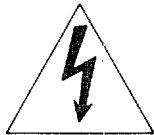


• Explanation of Graphical Symbols



The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert you 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 you to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

SAFETY INSTRUCTIONS

- 1 **Read Instructions** — All the safety and operating instructions should be read before the appliance is operated.
- 2 **Retain Instructions** — The safety and operating instructions should be retained for future reference.
- 3 **Heed Warnings** — All warnings on the appliance and in the operating instructions should be adhered to.
- 4 **Follow Instructions** — All operating and other instructions should be followed.
- 5 **Water and Moisture** — The appliance should not be used near water — for example, near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool, etc.
- 6 **Carts and Stands** — The appliance should be used only with a cart or stand that is recommended by the manufacturer.
- 7 **Wall or Ceiling Mounting** — The appliance should be mounted to a wall or ceiling only as recommended by the manufacturer.
- 8 **Ventilation** — The appliance should be situated so that its location or position does not interfere with its proper ventilation. For example, the appliance should not be situated on a bed, sofa, rug, or similar surface, that may block the ventilation openings; or cabinet that may impede the flow of air through the ventilation openings.
- 9 **Heat** — The appliance should be situated away from heat sources such as radiators, stoves, or other appliances that produce heat.
- 10 **Power Sources** — The appliance should be connected to a power supply only of the type described in the operating instructions or as marked on the appliance.
- 11 **Power-Cord Protection** — Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the appliance.
- 12 **Cleaning** — The appliance should be cleaned only as recommended by the manufacturer.
- 13 **Nonuse Periods** — The power cord of the appliance should be unplugged from the outlet when left unused for a long period of time.
- 14 **Object and Liquid Entry** — Care should be taken so that objects do not fall into and liquids are not spilled into the inside of the appliance.
- 15 **Damage Requiring Service** — The appliance should be serviced by qualified service personnel when:
 - A. The power-supply cord or the plug has been damaged; or
 - B. Objects have fallen, or liquid has been spilled into the appliance; or
 - C. The appliance has been exposed to rain; or
 - D. The appliance does not appear to operate normally or exhibits a marked change in performance; or
 - E. The appliance has been dropped, or the cabinet damaged.

16 Servicing — The user should not attempt to service the appliance beyond those means described in the operating instructions. All other servicing should be referred to qualified service personnel.

17 Power Lines — An outdoor antenna should be located away from power lines.

18 Grounding or Polarization — The precautions that should be taken so that the grounding or polarization of an appliance is not defeated.

**CAUTION: READ THIS BEFORE
OPERATING YOUR DSP-1**

1
To ensure the finest performance, please read this manual carefully. Keep it in a safe place for future reference.

2
Install your unit in a cool, dry, clean place—away from windows, heat sources, and too much vibration, dust, moisture or cold. Avoid sources of hum (transformers, motors). To prevent fire or electrical shock, do not expose to rain and water.

3
Do not operate the unit upside-down. It may overheat, possibly causing damage.

4
Never open the cabinet. If a foreign object drops into the set, contact your dealer.

5
Do not place records or other objects on top of the unit; this will block the ventilation holes, cause the internal temperature to rise and may result in a failure.

6
Do not use force on switches, knobs or cords. When moving the set, first turn the unit off. Then gently disconnect the power plug and the cords connecting to other equipment. Never yank the cords.

7
Do not attempt to clean the unit with chemical solvents; this might damage the finish. Use a clean, dry cloth.

8
Be sure to read the “troubleshooting” section on common operating errors before concluding that your unit is faulty.

9
Do not connect audio equipment to the AC outlets on the rear panel if that equipment requires more power than the outlets are rated to provide.

10
This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna
- Relocate the DSP-1 with respect to the receiver
- Move the DSP-1 away from the receiver
- Plug the DSP-1 into a different outlet so that the DSP-1 and receiver are on different branch circuits.

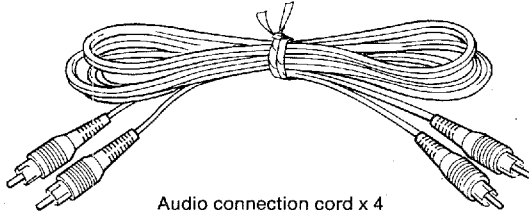
If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful: “How to Identify and Resolve Radio-TV Interference Problems”. This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4.

DSP-1

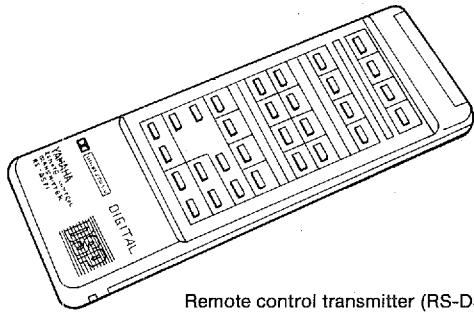
BEFORE USE

■ ACCESSORIES

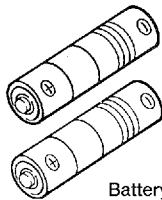
The following three accessories are provided:



Audio connection cord x 4



Remote control transmitter (RS-DSP1)

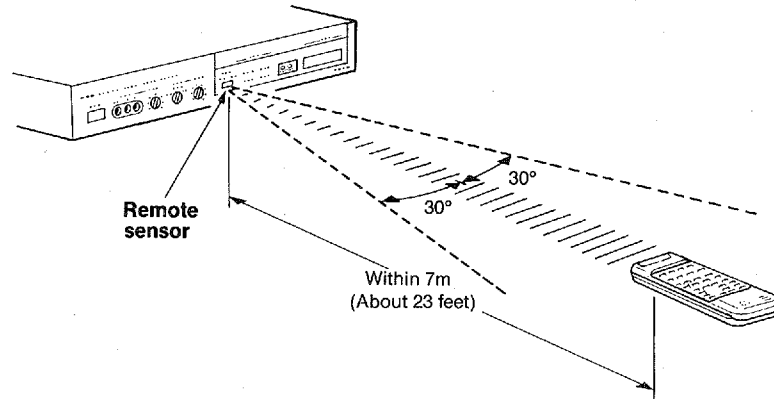


Battery (size "AA", R6) x 2

■ REMOTE CONTROL TRANSMITTER

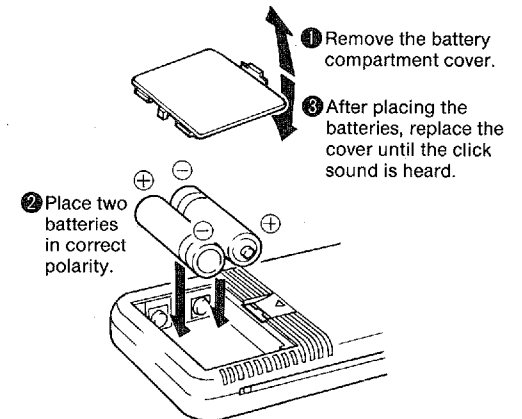
In this unit, most operations are controlled by the remote control transmitter (RS-DSP1) provided. Before operating, place the provided batteries into the remote control transmitter properly. As the infrared ray

is linear, use the remote control transmitter in the appropriate area taking care of the angles to the remote sensor of the DSP-1 main unit.



Remote sensor

Within 7m
(About 23 feet)



① Remove the battery compartment cover.

③ After placing the batteries, replace the cover until the click sound is heard.

② Place two batteries in correct polarity.

Remote control transmitter (RS-DSP1) rear view

■ BATTERY REPLACEMENT

When the remote controllable distance becomes short, batteries are exhausted. Replace two batteries with new ones.

Battery cautions

Incorrect use of the battery may cause leakage or explosion. Be careful the following items:

When replacing:

- Place the batteries in correct (+) and (-) polarities as indicated in the battery compartment.
- Do not use the old battery together with new one.
- Do not use the different kind of batteries at the same time even though in the same shape.

Rechargeable batteries:

- There are two kinds of batteries in the market; rechargeable and non-rechargeable. Read the caution labels on the battery carefully.

Use with the remote control transmitter:

- When not in use for an extended period of time, remove the batteries from the remote control transmitter.
- Replace the exhausted batteries earlier in good time.

To prevent accident:

- Never disassemble, heat the battery, or throw into the fire. Dispose the batteries in the specified places.
- Do not connect (short) (+) and (-) directly with the metal piece, etc.

In case of leakage:

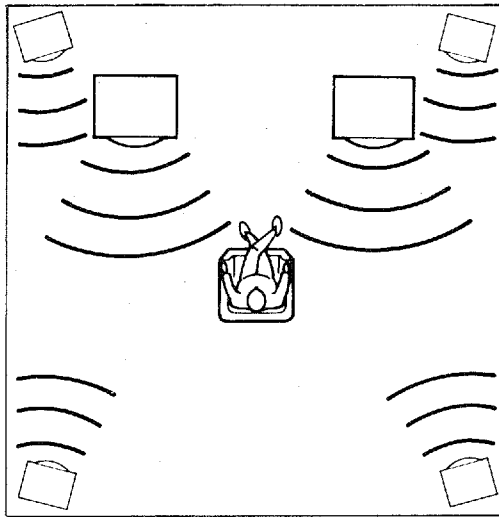
Wipe off the electrolyte in the battery compartment completely before replace with the new batteries.



SPEAKER PLACEMENT

Speakers may be placed in various kinds of patterns depending on the extent of the room or the room acoustic characteristics. The placement examples shown below are the typical patterns for effective use of this unit. Place the speakers on the most suitable position for your listening room while listening actually.

■ 6-CHANNEL SYSTEM

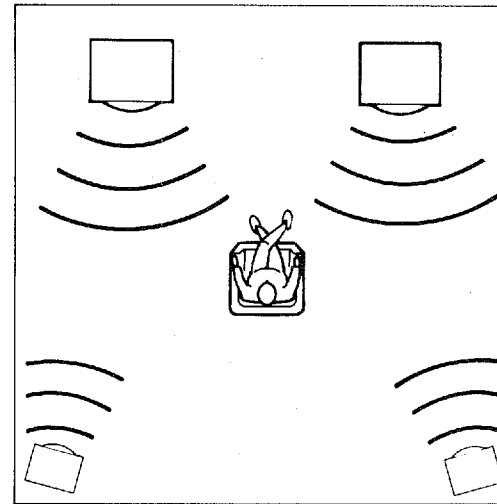
Standard placement example





-  Main speaker (For source sound reproduction)
-  Sub speaker (For effect sound reproduction)
(Place the sub speakers in a high place.)

■ 4-CHANNEL SYSTEM

Standard placement example



-  Main speaker (For source sound + effect sound reproduction)
-  Sub speaker (For effect sound reproduction)
(Place the sub speakers in a high place.)

CONNECTIONS

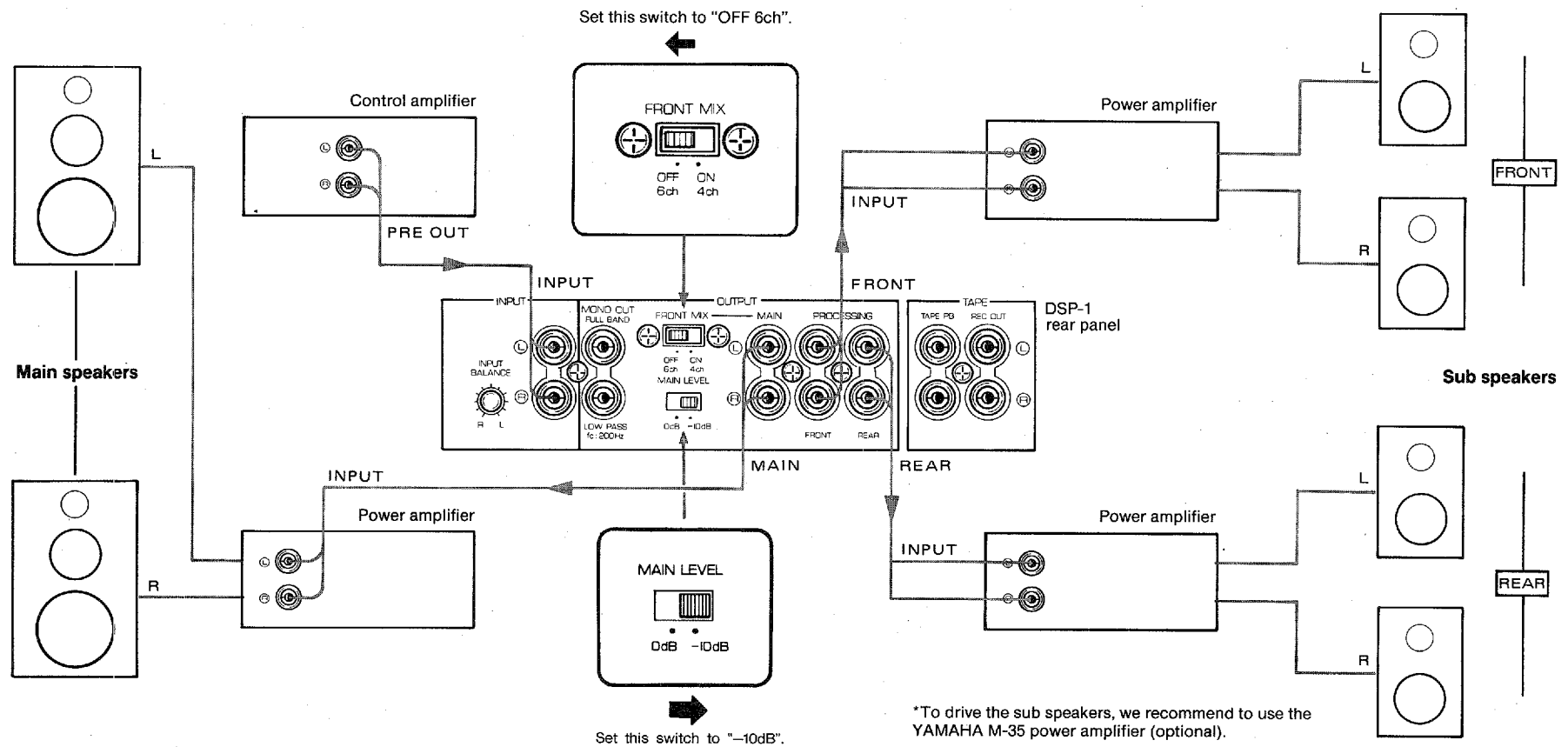
■ PRECAUTIONS ON CONNECTIONS

- **Power switch:**
Turn off the power of this unit and other equipment before making connections.
- **Power plug:**
After confirming that all connections are correct, insert the power plug of this unit into the AC outlet.
- **Connection cords:**
Connect all the audio cords with correct L (left) and R (right) channels firmly.
- **Installation:**
If this unit interfere with the other equipment (such as a tuner or amplifier), place this unit away from the other units.

DSP-1

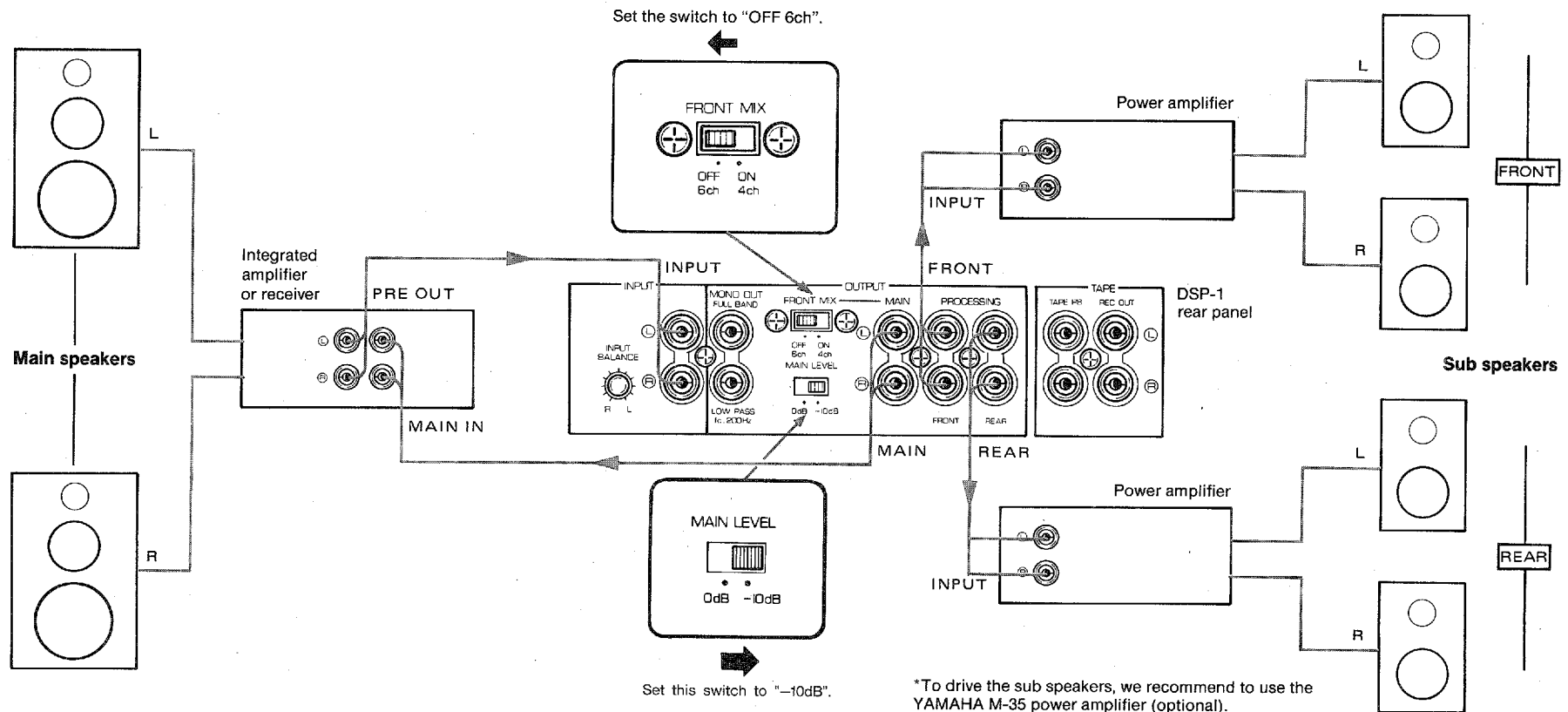
■ USING WITH SEPARATE AMPLIFIERS

- Set the FRONT MIX switch of this unit to "OFF 6ch".
- When only two speakers are used as the sub speaker, the FRONT MIX switch setting and PROCESSING jacks connections are different. Refer to page 10.



■ USING WITH THE INTEGRATED AMPLIFIER OR RECEIVER HAVING PRE-OUT AND MAIN-IN JACKS

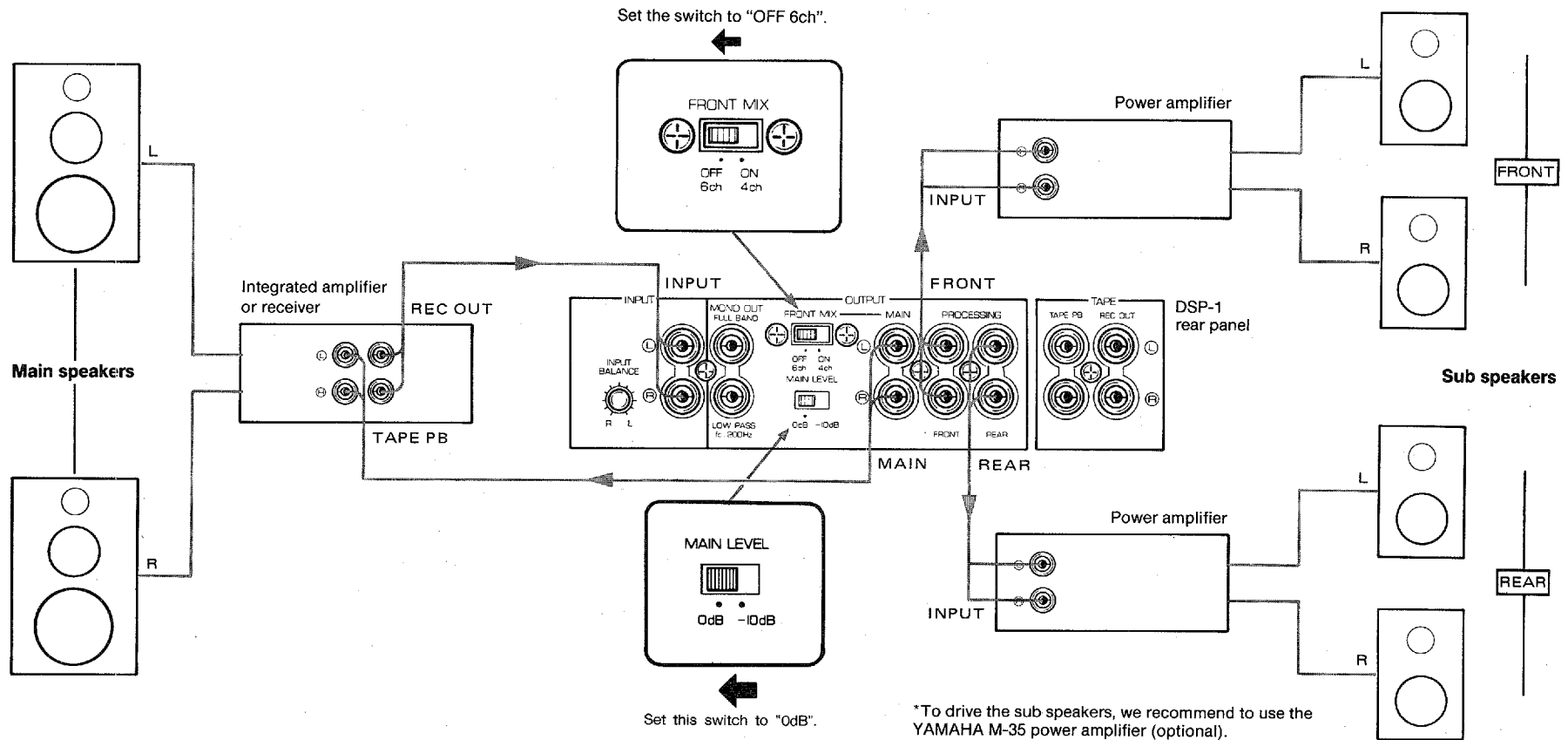
- Set the FRONT MIX switch of this unit to "OFF 6ch".
- When only two sub speakers are used, the FRONT MIX switch setting and the PROCESSING jack connections and different. Refer to page 10.
- When the COUPLER switch is provided with the integrated amplifier or receiver, set the switch to ON (SEPARATE). When the PRE OUT jacks and MAIN IN jacks are shorted with jumper pins, unplug the jumper pins before making connections.



DSP-1

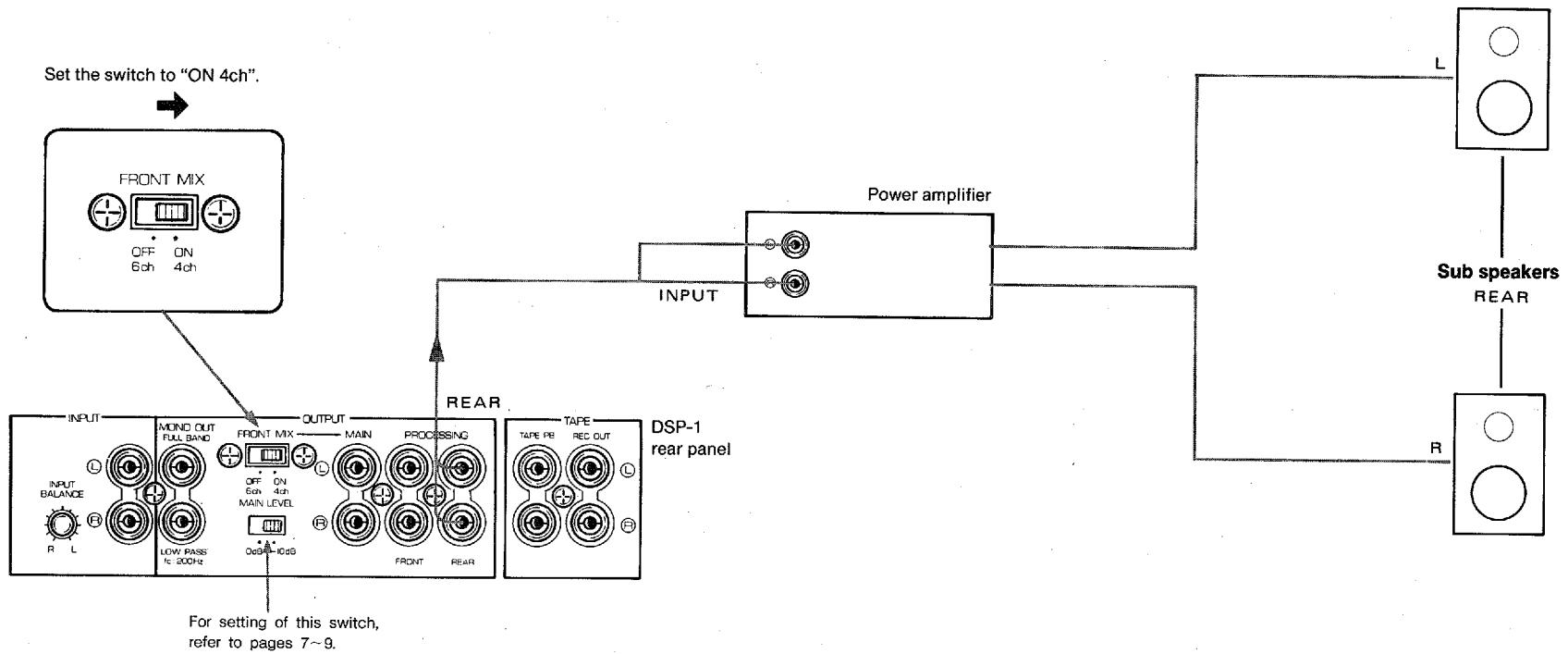
■ USING WITH THE INTEGRATED AMPLIFIER OR RECEIVER WITHOUT PRE-OUT AND MAIN-IN JACKS

- Set the FRONT MIX switch of this unit to "OFF 6ch".
- When only two sub speakers are used, the FRONT MIX switch setting and the PROCESSING jack connections are different. Refer to page 10.



■ WHEN A PAIR OF SUB SPEAKERS ARE USED

- Set the FRONT MIX switch of this unit to "ON 4ch"
- Use only the PROCESSING REAR jacks.

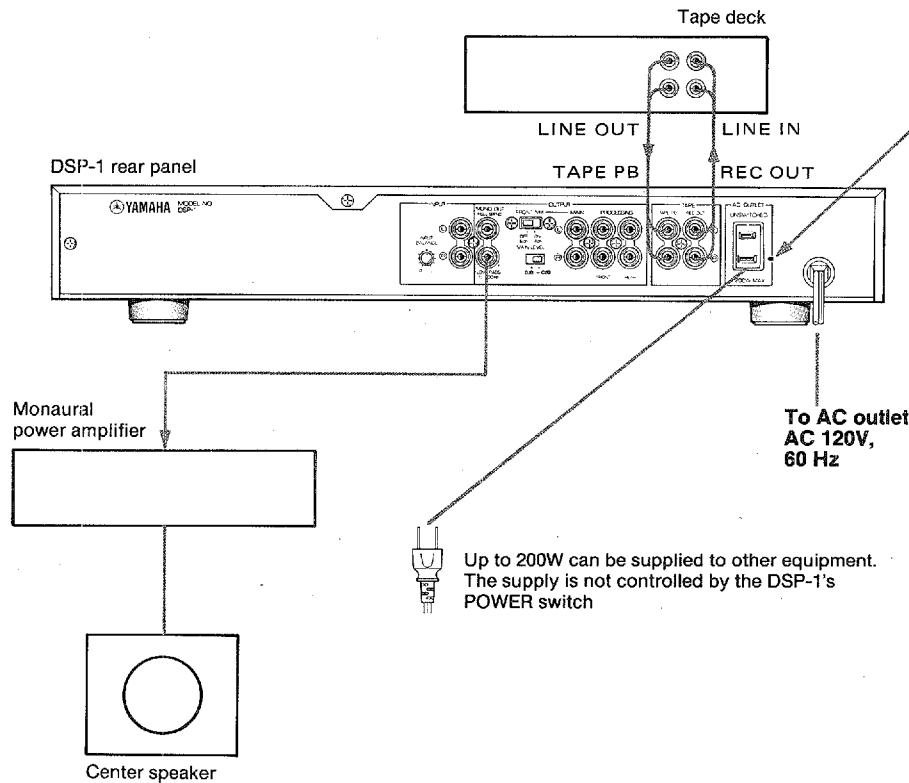


DSP-1

■ TAPE DECK CONNECTION

A tape deck can be connected to the TAPE jacks of this unit to record/play the source of effect sound. Also when this unit is connected to the tape jacks of

the integrated amplifier or receiver (or control amplifier), connect the tape deck to these jacks as shown below.



Polarity indication:
The polarity indication is to align the polarity of your audio system.

To AC outlet
AC 120V,
60 Hz

Up to 200W can be supplied to other equipment.
The supply is not controlled by the DSP-1's
POWER switch

■ CONNECTION OF OTHER EQUIPMENT

★ Connection of synthesizer or keyboard, etc. (MIX INPUT jacks)

Stereo inputs (L, R) and mono input (MONO) are provided for variety of use.

*To connect a microphone, a microphone amplifier is required.

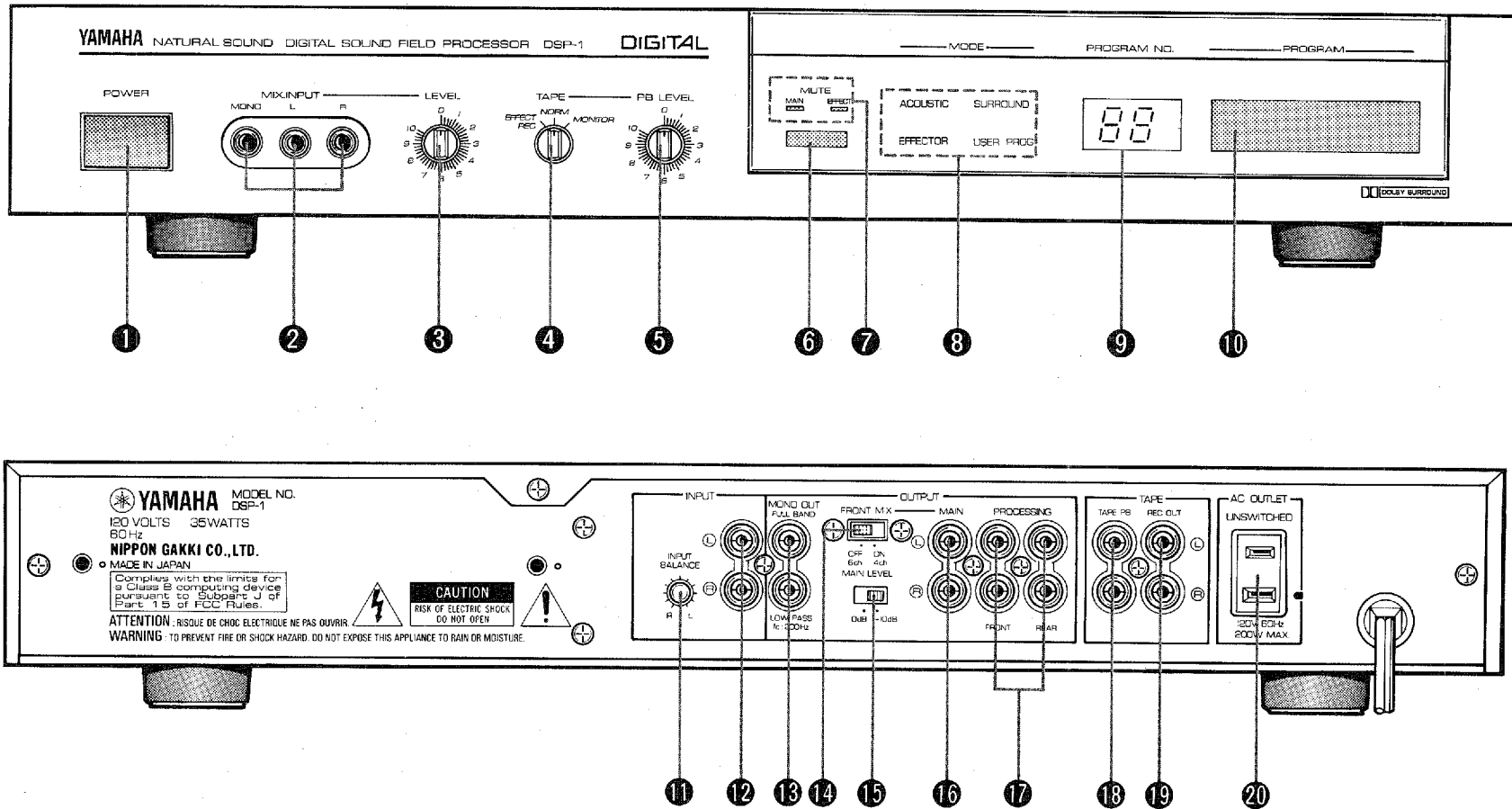
★ Connection of the center speaker (MONO OUT terminals)

The MONO OUT terminals which output the L-ch + R-ch mix signal are provided. Use the LOW PASS terminal when adding the subwoofer to compensate the very low frequency sound. Use the FULL BAND terminal when adding the center speaker between the left and right speakers to fill up the localization of the sound image.

★ The AC outlet supplies the AC power (200W max.) to the other audio component. This AC outlet is not interlocked with the POWER switch of this unit.

CONTROLS AND FUNCTIONS

FRONT PANEL



DSP-1

FRONT PANEL

1 POWER switch

Turn the power on and off. When the power is turned on, the last program before the power has been turned off is automatically recalled

*For several seconds after the power is turned on, the sound is muted by the protection circuit.

2 MIX INPUT jacks (MONO, L, R)

Used to mix the sound signal with the input source from the INPUT jacks on the rear panel. Use MONO when the output terminal of the equipment to be connected is monaural, and connect L and R jacks when the equipment is stereo.

If both the MONO and L/R jacks are used simultaneously, the level from the MONO jacks may be lowered.

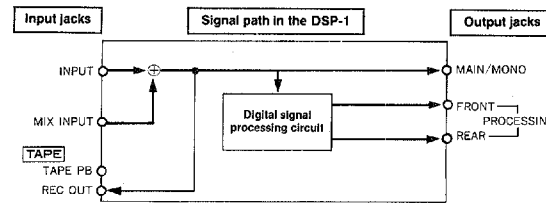
3 MIX INPUT LEVEL control

Used to adjust the input level from the MIX INPUT jacks. Turning it clockwise increase the input signal level.

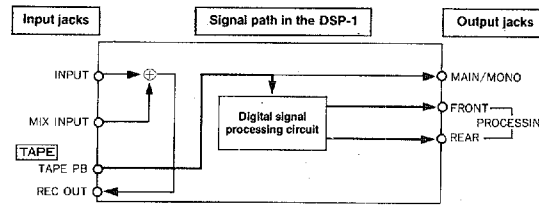
4 TAPE selector

Selects the input source or the signal recording/playback with the tape deck connected to this unit. According to the knob position, the signal path changes as follows:

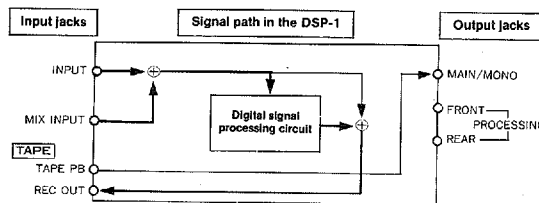
- **NORM:** Sound field effect or special sound effect can be applied to the input source from the rear panel INPUT jacks or the front panel MIX INPUT jacks.



- **MONITOR:** Sound field effect or special sound effect can be applied to the signal from the tape deck connected to this unit



- **EFFECT REC:** The effected sound (that the sound field effect or special sound effect is applied to the input source from the INPUT or MIX INPUT jacks) can be recorded onto the tape deck. This signal is output only from the REC OUT jacks.



5 TAPE PB LEVEL control

Used to adjust the tape sound level input from the TAPE PB jacks on the rear panel.

6 Remote sensor

Receives the remote control infrared signal from the remote control transmitter.

7 MUTE indicators (MAIN, EFFECT)

Lights when the MUTE key on the remote control transmitter is pressed to mute the sound.

- **MAIN:** Lights when the MAIN MUTE key is pressed to mute the source sound.
- **EFFECT:** Lights when the EFFECT MUTE key is pressed to mute the effect sound.

8 MODE indicators

These show the current mode; ACOUSTIC, SURROUND, EFFECTOR or USER PROG mode.

9 PROGRAM NO. display

Displays the selected program number.

10 PROGRAM display

Displays the selected program name, parameter, etc.
* The display panel may not be understandable when viewed from the certain direction. See it from the front when operating.

REAR PANEL

11 INPUT BALANCE control

Balances the left and right effect sound. Normally set to the center position.

12 INPUT jacks

Inputs the signal from the control amplifier, integrated amplifier or receiver.

13 MONO OUT jacks (FULL BAND, LOW PASS fc: 200 Hz)

Outputs the left and right mix (MONO) signal. Use these jacks when the left and right speakers are too separated or the low frequencies are unsatisfied.

- **FULL BAND:** Outputs the full range signal.
- **LOW PASS:** Outputs the low frequency signal below 200 Hz.

14 FRONT MIX switch

Used to mix the source signal with the front effect signal sent to the main speakers. When the switch is set to "ON 4ch", both signals are mixed, and when it is set to "OFF 6ch", they are output independently.

- When used in 4-channel system (with 4 speakers), set this switch to the "ON 4ch" position. The source sound is mixed with the front effect sound and output from the main speakers.
- When used in 6-channel system (with 6 speakers), set this switch to the "OFF 6ch" position. The source signal is output from the MAIN jacks and the front effect signal is output from the PROCESSING FRONT jacks separately.

15 MAIN LEVEL switch

The signal level output to the MAIN jacks can be selected between 0 dB and -10 dB with this switch. When the DSP-1 is connected between the control amplifier and power amplifier, set this switch to "-10dB".

When the DSP-1 is connected to REC OUT and TAPE PB jacks of the integrated amplifier or receiver, set this switch to "0 dB".

16 MAIN jacks

These jacks output the signal to the amplifier or receiver which drives the main speakers.

17 PROCESSING jacks (FRONT, REAR)

These jacks output the signal to the amplifier which drives the sub speakers.

18 TAPE PB jacks

These jacks input the signal output from the tape deck.

19 REC OUT jacks

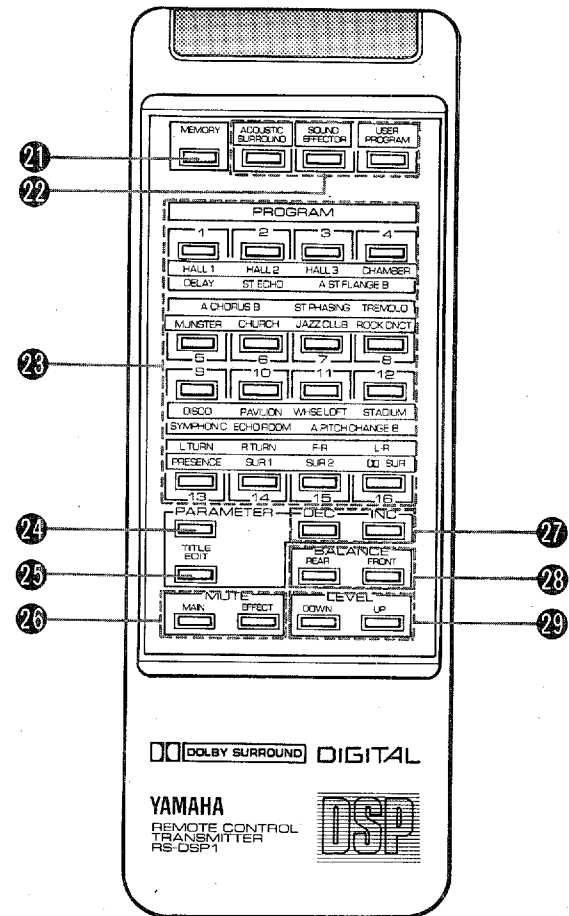
These jacks output the signal to the tape deck. The signal output from these jacks can be selected by the TAPE selector.

20 AC OUTLET (UNSWITCHED)

This supplies the AC power to the equipment regardless of the POWER switch setting of this unit.

* Be sure to check the power consumption of the equipment to be connected and use below 200 watts.

REMOTE CONTROL TRANSMITTER



21 MEMORY key

Used to store the program modified as desired into the user program area.

22 MODE keys

Select the desired mode with these keys. (See table below.)

When the mode is changed, the program which is stored in the same program position as the previous mode is called.

ACOUSTIC/SURROUND mode:

Programs for sound field effect or surround effect are preset.

SOUND EFFECTOR mode:

Programs for special sound effect are preset.

USER PROGRAM mode:

For storing the user-modified program.

Mode	Program
ACOUSTIC/ SURROUND	HALL 1, HALL 2, HALL 3, CHAMBER, Münster, CHURCH, JAZZ CLUB, ROCK CNCT (CONCERT), DISCO, PAVILION, WHSE (WARE HOUSE) LOFT, STADIUM, PRESENCE, SUR (SURROUND) 1, SUR (SURROUND) 2, □□ SUR (DOLBY SURROUND)
SOUND EFFECTOR	DELAY ST (STEREO) ECHO, ST (STEREO) FLANGE A, B, CHORUS A, B, ST (STEREO) PHASING, TREMOLO, SYMPHONIC, ECHO ROOM, PITCH CHANGE A, B, L (LEFT) TURN, R (RIGHT) TURN, F-R (FRONT-REAR), L-R (LEFT-RIGHT)
USER PROGRAM	When shipping, the same programs as the ACOUSTIC/SURROUND mode are preset at the factory. The program modified by the user can be stored in this area.

23 PROGRAM keys

Select the desired program with these keys. After selecting the desired mode with the MODE keys, select the desired one from the following.

24 PARAMETER key

Used to recall the program parameter (factor/element to determine the effect) and the setting value displayed on the panel. Each time this key is pressed, the parameter is changed in sequence. Press this key to display the parameter whose value is to be changed.

25 TITLE EDIT key

Used to change the program title (name) stored in the User Program area. (See page 22.)

26 MUTE keys (MAIN, EFFECT)

Mute the sound from the speakers with these keys.

- **MAIN:** When this key is pressed, the main sound is muted and the MUTE MAIN indicator lights. Also the signal output from the MONO OUT jack is canceled.
- **EFFECT:** When this key is pressed, the effect sound is muted and the MUTE EFFECT indicator lights.

27 DEC key, INC key

These keys are used to change the parameter value. To increase the value, press the INC key, and to decrease it, press the DEC key. When the key is kept pressing, the value is changed continuously and stopped at the minimum or maximum point. These keys are also used to change the program title (name) stored in the user program area. (See pages 20 and 22.)

28 BALANCE key (REAR, FRONT)

Used to balance the effect sound between the front and the rear speakers.

When the REAR key is pressed, the rear effect sound level is increased and the front sound is decreased.

When the FRONT key is pressed, the front effect sound level is increased and the rear effect sound is decreased. When one of the BALANCE keys is pressed, the indication shown below is displayed on the PROGRAM display as the reference for adjustment.



R: Rear

F: Front

■: Cursor (This position shows the volume balance between the front and rear.)

%: Percent (This figure shows the volume balance between the front and the rear.)

OUTLINE OF THE DSP-1

29 LEVEL keys (DOWN, UP)

Used to adjust the volume level of the effect sound.

- **DOWN:** When this key pressed, the effect sound is decreased.
- **UP:** When this key is pressed, the effect sound is increased. When one of the LEVEL keys is pressed, the indication shown below is displayed on the PROGRAM display as the reference for adjustment.



■: Cursor (Number of lighting cursor shows the volume level of the effect sound.)

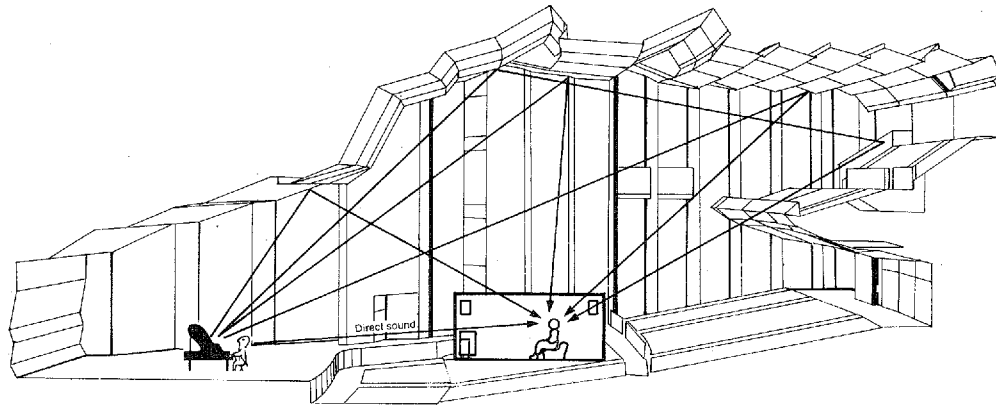
%: Percent (Shows the effect sound level in figures.)

Note: After adjusting the parameter value or level/balance of the effect sound, recalling the other program resets the parameter values to initial settings. To keep the adjusted value, store the program in the user program area. (See page 21.)

In a concert hall, the extent or shape, image localization, and echoicness or anechoicness can be appreciated even if the eyes are closed. This is because sound reflections from all directions are heard besides the direct sound from stage (instruments or voices) simultaneously. Our auditory sense can recognize the extent of the hall by the time difference between the direct sound and the reflections, the shape of the hall by the directions of the reflections, and the echoic or anechoic characteristic by the attenuations of the sound.

Therefore, simulating the time difference or direction of the reflections and the attenuating time may reproduce the sound field of an actual concert hall. As sound produced by performers is reflected by all objects in the hall, it is heard not only from the direct front but also from the sides, rear or ceiling.

These reflections cannot be reproduced by the conventional 2-channel (2-speaker) system, but require extra speakers to reproduce sound reflection (this is called the sub speaker). The DSP-1 is designed to reproduce the realistic sound field experienced in a concert hall in a normal listening room by simulating sound reflection from all directions based on actual measured data, using extra speakers surrounding the listener. Furthermore, the digital signal processing circuit adopted in this unit can be used to produce special sound effects, such as combining phase-difference signals, changing pitch or changing imaging position periodically.



PROGRAM CONTENTS

■ ACOUSTIC/SURROUND mode

Program No.	Program Title (Program display Indication)	Features/Applicable sources	Mode
1	HALL 1	Sound field such as a wide and deep grand hall. Suitable for reproducing operas or orchestra music.	ACOUSTIC
2	HALL 2	Sound field such as a medium-sized hall (smaller than that of HALL 1). Suitable for reproducing the orchestra music, etc.	
3	HALL 3	Sound field such as the multi-purpose hall which can store 1000 people. Deeper ambience is obtained.	
4	CHAMBER	Sound field such as the grand ball room in the court. Suitable for reproducing chamber music, etc.	
5	Münster	Sound field such as in the cathedral.	
6	CHURCH	Sound field such as in the church. Suitable for reproducing pipe organ music or church music.	
7	JAZZ CLUB	Sound field such as in the jazz club.	
8	ROCK CONCERT	Sound field with tight ambience, suitable for rock or rock-related music.	
9	DISCO	Sound field such as in the disco.	
10	PAVILION	Sound field such as in the indoor stadium.	
11	WAREHOUSE LOFT	Sound field such as in the concrete-built warehouse.	
12	STADIUM	Sound field such as in the stadium or open-air theater.	
13	PRESENCE	Effect sound is delayed separately and reproduced from the front and rear speakers.	
14	SURROUND 1	Sound field applying the depth to the screen. Suitable for AV sources.	SURROUND
15	SURROUND 2	Sound field applying a width to the screen. Suitable for AV sources.	
16	DOLBY SURROUND	Used to reproduce the Dolby Surround-encoded movies.	

■ SOUND EFFECTOR mode

Program No.	Program Title (Program display indication)	Feature
1	DELAY	This program shifts the delay time* between the front/rear, and left/right channels.
2	STEREO ECHO	Shifts the delay time* between the left and right channels slightly so that the stereophonic echo effect is obtained.
3	STEREO FLANGE A	Effect that tone is varying and swirling is obtained. STEREO FLANGE A has faster speed and light swirling effect against B.
4	STEREO FLANGE B	
5	CHORUS A	Effect that sound is rolling and swaying (drifting) is obtained. CHORUS A has faster speed and deep effect against B.
6	CHORUS B	
7	STEREO PHASING	Effect that tone is varying periodically is obtained.
8	TREMOLO	The swirling effect obtained by CHORUS is multiplied and the volume change is emphasized.
9	SYMPHONIC	The swirling effect obtained by CHORUS is multiplied and the timing is changed irregularly.
10	ECHO ROOM	Effect such as in the echo chamber of the recording studio is obtained.
11	PITCH CHANGE A	These programs are used to change the pitch, however, initially in the preset program, pitch is not changed. (See pages 28 and 29.)
12	PITCH CHANGE B	
13	PAN L-TURN	Sound image is turned to the left.
14	PAN R-TURN	Sound image is turned to the right.
15	PAN F-R	Sound image is moved from the front to the rear continuously.
16	PAN L-R	Sound image is moved from the left to the right continuously.

* **Delay Time:** The time difference between the time source sound is heard and the time effect sound is heard.

BASIC OPERATIONS

* Confirm that all the components are connected correctly before turning the power on. The 32 kind of programs have been preset in this unit. Among this, 16 present programs are used to reproduce the sound field (ACOUSTIC/SURROUND mode) and the rest 16 presets are used to obtain the special sound effect (SOUND EFFECTOR mode). For the features of each program, refer to the "Program Contents" on page 17.

* When using with the integrated amplifier having pre-out and main-in terminals:

When the REC OUT selector is provided	When the TAPE MONITOR switch is provided
Set the input selector to TAPE.	Set the switch to ON.

■ OPERATION

1 Power ON

Turn the power of this unit and audio system on.

2 TAPE SELECTOR switching

- When playing the amplifier's input source, or when mixing the input signal with the signal from the MIX INPUT signal, set the TAPE selector of this unit to the "NORM" position.
- When playing the tape deck connected to this unit, set the TAPE selector of this unit to the "MONITOR" position.

For example, recall the HALL 1 program in the ACOUSTIC/SURROUND mode.

3 Mode selection

Press the mode key (ACOUSTIC/SURROUND, in this example) on the remote control transmitter.

4 Program Recall

Press the program key (HALL 1, in this example) on the remote control transmitter.

5 Source selection

(When playing the amplifier's input source)

- **Using the separate amplifiers:**
Select the desired source with the input selector of the control amplifier.
- **Using the integrated amplifier or receiver having pre-out/main-in jacks:**
Select the source with the input selector of the integrated amplifier or receiver.
- **Using the integrated amplifier or receiver having no pre-out/main-in jacks:**

When the REC OUT selector is provided	When the TAPE MONITOR switch is provided
Set the REC OUT SELECTOR to the desired source.	Set the input selector to the desired source.

* For more details, refer to the instruction manual provided with the amplifier or receiver.

6 Start to play the desired source.

7 Source volume adjustment

When playing the amplifier's input source, adjust with the volume control of amplifier.

When playing the amplifier's input source mixing with the MIX INPUT signal, adjust the volume with the amplifier's volume control and the MIX INPUT LEVEL control of this unit.

When playing the tape deck connected to this unit, adjust with the TAPE PB LEVEL control of this unit.

When using the integrated amplifier or receiver having no pre-out/main-in jacks, adjust the volume also with the amplifier's volume control.

8 Balance adjustment

Using the MUTE key (MAIN, EFFECT) of the remote control transmitter, adjust the level of the power amplifier so that the source-only volume is equal to the volume level of only the effect sound.

* When the volume control is not provided with the amplifier for source reproduction, set the MAIN LEVEL switch on the rear panel of this unit to the "-10 dB" position to lower the source volume.

With this adjustment, the difference of the volume levels between speakers having different sensitivities or amplifiers having different gains can be corrected. When the sensitivity is different between the front and rear sub speakers, select the "DELAY" program in the SOUND EFFECTOR mode, and adjust the power amplifier to this unit so that the volume level of the front sub speakers becomes equal to that of rear sub speakers. (In the ACOUSTIC/SURROUND mode, balance between the front and the rear differs in each sound field data.)



USER PROGRAM EDITING METHOD (For more effective use)

9 When adjusting the volume of effect sound or adjusting balance between front and rear effect sound, operate as follows:

- Adjust the volume with the LEVEL keys of the remote control transmitter.
- Adjust the balance between front and rear with the BALANCE keys of the remote control transmitter.

Note: When recalling the other program or turning the power off, the volume level and front/rear balance of the effect sound is canceled and the initial setting resumes. To keep the adjusted condition, store the program setting into the user program area. (See page 21.)

- * When this unit is connected to the tape playback or rec out jacks of the integrated amplifier or receiver (or control amplifier), whole volume level cannot be controlled simultaneously with the amplifier's volume control.
- * If the noise from the sub speakers is noticeable, set the MAIN LEVEL switch to "-10dB".

■ LAST CONDITION CALL FUNCTION

When the power is turned on, the program which is used before turning the power is recalled, and the MUTE on/off, level and balance setting is also set as before turning the power off.

This function is available not only when switching the power ON/OFF, but after unplugging the power plug from the AC outlet. And when the mode is changed, the program which is used before changing the mode is recalled in the same way.

■ RECORDING

● When recording the effected sound

Set the TAPE selector to the "EFFECT REC" position before recording.

- * As the source sound is mixed on recording, if not necessary, press the MUTE (MAIN) key to cut it.

● When recording the input source only

Set the TAPE selector to "NORM" or "MONITOR" position before recording.

- * When it is set to the "MONITOR" position, the sound may not be produced from the speaker depending on the tape deck used. (In the case of two-head decks.)
- * For tape deck operation, refer to the instruction manual of the deck used.

Each program is composed by several parameters (factor or element to determine the sound field or effect). By changing the parameter value, the sound field or sound effect can be modified as desired.

- * For details of each parameter, refer to "Parameter" on page 23. Create the desired sound field or special effect referring to the parameter description.

■ PROGRAM RECALL/CHANGE

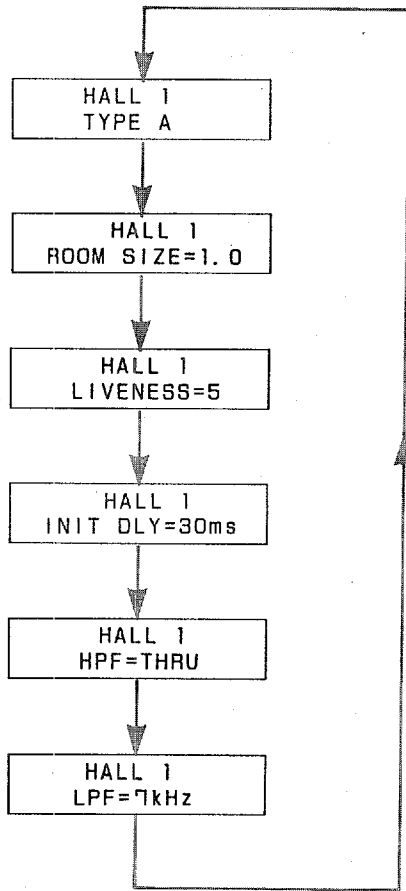
1 Program recall

In the same way as "Playing", recall the program which is used to modify the desired sound field or effect.

2 Parameter recall

The name and value of the parameter are displayed on the PROGRAM display as well as the name of the recalled program. Each time the PARAMETER key of the remote control transmitter is pressed, the name and value of one of the parameter consisting of the program contents sequentially. Press the key until the parameter to be changed is displayed.

EX: "HALL 1" program in ACOUSTIC mode
Each time the key is pressed, the displayed parameter is changed.



3 Parameter value change

The displayed parameter value can be changed by pressing the DEC and INC keys of the remote control transmitter.

EX: "LIVENESS" of the "HALL 1" program

The valuable range of this parameter is 0 to 10. The preset value is "5". However, increasing the value makes the sound more live (echoic), and decreasing the value make it more dead (anechoic).

Repeat the 2 and 3 operation so that the desired sound field or sound effect is obtained.

Note: Even when the parameter value is changed, recalling the other program resumes the initial setting of the parameter value. To keep the parameter-changed program, refer to the "Program Memory" described below.

■ PROGRAM MEMORY

Up to 16 kinds of programs can be stored in the user program area (NO. 1 to NO. 16.)

In the same way as "Program Recalling", make sound field or sound effect as desired.

The desired level and balance of the effect sound can also be stored in memory for each program.

When the MEMORY key of the remote control transmitter is pressed, the PROGRAM NO. display on the display window blinks (for approx. 5 seconds.) During blinking storing the setting is possible.

For example, to store the ACOUSTIC mode Hall 1 program modified as desired into the No. 2 memory of the user program area:

- 1) Press the MEMORY key.
- 2) The program No. to be stored blinks (for 5 seconds).
- 3) During blinking, press the program key of the storing number.
- 4) At this, the display "HALL 1 MEMORY STORE" momentarily, and the program display resumes. Program memory is completed.

The stored program can be recalled in the USER PROGRAM mode at any time

Note: When the program has been stored in the user program area with the same number, storing the new program cancels the previously-stored program.

■ TITLE EDITING (PROGRAM NAME CHANGE)

The program name stored in the user program area can be changed to its own name. Using alphabets, digits or symbols, the program name can be registered within 16 characters.

1 Program Recall

Select the USER PROGRAM mode with the MODE key of the remote control transmitter, and recall the program to be changed with the PROGRAM key.

2 Press the TITLE EDIT key of the remote control transmitter.

When this key is pressed, the "TITLE EDIT" is displayed on the lower section of the PROGRAM display. And the cursor (–) is displayed at the left end of the upper section.

3 Cursor movement

This cursor shows the changing position of the character.

When the TITLE EDIT key is pressed again, the cursor is moved from the left to the right. When it is kept pressed, the cursor is moved continuously.

4 Character selection

Select the characters to be used by pressing the DEC and INC keys. Each time the key is pressed, the character is changed continuously.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
R	S	T	U	V	W	X	Y	Z		a	ä	b	c	d	e	f	g
h	i	j	k	l	m	n	o	ö	p	q	r	s	t	u	ü	v	w
x	y	z		[]	<	>	:	•	*	+	-	=	&	/	,	.
'	%	!	?	-	-	#	0	1	2	3	4	5	6	7	8	9	

Repeat the procedures 3 and 4 change the program name.

* When the TITLE EDIT key is pressed other than the USER PROGRAM mode, "USER PRG. ONLY" is displayed on the upper section of the display window to show that the program change is impossible.

Operate as above after selecting the USER PROGRAM mode.

■ BACKUP BATTERY

- The stored user programs are protected by the built-in battery (lithium battery: CR2032). The memory is not canceled even when the power is turned off.
 - The battery life is about 5 years, however, replace it with the new one in good time earlier.
 - When replacing the battery, the stored user program are cleared. Note the program data before replacing, and set the program data again after replacement.
 - When replacing the battery, consult the nearest YAMAHA service station.
- * The factory-preset programs (ACOUSTIC/SURROUND, SOUND EFFECTOR) are not canceled even when the battery is exhausted.

DSP-1

PARAMETERS

The digital signal processor provided with the DSP-1 controls the various parameters (program composition factor). Among them, 1 to 6 parameters can be varied by the user to control the sound field or effect as desired.

Note: Other than the parameters described in this section, all programs have various fixed parameters. Therefore, even when the type or the variable range of the parameter is the same or set at the same level, each factor differs for each program.

■ TYPES OF PRIMARY REFLECTIONS

In the ACOUSTIC/SURROUND mode, for the program that the type of the primary reflection is displayed under the program name, the type (echo time pattern of the primary reflection) can be selected by the INC/DEC keys of the remote control transmitter.

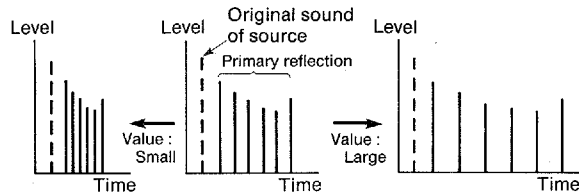
- **TYPE A** (HALL 1, SURROUND 1 programs only)
This is the primary reflection in the concert hall having almost wooden interior with 2,400 seats. Featuring a rich expanse of the sound and fine-textured echo. Listened on the left center seat of the 1st floor.
- **TYPE B** (HALL 1, SURROUND 1 programs only)
This reflection is of a 2,400-seated concert hall having wooden interior. The reflection from the direction of stage is increased emphasizing direct sound, featuring the tight and powerful sound (echo). Listened at the center right seat of the 1st floor.
- **TYPE C** (HALL 2 program only)
An asymmetry-designed concert hall having about 2,000-seats. The reflections from the concert hall are emphasized.
Listened at the center seat of the 1st floor.
- **TYPE D** (HALL 2 program only)
A juke-box type concert hall having 1,300-seats. This is located at the corner of the building, and the marble is used in the interior. The old-fashioned European-type hall in reangular shape. Listened at the front center seat of the 1st floor.
- **LIVE CONCERT** (HALL 3, SURROUND 1 program only)
Round-shaped hall, with rich presence and surround effect with a full echo.
- **ON STAGE** (HALL 3, SURROUND 1 program only)
Sound field on the stage at a live concert. The effect of the delayed sound reflected from the wall at the rear of the audience is obtained.
- **LIVE** (JAZZ CLUB, ROCK CONCERT, DISCO, STADIUM, SURROUND 2 programs)
Sound field featuring the concentrated energy rather than the expanse is obtained.
- **REVERSE** (JAZZ CLUB, ROCK CONCERT, DISCO, STADIUM, SURROUND 2 programs only)
With this effect, the reflection which is usually attenuated with the time elapse is emphasized in reverse. Featuring the mellow sound.
- **SPACIOUS** (JAZZ CLUB, ROCK CONCERT, DISCO, STADIUM, SURROUND 2 programs only)
Spacious sound field with wider expanse is obtained.

■ PARAMETER OF PROGRAM NO. 1 TO NO. 15 IN THE ACOUSTIC/SURROUND MODE

● ROOM SIZE (0.1 — 8.0)

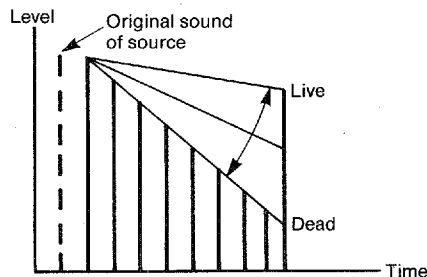
This parameter simulates the extent of the listening room. The time pitch of the primary reflection can be varied.

The more the value is increased, the greater the effect of extent such as in a room with a large extent is obtained.



● LIVENESS (0 — 10)

This parameter determines the attenuation characteristic of the primary reflections. The more the value increased, the more live characteristics one obtained (more reflections), and the more the value is decreased, the more of a dead characteristic is obtained (less reflections).



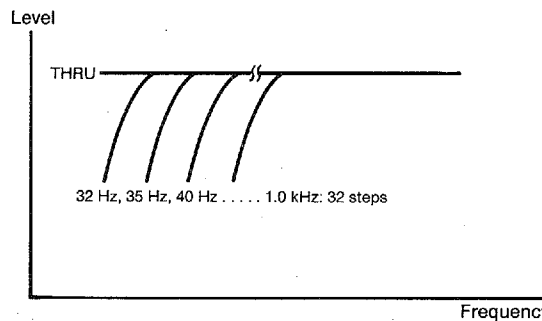
● INIT DLY (Initial Delay: 5 ms — 150 ms)

This determines the time-difference of starting time between original sound and the reflection. It is the important factor to determine the positioning relationship between the original source sound and the sound field.

For example, in the CHURCH program, when the INIT DLY is varied between 5 ms — 150 ms, the source original sound, sense of distance for the surrounding wall and the sense of the extent of the ambience space are changed together. The optimum point differs in the source, however, the sound image on the stage can be controlled by fine adjustment.

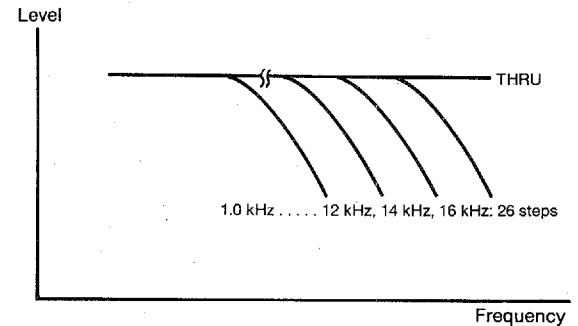
● HPF (High Pass Filter: THRU, 32 Hz — 1.0 kHz)

The lower frequency can be cut by 6 dB/oct with this high pass filter. 32-step frequencies are available from THRU position to 1.0 kHz position. Effective when the low frequency is emphasized and the sound is not clear.



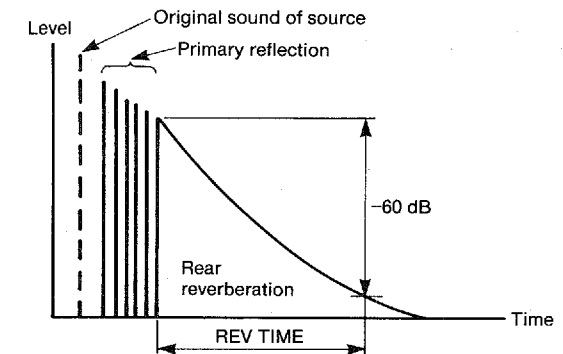
● LPF (Low Pass Filter: 1.0 kHz — 16 kHz, THRU)

The higher frequency can be cut by 6 dB/oct with this low pass filter. 26-step frequency points are available from 1.0 kHz to THRU position.

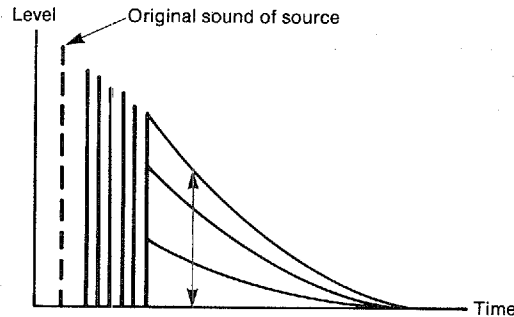


● REV TIME (Reverb Time: 0.3 s — 99.0 s)

This determines the time required for the rear reverberation at the middle frequency range (1 kHz) to be attenuated to the -60 dB (1/1000). It shows the length of the reverberation.



- HIGH** (High frequency Reverb Time Ratio: 0.1 — 1.0)
 This shows the high frequency reverberation time ratio to the REV TIME which is the middle frequency reverberation time. The more the value is decreased, the more the high frequency reverberation time is shortened.
- REV LVL** (Reverb Level: 0 — 100%)
 This shows the level of the rear reverberation is lengthed. The more the value is increased, the greater the reverberation.



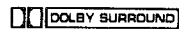
■ DOLBY SURROUND

This program is used to play the video discs, etc. (such as movie program sources) with " DOLBY SURROUND" indication. Input the monaural signal and turn the INPUT BALANCE control on the rear panel of this unit so that the sound heard from the rear sub speakers becomes minimum. Once the adjustment is performed on this Dolby Surround mode, the optimum effect will be obtained in other modes.

1 DELAY (Delay Time: 15.0 ms — 30.0 ms)

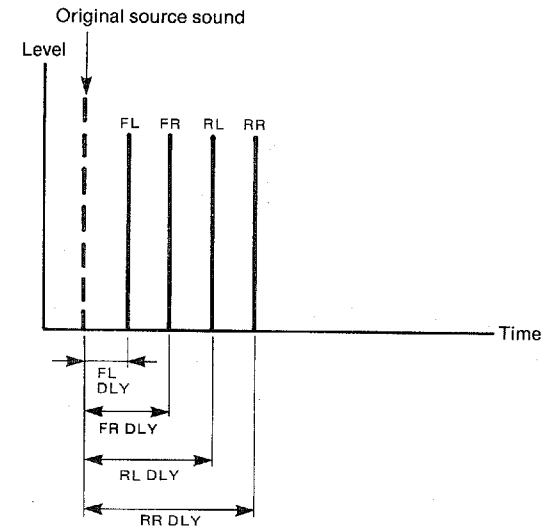
This is the starting time difference between the source sound and the effect sound. Adjust the delay time according to the extent of the listening room or your preference.

* In this mode, the front effect sound is not output.



* Manufactured under license from Dolby Laboratories Licensing Corporation. Additionally license under one or more of the following patents: U.S. numbers 3,632,886, 3,746,792 and 3,959,590; Canadian numbers 1,004,6003 and 1,037,887. "Dolby" and the Double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.

■ PRESENCE, DELAY



1 FL DLY (Front L-ch Delay Time: 0.1 ms — 600.0 ms)

Starting time between the original source sound and the front left-channel effect sound. The more value is increased, the greater the delay of the left channel effect is heard.

2 FR DLY (Front R-ch Delay Time: 0.1 ms — 600.0 ms)

Starting time between the original source sound and the front right-channel effect sound. The more the value is increased, the greater the delay of the right channel effect sound heard.

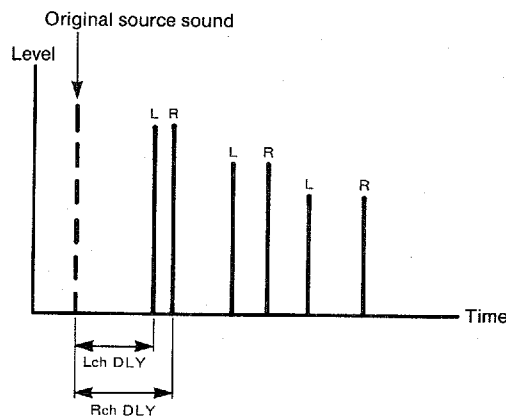
3 RL DLY (Rear L-ch Delay Time: 0.1 ms — 600.0 ms)
Starting time between the original source sound and the front left-channel effect sound. The more the value is increased, the greater the delay of the left channel effect sound is heard.

4 RR DLY (Rear R-ch Delay Time: 0.1 ms — 600.0 ms)
Starting time between the original source sound and the front right-channel effect sound. The more the value is increased, the greater the delay of the right channel effect sound heard.

5 HPF (High Pass Filter: THRU, 32 Hz — 1.0 kHz)

6 LPF (Low Pass Filter: 1.0 kHz — 16 kHz, THRU)

STEREO ECHO



1 Lch DLY (L-ch Delay Time: 0.1 ms — 270 ms)
This is the starting time difference between the original source sound and the first echo sound of the left channel. This time is also used for the echo interval in the left channel.

2 Lch F.B (L-ch Feed Back Gain: -95% — +95%)
This is the feedback rate of the L-ch delay circuit output to the input side. The more the value is increased, the greater the number of echo repetition of the L-ch. When negative value is set, the opposite-phase output is fed back.

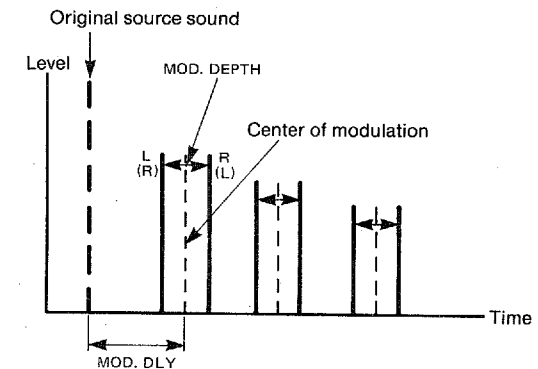
3 Rch DLY (R-ch Delay Time: 0.1 ms — 270 ms)
This is The starting time difference between the original source sound and the first echo sound of the right channel. This time is also used for the echo interval in the right channel.

4 Rch F.B (R-ch Feed Back Gain: -95% — +95%)
The is the feedback rate of the R-ch delay circuit output to the input side. The more the value is increased, the greater the number of echo repetition of R-ch. When negative value is set, the opposite-phase output is fed back.

5 HIGH (High Frequency Reverb Time Ratio: 0.1 — 1.0)
Note: When adjusting, be sure to perform in the order of delay time, feedback ratio. When varying the delay value, noise may occur, and when the FB value is too large, this noise is reverberated. In this case, lower the value of the feedback ratio.

STEREO FLANGE A, B

The delay time of echo sound is modulated by the L-ch/R-ch reverse phase to interfere with each other to produce a tone which is varied and swirled.



1 MOD. FRQ (Modulation Frequency: 0.1 Hz — 20.0 Hz)

This varies the modulating speed of (3) MOD. DLY (Tone change). The more the value (frequency) is set higher, the faster the one change speed becomes.

2 MOD. DEPTH (Modulation Depth: 0% — 100%)

The modulation depth (tone change depth) can be varied with this. No effect on 0% setting, and the more the value is increased, the more the timing modulation between L and R channels is deepened.

3 MOD. DLY (Modulation Delay: 0.1 ms — 100.0 ms)

This is the time from the original source sound to the used as sound (center of modulation). This time is also used as the interval of the effect sound, and swirling sound is generated by interfering the effect sounds each other in relation to (2) MOD. DEPTH. When the value is set lower than 1 ms, the interference at high frequency range is obtained, and the value is set between 1 and 3 ms, the interference between the middle and low frequency ranges is obtained.

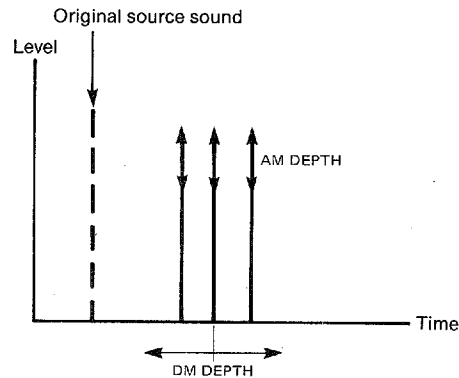
4 F. B. GAIN (Feed Back Gain): 0% — 95%

This is the feedback rate of the delay circuit output to the input side.

The more the value is increased, the deeper the effect of this program becomes.

■ CHORUS A, B

Floating or swaying tone effect is obtained by modulating the delay time and amplitude of more than two tones in which the delay time is slightly different.



1 MOD. FRQ (Modulation Frequency: 0.1 Hz — 20.0 Hz)

This changes the delay time modulation speed (tone swaying speed). The more the value (Frequency) is set higher, the faster the swaying speed becomes.

2 DM DEPTH (Delay Time Modulation Depth: 0% — 100%)

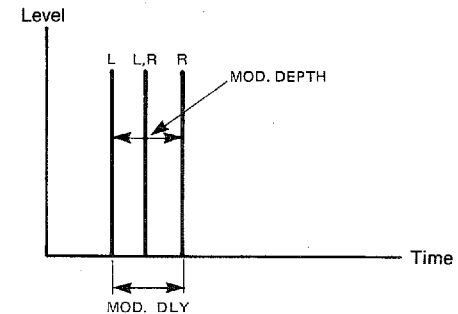
This varies the depth of the delay time modulation (swaying between left and right). The more the value is increased, the wider the swaying width becomes.

3 AM DEPTH (Amplitude Modulation Depth: 0% — 100%)

This varies the depth of the amplitude modulation (magnitude of volume change). The more the value is increased, the larger the volume change becomes.

■ STEREO PHASING

The original source sound is produced from the left channel and the modulation-delayed sound is produced from the right channel, and the sound MOD. DLY modulated is produced from the center. Tone is varied and the sound moves between right and left.



1 MOD. FRQ (Modulation Frequency: 0.1 Hz — 20.0 Hz)

2 MOD. DEPTH (Modulation Depth: 0% — 100%)

3 MOD. DLY (Modulation Delay Time: 0.1 ms — 5.0 ms)

* For parameter description, refer to the Stereo Flange A.B section.

■ TREMOLO

Chorus effect is further multiplied and the volume change is emphasized.

- 1 **MOD. FRQ** (Modulation Frequency: 0.1 Hz — 20.0 Hz)
- 2 **MOD. DEPTH** (Modulation Depth: 0% — 100%)

* For parameter description, refer to the Stereo Flange A.B section.

■ SYMPHONIC

Chorus effect is further multiplied and the timing change is emphasized.

- 1 **MOD. FRQ** (Modulation Frequency: 0.1 Hz — 20.0 Hz)
- 2 **MOD. DEPTH** (Modulation Depth: 0% — 100%)

* For parameter description, refer to the Stereo Flange A.B section.

■ ECHO ROOM

This simulates the echo room characteristic of the recording studio.

- 1 **REV TIME** (Reverb Time: 0.3 s — 99.0 s)
- 2 **DELAY** (Delay Time: 40 ms — 270 ms)
- 3 **HIGH** (High Frequency Reverb Ratio: 0.1 — 1.0)

* For details of each parameter, refer to pages 24 and 25.

Note: When adjusting, be sure to perform in order of Delay, and then Reverb Time. Changing the delay value may generate noise, and when the reverb time is set longer, this noise is reverberated. In this case, lower the reverb time value by one unit.

■ PITCH CHANGE A

This changes the pitch of the input signal. The pitch can be varied between a range of ± 1 octave by a half-tone. And furthermore, it is possible to change the pitch by 1/100 of half-tone (1 cent). By setting the delay time and the feedback gain, the echo effect accompanied with the pitch change can be obtained.

- 1 **PITCH** (-12 — +12, 1-degree 1-step in chromatic scale)

This is the magnitude of the pitch change. Pitch change can be set by a half-tone.

Setting to “-12” makes the tone one-octave lower and setting to “+12” makes the tone one-octave higher.

When the feedback gain value is large or when the pitch is changed between +1 and 0 and -1, a click noise occurs at the same time the data is switched.

- 2 **FINE** (-100 — +100 cent)

This is the magnitude of the pitch change.

Between the half-tone up and half-tone down pits, the pitch can be set by one cent (1/100 of half-tone).

- 3 **DELAY** (Delay Time: 0.1 ms — 300.0 ms)

This is the time from the original source sound to the first tone whose pitch is changed. This time is also used as the tone interval between pitch-changed tones.

- 4 **F.B. GAIN** (Feed Back Gain: 0% — 60%)

This is the feedback output rate of the delay circuit to the input side.

The more the value is increased, the greater the repetition.

■ PITCH CHANGE B

Changes the pitch of the input signal.

The magnitude of pitch change is the same as the Pitch Change A, however, the L-channel and R-channel can be set independently.

1 L PITCH (-12 — +12, 1-degree 1-step, chromatic scale)

2 L FINE (-100 — +100 cent)

These are used to set the amount of pitch change for L-channel.

3 L DLY (L-ch Delay Time: 0.1 ms — 120.0 ms)

Time from the original source sound to the effect sound of L-channel.

4 R PITCH (-12 — +12, 1-degree 1-step, chromatic scale)

5 R FINE (-100 — +100 cent)

These are used to set the amount of pitch change for R-channel.

6 R DLY (R-ch Delay Time: 0.1 ms — 120.0 ms)

Time from the original source sound to the effect sound of R-channel.

■ PAN L-TURN, R-TURN

1 PAN SPEED (0.1 Hz — 20.0 Hz)

Changes the speed when the sound image moves.

The more the value is increased, the higher the speed becomes.

2 DEPTH (0% — 100%)

The volume level is changed when the sound image is moved.

The more the value is increased, the greater the sound image effect becomes.

■ PAN F-R, L-R

1 PAN SPEED (0.1 Hz — 20.0 Hz)

Changes the speed when the sound image moves.

The more the value is increased, the higher the speed becomes.

2 DIRECTION (F → R, F ← R, F ↔ R) (L → R, L ← R, L ↔ R)

The direction when moving the sound image can be changed.

F → R: Sound image moves from the front to the rear continuously.

F ← R: Sound image moves from the rear to the front continuously.

F ↔ R: Sound image moves between the rear and the front continuously.

L → R: Sound image moves from the left to the right continuously.

L ← R: Sound image moves from the right to the left continuously.

L ↔ R: Sound image moves between the right and the left continuously.

3 DEPTH (0% — 100%)

The volume level is changed when the sound image is moved.

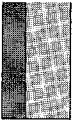
The more the value is increased, the greater the sound image effect becomes.

PARAMETER LIST

■ ACOUSTIC/SURROUND mode

No.	Program Name	Parameter Name	Dec	Preset Value	Inc	Control Contents
1	HALL 1	TYPE A	TYPE A/TYPE B			See page 23.
		ROOM SIZE	0.1	1.0	8.0	Simulates the room size. Larger value for larger space.
		LIVENESS	0	5	10	Attenuation characteristic of the early reflection. Larger value for more live.
		INIT DLY	5ms	30ms	150ms	Time until the delay sound production.
		HPF	—	THRU	32Hz~1.0kHz	Low range cut-off frequency. -6 dB/oct
		LPF	1.0kHz~	7.0kHz	~16kHz, THRU	High range cut-off frequency. -6 dB/oct
2	HALL 2	TYPE C	TYPE C/TYPE D			See page 23.
		ROOM SIZE	0.1	1.0	8.0	Simulates the room size. Larger value for larger space.
		LIVENESS	0	5	10	Attenuation characteristic of the early reflection. Larger value for more live.
		INIT DLY	5ms	30ms	150ms	Time until the delay sound production.
		HPF	—	THRU	32Hz~1.0kHz	Low range cut-off frequency. -6 dB/oct
		LPF	1.0kHz~	7.0kHz	~16kHz, THRU	High range cut-off frequency. -6 dB/oct
3	HALL 3	LIVE CONCERT	LIVE CONCERT/ON STAGE			See page 23.
		ROOM SIZE	0.1	2.0	8.0	Simulates the room size. Larger value for larger space.
		LIVENESS	0	5	10	Attenuation characteristic of the early reflection. Large value for more live.
		INIT DLY	5ms	45ms	150ms	Time until the delay sound production.
		HPF	—	THRU	32Hz~1.0kHz	Low range cut-off frequency. -6 dB/oct
		LPF	1.0kHz~	4.0kHz	~16kHz, THRU	High range cut-off frequency. -6 dB/oct
4	CHAMBER	REV TIME	0.3s	1.1s	99.0s	Length of reverberation time.
		HIGH	0.1	0.7	1.0	High frequency attenuation time ratio. Smaller value for shorter time.
		INIT DLY	5ms	15ms	150ms	Time until the delay sound production.
		HPF	—	THRU	32Hz~1.0kHz	Low range cut-off frequency. -6 dB/oct
		LPF	1.0kHz~	10kHz	~16kHz, THRU	High range cut-off frequency. -6 dB/oct
		REV LVL	0%	50%	100%	Level of the reverberation signal.

No.	Program Name	Parameter Name	Dec - Preset Value - Inc			Control Contents
5	Münster	REV TIME	0.3s	4.0s	99.0s	Length of reverberation time.
		HIGH	0.1	0.8	1.0	High frequency attenuation time ratio. Smaller value for shorter time.
		INIT DLY	5ms	95ms	150ms	Time until the delay sound production.
		HPF	—	THRU	32Hz~1.0kHz	Low range cut-off frequency. -6 dB/oct
		LPF	1.0kHz~	7.0kHz	~16kHz, THRU	High range cut-off frequency. -6 dB/oct
		REV LVL	0%~95%	100%	—	Level of the reverberation signal.
6	CHURCH	REV TIME	0.3s	2.5s	99.0s	Length of reverberation time.
		HIGH	0.1	0.9	1.0	High frequency attenuation time ratio. Smaller value for shorter time.
		INIT DLY	5ms	40ms	150ms	Time until the delay sound production.
		HPF	—	THRU	32Hz~1.0kHz	Low range cut-off frequency. -6 dB/oct
		LPF	1.0kHz~	8.0kHz	~16kHz, THRU	High range cut-off frequency. -6 dB/oct
		REV LVL	0%~95%	100%	—	Level of the reverberation signal.
7	JAZZ CLUB	LIVE	LIVE/DYNAMITEI/REVERSE/SPACIOUS			See page 23.
		ROOM SIZE	0.1	1.0	8.0	Simulates the room size. Larger value for larger space.
		LIVENESS	0	5	10	Attenuation characteristic of the early reflection.
		INIT DLY	5ms	20ms	150ms	Time until the delay sound production.
		HPF	—	THRU	32Hz~1.0kHz	Low range cut-off frequency. -6 dB/oct
		LPF	1.0~16kHz	THRU	—	High range cut-off frequency. -6 dB/oct
8	ROCK CONCERT	DYNAMITEI	LIVE/DYNAMITEI/REVERSE/SPACIOUS			See page 23.
		ROOM SIZE	0.1	4.0	8.0	Simulates the room size. Larger value for larger space.
		LIVENESS	0	9	10	Attenuation characteristic of the early reflection. Larger value for more live.
		INIT DLY	5ms	15ms	150ms	Time until the delay sound production.
		HPF	—	THRU	32Hz~1.0kHz	Low range cut-off frequency. -6 dB/oct
		LPF	1.0~16kHz	THRU	—	High range cut-off frequency. -6 dB/oct



No.	Program Name	Parameter Name	Dec -- Preset Value -- Inc			Control Contents
9	DISCO	DYNAMITE!	LIVE/DYNAMITE!/REVERSE/SPACIOUS			See page 23.
		ROOM SIZE	0.1	1.0	8.0	Simulates the room size. Larger value for larger space.
		LIVENESS	0	6	10	Attenuation characteristic of the early reflection. Larger value for more live.
		INIT DLY	5ms	10ms	150ms	Time until the delay sound production.
		HPF	—	THRU	32Hz~1.0kHz	Low range cut-off frequency. -6 dB/oct.
		LPF	1.0~16kHz	THRU	—	High range cut-off frequency. -6 dB/oct
10	PAVILION	REV TIME	0.3s	1.9s	99.0s	Length of reverberation time.
		HIGH	0.1	0.9	1.0	High frequency attenuation time ratio. Smaller value for shorter time.
		INIT DLY	—	5ms	10ms~150ms	Time until the delay sound production.
		HPF	THRU, 32Hz~	56Hz	~1.0kHz	Low range cut-off frequency. -6 dB/oct
		LPF	1.0kHz~	2.5kHz	~16kHz, THRU	High range cut-off frequency. -6 dB/oct
		REV LVL	0%~95%	100%	—	Level of the reverberation signal.
11	WAREHOUSE LOFT	REV TIME	0.3s	1.0s	99.0s	Length of reverberation time.
		HIGH	0.1	0.7	1.0	High frequency attenuation time ratio. Smaller value for shorter time.
		INT DLY	5ms	20ms	150ms	Time until the delay sound production.
		HPF	—	THRU	32Hz~1.0kHz	Low range cut-off frequency. -6 dB/oct
		LPF	1.0kHz~	9.0kHz	~16kHz, THRU	High range cut-off frequency. -6 dB/oct
		REV LVL	0%~95%	100%	—	Level of the reverberation signal.
12	STADIUM	SPACIOUS	LIVE/DYNAMITE!/REVERSE/SPACIOUS			See page 23.
		ROOM SIZE	0.1	4.0	8.0	Simulates the room size. Larger value for larger space.
		LIVENESS	0	5	10	Attenuation characteristic of the early reflection. Larger value for more live.
		INIT DLY	5ms	85ms	150ms	Time until the delay sound production.
		HPF	—	THRU	32Hz~1.0kHz	Low range cut-off frequency. -6 dB/oct
		LPF	1.0kHz~	3.6kHz	~16kHz, THRU	High range cut-off frequency. -6 dB/oct

No.	Program Name	Parameter Name	Dec - Preset Value - Inc			Control Contents
13	PRESENCE	FL DLY	0.1ms	20.0ms	600.0ms	Time until the front L-channel delay sound production.
		FR DLY	0.1ms	28.0ms	600.0ms	Time until the front R-channel delay sound production.
		RL DLY	0.1ms	24.0ms	600.0ms	Time until the rear L-channel delay sound production.
		RR DLY	0.1ms	36.0ms	600.0ms	Time until the rear R-channel delay sound production.
		HPF	—	THRU	32Hz~1.0kHz	Low range cut-off frequency. -6 dB/oct
		LPF	1.0kHz~	8.0kHz	~16kHz, THRU	High range cut-off frequency. -6 dB/oct
14	SURROUND 1	LIVE CONCERT	HALL TYPE A/HALL TYPE B/LIVE CONCERT/ON STAGE			See page 23.
		ROOM SIZE	0.1	1.0	8.0	Simulates the room size. Larger value for larger space.
		LIVENESS	0	5	10	Attenuation characteristic of the early reflection. Larger value for more live.
		INIT DLY	5ms	30ms	150ms	Time until the delay sound production.
		HPF	—	THRU	32Hz~1.0kHz	Low range cut-off frequency. -6 dB/oct
		LPF	1.0kHz~	5.0kHz	~16kHz, THRU	High range cut-off frequency. -6 dB/oct
15	SURROUND 2	LIVE	LIVE/DYNAMITE!/REVERSE/SPACIOUS			See page 23.
		ROOM SIZE	0.1	1.0	8.0	Simulates the room size. Larger value for larger space.
		LIVENESS	0	5	10	Attenuation characteristic of the early reflection. Larger value for more live.
		INIT DLY	5ms	20ms	150ms	Time until the delay sound production.
		HPF	—	THRU	32Hz~1.0kHz	Low range cut-off frequency. -6 dB/oct
		LPF	1.0kHz~	7.0kHz~	~16kHz, THRU	High range cut-off frequency. -6 dB/oct
16	DOLBY SURROUND	DELAY	15.0ms	20.0ms	30.0ms	Time until the rear delay sound is produced.

- Parameter values from the left to the right in the above list show the lower limit value, preset value and the upper limit value respectively.
- Other than listed above, all programs have the different fixed parameters. Therefore, even when the parameter type and the variable range are the same, or even when the same values are set, the feeling of the produced sound differs for each program.
- Improvements may result in parameter value change without notice.

■ SOUND EFFECTOR mode

No.	Program Name	Parameter Name	Dec -- Preset Value -- Inc			Control Contents
1	DELAY	FL DLY	0.1ms	100.0ms	600.0ms	Time until the front L-channel delay sound production.
		FR DLY	0.1ms	200.0ms	600.0ms	Time until the front R-channel delay sound production.
		RL DLY	0.1ms	300.0ms	600.0ms	Time until the rear L-channel delay sound production.
		RR DLY	0.1ms	400.0ms	600.0ms	Time until the rear R-channel delay sound production.
		HPF	—	THRU	32Hz~1.0kHz	Low range cut-off frequency. -6 dB/oct
		LPF	1.0kHz~16kHz	THRU	—	High range cut-off frequency. -6 dB/oct
2	STEREO ECHO	Lch DLY	0.1ms	170.0ms	270.0ms	Time until L-ch delay sound is produced.
		Lch F.B.	-95%	+60%	+95%	Amount of L-ch feedback input. Negative value for reversed phase.
		Rch DLY	0.1ms	178.0ms	270.0ms	Time until R-ch delay sound is produced.
		Rch F.B.	-95%	+58%	+95%	Amount of R-ch feedback input. Negative value for reversed phase.
		HIGH	0.1	0.9	1.0	Amount of high frequency feedback. Larger value for emphasizing the echo.
3	STEREO FLANGE A	MOD. FRQ	0.1Hz	2.5Hz	20.0Hz	Modulation frequency. Larger value for faster rate.
		MOD. DEPTH	0%	50%	100%	Timing modulation depth between L and R.
		MOD. DLY	0.1ms	1.2ms	100.0ms	Time until the modulation center where the delay sound is produced.
		F.B. GAIN	0%	35%	95%	Amount of delay output feedback.
4	STEREO FLANGE B	MOD. FRQ	0.1Hz	0.5Hz	20.0Hz	Modulation frequency. Larger value for faster rate.
		MOD. DEPTH	0%	90%	100%	Timing modulation depth between L and R.
		MOD. DLY	0.1ms	1.0ms	100.0ms	Time until the modulation center where the delay sound is produced.
		F.B. GAIN	0%	40%	95%	Amount of delay output feedback.



DSP-1

No.	Program Name	Parameter Name	Dec – Preset Value – Inc			Control Contents
5	CHORUS A	MOD. FRQ	0.1Hz	0.2Hz	20.0Hz	Modulation frequency. Larger value for faster rate.
		DM DEPTH	0%	72%	100%	Depth of timing modulation between delay sound.
		AM DEPTH	0%	40%	100%	Depth of the amplitude modulation of delay sound.
6	CHORUS B	MOD. FRQ	0.1Hz	0.6Hz	20.0Hz	Modulation frequency. Larger value for faster rate.
		DM DEPTH	0%	50%	100%	Depth of timing modulation between delay sound.
		AM DEPTH	0%	10%	100%	Depth of the amplitude modulation of delay sound.
7	STEREO PHASING	MOD. FRQ	0.1Hz	1.1Hz	20.0Hz	Modulation frequency. Larger value for faster rate.
		MOD. DEPTH	0%	100%	—	Depth of timing modulation between L and R.
		MOD. DLY	0.1ms	3.0ms	5.0ms	Moving time between L and R.
8	TREMOLO	MOD. FRQ	0.1Hz	6.0Hz	20.0Hz	Modulation frequency. Larger value for faster rate.
		MOD. DEPTH	0%	70%	100%	Depth of timing modulation between L and R.
9	SYMPHONIC	MOD. FRQ	0.1Hz	0.7Hz	20.0Hz	Modulation frequency. Larger value for faster rate.
		MOD. DEPTH	0%	70%	100%	Depth of timing modulation between L and R.
10	ECHO ROOM	REV TIME	0.3s	2.6s	99.0s	Length of reverberation time.
		DELAY	40ms	180ms	270ms	Time until the delay sound is produced.
		HIGH	0.1	0.9	1.0	High frequency attenuation time ratio. Smaller value for shorter time.
11	PITCH CHANGE A	PITCH	-12	+0	+12	Magnitude of pitch change. ± 12 for ± 1 octave up/down.
		FINE	-100	+0	+100	Fine pitch adjust by 1 cent (1/100 pitch).
		DELAY	—	0.1ms	300.0ms	Time until the delay sound is produced.
		F.B. GAIN	—	0%	60%	Amount of delay output feedback.

No.	Program Name	Parameter Name	Dec — Preset Value — Inc			Control Contents
12	PITCH CHANGE B	L PITCH	-12	+0	+12	Magnitude of L-ch pitch change. ± 12 for ± 1 octave up/down.
		L FINE	-100	+8	+100	Fine pitch adjust by 1 cent (1/100 pitch).
		L DLY	—	0.1ms	120.0ms	Time until the L-ch delay sound is produced.
		R PITCH	-12	+0	+12	Magnitude of R-ch pitch change. ± 12 for ± 1 octave up/down.
		R FINE	-100	-8	+100	Fine pitch adjust by 1 cent (1/100 pitch).
		R DLY	—	0.1ms	120.0ms	Time until the R-ch delay sound is produced.
13	PAN L TURN	PAN SPEED	0.1Hz	0.7Hz	20.0Hz	Localization moving frequency. Larger value for faster speed.
		DEPTH	0%	75%	100%	Volume change. Larger value for moving effect is emphasized.
14	PAN R TURN	PAN SPEED	0.1Hz	0.7Hz	20.0Hz	Localization moving frequency. Larger value for faster speed.
		DEPTH	0%	75%	100%	Volume change. Larger value for moving effect is emphasized.
15	PAN F-R	PAN SPEED	0.1Hz	0.7Hz	20.0Hz	Localization moving frequency. Larger value for faster speed.
		DIRECTION	F→R	F←R	F↔R	Localization moving direction between front and rear.
		DEPTH	0%	75%	100%	Volume change. Larger value for moving effect is emphasized.
16	PAN L-R	PAN SPEED	0.1Hz	0.7Hz	20.0Hz	Localization moving frequency. Larger value for faster speed.
		DIRECTION	L→R	L←R	L↔R	Localization moving direction between right and left.
		DEPTH	0%	75%	100%	Volume change. Larger value for moving effect is emphasized.

- The parameter values in the list above are the lower limit, preset and upper limit values in the order from the left to the right among the variable parameters.
- Other than listed above, each program has its own fixed parameters. Therefore, the feeling of the reproduced sound differs in each program even when the parameters are the same or their values are set at the same level.
- Improvement may result in parameter value change without notice.

■ HPF, LPF CUT-OFF FREQUENCY LIST

HPF (High Pass Filter)	
THRU	355Hz
32Hz	400Hz
35Hz	450Hz
40Hz	500Hz
45Hz	560Hz
50Hz	630Hz
56Hz	700Hz
63Hz	800Hz
70Hz	900Hz
80Hz	1.0kHz
90Hz	32 steps as above
100Hz	
110Hz	
125Hz	
140Hz	
160Hz	
180Hz	
200Hz	
220Hz	
250Hz	
280Hz	
315Hz	

LPF (Low Pass Filter)	
1.0kHz	12kHz
1.1kHz	14kHz
1.2kHz	16kHz
1.4kHz	THRU
1.6kHz	26 steps as above
1.8kHz	
2.0kHz	
2.2kHz	
2.5kHz	
2.8kHz	
3.2kHz	
3.6kHz	
4.0kHz	
4.5kHz	
5.0kHz	
5.6kHz	
6.3kHz	
7.0kHz	
8.0kHz	
9.0kHz	
10kHz	
11kHz	

- The HPF/LPF frequency list above is common to the ACOUSTIC/SURROUND and SOUND EFFECT modes.

SPECIFICATIONS

Input/Output Jacks

Inputs	INPUT L, R TAPE PB L, R MIXING INPUT L, R/MONO
Outputs	MAIN OUT L, R PROCESSING FRONT OUT L, R PROCESSING REAR OUT L, R REC OUT L, R MONO OUT (FULL BAND) MONO OUT (L.P.F)

Tape 3 modes (NORMAL, MONITOR, EFFECT REC)

A/D, D/A Conversion

Number of Bits on Quantization 16-bit linear

Sampling Rate 44.1 kHz

Program

Acoustic/Surround 16 programs

Sound Effector 16 programs

User Program 16 programs

Maximum Allowable Input 3V, 1 kHz

Maximum Output Level 3V, 1 kHz

Dynamic Range (IHF-A) 110 dB (MAIN)

94 dB (PROCESSING)

Total Harmonic Distortion 0.002% (MAIN), 1 kHz, 3V

0.006% (PROCESSING), 1 kHz, 3V

Frequency Response 10 Hz ~ 100 kHz (MAIN), +0, -3 dB

20 Hz ~ 20 kHz (PROCESSING), +0, -3 dB

Gain 0 ± 0.5 dB (MAIN)

0 ± 0.5 dB (PROCESSING)

Power Requirements AC 120V, 60 Hz

Power Consumption 30 watts

AC Outlet (Unswitched) 200W max.

Dimensions (W x H x D) 435 x 72 x 312 mm

(17-1/8 x 2-13/16 x 12-5/16 inch)

Weight 4.5 kg (9 lb 15 oz)

* Specifications and design subject to change without notice.

USER PROGRAM TABLE

Use this table when making the user-taste program as desired.

Program No.	Program Title	Parameter					
		1	2	3	4	5	6
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							

TROUBLESHOOTING

When this unit does not function correctly, check the following items. If the further trouble occurs, turn the power switch off, unplug the power cord, and consult your dealer or nearest YAMAHA service station.

Symptom	Check Points	Remedy
Power is not turned on even when the POWER switch is pressed.	<ul style="list-style-type: none"> ● Power plug of the AC cord is not inserted firmly. 	<ul style="list-style-type: none"> ● Re-connect the power plug firmly to the AC outlet.
No sound at all.	<ul style="list-style-type: none"> ● Audio cords are not connected firmly. 	<ul style="list-style-type: none"> ● Re-connect the connection cord firmly.
	<ul style="list-style-type: none"> ● Input source is mistakenly selected on the amplifier. 	<ul style="list-style-type: none"> ● Select the desired input source in the correct way depending on the amplifier used. (See page 19.)
	<ul style="list-style-type: none"> ● TAPE selector is set to the EFFECT REC position. 	<ul style="list-style-type: none"> ● Set the TAPE selector correctly according to the source. (Refer to page 19.)
	<ul style="list-style-type: none"> ● Both MAIN and EFFECT MUTE indicators are lit. 	<ul style="list-style-type: none"> ● Press the MAIN and EFFECT MUTE keys of the remote control transmitter so that they go off.
	<ul style="list-style-type: none"> ● The input source is connected to the MIX INPUT jacks and the MIX INPUT LEVEL knob is set to its "0" position. 	<ul style="list-style-type: none"> ● Turn the MIX INPUT LEVEL control clockwise to adjust the volume to the appropriate level.
Sound is not heard from the main speakers.	<ul style="list-style-type: none"> ● MAIN MUTE indicator is lit. 	<ul style="list-style-type: none"> ● Press the MAIN MUTE key of the remote control transmitter so that the MUTE indicator goes off.
No effect sound.	<ul style="list-style-type: none"> ● Volume of the effect sound is fully lowered. 	<ul style="list-style-type: none"> ● Adjust the volume level with LEVEL keys of the remote control transmitter.
	<ul style="list-style-type: none"> ● EFFECT MUTE indicator is lit. 	<ul style="list-style-type: none"> ● Press the EFFECT MUTE key of the remote control transmitter so that the MUTE indicator goes off.
Front or rear effect sound is not produced.	<ul style="list-style-type: none"> ● Front/rear balance of the effect sound is incorrectly. (Front or rear volume level is too high.) 	<ul style="list-style-type: none"> ● Adjust the balance between front and rear correctly with the BALANCE keys of the remote control transmitter.
Effected sound cannot be recorded on the tape deck connected to this unit.	<ul style="list-style-type: none"> ● TAPE selector is set to NORM or MONITOR position. 	<ul style="list-style-type: none"> ● Set the TAPE selector to the EFFECT REC position.
The sound from the center speaker is unnatural with little hight.	<ul style="list-style-type: none"> ● The center speaker is connected to the MONO OUT LOW PASS terminals. 	<ul style="list-style-type: none"> ● Connect it to the FULL BAND terminals.
Remote control transmitter does not function.	<ul style="list-style-type: none"> ● The batteries in the remote control transmitter are exhausted. 	<ul style="list-style-type: none"> ● Replace them with new ones.
	<ul style="list-style-type: none"> ● Remote control transmitter is used in the incorrect position (incorrect distance or angle). 	<ul style="list-style-type: none"> ● Operate it within 7 meters from the unit and 30 degrees to the remote sensor.
When the remote control transmitter is used, TV set functions incorrectly.	<ul style="list-style-type: none"> ● The remote controllable TV set is installed nearby this unit. 	<ul style="list-style-type: none"> ● Install the TV set away from this unit, or cover the remote control sensor window of the TV set.