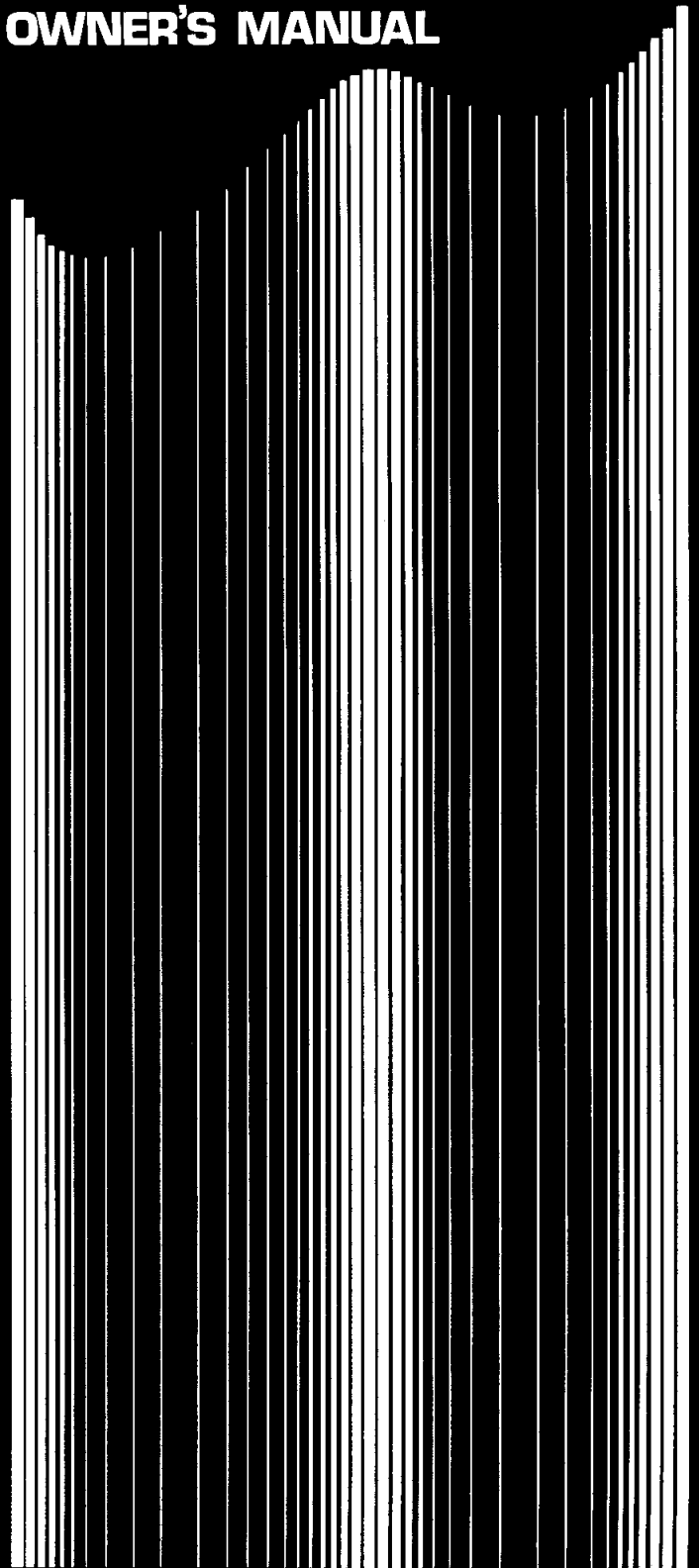


YAMAHA
CS15D
DUAL CHANNEL SYNTHESIZER
OWNER'S MANUAL



SYNTHESIZER CS15D

Thank you for your purchase of the YAMAHA SYNTHESIZER CS15D.

Provided with a total of 29 preset tones divided into two channels, plus one manual-control channel, the CS15D is particularly designed to provide improved real-time performing properties while retaining its originality as a synthesizer.

Please read this Owner's Manual carefully to bring out the full potential of the CS15D, making use of its many features.

■ Points of attention

● Installation

Avoid places subjected to direct sunlight, high humidity, or dust. Never use the synthesizer near fire or heat-producing objects, (such as on the top of a power amplifier), as it will cause cabinet deformation.

● Cleaning

When cleaning the set, do not wipe the panel or keyboard with thinner or other cleaning liquids, as this may cause stains and discoloration. Use always a soft and dry piece of cloth.

● Connections

Connections to an amplifier or other equipment must be made correctly and with due care, as wrong connections may lead to damaging the synthesizer or amplifier.

● Volume

The volume level should be set with care. Applications of excessive input may cause damage to the amplifier or speakers.

Page

5

OUTPUT/PITCH/MODULATION

This block accommodates controls with functions able to determine all basic functions of the CS15D.

This block is used, for example to set the basic pitch and to determine the volume. It must be set prior to performing control operations and checks.

Pages

6, 7

PITCH/MODULATION/SUSTAIN PORTAMENTO/BRILLIANCE

This block is used during performances to effect fine control of sounds to give various nuances to them. The controls are operated by the left hand.

The block is effective both for the voices created by the MANUAL block and for all preset voices. As it serves to add final nuances to those voices selected by the VOICE SELECTOR so as to meet your taste, it may be likened to spices used in cooking.

CONTENTS	Page
CONNECTIONS	4
OPERATIONS	5
CREATING SOUNDS	10
FOR FULL UTILIZATION	14
SOUND MEMO	16
BLOCK DIAGRAM	17
SPECIFICATIONS	17
TROUBLESHOOTING	18

Pages **4**, **15**

INPUT / OUTPUT Terminals (Rear Panel)

LINE OUT

The synthesizer does not incorporate a power amplifier. Therefore, when playing the synthesizer using speakers, the output of the synthesizer must be connected to a power amplifier such as a keyboard amplifier.

CONTROL VOLT/TRIGGER

These are input/output terminals used for exchanging voltage data with another synthesizer to determine the sounds of the synthesizer.

When only one synthesizer unit is to be used, there is no need to use these terminals.

Page **9**

VOICE SELECTOR

This block is used for selecting the sounds to be played by the CS15D. Of the 29 preset voices, plus those created by manual operation, desired voices are selected by the push buttons. Volume balancing between Ch-1 and Ch-2 is also performed at this block.



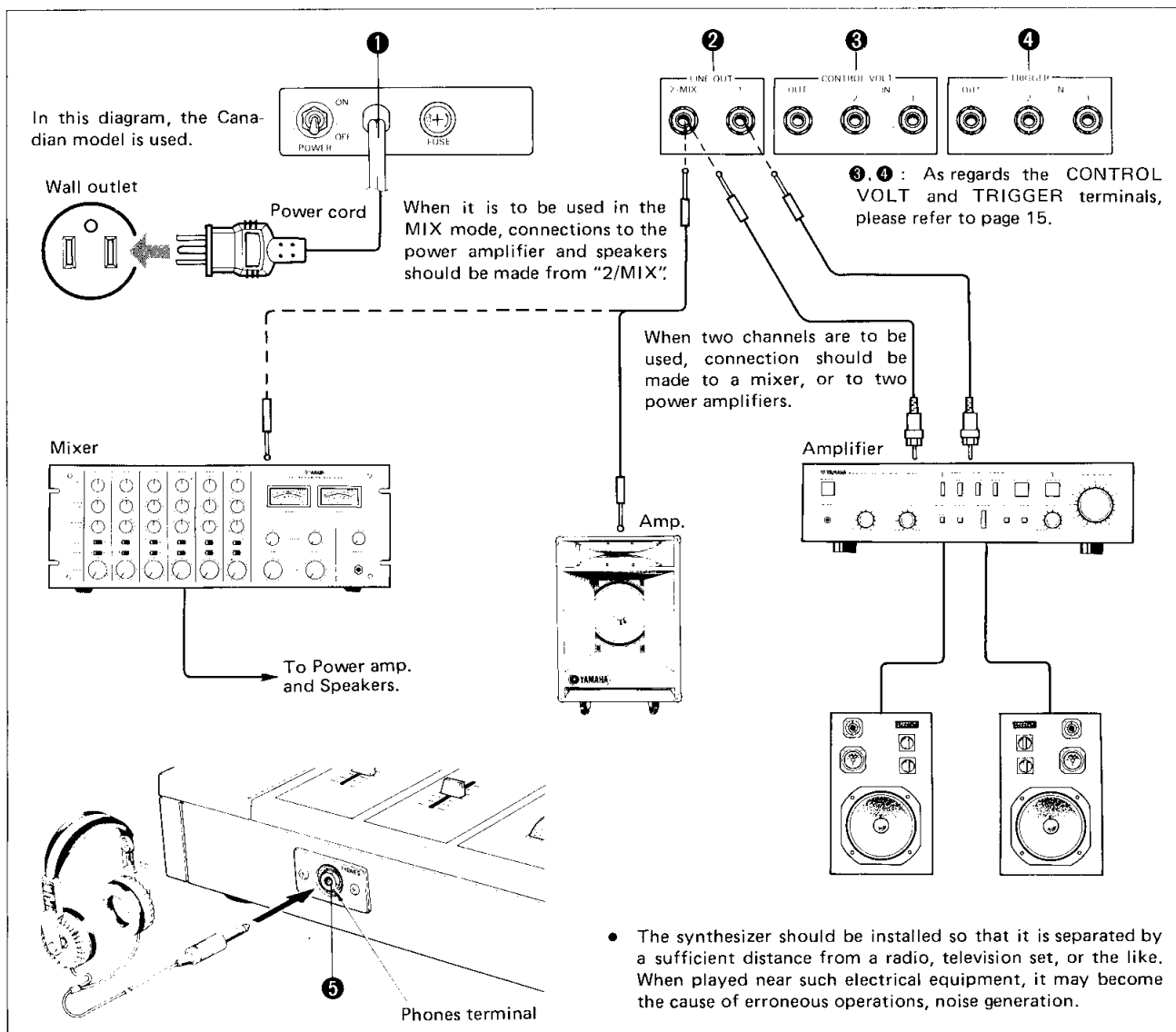
Page **9**

MANUAL

This block is used for creating original synthesizer voices. It consists of three blocks: the VCO block, or 'Voltage Controlled Oscillator' which produces signals that serve as sound sources; the VCF block, or 'Voltage Controlled Filter' which creates different timbre of sounds; the VCA block, or 'Voltage Controlled Amplifier' which determines volume variations from the point the voice starts up to the point at which it fades away.

This block becomes operable only when "MANUAL" of Ch-2 is selected by the VOICE SELECTOR.

CONNECTIONS



1 POWER CORD

Insert the plug into an AC outlet. Power consumption of the CS15D is 25W.

2 LINE OUT 1, 2/MIX

These are output terminals used for connecting the synthesizer to the amplifier, or other equipment. "1" feeds out the sounds of Ch-1, "2/MIX" feeds out sounds produced from the mixing of Ch-1 and 2 when no jack is inserted into "1"; it also feeds out those sounds of Ch-2 alone when a jack is inserted into "1".

- When making connection to an amplifier, take special protective measures with regard to the speakers, such as, switching off the amplifier's power switch, or by turning down its volume.

3 CONTROL VOLTAGE/4 TRIGGER

These terminals are used for feeding in to, or out from, another synthesizer such data as: (1) the voltage indicating the pitch of the keys that are being played (CONTROL VOLTAGE); and, (2) voltage data indicating the timing for playing and releasing the key (TRIGGER).

By connecting them to another synthesizer, control of multiplex systems can be effected from a single keyboard. For further details, please refer to Page 15.

- Connections should be made most carefully, as it may lead to such serious troubles as damaging the power amplifier, or speakers, when the connector cord for connection to the amplifier is connected to these terminals by mistake.

5 PHONES

Phones jack is used for connecting the headphones. Mixed sounds of Ch-1 and Ch-2 will be fed out.

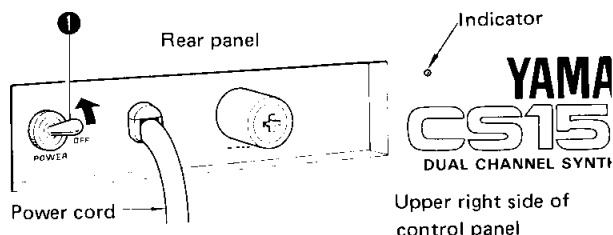
OPERATIONS/To Produce Sounds

On completion of connections, check them to confirm that no mistake has been made. Now, as we shall describe the functions of the control for each block, operate them yourself while listening to the sounds to confirm the functions.

Turn on the POWER switch.

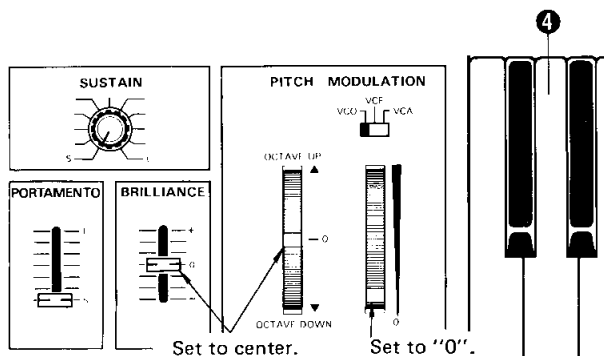
① POWER (Power switch)

The power switch is located at the back next to the power cord. Flip this switch up. This will cause power to turn on and the indicator on the upper right side of the control panel to light up.

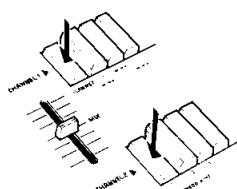


Preliminary Operations

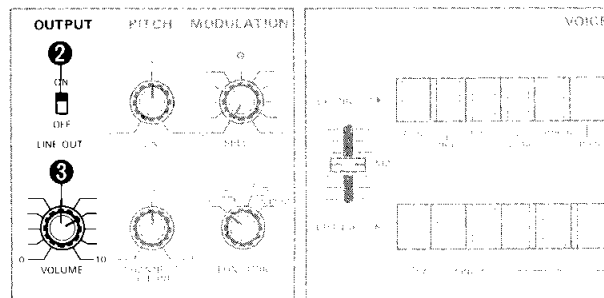
In order to confirm that connections have been made properly, you should now produce the sounds yourself. In preparation for this, the block adjacent to the keyboard should be set as shown in the following drawing.



The next step is to select a voice with the VOICE SELECTOR. Let us, for sake of convenience, select the voice at the left end. Set it as shown in the following drawing. With this, preparations have been completed.



After selecting CLARINET and WOOD WIND 1, fix MIX lever to the center.



for example, you are creating sounds while using the headphones.

③ VOLUME (Volume control)

Turn up the volume. Now the synthesizer can be played by working the keyboard. The volume of the amplifier-side should be adjusted at the same time.

④ KEYBOARD

The CS15D covers three octaves with 37 keys.

- When 2 or more keys are depressed simultaneously, priority will be given to the higher-pitched key so that only its sound will be fed out. (Being a monophonic synthesizer in which priority is given to the higher tone.)

When the keyboard is played with the unit set in this condition, the performance will be a dual-tone (clarinet and WOOD WIND 1) performance.

- In the case that no sound comes out, check to see whether connections are correct, whether the amplifier has been operated in the correct manner, and whether the amplifier and speakers are connected properly.
- In the case sufficient volume cannot be obtained, check the input terminal of the amplifier-side to see that connection is proper.
- When audio speakers are used, excessively high volumes may cause the speakers to be damaged by burning. Be sure to use the speakers within their rated power capacity.

After confirming that the sound output is proper, depress different buttons of the VOICE SELECTOR and freely turn other controls as well as to familiarize yourself with the functions. When proceeding to the next step, restore the controls to the positions shown in the above diagram.

OUTPUT

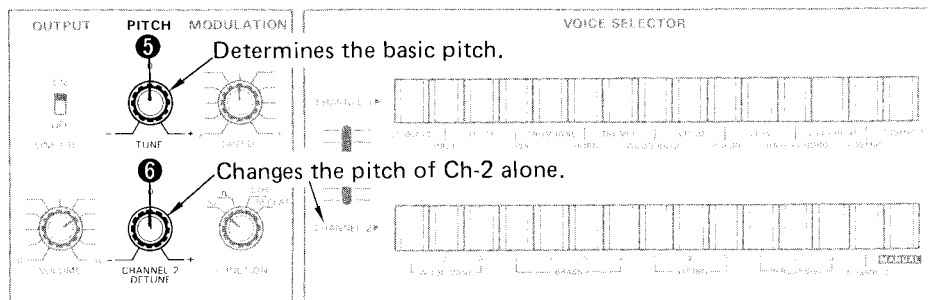
② LINE OUT (Output switch)

Turn on the switch. This will cause connection between the amplifier and the synthesizer.

This switch should be positioned "OFF" when,

OPERATIONS/To Change Pitch

Such controls as TUNE/DETUNE/PITCH Bend Wheel are provided to change the pitch.



Used for changing the pitch temporarily, chiefly during performances.

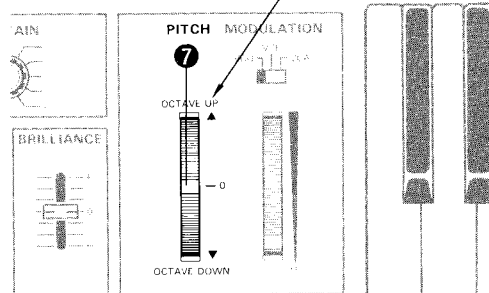
5 TUNE

This is a tuning control used for tuning the pitch with that of another musical instrument when performing joint performances. When tuning the pitches, be sure to confirm that the PITCH Bend Wheel is at the click-stop position.

- The tuning control is to be used with the mixing lever of the VOICE SELECTOR slid to the upper side, and after selecting the sounds of Ch-1.
- For the synthesizer, it takes about 15 minutes following power switch-on for the pitch to perfectly stabilize. For this reason, tuning is to be performed after more than 15 minutes have passed from the time of power switch-on.

6 DETUNE

This is a control used for tuning the pitches of Ch-2 alone. It is possible to gain a chorus effect by producing a slight deviation in the pitches of the two channels, or to create a harmony effect by setting the pitches apart by the third or fifth.

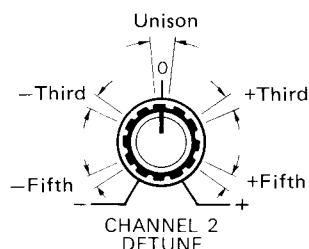


7 PITCH (Pitch Bend)

The PITCH bend wheel is to be used when the player wishes to change the pitch temporarily during performances. Normally, it is set to the click-stop position at the center. It is used, for example, to change the pitch according to the rhythm played by the keyboard, and then is swiftly restored to the former click-stop position during rests between sounds.

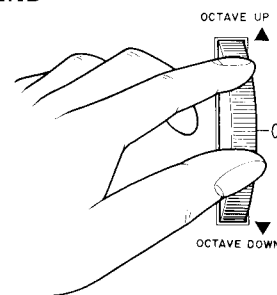
The range in which the pitch can be changed is $\pm$ one octave.

HINT: DETUNE



When the pitch of Ch-1 is set so that it deviates from the pitch of Ch-2 by the major third, or perfect fifth, the sounds will be given an increased depth by the harmony effects.

HINT: PITCH BEND

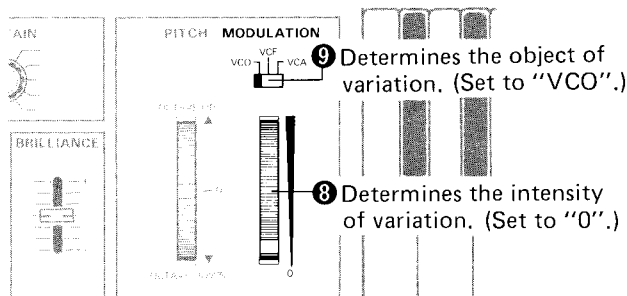
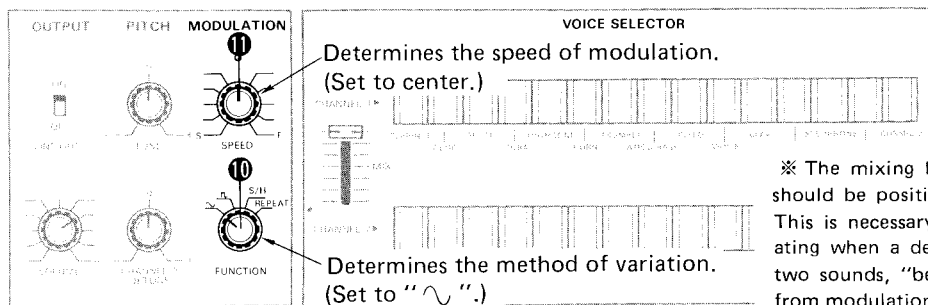


PITCH BEND is used, for example, to create a pitch-changing effect at the point where the tone starts in guitar choking, or in harmonica performances. It is also used for slur performances: while depressing the key with the right hand, the wheel is controlled with the left.

OPERATIONS/MODULATION

The operation to give a periodical variation to the sounds is known as modulation. Modulation consists of 4 factors: the speed of variation, method of variation, the object of variation, and the intensity of variation; each is set by individual controls.

To confirm the effects of modulation, the 4 controls related to modulation are to be first set as illustrated in the following drawing.



8 MODULATION WHEEL

This wheel functions to control the intensity of modulation. The more the dented portion of the wheel is turned upward, the more intense the modulation will become.

The intensity of modulation can be controlled as desired while playing the keyboard.

Here, it is to be set to the position where the strongest modulation will be applied.

9 MODULATION Switch

This is a switch used for selecting which block of the three blocks (VCO, VCF, or VCA) modulation is to be applied. When the switch is positioned to "VCO", the oscillating frequency will periodically change. Generally, it is used to create a VIBRATO effect.

When set to "VCF", it will cause the tone to vary periodically. This is used in general to create a GROWL, or WAH-WAH effect. When set to "VCA", it will cause the volume to vary periodically. It is general used to create a TREMOLO effect.

Change this switch over and confirm the condition in which the sound changes.

10 FUNCTION

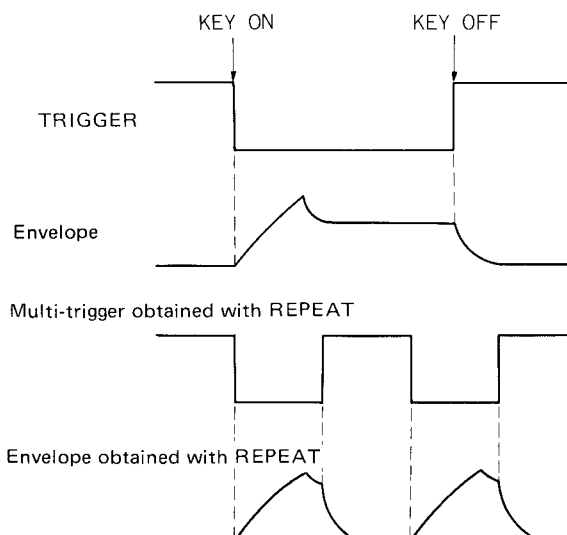
This is a switch that determines the mode in which modulation varies. When this switch is positioned to "~", natural variations will be obtained; such musical effects including VIBRATO, GROWL and TREMOLO described in 8. At other positions the variations will be those inherent to the synthesizer.

□ : Change the switch over to this position and see how the sounds change. As the form "□" indicates, rapid variation will be repeated.

S/H: When positioned to "S/H", irregular variation will be repeated.

REPEAT: Unlike the other three functions, REPEAT is effected by controlling the modulation signal, which, in turn, controls the TRIGGER signal that causes the EG to start up. Accordingly, it enables intermittent sounds of a period determined by the SPEED control to be produced while the keyboard is being played.

(Continued)



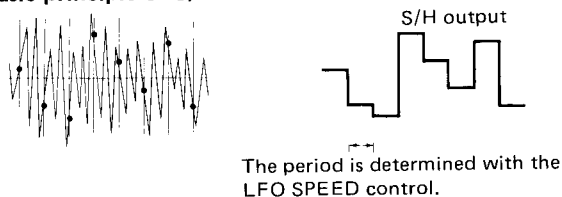
At the same time, it is possible to modulate the VCO, VCF and VCA blocks with the S/H form using the MODULATION SWITCH ⑨ and MODULATION WHEEL ⑧.

- In the case of sounds which are slow to start up, the volume may become markedly small, or no sound at all may be heard when the SPEED control is set at too fast a speed. This is due to the reason that the sound fails to start up fully during the REPEAT period.

NOTE: Principle of S/H

In reference to S/H, modulation is performed by an electrical circuit (Sampling and Hold) that reads (samples) the value of the noise wave form at a certain moment, and then holds this value until the next value is sampled.

Basic principle of S/H



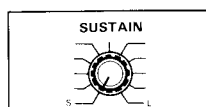
⑪ SPEED

This is a control that determines the speed at which modulation is to be changed.

By changing the speed, the way in which the modulation effect appears will differ considerably.

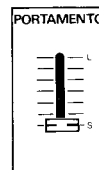
Now, the functions of SUSTAIN, PORTAMENTO and BRILLIANCE will be described. These controls are unrelated to the other controls, each having independent functions.

⑫ SUSTAIN



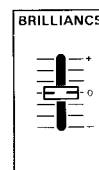
This control is used to control resonance during the period from KEY-OFF to the point the sound fades away. The preset tones of the VOICE SELECTOR contain resonance that has been preset. It can be freely controlled, however, to meet one's taste, and according to the details of the number that is being performed. When the control is positioned to "S", resonance of a length equal either to the preset tone or to the length set manually can be created. The control should be normally set to "S" when creating manual voices.

⑬ PORTAMENTO



PORTAMENTO denotes that effect in which the pitch, starting from the previously played key, undergoes a smooth variation until it reaches the pitch of the next key to be played. Confirm this by sliding the lever toward the L-side. Normally, it is positioned to the S-side.

⑭ BRILLIANCE



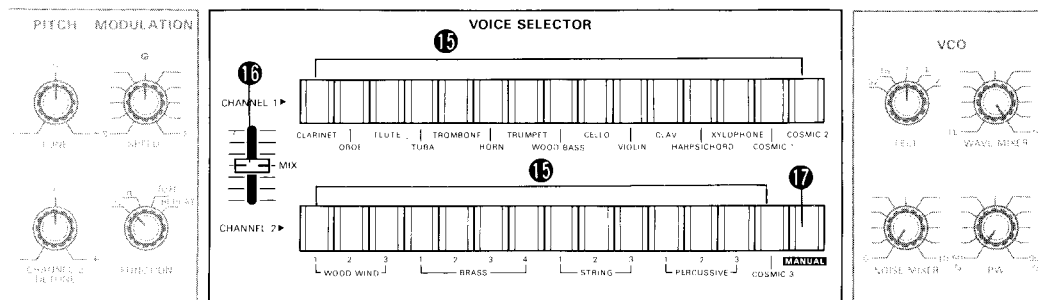
This lever is used for controlling the tone. It works upon the VCF, making the sound more brilliant and harder the more the lever is moved toward the "+" side, and softer, the more the lever is moved toward the "-" side.

It is a convenient lever that can be used to alter the preset tones to such that meets one's taste, and to change the real-time tone so as to match it with the movement and rhythm of the number that is being played.

- When this lever is moved to the end of the "-" side, the volume may drop markedly depending on the preset tone, or sounds may cease to come out. This is because the VCF has cut off even the fundamental tone. In this case, the lever, if lowered while playing the keyboard, can be used as a fader.

OPERATIONS/VOICE SELECTOR

This block is used for selecting the preset voices, or the manual voices.



15 VOICE SELECTOR buttons

When no button has been depressed, the tone at the left end will be selected. In the condition where 2 or more buttons have been simultaneously depressed, priority will be given to the voice at the right end and that voice will be selected.

16 MIX (Mixing lever)

This lever is used for selecting either Ch-1 or Ch-2, or for balancing the volumes of the two channels.

17 MANUAL SELECTOR

When the MANUAL button of Ch-2 is depressed, it permits voices created at the MANUAL block to be selected.

MANUAL BLOCK/CREATES VOICES.

The 29 preset tones, too, have as a rule been created in the same manner as voices created at the MANUAL block, that is, by setting the controls of the MANUAL block. At the MANUAL block, various voices, including those being preset, can be freely created by controlling the MANUAL block controls.

Largely divided, the MANUAL block can be grouped into three blocks: the VCO, VCF and VCA blocks. These blocks correspond respectively to the three factors characterizing sounds, that is, pitch, tone and volume. The blocks are prefixed with "VC" to indicate that the factors are voltage-controlled.

The VCO block, consisting of sawtooth waves ($\nearrow$) and square waves ($\square$), is a block that functions to oscillate sound sources that have a large number of harmonics and noise corresponding to the pitch of the key. The VCF is a block capable of freely changing the portion of the harmonics to be removed and that to be left (known as the cut-off frequency). Meanwhile, the VCA block has the functions of giving a transient change to the volume from the point the voice starts up to the point it fades away.

The following describes the functions of the controls for each block. Set the CS15D in the manner shown in the following drawing so that sounds will be produced the moment the keys are depressed.

Other controls should be set to the positions shown on Page 5, so that effects such as modulation will not be created.

