow the basic precautions listed below to avoid the possibility of serious injury or even death from electrical shock, short-circuiting, damages, fire or other hazards. These precautions include, but are not limited to, the following:

Power supply/Power cord

- Only use the voltage specified as correct for the device. The required voltage is printed on the name plate of the device.
- Use only the included power cord.
If you intend to use the device in an area other than in the one you purchased, the included power cord may not be compatible. Please check with your Yamaha dealer.
- Do not place the power cord near heat sources such as heaters or radiators, and do not excessively bend or otherwise damage the cord, place heavy objects on it, or place it in a position where anyone could walk on, trip over, or roll anything over it.
- Be sure to connect to an appropriate outlet with a protective grounding connection. Improper grounding can result in electrical shock.

Do not open

- Do not open the device or attempt to disassemble the internal parts or modify them in any way. The device contains no user-serviceable parts. If it should appear to be malfunctioning, discontinue use immediately and have it inspected by qualified Yamaha service personnel.

Water warning

- Do not expose the device to rain, use it near water or in damp or wet conditions, or place containers on it containing liquids which might spill into any openings.
- Never insert or remove an electric plug with wet hands.

If you notice any abnormality

- If the power cord or plug becomes frayed or damaged, or if there is a sudden loss of sound during use of the device, or if any unusual smells or smoke should appear to be caused by it, immediately turn off the power switch, disconnect the electric plug from the outlet, and have the device inspected by qualified Yamaha service personnel.
- If this device should be dropped or damaged, immediately turn off the power switch, disconnect the electric plug from the outlet, and have the device inspected by qualified Yamaha service personnel.



CAUTION

Always follow the basic precautions listed below to avoid the possibility of physical injury to you or others, or damage to the device or other property. These precautions include, but are not limited to, the following:

Power supply/Power cord

- Remove the electric plug from the outlet when the device is not to be used for extended periods of time, or during electrical storms.
- When removing the electric plug from the device or an outlet, always hold the plug itself and not the cord. Pulling by the cord can damage it.

Location

- Before moving the device, remove all connected cables.
- When setting up the product, make sure that the AC outlet you are using is easily accessible. If some trouble or malfunction occurs, immediately turn off the power switch and disconnect the plug from the outlet. Even when the power switch is turned off, electricity is still flowing to the product at the minimum level. When you are not using the product for a long time, make sure to unplug the power cord from the wall AC outlet.
- If this device is to be mounted in an EIA-standard rack, leave the back of the rack open and make sure that it is at least 10 cm away from walls or surfaces. Also, if this device is to be mounted with devices that tend to generate heat, such as power amplifiers, be sure to keep an adequate gap between this device and the heat-generating devices or install ventilation panels to prevent high temperatures from developing inside this device.

Inadequate ventilation can result in overheating, possibly causing damage to the device(s), or even fire.

- If several of the devices are mounted in an EIA-compliant rack, carefully read the section "Precautions for Using a Rack-mounted SP2060" on page 8.
- Avoid setting all equalizer controls and faders to their maximum. Depending on the condition of the connected devices, doing so may cause feedback and may damage the speakers.
- Do not expose the device to excessive dust or vibrations, or extreme cold or heat (such as in direct sunlight, near a heater, or in a car during the day) to prevent the possibility of panel disfiguration or damage to the internal components.
- Do not place the device in an unstable position where it might accidentally fall over.
- Do not use the device in the vicinity of a TV, radio, stereo equipment, mobile phone, or other electric devices. Doing so may result in noise, both in the device itself and in the TV or radio next to it.

Connections

- Before connecting the device to other devices, turn off the power for all devices. Before turning the power on or off for all devices, set all volume levels to minimum.

Handling caution

- Do not use the device for a long period of time at a high or uncomfortable volume level, since this can cause permanent hearing loss. If you experience any hearing loss or ringing in the ears, consult a physician.
- Do not rest your weight on the device or place heavy objects on it, and avoid use excessive force on the buttons, switches or connectors.

Backup battery

- This device has a built-in backup battery. When you unplug the power cord from the AC outlet, the current scene data is retained. However, the life of the backup battery is about five years. If the battery wears out, the current scene data will be lost. When the backup battery charge becomes low, the unit first displays "LOW BATTERY" then "CRITICAL BATTERY" when you turn on the power to the unit. (The Battery page of the Utility display also indicates first "Low Battery" then "No Battery" when the charge becomes low.) In this case, please have qualified Yamaha service personnel replace the backup battery.

Do not turn the [POWER] switch on and off repeatedly and rapidly. Be sure to wait six seconds or more between turning the power to the unit off and then on.

The rubber feet included in this package can be attached to the bottom of this device to prevent slippage when it is to be used on a slippery surface.

Yamaha cannot be held responsible for damage caused by improper use or modifications to the device, or data that is lost or destroyed.

Always turn the power off when the device is not in use.

The performance of components with moving contacts, such as switches, volume controls, and connectors, deteriorates over time. Consult qualified Yamaha service personnel about replacing defective components.

- The illustrations in this document are for instructional purposes, and may appear somewhat different from the actual equipment.
- CobraNet is a trademark of Cirrus Logic, Inc.
- Ethernet is a trademark of Xerox Corporation.
- All other trademarks are the property of their respective holders and are hereby acknowledged.

Contents

Foreword 7

Accessories (Please make sure the following items are included in the package.)	7
About the Firmware Version	7
About DME Designer	7
Preparation.....	7
Connecting the AC power cord.....	7
Turning the power on and off.....	7
Precautions for Using a Rack-mounted SP2060	8

Introduction to the SP2060 9

Features.....	9
Glossary for the SP2060.....	9
Configuration	10
3 x 2-way	10
3 x 2-way Link	10
2 x (2-way + Sub)	11
2 x (2-way + Sub) Link.....	11
2 x 2-way + 2 x Aux	12
2 x 2-way + 2 x Aux Link	12
2 x 3-way	13
2 x 3-way Link	13
4 way +2 x Aux	14
5-way + Aux.....	15
6-way	16
Multi Zone	17
System Examples.....	18
Speaker processing	18
Zone processing	19
Multiple SP2060.....	20

The Controls and Connectors..... 22

Front Panel	22
Rear Panel	23

Panel Operation 24

Basic Operation.....	24
Changing the parameter values.....	24
LEVEL.....	24
DELAY	25
EQ (Equalizer)	25
Input EQ	25
Output EQ.....	26
ROUTING.....	27
Input routing	27
Output routing	27
X-OVER (Crossover)	28
Setting the Crossover	28
LIBRARY.....	29
Displaying the current library.....	29
Recalling a library.....	29

LIMITER.....	30
SCENE	30
About a scene.....	30
Recalling a scene	31
Storing a scene	32
Changing a scene title	32
Protecting a scene	32
Deleting a scene	33
UTILITY	33
INPUT A/B LINK	33
User Lock	34
Setting the User Lock password	35
Defeating User Lock when a password has been specified ..	35
Setting the Last Memory Resume	36
Displaying the label	36
Displaying word clock	37
Checking the backup battery.....	37
Displaying the firmware version.....	37
Initializing the SP2060	38
Mute	38
Output port name display	38

Network Settings 39

Setting a Device Group	39
Setting the IP Address	39
Setting the Master ID.....	40
Setting Link Mode	40
Viewing the MAC Address	41

References 42

About Preset Libraries	42
File name	42
Subwoofer.....	42
Limiter.....	42
Libraries for 1-way speaker processors	43
Libraries for 2-way speaker processors	44
Libraries for 3-way speaker processors	45
Display Messages.....	46
Warning and error messages.....	46
Status messages	47
Troubleshooting.....	47
General Specifications	48
Electrical Characteristics.....	48
Input/Output Characteristics	49
Connector Pin Assignment.....	50
Dimensions	51
Index	52

Thank you for purchasing the Yamaha SP2060 Speaker Processor.

In order to take full advantage of the features and performance provided by the SP2060, we urge you to read this owner's manual thoroughly before connecting or using the unit. Keep this manual in a safe place for future reference.

Accessories (Please make sure the following items are included in the package.)

- SP2060 Owner's Manual (this document)
- AC power cord
- Rubber feet x 4

About the Firmware Version

You can check the firmware version of your SP2060 in the UTILITY display (see page 29).

You can also download the latest firmware from the following Yamaha website.

<http://www.yamahaproaudio.com/>

About DME Designer

DME Designer software enables you to control the SP2060 or DME series system from a connected computer.

The DME Designer version 2.0 or later features this function.

You can download DME Designer from the following Yamaha website.

<http://www.yamahaproaudio.com/>

Preparation

Connecting the AC power cord



Be sure to turn all devices OFF before connecting AC mains power.

First plug the female-connector end of the AC cord into the [AC IN] socket on the rear panel of the SP2060, then plug the male plug into an appropriate AC mains outlet. Be sure to use the voltage specified for the device. The required voltage is printed on the name plate of the device.

Turning the power on and off



To prevent the initial power-on surge from generating a large noise spike or damaging your speaker system, turn devices on in the following order: audio sources, mixer (such as M7CL), SP2060, and finally power amplifiers. Reverse this order when turning power off.

1. Press the [POWER] switch to turn the power on to the SP2060.

The SP2060 displays a message.



2. Press the [POWER] switch again to turn off the power.

NOTE

The SP2060 remembers the scene settings when you turn off the power. When you turn on the power to the SP2060, it will start up with the same scene settings.

You can also set up the SP2060 so that at the startup it will recall the scene selected before you turned off the power to the device (See page 36).

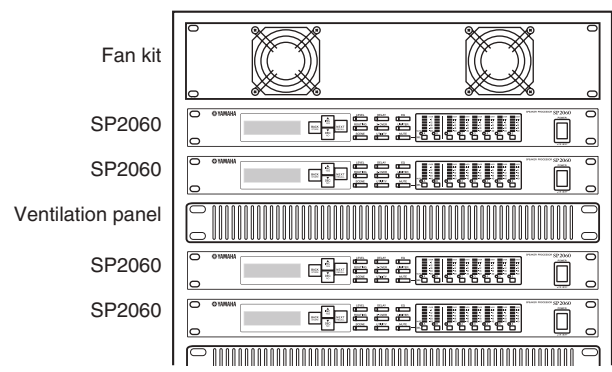


Do NOT turn off the power to the SP2060 while the unit is displaying the message "DO NOT TURN OFF!" at the bottom of the display, for example, while it is storing the scene. Otherwise, a malfunction may occur.

Precautions for Using a Rack-mounted SP2060

If several SP2060 units (or a SP2060 unit together with other devices) are installed in a poorly-ventilated rack, the heat generated by each unit may raise the temperature inside the rack, preventing the SP2060 from performing as designed. When mounting SP2060 units in a rack, please leave one rack space vacant for every two units. You can attach a ventilation panel to this space or leave it open to prevent excessive heat build-up.

If the temperature inside the rack is expected to rise above 40 degrees Celsius or 104 degrees Fahrenheit (or if the ambient temperature outside the rack is expected to rise above 30 degrees Celsius or 86 Fahrenheit), install a fan kit in the top row of the rack. The fan must provide airflow of 1.6m³/min or more and static pressure of 5mmH₂O or more.



Features

The Yamaha SP2060 Speaker Processor employs state-of-the-art digital technology and supports 96kHz audio. The SP2060 features two channel analog input connectors, an AES/EBU connector, and six channel analog output connectors.

Since it includes preset settings for fixed installation speakers (such as the Yamaha IF/IS series), the SP2060 enables you to take the best advantage of a variety of speakers from 1-way through 6-way speakers. You can also control the SP2060 remotely using DME Designer application software.

Glossary for the SP2060

This section explains terminology specific to the SP2060.

Components & Parameters

The individual audio modules (equalizers, delays, and speaker processors that feature various speaker adjustment functions) are called “components.” Various settings included with each component are called “preset parameters.” Changing the parameter values for components enables you to control the effects of the audio process.

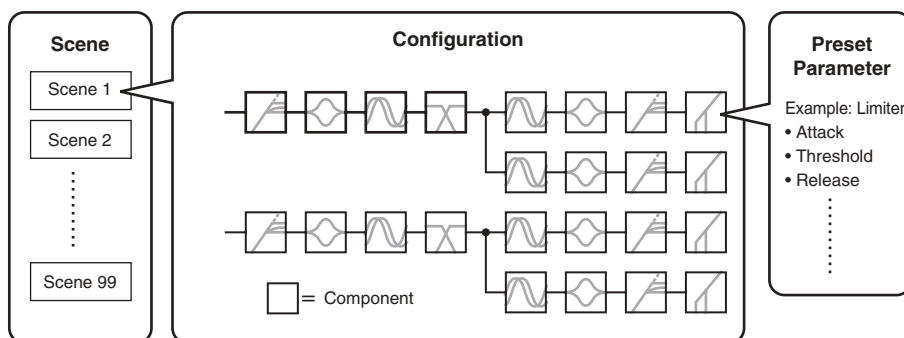
Configuration

A “configuration” is a complete set of components for constructing an optimum audio system that supports the connected speakers. See page 10.

Each configuration determines the audio function(s) of the corresponding SP2060 unit. All parameter sets included with each component in a configuration are called “preset parameters.”

Scene

A combination of all configuration and preset parameter combinations is called a “scene.” A scene can be recalled from the panel of each SP2060 or via DME Designer. See page 30.



Library

All parameter sets included with each speaker processor component optimized for the connected speakers are called “libraries.” A library can be recalled from the panel of each SP2060 or via DME Designer. You can also create a library using DME Designer, then store it in an SP2060.

Configuration

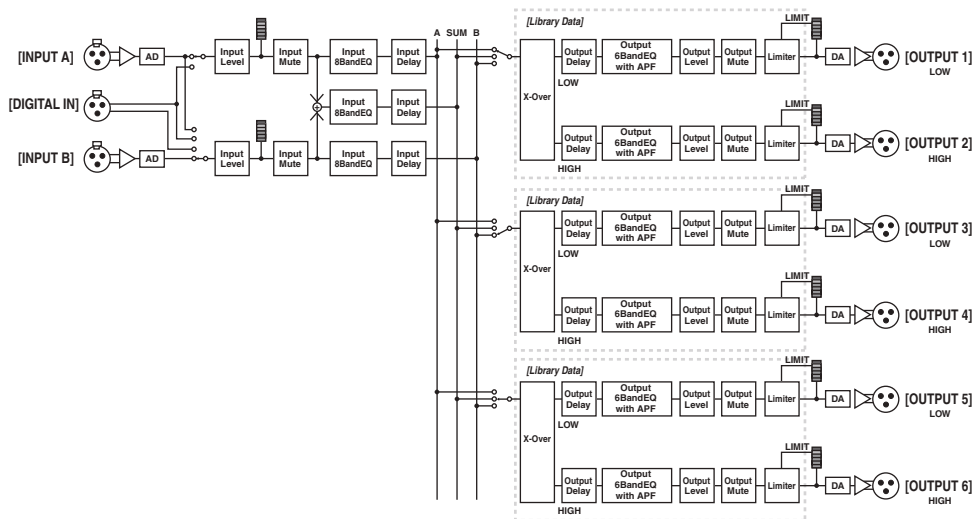
The SP2060 features 12 configurations. You can select one that suits the combination and configuration of the connected speakers.

A configuration is stored as part of each preset scene (read-only scene) in scene memory slots #1 through #12, and can be recalled along with the corresponding scene. You can also edit parameters of a configuration, then store them in a user scene (readable and writable scene). Connection between the output port and output connector on each component is specified and fixed for each configuration.

No. 1.	[3x2way	]	No. 5.	[2x2way+2xAux	]	No. 9.	[4way+2xAux]
No. 2.	[3x2way L	]	No. 6.	[2x2way+2xAuxL	]	No. 10.	[5way+Aux]
No. 3.	[2x (2way+Sub)	]	No. 7.	[2x3way	]	No. 11.	[6way]
No. 4.	[2x (2way+Sub) L	]	No. 8.	[2x3way L	]	No. 12.	[Multi Zone]

3 x 2-way

Controls three channel 2-way speakers.



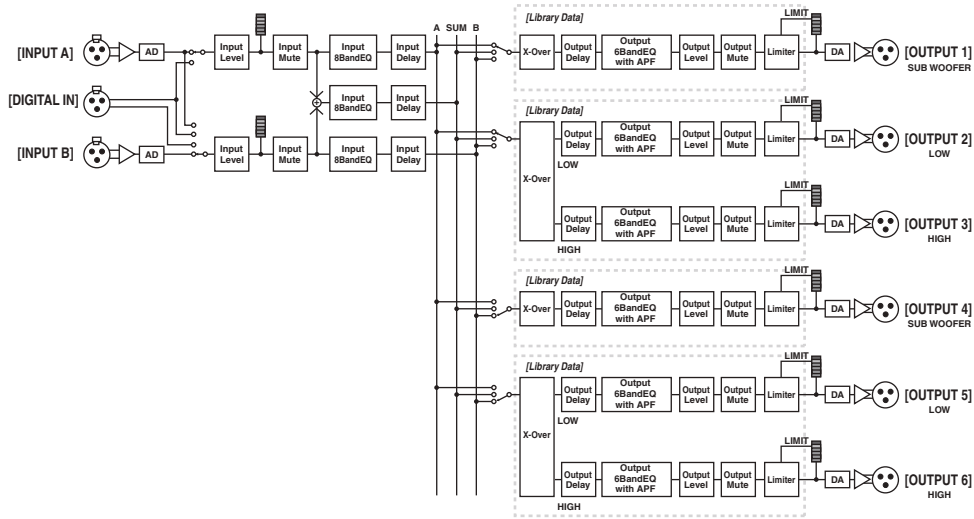
Output connector	Speaker's input connector
OUTPUT 1	2-way speaker (1) LOW
OUTPUT 2	2-way speaker (1) HIGH
OUTPUT 3	2-way speaker (2) LOW
OUTPUT 4	2-way speaker (2) HIGH
OUTPUT 5	2-way speaker (3) LOW
OUTPUT 6	2-way speaker (3) HIGH

3 x 2-way Link

Controls three channel 2-way speakers. All parameters for each component such as the Crossover, Delay, EQ, Level, and Limiter (excluding the Mute parameter) are linked.

2 x (2-way + Sub)

Controls two channel 2-way speakers and subwoofers.



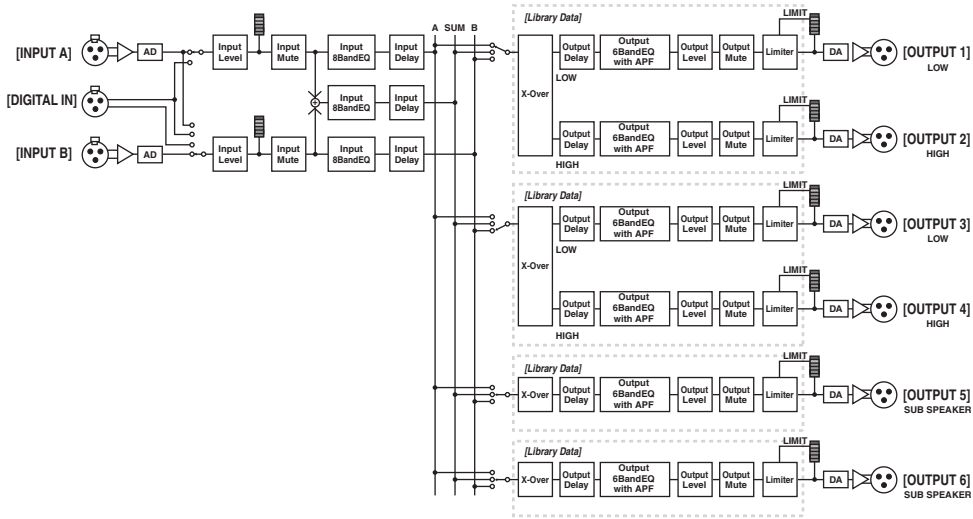
Output connector	Speaker's input connector
OUTPUT 1	Subwoofer (1)
OUTPUT 2	2-way speaker (1) LOW
OUTPUT 3	2-way speaker (1) HIGH
OUTPUT 4	Subwoofer (2)
OUTPUT 5	2-way speaker (2) LOW
OUTPUT 6	2-way speaker (2) HIGH

2 x (2-way + Sub) Link

Controls two channel 2-way speakers and subwoofers. All parameters for each component such as the Crossover, Delay, EQ, Level, and Limiter (excluding the Mute parameter) are linked.

2 x 2-way + 2 x Aux

Controls two channel 2-way speakers and two channel subspeakers.



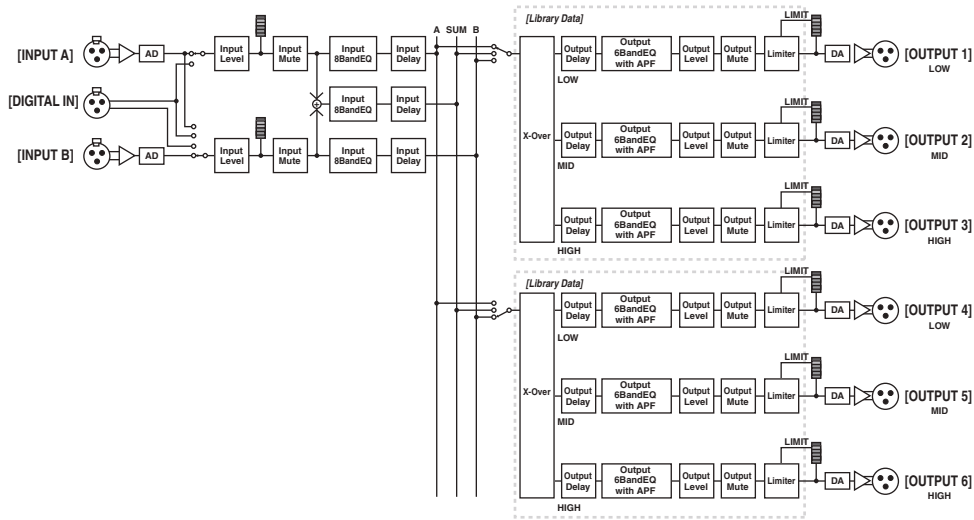
Output connector	Speaker's input connector
OUTPUT 1	2-way speaker (1) LOW
OUTPUT 2	2-way speaker (1) HIGH
OUTPUT 3	2-way speaker (2) LOW
OUTPUT 4	2-way speaker (2) HIGH
OUTPUT 5	1-way subspeaker (1)
OUTPUT 6	1-way subspeaker (2)

2 x 2-way + 2 x Aux Link

Controls two channel 2-way speakers and two channel subspeakers. All parameters for each component such as the Crossover, Delay, EQ, Level, and Limiter (excluding the Mute parameter) are linked.

2 x 3-way

Controls two channel 3-way speakers.



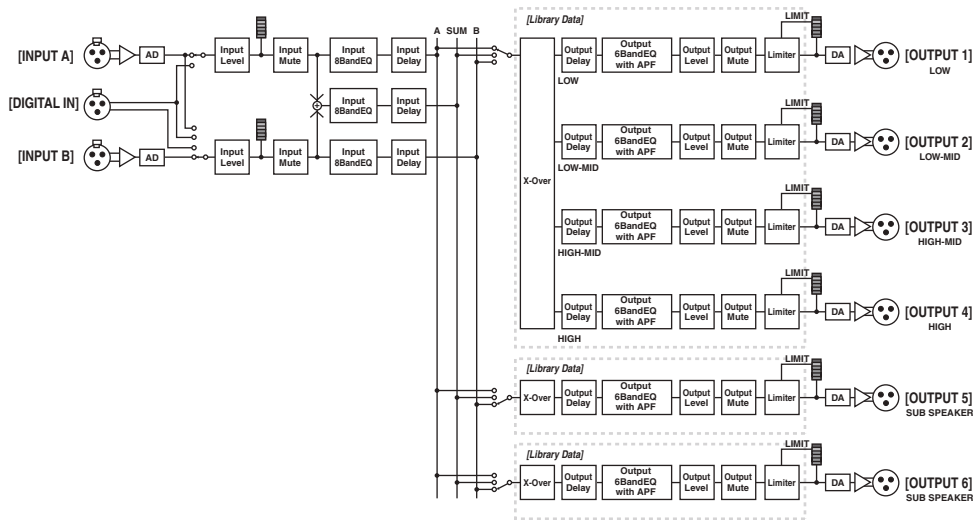
Output connector	Speaker's input connector
OUTPUT 1	3-way speaker (1) LOW
OUTPUT 2	3-way speaker (1) MID
OUTPUT 3	3-way speaker (1) HIGH
OUTPUT 4	3-way speaker (2) LOW
OUTPUT 5	3-way speaker (2) MID
OUTPUT 6	3-way speaker (2) HIGH

2 x 3-way Link

Controls two channel 3-way speakers. All parameters for each component such as the Crossover, Delay, EQ, Level, and Limiter (excluding the Mute parameter) are linked.

4 way +2 x Aux

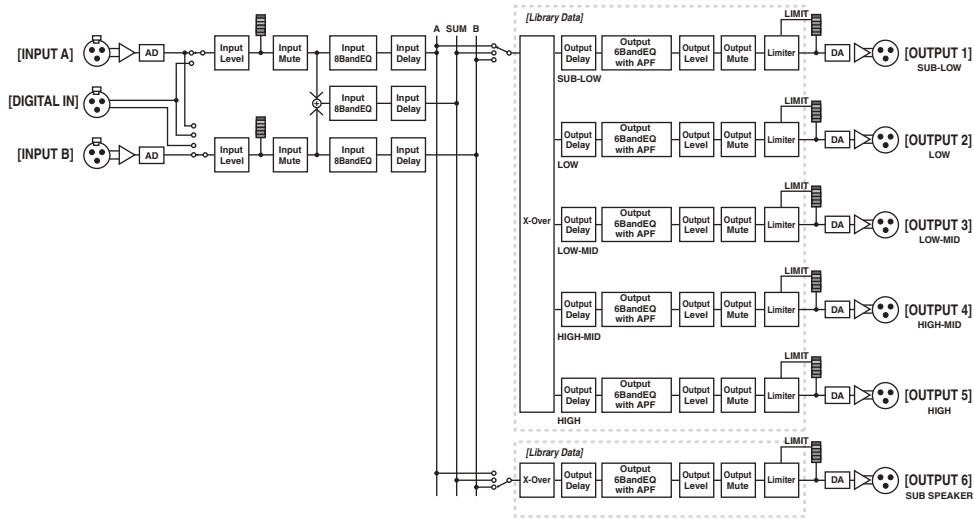
Controls one channel 4-way speaker and two channel subspeakers.



Output connector	Speaker's input connector
OUTPUT 1	4-way speaker (1) LOW
OUTPUT 2	4-way speaker (1) LOW-MID
OUTPUT 3	4-way speaker (1) HIGH-MID
OUTPUT 4	4-way speaker (1) HIGH
OUTPUT 5	1-way subspeaker (1)
OUTPUT 6	1-way subspeaker (2)

5-way + Aux

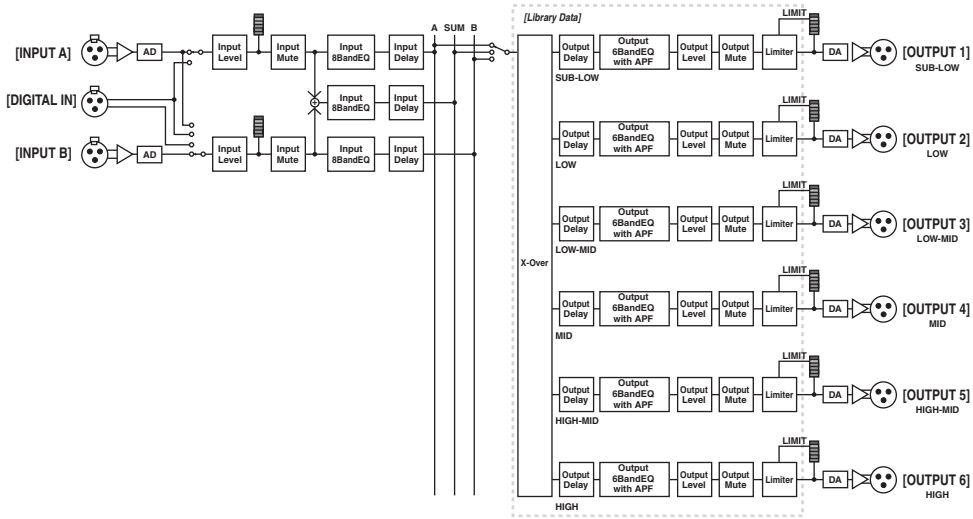
Controls one channel 5-way speaker and one channel subspeaker.



Output connector	Speaker's input connector
OUTPUT 1	5-way speaker (1) SUB-LOW
OUTPUT 2	5-way speaker (1) LOW
OUTPUT 3	5-way speaker (1) LOW-MID
OUTPUT 4	5-way speaker (1) HIGH-MID
OUTPUT 5	5-way speaker (1) HIGH
OUTPUT 6	1-way subspeaker (1)

6-way

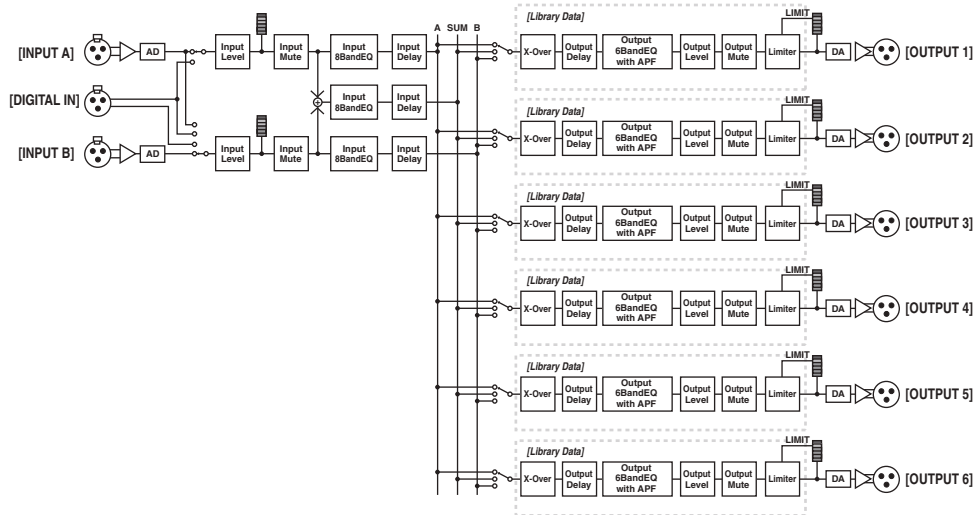
Controls one channel 6-way speaker.



Output connector	Speaker's input connector
OUTPUT 1	6-way speaker (1) SUB-LOW
OUTPUT 2	6-way speaker (1) LOW
OUTPUT 3	6-way speaker (1) LOW-MID
OUTPUT 4	6-way speaker (1) MID
OUTPUT 5	6-way speaker (1) HIGH-MID
OUTPUT 6	6-way speaker (1) HIGH

Multi Zone

Outputs only the frequency components (by retrieving them from the input signals) that are suitable for the response characteristics of each speaker connected to each of six output connectors.



Output connector	Speaker's input connector
OUTPUT 1	1-way speaker (1)
OUTPUT 2	1-way speaker (2)
OUTPUT 3	1-way speaker (3)
OUTPUT 4	1-way speaker (4)
OUTPUT 5	1-way speaker (5)
OUTPUT 6	1-way speaker (6)

System Examples

Speaker processing

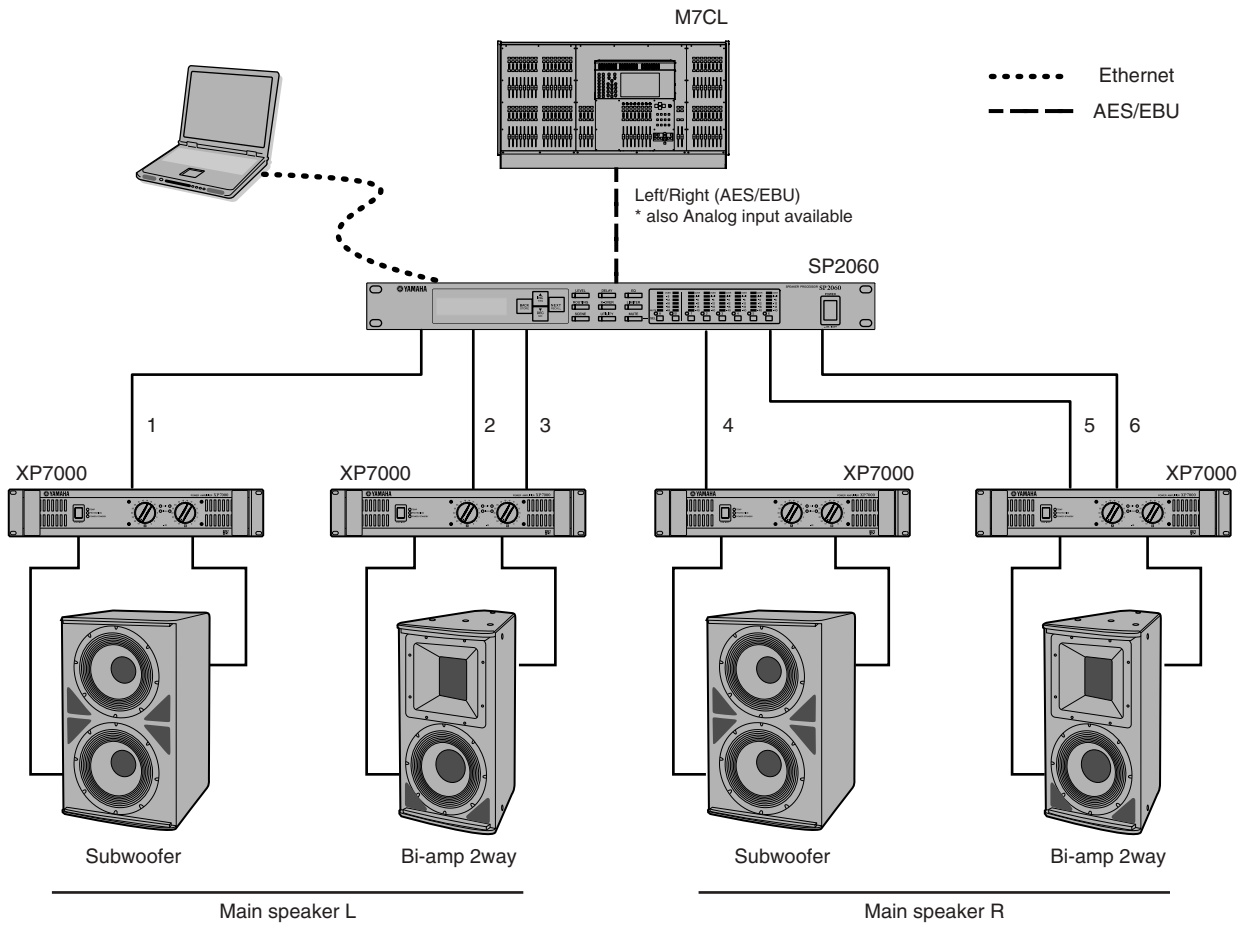
This diagram indicates an example of a stereo 3-way system.

The AES/EBU input connector on the SP2060 enables you to connect it directly to the AES/EBU output on a digital mixer.

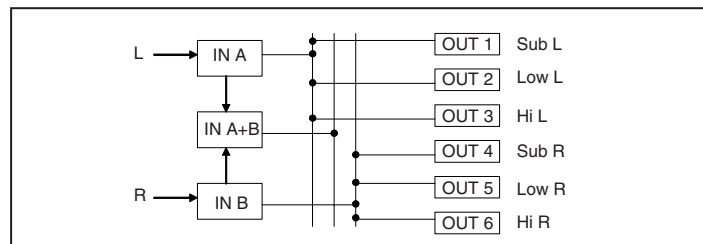
The configuration presets include 3 x 2-way, 2 x 3-way, 4-way + 2 x Aux, 5-way + Aux, and 6-way. (See page 10.)

The SP2060 Routing function enables you to select IN A, IN B, or IN SUM (A+B) as component input. In this way, you can create a stereo, mono, or stereo mono (full-range stereo plus mono subwoofer) system very easily.

You can also adjust the parameters or recall a scene from the front panel of the SP2060 or from a computer connected via Ethernet.



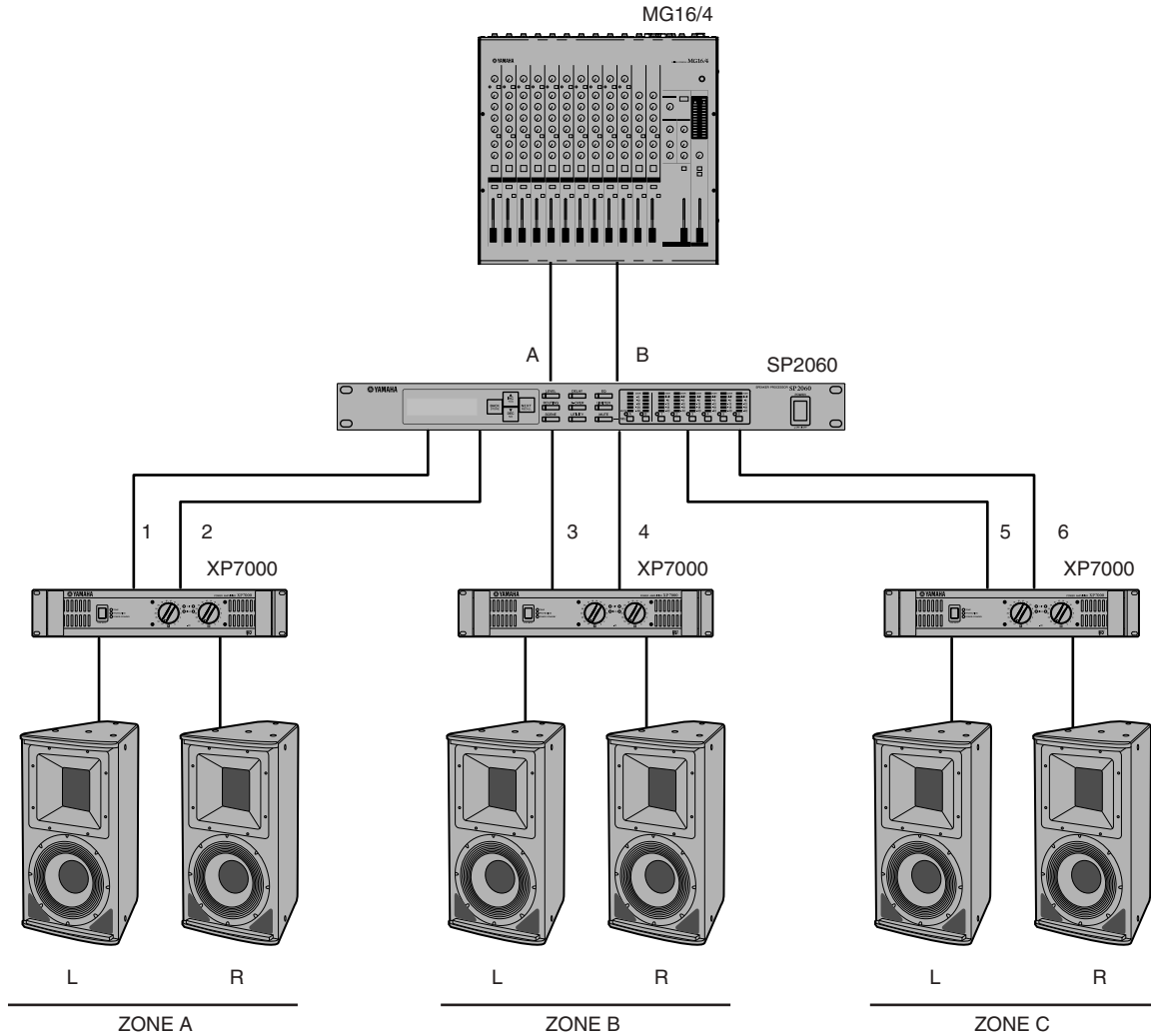
Routing



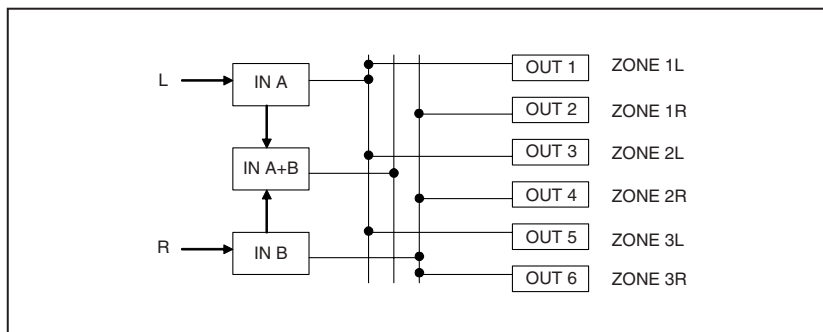
Zone processing

This example is a stereo 3-zone system in which the SP2060 is used as a signal distributor, rather than a crossover. Adjusting the routing will enable you to create a monaural 6-zone system. You can adjust EQ, Delay, and Level for each output.

This system is suitable for a facility that requires sound zoning, such as stores, restaurants, hotels, conference facilities, and exhibition halls, or for delay speakers in an SR system.



Routing



Multiple SP2060

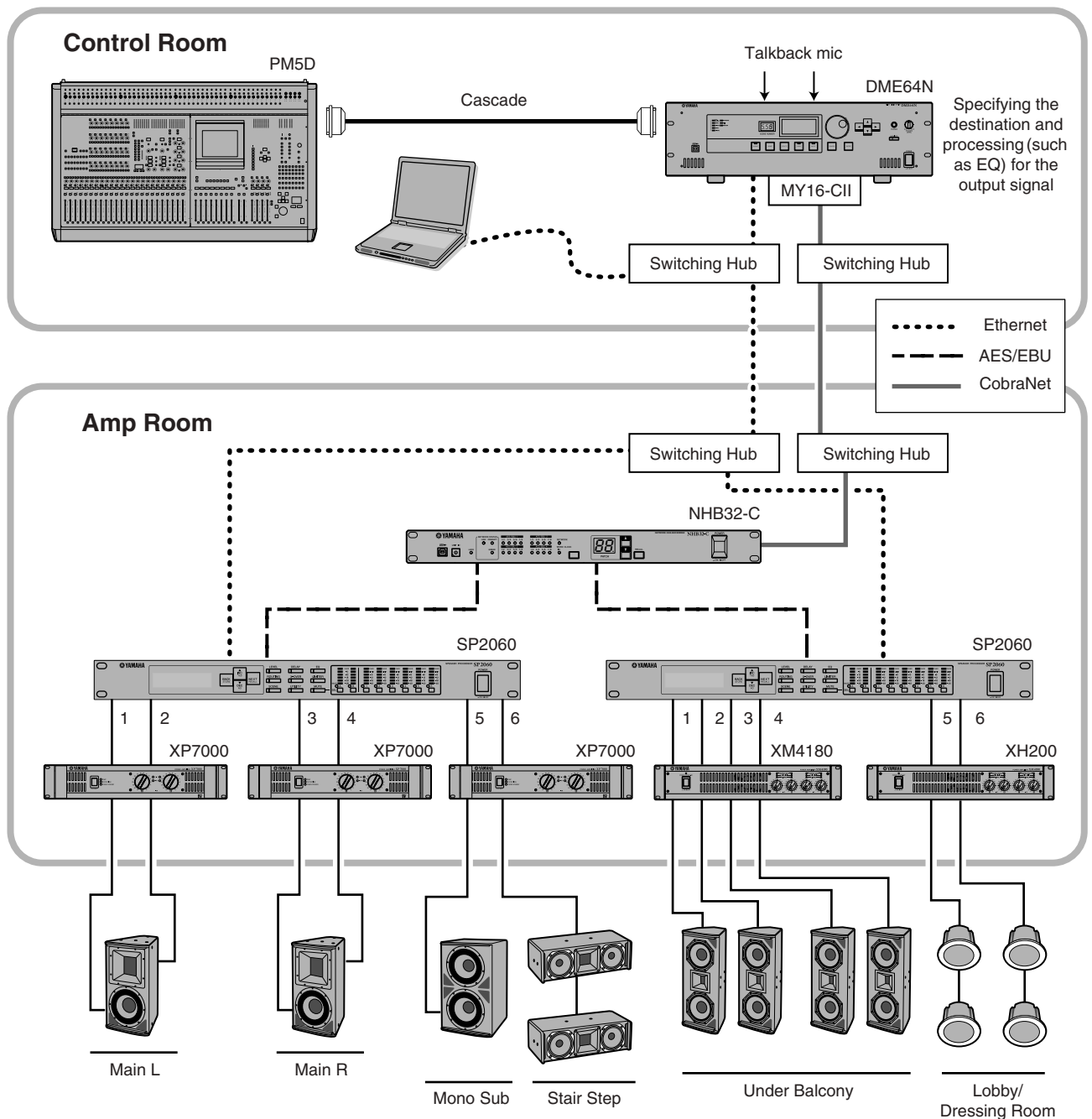
This example is a system that uses CobraNet™ for long-distance digital transfer between the control room and amp room.

Audio signals from Yamaha PM5D digital mixing console, talkback mic signal, chime source, etc. are input to the DME64N. The output destination and level settings are specified via the Routing function.

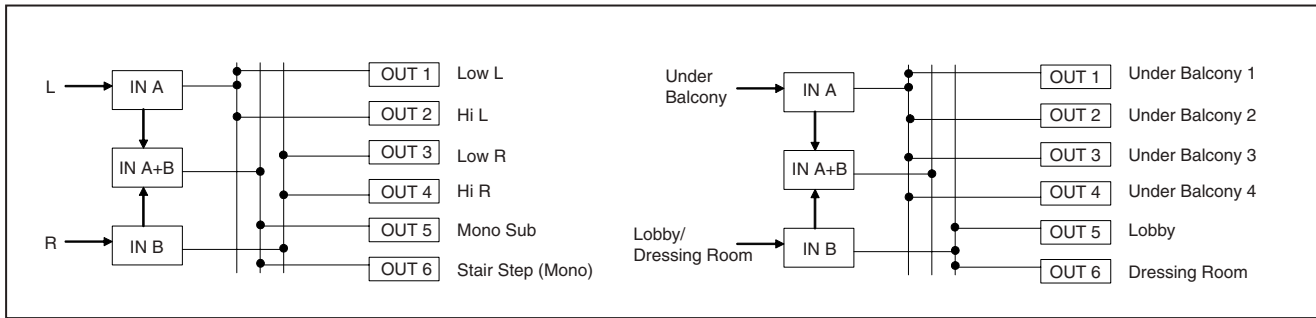
Furthermore, you can process output signals (EQ, Limiter, etc.) by adding an EQ component. The output from the DME64N is converted to CobraNet™ signals via the MY16-CII, then transferred via the Ethernet cable to the NHB32-C located in the amp room.

In the amp room, this signal is converted to the AES/EBU digital signal via the NHB32-C, then input to the SP2060, which, in turn, processes the signal using the Crossover, EQ, Delay, and Limiter to suit each speaker.

The SP2060 control signal is also transferred to the amp room via the Ethernet cable. (Yamaha recommends that you use Giga-bit switching hubs.)

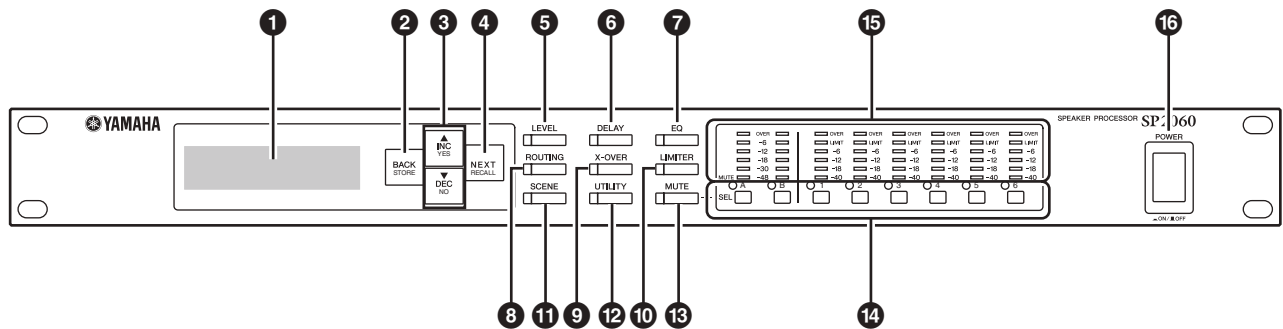


Routing



The Controls and Connectors

Front Panel



1 Display

Displays the parameters selected for editing and information about the currently-recalled scene.

Remove the transparent protective film that was applied prior to shipment from the factory.

2 [BACK/STORE] Key

Selects the previous parameter. In the Scene display, it stores a selected scene.

3 [▲INC/YES]/[▼DEC/NO] Keys

Confirm Yes or No to the change of parameter values or confirmation messages.

4 [NEXT/RECALL] Key

Selects the next parameter. In the Library List display or Scene display, it recalls a selected library or scene respectively.

5 [LEVEL] Key

Displays the input/output level settings. When these settings are displayed, the key LED lights up.

6 [DELAY] Key

Displays the signal delay time settings. When these settings are displayed, the key LED lights up.

7 [EQ] Key

Displays the EQ settings. When these settings are displayed, the key LED lights up.

8 [ROUTING] Key

Displays the selection of the [INPUT] connectors and Output channel signal sources. When these settings are displayed, the key LED lights up.

9 [X-OVER] Key

Displays the Crossover settings or library recall options. When these settings are displayed, the key LED lights up.

10 [LIMITER] Key

Displays the Limiter settings. When these settings are displayed, the key LED lights up.

11 [SCENE] Key

Displays scene store or recall options, or scene edit options. When these settings are displayed, the key LED lights up.

12 [UTILITY] Key

Displays the SP2060 Utility function settings. When these settings are displayed, the key LED lights up.

13 [MUTE] Key

Displays the Mute settings. When these settings are displayed, the key LED lights up. At this time, each [SEL] key LED indicates the corresponding channel's Mute On or Off and the [SEL] keys enable you to turn Mute On or Off for the corresponding channels.

Holding down the [MUTE] key for two seconds or longer will turn the User Lock function On or Off.

14 [SEL] Keys

Select the corresponding channels for editing. The [SEL] key LED for each selected channel lights up.

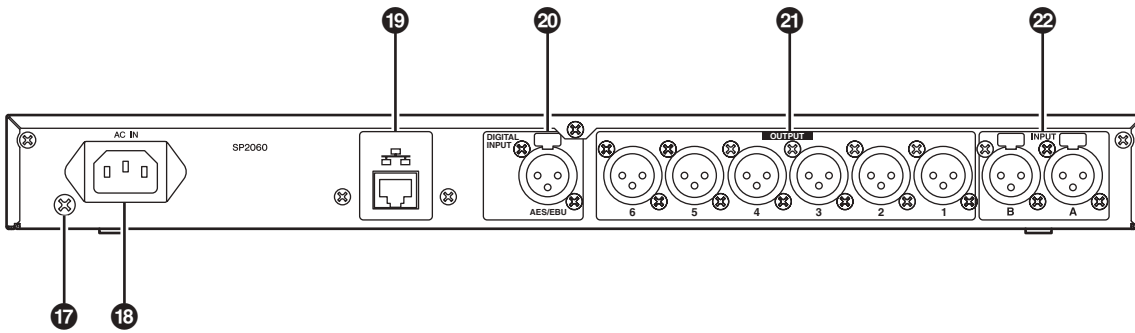
15 Meters

Display the channel level meters and the Limiter indicators for Output channels.

16 [POWER ON/OFF] Key

Turns mains power to the SP2060 on and off.

Rear Panel



17 Ground Screw

For maximum safety be sure to securely connect the SP2060 ground screw to an earth connection.

The supplied power cable has a three-prong plug that will ground the unit when plugged into an appropriately grounded three-prong type AC mains outlet. If the AC outlet is not grounded, be sure to ground the unit by using this ground screw.

Correct grounding will effectively eliminate hum noise and interference.

18 [AC IN] Connector

Connect to the AC mains using the supplied AC power cord. First connect the power cord to the SP2060, then insert the power cord plug into an AC outlet.

19 [NETWORK] Connector

This is a 100Base-TX/10Base-T Ethernet connector for connection to a computer or other device in the network.

NOTE

- Use a STP (Shielded Twisted Pair) cable for this connection to prevent electromagnetic interference. Since the SP2060 supports Auto MDI/MDI-X, it will automatically detect whether the connected cable is of the straight type or crossover type, and will configure itself to create the optimal connection. Therefore, you can use either a straight or crossover cable.
- The maximum length of a cable between a switching hub and the SP2060 is 100 meters. Due to the quality of cables and switching hub performance, however, proper operation at the maximum length cannot be guaranteed in some cases.

20 [DIGITAL INPUT] Connector (AES/EBU)

Connect an output of an AES/EBU (digital signal) compatible device to this XLR-3-31 connector.

21 [OUTPUT] Connectors

These XLR-3-32 balanced connectors output six channel analog audio signals. Connect them to the inputs on amplifiers.

22 [INPUT] Connectors

These XLR-3-31 balanced connectors input two channel analog audio signals.

Basic Operation

Changing the parameter values

You can adjust the parameter settings, such as EQ, according to the speaker response or the acoustic environment of a particular venue. This section explains how to change the delay time for Output channel 1 as an example.

1. Display the parameter setting you wish to change. To change the delay time, first press the [DELAY] key to switch to the Delay display.

Refer to “The Controls and Connectors” on page 22 for information on the relationship between the parameters and keys.



2. Select a channel for which you wish to change the delay time. In this example, press the OUTPUT 1 [SEL] key.

3. Press the [NEXT] key repeatedly until the parameter you wish to change appears on the screen. In this example, select the Time parameter.



4. Press the [▲ INC]/[▼ DEC] keys to change the parameter value.

The parameter value on the screen changes accordingly.

[▲ INC] key	Press the [▲ INC] key.	The value increases.
	Hold down the [▲ INC] key.	The value continues to increase as long as you hold down the key.
	While holding down the [▲ INC] key, press the [▼ DEC] key.	The value continues to increase at a rate more rapid than when you hold down the [▲ INC] key.
[▼ DEC] key	Press the [▼ DEC] key.	The value decreases.
	Hold down the [▼ DEC] key.	The value continues to decrease as long as you down the key.
	While holding down the [▼ DEC] key, press the [▲ INC] key.	The value continues to decrease at a rate more rapid than when you hold down the [▼ DEC] key.

This section describes the function of the panel keys and related displays.



Some parameters will prompt you to confirm the operation to reflect the change in the value.

In this case, a confirmation icon will appear on the display. Press the [NEXT] key to move the cursor to the icon, then press the [YES] key. A message prompts you to confirm. Press the [YES] key to confirm the operation.

LEVEL

You can view and adjust the Input and Output channel levels.

Parameter	Range
INPUT A/B/SUM	$-\infty$, -138.00 through +10.00dB
OUTPUT 1-6	$-\infty$, -138.00 through +10.00dB

1. Press the [LEVEL] key to select the Level display.



2. Press the [SEL] key for the target channel.

The corresponding channel is selected. The [SEL] key LED for the selected channel lights up.



3. Press the [▲ INC]/[▼ DEC] keys to adjust the input or output level.



NOTE

When INPUT A/B LINK is turned On, the parameters for channels A and B are linked and set to the same value automatically.

DELAY

You can set the signal delay time on each input and output channel. Set the On/Off parameter to On to delay the signal, and Off to bypass the delay.

Parameter	Range
INPUT A/B/SUM	0–1300.00msec
OUTPUT 1-6	0–500.00msec

NOTE

Channel SUM is a new channel created by applying the Level and Mute settings to Input channel A and B respectively, then adding both channel values.

1. Press the [DELAY] key to select the Delay display.

IN A
ON/OFF = OFF

2. Press the [SEL] key for the target channel.

The [SEL] key LED of the selected channel lights up, and the corresponding channel name is displayed.

Pressing the [SEL] keys for Input channels A and B simultaneously will turn on the [SEL] key LEDs and select channel SUM.

IN SUM
ON/OFF = OFF

3. Press the [▲INC]/[▼DEC] keys to select On or Off.

IN SUM
ON/OFF = ON

4. Press the [DELAY] or [NEXT] key to display the Time parameter.

IN B
TIME = 130.00ms

5. Press the [▲INC]/[▼DEC] keys to adjust the delay time.

IN B
TIME = 120.00ms

EQ (Equalizer)

An EQ boosts or cuts the level of specified frequency ranges. The SP2060's internal EQ processes input and output signals.

Input EQ

You can apply eight-band EQ to Input channels A, B, and SUM.

Set the On/Off parameter to On to apply EQ to the signal, and Off to not process the signal.

You can set the following parameters for each band.

Parameter	Range	Function
BYPASS	ON/OFF	Sets the bypass for each frequency range to On or Off.
Q	16.0–0.1	Specifies the width of each frequency range.
FREQ (Frequency)	20.0Hz–20.0kHz	Specifies the center frequency of each frequency range.
GAIN	–18dB through +18.00dB	Sets the gain of the target frequency.

You can select a type of filter for band 1 and band 8. All other bands utilize a fixed parametric EQ.

Parameter	Range	Function
TYPE	PEQ L.SHELF 6dB/Oct L.SHELF 12dB/Oct H.SHELF 6dB/Oct H.SHELF 12dB/Oct HPF LPF	Selects a type of filter.

- **PEQ**

This is a standard parametric equalizer.

- **L.SHELF(Low Shelving)**

Does not cut the lower frequency range, but cuts starting from the vicinity of the cutoff frequency toward the higher range at a specific rate. “6dB/Oct” and “12dB/Oct” stand for the cut amount per octave.

- **H.SHELF(High Shelving)**

Does not cut the higher frequency range, but cuts starting from the vicinity of the cutoff frequency toward the lower range at a specific rate. “6dB/Oct” and “12dB/Oct” stand for the cut amount per octave.

- **HPF**

This is a high pass filter (Q=0.7). The low frequency range is mildly cut (12dB/Oct), creating a slow curve.

- **LPF**

This is a low pass filter (Q=0.7). The high frequency range is mildly cut (12dB/Oct), creating a slow curve.

1. Press the [EQ] key repeatedly to select the EQ display.



2. Press the [SEL] key for the target channel.

The [SEL] key LED of the selected channel lights up, and the corresponding channel name is displayed. Pressing the [SEL] keys for channels A and B will turn on the [SEL] key LEDs and select channel SUM.



3. Press the [EQ], [BACK] or [NEXT] key to display the On/Off parameter.
4. Press the [▲INC] key to set the On/Off parameter to On to apply EQ to the signal. Press the [▼DEC] key to set the On/Off parameter to Off to not process the signal.
5. Press the [BACK] or [NEXT] key to select the Bypass, Type, Q, Freq, or Gain parameter.



6. Pressing the [EQ] key repeatedly will scroll the bands from 1 through 8.



7. Press the [▲INC]/[▼DEC] keys to select the value.

Output EQ

You can apply a 6-band EQ to Output channels 1–6. Set the On/Off parameter to On to apply EQ to the signal, and Off to not process the signal. The parameters are the same as for the input EQ.

You can set the following parameters for each band.

Parameter	Range	Function
BYPASS	ON/OFF	Sets the bypass for each frequency range to On or Off.
TYPE	PEQ L.SHELF 6dB/Oct L.SHELF 12dB/Oct H.SHELF 6dB/Oct H.SHELF 12dB/Oct HPF LPF APF 1st APF 2nd Horn	Selects a type of filter.
Q	63.0–0.1	Specifies the width of each frequency range.
FREQ (Frequency)	20.0Hz–20.0kHz	Specifies the frequency of each band.
GAIN	–18dB through +18.00dB	Sets the gain of the target frequency.

- **APF (All Pass Filter)**

This filter passes all ranges of frequency, but changes only the phase. It is used to align the phase in the crossover range.

APF 1st rotates the phase by 0 through 180 degrees, and APF 2nd rotates the phase by 0 through 360 degrees. APF 2nd requires the Q setting.

- **Horn**

A horn speaker typically features a roll-off in the higher frequency component.

Horn EQ corrects this characteristics. For this purpose, the gain is limited to 0dB or higher, and the frequency to 500Hz or higher.

ROUTING

Input routing

You can select either analog or digital input signals. This selection links to the word clock master setting. You can also route the left channel of an input signal received at the [INPUT A] or [DIGITAL IN] connector to both Input channels A and B.

Option	Input Signal Selection	Word Clock Master
ANA A/B	A signal at the [INPUT A] connector is routed to channel A, and a signal at the [INPUT B] connector to channel B.	Internal clock: 96kHz
ANA A/A	A signal at the [INPUT A] connector is routed to channels A and B.	
DIG L/R	A left channel signal is routed to channel A, and a right channel signal to channel B.	Incoming AES/ EBU signal
DIG L/L	A left channel signal is routed to channels A and B.	

HINT

You can check the word clock status on the Utility display. See page 37.

1. Press the [ROUTING] key to select the Routing display.



```
INPUT SELECT
SOURCE = ANA A/B
```

2. Press the [▲INC]/[▼DEC] keys to select an input signal source.



```
INPUT SELECT
SOURCE = ANA A/A
```

NOTE

Signals are muted while they are switched between analog and digital to avoid noise.

Output routing

You can route Input channel A, B, and SUM signals to the Crossover input.

The following three channels are available:

- IN A
- IN SUM
- IN B

1. Press the [ROUTING] key to select the Routing display.



```
OUT 2
SOURCE = IN A
```

2. Press the [SEL] key for the target Output channel.

The [SEL] key LED for the selected channel lights up. The [SEL] key LED for each channel that shares the same component flashes. The selected channel name appears on the display.



```
OUT 4
SOURCE = IN A
```

3. Press the [▲INC]/[▼DEC] keys to select an input source to be routed to the Crossover.



```
OUT 4
SOURCE = IN SUM
```

X-OVER (Crossover)

Setting the Crossover

Input signals can be divided into specified frequency ranges to suit speaker response characteristics prior to output.

The number of division is determined to 1-way through 6-way, depending on the selected component.

Parameter	Range	Function
LEVEL	$-\infty$, -138.00 through +10.00dB	Adjusts the level of the signal input to the Crossover. The same Level setting is used for the output channels of a component.
POLARITY	NORMAL INVERTED	The output signal phase for each frequency range is inverted.
HPF	Refer to Step 4.	
LPF		

1. Press the [X-OVER] key repeatedly until the X-Over display appears on the screen.



2. Press the [SEL] key for the target Output channel.

The [SEL] key LED of the selected channel lights up, and the corresponding channel name is displayed.



3. Press the [NEXT]/[BACK] keys to select a parameter to edit.



4. Press the [▲INC]/[▼DEC] keys to set the parameter value.

Parameter	Range	Function	
HPF	TYPE	Thru 6dB/Oct 12dB/Oct AdjustGc 12dB/Oct Butwrth 12dB/Oct Bessel 12dB/Oct Linkwitz 18dB/Oct AdjustGc 18dB/Oct Butwrth 18dB/Oct Bessel 24dB/Oct AdjustGc 24dB/Oct Butwrth 24dB/Oct Bessel 24dB/Oct Linkwitz 36dB/Oct AdjustGc 36dB/Oct Butwrth 36dB/Oct Bessel 48dB/Oct AdjustGc 48dB/Oct Butwrth 48dB/Oct Bessel 48dB/Oct Linkwitz	Selects an attenuation amount per octave, and a type of filter. If you select "Thru," no filter will be applied.
	FREQ (Frequency)	20.0Hz-20.0kHz	Specifies the cutoff frequency of the high pass filter.
	Gc	-6dB through +6dB	You can set the gain for the cutoff frequency (Gc) when you select "AdjustGc (Adjustable Gc)" for the Type parameter.
LPF	TYPE	Thru 6dB/Oct 12dB/Oct AdjustGc 12dB/Oct Butwrth 12dB/Oct Bessel 12dB/Oct Linkwitz 18dB/Oct AdjustGc 18dB/Oct Butwrth 18dB/Oct Bessel 24dB/Oct AdjustGc 24dB/Oct Butwrth 24dB/Oct Bessel 24dB/Oct Linkwitz 36dB/Oct AdjustGc 36dB/Oct Butwrth 36dB/Oct Bessel 48dB/Oct AdjustGc 48dB/Oct Butwrth 48dB/Oct Bessel 48dB/Oct Linkwitz	Selects an attenuation amount per octave, and a type of filter. If you select "Thru," no filter will be applied.
	FREQ (Frequency)	20.0Hz-20.0kHz	Specifies the cutoff frequency of the low pass filter.
	Gc	-6dB through +6dB	You can set the gain for the cutoff frequency (Gc) when you select "AdjustGc (Adjustable Gc)" for the Type parameter.

NOTE

- The type names are abbreviated on the SP2060 screen. For example, “24dB/Oct Bessel” is displayed as “24Bessel.”
- Gc page is displayed if you select “Adjust Gc” for the Type parameter.

- **Thru**

No filter is applied. The original characteristics are kept with no attenuation for all frequency ranges.

- **AdjustGc (Adjustable Gc)**

Filters with an Adjustable Gc enable you to adjust the gain at the cutoff frequency in the range of -6dB through $+6\text{dB}$. With Gc set to -3dB , the filter is practically a Butterworth filter. And with Gc set to -6dB , the filter is practically a Linkwitz-Riley filter.

- **Butwrth (Butterworth)**

This filter is the most common type of filter. It has a flat pass band and a -3dB gain at the cutoff frequency.

- **Bessel**

This filter focuses on the phase characteristics. Although it has a more gradual roll-off than a Butterworth filter, it will pass a square wave without causing ringing.

- **Linkwitz (Linkwitz-Riley)**

This filter features the square of the second order. When the output signal from its LPF and HPF are combined, the gain over the entire range is $\pm 0\text{dB}$. It has a flat pass band and a -6dB gain at the cutoff frequency.

LIBRARY

Using libraries facilitates the recall of optimal speaker settings. Up to 60 libraries are available for each component via the DME Designer application.

Displaying the current library

Pressing the [X-OVER] key repeatedly will select the Current Library display, Library List display, or X-Over display, in this order.

The title of the library most recently recalled for each component will be displayed.

**NOTE**

Libraries cannot be displayed or recalled for Input channels. If you press an Input channel [SEL] key, a message appears.

Recalling a library

Follow the steps below to recall a library:

1. Press the [X-OVER] key repeatedly until the Library List display appears on the screen.



2. Press the [SEL] key of an Output channel for a component for which you wish to recall a library.

3. Press the [▲INC]/[▼DEC] keys to select a library.



4. Press the [NEXT/RECALL] key.

A confirmation message will appear.



5. To confirm the selection, press the [YES] key.

The library is recalled and the unit returns to the Library List display.



To cancel the recall operation, press the [NO] key, instead of the [YES] key. The unit returns to the Library List display.

HINT

You can use the library data for speaker processor components for DME64N/24N that you have created using DME Designer.

LIMITER

You can set up the Output channel limiter. The Limiter precludes signal levels higher than a specified threshold to avoid speaker damage from excess output level.

Parameter	Range	Function
THRESHOLD	-54 through 0dB	Sets the threshold value.
ATTACK	FAST MID SLOW MANUAL (0-120.0ms)	Sets the attack time.
RELEASE	FAST MID SLOW MANUAL 44.1kHz: 6ms-46s, 48kHz: 5ms-42.3s, 88.2kHz: 3ms-23s, 96kHz: 3ms-21.1s	Sets the release time. If you select Fast, Mid, or Slow, the unit automatically sets the optimum value based on the maximum wave length of audio input to the Limiter.

NOTE

- You can set the attack time only when “Manual” is selected for the Attack parameter.
- You can set the release time only when “Manual” is selected for the Release parameter.

1. Press the [LIMITER] key to select the Limiter display.



2. Press the [SEL] key for the target channel.

The [SEL] key LED of the selected channel lights up, and the corresponding channel name is displayed.



3. Press the [LIMITER], [BACK] or [NEXT] key to display the On/Off parameter.

4. Press the [▲INC] key to set the On/Off parameter to On to apply the Limiter to the signal. Press the [▼DEC] key to set the On/Off parameter to Off to cancel the Limiter.

5. Press the [NEXT]/[BACK] keys to select a parameter to edit.



6. Press the [▲INC]/[▼DEC] keys to set the parameter value.

SCENE

About a scene

The SP2060 enables you to store various parameter settings as part of scene, and recall them via the front panel or remotely from DME Designer.

You can store the following settings in a scene:

- Configuration
- Routing
- Parameter sets of all components
- Scene titles
- Scene protection status
- INPUT A/B LINK
- The title of the library most recently recalled

HINT

You can protect a scene to forbid overwriting.

Scenes are stored in the preset area and user area.

Preset area

There is a preset scene for each of 12 configurations. These scenes are numbered 1 through 12. Each scene title has the same name as the corresponding configuration title.

No.1.	[3x2way]
No.2.	[3x2way L]
No.3.	[2x(2way+Sub)]
No.4.	[2x(2way+Sub)L]
No.5.	[2x2way+2xAux]
No.6.	[2x2way+2xAux L]
No.7.	[2x3way]
No.8.	[2x3way L]
No.9.	[4way+2xAux]
No.10.	[5way+Aux]
No.11.	[6way]
No.12.	[Multi Zone]

User area

The user area can accommodate up to 87 user scenes, which you can store and recall at your discretion. These scenes are numbered 13 through 99.

Scene indication

Scene number Scene property Title



Configuration title

The upper row indicates a scene number, property, and title. The bottom row indicates the configuration title.

Scene property includes the following types:

	Preset scene
	Protected user scene
:	Unprotected user scene

NOTE

After you recall a scene, if you edit a parameter, an icon appears in the lower right corner on the screen.

Recalling a scene

Follow the steps below to recall a scene (1–99):

HINT

You can also recall a scene using the DME Designer application.

NOTE

If recalling a scene has changed the configuration, audio output will be muted momentarily.

1. Press the [SCENE] key to select the Scene Selection display.



2. Press the [▲INC]/[▼DEC] keys to select a scene number.

While you are selecting a scene, the scene number and title will be flashing.

NOTE

If no data is included in the currently-selected scene, the message “No Scene” appears.

3. Press the [RECALL] key.

A confirmation message will appear.



4. Press the [YES] key.

The scene is recalled and its number becomes the current scene number.

To cancel the recall operation, press the [NO] key, instead of the [YES] key. The unit returns to the Scene Selection display.

NOTE

If the selected scene contains no data or User Lock is turned on for the scene, a status message appears.

Storing a scene

Follow the steps below to store a scene (13–99) to the user area:

HINT

You can also store a scene using the DME Designer application.

1. Press the [SCENE] key to select the Scene Selection display.

```
25:FOH(Event A)
[2x(2way+SUB)L1
```

2. Press the [▲INC]/[▼DEC] keys to select a scene number.

3. Press the [BACK/STORE] key.

A confirmation message will appear.

```
72:STORE
ARE YOU SURE?
```

4. Press the [YES] key.

The scene is stored and its number becomes the current scene number.

To cancel the store operation, press the [NO] key, instead of the [YES] key. The unit returns to the Scene Selection display.

Changing a scene title

Follow the steps below to change the title (up to 13 characters) of the scene stored for the current scene number:

NOTE

You cannot change the title of any protected User scenes.

1. Press the [SCENE] key repeatedly until the Scene Edit display appears on the screen.

```
SCENE EDIT
73:FOH(Event A)
```


2. Press the [BACK]/[NEXT] keys to move the cursor to a character you want to edit.

```
SCENE EDIT
73:FOH(Event A)
```

3. Press the [▲INC]/[▼DEC] keys to change the character.

HINT

Holding down the [▲INC]/[▼DEC] keys will increase the speed at which the characters scroll.

4. When you finish editing the title, press the [NEXT] key repeatedly to move the cursor to the  icon, then press the [YES] key.

A confirmation message will appear.

```
SCENE EDIT
ARE YOU SURE?
```

5. To confirm the edit, press the [YES] key.

The title is changed and the unit returns to the Scene Edit display.

Protecting a scene

Follow the steps below to protect a scene:

1. Press the [SCENE] key repeatedly until the Scene Edit display appears on the screen.

```
SCENE EDIT
73:FOH(Event A)
```

2. Press the [▲INC]/[▼DEC] keys to select a scene number.


3. Press the [NEXT] key to move the cursor to the scene property icon.

```
SCENE EDIT
73:FOH(Event A)
```

4. Press the [▲INC]/[▼DEC] keys to turn protection on or off.

The protection icon flashes.

```
SCENE EDIT
73:FOH(Event A)
```

- Press the [NEXT] key repeatedly to move the cursor to the  icon, then press the [YES] key.

A confirmation message will appear.



- To confirm the edit, press the [YES] key.

The unit reflects the edit and returns to the Scene Edit display.

HINT

You can turn protection on and off from the DME Designer application.

Deleting a scene

Follow the steps below to delete a scene:

- Press the [SCENE] key repeatedly until the Scene Delete display appears on the screen.



- Press the [▲INC]/[▼DEC] keys to select a scene to delete.

- Press the [NEXT] key to move the cursor to the  icon, then press the [YES] key.

A confirmation message will appear.



- To confirm the operation, press the [YES] key.

The operation is executed and the unit returns to the Scene Delete display.

NOTE

You cannot delete preset scenes, protected scenes, and current scene.

UTILITY

The Utility function enables you to view the word clock status and make network settings. See page 39 for more information on making network settings.

INPUT A/B LINK

Follow the steps below to link the Input channel A and B parameters:

When INPUT A/B LINK is turned On, the parameters for channel A and B are linked and set to the same value automatically.

NOTE

The channel SUM parameters cannot be linked.

The following components will be linked:

- INPUT LEVEL
- INPUT EQ
- INPUT DELAY

- Press the [UTILITY] key to select the Utility display.

The most recently used Utility display will appear.

- Press the [UTILITY], [NEXT] or [BACK] key repeatedly until the INPUT A/B LINK page appears.



- Press the [▲INC] key to link the parameters.

“ON” flashes on the screen.



- Press the [NEXT] key to move the cursor to the  icon.



- Press the [YES] key.

A confirmation message will appear.



6. To confirm the operation, press the [YES] key.

The flashing “ON” (or “OFF”) lights up steadily, and the cursor returns to the “ON (or OFF)” position.



To cancel the operation and return to the original setting, press the [NO] key.

NOTE

If you set INPUT A/B LINK to “ON,” the linked parameters for channel A will be copied to channel B parameters.

User Lock

Parameter settings can be “locked” temporarily to prevent accidental mis-operation. This function is useful to avoid unintentional operations or to prevent others from operating the panel controls. You can specify a password for User Lock. The following operations are the User Lock target.

- * Editing the parameters
- * Recalling and storing a scene
- * Changing a scene title
- * Changing the scene protection status
- * Recalling a library

NOTE

- You can mute or unmute, or cancel User Lock even if the User Lock function is turned on.
- The User Lock function is effective only for the panel controls on the SP2060, and does not affect any control signals from external devices.

1. Press the [UTILITY] key to select the Utility display.

The most recently used Utility display will appear.

2. Press the [UTILITY], [NEXT] or [BACK] key repeatedly until the User Lock page appears.**3. Press the [▲INC] key to turn User Lock on. To cancel User Lock, press the [▼DEC] key.**

“ON” flashes on the screen.

NOTE

If you have specified a password, a password input display will appear (page 35).

**4. Press the [NEXT] key to move the cursor to the ↓ icon.****5. Press the [YES] key.**

A confirmation message will appear.

**6. To confirm the operation, press the [YES] key.**

A status message appears, and User Lock becomes active.

**HINT**

- A short cut to turn on the User Lock function is to hold down the [MUTE] key for two seconds or longer.
- A short cut to turn off the User Lock function is to hold down the [MUTE] key for two seconds or longer.

Setting the User Lock password

You can specify a password for User Lock function. Specify a four-digit number (0–9) as the password.

1. Press the [UTILITY] key to select the Utility display.

The most recently used Utility display will appear.

NOTE

If User Lock is on, the display will indicate “USER LOCK ON.”

2. Use the [UTILITY] key or the [NEXT]/[BACK] keys to select the PASSWORD SETUP page.

This will indicate all “*” if a password has been specified, or all “—” if no password has been specified.



3. Use the [▲INC]/[▼DEC] keys to specify the first digit of the password.

Press the [NEXT] key, and then specify the second through fourth digits in the same way.



NOTE

If you want to disable a password you've already specified, set all digits to “—”.

4. Press the [NEXT] key to move the cursor to the ▲ icon.



5. Press the [YES] key.

A confirmation message will appear in the display.



6. Press the [YES] key if you want to confirm the password.

A status message will appear, and the password will be specified.

If you press the [NO] key at this time, you will return to

the previous display, and the password will not be specified.



Defeating User Lock when a password has been specified



1. Press the [▼DEC] key.

The characters OFF in the display will blink.



2. Press the [NEXT] key to move the cursor to the ▲ icon.



3. Press the [YES] key.

The password entry display will appear.



4. Enter the password, and press the [NEXT] key to move the cursor to the ▲ icon.

5. Press the [YES] key.

The display will indicate “Panel Unlocked,” and you will return to the USER LOCK page. If the password is incorrect, the display will indicate “Wrong Password,” and you will return to the USER LOCK page.

NOTE

- If you want to disable a password you've already specified, set all digits to “—”.
- If you've forgotten the password that was specified, you can clear the password by turning off the User Lock setting from DME Designer.

Setting the Last Memory Resume

You can select whether at the startup the SP2060 recalls the scene selected before you turned off the power to the device, or it starts up with the same status as when it was shut down last time. The default setting is “ON.”

OFF: At the startup, the SP2060 will recall the scene selected before you turned off the power to the device.

ON: The SP2060 will start up with the same status as when it was shut down last time.

1. Press the [UTILITY] key to select the Utility display.

The most recently used Utility display will appear.

2. Press the [UTILITY], [NEXT] or [BACK] key repeatedly until the Last Memory Resume page appears.



3. Press the [▲INC] key so that the SP2060 will start up with the same status as when it was shut down last time. Press the [▼DEC] key so that at the startup the SP2060 will recall the scene selected before you turned off the power to the device.

“ON” flashes on the screen.



4. Press the [NEXT] key to move the cursor to the ↕ icon.



5. Press the [YES] key.

A confirmation message will appear.



6. To confirm the operation, press the [YES] key.

The selection is applied and the unit returns to the Last Memory Resume page.

Displaying the label

You can view the label for the SP2060 that you have set on DME Designer.

1. Press the [UTILITY] key to select the Utility display.

The most recently used Utility display will appear.

2. Press the [UTILITY], [NEXT] or [BACK] key repeatedly until the Label page appears.

The unit displays the label you created on DME Designer.



NOTE

- You cannot edit the label on the SP2060.
- Up to 14 characters from the top can be displayed.

Displaying word clock

Word clock changes in accordance with input routing settings.

You can view the current word clock status on the display.

One of the following six word clock sources will be displayed:

For analog input signals:

The internal clock ($F_s=96\text{kHz}$) is used.

- INT:96kHz : Internal clock (96kHz)

For digital input signals:

The SP2060 synchronizes to an external clock (input at the AES/EBU connector).

- EXT:44.1kHz : External clock (44.1kHz)
- EXT:48kHz : External clock (48kHz)
- EXT:88.2kHz : External clock (88.2kHz)
- EXT:96kHz : External clock (96kHz)
- EXT:UNLOCK : Unlock to external clock

1. Press the [UTILITY] key to select the Utility display.

The most recently used Utility display page will appear.

2. Press the [UTILITY], [NEXT] or [BACK] key repeatedly until the W. Clock page appears.



NOTE

If no signal exists at the [DIGITAL INPUT] connector while digital input is selected, or if the SP2060 cannot somehow lock to the incoming signal, an error message appears.

Checking the backup battery

Follow the steps below to check the internal backup battery status:

1. Press the [UTILITY] key to select the Utility display.

The most recently used Utility display will appear.

2. Press the [UTILITY], [NEXT] or [BACK] key repeatedly until the Battery page appears.



The remaining battery charge is displayed as follows:

[OK]	Plenty of charge
[Low Battery]	Charge is getting low.
[No Battery]	Memory data may be lost. Or, no battery is installed.



“Low Battery” or “No Battery” will appear when the battery charge is getting low. In this case, save the data to an external device (such as a computer) immediately, then ask the Yamaha dealer to replace the backup battery.

HINT

If there is any issue with the backup battery, the SP2060 displays “Low Battery,” “Critical Battery,” or “No Battery” when you turn on the power to the unit.

Displaying the firmware version

Follow the steps below to view the current firmware version number:

1. Press the [UTILITY] key to select the Utility display.

The most recently used Utility display page will appear.

2. Press the [UTILITY], [NEXT] or [BACK] key repeatedly until the Version page appears.

The page indicates the current firmware version number.



You can update the SP2060 firmware via DME Designer. Refer to the DME Designer Owner's Manual for details.

You can also download the latest firmware from the following Yamaha website.

<http://www.yamahaproaudio.com/>

Initializing the SP2060

Follow the steps below to initialize the internal memory:
You can select one of the following initialization types:

- * Initializing the current scene backup [CURRENT BACKUP]
- * Initializing all user settings (excluding the libraries) to the factory settings [WITHOUT LIB.]
- * Initializing all settings to the factory settings [FACTORY SETUP]



When the internal memory is initialized, all data stored in the memory will be lost. Use caution when you execute this function.

1. Turn off the power to the SP2060.
2. Turn on the power to the SP2060 while holding down the [BACK/STORE] key.
The Initialization display appears.



3. Press the [▲INC]/[▼DEC] keys to select a type of initialization.

NOTE

To cancel the initialization operation, select "Exit" and confirm the cancellation. Alternatively, simply turn off the power to the SP2060.

4. Press the [NEXT] key to move the cursor to the  icon, then press the [YES] key.
The Initialization operation starts. During initialization, the following status message appears:



When initialization is completed, the SP2060 displays the following status message, then automatically restarts.



Mute

When Mute is on, the corresponding Input or Output channel audio is muted.

You can determine the channel Mute status by checking the corresponding channel [MUTE] key LED.

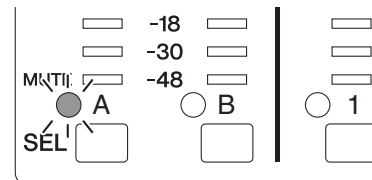
- MUTE OFF : Dark
- MUTE ON : Illuminated

1. Press the [MUTE] key to select the Mute display.



2. Press the [SEL] key for the target channel.

The channel audio is muted and the [MUTE] key LED lights up. Pressing the channel [SEL] key repeatedly toggles between Mute on and off.



NOTE

You can mute or unmute even if the User Lock function is turned on

Output port name display

You can view the output port name on the component of each OUTPUT channel in the display.

1. With [LEVEL], [DELAY], [EQ], [ROUTING], [X-OVER], or [LIMITER] selected, hold down the [SEL] key of the channel you want to view for two seconds or longer.



The upper row shows the output port name on the component, and the lower row shows the configuration name.

Network Settings

This section describes the network-related settings on the SP2060 that you need to make when you connect a computer or other external device to the SP2060 [NETWORK] connector.

NOTE

When connecting a computer to an SP2060 via Ethernet, you must install the appropriate DME-N Network driver on the computer. You can download the DME-N Network driver from the Yamaha website.

Setting a Device Group

A “device group” is a group of multiple SP2060 units that can be operated in sync via DME Designer. Follow the steps below to assign each SP2060 in a device group as master or slave. Each device group must have one master. All other devices in the group are assigned as slave.

1. Press the [UTILITY] key to select the Utility display.

The most recently used Utility display will appear.

2. Press the [UTILITY], [NEXT] or [BACK] key repeatedly until the MASTER/SLAVE page appears.



3. Press the [▲INC]/[▼DEC] keys to select “MASTER” or “SLAVE.”

When you change the setting, the parameter setting flashes.



4. Press the [NEXT] key to move the cursor to the icon, then press the [YES] key.

A confirmation message will appear.



5. To confirm the setting, press the [YES] key.

The selection is applied and the unit returns to the Device Group page.

Setting the IP Address

Follow the steps below to set the IP address for each SP2060.



NOTE

- Subnet mask is fixed at 255.255.255.0.
- Gateway address is the same network address as the IP address. The host address is automatically set to 254.

Each group of digits between periods in an IP address is called “octet.” These groups of digits are called “1st octet,” “2nd octet,” etc., starting from the left-most digit group.

You cannot specify 0, 127, and 223 through 255 for the 1st octet of the network address.

You can specify the following range of values for the 4th octet.

Master : 2–253

Slave : 3–253

1. Press the [UTILITY] key to select the Utility display.

The most recently used Utility display will appear.

2. Press the [UTILITY], [NEXT] or [BACK] key repeatedly until the IP Address page appears.



3. Press the [NEXT]/[BACK] keys to move the cursor to an octet you want to specify.



4. Press the [▲INC]/[▼DEC] keys to change the value.

When you change the value, the octet flashes.

5. Press the [NEXT] key to move the cursor to the icon, then press the [YES] key.

A confirmation message will appear.



6. To confirm the setting, press the [YES] key.

The setting is applied and the unit returns to the IP Address page.

Setting the Master ID

The SP2060 units that are assigned as slaves in a device group follow the master SP2060 in the same group via communication. Follow the steps below to set the master ID on the slave SP2060 units. Use the 4th octet of the IP address of the master unit as the Master ID parameter value.

NOTE

This parameter can be set from 2 through 253.

1. Press the [UTILITY] key to select the Utility display.

The most recently used Utility display will appear.

2. Press the [UTILITY], [NEXT] or [BACK] key repeatedly until the Master ID page appears.**3. Press the [▲INC]/[▼DEC] keys to set the value to the same number as the 4th octet of the master SP2060 IP address.****4. Press the [NEXT] key to move the cursor to the  icon, then press the [YES] key.**

A confirmation message will appear.

**5. To confirm the setting, press the [YES] key.**

The setting is applied and the unit returns to the Master ID page.

To cancel the operation and return to the original setting, press the [NO] key, instead of the [YES] key.

Setting Link Mode

Follow the steps below to select 100Base-TX or 10Base-T for the [NETWORK] connector speed.

100Base-TX

The [NETWORK] connector basically operates as 100Base-TX, but automatically switches to 10Base-T if the network environment is not compatible with 100Base-TX.

10Base-T

The [NETWORK] connector is compatible with 10Base-T operation.

1. Press the [UTILITY] key to select the Utility display.

The most recently used Utility display will appear.

2. Press the [UTILITY], [NEXT] or [BACK] key repeatedly until the Link Mode page appears.**3. Press the [▲INC] key to select 100Base-TX, and the [▼DEC] key to select 10Base-T.**

When you change the setting, the parameter setting flashes.

**4. Press the [NEXT] key to move the cursor to the  icon, then press the [YES] key.**

A confirmation message will appear.

**5. To confirm the setting, press the [YES] key.**

The unit reflects the edit and returns to the Link Mode page.

NOTE

Depending on the specifications of the connected network devices (such as a switching hub, router, etc.), changing Link Mode may cause the SP2060 to be unable to reconnect to the network. In this case, turn the power to the SP2060 off and then on. The SP2060 will reconnect to the network.

Viewing the MAC Address

Follow the steps below to view the SP2060 MAC address:

NOTE

In some cases, you may not need to set the MAC address via the DME-N Network driver when the SP2060 is communicating with DME Designer.

1. Press the [UTILITY] key to select the Utility display.

The most recently used Utility display will appear.

2. Press the [UTILITY], [NEXT] or [BACK] key repeatedly until the MAC Address page appears.

The bottom row indicates the MAC address.



About Preset Libraries

File name



Model name Drive mode Subwoofer usage



Model name Drive mode Floor monitor

- pa..... Passive mode*
- bi Bi-amp mode
- tri..... Tri-amp mode
- sub..... Combining with a subwoofer**
- moni For a floor monitor

* Yamaha Installation Series speakers are designed to be used without a speaker processor when Passive mode is selected. However, using a speaker processor will improve the performance significantly.

** This setting is for full-range speakers. Subwoofer settings are not included.

Subwoofer

- “_sub” settings for 12-inch or 15-inch 3-way full-range speakers are designed for a combination with IS1118, IS1215, or IS1218.
- The IS1118, IS1215, and IS1218 settings are specified for a monaural subwoofer usage.
- The full-range and subwoofer level balance varies depending on the number of speakers used, installation conditions, and applications.
- If the full-range speaker baffle and subwoofer baffle are aligned, the speaker polarity will be positive and in-phase. Depending on the installation conditions of the subwoofers, you might achieve better results if the subwoofer phase is inverted.

Limiter

- The default value of the threshold level has been specified based on the maximum analog output level of +24dBu and amp voltage gain of 26dB (which corresponds to “ATT -6dB” if you are using a Yamaha PC series amplifier that features a voltage gain of 32dB).
If you are not using the output levels referenced above, change the threshold level.
For example, if you are using an amplifier with a voltage gain of 30dB, lower the threshold level by 4dB.
- Attack time and Release time are both set to “Mid.”
- The Limiter may not completely protect the speakers. Use the Limiter if they suit your environment.

Libraries for 1-way speaker processors

NOTE

These libraries also apply to 2-way speakers that are used in passive mode.

The following table shows typical subwoofer settings when it is combined with Yamaha Installation Series speakers.

Target speakers	Library name	Meaning
IS1118 and IS1218	IS1118_IS1218	This setting can be shared by IS1118 and IS1218 when IF2112 (M), IF2115 (M) or IF3115 is combined.
IS1215	IS1215	This setting is for IS1215 when IF2112 (M), IF2115 (M) or IF3115 is combined.
Standard subwoofer	Sub_5inch&8inch	This LPF setting can be shared by standard subwoofers when IF2205, IF2108, or IF2208 is combined.

The following table shows the settings for Yamaha Installation Series speakers (full-range, passive mode).

Target speakers	Library name	Subwoofer usage*	For a floor monitor
IF2205	IF2205	–	–
	IF2205_sub	✓	–
IF2108	IF2108	–	–
	IF2108_sub	✓	–
	IF2108_moni	–	✓
IF2208	IF2208	–	–
	IF2208_sub	✓	–
	IF2208_moni	–	✓
IF2112/AS	IF2112AS_pa	–	–
	IF2112AS_pa_sub	✓	–
	IF2112AS_pa_moni	–	✓
IF2112/64	IF211264_pa	–	–
	IF211264_pa_sub	✓	–
IF2112/95	IF211295_pa	–	–
	IF211295_pa_sub	✓	–
IF2112/99	IF211299_pa	–	–
	IF211299_pa_sub	✓	–
IF2112M/64	IF2112M64_pa	–	–
	IF2112M64_pa_sub	✓	–
IF2112M/95	IF2112M95_pa	–	–
	IF2112M95_pa_sub	✓	–
IF2112M/99	IF2112M99_pa	–	–
	IF2112M99_pa_sub	✓	–
IF2115/AS	IF2115AS_pa	–	–
	IF2115AS_pa_sub	✓	–
	IF2115AS_pa_moni	–	✓
IF2115/64	IF211564_pa	–	–
	IF211564_pa	✓	–

Target speakers	Library name	Subwoofer usage*	For a floor monitor
IF2115/95	IF211595_pa	–	–
	IF211595_pa_sub	✓	–
IF2115/99	IF211599_pa	–	–
	IF211599_pa_sub	✓	–
IF2115M/64	IF2115M64_pa	–	–
	IF2115M64_pa_sub	✓	–
IF2115M/95	IF2115M95_pa	–	–
	IF2115M95_pa_sub	✓	–
IF2115M/99	IF2115M99_pa	–	–
	IF2115M99_pa_sub	✓	–

* This setting is for full-range speakers. Subwoofer settings are not included.

Libraries for 2-way speaker processors

NOTE

These libraries also apply to 3-way speakers (including a combination of IL series and IH series speakers) that are used in bi-amp mode.

The following table shows the settings for Yamaha Installation Series speakers (full-range, bi-amp mode).

Target speakers	Library name	Subwoofer usage*	For a floor monitor
IF2112/AS	IF2112AS_bi	–	–
	IF2112AS_bi_sub	✓	–
	IF2112AS_bi_moni	–	✓
IF2112/64	IF211264_bi	–	–
	IF211264_bi_sub	✓	–
IF2112/95	IF211295_bi	–	–
	IF211295_bi_sub	✓	–
IF2112/99	IF211299_bi	–	–
	IF211299_bi_sub	✓	–
IF2112M/64	IF2112M64_bi	–	–
	IF2112M64_bi_sub	✓	–
IF2112M/95	IF2112M95_bi	–	–
	IF2112M95_bi_sub	✓	–
IF2112M/99	IF2112M99_bi	–	–
	IF2112M99_bi_sub	✓	–
IF2115/AS	IF2115AS_bi	–	–
	IF2115AS_bi_sub	✓	–
	IF2115AS_bi_moni	–	✓
IF2115/64	IF211564_bi	–	–
	IF211564_bi_sub	✓	–

Target speakers	Library name	Subwoofer usage*	For a floor monitor
IF2115/95	IF211595_bi	–	–
	IF211595_bi_sub	✓	–
IF2115/99	IF211599_bi	–	–
	IF211599_bi_sub	✓	–
IF2115M/64	IF2115M64_bi	–	–
	IF2115M64_bi_sub	✓	–
IF2115M/95	IF2115M95_bi	–	–
	IF2115M95_bi_sub	✓	–
IF2115M/99	IF2115M99_bi	–	–
	IF2115M99_bi_sub	✓	–
IF3115/64	IF311564_bi	–	–
	IF311564_bi_sub	✓	–
IF3115/95	IF311595_bi	–	–
	IF311595_bi_sub	✓	–
IH2000/64	IH200064_bi	–	–
IH2000/95	IH200095_bi	–	–

* This setting is for full-range speakers. Subwoofer settings are not included.

The following table shows the settings for Yamaha Installation Series speaker IL series along with IH series.

Target speakers	Library name	Meaning
IL1115 and IH2000/64	IL1115+IH64_pa	Combination of IL1115 and IH2000/64 (passive mode)
IL1116 and IH2000/95	IL1115+IH95_pa	Combination of IL1115 and IH2000/95 (passive mode)

Libraries for 3-way speaker processors

The following table shows the settings for Yamaha Installation Series speakers (full-range, tri-amp mode).

Target speakers	Library name	Subwoofer usage
IF3115/64	IF311564_tri	–
	IF311564_tri_sub	✓
IF3115/95	IF311595_tri	–
	IF311595_tri_sub	✓

The following table shows the settings for Yamaha Installation Series speaker IL series along with IH series.

Target speakers	Library name	Meaning
IL1115 and IH2000/64	IL1115+IH64_bi	Combination of IL1115 and IH2000/64 (bi-amp mode)
IL1115 and IH2000/95	IL1115+IH95_bi	Combination of IL1115 and IH2000/95 (bi-amp mode)

Display Messages

Warning and error messages

Message	Meaning	Action
Duplicate IP Adr.	Duplicate IP addresses.	Change the IP addresses so that there are no duplicates.
Illegal MAC Adr.	An illegal MAC address has been encountered.	This could be due to a hardware malfunction. Refer this problem to a contact a Yamaha dealer.
Invalid IP Adr.	The IP address is not set properly.	Set an appropriate network IP address.
Network Error	A cable is disconnected, the power to the connected switching hub or router is turned off, or a cable is not in proper condition.	Connect the cables properly, and make sure that the hub and/or router are operating correctly.
No MAC Adr.	MAC address not specified.	This could be due to a hardware malfunction. Refer this problem to a Yamaha dealer.
No Battery	The internal battery is completely discharged or not installed.	If you turn off the power to the unit, the current settings will be lost and reset to the default values. Stop operating the unit, and contact a Yamaha dealer for battery replacement.
Critical Battery	The internal battery is almost discharged. Your data may be lost.	If you turn off the power to the unit, the current settings may be lost and reset to the default values. Stop operating the unit, and contact a Yamaha dealer for battery replacement.
Low Battery	The backup battery voltage is low.	This does not affect the operation of the unit. However, if you continue using the unit, the settings may be lost and reset to the default values. Contact a Yamaha dealer for battery replacement at your earliest convenience.
Recovering	A program update attempt has failed, and the previous program is currently being restored.	Do NOT turn power off while the unit is displaying this message. If the update attempt repeatedly fails, there may be a hardware malfunction. Refer this problem to a Yamaha dealer.
Scene Recall Err	A scene recall attempt has failed.	Recall the scene again. If the problem persists, contact a Yamaha dealer.
Saving Failed	A save operation has failed.	This could be due to a hardware malfunction. Refer this problem to a Yamaha dealer.
Param Access Err	Current setting cannot be displayed.	Save the current setting by using DME Designer, then initialize the unit. If the problem persists, contact a Yamaha dealer.
Param Set Err	Current setting cannot be changed.	
W.Clk Unlocked	A usable word clock signal is not being received or cannot be detected.	Recheck all word clock connections and internal parameters.
DevGrp Sync Err	The device group configuration set via DME Designer does not match the real configuration.	Use DME Designer to go off-line, create a configuration that correctly matches the actual configuration, and then go back on-line to synchronize the configuration.
System Error	A system error has occurred.	Save the current setting by using DME Designer, then initialize the unit. If the problem persists, contact a Yamaha dealer.

* Do NOT turn off the power to the SP2060 while the unit displays the message "DO NOT TURN OFF!" at the bottom of the display.

Status messages

Message	Meaning
Connecting	Connecting to the network.
Download Success	The program has been successfully updated.
Downloading	Program update in progress. Do NOT turn power off while the unit displays this message.
File Operating	A file operation is in progress during which the computer manipulates scene data. Do NOT turn power off while the unit displays this message.
Network Setup	Preparing network connection.
Panel Locked	The User Lock function is engaged. The panel controls do not work.
Panel Unlocked	The User Lock function has been disengaged. Panel operation is now possible.
Scene Recalling	Scene recall in progress.
Scene Storing	Scene store in progress. Do NOT turn power off while the unit displays this message.
Cannot Recall	Recalling scenes or libraries is disabled.
Cannot Store	The scene store is disabled.
NO X-OVER	Input channels do not feature the X-Over parameter.
NO LIMITER	Input channels do not feature the Limiter parameter.
Protected	You cannot edit or delete protected scenes.
NO ROUTING	Input channel SUM does not feature the Routing parameter.
NO LEVEL	Input channel SUM does not feature the Level parameter.
Network Busy	There is too much network traffic. Communication is very slow.
Synchronizing	Data is being received from the computer. Do NOT turn power off while the unit displays this message.
Scene Deleting	Deleting a scene. Do NOT turn power off while the unit displays this message.

* Do NOT turn off the power to the SP2060 while the unit displays the message "DO NOT TURN OFF!" at the bottom of the display.

Troubleshooting

Symptom	Possible Causes	Possible Solutions
No communication between the SP2060 and the DME Designer application software.	The connection cable is not connected properly.	Make sure that the cable is properly connected.
	The computer's Ethernet port is not functioning properly.	Refer to the DME Designer Installation Guide.
	The DME-N Network driver has not been installed.	Install and set up the DME-N Network driver.
No audio output.	The Mute function is turned on.	Turn off the Mute function (see page 38).
	The output level is set too low.	Increase the output level (see page 24).
The parameters cannot be edited.	The User Lock function is turned on.	Turn off the User Lock function (see page 34).

General Specifications

Sampling Frequency	External	Normal Rate: 44.1, 48 kHz ($\pm 0.1\%$) Double Rate: 88.2, 96 kHz ($\pm 0.1\%$)
	Internal	96 kHz
Signal Delay	Less than 761 μ sec (INPUT to OUTPUT @Fs=96kHz)	
Indicators	Key indicators x 9 MUTE indicators (INPUT A/B, OUTPUT 1-6) 6-segment LED level meters (INPUT A/B, OUTPUT 1-6)	
Miscellaneous	Power Consumption	30 W
	Dimensions (HxDxW)	44 x 361 x 480 mm
	Net Weight	4.2 kg
	Temperature Range	Operating: 5 to 40 °C Storage: -20 to 60 °C
	Included Accessories	AC power cord, Rubber feet x 4, Owner's manual

Electrical Characteristics

Output impedance of signal generator: 150 Ω

Frequency Response

Input	Output	RL	Conditions	MIN	TYP	MAX	Units
INPUT A, B	OUTPUT 1-6	600 Ω	Fs=96kHz@20Hz-40kHz, reference to the nominal output level @1kHz	-1.0	0.0	+0.5	dB

Total Harmonic Distortion

Input	Output	RL	Conditions	MIN	TYP	MAX	Units
INPUT A, B	OUTPUT 1-6	600 Ω	Fs=96kHz, +4dBu@20Hz-40kHz			0.05	%
			Fs=96kHz, +22dBu@1kHz			0.007	%
DIGITAL INPUT AES/EBU	OUTPUT 1-6	600 Ω	Fs=48kHz@1kHz, Input level: -1dBFS			0.015	%

* Total Harmonic Distortion is measured with a 18dB/octave filter @80kHz.

Hum & Noise

Input	Output	RL	Conditions	MIN	TYP	MAX	Units
INPUT A, B	OUTPUT 1-6	600 Ω	Fs=96kHz, Rs=150 Ω		-82	-79	dBu
DIGITAL INPUT AES/EBU	OUTPUT 1-6	600 Ω	Fs=48kHz, Input level: $-\infty$ dBFS		-86		dBu

*Hum & Noise are measured with a 6dB/octave filter @12.7kHz; equivalent to a 20kHz filter with infinite dB/octave attenuation.

Dynamic Range

Input	Output	RL	Conditions	MIN	TYP	MAX	Units
INPUT A, B	OUTPUT 1-6	600 Ω	Fs=96kHz		106		dB
DIGITAL INPUT AES/EBU	OUTPUT 1-6	600 Ω	Fs=48kHz		110		dB

*Dynamic range is measured with a 6dB/octave filter @12.7kHz; equivalent to a 20kHz filter with infinite dB/octave attenuation.

Crosstalk@1KHz

Fs=96kHz

Input	Output	Conditions	MIN	TYP	MAX	Units
INPUT A	OUTPUT 2, 4, 6	INPUT A assigned to OUTPUT 1, 3 or 5 INPUT B assigned to OUTPUT 2, 4 or 6			-80	dB
INPUT B	OUTPUT 1, 3, 5	INPUT A assigned to OUTPUT 1, 3 or 5 INPUT B assigned to OUTPUT 2, 4 or 6			-80	dB

*Crosstalk is measured with a 18dB/octave filter @80kHz.

LED Level Meters

Metering points	Conditions	MIN	TYP	MAX	Units
INPUT A, B	OVER red LED: On		0		dBFS
	-6 amber LED: On		-6		dBFS
	-12 amber LED: On		-12		dBFS
	-18 amber LED: On		-18		dBFS
	-30 green LED: On		-30		dBFS
	-48 green LED: On		-48		dBFS
OUTPUT 1-6	OVER red LED: On		0		dBFS
	LIMIT amber LED: On		LIMIT*		
	-6 green LED: On		-6		dBFS
	-12 green LED: On		-12		dBFS
	-18 green LED: On		-18		dBFS
	-40 green LED: On		-40		dBFS

*The LED turns on when the internal limiter is activated.

Input/Output Characteristics**Analog Input Characteristics**

Input Terminals	Actual Load Impedance	For Use With Nominal	Input level		Connector
			Nominal	Max. before clip	
INPUT A, B	10 k Ω	600 Ω Lines	+4 dBu (1.23 V)	+24 dBu (12.28 V)	XLR-3-31 type (balanced) *1

*1. XLR-3-31 type connectors with latches are balanced. (1=GND, 2=HOT, 3=COLD)

*2. In these specifications, 0 dBu is referenced to 0.775 Vrms.

*3. All AD converters are 24-bit linear, 64-times oversampling. (Fs=96kHz)

Analog Output Characteristics

Output Terminals	Actual Load Impedance	For Use With Nominal	Input level		Connector
			Nominal	Max. before clip	
OUTPUT 1-6	75 Ω	600 Ω Lines	+4 dBu (1.23 V)	+24 dBu (12.28 V)	XLR-3-32 type (balanced) *1

*1. XLR-3-32 type connectors are balanced. (1=GND, 2=HOT, 3=COLD)

*2. In these specifications, 0 dBu is referenced to 0.775 Vrms.

*3. All DA converters are 24-bit linear, 128-times oversampling (Fs=48kHz) or 64-times oversampling (Fs=96kHz).

Digital Input Characteristics

Terminal	Format	Data length	Level	Connector
DIGITAL INPUT AES/EBU	AES/EBU	24 bit	RS422	XLR-3-31 type (balanced) *1 *2

*1. XLR-3-31 type connector with latch is balanced. (1=GND, 2=HOT, 3=COLD)

*2. Only Double Speed Format is supported at 96 kHz. Double Channel or Single Format is not supported.

Control I/O Characteristics

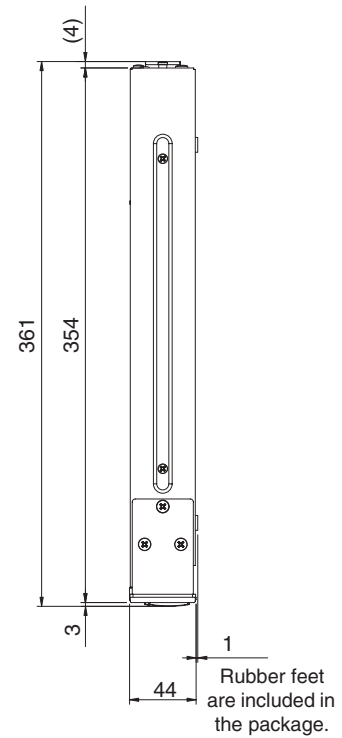
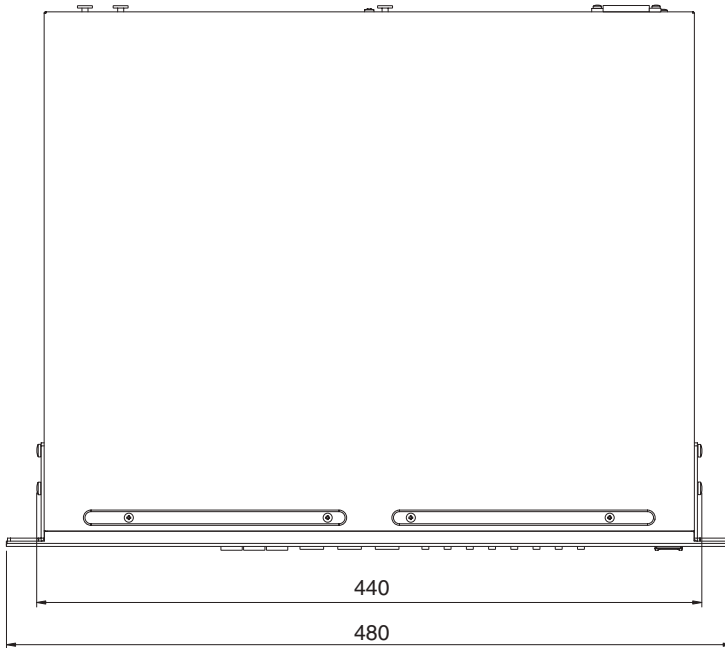
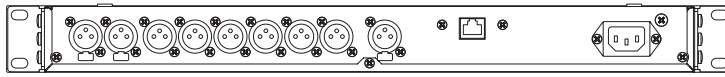
Terminal	Format	Level	Connector
Network	IEEE 802.3	10Base-T/100Base-TX	RJ-45

Connector Pin Assignment

[NETWORK] Connector (100Base-TX Ethernet, RJ-45)

Pin	Connection
1	TxD+
2	TxD-
3	RxD+
4	Unused
5	Unused
6	RxD-
7	Unused
8	Unused

Dimensions



Unit: mm

* Specifications and descriptions in this owner's manual are for information purpose only. Yamaha Corp. reserves the right to charge or modify products or specifications at any time without prior notice. Since specifications, equipment or options may not be the same in every locale, please check with your Yamaha dealer.

European models

Purchaser/User Information specified in EN55103-1 and EN55103-2.

Inrush Current: 35A

Conforms to Environments: E1,E2,E3 and E4.

Index

[▲INC/YES]/[▼DEC/NO] Keys	22	[DIGITAL INPUT] Connector (AES/EBU)	23
100Base-TX	40	Dimensions	51
10Base-T	40	Display	22
2 x (2-way + Sub)	11	Displaying the current library	29
2 x (2-way + Sub) Link	11	Displaying the firmware version	37
2 x 2-way + 2 x Aux	12	Displaying the label	36
2 x 2-way + 2 x Aux Link	12	Displaying word clock	37
2 x 3-way	13	DME Designer	7
2 x 3-way Link	13	E	
3 x 2-way	10	Electrical Characteristics	48
3 x 2-way Link	10	EQ (Equalizer)	25
4 way +2 x Aux	14	[EQ] Key	22
5-way + Aux	15	F	
6-way	16	[FACTORY SETUP]	38
A		Features	9
About a scene	30	Firmware Version	7
[AC IN] Connector	23	Front Panel	22
AdjustGc (Adjustable Gc)	29	G	
B		General Specifications	48
[BACK/STORE] Key	22	Ground Screw	23
Battery page	37	H	
Bessel	29	H.SHELF(High Shelving)	25
Buttrwrth (Butterworth)	29	HPF	25
C		I	
Changing a scene title	32	Initializing the SP2060	38
Changing the parameter values	24	INPUT A/B LINK	33
Checking the backup battery	37	INPUT A/B LINK page	33
Components	9	Input channel A	27
Configuration	9, 10	Input channel B	27
2 x (2-way + Sub)	11	Input channel SUM	27
2 x (2-way + Sub) Link	11	[INPUT] Connectors	23
2 x 2-way + 2 x Aux	12	Input EQ	25
2 x 2-way + 2 x Aux Link	12	Input routing	27
2 x 3-way	13	Input/Output Characteristics	49
2 x 3-way Link	13	IP address	39
3 x 2-way	10	IP Address page	39
3 x 2-way Link	10	L	
4 way +2 x Aux	14	L.SHELF(Low Shelving)	25
5-way + Aux	15	Label page	36
6-way	16	Last Memory Resume page	36
Multi Zone	17	LEVEL	24
Connector Pin Assignment	50	[LEVEL] Key	22
[CURRENT BACKUP]	38	LIBRARY	29
D			
DELAY	25		
[DELAY] Key	22		
Deleting a scene	33		

Library	9
LIMITER	30
Limiter	42
[LIMITER] Key	22
Link Mode page	40
Linkwitz (Linkwitz-Riley)	29
LPF	25
M	
MAC Address page	41
Master	39
Master ID page	40
MASTER/SLAVE page	39
Meters	22
Multi Zone	17
Multiple SP2060	20
Mute	38
[MUTE] Key	22
N	
[NETWORK] Connector	23
Network Settings	39
[NEXT/RECALL] Key	22
O	
octet	39
[OUTPUT] Connectors	23
Output EQ	26
Output routing	27
P	
Parameters	9
PEQ	25
[POWER ON/OFF] Key	22
Precautions for Using a Rack-mounted SP2060	8
Preset area	31
Preset Libraries	42
preset parameters	9
preset scene (read-only scene)	10
Protecting a scene	32
R	
Rear Panel	23
Recalling a library	29
Recalling a scene	31
ROUTING	27
[ROUTING] Key	22
S	
SCENE	30
Scene	9

[SCENE] Key	22
scene number	31
scene property	31
[SEL] Keys	22
Setting a Device Group	39
Setting Link Mode	40
Setting the Crossover	28
Setting the IP Address	39
Setting the Last Memory Resume	36
Setting the Master ID	40
Slave	39
Speaker	18
Speaker processing	18
Status messages	47
Storing a scene	32
Subwoofer	42
System Examples	18
T	
Thru	29
Troubleshooting	47
Turning the power on and off	7
U	
User area	31
User Lock	34
User Lock page	34
user scene (readable and writable scene)	10
UTILITY	33
[UTILITY] Key	22
V	
Version page	37
Viewing the MAC Address	41
W	
W. Clock page	37
Warning and error messages	46
[WITHOUT LIB.]	38
X	
X-OVER (Crossover)	28
[X-OVER] Key	22
Z	
Zone processing	19

MEMO

Foreword

Introduction
to the SP2060

The Controls
and Connectors

Panel Operation

Network Settings

References

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